REPORT FOR ACTION

Ship Channel Bascule Bridge Rehabilitation Project & Unwin Avenue Bailey Bridge Replacement Study - Update

Date: November 13, 2024
To: Infrastructure and Environment Committee
From: General Manager, Transportation Services
Wards: 14, Toronto-Danforth

SUMMARY

This report provides an update on the ongoing rehabilitation of the bascule bridge over the Ship Channel in the Port Lands, being undertaken by PortsToronto with financial support from the City of Toronto, as well as an update on the Unwin Avenue Bailey Bridge Replacement Study.

The Ship Channel Bridge is owned by PortsToronto and carries Cherry Street over the Ship Channel. In 2021, PortsToronto and the City agreed on a joint rehabilitation of the bridge in recognition of the vital role it plays providing access to the Port Lands area, with the City funding rehabilitation of the bridges approach spans and superstructure and PortsToronto funding rehabilitation of the bridge's mechanical and electrical systems. Project oversight is conducted by a joint staff level working group and an Executive Steering Committee. City Council granted authority for Transportation Services to enter into an agreement with PortsToronto to fund up to $22 million for the City portion of the works. Phase One, the approach spans, was completed in March 2024 and a portion of Phase Two, the contract for rehabilitation of the steel superstructure, has been tendered and is ready to commence in January of 2025.

PortsToronto will fund the second contract of the Phase Two works for rehabilitation of the mechanical and electrical systems with an anticipated award in Q1 2025.

As a result of post pandemic cost increases and supply chain challenges which have been experienced across the construction industry, along with some unforeseen work which is typical with structures of this age and complexity, and enhancements to the originally proposed traffic management to reduce delays for road users, the Phase One works cost more than originally estimated. The Phase Two contract for steel superstructure rehabilitation also reflects market conditions and is higher than originally envisaged in 2021 when the agreement with PortsToronto was completed. Given the age and type of structure and complexity of the works it can be expected that some unforeseen conditions will be encountered during construction. City staff are therefore requesting authority to amend the existing agreement with PortsToronto to provide up to an additional $15 million to complete the City funded critical bridge rehabilitation works.

Separately, in April 2024, the bridge's lifting mechanism encountered unanticipated and significant mechanical issues; a bent shaft, requiring an approximate five-month emergency repair period. During this time the bridge was raised and lowered only as able due to ongoing repairs, resulting in significant closures for road and/or ship users as the specialized repair work was completed.

The temporary emergency closure of the Ship Channel bridge during the summer of 2024 restricted access to lands south of the Ship Channel and to Cherry Beach. This put greater than anticipated demand on the existing single lane Bailey bridge on Unwin Avenue. Pre-planned capital repairs on the Bailey bridge were completed by the City in the summer of 2024, which included replacement of deck panels and waterproofing of the deck surface. These pre-planned repairs were co-ordinated with PortsToronto to ensure they were completed during periods when the Ship Channel bridge was in the lowered position.

The overall rehabilitation of the bascule bridge is anticipated to be complete in 2027, with structural steel repair and mechanical and electrical work to be caried out in parallel during the marine navigational closure period each year. This will maximize efficiencies in project delivery and avoid unnecessary disruptions to vehicular and pedestrian traffic. Non-critical path work will be required to be undertaken outside of the winter navigational closure period and may require periodic road closures.

To ensure the safe continued operation of the crossing and to improve traffic conveyance and access within the area of Unwin Avenue, Transportation Services, with the support of Engineering & Construction Services, is undertaking a study of design options as part of an interim bridge replacement strategy until the City is in a position to complete the Environmental Assessment process for the re-alignment of Unwin Avenue as established in the 2017 Council-endorsed Port Lands and South of Eastern Transportation and Servicing Master Plan. The current study is considering this future re-alignment, where possible. Recommendations on a preferred bridge replacement conceptual design are anticipated in early Q1 2025, with staff reporting back on the completed study at the end of Q1 2025.

