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BY EMAIL AND RESS

January 18, 2021

Ms. Christine E. Long, Registrar
Ontario Energy Board
Suite 2700, 2300 Yonge Street
P.O. Box 2319
Toronto, ON M4P 1E4

Dear Ms. Long:

EB-2020-0188 – Hydro One Networks Inc. Leave to Construct Application - Power Downtown Toronto LTC – Interrogatory Responses and Updated Application

In accordance with Procedural Order 2, issued January 8, 2021, please find attached an electronic copy of responses provided by Hydro One Networks Inc. ("Hydro One") to interrogatory questions posed by intervenors and Ontario Energy Board ("OEB") Staff.

Below are the tab numbers for each intervenor:

Tab	Intervenor
1	OEB Staff
2	Building Owners & Managers Association
3	City of Toronto

Hydro One is also submitting an updated Application to remove any references to the previously proposed mid-shaft. A detailed list of the updates are provided below:

Exhibit	Updated Pages
Exhibit B, Tab 2, Schedule 1, Attachment 1	Page 1 & 2
Exhibit C, Tab 1, Schedule 1	Page 1 & 2
Exhibit E, Tab 1, Schedule 1	Page 1
Exhibit E, Tab 1, Schedule 1, Attachment 1	Page 1 & 2

An electronic copy of the responses and the updated Application have been submitted using the OEB's Regulatory Electronic Submission System.

Sincerely,

Joanne Richardson

OEB STAFF INTERROGATORY #1

Reference:

1. Exhibit B, Tab 3, Schedule 1
2. Exhibit B, Tab 2, Schedule 1

Interrogatory:

Reference 1 above provides evidence in support of the need for the Power Downtown Toronto project.

Reference 2 above states that the proposed 230kV cables will continue to operate at 115 kV but their 230 kV rating will be more able to accommodate high temporary overvoltages during fault conditions, reducing the likelihood of damage requiring repair and improving long-term reliability.

a) Please clarify whether the Power Downtown Toronto project was recommended in a regional plan. If not, why not?

b) What criteria stipulate the overvoltage withstand capability required for circuits C5E/C7E? Would 115 kV rated cables be acceptable based on these criteria?

c) What is the statistical frequency of line-to-ground faults that cause a temporary overvoltage on the unfaulted cable and how does it compare to applicable criteria?

d) What is the potential that a temporary overvoltage could exceed the voltage withstand capability of the selected 230 kV cable?

e) If the 230 kV cables were converted to 230 kV operation during their service how would the potential for temporary overvoltage be addressed?

f) In Hydro One's view, what, if any, OEB approvals will be required to convert the 230 kV cables to 230 kV operation?

Response:

a) The C5E/C7E cable replacement project was recommended in the 2020 Metro Toronto Regional Infrastructure Plan[1].

b) The applicable criteria is that the cable should be able to withstand any potential overvoltages due to lightning, switching surges or fault conditions. Lower 115kV rated cables would be acceptable, for the current application, based on these criteria but would require mitigation measures to reduce the temporary overvoltages. Higher 230kV rated cables provide extra insulation margin and, given the small difference in cost between 115kV and 230kV cables, are cost effective.

c) There is no applicable criteria as to the number of faults that are acceptable. However, typical frequency of cable faults is about 0.02 per km per year. While this is low, repairs are expensive and take on average 4 weeks. Any subsequent outage can lead to customer interruption.

d) Temporary overvoltages in the current application can reach 2.06 -2.23 per unit of the rated voltage of a 115kV cable. It would however be only 1.03 – 1.12 per unit of the rated voltage of a 230kV cable. There is zero probability that voltage will exceed the voltage withstand capability of 230kV rated cables.

e) To keep voltages within acceptable limits, mitigation measures, such as installing shunt reactors, would be required as part of any conversion project.

f) Yes, in the hypothetical scenario that these circuits would be operated at 230 kV, OEB approvals will be required. To operate at 230kV a significant downtown transmission system upgrade would be required and any upgrade of the area facilities would first be identified in a Regional Plan. Hydro One would seek the appropriate approvals necessary from the OEB based on the specifics of the project at that time.

[1] Toronto Regional Infrastructure Plan Report, March 6, 2020. Please see link https://www.hydroone.com/abouthydroone/CorporateInformation/regionalplans/metrotoronto/Documents/Toronto%20Regional%20Infrastructure%20Plan_Mar6%202020.pdf

OEB STAFF INTERROGATORY #2

Reference:

Exhibit B, Tab 5, Schedule 1, pages 1-3

Interrogatory:

The above noted reference outlines transmission alternatives considered by Hydro One.

a) What alternatives to replacing C5E/C7E, such as non-wires alternatives, or distribution system alternatives, were considered?

b) Why was a transmission wires alternative recommended?

Response:

a) As identified in Exhibit I, Tab 1, Schedule 1, the C5E/C7E cable replacement project was studied as part of the Toronto Regional Infrastructure Plan[1]. There are no non-wires or distribution system alternatives to replacing the cable. The Regional Plan recommends replacement of the cables versus the only identified alternative of maintaining the status quo.

b) Please refer to (a) above. Transmission is the only practical alternative.

[1] Toronto Regional Infrastructure Plan Report, March 6, 2020. Please see link https://www.hydroone.com/abouthydroone/CorporateInformation/regionalplans/metrotoronto/Documents/Toronto%20Regional%20Infrastructure%20Plan_Mar6%202020.pdf

OEB STAFF INTERROGATORY #3

Reference:

Exhibit B, Tab 5, Schedule 1, pages 1-3

Interrogatory:

The above noted reference outlines transmission alternatives considered by Hydro One. The XLPE cable variant of alternative 3 was rejected because it did not address risks related to temporary overvoltages under fault conditions.

a) Please explain whether any reasonable alternatives to the proposed 230 kV cable could be employed in conjunction with a 115 kV XLPE cable to address temporary overvoltages. If any such alternatives exist, please explain whether they were considered and why they were not recommended.

Response:

Options to address temporary overvoltages would include:

- Installing reactors at Terauley TS to reduce voltages;
- Installing HV breakers at Terauley TS to isolate transformers faster;
- Installing rod gaps, which flashover under overvoltage conditions, at Terauley TS.

The first two alternatives are expensive (cost would be in the $10M+ range) and require significant space to install extra equipment. That space, however, is not available at Terauley TS. The third alternative, rod gaps, if designed to flashover under expected temporary overvoltage, would be prone to flashover during normal switching and cause a line outage thus negatively affecting reliability, therefore it also was rejected as a feasible alternative.

OEB STAFF INTERROGATORY #4

Reference:

Exhibit B, Tab 5, Schedule 1, pages 1-3

Interrogatory:

The above noted reference outlines transmission alternatives considered by Hydro One. Hydro One states that it considered multiple installation methods and routes.

a) Did Hydro One consider an alternative that follows the same route as the existing line to be replaced? If yes, please estimate the cost of that alternative and explain in detail why Hydro One did not recommend it. If the alternative was not considered, please explain why not.

b) Please provide a table which compares the project costs of the alternatives at reference 1.

Response:

a) As identified in Exhibit B, Tab 5, Schedule 1, the route for this project was defined by a comprehensive and completed Class Environmental Assessment. As part of the Environmental Assessment, a replacement that followed the same route as the existing circuits was considered. However, this would have resulted in operational constraints. To replace circuits in the same route, the existing circuits would require an outage that would exceed two years on both circuits. This reliability risk to the customers served by Terauley TS is unacceptable. This reliability concern in concert with construction constraints brought forward by the City of Toronto that would prolong the construction period considerably ultimately resulted in this route not being the preferred route established by the environmental assessment. A cost estimate for this alternative was therefore not developed.

b) Reference 1 lists three alternatives to complete the Power Downtown Project:

- **Alternative 1** is the reactive replacement of underground cables, considered the "Do Nothing" alternative, which means Hydro One will continue to operate and maintain the existing C5E and C7E cables and replace them upon failure. This alternative was not estimated;

- **Alternative 2** is the preferred alternative proposed in this Application and based on an AACE class 3 estimate (-20%/+30%), the cost is estimated at $107.2M.

- **Alternative 3** is the planned Replacement with 115 kV oil-filled underground cables or 115 kV XPLE cables. As discussed at Exhibit B, Tab 6, Schedule 1, this alternative would cost $500k less than the preferred alternative.

As is documented at the reference, as part of the Class Environmental Assessment, Hydro One considered multiple installation methods and routes before the three technical alternatives above were established. These are described in further detail below and are referred to as Open Cut Route 1, Open Cut Route 2, Open Cut Route 3, Open Cut Route 4, Tunnel Route 1, and Tunnel Route 2, respectively.

The routes and installation methods were assessed in the Class Environmental Assessment on the evaluation criteria of costs, technical considerations, natural environment, and socioeconomic environment. Based on that criteria, it is important to clarify for the reader that the Tunnel Route 1 was selected as the preferred route and is the route that underpins both Alternative 2 (the Power Downtown Toronto Project as proposed in this Application) and Alternative 3. In other words, tunneling, and more specifically, Tunnel Route 1, is the preferred route alternative as established by the Class Environmental Assessment.

