

Technical Briefing – Rapid Transit

To Rapid Transit Implementation Working Group **Date** March 6, 2017
From The Shift Team
Subject Preferred North Corridor & Richmond Street Transit Tunnel

The preferred North Corridor route for Rapid Transit is illustrated in Exhibit 1.

The Richmond Street Transit Tunnel is approximately 900m long. The north portal is located on Richmond Street near St. James Street. The south portal is located on Clarence Street south of Central Avenue.

Summary

The north corridor from Downtown London to Fanshawe Park Road has the highest ridership potential of the four Rapid Transit corridors. The route has an existing high demand for transit, anchored by Western University, which is the highest generator of transit ridership outside of the downtown.

In addition to a detailed technical evaluation, the following considerations influenced the selection of the preferred routing:

- All north corridor alternatives are constrained by CP Rail line crossings: the at-grade crossing at Richmond Street, a constrained underpass on Oxford Street West, and a constrained underpass on Western Road;
- Moving the CP Rail line has been considered in the past, and discussed with CP Rail. Relocating the rail line was deemed to be prohibitively expensive, requiring property acquisition for a new alignment, public consultation and federal approvals, in addition to the cost to construct new tracks, yards, and grade separations.
- The Rapid Transit Master Plan identifies a new CP Rail grade separation at Richmond Street. While the tunnel provides a seemingly small benefit in normal operations, around 1 to 2 minutes saved, train crossings cannot be predicted. The City has no jurisdiction over CP Rail in terms of restricting train frequency, length or time-of-day scheduling;
- The proposed transit tunnel is critical to achieving the mobility objectives of rapid transit (i.e. fast, reliable service). Without the tunnel, transit will not be an attractive and reliable alternative to the car. If we cannot attract people out of their cars and



Exhibit 1: Preferred North Corridor for Rapid Transit

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

onto transit, roads and intersections will need to be widened to accommodate cars, as identified in the most recent Transportation Master Plan.

- The proposed transit tunnel provides transit schedule reliability, with added benefits to emergency service vehicles (police, fire, ambulance), which can use the tunnel to by-pass queued traffic;
- Either Richmond Street or Wharncliffe/Western Road could connect Western University, but Richmond Street provides superior connections to more transit trip generators including Richmond Row, King’s University College, and St Joseph’s Hospital. The preferred North corridor route is also consistent with the land use planning framework in The London Plan; and,
- All north corridor alternatives are constrained by Thames River crossings and existing bridges: Richmond Street, University Drive, and Oxford Street West.

Issue

The preferred routes for Rapid Transit were presented to at Public Information Centre #4 on February 23, 2017 to gather feedback from Londoners. We heard concerns related to the selection of Richmond Street through Western University to Western Road for the north corridor. We also heard concerns related to the resulting Richmond Street Transit Tunnel, proposed to separate transit from the CP Rail corridor south of Oxford Street.

The preferred routes will be defined in the Rapid Transit Master Plan, which requires City Council approval. This Technical Briefing provides a summary of the analysis completed to date in support of the preferred north corridor and Rapid Transit Tunnel.

Rapid Transit Master Plan Analysis

The following table summarizes the advantages and inconveniences of the preferred North corridor route, based on the analysis completed to date. Details on the development and evaluation of the alternatives follows.

Advantages	Inconveniences
Provides direct high-quality transit service to: <ul style="list-style-type: none"> • Richmond Row • St. Joseph’s Hospital and King’s University College • Western University campus centre and future planned expansion areas • University Hospital • Transit Village at Fanshawe Park Road 	Treatment of Richmond Street between University Drive and Grosvenor Street (1.2km) to be determined: two-lanes of general traffic and no widening, or four-lanes of general traffic with widening, or transit operating in mixed traffic. Requires consideration of driveways, property and heritage designations, compared to transit and traffic operations.
Provides for up to 6 minutes in travel time savings (from Downtown to Fanshawe Park Road) vs. transit in mixed traffic	Places RT on private lands and University Drive bridge.
Avoids significant engineering challenges and associated costs with Oxford Street West crossing of Thames River and CP Rail crossings.	Restricts unsignalized intersections and driveways along the corridor to right-in/right-out operation.

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Advantages	Inconveniences
Best serves transit ridership in the north part of London.	
Minimizes natural environment impacts to North Thames River valley by using existing University Drive bridge.	
Avoids existing traffic congestion at Wharncliffe Road and Oxford Street West intersection.	
Serves the most transit trip generators.	