RECOMMENDATIONS

The General Manager, Transportation Services recommends that:

1. City Council authorize the General Manager, Transportation Services to negotiate, enter into and execute on behalf of the City of Toronto a funding agreement amendment with PortsToronto for contribution by the City of up to an additional $15 million from the approved 2024-2033 Capital Budget and Plan for Transportation Services in order to complete the Ship Channel Bascule Bridge Rehabilitation Project, on terms and conditions satisfactory to the General Manger, Transportation Services, and in a form satisfactory to the City Solicitor.

FINANCIAL IMPACT

Funding of up to an additional $15 million required for the delivery agreement amendment is available in the current approved 2024-2033 Transportation Services Capital Budget and Plan (CTP515-01).

The Deputy City Manager and Chief Financial Officer have reviewed this report and agree with the financial impact information.

DECISION HISTORY

On July 14, 2021, Toronto City Council authorized staff, by way of a Member Motion to negotiate and execute a funding agreement with PortsToronto for up to $22 million from the Approved 2021-2030 Capital Budget and Plan for Transportation Services. An additional $11.9 million was to be funded by PortsToronto for the mechanical and electrical system.

The Member Motion can be found at this link: https://secure.toronto.ca/council/agenda-item.do?item=2021.MM35.36

On July 3, 2024, the Infrastructure and Environment Committee directed the Deputy City Manager, Infrastructure Services, to report by Q4 2024 with an update on the Ship Channel Bascule Bridge Rehabilitation Project and on the timelines and next steps for improving or replacing the Unwin Avenue Bailey bridge. Information on the item for consideration can be accessed at this link:https://secure.toronto.ca/council/agenda-item.do?item=2024.IE15.11

COMMENTS

Ship Channel Bridge

Constructed in 1931, the Ship Channel bascule bridge features a 37-metre-long Warren Through Truss bascule span (a lift bridge activated by counterweights), and a 43-metre-long steel girder approach span on both the north and south ends. The north end of the bridge has 750-ton concrete counterweights that allow the bridge to pivot to the open position to allow ships to access the channel. The total length of the bridge is 123 metres, and the substructure consists of concrete abutments founded on timber piles.

Owned and operated by PortsToronto, the lifting of the bascule span provides critical access allowing marine vessels to access the Ship Channel and the Turning Basin. The bridge also provides vehicular and pedestrian access on Cherry Street and the Martin Goodman Trail. As such, it represents a significant transportation link between businesses and recreational areas south of the Ship Channel with the rest of the City. The only other access to these areas is via a single lane width Bailey bridge on Unwin Avenue. A map showing the location of the bridge in the context of the Port Lands is provided in Attachment 1.

Designed by American structural engineer Joseph Baermann Strauss, best known as the engineer responsible for the Golden Gate Bridge, the bridge's structure is a representative example of a type that is exceptionally rare in Canada and is listed as a

heritage structure by the City of Toronto. Although PortsToronto has been undertaking piecemeal repair work over the last 20 years it had been insufficient to maintain the now 93-year-old bridge, which as of 2021 was at the end of its service life and in an advanced state of deterioration. As a result, the bridge requires significant rehabilitation.

In 2020, the City, through Transportation Service's Capital Budget, provided funding to PortsToronto for approximately $700,000 in repairs, to enable continued vehicular and pedestrian movement across the bridge. Over that period PortsToronto developed a comprehensive short term rehabilitation program and completed a life-cycle cost analysis of future operating, maintenance and capital works based on technical evaluations of the bridge and past experience with its operation.

In an agreement signed by the parties in July of 2021, the City of Toronto provided funding of up to $22 million, which was intended to cover the full cost of the design and construction and project management for the rehabilitation of the Ship Channel bridge’s approach spans and the structural steel components. PortsToronto in turn agreed to provide $11.9 million to cover the full cost of rehabilitating the bridge’s mechanical and electrical systems.

Progress to Date

The rehabilitation of the Ship Channel Bridge was initiated in 2022, following the agreement between the City and PortsToronto and is anticipated to be complete in 2027. The rehabilitation project was split into two phases consisting of three contracts and is being undertaken in close partnership between the City of Toronto and PortsToronto.

