

The Regional Municipality of York

Committee of the Whole
Transportation Services
April 4, 2019

Report of the Commissioner of Transportation Services

Amendments to Agreements for Design of Improvements Major Mackenzie Drive Proposed Highway 427 Terminus to Highway 400 City of Vaughan

1. Recommendations

1. Council approve an amendment to the agreement between the Region and AECOM Canada Inc. for the design of improvements to Major Mackenzie Drive (Y.R. 25) from the proposed Highway 427 terminus to Islington Avenue (Y.R. 17), to increase the contract price, within the Capital Spending Authority for this project, from \$2,579,810 to \$2,970,382, excluding HST, as a result of additional services required during the construction of the project.
2. Council approve an amendment to the agreement between the Region and HDR Corporation for design of improvements to Major Mackenzie Drive (Y.R. 25) from Islington Avenue (Y.R. 17) to Highway 400, to increase the contract price, within the Capital Spending Authority for this project, from \$3,065,779 to \$3,353,261, excluding HST, as a result of additional services required during the construction of the project.

2. Summary

This report seeks Council approval to increase the contract price of two separate agreements for the design of improvements to Major Mackenzie Drive; the contract with AECOM Canada Inc. (AECOM) and the contract with HDR Corporation (HDR). These increases are required to address increased scope of services related to design assistance during construction.

As the additional fees being requested exceed staff authority provided for in the Region's Purchasing Bylaw, Council approval is required.

Key Points:

- Major Mackenzie Drive is under construction in phases from Highway 50 to Highway 400 and will provide a major six-lane east-west roadway in the City of Vaughan

- The construction contracts are complex and require significant coordination between the designer and the contractor
- The original agreements with AECOM and HDR were signed over seven years ago and focused on the detailed design phase
- The AECOM and HDR agreements need to be amended to accommodate design services required during the construction phase

3. Background

The Approved Western Vaughan Individual Environmental Assessment identified widening Major Mackenzie Drive to six lanes to serve the growing communities in the City of Vaughan

The City of Vaughan and, in particular, the Nashville Heights and Kleinburg subdivisions are growing rapidly. Currently, there are approximately 2500 homes adjacent to the Major Mackenzie Drive corridor within these two subdivisions, with more development planned over the coming years. The Ministry of Transportation (MTO) is extending Highway 427 from Highway 7 to Major Mackenzie Drive. With the terminus on Major Mackenzie Drive, there will be more traffic on Major Mackenzie Drive going to and from the Highway. Prior to development in the area, the Average Annual Daily Traffic (AADT) along this section of Major Mackenzie Drive was approximately 3000. With Highway 427 in place, and development proceeding as planned, this volume is expected to rise to approximately 40,000 by 2031.

The Western Vaughan Individual Environmental Assessment (IEA) was approved in July 2012. One of the key findings of the IEA was that Major Mackenzie Drive from Highway 50 to Highway 400 be widened to six lanes by 2031; therefore, reconstruction of Major Mackenzie Drive from Highway 50 to Highway 400 is included in the Region's current 10-Year Roads Capital Construction Program.

In 2011, Council approved two consulting agreements for the design of Major Mackenzie Drive from a two- to a four-lane road

In September 2011, Council approved a detailed design assignment with HDR for the section of Major Mackenzie Drive from Islington Avenue to Weston Road. In June 2012, Council approved a second detailed design assignment with AECOM for the section of Major Mackenzie Drive from the proposed Highway 427 terminus to Islington Avenue. These agreements were based on designing an interim four-lane facility while protecting the ability to provide for six lanes in the future. A location map is included as Attachment 1.

In 2014, Council approved amendments to the original agreements to revise the design of Major Mackenzie Drive to a six-lane road and extend the eastern limit from Weston Road to Highway 400

In November 2014, MTO committed to extending Highway 427 from Highway 7 to Major Mackenzie Drive by the year 2021. Following this commitment, staff determined that instead of phasing in the construction of Major Mackenzie Drive, all six lanes should be built at once, requiring changes to the design.

Initially, no improvements were required on Major Mackenzie Drive between Weston Road and Highway 400 as it was already a four-lane roadway, and therefore not included in the original HDR consulting assignment. With the decision to widen Major Mackenzie Drive to six lanes all at once and extend the eastern limit, this section also then needed to be widened to six lanes and included in the HDR assignment.

