



STAFF REPORT ACTION REQUIRED

New Implementation Approach for the F.G. Gardiner Expressway Revised Strategic Rehabilitation Plan

Date:	November 23, 2016
To:	Executive Committee
From:	Deputy City Manager, Cluster B Deputy City Manager & Chief Financial Officer
Wards:	Ward 5 – Etobicoke-Lakeshore Ward 6 – Etobicoke-Lakeshore Ward 13 – Parkdale-High Park Ward 14 – Parkdale-High Park Ward 19 – Trinity-Spadina Ward 20 – Trinity-Spadina Ward 28 – Toronto Centre-Rosedale Ward 30 – Toronto-Danforth
Reference Number:	P:\2016\Cluster B\TEC\EX16002 (AFS#22266)

SUMMARY

This report provides a summary of the current issues and concerns surrounding the previously approved procurement strategy for implementation of the F.G. Gardiner Expressway Revised Strategic Rehabilitation Plan and recommends approval of a new implementation approach that would permit the City to proceed as quickly as possible with the F.G. Gardiner Expressway's urgent rehabilitation needs.

The new approach involves:

1. Implementing the necessary rehabilitation work for the “elevated” section, west of Cherry Street, and the entire “at-grade” section of the Expressway using multiple contracts under an accelerated design-bid-build approach;
2. Incorporating construction contract terms and conditions to reduce schedule risk and promote additional opportunities for acceleration of the work; and,
3. Undertaking the preliminary engineering design for the implementation of the Gardiner East Environmental Assessment Hybrid Alternative Design 3, incorporating, where feasible, the scope of work for relevant elements of other

large projects planned within and adjacent to the Gardiner East work zone, in order to assess project risks and construction schedule before deciding on an appropriate project delivery approach.

The new approach recommended in this report provides for the phasing of the rehabilitation based on the current structural condition of the Expressway, incorporates proven techniques for mitigating the anticipated traffic congestion associated with this scale of construction, and provides the necessary additional technical information required to fully assess project risks and opportunities to advance the construction of other projects within the work zone of the eastern section of the Gardiner Expressway as one integrated project.

RECOMMENDATIONS

The Deputy City Manager, Cluster B, and the Deputy City Manager & Chief Financial Officer recommend that:

1. City Council authorize the Executive Director, Engineering & Construction Services, to proceed with the new approach for the implementation of the Revised Strategic Rehabilitation Plan for the F.G. Gardiner Expressway, as described in the section of this report titled, " New Approach for Implementation of the Revised Strategic Rehabilitation Plan".
2. City Council direct the General Manager, Transportation Services, to include the revised cash flows associated with the new approach to the implementation of the Revised Strategic Rehabilitation Plan for the F.G. Gardiner Expressway within the Transportation Services 2017-2026 Capital Budget and Plan for Council's consideration.
3. City Council direct the Executive Director, Financial Planning, Executive Director, Engineering & Construction Services, and General Manager, Transportation Services, to report annually on the status of the implementation of the Revised Strategic Rehabilitation Plan for the F.G. Gardiner Expressway.

Financial Impact

The recommended approach for implementation of the F.G. Gardiner Expressway Revised Strategic Rehabilitation Plan will result in an estimated increase of \$15.2 million in capital expenditures to the Transportation Services Capital Budget and Plan over the 2017 to 2026 planning period.

- An estimated \$1.34 billion in funding will also be required beyond the 10-Year Capital Plan (2027 and 2039).

Additional debt funding to fund the Revised Strategic Rehabilitation Plan using the recommended approach will be \$863.1 million, which is much greater than the \$15.2 million in increased capital expenditures. The increased debt is attributed to the following:

- \$15.2 million in added capital expenditures to be funded from debt;
- \$820 million in added debt arising from the removal of previously anticipated federal funding; and,
- \$29 million in added debt following the removal of funding from the Capital Financing Reserve Fund that would have occurred in the year 2026, where based on accelerated cash flows, expenditures are no longer anticipated to occur.

Immediate Financial Impacts

Tables 1 to 3 present the originally planned cash flows and funding sources compared to the revised funding required for the recommended approach for implementation of the F.G. Gardiner Expressway Revised Strategic Rehabilitation Plan.

Table 1. Original Cash Flows and Funding Sources for the Period 2017 – 2026 (millions)

\$Millions	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Year
Cash Flow											
Original	20.9	11.6	11.6	11.6	11.6	11.6	2,102.6	29.0	29.0	29.0	2,268.2
Funding Source											
Cap. Fin. RF	20.9	11.6	11.6	11.6	11.6	11.6	286.2	29.0	29.0	29.0	451.8
Federal							820.0				820.0
Debt							996.4				996.4

Table 2. Cash Flows and Funding Sources for the New Approach for the Period 2017 – 2026 (millions)

\$Millions	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Year
Cash Flow											
New Approach	3.0	111.9	215.2	220.6	228.1	250.1	256.3	998.1			2,283.4
Funding Source											
Cap. Fin. RF	3.0	29.4	11.6	11.6	11.6	11.6	238.8	106.5			423.9
Federal											0.0
Debt		82.5	203.7	209.1	216.6	238.5	17.5	891.6			1,859.5

**Table 3. Cash Flow and Funding Source Changes by Year for the Period 2017 – 2026
(millions)**

\$Millions	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Year
Cash Flow											
Change	-17.8	100.3	203.7	209.1	216.6	238.5	-1,846.2	969.1	-29.0	-29.0	15.2
Funding Source											
Cap. Fin. RF	-17.8	17.8					-47.4	77.5	-29.0	-29.0	-27.9
Federal							-820.0				-820.0
Debt		82.5	203.7	209.1	216.6	238.5	-978.8	891.6			863.1

As shown in Table 3, the new implementation approach results in an estimated \$15.2 million in additional capital expenditures and an estimated \$863.1 million in added debt over the 10 year (2017 – 2026) period compared to the original 2017 – 2026 Capital Plan for the F.G. Gardiner Expressway Revised Strategic Rehabilitation Plan.

