

## Feasibility Study (*accurate in the range $\pm 50\%$* )

### Transmission Line Relocation/Modification Cost Estimate

Appropriation Request # 23852 WBS# 700026391

Part 1: Don Mouth Naturalization and Port Lands Flood Protection Transmission Circuits Relocation

*REV 1 June 27<sup>th</sup>, 2016 (Original May 4<sup>th</sup> 2016)*

#### Background

The Toronto Region Conservation Authority (TRCA), Waterfront Toronto (WT) and the City of Toronto (CoT), hereafter known as the 'three co-proponents', are working on long term plans for the Port Lands Area. The existing Hydro One Network (HON) transmission facilities between Don Fleet Junction/Mill Creek Junction and Basin TS will be affected by the proposed plans. TRCA, WT and CoT requested Hydro One (HONI) to carry out this feasibility study to provide budgetary costs for potential modification/relocation of HONI facilities to facilitate the development of the Port Lands area.

The purpose of this study report is to provide feasibility input and budgetary cost estimates with +/- 50% accuracy of a number of alternatives to mitigate the impact of the proposed work.

The Project for the purpose of this study was broken down into two parts:

- Part 1. Don Mouth Naturalization and Port Lands Flood Protection Project (DMNP)
- Part 2. Development of the Port Lands Area

**This report covers Part 1: the Don Mouth Naturalization and Port Lands Flood Protection Project (DMNP).**

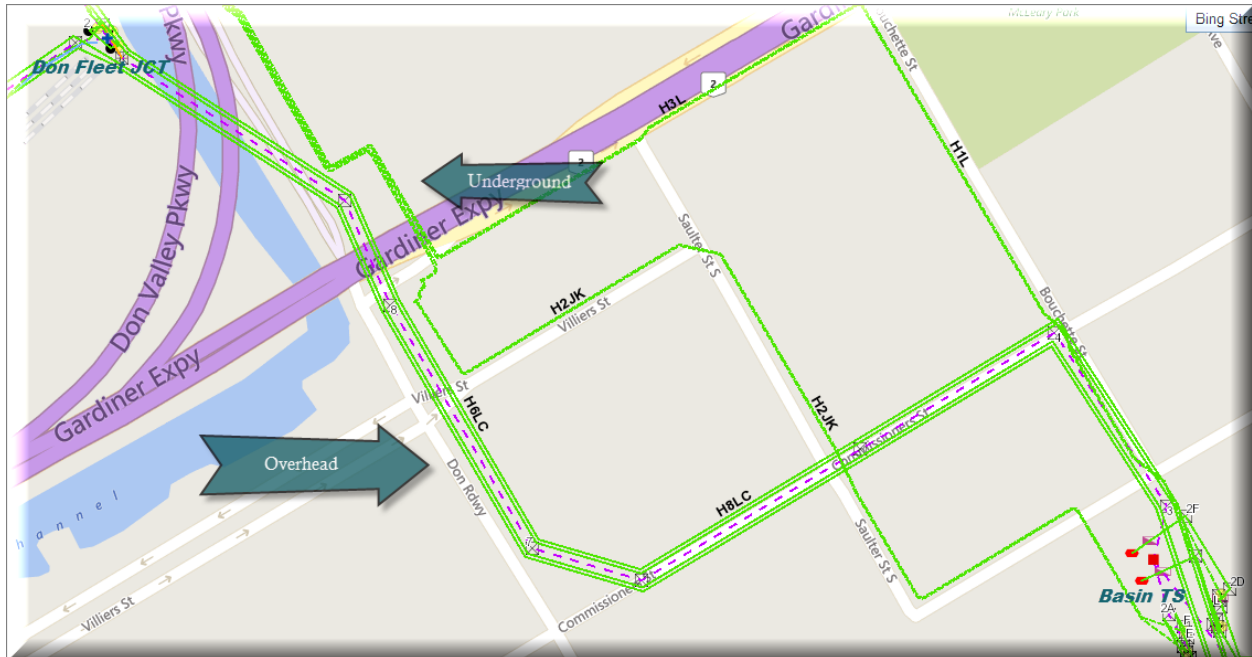
#### Current

The Don Mouth Naturalization and Port Lands Flood Protection Project is where the Don River is reconfigured to facilitate area development. Under this project, the three co-proponents will be building flood protection embankments on the east side of the Don River from the Railway tracks south to the Ship Channel. (See Figure 1).

