REPORT

Council

Meeting Date: July 9, 2024

FROM: Transportation and Engineering Department

DATE: June 25, 2024

SUBJECT: **Royal Windsor Drive Bridge Rehabilitation - Additional Budget Request**

LOCATION: Royal Windsor Drive
WARD: Ward 3

RECOMMENDATION:
That the budget for capital project 53361902 Royal Windsor Drive Bridge Rehabilitation over Metrolinx Rail be increased by $14,150,000 from $9,217,400 to $23,367,400 to be funded from the General Capital Reserve ($12,150,000) and the Canada Community-Building Fund ($2,000,000) in order to complete additional rehabilitation works.

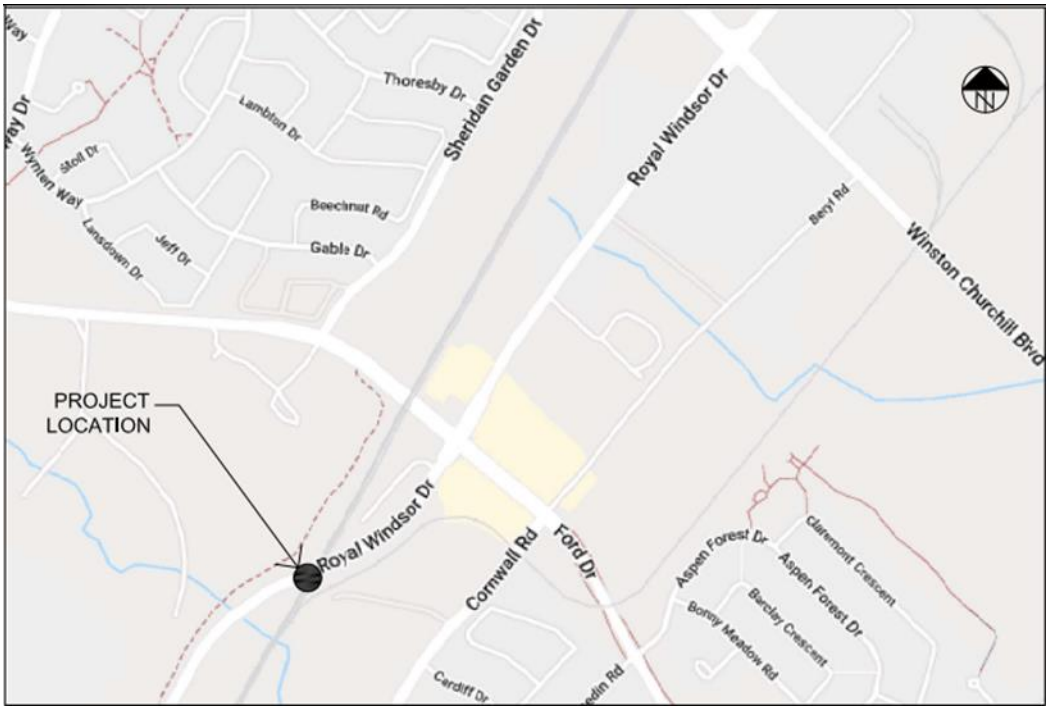
KEY FACTS:
The following are key points for consideration with respect to this report:

- The Royal Windsor Drive bridge is located in east Oakville, just west of Ford Drive. The bridge is a town-owned structure that crosses the Metrolinx Lakeshore West rail corridor.
- Planned concrete and structural steel rehabilitation (construction) work began in February 2024 and is ongoing.
- As rehabilitation work progressed, it was determined that the extent of the concrete and steel rehabilitation required is significantly greater than the scope identified during detail design.
- To complete the additional repairs that have now been identified, as recommended by Jewell Engineering (Jewell - the town's bridge design consultant), additional funding in the amount of $14,150,000 is required. It is recommended that this amount be funded from the General Capital Reserve ($12,150,000) and the Canada Community-Building Fund ($2,000,000). This amount includes newly identified concrete and steel repairs, engineering fees, internal costs, and contingencies.

- The bridge is approaching the end of its service life; staff recommends initiate necessary studies in 2025 for future bridge replacement.

