



Rapid Transit Corridors EA

Project Management Plan: Updated and Expanded Scope



Prepared for City of London

by IBI Group
In association with WSP Canada Inc.
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1. Introduction

This scope of work has been updated following the adoption of the Rapid Transit Master Plan (RTMP) by London City Council on July 25, 2017. This updated and expanded scope of work will develop the preliminary engineering design for the full 24-km BRT network, complete the Transit Project Assessment Process (TPAP), and satisfy City Council requests for technical studies based on public feedback to date.

1.1 Project Background

Over the past two years, the City of London has been embarking on a major initiative to implement rapid transit. The rapid transit initiative builds on the London 2030 Transportation Master Plan (TMP) approved by City Council in June 2012.

This updated work plan includes some commentary on the work completed to date, including design activities that were advanced in the first half of 2017. The focus of this work plan is the scope of work remaining to complete pre-planning activities and the TPAP process, and to gain City Council approval of the Environmental Project Report (EPR).

1.2 Project Objective & Approach

Project Objective

The objective of the next phase of the project is to complete the Environmental Assessment (EA) process following the Transit Project Assessment Process (TPAP) for both the North + East and South + West BRT corridors:

- The TPAP is a time-limited (6 months), proponent driven, self-assessment process intended specifically for transit-related projects. The TPAP places an emphasis on issues that may be provincially important, are of interest to Aboriginal communities, or may have federal implications.
- Pre-planning activities for TPAP include pre-consultation and engagement, identification of potential impacts, mitigation measures, and preparation of the draft Environmental Project Report. These activities are described in more detail in Section 2.
- TPAP activities include formal consultation, agency and public review of the draft Environmental Project Report and all pre-planning and technical background studies. Specific timeframes are defined, as detailed in Section 2.

Overall Approach

The approach of this project is to follow the required steps of the EA process while incorporating broader systems planning and city-building considerations in the work plan. The principles behind this approach are:

- Building on previous studies and the substantial body of work done on the rapid transit network concept in the Smart Moves TMP, Business Case, RTMP, and London Plan;
- Integrating planning and urban design as part of the study to assist the City in achieving its goals to develop denser, active and environmentally responsible neighbourhoods;
- Recognizing that rapid transit must work together with local services to form an integrated network across the entire city;
- Incorporating a traceable decision-making process in the project to document a logical and transparent approach to evaluating design alternatives to implement the approved BRT network;
- Focusing on design so that corridor challenges, in terms of impacts and mitigation measures, are given an appropriate level of attention; and,
- Listening to the public and stakeholders, recognizing the value of public input in terms of identifying design options, addressing concerns about potential impacts and benefits, and generating support for the preferred design alternative.

2. Project Organization and Status

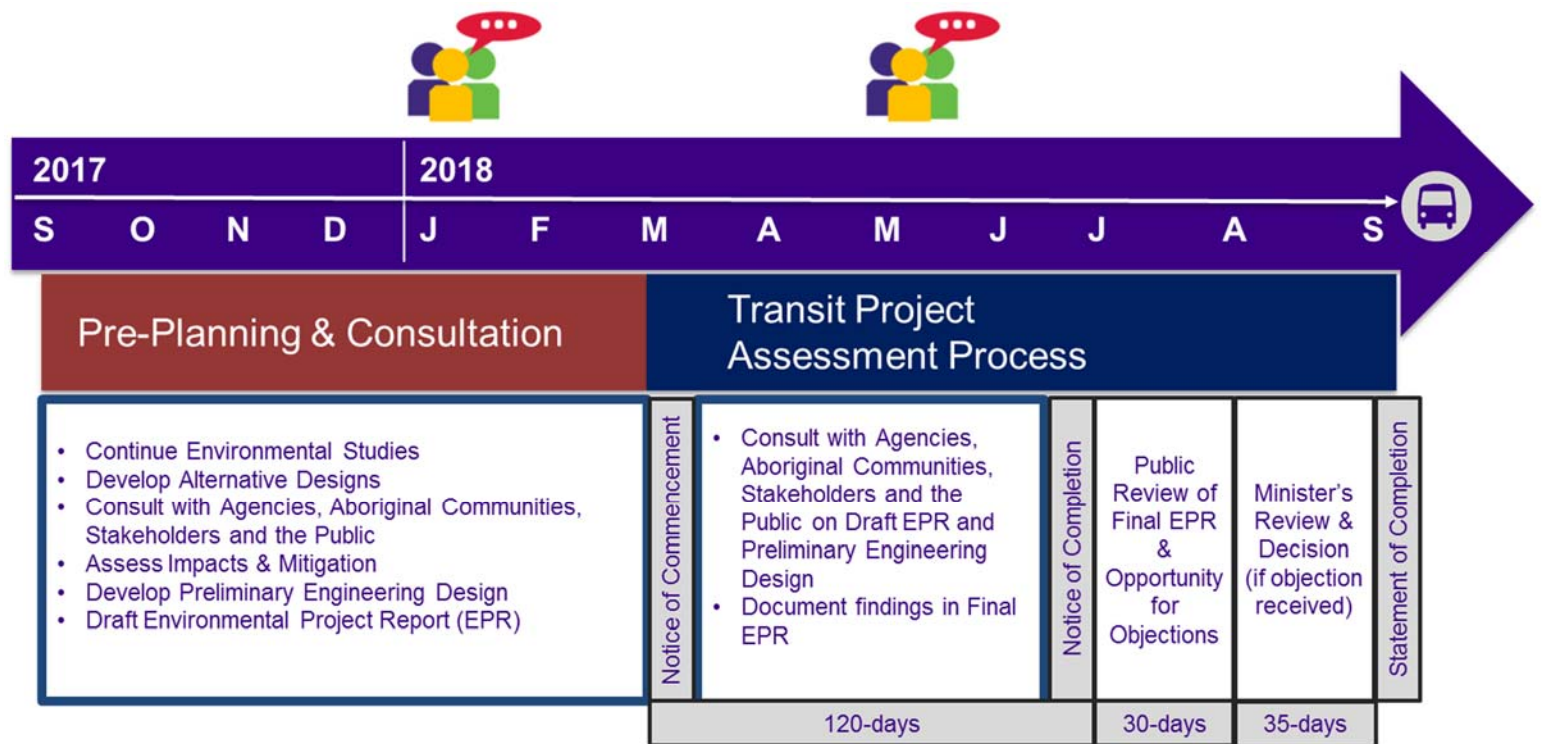
The project is structured into five technical phases that have been developed in accordance with Ontario's EA process. Phases 1 and 2 were completed in July 2017 with approval of the Rapid Transit Master Plan by Council. Phases 0, 3, 4, and 5 will complete the TPAP and work towards City Council approval of the EPR and preliminary engineering design. Consultation will occur during every phase of the process. The overall project schedule is illustrated below.

