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YONGE STREET SUBWAY EXTENSION TECHNICAL PROGRESS REPORT

The Rapid Transit Public/Private Partnership Steering Committee recommends the following:

- 1. The presentation by Tom Middlebrook, McCormick Rankin Corporation, be received; and**
- 2. The recommendation contained in the following report, January 9, 2008, from the Vice-President, York Region Rapid Transit Corporation, be adopted:**

1. RECOMMENDATION

It is recommended that Council receive this report for information.

2. PURPOSE

This report updates Council on the progress that has been made regarding the Environmental Assessment (EA) and preliminary engineering (PE) activities to facilitate the extension of the Yonge Street Subway to the Richmond Hill Centre (RHC).

3. BACKGROUND

McCormick Rankin Corporation and York Consortium 2002 have been retained to commence the EA process for the Yonge Street subway extension

On June 15, 2007, the Province of Ontario announced \$17.5 billion in funding for transit projects for the Greater Toronto Area and Hamilton, including the funding of the Yonge Street Subway extension to the RHC. As a result, on June 21 2007, Council directed staff to commence an EA and preliminary engineering, in coordination with the City of Toronto, for the timely extension of the subway. Council also authorized staff to retain the necessary resources to undertake the work, and an interim budget of \$3 million was authorized from capital reserves to undertake the work. Staff was directed to report back on the progress of the work plan in the Fall of 2007, including work completed, future work initiatives and budget implications.

In response to Council's direction on June 21, 2007 to retain the necessary resources to undertake the work, the first stage of the subway work programme The joint team of York Consortium 2002 (YC2002) and McCormick Rankin Corporation (MRC), with

URS Canada Inc. as a sub-consultant to MRC have been retained by YRRTC to complete a functional design for a subway extension on Yonge Street, north of its current terminus at the TTC Finch Station. The limits of the functional design are from the TTC Finch Station to a new subway terminal station at RHC. TTC has confirmed that they are prepared to allow the Region to take the lead on this work and has assigned a staff person to act as liaison on their behalf. The study examines possible vertical and horizontal alignments for the subway, as well as potential subway station locations along the corridor. The study will also provide guidance as to the most appropriate EA process to follow, given the Province's June 2007 announcement of a new 6 month EA process.

4. ANALYSIS AND OPTIONS

Subway Alignment Analysis

The subway alignment would be constructed within the Yonge Street right-of-way to south of Highway 407

Given the mostly urban setting surrounding the Yonge Street corridor north of Finch Avenue, as well as the need to minimize impact to existing properties, the subway alignment is expected to follow the Yonge Street right-of-way (ROW) from Finch Avenue north to the vicinity of Highway 407 and then northerly on one of the alignments to the RHC.

Two routes are being investigated for the location of the RHC Station

The subway alignment would follow the Yonge Street ROW northwards to just south of the Highway 407/Langstaff area. At this point, two route options are being examined which would affect the location of the RHC Subway Station (*see Attachment I*).

The first route continues north on Yonge Street and crosses under Highway 407/Highway 7. North of Highway 7 a range of alignments between Yonge Street and the storm water retention pond are being examined. This alignment would place the RHC Subway Station on Yonge Street adjacent to the large theatre/restaurant block, creating a considerable (over 500 metre) walking distance to transfer to the rail/bus intermodal facility adjacent the rail tracks at the existing RHC Bus Terminal/GO Station.

The second route swings easterly from the Yonge Street ROW and travels under the Holy Cross Cemetery and Langstaff lands. A range of alignments are being examined that would place the subway station centrally in the RHC lands within proximity of the planned interface between the RHC Terminal, Langstaff GO Station, and the future Highway 407 Transitway.

The potential future extension of the subway beyond RHC is being examined for both of the route options. In addition, land area requirements for an expanded bus terminal are being examined, along with a detailed investigation of the physical infrastructure and constraints at the RHC as described below. Both of these considerations will have to be

examined carefully in conjunction with opportunities for major transit oriented development (TOD) and amenities at this major passenger hub.

Intermodal Terminal Requirements

A major intermodal passenger hub acting as the southern/central transit gateway to York Region is required at Richmond Hill Centre

The confluence of several modes of transit at the RHC presents a unique and important opportunity to create a world class intermodal passenger hub (mobility hub). Ideally, the hub will be fully integrated with a major TOD plan for the entire landholdings on the northeast corner of Highway 7 and Yonge Street. The Yonge Street subway, GO Transit rail, CN rail, GO Transit 407 services (ultimately the 407 Transitway), Viva rapid transit and YRT conventional services will all connect at the RHC.

The integration of these transit services must be carefully planned. There are a number of physical constraints in the area that collectively present a unique condition for generating the best terminal passenger arrangements for all of these services.

Today, the core of the RHC is occupied by the York Region RHC Terminal and bridge entrance (3.5 acres), a large theatre complex, two restaurants and a book store on property that are owned by one private landowner, the Metrus Group and a woodlot owned by the Town of Richmond Hill. (*see Attachment 2*). The site is also constrained by the major east west hydro corridor in the south quadrant of the property, and immediately north of the hydro corridor by the ORC east-west surface and below-grade utility easement.