This work will impact:

- the overhead tower line carrying circuits H6LC/H8LC/H9EJ/H10EJ from Commissioner Street/Saulter St. South to Don Fleet Jct.
- the underground cable circuits H2JK1/H2JK2/H1L/H3L between Don Roadway/Lakeshore Blvd and Don Fleet Jct.
- the underground cable circuits H2JK1/H2JK2 between Villiers St./Saulter St. South and Don Roadway/Lakeshore Blvd.
- the utility bridge north of Don Fleet JCT.

Figure 1.



### Engineering Findings – Summary

All required Environmental and Real Estate requirements are to be provided and met by the proponents:

Below options are to be considered for the existent overhead lines and underground cables to accommodate proponents' proposal:

**NOTE:**

*HST is extra  
I/S date would be driven by outage and resources availability, Real Estate requirements and Environmental approvals*

**1) Overhead Tower line Circuits H6LC/H8LC/H9EJ/H10EJ**

Modify towers 6, 7, 8, 8A and 9 as required to incorporate the Don River east bank embankment north of Lakeshore and the raising of Don Roadway and valley fill south of Lakeshore Blvd.

***Estimated Cost: \$1,100,000.00 based on 2016 prices accurate in the range ± 50%***

The estimate is based on the following grade changes as provided by the proponents:

- Twr #8A: NO CHANGE. The proponents will include stabilization measures for the tower to prevent impacts from soil subsidence as a result of the flood protection loadings. There are no details for the impact on the tower received from the proponents at the time of preparing this estimate. Assume no modification work is required. Cost will be extra if the modification is required after more details from the proponents become available.
- Twr #8: Existing grade 77.09m, new grade 78.0M. Raised by 0.91m.
- Twr #7: Existing grade 76.66m, new grade 79.4M. Raised by 2.74m.
- Twr #6: Existing grade 77.00m m, new grade 79.04M. Raised by 2.04m.
- Twr #5: Existing grade 77.17m, NO CHANGE. Assume no modification work is required.
- Twr #4 & others: NO CHANGE. Assume no modification work is required.

Any deviations from the above grades may completely void this estimate package.

Assumptions for this Option:

- This section of overhead circuits will remain in place for about 10 to 15 years for the proponents' interim work, after that, the lines will be changed to all underground cables.
- All the existing above-ground facilities near or crossing Hydro One's lines within the width of a standard Hydro One corridor, such as the street lights, signs, rural lines, telecom/TV overhead cables, etc. will be modified by the proponents with adequate safety clearances to the transmission circuits, reviewed and accepted by Hydro One.
- For towers #6, #7, & #8 that require foundation reinforcement, a space of 10' around all 4 footings will be required to perform the foundation work. Any underground facilities within this 10' working zone MUST be removed prior to the foundation work. Otherwise, the towers may have to be relocated which will completely void this estimate.
- Road lane closure will be available as required to carry out the construction work
- Easement is available and provided by proponents
- The 4-cct tower line is in good conditions, including towers, foundations, conductor shield wire & associated hardware, and grounding, etc.
- The data in Condition Survey System are used to check the ground clearances with the aforementioned grade changes. It is assumed that the data in Condition Survey System are up-to-date.

**2) Underground Cable Circuits H2JK1/H2JK2/H1L/H3L**

Depending on the location of the proposed east embankment, these circuits may be affected. Detailed drawings of this area are required to determine the impact of the embankment on the cables. If the embankment is sufficiently away from the cables no work may be required. However, for the purpose of this evaluation it will be assumed that the circuits have to be relocated under the Don Roadway. Below options are to be considered for this section of the cables:

I. **Option 2 A: Relocate Underground Cable Circuits H2JK1/H2JK2/H1L/H3L via a new under Don Roadway**

***Estimated Cost: \$39,000,000.00 based on 2016 prices accurate in the range ± 50%***

- (a) Relocate the four circuits H2JK1/H2JK2/H1L/H3L from the existing location on the shoulder of the Don Roadway to under the Don Roadway and connect to Don Fleet Jct. via a new under river crossing.
- (b) Modify Don Fleet Jct. to connect the new cable circuits
- (c) Relocate the underground cable circuits H2JK1/H2JK2 between Villiers St. /Saulter St. South and Don Roadway/Lakeshore Blvd.