Phase 1 of the project consisted of a single contract for the rehabilitation of the bridge's north and south roadway approach spans and was completed in March of 2024. This component of the work was completed at a cost of $13 million, which was higher than originally estimated due to post pandemic cost increases, supply chain challenges and some unforeseen work which is typical with structures of this age and complexity.

Phase 2 of the project originally consisted of one contract for the rehabilitation of the bridge's bascule structural steel components and a second contract for the mechanical and electrical systems. These were originally tendered out as a combined work package to improve on the schedule with an intended start in the spring/summer of 2024. However, the tender was never awarded because the prices received were significantly higher then estimated. Consequently, the project Executive Steering Committee agreed to split the contracts for Phase 2 into two different tenders to see if this would lead to better pricing, which it did for the rehabilitation of the structural steel. Work on the structural steel rehabilitation is anticipated to commence in early January 2025 to coincide with closure of the St. Lawrence Seaway for ship traffic. The mechanical and electrical contract, which will be fully funded by PortsToronto, is currently being revised for retendering and is scheduled to be awarded in Q1 of 2025.

2024 Mechanical Issues

On April 24, 2024, PortsToronto informed City staff that a mechanical fault had occurred to the bridge lift system. As a result, the bridge was stuck in an upright position while PortsToronto investigated and undertook the necessary repair work.

On April 30, 2024, after completing an initial set of repairs and reopening the bridge to vehicular and pedestrian traffic, PortsToronto notified City staff that the main shaft of the bridge had bent and, although the lifting mechanism was scheduled to be replaced as part of the Phase Two construction works, its condition necessitated its immediate replacement to permit the safe operation of the lift bridge. Due to safety issues, the bridge was closed to all traffic and raised into the upright position throughout most of the summer of 2024 as this work was undertaken. Project communications, including notifying the public and stakeholders of the closures of Cherry St, were led by PortsToronto.

On October 1, 2024, PortsToronto notified the City that the emergency repairs and replacement of the main shaft were complete and that the bridge was reopened to traffic. The total cost of emergency repairs was close to $4 million and was born by PortsToronto, with some traffic and construction management support provided by Transportation Services.

Details on the repair milestones/timeline are provided in Attachment 2.

In total, the emergency repairs were conducted over a 155-day period, with the bridge being completely or partially out of service to vehicles and pedestrians for approximately 50% of the time. During this time, direct bus service to Cherry Beach was removed, mainly due to the single lane Bailey bridge on Unwin Avenue not meeting TTC minimum standards for daily, longer-term bus operations.

Next Steps

With the completion of the emergency repairs to the bridge’s main shaft, contracts have been tendered for the City funded structural steel work and tendering for the electrical and mechanical components will occur in Q4 2024 and be awarded by the end of Q1 2025.

City staff, including Transportation Services, Engineering & Construction Services, and the Waterfront Secretariat, have worked collaboratively with PortsToronto since the inception of the bridge rehabilitation program and will continue to be involved in the project working group and Executive Steering Committee throughout this next Phase.

PortsToronto and the working group and Executive Steering Committee have taken several steps to manage the project and upward pressure on the budget. This included the restructuring of the Phase Two tender to split the structural steel and electrical and mechanical components into smaller work packages. While this did achieve cost savings of around $1 million, industry wide cost escalations, along with increased traffic management needs during construction, has resulted in the bid prices for the structural steel work being higher than originally anticipated when the funding agreement was signed back in 2021. Given the higher than originally anticipated costs for both Phase

One and Phase Two, City staff are requesting authority to amend the existing agreement with PortsToronto to provide up to an additional $15 million to complete these critical bridge rehabilitation works.

The overall rehabilitation of the bascule bridge is anticipated to be complete in 2027, with structural steel repair and coating and mechanical and electrical work scheduled to be carried out during the navigational closure period (January 15 to April 15) each construction year. Due to limitations in the construction window, other non-critical path work will have to be carried out between April 16 to January 16, with partial road closures occurring as required. Detailed construction schedules will be determined as contractors come on board. As with Phase One of this work, any required road or ship traffic closures will be communicated to the local councillor, stakeholders, and the public in a proactive manner.