North Corridor Short-List of Alternatives

The two short-listed options for the North Corridor, Options 1a and 1b, are shown in Exhibit 2. While both options travel within close proximity to Western University, neither option directly enters the core of campus. This leaves much of the campus outside of the 400 metre distance (a 5 to 6 minute walk).

A third option was developed to provide transit within 400 metres of the centre of campus. Option 1c is a hybrid of Option 1a and 1b, Downtown to Masonville via Richmond – WU – Western. Option 1c also addresses the goals of the WU Campus Master Plan which identifies the need for a more direct transit connection to the campus.

Exhibit 2: North Corridor Short-List of Alternatives



Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Route 1c through Western University ranks the highest due to its direct connection of high quality RT to the centre of the University campus. Given that WU students represent the highest transit ridership population, it is a priority to optimize their quality of service. Although this route has challenges with regards to constructability and trying to route through the University, the benefits of doing so will outweigh the limitations of these challenges.

In addition, this route avoids congested areas along Wharncliffe and Oxford Roads, serves the most amount of potential trips generators, serves the most population, serves St Joseph’s Hospital, and serves the northern portion of downtown. Exhibit 3 provides the summary ranking of the north corridor alternatives. Detailed tables are provided at the end of this memo.

Exhibit 3: North Corridor Alternatives Ranking Summary

North Corridor Segment Alternatives Ranking			
	1a Richmond	1b Western-Wharncliffe	1c Richmond – WU – Western
Transportation Capacity and Mobility Focus	1	3	2
Ease of Implementation and Operational Viability	2	1	3
Community Building and Revitalization Focus	3	2	1
Overall Ranking	2	3	1
			Preferred

Richmond Street Transit Tunnel

The preferred north corridor segment routes RT on Richmond Street from downtown London to Western University, through the University to Western Road, then north to Masonville Place. The existing at-grade CPR rail crossing on Richmond Street north of downtown London, south of Oxford Street East, presents a significant constraint to RT operations. This is a major rail corridor, connecting Northern Ontario and Montreal to Detroit and rail lines in the United States. Project discussions with CPR indicate the line is important to the company’s operations, and there are no current plans nor feasible solutions to eliminate the line.

The number of trains that currently cross at the Richmond Street location varies from 10 to 20 trains per day. The delay from each crossing is variable, generally requiring all traffic to stop for 5 to 7 minutes. Note that CPR can increase train frequency at any time, with no warning to the City of London.

Train operations are very likely to continue, and while it is not possible to predict future train volumes, it is reasonable to assume that train frequency and length will increase over the life cycle of London’s RT system. It is also anticipated that CPR will be unable to provide train schedules or limit train crossings during peak traffic period.

Every time a freight train crosses Richmond Street, there would be far-reaching effects on the entire transit system, including significant delay and reduced reliability, increased transit travel times, RT vehicle bunching, increased transit operating costs and reduced consistency of operations. All of these effects would significantly impair the attractiveness of the RT system and make it difficult to attract ridership.

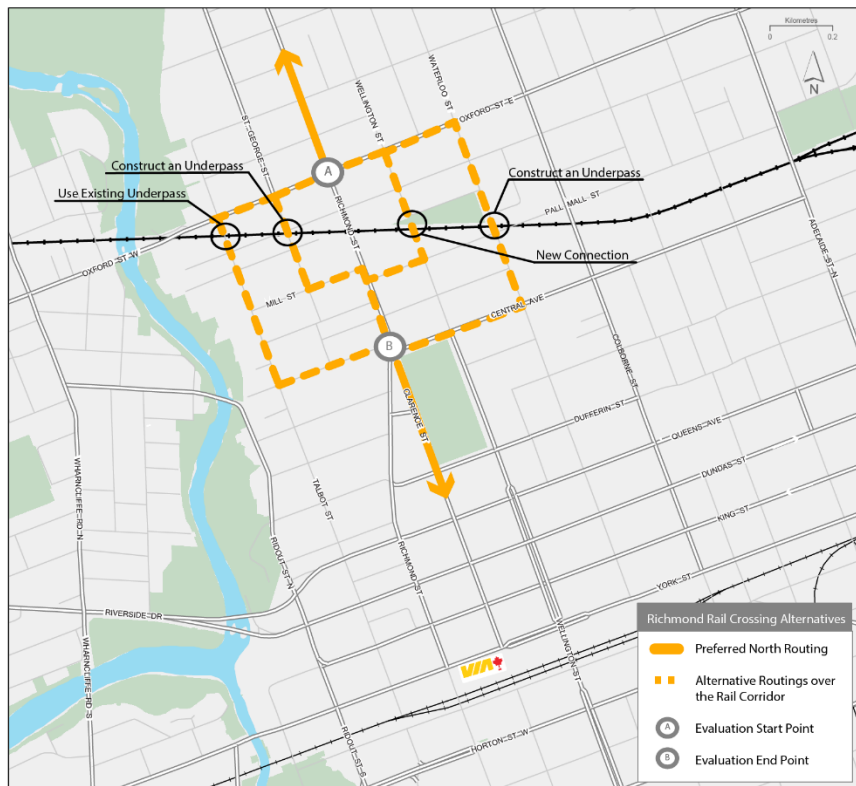
Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