The installation methods considered included open cut and tunneling. Tunneling as described in this Application would involve creating a tunnel approximately 25 meters (82 feet) below the surface to house the new underground cable. Comparatively, the open cut method would involve the excavation of roads and sidewalks to install cable ducts beneath the surface to house the new cable.

Installation methods and routes considered as part of the Environmental Assessment include:

Open Cut Route 1 – removed from consideration

From the Esplanade TS, Open Cut Route 1 also known as the existing underground cable route (denoted in black in the map that is provided as Attachment 1 of this response and Exhibit 5-1 in the Environmental Studies Report) heads south along

Sherbourne Street. From Sherbourne Street, the route then turns west onto Queens Quay until turning north onto York Street. The route then follows York Street going north to Queen Street, where it slightly turns east then continues north following Osgoode Lane (unopened road). The route then heads east on an unopened road between Armoury Street and Hagerman Place, then continues north along Elizabeth Street, before turning east on Foster Place and terminating at Terauley TS.

Though this route was initially considered, it was removed from consideration as it falls within the City of Toronto construction restriction area with restricted construction working hours, and was deemed not feasible as it would not meet the planned in-service date due to a much longer construction timeline.

Open Cut Route 2

From the Esplanade TS, Open Cut Route 2 (denoted in turquoise in the map that is provided as Attachment 1 of this response and Exhibit 5-1 in the Environmental Studies Report) heads north westerly before heading north along Sherbourne Street. From Sherbourne Street, the route then turns west onto Shuter Street until turning north onto Mutual Street. The route then follows Mutual Street to Gould Street, where it turns west and follows Gould Street to Yonge Street, passing through Ryerson University campus along an unopen road. The route then heads south on Yonge Street before turning west on Edward Street until Elizabeth Street. The route continues south along Elizabeth Street until turning east on Foster Place and terminating at Terauley TS.

The total length of Open Cut Route 2 is approximately 3 km. This route would require hand mining of tunnels under all intersections and TTC streetcar tracks.

Open Cut Route 3 – removed from consideration

From Esplanade TS, Open Cut Route 3 follows a similar alignment to the existing underground cable route (denoted in red the map that is provided as Attachment 1 of this response and Exhibit 5-1 in the Environmental Studies Report), heading south along Sherbourne Street. From Sherbourne Street, the route turns west onto Queens Quay until turning north onto York Street. The route then follows York Street north to Front Street where it continues north on University Avenue. The route turns east on Armoury Street and passes through an unopen road between Armoury Street and

Hagerman Place, then continues north along Elizabeth Street, before turning east on Foster Place and terminating at Terauley TS.

Though this route was initially considered, it was removed from consideration as it falls within the City of Toronto construction restriction area with restricted construction working hours, and was deemed not feasible as it would not meet the planned in-service date due to a much longer construction timeline.

Open Cut Route 4

From Esplanade TS, Open Cut Route 4 (denoted in lime green in the map that is provided as Attachment 1 of this response and Exhibit 5-1 in the Environmental Studies Report) follows Sherbourne Street north. The route then turns west on The Esplanade until turning north along George Street. The route then follows George Street until turning west on Gerrard Street, passing by Moss Park along a pedestrian walkway at the western side of the park between Queen Street and Shuter Street. The route continues west on Gerrard Street until Elizabeth Street, and then heads south on Elizabeth Street until turning east on Foster Place and terminating at Terauley TS.

The total length of Open Cut Route 4 is approximately 3.25 km. This route would require hand mining of tunnels under all intersections and TTC streetcar tracks.

This route was added as per consultation with City of Toronto Infrastructure Coordination Unit. Based on the City's analysis, this route presented the least amount of potential conflicts with upcoming and planned infrastructure projects.

Tunnel Route 1 - This route underpins the route for either Alternative 2 (the PDT Project) or Alternative 3 in reference 1.

Tunnel Route 1 (denoted in orange in the map that is provided as Attachment 1 of this response and Exhibit 5-1 in the Environmental Studies Report) would start at an entry shaft located inside Esplanade TS. This site has adequate space to support the necessary equipment and access for the tunnel mining operation.

From Esplanade TS, Tunnel Route 1 would head north along Sherbourne Street to Dundas Street. At this point, the route would follow Dundas Street, which curves to the northwest then curves southwest before straightening out and heading west. The route

continues west along Dundas Street then curves south down Bay Street. The tunnel continues on Bay Street for a short distance before terminating at Terauley TS.

An exit shaft would be constructed at Terauley TS either within or near the station. The total length of Tunnel Route 1 is approximately 2.5 km and would be situated within existing road allowances.

Tunnel Route 2

Similar to Tunnel Route 1, Tunnel Route 2 (denoted in blue in the map that is provided as Attachment 1 of this response and Exhibit 5-1 in the Environmental Studies Report) would start at an entry shaft located inside Esplanade TS.

From Esplanade TS, Tunnel Route 2 follows a similar route to Tunnel Route 1, heading north along Sherbourne Street until Queen Street, where the route bends to the northwest and crosses underneath Moss Park diagonally. The route then heads north along George Street until Dundas Street.

At this point, a mid shaft would be constructed within a landscaped area on the southeast corner of George Street and Dundas Street. The TBM would be lifted by crane to turn the machine 90 degrees at this shaft location as the turn at this intersection is too sharp for a TBM to do underground (in the rock). This mid shaft would require a larger construction area to accommodate the TBM turning, as well as a longer construction period of up to two years.

The route would then continue, heading west along Dundas Street. The remainder of the route is the same as Tunnel Route 1 as it continues west along Dundas Street then curves south down Bay Street. The tunnel continues on Bay Street for a short distance before terminating at Terauley TS.

An exit shaft would be constructed at Terauley TS either within or near the station. The total length of Tunnel Route 2 is approximately 2.2 km and would be situated within existing road allowances with the exception of the portion through Moss Park.

The following cost chart was used to support the decision to move forward with the route selection. At the time, the cost estimates were based on an AACE Class 4 estimate review.

Cable Construction		**Open Cut 2**	**Open Cut 4**	**Tunnel 1**	**Tunnel 2**
Length m		2987	3231	2402	2208
Civil		34,468,500	37,637,350	41,395,521	40,962,421
Cable Cost/m	784	14,050,848	15,198,624	11,299,008	10,386,432
Total		48,519,348	52,835,974	52,694,529	51,348,853
Compare		0.0%	8.9%	8.6%	5.8%
Risk		20.0%	20.0%	10.0%	10.0%
With Risk		58,223,218	63,403,169	57,963,982	56,483,738
Compare		3.1%	12.3%	2.6%	0.0%

The following additional costs will be similar for either option:
Cable connection and materials at Trauley and Esplanade
Engineering services
Commissioning
Project Management

In summary, the following chart highlights how the 4 alternatives were ranked against the aforementioned evaluation criteria during the Enviornmental Assessment. It clearly denotes that after significant consultation, Tunnel Route 1 was selected as the preferred route.

Evaluation Criteria	Open Cut Route 2	Open Cut Route 4	Tunnel Route 1	Tunnel Route 2
Socioeconomic Environment	Least Preferred	Least Preferred	Preferred	Less Preferred
Natural Environment	Less Preferred	Less Preferred	Preferred	Preferred
Technical Considerations	Least Preferred	Least Preferred	Preferred	Less Preferred
Costs	Preferred	Less Preferred	Preferred	Preferred
OVERALL			Preferred (OVERALL)	

POWER DOWNTOWN TORONTO STUDY AREA AND ALTERNATIVE ROUTES

hydro one
Partners in Powerful Communities

- Transformer Station
- Refined Study Area
- Open Cut Route 1 (Existing C5E/C7E Route)*
- Open Cut Route 2
- Open Cut Route 3*
- Open Cut Route 4 (New)
- Tunnel Route 1
- Tunnel Route 2

* Open Cut Routes 1 and 3 are no longer being considered options.

OEB STAFF INTERROGATORY #5

Reference:

1. Exhibit C, Tab 1, Schedule 1, pages 1-2
2. Exhibit B, Tab 1, Schedule 1, page 2

Interrogatory:

At reference 1 above, Hydro One outlines a variety of works that will occur "[…] regardless of whether Hydro One proceeds with the cable upgrade solution proposed in this leave to construct application for the PDT Project, or, alternatively, proceeds with a like-for-like sustainment solution […]". These include a tunnel between Terauley TS and Esplanade TS and access shafts.

At reference 2 above, Hydro One states that as part of the Power Downtown Toronto project, it "[…] will be spending approximately $500k more than what would otherwise be incurred under a pure sustainment project solution […]".

a) Please explain why the works outlined at reference 1 will occur whether Hydro One proceeds with the Power Downtown Toronto project as proposed or, alternatively, proceeds with a like-for-like sustainment solution.

b) Please explain whether (and why, if applicable) the works outlined at reference 1 would occur if Hydro One were to proceed with a like-for-like sustainment solution along the route of the existing cable.

c) What are the two costs that are the basis for the $500k difference at reference 2? Please provide the rated voltage, cable length in kilometres, cable type, and any other material factors for the two costs.

d) In calculating the $500k incremental cost at reference 2, did Hydro One include the cost of the works outlined at reference 1 in both the Power Downtown Toronto project and in the "pure sustainment project solution"? (i.e. does the incremental cost compare a solution with a tunnel to a solution without a tunnel?)

e) Are the tunnelling costs included in Hydro One's estimate of the Power Downtown Toronto project cost? If so, what are they? If not, please explain.

f) Please indicate the incremental cost of the proposed Power Downtown Toronto project compared to a sustainment solution alternative that does not involve the construction of a new tunnel and please also comment on the appropriateness of this alternative. Please express the incremental cost with respect to both a 115kV and a 230kV sustainment solution alternative.

