Detroit River
INTERNATIONAL CROSSING
STUDY

Canada-United States-Ontario-Michigan Border Transportation Partnership

DRAFT

Environmental Assessment Report
Individual Environmental Assessment
W.O. 04-33-002

Detroit River International Crossing Study
City of Windsor, County of Essex, Town of LaSalle, Town of Tecumseh

URS

November 2008

The Public Record

Copies of this document have been sent to the following locations:

Ontario Ministry of Transportation
Windsor Border Initiatives Implementation Group
949 McDougall Avenue, Suite 200
Windsor, Ontario

Ontario Ministry of the Environment
West Region Office
733 Exeter Road
London, Ontario

Ontario Ministry of the Environment
Windsor Area Office
4510 Rhodes Drive, Unit 620
Windsor, Ontario

Office of the Clerk
City of Windsor
350 City Hall Square West
Windsor, Ontario

Office of the Clerk
Town of LaSalle
5950 Malden Road
LaSalle, Ontario

Office of the Clerk
Town of Tecumseh
917 Lesperance Rd
Tecumseh, Ontario

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850 Ouellette Avenue
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1310 Grand Marais West Windsor, Ontario

LaSalle Public Library
5940 Malden Road
LaSalle, Ontario

Tecumseh Public Library
13675 St. Gregory's Road
Tecumseh, Ontario

URS Canada Inc.
75 Commerce Valley Drive E.
Markham, Ontario

Project Website: **http://www.partnershipborderstudy.com**

EXECUTIVE SUMMARY

To be inserted for final submission.

List of Appendices

Supporting Documents

The following is a list of supporting documentation that has been referenced throughout this Draft Environmental Assessment (EA) Report. At the time of printing, some of these documents were in the process of being finalized. These documents are identified as "pending" in the list below, and will be made available with the final EA Report submission. The remaining documents identified as "available" in the list below are available electronically from the study website (http://www.partnershipborderstudy.com). Hard copies of the report are available from URS Canada upon request.

1. Detroit River International Crossing Environmental Assessment Terms of Reference (May 2004) (*available*)
2. Draft Acoustics and Vibration Work Plan (February 2006) (*available*)
3. Draft Air Quality Work Plan (February 2006) (*available*)
4. Draft Archaeology Work Plan (February 2006) (*available*)
5. Draft Cultural Heritage Work Plan (February 2006) (*available*)
6. Draft Economic Impact Work Plan (October 2006) (*available*)
7. Draft Natural Heritage Work Plan (February 2006) (*available*)
8. Draft Social Impact Assessment Work Plan (February 2006) (*available*)
9. Draft Technical Considerations Work Plan (November 2005) (*available*)
10. Draft Waste and Waste Management Work Plan (November 2005) (*available*)
11. PIOH1 Summary Report (*available*)
12. PIOH2 Summary Report (*available*)
13. PIOH3 Summary Report (*available*)
14. PIOH4 Summary Report (*available*)
15. PIOH5 Summary Report (*available*)
16. PIOH6 Summary Report (*pending*)
17. Transportation Planning and Need Study Report (November 2005) (*available*)
18. Environmental Overview Paper – Canadian Existing Conditions Volume 1 (June 2005) (*available*)
19. Environmental Overview Paper – Canadian Existing Conditions Volume 2 (June 2005) (*available*)
20. Draft Feasible Transportation Alternatives (Alternatives to the Undertaking) Report (February 2006) (*available*)
21. Travel Demand Forecasts Working Paper (September 2005) (*available*)
22. Travel Demand Model Update Working Paper (September 2005) (*available*)
23. Regional and National Economic Impact of Increasing Delay and Delay-Related Costs at the Windsor-Detroit Crossings (August 2005) (*available*)
24. Generation and Assessment of Illustrative Alternatives Report (November 2005) (*available*)
25. Draft Generation of Practical Access Road Alternatives Report (*pending*)
26. Draft Generation of Plaza and Crossing Alternatives Report (*pending*)
27. Draft Level 2 Traffic Operations Analysis of Practical Alternatives (February 2008) (*available*)
28. Draft Practical Alternatives Evaluation Working Paper – Air Quality Impact Assessment (May 2008) (*available*)
29. Draft Practical Alternatives Evaluation Working Paper – Noise and Vibration Assessment (May 2008) (*available*)
30. Draft Practical Alternatives Evaluation Working Paper – Social Impact Assessment (April 2008) (*available*)
31. Assessment of Practical Access Road Alternatives Memorandum – Improve Regional Mobility (May 2008) (*available*)
32. Draft Practical Alternatives Evaluation Working Paper – Economic Impact (May 2008) (*available*)
33. Draft Practical Alternatives Evaluation Assessment Report – Existing and Planned Land Use (May 2008) (*available*)
34. Draft Practical Alternatives Evaluation Working Paper – Archaeology (April 2008) (*available*)
35. Draft Practical Alternatives Evaluation Working Paper – Cultural Heritage (April 2008) (*available*)
36. Draft Practical Alternatives Evaluation Working Paper – Natural Heritage (April 2008) (*available*)
37. Draft Practical Alternatives Evaluation Assessment Report – Stormwater Management Plan (March 2008) (*available*)
38. Draft Practical Alternatives Evaluation Working Paper – Waste and Waste Management (May 2008) (*available*)
39. Draft Pavement Engineering for Planning Report – Area of Continued Analysis (March 2008) (*available*)
40. Draft Practical Alternatives Evaluation – Constructability Report for Plaza & Crossing Alternatives (*pending*)
41. Draft Practical Alternatives Evaluation – Constructability Report for Access Road Alternatives (May 2008) (*available*)
42. Selection of the Technically and Environmentally Preferred Alternative – Plaza and Crossing Alternative (*pending*)
43. Draft Preliminary Construction Cost Estimate Report for Practical Alternatives (Access Road and Inspection Plaza) (May 2008) (*available*)
44. Bridge Conceptual Engineering Report (February 2008) (*available*)
45. Technically and Environmentally Preferred Alternative – Air Quality Impact Assessment Report (*pending*)
46. Technically and Environmentally Preferred Alternative – Human Health Risk Assessment Report (*pending*)
47. Technically and Environmentally Preferred Alternative – Social Impact Assessment Report (*pending*)
48. Technically and Environmentally Preferred Alternative – Noise & Vibration Assessment Report (*pending*)
49. Technically and Environmentally Preferred Alternative – Natural Heritage Assessment Report (*pending*)
50. Technically and Environmentally Preferred Alternative – Cultural Heritage Resource Assessment Report (*pending*)
51. Technically and Environmentally Preferred Alternative – Stage 2 Archaeological Assessment Report (*pending*)
52. Draft Structural Planning Report for Practical Alternatives (May 2008) (*available*)
53. Draft Level 3 Traffic Operations Analysis of Windsor-Essex Parkway (*pending*)

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Glossary of Terms

20th Century Euro-Canadian – Generally understood to refer to the early 20th century European settlement period in Ontario.

95th percentile queue length – The traffic queue length that is expected to be exceeded only 5% of the time during the peak traffic hour

Area of Continued Analysis (ACA) – Refers to the further defined study area that emerged from the Illustrative Crossing, Plaza, and Access Road Alternatives. The ACA formed the basis for the generation, assessment, and evaluation of the Practical Crossing, Plaza, and Access Road Alternatives.

Access Road – Refers to the new freeway facility connecting Highway 401 to international crossing of the Detroit River.

Agencies – Government bodies responsible for various approvals, and/or permits required to undertake various aspects of the project such as property acquisition and construction of the project. Both provincial and federal agencies were involved in this study. Examples of provincial agencies include: Ministry of the Environment (MOE), Ministry of Natural Resources (MNR), etc. Examples of federal agencies include: Transport Canada (TC), Fisheries and Oceans Canada (DFO), etc.

Area of Natural and Scientific Interest (ANSI) – Areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education.

ARCADY – A software package used for traffic analysis of roundabouts

Archaic – In Ontario, this refers to the period between approximately 9,500 and 3000 years ago.

Arterial Roads – Intended to move large volumes of traffic at high speeds. The major distinction between this classification and the freeway classification is in the full control of access. Roads that have full control of access should normally be in the freeway classification.

AST – Above ground storage tank.

ATMS – Automated Traffic Management Systems. Refers to the overhead digital signs and cameras that together with in-pavement detectors provides variable messages to drivers to allow them to make a choice regarding their route.

Average Annual Daily Traffic (AADT) – The average 24 hour, two-way traffic for the period January 1st to December 31st.

Back slope – In a cross-section of the roadway, the back slope is the slope between the drainage channel (ditch) and the natural ground.

Built Heritage Features – Individual buildings or structures that may be associated with a variety of human activities, such as historical settlement and patterns of architectural development.

CANAAG – Canadian Agency Advisory Group. A group composed of representation from federal and provincial agencies with an interest in the project. Consists of agencies involved in the review and approval of the OEA and CEAA Report.

Carolinian Canada - A non-profit coalition of over 40 government and non-government conservation groups and any individuals who encourage the protection of remaining natural areas in the Carolinian region.

Community Consultation Group (CCG): The study team solicited membership, from the public, with a wide variety of backgrounds and interest to join the CCG. Everyone who asked to be involved was included in the group. Participants volunteered their time to meet with the team on a regular basis, learn about the project, and share their ideas and interests.

CEAA – Canadian Environmental Assessment Act and Canadian Environmental Assessment Agency (federal).

Closed Circuit Television (CCTV) – A component of an ATMS system consisting of cameras positioned within a tunnel or along a roadway/freeway to monitor roadway operations.

Collector Roads – Roadways that collect traffic from local roads and feed it to arterials, or distribute it from arterials to locals.

COOP Advisory Group – Consisting of owners and operators of current border crossings as well as private sector proponents of new or expanded crossings.

Crest Vertical Curve – A vertical curve having a convex shape in profile viewed from above, like a hill.

Crossing - For the purposes of this study, the crossing refers to the proposed bridge over the Detroit River, and its approach roadways.

Cross-Section – The transverse profile of a road.

Crown – The highest break point of the surface of a roadway in cross-section.

CTC – Canadian Transit Company

Cul-de-sac – A road open at one end only.

Cultural Heritage Resources – Describes both “cultural landscapes” and “built heritage features”

Cultural Landscape – Collection of individual built heritage features and other related features that together form environmental features such as farm complexes, roadscapes and nucleated settlements.

Curb and Gutter – A curb has a vertical or a sloping face along the edge of a lane or shoulder that strengthens or protects the edge, or clearly defines the edge. Gutter is a paved shallow waterway provided for carrying surface drainage. Curb and gutter together control and conduct stormwater and provide delineation for traffic.

Cut Section – A roadway located below natural ground elevation.

Demographic Trends – The characteristics and statistics of human population

Design Hour Volume (DHV) – The 30th highest annual hourly volume.

Design Speed – A speed selected for purposes of design. It is the highest continuous speed at which individual vehicles can travel with safety on a road when weather conditions are favourable and traffic density is so low that the safe speed is determined by the geometric features of the road.

DIBC – Detroit River International Bridge Company

Drainage Channel (Ditch) – A drainage channel (or ditch) is placed adjacent to an outside lane or shoulder and is intended to control and conduct stormwater runoff. A shallow drainage channel is sometimes referred to as a swale.

DRIC – Detroit River International Crossing

Detroit River Tunnel Partnership (DRTP) – Partnership between two major private enterprises, Canadian Pacific Railway and Borealis Transportation Infrastructure Trust.

Environmental Assessment (EA) – An environmental assessment is a study, which assesses the potential environmental effects and benefits of a project or undertaking on the environment. Key components of an EA include: consultation with members of the public, regulatory agencies, municipalities, and other stakeholders; First Nations engagement; the consideration of alternatives; and the mitigation and management of environmental effects.

Entrance – The general area where turning roadway traffic enters the main roadway.

Environmentally Sensitive Areas (ESA) – Those areas identified by any agency or level of government which contain natural features, ecological functions or cultural, historical or visual amenities which are susceptible to disturbance from human activities and which warrant protection.

Evaluation Factors – Factors used to evaluate alternatives. The seven primary evaluation factors used for this study area were: changes to air quality; protection of neighbourhood and community features; consistency with existing and planned land use; protection of cultural resources; protection of natural environment; improvements to regional mobility; and cost and constructability.

Federal Environmental Assessment Coordinator (FEAC) – The Federal Environmental Assessment Coordinator (FEAC) must ensure that the screening of the project is carried out (Canadian Environmental Assessment Agency).

FHWA – Federal Highway Administration (U.S.)

Fill Section – A roadway located above the natural ground elevation.

Fore Slope/Side Slope – The slope between the roadway and drainage channel (ditch).

Freeway – A facility that accommodates the movement of large volumes of traffic at high speeds under free-flow conditions. The need for unrestricted movement on these facilities justifies the elimination of direct property access. A grade separation is required at all crossing roads.

GDSOH – Geometric Design Standards for Ontario Highways

Grade/Gradient – The rate of rise or fall of a roadway with respect to the horizontal distance, usually expressed as a percentage.

Guiderail – A longitudinal barrier which may count of concrete, IBC (International Barrier Corporation) barrier, steel beam or of posts and rail.

Historical Settlements – Comprise 2 or more buildings, usually residences or former stores at a railway or crossroads location.

Historic Euro-Canadian – Generally understood to refer to the 18th and 19th century European settlement period in Ontario.

Historic Pioneer – Generally understood to refer to the 18th and 19th century European settlement period in Ontario.

Horizontal Alignment – The configuration of a road or roadway as seen in plan, consisting of tangents, lengths of circular curve, and lengths of spiral or transition curves.

Individual Environmental Assessment (EA) – An environmental assessment for an undertaking to which the Environmental Assessment Act (provincial) applies, and which requires formal review and approval under the Act.

Illustrative Alternatives – The term "illustrative" is used in US environmental studies to describe the conceptual, "long list" alternatives determined from the PAA. This terminology was adopted on both sides of the border to promote the coordinated approach between the two EA processes.

Interchange – A grade separated intersection with one or more turning roadways (ramps) for travel between the through roads.

Intersection (At-Grade) – The general area where two or more roads join or cross, within which are included the roadway and roadside facilities for traffic movements.

Lane/Traffic Lane – A part of the travelled way intended for the movement of a single line of vehicles.

Level of Service (LOS) – A measure of traffic operations at an intersection or along a freeway or local road. LOS evaluation uses a six-letter grade scale (A to F) to rank the overall traffic handling ability of an intersection or a network based on delay per vehicle. LOS A indicates excellent traffic operations with minimal delays, while LOS F represents failing conditions with long delays. Levels of service E and F are generally considered undesirable.

Local Road – Local facilities that are normally short distance roads which emphasize the land access function.

Lower-tier Municipality – A municipality that forms part of an upper-tier for municipal purposes.

Median – The area that laterally separates traffic lanes carrying traffic in opposite directions. A median is described as flush, raised or depressed, referring to the general elevation of the median in relation to the adjacent edges of traffic lanes. The terms wide and narrow are often used to distinguish different types of median. A wide median generally refers to depressed medians sufficiently wide to drain the base and subbase into a median drainage channel. Flush and raised medians are usually narrow medians.

Median Barrier – A longitudinal barrier placed in the median to prevent a vehicle from crossing the median and encountering oncoming traffic or to protect a vehicle from a fixed object in the median.

Municipal Advisory Group (MAG) – Consisting of area municipalities and the County of Essex. As the study progressed, school boards were also invited to join the MAG.

MDOT – Michigan Department of Transportation

MES – Municipal Emergency Services

Mitigation – The elimination, reduction or control of the adverse environmental effects of the project; includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means. It also refers to the actions taken during the planning, design, construction and operation of works or undertakings to alleviate potential adverse effects.

MNR – Ontario Ministry of Natural Resources

MOE – Ontario Ministry of the Environment

MTO – Ontario Ministry of Transportation

Navigation Envelope – The vertical and horizontal clearance provided for marine traffic between a waterway and bridge or other structure.

NEPA – National Environmental Policy Act (USA only)

OEAA – Ontario Environmental Assessment Act

OEPA – Ontario Environmental Protection Act

Official Plan (OP) – A municipal planning document that sets out general policies for current and future land use for the entire municipality.

Overpass – A grade separation in which the major road passes over an intersecting road or railway.

Preliminary Analysis Area (PAA) – Refers to the originally defined broad study area formed the basis for the generation, assessment, and evaluation of the Illustrative Crossing, Plaza, and Access Road Alternatives.

PIOH - Public Information Open House. Events where the project is presented in an open house, drop-in style format, with no formal presentation. Members of the public can meet one-on-one with the study team members.

Plaza - A customs plaza consisting of numerous lanes and kiosks through which all international traffic must pass. Can include inspections services, and toll collection.

Practical Alternatives –The term "practical alternative" is used in US environmental studies to describe the more refined alternatives that emerge from the assessment and evaluation of the broader level conceptual alternatives, i.e. the illustrative alternatives. This terminology was adopted on both sides of the border to promote the coordinated approach between the two EA processes.

Private Sector Advisory Group (PSAG) – A bi-national consultation group. There were invitations sent to several business owners and associations in Canada and the US.

Prescribed Authority (PA) – The planning approval authority that the *Planning Act* assigns directly to a municipality, named in the regulation.

Proposed Freeway – The freeway portion of The Windsor-Essex Parkway

Proposed Service Road – The service road portion of The Windsor-Essex Parkway

Provincially Significant Wetland (PSW) – These are wetlands evaluated as provincially significant using the Ontario Wetlands Evaluation system (OWES).

Quaternary Period – Subdivision of geological time from the last two million years to present. It can be divided into two epochs; the Pleistocene (two million years to ten thousand years ago) and the Holocene (ten thousand years ago to the present day).

Queue Warning System (QWS) – A component of an ATMS system used to detect vehicle delays and alert drivers of downstream congestion at overhead VMS signs.

Ramp – A turning roadway to permit the movement of traffic from one highway to another.

Responsible Authority (RA) – the federal authority that is required to ensure that an environmental assessment of the project is conducted as defined under the Canadian Environmental Assessment Act.

Right-of-Way – The area of land acquired for, or devoted to, the provision of a roadway.

SAG – A group comprised of representatives from local school councils.

Sag Vertical Curve – A vertical curve having a concave shape in profile viewed from above, like a valley.

SARA – Federal Species at Risk Act (2002). Species at risk refer to an extirpated, endangered or threatened species or a species of special concern.

Service Road – A road in the vicinity of a through road designed to intercept, collect and distribute traffic desiring to cross, enter or leave the through road and access adjacent properties.

Shoulder – Areas of pavement, gravel or hard surface, placed adjacent to through or auxiliary lanes. They are intended for emergency stopping and travel by emergency vehicles only. They also provide structural support for the pavement.

Sight Distance – The distance required for a driver to detect an information source or hazard which is difficult to perceive in a roadway environment that might be visually cluttered, recognize the hazard or its potential threat, select appropriate action, and compete the manoeuvre safely and efficiently.

Summer Average Daily Traffic (SADT) – The average 24 hour, two-way traffic from the period July 1st to August 31st.

Superelevation – The gradient measured at right angles to the centre line across the roadway on a curve, from the inside to the outside edge.

TC – Transport Canada

TEPA – Technically and Environmentally Preferred Alternative for the Detroit River crossing, new customs plaza and access road linking these to the existing Highway 401. This consists of The Windsor-Essex Parkway, Plaza B1 and Crossing X10B.

TSAA – Technical Standards and Safety Act

The Partnership – The Canada-U.S.-Ontario-Michigan Border Transportation Partnership

Two-Lane Road – A road that provides for one lane of through traffic in each direction.

Underpass – A grade separation (bridge) in which the major road passes under an intersecting road or railway.

Undetermined Pre-Contact – An aboriginal site relating to the period prior to European contact for which the date and cultural affiliation have not been determined.

Upper-tier Municipality - a municipality of composed of two or more lower-tier municipalities form part for municipal purposes

UST – Underground storage tank

Vehicle Messaging System (VMS) – A component of an ATMS system consisting of a series of automated digital signs that inform motorists of potential diversion routes, slow traffic or incidents ahead, lane designations for customs, etc.

Vertical Alignment – The configuration of a road or roadway as seen in longitudinal section, consisting of tangents and parabolic curves.

VISSIM – A micro-simulation traffic analysis software package

Warrant – A criterion that identifies the need for an addition to the highway such as traffic signals, traffic barrier, truck climbing lanes, passing lanes, left turn lanes, etc.

WIFN – Walpole Island First Nation

Windsor-Essex Parkway, The –The portion of the TEPA that connects existing Highway 401 to the proposed new inspection plaza and international river crossing. The Windsor-Essex Parkway consists generally of a freeway portion connecting existing Highway 401 to the proposed plaza, a service road connecting existing Highway 3 to existing Huron Church Road, a multi-use trail network, buffer zones, tunnels, bridges, and all associated features such as lighting, Automated Traffic Management Systems, signs etc.

Woodland – Referring to the period between roughly 3000 years ago and the beginnings of European contact. This refers to the period after ceramic vessels first. Distinguished from the Archaic by changes in stone tool styles and the introduction of ceramic vessel manufacture.

WPA – Windsor Port Authority (see also *Prescribed Authority*)

WPRT – Windsor Peer Review Team

A APPROVALS BEING SOUGHT AND AMENDING PROCEDURE

A.1 Approvals Being Sought

The Detroit River International Crossing (DRIC) Environmental Assessment Report documents the coordinated environmental study undertaken by the Border Transportation Partnership, which includes the Ontario Ministry of Transportation, Transport Canada, the Michigan Department of Transportation and the U.S. Federal Highway Administration. The study resulted from the *Planning / Need and Feasibility (P/NF) Study* completed in 2004, which identified the need to address the safe and efficient movement of people and goods in the long-term between Southwestern Ontario and Southeastern Michigan.

The EA study provided a consultation process that involved stakeholders including external agencies, municipalities, and the public at major milestones throughout the study. The study also incorporated additional workshops, presentations, and meetings with interested groups / individuals to identify and address concerns.

If this Environmental Assessment is approved, the Ministry of Transportation and Transport Canada will then be in position to:

- Designate a highway right-of-way for the implementation of the recommended transportation improvement identified;
- Acquire property needed to build the facility and associated features, which may include but are not limited to: stormwater management facilities, temporary construction easements, mitigation / compensation measures, commuter parking lots, utility corridors and service roads;
- Relocate affected utilities;
- Close intersecting roads as identified in Chapter 9;
- Construct the Technically and Environmentally Preferred Alternative (TEPA);
- Operate and maintain the completed TEPA; and
- Make design and property refinements during future design phases.

Note: The approval being sought by this EA and commitments made in this EA will apply and be binding upon the MTO, its agents, successors, transfers and/or assigns, and will be applicable to the design, construction, operation and maintenance of the undertaking.

In support of the approval, this Detroit River International Crossing Study has followed the requirements of the *Ontario Environmental Assessment Act (OEAA)*. A Draft Environmental Assessment Report (EA Report) has been prepared for this project and provides information on the environmental effects and mitigation and the process that has been followed leading to the selection of the TEPA, as well as the technical findings of the study.

In general the Draft EA Report includes the following information:

- Purpose and history of the project;
- Existing and future natural, socio-economic, cultural and engineering conditions in the study area;
- Description and evaluation of alternatives considered, including their associated potential impacts and evaluation of the alternatives;
- Description of the recommended alternative and associated potential environmental effects and mitigation measures; and
- Commitments to future work and monitoring aspects of the project, including expected environmental effects and proposed mitigation measures.

This Draft EA Report is being made available to the public, other interested parties and external agencies for review. An Ontario Government Notice was placed in the local newspapers, mailed to over 37,000 local households and to over 2,000 persons, agencies and other stakeholders on the study mailing list advising the availability of the Draft EA Report for review. It will be available for review commencing Wednesday, November 12, 2008 at the following locations:

Ontario Ministry of Transportation Windsor Border Initiatives Implementation Group 949 McDougall Avenue, Suite 200 Windsor, Ontario	Ontario Ministry of the Environment West Region Office 733 Exeter Road London, Ontario	Ontario Ministry of the Environment Windsor Area Office 4510 Rhodes Drive, Unit 620 Windsor, Ontario
Office of the Clerk City of Windsor 350 City Hall Square West Windsor, Ontario	Office of the Clerk Town of LaSalle 5950 Malden Road LaSalle, Ontario	Office of the Clerk Town of Tecumseh 917 Lesperance Rd Tecumseh, Ontario
Windsor Public Library Central Branch 850 Ouellette Avenue Windsor, Ontario	Windsor Public Library Sandwich Branch 3312 Sandwich Street Windsor, Ontario	Windsor Public Library Nikola Budimir Branch 1310 Grand Marais West Windsor, Ontario
LaSalle Public Library 5940 Malden Road LaSalle, Ontario	Tecumseh Public Library 13675 St. Gregory's Road Tecumseh, Ontario	URS Canada Inc. 75 Commerce Vall ey Drive E. Markham, Ontario

Interested persons, agencies, municipalities or other stakeholders may provide comments to the Ministry of Transportation by Friday, December 12, 2008 in written form by email to detroit.river@ontario.ca or by mail to 949 McDougall Avenue, Suite 200, Windsor, Ontario, N9A 1L9, Attention: Mr. Roger Ward, Senior Project Manager. Following the public comment period, all comments received will be reviewed and a final Environmental Assessment Report will be prepared and submitted to the Ontario Minister of the Environment for approval. The Ministry of the Environment review procedure also includes opportunities for public review and comment.

Detailed background information, including all supporting background study reports, will be made available with the Final EA Report submission. Currently additional background and study material is available on the study website: www.partnershipborderstudy.com.

A.2 Amending Procedure

As noted in previous section, if this Environmental Assessment is approved by the Ontario Minister of the Environment, the approval will include the right to make refinements to the alignment and to the right-of-way during future design phases.

The Ministry of Transportation has developed the undertaking to a concept design level of detail for the purposes of this Environmental Assessment Report. The concept design level of detail does not provide the same level of detail as will be available during later stages of design. However, the concept design as contained in this Environmental Assessment does provide a sufficient level of detail to asses the environmental impacts of the preferred alternative. The environmental impacts identified in the Environmental Assessment are therefore to be considered sufficiently reliable on which to base a decision regarding approval of the undertaking.

Some aspects of the undertaking are subject to change as design details are developed through future phases of the project. Changes may come about in terms of study area conditions, the development of new technology or mitigating measures, or the identification of previous unknown information or concerns. The Ministry's assessment of the significance of the proposed change(s) will be based on further technical assessment and consideration of applicable policy, public and agency input as appropriate.

An assessment as to the significance of the proposed change will be based on consideration of the following issues:

- Are there any significant environmental issues?
- Are there any significant property issues?
- Is there a need to provide public documentation of any issues which have been identified?

If the proposed change is not anticipated to be significant based on the above considerations, the change will be documented in a Design and Construction Report (DCR), which will be made available for public review.

If the proposed change is anticipated to be significant, the amending procedure described below will be invoked. The amending procedure will be consistent with Chapter 10 of *MTO's Class Environmental Assessment for Provincial Transportation Facilities (approved 1999 - amended 2000).* This chapter outlines the process for amending an approved Individual Environmental Assessment per the Class process, and specifies the following:

- Affected parties will be consulted on the proposed changes, anticipated environmental effects, proposed mitigation and the need for a Transportation Environmental Study Report (TESR). The Class EA process and the principles for transportation engineering, environmental protection, consultation, documentation and bump-up, and environmental clearance will be followed. Depending on the complexity of the proposed change, and the number of stakeholders affected by the proposed change, a public information center may be held.
- A Transportation Environmental Study Report (TESR) will be prepared to document the circumstances necessitating the change, outline the proposed change and identify the anticipated environmental effects and proposed mitigation measures. The TESR will constitute an addendum to the original individual EA and will be made available for a 30-day public review period.
- A Notice of Bump-up opportunity will be issued at the time of TESR submission.
- Only the changes noted in the TESR will be eligible for bump-up. The concept of the undertaking, as outlined in the original EA may not be challenged. In the event that a bump-up is granted, the proponent has the option of withdrawing the TESR and implementing the project as documented in the original EA.

1 STUDY OVERVIEW

This chapter provides a study overview, including related projects within or near the Study Area as shown in Exhibit 1.1. The Detroit River International Crossing (DRIC) Study was initiated as a bi-national transportation improvement study by the governments of Canada, United States, Ontario, and Michigan. After completion of the Planning/Need and Feasibility Study (P/NF) Study in 2004, the *Environmental Assessment (EA) Terms of Reference (ToR*) was approved by the Ontario Minister of the Environment on September 17, 2004. While considering objectives of the Partnership for this EA Study, the DRIC study team generated and assessed illustrative alternatives within the generated Preliminary Analysis Area (PAA). Evaluation of these alternatives led to a refined Area of Continued Analysis (ACA). Within the ACA, six practical access road alternatives, four practical plaza locations, and three practical crossing locations were generated, assessed and evaluated.

Throughout the EA Study extensive consultation including Public Information Open Houses (PIOHs) was conducted to inform the public about the technical analysis leading to the generation, assessment, and evaluation of the illustrative and practical alternatives, and ultimately, the Technical and Environmentally Preferred Alternative (TEPA). Over 300 consultation sessions were held during the study with participation from thousands of Windsor-Essex County residents, community groups, experts, local elected officials, and other government agencies.

1.1 Study Background

The Detroit River International Crossing (DRIC) Study is a bi-national transportation improvement study that has been undertaken by the governments of Canada, United States, Ontario, and Michigan, who have formed the Canada-US-Ontario-Michigan Border Transportation Partnership (the Partnership).

The Partnership includes the transportation authorities from two federal governments and two provincial/state governments. The Federal Highway Administration (FHWA) is an arm of the US Department of Transportation and Transport Canada (TC) is the corresponding federal agency in Canada. The Ontario Ministry of Transportation (MTO) and the Michigan Department of Transportation (MDOT) are the provincial and state agencies that have roadway jurisdiction in Ontario and Michigan.

In 2001, the Partnership jointly commissioned a Planning/Need and Feasibility Study (P/NF) to identify a long-term strategy to address the safe and efficient movement of people and goods between Southwestern Ontario and Southeastern Michigan. The overall objectives of the Partnership in support of this strategy were the following:

- To improve the movement of people, goods and services in a safe and efficient manner across the Canadian / United States border at the Detroit and St. Clair Rivers to connect with existing national, provincial and regional transportation systems, such as I-75 and Highway 401;
- To enhance the regional economic vitality and Canadian/US trade;
- To meet the long term needs of the US and Canadian border inspection agencies;
- To expedite the planning and environmental study process to ensure that future travel demands in this region can be accommodated in a timely manner;
- To ensure that all modes of surface transportation including road, rail and marine will be considered;
- To use a single integrated planning and environmental study process, resulting in a single product, which will meet the requirements of all members of the Partnership;
- To ensure that any solutions which are developed as a result of the above integrated planning and environmental study process comply with all relevant and applicable federal, provincial, state and/or municipal laws, regulations, bylaws, ordinances or other binding enactments validly created by bodies with legislative or rule-making authority;
- To ensure that the process is conducted in a financially responsible and prudent manner; and
- To ensure that intelligent transportation systems/state-of-the-art facilities be provided to enhance border crossing efficiency.

The P/NF Study, completed in January 2004, identified a strategy for improvements to meet the long-term (2030 and beyond) needs of the transportation network serving cross-border traffic in the area of Southwestern Ontario and Southeastern Michigan. Among other things, the strategy confirmed the need for a new or expanded crossing of the Detroit River with connections to the freeway systems in Ontario and Michigan.

As a result of this recommendation, the Partnership initiated a formal environmental assessment process for a new or expanded Detroit River International Crossing (refer to Chapter 2 for further details). As a first step in this process in Ontario, an EA Terms of Reference (EA ToR) was prepared. The *Detroit River International Crossing Study Environmental Assessment Terms of Reference (May 2004)* outline the minimum considerations and study framework to be followed in completing this Individual Environmental Assessment. The EA ToR was approved by the Ontario Minister of the Environment on September 17, 2004. The EA ToR is available as a supporting document.

The project detailed in this EA Report is part of an overall international transportation improvement project that requires approvals from governments on both sides of the border. The Partnership's coordinated process facilitated the joint selection of a preferred river crossing location to meet the requirements of the Ontario Environmental Assessment Act (OEAA), Canadian Environmental Assessment Act (CEAA), and the United States National Environmental Policy Act (NEPA) effectively and efficiently.

In a separate but parallel process, the Government of Canada, the Province of Ontario, the City of Windsor, and Essex County have continued to work together to reach agreement on additional initiatives to be pursued under the "*Let's Get Windsor-Essex Moving*" strategy. This initiative is aimed at relieving congestion and improving traffic flows to existing crossings in a manner that is consistent with the requirements of the Detroit River International Crossing Project.

1.2 Study Location

The transportation problems identified during the P/NF Study formed the basis for this EA study and for the development of a study area in The Windsor-Essex region of Southwestern Ontario (refer to Exhibit 1.1).

The study has focused on confirming the need, confirming the study area, and then generating, assessing, and evaluating alternatives to address the identified transportation needs. As the process unfolded, the analysis area continued to focus on specific areas associated with illustrative and practical alternatives, and finally on the Technically and Environmentally Preferred Alternative (TEPA).

EXHIBIT 1.1 – STUDY AREA

1.3 Study Purpose, Objectives and Scope

The Windsor-Detroit border crossing represents an important trade corridor between the United States and Canada. Based on 2006 border crossing statistics, approximately 28% of Canada-US surface trade passes through Windsor-Detroit.

The purpose of the undertaking is to provide for the safe, efficient and secure movement of people and goods across the Canadian-US border in the Detroit River area to support the economies of Ontario, Michigan, Canada and the US.

Given the importance of this trade corridor to the local, regional and national economies and the negative effects associated with poor traffic operations and congestion already occurring at existing crossings, it was recognized that the partnering governments must take all responsible steps to reduce the likelihood of disruption to transportation service in this corridor.

In order to meet the purpose, this study has addressed the following regional transportation and mobility needs:

- Provide new border crossing capacity to meet increased long-term travel demand;
- Improve system connectivity to enhance the continuous flow of people and goods;
- Improve operations and processing capabilities at the border; and
- Provide reasonable and secure crossing options (i.e. network redundancy).

In addition, the study team has sought to recommended transportation solutions which minimize community and environmental impacts as much as reasonably possible. In particular, the study team has strived to address the local communities' goals to:

- Improve quality of life;
- Take trucks off local streets; and
- Improve traffic movement across the border.

The objectives of the study can generally be expressed in terms of the seven key evaluation factors that were developed in consultation with the public and were used to evaluate all of the alternatives developed during the study. These included:

Changes to Air Quality

- How will each alternative affect future levels of pollutants in the atmosphere in the next 10, 20, and 30 years?

Protection of Community and Neighbourhood Characteristics

- How will each alternative affect homes and businesses?
- How will each alternative affect future traffic conditions?
- How will each alternative affect future noise and vibration levels?

Consistency with Existing and Planned Land Use

- How does each alternative affect existing and future planned land use?

Protection of Cultural Resources

- How will each alternative affect historical, cultural and archaeological features in the area?

Protection of the Natural Environment

- How will each alternative affect ecosystems, species, water systems or other important natural resources?
- How will environmentally significant area or species at risk be affected by each alternative?

Improvements to Regional Mobility

- What will be needed to improve traffic flows in this area?

- How will each alternative affect future traffic conditions?
- How can a new river crossing and plaza be efficiently managed?

Cost and Constructability

- What is the cost of each alternative?
- Is each alternative constructible?
- Will each alternative provide value for the tax dollar?

1.4 Key Components of the EA Study

A key component of the EA study involved preparing an Environmental Assessment Report (EA Report), which documents the environmental effects and the process that has been followed leading to the selection of the Technically and Environmentally Preferred Alternative (TEPA). To support the analysis and evaluation of alternatives, environmental and technical studies have been undertaken during the preparation of the EA Report, and results have been fully documented in supporting documents which are listed after the table of contents at the beginning of this report and available on the project website at www.partnershipborderstudy.com.

1.5 Overview of Study Process and Schedule Milestones

The study process followed the requirements of the OEA and CEAA, and was guided by the approved EA ToR. As detailed in subsequent sections of this report, each stage of the study included systematic and thorough analysis at an appropriate level of detail as well as consultation with the affected stakeholders and the public. Overall project processes and schedule milestones are illustrated in Exhibit 1.2.

Specifically, the process involved outlining and confirming the purpose and need for the undertaking. Planning work undertaken in the previous P/NF Study (2001 – 2004) was reviewed and updated. That work confirmed the need for a new international crossing in the Windsor-Detroit area as part of a 30-year long term border strategy. The results of the analysis and a long list of illustrative plaza, crossing and access road alternatives were presented to the public and other stakeholders for input and review.

In parallel with the above activities, the study team prepared *Work Plans* (available as supporting documents) that would guide the analysis of alternatives throughout the Environmental Assessment. These were reviewed by the appropriate approval agencies, and were also made available to the public and key stakeholders for comment. The Work Plans are available as a supporting document.

As illustrated in Exhibit 1.2, this EA study commenced in January 2005. During the spring of 2005, the study team updated traffic forecasts, confirmed the need for the project, and generated a long list of illustrative alternatives.

The first round of Public Information Open Houses (PIOHs) was held in June 2005, focused on the purpose and need for the study, and presented the illustrative plaza, crossing and access road alternatives for public review and comment. Attendees were also asked to provide input into the development of the seven evaluation factors to be used throughout the remainder of the study to help determine the impacts associated with each alternative developed.

A thorough and systematic analysis and evaluation of this long list of alternatives was carried out during the fall and the results were shown to the public and key stakeholders for input and review late in 2005. The results of the evaluation identified an Area of Continued Analysis (ACA).

At the second round of PIOHs, held in November/December 2005, the study team presented the evaluation of the illustrative alternatives, as well as the Area of Continued Analysis that had been identified on the basis of this evaluation.

Early in 2006, the team developed practical crossing, plaza and access road alternatives within the ACA. At the third round of PIOHs, held in March 2006, the practical alternatives for the plaza, crossing and access road were presented. In addition, attendees were encouraged to provide feedback on the potential locations for interchanges, local access considerations (including service road options) and cross-sectional alternatives for at-grade, depressed and tunneled roadways.

The remainder of the 2006 calendar year focused on analysis of the practical alternatives. At the fourth round of PIOHs, held in December 2006, the study team presented the preliminary analysis to date of the practical alternatives for the plaza, crossing and access road. The public was advised on the status of the analysis work and conclusions to date. They were encouraged to comment on the analysis and work completed to date as well as the methods used to carry out the work conducted.

During 2007, analysis of the five original practical alternatives continued. As analysis of the practical alternatives proceeded, it became apparent that considerable property acquisition would be required, regardless of the alternative. Informal consultation continued into the spring and summer of 2007 with growing interest around a concept which would have some tunneled sections. At meetings with the City of Windsor the notion of a more "green" alternative emerged. The concept, as conceived by the City, would include a green corridor with tunneled sections, a grade separated recreational trail system, and extensive urban design of the green areas.

The study team utilized these ideas, plus its own, to develop a Parkway alternative. The alternative included 10 tunneled sections (total length 1.5 km), a grade separated recreational trail network, and extensive areas of future green space.

At the fifth round of PIOHs, held in August 2007, the study team presented this new below-grade alternative. Described as a green transportation corridor, the access road for international traffic would be below-grade with a number of tunnels. Information on the evaluation process to be undertaken in selecting a technically and environmentally preferred alternative for the crossing, plaza and access road was provided. As well, the public was invited to provide their ideas and comments to help the study team evaluate all the alternatives and develop a single preferred alternative.

The Partnership announced The Windsor/-Essex Parkway as the Technically and Environmental Preferred Alternative for the access road portion of the project in May 2008, and the preferred location for the international bridge crossing and Canadian plaza in June 2008.

At the sixth round of PIOHs, held in June 2008, the study team presented a broad overview of the study, as well as the analysis and evaluation process leading to the selection of The Windsor-Essex Parkway, Plaza B1, and Crossing X-10B as the Technically and Environmentally Preferred Alternative (TEPA). In addition, the study team responded to the "GreenLink" concept that had been suggested by the City of Windsor in terms of its similarities and differences to the recommended “Parkway” alternative.

The remainder of 2008 focused on detailed analysis and identification of appropriate mitigation measures for the TEPA, as well as documentation of the Environmental Assessment Reports. These measures were included in a draft version of this EA Report, which was made available to the public, agencies, municipalities, First Nations, and other interested parties for review in November 2008.

1.6 Study Process: A Coordinated Approach

The Partnership’s goal was to conduct essentially one body of work pertaining to alternative generation, analysis and evaluation, and document the project findings in format(s) suitable for circulation and review by the bi-national government agencies/ministries/departments and the general public.

A key principle of the process was that government ministries / departments / agencies, as well as non-government agencies, interest groups, community groups and interested members of the public were provided the opportunity to participate and offer input throughout the study. The Partnership proactively sought input from all stakeholders at key points in the decision-making process.

In addition, throughout the environmental study process, the Partnership coordinated meetings between Canadian and United States federal and state/provincial agencies of common/shared interests so that, as much as possible, a bi-national approach to identifying and addressing issues was developed.

Another key principle of the coordinated process was that, where two or more processes specified different requirements in conducting the study, the Partnership sought to incorporate the most rigorous requirement to the extent possible. However, there were certain requirements that were unique to a particular jurisdiction (i.e. Canada, United States, Ontario) that needed to be directly incorporated into the corresponding study process. These issues were addressed as required by the Partnership during the coordinated study process. This coordinated process is schematically illustrated in Exhibit 1.3.

EXHIBIT 1.2 – OVERALL STUDY SCHEDULE

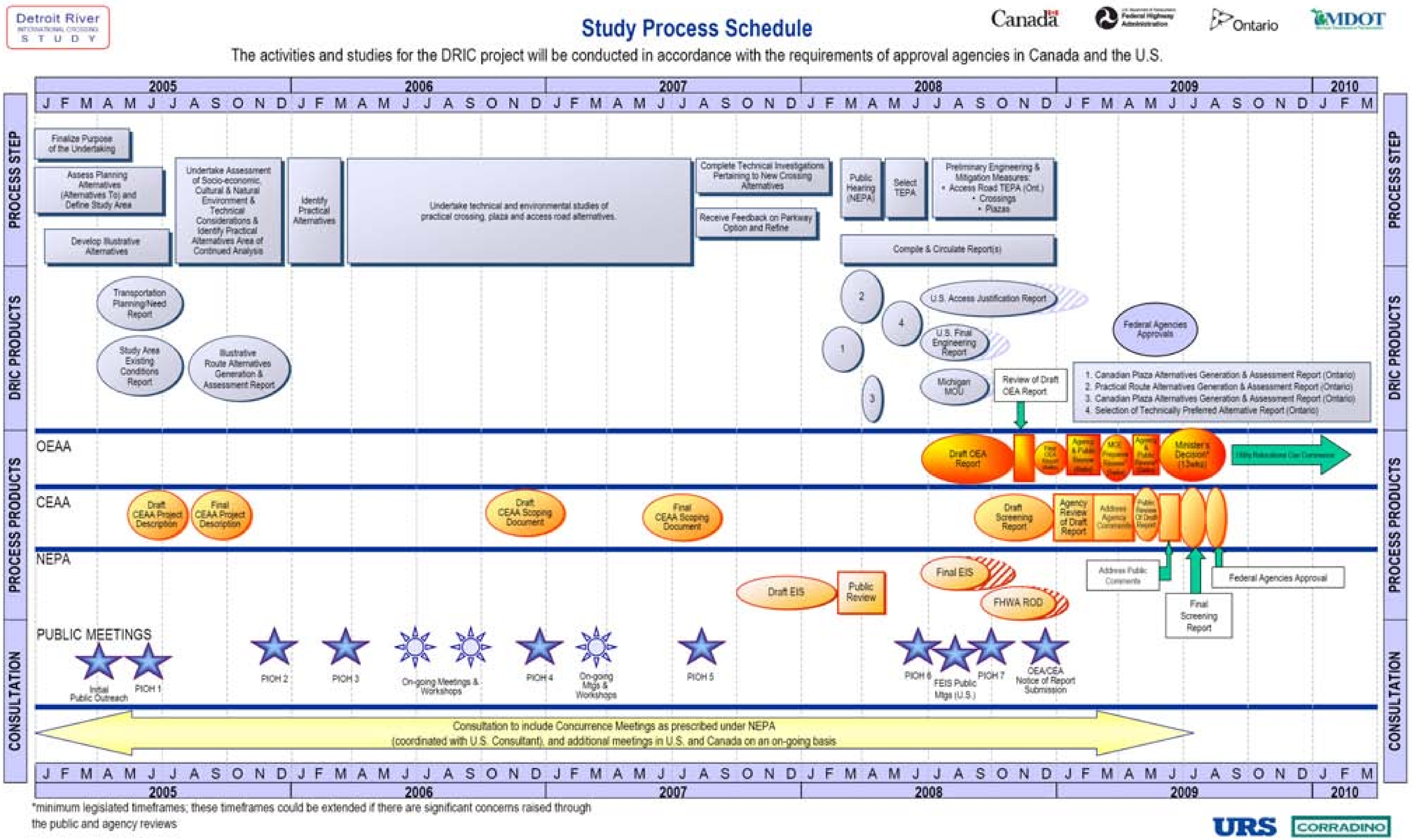
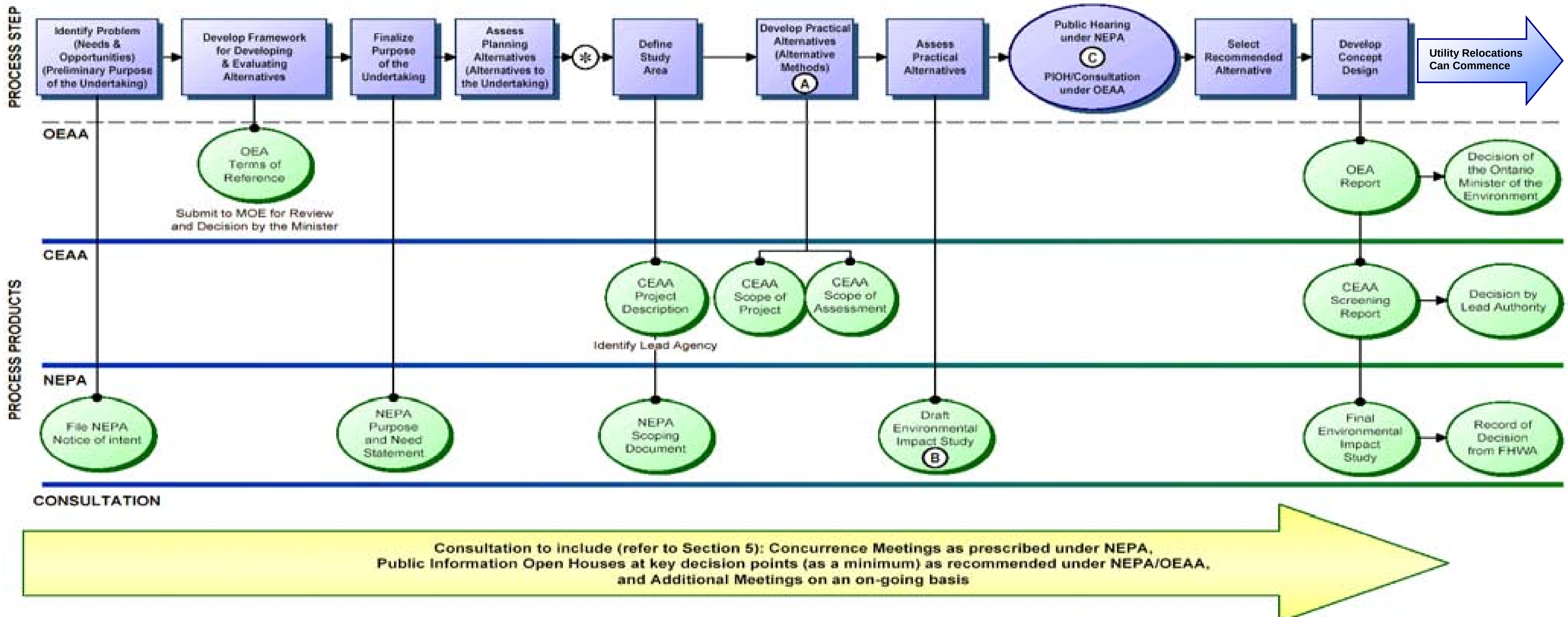


EXHIBIT 1.3 – COORDINATED NEPA/OEAA/CEAA PROCESS



(*) Following the assessment of planning alternatives, the process for identifying a recommended linear transportation facility, for which MTO would serve as the proponent, is illustrated. If the assessment of planning alternatives recommends other/additional alternatives, appropriate planning/implementation processes may be initiated by other proponents. MTO will meet with MOE at this point of the integrated environmental study process to obtain guidance/comment on future actions.

