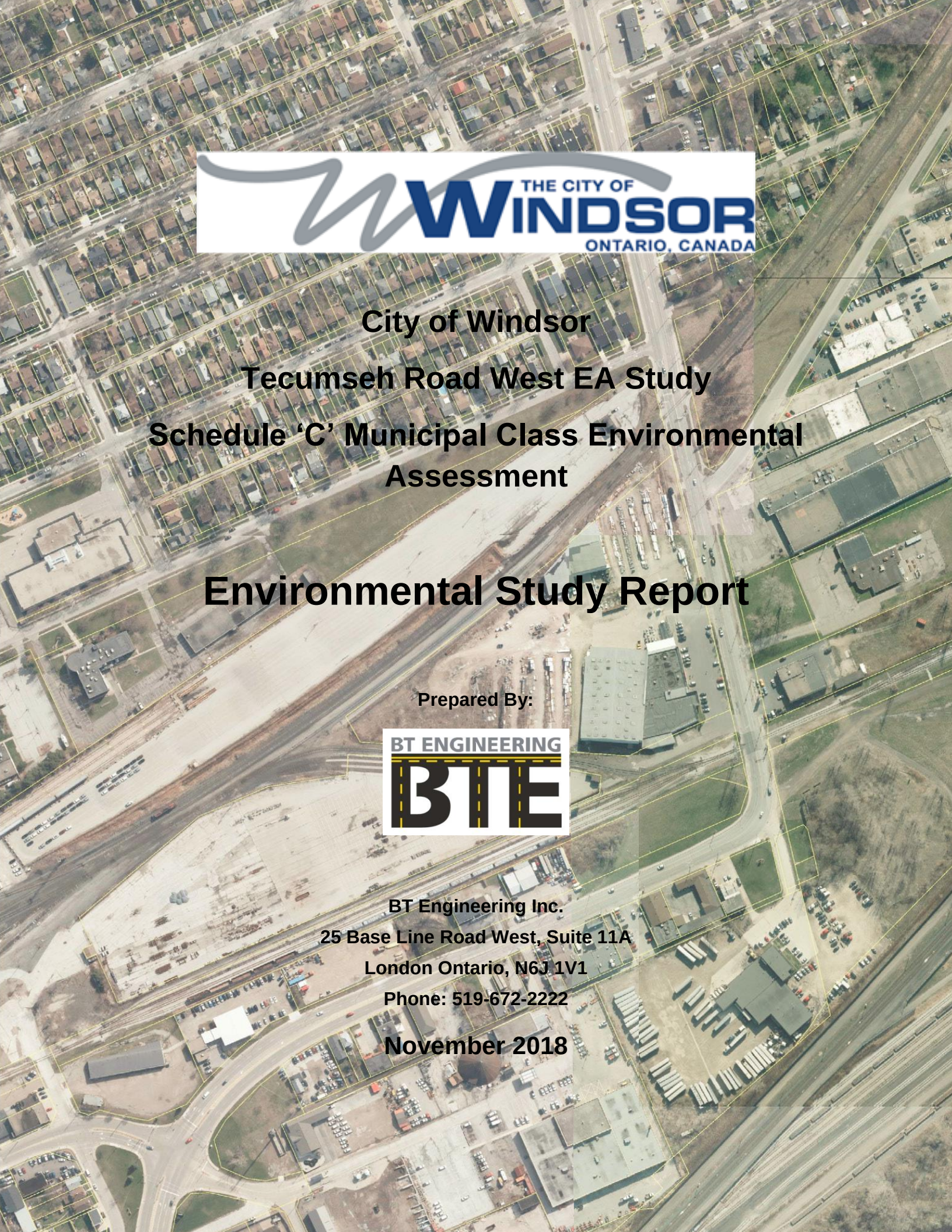

City of Windsor

Tecumseh Road West EA Study

Schedule 'C' Municipal Class Environmental Assessment

Environmental Study Report

Prepared By:

BT Engineering Inc.
25 Base Line Road West, Suite 11A
London Ontario, N6J 1V1
Phone: 519-672-2222

November 2018

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November 2018

Prepared by:

Steve Taylor, Steven Taylor, P.Eng., M.Eng., CVS-Life, Project Manager

BT Engineering Inc.

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TECHNICAL APPENDICES

1.0 INTRODUCTION

A Class Environmental Assessment (EA) Study was initiated by the City of Windsor (City) in May 2017 for the planning of improvements to Tecumseh Road West from east of Crawford Avenue to Janette Avenue. Planning of improvements to Tecumseh Road West was identified in the Tecumseh Road West Corridor Master Plan (1994), and in the Tecumseh Road West Corridor Master Plan Addendum (2001). See **Section 1.2** and **1.3** for the background of the Master Planning for the corridor. The Tecumseh Road West EA Study reviewed Phases 1 and 2, which were previously completed as part of the Tecumseh Road West Master Plan and Addendum, and completed Phases 3 and 4 of the Study. The Master Planning process is an approved process under the Municipal Class EA and has concluded with the preparation of this Class EA Environmental Study Report (ESR).

This Class EA Study documents the transportation need and the Recommended Plan to address current and future operational needs, considering all modes of travel and incorporating required environmental protection measures. These road improvements will provide all users (pedestrians, bicycles, commercial vehicles, vehicular traffic, transit, emergency services and trucks) with a safe and convenient route to travel along Tecumseh Road West.

This Study was undertaken as a Schedule C (Municipal) Class EA, and completed Phases 3 and 4 of the Municipal Class Environmental Assessment as amended in 2015. The Study established the need and justification for the project, considered all alternatives and proactively involved stakeholders and the public in defining a Recommended Plan for improvements.

1.1 Study Area

The Study Area is located in the City of Windsor, and is illustrated in **Figure 1**. The limits of the Study Area are 250 m south of Crawford Avenue to Janette Avenue. Technical investigations and environmental inventories have been focused on the Local Study Area, and the area where construction is anticipated to occur, although certain elements have been investigated beyond these limits based on the range of alternatives considered in this report and previous studies.

Figure 1: Study Area

1.2 Background

Tecumseh Road West is a major east-west arterial road carrying an average of 23,000 vehicles per day and providing access to industrial, commercial and residential properties, and the wider transportation network.

Existing issues along the corridor include: substandard roadway geometry and two at-grade rail crossings in close proximity. Corridor improvements are being considered to improve traffic safety, accommodate pedestrians, cyclists and transit and decrease delays to the road users.

1.3 Previous Studies

Previous studies completed for the corridor include the Tecumseh Road West Corridor Master Plan, and the Addendum to the Master Plan. The Tecumseh Road West Corridor Master Plan (1994, Dillon) was prepared to evaluate roadway conditions along

Tecumseh Road West between Janette Avenue and Everts/Curry Avenue. The Master Plan considered three transportation problems (see **Figure 2**). These findings, and the recommendations identified in the Master Plan, included:

1. Substandard subways at the railway crossing near Wellington Avenue. Recommendation: Increase the height and road width under the grade separation.
2. Roadway geometry at the intersections of Tecumseh Road West and Crawford Avenue. Recommendation: Improve the roadway geometrics.
3. At-grade rail crossings between Janette and Crawford Avenue. Recommendation: Provide a Grade Separation – Tecumseh Road West Alignment Subway (this recommendation was subsequently amended in 2001).

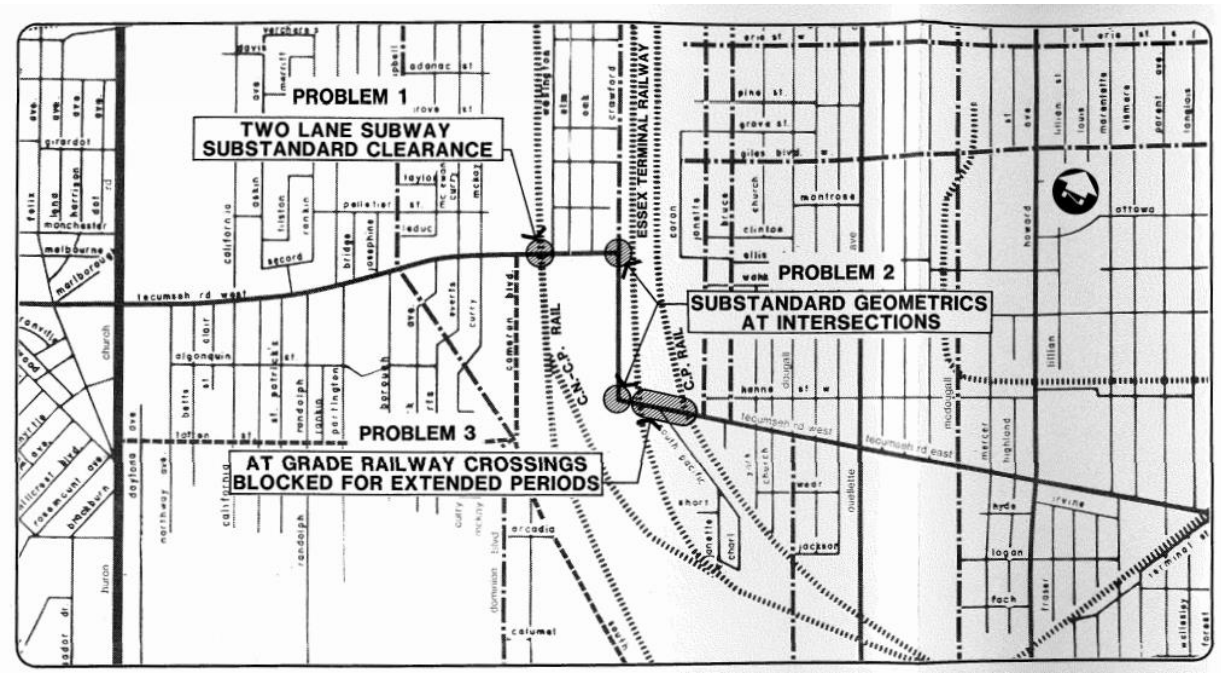


Figure 2: Problems identified in the Tecumseh Road West Corridor Master Plan

Following the completion of the Master Plan construction was completed in 1997 to address the deficiencies of the subway structure west of Wellington Avenue and the roadway geometry at the intersection of Tecumseh Road West and Crawford Avenue. Completion of these improvements took place in 1999 for the grade separation of Tecumseh Road West from McKay Avenue /Curry Avenue to Crawford Road under Contract No. 97-38. This grade separation now forms a constraint for all new improvements being considered by this study.

In 2001, the Tecumseh Road West Corridor Addendum to the Master Plan (Dillon) was prepared to identify alternative solutions for the at-grade rail crossing between Janette Avenue and Crawford Avenue. At the time of the Study, there was a decline in the number of rail movements at the CPR crossing. As a result, the Addendum to the Master Plan recommended that the ETR and CPR at-grade crossings be upgraded and

that improvements to the crossing protection (flashing signals, bells and crossing gates) be implemented.

The existing and projected traffic (roadway and rail) demand along Tecumseh Road West has now been reviewed as part of this EA study to assess if there is a warrant for improvements to the corridor to address infrastructure operational and safety improvements for the 20-year study horizon. Tecumseh Road West is a major commercial corridor (classified truck route) and is classified as a Civic Way and Class II Arterial Road in the City of Windsor Official Plan. The Bicycle Use Master Plan (2001) had identified Tecumseh Road West as a cycling corridor, recognizing the limited opportunities that exist to cross the rail lines, and had recommended that bicycle lanes be provided along Tecumseh Road West through the Study Area.

1.4 Problem Statement

Tecumseh Road West is a major east-west corridor in the City of Windsor's Transportation Network providing access across the various rail corridors dividing the City. The railways create a built environment constraint with limited opportunities for crossing which results in the channelization of all trips to a small number of crossings, increasing their importance to the overall transportation network.

The existing infrastructure within the Study Area is reaching the end of its service life. The surficial elements of the road will need to be reconstructed or rehabilitated in the near term and as such it is prudent to define any infrastructure, operational and safety improvements that may be part of any future project.

The problem to be addressed by the study is to identify what future roadway design will meet the safety and operational needs while addressing:

- The geometric deficiencies on Tecumseh Road West
- The CPR and ETR at grade crossings and their impact on traffic;
- All travel modes;
- Emergency services vehicles;
- Access to serve businesses;
- Transportation needs within the 20 year study horizon; and
- The Official Plan goals for the land use planning and Civic Way arterial road street classification.
- Improve safety

This study has evaluated improvement alternatives for the roadway geometry and the at-grade crossings, including consideration of grade separations, to improve the safety and efficiency of the corridor. The study will document the transportation need and define the new facility form and function of the road in the community. This route will continue to be a key link for motorists, cyclists and pedestrians in the future.

The roadway design and infrastructure improvements should reflect physical geometric design elements that match the community design objectives of a Civic Way (in keeping with the design approach of the modern “Complete Streets” philosophy).

1.5 Project Orientation

The orientation of Tecumseh Road through the Study Area includes sections of the corridor running north-south and east-west. However, for the purposes of this report Tecumseh Road is considered to be an east-west corridor.

2.0 CLASS EA PROCESS

This Class EA follows the Schedule C requirements under the Planning and Design process of the “Municipal Class Environmental Assessment”, as amended in 2015. The study was initiated by publishing a draft Study Design document that described the proposal work plan, public consultation and process to be followed to complete the Class Environmental Assessment to meet the requirements of the Municipal Class EA process. This Study Design report, included in **Appendix A**, was initially circulated in draft form for public comment, then amended and updated based on input from the public. This initial consultation included a Community Café event as a Phase I discretionary activity to reintroduce the project (since the previous 2001 Master Planning Consultation). The final Study Design report reflects the modified work program.

2.1 Class Environmental Assessment Process

This Study meets the requirements of the provincial EA Act following the “Municipal Class Environmental Assessment” process for a Schedule ‘C’ project as amended in 2015. This document specifies the procedures required to plan specific road projects according to an approved planning process. This is a self-assessment process that includes mandatory public consultation.

The EA has examined alternatives for operational improvements to Tecumseh Road West from Crawford Avenue to Janette Avenue.

The approach to the study includes the MOECC’s five guiding principles for EA studies, namely:

- Consider all reasonable alternatives;
- Provide a comprehensive assessment of the environment;
- Utilize a systematic and traceable evaluation of net effects;
- Undertake a comprehensive public consultation program; and
- Provide clear and concise documentation of the decision-making process and public consultation program.

The Class EA process includes an evaluation of all reasonable alternatives and the selection of a preferred alternative(s) with acceptable effects (including avoidance and mitigation of any residual effects) on the natural and social/cultural, economic and technical environments.

The EA process entails five phases. Phases 1 and 2 were previously completed during the Tecumseh Road West Master Plan and Addendum. This EA study subsequently completed Phases 3 and 4, finalizing the ESR in 2018.

The following is the specific breakdown of tasks by phase for a Schedule 'C' project[1]:

Phase 1: Identify the Problem (completed by Master Plan and Addendum)

Step 1: Identification and description of the problem or opportunity

Phase 2: Alternative Solutions (completed by Master Plan and Addendum)

Step 1: Identification of alternative solutions to the problem

Step 2: Identify the Study Area and a general inventory of the natural, social and cultural environments.

Step 3: Identification of the net positive and negative effects of each alternative solution

Step 4: Review and validation of Alternative Solutions and preliminary recommendation of a preferred solution

Step 5: Identification of reasonable design alternatives for the preferred solution

Step 6: Public consultation at PIC No.1 (completed in 2001).

Step 7: Selection of the preferred solution, following public and agency review.

The Tecumseh Road West Corridor Master Plan (1994) and Addendum (2001) were reviewed to confirm they satisfied Phases 1 and 2 of the Municipal Class Environmental Assessment process. It was determined that the findings from the previous studies were still accurate, with considerations for refinements and adjustments as needed. This EA study subsequently completed Phases 3 and 4.

Phase 3A: Confirmation of Master Plan

Step 1: Discretionary Public consultation and Community Café event (Draft Study Design available on the City's website)

Step 2: Validation of previous Master Plan conclusions.

Phase 3B: Alternative Design Concepts for the Preferred Solution

Step 1: Confirmation; finalization of Study Design for work program; and refinements and/or addition of design alternatives to be carried forward for Phase 3.

Step 2: Public consultation at PIC No. 2

Step 3: Identification of alternative designs.

Step 4: Preparation of a detailed inventory of the social and economic environments.

Step 5: Identification of the potential impact of the alternative designs.

Step 6: Evaluation of the alternative designs.

Phase 4: Environmental Study Report (ESR)

Step 1: Completion of the ESR

Step 2: File the ESR and Notice of Completion

Step 3: 30-day public review period

Phase 5: Implementation

Future phase after this Study

The Municipal Class EA process is illustrated in **Figure 3**.

This study will only be completed to the end of the Municipal EA process (i.e. Phase 4).