Unwin Avenue Bailey Bridge

Unwin Avenue is a two-lane east-west street located south of the Ship Channel, providing connection between Leslie Street and Cherry Street and access to the South Port area (Attachment 1). The section of Unwin Avenue east of the defunct Hearn Generation Station is a private street owned by the City through the Toronto Port Lands Company (now CreateTO) and to the east, a single-lane Bailey bridge provides access across the Hearn's circulating channel.

The Port Lands and South of Eastern Transportation Servicing Master Plan Environmental Assessment identified the need to realign and upgrade Unwin Avenue in order to remove the two existing 90 degree bends east of the discharge channel and to transform the current rural cross-section into a complete street with sidewalks, bikeways and some on-street parking. Removal or replacement of the existing one-lane bridge was also noted, depending on the design of the final road re-alignment.

In 2024, the closure of the Shipping Channel bridge for emergency repairs restricted access to the lands south of the Ship Channel and placed significant pressure on the existing single-lane Bailey bridge on Unwin Avenue, again highlighting the need to modernize Port Lands infrastructure for existing users including industry, and to keep up with growing needs and increased use anticipated for the area.

Over four days in July 2024, the City, with support provided by CreateTO in the coordination of landowners in the vicinity of the project area, undertook pre-planned capital repairs of the Unwin Avenue Bailey bridge. This necessitated a closure of the bridge and was scheduled in collaboration with PortsToronto so that it occurred during a period where the Ship Channel bridge was lowered, thus allowing road and pedestrian access to the South Port via Cherry Street. The capital repairs included deck panel replacements to address fatigue issues observed through routine inspections. New waterproofing was also applied to the deck surface.

Progress to Date and Next Steps

The Unwin Avenue Bailey Bridge Replacement Study was initiated in Q3 of 2024. A number of technical studies in support of developing a preferred conceptual bridge replacement have been completed, including subsurface utility engineering, a composite utility plan, completion of a tree inventory and arborist study, and topographic survey.

The development and evaluation of alternative bridge options is underway, with the selection of a preferred bridge option and accompanying general arrangement drawings anticipated for early Q1 2025, with staff reporting back on the study at the end of Q1 2025.

Following the selection of the preferred conceptual bridge option for Unwin Avenue, the next phase of work will include the undertaking of a geotechnical investigation to help inform detailed design in 2025.

CONTACT

Ashley Curtis
Deputy General Manager
Transportation Services
Tel: 416-392-0170
Email: ashley.curtis@toronto.ca

David Stonehouse
Director, Waterfront Secretariat
City Planning
Tel: 416-392-8113
Email: david.stonehouse@toronto.ca