The TPAP process is illustrated in the following flow chart. Phases and tasks are detailed in the following sections. It is important to note that in Phase 3, the technical tasks are completed in stages:

- In Tasks 3.3 and 3.4, additional technical analysis will expand on the work completed for the RTMP to inform the development and evaluation of alternative designs at locations where challenges have been identified through technical work and consultation;
- In Tasks 3.5 and 3.6, alternative design options will be developed, with consideration for potential impacts and mitigation strategies, and the

design options will be evaluated to determine the recommended design; and,

- In Task 3.7, once the preferred design is selected, including feedback through consultation, technical specialists will provide input to the preliminary engineering design and development of mitigation strategies and features.



2.1 Phase 0 – Project Management and Study Design

Phase 0 includes project management tasks including invoicing, scheduling, coordination of technical specialists, quality control and quality assurance. This phase will continue to the completion of the project.

2.2 Phase 1 – Need and Justification

Phase 1 involved identifying the need and justification for the undertaking and summarizing it in a Problem Statement. This phase was completed with the approved RTMP in July 2017.

2.3 Phase 2 – Alternative Solutions

Phase 2 dealt with identifying, evaluating, and selecting the alternative planning solutions to the problem. This phase was completed with the approved RTMP in July 2017.

2.4 Phase 3 – Pre-planning for Transit Project Assessment Process

Pre-planning activities are undertaken prior to formal commencement of the TPAP to develop a thorough understanding of project requirements, and to increase certainty prior to initiating the prescribed 6-month TPAP timeline and minimize the chance for a “time-out”. Refer to Ontario's Transit Project Assessment Process Guide for more information:

<https://dr6j45jk9xcmk.cloudfront.net/documents/1799/3-8a-6-ea-transit-projects-en-pdf.pdf>.

The team will:

- Identify alternative design options at specific locations along the BRT network;
- Evaluate the options based on a defined set of criteria;
- Select the recommended design for staff and partner/stakeholder review;
- Develop mitigation strategies; and,
- Update the implementation strategy.

Pre-planning activities include consultation with agencies and stakeholders, and engaging Aboriginal communities and the public. Pre-planning activities also include updating and completing a range of technical analyses to inform the preliminary engineering design and mitigation strategies. Pre-planning activities have already commenced in certain technical and corridor areas, as described later in the work plan.

The outcome of Phase 3 is a draft Environmental Project Report (EPR) with supporting technical appendices, preliminary engineering design, and a consultation summary.

2.5 Phase 4 – TPAP & Environmental Project Report

Phase 4 will be initiated after the Ministry of the Environment and Climate Change, Environmental Assessment and Approvals Branch, has reviewed the Draft EPR. This phase includes a formal Notice of TPAP Commencement, which triggers the time-limited 120-day TPAP period.

The 120-day period includes formal public consultation, usually in the form of a Public Information Centre. This period provides an opportunity for agencies, stakeholders and the public to comment on the Draft EPR and for the City to conduct other consultation, as appropriate. The Final EPR is produced at the end of the 120-days, documenting the consultation and findings of the 120-day period.

This is followed by Notice of EPR Completion and a 30-day formal review period of the Environmental Project Report, where objections may be submitted to the Minister of the Environment and Climate Change on the issues outlined in O.Reg. 231/08. If an objection is received during the 30-day period, there is a 35-day period for the Minister to give notice. The final step is a Statement of TPAP Completion.

2.6 Phase 5 – Implementation Plan

Phase 5 involves an update to the implementation strategy. A draft implementation strategy was developed as part of the RTMP and Business Case for the BRT network. The implementation strategy will be refined to define the Quick Start concept and subsequent phasing of construction, once the preliminary engineering design is complete, and will be included in the EPR. At this time, no update to the Business Case is envisioned.

3. Project Team, Stakeholders and Consultation

3.1 Project Team

The project will be managed by Jennie Ramsay, Project Director, Rapid Transit, and directed by Edward Soldo, Director of Roads and Transportation for the City of London.

The Project Team is comprised of Rapid Transit Implementation Office staff plus representatives from a number of key City departments including Roads and Transportation, Planning – Urban Design, as well as London Transit Commission staff.

The Project Team also includes staff from City departments that have an interest in the BRT corridors or support the study process, including but not limited to: Water, Wastewater, Stormwater, Planning – Environmental and Parks, Planning – Urban Forestry, Structures, Development Services, Realty Services, Legal Services, Communications, Financial, and Geomatics.

3.2 Aboriginal Communities (First Nations)

First Nations Communities are an important stakeholder group for Shift consultation and the project considers constitutionally protected Aboriginal rights and the City's duty to consult for engagement. The Project team has been in contact with Aboriginal Communities through the RTMP, and have already begun sending invitations for continued participation to First Nations communities in the immediate surrounding area.

3.3 Community Stakeholder Group (CSG)

This group comprises representatives from major property owners within the project area. Given the varying interests of these stakeholders, there will be a need to meet one-on-one with many of the individual stakeholders identified, in addition to scheduled CSG meetings.

3.4 Municipal Advisory Group (MAG)

This group comprises representatives from existing City Municipal Advisory Committees that have a direct interest in Shift.

3.5 Technical Agencies Group (TAG)

This group comprises representatives from the many technical agencies involved in Shift.

3.6 Consultation and Engagement

Consultation efforts will continue as the project progresses into the pre-planning and Transit Project Assessment Process. The City has developed a revised Communications Plan to provide the framework for pre-planning and TPAP consultation. This includes a variety of consultation tools and activities for the general public, transit riders, students, businesses and BIAs, neighbourhood/tenant associations, and other interest groups.