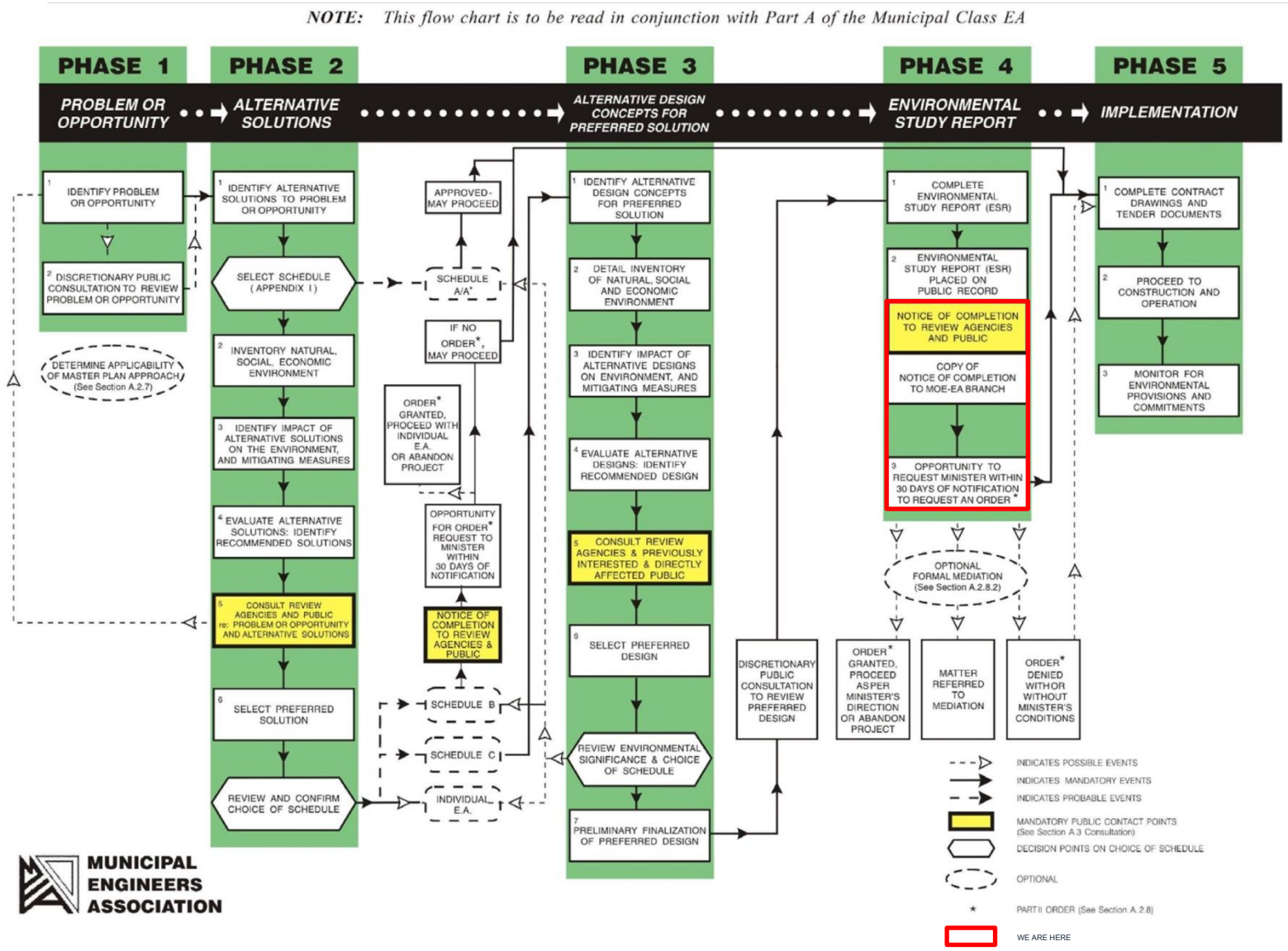


Figure 3: Municipal Class Planning and Design Process

3.0 CONSULTATION PROGRAM

The following sections provide a summary of the consultation activities held during the study.

3.1 Notices

Notices for the Study were publicized as follows:

- Study Commencement and Community Café –Windsor Star: Saturday, September 2, 2017
- www.windsoreas.ca
- Phase 3 PIC – Windsor Star: Wednesday, February 7, 2018 and Saturday, February 10, 2018
- Notice of Filing of Study Completion – Saturday, November 17, 2018 and Wednesday, November 21, 2018

See **Appendix B** for copies of the Notice of Study Commencement, Community Café Report, PIC report, and the Notice of Filing of Study Completion.

3.2 Contact List

A public/agency mailing list was developed at the outset of the study, and was updated throughout the duration of the study. The mailing list advised stakeholders and agencies at key milestones. See **Section 3.3.3** for the list of stakeholders contacted.

3.3 Phase 3 Public Information Centre

A Community Café Event and a Public Information Centre were held during the study to present the project, the assessment of opportunities, and the preliminary transportation improvement alternatives. These meetings were an integral component of the study – seeking input and comments from the local road users/stakeholders. City of Windsor and consultant staff were available to respond to any verbal comments/questions at these events.

See **Appendix B** for the Notices and PIC Summary Report.

3.3.1 Community Café Event

A Community Café was held on Thursday, September 7, 2017 at the Ecole Secondaire de Lamonthe-Cadillac Library in Windsor, as illustrated in **Photo 1**. All agencies,

Photo 1: Community Café Event

stakeholders and the general public were invited to the Community Café.

The Community Café process followed the principles of the 'World Café' philosophy; namely that people want to talk together about issues that matter and secondly, that as they talk together they are able to collectively achieve greater wisdom. The Community Café is a simple yet effective conversational method for fostering dialogue, accessing collective intelligence and creating innovative possibilities for action.

Discussion from the event was recorded and used as input for subsequent steps in the Environmental Assessment Study.

3.3.2 Public Information Centre

The Public Information Centre was held on Thursday, February 15, 2018 at Windsor City Hall at 400 City Hall Square East, Room 409 from 4:00 to 7:00 pm. The meeting presented information on the Municipal Class EA Process, background information and previous Master Planning EA Studies, preliminary design alternatives, the preliminary evaluation of alternatives and the Technically Preferred Plan.

Approximately 500 flyers were hand delivered to property owners within the Study Area inviting them to attend the PIC, and a PIC Notice was publicized in the Windsor Star on Wednesday, February 7, 2018 and Saturday, February 10, 2018.

Sixteen (16) members of the public registered at the Public Information Centre. Four (4) comment sheets were received at the PIC, and fourteen (14) comment sheets were received during the subsequent 2-week comment period.

A series of display panels were presented at the PIC that included descriptive text, photos and drawings around the meeting room for viewing. The public and agency representatives were encouraged to provide input/feedback.

3.3.3 Stakeholder Consultation

All agencies or groups that may have had an interest in the project or any documentation to contribute to the study were contacted at the start of the Class EA for their input. The following ministries, agencies and stakeholders were invited to attend the Community Café event and the Phase 3 PIC meeting.

- Ministry of the Environment and Climate Change
- Ministry of Natural Resources and Forestry
- Ministry of Tourism, Culture and Sport
- Ministry of Transportation
- Infrastructure Ontario
- Ministry of Municipal Affairs and Housing
- Ontario Federation of Agriculture

- Essex Region Conservation Authority
- Ministry of Aboriginal Affairs
- CP Rail
- Essex Terminal Rail
- Conseil Scolaire de District Des Ecoles Catholiques du Sud-ouest
- Greater Essex County District School Board
- Windsor-Essex Catholic School Board
- Windsor-Essex Student Transportation Services
- Windsor Essex County Health Unit
- Windsor-Essex Regional Chamber of Commerce
- Downtown Windsor Business Improvement Association
- Windsor and Essex County's Premier Cycling Club/Maple Leaf Cycling Club
- Essex County Field Naturalist's Club
- Bike Friendly Windsor Essex
- Brentwood Recovery Home
- GFL Environmental Inc.
- The Effort Trust Company
- Essex-Windsor EMS
- Windsor Police Services
- Windsor Fire and Rescue
- Ontario Provincial Police

The Windsor Police Services made significant contributions to the review of alternatives and safety and personal security within the Study Area.

Notices were also sent to the Indigenous Communities within the vicinity of the Study Area, inviting them to attend the meeting. Letters were sent to the following Indigenous Communities:

- Haudenosaunee Development Institute
- South First Nation Secretariat
- Caldwell Community
- Walpole Island First Nation
- Moravian of the Thames
- Chippewas of the Thames
- Oneida Nation of the Thames
- Monsee-Delaware
- Chippewas of Kettle & Stoney Point
- Metis Nation of Ontario
- Aamjiwnaang First Nation
- Moravian of the Thames

- Six Nations of the Grand River

Appendix C includes select correspondence received from interested individuals, ministries, agencies and Indigenous Communities.

3.4 Study Team

At the study initiation a Project Team was established and included representatives from the City of Windsor, BT Engineering Inc. (consulting staff) and Jock Valley Engineering (consulting staff).

The Project Team members included:

City of Windsor	
Josette Eugeni	Transportation Planning
Jeff Hagan	Transportation Planning
Kenneth Andoh-Dontoh	Transportation Planning
Phong Nguy	Maintenance and Operations
Denise Wright	Property Coordinator
Simona Simion	Planning – Research and Policy
Michael Capucci	Engineering
Stefan Feduik	Landscape Architect
BT Engineering Inc.	
Steve Taylor	BTE Project Manager
Stephen Brook	Transportation Team Lead
Katherine Scott	Project Coordinator
Jock Valley Engineering	
Bob Fish	Rail Safety

3.5 Council Endorsement

The study recommendations were presented to the Environmental Transportation & Public Safety Standing Committee on July 25, 2018. This was then taken to City Council on August 27, 2018 and given endorsement for publishing the study completion notice. See **Appendix J** for the resolution.

4.0 EXISTING CONDITIONS

Existing conditions of the natural and built environment, land use and property, and socio-economic environment in the Study Area are described in this chapter.

4.1 Technical Investigations

4.1.1 Transportation

Tecumseh Road is a major east-west arterial extending from Prince Road in the west, through the City of Windsor. Tecumseh Road West within the limits of the Study Area has a speed limit of 50 km/h, and is a 4-lane undivided cross-section with substandard

lane widths. The horizontal alignment includes a 37 m radius curve, with a 20 km/h advisory speed. The sharp horizontal curve also has no superelevation and is the critical location for collisions within the corridor. Traffic in the area of the subject corridor currently operates at a reasonable level of service, comparable to other sections of the corridor, and the average annual daily traffic is 23,000 (2017) and projected to be 27,000 in 2037.

Transportation Operational Issues

Tecumseh Road West has existing operational issues including:

- Utilities limiting useable width of sidewalks (See **Photo 2**)
- Substandard sidewalk widths
- Deterioration of sidewalks (See **Photo 3)**

Photo 2: Utility poles on sidewalk

Photo 3: Sidewalk deterioration

- Substandard lane widths within the study area (See **Photo 4**)
- No dedicated facilities for cyclists(See **Photo 5**)

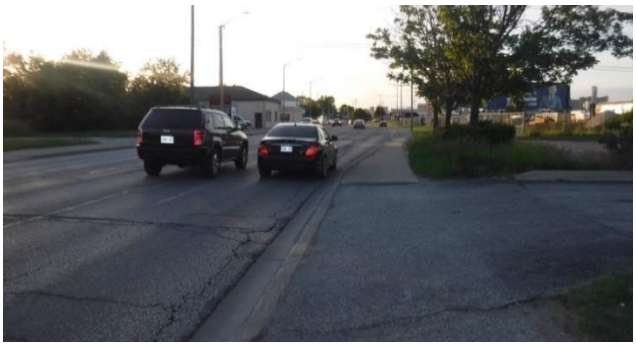


Photo 4: Deficient westbound lane width

Photo 5: Cyclist on the sidewalk

- Constraints resulting from the ETR and CPR crossings include:

- Ineffective guidance for pedestrians to cross perpendicular to tracks (see **Photo 6**)
- Access for emergency services
- Traffic delays
- Traffic queuing (potential to queue across ETR or CPR crossing)(see **Photo 7**)
- Insufficient rail signage

Photo 6: Sidewalk at rail crossing

Photo 7: Traffic queue at the rail crossing

Rail Crossing Survey

A survey of the rail crossings in the Study Area was completed on May 24 and May 25, 2017 to measure the pedestrians and cyclists crossing the ETR and CPR tracks, and the delays/queue lengths. The results of the 12-hour count are summarized in **Table 1**, **Table 2A** and **Table 2B**.

Table 1: 12-hour Count - Pedestrian and Cyclist Crossing ETR/CPR Tracks		
	CPR Crossing	**ETR Crossing**
Pedestrian Crossings	54	33
Cyclist Crossings	96	66

Table 2A: Rail Survey (Tecumseh Road West)							
						Westbound	Eastbound
Reference No.	Crossing Location	Date	Start	End	Duration (min)	Queue Length (m)	Queue Length (m) [1]
CPR 1	CPR	25-May	8:40	8:42	0:02	100	180
CPR 2	CPR	25-May	9:15	9:17	0:02	130	120
CPR 3	CPR	25-May	9:20	9:23	0:03	80	130
CPR 4	CPR	25-May	9:36	9:39	0:03	195	560
CPR 5	CPR	25-May	11:38	11:40	0:02	110	240
CPR 6	CPR	25-May	12:00	12:01	0:01	95	110
CPR 7	CPR	25-May	12:10	12:13	0:03	115	255
CPR 8	CPR	25-May	12:20	12:22	0:02	95	235
CPR 9	CPR	25-May	12:42	12:43	0:01	80	180
CPR 10	CPR	24-May	13:20	13:23	0:03	125	845 [2]
CPR 11	CPR	24-May	13:28	13:29	0:01	100	145
CPR 12	CPR	24-May	16:59	17:00	0:01	95	100
CPR 13	CPR	24-May	17:40	17:41	0:01	75	130
CPR 14	CPR	24-May	18:54	18:56	0:02	90	155

Table 2B: Rail Survey (Tecumseh Road West)							
						Westbound	Eastbound
Reference No.	Crossing Location	Date	Start	End	Duration (min)	Queue Length (m)	Queue Length (m) [1]
ETR 1	ETR	25-May	7:20	7:20	0:00	40	30
ETR 2	ETR	25-May	10:05	10:07	0:02	60	80
ETR 3	ETR	25-May	10:10	10:11	0:01	40	80
ETR 4	ETR	25-May	10:17	10:19	0:02	135	120
ETR 5	ETR	24-May	14:18	14:23	0:05	290	450
ETR 6	ETR	24-May	15:19	15:25	0:06	240	300
ETR 7	ETR	24-May	15:28	15:29	0:01	50	65
ETR 8	ETR	24-May	15:50	15:52	0:02	80	125
ETR 9	ETR	24-May	16:56	16:56	0:00	80	45
ETR 10	ETR	24-May	16:59	17:00	0:01	95	90
ETR 11	ETR	24-May	17:39	17:39	0:00	75	30

During the peak hours the survey recorded that a railway signal was activated 4 times, once during the am peak hour interrupting traffic flow for 2 to 3 minutes and 3 times during the pm peak hour interrupting traffic flow once for less than 1 minute and twice for between 1 to 2 minutes. The peak hours on Tecumseh Road West are 8:00-9:00 am (am peak) and 4:15-5:15 pm (pm peak).

Notes:

1) All queue lengths are measured from the centre of the railway.
2) The elongated queue length from railway crossing occurred as a result of a collision at the curve on Tecumseh Road West at approximately 1:00pm.
3) Spacing between the two rails crossings is 260m.

Rail Crossing – Exposure Index

The Exposure Index (Cross Product) is defined by Transport Canada as the product of the daily number of trains and the roadway AADT. An Exposure Index of 200,000 has traditionally been the minimum threshold before an engineering assessment of a grade separation will be considered. Based on the information provided by the rail authorities, train traffic crossing the corridor has been identified as 24 rail moves/day (CPR) and 4 rail moves/day (ETR). During the 12 hour period that the railway survey was conducted, the use of the ETR crossing by CPR trains resulted in a more balanced use of the 2 crossings with the CPR crossing activated 14 times and the ETR crossing activated 11 times.

The existing Exposure Indices based on rail moves/day provided by the rail authorities are 552,000 (satisfies the minimum threshold for consideration of grade separation) at the CPR crossing and approximately 276,000 at the ETR crossing. However, these triggers are generally applied at high speed crossings whereas this location is crossed by low speed trains. At both the CPR and ETR crossings, the Railway Safety Review, included in **Appendix D**, has identified measures that can further improve the safety of the existing at-grade railway crossings (see **Section 4.1.3**).

4.1.2 Collision Summary

Over a 5 year period (2012 to 2016) a total of 117 collisions were recorded to have occurred within the study area, none resulted in fatalities. The approximate locations of these crashes are presented in **Figure 4.** Over a 10 year period (2007 to 2016) only 1 collision with a train was recorded. A motorist who disobeyed the railway crossing signal and stopped on the ETR tracks was struck by a train which resulted in property damage only.

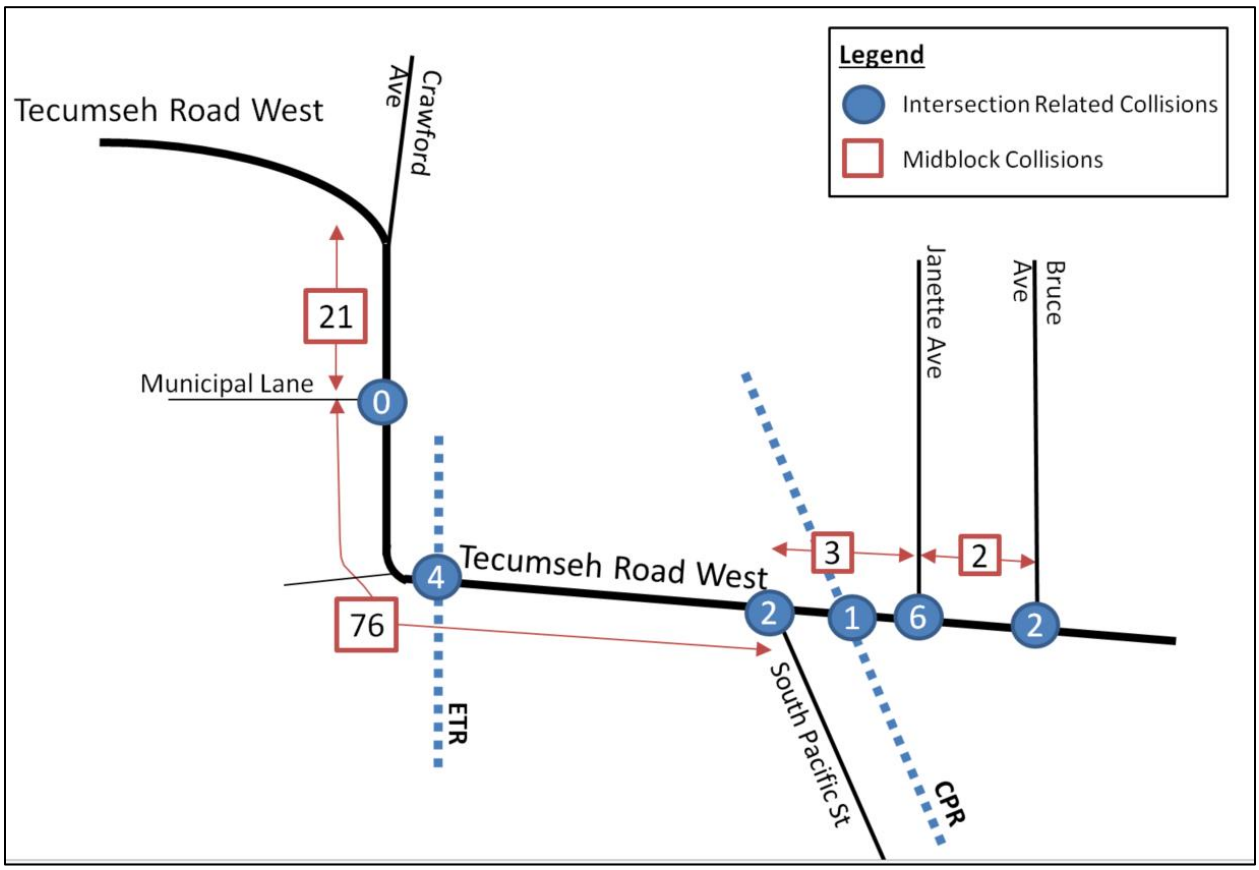


Figure 4: Collision History Over 5 Year Period (2012-2016)

The high proportion of midblock collisions is atypical for many urban roadways. Tecumseh Road West from South Pacific Street to Municipal Lane is the critical section. The curve and substandard lane widths were contributing factors in approximately 6 out of every 10 crashes. Of those 76 collisions in the critical section, the majority resulted in property damage only, as shown in **Figure 5**, and approximately one third of the crashes involved a single vehicle, as shown in **Figure 6**.