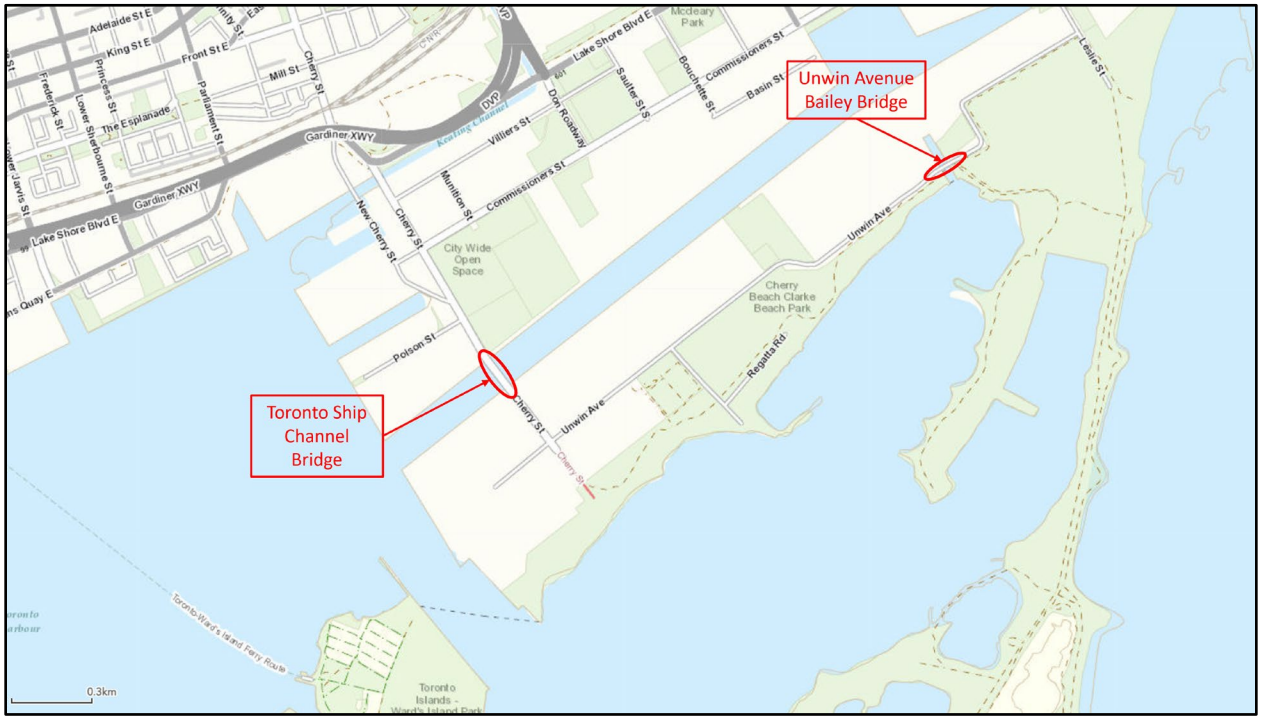
SIGNATURE

Barbara Gray
General Manager, Transportation Services

ATTACHMENTS

Attachment 1: Location of the Ship Channel Lift Bridge and Unwin Avenue Bailey Bridge
Attachment 2: Ship Channel Bridge 2024 Mechanical Issue – Timeline

Attachment 1: Location of the Ship Channel Lift Bridge and Unwin Avenue Bailey Bridge



Attachment 2: 2024 Mechanical Issue – Timeline

- April 23 - Bridge stuck upright due to mechanical issue.
- April 24 - PortsToronto notifies City staff of issue.
- April 25 - Bridge lowered, vehicle and pedestrian traffic restored.
- April 26 - Initial repairs completed, bridge tested and fully operational.
- April 30 - PortsToronto notifies City staff that main shaft of bridge is bent which caused the original issue. As this is a safety issue and could cause full failure of bridge, bridge was kept upright position.
- May 16 - PortsToronto notes structural analysis is complete, and supplies/parts were being sourced for repair. Bridge remains upright.
- May 31 - PortsToronto provides detailed schedule for bridge repairs. Repairs to occur from June 3-July 29, with various periods of full or partial road closure (when bridge raised) and periods with no ship traffic permitted (when bridge lowered). Also noted was that the bridge would be lowered for a 3-day period to allow for repairs of the Unwin Ave Bailey bridge.
- June 27 - PortsToronto notes revised repair schedule with work to be completed by August 16 (estimated). A 3-day lowering of the bridge is to occur July 16 to allow for repairs of Unwin Avenue Bailey bridge. Also noted is the potential for a winch system to raise/lower the bridge during construction period.
- July 15 - PortsToronto noted one week delay in winch system, which had to be installed in order to allow the bridge to be raised/lowered while the shaft is being replaced, extending period the bridge is raised until July 24.
- July 24 - PortsToronto notes the bridge was lowered, with road opening on July 25th allowing for repair of Unwin Ave Bailey bridge. Schedule adjusted with normal operations estimated to start on August 26.
- July 29 - PortsToronto notifies City staff of revised schedule due to repair challenges. Bridge to return to normal operations as of October 5. Bridge to be raised and lowered over various periods of time during repairs.
- August 23 - PortsToronto notes positive momentum on repair work and winch system. Schedule adjusted with normal operations expected October 23.
- October 1 - PortsToronto notifies City that lifting mechanism repair completed as of Sept 30 and bridge operating on its own power. Road open and bridge can lift for ships with advanced notice. Removal of winch system and demobilization to occur over 3-4 weeks with some possible closures. Likely that the winch system and other work has never been completed on a bridge of this size and age.