Response:

a) Tunnel and shaft construction would be required under either alternative as described in Exhibit I, Tab 1, Schedule 4, while other electrical needs such as termination replacement, installation of on-line temperature and partial discharge monitoring systems, adjustment of protection settings and decommissioning of the existing cables would proceed and be required for use of 115 kV (like-for-life replacement) or 230 kV rated cables. The only difference between the use of 115 kV and 230 kV cables are the physical cables.

b) It was determined through the Class Environmental Assessment that a like-for-like in-situ replacement was not feasible or practical and that the proposed solution route is preferred. There are significant system and customer reliability risks with the in-situ replacement since the existing cables must be taken out-of-service and removed to install the new cables. In addition, construction near the surface (1-3 metre depth) is challenging in the Toronto downtown core due to underground congestion given the significant number of buried utilities. Furthermore, surface construction also known as open-cut construction, following the existing route would be extremely impactive to traffic, public transit, businesses, pedestrians, and bike lanes.

c) The incremental cost of $500k is based on the cost difference between 2.5 km of 115 kV cross-linked polyethylene (“XLPE”) and 2.5 km of 230 kV XLPE cables. The only difference is the insulation rating (i.e. 115 kV vs. 230 kV).

d) Yes, Hydro One included the cost of the works outlined at reference 1 in both the Power Downtown Project and in the “pure sustainment project solution”. To elaborate, the incremental cost of $500k is the material cost difference between 2.5 km of 115 kV and 230 kV rated XLPE cables, i.e., a tunnel and the corresponding tunnel costs are included in either technical solution as the tunnel option was the preferred route established through the completed Class Environmental Assessment.

e) Yes, the tunneling costs are included in the estimate of the Power Downtown Toronto project. As of the current AACE Class 3 estimate, as documented at Exhibit B, Tab 6, Schedule 1, page 2, the costs are estimated to be 46% of the total cost or $49M.

f) Please refer to the responses provided in a) through d) of this interrogatory response as well as Exhibit I, Tab 1, Schedule 4.

OEB STAFF INTERROGATORY #6

Reference:

Exhibit B, Tab 6, Schedule 1, page 3

Interrogatory:

Hydro One states at the above noted reference that "in the event of future expansion or replacement of nearby underground assets, if practical and feasible, the tunnel may be used to accommodate two additional circuits."

a) Is the future utilization of the tunnel to accommodate an additional circuit part of a transmission system plan?

b) If not, please estimate whether a smaller diameter tunnel could be feasibly constructed at a lower cost and comment on why a smaller tunnel was not proposed.

c) If the tunnel may be used to accommodate additional circuits or other underground assets in the future, please comment on the appropriateness of Hydro One's proposal to allocate the full tunnel cost to the Power Downtown Toronto project, instead of only the portion of the tunnel necessary to accommodate the replacement of circuits C5E/C7E?

d) In Hydro One's view, what fraction of the cost of the proposed tunnel might reasonably correspond to its incremental capacity to accommodate future expansion or replacement of nearby underground assets?

e) Please comment on whether Hydro One has engaged with other potential utilities or service providers who might also use the proposed tunnel and help defray some of its costs.

Response:

a) There are currently no plans in the transmission system plan to incorporate additional circuits into the tunnel. However, in the event of future expansion or replacement of nearby underground assets the use of the proposed tunnel will be considered and therefore future projects may benefit from the availability of the tunnel.

b) While it is possible to construct a smaller tunnel, this project will utilize a standard sized Tunnel Boring Machine (TBM). A TBM for a smaller diameter tunnel is not readily available and would require customization and thus increase project costs.

c) Refer to part (a). All costs will be allocated to the Power Downtown Toronto project.

d) As discussed in part (a) and (b), while it is feasible to accommodate additional circuits, there are currently no plans to add additional circuits in the tunnel or to share the tunnel with other utilities. It is impossible to estimate the fractional cost of additional circuits given that the fractional cost would depend on the length of tunnel being shared.

e) As part of our Class Environmental Assessment other utilities were engaged. However, due to the depth, location and type of equipment installed (i.e. high voltage transmission cables) in the tunnel it was not feasible or practical to accommodate other utilities.

OEB STAFF INTERROGATORY #7

Reference:

Exhibit G, Tab 1, Schedule 1, Figure A-2, page 7

Interrogatory:

The reference above contains a simplified single-line diagram of circuits C5E/C7E. C5E/C7E runs between Esplanade TS, Terauley TS and Cecil TS. The Power Downtown Project would replace only the section of C5E/C7E between Esplanade TS and Terauley TS. Hydro One advises that the section of C5E/C7E between Esplanade TS and Terauley TS is at end of life.

a) Please clarify how the condition of the section of C5E/C7E between Terauley TS and Cecil TS compares to the condition of the section to be replaced as part of the Power Downtown Toronto project. For instance, are the two sections of comparable vintage, technology and degree of deterioration?

b) When will the section of C5E/C7E between Terauley TS and Cecil TS require replacement?

c) Please comment on the extent to which Hydro One has considered coordinating or combining the replacement of C5E/C7E between Esplanade TS and Terauley TS with the replacement of C5E/C7E between Terauley TS and Cecil TS. In Hydro One's view, would this kind of coordination or combination offer potential project synergies?

d) Why is Hydro One not proposing to replace the section of C5E/C7E between Terauley TS and Cecil TS as part of the Power Downtown Toronto project or as part of another project along with C5E/C7E between Esplanade TS and Terauley TS?

Response:

a) C5E and C7E between Esplanade TS and Terauley TS, proposed for replacement, are low-pressure oil-filled cables and were in-serviced in 1959. Their condition has been assessed, are at end-of-life, require replacement and cannot be depended upon to operate reliability for the foreseeable future.

The cables between Terauley TS and Cecil TS are high-pressure oil-filled cables and were in-serviced in 1971 (different technology and vintage). Their condition has been assessed, they have not reached end-of-life, do not require replacement and are expected to continue to operate reliably for the foreseeable future.

b) There are currently no plans to replace C5E or C7E between Terauley TS and Cecil TS. It is anticipated that replacement will not be required for 15+ years.

c) Due to the condition of C5E or C7E between Terauley TS and Cecil TS their replacement has not been considered in detail. Refer to parts (a) and (b). The cables between Terauley TS and Cecil TS are on different sections of the line and Hydro One does not anticipate any cost savings to advance the cable replacement of this section. Specifically, Hydro One does not anticipate any cost savings that would outweigh the cost of advancing the cable replacement of C5E/C7E between Terauley TS and Cecil TS by 15+ years. The replacement would be incremental to the current proposed project.

d) Due to the current condition of C5E and C7E between Terauley TS and Cecil TS replacement is not required and is not anticipated for 15+ years. Refer to parts (a) and (b).

OEB STAFF INTERROGATORY #8

Reference:

1. Exhibit B, Tab 7, Schedule 1, Table 1, page 1
2. Exhibit B, Tab 9, Schedule 1, Table 1, pages 4-6
3. Hydro One 2020 - 2022 transmission revenue requirements application, EB-2019-0082, Exhibit-B-1-1, Investment Summary Document-SR-27, Table 1, page 4

Interrogatory:

Reference 1 states the estimated total project cost of the Power Downtown Toronto Project.

Reference 2 shows the pre-tax revenue requirement for the Power Downtown Toronto Project in each year between 2025 and 2049.

Reference 3 summarizes Hydro One's "C5E/C7E Underground Cable Replacement Project" and states that "the projected costs of the Project are estimated to be $62.8 million over the 2020-2022 Test period." An additional $61 million in project costs was estimated for the 2023-2024 period; $4.5 million in project costs was identified for the period prior to 2020. A total project cost of $128.7 million is shown.

a) Please explain and reconcile the values in the tables at references 1, 2 and 3.

b) In light of reference 3, please clarify whether there have been or will be any in-service additions related to the Power Downtown Toronto project before its projected in-service in 2024. If yes, please confirm whether these amounts are in addition to the $107.2 million project cost shown at references 1 and 2 and restate the total project cost, including costs prior to the projected in-service.

Response:

a) The estimated capital costs of the project are documented as $107.2M in both reference 1 and 2. The differences between the $107.2M estimate provided at reference 1 and 2 and the value provided at reference 3 is addressed by the project maturation process and having a more defined project execution plan at this time. For comparability purposes, it is important to document that the estimate provided at reference 3 was filed in March of 2019 and is now approximately 2 years old with the project maturing significantly during that time.

b) The plan is to have all in-service additions in 2024. All project costs and in-service additions are included in the $107.2M.