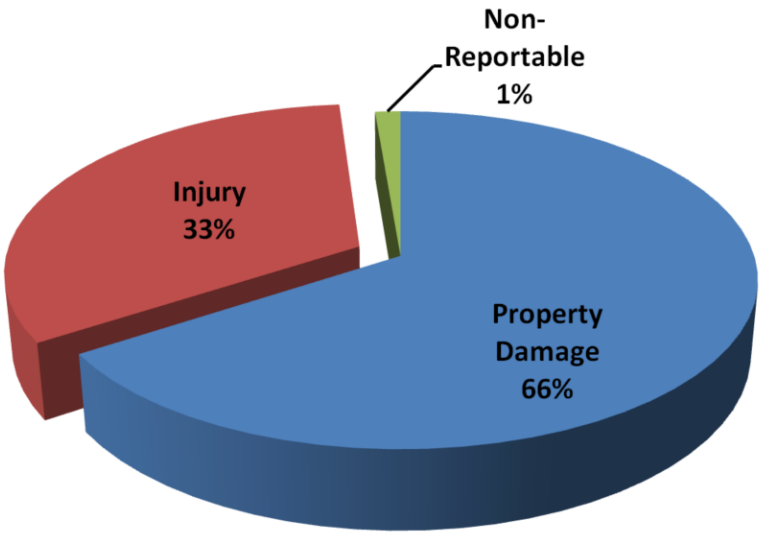


Figure 5: Collision Severity

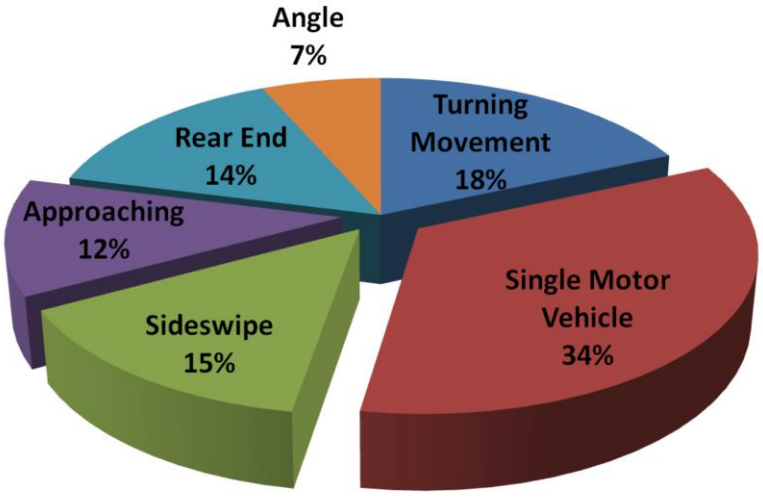


Figure 6: Collision Type

4.1.3 Rail

The traffic, collision history, queuing and pedestrian/cyclist conditions were assessed for both the Canadian Pacific Railway (CPR) and Essex Terminal Railway (ETR) in a Rail Traffic Conditions Technical Memorandum dated February 13, 2018. After evaluation, it was concluded that the current crossing warning systems conform to regulatory requirements and are appropriate. The following recommendations were made for the short term and long term.

Short term recommendations:

1. CPR: repairs to crossing surface on south sidewalk.
2. ETR: move Wc-4 sign on the west approach closer to the grade crossing.
3. Both crossings: provide “X” pavement markings 9 m downstream of the “railway crossing ahead” signs.
4. The orientation and location of the advance warning signs (Wc-4) for the CPR crossing should be adjusted to be in compliance with the Ontario Traffic Manual.
5. Recommend that stop bars be placed 2 m ahead of crossing gates when next repainting takes place.
6. Recommend that a “Do Not Stop on Tracks” sign be installed on the west approach to the ETR crossing.

Long term recommendations:

1. Tactile markings should be placed at the stop location on pedestrian approaches to the crossing.
2. Pedestrian gates on both sides of the crossing should be considered if future road changes require major changes to the crossing signals.
3. If any changes are made that would allow for an increased advisory speed on the west approach to the ETR crossing, consideration should be given to installing an active "Prepare to Stop at Railway Crossing" sign. This should be reviewed at the detail design stage.

The Rail Traffic Technical Memorandum is found in **Appendix D**.

4.1.4 Geotechnical

A preliminary geotechnical assessment was conducted by Golder Associates in April 2018, and is detailed in **Appendix E**. The report concludes with recommendations and discussion of materials and methods of construction required for the recommended plan. The overview of the existing geotechnical condition is:

Physiography

- Part of the St. Clair Clay Plains; and
- General characteristics of this area consist of varying thicknesses of fill, clayey topsoil, and silty clay till with varying amounts of sand silt and clay.

Geohazards

- Permafrost, landslide hazards and seismic hazards are not expected.

4.1.5 Stormwater Management

A drainage and stormwater review was conducted to determine the preliminary drainage and stormwater management design for the Recommended Plan. Today, the existing drainage system flows westerly beginning at the CPR rail crossing into a combined storm and sanitary system. Drainage travelling west separates into a 900 mm storm and 300 mm sanitary pipe approximately 300 m east of Crawford Avenue. Based on the existing drainage system and scope of roadway improvements, and the impact of the recommended plan, the following drainage improvements were recommended:

1. The stormwater within the limits of the construction should include separation of the storm and sanitary sewer systems matching the separated storm/sanitary design to the west.
2. The stormwater system should consider the use of surplus adjacent City-owned land for a stormwater management facility pond should the detailed design confirm the need to reduce post development volumes to those within the capacity of the downstream 900 mm storm sewer constructed under contract number 97-38.

The Drainage and Stormwater Review Report is found in **Appendix F.**

4.1.6 Structural

A structural review was conducted to determine the suitability of structural alternatives being considered in the long list alternatives for this Class EA. There were three (3) structural alternatives being considered:

- Alternative 1: At grade widening of Tecumseh Road, with no structures on the corridor
- Alternative 2: Grade separation with the new road over the existing railways with new roadway bridges over the railway
- Alternative 3: Grade separation with the new road under the two new railways, creating railway subway crossings.

Alternative 2 was considered unfeasible, due to the necessary road elevation that had to be achieved in order to meet vertical clearance guidelines, and was therefore coarse screened as an alternative.

The use of open abutments was also recommended for their ability to provide more light, greater personal safety and security for active modes of transportation and fit with the City of Windsor’s Official Plan if a grade separation was considered. However,

consistent with the 2001 Master Plan Addendum, grade separation is not recommended for the project (see **Section 6.2**).

4.1.7 Utilities

Various public and privately owned utilities exist within and/or adjacent to the limits of proposed works. Tecumseh Road West within the limits of the Study Area is serviced by a combination of underground and aboveground infrastructure as described below.

- 300 mm combined sewer
- Hydro One transmission line and towers running north-south adjacent to ETR
- Aerial Enwin lines including the replacement of a number of poles during the course of the study (2017)
- Underground telecommunication lines

4.2 Natural Environment

4.2.1 Terrestrial Environment

Natural environmental features located both within and surrounding the study area were identified and assessed in a Windsor Natural Environment – Existing Conditions Technical Memorandum dated April 1, 2018. The memo identified the lack of surface water present in the study area, a woodlot located immediately east of Totten Street (outside the study area) and a wetland (outside the study area). It was determined that there are no occurrences of 'natural vegetation' in the study area. There are some neglected and undisturbed locations with vegetation cover of invasive species of grasses and weeds as well as established trees and larger shrubs. The Municipal Species at Risk Guide, desktop reviews and consultation with the local MNRF office identified plant and animal Species at Risk (SAR) that have potential to occur.

The recommended plan would affect minimal natural environmental features. A detailed documentation of the existing conditions can be found in the Technical Memorandum detailed in **Appendix G**.

4.2.2 Natural Heritage

The study reviewed the City of Windsor Cultural Natural Heritage features identified in the 2007 update documented in the update to the CNHS Inventory, July 2008. These features are illustrated in CNHS # 29 in **Appendix G.**

Site 29 is a 21.10 hc site named the CNR Vanderwater Yard, which consists of four parcels. All parcels are wooded. This site is documented in **Appendix G** and was confirmed to be beyond the limits of any alternatives.

4.2.3 Contamination Overview Study

A Contamination Overview was performed as part of the Municipal Class Environmental Assessment for the rehabilitation and improvement of Tecumseh Road West from Crawford Avenue to Janette Avenue. The COS Study Area includes the "Local Study Area" as well as a 250 m buffer zone. The COS has been completed in accordance with the MTO Environmental Guide for Contamination Property Identification Management (2006). The COS is a high level assessment of properties/areas with potential for contamination. This documentation is provided in **Appendix H**.

4.2.4 Ground Water Source Protection

As identified in the Essex Region Source Protection Plan, the Study Area does not contain any highly vulnerable aquifers or significant groundwater recharge areas.

The City does have a requirement to mitigate the creation of vertical water infiltration in all vulnerable areas defined under the Clean Water Act including Well Head Protection Areas. This includes the Class EA study area. Vertical water infiltration pass are human-constructed flow routes through soil and bedrock that may increase the vulnerability of groundwater to certain containments. In the City of Windsor, this includes installation of vertical geothermal systems, installation of caissons or building piers for non-residential uses, aggregate projects, installation of utilities, or excavation within fractured bedrock or drilling projects (including but not limited to installation of private wells, environmental or geotechnical test wells and / or boreholes). Ontario Regulation 287/07 pursuant to the Clean Water Act requires municipalities to notify Source Protection Authorities and Committees when the municipalities receive applications that could create or modify a transport pathway/trail. It is important to note that the purpose of this requirement is collect information for the use of the Source Protection Authorities and Committees when updating vulnerability mapping during Assessment Report updates. The City has a process in place to collect this information; therefore, the City complies with all requirements of the Source Protection Plan for the Grand River Watershed. Based on the review of the study area it is concluded that no protection will be required for this project.

4.2.5 Climate Change

The City of Windsor's Climate Change Adaptation Plan (2012) identifies policies and plans to address climate change over the short and long-term. The City is monitoring the impacts of climate change and the effectiveness of adaptation strategies to reduce the City's vulnerability. One adaptation strategy that the City is implementing to reduce the risk of climate change is by expanding cycling infrastructure and encouraging active transportation and the use of public transit.

This Study has recognized the benefits of active transportation and has evaluated improvements to the existing sidewalks and implementation of a MUT to encourage

active transportation and reduce the use of motorized vehicles. This aligns with the recommendation of the Bicycle Use Master Plan to provide a cycling corridor along Tecumseh Road West. The study proposes an increase in storm water capacity and the replacement of the shared storm/sanitary sewer with independent infrastructure. This will reduce the vulnerability of the Study Area to flooding and reduce the sanitary discharge from being released during flooding from future higher rainfall events.

The Tecumseh Road West roadway improvements are unlikely to produce an increase or decrease in the greenhouse gas emission. This is based on the following statements:

- The existing traffic forecast does not foresee a significant increase in traffic volume along with this route as a result of the project and growth in traffic will be a result of overall growth in the city.
- The current design does not result in a significant increase or decrease in greenspace within the project limits.
- The construction will not be a significant source of greenhouse gasses.
- The addition of cycling infrastructure will encourage more active transportation along the corridor, but is not anticipated to cause a significant reduction in greenhouse emissions,

4.3 Existing Land Use

The Study Area and surrounding area is designated as industrial, commercial and residential according to the City of Windsor's Official Plan. North and south of the study area, land use is almost exclusively residential with the main exception being Crawford Avenue which has commercial land uses. To the east and west, Tecumseh Road continues to have primarily commercial land uses. Within the Study Area, Tecumseh Road West and South Pacific Avenue have primarily commercial and industrial land uses. Various auto repair shops, grocery stores/food retailers and industrial businesses make up the majority of the commercial land uses within the Study Area. The existing land uses within the study area are illustrated in **Figure 7**.

The Land Use Planning Report is documented in **Appendix I**.

LEGEND:

— — — STUDY AREA

1. A.983 TECUMSEH ROAD W - COMMERCIAL
   B.975 TECUMSEH ROAD W - RESIDENTIAL
   C.969 TECUMSEH ROAD W - COMMERCIAL
2. A.961 TECUMSEH ROAD W - VACANT
   B.963 TECUMSEH ROAD W - VACANT
3. A.951 TECUMSEH ROAD W - COMMERCIAL
   B.945 TECUMSEH ROAD W - VACANT
4. 964 TECUMSEH ROAD W - VACANT
5. A.950 TECUMSEH ROAD W - COMMERCIAL
   B.938 TECUMSEH ROAD W - COMMERCIAL
6. 931 TECUMSEH ROAD W - COMMERCIAL
7. A.925 TECUMSEH ROAD W - COMMERCIAL
   B.921 TECUMSEH ROAD W - VACANT
   C.913 TECUMSEH ROAD W - INDUSTRIAL
8. 905 TECUMSEH ROAD W - INDUSTRIAL
9. A.700 TECUMSEH ROAD W - COMMERCIAL
   B.750 TECUMSEH ROAD W - COMMERCIAL
10. 825 TECUMSEH ROAD W - COMMERCIAL
11. 777 TECUMSEH ROAD W - COMMERCIAL
12. 675 TECUMSEH ROAD W - VACANT
13. 635 TECUMSEH ROAD W - INDUSTRIAL
14. A.2100 SOUTH PACIFIC STREET - COMMERCIAL
    B.2130 SOUTH PACIFIC STREET - INDUSTRIAL
15. A.2186 JANETTE AVENUE - RESIDENTIAL
    B.2190 JANETTE AVENUE - RESIDENTIAL
    C.2198 JANETTE AVENUE - RESIDENTIAL
    D.2194 JANETTE AVENUE - RESIDENTIAL
    E.2174 JANETTE AVENUE - RESIDENTIAL
16. 2201 JANETTE AVENUE - COMMERCIAL
17. A.2200 JANETTE AVENUE - RESIDENTIAL
    B.2201 CHARL AVENUE - RESIDENTIAL
    C.2207 CHARL AVENUE - RESIDENTIAL
18. A.2217 CHARL AVENUE - RESIDENTIAL
    B.2221 CHARL AVENUE - RESIDENTIAL
    C.2225 CHARL AVENUE - RESIDENTIAL
19. A.2216 CHARL AVENUE - RESIDENTIAL
    B.2222 CHARL AVENUE - RESIDENTIAL
    C.2226 CHARL AVENUE - RESIDENTIAL

FIGURE 7
EXISTING LAND USE

THE CITY OF WINDSOR
ONTARIO, CANADA

TECUMSEH ROAD WEST
ENVIRONMENTAL ASSESSMENT STUDY

BT ENGINEERING

SCALE
N.T.S

FILEPATH: Z:\BTEng Projects\2017 Proj\17-006 Windsor Tecumseh Rd W EA\005-Drawings\TecumsehEA\dwg\ESR Figures\17-006 LandUse.dwg|Nov,14 2018-3.54pm

5.0 GENERATION OF ALTERNATIVES

The analysis and evaluation of alternatives involves a 2-step process for decision-making. The initial assessment is the analysis and evaluation of Planning Solutions, which considers different approaches to address the problem. This was considered in the original Master Plan and is documented in the Study Design. The second step is the assessment of preliminary design alternatives which considers different designs. These two steps in the evaluation are described in the following sections.

5.1 Assessment of Alternative Planning Solutions

Four Alternative Planning Solutions/ were considered for the proposed operational improvements to Tecumseh Road West, namely:

- Alternative 1 - “Do Nothing”: As mandated by the Class EA’s, this solution must be considered. It reflects a baseline from which other approaches can be compared.
- Alternative 2 – Transportation Demand Management (TDM). This strategy would reduce vehicular demand and would encourage alternative work hours, work at home and active modes of transportation (cycling and walking) as well as the use of transit.
- Alternative 3 – Limit Land Use Planning. This strategy would limit and new residential, commercial or industrial development and therefore reduce the generation of new trips along Tecumseh Road West.
- Alternative 4 – Provide Transportation Infrastructure. This strategy would be to provide new infrastructure and roadway improvements to accommodate existing and future demand.

Alternative 4 – Provide Transportation Infrastructure was selected as the preferred alternative. The “Do Nothing” and Limit Land Use Planning alternatives do not provide a plan for infrastructure renewal or provide a solution for the existing safety concerns or traffic delays along the corridor. This is consistent with and validates the previous Master Planning analysis completed in 2001.

TDM is not carried forward as a standalone solution, but rather will be incorporated with the Provide Transportation Infrastructure alternative as a Recommended Solution. This recommendation is consistent with the Tecumseh Road West Corridor Addendum to the Master Plan, and was presented in the Study Design and at the Public Information Centre meeting.

5.2 Generation and Assessment of Preliminary Design Alternatives

The analysis and evaluation process is a central requirement of the Class EA process.

In adhering to this process, a number of alternatives were generated for consideration which would improve traffic operations through the study area to meet existing and future traffic demand. A “long list” of alternatives was generated in an attempt to ensure consideration of a wide range of alternatives in addressing the identified needs (i.e. all reasonable alternatives are considered).