(A) In developing practical alternatives, the Project Team will first identify Illustrative Alternatives. The preferred Illustrative Alternatives will be carried forward as Practical Alternatives (See Section 3.3).

(B) Under NEPA, the Draft EIS is typically prepared and circulated prior to any selection of a recommended alternative.

(C) The Public Hearing following the circulation of the Draft EIS is mandatory under NEPA.

1.7 Relevant Projects / Initiatives

1.7.1 Canadian Projects / Initiatives

Prior to the DRIC EA study, the governments of Canada and Ontario announced a joint investment in Windsor-Essex for the "*Let's Get Windsor-Essex Moving*" strategy – a series of transportation infrastructure projects aimed at reducing congestion and improving efficiency in the local road network leading to the border crossings.

To date, more than $100 million has been invested in this strategy on several projects including road-rail grade separations, road widening projects, installation of intelligent transportation systems and improvements to the Windsor-Detroit Truck Ferry.

The Ontario Ministry of Transportation continues to improve Highway 3 in Essex County through a two-phase widening project from Leamington to Windsor. Phase 1 includes the widening of Highway 3 from two lanes to four from the west junction of Essex County Road 34 to Essex County Road 8 near Windsor. This project was completed in 2008. Phase 2 begins in 2009 and will widen Highway 3 from two lanes to five from Essex County Road 11 to the west junction of Essex County Road 34.

The Detroit International Bridge Company/Canadian Transit Company have proposed to build a second span adjacent to the existing Ambassador Bridge, referred to as the *Ambassador Bridge Enhancement Project*. The project includes a new suspension bridge similar in appearance to the Ambassador Bridge, located along the same corridor. A federal environmental assessment under the Canadian Environmental Assessment Act has been initiated for the proposed Ambassador Bridge Enhancement Project.

In addition, the Ambassador Bridge Company recently acquired land to expand its plaza operations and toll booth capacity in Windsor, Ontario. Construction has begun to expand the Ambassador Bridge plaza.

1.7.2 United States Projects / Initiatives

Construction is underway on the *Ambassador Gateway Project* in Detroit, Michigan. This project, which is being undertaken by the Michigan Department of Transportation (MDOT), is expected to be completed by December 2009. It will connect Detroit area freeways to the Ambassador Bridge and Detroit's Mexicantown neighbourhood. The project includes redesigning the Ambassador Bridge US Plaza to improve safety and ease traffic flow.

1.8 Description of the Recommended Plan

After evaluating several illustrative and practical alternatives for the access road, Canadian inspection plaza, and the international bridge crossing within the study area, the Technically and Environmentally Preferred Alternative (TEPA) was selected. Key elements of the TEPA are described in the following sections. (Refer to Exhibit 1.4 for an illustration of The Windsor-Essex Parkway corridor.)

EXHIBIT 1.4 – WINDSOR-ESSEX PARKWAY CORRIDOR

1.8.1 The Windsor-Essex Parkway

The Windsor-Essex Parkway is a key component of a new border transportation system that will provide a direct route connecting Highway 401 in Windsor, Ontario to Interstate 75 in Detroit, Michigan.

The Windsor-Essex Parkway is planned as a six-lane urban freeway with 11 tunnels and service roads. It allows long-distance international traffic to travel unimpeded by traffic signals to a new inspection plaza and river crossing while improving community linkages and providing extensive new trails, green space and other recreational opportunities. The Windsor-Essex Parkway includes:

- Over 300 acres of parkland;
- 20 km of recreational trails;
- 11 tunnels covering approximately 1.8 km of freeway;
- New 4-lane service roads;
- Improvements to the movement of traffic to and from the border;
- Stormwater management ponds in selected locations;
- Noise mitigation measures;
- Full illumination along the freeway; and
- Conventional illumination along service roads, side roads, and sections of the trail system.

From the inspection plaza easterly approximately 1 km to where the freeway portion of The Windsor-Essex Parkway approaches E.C. Row Expressway approximately 0.3 km east of Matchette Road, the proposed freeway is above-grade on an earth embankment and situated south of the existing E.C. Row Expressway corridor.

From approximately 0.3 km east of Matchette Road to approximately 0.4 km west of Huron Church Road, the freeway portion of The Windsor-Essex Parkway and E.C. Row Expressway are integrated into a core-collector system. In this section, the eastbound and westbound lanes of E.C. Row Expressway diverge and the freeway portion of The Windsor-Essex Parkway is aligned between them.

From north of Bethlehem Avenue/Labelle Street to approximately 1.0 km east of Howard Avenue, the proposed freeway is below-grade, predominantly in open-cut with grass side slopes. Retaining walls, either partial-height or full-height, are required in localized areas where necessary.

Within this section, the location of the service road relative to the freeway varies. From north of Bethlehem Avenue/Labelle Street to east of Huron Church Line the proposed service road is adjacent to the proposed freeway on the east/north side. From east of Huron Church Line to approximately 0.7 km west of Howard Avenue, the proposed service road is situated on the south side of the proposed freeway. From 0.7 km west of Howard Avenue to approximately 0.3 km east of Howard Avenue, the proposed service road is once again located adjacent to the proposed freeway on the north side. East of this location, no service road is proposed.

From approximately 1.0 km east of Howard Avenue to North Talbot Road, The Windsor-Essex Parkway is predominantly at existing grade. There is no service road proposed through this section.

1.8.2 Plaza B1

On the Canadian side, plaza alternatives were developed considering the need to provide improved border processing facilities to meet future travel demand and security requirements at the border crossing. All plaza alternatives considered were much larger than the current plazas at the Ambassador Bridge and the Detroit-Windsor Tunnel. The new plaza, Plaza B1 will be designed to serve the future (2035) travel demands at the border crossing. The sizing of the plaza will be such that future expansion will be possible by way of constructing additional inspection booths or tolls.

Plaza B1 was developed in consultation with Canada Border Services Agency and provides sufficient areas for primary inspection lane booths and on-site secondary inspection of people and goods. The plaza alternative also allows for dedicated NEXUS and FAST lanes and provides for a substantial improvement of border crossing processing capabilities.

Canada Border Services Agency has reviewed and tested functional layouts of the plaza alternatives to confirm the suitability under future traffic conditions. Plaza B1 includes:

- Total plaza area of 137 acres (55 hectares);
- Total of 29 inbound inspection lanes;
- Total of 103 secondary inspection parking spaces for commercial vehicles;
- Nine toll collection lanes; and
- Stormwater management features to control quality and quantity of runoff water.

The final design of the plaza will incorporate a local access road along the edge of the plaza that will provide continuity for traffic between Sandwich Street and Broadway Street as well as access for plaza employees. Local access will also be provided at the north end of the plaza from a realigned Sandwich Street to the Brighton Beach Power Station and Keith Transformer Station.

1.8.3 Crossing X-10B

The new Detroit River crossing is being developed as a six-lane bridge providing three Canada-bound lanes and three US-bound lanes. The capacity of the new crossing, Crossing X-10B will accommodate future travel demand, both in terms of meeting capacity and providing flexibility to stream traffic on the crossing to improve border process (e.g. designated NEXUS/FAST lane).

The new river crossing will be constructed to link inspection plazas on the Canadian and US sides of the Detroit River, and will be a key component of the new end-to-end transportation system that will link existing Highway 401 to the US Interstate system. The crossing will consist of both a main bridge that will span the width of the Detroit River, and approaches to the main bridge constructed on piers that will connect to plazas in both Canada and the US. The main bridge and approaches will be constructed on the Crossing X-10B alignment.

Two bridge types are being considered for the new crossing: a cable-stayed bridge and a suspension bridge. Selection of the bridge type will be made by the Partnership during subsequent design phases of this project.

The reader is referred to Chapter 9 for further details with regard to on The Windsor-Essex Parkway, Plaza B1, and Crossing X-10B.

2 ENVIRONMENTAL ASSESSMENT PROCESS

This section provides an overview of the Environmental Assessment process that was carried out as part of the DRIC EA Study. The study followed the requirements of the *Ontario Environmental Assessment Act (OEAA)* under the Individual Environmental Assessment process, and the requirements of the Canadian Environmental Assessment Act under subsection 5(1)(a) of the Canadian Environmental Assessment Act. As such, both EA processes have been coordinated pursuant to the *Canada-Ontario Agreement on Environmental Assessment Cooperation* (the Agreement).

As DRIC is a bi-national study, the EA processes undertaken in Canada included coordination of the Canadian study with the studies undertaken by the Michigan Department of Transportation (MDOT) and the Federal Highway Administration (FHWA). In the United States, the umbrella environmental law is the *National Environmental Policy Act (NEPA)*. NEPA provides for a decision-making process relying on interdisciplinary analysis, and consultation and commenting by the public, stakeholders, and regulatory agencies.

2.2 The Ontario Environmental Assessment Act

The purpose of the *OEAA* is to help protect and conserve Ontario's environment by ensuring that projects subject to the Act follow a planning process leading to environmentally sound decision-making.

For projects subject to the EA Act, an environmental assessment involves identifying and planning for environmental issues and effects prior to implementing a project. The process allows reasonable opportunities for public involvement in the decision-making process of the project. An EA document is prepared by the proponent of the project and is subject to review by the public and government agencies..

The *Detroit River International Crossing Study* has followed the requirements of the *OEAA* under the Individual Environmental Assessment (Individual EA) process *(Section 6.1 (2) of the OEAA)*. In general terms, an environmental assessment is a study, which assesses the potential environmental effects and benefits of a project or undertaking on the environment. Key components of an EA include: consultation with members of the public, regulatory agencies, municipalities, and other stakeholders; First Nations engagement; the consideration of alternatives and their potential environmental effects; and the mitigation and management of environmental effects.

Under the Individual EA process, the first step in an application for approval to proceed with the planning of an Individual Environmental Assessment study under the *OEAA* is the submission of a *Terms of Reference (ToR)* for the Environmental Assessment (EA). A *ToR* sets out a framework that guides the preparation of the EA. The approval of the Terms of Reference is the first statutory decision made by the Minister of the Environment in the EA planning and approval process.

The *Detroit River International Crossing Study Environmental Assessment Terms of Reference (May 2004)* outlines the minimum considerations and study framework that were to be followed in completing this Environmental Assessment. This Terms of Reference document was approved by the Ontario Minister of the Environment on September 17, 2004.

This Individual EA study has been undertaken consistent with the requirements identified in *Section 6.1 (2)* of the *OEAA*. The study has addressed the following components:

- A description of the purpose of the undertaking;
- A description and statement of the rationale for the proposed undertaking, alternatives to the undertaking, and alternative methods for carrying out the undertaking;
- A description of:
  - The environment that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking, the alternatives to the undertaking, and the alternative methods of carrying out the undertaking;
  - The effects that will be caused or that might reasonably be expected to be caused to the environment, by the undertaking, the alternatives to the undertaking, and the alternative methods of carrying out the undertaking;
  - The actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment, by the undertaking, the alternatives to the undertaking, and the alternative methods of carrying out the undertaking;
  - An evaluation of the advantages and disadvantages to the environment of the undertaking, the alternatives to the undertaking and the alternative methods of carrying out the undertaking; and,
  - A description of the consultation undertaken by the proponent and the results of the consultation.

Other aspects of the environmental assessment process applicable to this project are described in the Ontario Environmental Assessment Act, which can be accessed at: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90e18_e.htm

2.3 The Canadian Environmental Assessment Act

The *Canadian Environmental Assessment Act (CEAA)* is the legal basis for the federal environmental assessment process. The *Act* sets out the responsibilities and procedures for carrying out the environmental assessments of projects that involve federal government decision-making.

The federal environmental assessment process is applied whenever a federal authority has a specified decision-making responsibility in relation to a project, also known as a "trigger" for an environmental assessment. Specifically, the *Act* is "triggered" when a federal authority:

- Proposes a project;
- Provides financial assistance to a proponent to enable a project to be carried out;
- Sells, leases, or otherwise transfers control or administration of federal land to enable a project to be carried out; or
- Provides a licence, permit or an approval that is listed in the *Law List Regulations* that enables a project to be carried out.

As a co-proponent of the Canadian portion of the project, Transport Canada has determined that an EA is required pursuant to subsection 5(1)(a) of the *CEAA*. In addition, the project will require an approval under the *Navigable Waters Protection Act*, which is administered by TC, and is identified in the *Law List Regulations* under CEAA. As such, TC has identified itself as a Responsible Authority (RA) for the assessment. Fisheries and Oceans Canada (DFO) is also a Responsible Authority, in relation to *Fisheries Act* authorizations that will be required for certain water crossings along the access road. The Windsor Port Authority (WPA) is a Prescribed Authority under the *Canada Port Authority Environmental Assessment Regulations,* in relation to federal water lots that will be crossed by the new international bridge. TC, DFO and the WPA coordinated their activities, to ensure that a single environmental assessment is conducted.

A number of federal authorities also identified themselves as having specialist or expert advice that may contribute to the conduct of the assessment, including: Environment Canada, Health Canada, Natural Resources Canada, Foreign Affairs Canada, the Canadian Transportation Agency and the Canada Border Services Agency. They participated as expert federal authorities in the EA process. Since the assessment is multi-jurisdictional, the Canadian Environmental Assessment Agency (the Agency) served as the Federal Environmental Assessment Coordinator (FEAC). Together, these departments comprise the federal review team.

The project is not described on the *Comprehensive Study List Regulation* of the Act, and at this time, the Responsible Authorities and Prescribed Authority are not aware of any issues associated with this project that would warrant a need to have it referred to a mediator or a review panel pursuant to section 25 of the Act. As such, section 18(1) of the Act requires that a screening level assessment of the project be carried out.

A screening is a systematic approach to identifying and documenting the environmental effects of a proposed project and determining the need to eliminate or minimize (mitigate) the adverse effects, to modify the project plan or to recommend further assessment through mediation or by a review panel.

As this project is also undergoing an Individual EA under the Ontario *Environmental Assessment Act*, this EA processes will be coordinated pursuant to the *Canada-Ontario Agreement on Environmental Assessment Cooperation*. Within this coordinated EA process, a separate federal screening report, based on the assessment documented in this report, was prepared to support federal decision-making.

2.4 Coordination of the Federal and Provincial Environmental Assessment Processes

As noted in Section 2.3, the federal and provincial EA processes were coordinated pursuant to the *Canada-Ontario Agreement on Environmental Assessment Cooperation* (the Agreement), which states that federal and provincial governments:

> "*will coordinate the environmental assessment processes whenever projects are subject to review by both jurisdictions … The agreement maintains the current level of environmental standards and the legislative and decision-making responsibilities of both governments. While projects requiring both provincial and federal environmental assessment approvals will still require separate approvals, decisions will be based on the same body of information and there will be an ability to make decisions concurrently*".

A Canadian Agencies Advisory Group (CANAAG) was established in 2005 to provide a forum for federal and provincial government agency representatives to receive regular project updates, and to exchange information on issues and concerns.

To further assist in coordination efforts, a Joint Assessment Committee (JAC) was established in early 2008, comprised of representatives from the Ontario Ministry of the Environment, MTO, the Agency, TC, DFO, and the WPA.

The goal of the coordinated process was to ensure that the study generated the type and quality of information required to satisfy both the *Canadian Environmental Assessment Act* and the *Ontario Environmental Assessment Act*; and provides findings on the environmental effects of the proposed project required for decision-making by the respective parties.

2.5 Coordination Between the Canada and United States DRIC Study Teams

As a bi-national study, the federal / provincial EA undertaken in Canada was also coordinated with studies in the United States, which were undertaken in order to grain approval through the *National Environmental Policy Act (NEPA)*. Although the documents and approval processes are different, the objectives and processes of *NEPA* are similar to that of *OEAA*. There is no *NEPA* document that is equivalent to the *OEA ToR*, however, the Purpose of the Undertaking discussion in an *OEA ToR* is comparable to the *Purpose and Need Statement* under *NEPA*.

A draft Purpose and Need Statement was prepared in parallel with the preparation of the *OEA ToR*. Consultation with relevant federal environmental and cooperating agencies on the draft Purpose and Need Statement took place during the preparation and review of the *OEA ToR*. Upon approval of the *OEA ToR* and the finalization of the *Purpose and Need Statement*, the Partnership coordinated efforts in conducting the Detroit River International Crossing study.

In addition, throughout the study process, the Partnership coordinated meetings between Canadian and United States federal and state/provincial agencies of common / shared interests so that, to the extent possible, a bi-national approach to identifying and addressing issues could be developed.

3 CONSULTATION

3.1 Consultation Overview

From the outset of the study, the study team realized that the Detroit River International Crossing project would have benefits and impacts on many stakeholders throughout the Windsor and Essex County area. Based on this realization, the team set out to develop a consultation framework which would include a wide variety of stakeholders and allow opportunities for meaningful two-way dialog throughout the project. To this end, the study team established the following consultation groups early in 2005:

- Municipal Advisory Group (MAG): Consisting of area municipalities and the County of Essex. As the study progressed, school boards were also invited to join the MAG.
- Canadian Agency Advisory Group (CANAAG): Consisting of agencies involved in the review and approval of the OEA and CEAA Report.
- Private Sector Advisory Group (PSAG): A bi-national consultation group. There were invitations sent to several business owners and associations in Canada and the US.
- Crossing Owners/Operators/Proponents (COOP): Consisting of owners and operators of current border crossings as well as private sector proponents of new or expanded crossings.
- Community Consultation Group (CCG): The study team solicited membership, from the public, with a wide variety of backgrounds and interest to join the CCG. Everyone who asked to be involved was included in the group. Participants volunteered their time to meet with the team on a regular basis, learn about the project, and share their ideas and interests.
- Consultation with the First Nations began at the study commencement in January, 2005. Several First Nations groups were initially consulted.

The above-noted groups were established early in 2005 and the team has met with each of them several times as detailed in the following sections. As the study evolved, the team has consulted with various other interests groups and stakeholders, including community groups, business owners, and individual property owners. Specifically, after the selection of the ACA (see Chapter 6), a School Advisory Group was formed to provide more direct consultation with local school councils. In addition to the above the team maintained extensive coordination and consultation with the US study team and relevant stakeholders. Specifically, Working Group and Steering Committee meetings were held at regular intervals throughout the 4-year period. Study team representatives reciprocated attendance at most public meetings held on the opposite side of the border.

In addition to the above, the study team has consulted with the general public throughout the course of the study. The main forum for public consultation has been Public Information Open Houses (PIOH) and follow up workshops, bus and boat tours, as well as several context sensitive solutions workshops and an initial public outreach meeting. Each meeting was extensively advertised and well attended, in some cases, by over 1,000 citizens. The PIOHs consisted of display boards and handout materials, as well as video animations of proposals and other relevant information. PIOHs and workshops were staffed by several technical representatives from the study team as appropriate. These included technical and environmental specialists (air, noise, natural, heritage, etc.), and the lead consultant, MTO (project management, environmental, and property specialists). At each public event comments were solicited and responded to. Throughout the course of the study the team has also met with various community groups, as appropriate, in order to further understand and respond to specific issues and concerns.

To further general public knowledge about the project, the study team also established a project website, which has been maintained throughout the course of the study (www.partnershipborderstudy.com). This website has provided up-to-date information on the study progress as well as draft reports as they have become available. A second project website (www.weparkway.ca) was added in the spring of 2008 to highlight the Technically and Environmentally Preferred Alternative for the access road portion of the study. The public has been further informed about the study through the local media. Study progress has been widely covered by the local newspaper, radio stations, and television stations.

As noted above, the Environmental Assessment Study for Detroit River International Crossing project has included extensive consultation with a wide variety of stakeholders. These consultation activities are depicted graphically as Exhibit 3.1. Table 3.1 summarizes the consultation activities in chronological order. Table 3.2 provides a listing of the consultation activities sorted by stakeholder. These tables highlight the fact that over 300 meetings have been held throughout the study. Consultation has occurred during every phase of the project with stakeholders, including:

- Municipalities
- Federal and Provincial Agencies
- Community Groups
- First Nations
- Business Owners
- Proponents of New River Crossing Initiatives
- The General Public
- Emergency Services
- Utility Companies

The consultation has been undertaken using many forums, including Public Information Open House (PIOH) workshops, meetings, and correspondence.

The information received through these consultation activities has been considered in the development, analysis and evaluation of alternatives. In some cases, the comments and/or desires of interested stakeholders were not supported by the study team's analysis and evaluation, in which case they are not reflected in the final outcomes. However, in many cases the comments reinforced the analysis/evaluation and/or caused the team to adjust its thinking regarding the balance of impacts and benefits of the undertaking. In this way, the consultation has influenced the outcome of the project in many significant ways. Several of these are summarized as follows:

- The Schwartz Report: Released by the City of Windsor in January 2005, this report outlined a vision for a new border crossing and plaza in the Brighton Beach area, and a controlled access facility connecting to Highway 401. The report discounted alternatives, such as use of EC Row Expressway, and the DRTP Corridor through the central parts of Windsor. The report considered access road alternatives in the Huron Church Road / Highway 3 corridor, the corridor which was ultimately selected by the study team as the preferred route for the access road.

- Rating Tool: Seven evaluation factors were developed in consultation with the public received during the P/NF study and from the Initial Public Outreach (IPO) meeting. Public input relative to the weighting of the factors was obtained through a rating tool distributed at the first round of PIOHs in June 2005. Rating tools were also available through the local Project Office and on the project website. Interested members of the public were asked to provide the study team with their opinion as to how highly (on a scale of 0 to 100) the study team should consider each of the factors in deciding on what alternatives to carry forward for additional study. These responses served to enhance the study team's appreciation of the communities concerns and values.
- Consultation with the Municipal Advisory Group: Among many useful contributions, the Municipal Advisory Group outlined a vision in terms of the role and function of the future service road. This had considerable influence on the development of the alignments of the service road, as well as the ramp locations.

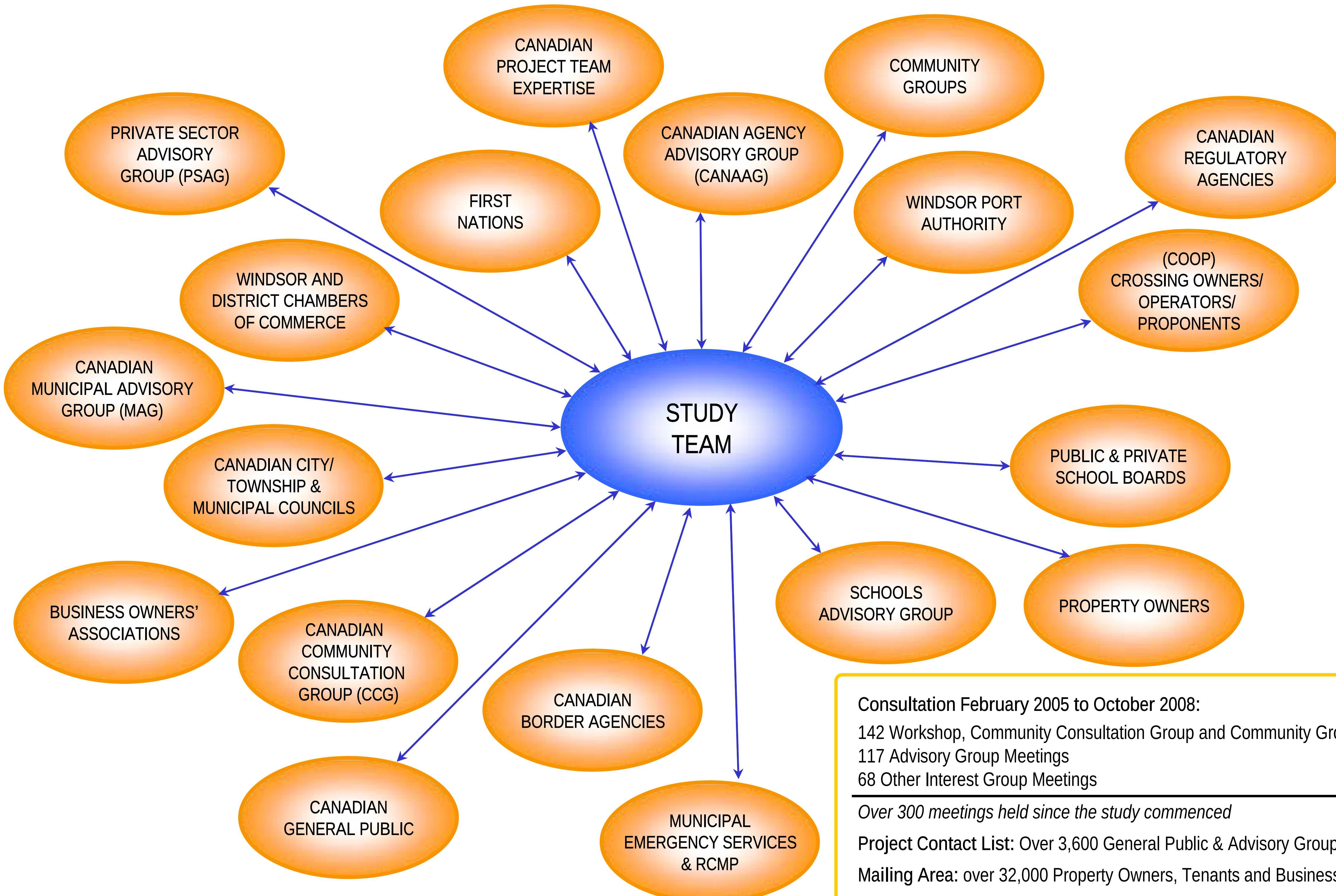
  The Municipal Advisory Group also outlined a vision for the Highway 3 interchange, which would help focus traffic away from the existing intersection of Howard Avenue / Highway 3 and more towards Highway 401, leading to and from the eastern parts of Windsor. These discussions had a direct bearing on the development of alternatives and the final selection of an interchange design at the Highway 3 / Highway 401 area.

  The Municipal Advisory Group also requested the study team to consider the use of roundabouts at one of more strategic locations in the corridor. This led directly to consideration of roundabouts and selection of a roundabout at the Highway 3 / Highway 401 interchange ramps.

  The Municipal Advisory Group also discussed the advisability of partial interchange ramps to and from Malden Road. These were included as part of the original concepts, however, subsequently determined as not being necessary. The absence of these ramps facilitated moving the alignment of the access road closer to EC Row and ultimately integrating it into the EC Row corridor so as to minimize impacts to the natural area and nearby communities.
- Consultations with the City of Windsor, Municipal Advisory Group, Community Consultation Group, the public and many stakeholders within the community influenced the decision to stop further work on "At Grade" alternatives part way through the analysis of practical options and to further develop "Below Grade" alternatives. These stakeholders also had a direct influence on the team's decision to develop a new alternative called The Parkway, a green transportation corridor which included a below-grade freeway, an end-to-end recreational trail system, and numerous tunnel sections along the Access Road corridor.
- Context Sensitive Solutions (CSS) Workshops: To follow up on PIOH's, the team convened CSS workshops in 2006 and 2007. Study team members participating in the meeting included PMA Landscape Architects. They worked with citizens to identify themes for buffer and landscaping. There was strong community interest in naturalized areas and ecological restoration, which has influenced the development of The Parkway alternative and mitigation treatments for the preferred alternative.
- Discussions with the Sandwich Community: Several discussions took place with representatives of the Sandwich community highlighting the historical importance of old Sandwich Towne. The historic nature and sensitivities of this community were considered throughout the analysis of practical alternatives for the plaza and bridge crossing. Ultimately a location removed from the main part of Sandwich Towne was selected as the preferred alternative.
- Spring Garden Community Meetings: Meetings held with the Spring Garden community in 2008 indicated dissatisfaction with The Windsor-Essex Parkway alignment as it had been recommended in May 2008. This input prompted the team to develop a refined alignment, which integrates The Windsor-Essex Parkway into the E.C. Row Expressway corridor. This refinement has met with a level of acceptance by the community and the City of Windsor.
- Consultation with Oliver Estates Community: The August 2007 Parkway alternative originally envisioned a tunnel section at Howard Avenue. Subsequent discussion with the community indicated that the tunnel would have more benefit if shifted further westerly. As a direct result of this consultation the tunnel design was revised at this particular location.
- Consultation with Residents in the areas of Kendleton Court, Sansotta Court, and other specific areas: These discussions have resulted in the team considering a wider buffer area and additional right-of-way.
- Consultation with Residents on Huron Church Line: Consultation with residents on Huron Church Line near the Highway 3 intersection has resulted in refinements to the alignment proposed for Huron Church Line and development of a short cul-de-sac to provide access to these residents.
- Consultation with Emergency Service Departments: Consultation with Windsor and LaSalle Fire Departments has led directly to development of the interchange design at Todd Lane / Cabana Road.

The following sections summarize consultations with many of the public, and key stakeholders, which are illustrated in **Exhibit 3.1**.

EXHIBIT 3.1 – STUDY STAKEHOLDERS



Consultation February 2005 to October 2008:

142 Workshop, Community Consultation Group and Community Group Meetings
117 Advisory Group Meetings
68 Other Interest Group Meetings

Over 300 meetings held since the study commenced

Project Contact List: Over 3,600 General Public & Advisory Group Addresses

Mailing Area: over 32,000 Property Owners, Tenants and Businesses

Table 3.1 – Consultation Meetings By Date

#	Meeting	Date
1	Meeting with Town of LaSalle	22-Feb-05
2	Meeting with City of Windsor	24-Feb-05
3	Meeting with County of Essex	24-Feb-05
6	CBSA Meeting	17-Mar-05
7	Windsor City Council	21-Mar-05
8	LaSalle Town Council	22-Mar-05
9	PSAG Meeting	23-Mar-05
5	COOP Meetings (individual by organization)	22 & 23-Mar-05
10	MAG Meeting	29-Mar-05
11	CANAAG Meeting	31-Mar-05
12	CBSA Meeting	31-Mar-05
22	Initial Public Outreach Meeting	5 & 6-Apr-05
13	COOP Meetings (DRTP)	8-Apr-05
14	Binational Border Agencies Meeting	21-Apr-05
15	COOP Meetings (AMB)	28-Apr-05
16	First Nations (Oneida)	4-May-05
17	Community Consultation Group Meeting #1	11-May-05
19	US Border Agencies Meeting	12-May-05
20	CBSA Meeting	18-May-05
21	MNR Meeting	18-May-05
	WWCTWC	26-May-05
23	PSAG Meeting (CAPC)	2-Jun-05
24	Community Consultation Group Meeting #2	9-Jun-05
27	NBEST Meeting	14-Jun-05
28	Essex County Council	20-Jun-05
29	Windsor City Council	20-Jun-05
32	MAG Meeting	21-Jun-05
33	CANAAG Meeting	22-Jun-05
34	PSAG Meeting	23-Jun-05
35	First Nations (WIFN)	27-Jun-05
31	US Public Meeting	27-Jun-05
36	COOP Meeting	28-Jun-05
30	Public Information Open House (PIOH) 1	21, 27 & 28-Jun-05
38	BASF Corporation Meeting	12-Jul-05
39	Community Consultation Group Meeting #3	13-Jul-05
40	MAG Meeting	14-Jul-05
41	PIOH1 Workshop	14 & 20-Jul-05
42	MAG Meeting (Windsor Peer Review Team)	29-Jul-05
43	MAG Meeting (Tecumseh)	17-Aug-05
44	MAG Meeting (Windsor)	23-Aug-05
45	US Scoping Meeting	31-Aug-05
46	Community Consultation Group Meeting #4 - Joint with LAC	28-Sep-05
47	CBSA Meeting	19-Oct-05
48	Community Consultation Group Meeting #5	25-Oct-05
49	US LAC Meeting	26-Oct-05
50	PSAG Meeting (CAPC)	17-Nov-05
53	Essex County Council	28-Nov-05
54	Windsor City Council	28-Nov-05
55	US LAC Meeting	28-Nov-05
57	MAG Meeting	29-Nov-05
58	Sandwich Development Task Force Meeting	30-Nov-05
59	CANAAG Meeting	1-Dec-05
56	Public Information Open House (PIOH) 2	29 & 30-Nov-05 and 01-Dec-05
60	Windsor Port Authority Meeting	2-Dec-05
61	COOP Meeting	6-Dec-05
62	PSAG Meeting	7-Dec-05
63	US Public Meeting	8-Dec-05
64	Greater Essex County School Board Meeting	14-Dec-05
66	Essex Aggregates Meeting	15-Dec-05
67	Essex Terminal Railway Meeting	15-Dec-05
68	Lou Romano Water Reclamation Plant Meeting	15-Dec-05
69	Van De Hogen Meeting	15-Dec-05
70	Windsor Salt Meeting	15-Dec-05
65	Sandwich Community Heritage Group Meeting	15-Dec-05
71	Brighton Beach Power Meeting	16-Dec-05
72	Hydro One Meeting	16-Dec-05
73	U.S. Border Agencies Meeting	19-Dec-05
74	US Workshop Meeting	21-Dec-05
75	US Workshop Meeting	4-Jan-06
76	Sandwich Community Task Force Meeting	10-Jan-06
78	CBSA Meeting (+ tour)	11-Jan-06
77	Community Consultation Group Meeting #6	11-Jan-06
79	Huron Church Business Owners Meeting	12-Jan-06
80	Windsor Ward 1&2 Councilors' Meeting	18-Jan-06
81	US Workshop Meeting	18-Jan-06
82	MAG Meeting	19-Jan-06
83	First Nations (WIFN)	20-Jan-06
84	PIOH2 Workshop (Plazas)	25-Jan-06
85	Windsor City Councilor Meeting	26-Jan-06
86	PIOH 2 Workshop (Routes)	26-Jan-06
87	Public Question & Answer Session	1-Feb-06
89	MAG Meeting	7-Feb-06
88	PIOH 2 Workshop (Routes Revised)	7-Feb-06
91	Municipal Emergency Services Meeting	8-Feb-06
90	Community Consultation Group Meeting #7	8-Feb-06
92	PIOH 2 Workshop (Plazas and Crossing)	9-Feb-06
93	Windsor & District Chamber of Commerce Meeting	15-Feb-06
94	Protect Windsor Meeting	15-Feb-06
95	Coco Corporation Meeting	16-Feb-06
96	Royal Canadian Legion Br. #594 Meeting	16-Feb-06
97	Public Meeting (Talbot Road/Huron Church)	21-Feb-06
98	First Nations (WIFN)	28-Feb-06
99	Port Authority & Sterling Fuels Meeting	1-Mar-06
100	Community Consultation Group Meeting #8 - Joint with LAC	22-Mar-06
102	CBSA Meeting	23-Mar-06
103	Briefing of Mayors & Warden	27-Mar-06
104	PSAG Meeting	28-Mar-06
107	CANAAG Meeting	29-Mar-06
106	MAG Meeting (Windsor Peer Review Team)	29-Mar-06
105	Public Information Open House (PIOH) 3	28 & 30-Mar-06
108	Presentation to WIFN Council	3-Apr-06
196	Presentation to Windsor Essex County Environmental Committee	3-Apr-06
109	Tour of Sandwich with Detroit City Council	5-Apr-06
110	PSAG Meeting	6-Apr-06
111	Oakwood Parent's Council	10-Apr-06
112	MAG Meeting	11-Apr-06
113	PIOH2 Workshop	11-Apr-06
114	RCMP/EMO/OPP/CBSA/Mun. Emergency Services Meeting	12-Apr-06
115	PIOH2 Workshop	12-Apr-06
116	Talbot Road Residents	18-Apr-06
117	MAG Meeting	26-Apr-06
118	School Board Meeting	26-Apr-06
119	Community Consultation Group Meeting #9	27-Apr-06
121	Armanda Street Residents	10-May-06
120	MDOT Tour for JIBA	10-May-06
122	MAG Meeting	24-May-06
123	Windsor & District Chamber of Commerce Meeting	29-May-06
124	School Council Meeting	30-May-06
125	US CSS Bus Tour	8-Jun-06
126	Sandwich Towne Community Task Force Tour of Delray	14-Jun-06
127	St. Clair College Meeting	21-Jun-06
128	Heritage Park Alliance Church Meeting	21-Jun-06
129	PIOH3 Workshops	23-Jun-06
130	PIOH3 Workshops	24-Jun-06
132	Community Consultation Group Meeting #10	26-Jun-06
131	Canadian CSS Bus Tour	26-Jun-06
139	Presentation to Windsor-Essex County District School Board of Trustees	8-Jul-06
133	Meeting with RCMP/NRCAN	10-Jul-06
134	Meeting with LaSalle Councillors (not formal council meeting)	11-Jul-06
135	Huron Church Business Owners Association Meeting	26-Jul-06
136	Meeting with City of Windsor Representatives	26-Jul-06
137	Meeting with Vidican Engineering	27-Jul-06
138	Meeting with Ministry of Tourism	3-Aug-06
140	Presentation to DaimlerChrysler	15-Aug-06
141	US CSS Workshops	24-Aug-06
142	Drilling Information Session with STCTF	31-Aug-06
143	MAG Meeting	5-Sep-06
144	Community Consultation Group Meeting #11	6-Sep-06
146	Meeting with Valente Real Estate	7-Sep-06
147	Bi-National Coast Guard Meeting	13-Sep-06
148	Schools Advisory Group (SAG) Meeting	19-Sep-06
149	Canadian CSS Workshops	2 & 3-Oct-06
150	Social Impact Assessment Workshop	21-Oct-06
151	Community Consultation Group Meeting #12	26-Oct-06
152	CSS Workshop (Detroit)	3-Nov-06
153	CBSA Meeting	7-Nov-06
154	First Nations (WIFN)	9-Nov-06

#	MEETING	DATE
155	Presentation to Bellewood School	14-Nov-06
156	CSS Workshop (Windsor)	15-Nov-06
157	Presentation to Windsor Essex County Environmental Committee	23-Nov-06
158	MAG Meeting	29-Nov-06
159	Community Consultation Group Meeting #13 – Joint w/US LAC	29-Nov-06
160	Meeting with Councilor Halberstadt	4-Dec-06
164	Schools Advisory Group (SAG) Meeting	5-Dec-06
161	Meeting with Dainty Foods	5-Dec-06
162	Meeting with Citizens Protecting Ojibway Wilderness	5-Dec-06
166	CANAAG Meeting	6-Dec-06
165	Mayor Briefing (PIOH #4)	6-Dec-06
167	Public Information Open House (PIOH) 4	06 & 07-Dec-06
168	PSAG Meeting	8-Dec-06
169	Meeting with City of Windsor Staff	13-Dec-06
170	Teleconference with Coast Guard	8-Jan-07
171	PIOH #4 Workshop	9-Jan-07
172	Windsor Port Authority Meeting	10-Jan-07
173	PIOH #4 Workshop	10-Jan-07
174	Meeting with Windsor Port Authority & Sterling Fuels	19-Jan-07
175	CBSA Meeting	23-Jan-07
176	Sandwich Towne Community Meeting	25-Jan-07
177	Social Impact Assessment Workshop	26-Jan-07
178	Social Impact Assessment Workshop	27-Jan-07
179	Meeting with Essex Region Conservation Authority	30-Jan-07
180	Meeting with Southwest Sales	30-Jan-07
181	Meeting with Royal Canadian Legion Br. 594	31-Jan-07
182	Meeting with LaSalle Utilities	31-Jan-07
183	Meeting with DFO	15-Feb-07
185	Community Consultation Group Meeting #14	21-Feb-07
184	Tour of ACA with Mike Weis, University of Windsor	21-Feb-07
186	First Nations (WIFN)	23-Feb-07
187	Municipal Emergency Services Meeting	27-Feb-07
188	Recreational Boaters Meeting	28-Feb-07
189	Schools Advisory Group (SAG) Meeting	1-Mar-07
190	Assumption Town Hall Meeting	3-Mar-07
191	Meeting with Ontario Ministry of the Environment (Noise)	6-Mar-07
192	Meeting with RCMP/NRCAN	9-Mar-07

#	MEETING	DATE
193	Meeting with Sterling Fuels	9-Mar-07
194	Heritage Park Alliance Church Meeting	16-Mar-07
195	Natural Science Agencies' Meeting	27-Mar-07
197	Meeting with Canadian Great Lakes Pilots Association	4-Apr-07
198	Presentation to US Coast Guard Working Group	10-Apr-07
199	Meeting with Canadian Shipowners Association	10-May-07
200	PSAG Meeting (CAPC)	10-May-07
202	Meeting with Windsor Crossing Premium Outlets	15-May-07
201	Meeting with Town of LaSalle re: HPAC	15-May-07
203	Meeting with City of Windsor	18-May-07
204	Meeting with City of Windsor	24-May-07
205	Meeting with Windsor Crossing Premium Outlets	28-May-07
207	Presentation to Heritage Park Alliance Church	30-May-07
206	Meeting with Town of Tecumseh	30-May-07
208	Meeting with Town of LaSalle and County of Essex	31-May-07
209	Meeting with City of Windsor	4-Jun-07
210	Presentation to County of Essex Council	6-Jun-07
211	Meeting with City of Windsor	8-Jun-07
213	Detroit River Canadian Cleanup	26-Jun-07
214	Elected Officials Briefing	14-Aug-07
215	Media Briefing	14-Aug-07
217	PSAG Meeting	15-Aug-07
216	Public Information Open House (PIOH) 5	14 & 15-Aug-07
219	Community Consultation Group Meeting #15	21-Aug-07
220	PIOH 5 Workshop Session	22-Aug-07
218	MAG Meeting	23-Aug-07
221	PIOH5 Workshop Session	23-Aug-07
222	Presentation to International Joint Commission (IJC)	27-Aug-07
223	Presentation to Tecumseh Council	28-Aug-07
224	Presentation to LaSalle Council	12-Sep-07
225	CANAAG Meeting	13-Sep-07
226	Meeting with ERCA & MNR	19-Sep-07
227	Meeting with Representatives of Affected Municipalities	20-Sep-07
228	Municipal Emergency Services Meeting	4-Oct-07
229	Meeting with City of Windsor	26-Oct-07
230	Meeting with DFO	2-Nov-07
231	Meeting with City of Windsor	14-Nov-07
232	Meeting with Windsor Crossing	19-Nov-07

#	MEETING	DATE
233	Presentation to CSCE	21-Nov-07
234	Meeting with Trillium Court	28-Nov-07
235	MAG Meeting	11-Dec-07
236	First Nations (WIFN)	13-Dec-07
238	First Nations (WIFN)	11-Jan-08
239	Meeting with Ministry of the Environment (MOE)	29-Jan-08
240	First Nations (WIFN) Council Meeting	4-Feb-08
241	Meeting with Oliver Estates	19-Feb-08
242	First Nations (WIFN) PIOH	26-Feb-08
243	Community Consultation Group Meeting #16 - invited to LAC	27-Feb-08
244	PSAG Meeting	19-Mar-08
245	Meeting with DFO	26-Mar-08
246	PSAG Meeting (CAPC)	2-Apr-08
247	MNR/ERCA Meeting	21-Apr-08
248	Essex County Medical Society	6-May-08
249	Meeting with Windsor Crossing Premium Outlets	9-May-08
250	CBSA Meeting	14-May-08
251	MAG Meeting	15-May-08
252	Community Consultation Group Meeting #17	21-May-08
253	Schools Advisory Group (SAG) Meeting	22-May-08
254	Windsor City Council	26-May-08
256	Presentation to Tecumseh Council	27-May-08
258	Presentation to Essex Council	4-Jun-08
259	Presentation to LaSalle Council	10-Jun-08
260	Public Information Open House (PIOH) 6	18 & 19-Jun-08
262	Meeting with Nemak	24-Jun-08
263	CANAAG Meeting	25-Jun-08
264	First Nations (WIFN) Meeting	25-Jun-08
261	PIOH6 Workshops	24 & 25-Jun-08
265	Hydro One Meeting	11-Jul-08
267	Meeting with Spring Garden/Bethlehem Residents	15-Jul-08
266	Meeting with City of Windsor	15-Jul-08
268	CANAAG Agency Meeting	16-Jul-08
269	Municipal Emergency Services Meeting	16-Jul-08
271	Community Consultation Group Meeting #18	16-Jul-08
272	CANAAG Meeting	22-Jul-08
273	Meeting with Windsor Essex County Environmental Committee	23-Jul-08

#	MEETING	DATE
275	CANAAG Agency Meeting	24-Jul-08
274	Context Sensitive Solutions (CSS) Workshops	23 & 24-Jul-08
276	Meeting with Mr. Lalonde & Neighbours	29-Jul-08
277	West Windsor Power Meeting	30-Jul-08
278	Brighton Beach Power Meeting	30-Jul-08
279	WECEC Bus Tour	6-Aug-08
280	Meeting with Southwest Sales	6-Aug-08
281	Presentation at NATPO Conference	11-Aug-08
282	First Nations (WIFN) Council Meeting	12-Aug-08
283	Meeting with PB/City of Windsor	19-Aug-08
284	Bell Utility Relocation Meeting	20-Aug-08
285	Meeting with Huron Church Line Residents	28-Aug-08
286	Union Gas Utilities Meeting	29-Aug-08
288	MNR Meeting	3-Sep-08
289	Meeting with Dainty Foods	3-Sep-08
287	Tecumseh Utilities Meeting	3-Sep-08
290	Trillium Court Meeting	9-Sep-08
291	Meeting with Essex Power Lines	18-Sep-08
292	Meeting with Cogeco Cable	18-Sep-08
293	MNR Meeting	22-Sep-08
294	DFO Meeting & Tour	23-Sep-08
295	Southwestern Sales Meeting	25-Sep-08
296	River Park Board Meeting	30-Sep-08
298	WECEC Meeting	2-Oct-08
297	Meeting with ERCA	2-Oct-08
299	Meeting with LaSalle Planning Department	3-Oct-08
300	Presentation to CAW Retirees	9-Oct-08
301	Meeting with Montessori School	15-Oct-08
302	Meeting with Spring Garden Residents	15-Oct-08
303	Presentation to LaSalle Business Association	5-Nov-08
305	Meeting with Kendleton Court Residents	6-Nov-08
307	Meeting with Sansotta Residents	7-Nov-08
308	Meeting with Trillium Court Residents	10-Nov-08
310	Public Information Open House (PIOH) 7	24 & 25-Nov-08