IBI Group and WSP will support the City's consultation efforts as described in Section 4.

4. Work Plan

4.0 Phase 0 – Project Management

Task 0.2 - Project Management Tasks

Purpose: Project management tasks include monthly invoicing, communications with the City's Project Team, coordination of technical specialists, quality control and quality assurance.

Actions:

- Monthly invoicing and status updates.
- Regular communication by phone and email with City's project team, LTC, and other departments.
- Coordination of data requests, and coordinate and review work by technical specialists.
- Work plan updates, monitoring schedule and critical path items, and project risk management.
- Quality assurance and quality control.

Task 0.9 – Bi-Weekly Meetings with City Project Team

Purpose: To work closely with the City's Project Team, by preparing for and attending working meetings with staff every 2 weeks.

Actions:

- Develop meeting schedule and work flow to address critical path items.
- Prepare meeting materials and send meeting invites.
- Attend meetings, record key decisions and action items.

4.1 Phase 3 – Pre-planning for TPAP

Objective: The third phase of this project continues with the development and evaluation of design alternatives for the implementation of the approved 24-km BRT network in accordance with the requirements of the Transit Project Assessment Process (O.Reg. 231/08).

Alternative design concepts will be identified for each element of the system including corridors and stations, as well as a strategy for the implementation of Intelligent Transportation Systems (ITS). Evaluation criteria will be developed for each design element; design alternatives will be evaluated for their overall environmental impact and appropriate preferred design alternatives selected after stakeholder consultation.

The results of the environmental assessment process, highlighting the evaluation of alternatives, the selection of preferred alternatives, and the record of consultation will be documented within the draft Environmental Project Report.

Task 3.1 – Class EA Process or TPAP Decision

Completed.

Task 3.2 – Rapid Transit Design Criteria

Completed.

Task 3.3 – Identify and Analyze Alternative Design Concepts for Preferred Solution

Purpose: To identify the different design concepts available to satisfy the preferred solution including the runningways, stations (platform locations and massing), intersection elements, and structures (bridges and retaining walls). This task will develop the overall roadway design concept from property line to property line for design alternatives. The focus will be on plan drawings, supplemented by cross-sections, as appropriate.

Several technical areas are included at a high-level in this task, to inform the development and evaluation of alternative design concepts, including: civil and structural engineering, station architecture, traffic modelling, landscape/streetscape design, geotechnical and property contamination assessments, utility impacts and relocations, stormwater management, municipal services impacts, parking, access and curbside activities, noise and vibration assessment, and air quality.

Conceptual level designs have been completed for the entire 24-km network, excluding the 4 bus turnaround locations at the corridor ends. These designs will be advanced to a functional design level (maximum 10-15% design) in the following areas for the purpose of evaluating alternative design concepts. In some cases, multiple design options will be drafted in order to have materials to present to the project team, stakeholders and the public.

- Alignment (Civil engineering)
 - The 24-km bus rapid transit network will be reviewed to determine areas where alternative designs could reduce or eliminate negative impacts. In particular, any locations where potential property take has been identified should be assessed. The list locations and proposed design options will be reviewed with the City project team prior to initiating design option development. Design options will be developed using the design criteria that were developed in Fall 2016.
 - Identifying alternative design concepts began in late 2016, and will be updated based on the approved network in consultation

with the project team. Many locations are anticipated to have design options, for example: Richmond Street north of Oxford (4 lane or 6 lane cross-section, centre or improved side rapid transit lanes), Western and Richmond intersection realignment, horizontal alignment of Wellington south of the Thames River, 4 bus turnaround locations, and park-and-ride facility options.

- Design options will be developed in plan based on typical cross-sections, with centreline profile and location-specific cross-sections developed to assist in evaluating the options as appropriate.
- Structures (Structural engineering)
 - Preliminary structural requirements were determined for existing structures along the BRT corridors, including Kensington Bridge, which is now out of the project scope.
 - Structure alternatives will be developed and evaluated in parallel with the road alignment at existing crossings, plus retaining wall analysis, as needed.
 - Structure life cycle will be considered in selecting the recommended design, along with environmental and operational constraints.
 - The preferred alternative will be carried forward for each crossing to the preliminary engineering design in consultation with the City's project team.
- Station Architecture
 - Typical rapid transit station layouts and key station features will be defined and analyzed including: safety and security, shelter, accommodation of one or two transit vehicles, platform, dynamic and static transit information, illumination, fare collection system, and loading area capacity based on dwell times, clearance time etc.
 - A review of the requirements for electric buses and the potential impacts on station design will be completed.
 - A workshop will be held with the City to review and discuss design precedents and direct station design development.
 - Advancing the Quick Start concept will be considered. It will be important to identify property and utility constraints to minimize cost and facilitate implementation. Developing the Quick Start is described in more detail in Phase 5.
- Traffic Modelling

- A transportation modal hierarchy and general plan for traffic access and circulation was previously confirmed. Constrained locations were identified in the RTMP. Candidate alternative measures will be determined on a section-by-section basis.
- Transit connections with cross-platform or same platform connections will be identified and analyzed. The aim will be to limit walking distances and integrate adjoining bus stops.
- Additional intersections requiring traffic signals, the potential for, and the storage length of left and right turn lanes at intersections along the preferred corridor will be identified. This will be used to determine where widening for rapid transit may be constrained by the ROW width, and inform the evaluation of design concepts.
- Provide future build (2034) and future no-build traffic volumes suitable for noise assessment and air quality assessment.
- **Recommended Enhancement:** VISSIM modelling is proposed for the area of Richmond Street, St. George and Wellington Street, from University Drive (the Gates) to Central Avenue, including all intersections. Around the Richmond & Oxford intersection, the model will include Talbot Street and Waterloo Street from St. James to Central. The City will provide traffic counts for all intersections in the study area. The purpose of this task is to assist in quantifying potential diversion to neighbourhood streets. Using the VISSIM software will also produce visualizations suitable for public presentation. Model scenarios to be developed for one peak period. Pedestrians will be included in the model to the extent possible.
- Landscape/Streetscape Design
 - Alternative streetscape concepts will be developed, building on the typologies defined in the RTMP. Concepts will include planting areas, active transportation, wayfinding, and potential sustainability features to explore during detailed design. Illumination requirements will be developed in consultation with the City. A strategy for planted medians identified in the RTMP concept design will be developed. Concepts will be developed through a Complete Streets lens and strive to maximize space for pedestrians and plantings.
 - Coordination with the on-going City Complete Streets project and a design workshop with City staff is included in Task 6.5.
 - Typical conceptual landscape designs for stations will be developed from property line to property line for: typical

curbside platforms, typical farside median platforms, typical mirrored median platforms, on-road turnaround, off-road turnaround.