- (d) Assess the impact of changing grades over underground cable circuits to confirm operating integrity of H1L/H3L between Bouchette Street and Don Roadway adjacent to Lakeshore Blvd. If operating capability is compromised, relocate.

**II. Option 2 B: Relocate Underground Cable Circuits H2JK1/H2JK2/H1L/H3L via a new Utility Bridge**

***Estimated Cost: \$40,000,000.00 based on 2016 prices accurate in the range ± 50%***

- (a) Relocate the four circuits H2JK1/H2JK2/H1L/H3L from the existing location on the shoulder of the Don Roadway to under the Don Roadway and connect to Don Fleet Jct. via a new utility bridge. For feasibility study purposes please assume that the new utility bridge will be 50% longer in length compared to the existing bridge until such information becomes available.
- (b) Modify Don Fleet Jct. to connect the new cable circuits
- (c) Relocate the underground cable circuits H2JK1/H2JK2 between Villiers St. /Saulter St. South and Don Roadway/Lakeshore Blvd.
- (d) Assess the impact of changing grades over underground cable circuits to confirm operating integrity of H1L/H3L between Bouchette Street and Don Roadway adjacent to Lakeshore Blvd. If operating capability is compromised, relocate.

**III. Option 2 C: Convert the H2JK1/H2JK2/H1L/H3L circuits to Overhead and remove the utility bridge.**

Under this option, the four circuits would be converted to overhead for the purpose of crossing the Don River. A second 4 circuit tower line is built from south of Lakeshore Blvd. to Don Fleet Jct. – adjacent to the existing crossing.

**This Option was deemed as NOT feasible as there is no available space to relocate these circuits as per email communication with proponents on November 10<sup>th</sup> 2015.**

**IV. Option 2 D - Realign H2JK1/H2JK2/H1L/H3L along routes 1C and 1D, as proposed by the proponents.**

Relocate the four circuits H2JK1/H2JK2/H1L/H3L from the existing location on the shoulder of the Don Roadway to alignments 1C and 1D shown in Figure 2 below:

Figure 2



Option 2D - 1C: **Estimated Cost: \$46,000,000.00 based on 2016 prices accurate in the range  $\pm$  50%**

Option 2D - 1D: **Estimated Cost: \$44,000,000.00 based on 2016 prices accurate in the range  $\pm$  50%**

ASSUMPTIONS AND RISKS - ALL OPTIONS:

- The oil will be drained from the existing oil filled cables, capped, abandoned and will be left in the ground
- The cost to remove the utility bridge is not included in this estimate
- The proposed cable route is highly congested. It will be very difficult to get adequate space for 4 circuits without thermal interference and manholes for cable splices
- Cable lengths are approximate
- Soil thermal resistivity is assumed to be 1.0 C-w/m. If actual site measurement exceeds this value, duct bank dimension and space requirement may increase.
- Cable ducts across road crossings are installed by horizontal directional drilling method
- Environmental costs not included in this estimate
- Legal survey, topographic survey, and easement rights are available
- Real Estate requirements will be provided by proponents at proponents' expense
- 2016 labor rates and dependent on Canadian dollar fluctuations
- Parts of the estimate is based on historic information from previous projects
- Costing and requirements were based on current system configuration and standards
- Third party feeder modification/ relocation is not included in this estimate and must be coordinated and funded by proponents
- Old station equipment, structures and cable removal costs are not included in this estimate
- Assessment on condition of existing structures and foundations not considered in this estimate
- Permission to access all areas of construction will be available
- No hazardous or contaminated waste disposal not necessary

Once an option has been chosen by the co-proponents and they want to move onto the next estimating stage, to upgrade this study report into a Class "B" estimate (+/-20%), co-proponents must pay upfront all associated costs for such undertaking.

And lastly, if the Class "B" estimate proves satisfactory, co-proponents will enter into our *Transmission Line Modification Agreement*, which scope of work will be based on the value of our Class "B" estimate, will require the full payment of the cost to complete our work up front. This payment would still be just an estimated amount; the proponents will ultimately pay 100% of the actual cost on completion of the work or will be reimbursed any balance of its advance payment.