To address these concerns, either RT needs to route around the rail crossing, or RT requires a grade separation at the CPR rail corridor. Alternative north-south routes within approximately 500m of Richmond Street, south of Oxford Street East, were examined to determine their suitability to connect the preferred north corridor segment to Downtown London.

Four potential alternate routes were identified, and their suitability assessed based on a critical flow analysis as compared to the base case of a new grade separation on Richmond Street. The four alternatives are illustrated in Exhibit 4 and assessed in Exhibit 5.

Based on this assessment, there is no viable alternative route to the Richmond Street CPR crossing.

Exhibit 4: Route alternatives to the Richmond Street Rail Crossing



Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Exhibit 5: Analysis of route alternatives to the Richmond Street Rail Crossing

Route	Description	Critical Flaw Analysis
Talbot Street to Central Avenue to Richmond Street	Two-lane road CPR rail crossing is a road underpass with a height restriction of 3.3 m Approximately 1.4 km detour	LRT would require reconstruction of the CP bridge over Talbot to provide sufficient clearance and appropriate alignment. BRT could potentially operate with the existing bridge vertical clearance; however due to the existing lane skew under the bridge, there would be horizontal clearance issues and potential for conflict with opposing traffic. Road and/or bridge reconstruction is required to meet current design standards. This is a potential alternative, but is less preferred than a direct route on Richmond Street.
St. George Street to Mill Street to Richmond Street	Two-lane road CPR rail crossing is at-grade Approximately 700 m detour	Potential grade separation of rail crossing is complicated by adjacent intersection of Piccadilly Street and driveways, and would require significant property acquisition of surrounding buildings. This is not a suitable alternative.
Wellington Street to Pall Mall Street to Richmond Street	Two-lane road Street is discontinuous at CPR rail corridor with large residential and commercial development in between Approximately 750 m detour	Creating a connection would require significant property acquisition south of the rail corridor. This is not a suitable alternative.
Waterloo Street to Central Avenue to Richmond Street	Three-lane road (two northbound, one southbound) CPR rail crossing is at-grade Approximately 1.5 km detour	Existing land use is a mature low density residential area Potential grade separation of rail crossing is complicated by adjacent intersections of Pall Mall Street and Harvard Street, and would likely result in impact to the adjacent building to the northeast of the crossing (underground parking). This is not a suitable alternative.

Based on the review of alternative north-south routes, all of the alternative routes were either not suitable or less preferred than the base case of a new grade separation on Richmond Street. As a result, five grade separation options for the Richmond Street / CPR rail crossing were investigated and assessed using a critical flaw analysis, provided in Exhibit 6. Options include separating just RT or separating all of Richmond Street from the rail corridor.

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Exhibit 6: Analysis of Richmond Rail Crossing Grade Separation Options