To the east, the site is constrained by the CN Bala Subdivision rail line (GO Transit Richmond Hill Line), which runs north-south on the east side of the RHC Terminal. The newly constructed pedestrian bridge connects the existing Viva RHC bus terminal with GO Transit rail and bus services of the east side of the CN tracks. The recently completed bridge has been designed for future expansion, either into TOD and/or expanded into a completely new terminal that will be required on the site.

To the west of Yonge Street, existing residential development limits the available ROW for locating a station and a terminal. To the south, issues exist concerning the ability to incorporate the lands under the 500 kV Hydro One transmission corridor as part of the new RHC station/terminal. Other features in the area that require consideration include the woodlot at the Yonge Street/High Tech Road intersection, as well as the Highway 407/Highway 7 storm management pond.

To the north, the site is constrained by High Tech Road that rises in elevation from Yonge Street to the bridge crossing of the CN rail tracks creating a barrier to expansion of the site to the north. An existing bridge opening for cars and a future potential rapid transit corridor provides some additional access to the RHC site.

To the south, the site is constrained physically by a major storm water management pond, rising grades to Highway 7 and Highway 407. The site is however connected below the 407 by the widened CN bridge overpass to the Langstaff lands south of Highway 407. Surface rapid transit is intended to connect from Yonge Street to the RHC. GO Transit will use the space between Highway 407 and Highway 7 at this location to site a future 407 rapidway connection to the RHC intermodal terminal. Major development proposals have been received by the Town of Markham for the lands south of Highway 407 and connections to the community will be need to carefully examined.

The potential to co-locate the subway tunnel within The Holy Cross Cemetery lands south of the Langstaff lands will require close consultation with the Roman Catholic Cemetery as part of the consultation process.

Park and Ride strategy will be required

Currently, all of the hydro corridor crossing the site is owned by Metrus Development and is asphalted to provide for parking for the theatre complex. On the east side of the tracks, GO Transit commuters park under the hydro towers. Further opportunities for commuter parking and drop-off facilities to support the transit facilities at the gateway location will need to be developed as part of the comprehensive planning of the intermodal hub east and west of the tracks. Further opportunities for commuter parking may need to be explored south of Highway 407 in the Town of Markham and the City of Vaughan.

An intermodal terminal will also be required at Steeles Avenue

A second intermodal station will be required at Steeles Avenue. The terminal will provide transfers to the subway for bus passengers travelling south on Regional arterials to Steeles Avenue and TTC east west travel demand on Steeles that would have otherwise continued south on Yonge Street to the heavily used GO/TTC Finch terminals. The technical team will be consulting with all transit agencies to confirm station size requirements based on the surface feeder system.

Optimal terminal location(s), in conjunction with TOD opportunities at the four corners of Steeles Avenue and Yonge Street, will need to be examined by the many stakeholders at this intersection. A park and ride strategy will also need to be developed in support of the Steeles station intermodal facilities.

Subway Station Spacing

Yonge Street subway station spacing needs to be examined

Using 500 metres as the practical walking distance to a subway station, the minimum spacing between stations would be 1 km. The most recent TTC subway stations, found on the Sheppard line, are spaced approximately 1 km to 2 km apart. Average station spacing on the Yonge-University-Spadina subway line varies from 1.3 km to 1.7 km north of St. Clair Avenue, while average station spacing on the proposed Spadina subway extension to the Vaughan Corporate Centre (VCC) is 1.4 km. (*see Attachment 3*).

Five potential station locations have been identified between Finch Avenue and the RHC

Five potential opportunities for subway stations have been identified between Finch Avenue and the RHC: Cummer Avenue, Steeles Avenue, Clark Avenue, Centre Street, and Helen Avenue. Six station combinations are being carried forward for evaluation (*see Attachment 4*). Each of these options carries different operating and capital budget considerations, which will have differing impacts on the community. The determination of the number of stations to be built and their final location requires direction from Regional Council, and the City of Toronto, particularly for the station south of Steeles, and the many technical, municipal and local stakeholders affected by the project. A recommended process for examining the station options is outlined in a separate report on this agenda.

Station Design

Subway stations should be designed to accommodate transit-oriented development

One of the many considerations in locating stations relates to their function. Subway stations should be planned at locations where they can either function as a transportation hub, or attract TOD within a 500 metre walking distance. Currently, the Town of Markham, City of Richmond Hill and the City of Vaughan have land use studies underway along the corridor. The nexus between these studies and the final subway station locations will be part of the stakeholder consultation process.

Subway stations should be as near to the surface as possible

In order to maximize convenience for passengers, minimize costs of construction, as well as to minimize safety concerns regarding egress from depths, subway stations, whenever possible, should be built as near to the surface as possible. All but three of the Toronto Transit Commission's (TTC's) current subway stations are 14 metres or less from the surface to the platform, with the majority being less than 10 metres. The deepest TTC station is at Bayview on the Sheppard Line at 18.6 metres from surface to platform. The depth of potential subway stations has been examined by the team as an outcome of their review of physical barriers encountered along the length of the system.