- Alternative designs for Transit Villages have been prepared including off-street and on-street alternatives. Designs account for wider area land use plans and opportunities for redevelopment. Evaluation will be completed and recommended alternatives will be identified.
- **Recommended Enhancement:** Conceptual landscape design at eight Rapid Transit stations will be developed to address unique situations. Landscape designs would consider the unique conditions and features. The locations will be determined as the study progresses in consultation with the City's project team. Deliverables will include preliminary streetscape design with SketchUp or photo renderings to illustrate the integration of Rapid Transit with adjacent land use.
- Geotechnical and Property Contamination Assessments
 - A preliminary evaluation of overall near-surface geotechnical and pavement engineering issues was completed and will be refined for the approved 24-km network to determine design and future construction of pavements for BRT lanes and stations, the effects of heavy bus traffic on existing pavements, and shelter foundations.
 - A preliminary evaluation of potential subsurface environmental impacts associated with past land uses that may affect property acquisition and later management of any excavated soil and groundwater within the right-of-way and on properties impacted along the BRT corridors will be completed.
 - Geotechnical recommendations will be completed (may include anticipated subgrade conditions for pavements, new structure foundations and below grade utilities).
- Utility Impacts and Relocations
 - Utilities with infrastructure within the BRT corridors have been identified and contacted. Existing and future plant information, clearance and any other permit and approval requirements has been started, and updates will be requested given the time that has passed since the original request.
 - The BRT team has meet previously with the Utilities Coordinating Committee (UCC) to provide updates on the

- status of the study and corridor alternatives. Consultation through this group, and with individual utilities, will continue.
- The scope of utility relocations and the preliminary order of magnitude of relocation costs will be estimated to inform the evaluation of design alternatives.
 - Focus will be on the major utilities, such as high voltage hydro corridors, gas, and fibre optic lines, which would present implementation and cost issues.
 - A utility relocation strategy has been developed and was presented to the UCC in March 2017.
- **Stormwater Management**
 - Data collection and a review of sub-watershed studies and recently completed and current EA's that impact the BRT corridors has been substantially completed.
 - Continue to liaise with City staff regarding known problem areas and planned improvements.
 - The identification of sewer catchment areas and storm drainage infrastructure and an analysis of impervious areas is substantially complete.
 - Identification of Upper Thames River Conservation Authority (UTRCA) regulated areas and areas of specific natural environmental interest is underway as part of Natural Heritage work.
 - Additional data collection and a review of new sewer catchment areas is required as result of the updates made to the BRT corridors.
 - **Area of Special Study: Westminster Ponds ESA / Provincially Significant**
 - The work program to address stakeholder and regulatory body concerns is substantially complete. A water balance study is required, and will be considered in the evaluation of alternatives and coordinated with UTRCA.
 - **Municipal Services Impacts**
 - Conflict and relocation issues were identified at a preliminary level in the RTMP. This will inform the evaluation of design alternatives. Where available from the City, the evaluation will also consider future servicing plans, such as the on-going

Central Area Servicing Study (CASS) and Pollution Control and Prevention Plan.

- **Recommended Enhancement: Parking, Access and Curbside Activities**
 - A review of on-street parking, access, and curbside activities will be conducted for the full 24-km network. This will include a site visit and photo record, in particular for corridor segments where transit lanes may be median or curb side.
 - This task includes counting driveways and on-street parking spots, documenting City input on snow clearing, waste removal, and other City maintenance activities, review of utilities in the curb lane and in the roadside.
- Noise and Vibration Assessment
 - The identification of Noise Sensitive Areas (NSAs) is complete. These areas will be presented to the City for approval before the noise assessment begins for the preliminary engineering design.
 - The evaluation of design alternatives will consider noise and vibration, for example, by considering the distance between travel lanes and sensitive receptors and future traffic volumes.
- Air Quality
 - The development and evaluation of design alternatives will consider air quality in a qualitative manner.
 - Air quality specialists will also comment on the potential bus fleet composition for Bus Rapid Transit.

Task 3.4 – Detail Inventory of Natural, Social and Economic Environment

Purpose: Based on additional detail in the development of the two corridors, detailed inventories will be undertaken to confirm / update the analysis done for the RTMP. Additional focus will be given to the development of mitigation measures and to document the significant benefits to the environment arising from the project. Consideration will be given to the potential impacts on affordable rental stock based on data provided by the City. The multi-season assessment has continued in summer 2017 for the areas identified in the Subject Lands Status Report.

Protected heritage property, built heritage resources, cultural heritage landscapes, and archaeological resources and areas of potential archaeological interest are some matters that may be provincially important.

- Natural Heritage:

- A Subject Lands Status Report (SLSR) was included as part of the RTMP submission.
- An Environmental Impact Study (EIS) will be completed as part of the pre-planning for TPAP. A meeting was held with various stakeholders in April 2017 to determine the scope and requirements of the EIS. See Task 3.10 for details on the EIS.
- The evaluation of alternative designs will consider the impacts to the natural environment based on the analysis in the SLSR and the on-going EIS.
- Cultural Heritage:
 - A Cultural Heritage Constraints Report was completed and included as part of the RTMP.
 - A Cultural Heritage Screening Report (CHSR) report will be prepared for the approved BRT network. Properties identified as being directly or indirectly impacted by the undertaking will receive specific analysis regarding impacts and mitigation. This report will be submitted to the Ministry of Tourism, Culture, and Sport for purposes of review and compliance.
 - **Recommended Enhancement:** A heritage workshop was requested by City Heritage Planners – see Task 6.5. This could also include a walk-about of certain areas with London Advisory Committee on Heritage in the afternoon or evening.
 - **Recommended Enhancement:** The cultural heritage specialists will work with the architects and landscape designers to develop the typical station designs as described in Task 3.3.
- Archaeology:
 - A Stage 1 Archaeological Assessment was completed and included as part of the RTMP submission.
 - As a result of changes to the BRT corridors, an additional Stage 1 Archaeological Assessment will be required for the new corridor areas.
 - The evaluation of design alternatives will consider archaeological impacts.
 - **Recommended Enhancement:** A Stage 2 Archaeological Assessment will be conducted for the selected areas identified in the original and additional Stage 1 Assessment. This would be limited to areas around known cemeteries/church yards highlighted by City staff. Additional Stage 2 work may be

required during detail design prior to construction, beyond the completion of TPAP.