OEB STAFF INTERROGATORY #9

Reference:

Exhibit B, Tab 7, Schedule 1, Table 1, page 1

Interrogatory:

The above noted reference states the total estimated project cost of $107.208 million, which includes a contingency cost estimate of $8.266 million. This contingency cost estimate represents approximately 8.4% of the pre-contingency estimate.

a) Please describe the basis for the contingency cost estimate for the project and why it is appropriate.

b) Please describe how the contingency cost estimate for the Power Downtown Toronto project compares to contingency cost estimates developed for other Hydro One projects.

c) How would Hydro One characterize the confidence of the cost estimate for the Power Downtown Toronto project? What method did Hydro One use to estimate its confidence?

d) How did Hydro One develop its estimates for project material, labour, equipment rental and contractor costs?

e) How would Hydro One characterize the confidence of its estimates for project material, labour, equipment rental and contractor costs? What method did Hydro One use to estimate its confidence?

Response:

a) The contingency was developed using a qualitative analysis by identifying risks assigning a probability and impact rating through a risk workshop that was run with the project team and engineering consultants. This workshop looked at past lessons learned (successes and failures) and experiences from other tunnel projects in the Toronto area. The project team identifies project risks and the probability of the occurrence of those risks by relying on their previous experience with similar type projects. The model was then used to calculate the deterministic expected value for cost contingency.

b) The contingency value for this project was developed according business practices, defined by Hydro One's project delivery model. That is, all projects with an estimated value that exceeds $10M undergo a risk workshop, as described in part a). The outcome of this risk workshop is an estimated contingency amount that is specific to the given project. This contingency value is then included in the overall estimate for the project, which underpins the cost baseline for the project. During execution, identified risks and the contingency value are monitored as the schedule progresses to ensure the risk register is kept up to date.

c) The confidence of the estimate was developed consistent with the American Association of Cost Engineering (AACE) standards. This project is characterized by an AACE Class 3 (-20% / +30%) level of confidence.

d) The AACE Class 3 estimate was produced in partnership with the knowledge and expertise of our engineering consultants. Hydro One has hired a tunnel consultant with many years of experience with tunneling in the Toronto area and a cable consultant with many years of experience with XLPE cable installations.

e) Please refer to responses to c) and d) above.

OEB STAFF INTERROGATORY #10

Reference:

1. Exhibit B, Tab 7, Schedule 1, page 2
2. Exhibit B, Tab 7, Schedule 1, page 1

Interrogatory:

The first reference above outlines project risks, including Hydro One's estimated top three project risks. The second reference above states Hydro One's contingency cost estimate.

a) Please explain the methods Hydro One used to assess project risks for the Power Downtown Toronto project and please clarify how Hydro One's contingency estimate relates to that analysis.

Response:

a) Please refer to response Exhibit I, Tab 1, Schedule 9 response a).

OEB STAFF INTERROGATORY #11

Reference:

Exhibit B, Tab 7, Schedule 1, Table 1, page 1

Interrogatory:

The above noted reference shows an estimated sundry cost of $7.941 million. It represents nearly 8% of the pre-sundry estimate.

a) Please describe what a sundry cost is and describe the basis for the sundry cost estimate for the project and why it is appropriate.

b) Please describe how the sundry cost estimate for the Power Downtown Toronto project compares to sundry cost estimates developed for other Hydro One projects.

Response:

a) The following items are in the Sundry cost line item:
   a. Real Estate costs;
   b. Insurance;
   c. Bonding;
   d. Allowance for Disposal of contaminated soils and rock;
   e. Utility Relocations; and,
   f. Temporary power connection from Toronto Hydro.

   All of these costs are important and appropriate costs to include in the Project's costs.

b) These sundry costs are typical project costs that are outside of the Materials, Labour, Equipment Rental & Construction Costs, Contingency, Overhead and Allowance for Funds Used During Construction categories.

OEB STAFF INTERROGATORY #12

Reference:

1. Exhibit B, Tab 7, Schedule 1, Table 2, page 3
2. Post Construction Financial Report, Toronto Midtown Transmission Reinforcement Project, EB-2009-0425, May 2018

Interrogatory:

Reference 1 shows the costs of comparable projects.

Reference 2 is Hydro One's Post Construction Financial Report for the Midtown Tunnel project which provides actual capital costs of the project and explains all significant variances from the estimates filed with the OEB.

a) Please clarify whether the values cited for the Midtown Tunnel at reference 1 above represent estimates or actual costs and reconcile them with the actual costs reported by Hydro One in reference 2.

b) At reference 2 above, Hydro One describes various challenges it encountered with the construction of the tunnel from Bayview Junction to Birch Junction and with the construction of the main tunnel shaft at the Rose Hill site adjacent to Mount Pleasant Road. Hydro One explains how these and other challenges caused scheduling delays and cost increase. Please comment on how Hydro One will incorporate any lessons learned from the Midtown Tunnel project to the Power Downtown Toronto project regarding project estimation (including contingency) and implementation within schedule and budget.

Response:

a) The values shown in reference 1 are the actual costs for the Midtown Tunnel, a component of the Midtown Project. The total project cost in reference 2 for the Midtown Project included costs associated with station work and overhead lines required for that project. Therefore, to provide a comparable to the PDT Project, as expressed in the footnote of Table 2 at Reference 1, they were removed as the PDT Project does not include such work.

b) The challenges experienced by the Midtown project have been considered for the PDT project. For example the engineering will be 100% complete prior to the RFP (Request for Proposal) for the construction of the tunnel and cable contracts including the ventilation and cable health detection systems. Also Hydro One will be running a RFPQ (Request for Pre-Qualification) for the tunnel contract. The Pre-Qualification will allow Hydro One to work with qualified vendors that have worked in the Toronto-area in the past and better quantify the risks in this contract.

OEB STAFF INTERROGATORY #13

Reference:

1. Exhibit B, Tab 7, Schedule 1, Table 2, page 3
2. Decision and Order on the John x Esplanade tunnel project, EB-2004-0436, March 2005

Interrogatory:

Reference 1 shows the costs of comparable projects.

Reference 2 is the OEB's Decision and Order on Hydro One's application for the John x Esplanade tunnel project that was cited by Hydro One at reference 1. The Decision required Hydro One to file a Post Construction Financial Report within 15 months of the completion of construction.

a) Please briefly summarize how actual John x Esplanade tunnel project costs and in-service date compared to estimates used for the leave to construct application. If applicable, please comment on drivers for any key differences.

b) If applicable, please comment on how Hydro One will incorporate any lessons learned from the John x Esplanade tunnel project to the Power Downtown Toronto project regarding project estimation (including contingency) and implementation within schedule and budget.

c) Please clarify why the Power Downtown project is expected to cost 26% less per circuit km than the Esplanade TS to John TS project cited at reference 1 above (i.e. $21,442k vs $28,980k per circuit/km).

Response:

a) Please refer to Hydro One Networks – Post-Construction Financial Report Dated April 17, 2009 which is provided as Attachment 1 of this interrogatory response.

b) The lesson learned from the John x Esplanade project is how important a good geotechnical and hydro geotechnical report is to the project risk mitigation. This report will be completed prior to the Request for Proposals from contractors.

c) The expected circuit cost are expected to be less at this time due to the available tunneling projects that have been completed in the Toronto area and the raw material pricing that is available for the contractors.