BACKGROUND:

The Royal Windsor Drive (RWD) bridge is located in east Oakville, just west of Ford Drive. The bridge was constructed in 1954 and is a town-owned structure that crosses the Metrolinx Lakeshore West rail corridor. Access to certain parts of the bridge requires access permission from Metrolinx due to the active rail corridor.



Bridges are inspected based on legislative requirements and the Royal Windsor Bridge was last inspected in 2021 with a "Fair" condition.

The Royal Windsor Drive bridge was originally constructed in 1954. Rehabilitation projects were previously completed in 1974, 1992, 1994 and 2019.

The town's bridges are inspected regularly as part of the Town's asset management practices in accordance with Ontario Structural Inspection Manual (OSIM) inspection requirements. OSIM reports use an overall ranking system of Excellent/Good/Fair/Poor, specifically:

- Excellent – rehabilitation is usually not required within the next 10 years.
- Good – rehabilitation work usually not required within the next 5 years.

- Fair – rehabilitation work is usually scheduled within the next 5 years. This is the ideal time to schedule major repairs from an economic perspective.
- Poor – rehabilitation work is usually scheduled within approximately 1 year.

OSIM inspection reports were completed in 2019 and 2021 and were used to inform the capital program. In 2019, the OSIM report concluded that the bridge was in generally good repair. The 2021 OSIM inspection assigned the structure an overall rating of "Fair" with recommendations to initiate rehabilitating abutment walls, pier shafts and pier caps, among other works. Budget for major rehabilitation of the bridge was planned for in the 2019 capital forecast with design work to begin that year and construction to follow in subsequent years.

Structural design consultant hired in 2021 and recommended rehabilitation design with budget approved in 2023 for $9.2M.

A request for Proposals (RFP) was issued to retain a structural engineering consultant to deliver the preliminary and detail design drawings, construction cost estimates, and contract administration and inspection services for the Royal Windsor Drive bridge rehabilitation project. The design assignment was awarded to Jewell Engineering (Jewell) on March 22, 2021.

Jewell's recommendations were based on availability of inspection and field testing of accessible areas. The recommendations, which were expected to add 20 years to the service life of the structure, include: the deteriorated concrete areas of the substructure be removed to sound concrete and properly repaired; areas exposed to salt spray were proposed to be sealed; and steel elements were noted to be cleaned of any existing corrosion on the surface or between the girder plates. In addition, plates were to be welded and repaired, and then sealed with an approved penetrating sealer; cracks in the asphalt wearing surface were identified to be cleaned and sealed with an asphalt sealing product; and cracks found in the underside of the bridge deck were recommended to be epoxy injected.

Using the design estimate prepared by Jewell, a total budget for the project of $9,217,400 was approved, including rehabilitation, contingencies, staff time, materials testing, permitting and other related expenses.

Contract was awarded to KAPP Infrastructure Inc. and work began in 2024.

Reflecting the scope and complexity of the project, a prequalification process (RFSQ-2-2023) was completed prior to tendering (RFT-21-2023) the project. On October 17, 2023, the project was awarded to KAPP Infrastructure Inc. (KAPP). The tender was awarded in the amount of $8,356,601, within the total approved budget.

The contractor began mobilizing on-site on January 15th, 2024. Active rehabilitation work began in February 2024, outside of the Metrolinx right-of-way, on the west abutment of the bridge and is still in progress. The bridge is restricted to one-lane of traffic each way during the contract with the work planned to be completed in Q3 2024.

The purpose of the report is to request for additional budget to complete the rehabilitation project.

COMMENT/OPTIONS:

Additional work and budget are required to complete the rehabilitation due to an unforeseen level of deterioration discovered.

To rehabilitate the piers and abutments, KAPP was required to remove deteriorated concrete. The extra degradation of the concrete components was not immediately apparent but, as work continued, the extent of the deterioration became more evident. As a result, considerably more work is required to address these areas than originally anticipated, including:

- Deeper, more extensive deteriorated concrete removal, with replacement with new concrete.
- Additional bridge jacking requirements.
- Rehabilitation of various steel elements and replacement of corroded reinforcing steel.

There are insufficient funds in the contract as awarded or in the project account to cover these additional works.