Post 2026 Financial Impacts

An estimated \$1.34 billion in funding will also be required beyond the 10-Year Capital Plan (between 2027 and 2039) to complete the implementation of the Revised Strategic Rehabilitation Plan. The estimated cost is based on replacement of the bridges over the Humber River on the western part of the Expressway, replacement of box girders and bridge deck, steel coating of the west deck and ramps, and bent re-facing.

Revised Total Project Costs

Table 4 shows the total estimated project costs for the New Implementation Approach for the F.G. Gardiner Expressway Revised Strategic Rehabilitation Plan. The annual cash flow and funding source requirements for the new approach for implementation of the Revised Strategic Rehabilitation Plan are presented and compared to the original \$2.6 billion total project (construction) cost in Attachment 1.

Table 4. Total Project Costs for the New Implementation Approach for the F.G. Gardiner Expressway Revised Strategic Rehabilitation Plan (millions)

Period	Total Estimated Project Cost
2017 - 2026	\$2,283
2026 - 2039	\$1,340
2017 – 2039 (Total)	\$3,623

Staff will continue to refine cost estimates and identify potential funding sources in the period beyond the initial 10 year implementation period.

Funding Assumptions

Should Council decide at some point in the future to implement tolling, such revenues could be used to offset part or all of the net costs associated with implementation of the new approach for implementation of the Revised Strategic Rehabilitation Plan

The Deputy City Manager & Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

Strategic Rehabilitation Plan for the F.G. Gardiner Expressway

At its meeting on April 1 to 3, 2014, in consideration of the report and presentation about the Strategic Rehabilitation Plan for the F.G. Gardiner Expressway, City Council (a) approved the Accelerated Bridge Construction approach as the method of construction for implementation of the Plan, based on maintaining the Expressway in its current configuration; (b) requested a further report to include a project delivery schedule, multi-year cash flow requirements and financing strategy, proposed project delivery model and proposed procurement process for the implementation of the Strategic Rehabilitation Plan; (c) advised staff to ensure that the Strategic Rehabilitation Plan be revised in the event that Gardiner East Environmental Assessment Study identified a preferred option other than “maintain”; (d) awarded Contract 13SE-19S, Tender Call 314-2013, to Grascan Construction Limited, for the replacement of the deck on the elevated section of the F.G. Gardiner Expressway, between Exhibition Place and Grand Magazine Street; and, (e) awarded Contract 13SE-21S, Tender Call 14-2014, to Soncin Construction Corporation for the rehabilitation of the F.G. Gardiner Expressway at-grade bridges between Park Lawn Road and the Humber River. The associated Council decisions can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.PW29.1> and
<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.PW29.3>

The report on the Strategic Rehabilitation Plan can be found at:

<http://www.toronto.ca/legdocs/mmis/2014/pw/bgrd/backgroundfile-67051.pdf>

The presentation about the Strategic Rehabilitation Plan to the Public Works & Infrastructure Committee by the Executive Director, Engineering & Construction Services, and the General Manager, Transportation Services, can be found at:

<http://www.toronto.ca/legdocs/mmis/2014/pw/bgrd/backgroundfile-67367.pdf>

At its meeting on June 10, 2014, City Council authorized the City Manager to retain the advisory services of the Ontario Infrastructure and Lands Corporation (IO) for the purpose of preparing a procurement options analysis in support of the implementation of the Strategic Plan for the Rehabilitation of the F.G. Gardiner Expressway. The Council decision can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.PW31.17>

At its meeting on September 30 and October 1 – 2, 2015, in consideration of the report on the F.G. Gardiner Expressway Strategic Rehabilitation Plan Procurement Strategy, City Council (a) approved the incorporation of the future outcome of the Gardiner East Environmental Assessment into the scope of work for the overall rehabilitation of the F.G. Gardiner Expressway; (b) authorized staff to proceed with an Alternative Financing and Procurement approach for the implementation of the Revised Strategic Plan, subject to the approval of Government of Canada funding of one-third of capital construction costs eligible for funding; (c) directed the City Manager to submit business cases to P3 Canada and Infrastructure Canada to formally request Government of Canada funding for the Revised Strategic Plan and reiterate the City's request to the Province of Ontario to

provide matching one-third funding of the capital cost of the Revised Strategic Plan; and, (d) authorized staff to negotiate and enter into an agreement with Ontario Infrastructure and Lands Corporation (IO), whereby IO would act as commercial procurement lead for the Alternative Financing and Procurement approach. The Council decision can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.EX8.12>

At its meeting on January 28, 2016, Executive Committee received a report from the Deputy City Manager & Chief Financial Officer related to the procurement strategy for the Strategic Rehabilitation Plan of the F.G. Gardiner Expressway Rehabilitation. The report provided the results of a third-party peer review of the methodology of the underlying Value for Money analysis as directed by Council. The information and report received by the Executive Committee can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.EX11.8>.

Gardiner Expressway and Lakeshore Boulevard East Reconfiguration Environmental Assessment and Integrated Urban Design Study

At its meeting on June 10 to 12, 2015, City Council adopted the "Hybrid" option as the preferred alternative for the Gardiner Expressway and Lake Shore Boulevard Reconfiguration Environmental Assessment Study and directed the Deputy City Manager, Cluster B, and the Deputy City Manager & Chief Financial Officer to report back to Executive Committee on incorporating the preferred alternative into the Strategic Plan for the Rehabilitation of the F.G. Gardiner Expressway, including a preferred procurement delivery option, project delivery schedule, multi-year cash flow requirements and financing strategy. The Council decision can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW4.1>

At its meeting on March 31 and April 1, 2016, City Council approved the Hybrid Alternative Design 3 as the Preferred Design for the Gardiner East Environmental Assessment and directed staff to report to the Budget Committee on implementation funding for the preferred Environmental Assessment alternative design following completion of Class C cost estimates. The Council decision can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.PW11.1>

ISSUE BACKGROUND

The City of Toronto owns and operates the F.G. Gardiner Expressway, a major arterial roadway that runs parallel to the Lake Ontario shoreline in the downtown core. The Expressway, which is shown in Figure 1, is 18 kilometres long and has “at grade” and “elevated” sections.



Figure 1. Map showing the F.G. Gardiner Expressway

The Expressway was constructed over an 11-year period from 1955 to 1966, and has been in service for over 60 years. The effects of weathering, salt, and increasing traffic loads have had an impact, and the concrete deck for the elevated section of the Expressway is approaching the end of its original design life. Details about the Expressway are presented in Table 5.