In November 2014, Council approved amendments to the agreements with AECOM and HDR to revise the designs for a six-lane road and include the section from Weston Road to Highway 400.

Designs are complete and construction is underway on the different phases of the project

AECOM and HDR have completed the designs and construction is underway. The construction is being undertaken in phases.

The first section constructed was between Pine Valley Drive and Highway 400. Construction began in spring 2015 and was completed in fall 2017.

The second section, currently under construction, is from the proposed Highway 427 terminus to Islington Avenue. Construction began in spring 2018 and is expected to be complete by fall 2021. Highway 427 is also currently under construction and staff is coordinating with the MTO project team at the interface of the two projects. The contractor has been making good progress has accomplished the following to date:

- Constructed the north half of Major Mackenzie Drive between Highway 27 and Islington Avenue.
- Constructed the foundations, abutments, piers and installed girders for the 150-metre long five-span Humber River Bridge.
- Completed the grading for the new roadway from the Humber River Bridge to the CP Rail bridge.
- Completed the Major Mackenzie Drive detour at the CP Rail bridge needed to divert traffic around the site of a new road-over-rail bridge while it is under construction. To complete this detour, a separate detour of Barons Street was needed to keep traffic flowing from the Nashville Heights subdivision.

- Graded the footprint for the new CPR bridge and installed numerous wick drains required to help the underlying soil settle prior to building the bridge.

The third section to be constructed is from Islington Avenue to Pine Valley Drive. Construction is expected to start in summer 2019 and be complete by fall 2021. The outstanding issue for this section is finalizing the land exchange agreement with Ontario Heritage Trust (OHT). There are First Nations interests associated with the OHT lands and, also linked to the OHT agreement, is a requirement to enter into agreements with the Mississaugas of the Credit First Nation and Huron-Wendat Nation. It is taking much longer than anticipated to obtain lands from OHT and finalize agreements with OHT and the First Nations. Negotiations with OHT commenced in 2013 and are expected to be completed by summer 2019.

The construction timelines for the various sections are outlined in Attachment 2.

4. Analysis

The original agreements were for the detailed design phase only and staff have determined they should be amended to provide for additional consulting services during the construction phase

The original consultant assignments were developed more than seven years ago. The focus was on the detailed design aspects of the project and all activities needed to prepare a contract and be ready for tender and construction. The AECOM and HDR agreements included a standard cash allowance of \$75,000 for design assistance during construction and record drawings. These allowances, previously estimated by the Region, are insufficient to meet the requirements for consultant services now deemed required during construction.

During the construction of the section of Major Mackenzie Drive between Pine Valley Drive and Highway 400, \$75,000 was paid to HDR for design assistance during construction. HDR's services will still be required for the section between Islington Avenue and Pine Valley Drive, which is considered more complex as it includes two bridges, three box culverts, environmentally sensitive areas and high embankments.

Due to the scale and complexity of the Major Mackenzie Drive projects, the design consultants must work closely with the contractors throughout the construction phase. Most on-site design decisions need to go back to the designer for review as this keeps the potential liability of any design problems and errors/omissions with the original designer.

Examples of consultant tasks during construction include:

- Addressing requests from the contractor to provide clarification on the design and revising and stamping drawings with a professional seal, specifications and quantities as needed.

- Addressing unforeseen site conditions, such as varying soil conditions or utility conflicts, and adjusting the designs accordingly.
- Reviewing shop drawings for bridges, culverts and retaining walls, drainage structures, watermain structures, and providing comments and acceptance.
- Reviewing alternate designs or products proposed by the contractor.
- Attending site meetings to address construction issues/conflicts.
- Reviewing contractor claims related to quantity disputes or interpreting the contract specifications.
- Conducting interim and final inspections to ensure construction meets the design requirements.
- Preparing as-built drawings reflecting changes that took place during construction.