A range of operational improvements were generated to provide site specific solutions to existing and future transportation and safety concerns. The alternatives were categorized under four groups of preliminary design alternatives based on the magnitude of capital cost and environmental effects. These groups of alternatives are summarized and below:

Minor Operational Improvements

- Advance warning signs for crossings (Wc-4) to indicate the appropriate crossing angle
- Advanced Railway Crossing Pavement marking ‘X’ in accordance with OTM Book 11 (9 m downstream of Wc-4)
- Stop bars located 2 m in advance of crossing gates
- Mid-block pedestrian cross-over
- Improved signage and guidance for pedestrians and cyclists at Rail Crossings

Minor Capital Improvements

- Reconstruction of existing lanes including sidewalk and boulevard improvements
- Safety improvements including medians to mitigate tight horizontal curvature (see **Figure 8**)
- Addition of raised barrier to protect pedestrians from errant vehicles on tight radius horizontal curve
- Removal of poles from the sidewalks
- Construction of cycling facilities such as a multi-use trail
- New wider sidewalks
- Introduction of superelevation to the tight horizontal curve

Medium and Major Capital Improvements

- Increase in curve radius for improved roadway geometry (see
- **Figure 9**)
- Provision of a 4-lane cross-section with wider lanes meeting applicable design standards

- Construction of bike lanes
- Construction of raised cycle tracks
- Construction of a cycling and pedestrian grade separated crossing (see **Figure 10**)
- Dual lane roundabout at the Tecumseh Road West and the entrance to 905 Tecumseh Road West (see **Figure 11**)
- Extension of South Pacific Avenue to Dougall Avenue (see **Figure 12**)
- Construction of grade separated crossings (subway or overpass) for motor vehicle, pedestrian and cyclist traffic (see **Figure 13**)
- Provision of a 5-lane cross-section
- Realignment of the ETR railway to follow a common alignment with the CPR

The second step in the analysis and evaluation process is to assess preliminary design alternatives which reflect feasible design concepts to implement the preferred planning solution. Each alternative has specific trade-offs and the study has used an iterative approach of considering all feasible alternatives and a systematic comparison of competing alternatives based on the performance, environmental impacts and costs of those options.

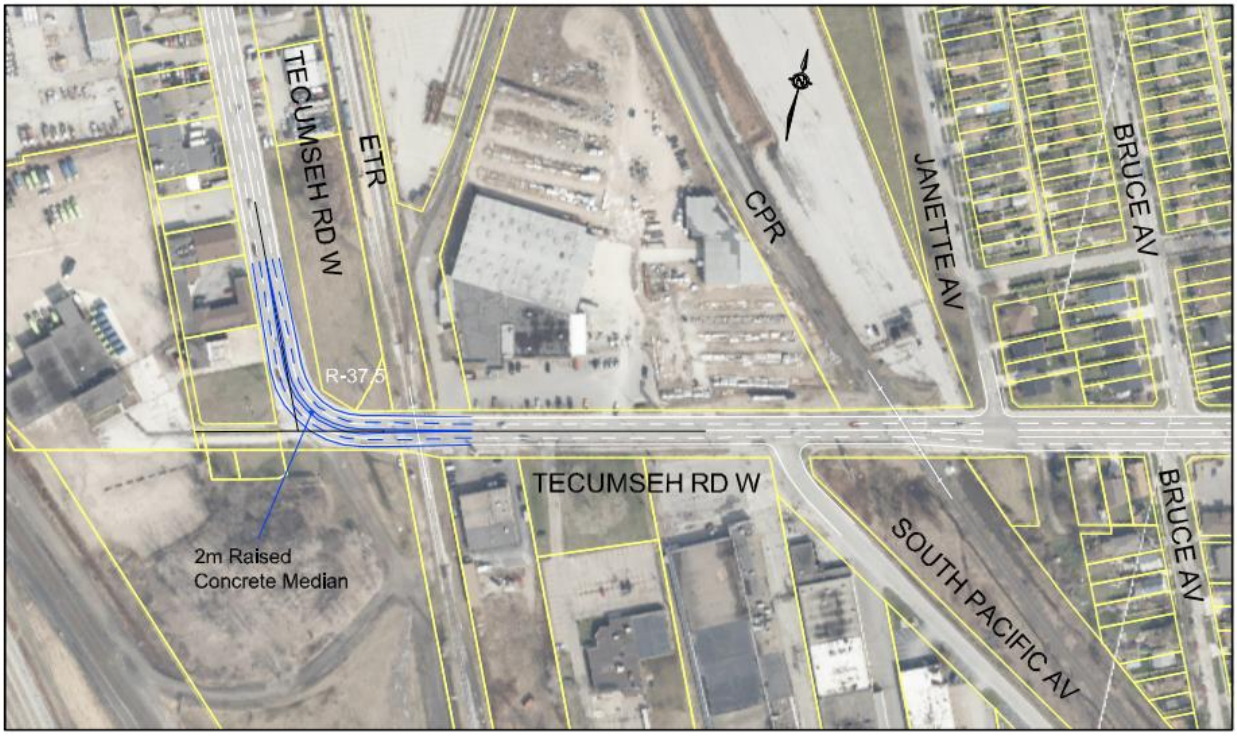


Figure 8: Raised Concrete Median

Figure 9: Alternative - Increased Curve Radius

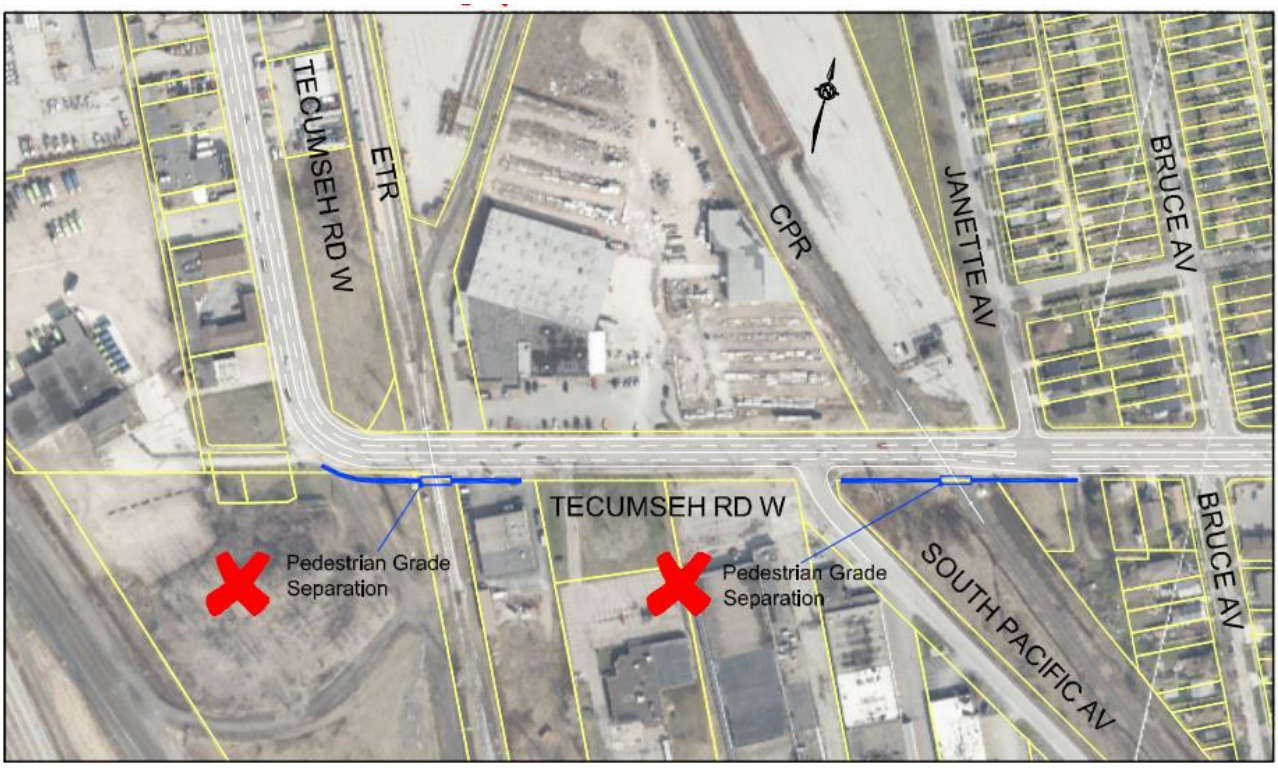


Figure 10: Cycling/Pedestrian Grade Separation

Figure 11: Dual Lane Roundabout

Figure 12: Extension of South Pacific Avenue to Dougall Avenue

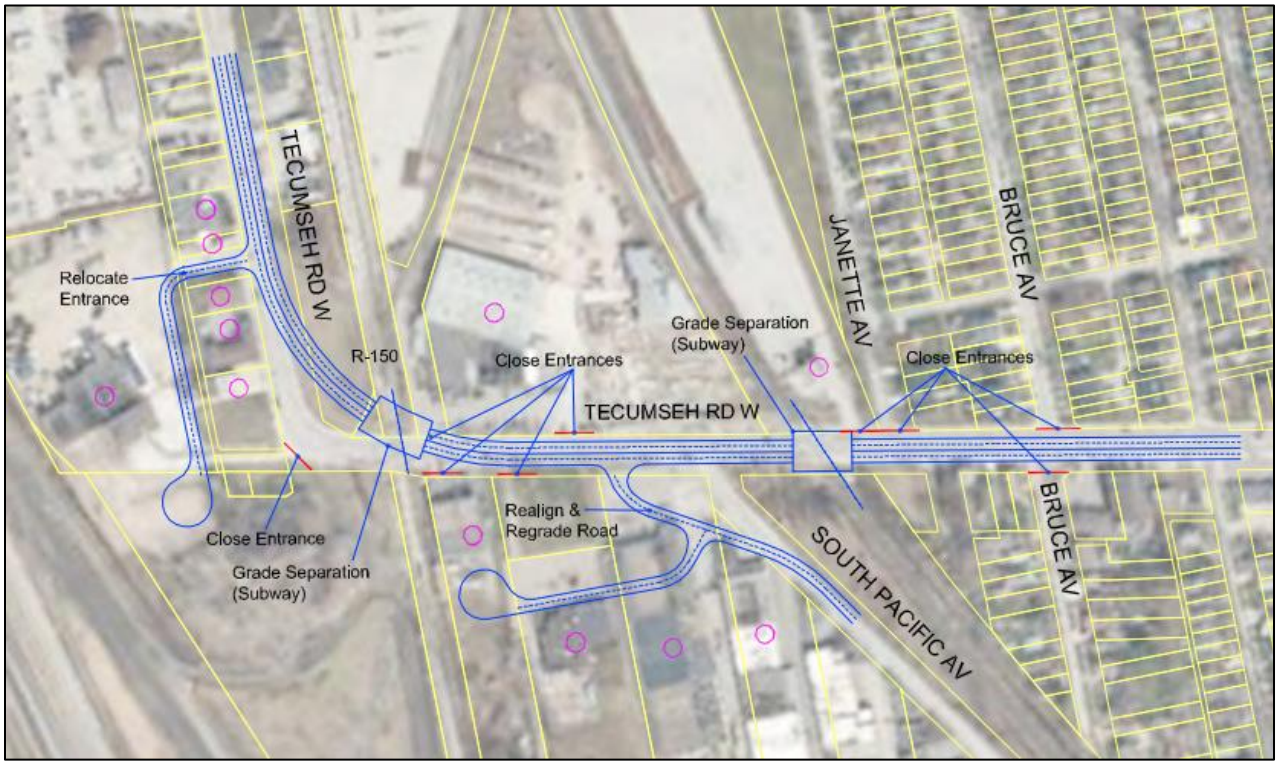


Figure 13: Grade-Separated Crossing

6.0 EVALUATION OF ALTERNATIVES

The evaluation of alternatives was completed using a qualitative assessment to compare the net effects and performance of the alternatives. This method considers the advantages and disadvantages of each of the alternatives using the evaluation criteria as descriptors to measure the relative differences of the alternatives being considered. These effects have considered natural, social/cultural, economic and physical elements in the study area.

6.1 Assessment of Minor Improvements

The assessment of minor operational improvements considered what improvements should be carried forward in the short term. These improvements are considered as Schedule A type initiatives under the Municipal Class EA and are pre-approved i.e. they can be undertaken immediately.

The comparison of these short term operational and safety improvements is tabulated in **Table 3**.

6.2 Assessment of Medium Scale Operational Improvements

The assessment of medium scale operational and safety improvements are those which are greater in scale and cost than the smaller scale improvements described in **Section 6.1.** These projects will require capital construction contracts but with values generally below $1 million.

The comparison of these medium scale operational improvements is presented in **Table 4**. The short term improvements include the increase in curve radius of the existing cross section. The remainder of the capital improvements are described in the succeeding section regarding major scale capital improvements which are those involving widening, realignments or grade separation.

6.3 Assessment of Major Scale Operational Improvements

The assessment of major operational improvements considers larger scale projects including widening the cross section, realigning the roadway and/or grade separation of the railway crossings. The assessment is summarized in **Table 5.**

The major study recommendation was that improvements focus on maintaining the existing at-grade crossings of the ETR and CPR lines. Collision experience in the area, as described in **Section 4.1**, reflects predominantly property damage collision and the majority of collisions are associated with the substandard horizontal curve west of the ETR crossing, lack of superelevation on the curve and the narrow lane widths.

Construction of grade separated crossings are not recommended because of the low operating speeds of trains at the crossing have low collision potential, and is operating at a Level of Service comparable to other sections of the corridor. To reduce the delays would require a large capital cost which is not considered appropriate for the magnitude of the problem.

The remainder of the capital improvements generally follow the 2001 Master Plan EA Addendum and focus on safety. These improvements include flatter horizontal alignments, standard lane widths and accommodating both turning movements and separated pedestrian/cycling modes of travel.

The capital improvements include:

- Provision of a 5-lane cross section with standard lane widths and centre continuous two-way left turn lane
- Replacement of sidewalk and a 3.0 m multi-use trail (north side).

6.3.1 Corridor Capacity

The capacity of the Tecumseh Road West corridor, in the area of the study, is constrained by delays resulting from:

- The operation of signalized intersections along the corridor.
- Existing roadway geometry:
    - Substandard lane widths – heavy trucks are often observed straddling both lanes;
    - Substandard horizontal curve (R=37.5 m) with a 20 km/h operating speed (reflects this curve does not include superelevation of the pavement surface); and
    - No provision of a left turn lane.
- CPR and ETR Railway Crossings.

The pm peak hour represents the most critical time period for traffic operations along the corridor. With the existing geometry the intersection with South Pacific Avenue currently operates at an overall level of service B while South Pacific Avenue operates well within its capacity at level of service C. The provision of a left turn lane on Tecumseh Road, as recommended by the 2001 Transportation Master Plan Update would allow traffic queues resulting from the railway crossings to clear more quickly. And the overall level of service at the Tecumseh Road West and South Pacific Avenue intersection would improve to level of service A. The northbound approach to the intersection (South Pacific Avenue) would continue to operate at level of service C. By 2037, traffic operations at the unsignalized intersection of a widened (5 lane) Tecumseh Road West and South Pacific Avenue would experience some increase in delay however, the peak hour levels of service would remain unchanged.

6.3.2 Assessment of Grade Separation Warrant

The volumes of roadway and rail traffic have changed very little since the Transportation Master Plan Addendum was completed in 2001. With no serious safety issue to address, and delays that are not considered unreasonable, the recommendations are that:

- The provision of railway grade separations cannot be justified within the current 20 year planning horizon.
- Further improvements to the existing at-grade railway crossings be implemented to further improve safety.
- Improvements to the roadway's horizontal alignment and cross section be implemented to improve road safety and traffic flow.
- Provision of a continuous two-way left turn lane.

These recommendations are consistent with the 2001 Transportation Master Plan Addendum which concluded the need for a grade separation had been reduced and recommended improvements to the roadway and existing at-grade crossings including the provision a left turn lane along the length of the corridor.

Table 3: Evaluation of Alternatives-Minor Operational Improvements								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Advance warning signs for crossings (Wc-4) to indicate the appropriate crossing angle	● Provides advance notice of at-grade crossing and improves safety.	● No impact.	- No change.	● No impact.	● Nominal cost.	- No change.	- No change.	✓ Recommended for immediate implementation.
Advanced Railway Crossing Pavement Marking 'X' in accordance with OTM Book 11 (9 m downstream of Wc-4)	● Provides advance notice of at-grade crossing and improves safety.	● No impact.	- No change.	● No impact.	● Nominal cost.	- No change.	- No change.	✓ Recommended for immediate implementation.
Stop bars located 2 m in advance of crossing gates	● Provides consistent delineation contributing to improved safety.	● No impact.	- No change.	● No impact.	● Nominal cost.	- No change.	- No change.	✓ Recommended for implementation as part of the regular roadway maintenance program.

Legend	
- No change	○ ◔ ◑ ◕ ● Poor → Good

Table 3: Evaluation of Alternatives-Minor Operational Improvements Cont.								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Mid-block pedestrian cross over	○ Improves safety and accessablility for pedestrians. Results in a potential conflict with the close proximity of rail crossings (railway pre-emption of the crossing could not be provided)	● No Impact	● Improves access to businesses for pedestrians.	● No Impact	● Low Cost	- No Change	- No Change	✗ Not Recommended due to potential conflicts of queued vehicles with rail crossing. The provision of a signalized pedestrian crossing as part of a Medium/Major Capital Improvement is considered a safer alternative.
Improved signage and guidance for pedestrians and cyclists at Rail Crossings	● Additional signage and pedestrian barriers would Improve safety for pedestrians/ cyclists.	● No impact.	- No change.	● No impact.	● Nominal cost.	- No change.	- No change.	✓ Recommended to be carried forward for consideration as part of the operational improvement plan.

Legend	
- No change	○ ◔ ◑ ◕ ● Poor → Good

Table 3: Evaluation of Alternatives-Minor Operational Improvements Cont.								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Resurfacing of existing lanes including sidewalk and boulevard improvements	○ Better accommodates pedestrians but does not address the needs of cyclists or safety concerns as it maintains substandard travel lanes.	◕ Minor impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state.	◑ Enhances the pedestrian realm within the corridor but provides limited benefit for other travel modes.	● Reconstruction of sidewalks and boulevards is within existing right-of-way.	◑ Moderate cost.	- No change.	- Increased impervious areas and runoff to be mitigated with LID stormwater treatment within adjacent City owned parcels to allow peak flows to be maintained at pre-development levels. No change to existing sewer infrastructure.	✘ Not recommended to be carried forward since improving the condition of existing substandard lanes will not address safety concerns or accommodate cyclists.
Safety improvements including medians to mitigate tight horizontal curvature	◕ Separates EB and WB traffic. Acts as traffic calming measure. Limits left-turn movements.	◕ Minor impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state.	- No change.	● Reconstruction of road with a median is within existing right-of-way.	◑ Moderate cost.	- No change.	- No change – maintains existing drainage capacity and sewer infrastructure.	✓ Recommended to be carried forward for consideration as part of the operational improvement plan through the horizontal curve.