Table 5. Features of the “At Grade” and “Elevated” Sections of the F.G. Gardiner Expressway

Feature	At Grade	Elevated
Length and Location	11 kilometres long, starting at Highway 427 to about 300 metres east of Dufferin Street;	7 kilometres long, from just east of Dufferin Street to approximately Logan Avenue
Structures	32 structures (e.g., bridges and culverts);	335 bridge spans
Driving Lanes	6 to 10 driving lanes west of the Humber River 6 driving lanes east of Humber River	6 driving lanes and 17 ramps
Total Surface Area of Paved Traffic Lanes	~370,000 square metres (m ²)	~300,000 m ²
Posted Speed Limit	100 km/h west of the Humber River 90 km/h east of the Humber River.	90 km/h.

The "elevated" section of the Expressway has 3 main components, shown in the cross-section in Figure 2:

1. The "deck", which is the road surface and is composed of a layer of asphalt and waterproofing on top of reinforced concrete;
2. "Girders", which support the deck; and,
3. A series of 334 steel reinforced concrete "bents", which consist of a steel reinforced concrete pier cap that sits on top of steel reinforced concrete columns.

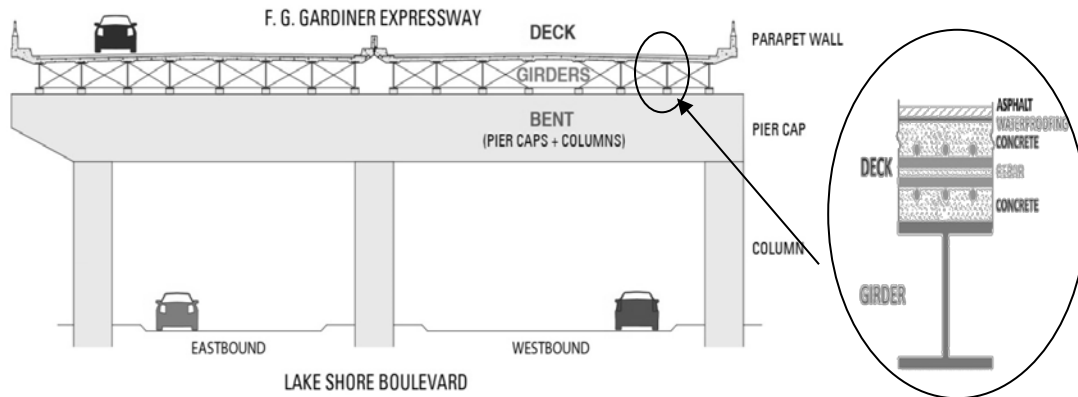


Figure 2. Typical cross-section of "elevated" section of the Expressway

In March 2014, drawing on detailed investigations and available condition assessment data for both the "at-grade" and "elevated" sections, a Strategic Plan for the rehabilitation of the Gardiner Expressway was completed and presented to the Public Works and Infrastructure Committee. The sections below explain the rehabilitation needs for the "at-grade" and "elevated" section of the Gardiner; the construction methodology proposed for parts of the "elevated" sections; and, the original procurement strategy for the Strategic Rehabilitation Plan.

Rehabilitation Needs of the "At-Grade" Sections of the Gardiner Expressway

Most of the bridges along the "at-grade" section of the Expressway are not in immediate need of replacement or major rehabilitation, although some minor rehabilitation is required. Rehabilitation work for the "at-grade" section of the Gardiner Expressway consists of the following:

- Interim repairs on a number of structures
- Overpass and underpass structural rehabilitation
- Overpass and underpass concrete patching repairs
- Pavement resurfacing/reconstruction
- Roadside safety improvements
- Drainage improvements (sewer and drain upgrades)
- Interchange reconfigurations at Kipling Avenue and Islington Avenue as per recently completed Environmental Assessments

Rehabilitation Needs of the "Elevated" Sections of the Gardiner Expressway

The bridge deck along much of the elevated portion of the Gardiner Expressway has deteriorated to the point where it is now very difficult to manage the Expressway to ensure a reasonable level of risk in maintaining the serviceability of the deck. Asphalt deterioration, concrete spalling of the deck soffit, and the risk of potential localized deck failures exist throughout the Expressway. Consequently, the concrete deck and barrier (parapet) walls on the elevated sections of the Expressway are in poor condition and considered to be at the end of their service life.

Of particular concern is the section of the Expressway between the Don Roadway and Jarvis Street, where the main deck and concrete barrier walls have been assessed as being in poor or very poor condition, requiring complete replacement as soon as possible. This section, which is referred to as the East Deck, is the subject of Gardiner East Environmental Assessment (EA). The resumption of the Gardiner East EA in 2013 necessitated a deferral of the original plans for the complete rehabilitation of the East Deck, pending the outcome of the EA.

As an interim measure, in 2013, Council approved repairs to address the urgent structural needs of the East Deck to extend the service life this section of the Expressway until 2020, when construction of the EA's preferred option was expected to begin. The interim repairs to the East Deck were completed at a total cost of approximately \$20 million, and included the installation of temporary timber bracing under the deck; localized concrete deck repairs; and, the replacement of severely deteriorated parapet walls.

Recently completed rehabilitation work on the precast concrete box girders on the Expressway between York Street and Jarvis Street has extended the service life of this section to 2035, at which point a complete replacement of the precast box girder and deck slab will be required. The substructure components (bents) vary in condition along the length of the Expressway, and some require extensive surface rehabilitation and, where necessary, could be scheduled in conjunction with deck replacement. Replacement of the barriers could be undertaken at the same time as the deck replacement. The remaining bents will need to be rehabilitated within the next 20 years, and all steel girders will need to be recoated within the next 20 years.

Accelerated Bridge Construction to Reduce Overall Time Needed for Rehabilitation

At the time the Strategic Rehabilitation Plan was presented to Council in 2014, the cost to rehabilitate the entire Expressway from Highway 427 in the west to Logan Avenue in the east was estimated to be \$1.9 billion over a 25-year period. This estimate was based on the assumption that an Accelerated Bridge Construction approach would be used to rehabilitate the elevated sections. This approach involves the construction of prefabricated sections, containing new girders and deck segments, constructed in advance at a remote facility and then transported to the site. The existing deck would be saw cut in

sections and each deck section, together with the supporting girders, would be removed, and the new prefabricated girders and deck segments would be hoisted into place.