Table 3.2 – Consultation Meetings By Category

Meeting	Date
Advisory Group 1	
WECEC Bus Tour	6-Aug-08
WECEC Meeting	2-Oct-08
MAG Meeting	29-Mar-05
MAG Meeting	21-Jun-05
MAG Meeting	14-Jul-05
MAG Meeting	29-Nov-05
MAG Meeting	19-Jan-06
MAG Meeting	7-Feb-06
MAG Meeting	11-Apr-06
MAG Meeting	26-Apr-06
MAG Meeting	24-May-06
MAG Meeting	5-Sep-06
MAG Meeting	29-Nov-06
MAG Meeting	23-Aug-07
MAG Meeting	11-Dec-07
MAG Meeting	15-May-08
Advisory Group 2	
CANAAG Meeting	31-Mar-05
CANAAG Meeting	22-Jun-05
CANAAG Meeting	1-Dec-05
CANAAG Meeting	29-Mar-06
CANAAG Meeting	6-Dec-06
CANAAG Meeting	13-Sep-07
CANAAG Meeting	25-Jun-08
CANAAG Agency Meeting	16-Jul-08
CANAAG Meeting	22-Jul-08
CANAAG Agency Meeting	24-Jul-08
Advisory Group 3	
PSAG Meeting	23-Mar-05
PSAG Meeting	23-Jun-05
PSAG Meeting (CAPC)	17-Nov-05
PSAG Meeting	7-Dec-05
PSAG Meeting	28-Mar-06
PSAG Meeting	6-Apr-06
PSAG Meeting	8-Dec-06
PSAG Meeting	15-Aug-07
PSAG Meeting	19-Mar-08
PSAG Meeting (CAPC)	2-Apr-08
Advisory Group 4	
COOP Meetings (individual by organization)	22 & 23-Mar-05
COOP Meeting	6-Dec-05
Advisory Group 5	
Municipal Emergency Services Meeting	8-Feb-06
RCMP/EMO/OPP/CBSA/Mun. Emergency Services Meeting	12-Apr-06
Municipal Emergency Services Meeting	27-Feb-07
Municipal Emergency Services Meeting	4-Oct-07
Municipal Emergency Services Meeting	16-Jul-08
Advisory Group 6	
School Board Meeting	26-Apr-06
Greater Essex County School Board Meeting	14-Dec-05
School Council Meeting	30-May-06
Presentation to Windsor-Essex County District School Board of Trustees	8-Jul-06
Schools Advisory Group (SAG) Meeting	19-Sep-06
Schools Advisory Group (SAG) Meeting	5-Dec-06
Schools Advisory Group (SAG) Meeting	1-Mar-07
Schools Advisory Group (SAG) Meeting	22-May-08
Advisory Group 7	
CBSA Meeting	17-Mar-05
CBSA Meeting	31-Mar-05
CBSA Meeting	18-May-05
CBSA Meeting	19-Oct-05
CBSA Meeting (+ tour)	11-Jan-06
CBSA Meeting	23-Mar-06
CBSA Meeting	7-Nov-06
CBSA Meeting	23-Jan-07
CBSA Meeting	14-May-08
Advisory Group 8	
Meeting with RCMP/NRCAN	10-Jul-06
Meeting with RCMP/NRCAN	9-Mar-07
Advisory Group 9	
Meeting with Ministry of Tourism	3-Aug-06
Advisory Group 10	
MNR Meeting	18-May-05
Meeting with Ontario Ministry of the Environment (Noise)	6-Mar-07
Presentation to International Joint Commission (IJC)	27-Aug-07
Meeting with DFO	26-Mar-08
MNR/ERCA Meeting	21-Apr-08
MNR Meeting	3-Sep-08
MNR Meeting	22-Sep-08
DFO Meeting & Tour	23-Sep-08
Meeting with ERCA	2-Oct-08
Meeting with Essex Region Conservation Authority	30-Jan-07
Meeting with DFO	15-Feb-07
Natural Science Agencies' Meeting	27-Mar-07
Detroit River Canadian Cleanup	26-Jun-07
Meeting with ERCA & MNR	19-Sep-07
Meeting with DFO	2-Nov-07
Meeting with Ministry of the Environment (MOE)	29-Jan-08
Advisory Group 11	
Bi-National Coast Guard Meeting	13-Sep-06
Teleconference with Coast Guard	8-Jan-07
Meeting with Canadian Great Lakes Pilots Association	4-Apr-07
Presentation to US Coast Guard Working Group	10-Apr-07
Meeting with Canadian Shipowners Association	10-May-07
Business Owner	
PSAG Meeting (CAPC)	2-Jun-05
Windsor Port Authority Meeting	2-Dec-05
Essex Aggregates Meeting	15-Dec-05
Essex Terminal Railway Meeting	15-Dec-05
Lou Romano Water Reclamation Plant Meeting	15-Dec-05
Van De Hogen Meeting	15-Dec-05
Windsor Salt Meeting	15-Dec-05
Brighton Beach Power Meeting	16-Dec-05
Hydro One Meeting	16-Dec-05
Coco Corporation Meeting	16-Feb-06
Royal Canadian Legion Br. #594 Meeting	16-Feb-06
Port Authority & Sterling Fuels Meeting	1-Mar-06
St. Clair College Meeting	21-Jun-06
Heritage Park Alliance Church Meeting	21-Jun-06
Huron Church Business Owners Association Meeting	26-Jul-06
Meeting with Vidican Engineering	27-Jul-06
Presentation to DaimlerChrysler	15-Aug-06
Meeting with Valente Real Estate	7-Sep-06
Meeting with Dainty Foods	5-Dec-06
Windsor Port Authority Meeting	10-Jan-07
Meeting with Windsor Port Authority & Sterling Fuels	19-Jan-07
Meeting with Southwest Sales	30-Jan-07
Meeting with Royal Canadian Legion Br. 594	31-Jan-07
Meeting with Sterling Fuels	9-Mar-07
Heritage Park Alliance Church Meeting	16-Mar-07
PSAG Meeting (CAPC)	10-May-07
Meeting with Windsor Crossing Premium Outlets	15-May-07
Meeting with Windsor Crossing Premium Outlets	28-May-07
Presentation to Heritage Park Alliance Church	30-May-07
Meeting with Trillium Court	28-Nov-07
Meeting with Windsor Crossing Premium Outlets	9-May-08
Meeting with Nemak	24-Jun-08
West Windsor Power Meeting	30-Jul-08
Brighton Beach Power Meeting	30-Jul-08
Meeting with Southwest Sales	6-Aug-08
Meeting with Dainty Foods	3-Sep-08
Trillium Court Meeting	9-Sep-08
Southwestern Sales Meeting	25-Sep-08
Meeting with Montessori School	15-Oct-08
CCG	

MEETING	DATE
Community Consultation Group Meeting #1	11-May-05
Community Consultation Group Meeting #2	9-Jun-05
Community Consultation Group Meeting #3	13-Jul-05
Community Consultation Group Meeting #4 - Joint with LAC	28-Sep-05
Community Consultation Group Meeting #5	25-Oct-05
Community Consultation Group Meeting #6	11-Jan-06
Community Consultation Group Meeting #7	8-Feb-06
Community Consultation Group Meeting #8 - Joint with LAC	22-Mar-06
Community Consultation Group Meeting #9	27-Apr-06
Community Consultation Group Meeting #10	26-Jun-06
Community Consultation Group Meeting #11	6-Sep-06
Community Consultation Group Meeting #12	26-Oct-06
Community Consultation Group Meeting #13 – Joint w/US LAC	29-Nov-06
Community Consultation Group Meeting #14	21-Feb-07
Community Consultation Group Meeting #15	21-Aug-07
Community Consultation Group Meeting #16 - invited to LAC	27-Feb-08
Community Consultation Group Meeting #17	21-May-08
Community Consultation Group Meeting #18	16-Jul-08
Community Meetings	
Sandwich Community Heritage Group Meeting	15-Dec-05
Sandwich Community Task Force Meeting	10-Jan-06
Huron Church Business Owners Meeting	12-Jan-06
Sandwich Towne Community Task Force Tour of Delray	14-Jun-06
Sandwich Towne Community Meeting	25-Jan-07
Assumption Town Hall Meeting	3-Mar-07
Meeting with Oliver Estates	19-Feb-08
Meeting with Spring Garden/Bethlehem Residents	15-Jul-08
Meeting with Mr. Lalonde & Neighbours	29-Jul-08
Oakwood Parent's Council	10-Apr-06
Talbot Road Residents	18-Apr-06
Armanda Street Residents	10-May-06

MEETING	DATE
Presentation to Bellewood School	14-Nov-06
Meeting with Huron Church Line Residents	28-Aug-08
River Park Board Meeting	30-Sep-08
Meeting with Spring Garden Residents	15-Oct-08
Meeting with Kendleton Court Residents	6-Nov-08
Meeting with Sansotta Residents	7-Nov-08
Meeting with Trillium Court Residents	10-Nov-08
Council	
Windsor City Council	21-Mar-05
LaSalle Town Council	22-Mar-05
Essex County Council	20-Jun-05
Windsor City Council	20-Jun-05
Essex County Council	28-Nov-05
Windsor City Council	28-Nov-05
Windsor Ward 1&2 Councilors' Meeting	18-Jan-06
Windsor City Councilor Meeting	26-Jan-06
Briefing of Mayors & Warden	27-Mar-06
Meeting with LaSalle Councillors (not formal council meeting)	11-Jul-06
Meeting with Councilor Halberstadt	4-Dec-06
Mayor Briefing (PIOH #4)	6-Dec-06
Presentation to County of Essex Council	6-Jun-07
Elected Officials Briefing	14-Aug-07
Presentation to Tecumseh Council	28-Aug-07
Presentation to LaSalle Council	12-Sep-07
Windsor City Council	26-May-08
Presentation to Tecumseh Council	27-May-08
Presentation to Essex Council	4-Jun-08
Presentation to LaSalle Council	10-Jun-08
First Nations	
First Nations (Oneida)	4-May-05
First Nations (WIFN)	27-Jun-05
First Nations (WIFN)	20-Jan-06
First Nations (WIFN)	28-Feb-06
Presentation to WIFN Council	3-Apr-06
First Nations (WIFN)	9-Nov-06

MEETING	DATE
First Nations (WIFN)	23-Feb-07
First Nations (WIFN)	13-Dec-07
First Nations (WIFN)	11-Jan-08
First Nations (WIFN) Council Meeting	4-Feb-08
First Nations (WIFN) PIOH	26-Feb-08
First Nations (WIFN) Meeting	25-Jun-08
First Nations (WIFN) Council Meeting	12-Aug-08
Interest Group	
WWCTWC	26-May-05
MAG	
Meeting with Representatives of Affected Municipalities	20-Sep-07
Media	
Media Briefing	14-Aug-07
Municipality	
Meeting with Town of LaSalle	22-Feb-05
Meeting with City of Windsor	24-Feb-05
Meeting with County of Essex	24-Feb-05
MAG Meeting (Windsor Peer Review Team)	29-Jul-05
MAG Meeting (Tecumseh)	17-Aug-05
MAG Meeting (Windsor)	23-Aug-05
MAG Meeting (Windsor Peer Review Team)	29-Mar-06
Presentation to Windsor Essex County Environmental Committee	3-Apr-06
Meeting with City of Windsor Representatives	26-Jul-06
Meeting with City of Windsor Staff	13-Dec-06
Meeting with LaSalle Utilities	31-Jan-07
Meeting with Town of LaSalle re: HPAC	15-May-07
Meeting with City of Windsor	18-May-07
Meeting with City of Windsor	24-May-07
Meeting with Town of Tecumseh	30-May-07
Meeting with Town of LaSalle and County of Essex	31-May-07
Meeting with City of Windsor	4-Jun-07
Meeting with City of Windsor	8-Jun-07
Meeting with City of Windsor	26-Oct-07
Meeting with City of Windsor	14-Nov-07

MEETING	DATE
Meeting with City of Windsor	15-Jul-08
Meeting with PB/City of Windsor	19-Aug-08
Meeting with LaSalle Planning Department	3-Oct-08
Other Interest Groups	
Meeting with Citizens Protecting Ojibway Wilderness	5-Dec-06
Other Study Area/Interest Group	
Binational Border Agencies Meeting	21-Apr-05
US Border Agencies Meeting	12-May-05
NBEST Meeting	14-Jun-05
US Border Agencies Meeting	19-Dec-05
US Workshop Meeting	21-Dec-05
US Workshop Meeting	4-Jan-06
Windsor & District Chamber of Commerce Meeting	15-Feb-06
Windsor & District Chamber of Commerce Meeting	29-May-06
Meeting with Windsor Crossing	19-Nov-07
Presentation to CSCE	21-Nov-07
Essex County Medical Society	6-May-08
Meeting with Windsor Essex County Environmental Committee	23-Jul-08
Presentation at NATPO Conference	11-Aug-08
Presentation to CAW Retirees	9-Oct-08
Presentation to LaSalle Business Association	5-Nov-08
BASF Corporation Meeting	12-Jul-05
Other/Interest Group	
Tour of ACA with Mike Weis, University of Windsor	21-Feb-07
Recreational Boaters Meeting	28-Feb-07
PIOHs, Workshops & Public Community Meetings	
PIOH1 Workshop	14 & 20-Jul-05
Public Information Open House (PIOH) 7	24 & 25-Nov-08
Initial Public Outreach Meeting	5 & 6-Apr-05
Public Information Open House (PIOH) 1	21, 27 & 28-

MEETING	DATE
	Jun-05
Sandwich Development Task Force Meeting	30-Nov-05
PIOH2 Workshop (Plazas)	25-Jan-06
PIOH 2 Workshop (Routes)	26-Jan-06
Public Question & Answer Session	1-Feb-06
PIOH 2 Workshop (Routes Revised)	7-Feb-06
PIOH 2 Workshop (Plazas and Crossing)	9-Feb-06
Public Meeting (Talbot Road/Huron Church)	21-Feb-06
Public Information Open House (PIOH) 3	28 & 30-Mar-06
PIOH2 Workshop	11-Apr-06
PIOH2 Workshop	12-Apr-06
PIOH3 Workshops	23-Jun-06
PIOH3 Workshops	24-Jun-06
Canadian CSS Bus Tour	26-Jun-06
Canadian CSS Workshops	2 & 3-Oct-06
Social Impact Assessment Workshop	21-Oct-06
CSS Workshop (Windsor)	15-Nov-06
Public Information Open House (PIOH) 4	06 & 07-Dec-06
PIOH 4 Workshop	9-Jan-07
PIOH 4 Workshop	10-Jan-07
Social Impact Assessment Workshop	26-Jan-07
Social Impact Assessment Workshop	27-Jan-07
Public Information Open House (PIOH) 5	14 & 15-Aug-07
PIOH 5 Workshop Session	22-Aug-07
PIOH5 Workshop Session	23-Aug-07
Public Information Open House (PIOH) 6	18 & 19-Jun-08
PIOH6 Workshops	24 & 25-Jun-08
Context Sensitive Solutions (CSS) Workshops	23 & 24-Jul-08
PIOHs, Workshops, Public & Community Meetings	
Public Information Open House (PIOH) 2	29 & 30-Nov-05 and 01-

MEETING	DATE
Protect Windsor Meeting	15-Feb-06
Drilling Information Session with STCTF	31-Aug-06
Presentation to Windsor Essex County Environmental Committee	23-Nov-06
Proponent	
COOP Meetings (DRTP)	8-Apr-05
COOP Meetings (AMB)	28-Apr-05
COOP Meeting	28-Jun-05
US Group	
US Scoping Meeting	31-Aug-05
US LAC Meeting	26-Oct-05
US LAC Meeting	28-Nov-05
US Public Meeting	8-Dec-05
US Workshop Meeting	18-Jan-06
Tour of Sandwich with Detroit City Council	5-Apr-06
MDOT Tour for JIBA	10-May-06
US CSS Bus Tour	8-Jun-06
US CSS Workshops	24-Aug-06
CSS Workshop (Detroit)	3-Nov-06
US Public Meeting	27-Jun-05
Utility	
Hydro One Meeting	11-Jul-08
Bell Utility Relocation Meeting	20-Aug-08
Union Gas Utilities Meeting	29-Aug-08
Tecumseh Utilities Meeting	3-Sep-08
Meeting with Essex Power Lines	18-Sep-08
Meeting with Cogeco Cable	18-Sep-08

3.2 Public Information Open Houses, Workshops and Meetings

Public consultation began at the beginning of the study in January 2005 with a Notice of Study Commencement published in local newspapers. Over the study period, an Initial Public Outreach Meeting (IPO), seven Public Information Open Houses (PIOHs) and associated workshops have been held in which the study material has been presented to the public for their input and information. Follow up workshops were used to address specific issues and/or develop context sensitive solutions. The workshops were generally conducted with the aid of a facilitator. The public provided the study team with input into the materials presented. The study team has used this input in modifying the design of the alternatives and in analyzing the data at each step of the study process.

The IPO, PIOH, and workshop sessions are summarized in Table 3.3.

TABLE 3.3 – INITIAL PUBLIC OUTREACH MEETING, PUBLIC INFORMATION OPEN HOUSES AND WORKSHOPS

PUBLIC EVENT	Advertising	Attendance	Topics/Material Presented/ Displayed	Handout Material	Comment Sheet Questions	Comments Received	Overview of Comments	Outcomes
Initial Public Outreach (IPO) Meeting April 5 & 6, 2005	• Ontario Government Notice published in the following papers: LaSalle Silhouette, Windsor Star, Amherstburg Echo, Harrow News, Kingsville Reporter, Leamington Post, Essex Free Press, LaSalle Post, Le Rempart • Meeting dates and locations presented to local councils and Advisory Group meetings in advance of the IPO meetings • Notices mailed directly to Project Team's contact lists (over 400 addresses) • Details posted on project website	Total number of sign-ins: 179 (91 at Windsor session, 88 at LaSalle session)	• Introduction to the Project Team & the study • Study, evaluation & EA planning processes • Key milestones • Proposed evaluation criteria • Short-term improvements • How to stay involved	• Copy of the presentation boards • Project Team contact sheet • Comment sheet	1. Indicate citizenship and use of the border for commuting 2. Rate importance of specific principles while generating or developing new/expanded crossing alternative and connections to existing highways (on scale of 1-5) 3. Input to evaluation criteria 4. Mark areas of interest on aerial photo maps	Total number of comment sheets received: 129 • 124 received in person at IPO • 5 received by mail/fax	• Preserve environmentally significant areas (concerned about impacts to Ojibway area) • Consider air quality • Health and quality of life of residents • Consider tunnel option • Consider other modes of transportation • Keep trucks off local roads	Team became aware of community issues re: air quality, significant natural areas and desire to consider tunnels. The interest of the community confirmed the need to develop a wide range of Illustrative Alternatives.
Public Information Open House #1 (PIOH1) June 21, 22 & 28, 2005	• Ontario Government Notice published in the following papers: Windsor Star, Amherstburg Echo, Harrow News, Kingsville Reporter, Leamington Post, Essex Free Press, LaSalle Post, Le Rempart, LaSalle Silhouette • Meeting dates and locations presented to local councils and Advisory Group meetings in advance of PIOH1 • Media Briefing Session and drop-in session for Windsor Councilors held prior to PIOH1 • Notices mailed directly to Project Team's general public contact list (over 340 addresses) and advisory group contact lists (over 250 addresses) • Details posted on project website	Total number of sign-ins: 477 (255 at Windsor session, 155 at LaSalle session, 97 at Amherstburg session)	• Study schedule and key milestones • Review of IPO • Travel demand information • Development of Illustrative Alternatives • Alternative inspection plaza sites and conceptual layout` • Crossing types • Generation of connecting routes • Evaluation criteria and proposed evaluation method • What's next and how to stay involved	• Copy of the presentation boards • Project Team contact sheet • Comment sheet • Sign-up sheets for PIOH1 Workshop sessions • "Rating Tool Form"	1. Agree/disagree with Purpose and Need for study 2. Any additional plazas, crossings or route alternatives to consider 3. Mark areas of interest on aerial photo maps 4. Please comment on Factor Weights Using Rating Tool form	Total number of comment sheets received: 181 • 169 received in person at PIOH • 12 received by mail/fax	• Preserve environmentally significant areas (concerned about impacts to Ojibway area) • Consider air quality • Health and quality of life of residents • Opposed to Schwartz plan • Consider tunnel option • Consider other modes of transportation • Consider routes outside (south) of study area	Team awareness of air quality, natural concerns continued to develop. Many differing viewpoints, re: the Illustrative Alternatives confirmed the need for a thorough and systematic analysis of Illustrative Alternatives.
PIOH1 Workshops July 14 & 20, 2005	• Announced workshop dates at PIOH1 • Provided registration forms at PIOH1 for sign-ups • Followed up with phone call to those who signed up at PIOH to confirm attendance	Total number of participants: 19	• Results of Public Information Open House #1 • Discussion of Purpose and Problem Statement, including Travel Demand • Discussion of Assessment of Other Alternatives (i.e. rail; diversion to	• Agenda • Large scale maps (as shown at PIOH1) were shown to facilitate discussions	• Discussions centred around agenda items, and time was allotted to general questions during in an open forum setting	• N/a	• What are the time requirements and costs involved in this study • Questions re: travel demand, use of other modes • Who makes the decisions	

PUBLIC EVENT	Advertising	Attendance	Topics/Material Presented/ Displayed	Handout Material	Comment Sheet Questions	Comments Received	Overview of Comments	Outcomes
			Blue Water Bridge) • Review / Discussion of Illustrative Alternatives (Crossings, Plazas and Routes) • Discussion of Evaluation Factors and Methods				and who will own the new crossing • Connections to existing infrastructure • Consultation, public input and next steps	
SUMMARY	At the conclusion of the first round of public consultation the team further appreciated the wide range of (and sometimes competing) interests and preferences for alternative border solutions. This reinforced the team's commitment to proceed based on thorough and systematic analyses.							
Public Information Open House #2 (PIOH2) November 29 & 30 and December 1, 2005	• Ontario Government Notice published in the following papers: Windsor Star, Amherstburg Echo, Harrow News, Kingsville Reporter, Leamington Post, Essex Free Press, LaSalle Post, Le Rempart, LaSalle Silhouette • Meeting dates and locations presented to local councils and Advisory Group meetings in advance of PIOH2 • Media briefing and drop-in session for Windsor Councilors held prior to PIOH2 • Notices mailed directly to Project Team'sgeneral public contact list (over 350 addresses) and advisory group contact lists (over 260 addresses) • Details posted on project website • Public Service Announcements placed on local community electronic billboards & websites	Total number of sign-ins: 433 (106 at Windsor session, 146 at LaSalle session, 181 at Sandwich Towne session)	• Study schedule and key milestones • Review of PIOH1 • Evaluation process & methods • Evaluation of Illustrative Alternatives • Results of analysis of alternatives • Summary of Arithmetic Evaluation Results • End-to-end evaluation • Area of Continued Analysis • What's next and how to stay involved	• Copy of the key presentation boards • Project Team contact sheet • Comment sheet • Sign-up sheets for PIOH2 Workshop sessions	1. Agree with results of Reasoned Argument analysis and Arithmetic Evaluation? 2. Are there additional plaza, crossing or route alternatives within or outside ACA to consider as practical alternatives? 3. Mark areas of interest on aerial photo maps	Total number of comment sheets received: 108 • 99 received in person at PIOH • 9 received by mail/fax	• Protect natural areas such as Ojibway, Spring Garden ANSI, Black Oak Woods • Protect established recreational trails & fields • Do not use Schwartz route • Keep away from existing schools • Use existing transportation corridors • Tunnel the route • Concern about decrease to property values	Team determined that a tunnelled alternative should be developed and analysed as a Practical Alternative. Awareness of historical importance of Sandwich Towne was heightened leading to future meetings with key representatives from the community
PIOH2 Workshops January 25 & 26 and February 7 & 9, 2006	• Announced workshop dates at PIOH2 • Provided registration forms at PIOH2 for sign-ups • Followed up with letters to those who signed up at PIOH to confirm attendance at January or February workshops	Total number of participants: 183 (121 in January, 62 in February)	January Workshops: • Project Update / What's Next • Brief Presentation by Project Team • Workshop Exercises • Project Team Responses to Issues Raised During Workshop Exercises February Workshops: • Format was question & answer on routes and plazas	January Workshops: • Agenda • Orthophoto of ACA • Plaza visualizations • Comment sheet February Workshops: • Agenda • Proposed Evaluation Factors and	January Workshops: • General comment sheet requesting comments on/ questions about the project February Workshops: • What are the priority areas for tunneling or for a depressed roadway? • Are there other locations	• Total number of question cards received: 38 (18 in January, 20 in February) • Total number of comment sheets received: 17	January Workshops: • Received suggestions for suitable/unsuitable plaza locations • Questions regarding alternatives • Avoid natural areas February Workshops: • Suggestions for	Team gained better appreciation for local conditions which assisted in development of Practical Alternatives

PUBLIC EVENT	Advertising	Attendance	Topics/Material Presented/ Displayed	Handout Material	Comment Sheet Questions	Comments Received	Overview of Comments	Outcomes
				Performance Measures table • General and specific comment sheets	where interchanges should be considered? • Where should different highway crossings (vehicular/pedestrian) be located? • What should the Project Team incorporate in the design of the roadway to improve its look and aesthetics and have it blend more seamlessly into the community?		suitable/unsuitable areas for plazas and tuneling/ depressed roadway, highway interchange and crossing locations • Suggestions for impacts/ opportunities to assess in evaluation of Practical Alternatives • Suggestions for design components and plantings along the roadway	
Public Question & Answer Session February 1, 2006	• Provided registration forms at PIOH2 for sign-up • Followed up with letters to those who indicated interest at PIOH to confirm attendance	Total number of participants: 78	• Project Status • Common Questions & Answers • Group Questions • Key Dates / What's Next	• Question card (for use during the meeting) • Comment sheet	• General comment sheet requesting comments on/ questions about the project	• Total number of question cards received: 18	• Concerns with air quality • Who makes the decisions and who will own the new crossing • Effects of project on properties and owners • Coordination with US • Next steps and how to stay informed & involved	Team continued to gain appreciation for high level of community interest and concern especially regarding air quality and tunneling
Public Meeting February 21, 2006	• Hand delivery of meeting notice to properties within and surrounding the area of continued analysis (approximately 3,600 addresses) • Participants asked to email or call to register	Total number of participants: 339	• Project update & current status • Input to develop practical alternatives for new crossing, inspection plaza and connecting route • Question & Answer session	• Proposed Evaluation Factors and Performance Measures • Question card (for use during the meeting)	• Discussions centred around development of practical alternatives; time was allotted to general questions during in an open forum setting	• Total number of question cards received: 52	• Questions about air quality, protection of environmentally sensitive areas, vehicle emissions • Concern with amount of property required • Tunnel the access route • Suggestions for other alternatives	Team continued to gain appreciation for high level of community interest and concern especially regarding air quality and tunneling
SUMMARY	The second round of consultation was instrumental in raising the team's awareness of community concerns in the ACA, particularly as they related to air quality and protection of the natural environment. This awareness led directly to inclusion of below-grade alternatives and a full 6km tunnel as Practical Alternatives that would be subject to full analysis and evaluation.							
Public Information Open House #3 (PIOH3) March 28 & 30, 2006	• Ontario Government Notice published in the following papers: Windsor Star, Amherstburg Echo, Harrow News, Kingsville Reporter, Leamington Post, Essex Free Press, LaSalle Post, Le Rempart • Meeting dates and locations	Total number of sign-ins: 812 (472 at Oldcastle session, 340 at Sandwich Towne	• Study schedule and key milestones • Review of PIOH2 & consultation to date • Evaluation process & methods • End-to-end evaluation • Crossing, plaza & route alternatives	• Copy of the presentation boards • Project Team contact sheet • Comment sheet • Sign-up sheets for PIOH3 Workshop	1. Are there other plaza and crossing options/ modifications to be considered? 2. Comments on access road alternatives 3. What are the most important	Total number of comment sheets received: 232 • 215 received in person at PIOH • 17 received by mail/fax	• Tunnel instead of a bridge • Put crossing outside Windsor • Concerned with neighbourhood access, air quality, noise pollution	Team proceeded with full analysis of 5 Practical Alternatives for the Access Road, including a 6km cut and cover tunnel, 3

PUBLIC EVENT	Advertising	Attendance	Topics/Material Presented/ Displayed	Handout Material	Comment Sheet Questions	Comments Received	Overview of Comments	Outcomes
	presented at Advisory Group meetings in advance of PIOH3 • Technical briefing session held for Mayors & Wardens prior to PIOH3 • Notices mailed directly to Project Team's general public and Advisory Group contact lists (over 1,400 addresses) as well as to property owners as identified and supplied by municipalities (over 7,500 addresses) • Details posted on project website • Public Service Announcements placed on local community electronic billboards & websites	session)	• Canadian side analysis results • Sample river crossing visualization • Inspection plaza alternatives • Access route alternatives and access road conceptual visualizations • Tunnelling • Evaluation factors & performance measures • What's next and how to stay involved	sessions	considerations in evaluation of plaza, crossing and access road alternatives 4. Mark areas of interest on aerial photo maps		• Depress the roadway • Consider/minimize impacts during and after construction • Consider emergency access	plaza locations, and 3 bridge crossing locations in the ACA.
PIOH3 Workshops April 11 & 12, 2006	• Announced workshop dates at PIOH3 • Provided registration forms at PIOH3 for sign-ups	Total number of participants: 91	• Public Input from PIOH 3 Sessions • How We Got Here / Area of Continued Analysis / O-D • Tunneling • April 11th session focused on review/refinements to Access Road alternatives; April 12th session focused on review/refinements to Plaza & Crossing alternatives • Air Quality and Noise/Vibration Impact Assessment • Introduction to the Ministry of Transportation Property Acquisition Process • CBSA gave a presentation at April 12th session on roles, functions and responsibilities of CBSA	• Agenda • Comment sheet	• General comment sheet requesting comments on/ questions about the project • Workshop format was general question & answers session on access roads (April 11) and plazas & crossings (April 12)	• Total number of comment sheets received: 24	• Concern about property value/impact to property • Size of plaza footprint • Concern with access to tunnelled portions of route • Impacts to residents during construction • Concerns with air quality and community connections • Suggestions for alternate locations for access road, plaza and crossing	Team increased its awareness of community values and began to gain a better sense of how "greening" could be effective as mitigation
CSS Public Workshops June 23 & 24, 2006	• Advertised in local area newspapers • Notices mailed directly to Project Team's general public contact lists (over 1,500 addresses) as well as to property owners & tenants as identified and supplied by municipalities (over 8,600 addresses) • Participants asked to email or call to register • Followed up with phone calls to	Total number of participants: 189 (116 on June 23, 73 on Jun 24)	• Presentation of examples of design elements to address concerns re: aesthetics and community impacts • Open discussion to generate ideas for design elements for practical alternatives	• Agenda • Workshop booklets and worksheets • Comment sheet • Large scale maps were shown to facilitate discussions and allow comments on specific areas	• What other options/ modifications to the plaza and crossings should be considered? • Concerns or comments about access road alternatives • What are most important considerations in the evaluation of access road and plaza & crossing	• Total number of comment sheets received: 11	• Suggestions for alternate locations for access route; request to tunnel whole route • Protect wildlife and green areas; plantings should be easy to maintain • Concern with impacts of exhaust/diesel fumes • Questions about property acquisition, project	

PUBLIC EVENT	Advertising	Attendance	Topics/Material Presented/ Displayed	Handout Material	Comment Sheet Questions	Comments Received	Overview of Comments	Outcomes
	those who indicated an interest to confirm attendance				alternatives?		timeline, and staying involved & informed	
CSS Public Workshops October 2 & 3, 2006	• Advertised in local area newspapers • Notices mailed directly to Project Team's general public contact lists (over 1,700 addresses) as well as to property owners & tenants as identified and supplied by municipalities (over 7,700 addresses) • Participants asked to email or call to register • Followed up with phone calls to those who indicated an interest to confirm attendance	Total number of participants: 169	• Aesthetic themes for the access road (Carolinian, Rose City, Motor City) • Landscaping elements for the access road corridor and plaza buffer areas • Themes for focus areas	• Workshop booklets and worksheets	Worksheet questions: • Comments on aesthetic themes for access roads • What other themes or landscaping elements should be considered for the access road corridor and plaza buffer areas • General comments	• N/a	• Suggestions for features to incorporate into designs • Concerns about costs related to maintenance, soil quality, safety issues • Mitigate existing sensitive areas (acquire property) • Include Canadian themes for plaza options • Consider safety of pedestrians in landscaped spaces	Team increased its awareness of community values and began to gain a better sense of how "greening" could be effective as mitigation
CSS Public Workshops November 2 & 15, 2006	• Advertised in local area newspapers • Notices mailed directly to Project Team's general public contact lists (over 1,800 addresses) as well as to property owners & tenants as identified and supplied by municipalities (over 8,300 addresses) • Participants asked to email or call to register • Followed up with phone calls to those who indicated an interest to confirm attendance	Total number of participants: 168	• Conceptual design visions for new international bridge (suspension, cable stay) and themes (history, friendship)	• Workshop booklets and worksheets • Computer simulation stations produced postcards for participants in response to answers re: design preferences • Visual artist stations produced sketches for participants in response to answers re: design preferences	Worksheet questions: • Was workshop setup efficient and effective for displaying material and gathering ideas • Are there other tools that could have enhanced the experience for visitors • Was the technology provided intuitive/easy to utilize • Would you like to see similar technology presented at future meetings • Add any sketches to illustrate your ideas regarding the look & fit of the new crossing • General comments	• N/a	• Comments supported the Historical Vision for the suspension bridge option and the Friendship Vision for the cable stay bridge option • Preference for natural sustainable vegetation for Access Road • More intensive plantings in pedestrian-oriented spaces • Incorporate art and natural textures in surfaces	
Public Information Open House #4 (PIOH4) December 6 & 7, 2006	• Ontario Government Notice published in the following papers: Windsor Star, Amherstburg Echo, Harrow News, Kingsville Reporter, Leamington Post, Essex Free Press, LaSalle Post, Le Rempart • Meeting dates and locations presented at Advisory Group meetings in advance of PIOH4 • Notices mailed directly to Project Team's general public and Advisory Group contact lists (over 2,000	Total number of sign-ins: 510 (334 at Windsor session, 176 at Oldcastle session)	• Study schedule and key milestones • Review of PIOH3 & consultation to date • Practical Alternatives • Crossing & plaza alternatives • Governance • US plaza alternatives • Evaluation Factors • Tunnelling • Context Sensitive Solutions	• Copy of the presentation boards • CD of alternatives • Project Team contact sheet • Comment sheet • Sign-up sheets for PIOH4 Workshop sessions	1. Comments on preliminary analysis of the seven evaluation factors 2. Suggestions for refinements/improvements to crossing, plaza or access road alternatives	Total number of comment sheets received: 46 • 36 received in person at PIOH • 7 received by mail/fax • 3 received by e-mail	• Don't sacrifice homes • Relocate wildlife • Keep community linkages intact • Plazas too close to natural areas • Don't make cost a consideration • Reduce impacts to natural areas • Tunnel the route	Continued community concerns, expressed at PIOHs plus other consultation meetings resulted in the team developing a 6th Practical Alternatives for the Access Road, labelled as The

PUBLIC EVENT	Advertising	Attendance	Topics/Material Presented/ Displayed	Handout Material	Comment Sheet Questions	Comments Received	Overview of Comments	Outcomes
	addresses) as well as to property owners and tenants as identified and supplied by municipalities (over 7,700 addresses) and Canada Post mail walks (over 12,300 addresses) • Details posted on project website • Public Service Announcements placed on local community electronic billboards & websites		• Evaluation process & methods • Property acquisition • Crossing visualizations • What's next and how to stay involved • Video simulations of access road alternatives					Parkway
PIOH4 Workshops January 9 & 10, 2007	• Announced workshop dates at PIOH4 • Provided registration forms at PIOH4 for sign-ups • Followed up with phone call to those who signed up at PIOH to confirm attendance	Total number of participants: 27	• Breakout sessions on Plazas & Crossings and Access Roads • Summary and Next Steps	• Agenda • Comment sheet	• General comment sheet requesting comments on/ questions about the project • Workshop format was general question & answers session on access roads and plazas & crossings	• Total number of comment sheets received: 1	• Concern with location of air quality monitoring stations, accuracy of AQ results, and impacts to cultural heritage features • DRIC can have positive effect on tourism/ economic development • Costs of tunnelling • Concern with noise impacts; what are possible mitigation measures • Next steps and how to stay informed & involved	
SUMMARY	All of the consultation to date and reactions received at public venues led the team to the conclusion that an additional green alternative for the Access Road should be developed and considered.							
Public Information Open House #5 (PIOH5) August 14 & 15, 2007	• Flyer was placed in the following papers: Windsor Star, Amherstburg Echo, Harrow News, Kingsville Reporter, Leamington Post, Essex Free Press, LaSalle Post, Le Rempart • Full-page advertisement published in Windsor Star • Meeting dates and locations presented at Advisory Group meetings and media events held in advance of PIOH5 • Media briefing session held in advance of PIOH5 • Notices mailed directly to Project Team's general public and Advisory Group contact lists (over 2,100	Total number of sign-ins: 1,672 (919 at Windsor session, 753 at Tecumseh session)	• Study schedule and key milestones • Review of PIOH4 & consultation to date • CEAA & Ontario EA processes & coordination • Governance • Property acquisition • Evaluation process & methods • Summary of analysis of access road, plaza and crossing alternatives • The Parkway alternative • Connecting communities • Context Sensitive Solutions • Bridge types	• Copy of the presentation boards • Fact sheets • CD of alternatives • Comment sheet • Sign-up sheets for PIOH5 Workshop sessions	1. Assessment of practical alternatives does not support further analysis of the end-to-end at-grade solution – do you agree/disagree? 2. Assessment of practical alternatives found limited benefits to end-to-end cut and cover tunnel do not justify associated additional costs & risks – do you agree/disagree? 3. Suggestions to improve/ refine The Parkway alternative. 4. Provide comments on practical alternatives,	Total number of comment sheets received: 207 • 184 received in person at PIOH • 23 received by mail, fax, e-mail or via the project website	• As the gateway to Canada, Windsor deserves the best solution • Concern about air quality; improve air quality • Tunnel the route • Concerned with traffic flow during construction • Consider wildlife linkages • Protect community connections • Support for The Parkway • Make the short tunnels longer • Protect the natural areas • Cost should not be a	The team committed to further develop of The Parkway alternative and a full evaluation. Refinements to The Parkway based on the PIOHs and subsequent community meetings, included a new tunnel near Spring Garden and a shift of the Howard tunnel to a location opposite Oliver Estates. The

PUBLIC EVENT	Advertising	Attendance	Topics/Material Presented/ Displayed	Handout Material	Comment Sheet Questions	Comments Received	Overview of Comments	Outcomes
	addresses) as well as to property owners and tenants as identified and supplied by municipalities (over 8,000 addresses) and Canada Post mail walks (over 12,300 addresses) • Details posted on project website • Public Service Announcements placed on local community electronic billboards & websites		• US study progress • What's next and how to stay involved • Video simulations of access road alternatives		including The Parkway, by marking areas on aerial photo maps 5. Comments on preliminary analysis of seven evaluation factors		factor	overall length of tunnelling was increased from 1.5km to 1.86km
PIOH5 Workshops August 22 & 23, 2007	• Announced workshop dates at PIOH5 • Provided registration forms at PIOH5 for sign-ups • Advertised on project website and provided sign-up form	Total number of participants: 200+	• Overview of update on study process and progress • Issues/concerns about analysis presented at PIOH5 • Comments on analysis to date • Comments/ideas on new Parkway alternative	• Comment sheet	• Comment sheet requesting comments/opinions on general topics of discussion	• Total number of comments received: 235	• Suggestions for alternate locations for route, plaza and crossing • Estimated timeframes for construction • Concern about impacts to properties and residents, community connections • Who makes the decisions; coordination with US • Questions about AQ modeling, scrubbers, tunnel ventilation, impacts • Consider end-to-end tunnel	
SUMMARY	This round of consultation focused attention on the newly developed Parkway Alternative. These meetings plus subsequent consulations resulted in refinements to The Parkway and development of The Windsor-Essex Parkway, which eventually became the preferred alternative.							
Public Information Open House #6 (PIOH6) June 18 & 19, 2008	• An advertisement was placed in the following papers: Windsor Star, Amherstburg Echo, Harrow News, Kingsville Reporter, Essex Voice, Leamington Post & Shopper, Essex Free Press, LaSalle Post, Le Rempart • Meeting dates and locations presented at Advisory Group meetings and media events held in advance of PIOH5 • Notices mailed directly to Project Team's general public and Advisory Group contact lists (over 4,400 addresses) as well as to property	Total number of sign-ins: 1,000 (658 at Windsor session, 342 at LaSalle session)	• Study schedule and key milestones • Review of PIOH5 & consultation to date • CEAA & Ontario EA processes & coordination • Governance • Evaluation process & methods & study process • Summary of analysis of Illustrative and Practical Alternatives • Connecting communities • Refinements to The Parkway alternative based on consultation	• Copy of the display boards • Fact sheets • CD containing fact sheets, bridge types, images, display boards and TEPA • Comment sheet • Sign-up sheets for PIOH6 Workshop sessions	1. Comments on evaluation process and choice of TEPA 2. What mitigation methods should be explored as the TEPA proceeds into the next phase of study/ design? 3. Do the tunnel locations provide adequate community connections & access to greenspace? 4. Comments on analysis of seven evaluation factors	Total number of comment sheets received: 196 • 189 received in person at PIOH • 7 received by mail, fax, e-mail or via the project website	• TEPA is excellent choice; good, acceptable solution • Concern re: maintenance of green areas • Concern about air quality; improve air quality • Support for GreenLink • Concern about noise • Protect wildlife • Tunnel the route; add more tunnels • Get started on construction • Add more greenspace	• The team decided to have follow-up meetings with Spring Garden community; led to TEPA refinement • The team reconsidered buffer areas near Chappus Street, Sansotta Court, Trillium Court, Kendleton Court,

PUBLIC EVENT	Advertising	Attendance	Topics/Material Presented/ Displayed	Handout Material	Comment Sheet Questions	Comments Received	Overview of Comments	Outcomes
	owners and tenants as identified and supplied by municipalities (over 8,000 addresses) and Canada Post mail walks (over 12,300 addresses) • Details posted on project website • Public Service Announcements placed on local community electronic billboards & websites		• The Windsor-Essex Parkway • The Technically and Environmentally Preferred Alternative (TEPA) • Summary of analysis of access road, plaza and crossing alternatives • Bridge type study and bridge types • Evaluation factors • US study progress • Context sensitive solutions • What's next and how to stay involved • Video simulations of access road alternatives				areas • Route is close to properties • Thank you for protecting sensitive natural areas • Do whatever it takes, no matter the cost	and Todd Lane • The team revised tunnel design at Hearthwood and Coussineau
PIOH6 Workshops June 24 & 25, 2008	• Announced workshop dates at PIOH6 • Provided registration forms at PIOH6 for sign-ups • Advertised on project website	Total number of participants: 110	• Design of Windsor-Essex Parkway • Design features of preferred plaza and crossing alternative • Mitigation measures to reduce impacts	• Comment sheet	• General comment sheet requesting comments on/ questions about the project	• Total number of comment sheets received: 25	• Comparison of Windsor-Essex Parkway to GreenLink solution • Concern about impacts to properties and residents, community connections • Concerns with air quality and noise; what is possible for mitigation • Protect human health • Amount of tunnelling is good; consider more tunnels • Support for amount of parkland and green areas	
Public Workshops July 23 & 24, 2008	• Advertised in local area newspapers • Notices mailed directly to Project Team's general public contact lists (over 2,700 addresses) as well as to property owners & tenants as identified and supplied by municipalities (over 4,400 addresses) • Participants asked to email or call to register	Total number of participants: 86	• Discussion of the TEPA design for the crossing, plaza and access road • Exploration of how to best fit new transportation facilities and access road into the community	• Comment sheet	• General comment sheet requesting comments on/ questions about material presented at workshops	• Total number of comment sheets received: 13	• Comments on at-grade vs. below-grade roadway • Specific comments on plaza and bridge • Concerns about air quality and human health • Suggestion to tunnel more of the route • Support for TEPA • Support for The Windsor-Essex Parkway design	

PUBLIC EVENT	Advertising	Attendance	Topics/Material Presented/ Displayed	Handout Material	Comment Sheet Questions	Comments Received	Overview of Comments	Outcomes
							• Preference for using natural features over man-made construction features	
SUMMARY	This round of consultation served to focus awareness on direct impacts to adjacent properties. As a result of these concerns and comments, additional community meetings and reviews by the team were held. These in turn resulted in refinements to the preferred alternative including: • Shifting The Parkway alignment further away from Spring Garden and adjusting ramp geometry to reduce community impacts and impacts to the very significant natural environmental features in the area; • Increasing the buffer areas at Chappus Street, Sansotta Court, and Kendleton Court; and • Introducing a cul-de-sac design near the terminus of Huron Church Line to better buffer local residents.							
Public Information Open House #7 (PIOH7)	***FALL 2008 (TO BE ADDED IN FINAL REPORT)***							

3.3 Community Groups

In addition to the public events (Open Houses and Workshops), the team has met with individual community groups when requested or in response to specific issues and concerns. Meetings with communities have included:

- Sandwich Community;
- Spring Garden / Bethlehem / Armanda Street Community;
- Oliver Estates;
- Huron Church Line Residents;
- Kendleton Court Residents;
- Sansotta Residents;
- Trillium Court Residents (November 2008); and,
- Talbot Road Residents.

Consultation with each of these groups helped the study team to better understand issues and concerns identified by the communities, and allowed the team to provide clarifications and / or detailed information about the project. The information gained by the study team through these consultations has been included and considered in the analysis / evaluation of alternatives and mitigation for the preferred alternative, and have resulted in decisions including:

- A preferred bridge crossing and plaza location well removed from the historic area of Sandwich Towne;
- An additional tunnel section near Spring Garden / Bethlehem;
- A refined Parkway alignment to integrate The Parkway into the EC Row corridor further away from the Spring Garden area;
- A relocated tunnel section in the vicinity of Oliver Estates;
- A cul-de-sac design and relocation of existing Huron Church Line to reduce local traffic and provide a better buffer from The Parkway;
- Development of a Parkway alternative so as to provide a buffer area along Highway 3 / Talbot Road and Huron Church Road; and,
- Provision of additional buffer zones near Kendleton Court and Sansotta Court.

As well, it should be noted that consultation was a key component of the Social Impact Assessment (SIA) carried out for this study. For the assessment of practical plaza, crossing and access road alternatives, data collection for the SIA involved household questionnaires, social feature questionnaires, focus group sessions, input received as part of the public consultation efforts, stakeholder interviews, site visits, and review of various published secondary sources (e.g. Census Canada, City of Windsor). For the assessment of the Technically and Environmentally Preferred Alternative, data collection for the SIA included use of the social household questionnaire data, public consultation activities and comment forms, context sensitive solution workshops, and the review of information provided by the Ministry of Transportation (MTO) property agents.

3.4 Community Consultation Group (CCG)

The Community Consultation Group (CCG) was formed at the commencement of this study in the spring of 2005. The Ontario Ministry of Transportation (MTO) in coordination with Transport Canada (TC) invited interested individuals from the City of Windsor, Town of LaSalle, and Essex County to participate in the study as part of the Community Consultation Group. Members of the public with a variety of backgrounds and interests joined the CCG and volunteered their time to meet and share ideas and concerns. In total 73 citizens have enrolled as CCG members.

The primary role of the CCG was to operate as a forum for open dialogue and information exchange between the study team and the public. CCG members were asked for their advice/input and joint exploration of key issues, concerns, challenges, and opportunities. CCG meetings were held at key milestones of the study to review and comment on project materials and analysis.

In total, 18 CCG meetings have been held at key milestones of the study. Meetings have been well attended with an average attendance of 29. While some members have come and gone, a core group of approximately 20 has remained engaged over the life of the study. The majority of the meetings held with the CCG were presentation-style meetings and question and answer sessions. The presentations consisted of the study team presenting new data and information to the CCG, and then seeking input and feedback from the CCG members regarding the materials presented. At each CCG meeting, members of the public were invited to attend as observers only. They were encouraged to ask questions at specific points in the meeting.

The CCG has provided the team with an excellent barometer of community concerns and issues. Team members have contributed to the team's awareness of the need for a new border crossing and connection to the freeway network and have articulated concerns regarding air quality, the natural environment, specific community concerns, and tunneling. Its accomplishments are reflected in many of the study decisions and outcomes, including decisions to stay out of the most sensitive natural areas, avoid impacts on the historic area of Sandwich Towne and fully analyze a tunneling alternative. Of particular note is that the study team modified its study analysis to include a full year of air quality monitoring along the Highway 3 / Huron Church Line corridor. This was done as a direct result of consultation with the CCG.

3.5 Municipalities

The following sub sections summarize the consultation which took place with the Municipal Advisory Group (MAG) and with individual municipalities.

3.5.1 Municipal Advisory Group (MAG)

The MAG, convened at the study outset, has included senior staff officials from the municipalities and county as well as school board representatives. Specifically, the MAG consisted of the following:

- City of Windsor;
- Town of LaSalle;
- Town of Tecumseh;
- Town of Lakeshore;
- Town of Amherstburg;
- Town of Essex; and,
- County of Essex.

Throughout the duration of the study, the following school boards were also invited to join the MAG:

- Greater Essex County District School Board;
- Windsor-Essex Catholic District School Board;
- Conseil Scolaire de District des Ecoles Catholiques du Sud-Quest; and,
- Conseil Scolaire de District Centre-Sud-Quest.