Legend	
- No change	○ ◔ ◑ ◕ ● Poor → Good

Table 3: Evaluation of Alternatives-Minor Operational Improvements Cont.								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Addition of raised barrier to protect pedestrians from errant vehicles on tight radius horizontal curve	◑ Improves safety for pedestrians by providing a barrier separating pedestrians from travel lanes but the barrier will become an additional hazard for motorists.	- No change.	- No change.	- No change.	◕ Low cost.	- No change.	- No change.	✘ Not recommended. Construction of a boulevard to separate pedestrians and motorized vehicles and increasing the radius of the curve are preferred alternatives.
Removal of poles from the sidewalks	● Improves accessibility and useable width for pedestrians.	- No change	- No change	◑ Existing development at key locations provides limited opportunity to relocate the existing pole line.	◑ Moderate cost.	- No change.	- No change	✓ Recommended to be carried forward as part of the operational improvement plan. The corridor alignment could be shifted to create space for a sidewalk outside the limit of Enwin's 2017 pole realignment.

Legend	
- No change	○ ◔ ◑ ◕ ● Poor → Good

Table 3: Evaluation of Alternatives-Minor Operational Improvements Cont.								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Construction of cycling facilities such as a multi-use trail.	● Provides off-road facility to accommodate cyclists. Improves safety.	◕ Minor impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state.	● Encourages active modes of transportation and improves access to businesses for alternative travel modes.	◕ Reconstruction of road with a multi-use trail is within existing right-of-way.	◕ Low cost.	- No change.	◑ Minor impact from increased impervious surfaces. Mitigated with stormwater retention system.	✓ Recommended to be carried forward for consideration as part of the operational improvement plan
Replace with wider sidewalks	● Improves safety for pedestrians. Meets AODA standards.	◕ Minor impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state.	● Encourages active modes of transportation and improves access to businesses for pedestrians.	● Reconstruction of wider sidewalks is within existing right-of-way.	◕ Low cost.	- No change.	◑ Minor impact from increased impervious surfaces. Mitigated with stormwater retention system.	✓ Recommended to be carried forward as part of the operational improvement plan.
Introduction of superelevation to the tight horizontal curve (with no change to radii of horizontal curve)	○ The close proximity of the ETR crossing limits the amount of superelevation that can be provided - unable to achieve a suitable design standard on existing 37.5 m curve radius.	◕ Minor impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state. Improves drainage.	- No change.	◑ Property impacts from grade change.	◑ Moderate cost.	- No change.	- No change.	~ Not recommended as a standalone improvement. To be considered as part of all Medium and Major Capital Improvement alternatives

Legend	
- No change	○ ◔ ◑ ◕ ● Poor → Good

Table 4: Evaluation of Alternatives-Medium Capital Improvements								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Increase in curve radius for improved roadway geometry	● Improves safety for moterist and pedestrians	◕ Minor impacts to existing tress and vegitation. Corridor is perviously disturbed/trasnformed from its natural state.	◕ Minor impacts to existing buisnesses and entrances on Tecumseh Road West.	◑ Minor property acquisition required. Requires relocation for ETR rail switch to south of the corridor.	◑ Moderate Cost	- No change.	- No change.	✓ Recommended to be carried forward as part of the operational improvement plan.
Provision of a 4-lane cross-section with wider lanes meeting applicable design standards	◑ Improves safety for motorized vehicles, emergency vehicles and trucks. Does not provide additional roadway capacity to accommodate future growth in traffic demands.	◕ Impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state.	◑ Minor impacts to existing businesses due to driveway relocation.	◑ Minor property acquisition required.	◑ Moderate cost.	● Wider lanes improve access for emergency services.	◑ Increased impervious areas and runoff to be mitigated with LID stormwater treatment within adjacent City owned parcels to allow peak flows to be maintained at pre-development levels. No impact to existing sewer infrastructure.	✗ Not recommended to be carried forward since it would not significantly benefit the future roadway capacity. (See 5-lane improvements under major capital improvements.)

Legend	
- No change	○ ◔ ◑ ◕ ● Poor → Good

Table 4: Evaluation of Alternatives-Medium Capital Improvements Cont.								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Construction of bike lanes	◑ Improves safety for cyclists. Does not accommodate pedestrians.	◑ Impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state.	◑ Encourages active modes of transportation and improves access to businesses for cyclists. The increased asphalt width will result in reduced opportunities to provide streetscaping.	◑ Wider roadway cross-section increases the property acquisition requirements.	◑ Moderate cost.	- No change.	◑ Minor impact from increased impervious surfaces. Increased impervious areas and runoff to be mitigated with LID stormwater treatment within adjacent City owned parcels to allow peak flows to be maintained at pre-development levels. No impact to existing sewer infrastructure.	✘ Not recommended to be carried forward. A multi-use trail is recommended to separate modes and accommodate both pedestrians and cyclists. See **Section 6.3.**

Legend	
- No change	○ ◔ ◑ ◕ ● Poor → Good

Table 4: Evaluation of Alternatives-Medium Capital Improvements Cont.								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Construction of raised cycle tracks	◑ Improves safety for cyclists. Does not accommodate pedestrians.	◑ Impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state.	◑ Encourages active modes of transportation and improves access to businesses for cyclists. The increased asphalt width will result in reduced opportunities to provide streetscaping.	◑ Wider roadway cross-section increases the property acquisition requirements.	◑ Moderate cost.	- No change.	◑ Minor impact from increased impervious surfaces. Increased impervious areas and runoff to be mitigated with LID stormwater treatment within adjacent City owned parcels to allow peak flows to be maintained at pre-development levels. No impact to existing sewer infrastructure.	✖ Not recommended to be carried forward. A multi-use trail is recommended to separate modes and accommodate both pedestrians and cyclists.

Legend	
- No change	○ ◔ ◑ ◕ ● Poor → Good

Table 4: Evaluation of Alternatives-Medium Capital Improvements Cont.								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Construction of a cycling and pedestrian grade separated crossing	◑ Improves safety for cyclists and pedestrians. Separates modes. Requires switchbacks due to vertical/ horizontal constraints (switchbacks not desirable for cyclists). Does not improve delays or queuing for motorized vehicles.	◑ Impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state. Issue with draining subway.	○ Vertical/horizontal constraints require grade separation to be a subway with switchback ramps. Issues with safety and security.	◑ Minor property acquisition required.	◑ Moderate cost.	- No change.	- No change.	✘ Not recommended to be carried forward as part of the operational improvement plan.
Dual lane roundabout at the Tecumseh Road West and the entrance to 905 Tecumseh Road West	◑ Reduces speed for motorized vehicles. Does not improve delays or queuing for motorized vehicles. Two-legged roundabout not desirable. Safety concerns due to proximity to the rail crossing and the potential queuing over the tracks.	◕ Impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state.	- No change.	◔ Property acquisition required from adjacent businesses. Impacts access to businesses.	◑ Moderate cost.	- No change.	◑ Minor impact from increased impervious surfaces. Increased impervious areas and runoff to be mitigated with LID stormwater treatment within adjacent City owned parcels to allow peak flows to be maintained at pre-development levels. No impact to existing sewer infrastructure.	✘ Not recommended to be carried forward as part of the operational improvement plan.

Legend	
- No change	○ ◔ ◑ ◕ ● Poor → Good

Table 4: Evaluation of Alternatives-Medium Capital Improvements Cont.								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Emergency Services Access Route and Multi-Use Trail	● Provides emergency access through an alternative route to South Pacific Avenue Community and an MUT connection for active transportation modes.	◕ Impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state.	◑ Improves walkability and access in and out of the community. Local property owners concerned for safety (increased loitering and vandalism) with improved access. Windsor Police Services identified that statistically safety will improve with increased activity and lighting.	◔ Property acquisition required from adjacent businesses and home owners to achieve more than 4 m of pavement width at narrowest point.	◑ Moderate cost.	○ Right-of-way width not optimal for emergency width along its full length.	◑ Minor impact from increased impervious surfaces. Increased impervious areas and runoff to be mitigated with LID stormwater treatment within adjacent City owned parcels to allow peak flows to be maintained at pre-development levels. No impact to existing sewer infrastructure.	✘ Not recommended to be carried forward for consideration as part of the operational improvement plan at this time based on input by City Emergency Services and property owners. The active transportation connection will be protected for future consideration and referred to the Active Transportation Master Plan currently in progress.

Legend	
-	○ ◔ ◑ ◕ ●
No change	Poor → Good

Table 5: Evaluation of Alternatives-Major Capital Improvements								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Construction of grade-separated crossings (subway or overpass) for motor vehicle, pedestrian and cyclist traffic	◑ Eliminates delays and queuing from rail traffic. Grade separation at ETR tracks is not warranted. Safety considerations at CPR crossing do not identify the need for a grade separation.	◑ Impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state. Impacts to drainage.	○ Significant impacts on existing businesses/ property owners.	○ Requires acquisition of many properties. Removes entrances to existing businesses – requires a service road.	○ High cost.	● Provides access to South Pacific Community and eliminates delay from rail traffic.	○ Moderate impact from increased impervious surfaces. Increased impervious areas and runoff to be mitigated with LID stormwater treatment within adjacent City owned parcels to allow peak flows to be maintained at pre-development levels. No impact to existing sewer infrastructure. Stormwater potentially requires pumping to gravity outlet, a stormwater retention system and a pumping station.	× Not recommended because the low operating speeds of trains at the crossing have low collision potential, and is operating at a Level of Service comparable to other sections of the corridor. To reduce the delays would require a large capital cost and is not considered appropriate for the magnitude of the problem at this time.

Legend	
-	○ ◔ ◑ ◕ ●
No change	Poor → Good

Table 5: Evaluation of Alternatives-Major Capital Improvements Cont.								
Operational Improvements	**Transportation**	**Natural Environment**	**Social Environment**	**Land Use and Property**	**Cost**	**Emergency Services**	**Stormwater Management/ Sewer Design**	**Summary**
Provision of a 5-lane cross-section sidewalks(south side) and multi-use Trail (MUT)(north side)	◕ Provides two-way left turn lane and reduces delays. Improves access to businesses. Provides additional capacity to accommodate future growth. Improves safety for motorized vehicles, emergency vehicles and trucks.	◕ Impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state.	◕ Minor impacts to existing businesses due to driveway relocation. Improves access to businesses.	◑ Minor property acquisition required.	◔ Mid to high cost.	◕ Provides additional lane for emergency services.	◔ Moderate impact from increased impervious surfaces. Increased impervious areas and runoff to be mitigated with LID stormwater treatment within adjacent City owned parcels to allow peak flows to be maintained at pre-development levels. No impact to existing sewer infrastructure.	✓ Recommended to be carried forward as part of the operational improvement plan including sidewalk and multi-use trail.
Realignment of the ETR railway to follow a common alignment with the CPR	● Reduces the potential conflict locations with rail traffic. The required multi-track rail storage yard for CPR - ETR transfers may require more shunting.	◑ Impacts to existing trees and vegetation. Corridor is previously disturbed/ transformed from its natural state. Impacts to drainage.	○ Impacts existing businesses/ property owners.	○ Requires acquisition of many properties.	○ High cost.	● Consolidates ETR and CPR to one rail crossing.	● Minor impact from increased impervious surfaces. No proposed mitigation with rail ballast allowing infiltration.	✖ Provides some benefit for EMS access but results in significant cost and property impacts. Associated changes to rail yard operations may increase shunting. Option recommended to be further explored at a later time.

Legend	
- No change	○ ◔ ◑ ◕ ● Poor → Good

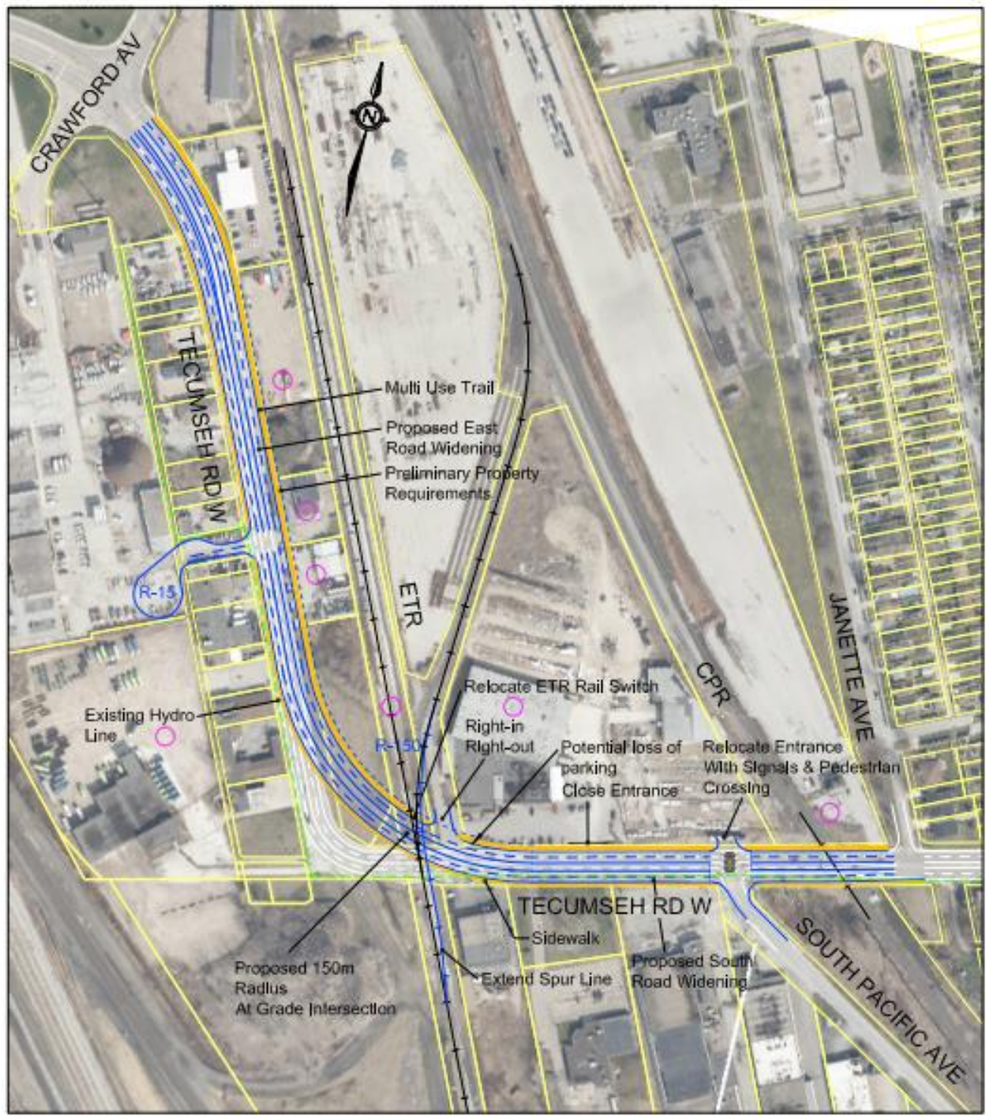
6.4 Technically Preferred Plan (TPP)

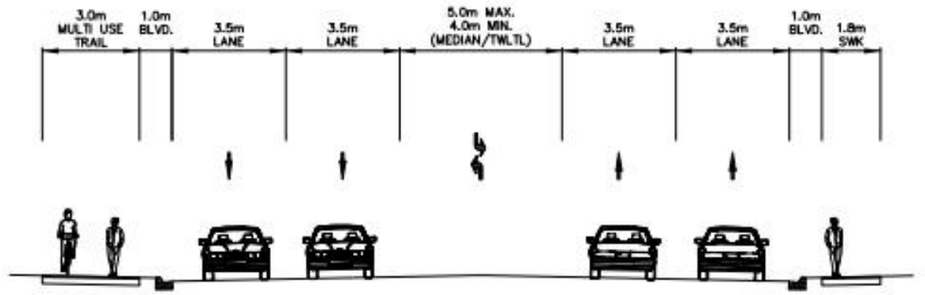
The Technically Preferred Plan for the improvements to Tecumseh Road West is illustrated in **Figure 14**. This plan includes:

- Operational improvements to Tecumseh Road West including:
  - Provision of a 5-lane cross-section
  - Increase in curve radius for improved roadway geometry
  - Medians to mitigate tight horizontal curvature
  - Improvements to the active transportation facilities including:
    - Removal of poles from the sidewalks
    - Construction of cycling facilities(a 3.0 m minimum multi-use trail)
    - Replacement with wider 1.8 m sidewalks
    - Emergency services access route/MUP for secondary access to Dougall Avenue
    - Closure of Home Hardware driveway and relocation to be opposite to South Pacific Avenue at a signalized intersection.
- Improvements to the rail crossing including:
  - Advance warning signs for crossings (Wc-4) to indicate the appropriate crossing angle
  - Advanced Railway Crossing Pavement marking ‘X’ in accordance with OTM Book 11 (9 m downstream of Wc-4)
  - Stop bars located 2 m in advance of crossing gates
  - Improved signage and guidance for pedestrians and cyclists at rail crossings
  - Emergency access/MUT

The Technically Preferred Plan was presented to the public at the Public Information Centre. Refinements were made to the TPP based on comments received at the PIC, and are summarized in **Section 7.0** of this Report. The refinements have modified initial elements of the TPP shown to the public including: MUT connecting South Pacific Avenue to Dougall Avenue, and access for 700 Tecumseh Road West and 905 Tecumseh Road West.

The potential to provide traffic signals at the intersection of Tecumseh Road West and South Pacific Avenue was considered as a future pedestrian crossing but was not carried forward at this time. It would be dependent on a significant increase in pedestrian and bicycle traffic crossing Tecumseh Road West from South Pacific Avenue to access the proposed multi-use trail if a MUT connection was constructed from South Pacific Avenue to Dougall Avenue as well as the relocation of an existing Home Hardware entrance opposite South Pacific Avenue.