- **Recommended Enhancement: Wellington Street Business Impact Assessment**
 - Conduct field review of the SoHo area to inventory and categorize businesses along Wellington Street from Horton Street to South Street (approx. 1km), similar to the review completed for the Downtown and Richmond Street in spring 2017.
 - Assess the impacts of different design alternatives in terms of parking, access, and property, for input into the evaluation of design alternatives.
 - Report on the findings to local businesses, Councillors and other stakeholders.
 - The scope of work does not include a review of individual businesses, or assessment of earnings, land value, or other economic factors.

Task 3.5 – Identify Potential Impacts of Alternative Design Concepts & Mitigating Measures

Purpose: To compile and compare the technical analyses completed in Tasks 3.3 to 3.5 and understand the impacts and potential mitigation measures of the various alternative design options.

Actions:

- Review the technical analysis for each alternative design concept, and modify the design concepts as appropriate to achieve feasible options for evaluation.
- Develop the potential mitigation measures to understand their cost, property, or other implications, to inform the evaluation of design concepts.

Task 3.6 – Evaluate Alternative Design Options

Purpose: To evaluate and summarize the alternative design options using a combination of quantitative and qualitative approaches. The summary will be presented in drawings, tables, renderings and text.

Actions:

- Draft evaluation criteria have been developed. Criteria will be circulated to Project Team, and potentially presented to others for input before beginning the evaluations.

- A multidisciplinary evaluation of the alternative design options will be undertaken. Input from agencies, stakeholders, Aboriginal communities, and the public will inform the evaluation of options.
- Recommended design alternatives will be presented to the City. The City will confirm if the recommended alternative is preferred, or if further modifications are needed to create the preferred design.

Task 3.7 – Preferred Preliminary Engineering Design

Purpose: To combine the preferred design options and advance the design to a 25-30% preliminary engineering design level.

- Civil Plan and Profile Drawings
 - Preliminary engineering design (25-30%) plans and profiles (1:1,000) will be prepared and requirements will be documented in a report and drawings.
 - Appropriate cross-sections will be prepared and will incorporate features from other disciplines, highlighting traffic configurations, required infrastructure, streetscape features, boulevards/sidewalks, and location of major utilities.
 - Design requirements including retaining walls, station requirements, and hydraulic structures, will be identified and provided in preliminary drawings.
 - Property requirements, entrance/access modifications, utility impacts/relocations and sidewalks and cycle facilities will be identified. Separate property plans will be developed, see below.
- Typical Cross-sections and Detail Sections
 - Grading limits will be developed.
 - Potential construction easement requirements and/or retaining walls will be identified.
- Structures/ GA Drawings
 - General arrangement drawings will be prepared for superstructure and substructure, showing grading/retaining walls/abutments suitable for property identification, Lifecycle Cost Estimate and recommendations for construction staging.
 - The footprint requirements for the final structure will be determined along with alignment, temporary diversions and construction staging.
- Intersection Design

- Station Design
 - Functional design (10%) of prototype shelter for typical centre platform application and typical curb-side application.
 - Design concept for platform design and elements (ramp, rail, elements) including diagrams and 3D SketchUp model.
- Streetscape Design
 - The requirements and example concept designs (~15%) will be identified for lighting, benches, waste receptacles, kiosks, newspaper boxes, and banners. Location and spacing advice and precedent images will be provided.
 - A workshop will be held with staff from different City departments to identify and evaluate urban design concepts for the rapid transit corridors and stations. See Task 6.5 for more information.
 - Opportunities and suggestions for public art at key stations will be identified.
- Geotechnical and Property Contamination Assessments
 - The draft geotechnical report is complete. The report will be revised to reflect updates to the preferred BRT corridor: work related to the tunnel will be removed and the additional investigations required for the extension to Exeter Road for the potential Park-and-Ride facility will be added.
 - Coloured pavement technologies for bus lane demarcation and concrete pavement alternatives will be evaluated and considered.
 - A “screening level environmental site assessment” will be completed, documenting an inventory of land uses and potential for environmental contamination at and near properties along the BRT corridors. Preliminary screening information on properties that may have the potential to contribute to environmental contamination along the proposed alignments will be obtained from government and private sources for properties within the study area.
 - A summary report of existing geology and geotechnical conditions will be prepared and will address: overburden stratigraphy, hydrogeological environment and geo-environmental impacts along the various designs with regard to general construction methods, soil and rock excavation and disposal options, and potential general effects of dewatering on

- the surrounding areas. The influences of road widening on slope stability will be parametrically examined, if necessary, to assist in assessing whether or not such widening is feasible or practical.
- Based on the information contained in each record, properties within each alignment's buffer zone will be categorized as having low, medium, or high potential to contribute to environmental contamination along the proposed alignment. The outcome of this ranking of potential risks for encountering contamination will be discussed and summarized with reference to the proposed construction in a summary report.
- ITS Strategy/Signals
 - An Intelligent Transportation Systems (ITS) strategy has been drafted for the rapid transit corridors. The existing state of Advanced Traffic Management Systems (ATMS), Advanced Public Transportation Systems (APTS), Advanced Traveler Information Systems (ATIS), and Electronic Payment (EP) system was assessed. A high level ITS architecture was developed, and specific systems to be included in the runningway, stations, and centres (operations, and maintenance) to support the rapid transit system have been identified.
 - Appropriate ITS components and station design attributes have been drafted, including off-board fare purchase and payment, security features and traveler information devices. Based on City/LTC feedback, the elements will be incorporated into the station architecture.
 - A new traffic control study is under consideration for tender by the City of London. It may be necessary to coordinate the BRT ITS work with this or other studies.
 - Traffic Modelling
 - A detailed analysis of all signalized intersections will be completed in Synchro for the preferred design. This will build on the work completed in the RTMP and include feedback from the design alternatives and preferred design.
 - An assessment of proposed road and transit alignment/configuration concepts on road safety and emergency services operations during emergency response situations will be completed, in consultation with the appropriate emergency services representatives.