Option	Description	Critical Flaw Analysis
Elevate rail over road	Reconstruct the CPR rail corridor over Richmond Street	<p>Significant construction impacts, requiring rail diversion during construction to maintain CPR operations.</p> <p>Significant constraints at existing CPR crossing of Oxford Street and Thames River to the west. Grade separation will impact other rail crossings: Talbot Street, St. George Street, and Waterloo Street.</p> <p>Significant impacts to existing business and future land use with social impact of new rail overpass, creates a physical and visual barrier between north and south.</p> <p>This is not a suitable option.</p>
Lower rail under road	Reconstruct the CPR rail corridor under Richmond Street	<p>Significant construction impacts, requiring rail diversion during construction to maintain CPR operations.</p> <p>Significant constraints at existing CPR crossing of Oxford Street and Thames River to the west. Grade separation will impact other rail crossings: Talbot Street, St. George Street, and Waterloo Street.</p> <p>Significant impacts to existing business and future land use with social impact of new rail underpass, creates a physical and visual barrier between north and south.</p> <p>This is not a suitable option.</p>
Elevate road over rail	Construct a bridge to carry two transit lanes and two general traffic lanes, and sidewalks over the CPR rail corridor	<p>Significant constraints with existing buildings at the property line adjacent to the crossing. Significant property acquisition likely required plus retaining walls / bridge abutments to minimize physical area of impact.</p> <p>Substantial reduction in vehicle and pedestrian access for the length of the structure.</p> <p>Grade separation is complicated by adjacent intersections including Oxford Street, Piccadilly Street, Mill Street and Pall Mall Street.</p> <p>This is not a suitable option.</p>
Lower road under rail	Construct a tunnel to carry two transit lanes and two general traffic lanes under CPR Corridor	<p>Significant constraints with existing buildings at the property line adjacent to the crossing. Significant property acquisition likely required.</p> <p>Reduction in vehicle access for the length of the structure; pedestrian access could likely be maintained at-grade.</p> <p>Grade separation is complicated by adjacent intersections including Oxford Street, Piccadilly Street, Mill Street and Pall Mall Street.</p> <p>This is not a suitable option.</p>
Lower RT under rail	Construct a tunnel to carry two transit lanes under CPR Corridor; general traffic lanes and sidewalks remain at-grade	<p>Two-lane tunnel fits within existing right-of-way, minimizing potential impacts to adjacent properties and buildings.</p> <p>Maintains vehicle and pedestrian access to commercial areas at-grade.</p> <p>Maintains transportation network at adjacent intersections including Oxford Street, Piccadilly Street, Mill Street and Pall Mall Street.</p> <p>This is the preferred option.</p>

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Based on the analysis above, constructing a tunnel for RT under the CPR rail corridor has been carried forward as the preferred option for Richmond Street. This option will provide reduced transit operating costs and reduced travel time for transit passengers, compared to the existing at-grade crossing. In addition, the reliability and consistency of RT travel times for the entire system will be enhanced by the RT tunnel.

The tunnel requires two entrance/exit locations, referred to as portals, at the north and south ends. To locate the north and south tunnel portals, the following major criteria were applied:

- Provide RT stations at or near Central Avenue, Oxford Street, and Grosvenor Street.
- Minimize impacts to the Richmond Row commercial area, including driveway access, parking, delivery activities, boulevards and sidewalks.
- Maintain transportation network connectivity for general through traffic, pedestrians, and cyclists.
- Design the tunnel such that either BRT or LRT can be accommodated; including vertical elements such as profile and clearance, and horizontal design elements such as centreline alignment and clearance.
- Locate an underground station as near as practical to the intersection at Oxford Street, with easy access for transit riders to the surface, and design elements that meet applicable standards including the Ontario Building Code and Accessibility for Ontarians with Disabilities Act (AODA).
- Allow emergency vehicles access to and through the tunnel.

The existing vertical grade of Richmond Street is generally flat from the CPR rail corridor to Oxford Street then slopes upwards to Grosvenor Street. This profile, in combination with the above criteria, results in one viable option for the north tunnel portal location: between St. James Street and Grosvenor Street. The transit running surface would ramp up to match the existing road grade south of Grosvenor Street.

Two options meet the above criteria and were considered for the south portal location: 1) on Richmond Street near John Street, and 2) on Clarence Avenue south of Central Avenue. A critical flaw analysis of these options is provided in Exhibit 7. The analysis considered critical elements, including traffic operations, RT route compatibility, property impacts, land use compatibility, ease of implementation, and resulting tunnel length.

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Exhibit 7: Analysis of Tunnel South Portal Options

South Portal Options	Description	Critical Flaw Analysis
<p>1) On Richmond Street near John Street</p>	<p>Tunnel ramp extends from John Street to approximately Central Avenue. Richmond Street reduced to 2 lanes between Oxford Street and Central Avenue. Tunnel length approx.: 700m</p>	<ul style="list-style-type: none"> • Reduction in carrying capacity of Richmond Street. John Street and Hyman Street become right-in/right-out only. • Compatible with RT on Richmond or Clarence. • Generally fits within existing right-of-way with minimal space for public realm improvements. • Less compatible with existing and future Richmond Row land use, with ramp and portal disrupting east-west connectivity. • Implementation is complex with limited construction work areas adjacent to right-of-way. <p>This option is not preferred.</p>
<p>2) On Clarence Avenue south of Central Avenue</p>	<p>Tunnel ramp extends from Central Avenue to north of Angel Street. Richmond Street is maintained with 4 lanes for general traffic. Angel Street reduced to 1 lane. Clarence Street between Angel Street and Central Avenue is closed to traffic. Tunnel length approx. 900m.</p>	<ul style="list-style-type: none"> • Maintains existing carrying capacity of Richmond Street, but reduces carrying capacity on Clarence Street • Compatible with RT on Clarence. • Fits within existing right-of-way and allows public realm improvements. • More compatible with existing and future Richmond Row land use, with ramp and portal located south of commercial area. • Implementation is simplified with available construction work areas within Clarence right-of-way, adjacent parking lots or edge of Victoria Park. <p>This option is preferred</p>