The net effect of using this type of Accelerated Bridge Construction approach is that the time to rehabilitate the "elevated" section of the Expressway could be reduced by up to 40% when compared to the conventional approach, from an estimated 20-year construction period to 12 years or less. It is estimated that eliminating eight (8) years of traffic restrictions would reduce road user impacts by almost \$3 billion (\$400 million per year of construction). To further compress the construction schedule for the implementation of the Strategic Rehabilitation Plan, work for the "at-grade" sections would be bundled with the replacement of the deck along the "elevated" sections. In this way, one set of traffic restrictions would support multiple construction activities running concurrently.

At its meeting in April 2014, City Council approved the Accelerated Bridge Construction approach as the method of construction for implementation of the Plan, based on maintaining the Expressway in its current configuration. At the same time, Council requested further details regarding a proposed project delivery and procurement process for the Strategic Rehabilitation Plan for the F.G. Gardiner Expressway.

Engagement of Infrastructure Ontario and Identification of Procurement Strategy

In June 2014, Council authorized the retention of Ontario Infrastructure and Lands Corporation (IO) to assist with the identification of procurement options to implement the Strategic Rehabilitation Plan.

Quantitative and qualitative analyses of four procurement options were conducted by the City with the advisory support of IO, and sub-consultants (Ernst & Young, Hanscomb, and HDR):

1. Design-Bid-Build
2. Design-Build
3. Design-Build-Finance
4. Design-Build-Finance-Operate-Maintain

The results of the analyses resulted in the recommendation that implementation of the Strategic Rehabilitation Plan for the F.G. Gardiner Expressway should be pursued using an Alternative Financing and Procurement (public private partnership) approach, specifically Design-Build-Finance-Operate-Maintain (DBFOM). The main reasons for recommending this approach were:

- Cost and schedule certainty for design and construction, as well as for maintenance and operations, which would be realized by shifting the risk from the City to the private sector partner.

- Anticipated federal funding totalling \$820 million, or one-third of capital construction costs, based on the then existing federal funding programs administered by P3 Canada and the New Building Canada Fund.

At its meeting of September 30 to October 2, 2015, City Council authorized staff to continue to engage IO as the commercial procurement lead for the Alternative Financing and Procurement approach and to retain the necessary professional services required to implement the Revised Gardiner Expressway Strategic Plan using a DBFOM, subject to the approval of Government of Canada funding of one-third of capital construction costs. At that time, the total capital cost estimate for the construction portion of the Plan (excluding operations and maintenance) had increased to \$2.6 billion (inflated dollars), compared to the previous 2014 estimate of \$1.9 billion. The higher cost estimate was mainly related to:

- Scope modifications to include the Gardiner East hybrid (assumed to be an additional \$125 million in accordance with the base hybrid alternative, as considered by Council in June 2015);
- Inclusion of the proponent's financing costs during construction, where traditionally the City makes and finances payments during construction but does not bill them to the project (approximately \$230 million); and,
- The costs of managing risks transferred to the proponent, which protects the City against further exposure to related cost increases (approximately \$345 million).

COMMENTS

Since the September 2015 Council decision to proceed with the Alternative Financing and Procurement strategy, a number of developments have taken place that affect implementation of the Revised Strategic Rehabilitation Plan, and these are summarized below.

Gardiner East EA – Final Decision

Following Council's adoption of the Revised Strategic Rehabilitation Plan, further work was undertaken on the Gardiner Expressway and Lake Shore Boulevard East Reconfiguration Environmental Assessment culminating in the identification of Hybrid Alternative Design 3 as the preferred alternative. Hybrid Alternative Design 3, shown in Figure 3, maintains the link to the Don Valley Parkway, moves the Expressway away from the Keating Channel, and rebuilds it closer to the existing rail corridor.