- **Stormwater Management**
 - Complete analysis of BRT corridors impervious areas, ability of existing drainage system to accommodate flows, and drainage improvements required.
 - Identify mitigation measures and application to the corridors e.g. OGS, BMP, LID, end of pipe solutions for input to the design and in particular consider property requirements to accommodate appropriate measures.
 - Approval of stormwater management design will be sought from UTRCA.
- **Illumination**
 - Illumination requirements will be identified using ANSI/IES RP-8-14 for final preferred design and incorporated into preliminary engineering design. Design will consider special illumination conditions on the BRT corridors such as Downtown, underpass, and overpass.
 - Provide input to capital cost estimate.
 - Scope does not include traffic signal design. Illumination design may be refined during detailed design in coordination with other utilities (e.g., pole sharing).
- **Utilities and Servicing**
 - A relocation strategy, capital cost estimate, associated schedule will be developed in consultation with utility owners (public and private).
 - Schedule lead times will be obtained from individual utilities for significant relocations.
 - The preliminary engineering design will be coordinated with the Central Area Servicing Study (CASS) that is currently underway.
 - The City has initiated subsurface utility investigations within the downtown core area. In the completion of the preliminary engineering for the BRT corridors, the consultant team will review with the City the need to complete further subsurface utility investigations in congested corridors where utility relocations and spatial constraints are issues. The actual completion of such investigations are beyond the scope of this assignment.
- **Property Plans**

- Potential property impacts will be identified for the preliminary engineering design showing the approximate amount of property required.
- A potential property request plan will be prepared with drawings consisting of a strip plan illustrating all of the property requirements including working easements in sufficient detail to allow the City to commence negotiations with property owners. The property requirements would include property required for utilities. Scope does not include individual parcel block plans.
- Noise and Vibration Assessment
 - Operational Noise Assessment
 - All noise assessments (operational and construction) will conform to MOE / MTO Joint Protocol environmental noise guidelines.
 - Assess potential noise impacts at the worst-case NSA's using an approved noise prediction model (i.e., STAMSON, STAMINA, etc.) for the future build and future no-build scenarios. Future scenarios will be assessed based on traffic projections to 2034.
 - Assess potential noise impacts at the worst-case NSA's using an approved noise prediction model (i.e., CADNA, etc.) for the future build and future no-build scenarios for one transit station.
 - Supplement modelling using engineering judgment based on professional experience in environmental noise.
 - Construction Noise & Vibration Assessment
 - Construction noise and vibration is typically only a concern if activities such as pile driving, vibro-hammering or blasting are undertaken. At this time, these activities are not expected. The report will include standard mitigation measures and potential construction concerns.
 - Review the implementation plans / construction staging concepts for the preferred engineering design to determine the types and timing of various construction activities.
 - Undertake a review of the preferred engineering design to identify areas where bridge/overpass construction, pile driving, etc. may occur, and identify the NSA's, which could be affected.
 - Identify potential noise impacts from construction.

- Identify applicable municipal noise control by-laws along the preferred route and summarize their potential impact on the construction program.
- Vibration Assessment
 - Vibration impacts from roadways are typically not a concern and will therefore be discussed at a high level along with standard mitigation measures.
- Air Quality
 - An Air Quality Impact Assessment will be completed for the preferred design. The assessment will estimate contaminant concentrations resulting from the proposed London bus rapid transit operations.
 - Scheduled bus traffic will be used to determine impacts at sensitive receptors within the Study Area. Other operations will be considered in the Study Area including existing London City Transit. The impacts will be predicted using air dispersion modelling.
 - Emission models most commonly used are the United States Environmental Protection Agency's (US EPA) Motor Vehicle Emission Simulator (MOVES) and American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD). US EPA MOVES software will be used to determine bus emission rates for traffic and parking areas. US EPA AERMOD will be used to determine potential air quality impacts associated with the aforementioned scenarios.
- Cost Estimate
 - Using the established unit costs, capital and operating costs will be refined, including appropriate consideration and recommendation of mitigation measures.

Task 3.8 – Identify Preferred Design Alternative & Mitigation Measures

Purpose: Based on the evaluation of design alternatives in Task 3.7, and the preliminary engineering design in Task 3.8, the preferred design alternative will be documented along with mitigation measures and areas for further study.

Actions:

- Document the preferred design alternative and preliminary engineering design.
- Itemize the mitigation measures, commitments to future work, and how the issues and comments raised through consultation were addressed in the design or will be addressed in detail design.

- Identify permits and approvals required for the detail design stage.

Task 3.9 – Scoped Environmental Impact Study (EIS)

Purpose: To identify significant natural heritage features and evaluate the project's potential impacts on the features. In order to maintain transparency, the findings are to be documented in the EIS report, as required by the City of London Official Plan Section 15.5.1.

Actions:

- A meeting was held with various stakeholders in April 2017 to determine the scope and requirements of the EIS.
- As a result of the changes to the BRT corridors, additional natural heritage work is required to obtain updated information for the EIS and to verify the presence of Species at Risk within the new areas of impact.
- The sensitivity/significance of natural heritage features will be determined in relation to provincial, regional and local municipal policies. An impact analysis will be performed to identify the likelihood and significance of potential adverse effects on natural heritage features and to identify impact management measures including avoidance, mitigation, enhancement and compensation. Recommendations will be made for environmental monitoring during and post-construction.
- The EIS will be presented to the City's Environmental and Ecological Planning Advisory Committee (EEPAC) to obtain support for the project.

Task 3.10 – Recommended Enhancement: Independent Safety Audit

Purpose: To respond to City direction and concerns heard through consultation, an independent road safety audit of the preliminary engineering design is recommended. The road safety audit will be completed by an independent consulting team and report to the City.