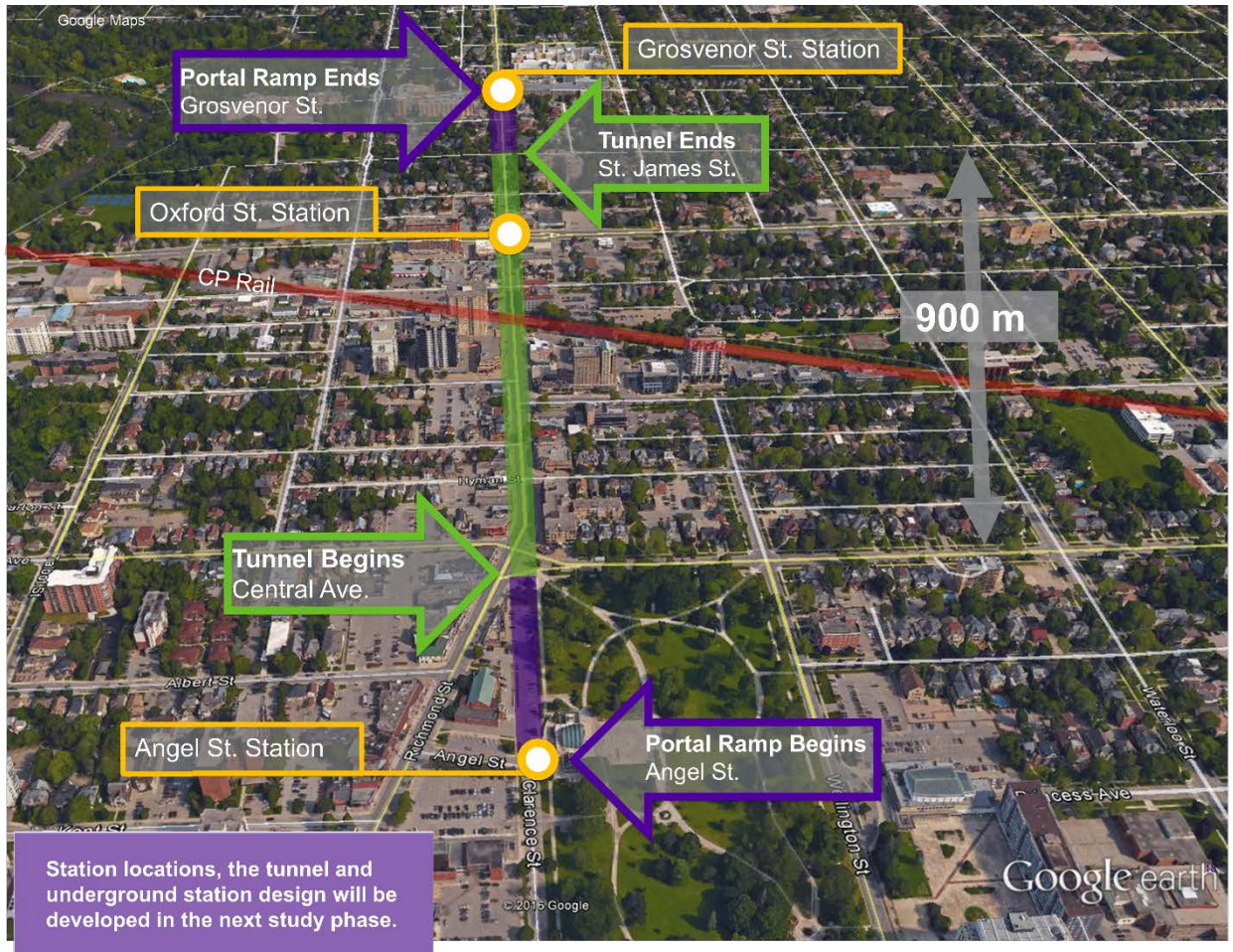
Based on this analysis, the preferred location for the southern tunnel portal is on Clarence Street south of Central Avenue. This decision also incorporates feedback received at PIC#3 and staff report to Council (May 5, 2016). This portal location maintains the existing four lanes on Richmond Street through the Richmond Row commercial area, minimizes impacts to the area, and maintains east-west community cohesiveness.