As with the CCG, the MAG has served as an excellent barometer for articulating municipal and community concerns. A series of 14 meetings with MAG have occurred since the study began. The MAG has also contributed significantly to the development and refinement of project alternatives. The MAG has made many positive contributions, however in particular, MAG members highlighted the importance of retaining a roadway which would meet the local and regional functions of the existing Highway 3 / Huron Church Road corridor. This was influential in the development of practical alternatives which provided for a service road which separates local / regional traffic from international traffic.

As well, MAG members articulated a vision for the future Highway 3 / Highway 401 interchange which would provide full traffic movements as well as divert longer distance traffic away from Howard Avenue in the City of Windsor. This led directly to abandonment of some early alternative interchange layouts and development of new alternatives (one of which has been selected) at this location that would provide full traffic movements, and divert traffic away from Howard Avenue. The selection of the preferred interchange alternative was a collaborative effort of the MAG team and the study team.

The Municipal Advisory Group also requested the study team to consider the use of roundabouts at one or more strategic locations in the corridor. This led directly to consideration of roundabouts and selection of a roundabout for the Highway 3 / Highway 401 interchange ramps.

In addition to meetings with the MAG, the team has also attended two meetings of the Windsor and Essex County Environmental Committee, a committee that advises both City Council and County Council. Bus tours for members were also arranged. These meetings have provided opportunity for continuing dialogue particularly relative to The Parkway alternative, discussion of air quality, and review of issues associated with the plaza alternatives.

Consultations with staff from individual municipalities have also occurred throughout the study. These included introductory meetings early in 2005 and meetings to gain better mutual appreciation of the study and of the concerns of municipalities. Each of these meetings has been beneficial. In general they augmented discussions held at MAG meetings and have helped the study team develop the practical alternatives, as they related to the configurations of the service road, interchanges and access/egress ramps. The discussions with the City of Windsor and its consultants leading up to and following the development of The Parkway alternative are of particular note and are summarized in Section 3.5.2 below.

3.5.2 City of Windsor

The Schwartz Report was released by the City in January 2005. This report outlined a vision for a new border crossing and plaza in the Brighton Beach area, and a controlled access facility connecting to Highway 401. The report discounted alternatives, such as, use of EC Row Expressway, and the DRTP Corridor through the centre parts of Windsor. The report considered access road alternatives in the Huron Church Road/ Highway 3 corridor, the corridor which was ultimately selected by the study team as the preferred route for the access road.

In the summer of 2005, the City of Windsor formed a Peer Review team. The Peer Review Team reviewed and provided detailed comments on the illustrative alternatives that had been announced by the study team in June 2005.

In March 2006, the city provided comments and questions to the study team, including questions about the selection of access road corridor.

In April 2007, City Council passed a resolution supporting the inclusion of tunnelling in the access road corridor, and emphasizing the need to mitigate impacts on local residents.

Informal consultations continued into the spring and summer of 2007 with growing interest around a concept which would be a combination of the tunneled and below-grade alternatives. At meetings with the City of Windsor the notion of a more “green” parkway-like alternative emerged. The concept, as conceived by the City, would include a green corridor with tunneled sections, a grade separated recreational trail system, and extensive urban design of the green areas.

The study team built upon the vision to develop The Parkway Alternative, which was released for public comment in August 2007. The alternative included 10 tunneled sections (total length 1.5km), a grade separated recreational trail network, and extensive areas of future parkland.

In response to The Parkway, the City of Windsor released a concept for the access road which it called GreenLink in October 2007. The GreenLinkWindsor proposal was similar to the August 2007 Parkway in many respects. Both the GreenlinkWindsor and The Parkway, included:

- A six-lane below-grade freeway with separate service roads for local traffic;
- Tunnelled sections in key locations to link communities;
- Hundreds of acres of green space, with new spaces for community features;
- Walking and biking trails which allow pedestrians and cyclists to travel from E.C. Row;
- Expressway to Howard Avenue without ever crossing paths with a vehicle;
- Air quality and noise improvements by eliminating stop and go truck traffic and getting trucks off local streets;
- The same general layout of roadways and interchanges;

- Nearly identical property requirements with buffer areas between the roadway and the adjacent community; and,
- An opportunity to create a signature gateway welcoming travellers to Canada, Ontario and Windsor and Essex County.

However, there were also some significant differences. The most significant of these was the fact that GreenLinkWindsor proposed approximately 3.8km of tunneled section as opposed to the 1.5km proposed in the August 2007 Parkway. GreenlinkWindsor featured individual tunnels greater than 240 m in length (two tunnels were greater than one kilometre in length). Specifically, GreenLinkWindsor proposed longer tunneled sections than The Parkway in the areas of Spring Garden/Bethlehem/Grand Marais, Todd Lane/Cabana Rd and Cousineau Rd/Sandwich West Parkway/Hearthwood Place.

In addition, GreenLinkWindsor included a tunnel section under the Grand Marais Drain. The Parkway alternative was developed to pass over the Grand Marais Drain to avoid construction in difficult ground conditions and the associated problems related to schedule impacts, constructability risks, and the increased costs associated with a tunneled crossing in this area.

The study team reviewed publicly available information on the GreenLinkWindsor proposal and, in the fall of 2007, met with the City and its consultants on a couple of occasions. These meetings provided the opportunity for the study team to gain improved understanding of the GreenLinkWindsor proposal and for the City representatives to gain improved understanding of The Parkway alternative. Subsequently, in March 2008, the City provided more analysis of the GreenLinkWindsor proposal to the study team.

The study team carefully reviewed and assessed all of the information available about the GreenLinkWindsor proposal, and considered the extent to which it would be appropriate to modify the August 2007 Parkway alternative.

A preliminary review of the air quality implications of the GreenLinkWindsor proposal in comparison to The Parkway alternative was completed by SENES Consultants Limited. SENES is responsible for all of the air quality work undertaken for the study, and is a subconsultant to URS Canada Inc. The review by SENES focused on the potential impacts of the three long tunnel sections proposed as part of the GreenLink alternative.

Based on SENES' detailed work conducted previously for the *Practical Alternatives Evaluation Working Paper*, SENES determined that, on a Windsor airshed basis, the air quality is generally not impacted by any of the alternatives, including a full 6km tunnel. The GreenLinkWindsor proposal could be considered an "intermediate" alternative between The Parkway and the full 6km tunnel that was assessed previously. The assessment concluded that the greatest impacts from roadways were typically limited to within the first 50-100 m of the roadway corridor when comparing one alternative to another, and in SENES' professional opinion, GreenLinkWindsor was sufficiently similar to the other alternatives that this conclusion would not change. As the six kilometer tunnel alternative did not have substantial air quality benefits, neither would the shorter tunnels that were proposed in the GreenLinkWindsor proposal. Therefore, GreenLinkWindsor was not expected to impact Windsor air quality in any manner that is significantly different from the practical alternatives that were analyzed in detail.

Localized differences are detectable between the GreenLinkWindsor proposal and the practical alternatives. For GreenLinkWindsor, there are three local air quality impacts to consider with the tunnels:

- The impact on the community adjacent to the tunnel;
- The impact on receptors near the tunnel portals; and,
- The impact on the air quality on the tunnel covered area (green space).

An analysis submitted by the City's consultant indicated that predicted concentrations of $PM_{2.5}$ in the Todd Lane / Cabana Road area would be essentially identical ($\pm$ 0.2 ug/m^3) compared to the DRIC forecasts. The study team concluded that the ability to reliably predict concentrations to less than 1 ug/m^3 was questionable, particularly given the inherent uncertainty in many of the model parameters.

Based on the above, the study team concluded that the longer tunnels proposed in the GreenLinkWindsor proposal offered no significant overall air quality benefits over The Parkway or the other practical alternatives.

With respect to any potential noise reductions associated with the longer tunnel sections proposed in the GreenLinkWindsor proposal, the study team again turned to its analysis of Alternative 3, the 6km tunnel, as compared to the below-grade alternatives. That analysis showed that future noise levels for a below-grade freeway could be limited to acceptable levels, and in some cases reduced, from a future 'Do Nothing' scenario particularly when standard noise mitigation measures (berms and/or barriers) were applied. The MTO acknowledged that these mitigation measures would be included with The Parkway and other below-grade alternatives.

The study team also considered the extent to which the longer GreenLinkWindsor tunnels would enhance community connectivity. It is acknowledged that longer tunnel sections potentially provide more space for active recreation on the tunnel roof; however, the team concluded that the 120 – 240m lengths provided by The Parkway alternative would provide adequate opportunities for community connections in pedestrian friendly environment.

The GreenLinkWindsor proposal had the same general footprint and property requirements as that of The Parkway and therefore, the overall impacts to the natural environment were considered relatively equal. The only difference between the two options from a natural perspective was the potential for restoration and enhancement opportunities on the additional greenspace that could be provided on top of the longer GreenLinkWindsor tunnel sections. However, given the overall anticipated impacts to the natural environment from both alternatives, this additional benefit was considered relatively minor.

Last but not least, the study team assessed the GreenLinkWindsor proposal from the cost and constructability viewpoint. Some of the estimates presented by the City were not comparable to the estimates prepared for the practical alternatives and The Parkway (i.e. length of roadway included, freeway cross section and inclusion of allowance for inflation). The study team developed a cost estimate for GreenLinkWindsor proposal, on the same basis as the estimates that had been developed for the practical alternatives and The Parkway alternative. Using this approach, the study team estimated the cost of the GreenLinkWindsor proposal at $2.3 to $2.5-billion about $700 to $900-millionmore than the estimate of $1.6-billion that was developed for The Windsor-Essex Parkway alternative in the spring of 2008.

The study team was also concerned that the longer tunnels in the GreenLinkWindsor proposal would require introduction of mechanical ventilation in tunnels, would cause increased risk associated with movement of hazardous goods through longer tunnels. The GreenLinkWindsor proposal to tunnel under Turkey Creek added increased risks to construction cost and schedule.

Based on the above assessment, the study team concluded that the benefits of the longer tunnels identified in the GreenLink proposal did not justify the expenditure of an additional $750-million.

The study team had solicited comments on its Parkway alternative at the August 2007 PIOH's in order to identify how The Parkway could be improved. The study team reviewed and assessed the City's material on that basis, along with suggestions of other stakeholders including other municipalities, ministries agencies and the public. As noted above, the study team concluded that the increased cost of the GreenLinkWindsor proposal ($700 to $900-million) did not result in enough additional benefit in terms of air quality, noise reduction, and community connectivity to warrant adoption of the GreenLinkWindsor proposal. However, in response to the GreenLinkWindsor proposal and in response to other suggestions received after the August 2007 PIOHs, the study team made a number of refinements to the August 2007 Parkway. These refinements were adopted in order to reduce the negative effects of The Parkway and to the extent practicable, to improve the transportation benefits and community benefits of The Parkway.

A new tunnel section was added near Spring Garden Road, and the tunnel at Howard Avenue was relocated and lengthened. There were also other minor shifts to tunnel lengths and portal locations. In total these resulted in increasing the amount of tunneled section in The Parkway from 1.5km to 1.86km. Refinements were made to the recreational trail system, to reduce property impacts, and yet retain the principle that trail users are able to traverse The Parkway corridor without having to cross a lane of traffic. A new loop ramp was introduced at Todd Lane, in response to concerns expressed by emergency services regarding access to the freeway. The Howard Avenue/Highway 3 interchange was modified to include a connection to Howard Avenue and the possible future Laurier Parkway extension. Details of these refinements are discussed in Chapter 8.

The refined Parkway alternative was identified as The Windsor-Essex Parkway (refer to Exhibit 8.14). The Parkway alternative was analyzed in accordance with the seven major factors and evaluated against the practical alternatives, i.e. the at-grade and below-grade alternatives, as well as the cut and cover tunnel alternative.

3.6 First Nations

Consultation with the First Nations began at the study commencement in January, 2005. The First Nations groups that were initially consulted include the following:

- Walpole Island First Nations;
- Oneida Nation of the Thames;
- Caldwell First Nation;
- Munsee Delaware Nation;
- Aamjiwnaang;
- Chippewas of Kettle and Stony Point;
- Moravian of the Thames; and
- Chippewas of the Thames.

Early in the study, Walpole Island First Nation demonstrated a desire to actively participate in the study, and the study team has continued to consult directly with Walpole Island First Nation. In addition however, each First Nation group identified in the list above has been invited to comment on study materials at each key milestone of the study. All First Nations groups were notified of the EA study via a study commencement package including follow-up phone calls / letters. Additionally, mailing notices were also sent to each group prior to Public Information Open Houses and workshops.

To date, 12 meetings have been held with the First Nations. Issues identified at the meetings included:

- Possession of artifacts found;
- Piers in the river/disturbance of river bottom;
- Air and water quality;
- Species at Risk;
- Introduction of Foreign Species;
- Detroit River land claim;
- Legal duty to consult;
- Sharing of information with other First Nations;
- Funding for meaningful participation;
- Economic opportunities; and,
- Reflect historical presence in the naming of the bridge.

In response to these concerns, the Ontario government has provided funding for Walpole Island to retain a consultant to review and provide input to the teams study materials and findings. A community meeting was held in February 2008 with Walpole Island First Nations to present the study alternatives to the members of Walpole Island and gather their input and comments about the study and the team discussed the project with the Council in the summer of 2008. Input received from the Walpole Island First Nation members has related to environmental mitigation, archeological preservation and opportunities for meaningful employment. Walpole Island First Nation were also asked to provide their input and comment regarding the technical work completed at each milestone phase of the study. Input received from Walpole Island has been incorporated into the ongoing evaluation of the illustrative and practical alternatives. Recently additional discussions with respect to mitigation have occurred.

3.7 Schools

The study team has recognized the proximity of several schools to the area of continued analysis. Therefore, in addition to inviting Board representatives to MAG meetings the study team has met with specific Boards on request. Also, at the request of representatives from Oakwood Public School, a

Schools Advisory Group was established. Although only a few meetings have transpired, consultation with this group has served to heighten awareness of the proximity of the schools and related concerns. This has influenced, in part, the development of The Windsor-Essex Parkway with 11 tunneled sections as the preferred alternative.

3.8 Business Owners

Over the course of the study there have been numerous consultations with individual business institutions. The team's economic consultant carried out an overall economic assessment which is documented in the *Practical Alternatives Evaluation Working Paper – Economic Impact, April 2008* (refer to List of Supporting Documents). In addition, members from the core team have held over 35 meetings with individual businesses, institutions, and associations. These meetings have served as useful dialogue so that both the project and its benefits and impacts are understood. Where appropriate these meetings have resulted in detailed negotiations to proactively mitigate impact.

3.9 Crossing Owners, Operators and Proponents Group (COOP)

At the outset of the project, there were several private interests with specific proposals for new border crossings. These included:

- Canadian Transit Company / Detroit International Bridge Co., owners and operators of the Ambassador Bridge;
- Detroit & Canada Tunnel Corporation;
- The Detroit River Tunnel Partnership (DRTP) – a dedicated international truck route and tunnel river crossing;
- MichCan International Bridge Company – an international bridge proposal in the vicinity of Brighton Beach;
- Hennepin Point Crossing – a proposed international bridge crossing downstream near Amherstberg; and,
- Border Gateways.

The study team consulted with each of these groups individually and collectively to ensure that their proposals were understood and that they understood the Partnerships objectives and EA study. Based on these meetings, the above-noted proposals were included in the development, analysis and evaluation of illustrative alternatives.

3.10 Private Sector Advisory Group (PSAG)

The combined Canadian and US study teams formulated a bi-national Private Sector Advisory Group and invited owners from many businesses (both in Canada and the US) to participate. This has served as a useful method to provide timely information to a large number of businesses, and has resulted in further contact with several individual businesses, as documented below. These meetings have given the team a better understanding of the economic importance of an efficient border crossing system.

American Chamber of Commerce in Canada	Association of International Automobile Manufacturers (Canada & US)
Automotive Parts Manufacturer's Association	Bison Transport Inc., Border Gateways
BP Canada Energy Company	Brighton Beach Power
Canadian Association of Importers and Exporters Inc.	Canadian Auto Partnership Council, Canadian Chamber of Commerce
Canadian Manufacturers and Exporters	Canadian Shipowners Association
Canadian Trucking Alliance	Canadian Vehicle Manufacturers' Association
Canadian/American Border Trade Alliance	Chamber of Maritime Commerce
City of St. Catharines	CN Rail / US Government Affairs
Canadian Manufacturers & Exporters	Coco Group of Companies
DaimlerChrysler (Canada & Michigan)	Detroit Regional Chamber
Essex Terminal Railway Company / Morterm Limited	Fednav Limited
Ford of Canada, General Motors (Canada & US)	Gorski Bulk Transport Inc.
Great Lakes Pilotage Authority	Honda Canada Inc.
Hydro One Networks Inc.	Industry Canada
International Business Consultants of Canada Inc.	Lake Carriers' Association
Lou Romano Water Reclamation Plant	Michigan Trucking Association
Motor and Equipment Manufacturers Association	Norfolk Southern Railway
Ontario Chamber of Commerce	Ontario Trucking Association
SLH Transport Inc.	Sterling Marine Fuels
Sysco Food Services	The Canadian Salt Company Limited

Tourism Industry Association of Ontario	US Great Lakes Pilotage Association
District 2	United States Consulate General
University of Windsor	Windsor & District Chamber of Commerce
Windsor Construction Association	Windsor-Essex County Development Commission
Southern Ontario Gateway Council	Corp. of Professional Great Lakes Pilots
Lakes Pilots Association, Inc.	Seaway Marine Transport
V.Ships Canada Inc.	

3.11 Canadian Border Services Agency (CBSA)

The team has met numerous times with CBSA throughout the study. CBSA has provided direct input regarding the plaza requirements in terms of size, proximity to the border, capacity, and components. They have reviewed and commented on alternative layouts and continue to advise on the layout and requirements at the preferred plaza location. To ensure that the plaza alternatives were viable and would operate smoothly the operations for each practical alternative were simulated under year 2035 traffic conditions using customized simulation software.

3.12 Emergency Services (EMS) / RCMP

The study team has consulted several times with EMS representatives (police, fire, and ambulance) as well as the RCMP. Meetings with EMS representatives have helped shape the location of access opportunities for the practical alternatives and for the preferred alterative. In particular, their input has influenced the access ramp locations at the Todd Land / Cabana Road intersection.

The team asked the RCMP to review the practical alternatives for the plazas and river crossing from a threat security viewpoint. This review was undertaken and with the conclusion that each alternative was viable and could be made secure with no undue threat to safety and security.

3.13 Environmental Agencies

3.13.1 Canadian Agency Advisory Group (CANAAG) / Individual Ministries and Agencies

The CANAAG was formed at the study outset to ensure that review and approval agencies would be brought into the process early and at timely study milestones. CANAAG consists of the following:

Canada Border Services Agency	Canada Political/ Economic Relations and Public Affairs
Canadian Coast Guard, Canadian Environmental Assessment Agency	Canadian Transportation Agency
Environment Canada	Essex County OPP
Essex Region Conservation Authority	Fisheries & Oceans Canada
Foreign Affairs & International Trade Canada	Health Canada
Indian and Northern Affairs Canada	International Joint Commission
Medical Officer of Health	National Energy Board
Natural Resources Canada	Ontario Ministry of Agriculture and Food
Ontario Ministry of Culture	Ontario Ministry of Economic Development & Trade
Ontario Ministry of Municipal Affairs & Housing	Ontario Ministry of Natural Resources
Ontario Ministry of Northern Development & Mines	Ontario Ministry of the Environment
Ontario Ministry of Tourism and Recreation	Ontario Realty Corporation
Ontario Tourism Marketing Partnership Corporation	Royal Canadian Mounted Police
Transport Canada – Marine	Windsor Port Authority.

The objective has been to take their concerns and requirements into account throughout the development analysis, evaluation and mitigation phases. As well an objective to ensure that they in-turn were abreast of study developments as they occurred, and had opportunities for input.

The consultation began in 2005 with initial meetings and development of work plans for major environmental disciplines. Draft work plans were reviewed and comments provided by review / approval agencies and amended accordingly. These work plans served to guide the data collection and analysis for these environmental disciplines. To date, 11 meetings with the CANAAG have been held. These meetings have served to update members on study progress, distribute draft reports for review, and receive input.

In addition to CANAAG meetings, over 15 meetings have been held with individual ministries and approval agencies, including:

- Essex Region Conservation Authority (ERCA);
- Department of Fisheries and Oceans (DFO);
- Ministry of Environment (MOE);
- Ministry of Natural Resources (MNR);
- International Joint Commission (IJC);
- Transport Canada;
- Health Canada;
- Ministry of Municipal Affairs and Housing;
- Canadian Environmental Assessment Agency;
- Canadian Citizenship and Immigration Office;
- Ministry of Agriculture;
- Ministry of Foreign Affairs;
- Trade Canada; and,
- Ministry of Economic Development Trade.

These meetings have been critical to and have helped shape the extensive environmental mitigation measure outlined in the Mitigation chapter of this report.

3.14 Individual Detroit River Authorities

The Detroit River Authorities include the Transport Canada, the Windsor Port Authority, the US Coast Guard, Canadian Shipowners Association, Canadian Great Lakes Pilots Association, and the International Joint Commission. The study team consulted with these agencies to determine whether it would be viable to have bridge piers in the Detroit River as part of the international crossing. The placement of even one pier in the river would lower the cost of the bridge by tens of millions of dollars. However, after consultation with these groups (and realizing that there would be environmental impacts by having a pier in the river) the Partnership decided that a full span of the river (no piers in the river) was the only viable options. Aside from the environmental concerns, one or more piers in the river would significantly detract from shipping and docking safety in the area.

3.15 Pre-Submission Review

This document has been / will be circulated to municipalities, review agencies and the general public for review and input prior to finalization and formal submission to the Minister of the Environment.

3.16 Summary

Since the beginning of the study in 2005, consultation has been an integral component of the project. Municipalities, agencies, businesses, communities, the public at large, and First Nations have been involved in the over 300 meetings and events which have occurred. The consultation has helped shape every phase of the study leading up to the recommended alternative and development of mitigating measures.

4 DESCRIPTION OF THE EXISTING ENVIRONMENT

This section of the report provides an overview of existing environmental conditions within the Preliminary Analysis Area (PAA), which is represented by the highlighted area in Exhibit 1.1 (see Chapter 1). Subsequent to the evaluation of the illustrative plaza, crossing and access road alternatives (refer to Chapter 6), the study team identified an Area of Continued Analysis (ACA), and a more detailed review of existing environmental conditions within this more focused area was undertaken. The reader is referred to Chapter 7 of this report for information regarding the existing environmental conditions within the Area of Continued Analysis.

Two Environmental Overview Papers were prepared to support the study team's assessment of existing conditions within the PAA. These papers, which are summarized below provide a rich source of existing conditions information for the PAA:

- *Environmental Overview Paper – Canadian Existing Conditions Volume 1 (Social, Economic, Archaeological, Cultural Heritage, Acoustics and Vibration, Air Quality, Waste and Waste Management and Technical Considerations), June 2005 (available); and*
- *Environmental Overview Paper – Canadian Existing Conditions Volume 2 (Natural Sciences), June 2005 (available).*

To enhance readability, the key findings from these documents are presented in the subsequent sections of this chapter. The reader is referred to each of the above documents, which are available electronically from the study website (http://www.partnershipborderstudy.com). Hard copies of the report are available from URS Canada upon request.

4.1 Air Quality

Southern Ontario is part of a regional airshed that stretches from the US Midwest into Quebec and the northeastern US states. Local air pollution sources are outweighed by pollutants entering the province from US sources. Prevailing wind patterns make US pollution sources the largest contributors to air pollution in Ontario. This is especially true for smog. On average more than 50% of Ontario smog originates south of the border.

The air quality of southwest Ontario and southeast Michigan is of special concern because of the past air quality problems that have been experienced in these areas. The increased air quality episodes in this region are mainly attributed to high population density in the region, a large number of heavy industries and the existing transportation infrastructure (major border crossings between the US and Canada). Special attention has been given to the air quality of these regions to reduce/prevent episodes of bad air quality by identifying the major contributing sources of pollutants and coordinating efforts to reduce/prevent pollutant emissions.

The Ontario Ministry of the Environment (MOE) measures air contaminants at various locations throughout Ontario, and reports on the state of Ontario's air quality on an annual basis. In the *Air Quality in Ontario 2000 Report*, MOE reported trends from 1991 to 2000 for ozone, inhalable particles, nitrogen dioxide, carbon monoxide, and sulphur dioxide, for nine US and Canadian cities in the Great Lakes Basin Area, including Windsor. The report showed that Windsor's mean concentrations for these contaminants were below respective *US National Ambient Air Quality Standards (NAAQS)* and Ontario ambient air quality criteria for all contaminants, with the exception of ozone.

The mean concentration of ozone in Windsor during this period exceeded Ontario's standard of 80 parts per billion. The report states that air quality in the province as a whole has improved over the past 30 years despite significant increases in population, economic activity and vehicle travel.

For the Windsor–Essex area the existing air quality is influenced by local and long-range (cross-border) contaminants generated in upwind urban and industrial areas. The predominant wind directions in Windsor are from the west to south-southwest. These bring contaminants from the heavily industrialized areas of Detroit and nearby communities. Air quality impacts are dominated by the substances that combine to produce smog or acid rain such as carbon monoxide (CO); nitrogen oxides (NOx); volatile organic compounds (VOCs); sulphur dioxide (SO_2); and particulate matter (SPM)[1].

To assess the current air quality in the Preliminary Analysis Area, historical air quality monitoring data from provincial (MOE)[2] and federal (Environment Canada)[3] stations, in close proximity to the Preliminary Analysis Area were considered.

Air quality monitoring stations that were located in the vicinity of the Preliminary Analysis Area and had the most complete set of data were selected for use in this study. The following stations were used:

- 467 University Avenue (Station #060204 C);
- College/South St. (Station #060211R);
- Wright/Water St. (Station #060212I); and
- Tecumseh, 9725 Riverside Drive East (Station #012009) (note: removed from the network in 2002).

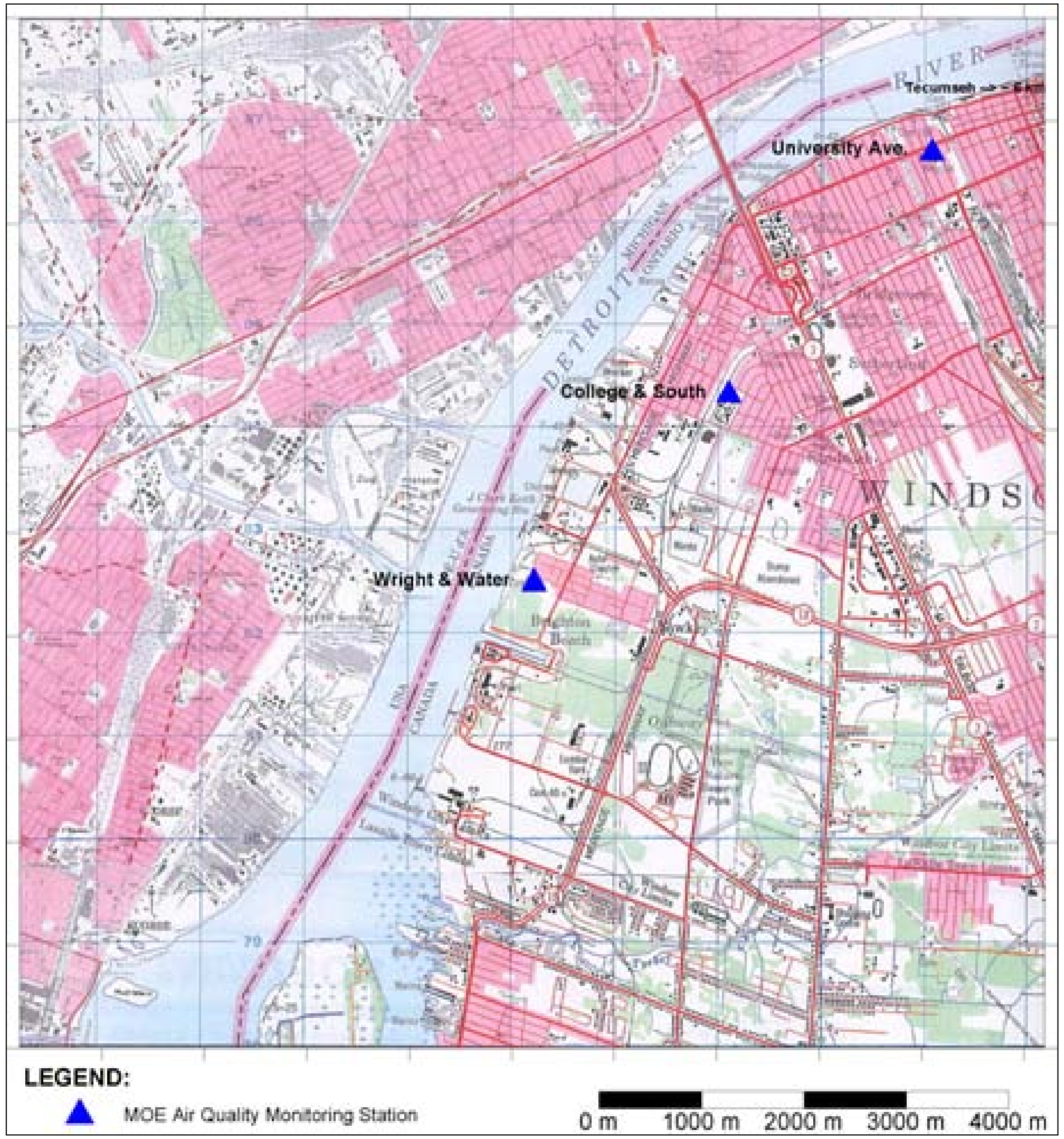
The location of these ambient air monitoring stations are illustrated in Exhibit 4.1. It should be noted that the stations shown in Exhibit 4.1 are representative of overall air quality conditions in the City of Windsor. They do not reflect particular local conditions, such as the present heavy traffic conditions on Huron-Church Road, nor do they reflect air quality conditions in the LaSalle area, where there are currently no ambient air monitoring stations.

The most recent available data (for 1999 to 2003) collected from these air monitoring stations are summarized in the *Environmental Overview Paper – Canadian Existing Conditions Volume 1* (refer to List of Supporting Documents). For each pollutant, statistical analyses including the mean, maximum and 90th percentile as well as the measured concentrations for different averaging times (e.g. 1-hour, 24-hour, etc.) are presented in tabular format in the report. Where applicable, numbers of exceedances (when the measured concentrations exceed the ambient air quality criteria (AAQC) for a certain averaging time) are also presented. With the exception of the annual monitoring data for VOCs and PAHs, which is collected by Environment Canada, all other data for conventional pollutants are from the MOE ambient monitoring stations in the vicinity of the Preliminary Analysis Area.

A brief summary of the findings for each pollutant is summarized in the following sections.

[1] Environment Canada 1999a.
[2] Environmental Monitoring and Report Branch, Ontario Ministry of the Environment, Air Quality in Ontario 1999-2003.
[3] Environment Canada 1999-2003.

EXHIBIT 4.1 – LOCATION OF LOCAL AMBIENT AIR QUALITY MONITORING STATIONS



NITROGEN OXIDES (NO_X) / NITROGEN DIOXIDE (NO_2)

Nitrogen oxides (NO_x) are present in the atmosphere as various species of NO, NO_2, N_2O, etc. NO_2 is monitored at three of the four monitoring locations, namely at College/South Street, Riverside Drive, and University Avenue, however, monitoring at the Riverside Drive Station was halted as of 2002. The 1-hour and 24-hour maximum NO_2 concentrations measured at the three stations did not exceed the AAQC of 200 and 100 ppb, respectively.

SULPHUR DIOXIDE (SO_2)

Ambient monitoring data for SO_2 concentration was collected at all four monitoring locations examined in this study. However, the monitoring at Riverside station and at Wright/Water St. Station were halted in 2002 and 2003, respectively. The available data indicate that the annual mean and the 1-hour and 24-hour maximums were not exceeded at any of the four stations, for the years 1999 to 2003.

CONTINUOUS PM_{10} MEASUREMENTS

Continuous ambient monitoring data for PM_{10} was collected at one of the four monitoring locations, namely, the College/South Street Station. However, this monitoring was halted as of 2002. The available data indicate that the Ontario interim criterion of 50 µg/m3 was exceeded greater than 9 times for all the three years of available data, i.e. 1999 to 2001.

CONTINUOUS $PM_{2.5}$ MEASUREMENTS

Ambient monitoring data for $PM_{2.5}$ is available for all four stations. However, the monitoring started in 2002 at the College/South Street Station, in 2001 at the 467 University Avenue Station, and ended in 2001 for the Riverside Drive Station. Only two years of data was collected at the Wright/Water Street Station. Achievement of the CWS is based on the 98th percentile over 3 years, which is equivalent to approximately 22 exceedences during this period. The available data indicate that the proposed Canada Wide Standard of 30 $\mu g/m^3$ was exceeded at all the four stations for all the years of available data.

OZONE (O_3)

Ambient monitoring data for O_3 concentration is available for two of the ambient monitoring stations, namely, the College/South Street Station and the 467 University Avenue Station. The available data indicate that the 1-hour maximum concentrations at both stations exceeded the AAQC of 80 ppb for the years 1999 to 2003.

CARBON MONOXIDE (CO)

Ambient monitoring data for CO concentration is available for one of the ambient monitoring stations, namely, the 467 University Avenue Station. The available data indicate that the 1-hour and 8-hour maximum concentrations at both stations did not exceed the AAQC of 30 and 13 ppm from 1999 to 2003, respectively.

VOCS AND PAHS

Ambient monitoring data for VOC and PAH concentrations was collected at Environment Canada's monitoring station for the City of Windsor. With the exception of benzo(a)pyrene and one year of data for naphthalene, the data set for the organic contaminants of interest is complete for the period of 1999 to 2003. When compared against the AAQC values, the maximum 24-hour values for the pollutants of concern are all below the associated criteria.

4.2 Socio-Economic Environment

This section provides a summary of existing socio-economic conditions within the Preliminary Analysis Area. Existing noise and vibration conditions, and economic conditions, as well as population characteristics are presented in this section. The *Environmental Overview Paper – Canadian Existing*

Conditions Volume 1 (refer to List of Supporting Documents) provides detailed documentation of conditions.

4.2.1 Noise and Vibration

The study team obtained information with regard to existing noise conditions in the Preliminary Analysis Area from numerous sources. These sources are described in more detail in the *Environmental Overview Paper – Canadian Existing Conditions Volume 1* (refer to List of Supporting Documents).

The Preliminary Analysis Area (**Exhibit 2.1, Chapter 2**) encompasses a range of land use conditions which varies from highly urbanized areas within the City of Windsor and the neighbouring towns of LaSalle and Tecumseh to rural areas with intensive agricultural land uses.

Transportation noise, including road, rail, air and watercraft, is a major contributor to the existing noise environment. Industrial, including several large complexes and commercial activities are also significant sources of existing noise.

In rural areas, the existing noise environment is characterized by sounds of nature, domestic activities and farm machinery noises.

4.2.2 Population and Demographic Trends

Table 4.1 lists the population of the Canadian segments of the Preliminary Analysis Area for 1991 and 2001. Although not available at the time of preparing the *Environmental Overview Paper – Canadian Existing Conditions Volume 1* (refer to List of Supporting Documents), population and demographic information from the 2006 Canadian Census was available at the time of preparing this EA Report, and has also been presented in **Table 4.1** for comparison purposes.

Between 1991 and 2001 all three communities experienced growth with higher growth rates experienced in the surrounding Towns of LaSalle and Tecumseh.

Continued growth was experienced between 2001 and 2006 for the City of Windsor and Town of LaSalle, while a small decline in growth was experienced in the Town of Tecumseh. The highest growth rate was experienced in the Town of LaSalle over the five year period.

TABLE 4.1 – POPULATION IN THE PRELIMINARY ANALYSIS AREA[4]

Population	Windsor	LaSalle	Tecumseh
Population in 2006	216,473	27,652	24,224
Population in 2001	208,402	25,285	25,105
Population in 1991	191,435	16,628	10,495
1991 to 2001 population change (%)	9%	23.7%	23.9%
2001 to 2006 population change (%)	3.9%	9.4%	-0.4%

As illustrated in **Table 4.2**, the population is projected to grow moderately over the next twenty years. The City of Windsor population has gradually declined since the mid-1990's as the other municipalities have developed. The population in the Preliminary Analysis Area is expected to grow at an average rate of approximately 2 to 2½ %. The exception to this is the Town of LaSalle where the expected rate of growth is projected to be between 2½ and 4% annually. The Town of LaSalle is a rapidly urbanizing municipality.[5]

TABLE 4.2 – FORECASTED POPULATION CHANGES IN THE PRELIMINARY ANALYSIS AREA[6]

Population	Windsor	LaSalle	Tecumseh
Population in 2001	208,402	25,285	25,105
Population in 2020	200,972	32,400	35,259
2001 to 2020 population change (%)	-3.6%	28.1%	40.4%

With regard to demographic trends, the age characteristics of the population for the three communities are presented in **Table 4.3**. Other characteristics of the population are included in the *Environmental Overview Paper – Canadian Existing Conditions Volume 1* (refer to List of Supporting Documents).

TABLE 4.3 – AGE CHARACTERISTICS OF THE POPULATION[7]

Age Characteristics of the Population (2001)	Windsor			LaSalle			Tecumseh		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total - All persons	208,405	101,925	106,475	25,285	12,550	12,730	25,105	12,410	12,690
Age 0-4	13,155	6,810	6,345	1,765	945	820	1,420	725	695
Age 5-14	26,495	13,680	12,810	4,095	2,065	2,025	3,955	2,035	1,920
Age 15-19	12,960	6,555	6,400	1,885	935	945	2,035	1,020	1,015
Age 20-24	15,330	7,600	7,730	1,470	745	725	1,550	810	740
Age 25-44	65,915	33,355	32,560	8,245	3,985	4,255	7,255	3,460	3,790
Age 45-54	26,910	13,220	13,690	3,650	1,800	1,845	4,205	2,055	2,150
Age 55-64	18,305	8,800	9,500	2,190	1,130	1,060	2,385	1,240	1,145
Age 65-74	15,595	7,070	8,530	1,295	665	635	1,435	720	720
Age 75-84	10,645	4,015	6,630	585	245	340	685	280	400
Age 85 and over	3,100	815	2,285	110	30	80	175	60	115
Median age of the population	36.0	34.8	37.2	35.1	34.9	35.3	37.1	36.8	37.4
% of the population ages 15 and over	81.0	79.9	82.0	76.8	76.0	77.6	78.6	77.8	79.4

4.2.3 Economic Conditions

This section provides an overview of the existing economic conditions in the Preliminary Analysis Area. At the time of undertaking the analysis, the most recent available information corresponded to 2004. At the time of preparing this report, more recent information was available, and has also been presented throughout this section for comparison purposes.

The economic analysis for this study has been undertaken in two phases:

- Phase I consisted of an overview of the existing economic base, urban structure and growth outlook in the Preliminary Analysis Area; and,

[4] Statistics Canada 2002 & Statistics Canada, 2007.

[5] URS Canada Inc. Canada - United States - Ontario - Michigan Border Transportation Partnership Planning/Need and Feasibility Study: Environmental Overview Report (Amended). January, 2005.

[6] Statistics Canada 2002.

[7] Ibid.

- Phase II consisted of a detailed analysis of the economic and business impacts of each route, including an examination of the social and economic fabric of the neighbourhoods. Further information with regard to the Phase II economic analysis is included in **Chapter 7**.

The focus of the analysis was on local economic impacts. Regional economic impacts related to reducing the cost of congestion were analyzed; however, it was difficult to assign these impacts to any particular person or location. Improving transportation is primarily a benefit to society and the enhancement of the role of Windsor-Essex within southern Ontario.

The analysis considered three main factors:

- **The future outlook.** A key consideration in determining local economic impact is the effect that a major transportation investment could have on future growth. If the improved capacity results in more rapid growth than is currently anticipated there will be economic impacts related to new jobs and people, the provision of services and property assessment and other land use planning considerations.
- **Urban structure.** Major highway corridors can be highly influential in directing the location of urban growth and economic activity. Plans are currently in place to accommodate growth in Windsor for about 20 years. If the planned urban structure is changed this would have economic impacts in terms of land use designations, inefficient use of existing investments and additional infrastructure investment to accommodate growth in new locations
- **Real estate in the corridor.** There will be economic impacts associated with demand for services related to the construction of the facility, the displacement of people and jobs, changes in property values and long term changes in access patterns.

CURRENT ECONOMIC SITUATION IS HAVING A SIGNIFCANT IMPACT ON WINDSOR-DETROIT, BUT THE COMPLETE EFFECT IS NOT YET CLEAR

This report is being finalised at the beginning of November of 2008. At this time, there is no clarity as to the short-term or long-term consequences of the global financial crisis and stock market turmoil of September and October 2008. While signifcant effects to the local economy of Windsor and elsewhere are expected, the length and depth of the economic slowdown is highly uncertain.

Additional uncertainty in Windsor is created by the possibiltiy of major restructuring and, perhaps, mergers among the major North American manufacturers. As this is being written, some of the major outcomes are expected soon, but yet known.

The current situation will only be understood within a long-term context, recognising the cyclical nature of economies, particularly a manufactuing-based economy such as Windsor. Future long-term prospects for Windsor, even in a time of great uncertainty,will remain based on its core economic attractions including internatioinal trade infrastructure such as is being planned for the long term through the Deteroit River International Crossing process.

WINDSOR-DETROIT IS A KEY LINK IN A LARGER ECONOMIC SYSTEM

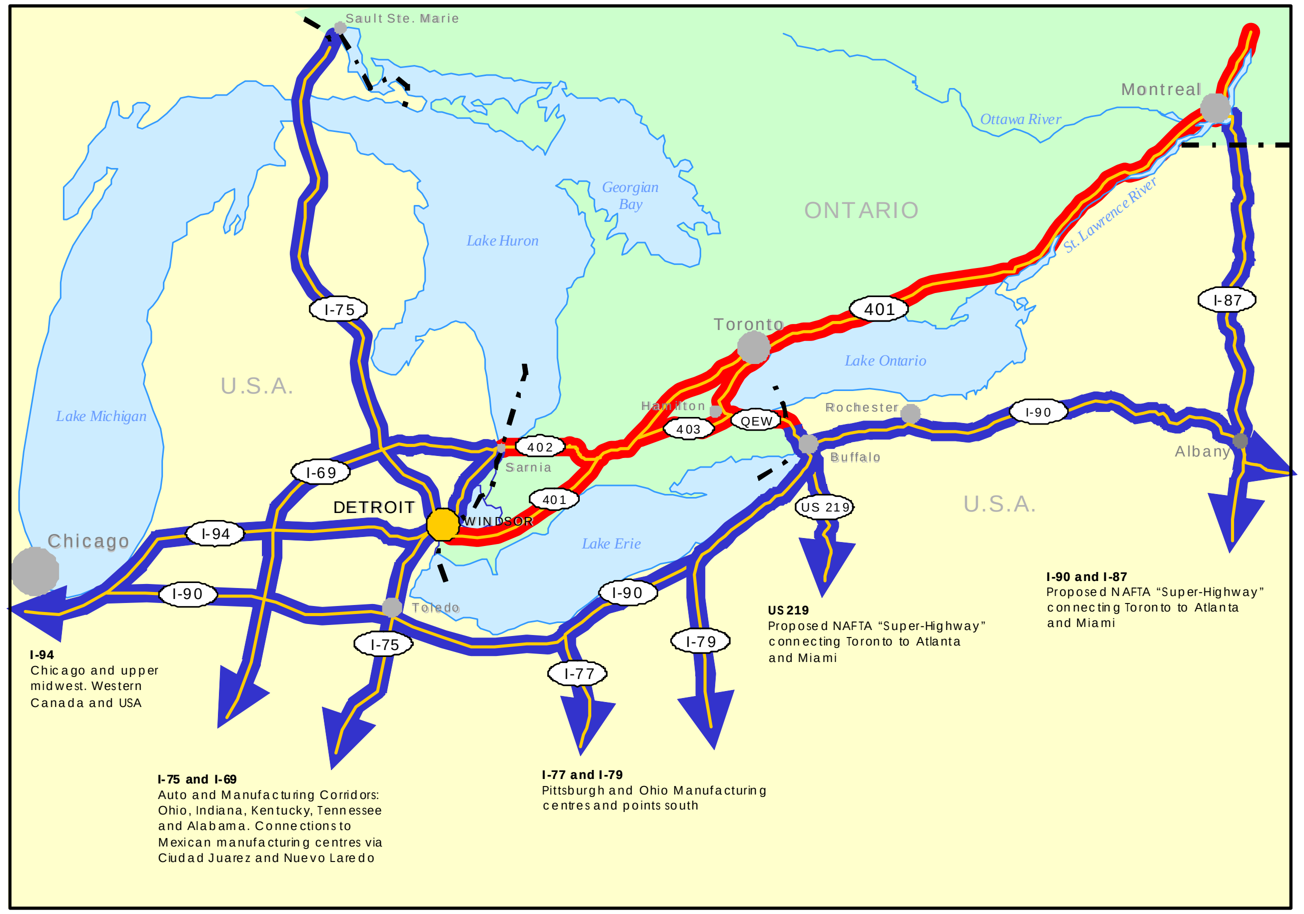
As illustrated below in **Exhibit 4.2**, the Windsor-Detroit area is one of three major links within a system of highways and trade corridors connecting major urban areas in southwest Ontario to major US centres. A significant amount of trade takes place between Canada and the US, and the transportation system in southern Ontario plays a key role in facilitating this economic activity. Major connections to the US served by the Windsor-Detroit crossing include:

- I-94, which provides access to Chicago and the upper midwest, Western Canada and other parts of the US;
- I-75 and I-69, which are major auto and manufacturing corridors providing access to Ohio, Indiana, Kentucky, Tennessee, Alabama and to major Mexican manufacturing centres in Mexico; and
- I-77 and I-79, which provide access to manufacturing in Pittsburgh and Ohio and other southern locations.

In the Windsor-Detroit area, Windsor is by far the smaller of the two urban areas. The Windsor Census Metropolitan Area (CMA) is comprised of the City of Windsor and the Town's of Lakeshore, Amherstburg, Tecumseh, and LaSalle. Windsor represents the major urban area in the CMA with the built up areas of neighbouring Tecumseh and La Salle located along the border. The remainder of the CMA is largely rural with some scattered hamlets and shoreline development. In 2006, the Windsor Census Metropolitan Area (CMA) had a population of approximately 325,000[8]. This is much smaller than the approximate 4.5 million residents within the Detroit Metropolitan Statistical Area (MSA). Within the MSA, Wayne County contains the core urban area within which the City of Detroit is located. The difference in size between Windsor and Detroit is clearly evident in **Exhibit 4.3**. Because Windsor is relatively small, a major infrastructure investment could have a major economic impact. Windsor is strategically located at the end of one highway corridor in Ontario (Highway 401) and the beginning of a much larger system of highways and trade corridors to the United States. As a result, improving the connection between these two areas could have significant implications for the future economic prospects and growth.