Actions:

- Provide the preliminary engineering design drawings to the independent Road Safety Audit team.
- Respond to comments made by the auditor, in consultation with the City.
- Incorporate changes to the design at the direction of the City.

Phase 3 Deliverables:

- Rapid Transit Corridors EA Process decision (T3.1) - Complete

- Rapid Transit Design Criteria Report (T3.2) - Complete
- List of Alternative Design Options for Evaluation (T3.3)
- Evaluation Criteria for Design Options (T3.3)
- Cultural Heritage Screening Report (T3.4)
- Stage 1 Archaeology Report (T3.4)
- **Recommended Enhancement:** Stage 2 Archaeology Report (T3.4)
- Alternative Design Evaluation Tables (T3.6)
- Preliminary Engineering Design, Preliminary Property Plans and Preliminary Cost Estimate for Preferred Design (T3.7)
- Air Quality Impact Assessment Report (T3.7)
- Noise and Vibration Assessment Report (T3.7)
- ITS Strategy (T3.7)
- Environmental Impact Study Report (T3.9)
- **Recommended Enhancement:** Independent Safety Audit (T3.10)

4.2 Phase 4 – Environmental Project Report (Transit Project Assessment Process)

Objective: To complete the Transit Project Assessment Process by drafting and distributing the Notice of Commencement and starting the 120-day consultation and documentation period, which will inform the composition of the EPR. Upon completion of the EPR, a Notice of Completion of the EPR will be published and the 30-day public review period will commence. The 35-day Ministerial review period will follow the public review period. Upon completion of the Minister's review period, a Statement of Completion will be published.

Task 4.1 – Notice of Commencement of Transit Project Assessment Process

Purpose: To prepare and submit the Notice of TPAP Commencement, and complete all administrative tasks associated with initiating the TPAP and the associated 120-day consultation and documentation period.

Actions:

- Prepare and publish the Notice of TPAP Commencement, working with the City to decide between a simple notice and a broader study announcement.
- Determine distribution logistics for the Notice of TPAP Commencement.

- Post notice on project website and publish in local paper, in coordination with the City.

Task 4.2 – Draft Environmental Project Report

Purpose: To provide a single report, associated executive summary and presentation materials that will satisfy the requirements of the O. Reg 231/08 and gain Council approval, with a clear and concise description of the work undertaken, the alternative solutions and designs developed and evaluated, leading to the selection of the preferred solution and design. A Notice of Completion of the EPR will be drafted and published, which invites the public/agencies/Aboriginal communities to review the report.

Actions:

- Draft the Environmental Project Report (EPR).
- Post the Draft EPR for public review during the 120-day period.
- Determine distribution logistics for the Notice of Completion of EPR.

Task 4.3 – Final Environmental Project Report

Purpose: To finalize the Environmental Project Report based on feedback received during the 120-day period and conduct the 30-day public review period.

Actions:

- Incorporate comments made during 120-day period.
- Post EPR for 30-day public review on the project website.
- Post Notice on project website and publish in local newspaper, in coordination with City.
- Circulate Notice of Completion of EPR to the Director, Regional Director, and individuals that received the Notice of TPAP Commencement, made a written request for a copy of the notice, and those that provided comments during the 120-day consultation period.
- Support the City to circulate the Final EPR to Aboriginal (First Nations) communities, Technical and Government Agencies, City departments, Councillors, MPs, and MPPs.

Task 4.4 – Statement of Completion of TPAP

Purpose: To prepare and submit the Statement of Completion of TPAP to the Director and the Regional Director, which is not to be submitted earlier than 65 days after the Notice of Completion of the EPR is first published.

Actions:

- Prepare the Statement of Completion of the TPAP.
- Determine distribution logistics for the Statement of Completion of the TPAP.
- Publish Statement of Completion of the TPAP on project website.

Phase 4 Deliverables:

- Finalize and Issue Notice of TPAP Commencement (T4.1)
- Draft Environmental Project Report (T4.2)
- Finalize and Issue Notice of EPR Completion (T4.3)
- Final Environmental Project Report (T4.3)
- Publish Statement of Completion of the TPAP (T4.4)

4.3 Phase 5 – Implementation

Objective: Phase 5 of the Rapid Transit Corridors EA study supports London’s interest in proceeding quickly to have BRT service in place as soon as is practicable. It includes the implementation strategy, coordination with other capital works for water, sanitary and storm sewers, and the business case.

Task 5.1 – Develop Implementation Strategy

Purpose: To provide the City of London with a strategy for getting the project from paper to reality in the context of the BRT corridors, and assist in how it could be integrated into the current built environment and transit system.

Actions:

- Develop “Quick Start” action plan, adding detail to the concept identified in the RTMP. This may include preliminary engineering design, streetscape, station architecture, utilities, illumination and other features.
- Identify other “quick wins” that can be taken by the City/LTC along the BRT corridors to improve service and increase awareness, and provide a set of recommendations including commentary on benefits, costs and risks.
- Identify Construction Staging Strategies for laydown and staging areas and matters such as BRT stations, accommodating local transit routes, and future considerations for BRT-to-LRT conversion.
- An overview of alternative procurement and financing methods for delivery of the preferred design including case studies of similar

projects was included in the RTMP. Selecting a procurement method is beyond the scope of TPAP.

Task 5.2 – Procurement Analysis by Infrastructure Ontario

Purpose: To support the City during this procurement analysis and value-for-money assessment.

Actions:

- Assist in responding to Infrastructure Ontario questions or requests for more information.
- Provide material to the City/Infrastructure Ontario at key milestones.

Task 5.3 – Recommended Enhancement: Local Transit Integration

Purpose: To address public concerns regarding the integration of local transit and rapid transit. To inform the preliminary engineering design to protect right-of-way for local bus stops and other transit infrastructure along the BRT corridors, and to share data and final decisions with respect to each corridor with LTC to provide for updates to the Post 2019 Service Framework, as required.