The resulting tunnel is approximately 900m in length. The RT station at Oxford Street will be underground. This is illustrated in Exhibit 8. This design solution to the Richmond at-grade CPR

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

rail crossing will be considered as an option for inclusion in the north corridor in the development of the network alternatives.

Exhibit 8: Preferred Solution for Richmond Rail Crossing



Implications for the South + West Preferred Route

The RT tunnel under the CPR rail corridor, and under Oxford Street, precludes a RT connection between Richmond Street and Oxford Street. In other words, RT vehicles from the West Corridor cannot access dedicated transit lanes on Richmond Street to enter the downtown. As noted above in this section, there are no suitable parallel routes within approximately 500m of Richmond Street, south of Oxford Street East, for RT to cross the CPR rail corridor. Given the importance of the rail grade separation for transit to the overall project, the greater ridership potential on the north corridor, and the lack of alternative north-south routes into the downtown, alternative options for the West Corridor into Downtown were evaluated further.

Routing transit from the west via streets to the east of Richmond Street does not provide direct and convenient access to the downtown, and does not suitably accommodate the south + west preferred RT route. Alternative streets to the west of Richmond Street with access to the downtown are limited, with Wharncliffe Road being the only suitable option.

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

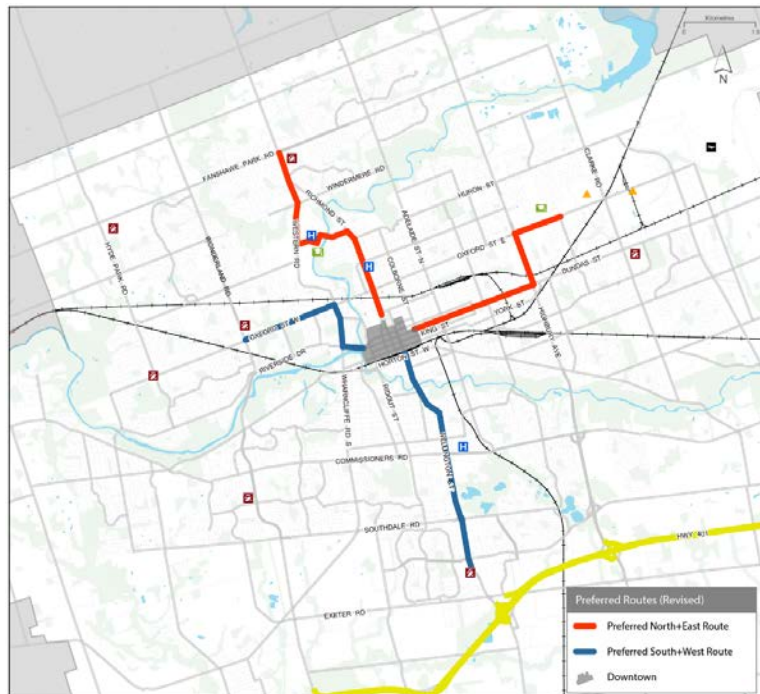
While Wharnccliffe Road was screened out of the long list of route alternatives (Section 3.4), the technical constraints of the CPR rail corridor crossing, and lack of alternative routes, requires re-evaluation of the West corridor alignment. Refining the South + West route along Wharnccliffe Road has the following advantages and disadvantages (Exhibit 9).

Exhibit 9: Wharnccliffe Road Advantages and Disadvantages

Advantages	Disadvantages
<ul style="list-style-type: none"> + Opportunity for additional RT stations for the west part of downtown and major destinations, including Wharnccliffe/Riverside Museum London, and Budweiser Gardens. + Opportunity for Central Transit Hub, and interlining between North + East and South + West routes, closer to the downtown core + Avoid impacts to CPR structure over Oxford Street between Thames River and Talbot Street + Avoid impacts to Oxford Street bridge over Thames River 	<ul style="list-style-type: none"> - Majority of buildings along Wharnccliffe have heritage designation, limiting the opportunity to widen the corridor for transit-only lanes. - Most of the Wharnccliffe corridor south of Oxford Street is within the flood plain, limiting the opportunity for future population and employment growth. - RT will operate in mixed traffic, potentially incurring delay and reducing travel time reliability.