[8] http://www.citywindsor.ca/002358.asp

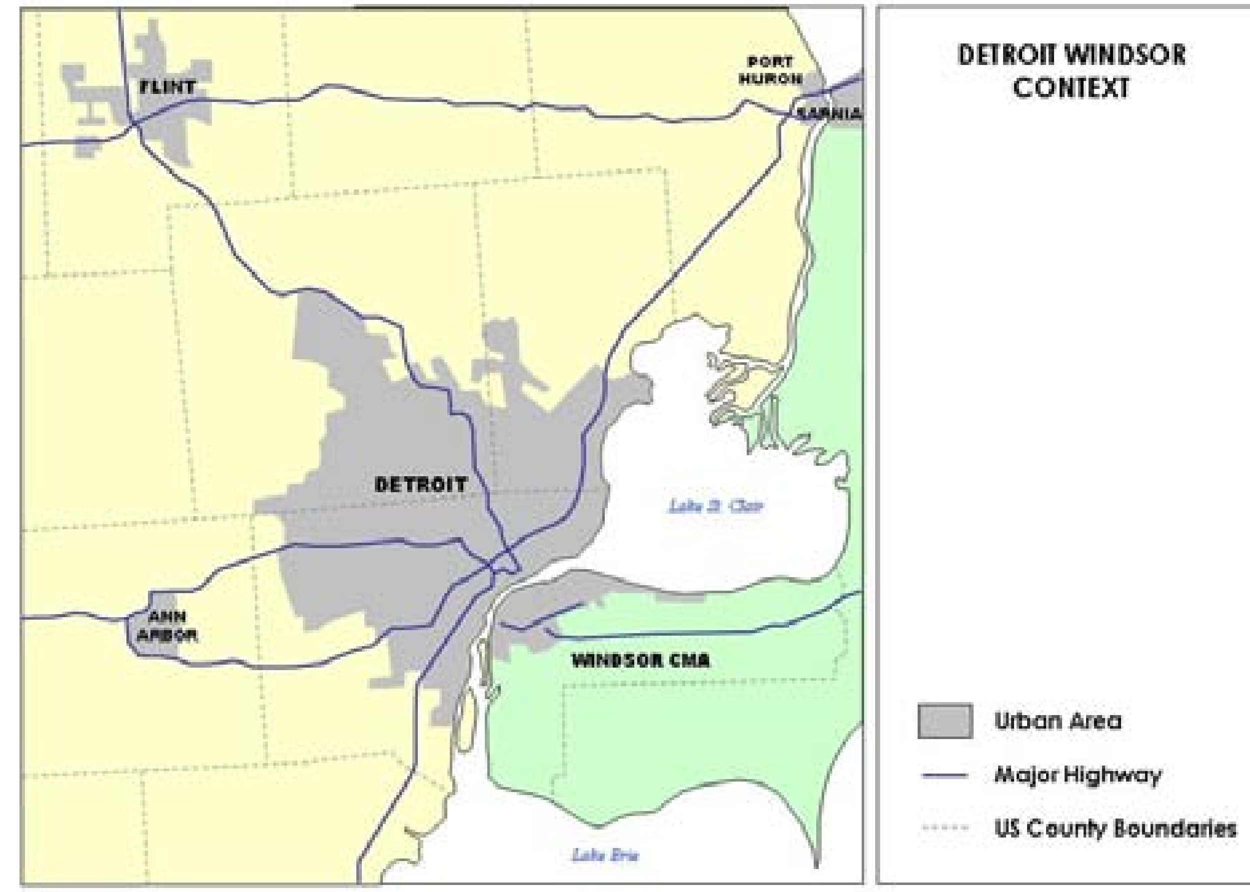
Exhibit 4.2– Southwest Ontario – US Highway System



NTS

Source: Hemson Consulting Ltd.

Exhibit 4.3 – Windsor-Detroit Context



NTS

WINDSOR IS SMALLER THAN DETROIT, BUT GROWING

Overall, the population of the Detroit MSA has remained stable at about 4.5 million since 1970. Wayne County, however, which contains the core urban area, has experienced a steady decline in population, from 2.7 million in 1970 to just under 2 million in 2007. By comparison the Windsor CMA has grown steadily over the past 35 years adding about 140,000 people, as shown in Exhibit 4.4.

A similar situation is observed with employment. Between 1987 and 2008, a net of more than 30,000 jobs have been added with steady gains occurring from 1994 through to a peak of 165,000 in 2006. The last two years have seen some employment decline as the downturn in manufacturing has its effect on the labour market (refer to Exhibit 4.5).

EXHIBIT 4.4 – POPULATION OF WINDSOR CMA SINCE 1971

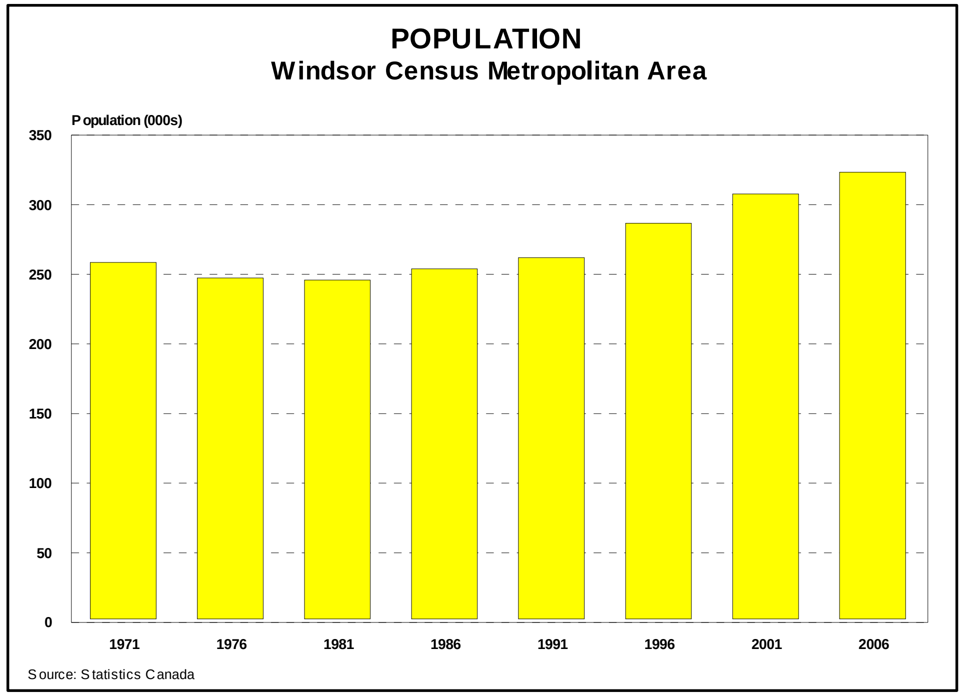
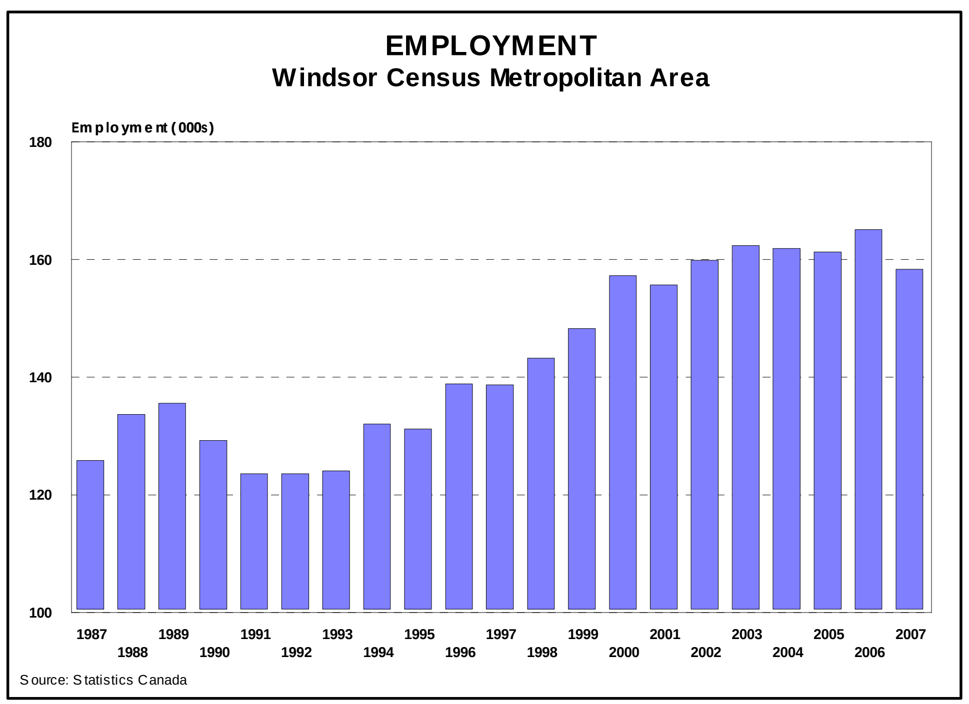


EXHIBIT 4.5 – EMPLOYMENT IN WINDSOR CMA SINCE 1987



BUILDING ACTIVITY HAS BEEN STRONG

Despite some clear cyclical variations new residential construction has generally been strong over the long term (Exhibit 4.6). Rapid population growth in the 1970s was accompanied by significant housing construction and then halted abruptly by a deep downturn at the start of the 1980s. The remainder of the 1980s and 1990s was characterized by steady growth in new permits, with the peak of the current cycle evident in 2002 but with significant subsequent declines in response to the recent economic slowdown.

In the industrial commercial sector the recession of the early 1980s was followed by more moderate levels of new permit activity. It is only since the 1990s that new construction and investment returned to levels observed in the late 1970s. The peak in 1997 is the Windsor Casino investment, as shown in Exhibit 4.7. Recent permit values have yet to show a pattern of decline seen in the residential permits.

EXHIBIT 4.6 - RESIDENTIAL BUILDING PERMITS IN WINDSOR CMA SINCE 1970

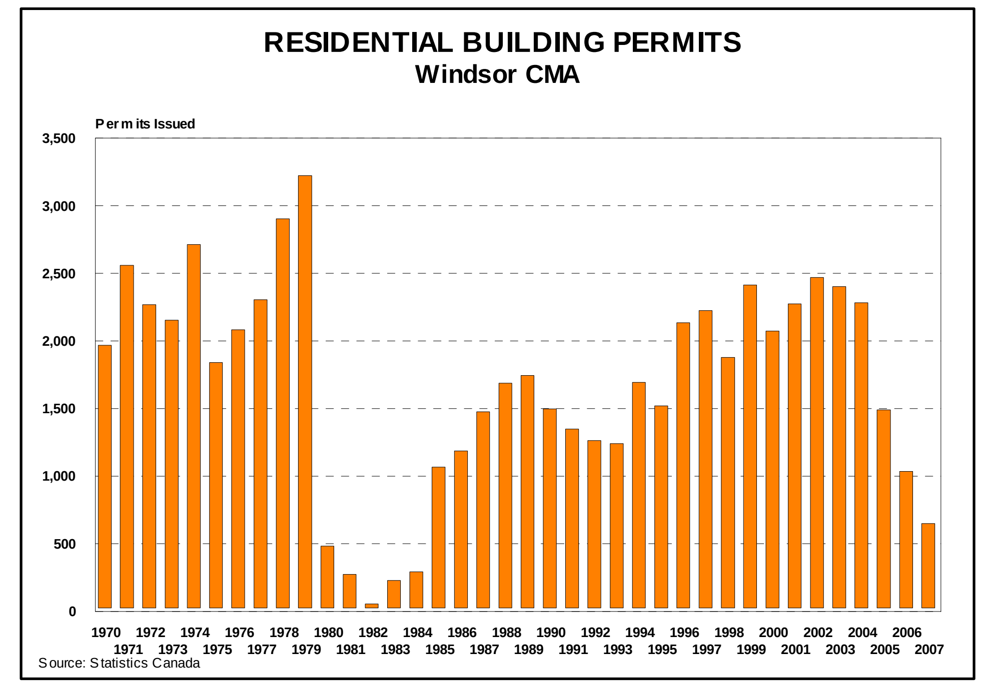
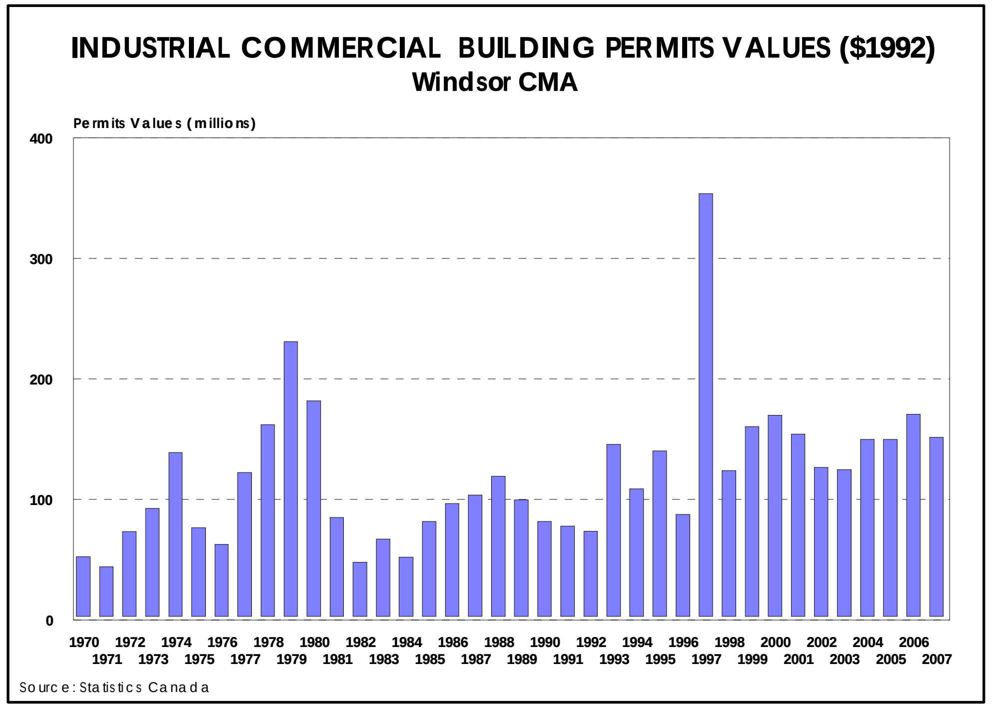


EXHIBIT 4.7– INDUSTRIAL COMMERCIAL BUILDING PERMITS VALUES IN WINDSOR CMA SINCE 1970



ECONOMIC BASE IS CONCENTRATED IN THE AUTOMOTIVE INDUSTRY

Considering the importance of the automotive sector in the Canadian economy the concentration of vehicle and parts manufacturing in Ontario and Windsor's key location in the broader transportation system, it seems logical that Windsor's economic base would also be focused in the automotive sector. The automotive sector is a major contributor to Windsor's manufacturing base. All three of the North American automakers produce car components in Windsor. Chrysler has the only major assembly facility in Windsor producing light trucks (mini-van and SUV), which account for almost 13% of the vehicles manufactured in Canada.

In addition to the Chrysler plants, Ford has an engine plant and a test track while General Motors has an engine plant in Windsor among a wide range of other automotive manufacturing activities. General Motors has, however, announced the closing of its engine plant in 2010.

While declining from earlier peaks, vehicle production in Canada remained relatively robust into 2007 Of course, when complete statistics are available for 2007 and more so for 2008, a significant decline in production will be evident. Refer to Table 4.4 below for trends in Canadian vehicle production from 2003 to 2006.

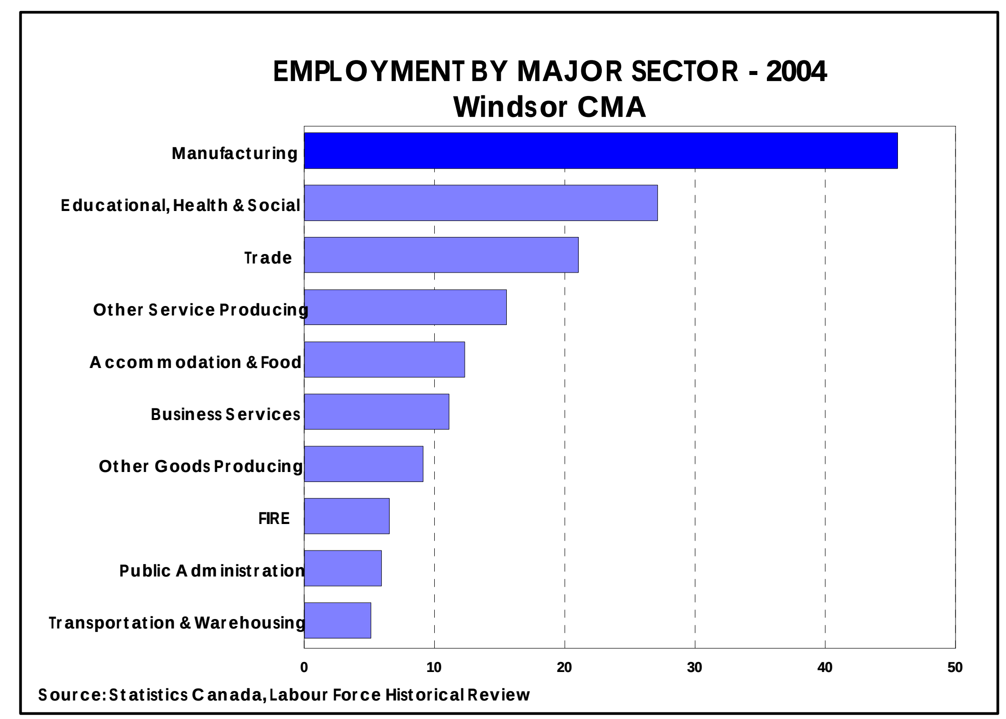
TABLE 4.4– CANADIAN VEHICLE PRODUCTION IN 2003 - 2006[9]

	2003	*Windsor*	2004	*Windsor*	2005	*Windsor*	2006	*Windsor*
Chrysler	447,526	*307,177*	555,278	*346,233*	678,382	*307,477*	605,733	*291,572*
Ford	461,429	-	372,241	-	221,809	-	196,374	-
GM	940,044	-	923,862	-	841,235	-	794,421	-
Honda	392,230	-	325,704	-	385,491	-	387,078	-
Toyota	227,543	-	287,859	-	305,966	-	317,433	-
Total	2,468,772	307,177	2,464,944	346,233	2,432,883	307,477	2,301,039	291,572

In addition to production, Windsor is home to the Chrysler Canadian headquarters and its Automotive Research and Development Centre. At peak production during the middle of this decade, the 3 major North American automakers together employed approximately 14,000 people in Windsor, almost 10% of the workforce. In total, there are 80 companies involved in automotive parts and assembly in the City of Windsor. Complete recent statistics are not available, but many of these jobs will have been lost, at least temporarily through completed and announced plant closings and layoffs.

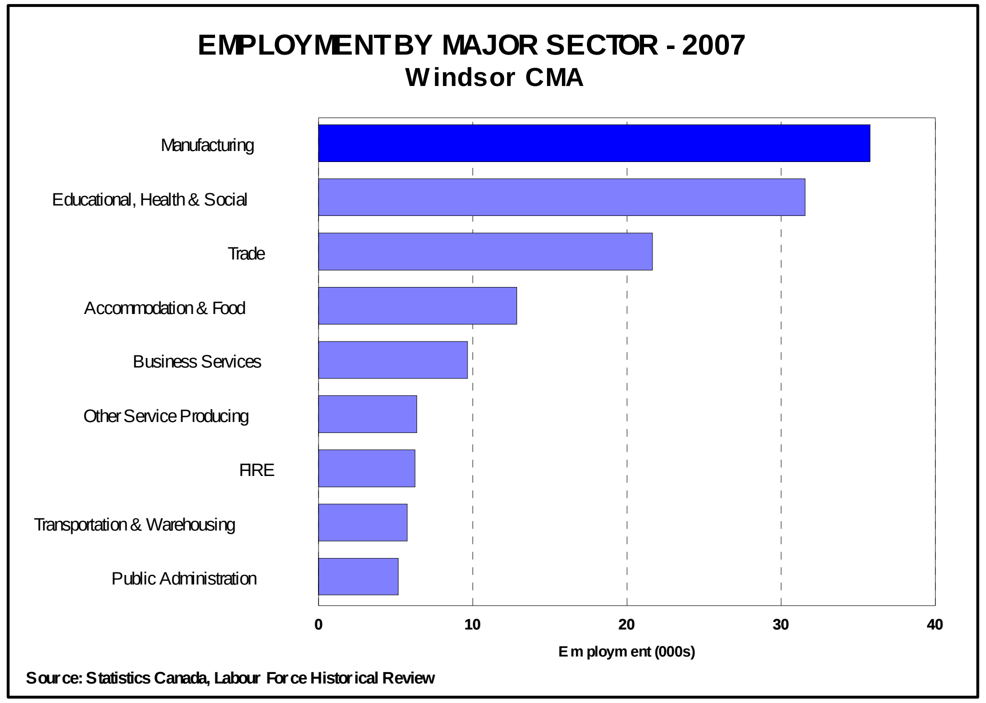
As a result of the focus on the automotive sector, Windsor has a long history as a manufacturing based economy. In 2004, manufacturing accounted for 46,000 employees and 28 per cent of total employment (Exhibit 4.8). Subsequently, for comparison purposes, in 2007, manufacturing accounted for 36,000 employees and 23 per cent of total employment (Exhibit 4.9).

EXHIBIT 4.8 – EMPLOYMENT BY MAJOR SECTOR IN 2004 IN WINDSOR CMA



9 Industry Canada; Ward's AutoInfoBank

EXHIBIT 4.9 – EMPLOYMENT BY MAJOR SECTOR IN 2007 IN WINDSOR CMA



The focus of Windsor's economic base on manufacturing is clear when compared to Ontario. Manufacturing is third largest component of employment in Ontario, where there is a greater diversity in other service-providing sectors, as shown in Exhibit 4.11 and for comparison purposes, Exhibit 4.12.

EXHIBIT 4.10 – EMPLOYMENT BY MAJOR SECTOR IN 2004 IN ONTARIO

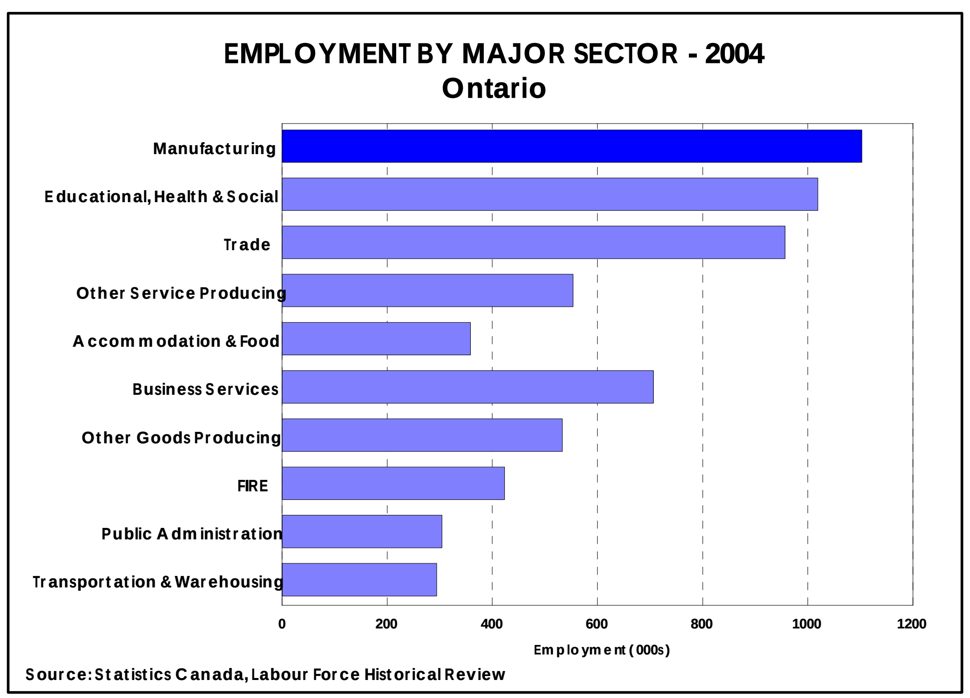
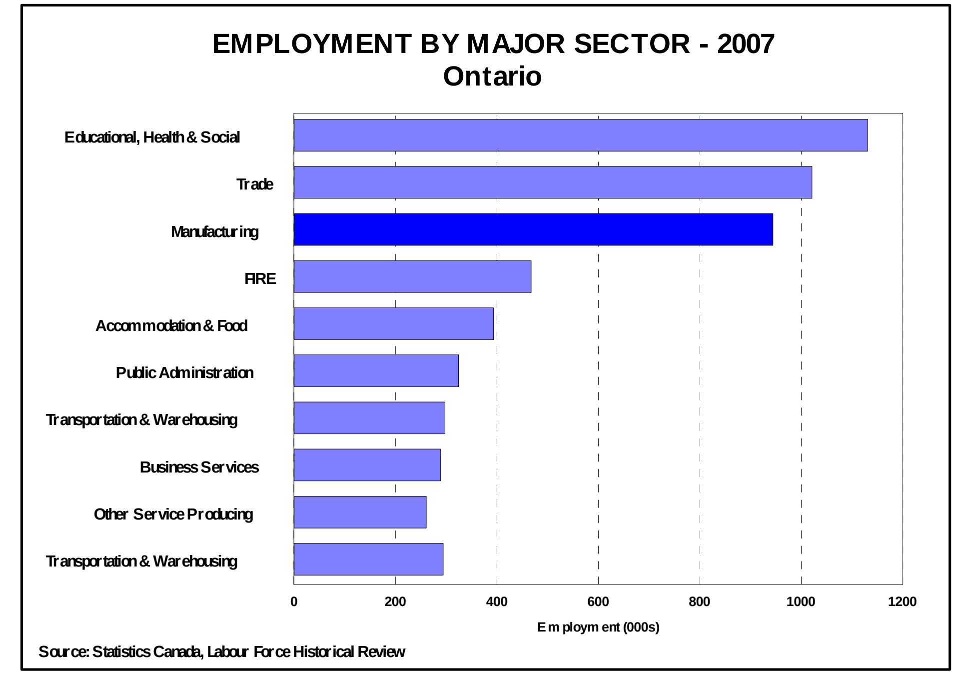


EXHIBIT 4.10 – EMPLOYMENT BY MAJOR SECTOR IN 2007 IN ONTARIO



4.3 Land Use

The Preliminary Analysis Area is comprised of an upper-tier and lower-tier municipal structure. The upper tier municipalities are the City of Windsor, and the Corporation of the County of Essex.

The City of Windsor is responsible for providing long-range land use planning and policy development, environmental management, recreation, transit and other services (police, fire) for the City. The Official Plan for the City of Windsor provides the policy framework to guide and manage growth within the City.

The Corporation of the County of Essex is comprised of seven newly restructured municipalities –Town of LaSalle, Town of Tecumseh, Town of Lakeshore, Town of Amherstburg, Town of Essex, Town of Kingsville, and Municipality of Leamington. As an upper-tier municipality, Essex County is responsible for providing services that are common to all municipalities in Essex County thereby avoiding the need for duplicate services and administration. These services include: transportation services, libraries, homes for the aged, planning services, emergency management coordination, community services, land ambulance and general government administration. As well, the County is a funding partner for Regional services including: social services, child care, social housing, public health, economic development, tourism and property assessment[10].

With regard to long-range land use planning and other services, each lower-tier municipality within Essex County has an Official Plan to help guide and manage growth. Planning staff from the lower-tier municipalities collaborate with the upper-tier planning staff at the County of Essex to ensure future growth is well managed and in compliance with provincial legislation.

[10] www.countyofessex.on.ca

The following sections provide a brief overview of the Official Plans for the City of Windsor and the three lower-tier municipalities within Essex County that are included within the Preliminary Analysis Area for this study. Of note is that each municipality has planning designations related to floodplains and flooding control. These designations are not related to natural heritage or environmental features, but rather to natural hazards. Accordingly, no references were made to this aspect of planning policy in the following sections. Further to this, the designated environmental areas within the Preliminary Analysis Area are discussed in Section 4.6.6.

4.3.1 City of Windsor

LEGAL STATUS OF PLAN

The *City of Windsor Official Plan (2004)*[11] was adopted on October 25, 1999 by By-law 350-1999. The Plan was approved by the Ontario Ministry of Municipal Affairs and Housing (MMAH), in part, on March 28, 2000. The remainder of the Plan was approved by an Ontario Municipal Board (OMB) decision on November 1, 2002.

ENVIRONMENTAL DESIGNATION

Section 5, Volume 1 of the Official Plan identifies designations as being part of the '*Greenway System*' on Schedule B of the City's Official Plan.

Section 6, Volume 1 identifies permitted uses for each of the land use designations in the City.

Public and Private Open Space (Section 6.7)	Identifies the main locations for recreation and leisure activities. Permitted uses include recreation and leisure areas and facilities. Public Open Spaces include Community and Regional Parks, and Neighbourhood Parks. Ancillary uses may include residential, commercial or institutional provided that the use is clearly secondary to and complementary with the main Open Space use.
Natural Heritage (Section 6.8)	Permitted uses include nature reserves and wildlife management. Ancillary uses may include recreation and leisure activities and facilities, provided the use is secondary and complementary to the main permitted use. If development is proposed, an Environmental Evaluation Report (EER) is required to demonstrate that features and functions will not be adversely impacted. EERs are also required for any development on lands adjacent to those designated Natural Heritage.
Waterfront (Section 6.10)	Identifies the main locations for recreation and leisure activities and facilities along the waterfront. Permitted uses include recreation and leisure activities, facilities and marina for pleasure craft. A recreational needs study is required at the time of application to confirm that the change in land use is appropriate.

The following table summarizes subcategories to the land use designations, and is identified as '*Development Constraint Areas*' on Schedule C of the City's Official Plan. These areas afford various levels of protection to the City's natural environmental features.

[11] www.citywindsor.ca

Natural Heritage	Policies identify areas under provincial protection (ie. Provincially-Significant Wetlands and ANSIs)
Environmental Policy Areas	Identifies areas of significance that may permit development, subject to criteria, including: biological diversity; significant natural community; vulnerable, threatened or endangered species; low levels of disturbance; significant earth science features; and, visual, aesthetic or recreational importance to the City.
Candidate Natural Heritage Sites	Contains potentially significant and/or sensitive environmental features or functions, which are subject to an Environmental Evaluation Report to determine if development is appropriate.
Aggregate Resource Sites & Mineral Mining Sites	Considers temporary land uses, with ultimate land uses identified on Schedule D of the Plan.
Floodplain Area	Identifies floodplains determined by the Essex Region Conservation Authority (ERCA).
Shoreline and Floodprone Areas	Identifies areas subject to flooding that were determined by the ERCA. Development in these areas is subject to additional study and setbacks to prove that the development will not be impacted by flooding.
Potentially Contaminated Sites	Requires that Environmental Site Assessments be undertaken to confirm the existence and nature of any contaminants, as well as recommending methods to remediate the site.

SECONDARY PLANNING AREAS

The *Official Plan – Volume 2* contains several Secondary Plans, some of which have natural feature components.

East Riverside Planning Area

- A Greenway System is proposed for this area, which will be composed of a linear assembly of open spaces, natural features, stormwater management areas and community services. It will provide a network of recreational trails, linking planning areas to one another and to natural/recreational areas off-site.

South Cameron Planning Area

- A community park/woodland in the centre of the district is intended for conservation. It contains mature and successional deciduous woods.

Spring Garden Planning Area

- Features in this area are recognized as significant, including Spring Garden Natural Area Complex (Schedule SG-1) and shall be conserved. Development must adhere to the Spring Garden Complex Management Plan.
- All lands within the Spring Garden Natural Area Complex shall be acquired in stages, by means of exchanges, parkland conveyance provisions (*Planning Act*), purchase by City based on independent appraisal, or purchase by appropriate government agencies.
- A noise study shall be undertaken for any development proximate to the E.C. Row Expressway, Huron Church Road and Malden Road.

Forest Glade North Planning Area

- The ERCA identified a '*Candidate Natural Heritage Site*', which is designated as an *'Environmental Policy Area B*' in the Official Plan. This feature contains mature woods and open fields that are in a shrub-dominated stage of succession.

LEVEL OF PROTECTION

Lands included as part of the Greenway System may be protected via: conveyance/dedication as part of the planning system; land purchase; partnership arrangements with the ERCA or other group; conservation as a condition of planning approval; leases with private property owners to protect parts/all of the identified area; land exchange; donations/gifts/bequeaths from individuals/corporations; conservation easements; stewardship agreements; and other measures.

Environmental land use designations within the City of Windsor are governed by Provincial statute and policy. Only those features/functions identified as Provincially-Significant are afforded protection from the Provincial Policy Statement. However, the *Planning Act*, in combination with the Official Plan and municipal practices, does provide protection via constraints to development, through the use of Development Constraints, or overlays.

4.3.2 Essex County

Of the seven lower-tier municipalities within Essex County described previously, three are within the Preliminary Analysis Area – Town of Amherstburg, Town of LaSalle[12] and Town of Tecumseh[13]. The other four lower-tier municipalities are not within the Preliminary Analysis Area. An overview of the Official Plans for each of these municipalities is included in the following sections.

TOWN OF AMHERSTBURG

Legal Status of Plan

The *Corporation of the Town of Amherstburg Official Plan was* adopted on March 22, 1999. The Plan was approved by the Ministry of Municipal Affairs and Housing (MMAH) on July 6, 1999.

Environmental Designations

Section 2 identifies land use policies for various uses, including: woodlots, developments along inland watercourses, re-use of potentially contaminated sites, and, special policy area – species at risk.

Section 3 provides the land use designations, including permitted uses and other restrictions in the Town. These include:

Natural Environment (Section 3.8)	Identifies and protects environmentally significant areas including: valleylands, habitat of endangered and threatened species, fish habitat, significant woodlands, wildlife habitat and ANSIs. Permitted uses include: wildlife management, including hunting and fishing, natural environmental management, passive outdoor recreation, conservation and associated facilities. Site alteration is only permitted once Council and the Conservation Authority are convinced that no adverse impacts will occur. An Environmental Impact Statement may be required to demonstrate this. All Natural Environment lands will be zoned in a Natural Environmental Zone in the implementing Zoning By-law.
Wetland (Section 3.9)	Identifies and designated Provincially Significant wetlands and prohibits development within them. Permitted uses include: conservation, fish and wildlife management areas, passive open space uses, existing agricultural uses and any buildings/structures associated with a permitted use. Dyked portion of lands are not designated wetland, but rather Natural Environment instead. Development of adjacent lands, as defined by the Provincial Policy Statements, may be permitted if no negative impact on the wetland can be demonstrated. All land based Provincially Significant wetland areas are zoned Wetland Area by the Town's Zoning By-law.

Level of Protection

All lands designated Natural Environment are protected by the Town's Zoning By-law and the *Planning Act*. In addition, the *Provincial Policy Statements (PPS)* and *Planning Act* provide protection for provincially significant natural heritage features and functions.

TOWN OF LASALLE

Legal Status of Plan

The Town *of LaSalle Official Plan – LaSalle 2016 – Healthy, Vibrant and Caring* was adopted on October 14, 1997. The Plan was approved by the Ministry of Municipal Affairs and Housing (MMAH) on May 18, 1998. The document used for this report is the November 4, 2003 Office Consolidation, which incorporates Official Plan Amendment No. 1, provincially approved on November 4, 2003.

Environmental Designations

Section 2 identifies general development policies for various uses, including: woodlots; developments along inland watercourses; re-use of potentially contaminated sites; and, special policy area – species at risk.

Section 3 provides the land use designations for natural heritage sites, including permitted uses and other restrictions in the Town. These include:

Wetland (Section 3.11)	Includes all land-based and submergent wetlands situated on or along the Detroit River, Turkey Creek or the Canard River which have been identified by the MNR as Provincially-Significant. Detroit River Marsh Wetland Complex is the largest in the Town. First evaluated in 1985, it has had several re-evaluations to refine the boundaries of the wetland. Development is prohibited within any 'wetland' designation, except for buildings and structures used in conjunction with a permitted conservation, fish and wildlife management or public passive open space purpose. Permitted uses include: conservation, fish and wildlife management areas, passive open space uses and existing agricultural uses.

[12] www.town.lasalle.on.ca
[13] www.town.tecumseh.on.ca

Natural Environment (Section 3.8)	Features designated include: woodlots, wetlands, and prairie communities. Each of these play an important ecological role in keeping people physically, mentally and spiritually healthy. Permitted uses include: passive recreation, wildlife management, conservation uses and buildings/structures associated with these uses. Utility corridors and inland watercourses should be used as linkages between natural heritage sites, and should be enhanced and maintained as wildlife habitat areas, recreational trails, bikeways and walkways. Preservation and management of these areas shall be via public purchase, private stewardship, conservation easements and management agreements.

Secondary Planning Areas

The Official Plan contains Secondary Plans, some of which have natural feature components.

Bouffard and Howard Planning Districts Secondary Plan

- A Greenway System is proposed for this area, which is in the approved urban growth boundary of the Town of LaSalle. This will involve the creation of linkages, connecting wildlife habitats, human settlements, urban to rural areas, etc.
- Land Use designations include: Recreational, Natural Environment, Natural Corridors/Greenway Linkage, Neighbourhood Centre, Neighbourhood Park and Stormwater Management Pond.
- Permitted uses include: public use and utility facilities, stormwater management facilities, fish, wildlife and conservation management uses, archaeological activities, legally existing uses, buildings and structures and their replacement, non-intensive recreation uses such as nature trails and parks.

Level of Protection

The Town of LaSalle, through its Official Plan has set a goal of creating a Greenway System, which will comprise trails, parks and woodlots for the benefit and enjoyment of wildlife and residents alike. As a municipal planning policy, this provides a reasonable level of protection for natural features within the proposed Greenway System.

Environmental land use designations within the Town of LaSalle are governed by Provincial statute and policy. Only those features/functions identified as Provincially Significant are afforded protection from the *Provincial Policy Statement (PPS)*, including the Detroit River Marsh Wetland Complex. However, the *Planning Act*, in combination with the Official Plan and municipal practices, does not provide protection for any regionally or locally significant natural features.

TOWN OF TECUMSEH

Legal Status of Plan

In 1999, the former Town of Tecumseh, Village of St. Clair Beach and Township of Sandwich South were amalgamated. The existing Official Plans of the former municipalities remain in place until a new Official Plan is adopted by the Town of Tecumseh. Details of the existing Official Plan documents are provided in Table 4.4. Since June 13, 1946, the Town of Tecumseh has also been a subsidiary planning unit with the Windsor and Suburban Planning Area.

TABLE 4. 5 - SUMMARY OF TOWN OF TECUMSEH OFFICIAL PLANS

Title	Adopted	Approved
Town of Tecumseh – *Tecumseh Official Plan* (Consolidated January 2000)	November 27, 1973	By OMB in parts: August 4, 1976 July 21, 1977 August 25, 1978
Town of Tecumseh – *St. Clair Beach Official Plan* (Consolidated April 2004)	December 1989	Date of approval not stated. All OPAs adopted and approved by Province as of January 23, 2004
Town of Tecumseh – *Sandwich South Official Plan* (Consolidated July 2003)	June 23, 1997	March 13, 1998

Environmental Designations

The Town of Tecumseh – Tecumseh Official Plan has no environmental or natural heritage designations. Nor does it provide any related policy.

The Town of Tecumseh – St. Clair Beach Official Plan provides general level protection for natural hazards, but no direct or related policies dealing with natural heritage or the environment.

The Town of Tecumseh – Sandwich South Official Plan provides general development policies that use site plan control to incorporate buffering between conflicting land uses, setbacks for development along inland watercourses, and protection of woodlots. Town of Tecumseh – Sandwich South Official Plan Designations

Natural Environment (Section 3.11)	Preserves, protects and enhanced the remaining natural areas for ecological and/or passive open space purposes. Permitted uses include: passive recreation, wildlife management, and conservation uses. Utility corridors and inland watercourses should be used as linkages between natural heritage sites, and should be enhanced and maintained as wildlife habitat areas, recreational trails, bikeways and walkways. Encourage and support private initiatives to maintain/improve the natural character of lands they own.
Natural Environment Land Division Policies (Section 4.8)	Consents permitted for conveyance of land to public or private agencies, conservation groups, etc., who are engaged in protection and conservation of the natural environment.

Level of Protection

While there is no land use designation within the Town of Tecumseh to provide local protection, all development applications are governed by Provincial statute and policy. The Official Plan does not identify any features or functions having provincial significance. Current and pending development applications will be subject to municipal review against all current policies and practices.

4.4 Contaminated Properties and Waste Management

This section provides a summary of the study team's assessment of the Preliminary Analysis Area from the perspective of potential property contamination and waste management issues. Several types of potential issues are discussed in this section including contaminated sites, underground storage tank sites, land fills, hazardous waste generators, disposal wells and undiscovered sites.

The information presented in this section of the report represents a summary of more detailed information contained in the *Environmental Overview Paper – Canadian Existing Conditions Volume 1* (refer to List of Supporting Documents).

CONTAMINATED SITES

The Government of Canada introduced the *Federal Contaminated Sites and Solid Waste Landfills Inventory Policy* on July 1, 2000. This policy states that departments and agencies that hold property must establish and maintain a database of their contaminated sites and solid waste landfills, and that this information must be submitted to the Treasury Board Secretariat for inclusion in a central inventory.

The inventory includes all known federal contaminated sites for which departments and agencies are accountable. It also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. Suspected sites are not added to the inventory until assessments have confirmed contamination. The inventory does not include properties owned by Crown corporations.

Based on a review of this inventory, one site was identified in the Preliminary Analysis Area, located onshore near the Town of Amherstburg. An additional eight sites were identified in close proximity to the Preliminary Analysis Area, located along the Detroit River on Bois Island and Fighting Island. These eight sites were located along channels and bays in between the mainland and the islands, mostly around navigational towers, dykes and burnpits. At these locations, it was found that the contamination ranged from heavy metals to petroleum hydrocarbons and polyaromatic hydrocarbons. Although these sites are offshore and do not fall within the limits of the Preliminary Analysis Area, their existence may impact construction activity associated with a river crossing.

The Ministry of Environment has also produced a *Waste Disposal Site Inventory* that lists all the industrial sites that produced or used coal tar and related tars in Ontario prior to 1988. For each site, information is provided on the location, operating period, evidence of buried wastes, site conditions, site assessments conducted, resource characteristics (i.e. surface water, groundwater, wells), etc.

A review of the listings identified three sites located in the Preliminary Analysis Area that produced coal tar. Sites contaminated with coal tar tend to involve expansive contamination that can involve extensive clean up of soil and groundwater prior to re-use. Alternative risk management methods for controlling movement and seepage of coal tar can be conducted to mitigate contamination migration and allow the potential re-use of these properties.

UNDERGROUND STORAGE TANK SITES

In Canada, underground storage tanks containing petroleum products are primarily regulated under the *Technical Standards and Safety Act (TSSA)* and the Ontario *Environmental Protection Act (EPA)*. TSSA and the Ontario Ministry of the Environment (MOE) co-ordinate clean up efforts depending on the extent of contamination, whether there are off-property contaminant migration issues, and whether continued use of the property as a fuelling station is desired. The TSSA maintains a database of all registered tanks containing petroleum products that includes a listing of any work orders associated with the property. Based on the ERIS database search conducted, there are 16 registered storage tanks containing petroleum products within the Preliminary Analysis Area.

While underground and leaking underground storage tanks should be avoided if possible, they would not preclude routes, bridges, or other transportation projects. The contamination problems that they pose tend to be localized and relatively easy to address.

LANDFILLS

A *Waste Disposal Site Inventory* has been prepared by the Ministry of Environment, which contains a list of all known active and closed waste disposal sites in the Province of Ontario as of October 31, 1990. For each site, information is provided on the type of wastes, site locations, and operating period. The inventory includes both sites that were previously approved and operated under an Approval for which there is adequate information regarding the types of wastes that were deposited, and unapproved sites where information regarding waste burial is limited.

The sites are classified according to the type of waste, the type of waste it received if known, (industrial, commercial, municipal) and the adjacent land use (urban or rural). Forty-one sites were identified in the Preliminary Analysis Area, and are depicted in Exhibit 4.12. Two liquid disposal dumps are located in Anderson Township near Amherstburg while the regional active landfill is located in the southeast corner of the Preliminary Analysis Area. The re-use of these sites is dependent on the setting and previous landfilling activities and could involve extensive remediation and/or waste removal.

The Ontario EPA restricts the re-use of any former landfill site for any other use for a minimum of 25 years from the day of closure and therefore these types of sites should be avoided as they would require extensive legal negotiation for re-use.

HAZARDOUS WASTE GENERATORS

Ontario sites that generate subject wastes must register the types of waste classes that are produced under Regulation 347. Generators range from small printing shops to large automotive parts manufacturers. A database of waste generators is maintained and can be accessed. However, as most of these wastes are shipped off-site for disposal, a listing of a waste generator does not necessarily provide any additional information as to the relative risk of acquiring such a site for the purpose of transportation planning. Based on the ERIS database search, there are 122 waste generators within the Preliminary Analysis Area and two registered waste receiving sites. These are depicted in Exhibit 4.12.

While these facilities may use, generate, store, or dispose of hazardous materials or wastes, they do not preclude a route, bridge, or other transportation project. Their utilization should be approached with caution, but issues associated with their use are generally readily resolved.

OIL, GAS, MINERAL AND DISPOSAL WELLS

The type of well determines the approvals that are needed for operation. Wells used for disposal of hazardous wastes through deep well injection are regulated under the *Ontario Environmental Protection Act* by the Ministry of Environment. There are very few licenses for deep well injection of hazardous wastes.

The Ministry of Natural Resources regulates oil and gas wells. Based on the ERIS database search, nearly 180 wells were identified in the Preliminary Analysis Area.

While their use should be approached with caution, these facilities and sites would not preclude a route, bridge, or other transportation project.

UNDISCOVERED SITES

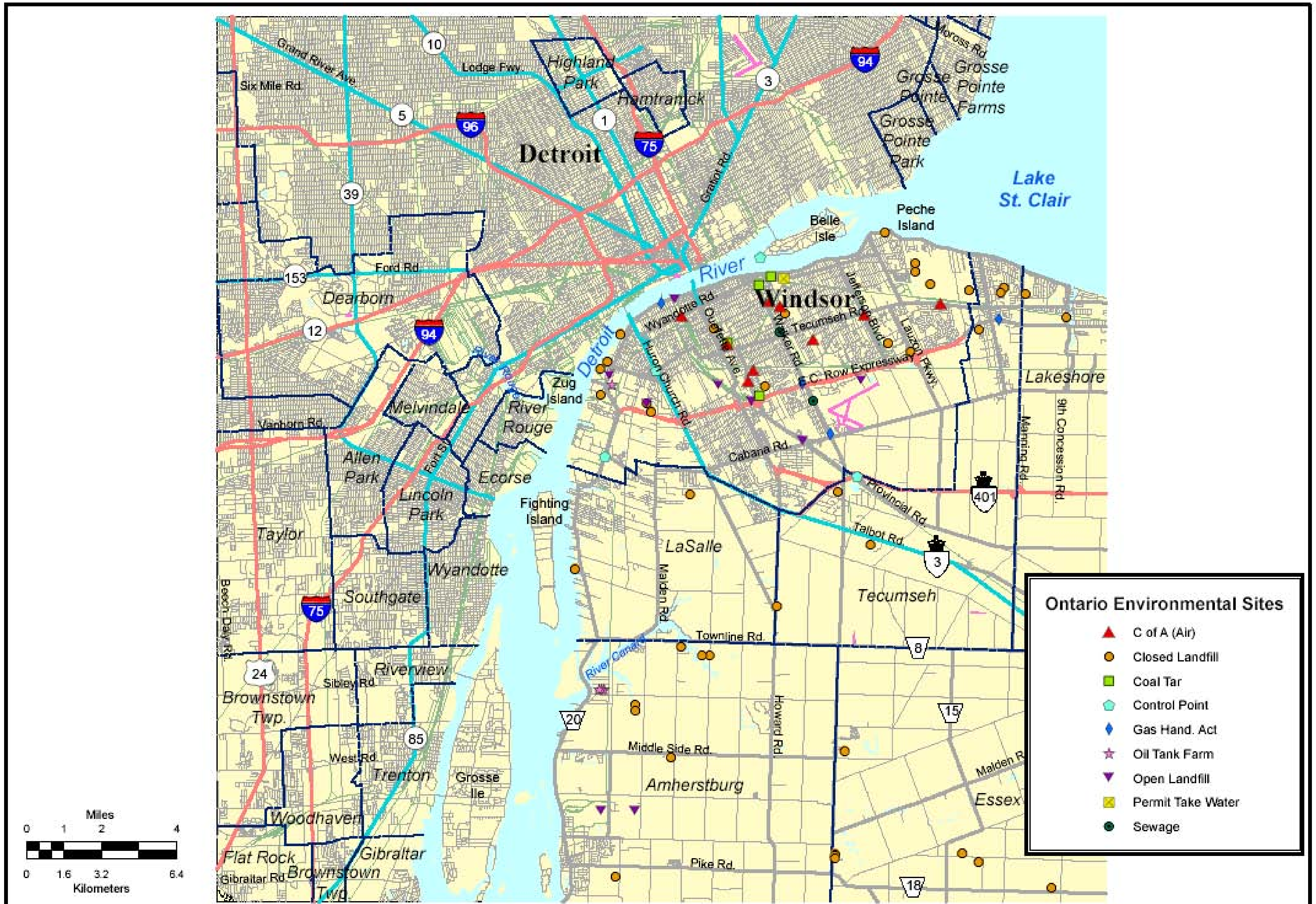
In Ontario, the test of whether a site is contaminated is determined by the presence of an adverse effect, which is broadly defined under the *Ontario Environmental Protection Act*. Owners of properties where an adverse effect has been determined to exist or which has migrated onto adjacent properties must notify the appropriate authority (usually the Ministry of Environment).