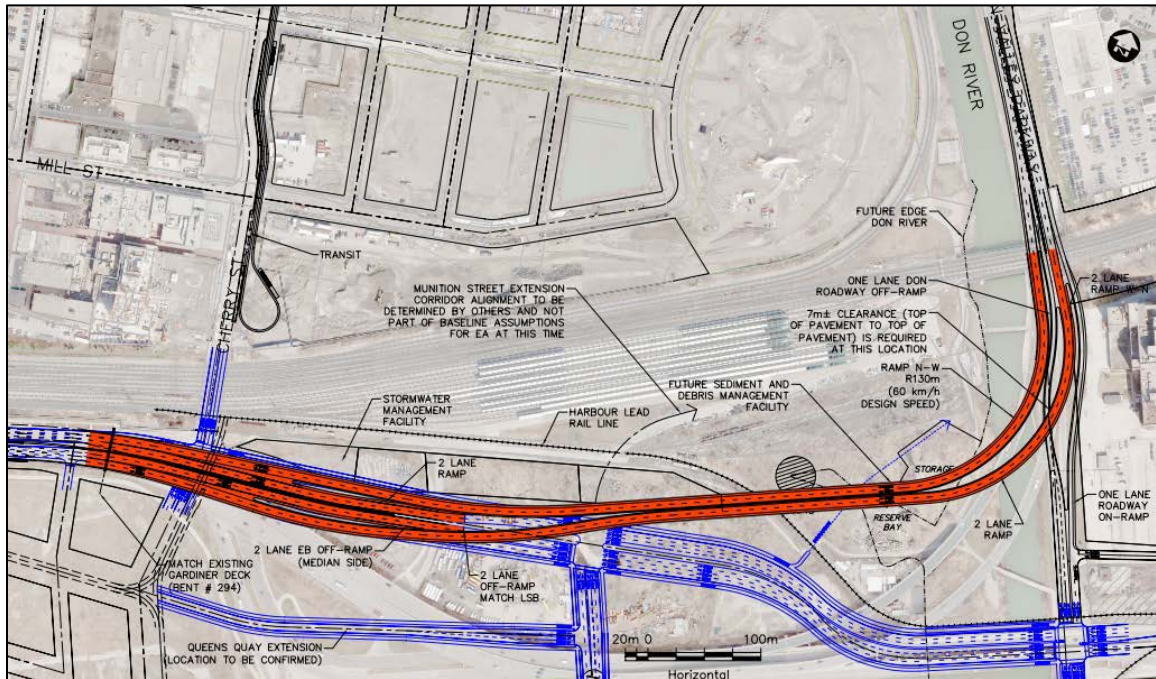


Figure 3. Plan view of Gardiner East Hybrid Alternative Design 3

Legend:	■	Re-aligned Gardiner East ramps to DVP
	■	Reconstructed Lake Shore Blvd

As noted above, the \$2.6 billion cost for the Revised Gardiner Expressway Strategic Plan included \$524 million for the “base case” design of the Gardiner East EA Hybrid preferred alternative. With the identification and adoption of Hybrid “Alternative Design 3”, additional capital funding of \$194 million will be required, bringing the order of magnitude cost estimate for the Gardiner Expressway and Lake Shore Boulevard East Reconfiguration to \$718 million. This cost estimate was developed for the purposes of comparing costs for the various design alternatives presented in the EA, and will undergo further refinement through the development of a Class C cost estimate, as described in the Gardiner East EA Staff Report considered by Council at its meeting of March 31, 2016. It is noted that the engineering consultant working on the cost estimates has consistently advised of a potential variance of up to plus or minus 20%.

Furthermore, the cost of public realm improvements east of Jarvis Street, which were identified as part of the integrated urban design component of the Gardiner East EA, are not included in the \$2.6 billion estimate for the Revised Gardiner Expressway Strategic Plan budget, nor are the costs included in the Hybrid Alternative Design 3 cost estimate of \$718 million. While the public realm improvements have not been fully scoped, the initial estimate is \$60 million (+/- 20%), and is subject to further cost refinement.

City Council's approval of the Hybrid Alternative Design 3 requires the reconfiguration of the easterly 3 spans of the Metrolinx rail bridge over the Don Valley Parkway (DVP).

The Metrolinx rail bridge over the Don River and the DVP has limited space for any required lane reconfiguration through the underpass due to the location of the existing structural supports for the bridge. As a result of the physical constraints of the rail bridge, a widening of the bridge underpass is required to permit the northern alignment of the new ramp connecting the Gardiner Expressway with the DVP as proposed in Hybrid Alternative Design 3. Widening the rail bridge presents both technical issues and schedule challenges and will require significant planning and pre-engineering investigation. Additionally, the bridge is owned by a third party (Metrolinx), and any changes would need to be negotiated and fully scoped before proceeding to design and ultimately construction.

Other Waterfront Revitalization Projects within the Gardiner East Work Zone

There are two other large scale construction projects planned within the Gardiner East work zone, east of Cherry Street:

1. Rail Track Expansion/Unilever GO Station

On June 22, 2016, Metrolinx announced plans for a new GO station, the Don Yard/Unilever station, to be located between Cherry Street and Eastern Avenue. The new station will require changes to the existing Metrolinx rail bridge, which will need to be modified and widened to accommodate the new platforms. This, in turn, will result in an additional constraint for the Gardiner/DVP ramp reconfiguration. As noted above, the work related to the widening of the rail bridge will, in itself, be a major undertaking.

The new Don Yard/Unilever GO Station and the proposed Track Expansion and Electrification are planned Metrolinx projects. Although they have not yet been approved nor have any commitments been made to fund them, the City should take the prudent approach of working collaboratively with Metrolinx to ensure Metrolinx projects are coordinated and integrated with implementation of the Revised Strategic Rehabilitation Plan, particularly east of Cherry Street, and the implementation of the Hybrid Design Alternative 3.

2. Port Lands Flood Protection Project

The Port Lands Flood Protection Project is a collaborative initiative among the Toronto and Region Conservation Authority, the City of Toronto, and Waterfront Toronto. Figure 4 shows the Project study area.

The Port Lands Flood Protection Project (PLFPP) will protect a 290-hectare (715 acre) parcel of downtown waterfront land that is continually at risk of flooding from the Don River. The project will naturalize the mouth of the Don River, provide flood protection to the area by creating new outlets for the Don River that will safely convey flood waters into Lake Ontario, improve water quality, create new parks and wildlife habitats and unlock significant economic development potential in the underused Port Lands area.

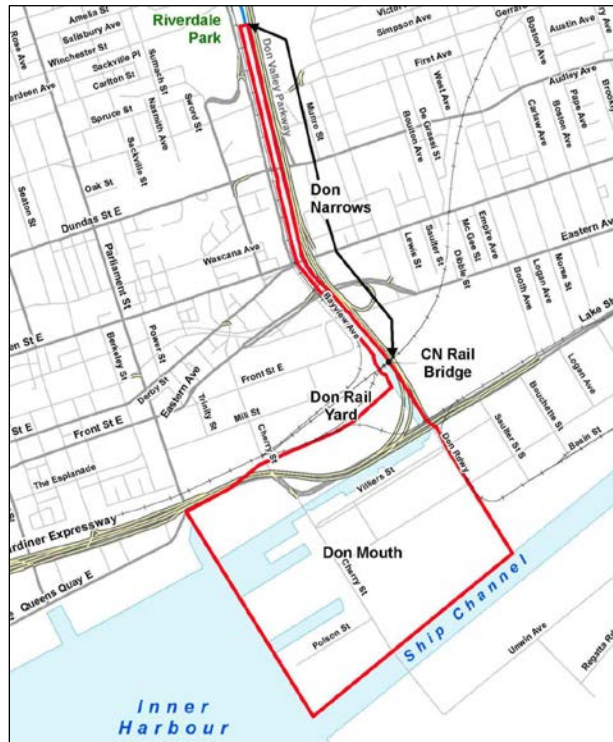


Figure 4. Port Lands Flood Protection Project Study Area.

The estimated cost for the PLFPP is approximately \$1.25 billion (as-spent dollars) and is expected to take seven (7) years to construct. Site preparation and demolition work is anticipated to start in Q4 2017; however, this is subject to federal and provincial funding decisions. Furthermore, there is significant risk to the project schedule and budget due to uncertainty in regards to geotechnical conditions, contaminated soil and conflicts with underground utilities that characterize the area, along with the lack of an established environmental regulatory approval process for creating a river valley in a brownfield.