Given the constraints noted, the South + West Preferred Route was refined to turn from Oxford Street West to Wharnccliffe Road, then via Riverside Drive into the Downtown, as shown in Exhibit 10.

Exhibit 10: Preferred RT Network with Revised South + West Route due to CPR Rail Grade Separation



Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Supporting Information

Exhibit 11: North Corridors Transportation and Mobility Assessment

Transportation Capacity and Mobility			
Criteria	1a Richmond	1b Western-Wharncliffe	1c Richmond – WU – Western
Existing Demographics	15 persons/ha and 25 jobs/ha	15 persons/ha and 25 jobs/ha	5 persons/ha and 25 jobs/ha
	●	●	◐
Demographic Growth	Based on 2011 population projections, this route segment is expected to grow by 3 pers/ha and 5 jobs/ha by 2031.	Based on 2011 population projections, this route segment is expected to grow by 3 pers/ha and 5 jobs/ha, by 2031.	Based on 2011 population projections, this route segment is expected to grow by 3 pers/ha and 5 jobs/ha by 2031.
	◐	◐	◐
Existing Transit Culture	560 transit boardings per km along this route, with primary transit generators at St. Joseph’s Hospital, Masonville Place, and WU.	580 transit boardings per km along this route, with primary transit generators at St. Joseph’s Hospital, WU, University Hospital, and Masonville Place.	580 transit boardings per km along this route with primary transit generators at St. Joseph’s Hospital, WU, University Hospital, and Masonville Place.
	◐	◐	◐
Existing Corridor Performance	Segment length: 5.7 km Average vehicle delay: 3.9 seconds/km Maximum Volume to Capacity Ratio: 1.1 Transit Travel Time to Auto Travel Time: 1.4	Segment length: 6.9 km Average vehicle delay: 8.5 seconds/km Maximum Volume to Capacity Ratio: 1.7 Transit Travel Time to Auto Travel Time: 1.4	Segment length: 6.5 km Average vehicle delay: 9 seconds/km Maximum Volume to Capacity Ratio: 1.1 Transit Travel Time to Auto Travel Time: 1.4
	●	○	◐
RANK	1	3	2

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Exhibit 12: North Corridor Ease of Implementation Assessment

Ease of Implementation			
Criteria	1a Richmond	1b Western-Wharncliffe	1c Richmond – WU – Western
Physical Constraints	Limited right-of-way on Richmond Street south of Oxford Street will require widening and property acquisition. Richmond Street, north of Oxford Street can generally accommodate widening within the existing right-of-way, except around the University Drive intersection where property acquisition would be required.	Western Road from Fanshawe Park Road to Oxford Street will require widening and property acquisition. Wharncliffe Road is within the flood plan and is a mature residential area that is not expected to grow.	Limited right-of-way on Richmond Street south of Oxford Street will require widening and property acquisition. Routing through WU campus will be challenging due to limited space on private roads.
	●	●	○
Engineering Challenges	There is an at-grade CP Rail crossing on Richmond Street approximately 200m south of Oxford Street that will require grade-separation. The Richmond Street crossing of the North Thames River would be costly to widen.	The Riverside Drive crossing of the Thames River is currently twinned with two lanes on each structure. The CP Rail bridge over Wharncliffe Road is very narrow but is planned to be improved as determined by the Western Road EA.	There is an at-grade CP Rail crossing on Richmond Street approximately 200m south of Oxford Street that will require grade separation. The University Drive crossing of the Thames River is two-lanes and would either require mixed traffic, restricted general traffic, twinning or widening of the existing bridge. Maintaining the character of the existing bridge will be a priority.
	●	●	●
RANK	2	1	3

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Exhibit 13: North Corridors Community Building and Revitalization Assessment