The extent of additional rehabilitation work is influenced by elements that were unforeseen and unexpected and which are difficult to be identified through inspection:

- Inconsistency between actual site condition versus what is illustrated on the available drawings (e.g. depth of reinforcing steel shown at a depth of 50mm when it was found at 100mm).
- Additional deterioration between the time of inspection and award of contract (e.g. smaller cracks have migrated to larger cracks).
- Certain elements can only be seen once exposed (e.g. removal of steel elements showed severe corrosion which was hidden under steel bearing plates which are not removed during inspections).
- Water penetration deeper into the structure than expected causing significant concrete spalling and delamination.

The bridge is restricted to one lane per direction while rehabilitation is underway. The bridge is safe to travel on in this configuration and can remain open while construction proceeds.

To return traffic over the bridge on its original platform of 4 lanes, with no lane or weight restrictions, staff recommends completing the necessary rehabilitation for an additional $14.15 million.

- Complete all the necessary rehabilitation works now for an additional $14.15 million (see Table 1) to extend the life of the structure by approximately 10-15 years.
- Work will include additional concrete/steel rehabilitation, bridge jacking, more extensive works to minimize water intrusion to reduce freeze/thaw impacts and corrosion by full replacement of bridge deck waterproofing, along with repaving of the bridge deck driving surface.
- Project completion (rehabilitation work) is planned for Q2 2025 (extension by 9 months compared to original completion date).
- Jewell has completed a structural review of the bridge with the recommended rehabilitations in place and advised that the structure is sufficient to retain a full Ontario Truck and Lane Load as specified in Canadian Highway Bridge Design Code 2019.

Returning the bridge to 2 lanes in each direction, with no lane or weight restrictions is the basis of the rehabilitation plan. Other options were considered however these would result in long term travel or weight restrictions being applied to the bridge, which would impact local businesses and others, along with the motorists and residents who travel through the area. Royal Windsor Drive is part of the Ministry of Transportation Emergency Detour Route (EDR) for the QEW corridor. When serious accidents or closures occur on the provincial highway, traffic overflows to the EDR network of streets. Restrictions on the bridge would hinder Oakville’s commitment to both the MTO and the community at large.

Table 1: Summary of Additional Project Costs

	KAPP Infrastructure Inc Awarded Tender	Jewell Engineering Revised Cost Estimate (10-15 Year Life Cycle Option)	Cost Increase from Tender (As Awarded)
Part A – Mobilization and Traffic Control	$ 1,996,974.50	$ 3,615,151.50	$ 1,618,177
.Part B – Site Access	$ 721,010.00	$ 988,608.90	$ 267,599
Part C – Structural	$ 4,449,777.00	$ 11,968,234.61	$ 7,518,458
Part D – Restoration	$ 4,400.00	$ 4,400.00	$ -
Part E – Provisional and Contingency	$ 1,184,500.00	$ 4,402,860.00	$ 3,218,360
Total Contract Value	$ 8,356,661.50	$ 20,979,255.01	$ 12,622,594
		Subtotal	$ 12,622,594
		Additional Inspection, Material Testing and Contract Administration Costs	$ 635,000
		Contingency for Eng. Services during construction, CA and Inspection	$ 180,000
		Third Party Engineering Review	$ 40,000
		1.76% Non-recoverable HST	$ 237,206
		Project Coordination and Staff Time	$ 85,000
		Uncommitted Contingency	$ 350,000
		Estimated Additional Cost	$ 14,149,799
		Requested Additional Funds	$ 14,150,000

Access to the rail corridor poses a potential risk to the project schedule, rehabilitation strategy and costs.

Access to the rail corridor to complete the rehabilitation work requires Metrolinx permits and approvals, as well as flagging supervision by Metrolinx. Delays in obtaining permits, or a lack of available flagging and track protection will impact the timeline for completion of the rehabilitation work. To date, Metrolinx has not provided KAPP with access to the active rail corridor.

The rehabilitation plan is based on the accessible area of the bridge. Approximately 25 percent of the bridge substructure has not undergone detailed inspections due to the access restrictions above the active rail corridor. While rehabilitations in this area are expected and planned for, the extent of rehabilitations required may be greater than that currently estimated. Metrolinx approvals, and conditions on those approvals (e.g. daily installation and tear down of equipment), are both a schedule and a cost risk. Discussions with Metrolinx staff are ongoing.