Notification to the Occurrence Reporting Incidence System (ORIS) is also required if a spill or release occurs onsite. If the site files a Record of Site Condition (RCS) in relation to the contamination it will be listed in a database which can then be searched to determine the presence of these sites along the chosen transportation routes. However, in Ontario, contaminated sites, which are undergoing remediation, are not necessarily public information unless a clean up order or other legislative instrument has been enacted to control the contamination. The Ministry of Environment will only release information regarding contamination issues if permission from the owner of the property is obtained under the *Freedom of Information Act*.

In addition, known impacts to soil or groundwater on a property that are demonstrated not to have migrated off-site or which do not fit the definition of an adverse effect were not necessarily required to be reported. Typically these types of sites may have low levels of contamination which are stable in the environment but which would be disturbed if re-development occurred.

While they should be approached with caution, these sites would not preclude a route, bridge, or other transportation project.

EXHIBIT 4.12 – LANDFILLS AND HAZARDOUS WASTE SITE LOCATIONS



N	Environmental Overview Paper - Canadian Existing Conditions Volume 1 Detroit River Crossing Study	**Landfills and Hazardous Waste**	FIGURE

4.5 Cultural Resources

This section provides a summary of archaeological and built heritage features within the Preliminary Analysis Area based on review of secondary source information. The information presented in this section of the report represents a summary of more detailed information contained in the *Environmental Overview Paper – Canadian Existing Conditions Volume 1* (refer to List of Supporting Documents).

4.5.1 Archaeological Resources

PREVIOUS ARCHAEOLOGICAL RESEARCH

In order that an inventory of archaeological resources could be compiled for the Preliminary Analysis Area, three sources of information were consulted:

- Site record forms for registered sites housed at the Ontario Ministry of Culture;
- Published and unpublished documentary sources; and,
- In-house archaeological files.

In Ontario, information concerning archaeological sites is stored in the *Ontario Archaeological Sites Database (OASD)* maintained by the Ontario Ministry of Culture. This database contains archaeological sites registered within the Borden system. Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 kilometres east to west, and approximately 18.5 kilometres north to south. Each Borden block is referenced by a four-letter designator, and sites within a block are numbered sequentially as they are found. The Preliminary Analysis Area under review is located in the Borden blocks AbHa, AbHr, AaHs, and AaHr.

According to the OASD, a total of 64 sites have been registered within the Preliminary Analysis Area. A general overview of the cultural affiliations of the identified sites is provided below. For more detailed information, the reader is referred to the *Environmental Overview Paper – Canadian Existing Conditions Volume 1* (refer to List of Supporting Documents).

- 14 – Underdetermined Pre-Contact;
- 11 – Archaic;
- 15 – Historic Euro-Canadian;
- 8 – Unknown;
- 6 – Woodland;
- 1 – Historic Pioneer; and,
- 1 – 20th Century Euro-Canadian.

The remaining 8 sites have been characterized as being a combination of the above affiliations.

PHYSIOGRAPHY AND ASSESSMENT OF PRE-CONTACT ARCHAEOLOGICAL POTENTIAL

The Preliminary Analysis Area is located within the St. Clair Clay Plains physiographic region of Southern Ontario. Adjoining Lake St. Clair in Essex and Kent Counties and the St. Clair River in Lambton County are extensive clay plains covering 2,270 square miles[14]. Essex County and the southwestern part of Kent County have a fairly uniform environment and may be discussed together as a sub-region[15]. Standing between the basins of Lake Erie and Lake St. Clair, the surface is a till plain overlaying the Cincinnati Arch which, in this area, is a low swell in the bedrock[16] . The surface drainage of the plain is nearly all northward to Lake St. Clair, but the gradient is extremely low and the drainage divide near Lake Erie is rather vague[17]. The prevailing soil type is Brookston clay loam, a dark-surfaced gleycolic soil developed under a swamp forest of elm, black and white ash, silver maple, and other moisture-loving tress[18].

Potable water is the single most important resource necessary for any extended human occupation or settlement. Since water sources have remained relatively stable in south central Ontario after the Pleistocene era, proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. Indeed, distance from water has been one of the most commonly used variables for predictive modeling of site location. More specifically, the Detroit River, designated as a Canadian Heritage River in 2001 (and an American Heritage River designation in 1998), would have served as a vital resource for both pre-contact and historic settlement. The Detroit River is the first River with dual designations.

The Ontario Ministry of Culture Primer on Archaeology, Land Use Planning and Development in Ontario[19] stipulates that undisturbed lands within 300 metres of a primary water source, and undisturbed lands within 200 metres of a secondary water source, are considered to exhibit archaeological potential.

ASSESSMENT OF HISTORIC ARCHAEOLOGICAL POTENTIAL: SUMMARY OF REVIEW OF HISTORICAL MAPS AND EURO-CANADIAN HISTORY

The 1881 *Essex Supplement in Illustrated Atlas of the Dominion of Canada* was reviewed to determine the potential for the presence of historical archaeological remains within the Preliminary Analysis Area during the nineteenth century (Exhibit 4.13).

The Detroit River has been an important asset for the development of Essex County. The first European settlement in the area was in 1701 when Sieur De Lamonthe Cadillac and approximately 100 civilians and military members settled in Fort Pontchartrain on the Detroit side of the river (the north side of the current Detroit River)[20].

[14] Chapman, L.J. and F. Putnam. 1984. *The Physiography of Southern Ontario.* Ontario Geological Survey, Special Volume 2. pp. 147 Ontario Ministry of Natural Resources, Toronto.
[15] Ibid. pp 147-149.
[16] Ibid.
[17] Ibid.
[18] Ibid.
[19] Ministry of Culture. 1993. Conserving a Future for a Past: Archaeology, Land Use Planning and Development in Ontario. An Educational Primer and Comprehensive Guide for Non Specialists. pp. 12-13.
[20] Archaeological Services Inc. 2002. Ontario–Michigan Border Transportation Planning / Need And Feasibility Study: Ontario Portion, Cultural Heritage Assessment. Existing Conditions.

European settlement remained largely on the Detroit side until 1748 when the Jesuit mission to the Huron Indians was established on the south shore near the foot of the present Huron Church Road and the Ambassador Bridge. From 1748 to 1760, a French agricultural settlement developed in this area paralleling a similar settlement across the water[21].

EXHIBIT 4.13 – LOCATION OF THE PRELIMINARY ANALYSIS AREA AS DEPICTED IN THE 1881 ESSEX SUPPLEMENT IN ILLUSTRATED ATLAS OF THE DOMINION OF CANADA

[21] Ibid.

Although Fort Pontchartrain surrendered to the British in 1760 and the Detroit side of the river was again officially surrendered to the United States in 1783, both sides remained under British control until 1796, when US forces took up actual occupation of Detroit. During this period, the settlement continued to grow but remained predominantly French in population. Few buildings from the period of French settlement have survived, although the street pattern of the City still reflects the French method of agricultural land division (i.e. long narrow farms fronting the river).

In 1797, the original Sandwich Towne was established to accommodate persons of both French and British origin from the US who wished to remain under British rule following American occupation of Detroit. This constituted the first urban settlement in what is now the City of Windsor, and also the first significant migration of English speaking people into the Windsor area. Sandwich developed over the following decades as the seat of government and the courts for the County of Essex[22].

As the chief port-of-entry to the region opposite Detroit, the Town of Windsor (now the downtown area) was already catching up to Sandwich, in terms of population, when the Great Western Railway (now part of the CNR system) chose Windsor as its termination point in 1854. The arrival of the railway also marked the beginning of significant industrial development in Windsor, and sparked the foundation of the third of Windsor's oldest settlements, Walkerville.

In 1857, Hiram Walker established his distillery at the point east of downtown, where the Great Western Railway first met the waterfront. On his lands running south of the river, Walker planned a complete town including provisions for industry, commerce, residences and agriculture (Walker Farms). The housing, a large part of which was built by Walker's own contractors, ranged from E. Chandler Walker's estate of Willistead (1906), built in the style of a Tudor manor house, to blocks of row housing for his industrial workers (1880s)[23].

Although the Ford Motor Car Company was established in Windsor as early as 1904 to gain the benefit of Imperial trade preferences, it was the period during and following World War I that saw the auto industry assume predominance in the city. An area known as Ford City was developed around the industrial complex. Numerous large residences were built overlooking the river at that time although most have since been demolished[24].

The automotive industry changed Windsor from a relatively slow growing collection of border communities to a rapidly growing, modern, industrial city. By the early 1930s, the separate Border Cities of Windsor, East Windsor (Ford City), Walkerville and Sandwich amalgamated politically into a single community with a population of more than 100,000.

During World War II, industrial production increased dramatically attracting many new workers and resulting in substantial residential growth within the city and in the surrounding townships. In 1966 the City annexed the Towns of Riverside and Ojibway, and parts of Sandwich East, Sandwich South and Sandwich West Townships[25].

South of Windsor along the Detroit River is the Town of Amherstburg. Amherstburg came into being around 1796 when a portion of the Fort Malden military reserve was laid out as a town site and settled by United Empire Loyalists from Detroit. However, the region's European history can be traced even

[22] Archaeological Services Inc. 2002. Ontario–Michigan Border Transportation Planning / Need And Feasibility Study: Ontario Portion, Cultural Heritage Assessment. Existing Conditions.
[23] Ibid.
[24] Ibid.
[25] Ibid.

earlier to the early French explorers, the days of French rule and the arrival of French traders and settlers in the 1730's. By 1763, when France surrendered Canada to the British, several hundred French settlers were scattered along the Detroit River. The French colony continued to flourish under British rule, and few British settlers came to the area until the American Revolution brought an influx of Loyalists. The first to take up land grants in the vicinity of Amherstburg were members of Butler's Rangers who came in 1784[26].

By 1851, the settlement of Amherstburg was separated from the Township of Malden and was incorporated as a village with town powers. Amherstburg was incorporated as a town in 1878 and by the 1880s's it had become a thriving mercantile and manufacturing centre. Amherstburg is also known as an important stop along the Underground Railway that helped black slaves escape from their servitude south of the border. By the 1840s, Amherstburg had become the centre of Ontario's Black population[27].

Although separated out in the nineteenth century, Amherstburg amalgamated with the neighbouring Townships of Anderdon and Malden in January of 1999 to create the Town of Amherstburg. Anderdon Township was surveyed as a part of Essex County in 1839, but settlement had already begun prior to that date in the northern portion around the River Canard by French people coming south from Sandwich Township and in the southern portion by United Empire Loyalists. By 1850 there were 774 settlers in the township, concentrated in two main settlements, Gordon on the shore of the Detroit River, and McGregor on the eastern boundary. In the 1860s the Canada Southern Railway was built through the township and this encouraged growth in the largely agricultural township. There remains only three small communities of any size within the original historic boundary: Auld, River Canard and McGregor[28].

Malden Township was surveyed as part of Essex County in the early nineteenth century and it likewise contained a mix of early French and Loyalist settlers. Like Anderdon, Malden's rural economy benefited greatly from the construction of the Canada Southern Railway, which constructed a branch line from Amherstburg to Essex[29].

SUMMARY

For the Euro-Canadian period, the majority of early nineteenth century farmsteads (i.e. those which are arguably the most potentially significant resources and whose locations are rarely recorded on nineteenth century maps) are likely to be captured by the basic proximity to water model outlined above, since these occupations were subject to similar environmental constraints. An added factor, however, is the development of the network of concession roads through the course of the nineteenth century. These transportation routes frequently influenced the siting of farmsteads. Accordingly, undisturbed lands within 100 metres of an early settlement road are also considered to have potential for the presence of Euro-Canadian archaeological sites.

Therefore, depending on the degree of previous land disturbance, it may be concluded that there is potential for the recovery of historic cultural material within the Preliminary Analysis Area. Furthermore, it should be noted that not every feature of potential interest today would have been illustrated on the nineteenth century mapping.

4.5.2 Built Heritage Resources

The cultural heritage assessment considered cultural heritage resources in the context of improvements to specified areas, pursuant to undertaken for this study within the Preliminary Analysis Area the *Ontario Environmental Assessment Act*. This assessment addresses above ground cultural heritage resources more than 50 years old. The findings of the cultural heritage assessment are summarized in the *Environmental Overview Paper – Canadian Existing Conditions Volume 1* (refer to List of Supporting Documents).

Changes to transportation corridors have the potential to affect cultural heritage resources in a variety of ways. These include the loss or displacement of resources through removal or demolition and the disruption of resources by introducing physical, visual, audible or atmospheric elements that are not in keeping with the resources and/or their setting.

For the purposes of this assessment, the term cultural heritage resources was used to describe both cultural landscapes and built heritage features. A cultural landscape is perceived as a collection of individual built heritage features and other related features that together form farm complexes, roadscapes and nucleated settlements. Built heritage features are typically individual buildings or structures that may be associated with a variety of human activities, such as historical settlement and patterns of architectural development.

DATA COLLECTION

For the purposes of determining the existence of previously identified built heritage features and cultural landscapes within the Preliminary Analysis Area, contact was made with the City of Windsor's Heritage Planner and the Town of Amherstburg. The Ministry of Culture's *Ontario Heritage Properties Database* was consulted, as was the Parks Canada listing of National Historic Sites.

Historical research was conducted for the purposes of identifying broad agents or themes of historical change and cultural landscape development in this area.

Previously identified heritage resources were then categorized according to their heritage protection status and their inclusion on municipal, provincial and federal inventories and heritage designation lists. All heritage sites and heritage sensitive areas were mapped using GIS data co-ordinates.

HERITAGE SENSITIVE AREAS

The following areas have been identified through various data sources and are considered to be of special heritage significance. They represent aggregate areas of historic activity and resources, and are depicted in Exhibit 4.14.

Ambassador Bridge

The Ambassador Bridge, built in 1929, is listed on the *Ontario Heritage Bridge List*. This list includes approximately 90 heritage bridges of provincial significance. It helps ensure that the significance of these bridges is taken into account when municipalities undertake construction projects covered by the *Ontario Environmental Assessment Act*.

[26] Archaeological Services Inc. 2002. Ontario–Michigan Border Transportation Planning / Need And Feasibility Study: Ontario Portion, Cultural Heritage Assessment. Existing Conditions.
[27] Ibid.
[28] Ibid.
[29] Ibid.

Sandwich

The original Sandwich Towne retains a number of buildings of the pre-confederation era that are of historical significance and/or which exemplify the Neo-classical and Georgian styles of architecture, which were in vogue during the first half of the nineteenth century. A number of designated heritage properties can be found along the following streets: Russell Street, Sandwich Street, Peter Street, Detroit Street, Mill Street, Brock Street, Chippewa Street, South Street, Watkins Street, and Prince Road.

Highway 18 (Ojibway Parkway)

Highway 18 (Ojibway Parkway) is a heritage highway and is generally considered to be the oldest road in Ontario.

Huron Church Road

Between University Avenue and Wyandotte Street West, Huron Church Road has several properties of heritage interest.

Town of Windsor

Due to numerous fires and the continuous redevelopment of the area over the decades, few of the early buildings in downtown Windsor still exist, but a number of late nineteenth century and early twentieth century buildings remain, including in particular a number of larger, upper income houses in areas immediately adjacent to the downtown area. Of particular heritage interest is Victoria Avenue, along which several designated properties are situated.

Highway 3 (The Talbot Road)

First surveyed by Colonel John Talbot beginning in 1809, the Talbot Road (now Highway 3) was interrupted by the War of 1812, but reached Essex County in 1818. The Talbot Road was surveyed to follow a natural ridge of glacial moraine which stretched from Windsor to Point Pelee. It was termed a "corduroy road" for in areas of swampy land, three inch planks, flattened on the upward side, were laid down side by side across the road. Highway 3 (the Talbot Road) is celebrated with a provincial plaque west of St. Thomas that attests to its heritage interest and value. Significant villages along the route include Oldcastle and Maidstone.

Highway 46 (The Middle Road)

Also surveyed by Colonel Talbot (and incorporating a native trail), the settlers along the Middle Road were largely emigrants from Ireland who came to escape the potato famine of the 1840s. Along the Middle Road and up toward Lake St. Clair the "Irish Settlement" grew, and fourth and fifth generation descendants remain today. The village of Maidstone was the centre of the Irish community.

Amherstburg

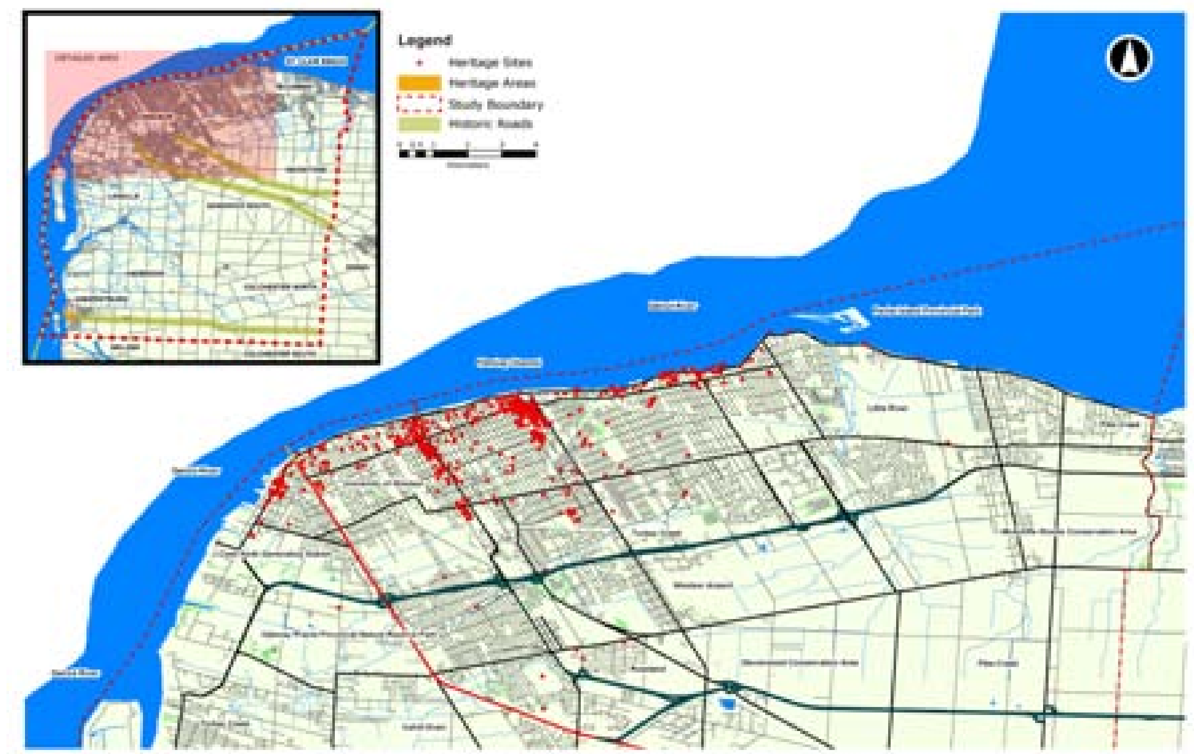
Bounded by the Detroit River to the west, Alma Street to the north, the Lowes Side Road to the south and Meloche Road to the east, and situated approximately 32 km southwest of Windsor across from Boblo Island (Bois Blanc), Amherstburg is one of the oldest towns in the province. A preliminary inventory of heritage properties was completed in 1976 and it has not been updated. However, the following streets have the highest concentration of heritage structures and are therefore considered to be of particular heritage interest: Brock Street, George Street, King Street, Seymour Street, Sandwich Street, Bathurst Street, Ramsay Street, Dalhousie Street, North Road, Rankin Avenue, Richmond Street, Murray Street, Gore Street, Simcoe Street, and Park Street.

Despite its modern business establishment and plants, Amherstburg retains its historic atmosphere. In the older section of town the streets are narrow and houses front directly on the sidewalk.

Fort Malden National Historic Park

Located on Laird Avenue in Amherstburg, Fort Malden preserves elements of the second fort built by the British on the eastern bank of the Detroit River to defend the Canadian border from American attack in the first half of the 19th century. The first post, known as Fort Amherstburg, was constructed in 1796 near the mouth of the Detroit River where it empties into Lake Erie. This post was the headquarters for the British forces in southwest Upper Canada during the War of 1812. Fort Malden was erected after the war and rebuilt in 1838-40 and served once again as a centre for the British defence during the Upper Canada Rebellion of 1837-39. Today the 4.5-hectare site includes remains of the 1840-period earthworks and four buildings, including a restored and furnished 1819 brick barracks.

EXHIBIT 4.14 - HERITAGE RESOURCES WITHIN THE PRELIMINARY ANALYSIS AREA



SUMMARY OF HERITAGE PROPERTIES IDENTIFIED IN THE PRELIMINARY ANALYSIS AREA

A total of 139 heritage properties have been identified with the Preliminary Analysis Area, which are categorized as follows:

- 9 – National Historic Sites of Canada
- 14 – Heritage Easement Sites
- 115 – Properties Protected under Part IV of the Ontario Heritage Act

In addition, the Ambassador Bridge is identified as an Ontario Heritage Bridge in the Ontario Heritage Bridge List compiled by the Ministry of Culture. Additional details with regard to each of the properties is included in the *Environmental Overview Paper – Canadian Existing Conditions Volume 1* (refer to List of Supporting Documents).

4.6 Natural Environment

This section provides a summary of existing natural environmental conditions within the Preliminary Analysis Area. The information presented in this section of the report represents a summary of more detailed information contained in the *Environmental Overview Paper – Canadian Existing Conditions Volume 1* (refer to List of Supporting Documents).

4.6.1 Geology / Subsurface Environment

GEOLOGY OF THE WINDSOR AREA

The subsurface conditions in the Windsor area are characterized by regionally extensive, flat-lying soil and bedrock strata including:

- Surface layers of miscellaneous fill materials associated with industrial, urban and suburban development, typically ranging in thicknesses of 1 to 4 m, though local areas of deeper fills may be present in some areas;
- Native deposits of sand and silt may be present at or near the surface in some locations, particularly in the west end of the City of Windsor and Town of LaSalle;
- Beneath the sand (where present) and overlying bedrock, are thick deposits of silty clay that start out relatively stiff near the surface and become gradually softer and weaker with increasing depth. In the western sections of the Preliminary Analysis Area, beneath the surficial sand deposits identified on Exhibit 4.15, the silty clay is generally less stiff than in the eastern part of the Preliminary Analysis Area, and in some areas this silty clay deposit is very soft;
- Bedrock throughout the Preliminary Analysis Area is generally encountered at depths of 20 m to 35 m but can be found as shallow as 2 m and as deep as 54 m in localized areas. In many areas, a thin layer of dense glacial till overlies the bedrock; and
- Salt formations are found within the bedrock stratigraphy at depths ranging from about 150m to 400m.

Exhibit 4.15 illustrates the general surficial sedimentary geology of the Preliminary Analysis Area based on geologic interpretation of widely-spaced sample locations and an understanding of geomorphologic processes. This figure has been prepared using data and mapping from government agencies in both Ontario and Michigan. Although the surficial sedimentary information is more spatially detailed for Ontario and the nomenclature somewhat different between the two jurisdictions, the general characteristics of the sediments are well known in both areas.

SEDIMENTARY GEOLOGY

The Preliminary Analysis Area is located in the physiographic region of southwest Ontario known as the St. Clair Clay Plains. Within this region, Essex County and the southwest part of Kent County are normally discussed as a sub-region known as the Essex Clay Plain. The clay plain was deposited during the retreat of the ice sheets (late Pleistocene Era) when a series of glacial lakes inundated the area. In general, the ice sheets deposited till in the area of Windsor and Detroit.

A large end moraine of glacial till is mapped in the area of Windsor-Detroit, generally trending northwest to southeast near the outlet of Lake St. Clair as illustrated by the dark-green areas illustrated in Exhibit 4.15. Outcrops of this moraine may also be found throughout Essex County near the terminus of Provincial Highway 401. In other areas, the lacustrine deposits overlie the hard glacial till.

The major clay stratum typically ranges in thickness from about 20 m to 30 m. Surficial layers or pockets of more typical layered lacustrine (lake deposited) silty clay, silt, or sand may be encountered overlying the extensive stratum of "till-like" silty clay. Silt and sand deposits, on the order of 2 to 4 m thick, are often found near the ground surface in areas near the western side of Windsor and the south-western limits of the Preliminary Analysis Area. A relatively thin stratum, on the order of 1 to 6 m thick, of very dense or hard basal glacial till or dense silty sand is found directly overlying the bedrock surface.

Bedrock Geology

Within the Windsor area, the bedrock geology consists of an evaporate-carbonate sequence of rock formations. These include the Silurian Salina formation, the Devonian Bass Islands dolomite, the Detroit River Group, the Dundee Formation, and the Hamilton Group, respectively, with decreasing age and closer proximity to the ground or bedrock surface. The surface of the bedrock, beneath the overlying sediments, is relatively flat except for "a significant depression in the vicinity of the Windsor airport. The depression may represent a dissolution collapse of either the underlying carbonates or the lower Salina salt beds" [Hudec 1998].

Devonian Age bedrock of dolomite, shaly limestone, limestone and sandstone extend from the bedrock surface, found at depths of between 20 and 40 m, to depths of about 160 m below ground level. These bedrock formations are underlain by the Salina Group of formations that include thick salt beds at depths of about 270, 300, and 400 m below the ground surface. It is also known that relatively small volumes of petroleum are found within the limestone and dolomite strata.

Near the eastern limits of the Preliminary Analysis Area, the bedrock encountered beneath the sedimentary deposits is the Hamilton Group of limestone, shaly limestone, and mudstone formations. Near the southwest tip of Belle Isle, the uppermost bedrock formation is the Dundee limestone formation within the Hamilton Group. Approximately equidistant between Belle Isle and Fighting Island, the uppermost bedrock formation transitions to the Detroit River Group and the Lucas formation of dolomite in particular.

Groundwater Levels

Static groundwater levels within the overburden soil deposits are typically at about 1 and 3 m below the ground surface depending on specific locations and ground surface elevations. Groundwater within the underlying glacial till and bedrock in some areas, however, is known to be under artesian pressures (in which groundwater levels will rise above the ground surface for wells that penetrate the soil overburden and connect with groundwater in the bedrock). In these areas, particularly in the western part of the Preliminary Analysis Areas, artesian pressures may be on the order of 2 to 3 m above the river level. In general, groundwater flow will be toward the Detroit River, Lake St. Clair, and Lake Erie. Groundwater from within the bedrock is likely to be corrosive because of the salt deposits found at depth.

Gas

It is also known in some areas that the groundwater contains hydrogen sulphide that will be liberated from solution and become hydrogen sulphide gas at normal atmospheric pressures. Hydrogen sulphide gas is toxic at low concentrations. Methane gas has also been encountered during excavations into both soft ground and bedrock in the Windsor-Detroit area. Methane gas can present an explosion hazard if not adequately controlled during construction.

KEY SUBSURFACE CONDITIONS

The following provides a summary of key subsurface conditions that influenced the development of the various alternatives examined through the course of this study. Further details with regard to geotechnical deep drilling investigations undertaken to confirm subsurface conditions are provided in Chapter 7 of this report.

Salt Extraction Activities

Within the Windsor-Detroit area, salt has been extracted from beneath the ground surface since the mid to late 1800s. The salt has been extracted using two different methods, solution mining and underground rock salt mining. Salt extraction by solution mining involves pumping water into wells drilled into the salt formations, dissolving the salt with the pumped water, and extracting salt from the saline water (brine) which is returned to surface. Rock salt mining of the salt typically uses the "room and pillar" method, whereby mine shafts are excavated from the ground surface down to the level of the salt beds. At the level of the salt beds rooms are excavated using drilling and blasting, and the "rock" salt is transported back to the surface in large buckets, or "skips". The extraction of salt from deep formations results, in most cases, in subsidence of the ground surface.

Solution Mining

As a consequence of solution mining activities, large caverns have been formed where the salt was removed. Modern methods of cavern development control the shape and size of caverns quite carefully. However, it was not unusual, for the cavities surrounding older wells (those drilled prior to about 1970), to become accidentally interconnected or for accidental interconnection to adjacent aquifers to occur.

Single well caverns have been known to be on the order of 200 to 300 m in diameter or more and more than 50 m in height. Caverns may be interconnected in rows as long as 1,000 m or more. Caverns created by single brine wells can be in the range of 0.2 to 1 million cubic metres in volume and that interconnected brine well caverns are typically on the order of 1 million cubic metres in volume or more.

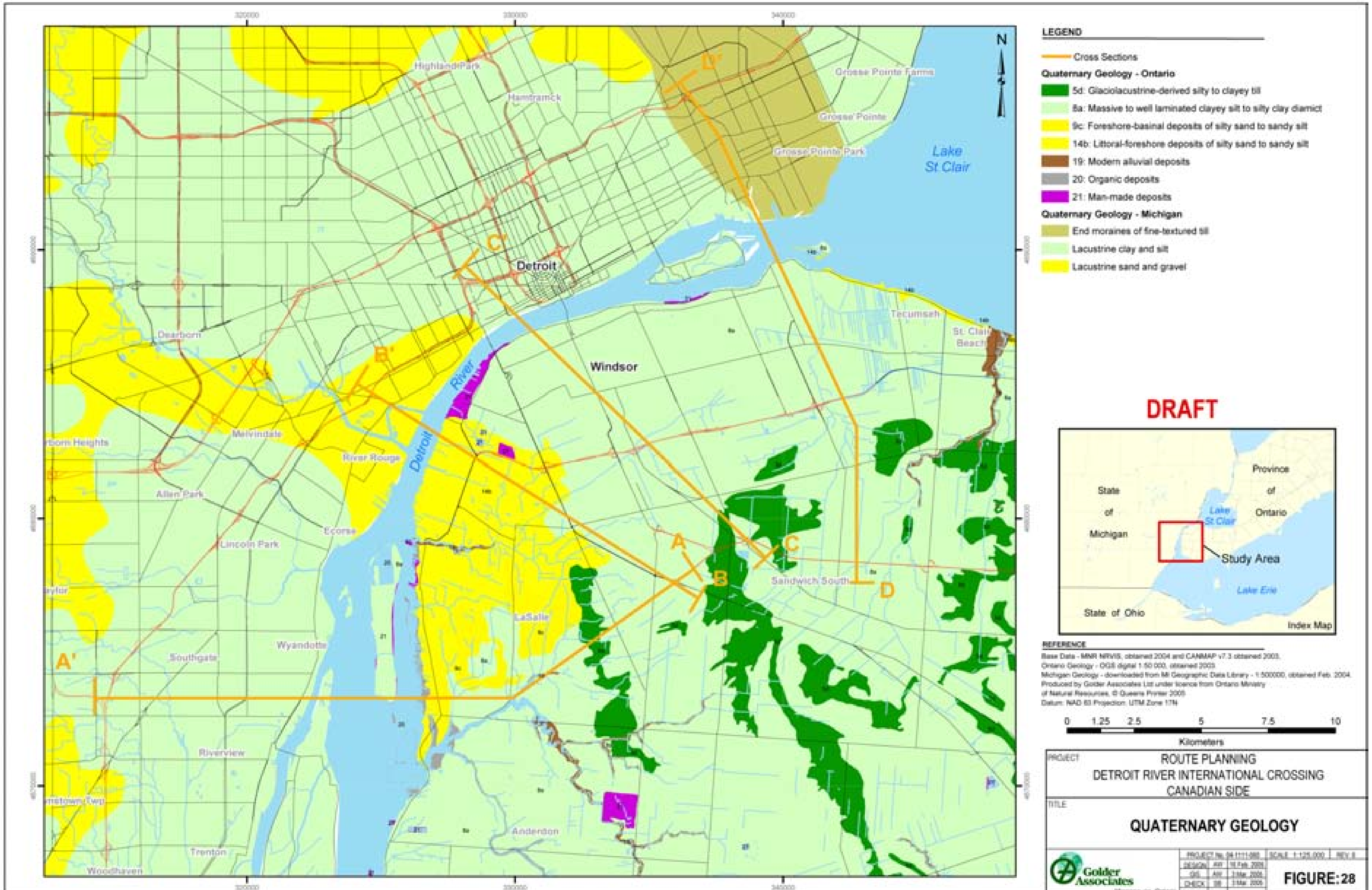
The presence of brine well mining activities in the vicinity of a potential roadway or structure, could lead to the potential for general subsidence or a sudden collapse directly over these areas. The potential for collapse is generally thought to be greater for wells that were in operation prior to about 1980, but this potential depends to a great (and often indeterminate) extent on the well operational methods, local bedrock conditions, interconnection of cavities between wells, and the methods used to abandon or plug the wells.

Room and Pillar Mining (Dry Mining)

Salt is also mined in a dry form, mainly for application as a highway de-icing agent. Underground mining of rock salt typically occurs using the "room and pillar" method, whereby mine shafts are sunk from the ground surface down to the level of the salt beds and rooms are then created by horizontal tunneling. In room and pillar mining the ore is excavated leaving pillars to support the roof. Rooms and pillars are dimensioned depending on the depth of the mine and the strength of the rock in the roof and pillars and it is typical to design pillars to be stable for an indefinite time period. Generally, pillars are arranged in a regular pattern, like a checker board. The salt is mined by drilling and blasting, and it is then crushed and the "rock" salt is transported to the surface in a large box or "skip" suspended from wire hoisting ropes in the shaft.

Subsidence also occurs over room and pillar mines, though it is more easily predicted since the size of pillars can be easily controlled and it is possible to install support in the mine roof if there is any indication of instability. Subsidence may occur in the context of underground mining due to the gradual deformation or, occasionally, the sudden collapse, of the pillars that remain after salt extraction. Since the pillars are generally very large, it is rare for sudden collapse to occur and so the most common type of subsidence is a very slow, widespread sinking of the ground surface across the entire mining area. As ore is mined from the "rooms", the load carried by the overlying "roof" rock is transferred to the pillars.

The presence of deep salt mining activities within a possible route could lead to the potential for general subsidence. General subsidence of the type observed over room and pillar mines in the Windsor area is unlikely to cause significant concerns for highway pavements or embankments, in that repairs could be made if and when needed, but may be undesirable for bridge structures.



LEGEND
Cross Sections
Quaternary Geology - Ontario
5d: Glaciolacustrine-derived silty to clayey till
8a: Massive to well laminated clayey silt to silty clay diamict
9c: Foreshore-basinal deposits of silty sand to sandy silt
14b: Littoral-foreshore deposits of silty sand to sandy silt
19: Modern alluvial deposits
20: Organic deposits
21: Man-made deposits
Quaternary Geology - Michigan
End moraines of fine-textured till
Lacustrine clay and silt
Lacustrine sand and gravel
N
Lake St Clair
Detroit
Windsor
Detroit River
Highland Park
Hamtramck
Grosse Pointe Farms
Grosse Pointe
Grosse Pointe Park
Dearborn
Melvindale
River Rouge
Allen Park
Ecorse
Lincoln Park
Wyandotte
Southgate
Riverview
Trenton
Woodhaven
LaSalle
Anderdon
Tecumseh
St. Clair Beach
Sandwich South
A
A'
B
B'
C
C'
D
D'
DRAFT
State of Michigan
Province of Ontario
Lake St Clair
Study Area
Lake Erie
State of Ohio
Index Map
REFERENCE
0 1.25 2.5 5 7.5 10
Kilometers
PROJECT
ROUTE PLANNING
DETROIT RIVER INTERNATIONAL CROSSING
CANADIAN SIDE
TITLE
QUATERNARY GEOLOGY
Golder Associates
FIGURE: 28

4.6.2 Aquatic Habitat and Communities

The Preliminary Analysis Area encompasses a very large area of Essex County. In addition to the Detroit River, it includes the following five main subwatersheds:

- Pike Creek;
- Little River;
- Turkey Creek;
- Big Creek; and,
- Canard River.

The locations of the corresponding watercourses are presented in **Exhibit** 4.16, and a summary of each watershed is provided in following sections of this report.

The Detroit River and the inland subwatersheds within the Preliminary Analysis Area fall under the jurisdiction of the Essex Region Conservation Authority (ERCA) and the Ontario Ministry of Natural Resources (OMNR) Aylmer District.

Heavy impacts associated with agricultural and/or urban development affect all of these subwatersheds[30]. These impacts include both physical (e.g. channelization, barriers) and chemical (e.g. metals, organic compounds, nutrients) factors[31]. Despite these impacts, the fish communities in these subwatersheds are relatively diverse and most stations sampled historically were found to contain fish[32]. The fish communities found in each of these subwatersheds, as well as in the Detroit River, are discussed briefly below.

Fish species found in the Detroit River are documented by Manny et al. 1988 (in MDNR and MOE 1991). A summary of the fish species known to inhabit the Detroit River is presented in the *Environmental Overview Paper – Canadian Existing Conditions Volume 2* (refer to List of Supporting Documents). Fish communities in the subwatersheds of the Detroit River have been sampled historically by the OMNR (1978; 1979; 1980; 1984), the ERCA (1999; 2000; 2001) and others (Gartner Lee 2001). Fish occurrence records for the five inland watersheds and one municipal drain that were provided by the ERCA are also summarized in the *Environmental Overview Paper – Canadian Existing Conditions Volume 2* (refer to List of Supporting Documents).

PIKE CREEK

The watercourses within this watershed were sampled at 16 stations historically, with one station sampled twice (17 sampling events). Fish were collected at all but two stations. Available mapping indicates that the watercourses within this watershed, which flow generally north into Lake St. Clair, are in a relatively natural state (i.e. excessive channelization is not evident). A total of 28 species were collected from the Pike Creek watershed, including several sportfish. Fish were well distributed throughout the watershed and the number of species varied from three to 16 per station. Sportfish were collected from 12 of the 14 stations at which fish were present, which indicates that good habitat conditions exist throughout the watershed.

LITTLE RIVER

The Little River flows in a northerly direction and discharges into the upstream end of the Detroit River near Peche Island. Much of the watercourse appears to be heavily channelized with few areas in a natural state. The upper portion of the watershed consists of channelized ditches that parallel the concession roads to the southeast of the Windsor Airport. This watershed was sampled for fish 19 times at 14 locations, and no fish were captured at six locations. These locations at which no fish were collected were all in the upper portion of the watershed at crossings of Highway 401. Despite the apparently poor habitat conditions in the upper part of the watershed, the Little River supports 25 species of fish, including several sportfish. As with the Pike Creek watershed, fish species were well distributed within the Little River watershed with the number of species captured at each station ranging from 2 to 15. Sportfish were collected from seven of the eight stations at which fish were collected, indicating that fairly good habitat conditions exist within the lower portions of the watershed.

TURKEY CREEK

Turkey Creek discharges into the Detroit River near the upstream end of Fighting Island. It receives water from many municipal/agricultural drains and has been channelized throughout the watershed. The upper portion of Turkey Creek flows out of South Windsor and through several parks and small residential areas before discharging into the Detroit River. Many of the drains, which historically likely conveyed agricultural run-off, now flow through residential areas. Several of these still flow out of agricultural land. Some of the drains which contribute flow to Turkey Creek are the Cahill, Lennon, Lepain and Tourangeau Drains. The Turkey Creek watershed was sampled for fish at five locations, two of which were located within the higher density residential area and one in the lower density residential area along Turkey Creek, and the other two in the drains associated with Brunet Park. All five stations contained fish with a total of 19 species captured. Each station was sampled only once. The number of species captured at each station ranged from 2 to 16, with a mean of 6 species per station. At least one species of sportfish was found at each of the sampling locations indicating the presence of fairly good habitat conditions at these locations.

BIG CREEK

The headwaters of Big Creek are located within the Preliminary Analysis Area in the Town of Amherstburg. This watercourse flows in a north-to-south direction and discharges into Lake Erie. Fish were collected eight times at five stations within the Preliminary Analysis Area. A sixth station was also sampled, but no fish were captured. A total of nine species were collected including three sportfish species. Diversity at the stations was comparatively low with two stations at which only one species was captured. Sportfish were collected from three of the five stations at which fish were captured.

CANARD RIVER

The Canard River watershed occupies the most area within the Preliminary Analysis Area. It flows in a northwesterly direction through mainly rural lands and discharges into the Detroit River opposite Grosse Ile. It was sampled 27 times at 19 stations, all of which contained fish. The stations were spread throughout the watershed and likely represented a diversity of habitats. A total of 36 species were recorded from the watershed including several sportfish species. Sportfish were collected from all but one of the 19 stations indicating favourable habitat conditions throughout the watershed.

[30] URS Canada Inc. Canada - United States - Ontario - Michigan Border Transportation Partnership Planning/Need and Feasibility Study: Environmental Overview Report (Amended). January, 2005.
[31] Ibid.
[32] Ibid.

EXHIBIT 4.16 - WATERCOURSES WITHIN THE PRELIMINARY ANALYSIS AREA

MARENTETTE DRAIN

This small drain empties into the Detroit River south of the Town of LaSalle at Grassy Island. It flows through agricultural lands and consist of two main branches: the Marentette Drain and the Gignac Drain. ERCA records show that this drain was sampled for fish at one location in 2001. Two species were captured here, including one sportfish.

DETROIT RIVER

Previous reports indicate that at least 65 species of fish inhabit the Detroit River (Manny et al. 1988 in MDNR and MOE 1991). These species include many sportfish as well as migratory species that use the river to move between Lakes Erie and St. Clair. Diverse habitat exists within the river, especially in the wetlands which are used by warmwater species for many of their life functions (spawning, nursery, foraging, etc.). Several provincially significant wetlands exist within the river or are associated with tributary rivermouths. These wetlands cover an area of 462.5 ha[33]. As reported in MDNR and MOE (1991), 41 fish species have been reported to spawn within the Detroit River and an additional seven species are suspected of spawning. Manny et al.[34] reported that 25 species use the river as nursery habitat, including both warm and coldwater species.

4.6.3 Vegetation and Vegetation Communities

Within the County of Essex, tallgrass prairie and oak savannah vegetation communities were widespread prior to the 20th century. These open communities were maintained by climate and periodic fire events. Since the early 20th century, these communities have rapidly declined with increased settlement and subsequent fire suppression in these areas[35].

Natural vegetation communities within the Preliminary Analysis Area are restricted to areas that are not currently in use for residential, industrial or agricultural purposes. As such, they are limited in number, size and connectivity with other natural vegetation communities. The majority are within or around designated natural areas such as Provincial Parks, Areas of Natural and Scientific Interest (ANSIs), evaluated wetlands, Environmentally Significant Areas (ESAs) and Candidate Natural Heritage Sites (CNHSs). These communities include fragmented oak-hickory forests, oak savannahs, thickets, tallgrass prairies, forb prairies and old field cultural meadows.

Forest communities include those in dry-fresh upland locations and those in fresh-moist lowland locations. Upland forested communities are typically dominated by oak (*Quercus* sp.), hickory (*Carya* sp.), and maple (*Acer* sp.), with associations of sassafras (*Sassafras albidum*), white ash (*Fraxinus americana*), butternut (*Juglans cinera*), basswood (*Tilia americana*), beech (*Fagus grandifolia*), tulip-tree (*Liriodendron tulipifera*), ironwood (*Ostrya virginiana*), trembling aspen (*Populus tremuloides*) and black cherry (*Prunus serotina*). Lowland forested communities are typically dominated by swamp white oak (*Quercus bicolor*), pin oak (*Q. palustris*), silver maple (*Acer* saccharinum), red ash (*Fraxinus pennsylvanica*), white elm (*Ulmus americana*) and red maple (*Acer rubrum*).

In some locations, fire suppression has allowed for the establishment of shrub species. Common shrub thicket species include hawthorns (*Crataegus* sp.), gray dogwood (*Cornus foemina* ssp. *racemosa*), silky dogwood (*C. amomum*), smooth sumac (*Rhus glabra*), common blackberry (*Rubus alleghaniensis*) and riverbank grape (*Vitis riparia*). In other locations the invasion of non-native species into grasslands has resulted in their conversion to old field meadow communities with fewer grass species. In locations where prairie grassland has been maintained dominant species include big bluestem (*Andropogon gerardii*), tall cord grass (*Spartina petcinata*), Indian grass (*Sorghastrum nutans*), ironweed (*Vernonia gigantea*), showy tick-trefoil (*Desmodium canadense*), giant goldenrod (*Solidago gigantea*), grass-leaved goldenrod (*Euthamia graminifolia*) and many others.

Wetland communities are predominantly riverine, associated with the Detroit River or its tributaries. These communities are typically marshes dominated by narrow-leaved emergent species such as cattails (*Typha sp.*), reed-canary grass (*Phalaris arundinacea*) or floating leaved and submerged aquatic plants.

Based on secondary sources, a total of 615 plant species have been documented in the Preliminary Analysis Area. Of these species, 133 or 21.6 percent are considered introduced and non-native to southern Ontario. The majority of these 615 species have been identified in designated natural areas within the City of Windsor and the Town of LaSalle.

4.6.4 Wildlife and Wildlife Habitat

The Preliminary Analysis Area is comprised of urban, industrial, rural, agricultural and natural heritage features with numerous protected parks. Most of the natural heritage areas within the City of Windsor are located in the protected zones of the Ojibway Prairie Complex in the southwest corner of the municipality. Within the Town of LaSalle numerous natural areas, such as the Turkey Creek and Carnard Ecosystem management areas, are also protected with large expansive agricultural areas of creeks and drains making up the southern part of the Detroit River Watershed that runs down to the Canard River. This river opens into the provincially significant Canard River Mouth Marsh, which is adjacent to another provincially significant marsh located on Fighting Island. From the Canard River to Amherstburg, open agricultural areas and a few natural heritage features surrounding Big Creek and its tributaries, dominating the habitat of this region.

The determination of wildlife inhabiting the Preliminary Analysis Area was collected from secondary sources that covered as much of the area as possible. 149 species of wildlife were recorded. Of these, 33 species were herpetofauna (most of which were recorded along creeks or within prairie grasslands and forests of the natural heritage areas), and 88 species of birds were documented breeding within the Preliminary Analysis Area. In addition, thousands of migrating birds, comprising many more species, stage in the Detroit River and adjacent marshes each spring and fall. The 28 species of mammals that have also been recorded within the Preliminary Analysis Area finalize the wildlife totals. A summary of the wildlife recorded in the Preliminary Analysis Area based on secondary sources is provided in the *Environmental Overview Paper – Canadian Existing Conditions Volume 2* (refer to List of Supporting Documents).

4.6.5 Designated Natural Areas

A number of Evaluated Wetlands, Areas of Natural and Scientific Interest (ANSIs) and Environmentally Significant Areas (ESAs) and one Provincial Nature Reserve are located within the Preliminary

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[33] URS Canada Inc. Canada - United States - Ontario - Michigan Border Transportation Partnership Planning/Need and Feasibility Study: Environmental Overview Report (Amended). January, 2005.

[34] Manny, B. A., T. A. Edsall and E. Jawarski. 1988. The Detroit River, Michigan: An ecological profile biological report. US Fish and Wildlife Service, US Department of Interior. Contribution No. 683 of the National Fisheries Research Centre - Great Lakes. Ann Arbor, MI.

[35] OMNR. 1997. Resource Management Plan for Ojibway Prairie Provincial Nature Reserve (Ontario Parks). Ontario Ministry of Natural Resources, Chatham Area Office. 26 pp. + maps.

Analysis Area. Two of these natural heritage features have also been evaluated by Carolinian Canada. These features are illustrated in **Exhibit 4.17**, and summarized in **Table 4.6**.

In addition, the City of Windsor and the Town of LaSalle have both undertaken biological inventories of the remnant forest and prairie habitat features not already designated and afforded some form of preservation status in planning documents to determine if these areas should be included under an Open Space/Greenway system policy to assist in preserving these areas. These areas are referred to as Candidate Natural Heritage Sites (CNHSs). This section provides a summary of these features within the Preliminary Analysis Area.