The AECOM agreement requires amending to provide for the necessary engineering consulting services and design assistance during construction

The segment from the proposed Highway 427 terminus to Islington Avenue, designed by AECOM, has a total project cost of \$107 million. In addition to the general volume of work required for this size of project, some of the specific items the consultant will be required to do during construction include:

- Monitor construction closely and review numerous shop drawings for two large bridges worth approximately \$20 million. The Humber River bridge is a five-span bridge with over 90 girders. The CP Rail bridge requires coordination and liaison with CP Rail during construction to ensure activity does not adversely affect rail operations.
- Address specific bridge construction issues such as soil conditions, piles out of alignment or not reaching anticipated design depth.
- Review contractor alternative staging plans for Highway 27 and Major Mackenzie Drive to reduce traffic disruption while maintaining the project schedule.
- Evaluate/design a detour for Barons Street due to the early closure of Huntington Road for the Highway 427 project, which is adjacent to this project and now under construction.
- Coordinate designs during construction of the Major Mackenzie Drive work, adjacent subdivision work and the Highway 427 work.
- Adjust plans for Hydro One permit requirements and coordinate with Highway 427 designs.

The HDR agreement requires amending to provide for the necessary engineering consulting services and design assistance during construction

The segment between Islington Avenue and Pine Valley Drive, designed by HDR, has a total project cost of \$55 million. It is expected that in addition to the general volume of work required for the project, some of the specific items the consultant will be required to do during construction include:

- Multiple reviews of shop drawings and close monitoring of the contractor to ensure quality for two large bridges on this project. To maintain traffic, these bridges and three large box culverts will be built in two stages; the south half followed by the north half. This will require review of staging plans.
- Similar to the AECOM assignment there may be structural issues such as piles out of alignment, pile obstruction, pile length shorter/longer than anticipated, that will need to be addressed.
- The bridges cross rivers that have the endangered Redside Dace present so the timing windows for working in the water are short. The contractor may propose to revise the staging for the stream reconstruction. This will require coordination with the Toronto and Region Conservation Authority and the Ministry of Natural Resources and Forestry to finalize.
- The existing road between Islington Avenue and Pine Valley Drive is a narrow two lane road with significant valleys. The contractor may propose alternate construction staging to reduce impact on traffic, which will have to be reviewed and approved.

5. Financial

Additional fees are required to provide engineering consulting services during construction of the Major Mackenzie Drive Improvements

Agreements with AECOM and HDR need to be amended to include additional fees in the amount of \$390,572 and \$287,482 to provide for adequate engineering consulting services and design assistance during construction. Staff has reviewed the request for additional fees, compared them to rates in the current assignments, and against other similar consultant assignments, and consider them to be fair and reasonable. This amount is not a lump sum fee and only actual hours worked by the consultant will be paid.

The detailed design assignment fees are lower than the expected range for the scope of work

The three Major Mackenzie Drive projects that extend from the proposed Highway 427 terminus to Highway 400 have a total value of approximately \$197 million. Detailed design assignments typically represent five to seven per cent of the project's construction value. The

recommended total fees for the AECOM and HDR assignments of \$6,323,643 are only 3.24 per cent of the estimated construction value.

The total additional fees will be funded from 90 per cent development charges and 10 per cent tax levy

There are sufficient funds included in the 2019 Roads Capital Budget and Capital Spending Authority is available for these additional services. All expenditures for this project will be funded from 10 per cent tax levy and 90 percent development charges.

6. Local Impact

The Major Mackenzie Drive project is a major link in the Regional road network in the City of Vaughan and will provide many benefits including:

- Improve roadway and traffic connectivity from the proposed terminus of Highway 427 west to Highway 50 and east to Highway 400
- Support residential and commercial growth in the area
- Improve pedestrian and cyclist access through installation of sidewalks and a multi-use path
- Provide illumination and streetscaping

7. Conclusion

The three Major Mackenzie Drive projects that extend from the proposed Highway 427 terminus to Highway 400 are large with a total value of approximately \$197 million. The agreements with AECOM and HDR need to be amended so that necessary engineering consulting services and design assistance may be provided during construction.

Staff recommends the agreement with AECOM be amended by an amount of \$390,572, increasing the total from \$2,579,810 to \$2,970,382, excluding HST, and the agreement with HDR be amended by an amount of \$287,482, increasing the total from \$3,065,779 to \$3,353,261, excluding HST. The recommended total fees for these assignments represent only 3.2 per cent of the estimated construction value of the Major Mackenzie Drive improvements project.

For more information on this report, please contact Salim Alibhai, Director of Capital Planning and Delivery at 1-877-464-9675 ext. 75229. Accessible formats or communication supports are available upon request.

Recommended by:

Paul Jankowski
Commissioner of Transportation Services

Approved for Submission:

Bruce Macgregor
Chief Administrative Officer

March 21, 2019
Attachments (2)
9026097