As various portions of the work for the approved Gardiner East EA project, Metrolinx Rail Track Expansion/Unilever GO Station Project, and the Port Lands Flood Protection Project directly overlap with respect to work zone area and schedule, opportunities may exist to shorten schedules and provide cost efficiencies by integrating certain aspects of these projects within the overall scope of the Revised Strategic Rehabilitation Plan for the F.G. Gardiner Expressway.

No Confirmation of Federal or Provincial Funding Assistance

The original procurement strategy presented and adopted by Council in September 2015 assumed the City would be eligible for federal funding of up to one-third of the capital costs, equal to \$820 million, which reduced the City's net capital cost to \$1.75 billion. Application for federal funding was contingent on implementing the Revised Strategic Rehabilitation Plan using a Design-Build-Finance-Operate-Maintain (DBFOM) approach.

Upon receiving Council approval to proceed with the DBFOM approach, staff prepared a comprehensive business case and applications for capital funding of \$820 million. The applications were submitted to P3 Canada and the New Building Canada Fund by the March 31, 2016 due date.

In June 2016, the City was advised by a representative from P3 Canada that the F.G. Gardiner Expressway Strategic Rehabilitation Plan Business Case was not presented at the June 2016 Board meeting (this was a necessary step in the process to receive confirmation of federal funding in the Fall of 2016).

Similarly, the Province has not provided any indication that it is prepared to fund the project, citing its 2014 and 2015 budget priorities to instead invest approximately \$15 billion over ten years in regional transit projects.

P3 Approach Costing Update

At the end of August 2016, IO provided the City with revised cost estimates for the delivery of the Revised Strategic Rehabilitation Plan using the DBFOM procurement model. Table 6 shows the original (September 2015) and revised cost estimates.

Table 6. Comparison of September 2015 and August 2016 Revised Strategic Rehabilitation Plan Cost Estimates

	Original Cost Estimate as at September 2015 \$ millions (As spent dollars)			Revised Cost Estimate as at August 2016 \$ millions (As spent dollars)		
	East of Jarvis	West of Jarvis	Total	East of Jarvis	West of Jarvis	Total
Capital Cost	\$960	\$1,500	\$2,460	\$1,428	\$2054	\$3,482
Professional Services	\$40	\$70	\$110	\$64	\$91	\$155
Total Capital Costs	\$1,000	\$1,570	\$2,570	\$1,492	\$2,145	\$3,637

The total capital cost estimate for the implementation of the entire Plan has been revised to \$3.6 billion (as-spent dollars), compared to the previous estimate of \$2.6 billion. The higher cost estimate is attributable primarily to:

- The refined (Class "C") cost estimate that was developed by IO for the Hybrid Design Alternative 3 was \$1,428 million (as-spent dollars). The estimate assumed a P3 procurement strategy and included construction financing costs, financial administration costs, ancillary (e.g., legal) costs, and extra contingency allowance. Thus, the difference between the September 2015 "base" Hybrid capital cost estimate and the refined (Class "C") cost estimate for the Gardiner East Hybrid Alternative Design 3 is \$468 million.
- Further refinement of an existing Class "C" cost estimate for the western section of the Gardiner Expressway (West of Jarvis Street) was undertaken by IO resulting in a revised total amount of \$2,054 million, which included contingency, ancillary, construction financing, and financial administration costs. The refinement also included additional scope mainly resulting from the recommendations contained in a recently completed due diligence condition assessment report. Thus, the difference between the original and further refined capital cost estimate for the western section of the Gardiner increased by \$554 million over the original September 2015 estimate of \$1,500 million.

The success of a P3 (e.g., DBFOM) project in meeting both cost and schedule expectations relies on a high degree of certainty regarding project scope and risk. Any uncertainty about project scope or schedule represents increased risk. To compensate for the increased risk, the private sector partner will price its services accordingly. Due to the complexity of the DBFOM procurement model, it is imperative that the scope and schedule (and any other inherent project construction risks) are clearly identified. This is not possible in regards to the construction of the Gardiner East Hybrid Alternative Design 3; nor is it possible for any of the aspects of other projects planned within the Gardiner East work zone. Until such time as the risks and opportunities associated with the above-noted projects are fully explored and confirmed, advancing the rehabilitation of the eastern portion of the Gardiner Expressway as a public-private-partnership represents an unacceptable financial risk to the City.

Instead, once the construction and schedule risks for the eastern portion of the Gardiner have been fully assessed, it is proposed that a new options analysis be undertaken. A final determination can then be made about the inclusion of elements of the other projects within the overall scope of the Revised Strategic Rehabilitation Plan. As an important first step, it is proposed that a preliminary engineering design assignment be issued for the Gardiner East Hybrid Alternative 3, to advance the design to a 30% completion, wherein project costs, schedule and risk can be more fully and accurately assessed. In addition, consultations with Metrolinx and Waterfront Toronto should take place at the same time to explore the merits and opportunities of incorporating components of their projects into the Revised Strategic Rehabilitation Plan.

New Approach for Implementation of the Revised Strategic Rehabilitation Plan

As noted above, given the current condition of the Gardiner Expressway, there is an urgent need to proceed with the implementation of the Revised Strategic Rehabilitation Plan. Of particular concern is the condition of the East Deck (east of Jarvis Street) where the interim repairs recently completed are only expected to extend the service life of the Expressway to 2020.

The issues now facing implementation of the Revised Strategic Rehabilitation Plan are:

- Higher project cost estimates;
- Lack of federal funding confirmation and lack of provincial funding; and,
- Other impending projects affecting the construction of the eastern portion of the Gardiner Expressway, some of which are not yet fully defined in terms of scope or schedule, and which will require coordination and integration into the overall Plan.