Actions:

- Build on the 2016 Rapid Transit Integration Framework, 2017 Annual Service Plan, approved BRT network (July 2017), Dundas Place impacts to transit, and consider Western University requirements to identify modifications to the recommended 2035 LTC network with BRT in place, in particular for routes along or through the BRT corridors.
- Integrate infrastructure requirements along the BRT corridors to support local bus service, as appropriate

Task 5.4 – Business Case Analysis - COMPLETE

Phase 5 Deliverables:

- “Quick Start” action plan (T5.1)
- Summary of “Quick wins” and Network Staging Strategies (T.5.1)
- Materials to support Infrastructure Ontario analysis (T5.2)
- **Recommended Enhancement:** Local transit integration (T5.3)

4.4 Stakeholders and Consultation

Objective: To actively engage with the general public, businesses, Aboriginal communities (or First Nations), Metis, review agencies, and other stakeholders. The consultant team will support the Rapid Transit Implementation office.

Task 6.1 – Recommended Enhancement: Public Information Centre #5

Purpose: To obtain feedback from the public to aid in the creation of the Environmental Project Report prior to the issuance of the Notice of TPAP commencement. A public meeting during the pre-planning phase is not a mandatory requirement of TPAP.

Actions:

- Prepare PIC notice and distribute in coordination with City.
- Prepare PIC material for City review.
- Arrange printing of PIC material including comment and sign-in sheets.
- City to arrange venues and provide staff to attend.

Task 6.2 – Public Information Centre #6

Purpose: To meet the public consultation requirements of the TPAP and to inform and respond to the concerns of interested persons and those affected by the project during the 120-day period.

Actions:

- Prepare PIC notice and distribute in coordination with City.
- Prepare PIC material for City review.
- Arrange printing of PIC material including comment and sign-in sheets.
- City to arrange venue and provide staff to attend.

Task 6.3 – Technical Agencies Group, Key Stakeholders Group, Municipal Advisory Group, and RTIWG Meetings

Purpose: To prepare for and attend meetings with the groups described in Section 3 to gather feedback and engage with assembled groups.

Actions:

- Initiate groups by preparing letters, identifying contacts, and inviting representatives in coordination with the City.
- Prepare and print materials required for meetings.

Task 6.4 – Council Meetings

Purpose: To present the draft and final versions of the Environmental Project Report to City Council to obtain their endorsement prior to issuing the Notices of Commencement and Completion of TPAP.

Actions:

- Arrange printing of Draft and Final Environmental Project Reports and related materials. Prepare presentation materials in advance to support staff report.
- Senior consultant team members will attend to present and/or answer questions as needed.

Task 6.5 – Workshops with City staff & Public Design Charrettes

Purpose: Four workshops with City staff are proposed to build consensus on key topics. A public design charrette will be held to build support and involve the public in the development of select components of the project centred on station architecture, urban design and public art.

Actions:

- Staff workshops will be arranged with invite lists confirmed by the City's project director. Prepare materials in advance of the workshop. Facilitate the workshop and prepare a workshop summary. Topics may include: urban design, station architecture, traffic and construction management, and heritage.
- **Recommended Enhancement:** Public design charrette will be arranged with invite list developed in coordination with City staff. Determine distribution method for invitations. Prepare and print required materials (precedents, sign-in sheets etc.). Attend and summarize the session. City to arrange venue and provide staff to attend.

Task 6.6 – Responding to Questions

Purpose: The public consultation requirements of the TPAP require that a consultation record be compiled that contain summaries of the comments submitted by interested persons, including Aboriginal communities. To garner support for the project, and to educate and inform the public, the project team will respond to questions submitted by the public.

Actions:

- Create and maintain public consultation comment records.
- Respond to comments by phone and email.
- Redact comment records prior to their release to the public.

Task 6.7 – Meetings with Property Owners

Purpose: To support the City as they inform and/or notify individuals with property that may potentially be affected by the project. City staff will meet with property owners to identify concerns and provide input to design options.

Actions:

- Provide drawings to support City meetings with individual property owners.

Task 6.8 – Prepare Website Content, Newsletters, FAQ, and Other Public Materials

Purpose: To enhance public consultation events and meet the requirements of the TPAP, materials such as sign-in sheets, postcards, posters, and videos will be used at public consultation events. The project website and social media accounts will be maintained.

Actions:

- Prepare and/or print and distribute materials required for open houses, public design charrettes, the project website and social media accounts, including the FAQ document and graphics.

Task 6.9 – Technical Agency Meetings

Purpose: To meet individually with the technical agencies involved in the approval of project components including the MOECC, UTRCA, private utilities, and emergency services.

Actions:

- Arrange meetings in consultation with City staff. Determine meeting venue. Prepare agenda and meeting summaries. Prepare and print required materials (plans).

Task 6.10 – Aboriginal Community / First Nations Meetings

Purpose: To engage Aboriginal communities / First Nations to discuss the project and identify and review any issues specific to the community.

Actions:

- Draft letters to be mailed by City staff updating the communities of the project and offering to arrange a meeting. Prepare and print required materials (plans).

Task 6.11 – Additional Meetings

Purpose: To meet individually with other agencies and groups that own property within the BRT corridors or have an interest in the project to inform them and collaborate on the development of design alternatives involving their property.

This could include BIAs, resident associations, tenant associations, student groups, or others.

Actions:

- Arrange meetings in consultation with City staff. Determine meeting venue. Prepare agenda and meeting summaries. Prepare and print materials required at meeting.

Task 6.12 – Western University & Fanshawe College Engagement

Purpose: To work with these major property owners to obtain answers to unresolved questions regarding property access and preliminary engineering design.

- Meeting topics may include: input to design options and evaluation, recommended design options, and preliminary engineering design.
- Determine meeting venue. Prepare and print materials required. Prepare meeting summaries.

Task 6.13 – Recommended Enhancement: Expert Peer Review

Purpose: To gather suggestions and feedback from professionals involved in similar BRT projects across Canada by inviting them to London to view the work completed.

Actions:

- Assist the City by planning, preparing materials, and attending this one-day event.

5. Key Milestones

Planned dates for key milestones include:

- PIC 5 – December 2017
- Draft EPR to MOECC – February 2018
- Issue Notice of TPAP Commencement – March 2018
- PIC 6 – April 2018
- 120-day TPAP Consultation ends June 2018
- 30-day public review – July 2018
- 35-day Ministerial review – August 2018
- Statement of TPAP Completion – September 2018