HYDRO ONE NETWORKS - POST-CONSTRUCTION FINANCIAL REPORT

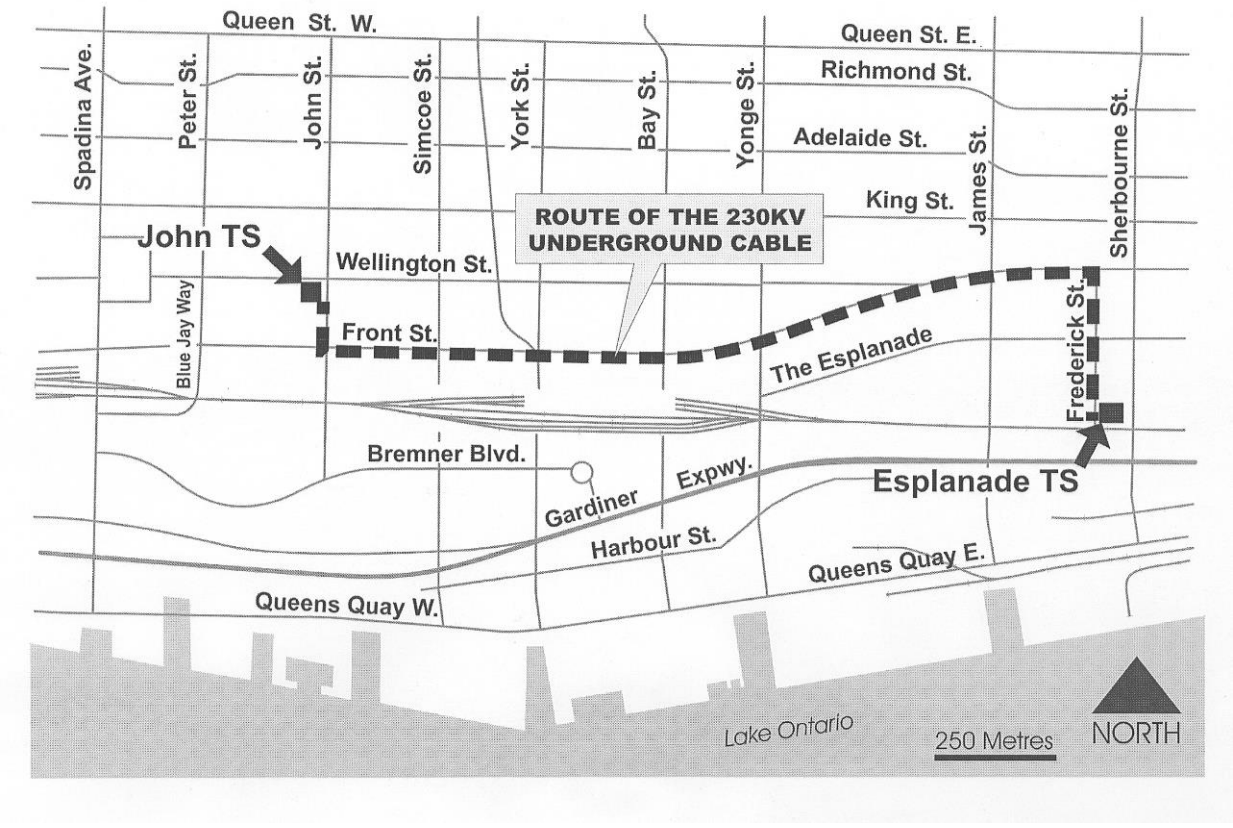
Tunnel and 230 kV Lines Linking
Esplanade Transformer Station and John Transformer Station
EB-2004-0436

April 17, 2009

1.0 Project Scope

The scope of this project included the following elements:

- A tunnel of 3 m diameter and concrete lined, located about 30 m below grade and approximately 2.2 km long, now links John Transformer Station (TS) and Esplanade TS. Access shafts permit entry to the tunnel at both station ends with additional rescue shafts at 500 m intervals along the route. The tunnel runs south on John Street to Front Street, east on Front Street to Fredrick Street, then south on Fredrick Street to Esplanade TS.



- Two new 230kV (2500 kcmil XLPE) underground cable circuits installed in the tunnel, connect the two stations. These cables are operated initially at 115kV but with capacity to carry future loads at 230 kV.
- New circuits are terminated at both John TS and Esplanade ST. New station equipment includes motorized switches, CVTs, surge arresters and necessary protections.
- A new perimeter wall has been constructed at Esplanade TS in fulfilment of Hydro One's public safety and site rehabilitation obligations. This was particularly specified under section 6.6 of the Class Environmental Assessment (Minor Transmission Projects).

2.0 Background

- On September 24, 2004, Hydro One applied to the Ontario Energy Board for an order granting leave to construct two new 230kv underground cable circuits located in new a tunnel between Hydro One's John Transformer Station ("TS") and Esplanade TS.
- On March 11, 2005, the OEB granted leave to Hydro One to construct the proposed tunnel and install 230 kv cable.
- In June 2005, a contract was awarded for construction of the tunnel.
- In July 2005, Hydro One commenced construction activities on the tunnel.
- In April 2006, a Purchase Order was let for 230 kV cable.
- In August 2006 equipment additions began at John TS and Esplanade TS.
- On May 15, 2007, a major construction milestone was attained with completion of the tunnel and liner.
- In September 2007 a major construction milestone was achieved with completion of installation of the cable within the tunnel.
- On December 3, 2007 the tunnel, cable and station support equipment were substantially completed and declared in-service.

Above: A section of the concreted tunnel that runs under Jarvis Street.

3.0 Schedule Status

Project Element	Planned Completion	Actual Completion
Tunnel	February 6, 2007	May 15, 2007
Cable	August 7, 2007	September 15, 2007
Stations & Connections	April 26, 2006	November 9, 2007
Commissioning	October 15, 2007	December 3, 2007
In Service	October 15, 2007	December 3, 2007
Site Restoration and Landscaping	October 15, 2007	June 15, 2009*

* Subject to city approval of landscaping plan.

4.0 Schedule Variance

Tunnel

Work on the tunnel commenced in July of 2005, in conformance to the schedule proposed by Hydro One to the Ontario Energy Board. At the time that the project began, Hydro One was involved in a labour dispute which caused a 1 month delay in the tunnel schedule. At approximately the half-way point in the tunnel (Yonge Street) the excavators encountered a 13.4 m seam of clay. Unlike the typical and surrounding shale, the clay needed to be shored with hardwood boards and supported at quarter-metre intervals with curved steel beams. This slowed progress on the tunnel and two weeks were lost on the schedule. A further delay of approximately 1 week was encountered when the tunnel borer exhumed a live gas line—not identified on utility maps of the area (The piping had been used for gas street lighting in the 1920s). Finally, there were difficulties associated with construction of the two 90 degree turns in the tunnel at John and Front Street and at Front and Fredrick Street (the tunnel followed road allowances so as to avoid impacting private property along the route). Because sharp turns are almost unknown in the tunnelling industry, it was necessary to split the 230 foot conveyor system behind the boring machine into five hinged sections. Even still, the conveyor segments were prone to spillage when operating out of line. Work slowed on the Front-Fredrick corner and approximately five weeks were lost on the schedule.

Cable

The start of the installation of the cable was delayed by three months on account of construction delays to the tunnel.

Stations, Connections and Commissioning

New electrical equipment (switches, metering) including steel structures were added at both John TS and Esplanade TS to support these new circuits. New protections and control equipment were installed at both stations to allow OGCC to monitor these new circuits upon their being brought into service.

Below: Architecturally Co-ordinated Wall, Installed at Esplanade TS

Site Restoration and Landscaping

A log of complaints related to this project and associated construction activities is submitted as an Appendix to this report. Particular care was taken to properly handle unclean soils which were slurry-vacuumed in association with excavation processes at the stations and intermediate tunnel-access shaft sites. A lined catchment area was set up at Esplanade TS to de-water the slurried material. The soil was then tested, and disposed of according to Ministry of Environment guidelines.

All rock excavated from the tunnel was clean and was trucked away to clean fill areas by the tunnel contractor Dibco. Drying catchments were only used to stage trenched material from inside the stations, prior to removal.

Significant difficulties have been encountered in building consensus among Hydro One, City of Toronto and Fredrick/Esplanade area residents as to the extent of post-project restorations and landscaping at Esplanade Transformer Station. An architecturally co-ordinated substation enclosure wall (shown above) and new landscaping are expected to be completed by June 2009.

5.0 Cost Status Report

		Estimated Cost[1]	Actual Cost[2]
Lines Work			
	Material[3]	$12,500,000	$960,000
	Construction	$15,000,000	$24,300,000
	Engineering	$500,000	$500,000
	Commissioning	-	-
	Project Management	$500,000	$700,000
	Contingencies	$3,750,000	-
	Sub-total (Base Cost)	$32,250,000	$26,460,000
	Overheads	$5,300,000	$3,700,000
	Interest	$2,950,000	$1,900,000
	TOTAL LINES WORK	***$40,500,000***	***$32,400,000***
Stations Work			
	Material	$1,000,000	$1,460,000
	Construction	$550,000	$1,430,000
	Engineering	$450,000	$450,000
	Commissioning	$300,000	$840,000
	Project Management	-	$80,000
	Contingencies	$300,000	-
	Sub-total (Base Cost)	$2,600,000	$4,260,000
	Overheads	$400,000	$680,000
	Interest	$200,000	$170,000
	TOTAL STATIONS WORK	***$3,200,000***	***$5,110,000***
Combined			
	Material	$13,500,000	$2,420,000
	Construction	$15,550,000	$25,730,000
	Engineering	$950,000	$950,000
	Commissioning	$300,000	$800,000
	Project Mgmt//Real Estate	$500,000	$800,000
	Contingencies	$4,050,000	-
	Sub-total (Base Cost)	$34,850,000	$30,700,000
	Overheads	$5,700,000	$4,380,000
	Interest	$3,150,000	$2,070,000
	TOTAL LINES & STATION WORK	***$43,700,000***	***$37,150,000***
	Preparatory Engineering[4]	1,000,000	1,000,000
	TOTAL PROJECT COSTS	***$44,700,000***	***$38,150,000***

Table Notes:

1. Estimated Costs are those presented in the S-92 Evidence - Leave to Construct John TS to Esplanade TS Tunnel with 230 kV cable.
2. Actual Costs are as per Hydro One Data Mart submissions as at April 2009.
3. Line Work Materials and Construction were segregated in the Estimate but, have been combined in the "Actual" column.
4. Actual Engineering Charges substantially match estimates and have been allocated to reflect this.