PROVINCIAL NATURE RESERVES

Provincial Nature Reserves are areas selected to represent the distinctive natural communities and landforms in Ontario. Ojibway Prairie is a 65 ha Provincial Nature Reserve that was regulated under the *Provincial Parks Act* in 1977 to protect one of the largest remnants of tallgrass prairie and oak savannah in Ontario (OMNR 2002). The dominant feature of this nature reserve is the tallgrass prairie plant community. Within the Ojibway Prairie Provincial Nature Reserve, 533 flowering plant species have been documented, of which more than 60 are of prairie and western affinity. It is home to more than 60 plants that are rare in Ontario as well as a number of animal species that are representative of prairie habitats (Pratt 1979; OMNR 2002).

Vegetation communities in Ojibway Prairie include Old Field (27.5 ha), Forb Prairie (17 ha), Tallgrass Prairie (11.5 ha), Thickets (3 ha), Oak Savannah (4.5 ha), and Black Oak/Red Hickory Forest (1.5 ha). While some early successional tallgrass prairie species occur in Old Field communities, the majority of species with a prairie affinity are located within the remaining vegetation communities. The Ojibway Prairie contains two vegetation communities that are globally and provincially rare. Moist-Fresh Tallgrass Prairie Type (TPO2-1) and Moist-Fresh Black Oak Tallgrass Savannah Type (TPS2) both have a global rank of G1 (Extremely Rare – having less than five occurrences in the overall range) and a provincial rank of S1 (Extremely Rare in Ontario – having less than five occurrences in the province).

The Ojibway Prairie provides habitat for three nationally and provincially 'Threatened' wildlife species listed on SARA, Schedule 1, including eastern foxsnake (*Elpahe gloydi*), Butler's gartersnake (*Thamnophis butleri*) and eastern hog-nosed snake (*Heterodon platirhinos*). Purple twayblade (*Liparis liliifolia*) and eastern prairie fringed orchid (*Platanthera leucophaea*), both nationally and provincially 'Endangered' and listed on SARA, Schedule 1, are present in the reserve. Colicroot (*Aletris farinosa*) and willowleaf aster (*Symphotrichum praealtum*), both nationally and provincially 'Threatened' and listed on SARA, Schedule 1, are present in the reserve. Several provincially, regionally and/or locally significant species are also present in the Ojibway Prairie.

EVALUATED WETLANDS

Evaluated wetlands in the Preliminary Analysis Area are predominantly riverine, and the majority are associated with the Detroit River. These evaluated wetlands include:

- Detroit River Marshes;
- Canard River Marshes;
- Fighting Island Wetland; and,
- Turkey Creek Wetland.

Detroit River Marshes

Wetlands located along the Detroit River are remnants of the submergent and land-based wetlands that once made up the more extensive Detroit River Wetland. Presently, the Detroit River Marshes PSW is a 575 ha coastal wetland complex comprised of six individual wetlands, including river marshes, Grassy Island, Turkey Island and the north and south ends and east side of Fighting Island. Wetland types include marsh (96 percent) and swamp (4 percent) and the dominant vegetation forms include submergent vegetation (59.4 percent) and emergent vegetation (29.5 percent). The site type of this wetland is 100 percent riverine, and soils have not been designated (Wormington and Fraser 1985a).

Submergent species such as pondweed (*Potamogeton* sp.), milfoil (*Myriophyllum* sp.) and grassleaf mud-plantain (*Heteranthera dubia*) are dominant in more than 59 percent of this wetland, by area. Robust emergents such as cattail, reed (*Phragmites* sp.) and bulrush (*Scirpus* sp.) are common in marsh portions of this wetland. Smartweeds (*Polygonum* sp.), sedges (*Carex* sp.) and meadowsweet (*Spiraea* sp.) are also present in marsh communities. Species such as willow (*Salix* sp.), dogwood (*Cornus* sp.) and sumac (*Rhus* sp.) dominate swamp portions of this wetland.

This wetland provides breeding and/or feeding habitat for three nationally and provincially 'Threatened' wildlife species listed on SARA, Schedule 1, including eastern foxsnake, Butler's gartersnake and eastern massasauga (*Sistrurus catenatus*). It provides habitat for swamp rose-mallow (*Hibiscus moscheutos*), a species listed on SARA, Schedule 3 and as 'Special Concern' both nationally and provincially. Several provincially, regionally and/or locally significant species are also present in this wetland.

Canard River Marshes

The Canard River Marshes PSW is a 416 ha coastal wetland complex comprised of two individual wetlands. This wetland is 100 percent marsh and the dominant vegetation forms include emergent vegetation, floating plants and submergent vegetation. The site type of this wetland is 100 percent riverine with 100 percent organic soils[36].

Submergent and floating-leaved vegetation and unvegetated water portions of this marsh comprise 50 percent of this wetland, by area. Species in this community include water lily, and pickerel weed (*Pontederia cordata*). Together, robust emergents and narrow-leaved emergents are dominant in 48 percent of this wetland, by area. Robust emergents include cattail and reed, and narrow-leaved emergents include grasses. Swamp portions of this wetland are dominated by species such as willows, red maple, silver maple, red-osier dogwood (*Cornus stolonifera*), black ash (*Fraxinus nigra*), green ash (*F. pennsylvanica*), white elm and swamp white oak.

This wetland provides breeding and/or feeding habitat for Least Bittern (*Ixobrychus exilis*), a nationally and provincially 'Threatened' species listed on SARA, Schedule 1. It provides habitat for swamp rose-mallow, a species listed on SARA, Schedule 3 and as 'Special Concern' both nationally and provincially. Several provincially, regionally and/or locally significant species are also present in this wetland.

[36] Parker, B. and J. Dawson. 1984. Wetland Data Record and Evaluation – Canard River. Second Edition. Ontario Ministry of Natural Resources. 1984. Manuscript. 12 pp. + 2 pp. supplement.

Fighting Island Wetland

Fighting Island Wetland PSW is a 113 ha coastal wetland comprised of 94 percent marsh and six percent swamp. Dominant vegetation forms include emergent vegetation and submergent vegetation in marsh portions and deciduous trees in swamp portions. This wetland is a dyked wetland, the site type is 100 percent riverine and soils have not been designated (Wormington and Fraser 1985b).

Robust emergents such as cattail and reed are dominant in more than 75 percent of this wetland, by area. Narrow-leaved emergents such as rice cut grass (*Leersia oryzoides*) and sedges are also present in these communities. Open water portions of this wetland contain species such as coontail (*Ceratophyllum* sp.), pondweed and milfoil. Species such as willow and dogwood dominate swamp portions of this wetland.

This wetland provides breeding and/or feeding habitat for three nationally and provincially 'Threatened' wildlife species listed on SARA, Schedule 1, including Least Bittern, eastern foxsnake and Butler's gartersnake. It provides habitat for swamp rose-mallow, a species listed on SARA, Schedule 3 and as 'Special Concern' both nationally and provincially. Several provincially, regionally and/or locally significant species are also present in this wetland.

Turkey Creek Wetland

Turkey Creek Wetland PSW is a 32 ha coastal wetland comprised of 77 percent marsh and 23 percent swamp. Dominant vegetation forms include emergent vegetation and submergent vegetation in marsh portions and deciduous trees and tall shrubs in swamp portions. This wetland is 80 percent riverine site type and 20 percent riverine at river mouth site type with 100 percent organic soils[37].

The majority of marsh areas in this wetland are dominated by robust emergents such as cattail. Narrow-leaved emergents such as rice cut grass are also present in marsh areas. Open water portions of this wetland contain submergent species such as pondweed and milfoil. Species such as willow and dogwood dominate swamp portions of this wetland.

This wetland provides breeding and/or feeding habitat for two nationally and provincially 'Threatened' wildlife species listed on SARA, Schedule 1, including eastern foxsnake and eastern massasauga. Several provincially, regionally and/or locally significant species are also present in this wetland.

AREAS OF NATURAL AND SCIENTIFIC INTEREST

ANSIs in the Preliminary Analysis Area include several provincially and regionally significant Life Science ANSIs. According to the OMNR (1998; 2004a), the Ojibway Prairie Complex provincially significant Life Science ANSI is comprised of the following areas:

- Ojibway Prairie Provincial Nature Reserve;
- Prairie Remnants (Ojibway Park) Life ANSI;
- Prairie Remnants (Titcombe Road North) Life ANSI;
- Prairie Remnants (Spring Garden Road) Life ANSI;
- Prairie Remnants (Black Oak Woods) Life ANSI; and,
- Prairie Remnants (Southeast of Nature Reserve) Life ANSI.

Ojibway Prairie Provincial Nature Reserve

The Ojibway Prairie Provincial Nature Reserve is discussed previously in this section.

Ojibway Park

Ojibway Park is a 64 ha site dominated by a Swamp White Oak Mineral Deciduous Swamp (SWD1-1), which has a provincial rank of S2S3 (Very Rare to Uncommon in Ontario – having five to 100 occurrences in the province). Prairie, savannah and woodland communities are also present. At least three different prairie communities have been identified in the park based on differing herbaceous layer species assemblages. Woody species in savannah and woodland communities include pin oak, swamp white oak, black oak (*Q. velutina*), and red maple.

Slender bush-clover (Lespedeza virginica), which is nationally and provincially 'Endangered' and listed on SARA, Schedule 1, is present in Ojibway Park. Several provincially, regionally and/or locally significant species are also present in Ojibway Park (OMNR 2002).

Titcombe Road North

This 40 ha site consists of tallgrass prairie and oak woodland communities. At least three different prairie communities have been identified in the Titcombe Road North ANSI based on differing herbaceous layer species assemblages. Woody species in woodland communities include black oak, white oak (*Quercus alba*) and red hickory (*Carya ovalis*).

Spring Garden Road

This 165 ha consists of tallgrass prairie and oak savannah communities, all of which have a provincial rank of S1 ('Extremely Rare' in Ontario – having less than five occurrences in the province). Other vegetation communities present in Spring Garden Road ANSI include a large wetland and old field communities. The wetland was originally an artificially constructed lagoon and is presently the largest remaining wetland within the City of Windsor[38].

Spring Garden Road ANSI is home to approximately 475 species of plants, 66 species of breeding birds, 14 species of mammals, 10 species of reptiles, four species of amphibians and 66 species of butterflies. Many of the plant species have a prairie affinity[39]. Purple twayblade, which is nationally and provincially 'Endangered' and listed on SARA, Schedule 1, is present in Spring Garden Road ANSI. Two nationally and provincially 'Threatened' species listed on SARA, Schedule 1 are present including colicroot and dense blazing star (*Liatris spicata*). American chestnut (*Castanea dentata*), which is nationally and provincially 'Threatened' and listed on SARA, Schedule 2, and prairie rose (*Rosa setigera*) and Riddell's goldenrod (*Solidago riddellii*), which are listed on SARA, Schedule 1 and as 'Special Concern' both nationally and provincially, are present in Spring Garden Road ANSI. Several provincially, regionally and/or locally significant species are also present in Spring Garden Road ANSI[40].

[37] Wormington, A. and D. Fraser. 1985c. Wetland Data Record and Evaluation – Turkey Creek. Second Edition. August 1985. Ontario Ministry of Natural Resources, Chatham. Manuscript. 22 pp. + 2 maps + 3 pp. supplement.

[38] Woodliffe, P. A. 1994. Spring Garden Road Prairie. OMNR, Chatham. Unpublished letter. 3 pp. + map.

[39] Ibid.

[40] Oldham, M. J. 1994. Spring Garden Road Plant List. Natural Heritage Information Centre, Peterborough. Unpublished list. 7 pp.

Black Oak Woods

This 46 ha site is dominated by a Moist-Fresh Black Oak-White Oak Tallgrass Woodland community (TPW2-1). This community type has a global rank of G1 ('Extremely Rare' – having less than five occurrences in the overall range) and a provincial rank of S1 ('Extremely Rare' in Ontario – having less than five occurrences in the province). Dominant tree species include black oak and white oak, with some particularly large specimen trees situated at the north end of the woodland.

This ANSI is home to at least 24 prairie indicator species. Purple twayblade, which is nationally and provincially 'Endangered' and listed on SARA, Schedule 1, willowleaf aster (*Symphotrichum praealtum*), which is nationally and provincially 'Threatened' and listed on SARA, Schedule 1, and American chestnut, which is nationally and provincially 'Threatened' and listed on SARA, Schedule 2 are all present in Black Oak Woods ANSI. Several provincially, regionally and/or locally significant species are also present in Black Oak Woods ANSI (OMNR 2002).

Regionally Significant Life Science ANSIs

In addition, two regionally significant Life Science ANSIs are located within the Preliminary Analysis Area, including:

- Canard River Kentucky Coffee-tree Woods; and,
- Canard River Scout Camp.

These regionally significant Life Science ANSIs are also designated as ESAs.

ENVIRONMENTALLY SIGNIFICANT AREAS

A number of Environmental Significant Areas (ESAs) are located within the Preliminary Analysis Area. Sixty-three (63) potential ESAs were inventoried in 1981 and/or 1982 and summarized by Oldham[41]. These ESAs were evaluated based on several physical, ecological, and social criteria, including:

- Significant Landforms;
- Linkage System;
- Migratory Stopover;
- Significant Communities;
- Hydrological Significance;
- Diversity;
- Significant Species;
- Size;
- Research/Education; and,
- Aesthetic/Historical.

A location was deemed to be an ESA if at least two of the ten criteria were met. Eight ESAs were established within the study, including:

- Allied Chemical Brine Wells ESA;
- Canard River Kentucky Coffee-tree Woods ESA;
- Canard River Scout Camp ESA;
- Devonwood ESA;
- Sandwich West Woodlot (LaSalle Woods) ESA;
- Ojibway Black Oak Woods ESA;
- Spring Garden Road Prairie ESA; and,
- Upper Big Creek Woods ESA.

An update of ESAs within the County of Essex was undertaken in 1991 to evaluate supplementary sites, including previously considered sites and newly identified candidate ESA sites. A resolution was passed that all PSWs and ANSIs in the County of Essex be included as ESAs. An ESA update report was prepared by ERCA (1994), which detailed the criteria met by locations not already designated as a PSW or ANSI. In addition to the above-referenced PSWs and ANSIs, six additional ESAs were identified within the Preliminary Analysis Area, including;

- Fairplay Woods ESA;
- New Canaan Woods ESA;
- Peche Island ESA;
- Green Dragon Woods ESA;
- Reaume Prairie ESA; and,
- St. Clair College Prairie ESA.

A summary of the ESAs located within the Preliminary Analysis Area which have no other designation (eg. PSW or ANSI) is presented in Table 4.6 and illustrated in Exhibit 4.17.

CAROLINIAN CANADA SITES

Carolinian Canada is a coalition of groups, agencies and individuals working to halt the loss of and achieve a substantial increase in the size and quality of natural communities characteristic of Carolinian Canada.

Two Carolinian Canada sites are present within the Preliminary Analysis Area, the Ojibway Prairie Remnants (site #31) and the Canard River Kentucky Coffee-tree Woods (site #32). The Ojibway Prairie Remnants site is now encompassed within the Ojibway Prairie Complex ANSI, and the Canard River Kentucky Coffee-tree Woods site is now encompassed within the Canard River Kentucky Coffee-tree Woods ESA.

[41] Oldham, M. J. 1983. Environmentally Significant Areas of the Essex Region. Essex Region Conservation Authority, Essex, Ontario. 426 pp.

EXHIBIT 4.17 – DESIGNATED NATURAL AREAS IN THE PRELIMINARY ANALYSIS AREA

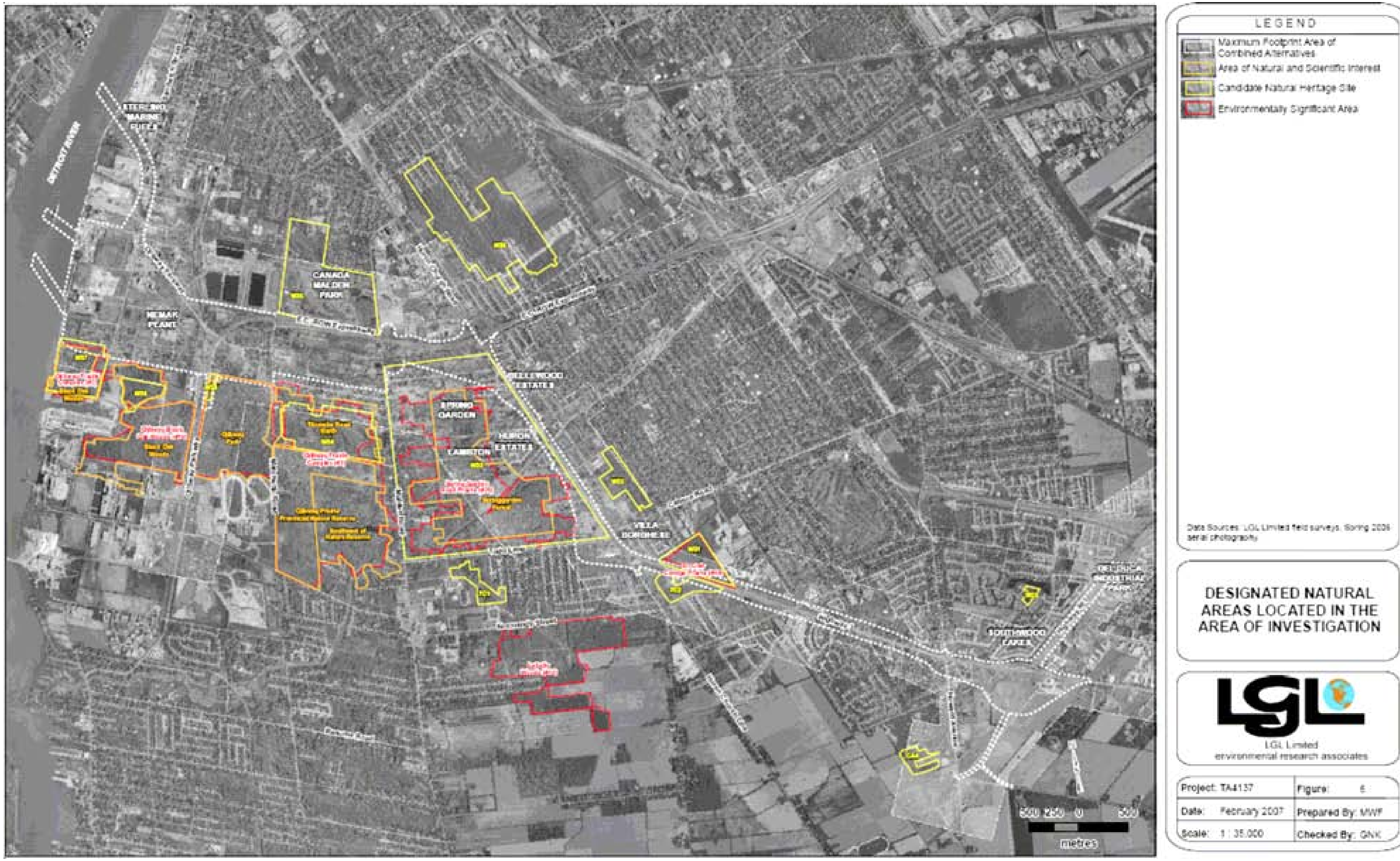


TABLE 4.6 – SUMMARY OF ENVIRONMENTALLY SIGNIFICANT AREAS IN THE PAA

ESA Name (ESA Number)	Significant Landforms	Linkage System	Migratory Stopover	Significant Communities	Significant Habitats/ Hydrological Significance	Diversity	Significant Species	Size	Research/ Education	Aesthetic and/or Historical Values
Canard River Scout Camp (#1)		Connected to the longest stretch of relatively continuous woodland in Essex County.		Largest upland wooded area remaining on the Canard River.		Good	Two SARA, Schedule 1 species, several provincially and locally significant species.		Scout Camp.	Sites with adequate trails through continuous woodland are uncommon in Essex County.
Canard River Kentucky Coffee-tree Woods (#2)		Forms part of a wooded corridor along the Canard River.		The only example of a lowland forest community containing Kentucky Coffee-tree in the Essex Region.		Good	Three SARA, Schedule 1 species, several provincially and locally significant species.			
Ojibway Prairie Complex (#3)	See Section 4.6.6									
Canard River Marsh (#13)	See Section 4.6.6									
Allied Chemical Brine Wells (#14)			Used by migrating shorebirds and waterfowl.	Unusual inland assemblage of halophytic (salt-tolerant) plants.	The alkaline, salt-rich soil and water provide unusual habitat.		Three SARA, Schedule 1 species, several provincially and locally significant species.		Researched and documented by Catling and McKay in Canadian Field-Naturalist.	
Sandwich West Woodlot/LaSalle Woods (#18)		Linkage with Turkey Creek and Ojibway Prairie via a hydro corridor.		Species assemblages include species with a prairie affinity.	Prairie habitat.	Good	Six SARA, Schedule 1 species, one SARA, Schedule 2 species, several provincially and locally significant species.	115 ha	Associated with Brunet Park. Potential for scientific research on prairie flora and fauna.	
Ojibway Black Oak Woods (#19)		Linkage with Ojibway Prairie.		Species assemblages include species with a prairie affinity.			One SARA, Schedule 2 species, several provincially and locally significant species.			
Spring Garden Road Prairie (#29)		Linkage with Ojibway Prairie.		Considered to be one of the best prairie remnants remaining in Essex County.	Prairie habitat.		Three SARA, Schedule 1 species, one SARA, Schedule 2 species, several provincially and locally significant species.			Impressive display of fall-blooming prairie wildflowers.

ESA Name (ESA Number)	Significant Landforms	Linkage System	Migratory Stopover	Significant Communities	Significant Habitats/ Hydrological Significance	Diversity	Significant Species	Size	Research/ Education	Aesthetic and/or Historical Values
Peche Island (#30)	One of five main islands in the Detroit River.					Good	Five SARA, Schedule 1 species, several provincially and locally significant species.			Used as a fishing station, both by natives and by settlers. It contains the foundation of a summer residence constructed by the famous distiller Hiram Walker.
Fighting Island (#32)	Largest of the five main islands in the Detroit River.		Used as a feeding stop for migratory waterfowl.	Carolinian forest communities present.		Good	One SARA, Schedule 1 species, one SARA, Schedule 3 species, several provincially and locally significant species.	148.8 ha		Occupied by the Wyandot Native Americans until 1820. Well known for its role in the Patriot War (1837-38). Promoted as a resort area from 1890-1918.
Upper Big Creek Woodlot (#33)		Linkage along Big Creek to Big Creek Marsh (#15).		Species assemblages include species with a prairie affinity.	Habitat for eastern foxsnake, Butler's gartersnake, White-eyed Vireo and Yellow-breasted Chat.		Four SARA, Schedule 1 species, one SARA, Schedule 3 species, several provincially and locally significant species.		Resident snakes researched and documented by Freedman and Catling in Canadian Field-Naturalist.	
New Canaan Valley (#36)		Longest natural linkage in the region (12 km) and linkage with Canard River Kentucky Coffee-tree Woods (#2)		Communities which are provincially unusual include buttonbush thickets and yellow pond-lily/lizard's tail marshes.	The Canard River is the region's largest natural watercourse. New Canaan Valley provides floodwater storage capacity and flow attenuation	Good	One SARA, Schedule 1 species, one SARA, Schedule 3 species, several provincially and locally significant species.	220 ha		Named after the New Canaan Settlement founded by runaway slaves from the U. S. in the 1850s. Union Cemetery is located in the ESA. A portion of a railroad built by Hiram Walker is located in the ESA.
Fairplay Woods (#38)	Contains portions of a river channel which predates 19th century settlement. Provides an example of pre-settlement channel configuration and capacity.				Provides floodplain storage and reserve flow capacity for Pike Creek.	Good	One SARA, Schedule 1 species, one SARA, Schedule 3 species, several provincially and locally significant species.			

ESA Name (ESA Number)	Significant Landforms	Linkage System	Migratory Stopover	Significant Communities	Significant Habitats/ Hydrological Significance	Diversity	Significant Species	Size	Research/ Education	Aesthetic and/or Historical Values
Devonwood (#45)				Unique woodlot contains eight oak species plus hybrids.			Two SARA, Schedule 1 species, one SARA, Schedule 3 species, several provincially and locally significant species.		Presence of eight oak species plus hybrids provides an opportunity to study this group.	
St. Clair College Prairie (#49)					Species assemblages include species with prairie and savannah affinities.	Good	Three SARA, Schedule 1 species, several provincially and locally significant species.		The St. Clair College of Applied Arts and Technology is adjacent to this ESA.	
Green Dragon Woods (#62)		Forms part of a wooded corridor along the Canard River.			The floodplain contains oxbows and braided channels which provide flood storage capacity and reduce main channel velocity.		One SARA, Schedule 1 species, one SARA, Schedule 3 species, several provincially and locally significant species.			
Reaume Prairie (#64)				Considered to be one of the best prairie remnants remaining in Essex County.		Good	Four SARA, Schedule 1 species, one SARA, Schedule 3 species, several provincially and locally significant species.			
Detroit River Marshes (#77)	See Section 4.6.6									

4.7 Transportation Network

This section provides an overview of the existing transportation system in the PAA, comprising the road, rail and marine border crossing facilities and the supporting transportation infrastructure for the Detroit River and St. Clair River crossings.

BRIDGE AND TUNNEL CROSSINGS

There are three road crossings between southeast Michigan and southwest Ontario. These include the Ambassador Bridge and -Detroit-Windsor Tunnel, which cross the Detroit River in Windsor-Detroit, as well as the Blue Water Bridge, which crosses the St. Clair River in Sarnia-Port Huron.

Ambassador Bridge

The Ambassador Bridge was opened in 1929 and connects the local road network in west Windsor with the US interstate system in southwest Detroit. From entrance to exit, the suspension bridge is 2.8 kilometres (9,200 feet) long, and rises as high as 46 m (152 feet) above the Detroit River at its centre. Two lanes in each direction are provided along its length; currently one is used for cars and one for commercial vehicles. All tolls are collected on the US side of the bridge, although toll collection facilities also exist on the Canadian side on the approach to the bridge.

For entry to the US, Department of Homeland Security (DHS) operates separate border processing facilities for commercial vehicles and for passenger cars. Commercial vehicles are routed via a ramp from the bridge to a processing area below and to the east of the bridge with thirteen primary inspection booths. Passenger cars continue straight ahead from the Bridge to twelve primary inspection booths. Toll booths are provided after primary inspection for cars and commercial vehicles.

For entry to Canada, Canada Border Services Agency (CBSA) operates ten passenger car and ten truck primary inspection lanes. Secondary inspection for cars occurs beyond the primary inspection booths. Secondary inspection for commercial vehicles is located off-site at Malden Road, approximately two kilometres south off of Huron Church Road, although there is a small area for secondary commercial inspection at the plaza.

Detroit-Windsor Tunnel

The Detroit–Windsor Tunnel was opened in 1930 and connects downtown Windsor and downtown Detroit. The tunnel is approximately 1.6 kilometres (1 mile) long and extends 23 metres (75 feet) below the surface of the Detroit River. The tunnel is illuminated and ventilated. One lane is provided in each direction. The tunnel has a height clearance of 4.0 metres (13'2") and a 330-degree bend in the tunnel, which restricts the types of commercial vehicles that can use the tunnel.

Primary inspection facilities are provided at the entry to both Canada and the US. Due to the downtown location of the plazas, the space for secondary commercial inspection is limited and most secondary inspection for commercial vehicles is carried out off-site.

There are twelve primary inspection lanes on the US side, including three booths available for use by commercial vehicles. Secondary inspection for cars is carried out immediately adjacent to the primary inspection with twenty-three spaces available. In Canada, there are twelve primary inspection lanes, with commercial vehicle primary inspection lanes to the east of the tunnel exit portal and leading onto Goyeau Street. Primary inspection lanes for cars are on the west side of the tunnel exit portal, leading onto Park Street. Secondary inspection for cars is located directly after passing through the primary inspection. Secondary inspection for commercial vehicles is located off-site at Hanna Street, approximately 1.5 kilometres south of the tunnel plaza, although there is a small area for secondary commercial inspection on the plaza itself.

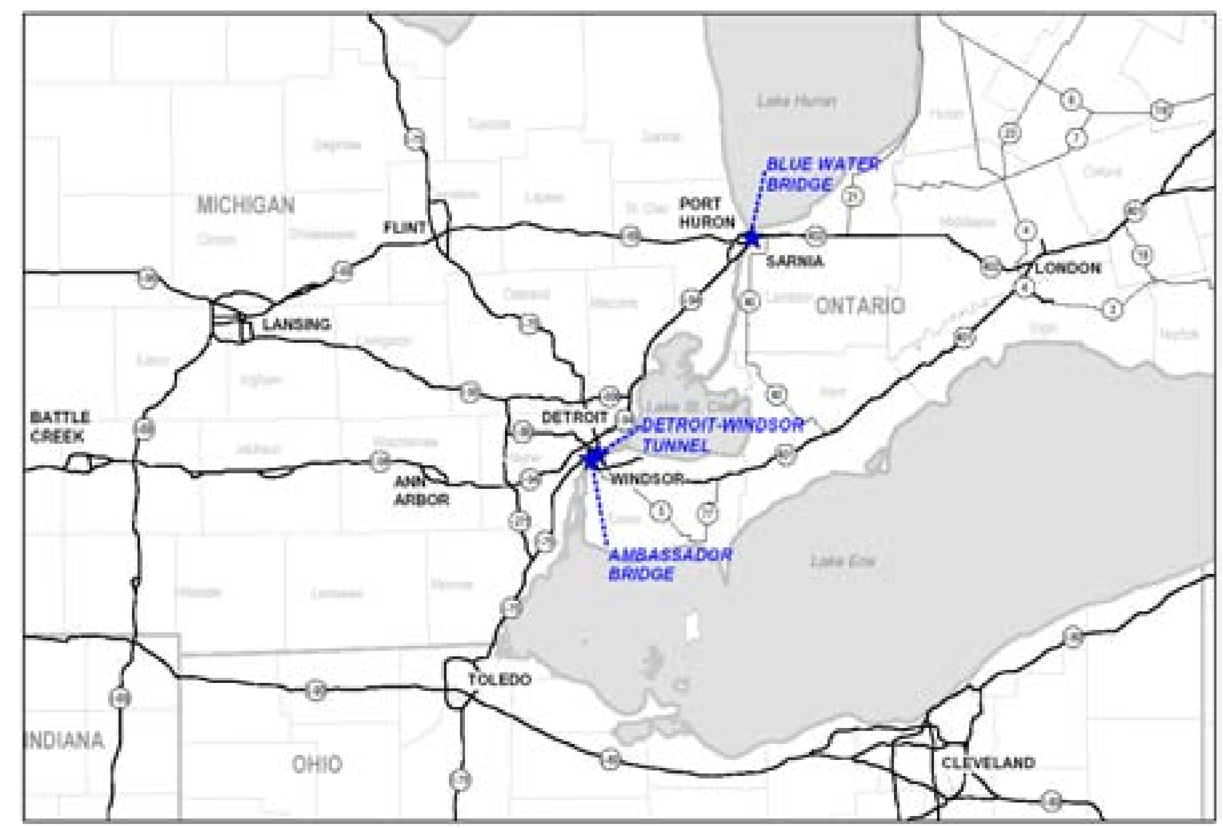
Blue Water Bridge

The Blue Water Bridge was opened in 1938. The original three-lane, 6,200-foot (1.88-km) cantilever truss bridge over the St. Clair River connects Sarnia and Port Huron. A second three-lane, 6,100-foot (1.86-km) continuous tied arch bridge was opened in 1997 to allow the closure of the first span for major deck rehabilitation. In 1999, both spans were open to traffic, providing a significant increase in roadway capacity.

HIGHWAY SYSTEM

The road border crossings in the Preliminary Analysis Area are served by a network of provincial highways in Ontario and interstate highways in Michigan. The layout of the highway network in the broad geographic Preliminary Analysis Area is a key aspect of cross-border route selection (see Exhibit 4.18).

EXHIBIT 4.18 - SOUTHWEST ONTARIO / SOUTHEAST MICHIGAN HIGHWAY SYSTEM



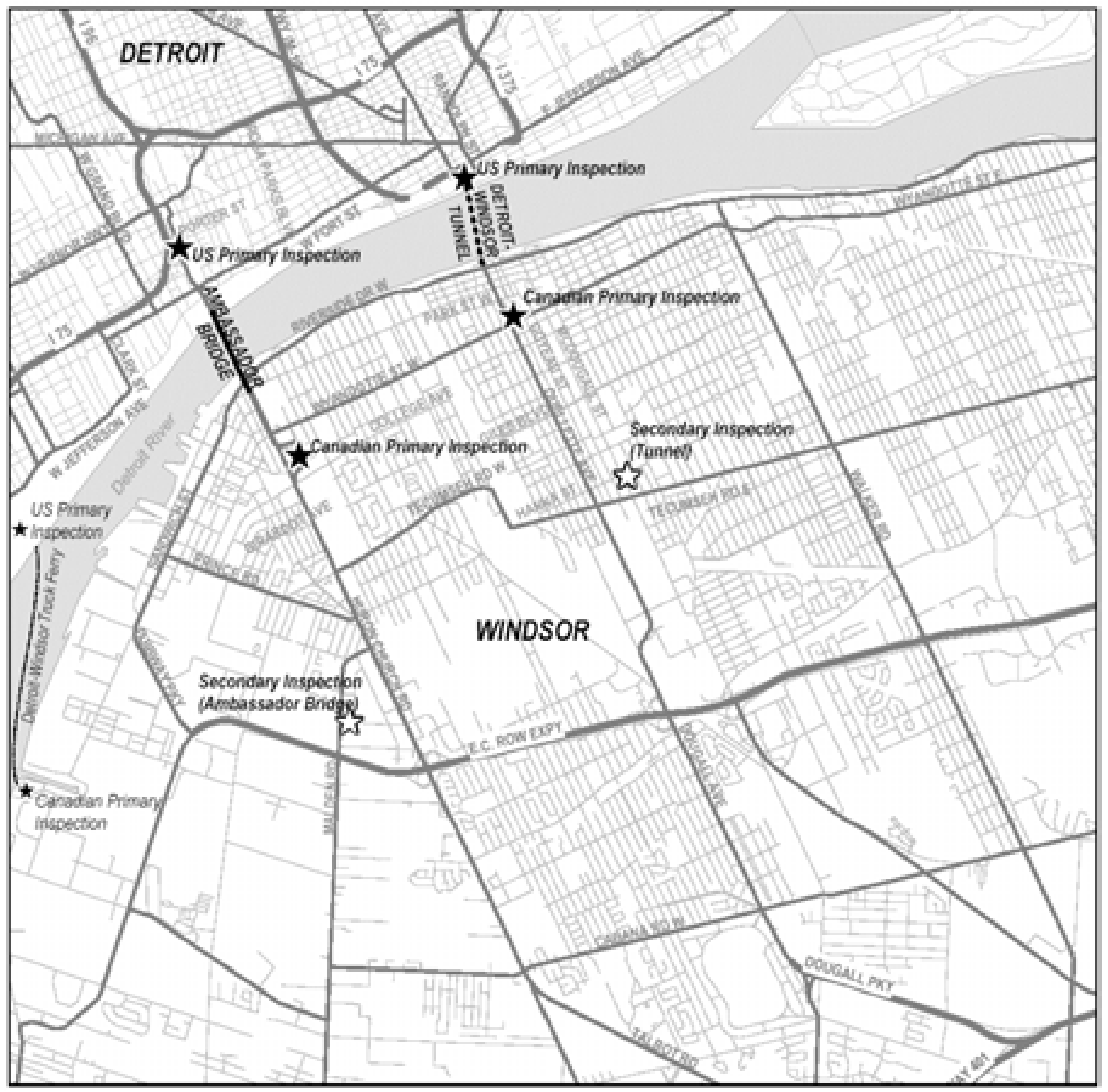
Highway 401 is the dominant corridor in Canada, extending from beyond the Greater Toronto Area to Windsor, with local road access to the Ambassador Bridge. In Detroit, the Ambassador Bridge connects with the interstate system, with the main long distance travel flows being I-75 for travel to south US and I-94 for travel west to Chicago and beyond.

For travel via Sarnia-Port Huron, Highway 402 branches off of Highway 401 west of London towards Sarnia and connecting with the Blue Water Bridge. In the US, I-94 connects with the Blue Water Bridge and provides freeway access south to Detroit. I-69 provides a westward connection from Port Huron, linking with I-94 near Battle Creek. For trips from Highway 401 to points west via I-94 or south via I-69, the routes using the Ambassador Bridge and the Blue Water Bridge are almost equal in length.

ROAD SYSTEM

Exhibit 4.19 illustrates the local road system and access roads in the vicinity of the Ambassador Bridge and the Detroit-Windsor Tunnel.

EXHIBIT 4.19 – LOCAL ROAD SYSTEM



Canadian Access Roads

Huron Church Road is the main access road to the Ambassador Bridge on the Canadian side, extending as a 6-lane urban arterial road linking Highway 401 to the Ambassador Bridge via Highway 3/Talbot Road. The posted speed limit on Huron Church Road is 80 km/h from Highway 3/Talbot Road to Pulford Street (south of the E.C. Row Expressway), and 60 km/h from Pulford Street to College Avenue, near the bridge plaza. There are 17 signalized intersections on Huron Church Road and Highway 3/Talbot Road between Highway 401 and the Ambassador Bridge.

Given the high commercial vehicle volumes, overhead signs direct commercial vehicles to use the centre lane, local traffic to use the right lane, and international cars to use the left lane. Further north, at Northwood Street (north of the E.C. Row Expressway) cars are directed to use the left lane, while commercial vehicles use the centre and right lanes.

Significant development and facilities along Huron Church Road also contribute to traffic levels on this route. Significant traffic generators along Huron Church Road include, from north to south, the University of Windsor at College Avenue, Assumption High School at Wyandotte Street, the University Mall at Tecumseh Road, and, further south on the Highway 401/Huron Church corridor, St. Clair College on Talbot Road.

The Detroit-Windsor Tunnel is accessed from Goyeau Street, an arterial road in the central business district. From Highway 401, the route to the tunnel follows the urban arterial roads of Dougall Avenue/Ouellette Avenue, then Wyandotte Street and Goyeau Street to the tunnel entrance in downtown Windsor. For trips arriving in Canada from the Tunnel, exit from the Tunnel into Windsor is onto Park Street, then either onto Goyeau Street or Ouellette Avenue. The route along Dougall Avenue/Ouellette Avenue is a fourlane urban arterial road. The Dougall Avenue exit on westbound Highway 401 is signed on the highway as a route to the Detroit-Windsor Tunnel, although the primary function of these roads are as local roads.

US Access Roads

For traffic using the Ambassador Bridge, cars and commercial vehicles have many route options, given the proximity to several Interstate freeways. Cars exit onto Porter Street, which has ramps at signalized intersections to/from I-75 and I-96 and intersects with service roads paralleling the freeways. All commercial vehicles entering the US from the Ambassador Bridge follow a ramp to the truck customs inspection facility, and then exit onto West Fort Street, south of the plaza. Commercial vehicles can link with I-75 by travelling west on Fort Street then north on Clark Street, or by travelling east then north on Rosa Parks Boulevard. I-75 provides a connection south toward Ohio and north toward Northern Michigan. It can also be used to access I-96, which connects to western Michigan and is the link to I-94 for travel toward Chicago. The arrangement from the bridge to the Interstate freeway systems is a confusing arrangement for drivers and hazardous due to the high level of weaving traffic. The Ambassador Bridge Gateway Project, planned for construction, will address these traffic issues.

At the Detroit-Windsor Tunnel, commercial vehicles are part of the same traffic stream as cars. All traffic entering or leaving the Detroit-Windsor Tunnel must pass through the signalized intersection of the Tunnel access to the south, Randolph Street to the north, and Jefferson Avenue to the east and west. Interstate 375 and M-10 (John C. Lodge Freeway) link with Jefferson Avenue in close proximity to the Tunnel. The M-10 provides access to the I-96 and I-75 freeways from the tunnel.

RAIL SYSTEM

The rail network serving the Preliminary Analysis Area roughly parallels the US interstate/Ontario provincial road system. Exhibit 4.19A is a map of the rail network and operators.

A Canadian National Railway (CN) line runs from London to Sarnia parallel to the Highway 402 corridor, and continues through Port Huron, following I-69 to Battle Creek, then continues toward Illinois and beyond. VIA rail and Amtrak passenger services use this line although the one through train was discontinued in 2004. Another CN line roughly follows the Highway 401 corridor from London to Windsor, carrying VIA passenger service. The line continues through Detroit, northwest toward Flint. Amtrak passenger services are available on this line from Detroit to Pontiac. In Canada, this line roughly parallels a Canadian Pacific Railway (CPR) line from London to Windsor. The CPR line continues through Detroit to Lansing, Chicago (via trackage rights) and beyond. A CN line connects Detroit and Port Huron on the Michigan side.

Other rail operators have connections in Detroit. A Norfolk Southern (NS) line, used by Amtrak, runs between Detroit and Chicago roughly along I-94. Another NS line runs south toward Toledo then branches east and west. An Indiana & Ohio Railway (IORY) line runs south toward Cincinnati. CSX Transportation (CSXT) lines run north toward Saginaw, and south toward Cincinnati or Columbus. A Tuscola and Saginaw Bay Railway Company (TSBY) line connects in Ann Arbor to service northwest Michigan. A CSXT line also links Sarnia and Chatham on the Canadian side, roughly along the Highway 40 corridor.

For rail freight, two underground railway crossings are located at Sarnia-Port Huron and at Windsor-Detroit. The former is owned and controlled by CN and the latter, comprised of one well-used line and one unused line, is controlled by CPR and owned by a joint venture of CPR and Borealis Infrastructure Fund. The locations of the Detroit-Windsor tunnels are also shown in Exhibit 4.19B.

During the 1990s, both crossings were expanded to accommodate larger vehicles. The CN tunnel at Sarnia accommodates the largest vehicles that operate across the North American railway system. CPR expanded one of the two existing tunnels between Detroit and Windsor to the maximum dimensions structurally possible; this is not quite as large as the CN tunnels and cannot accommodate double stack domestic containers; however, it is capable of handling double stack international containers, intermodal trailers on flat cars (TOFC), as well as domestic auto tri-level cars which were the primary target market.

EXHIBIT 4.19A – RAIL SYSTEM: SOUTHEASTERN MICHIGAN/SOUTHWEST ONTARIO

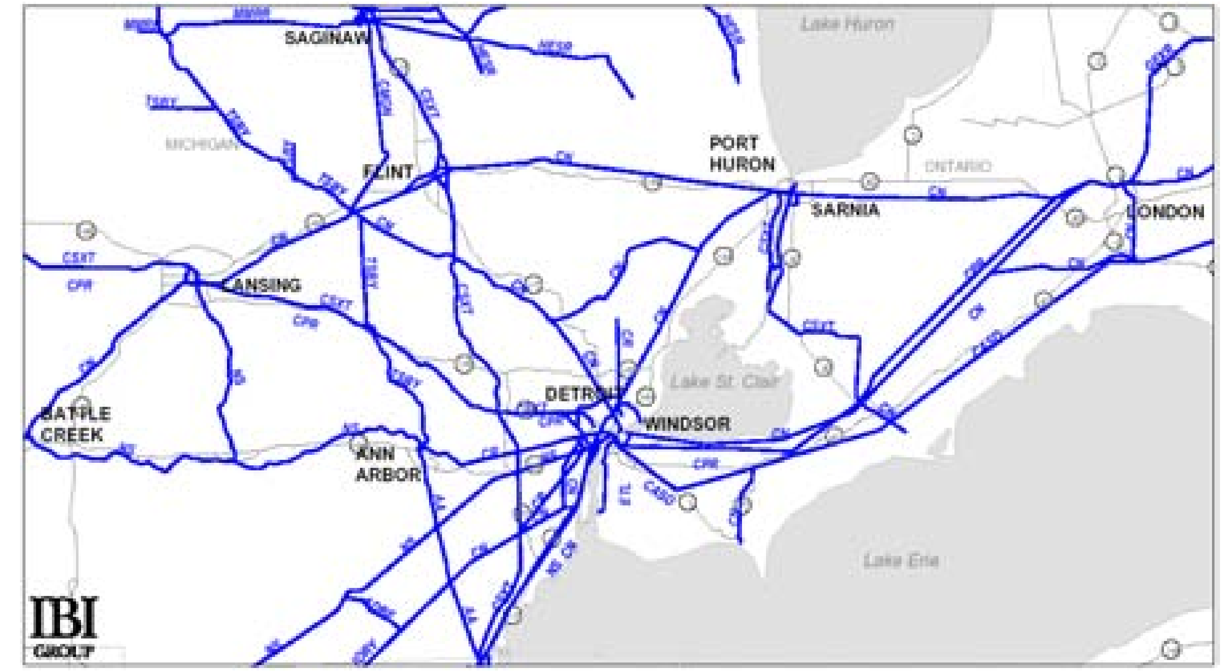
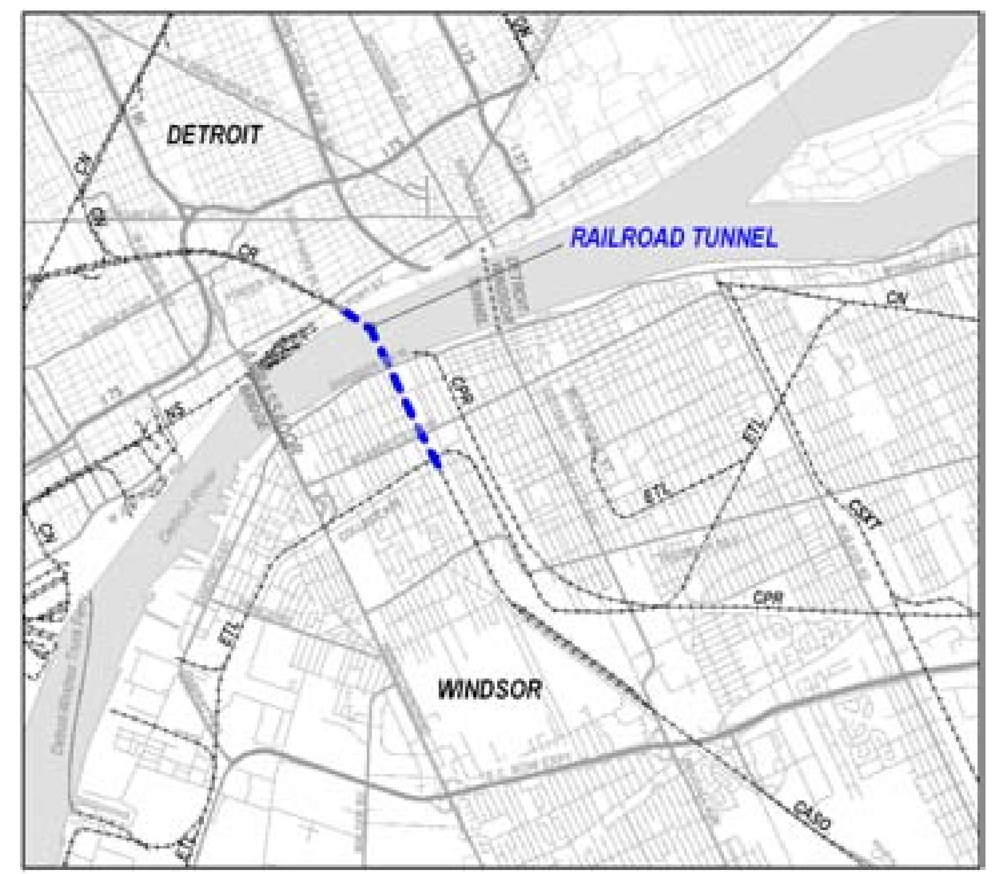


EXHIBIT 4.19B – RAIL SYSTEM: WINDSOR-DETROIT



MARINE SYSTEM

There are currently three ferry services operating in the Preliminary Analysis Area, consisting of the Walpole Island Ferry, Marine City Ferry and Windsor-Detroit Truck Ferry. The locations of these are shown in Exhibit 4.21. Each service has relatively limited vehicle capacity.