Significant Alignment Considerations

The CN York Subdivision rail corridor must be crossed

The CN York Subdivision rail corridor, which crosses Yonge Street north of Clark Avenue, is the main connection to the CN McMillan Yard for freight traffic originating east of Toronto. The corridor is situated in a deep cut with a wide open ROW. On the north side of the corridor, the terrain descends sharply over a short distance before reaching a low point just north of Clark Avenue (*see Attachment 5*).

Two crossing options exist for the subway alignment. The first option involves crossing over the rail corridor. This option would require the subway profile to change from a tunnelled section to an at-grade or elevated section within the Yonge Street corridor and cross the railway tracks at or above the existing elevation of Yonge Street. Due to the maximum allowable gradient in the vertical alignment, the subway would be forced to be elevated above Yonge Street north of the railway tracks, to an area south of John Street. If a station was required at Clark Avenue, it would be elevated as the tracks would still be above Yonge Street at this point. The costs and impacts associated with bringing the subway above the railway tracks within the existing Yonge Street corridor will have to be examined as part of the stakeholder consultation process.

A second option would be to cross under the rail corridor, minimizing impact to the busy rail corridor during construction and avoiding the need for extensive transitions from tunnelled to elevated section, including costly elevated structures above Yonge Street. Crossing under the railway also allows for a shallow underground station at Clark Avenue. This option will be examined as part of the stakeholder consultation process.

The subway elevation of the East Don River crossing depends on whether there is a station at Centre Street

The East Don River is one of the two main branches that form the Don River Watershed: a significant watercourse system and an environmentally-sensitive feature. The river is situated in a relatively deep valley with wide open embankments on both sides. The Ladies' Golf Club of Toronto is located on the east side of Yonge Street, while the Thornhill Country Club is situated on the west side.

Similar to the CN rail crossing, the subway alignment could cross over or under the East Don River. However, in order to have a feasible station at Centre Street, the subway tunnels would have to cross over the East Don River, requiring the subway to come out of the ground just north of Centre Street location. A shallow station at Centre Street would require the tunnels to be at an elevation that would preclude going under the river.

Crossing over the East Don River would place the subway tunnel at a shallower depth on the north side of the river and would result in a shallower station at Helen Avenue. Crossing over the East Don River would also create an opportunity to improve Yonge Street's existing vertical profile at the river crossing by raising the roadway on top of the subway box. However, this profile would impact some of the existing entrances along Yonge Street, primarily the Ladies Golf Course entrance (*see Attachment 6*) and will be carefully examined as part of the stakeholder consultation process.

Alternatively, if the subway tunnels were to go under the East Don River, it is almost certain that a station at Centre Street, and quite possibly at Helen Avenue, would not be possible due to the significant depths of the stations. These stations would be in the order of 30 metres deep, which would be 3 to 4 times deeper than 90% of the existing TTC subway stations. Again both these options will be examined as part of the stakeholder

process, including a detailed analysis of environmental impacts of going over the river vs. going under the river.

Environmental Assessment Process

New details on the expedited environmental process for subways have not yet emerged

The new Municipal Engineers Association (MEA) Class EA document has just been released. While it provides a class process for light rail transit projects, it does not allow for subway projects. Furthermore, the Provincial Government announced as part of MoveOntario 2020, that there would be a new 6 month EA process for transit projects. There is no definition or publication of the details of this proposed process at this time. It is intended for the team to hold detailed discussions with the Ministry of the Environment (MOE) regarding this new proposed EA process and its applicability for this project.

The project is now approaching a level of subway design development that would benefit from stakeholder consultation that will ultimately fulfill the requirements of the redefined EA process.

Attachment 7 illustrates the subway work programme sequence and points of contact with stakeholders. A process to consolidate the multiple points of stakeholder contact is the subject of a separate report on this agenda.

5. FINANCIAL IMPLICATIONS

Current cost estimates for construction of the subway extension range between \$1.5 and \$2.1 billion

As illustrated in *Attachment 4*, the cost for the Yonge subway extension ranges from \$1.5 to \$2.1 billion and is primarily dependent on the number of station, which may cost up to \$150 million each. Refinement of the number of stations will be the subject of future work and more detailed financial cost analysis will be reported back in future reports.

6. LOCAL MUNICIPAL IMPACT

Viva is being closely coordinated with local planning and economic development activities along the rapid transit corridors.

7. CONCLUSION

Since the meeting of the Rapid Transit Public/Private Partnership Steering Committee on September 20, 2007, the project team has advanced the functional design of the Yonge

Street Subway Extension to the point where we are now ready to begin external stakeholder consultation.

Staff will be approaching the MOE to confirm the provincial direction on an amended EA subway process and will report back to Council. A proposed consultation process for the many stakeholders that will need to be consulted on the subway is the subject of a separate report on this agenda. The Senior Management Group has reviewed this report.

(The seven attachments referred to in this clause were included in the agenda for the January 17, 2008 Committee meeting.)