6.0 Cost Change Analysis

Sources of Variance

Cost Change (actual cost of $38.15 M against submission forecast of $44.7 M) is primarily attributable to:

- Favourable Lines (tunnel and cable base costs of $26.5 M versus $32.3 M expected) (-5.8M). This was primarily due to competitiveness in the tunnelling and cable supply businesses, resulting in attractive pricing for the required materials and services. In addition, the tunnelling contract was well written and administered, resulting in minimal extra work claims.
- Favourable Overhead charge (-$1.3 M). This was a direct consequence of significantly under-budget project costs.
- Favourable Interest payments during construction (-$1.1 M). The Interest charges were likewise reduced as a consequence of under-budget project costs. Interest charges were further reduced by delaying the start of Stations project work from December 2005 to August 2006.
- Unfavourable Stations project variance (+$1.7 M). There were certain items that were higher than estimated. The most significant was the construction of the Durisol wall at Esplanade TS ($1.8 M total cost).

Below: Red Tinted Concrete warns of Hazardous Buried Cables at Esplanade TS. The Dye was a $5k Project Extra Charge.

OEB STAFF INTERROGATORY #14

Reference:

Exhibit B, Tab 9, Schedule 1, page 2

Interrogatory:

Hydro One states at the above noted reference that the Power Downtown Toronto project addresses end-of-life assets, is not tied to any load increase or customer load applications and does not require any customer contributions "consistent with the provisions of Section 6.3.5 of the Transmission System Code." Section 6.3.5 of the Transmission System Code (TSC) states that "A transmitter shall not require any customer to make a capital contribution for the construction of or modifications to the transmitter's network facilities that may be required to accommodate a new or modified connection."

OEB staff notes that Section 6.7.2 of the TSC describes circumstances where end-of-life assets are replaced, and a capital contribution is required:

> 6.7.2 Where a transmitter-owned connection facility has reached its end-of-life and is planned to be retired and replacement with a new connection facility is determined to be the optimal solution, the transmitter shall undertake an assessment, in consultation with any affected customers, to determine the appropriate capacity of the replacement connection facility. Where the asset is replaced, the transmitter shall either:
>
> (a) not recover a capital contribution from a customer to replace that connection facility, where the new facility is the same capacity or lower capacity; or
>
> (b) recover a capital contribution from a customer to replace the connection facility, where the customer requires additional capacity. The capital contribution shall be limited to the incremental cost relative to the cost of a like-for-like replacement facility.

a) Please confirm that Hydro One consulted with Toronto Hydro to determine the appropriate capacity of the replacement facilities and briefly describe the conclusions of that consultation.

b) In light of section 6.7.2 of the TSC, please comment on why Hydro One is not requesting a capital contribution from Toronto Hydro even though Hydro One is proposing a larger capacity cable.

Response:

a) Please refer to Exhibit I, Tab 1, Schedule 1.

b) While the cables will be insulated to 230 kV they will continue to operate at 115 kV. Their 230 kV rating will be able to accommodate high temporary overvoltages during fault conditions, thus reducing the likelihood of damage requiring repair and improving long-term reliability. As there are no plans to upgrade the system in the area to operate at 230 kV there is no capacity increase therefore no capital contributions are being proposed.

OEB STAFF INTERROGATORY #15

Reference:

1. Exhibit B, Tab 9, Schedule 1, Table 2, page 7
2. OEB Decision and Order on Hydro One 2020-2022 transmission revenue requirements, EB-2019-0082, April 23, 2020

Interrogatory:

Table 2 at the above noted reference specifies an assumed 4.42% forecast cost of long-term debt, which is higher than the long-term debt rate of 4.33% approved for Hydro One Networks Inc. at EB-2019-0082 for the period 2020 to 2022.

a) Please comment on how the assumed 4.42% relates to the 4.33% long-term debt rate approved for Hydro One Networks Inc. at EB-2019-0082.

Response:

The 4.33% long-term debt rate was the value proposed by Hydro One in the application in EB-2019-0082. The OEB approved a long term debt rate of 4.42% which was updated to as disclosed in Exhibit 1.4 Implementation of Decision with Reasons in the Draft Rate Order.

OEB STAFF INTERROGATORY #16

Reference:

Exhibit B, Tab 9, Schedule 1, Table 1, pages 4-5

Interrogatory:

The title of Table 1 at the above noted reference refers to the "Network Pool Rate Impact," whereas the table itself refers to the "Line Pool Rate Impact."

a) Please confirm that the reference to "Network Pool" is an oversight/typo. Otherwise, please clarify.

Response:

a) The reference to "Network Pool" is a typo and should read "Line Connection Pool".

OEB STAFF INTERROGATORY #17

Reference:

Exhibit B, Tab 9, Schedule 1, page 3

Interrogatory:

The table at the above noted reference estimates the impact of the Power Downtown Toronto project on the typical residential customer. The estimate assumes a residential consumption of 1,000 kWh per month.

a) Please recalculate the table assuming a residential consumption of 700 kWh per month.

Response:

A. Typical monthly bill (Residential R1 in a high density zone at 720 kWh per month with winter commodity prices.)*	$143.79 per month
B. Transmission component of monthly bill	$11.14 per month
C. Line Connection Pool share of Transmission component	$1.54 per month
D. Transformation Connection Pool share of Transmission component	$3.69 per month
E. Network Connection Pool share of Transmission component	$5.92 per month
F. Impact on Line Connection Pool Provincial Uniform Rates	3.09%
G. Net impact on typical residential customer bill (C x F)	$0.05 per month or $0.57 per year
F. Net increase on typical residential customer bill (G / A)	0.03%

Note: Values rounded to two significant digits.

* The same winter commodity prices were utilized as per EB-2020-0188 Ex B, Tab 9, Sch 1 for this calculation, not temporary COVID relief rates for January 1, 2021.

OEB STAFF INTERROGATORY #18

Reference:

1. Exhibit D, Tab 1, Schedule 1, page 1
2. Exhibit G, Tab 1, Schedule 1, Attachment 1, page 4

Interrogatory:

At reference 1 above, Hydro One states that "Toronto Hydro-Electric System Limited is the only customer and will remain connected to the same locations at Esplanade TS and Terauley TS."

At reference 2 above, Hydro One states that "the new cables will be routed in a different path than that of the existing cables. Therefore, no major outages are expected to impact the supply of customer's load."

a) Please clarify how continuity of service will be provided for Toronto Hydro during the replacement of the existing circuits C5E and C7E, including in the event that unforeseen delays arise during the replacement work.

b) If not already addressed in response to question a) above, please clarify what outages are expected and how they will impact the supply to Toronto Hydro.

Response:

a) To mitigate any impact to Toronto Hydro, the majority of construction (i.e. tunnel and cable installation) will occur with the existing C5E and C7E circuits remaining in-service. This is possible since the proposed replacement will follow a different route. Once tunnel construction and cable installation is complete each circuit will be taken out-of-service, one at a time, to facilitate station connections (terminal work) at Esplanade TS and Terauley TS. This approach will minimize the outage duration. To further mitigate the risk to Toronto Hydro, both circuits will not be taken out-of-service concurrently, outages will be planned and coordinated with Toronto Hydro and done during off-peak seasons, and C5E and C7E between Terauley TS and Cecil TS will remain in-service at all times. By taking one circuit out-of-service at a time, in coordination with Toronto Hydro, during off-peak seasons Hydro One is confident that that there is little risk of loss of continuity of service even in the event of a construction delay.

b) Refer to part (a).

OEB STAFF INTERROGATORY #19

Reference:

Exhibit F, Tab 1, Schedule 1, page 1, Attachment 2, page 7

Interrogatory:

The SIA at the above noted reference states that "the transmitter confirmed that the functionality and operating times of the protection system will remain the same."

a) Please confirm that the functionality and operating times of the protection system will remain the same even though the new cable will follow a different route. Otherwise, please clarify.

Response:

a) As part of the project the protection settings will be reviewed and adjusted as necessary to account for the change in cable type and length. The protection functionality and operating times of the protection system will remain unchanged (i.e. settings will be adjusted to ensure the same functionality and timing).

OEB STAFF INTERROGATORY #20

Reference:

1. Exhibit E, Tab 1, Schedule 1, pages 2-3
2. Exhibit E, Tab 1, Schedule 1, Attachment 3
3. Exhibit E, Tab 1, Schedule 1, Attachment 4
4. EB-2018-0117, Exhibit E, Tab 1, Schedule 1, Attachment 3
5. EB-2018-0117, Exhibit E, Tab 1, Schedule 1, Attachment 7

Interrogatory:

Hydro One has applied for approval of the forms of the agreement offered or to be offered to affected landowners pursuant to s.97 of the OEB Act. Hydro One states that its proposed land agreements were approved by the OEB as part of Hydro One's Barrie Area Transmission Upgrade Project under docket EB-2018-0117.

a) Please confirm that the forms Hydro One seeks approval of at references 2 and 3 correspond, respectively, to the forms approved under docket EB-2018-0117 at references 4 and 5 above.

b) Please advise whether there are any substantive differences between the previously approved forms referenced above and the forms that Hydro One requests approval of as part of the Power Downtown Toronto project.

Response:

a) Confirmed. The Hydro One form agreements included in this application have been previously approved by the OEB in Hydro One's approved leave to construct application EB-2018-0117.

b) There are no substantive differences between the previously approved forms included in Hydro One's approved leave to construct application EB-2018-0117 and the form agreements included in this application. To confirm, no amendments or alternations have been made to the previously approved form agreements.