The Agreement will also require that the proponents arrange and provide Hydro One with satisfactory registered easements to accommodate its assets. These easements must be registered prior to commencement of our work. All costs associated with securing the new easements will be borne by the proponents, including land survey, registration, legal, and consideration and allowances paid to land owners and/or parties otherwise having an interest in the lands occupied. These costs are not included in this estimate.

For any questions or concerns, please contact your Account Executive, **Elsy Aceves** at:

**Key Account Management**

**Recoverable Transmission Modifications**

**483 Bay Street, North Tower 13th Floor, Toronto, ON, M5G 2P5**

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*This estimate is valid for 120 days from June 27<sup>th</sup> 2016.*

**DISCLAIMER**

*Any change in the scope of work, as defined in this proposal, may result in a change to the project costs and the project schedule. All scope changes to this project must be in writing to Hydro One Key Account Management, which will advise the proponents of any cost and*

*schedule impacts. No scope changes will be implemented until written approval has been received from Hydro One Asset Management accepting new cost and schedule impacts.*

## Feasibility Study (*accurate in the range $\pm 50\%$* )

### Transmission Line Relocation/Modification Cost Estimate

Appropriation Request # 23852 WBS# 700026392

Part 2: Development of the Port Lands Area

**REV 1 June 27<sup>th</sup> 2016** (*Original May 4<sup>th</sup>, 2016*)

#### Background

The Toronto Region Conservation Authority (TRCA), Waterfront Toronto (WT) and the City of Toronto (CoT), hereafter known as the 'three co-proponents', are working on long term plans for the Port Lands Area. The existing Hydro One Network (HON) transmission facilities between Don Fleet Junction/Mill Creek Junction and Basin TS will be affected by the proposed plans. TRCA, WT and CoT requested Hydro One (HONI) to carry out this feasibility study to provide budgetary costs for potential modification/relocation of HONI facilities to facilitate the development of the Port Lands area.

The purpose of this study report is to provide feasibility input and budgetary cost estimates with +/- 50% accuracy of a number of alternatives to mitigate the impact of the proposed work.

The Project for the purpose of this study was broken down into two parts:

- Part 1. Don Mouth Naturalization and Port Lands Flood Protection Project (DMNP)
- Part 2. Development of the Port Lands Area

#### **This report covers Part 2: Development of the Port Lands Area**

#### Current

This feasibility study covers the long term development of the Port Lands area and a desire on the part of the co-proponents to reconfigure/bury overhead HON facilities in the area to facilitate a Light Rail Transit (LRT) system along Commissioner Street and the revitalization of the Film Studio Precinct.

Additionally, new connections across the Ship Channel are being explored in the vicinity of the Basin TS through a Municipal Class EA.

This work primarily impacts HONI overhead tower line carrying circuits H6LC/H8LC/H9EJ/H10EJ between Basin TS and Don Roadway/Lakeshore Blvd. Other potential impacts include tower locations within the Basin TS to accommodate a southerly extension of Broadview Avenue across the Ship Channel, and extension of Basin Street through Basin TS.