Community Building and Revitalization			
Criteria	1a Richmond	1b Western-Wharnccliffe	1c Richmond – WU – Western
Intensification and Revitalization	<p>There is redevelopment potential along Richmond Street south of Oxford Street. Richmond Street, north of Oxford Street is primarily low and mid density residential and has less potential for intensification. This route is farthest from planned WU campus expansion west of Western Road</p>	<p>There is little potential for intensification or redevelopment along Wharnccliffe Road due to the floodplain and mature residential uses. Serves WU planned campus expansion west of Western Road</p>	<p>There is redevelopment potential along Richmond Street south of Oxford Street. Richmond Street, north of Oxford Street is primarily low and mid density residential and has less potential for intensification. Serves WU planned campus expansion west of Western Road</p>
	○	◐	●
Benefits to Disadvantaged Populations	<p>This route provides improved transit service to WU students and to Street Joseph’s Hospital. However, since the route does not pass through WU campus, it is limited in its ability to provide high quality rapid transit service directly to the University and to University Hospital</p>	<p>This route provides improved transit service to University Hospital and to WU staff and students. By passing through WU campus on Western Road, students are more directly connected to high quality rapid transit.</p>	<p>This route provides improved transit service to the Unviersity Hospital and St. Joseph’s Hospital, as well as WU staff and students. By routing directly through WU campus and along Western Road, students are most directly connected to high quality rapid transit.</p>
	○	◐	●
Transit and Pedestrian Supportive Land Use	<p>Richmond Street south of Oxford Street has a more traditional “main street” feel with small scale retail and commercial activity. Grid street network is supportive of pedestrian and transit movements.</p>	<p>Western Road is low density residential supported by a curvilinear street network, making difficult “first-mile” walking connections to transit. Wharnccliffe Road is primarily residential</p>	<p>Richmond Street north and south of Oxford Street has the same characteristics as Option 1A. By routing directly through WU campus and along Western Road, transit oriented development is</p>

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Community Building and Revitalization			
Criteria	1a Richmond	1b Western-Wharncliffe	1c Richmond – WU – Western
	<p>North of Oxford Street, the land use is primarily low and medium density. The properties are closely spaced, with moderate building setbacks making for decent walkability along the route.</p> <p>All routes support TOD at the Fanshawe Park Road intersection.</p>	<p>with tight spacing of houses. This is a reasonably walkable area.</p> <p>All routes support TOD at the Fanshawe Park Road intersection.</p>	<p>supporting for Western University and the Windermere/Western area.</p> <p>All routes support TOD at the Fanshawe Park Road intersection.</p>
	●	○	●
RANK	3	2	1

Background

Richmond Street Corridor Characteristics

- Western University is the largest generator of transit trips in the City. Western University (WU) sits along Western Road, south of Windermere Road. The University is home to over 32,000 undergraduates, postgraduates, faculty, and full-time staff as of the 2015-2016. The WU Campus also includes London Health Science’s Centre - University Hospital.
- The London Health Sciences Centre is home to a number of hospitals, medical centres, and research institutes that together form London’s largest employer, with nearly 15,000 physicians, residents and staff (www.lhsc.on.ca/About_Us/LHSC/Who_We_Are/Facts_And_Stats/FactsandStats2016.pdf).
- St Joseph’s Hospital is one of London’s regionally significant health centres that employs more than 4,500 physicians and staff and provides care to more than 400,000 patients annually. It is one of the largest employers along the Richmond Street corridor.
- King’s University College is home to approximately 3,500 full and part time students (<http://www.kings.uwo.ca/about-kings/>)
- Masonville Place is a major shopping centre located on the southeast corner of Richmond Street and Fanshawe Park Road. Masonville Place is home to 150 stores and a 12 screen movie theatre. A number of other retail outlets are located on the northeast and northwest corners of the intersection.

Preferred North Corridor & Richmond Street Transit Tunnel - March 6, 2017

Long List of Route Alternatives

At the beginning of the Rapid Transit Master Plan study, 13 corridor segments were identified as the Long List of route alternatives, shown in Exhibit 14. Each of these corridors serve the major trip generators in London and the major LTC and intermodal transportation facilities. All of these corridor segments are currently served by at least one LTC route.

Routing within the downtown area was excluded at this stage of analysis. While a preliminary study of downtown routing was conducted as part of previous work, the approval of the *Move Forward: London's Downtown Plan* provides new considerations for the area that restrict the previously preferred routing. Ensuring that RT supports the long-term vision and projects of the Downtown Plan is important to maintain the cohesive vision for the area. In addition, the long list of alternative corridor segments will create a wide range of alternative connections through the downtown area.

A full description of the methodology and criteria will be provided in the Rapid Transit Master Plan. Based on the assessment, eight corridor segments scored 'high' or 'average' and were carried forward for more detailed consideration, as shown in Exhibit 14. For the North Corridor, two options were carried forward:

1. Richmond Street from Downtown to Masonville Place; and
2. Western Road from Downtown to Masonville Place.

Exhibit 14: Results of Corridor Level Screening Assessment