OEB STAFF INTERROGATORY #21

Reference:

Exhibit E, Tab 1, Schedule 1, Attachment 3 and 4

Interrogatory:

The reference above contains the land right agreements that Hydro One proposes to use to obtain any identified land rights for the Power Downtown Toronto project.

a) Please confirm that all impacted landowners will have the option to receive independent legal advice regarding the proposed land agreements.

b) Please clarify whether Hydro One has committed to or will commit to reimbursing landowners for reasonably incurred legal fees associated with the review and completion of the necessary land rights agreements.

Response:

a) Confirmed. Hydro One will provide the option to all impacted landowners to receive independent legal advice regarding the proposed land agreements when applicable. Specific to private landowners, Hydro One commits to reimbursing these owners for reasonably incurred legal fees associated with the review and completion of the necessary land rights.

b) Hydro One commits to reimbursing private landowners for reasonably incurred legal fees associated with the review and completion of the necessary land rights.

OEB STAFF INTERROGATORY #22

Reference:

Exhibit B, Tab 1, Schedule 1

Interrogatory:

Hydro One has applied for leave to construct approval pursuant to s.92 of the OEB Act.

a) Please comment on the following draft conditions of approval proposed by OEB staff. If Hydro One does not agree with any of the specific draft conditions of approval noted below, please identify the specific conditions that Hydro One disagrees with and explain why. For conditions in respect of which Hydro One would like to recommend changes, please provide the proposed changes.

1. Hydro One shall fulfill any requirements of the SIA and the CIA, and shall obtain all necessary approvals, permits, licences, certificates, agreements and rights required to construct, operate and maintain the project.

2. Unless otherwise ordered by the OEB, authorization for leave to construct shall terminate 12 months from the date of the Decision and Order, unless construction has commenced prior to that date.

3. Hydro One shall advise the OEB of any proposed material change in the project, including but not limited to changes in: the proposed route, construction schedule, necessary environmental assessment approvals, and all other approvals, permits, licences, certificates and rights required to construct the project.

4. Hydro One shall submit to the OEB written confirmation of the completion of the project construction. This written confirmation shall be provided within one month of the completion of construction.

5. Hydro One shall designate one of their employees as project manager who will be the point of contact for these conditions, and shall provide the employee's name and contact information to the OEB and to all affected landowners, and shall clearly post the project manager's contact information in a prominent place at the construction site.

Response:

Hydro One has no concerns with the proposed draft conditions.

OEB STAFF INTERROGATORY #23

Reference:

1) Letter from Hydro One Networks Inc. - Descope of Mid-shaft, January 7, 2021
2) Exhibit B, Tab 7, Schedule 1, Table 1
3) Exhibit B, Tab 7, Schedule 1, Table 2
4) Exhibit B, Tab 9, Schedule 1, untitled Table describing rate impact on typical residential consumer, p. 3
5) Exhibit B, Tab 9, Schedule 1, Table 1

Preamble:

Reference 1 states that Hydro One intends to descope the mid-shaft at Sherbourne St. and Shuter St. from the works being requested as part of the Power Downtown Toronto project Application.

References 2 through 5 present the costs and rate impacts of the Power Downtown Toronto project.

Interrogatory:

a) What is the impact of the mid-shaft descoping described at reference 1 on the Power Downtown Toronto total project cost?

b) Please provide an update to references 2 through 5 above which accounts for the descoping of the mid-shaft from the works being requested as part of the Power Downtown Toronto project Application.

Response:

a) The cost of the mid-shaft is anticipated to be less than 2% of the total project cost. This change remains within the tolerance of the existing AACE Class 3 (-20% / +30%) estimate.

b) With the removal of the mid-shaft being within the tolerance of the estimate, no changes are provided for references 2 through 5.

OEB STAFF INTERROGATORY #24

Reference:

1) Exhibit E, Tab 1, Schedule 1
2) Letter from Hydro One Networks Inc. - Descope of Mid-shaft, January 7, 2021

Preamble:

Reference 1 addresses land matters related to the Power Downtown Toronto project.

Interrogatory:

a) How does the descoping of the mid-shaft change the number of impacted properties and the land ownership/land use, approximate right of way area and approximate relative proportions impacted by the Power Downtown Toronto project?

b) How, if at all, does the descoping of the mid-shaft change the land rights that Hydro One will require?

c) How, if at all, does the descoping of the mid-shaft change which forms of agreement that Hydro One is requesting the OEB to approve in the Power Downtown Toronto project proceeding?

Response:

a) The descoping of the mid-shaft does not alter the number of impacted properties and the land ownership/land use, approximate right of way area or approximate relative proportions impacted by the Power Downtown Toronto project. The previously contemplated mid-shaft location was to be on property PIN: 21090-0046, which is a municipal road allowance known as Sherbourne Street. This property will still be leveraged for the tunnel right of way.

b) The descoping of the mid-shaft does not alter the land rights required for the project. As stated in part a) above, the mid-shaft location was to be on an already impacted municipal road allowance, in which Hydro One holds legislated occupation rights under Section 41 of the *Electricity Act, 1998*.

c) The descoping of the mid-shaft does not change the forms of agreement that Hydro One has included in the application.

OEB STAFF INTERROGATORY #25

Reference:

1) Letter from Hydro One Networks Inc. - Descope of Mid-shaft, January 7, 2021

Preamble:

Hydro One indicates at reference 1 that the Power Downtown Toronto project has continued to progress through detailed design since the leave to construct application was filed.

Interrogatory:

a) Given that the project appears to continue to undergo detailed design, please comment on what, if any, further changes to the scope of the Power Downtown Toronto project does Hydro One anticipate that might affect the works being requested as part of the Power Downtown Toronto project Application?

Response:

a) The detail engineering design has reached a maturity that there will be no significant additions or removals from the scope of work.

BOMA INTERROGATORY #1

Reference:

Exhibit F/Tab 1/Schedule 1/Attachment 2/Page 3 and 4 (Appendix A)

Preamble:

Hydro One Networks Inc. (the "connection applicant" and "transmitter") is proposing to replace the 115 kV underground cables from Terauley Transformer Station (TS) to Esplanade TS on circuits C5E and C7E (the “project”). The electrical parameters of the new cables are included in Appendix A of this report.

Appendix A: Data Verification

Table 1 Disconnect switch specifications

Parameter	Existing C5E	Existing C7E	Proposed C5E	Proposed C7E
Sections	Terauley TS to Esplanade TS	Terauley TS to Esplanade TS	Terauley TS to Esplanade TS	Terauley TS to Esplanade TS
Length (km)	3.57	3.57	2.5[1]	2.5[1]
Positive sequence R (pu)	0.001891	0.001722	0.000364	0.000367
Positive sequence X (pu)	0.004875	0.004526	0.004289	0.004289
Positive sequence B (pu)	0.077123	0.081672	0.028442	0.028442
Zero sequence R (pu)	0.014093	0.013768	0.003087	0.003106
Zero sequence X (pu)	0.001459	0.001387	0.002571	0.002592
Zero sequence B (pu)	0.077123	0.081672	0.028442	0.028442
Winter continuous rating (A)	750	750	1200	1200
Winter 15 min STE rating (A)	2240	2240	6733	6733
Winter pre-loading used for STE calculation (A)	600	600	500	500
Winter LTE rating (A)	N/A[2]	N/A[2]	2174	2174
Summer continuous rating (A)	700	700	1200	1200
Summer 15 min STE rating (A)	2390	2390	6733	6733
Summer pre-loading used for STE calculation (A)	500	500	500	500
Summer LTE rating (A)	N/A[2]	N/A[2]	2174	2174

[1] The cable lengths have changed due to a change in routes
[2] At the time of this assessment the connection applicant did not provide the long term emergency (LTE) ratings of the existing cables, however, the connection applicant confirmed that the LTE ratings of the new cables are higher than the existing ones.

Interrogatory:

a) The IESO SIA does not refer to the replacement cables being 230 kV cables. Can cable voltage have an impact on SIA?

b) Was the IESO informed that the project is proposed to involve the replacement of 115 kV low-pressure oil-filled underground transmission cables with 230 kV rated oil-free XLPE cables?

Response:

a) The SIA must take the operating voltage into account. The use of 230 kV cables will not affect the SIA as impedances for the proposed cable were provided and the cables will continue to operate at 115 kV.

b) The IESO was informed that the existing low-pressure oil-filled cables would be replaced with oil-free XLPE cables and operated at 115 kV. The cable parameters (impedances) and operating details (ampacities) were provided for the proposed 230 kV insulated cable.

BOMA INTERROGATORY #2

Reference:
Exhibit B/Tab 1/Schedule 1/Page 2 of 5

Preamble:
The IESO has also provided an expedited and final System Impact Assessment 26 ("**SIA**").

Interrogatory:
a) Did HONI seek an "expedited" SIA? If so, what was the reason for seeking an "expedited" SIA?

b) What is the difference between an "expedited" and a non-expedited SIA?