Figure 1

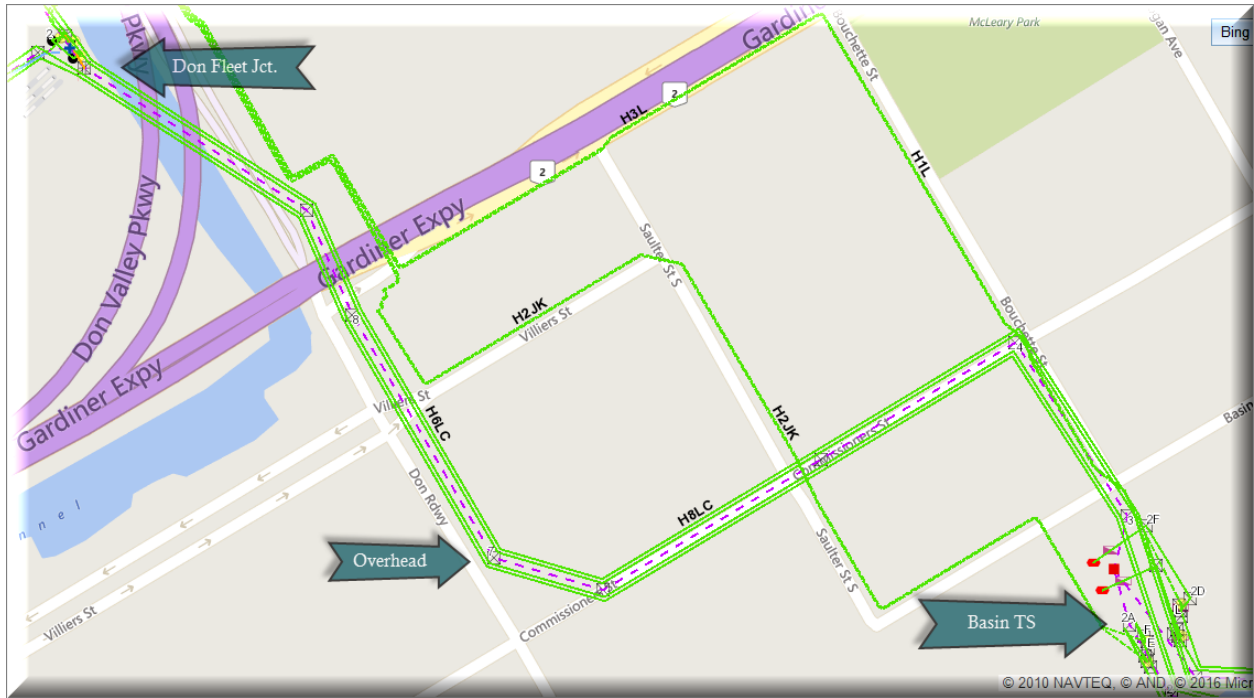
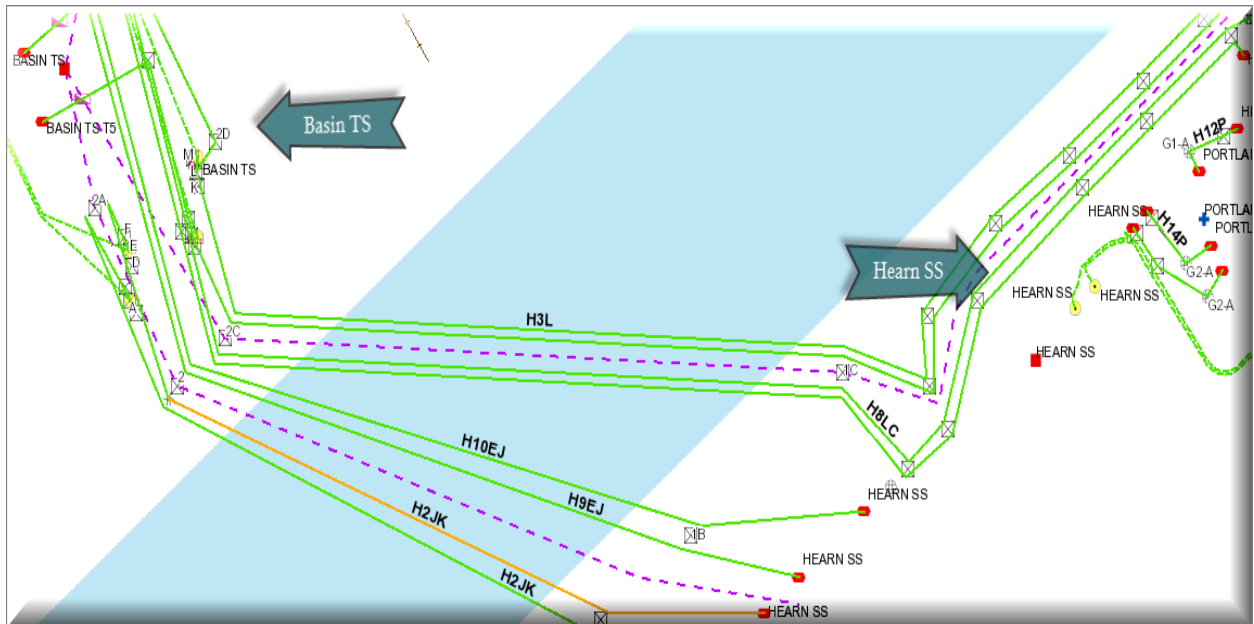


Figure 1A



## Engineering Findings – Summary

All required Environmental and Real Estate requirements are to be provided and met by the proponents.