Taken together, the above-noted issues represent significant pressures on the budget and overall timetable for the implementation of the Plan, and a new implementation approach is being recommended. The new approach is based on segregating work on the Gardiner Expressway east and west of Cherry Street. Furthermore, a phased approach, shown schematically in Attachment 2 and based on a prioritization of Gardiner Expressway rehabilitation needs identified through condition assessments and with a view to minimizing traffic disruption, is proposed as part of the new approach:

East of Cherry Street

The eastern section of the Gardiner Expressway involves construction of new elevated bridge decks connecting the Expressway to the Don Valley Parkway and based on Hybrid Design Alternative 3. This section is also subject to integration and coordination with the Metrolinx Rail Track Expansion/Unilever GO Station Project and the Port Lands Flood Protection Project. Given these other large scale projects planned within the Gardiner East work zone, further work is required to ascertain project risks, scope and delivery schedule, so that opportunities for integration, where appropriate, can be identified.

For the section of the Gardiner Expressway east of Cherry Street, it is recommended that an engineering consultant be hired to develop a preliminary engineering design for the Gardiner East EA Hybrid Design Alternative 3, incorporating requirements of other projects in the work zone, as may be necessary, in consultation with Metrolinx, Waterfront Toronto, and others as appropriate.

Once the preliminary engineering design is completed, and the project costs, schedule and risks are fully assessed, it is proposed that a value for money analysis be undertaken to ascertain whether the implementation of this section of the Plan could be delivered as a public-private-partnership (P3) project, and that the Deputy City Manager, Cluster B, and the Deputy City Manager & Chief Financial Officer determine the appropriate delivery approach.

West of Cherry Street

For the section of the Gardiner Expressway west of Cherry Street to Highway 427, it is recommended that the City proceed with a series of phased contracts utilizing the traditional design-bid-build (DBB) approach.

The rehabilitation of the "elevated" section of the Gardiner Expressway between Jarvis Street to Cherry Street would begin as an immediate first priority because, as noted earlier, this section of the Expressway is at the end of its service life.

As shown in Attachment 2, the new approach involves scheduling rehabilitation work for the "at-grade" section with the replacement of deck for the "elevated" section, to help reduce overall traffic congestion. To compress the construction schedule, work on the "at-grade" sections could be bundled with the replacement of the deck along the "elevated" sections. This this way, one set of traffic restrictions would support the multiple construction activities running concurrently.

Engineering & Construction Services (ECS) Division staff have successfully completed several projects on the "at-grade" and "elevated" sections of the Gardiner Expressway within budget and schedule. In addition, ECS staff have been able to accelerate the completion of some road and bridge construction projects. For example, use of an acceleration cost payment scheme allowed ECS to complete work on the West Deck of the Gardiner Expressway a full 6.5 months ahead of schedule for a time saving of 27% compared to the original construction schedule. This translated to road user cost savings of approximately \$200 million at a construction cost premium that was only 8% of the final contract cost.

As proposed in the original implementation plan, the Accelerated Bridge Construction approach for the "elevated" section of the Expressway would be used, where feasible (e.g., in some areas site constraints such as residential or commercial structures abutting the Expressway may preclude this approach). This construction method could reduce the implementation schedule by 15% to 40% in comparison to the conventional, build-in-place approach to bridge deck rehabilitation.

To further minimize traffic disruption, terms and conditions could be included in the construction contracts to incentivize contractors to complete projects ahead of schedule, where feasible. The contracts could also have a provision to assign a prescribed lane rental fee, charged to the contractor, for each day the specified completion time is delayed. Other options that could be employed to help provide schedule and cost certainty include “Cost plus Time Bidding”, which is explained in the report titled "Applying Acceleration and Delay Costs in Construction Contracts" by the Executive Director, Engineering & Construction Services to the Public Works and Infrastructure Committee. The report was subsequently considered by Council and can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW6.2>

Incorporation of the above-noted terms and conditions into construction contracts would be done in consultation with Legal Services.

In accordance with the 2017 capital budget Guidelines and Principles published by the City's Financial Planning Division, ongoing status reporting about the Revised Strategic Plan for the F.G. Gardiner Expressway will be provided. The quarterly capital variance reports will include details about the overall status of the project, including budget/financial status (including year-to-date and life-to-date information); schedule status (milestones and milestone slippages, expected completion date); major challenges and project risks (including any costs escalations); risk mitigation strategies; and customer and stakeholder relations/impacts.

Impact of New Approach on Transportation Services 2017-2026 Capital Budget and Plan

The 2016 to 2025 Capital Budget and Plan for Transportation Services includes \$2.315 billion in funding for implementation of the Revised Strategic Rehabilitation Plan, which reflects the payments required for the original estimate of \$2.6 billion in total construction costs over the ten (10) year period. However, most of this funding (\$2.1 billion) was budgeted in 2023, the year in which the implementation of the Plan, through a P3 procurement model, was expected to achieve the milestone of “substantial completion” and where a payment of 85% of the total capital construction cost was to be made to the private sector partner delivering the project.

The new approach, described above, represents an overall investment of \$2.28 billion for the period 2017 to 2026, comparable to the current 10 year project budget as shown in Attachment 1, but with the following significant budget pressures:

- A funding shortfall of \$820 million over the ten (10) year period, due to the absence of the expected Federal funding contribution; and,

- A budget shortfall of an estimated \$984 million for the five (5) year period from 2018 to 2022, given the new "pay as you go" approach. The reason for the shortfall is based on the new approach, which no longer includes an 85% substantial completion payment in 2023.

It should be noted that an estimated \$1.34 billion will also be required between 2027 and 2039 to complete the implementation of the Plan. This estimated cost is based on replacement of the bridges over the Humber River on the western part of the Expressway, replacement of box girders and bridge deck between York Street and Jarvis Street, steel coating of the west deck and ramps, and bent re-facing.

Overall Project Schedule

An aggressive schedule is proposed for the implementation of the Revised Strategic Rehabilitation Plan using the new approach. This is due to the urgent rehabilitation needs that have been identified through condition assessments and described earlier in this report.

The proposed implementation schedule for the project is presented schematically in Attachments 2 and 3, together with the expected timelines and duration of traffic disruption. As noted in Attachment 2, construction for the implementation of the Plan, for the area west of Cherry Street to Highway 427, would extend from 2018 to 2023. At this time, construction for the work east of Cherry Street is expected to begin in 2021 and extend to 2024. In total, this work represents an anticipated traffic impact lasting 7 years, from 2018 to 2024.