Additional project risk due to concrete condition has been considered and will be closely monitored.

The rehabilitation of old structures such as the Royal Windsor Drive bridge is similar to a “time and materials” contract. In time and materials contracts, costs may

increase over estimated amounts, or costs could be less than estimated amounts. Once work advanced on the Royal Windsor Drive bridge contract, it was evident that the time and materials required to remediate the structure were greater than originally envisioned. Jewell has included contingency along with the time and material quantities/cost for the recommended expanded rehabilitation works.

The condition of the Royal Windsor Drive bridge is being actively monitored by the consultant (Jewell Engineering) and contractor (KAPP Infrastructure) to ensure that any additional risks or concerns are identified and addressed quickly and that there are no safety concerns with the structure.

Process improvements and lessons learned will be incorporated into future capital project management practices.

There are number of complexities that cause increases in project costs and timelines. For this project, the rate and extensiveness of the bridge structure deterioration is unforeseen and for some areas difficult to estimate as certain structural elements were covered and not exposed until the work is underway.

Lessons learned through this project include the following and will be incorporated into future project planning and management:

- Scope definition: Well defined scope for detailed testing will be specified for all future bridge rehabilitation projects.
- Project plan / timelines: Develop project plans that minimizes time lag between inspection/testing/design to construction start.
- Cost risk management: Recognize the “time and material” nature of these contracts by allocating additional unit quantities for unknown elements and allocate larger contingencies. In the case of the Royal Windsor Drive bridge however, as outlined above, the scale of the unforeseen conditions was significant and well beyond what could be covered by a standard contingency allowance.
- Recognize the varying expertise of the staff and hire specialty consulting engineer (bridge) to conduct a peer review of design/rehabilitation strategy and associated estimates.

The bridge is approaching the end of its service life, staff recommends initiate necessary studies in 2025 for future bridge replacement.

Concurrently with the above noted rehabilitation work, staff is recommending the activities related for the ultimate replacement on the Royal Windsor Drive bridge to be included in the 2025 budget and 10-year capital forecast, as the bridge is approaching the end of its service life. The required studies, design, permits, and construction will take approximately 8 years from start to finish due to the complexity in the design and coordination with external agencies such as Metrolinx, MTO and

Hydro One, therefore, it is important for activities related to the ultimate replacement of the bridge to begin in 2025.

Summary

While scheduled rehabilitation of the Royal Windsor Drive bridge was underway, it was discovered that significantly more work was required to address concrete and steel deficiencies than originally scoped. These items increased contract quantities, and bridge jacking requirements significantly. Staff recommends to rehabilitate the structure at a cost of additional $14.15 million in order to restore the 4 lane traffic on the bridge, and incorporate the ultimate bridge replacement activities in the 2025 capital budget and 10 year capital forecast.

CONSIDERATIONS:

(A) PUBLIC

There are no additional public notification requirements as a result of this report. The project webpage on Oakville.ca will be updated with the new schedule information.

(B) FINANCIAL

Capital Project – 53361902 Royal Windsor Drive Bridge Rehabilitation over Metrolinx Rail was approved by Council through previous capital budgets with a total budget of $9,217,400. With Council approval of recommended budget adjustment of $14,150,000, the total capital budget for the project will be $23,367,400 funded from the General Capital Reserve ($14,182,400) and the Canada Community-Building Fund ($9,185,000).

The Capital Reserve being utilized to fund this request is the primary source of funding for the town's asset management needs, as well as the town's share of growth-related costs and program initiatives. A balance of $109 million is projected year end 2024; however, as discussed in the 2024 budget, the balance is projected to rapidly decline over the 2024-2033 forecast period. The additional costs required for this project will put additional pressure on the reserve, reducing the balance to $97 million at year end.

(C) IMPACT ON OTHER DEPARTMENTS & USERS

The Finance Department will be requested to make the required budget updates, subject to the approval of this report.

(D) COUNCIL STRATEGIC PRIORITIES

This report addresses Council's strategic priority of Accountable Government.

(E) CLIMATE CHANGE/ACTION

There are no Climate Action considerations associated with this report.

APPENDICES:

None

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