This section covers work to facilitate proponents' plans for the redevelopment of the Port Lands area. The following alternatives are to be considered:

**NOTE:**

*HST is extra*  
*I/S date would be driven by outage and resources availability, Real Estate requirements and Environmental approvals*

- 1) **Bury all above ground wires south of Lakeshore to Basin TS - Relocate the circuits H6LC/H8LC/H9EJ/H10EJ from overhead tower line to underground between Basin TS and Don Fleet Jct. south of Lakeshore Blvd East**

*Estimated Cost: \$63,000,000.00 based on 2016 prices accurate in the range ± 50%*

**Note:** The circuits that will be undergrounded are 115 kV overhead H6LC, H8LC, H9EJ, H10EJ from Hearn GS to Don Fleet junction. Proponent shall reserve the land for HONI at Don Fleet Jct. to accommodate the overhead terminal towers to underground potheads of these underground circuits. Cost and availability of space at Don fleet JCT is not taken into account in this estimate

- 2) **Reconfigure Basin TS to accommodate Bouchette Street extension.**

- i) Reroute from existing Basin TS H2JK Ca1 & Ca2, H1L, H3L 115 kV circuits to new Basin TS

*Estimated Cost: \$47,000,000.00 based on 2016 prices accurate in the range ± 50%*

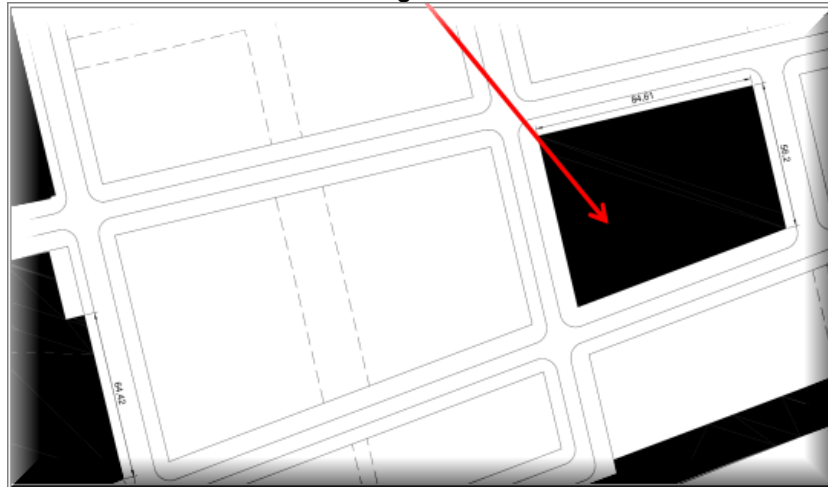
- ii) Reconfigure Basin TS to accommodate Bouchette Street extension.

*Estimated Cost: \$60,000,000.00 based on 2016 prices accurate in the range ± 50%*

Footprint requirement was based on historic information from previous projects that would allow station buildings (Hydro One's and Toronto Hydro) plus road access, fencing and noise barriers. Required estimated area should be 50m x 45m and based on the information provided by proponents on available spaces and on approximate dimensions it is possible to utilize the 60m by 50m area shown on Figure 2 below, which aligns with an area behind a heritage building, please note that the new station must be built prior to affecting existing station.

**Note:** The existing underground cables H1L, H3L, H2JK1, H2JK2 from Don Fleet/Mill St. Jct. to existing Basin TS will be relocated to the new Basin TS, and then underground cables from new Basin TS to Hearn SS. The tall overhead towers over the channel will be removed. Some of the small towers inside Hearn SS may also be removed but will depend on the future layout pending on the underground routes under the channel.

Figure 2



ASSUMPTIONS AND RISKS - ALL OPTIONS:

- This estimate does not include the removal of Basin TS, the towers over the channel, existing Basin TS and Hearn SS (including conductor, hardware and foundations etc.).
- The proposed cable route is highly congested. It will be very difficult to get adequate space for 4 circuits without thermal interference and manholes for cable splices
- Cable lengths are approximate
- Soil thermal resistivity is assumed to be 1.0 C-w/m. If actual site measurement exceeds this value, duct bank dimension and space requirement may increase.
- Cable ducts across road crossings are installed by horizontal directional drilling method
- Environmental costs not included in this estimate
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