Response:
a) Hydro One did seek an expedited SIA because Hydro One believed the Project met the criteria for an expedited SIA outlined in section 9.2 of the Independent Electricity System Operator's *Market Manual 1: Connecting to Ontario's Power System Part 1.4: Connection Assessment and Approval.*

b) The following is a quote from section 9.1 of the Independent Electricity System Operator's *Market Manual 1: Connecting to Ontario's Power System Part 1.4: Connection Assessment and Approval.*

> *"A detailed SIA may not be necessary for projects that do not represent significant system changes and are not expected to have a major impact on the reliability of the integrated power system. In this case an expedited SIA (ESIA), which involves a simple study, will be conducted. The IESO will determine whether an SIA or an ESIA is appropriate upon receiving the request for connection assessment."*[1]

[1] Part 1.4: Connection Assessment and Approval Issue 21.0 – Section 9.1 – IESO – December 2, 2020

BOMA INTERROGATORY #3

Reference:

Exhibit G/Tab 1/Schedule 1/Attachment 1 (Final November 24, 2020)/Page 4

Preamble:

There is an insignificant increase in the fault level primarily at the Esplanade TS 115kV buses as a result of the HV cable replacement. The short circuit levels at all area HV and LV buses are given in Appendix B Tables 1 for the before and after scenarios.

All local customers are advised to review the short circuit results to ensure that their equipment ratings are adequate for the increased fault current level.

Interrogatory:

a) The CIA does not refer to the replacement cables being 230 kV cables. Can cable voltage have an impact on CIA?

b) Would the use of 230 kV replacement cables have an impact on fault levels?

Response:

a) The impedances for the proposed 230kV cable were used and the cables will continue to operate at 115 kV. The cable voltage does not have an impact on the CIA.

b) Please see answer in a).

BOMA INTERROGATORY #4

Reference:
Exhibit B/Tab 5/Schedule 1/Page 2 of 3/Footnote 1

Preamble:
https://www.hydroone.com/abouthydroone/CorporateInformation/majorprojects/power-downtown-toronto/Documents/Final_ESR/PDT%20-%20Class%20EA%20Final%20Environmental %20Study%20Report.pdf

Interrogatory:
a) The hyperlink provided in Footnote 1 to the ESR does not work. Please provide a copy of the ESR.

Response:
The final Environmental Study Report and the appendices can be viewed here: https://www.hydroone.com/about/corporate-information/major-projects/power-downtown-toronto/public-consultation . Given the size of the ESR it has not been provided as an attachment.

BOMA INTERROGATORY #5

Reference:

Exhibit B/Tab 6/Schedule 1/Page 1 of 3

Preamble:

Hydro One is required by provincial legislation to provide locate services for its underground infrastructure. Locate requests are most often requested by utilities planning construction activities in close proximity to Hydro One's underground assets. By installing the replacement cables in a tunnel at a depth of approximately 25m, these assets will be far below typical utility depths, reducing the need to perform field locates. It is estimated that approximately $12,000 13 per year in locate costs will be saved, compared to similar surface routes.

Interrogatory:

a) At what depth are the existing 115 kV cables?

Response:

a) The existing cables are approximately 1 – 3 metres in depth.

BOMA INTERROGATORY #6

Reference:

Exhibit B/Tab 5/Schedule 1/Page 2 of 3

Preamble:

In pursuing this alternative, Hydro One considered multiple installation methods 6 and routes. Through a comprehensive and completed Class Environmental Assessment that evaluated socioeconomic, natural environment, technical and financial factors in detail, Hydro One will be completing this Project utilizing a tunnel installation method and route, which has the following key advantages:

- Least disruption to vehicular, and pedestrian traffic;
- Least conflicts with existing and planned infrastructure and utilities;
- The anticipated noise and vibrations from the tunnel boring machine 13 (TBM) operating at approximately 25 m below ground surface will not be 14 perceptible at the surface, minimizing disruptions to communities;
- No anticipated direct effects to institutions, emergency uses, and businesses as a result of the construction method and route alignment;
- Similar costs to other route and construction methods that would be far more disruptive and,
- Minimal impacts to the natural environment.

Interrogatory:

a) What would the cost be to replace the 115 kV cables using the existing underground cable route?

Response:

a) Please refer to Exhibit I, Tab 1, Schedule 4 and 5.

CITY OF TORONTO INTERROGATORY #1

Reference:

Exhibit C, Tab 2, Schedule 1, Attachment 1

Preamble:

Hydro One has filed a letter dated January 7, 2021 to put on record that it intends to descope the mid-shaft (location B on the map provided at Exhibit B, Tab 2, Schedule 1, Attachment 1) at Sherbourne St. and Shuter St. ("the mid-shaft") from the works being requested as part of this Application.

Interrogatory:

Will Hydro One update the prefiled evidence to remove references to the mid-shaft and resubmit prior to receiving Leave to Construct?

Response:

Yes, the updated evidence has been filed along with these interrogatory responses.

CITY OF TORONTO INTERROGATORY #2

Reference:
Exhibit B, Tab 7, Schedule 1, page 2

Preamble:
Risks and Contingencies
Three project risks are outlined as major contributors to the total contingency suggested for this project. The first named risk are Approvals – "there are many risks with permits and approvals from third party stakeholders. There are other utilities crossings, transportation crossings, and environmental permits with the City of Toronto and MECP".

Interrogatory:
What approvals does Hydro One anticipate it will require from the City of Toronto that present a risk of delay or cost?

Response:
During the engineering and construction phases of the project Hydro One will be looking for the following:

a) Road Access permits for the Geotechnical investigation;
b) Temporary Land Use License Agreement for 1 Foster Place (75 Elizabeth St) and / or Land Right on City Parkland for Larry Sefton Park;
c) Sewer Discharge Permits (temporary and permanent);
d) Tree Removal Permit / Tree Protection Plan;
e) Clearance Letters;
f) Utility Relocation Agreements;
g) Access/Use Permit;
h) Per-Construction Road Condition Assessment;
i) Traffic Management Plan;
j) Municipal Road Damage Deposit;
k) Municipal Cut;
l) Street Occupation Permit;
m) Temporary Street Closure Permit;
n) Entrance Permit;
o) Noise Exemption;

p) TTC Technical Review and approval of the tunnel crossing under the Yonge St subway;
q) Clearance Letters with the TPUCC; and,
r) Utility Relocations Agreements.

CITY OF TORONTO INTERROGATORY #3

Reference:

Exhibit E, Tab 1, Schedule 1, page 2 of 4, lines 14 to 19

Preamble:

Hydro One Request for Temporary Rights to City Property Located at 75 Elizabeth Street

The exit shaft located at Terauley TS requires temporary rights for a storage/staging area adjacent to this location for the forecast term of Q1 2022 to Q2 2025. Hydro One has stated that it is seeking a short-term licence with the impacted landowner, City of Toronto.

Staff with the City of Toronto and the City's real estate agency CreateTO have been engaged in discussions with Hydro One with respect to the Project and the proposal to use the City property at 75 Elizabeth Street (the "City Property") for storage/staging purposes. In 2019 the City publicly identified the City Property for redevelopment and use for public purposes according to a timeline which will conflict with the timeline for Hydro One's proposed use of the City Property as currently proposed. Further discussion will be required to see if it is possible to accommodate the proposed use on agreement terms satisfactory to the City.

In October, 2019 City Council identified the City Property as a future development property under the City's ModernTO program, which is a City-wide real estate strategy to optimize its real estate portfolio planning. The City Property was specifically identified at that time as an important asset that will be repurposed to address City priorities, such as affordable housing, employment uses and community infrastructure. The City's contemplated redevelopment is also anticipated to occur commencing in late 2023. As a result, City and CreateTO staff currently have no City Council direction to permit the City Property to be used in the manner Hydro One has suggested given the clear impacts on the City's own plans for the use of the property as directed by City Council. Staff would have to obtain further direction in order to depart from the current plan to utilize the City Property to address City priorities.

Interrogatory:

a) Has Hydro One considered or identified other locations for storage/staging purposes?

b) Can Hydro One arrange construction scheduling or staging such that its requirement for a storage/staging area will for a shorter term that permits the City to proceed with redevelopment of the City Property commencing in late 2023?

Response:

a) Hydro One has considered alternative locations for temporary storage/staging purposes during construction but alternatives were insufficient for the construction requirements of the exit shaft at Terauley TS. Construction means and methods deem the temporary staging area must be directly adjacent to the exit shaft located at Terauley TS.

After determining the Terauley TS property boundaries were insufficient, Hydro One further examined properties directly adjacent to the Terauley TS as potential alternative locations for temporary storage/staging during construction. Properties identified as potential locations were 75 Elizabeth Street (PIN: 21200-0064 (LT)) and 500 Bay Street (PIN: 21200-0008 (LT) & 21200-0063 (LT)), known as Larry Sefton Park. Given the use of Larry Sefton Park as a public park and green area for the local community, the preference was to utilize 75 Elizabeth Street which is generally unimproved with limited permanent installations. 75 Elizabeth Street also provides safe and controllable ingress and egress for construction staging purposes. Given the above, 75 Elizabeth Street was deemed the only feasible option after consideration of the other adjacent properties to the exit shaft location.

b) Hydro One is willing to work with the City to promote the progress of both projects.