TECHNICALLY PREFERRED ALTERNATIVE
TECUMSEH ROAD

Figure 14: Technically Preferred Plan (As shown to the public at PIC)

7.0 RECOMMENDED PLAN

The TPP described in **Section 6.4** was presented at the PIC and then was subject to refinements based on community input. This was followed by field investigations and a meeting with Home Hardware on March 20, 2018. These refinements are described in **Section 7.1**.

7.1 Refinements to Technically Preferred Plan

The five refinements to the TPP were:

- Emergency access route/ MUT connecting South Pacific Avenue to Dougall Avenue
- To not carry forward signals illustrated at South Pacific
- Centre two-way left-turn lane width
- MUT width (north side of Tecumseh Road West)
- Municipal lane design / access driveway to GFL Environmental

The evaluation of refinement alternatives is described in the following sections.

7.1.1 Emergency Access Route/MUT Connecting South Pacific to Dougall Avenue

The concept of creating a new MUT link from the study area to Dougall Avenue was considered and presented at the PIC. Based on the number of comments received and consultation with Emergency Services the concept was reviewed following the PIC.

The analysis and evaluation of possible MUT alternatives is presented in **Table 6.** The analysis concluded implementing the emergency access at this time which requires land acquisition from a private land owner or CP Rail would be deferred. Without the land acquisition, the path would be narrow and preclude the Fire Department using the route.

It was decided not to carry forward the pathway as part of the EA. Although the link is a positive component for active transportation the Fire Services considered the path width too narrow for use of their vehicles unless the wider path (which required property acquisition) was provided.

The ESR recommended not carrying it at this time because the 4 m pinch point would limit access for some emergency vehicles. Using this route however, as an active transportation connection will be reviewed by the ATMP currently in progress, as it is desired travel route for pedestrians and cyclists.

7.1.2 Continuous Two-Way Left-Turn Lane (CTWLTL) Width

The width of the CTWLTL was reviewed following the PIC to minimize property inputs. Base on the review the Study has recommended following the Transportation Association of Canada (TAC) minimum standard width of 4.0m. (Reference: TAC

Geometric Design Guide for Canadian Roads, June 2017 Section 8.6.2). This will reduce property impacts.

The analysis and evaluation of alternative CTWLTL widths is shown in **Table 7.**

7.1.3 MUT width (north side of Tecumseh Road West)

The width of the MUT was reviewed following the receipt of several comments from the public. These comments supported widening the MUT from 3.0 m to 4.0 m. However, the MUT width was reviewed and based on the property impacts west of the ETR crossing it was recommended to maintain the 3.0m width of the path.

The analysis and evaluation of alternative MUT widths is shown in **Table 8.**

7.1.4 Municipal Lane Design

The City of Windsor Works Department provided feedback following the PIC that it was a major impact to lose substantial lands from the Public Works Yard to accommodate alternative access to 905 Tecumseh Road West. As a result, the study team has reviewed the technical standards for roadways with higher speeds which would require a 30 m separation. However, the ETR currently operates at 16 km/h over the crossing and this standard would not apply. Therefore the driveway separation has been designed to accommodate a single WB20.5 large truck. The recommended driveway alternative for 905 Tecumseh Road is illustrated in **Figure 15.**

The analysis and evaluation of alternative Municipal Lane Designs is shown in **Table 9**.

Table 6: Emergency Access Route/MUT Evaluation of Alternatives							
Alternative	**Emergency Services**	**Active Transportation**	**Land Use and Property**	**Natural Environment**	**Social Environment**	**Cost**	**Recommendation**
Do Nothing	× Does not provide secondary access for emergency services to the South Pacific neighbourhood.	- No change.	✓ No property required.	✓ No change.	✓ No change.	✓ No cost.	✓ Recommended to be carried forward.
6 m access/ MUT with narrow 4m pinch point at 2216 Charl Avenue	- Provides secondary access for police and ambulance to South Pacific neighbourhood. Four m pinch point precludes access for fire and rescue services.	✓ Improves access for pedestrians and cyclists travelling along the corridor.	✓ MUP in close proximity to existing garage at 2216 Charl Avenue and requires an easement/property acquisition from CPR to provided 6 m width at the pinch point. (However no property required as alternative allows for 4m pinch point)	- Minor impacts to existing shrubs/vegetation.	× Visual intrusion and increase in pedestrian/ emergency vehicle traffic behind houses on Charl Avenue. The community has identified concerns for increased loitering and potential for vandalism/theft with improved access to their neighbourhood (Note: the Windsor Police have identified that a maintained path with improved lighting discourages illegal activities). Improves community access to retail on both Dougall and Tecumseh Road W. It also creates a direct route for active transportation in the area.	- Moderate cost.	× Not recommended to be carried forward. This alternative referred to the ATMP.

Table 6: Emergency Access Route/MUT Evaluation of Alternatives-Cont.							
Alternative	**Emergency Services**	**Active Transportation**	**Land Use and Property**	**Natural Environment**	**Social Environment**	**Cost**	**Recommendation**
6 m access/ MUT (widen on private property)	✓ Provides secondary access for all emergency services to South Pacific neighbourhood.	✓ Improves access for pedestrians and cyclists travelling along the corridor.	× Requires buyout of 2216 Charl Avenue and property impacts to 2222 Charl Avenue.	- Minor impacts to existing shrubs/vegetation.	× Visual intrusion and increase in pedestrian/ emergency vehicle traffic behind houses on Charl Avenue. The community has identified concerns for increased loitering and potential for vandalism/theft with improved access to their neighbouhood (Note: the Windsor Police have identified that a maintained path with improved lighting discourages illegal activities). Improves community access to retail on both Dougall and Tecumseh Road W. It also creates a direct route for active transportation in the area.	× High cost.	× Not recommended to be carried forward.

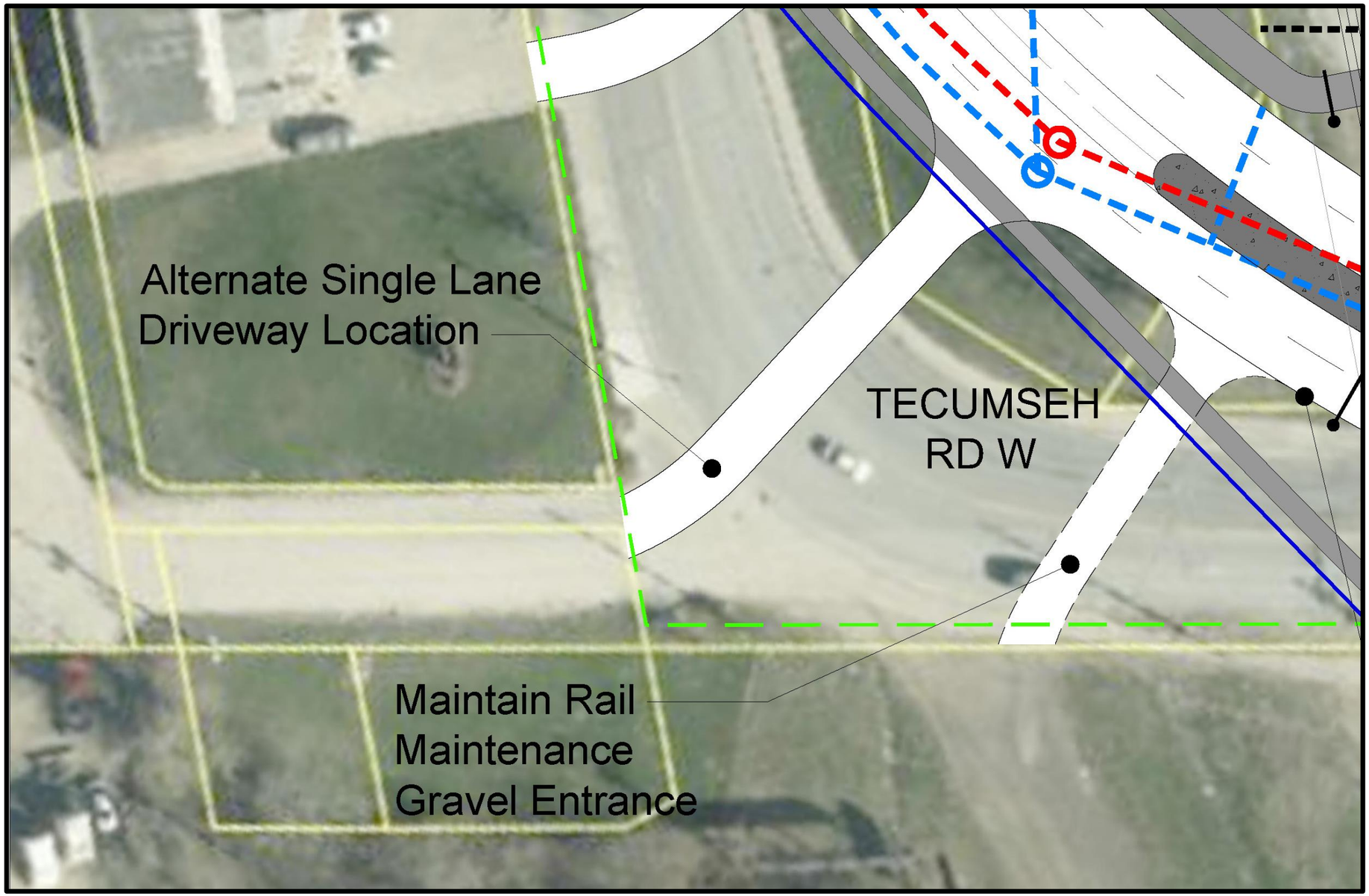
Table 6: Emergency Access Route/MUT Evaluation of Alternatives-Cont.							
Alternative	**Emergency Services**	**Active Transportation**	**Land Use and Property**	**Natural Environment**	**Social Environment**	**Cost**	**Recommendation**
6 m Access/ MUT (buy property from CPR)	✓ Provides secondary access for all emergency services to South Pacific neighbourhood.	✓ Improves access for pedestrians and cyclists travelling along the corridor.	× Requires acquisition of property from CPR adjacent to rail line.	- Minor impacts to existing shrubs/vegetation.	× Visual intrusion and increase in pedestrian/ emergency vehicle traffic behind houses on Charl Avenue. The community has identified concerns for increased loitering and potential for vandalism/theft with improved access to their neighbourhood (Note: the Windsor Police have identified that a maintained path with improved lighting discourages illegal activities). Improves community access to retail on both Dougall and Tecumseh Road W. It also creates a direct route for active transportation in the area.	× High cost.	× Not recommended to be carried forward. This alternative referred to the ATMP.
Summary	The Emergency Access Route/MUT connecting South Pacific Avenue to Dougall Avenue was identified as part of the Technically Preferred Plan to provide a secondary access for emergency services to the community and an additional link for pedestrians and cyclists. This plan was presented to the public at the PIC. Several property owners from the South Pacific neighbourhood attended the meeting and identified their opposition and concern for increased traffic, loitering and vandalism as a result of the proposed link. The provision of a secondary access for emergency services was identified because the existing entrance to the neighbourhood on South Pacific Avenue is located between the CPR and ETR tracks, which could result in delays during emergency events. This Technically Preferred Plan was presented to Emergency Services in Windsor, and they identified that improving access is beneficial; however, it is not critical at this location. The Windsor Police Services confirmed this link will improve safety. However, the Fire Department provided input that a narrow pathway/trail does not achieve optimal pavement width for their vehicles all along the entire length of the corridor. The Fire Department requested a larger path width than 4 m to accommodate the larger fire vehicles. As a result of the anticipated property impacts and Fire Department input on the inability to use the narrower 4 m access route, the MUT was removed from the Recommended Plan. It is recommended that the City owned lands be retained for an active transportation connection and that widening in the area of the pinch point will be considered in the ATMP for an active transportation link.						

Table 7: Continuous Two-way Left-turn Lane (CTWLTL) Width Evaluation of Alternatives					
Alternative	**Transportation**	**Land Use and Property**	**Natural Environment**	**Cost**	**Recommendation**
Do Nothing	× Does not accommodate existing or future traffic demand.	✓ No change.	✓ No change.	✓ No cost.	× Not recommended to be carried forward.
4.0 m CTWLTL	× CTWLTL will accommodate turning movements along Tecumseh Road West to reduce queuing and delays. A width of 4.0 m is desirable for design speeds over 60km/h (recognize vehicles are making turning manoeuvers from both directions).	✓ Minimizes property requirements.	- Minor impacts to adjacent trees/vegetation.	- Medium cost.	✓ Recommended to be carried forward.
5.0 m CTWLTL	× CTWLTL will accommodate turning movements along Tecumseh Road West to reduce queuing and delays. Widths for TWLTLs are generally less than 5.0 m due to operational problems.	× Requires sliver of property for road widening.	- Minor impacts to adjacent trees/vegetation.	× High cost (due to property impacts and increased pavement area).	× Not recommended to be carried forward.
Summary	The CTWLTL on Tecumseh Road West will remove turning traffic from through lanes, improving safety and capacity. A 4.0 m CTWLTL is desirable for at locations where design speed is greater than 60km/h. Based on this dimension meeting the Transportation Association of Canada (TAC) standards and minimizing property acquisition it is recommended to be carried forward.				

Table 8: MUT Width Evaluation of Alternatives					
Alternative	**Transportation**	**Land Use and Property**	**Natural Environment**	**Cost**	**Recommendation**
3.0 m	✓ The City of Windsor's standard width for multi-use trails is 3.0 m. A 3.0 m MUT allows space for a boulevard to offset motorized vehicular lanes from the MUT (improves safety).	✓ No property impacts (widening is within right-of-way).	- Minor impacts to adjacent trees/vegetation.	✓ Low cost.	✓ Recommended to be carried forward.
3.5 m	- Reduces offset from motorized vehicular lanes to pedestrians/cyclists on MUT. Provides wider useable area for pedestrians/cyclists.	- Minor property impacts.	- Minor impacts to adjacent trees/vegetation.	✓ Low cost.	× Not recommended to be carried forward.
4.0 m	× No offset from vehicular lanes - safety concerns associated with curb-faced MUT. Provides wider useable area for pedestrians/cyclists.	× Requires sliver of property.	- Minor impacts to adjacent trees/vegetation.	× High cost (due to property impacts and increased pavement area).	× Not recommended to be carried forward.
Summary	A 3.0 m MUT is recommended along the north side of Tecumseh Road West to match the standard width for multi-use trails in Windsor. The 3.0 m MUT allows an offset between the vehicular lanes, improving safety for the pedestrians and cyclists. Based on the anticipated use, and surrounding infrastructure/ROW constraints, a 3.0 m MUT was carried forward as part of the Recommended Plan. The public input suggested a 4 m MUT, consideration was given to this but the original width was determined to be the preferred solution.				

Table 9: Access to 905 Tecumseh Road West Design				
Alternative	**Transportation**	**Land Use and Property**	**Cost**	**Recommendation**
Turning Basin (Cul-de-Sac at Municipal Lane)	✓ Accommodates truck turning movements for vehicles accessing 905 Tecumseh Road West.	× Requires property from City of Windsor Works Yard.	- Moderate cost.	× Not recommended to be carried forward.
No turning Basin (Cul-de-sac Direct Access)	- Provide access for trucks accessing 905 Tecumseh Road West from a modified driveway to achieve a desirable 30m offset from ERT railway tracks.	- No property impacts to City of Windsor Works Yard.	✓ Low cost.	✓ Recommended to be carried forward.
Summary	The Recommended Alternative for the driveway access to 905 Tecumseh Road West is to introduce a minor realignment of the driveway (to increase offset from the ETR) and avoid property impacts to the City Works yard. This alternative provides access to 905 Tecumseh Road West and minimizes property impacts.			

Figure 15: Access to 905 Tecumseh Road West Design



7.2 Municipal Services

There is currently a combined sewer (storm and sanitary sewage in a single pipe) to the west of the project limits. In a previous capital project, Contract 97-38, the City introduced a sewer separation by constructing separate pipes for the storm and sanitary systems. It is proposed to continue the separation of the 900 mm storm sewer and the 300 mm sanitary sewer westerly into the new project along the new road alignment. During the detail design phase of the project, the future designer and City may also choose to inspect the existing sewer pipe by camera (CCTV) to determine its condition for continued use as a sanitary sewer.

The preliminary design has determined that there will be additional stormwater runoff from the new roadway construction (see **Appendix F**). The amount of additional runoff is small in comparison to the overall drainage area; however, the outlet is limited by the 900 mm storm sewer constructed in Contract 97-38. Flooding occurred within the study area during the EA study and the capacity of the system during this event was limited by the size of the existing combined sewer. Upsizing of this pipe will provide improved outlet capacity. As described in **Appendix F**, the design storm is estimated to exceed the capacity of the 900 mm storm sewer constructed in 1997 and therefore it is recommended that a stormwater management facility be investigated during detail design. More detailed modelling of the downstream system may determine if storage is required and if so the volume of the facility.

The previous 1997 contract also upsized the previous watermain from a 150 mm pipe to a 200 mm pipe. The proposed preliminary design has also included the upsizing of the pipe from its termination in Contract 97-38. The future designer and City should review the adequacy of the 200 mm size for fire flow during detail design.

7.3 Description of Recommended Plan

The Recommended Plan for this project includes refinements to the TPP following the PIC based on public, stakeholder and City of Windsor input. The refinements described in **Section 7.1** reflect changes in the plan to respond to public and stakeholder comments received throughout the study. The Recommended Plan includes the following key features:

Tecumseh Road West:

- Operational improvements to Tecumseh Road West including:
    - Provision of a 5-lane cross-section with a 4.0 m CTWLTL
    - Increase in curve radius to 150 m for improved roadway geometry
        - Relocation of ETR rail switch to accommodate 150 m radius curve
        - Minor relocation of entrances to 700 and 905 Tecumseh Road West to accommodate 150 m radius curve

    - A raised median in the area of the ETR crossing to mitigate tight horizontal curvature
    - Improvements to the active transportation facilities including:
        - Avoidance (where possible) of poles from the sidewalks
        - Construction of active transportation facilities (i.e. 3 m MUT on north side of corridor and 1.5 m sidewalk on south side)
    - Civic-way landscape elements including low level lighting, green areas, street furniture etc.
- Proposed drainage improvements for consideration during detail design should include:
    - Separation of the storm and sanitary sewer systems
    - Use of adjacent City-owned land for localized retention facility
    - Civic-way greening of corridor to reduce imperviousness of ground surface

Rail Crossing:

- These improvements are recommended for immediate implementation to improve safety for road users crossing the ETR and CPR tracks. The improvements include:
    - Advance warning signs for crossings (Wc-4) to indicate the appropriate crossing angle
    - Advanced Railway Crossing Pavement marking ‘X’ in accordance with OTM Book 11 (9 m downstream of Wc-4)
    - Stop bars located 2 m in advance of crossing gates
    - Improved signage and guidance for pedestrians and cyclists at rail crossings

The Recommended Plan is illustrated in **Figure 16A, Figure 16B and Figure 16C.**

Associated property acquisitions for effected adjacent properties are summarized in **Table 10**. All areas are approximate and actual requirements will be based on legal survey that will be completed during the detail design phase of the project.