As shown in Attachment 3, the rehabilitation of the "elevated" section of the Gardiner Expressway between York Street and Jarvis Street will be undertaken starting in 2035, because it is in relatively better condition. This rehabilitation work would extend to 2037, representing a traffic impact that is estimated to last for 3 years. Also noted in Attachment 3 is the scheduling of other rehabilitation work that is not expected to impact traffic on the Gardiner Expressway, such as recoating the steel girders (under the concrete deck of the "elevated" section), and the re-facing the bents (the concrete support structures along the "elevated" section). In total, this work is expected to begin in 2027 and be completed by 2038.

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- Attachment 1 – Annual Cash Flow Requirements for the New Approach for Implementation of the Revised Strategic Rehabilitation Plan
- Attachment 2 – Proposed Implementation Schedule for the New Approach (2018-2024)
- Attachment 3 – Proposed Implementation Schedule for the New Approach (2027-2039)

Attachment 1

Annual Cash Flow Requirements for the New Approach for Implementation of the Revised Strategic Rehabilitation Plan

Gardiner Rehabilitation Procurement Options: Cash Flow Impact

\$ Million (inflated) Capital Construction Costs

New Approach Comparison	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total 10 Year
New Approach Cash Flows	3	112	215	221	228	250	256	998	0	0	2,283
Transportation Services Draft Budget (2017-2026)	21	12	12	12	12	12	2,103	29	29	29	2,268
Difference	-18	100	204	209	217	239	-1,846	969	-29	-29	15

Total 2027 - 2039	TOTAL PROJECT COSTS
1,340	3,623

DBFOM Comparison	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total 10 Year
P3/AFP DBFOM Cash Flows (includes Financing costs)	18	19	11	11	11	11	2,980	62	56	51	3,230
Transportation Services Draft Budget (2017-2026)	21	12	12	12	12	12	2,103	29	29	29	2,268
Difference	-3	7	-1	-1	-1	-1	877	33	27	22	962

Total 2027 - 2039	TOTAL PROJECT COSTS
1,045	4,275

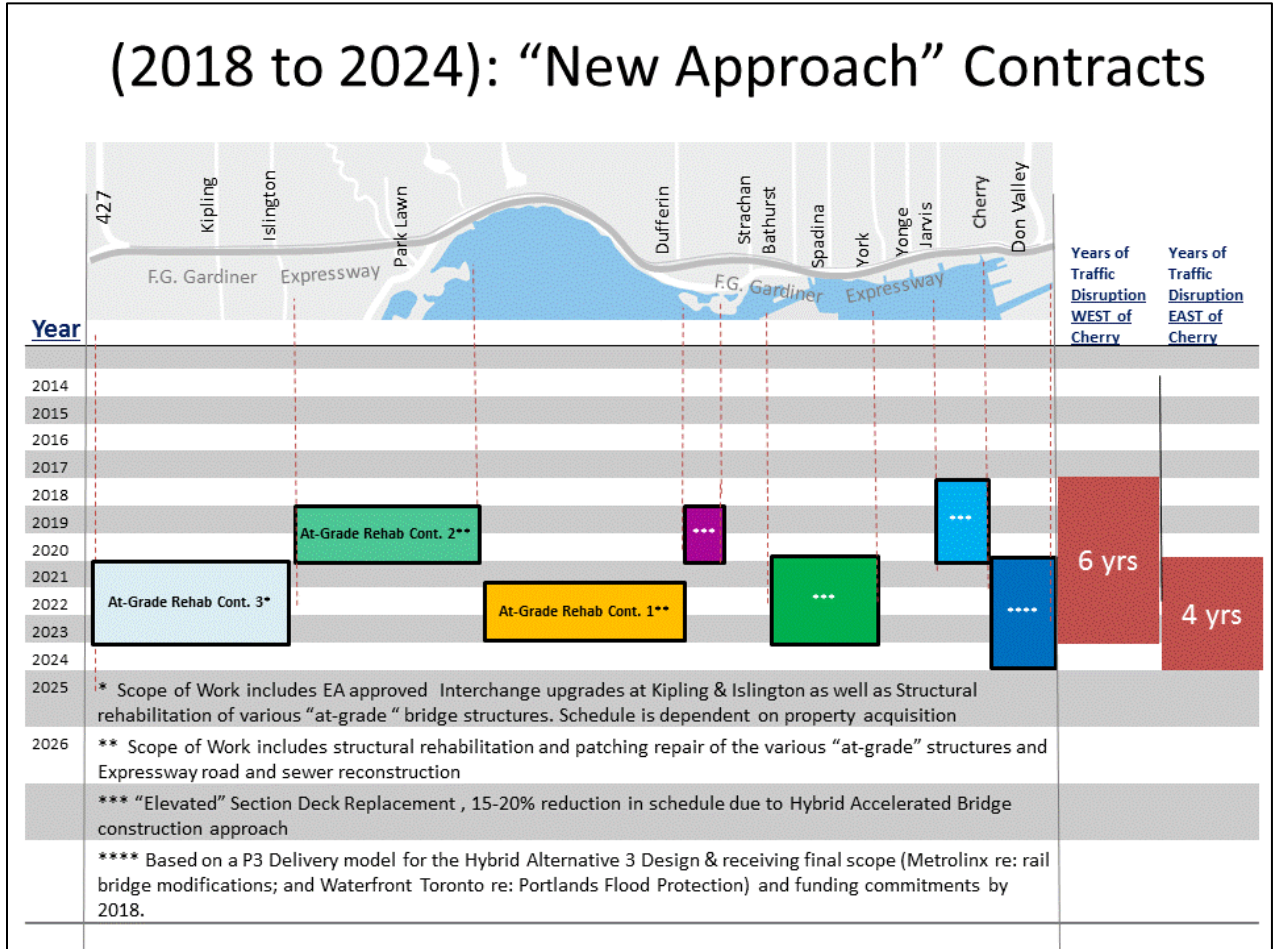
Annual service payments in 2024, 2025, 2026 include nominal operating costs

Estimates only

Original P3 Procurement Proposal assumed \$820M contribution from federal funding programs to cover 1/3 of original capital cost estimate

Attachment 2

Proposed Implementation Schedule for the New Approach (2018-2024)



Attachment 3

Proposed Implementation Schedule for the New Approach (2027-2039)