Table 10:Preliminary Land Requirements

ID #	Approx. Property Requirements (ha.)	Approx. Property Requirements (m^2)	Approx. Length (m) (Parallel to Main Road)	Approx. Width (m) (Perp. to Main Road)	Address	Primary Road	Municipality
1	0.0016	15.5	20.8	0.745	990 Tecumseh Rd W	Tecumseh Rd W	Windsor
2a	0.0033	32.8	52	0.631	986 Tecumseh Rd W	Tecumseh Rd W	Windsor
2b	0.0007	7	13	0.5	986 Tecumseh Rd W	Tecumseh Rd W	Windsor
3	0.0206	205.9	131	1.57	956 Tecumseh Rd W	Tecumseh Rd W	Windsor
4	0.0096	95.7	42	2.279	950 Tecumseh Rd W	Tecumseh Rd W	Windsor
5	0.0104	103.6	50	2.072	938 Tecumseh Rd W	Tecumseh Rd W	Windsor
6[2]	0.0249	248.8	26	28.4	CPR	Tecumseh Rd W	Windsor
7	0.0653	652.9	20.9	31.24	ETR	Tecumseh Rd W	Windsor
8[2]	0.0395	395.4	21.4	A = 3.92 B = 18.59	CPR	Tecumseh Rd W	Windsor
9	0.0005	5	10	0.5	825 Tecumseh Rd W	Tecumseh Rd W	Windsor
10a[2]	0.0102	101.9	40	7.1	700 Tecumseh Rd W	Tecumseh Rd W	Windsor
10b	0.0075	75	150	0.5	700 Tecumseh Rd W	Tecumseh Rd W	Windsor
11	0.0123	122.9	65.5	1.876	777 Tecumseh Rd W	Tecumseh Rd W	Windsor
12	0.0094	94.3	81	1.164	The ON and QC Rail Company	Tecumseh Rd W	Windsor
13	0.0035	35	70	0.5	CPR	Tecumseh Rd W	Windsor

Notes

1) All areas are approximate and actual requirements will be based on legal survey.
2) Irregular shape, this measurement refers to the height of the triangle perpendicular to the existing roadway.Width with a non-rectangular shape represented as an average width.

7.4 Cost Estimate/ Construction Phasing Recommendation

The cost estimate in **Table 11** for the Tecumseh Road West roadworks uses 2018 dollars and does not include HST or property acquisition costs. This is a preliminary estimate and will be refined during detailed design.

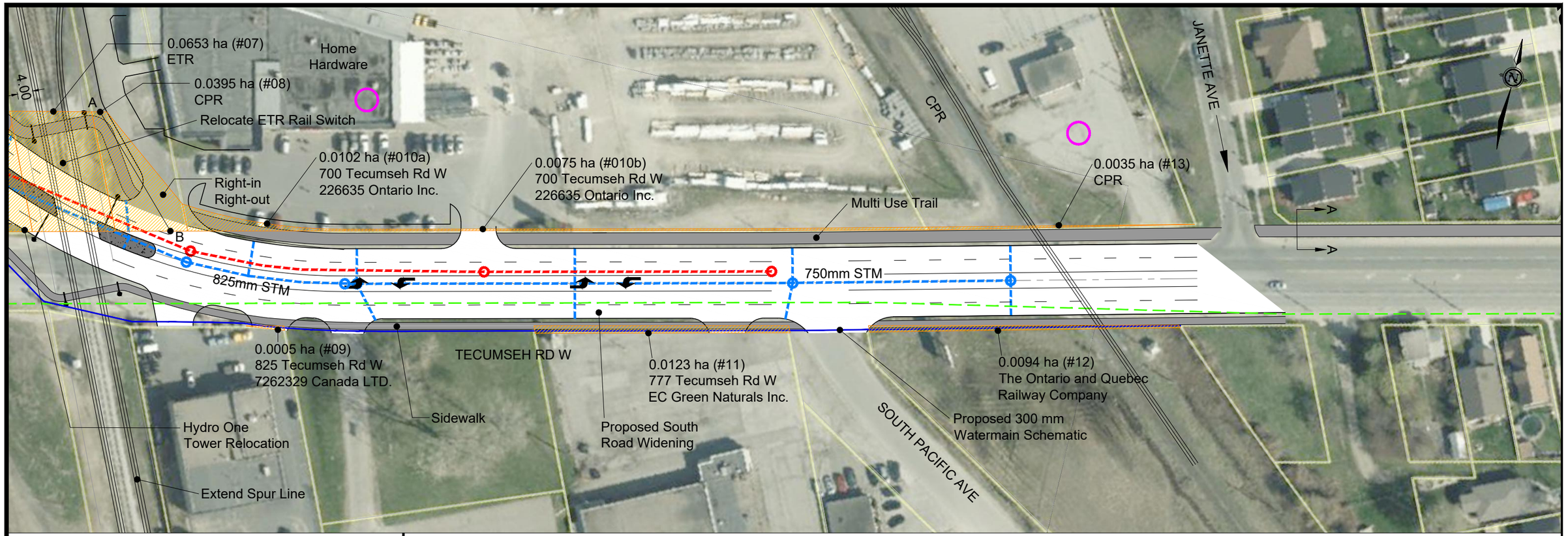
Table 11: Preliminary Cost Estimate

Description	Unit	Quantity	Unit Price	Total
Road Work				
Granular A	t	5500	$30.00	$165,000.00
Granular B	t	12300	$20.00	$246,000.00
Asphalt HL3	t	1425	$115.00	$163,875.00
Asphalt HL8	t	2280	$115.00	$262,200.00
Concrete Curbs	m	1600	$55.00	$88,000.00
Earth Excavation	m^3	8500	$25.00	$212,500.00
Removal of Asphalt	m^2	11400	$5.00	$57,000.00
MUP	m^2	2630	$90.00	$236,700.00
Sidewalk	m^2	1200	$90.00	$108,000.00
			Total (Road Work)	**$1,539,275.00**
Utilities				
Storm Sewer (750mm)	m	170	$750.00	$127,500.00
Storm Sewer (825 mm)	m	45	$800.00	$36,000.00
Storm Sewer (900 mm)	m	120	$850.00	$102,000.00
Storm Sewer (900 mm)	m	80	$850.00	$68,000.00
Storm Sewer (900 mm)	m	105	$850.00	$89,250.00
Catch Basins	ea	21	$3,500.00	$73,500.00
Storm Manholes	ea	7	$9,000.00	$63,000.00
Storm Laterals	m	150	$350.00	$52,500.00
Sanitary Sewer (300 mm)	m	446	$625.00	$278,750.00
Sanitary Manholes	ea	9	$7,000.00	$63,000.00
Sanitary Laterals	m	90	$300.00	$27,000.00
Water Main (200 mm)	LS	1	$825,000.00	$825,000.00
Stormwater Management Facility	LS	1	$150,000.00	$150,000.00
Hydro Transmission Tower	LS	1	$250,000.00	$250,000.00
			Total (Utilities)	**$2,205,500.00**
Rail Line				
Rail Line Adjustment	m	60	$1,100.00	$66,000.00
Signalling	m	60	$250.00	$15,000.00
Rail Flagging	LS	1	$250,000.00	$250,000.00
Rail Line Utility Protection	LS	1	$10,000.00	$10,000.00
Staging (Railway Bore)	LS	1	$200,000.00	$200,000.00
			Total (Rail Line)	**$541,000.00**
Traffic				

Staging (Traffic)	LS	1	$65,000.00	$65,000.00
			Total (Traffic)	**$65,000.00**
Geotechnical Investigation				
Contaminated Soil Remediation and or Disposal	LS	1	$500,000.00	$500,000.00
Geotechnical Investigation	LS	1	$75,000.00	$75,000.00
			Total (Geotechnical Investigation)	**575,000.00**
Summary				
			Subtotal	**$4,925,775.00**
			Landscaping and Streetscaping (2%)	**$98,515.50**
			Contingency (10%)	**$493,000.00**
			Engineering (15%)	**$738,866.25**
			Grand Total	**$6,256,156.75**

7.5 Construction Phasing

The scope of work will be phased with advanced utility relocation including the Hydro One tower relocation. This will be followed by a single contract for the roadworks and municipal services, which is expected to be complete in a single construction season.



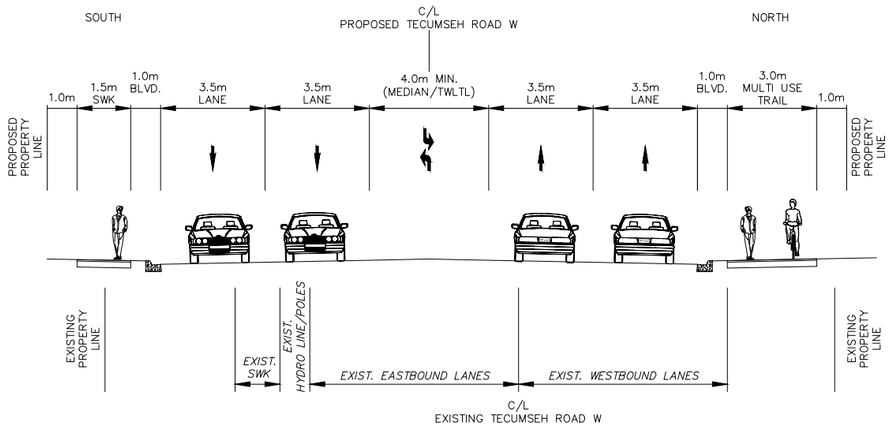
Note:

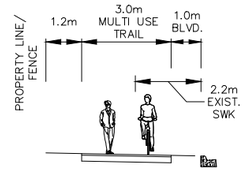
Property requirements depicted are preliminary only. Property fabric based on GIS mapping and does not necessarily reflect accurately existing property limits. Further investigation required in detail design stage to accurately determine property requirements.

Preliminary design developed from GIS airphotos, further refinement required in detail design phase of project.

Legend:

- EXISTING RIGHT-OF-WAY & PROPERTY FABRIC
- EXISTING HYDRO
- IMPACTED PROPERTIES
- PROPOSED GATE
- PROPOSED STORM SEWER SCHEMATIC
- PROPOSED SANITARY SEWER SCHEMATIC
- PROPOSED 300 mm WATERMAIN
- PROPOSED SIDEWALK, MULTI USE PATH
- PROPOSED RAISED CONCRETE ISLAND
- LAND REQUIREMENTS
- **A - B** SEE TABLE 11





SECTION A-A

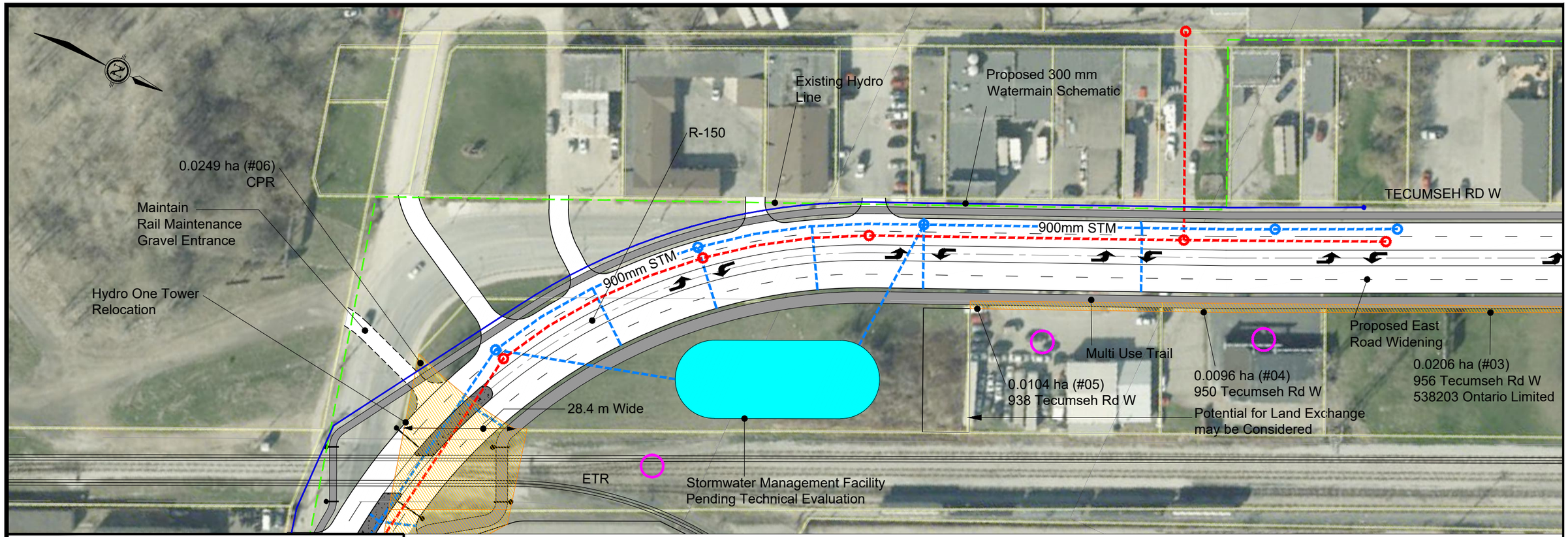
FIGURE 16A
RECOMMENDED PLAN

TECUMSEH ROAD WEST
ENVIRONMENTAL ASSESSMENT STUDY

THE CITY OF WINDSOR
ONTARIO, CANADA

BT ENGINEERING

SCALE
10m 0 20m
HORIZONTAL 1:1,000



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Preliminary design developed from GIS airphotos, further refinement required in detail design phase of project.

Legend:

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- EXISTING HYDRO
- IMPACTED PROPERTIES
- PROPOSED GATE
- PROPOSED STORM SEWER SCHEMATIC
- PROPOSED SANITARY SEWER SCHEMATIC
- PROPOSED 300 mm WATERMAIN
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- PROPOSED RAISED CONCRETE ISLAND
- LAND REQUIREMENTS

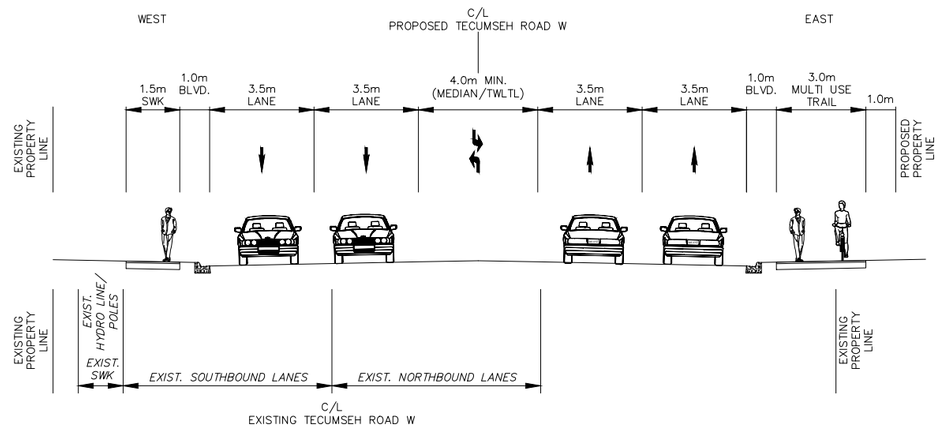


FIGURE 16B
RECOMMENDED PLAN

THE CITY OF WINDSOR
ONTARIO, CANADA

TECUMSEH ROAD WEST
ENVIRONMENTAL ASSESSMENT STUDY

BT ENGINEERING

SCALE
10m 0 20m
HORIZONTAL 1:1,000

LEGEND:

— — — STUDY AREA

1. A.983 TECUMSEH ROAD W - COMMERCIAL
   B.975 TECUMSEH ROAD W - RESIDENTIAL
   C.969 TECUMSEH ROAD W - COMMERCIAL
2. A.961 TECUMSEH ROAD W - VACANT
   B.963 TECUMSEH ROAD W - VACANT
3. A.951 TECUMSEH ROAD W - COMMERCIAL
   B.945 TECUMSEH ROAD W - VACANT
4. 964 TECUMSEH ROAD W - VACANT
5. A.950 TECUMSEH ROAD W - COMMERCIAL
   B.938 TECUMSEH ROAD W - COMMERCIAL
6. 931 TECUMSEH ROAD W - COMMERCIAL
7. A.925 TECUMSEH ROAD W - COMMERCIAL
   B.921 TECUMSEH ROAD W - VACANT
   C.913 TECUMSEH ROAD W - INDUSTRIAL
8. 905 TECUMSEH ROAD W - INDUSTRIAL
9. A.700 TECUMSEH ROAD W - COMMERCIAL
   B.750 TECUMSEH ROAD W - COMMERCIAL
10. 825 TECUMSEH ROAD W - COMMERCIAL
11. 777 TECUMSEH ROAD W - COMMERCIAL
12. 675 TECUMSEH ROAD W - VACANT
13. 635 TECUMSEH ROAD W - INDUSTRIAL
14. A.2100 SOUTH PACIFIC STREET - COMMERCIAL
    B.2130 SOUTH PACIFIC STREET - INDUSTRIAL
15. A.2186 JANETTE AVENUE - RESIDENTIAL
    B.2190 JANETTE AVENUE - RESIDENTIAL
    C.2198 JANETTE AVENUE - RESIDENTIAL
    D.2194 JANETTE AVENUE - RESIDENTIAL
    E.2174 JANETTE AVENUE - RESIDENTIAL
16. 2201 JANETTE AVENUE - COMMERCIAL
17. A.2200 JANETTE AVENUE - RESIDENTIAL
    B.2201 CHARL AVENUE - RESIDENTIAL
    C.2207 CHARL AVENUE - RESIDENTIAL
18. A.2217 CHARL AVENUE - RESIDENTIAL
    B.2221 CHARL AVENUE - RESIDENTIAL
    C.2225 CHARL AVENUE - RESIDENTIAL
19. A.2216 CHARL AVENUE - RESIDENTIAL
    B.2222 CHARL AVENUE - RESIDENTIAL
    C.2226 CHARL AVENUE - RESIDENTIAL

FIGURE 7
EXISTING LAND USE

THE CITY OF WINDSOR
ONTARIO, CANADA

TECUMSEH ROAD WEST
ENVIRONMENTAL ASSESSMENT STUDY

BT ENGINEERING

SCALE
N.T.S

FILEPATH: Z:\BTEng Projects\2017 Proj\17-006 Windsor Tecumseh Rd W EA\005-Drawings\TecumsehEA\dwg\ESR Figures\17-006 LandUse.dwg|Nov,14 2018-3.54pm

8.0 RECOMMENDED PLAN EFFECTS, MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK

Stakeholders, agencies and the public in the Study Area submitted questions and concerns throughout the study process.

Key issues have been identified and commitments to future work are summarized in **Table 12**. Property municipal addresses are indexed/ illustrated on **Figure 7.**

Identified mitigation measures reflect commitments by the City of Windsor to mitigate environmental effects. Effects on the environment were considered in accordance with the Municipal Class EA process.

Table 12: Summary of Issue, Proposed Mitigation and Commitments to Future Work			
No.	**Issue**	**Project Effect**	**Commitments**
1.0	**Property Impacts**		
1.1	964 Tecumseh Road West	A portion of property is required to accommodate the widening of Tecumseh Road West.	Land conveyances will be obtained through the site plan process, negotiations or expropriation as applicable. Existing structures and mature trees will be protected (if possible) or replaced.
1.2	950 & 938 Tecumseh Road West	A portion of property is required to accommodate the widening of Tecumseh Road West.	Land conveyances will be obtained through the site plan process, negotiations or expropriation as applicable. Existing structures and mature trees will be protected (if possible) or replaced. Potential land exchange of City owned property located immediately south of 938 Tecumseh Road West to accommodate lost parking within the existing ROW. The potential land exchange is illustrated on **Figure 17**.
1.3	905 Tecumseh Road West	Minor relocation of existing entrance at 905 Tecumseh Road West.	The entrance to 905 Tecumseh Road West will be relocated to improve safety.
1.4	750/700 Tecumseh Road West (Home Hardware)	Minor property impacts to the southwest corner of 750/700 Tecumseh Road West and impacts to the existing entrances based on proximity to the horizontal curve. The Home Hardware access for large trucks to the loading dock will be changed to circulate around the rear of the building.	The western entrance to 750/700 Tecumseh Road West will be relocated due to the improved geometry at the horizontal curve. This western entrance will also be limited to right-in/right-out. The eastern entrance will be relocated further to the east from its existing location to improve spacing and sight lines. Home Hardware accepted the proposed configuration at the March 20, 2018 meeting (see **Figure 18**). The meeting notes are provided in **Appendix C**.
1.5	ETR	Flattening the horizontal curve on Tecumseh Road West requires relocation of the existing ETR rail switch.	The ETR spur line will be extended and the switch will be relocated south of the Tecumseh Road West corridor.
2.0	**Natural, Social and Cultural Environment**		
2.1	Natural Environment	A site inspection of the Study Area was completed in July 2017 which identified that Tecumseh Road West is a commercial/industrial corridor that has been completely transformed from its natural state.	During detail design the consultant will be required to prepare an Agency-approved and comprehensive Environmental Protection Plan. Existing vegetation removed is to be replaced as per a landscape streetscaping plan.
2.2	Contamination Overview Study	A Contamination Overview Study was completed for the Tecumseh Road West Local Study Area which indicated areas with potential for environmental concern.	A Phase II ESA and a Soils Management Plan is required prior to construction to confirm soil and/or groundwater contamination through the Study Area.

3.0	**Engineering**		
3.1	Geotechnical	A preliminary Pavement Design Report was prepared for Tecumseh Road West.	A site specific geotechnical exploration and testing program is required during the design and construction stages of this project to address underground services, trenchless service installations and pavements for the proposed corridor improvements.
3.2	Drainage	Increase in impervious areas and increased stormwater runoff.	The detail design phase will investigate stormwater management approaches to reduce stormwater runoff. Measures may consider oversizing of storm sewer pipes for storage, groundwater infiltration or offline storage. These will require input from the detail design geotechnical investigation.
4.0	**Socio-Economics**		
4.1	Business Impacts	Short term business disruptions for access during construction.	All driveway closures will be short term and owners will be notified in advance to plan for disruption of access.
4.2	Civic Way Elements	Support civic ways vision.	-Inclusion of way finding signs(In a non-disruptive manner) -Deciduous trees
4.3	Roadway Operations	Improve future traffic operations by: 1) ETR realignment to a common rail crossing location with CPR as part of an alternate process 2) 6.0 m Multi-use path connection from South Pacific Avenue to Dougall Avenue to be considered under the ATMP and be a separate undertaking from this ea.	These will be considered outside the scope of the current EA.

Figure 17: Potential Land Exchange for 950/938 Tecumseh Road West

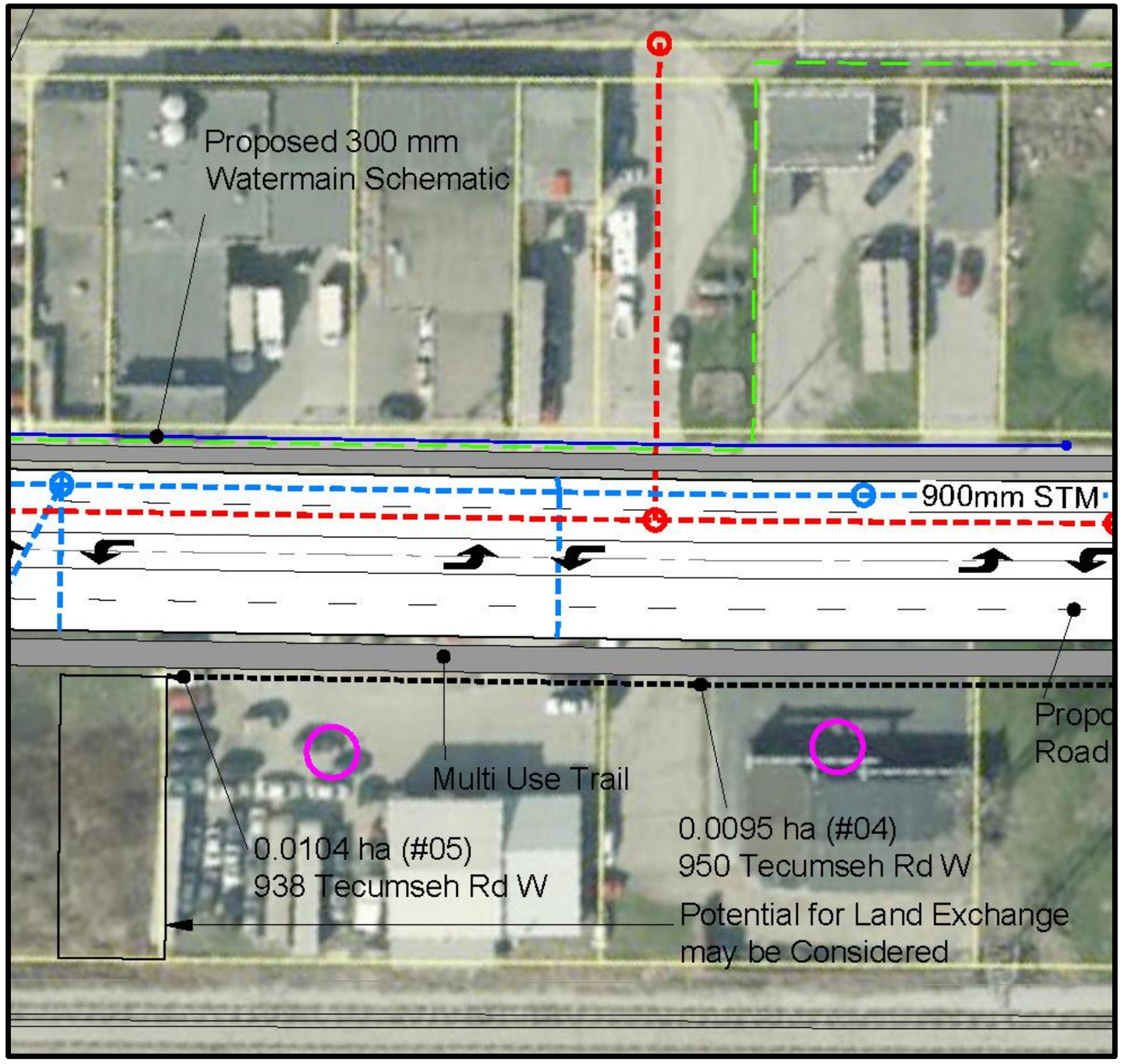
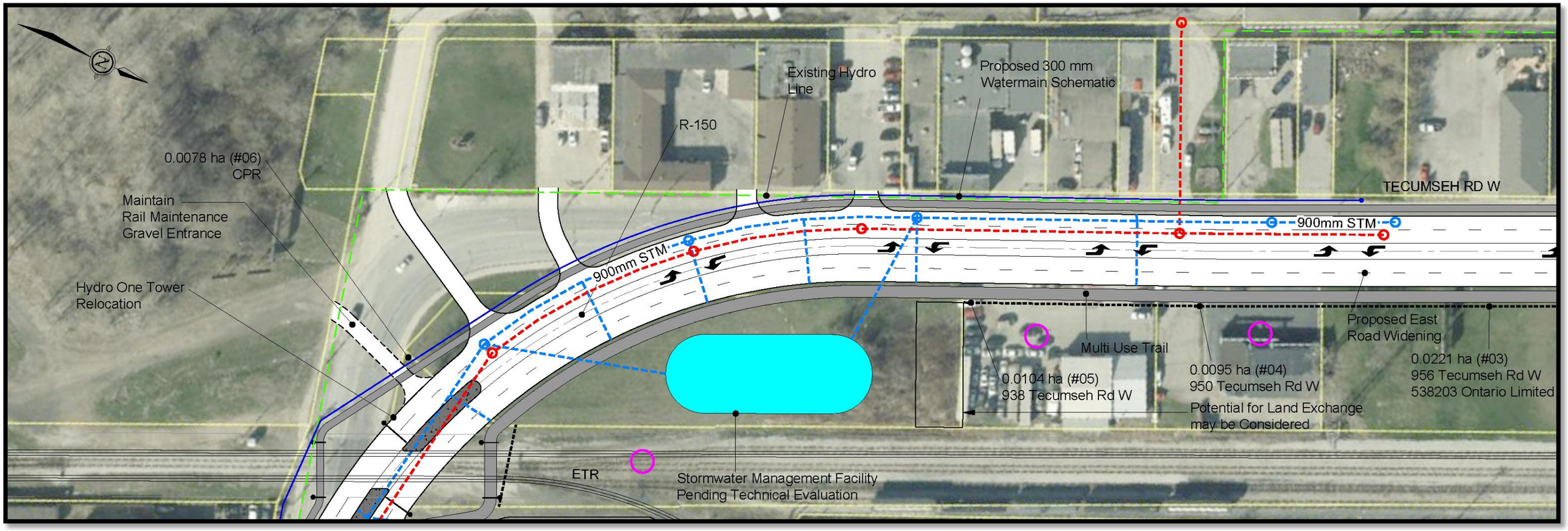


Figure 18: Proposed Entrance to 750/700 Tecumseh Road West



9.0 FUTURE ACTIVITIES

Following a 30 day public review period of the ESR (with no objections) and obtaining Class EA clearance, this project, or any individual element of this project, may proceed to detail design and construction by the City after obtaining the necessary environmental permits and approvals and subject to availability of funding and construction priorities. Mitigation measures listed in **Section 8.0** are to be incorporated during detailed design and construction, as appropriate.

Glossary of Terms

• **AADT**	Annual Average Daily Traffic – the average 24-hour, two-way traffic per day for the period from January 1st to December 31st.
• **Alignment**	The vertical and horizontal position of a road.
• **Alternative**	Well-defined and distinct course of action that fulfils a given set of requirements. The EA Act distinguishes between alternatives to the undertaking and alternative methods of carrying out the undertaking.
• **Alternative Planning Solutions**	Alternative ways of solving problems or meeting demand (Alternatives to the Undertaking).
• **Alternative Design Concepts**	Alternative ways of solving a documented transportation deficiency or taking advantage of an opportunity. (Alternative methods of carrying out the undertaking).
• **Alternative Project**	Alternative Planning Solution, see above.
• **Bump-Up**	The act of requesting that an environmental assessment initiated as a class EA be required to follow the individual EA process. The change is a result of a decision by the proponent or by the Minister of Environment to require that an individual environmental assessment be conducted.
• **Canadian Environmental Assessment Act (CEAA)**	The CEAA applies to projects for which the federal government holds decision-making authority. It is legislation that identifies the responsibilities and procedures for the environmental assessment.
• **Class Environmental Assessment Document**	An individual environmental report documenting a planning process which is formally submitted under the EA Act. Once the Class EA document is approved, projects covered by the class can be implemented without having to seek further approvals under the EA Act provided the Class EA process is followed.

• **Class Environmental Assessment Process**	A planning process established for a group of projects in order to ensure compliance with the Environmental Assessment (EA) Act. The EA Act, in Section 13 makes provision for the establishment of Class Environmental Assessments.
• **Compensation**	The replacement of natural habitat lost through implementation of a project, where implementation techniques and other measures could not alleviate the effects.
• **Corridor**	A band of variable width between two locations. In transportation studies a corridor is a defined area where a new or improved transportation facility might be located.
• **COS**	Contamination Overview Study
• **CPR**	Canadian Pacific Railway
• **Criterion**	Explicit feature or consideration used for comparison of alternatives.
• **Cumulative Effects Assessment**	Cumulative Effects Assessment assesses the interaction and combination of the residual environmental effects of the project during its construction and operational phases on measures to prevent or lessen the predicted impacts with the same environmental effects from other past, present, and reasonably foreseeable future projects and activities.
• **Detail Design**	The final stage in the design process in which the engineering and environmental components of preliminary design are refined and details concerning, for example, property, drainage, utility relocations and quantity estimate requirements are prepared, and contract documents and drawings are produced.
• **DFO**	Department of Fisheries and Oceans.
• **EA**	Environmental Assessment
• **EA Act**	Ontario Environmental Assessment Act (as amended by S.O. 1996 C.27), RSO 1980.

• **Environment**	• Air, land or water, • Plant and animal life, including human life, • The social, economic and cultural conditions that influence the life of humans or a community, • Any building structure, machine or other device or thing made by humans, • Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or • Any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.
• **Environmental Effect**	A change in the existing conditions of the environment which may have either beneficial (positive) or detrimental (negative) effects.
• **ESR**	Environmental Study Report. The final documentation for Schedule C project, defining the project, consultation process, preferred solution and mitigation measures.
• **ETR**	Essex Terminal Railway
• **Evaluation**	The outcome of a process that appraises the advantages and disadvantages of alternatives.
• **Evaluation Process**	The process involving the identification of criteria, rating of predicted impacts, assignment of weights to criteria, and aggregation of weights, rates and criteria to produce an ordering of alternatives.
• **External Agencies**	Include Federal departments and agencies, Provincial ministries and agencies, conservation authorities, municipalities, Crown corporations or other agencies other than MTO.
• **Factor**	A category of sub-factors.
• **General Arrangement**	Structural plan of the bridge and proposed works including elevations and cross-sectional views of the bridge.

• **Individual Environmental Assessment**	An environmental Assessment requiring the submission of a document for approval by the Minister, pursuant to the EA Act and which is neither exempt from the EA Act nor covered by a Class EA approval.
• **Mitigating Measure**	A measure that is incorporated into a project to reduce, eliminate or ameliorate detrimental environmental effects.
• **Mitigation**	Taking actions that either remove or alleviate to some degree the negative impacts associated with the implementation of alternatives.
• **MNRF**	Ministry of Natural Resources and Forestry.
• **MOECC**	Ministry of the Environment and Climate Change.
• **MTCS**	Ministry of Culture, Tourism and Sport.
• **MTO**	Ministry of Transportation Ontario.
• **MUT**	Multi- Use Trail
• **PIC**	Public Information Centre.
• **Planning Alternatives**	Planning alternatives are “alternative methods” under the EA Act. Identification of significant transportation engineering opportunities while protecting significant environmental features as much as possible.
• **Planning Solutions**	That part of the planning and design process where alternatives to the undertaking and alternative routes are identified and assessed. Also described as “Alternative Project” under the federal EA Act.
• **Project**	A specific undertaking planned and implemented in accordance with the Class EA including all those activities necessary to solve a specific problem.
• **Proponent**	A person or agency that carries or proposes to carry out an undertaking, or is the owner or person having charge, management, or control of an undertaking.
• **Public**	Includes the general public, interest groups, associates, community groups, and individuals, including property owners.

• **Realignment**	Replacement or upgrading of an existing roadway on a new or revised alignment.
• **Recommended Plan**	That part of the planning and design process, during which various alternative solutions are examined and evaluated including consideration of environmental effects and mitigation; the recommended design solution is then developed in sufficient detail to ensure that the horizontal and vertical controls are physically compatible with the proposed site, that the requirements of lands and rights-of-way are satisfactorily identified, and that the basic design criteria or features to be contained in the design, have been fully recognized and documented in sufficient graphic detail to ensure their feasibility.
• **Route Alternatives**	Location alternatives within a corridor.
• **Screening**	Process of eliminating alternatives from further consideration, which do not meet minimum conditions or categorical requirements.
• **Sub-factor**	A single criterion used for the evaluation. Each sub-factor is grouped under one of the factors.
• **Technical Advisory Committee**	The Advisory Committee will include the City and Consultant. It will act as the decision-making body for the study recommendations.
• **TMP**	Transportation Master Plan
• **Traceability**	Characteristics of an evaluation process which enables its development and implementation to be followed with ease.
• **Undertaking**	In keeping with the definition of the Environmental Assessment Act, a project or activity subject to an Environmental Assessment.
• **World Café**	A philosophy that people want to talk together about issues that matter, and that as people talk together we are able to collectively achieve greater wisdom. The World Café event is an effective conversational meeting to foster dialogue, access collective intelligence and create innovative possibilities for action.

Disclaimer

All personal information has been removed, including names and addresses, in accordance with the *Freedom of Information and Protection of Privacy Act*.