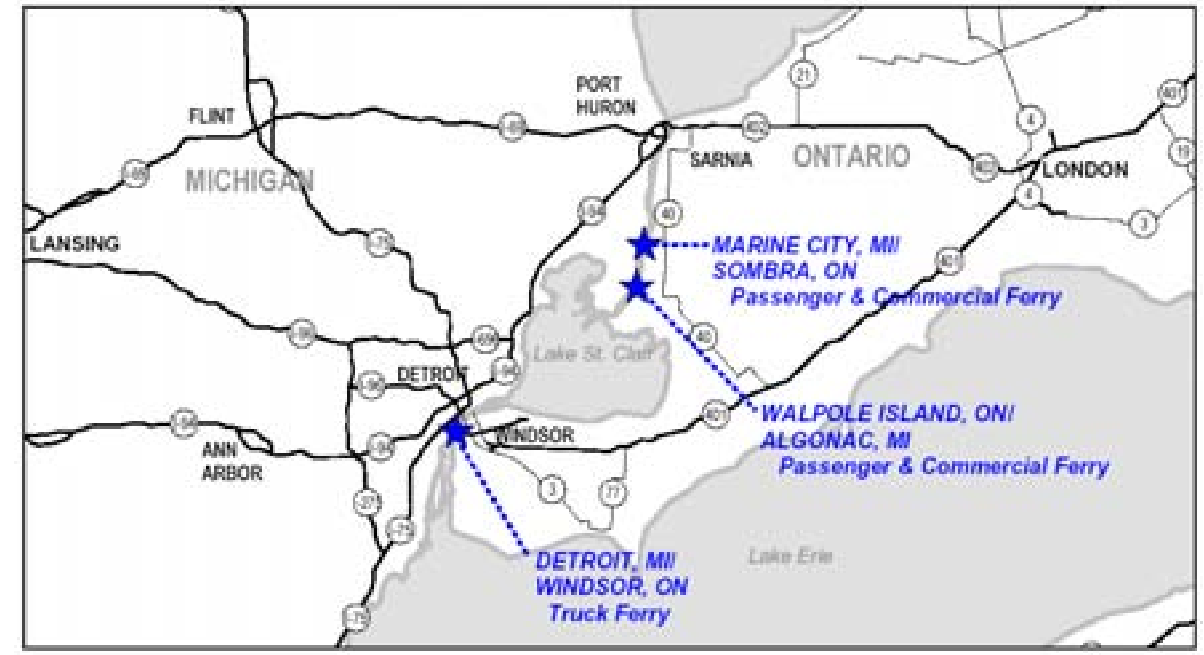
The Walpole Island Ferry provides daily service at 20-minute headways between Algonac, Michigan and Walpole Island, Ontario at the northern end of Lake St. Clair, weather permitting. Two boats are available, each capable of servicing 20 passenger cars and/or small commercial vehicles. Ferries leave Walpole Island from 6:20 a.m. to 9:45 p.m., and return from Marine City from 6:50 a.m. to 10:00 p.m. The one-way cost is approximately $4 US and travel time is 6 minutes.

The Marine City Ferry operates daily between Marine City, Michigan and Sombra, Ontario, weather permitting. Two boats are used when busy. The ferries can transport 12 passenger cars each, but will also take commercial vehicles. The larger of the two ferries can hold up to two tractor trailers or larger vehicles up to 80,000 pounds gross weight each. The service runs approximately every 15 minutes, 7 days a week year round at a cost of $5 US per car each way and $2 for foot passengers. Ferries leave Sombra from 6:40 a.m. to 10:15 p.m., and return from Marine City from 7:00 a.m. to 10:30 p.m. Travel time is 7 minutes.

The Windsor-Detroit Truck Ferry was started in 1990 for the purpose of handling commercial vehicles carrying dangerous goods (Classes 1, 3, 7 and 8) which are banned from the bridge and tunnel crossings in accordance with Michigan State law. The ferry also handles over-sized loads that cannot use the bridge or tunnel, but its use is not restricted to these two markets. The ferry operates hourly 10 hours per day and can accommodate 8 trucks per crossing.

The truck ferry provides a significant distance savings to commercial vehicles carrying dangerous goods or heavy loads by allowing them to cross at Windsor-Detroit as opposed to having to travel to alternate ports that support this market. The alternative for vehicles with dangerous goods within the Preliminary Analysis Area is Port Huron-Sarnia. Heavy vehicles must cross much further away by land between Minnesota and Ontario. It is estimated that more than 50% of the trips using the ferry crossing are from London (i.e. the point at which travel distances across the corridor via Port Huron-Sarnia and Windsor-Detroit are similar) inward, with a similar market range on the Michigan side.

EXHIBIT 4.21– MARINE SYSTEM



5 TRANSPORTATION NEEDS ASSESSMENT

As discussed in Section 1.1, the Partnership jointly commissioned a *Planning/Need and Feasibility Study (P/NF)* in 2001, which identified a long-term strategy to promote the safe and efficient movement of people and goods between Southwest Ontario and Southeast Michigan.

Although conducted in a manner consistent with the environmental study processes in both countries, the P/NF Study was not completed within the formal environmental study framework. The findings of the P/NF Study, however, serve as an important basis for governments to move forward in the development and improvement of cross-border transportation services, including proceeding with the environmental study processes in the US and Canada for major transportation improvements at the Detroit River international crossing.

A consultation component was incorporated in the P/NF Study process. Canadian and US government departments, ministries and agencies, local municipalities, First Nations groups, private sector stakeholders in border transportation issues, as well as the general public were engaged in the course of the study.

Throughout the P/NF Study, the Partnership affirmed that the findings of the P/NF Study may be used to initiate environmental studies in accordance with the requirements of the *US National Environmental Policy Act (NEPA)*, *Canadian Environmental Assessment Act (CEAA)* and *Ontario Environmental Assessment Act (OEAA)*. This step would be followed by completion of the appropriate environmental impact/assessment studies, design of the approved improvements and ultimately, construction.

The transportation problems and opportunities identified during the P/NF Study provided the basis for the Partnership to initiate the environmental study processes for the development and assessment of transportation alternatives at the Detroit River international crossing.

The findings of the P/NF Study have been brought forward into the formal environmental study process for consultation. The work completed under the P/NF Study was updated to reflect changes in traffic and network demands. Specifically, changes in travel behaviour and trip patterns across the southeast Michigan/southwest Ontario border have occurred since the P/NF study was undertaken. A decline in the US economy, 9/11, a SARS outbreak in Toronto, the Iraq war, a rising Canadian dollar and the opening of three casinos in Detroit and other events have all contributed to a large decline in cross-border passenger car traffic and has retarded commercial vehicle growth. None of these events were reflected in the previous 2000 base year data that provided the basis for the thirty-year passenger car and commercial vehicle forecasts prepared for the previous Bi-national Partnership P/N&F Study.

The updated transportation problems and needs are documented in the following sections. These sections provide a summary of the key findings of the study. For further details, the reader is referred to the following supporting documents (listed at the beginning of this report):

- *Draft Feasible Transportation Alternatives (Alternatives to the Undertaking) Report (February 2006) (available);*
- *Transportation Planning and Need Study Report (November 2005) (available);*
- *Travel Demand Forecasts Working Paper (September 2005) (available);*
- *Travel Demand Model Update Working Paper (September 2005) (available); and*
- *Regional and National Economic Impact of Increasing Delay and Delay-Related Costs at the Windsor-Detroit Crossings (August 2005) (available).*

5.1 Transportation Problems and Needs

5.1.1 Transportation Problems

CAPACITY

The current and future deficiencies in the roadway network serving the international border crossings at Windsor-Detroit that are anticipated within the 30-year timeframe are documented in the *Travel Demand Forecasts Working Paper* (refer to List of Supporting Documents).

For this study, capacity was defined as the maximum vehicle service flow rate that can be sustained by a facility and represents a severe breakdown in traffic operations. This is a very undesirable condition with long queues and delays.

Although traffic volumes up to the capacity can be accommodated, it was considered prudent to provide a level-of-service that is better than that provided when traffic volumes reach capacity. As such, capacity values within this study were defined as a range, with the upper limit corresponding to the maximum rate (as defined above) and the lower limit corresponding to the flow rate at which traffic operations start to become unstable due to the high number of vehicles using the facility.

Given the high importance of an international crossing, the long lead time to construct/expand a crossing, the large economic costs associated with unstable cross-border traffic and the range of uncertainty inherent in the forecasts (which represent the peak conditions for a typical day and not the periods of extreme traffic volume that inevitably occur from time to time), the lower limit was identified as a practical volume that should not be exceeded for an extended period of time.

This suggested that, while a crossing is able to accommodate higher traffic volumes than the lower capacity limit, those within the range defined by the lower and upper limits are not desirable and a new or expanded crossing is needed before consistently high levels of congestion and unstable operations are reached.

Crossing Capacity

The determination of the upper and lower limit capacities for the Ambassador Bridge and the Detroit-Windsor Tunnel are documented in the *Travel Demand Model Update Working Paper* (refer to List of Supporting Documents). Table 5.1 presents the existing volume and capacity for each bridge/tunnel and the total for the Detroit River crossings.

The roadway crossing upper limit capacities were estimated to be 1,750 PCE/hour/lane for the Ambassador Bridge and 1,500 PCE/hour/lane for the Detroit-Windsor Tunnel. The lower limit capacities are estimated to be 1,450 PCE/hour/lane for the Ambassador Bridge and 1,250 PCE/hour/lane for the Detroit-Windsor Tunnel. PCEs (Passenger Car Equivalents) are a measure of total combined passenger car and commercial vehicle volumes, where commercial vehicles are expressed as a multiple of passenger cars and then added to passenger cars.

Based on fall 2004 peak hour traffic volumes, the volume-to-capacity (v/c) ratio for the Ambassador Bridge was estimated to be 0.67. The Detroit-Windsor Tunnel was found to have a similar v/c ratio of 0.65.

TABLE 5.1 - ASSESSMENT OF EXISTING ROADBED CAPACITY

Measure	Crossing		
	Ambassador Bridge	Detroit-Windsor Tunnel	Detroit River Crossings
Peak Hour Capacity (PCE/h/lane)	1,750	1,500	N/a
Number of Lanes (one-way)	2	1	3
One-Way Capacity (PCE/h)	3,500	1,500	5,000
Peak Hour Demand[1]			
Passenger Cars	1,176	931	2,106
Commercial Vehicles	390	14	404
Peak Hour Total PCE Demand[2]	2,346	973	3,319
Peak Hour & Direction Volume-to-Capacity Ratio	67%	65%	66%

[1] Represents 4 p.m. to 5 p.m. of average Thursday/Friday in September, 2004.
[2] Based on PCE factor of 3.0 for commercial vehicles.

The projected Base Forecast future year peak hour, peak direction traffic volumes and v/c ratios are presented in Table 5.2. Based on these results, the year in which crossing capacity is reached is illustrated in Exhibits 5.1A and 5.1B.

The high and low forecast bounds that bracket the Base Forecast line represent the future range of uncertainty in the forecasts. The results show that the Ambassador Bridge has adequate capacity to accommodate growth in cross-border traffic until approximately the year 2020. The lower capacity limit indicates that bridge traffic operations will become unstable by approximately 2011. The Detroit-Windsor Tunnel is not expected to reach capacity until approximately 2035, with unstable traffic operations projected by approximately 2015.

Table 5.5 at the end of this section provides an overall summary of the year that capacity is reached at the two crossings, as well as for the access/egress roads and plazas on the Canadian and US side of the border. These elements are discussed in the following sections.

Canadian Access/Egress Roads

The traffic analysis for the Ambassador Bridge access/egress roads on the Canadian side of the border was based on traffic modelling of the seventeen intersections between Highway 401 and the Ambassador Bridge Plaza. The 2004 base year conditions and future year analyses were based on 2004 intersection counts and traffic signal timings for Huron Church Road and Highway 3/Talbot Road, as obtained from the City of Windsor, as well as from traffic model estimates. The analysis focused strictly on the Canadian side of the border, as the Ambassador Bridge Gateway Project (refer to Section 1.7) addressed future access/egress road needs on the US side.

In 2004, adequate road capacity was provided between the Ambassador Bridge Canadian Plaza and Highway 401, with acceptable traffic operations in the afternoon peak hour. This was also verified by observations of current traffic conditions, with queuing of commercial vehicles on Huron Church Road no longer a problem since additional US border processing capacity was provided in June 2004.

By 2015, traffic volumes are projected to be at or above the road capacity for many sections of this corridor, with unacceptable traffic operations in the afternoon peak hour. By 2025, the majority of sections are projected to be over capacity and exhibiting unacceptable traffic operations during both the morning and afternoon peak hours.

Access roads leading to the Detroit-Windsor Tunnel were near capacity during peak hour traffic conditions on the Canadian side of the border based on 2004 traffic counts, with traffic operations at intersections impacted by the high volumes of local traffic travelling through downtown Windsor.

Taking the access/egress road system as a whole, it is projected that capacity will be reached by approximately 2010, although localized intersection improvements at critical locations could potentially extend the timeframe before capacity is reached by several years.

TABLE 5.2 – EXISTING AND BASE FORECAST DETROIT RIVER CROSSINGS VOLUMES AND CAPACITY UTILIZATION

Crossing	Year	PCE Volume (1-way)		Volume / Capacity Ratio	
		AM Peak Hour	AM Peak Hour	AM Peak Hour	PM Peak Hour
Ambassador Bridge	2004	1,930	2,350	55%	67%
	2015	2,510	3,180	72%	91%
	2025	2,900	3,880	83%	111%
	2035	3,300	4,520	94%	129%
Detroit-Windsor Tunnel	2004	900	970	60%	65%
	2015	1,070	1,250	71%	84%
	2025	1,190	1,370	79%	91%
	2035	1,310	1,480	87%	99%
Detroit River Crossings	2004	2,830	3,320	57%	66%
	2015	3,580	4,440	72%	89%
	2025	4,090	5,250	82%	105%
	2035	4,610	6,000	92%	120%

Note: Morning peak direction is Canada to US, afternoon peak direction is US to Canada.

EXHIBIT 5.1A – BASE FORECAST YEAR – AMBASSADOR BRIDGE CAPACITY REACHED

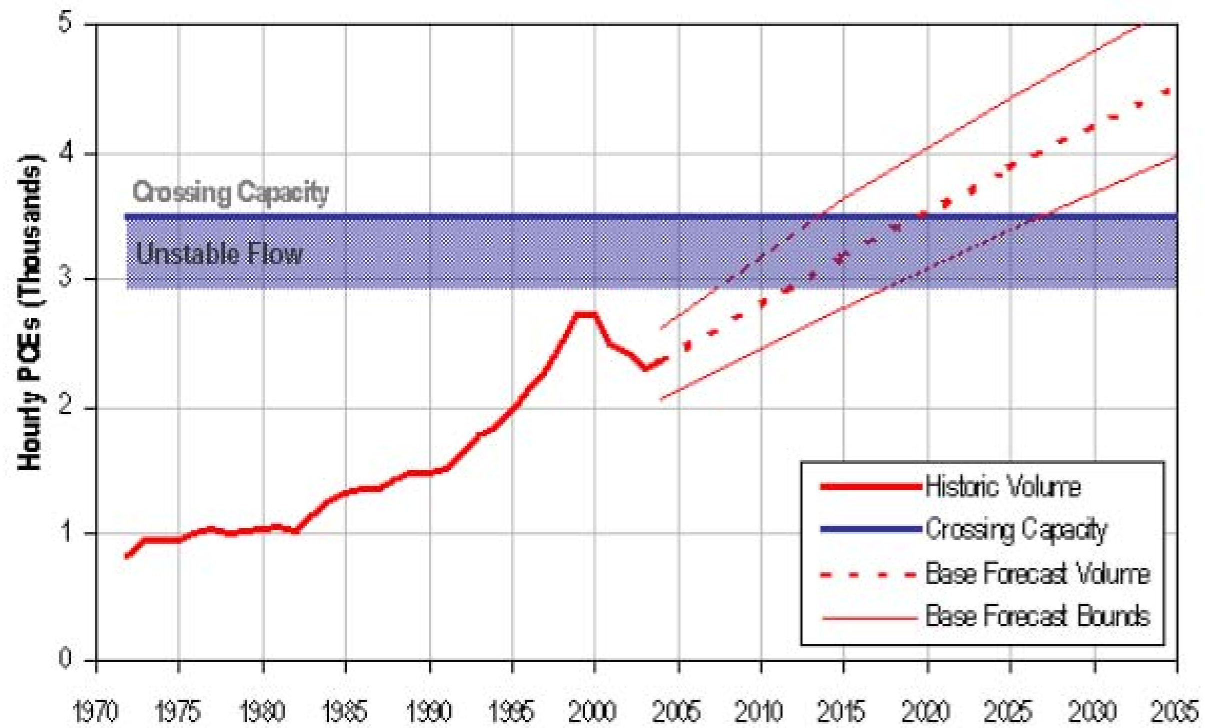
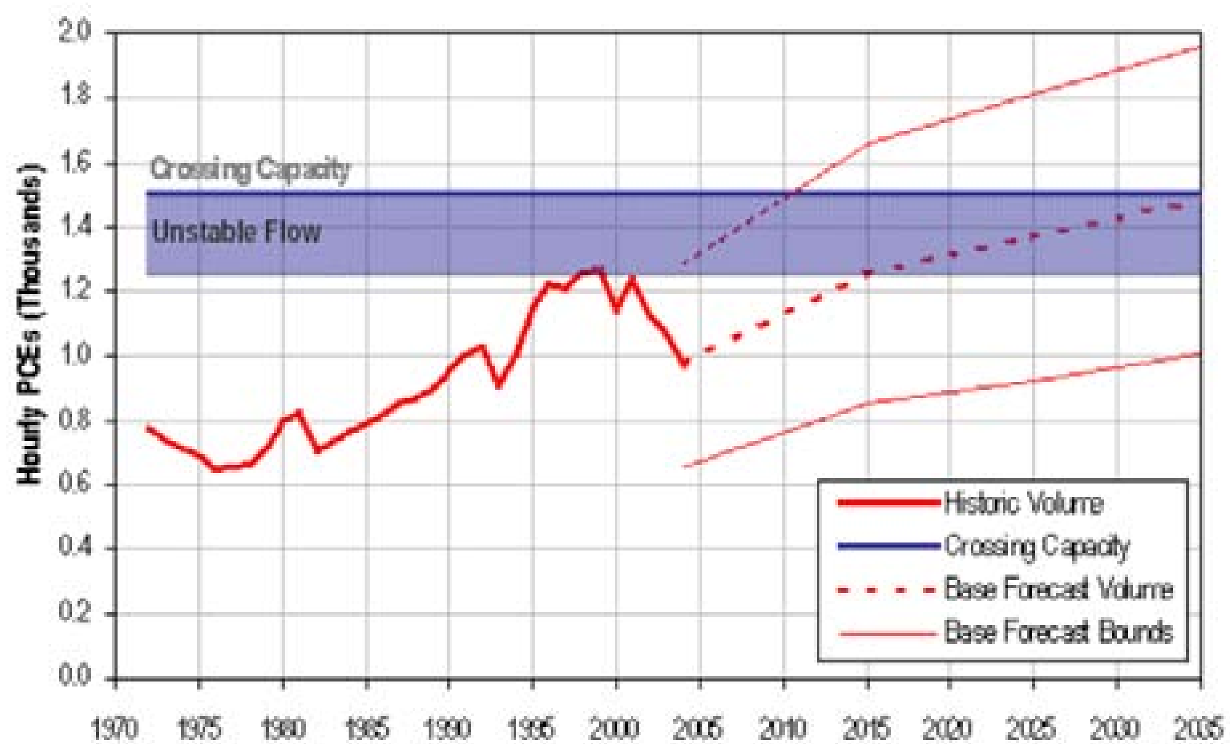


EXHIBIT 5.1B – BASE FORECAST YEAR – DETROIT-WINDSOR TUNNEL CAPACITY REACHED



US Access/Egress Roads

The Ambassador Bridge access/egress road conditions on the US side of the border were addressed by the *Ambassador Bridge Gateway Project*. The project is currently under construction, and is expected to be completed by December 2009.

The project will provide acceptable freeway operations through 2035 according to the Michigan Department of Transportation (MDOT), as documented in the *1999 Final Traffic Report Supplement* and the *2003 Ambassador Bridge Gateway Project Reassessment Final Traffic Technical Report*. Therefore, no further analysis was conducted regarding access/egress conditions on the US side of the Ambassador Bridge.

The Detroit-Windsor Tunnel access/egress road analysis on the US side of the border modelled five intersections adjacent to and connecting the Detroit-Windsor Tunnel with Jefferson Avenue in downtown Detroit.

In the base year (2004), unstable road capacity was evident at the entrance of the Detroit-Windsor Tunnel, with congested traffic operations in the afternoon peak hour, as verified by field observations of current traffic conditions. Detroit Police personnel manage traffic operations at the Detroit-Windsor Tunnel's entrance during recurring periods of high traffic congestion, which typically occur on Thursday and Friday afternoons. Even with managed traffic operations, traffic will frequently back up onto the Lodge freeway under Cobo Hall, and onto I-375.

The capacity and operational issues of the access road into the Detroit-Windsor Tunnel are significantly influenced by the geometric configuration of the Detroit-Windsor Tunnel entrance. Through traffic, moving from southbound Randolph Street to the Detroit-Windsor Tunnel is limited to vehicles enrolled in the NEXUS program. This traffic is provided an exclusive lane through the plaza entrance and exclusive use of a tollbooth.

The roadway immediately downstream from this movement narrows to the equivalent of 1½ lanes due to the exclusive NEXUS lane. This causes frequent backups onto Jefferson Avenue. Queues and delays downstream are not affected by the signal timing at Jefferson Avenue and the Detroit-Windsor Tunnel entrance. Limited sight distance and maneuvering space at the tollbooths exacerbate these delays.

The existing tollbooths on the US side of the Detroit-Windsor Tunnel further limit capacity. During peak-hour traffic conditions, non-NEXUS vehicles are limited to four tollbooths that are unable to process the traffic at a rate that prevents significant queuing. The storage for traffic at the Detroit-Windsor Tunnel entrance is very limited and quickly causes the backup to spill over onto Jefferson Avenue. The US Customs plaza for inbound traffic, the historic Mariner's Church, the Duty Free shop, and the roadway configuration that eventually narrows to one lane as it enters the Detroit-Windsor Tunnel limit possible expansion of the number of tollbooths.

Border Processing

Border processing includes customs and immigration inspection on entry to Canada and the US and is performed by Canada Border Services Agency (CBSA) and US Department of Homeland Security (DHS), Customs and Border Protection (CBP), respectively. Upon entry to the country, vehicles are required to stop at primary inspection where an officer performs checks on the vehicle, driver and passengers. Individuals requiring further questioning or carrying goods requiring further inspection are directed to secondary inspection.

Discussions were held with CBSA and DHS to determine appropriate border processing assumptions for this study. The processing times that were confirmed at that time do not reflect new initiatives/technologies that may result in reductions or increases in these processing times.

The capacity of primary inspection is a function of the number of primary inspection lanes and the processing time per vehicle. There is a high degree of variability in processing times depending on the circumstances of the driver and/or passenger(s) and the nature of the contents of the goods within the vehicle.

The existing number of primary inspection lanes at the Detroit River crossings is shown in Table 5.3 for travel to Canada and to the US.

TABLE 5.3 – NUMBER OF PRIMARY INSPECTION LANES

Facility	To Canada		To US	
	Autos	Trucks	Autos	Trucks
Ambassador Bridge	10 / 16 [1]	10 / 13 / 19 [2]	12	13 [3]
Detroit-Windsor Tunnel	9	3	9	3

[1] The regular number of auto lanes is ten. When required in special circumstances, six truck lanes can be converted to auto lanes for a total of sixteen lanes.
[2] Three new lanes are to be opened in July, 2005. Six additional lanes are to be added in the next two to three years.
[3] 13 lanes are open for primary inspection. A 14th lane is used for trucks exiting from secondary inspection.

Table 5.4 presents the estimated processing time per passenger car and per commercial vehicle at primary inspection.

NEXUS is a joint US/Canada program for passenger car travel designed to simplify border crossing for frequent low-risk travellers. At the time of undertaking the analysis of crossing capacity, the average processing time for a passenger car was 15 seconds and approximately 25% of passenger cars travelling during peak periods were enrolled in the NEXUS program.

Regular or non-NEXUS travellers undergo questioning by border inspection officers. As a result, the average processing time per vehicle was estimated at 35 seconds per vehicle for travel to Canada and 40 seconds to the US.

Commercial vehicle processing times at primary inspection depend on the line release program. Most commercial operators use the Pre-Arrival Review System (PARS), which allows pre-approved shippers/carriers to transmit documents to customs in advance of arrival at the border to expedite border processing.

The US Trade Act (2005) requires all commercial vehicles entering the US to transmit documentation electronically at least one hour in advance of crossing. The processing time for PARS commercial vehicles entering Canada was 85 seconds on average and two to three minutes entering the US.

The Fast and Secure Trade (FAST) program is the commercial vehicle equivalent of NEXUS and provides expedited processing for low-risk pre-approved carriers. The processing time for FAST commercial vehicles entering Canada was estimated to be approximately 30 seconds. For commercial vehicles travelling to the US, expedited processing is provided to FAST vehicles and also those enrolled in the Pre-Arrival Processing System (PAPS) program, which uses barcode technology for the release of commercial shipments. The average processing time for FAST/PAPS eligible commercial vehicles entering the US was 80 seconds.

Given the projected demand and the processing times per vehicle, Table 5.5 presents the existing (2004) and projected required future number of passenger car and commercial vehicle primary inspection lanes for the Detroit River crossings.

For passenger car traffic, the existing/planned number of primary inspection lanes is considered sufficient to accommodate future cross-border travel demands in the near term, with capacity increases needed by 2015. Projected commercial vehicle growth will result in the need for additional capacity at primary inspection by 2035 for travel to Canada and before 2015 for travel to the US.

Given the above, the improvements required for primary inspection at the Detroit River crossings to meet the projected 2035 demand are as follows, based on existing productivity levels:

- Seven additional auto and one additional commercial vehicle lanes for vehicles entering Canada; and
- Six additional auto and ten additional commercial vehicle lanes for vehicles entering the US.

These primary inspection needs would have to be adjusted for new initiatives/requirements that may be implemented in the future.

With regard to secondary inspection, given the direction to pre-clearance and automated commercial inspection, the proportion of commercial vehicles referred to secondary inspection is expected to decrease in the future, thereby reducing secondary inspection capacity needs. As such, existing capacity at secondary inspection is considered adequate to accommodate the long-term capacity needs. However, the existing off-site Canadian secondary inspection location for commercial vehicles is not considered an acceptable long-term solution by CBSA, given the unsecured route between the bridge plaza and secondary inspection.

TABLE 5.4 – PRIMARY INSPECTION PROCESSING TIMES

A. Autos Passenger Cars

Factor	Type / Country	Year	
		2004	Future
Distribution – Peak Period (Daily)	NEXUS	25% (12%)	25% (12%)
	Regular	75% (88%)	75% (88%)
Processing Times (sec/veh)	NEXUS	15	15
	Regular – To Canada	35	35
	Regular – To US	40	40
Average Time – Peak Period	To Canada	30.0	30.0
	To US	33.8	33.8

B. Commercial Vehicles

Factor	Line Release / Country	Year	
		2004	Future
Distribution by Line Release Program	Non-PARS – to Canada	22%	0%
	Non-PARS – to US	22%	0%
	PARS/ACI – to Canada	66%	85%
	PARS – to US	66%	75%
	FAST – to Canada	12%	15%
	FAST/PAPS – to US	12%	25%
Processing Times (sec/veh)	Non-PARS – to Canada	120	n/a
	Non-PARS – to US	120 – 180	n/a
	PARS – to Canada	85	85
	PARS – to US	120 – 180	120 – 180
	FAST – to Canada	30	30
	FAST/PAPS – to US	80	80
Weighted Average Processing Time (sec/veh)	To Canada	78.4	76.8
	To US	141.6	132.5

Source: Discussions with CBP and CBSA

Toll Collection

The capacity of the toll collection component is a function of the number of toll collection lanes/booths and the time that is required to process each vehicle. Manual collection (e.g. cash, commuter cards) and electronic toll collection utilizing transponders is provided in both directions at the Detroit River crossings. At present, toll collection facilities are able to accommodate peak hour demands and are not a bottleneck in the border crossing system.

Toll collection is the responsibility of the bridge/tunnel operator and it is in the operator's best interest to provide adequate capacity. Given the efficiencies of electronic toll collection and the relatively low cost to increase capacity, it is assumed that toll collection will not be a future constraint to border crossing system capacity and that the appropriate bridge/tunnel operators will make the necessary improvements to ensure that the revenue stream generated by cross-border traffic is not compromised by insufficient toll collection capacity.

Table 5.5 below, summarizes the future capacity deficiencies for the various elements of the overall border crossing system, based on the information provided in the previous sections.

TABLE 5.5 – SUMMARY OF FUTURE DETROIT RIVER CROSSINGS CAPACITY DEFICIENCIES

Crossing	Time Capacity Reached				
	US Road Access	US Border Processing	Bridge/ Tunnel Roadbed[1]	Canadian Border Processing	Canadian Road Access
Ambassador Bridge	Beyond 30 years	5 to 10 years	10 to 15 years	5 to 10 years	5 to 10 years
Detroit-Windsor Tunnel	0 to 5 years	5 to 10 years	30 years[1]	5 to 10 years	5 to 10 years

[1] If no improvements are made at the Detroit River, there would be some diversion from the Ambassador Bridge to the Detroit-Windsor Tunnel. Diversion of car traffic may move the timeframe that capacity is reached to between 25 and 30 years. Physical restrictions of the Tunnel limit the diversion of most types of trucks.

The Ambassador Bridge and Detroit-Windsor Tunnel represent two of the busiest border crossings in North America. In 2006, they carried over 11 million passenger vehicles and over 3.7 million commercial vehicles annually and handled 28% of the total surface trade between Canada and the US. The delays and resultant queuing at these crossings will have several negative effects associated with poor transportation network operations, including the following:

- Increased highway safety concerns, including higher potential for collisions at intersections, entrances and queue ends;
- Lost economic opportunity costs;
- Increased air pollution;
- Impacts to access and adjacent land uses in the vicinity of the border crossings;
- Infiltration of cross-border traffic onto local roads;
- Impacts to incident/emergency response;
- Increased vehicle operating costs and fuel consumption; and

- Increased driver frustration.

Over time, the effects of increased congestion and delays will continue to worsen.

Given the importance of this trade corridor and the substantial number of people dependent upon safe, reliable access across the Detroit River on a daily basis, the capacity deficiencies discussed in this section are a serious problem that needs to be corrected.

SYSTEM CONNECTIVITY

In general, the MTO strives to have an interconnected network of highways so that people and goods can move through the province on a continuous and efficient inter-regional transportation system. This is appropriate to help minimize long-distance traffic movements (cars and trucks) on local municipal road networks, and thereby reduce traffic-related impacts on local communities and maximize economic and personal productivity.

As well as being connected throughout the province, it is important that the provincial transportation network connect directly with the United States. Again, direct connections can help maximize productivity while minimizing negative impacts associated with congested transportation corridors.

The provincial highway network connecting Highway 401 with the Windsor-Detroit crossings is not continuous. In fact, traffic on Highway 401 must travel along Highway 3 and Huron Church Road a distance of approximately 11 km before reaching the Ambassador Bridge. A total of 17 signalized intersections are situated along this section of road as well as numerous commercial and residential entrances.

At the time of undertaking this analysis, travel time along the section of roadway was estimated to be 17 minutes even under relatively non-congested traffic conditions. This represents a delay of approximately 10 minutes compared to a freeway network that would directly connect Highway 401 to the Ambassador Bridge. The increased delay at times increases the traffic congestion and results in queuing, which in turn results in increased noise, air pollution and travel costs for both cars and trucks and inhibits economic productivity in Ontario and other parts of Canada.

The lack of system connectivity from Highway 401 to the US interstate network system is a serious network deficiency.

BORDER PROCESSING

Addressing issues related to border processing facilities, resources and procedures is not within direct control of the transportation agencies sponsoring this study. This responsibility lies primarily with agencies such as Canada Border Services Agency (CBSA), US Department of Homeland Security (DHS) and US General Services Agency (GSA). However, it is recognized that delays in border processing can result in congestion and delays at the Ambassador Bridge border crossing. Similarly, delays in border processing and lack of capacity at the connections to the plazas at the Detroit-Windsor Tunnel result in congestion and delays at the Detroit-Windsor Tunnel.

During the P/NF study and throughout the current EA study, border processing agencies have been working to identify issues and concerns related to border processing at the existing crossings, as well as identify the proposed increases to staffing, improvements to border processing facilities to increase capacity and programs to facilitate border processing procedures.

As a result of the terrorist attacks on the US on September 11, 2001, and of ongoing national security concerns, heightened border security is a new reality facing all border crossings. Security priorities affect border crossing operations. Periods of rigorous inspection of all passengers and goods using border crossings effectively reduce border crossing capacity, and can lead to congestion on the road network in the vicinity of the border crossings. Transportation agencies must develop solutions to accommodate the capacity requirements of international traffic, while ensuring security concerns are also addressed.

The border processing agencies and border crossing owners and operators have moved forward on implementing improvements to the border crossings, to increase capacity and reduce congestion, while maintaining their objectives related to having a safe and secure border. Initiatives such as the *Ambassador Bridge Gateway Project* and the proposed improvements to the Detroit-Windsor Tunnel plaza are intended to increase capacity of border processing facilities at these crossings.

Similarly, programs such as NEXUS and FAST are reducing processing times for vehicles and cargo crossing the border, thereby increasing capacity and potentially lessening the need for additional staffing at the crossings.

In addition, the US government enacted the *US Trade Act (2005)* which requires all US-bound carriers to provide pre-notification of their shipment to US Customs one hour in advance of their truck arriving at the border (30 minutes advance notice is required for FAST trucks).

The ability of these improvements and programs to meet future travel demand is not certain. Staffing at the border crossings will continue to be of critical importance to the border capacity issue. Additionally, at the Ambassador Bridge, expansion of the existing Canadian bridge plaza to accommodate additional primary and on-site-secondary inspection is not feasible given the urban constraints surrounding the existing plaza.

The increasing participation rate in the various border crossing programs will have a direct effect on the success of these programs to increase capacity of border processing. Transportation agencies will need to continue to coordinate border processing capacity and security issues with border processing agencies.

NETWORK OPTIONS (REDUNDANCY)

As discussed earlier in this report the international crossings at Windsor-Detroit are vital to the local, provincial and national economies. Although there are two crossings (the bridge and tunnel), the vast majority of trucks use the bridge. This is due to the fact that the tunnel is only one lane per direction with a height restriction that limits the use of trucks. As well, the dense urban fabric of downtown Windsor and Detroit effectively limits roadway access and the size of the customs plaza.

Therefore the majority of trade crossing at Windsor-Detroit is dependent on one facility, the Ambassador Bridge. Any prolonged capacity reduction or shut down at the Ambassador Bridge and/or its customs plazas would have serious implications on the national and local economies in both Canada and the United States.

5.1.2 Transportation Needs

In order to relieve the above-noted problems and meet the purpose as defined in Chapter 1 of this document, the current EA study has strived to address the following regional transportation and mobility needs:

- Provide new border crossing capacity to meet increased long-term travel demand;
- Improve system connectivity to enhance the continuous flow of people and goods;
- Improve operations and processing capabilities at the border; and
- Provide reasonable and secure crossing options (i.e. network redundancy).

A range of transportation alternatives that could potentially respond to these needs are discussed in the next section of this report.

5.2 Alternatives to the Undertaking

This section describes the transportation planning alternatives (Alternatives To the Undertaking) considered, and the assessment of those alternatives, to address the need for a new international crossing of the Detroit River. For further detail, the reader is referred to the *Draft Feasible Transportation Alternatives (Alternatives to the Undertaking) Report* (refer to List of Supporting Documents).

Transportation planning alternatives represent reasonable means of addressing the stated transportation problems, as well as meeting the purpose of the undertaking.

5.2.1 Alternatives Considered

The Canada-US-Ontario-Michigan Border Transportation Partnership (the Partnership) prepared a *Planning/Need and Feasibility (P/NF) Report, November 2005* (refer to List of Supporting Documents) that identified several transportation planning alternatives, which have been revisited in the current EA study.

The alternatives considered included the following, which are discussed in greater detail in the following paragraphs:

- Do Nothing;
- Improvements to border processing;
- Transportation demand management;
- Transportation systems management;
- New and/or improved rail alternatives including a new and/or expanded international rail crossing;
- New and/or improved transit services;
- New and/or improved marine services;
- New and/or improved road alternatives with a new or expanded international road crossing; and
- Combinations of the above.

The assessment of transportation planning alternatives provided an opportunity to examine fundamentally different ways of addressing transportation problems. In recognition of these fundamental differences among the planning alternatives, it was considered appropriate to assess the effectiveness of each type of alternative in addressing the problems and taking advantage of opportunities at a functional level.

THE "DO-NOTHING" ALTERNATIVE

This alternative was defined as taking no significant action to expand infrastructure, manage demand or improve operations. It included transportation improvements already contained in the existing plans and programs for geographical areas encompassed by the Southeast Michigan Council of Governments (SEMCOG) and the Windsor-Essex area. It did not include improvements to existing border processing capacity.

IMPROVEMENTS TO BORDER PROCESSING

Border processing is a key component in the transportation network in that it can restrict the capacity of the transportation network. Alternatives that improve border processing rates to a level equal to or greater than the flow rate of traffic across the border will to some degree address the transportation problems on the network.

TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) and Transportation Systems Management (TSM) focus on the optimal use of existing and future infrastructure. These alternatives include measures such as Intelligent Transportation Systems (ITS) technologies as well as transportation and land use policies with incentives to reduce, shift or divert transportation demand, thereby deferring the need for expansion of the transportation network.

NEW AND / OR IMPROVED RAIL ALTERNATIVES WITH NEW OR EXPANDED INTERNATIONAL CROSSING

Rail currently plays a role in the movement of international and inter-regional goods in the area. Improvements to the rail network and/or expansion of the existing rail crossing may address transportation problems by diverting sufficient truck traffic from the road network to impact the need or timing of roadway-based improvements.

NEW AND / OR IMPROVED TRANSIT AND MARINE SERVICES

Capacity and/or service improvements/expansions to transit and marine services may reduce, shift or divert road-based passenger and freight travel demand.

NEW AND / OR IMPROVED ROAD ALTERNATIVES WITH NEW OR EXPANDED INTERNATIONAL CROSSING

Provincial roads are generally freeways and highways designed to accommodate high volumes of international and inter-regional long distance, traffic. Connections between Highway 401 in the Windsor-Essex County area to the interstate freeway system in the Detroit-Wayne County area are required with this alternative to maintain continuity of the freeway network. The highway connections would be designed to appropriate freeway standards.

The Detroit River crossing could be either a new crossing (bridge or tunnel) or an expanded existing crossing. For the purposes of this study, a second span at the Ambassador Bridge crossing was considered to be an expansion of the existing crossing. Converting a rail tunnel to accommodate vehicular traffic was considered to provide a new crossing for road-based traffic.

Operational or structural changes of the existing crossings, such as modifications to plaza layouts or lane configurations were considered as expansion to existing crossings.

COMBINATIONS OF THE ABOVE

This involves the consolidation of the above alternatives to form as a transportation network improvement strategy to expand the transportation network and reduce, shift or divert various aspects of travel demand.

The above-noted alternatives were assessed during the P/NF Study. As noted at the beginning of this chapter, the P/NF Study was conducted in a manner consistent with the environmental study processes in both countries, but was not completed within the formal environmental study framework. For this EA study, the work completed under the P/NF Study was updated to reflect changes in traffic and network demands.

The transportation planning alternatives were assessed and evaluated using broad factors to determine which alternatives were practical and feasible from a transportation, environmental and border processing perspective.

The evaluation factors were established to achieve the objectives of current EA Study and were consistent with environmental approval processes in both Canada and the US. The factors developed for evaluating the transportation alternatives were as follows:

- Transportation Network Improvement;
- Transportation Opportunities;
- Governmental Land Use, Transportation Planning and Tourism Objectives;
- Border Processing;
- Environmental Feasibility; and,
- Technical Feasibility.

The rationale and method of assessment used in the evaluation are listed in Table 5.6.

TABLE 5.6 – EVALUATION FACTORS

Factor	Rationale	Method of Assessment
Transportation Network Improvement	Alternative would be considered feasible only if it enhances the performance of the transportation system with respect to the quality of travel as defined by levels of service and volume/capacity at the crossings of the Detroit River	Assessment of ability of the alternative to address congestion and provide for continuous ongoing river capacity on the transportation network by improving travel time and reliability for international passenger and freight movement.
Transportation Opportunities	Improvements to transportation efficiency may be gained by improving the utility of inefficient or underutilized transportation corridors as well as making use of planned network improvements.	Assessment of the ability of the alternative to optimize use of existing transportation corridors or planned network improvements.
Governmental Land Use, Transportation Planning and Tourism Objectives	Recognizing the importance and impacts of accommodating the free flow of international passengers and goods, consideration must be given to the degree to which alternatives support local, regional, provincial, state and national planning and tourism objectives.	Assessment of the degree to which the alternative is consistent with approved land use, transportation planning and tourism objectives.
Border Processing	Alternatives would be considered feasible only if the long-term needs of the US and Canadian border processing agencies can be met.	Assessment of the ability of the alternative to meet long-term needs of border processing agencies.
Environmental Feasibility	Consideration of potential impacts to environmental constraints (including natural, social and cultural features) is required under the environmental approval processes in both Canada and the US	Assessment as to whether environmental constraints in the area (including natural, social and cultural features) preclude the alternative.
Technical Feasibility	Alternatives requiring new or expanded facilities would be considered feasible only if technical requirements related to alignment (both horizontal and vertical) and cross-section can be achieved at a reasonable cost.	Assessment of the ability of alternative requiring new or expanded facilities to achieve minimum technical requirements at a reasonable construction/implementation cost.

The following paragraphs provide a summary of the study team's evaluation of each of the transportation planning objectives based on the broad level evaluation factors in Table 5.6. Exhibit 5.4, which follows the evaluation summary for each alternative, provides a graphical overview of the evaluation.

DO NOTHING

One objective of the current EA study was to identify feasible alternatives to address the transportation problems associated with the international road network. Traffic forecasts show clearly that delays and queuing experienced in the past years at the Ambassador Bridge and the Detroit-Windsor Tunnel will return and be significant in the future. Doing nothing will not reduce the likelihood of disruption to the transportation network on this strategic trade corridor, nor will it address the lack of sufficient river crossing capacity to meet existing and future travel demand in the Windsor-Detroit area.

Doing nothing will result in capacity deficiencies and increased travel delays. Extended delays at border crossings and queuing on approach roadways will negatively impact the local communities. The effects of congested border crossings in Windsor-Detroit will extend beyond the border communities to other regions in both countries.

Based on the findings of the *Regional and National Economic Impact of Increasing Delay and Delay-Related Costs at the Detroit River Crossings Report, August 2005* (refer to List of Supporting Documents), by 2025, mounting congestion and delay will cost the United States more that US$1.4 billion and Canada more than CAN$206-million a year in foregone production and output, unless steps are taken to expand infrastructure capacity at the principal border crossings between Michigan and Ontario. Exponentially rising congestion over the subsequent ten years (2025 to 2035) would lead to further production losses of US$9.3 billion per year to the US and CAN$ 1.5 billion per year by 2035.

Lost production means fewer jobs. Failure to address the congestion problem, and the production losses arising accordingly, means 10,000 fewer jobs in the US and 3,000 fewer jobs in Canada by 2025, rising to over 94,000 fewer jobs by 2035 in both countries. Job losses on this scale imply sharp reductions in personal incomes and living standards, and lost tax revenues for the provision of public services, particularly in the local jurisdictions of Michigan and Ontario.

The Do-nothing alternative was not carried forward as a possible solution. However, it was carried forward as a benchmark from which to compare and assess other alternatives.

IMPROVEMENTS TO BORDER PROCESSING

Many of the delays and queuing experienced in recent years on the approaches to the border crossings were related to border processing deficiencies and border security concerns. The issues of border security are anticipated to be ongoing and will require additional efforts among border processing agencies, transportation agencies and local community agencies to accommodate security procedures implemented during periods of high level risk.

In the past, many of the deficiencies in border processing related to improper or inaccurate documentation by drivers, passengers, or shippers, a lack of available border processing staff and facilities to accommodate border processing requirements, limited use of Intelligent Transportation Systems (ITS) and a low participation rate in border processing programs. These issues combined to result in delays and queuing at the border crossings.

In recent years, the US government has provided additional staffing at the Detroit border crossings and the launch of the NEXUS and FAST programs are addressing to some degree the issues of identifying high and low risk border users and proper documentation. In addition, commercial vehicle pre-processing centres have been brought into use in Ontario to ensure documentation of commercial border users is properly and accurately completed. The Canadian Transit Company, owner of the Ambassador Bridge, has opened such a centre along the Highway 401 Corridor west of London, as well as one in Windsor at Industrial Road. The purpose of these facilities is to reduce processing times at the border crossings. In addition, they have increased the number of primary inspection booths for trades to 13.

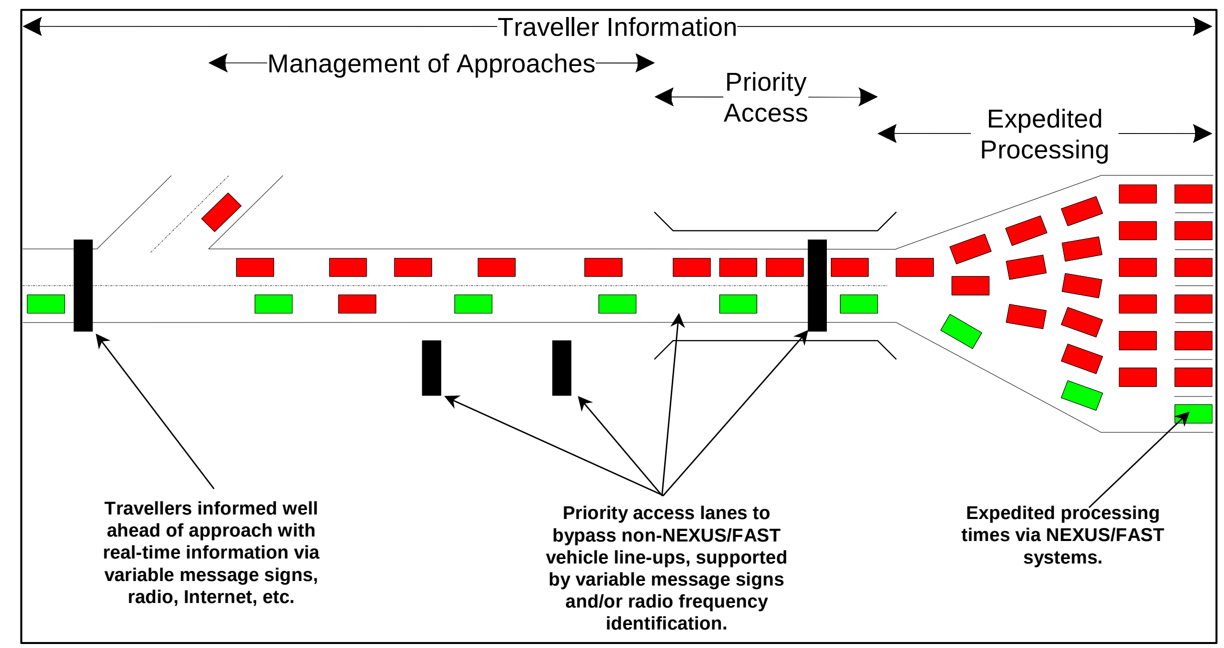
In November 2004, the US Government began enforcing the US Trade Act, which requires all US-bound shipments to forward data to the US port of entry one hour prior to the shipment arriving (30 minutes advance notice is required for FAST trucks). This requirement has reduced the need to send trucks to a secondary inspection area to complete paperwork and has contributed to reductions in extended delays at Ambassador Bridge.

Operators at the existing border crossings have identified additional facilities and additional staffing as being the most important issue facing the border over the short term. Governments have responded and are adding more staff and opening more inspection booths at the border crossings. In the longer term, more inspection facilities, increased staffing and greater use of NEXUS and FAST are seen as being the more cost-effective method of addressing the projected increases in travel demand at the border crossings.

International border crossings present unique opportunities for the implementation of Intelligent Transportation System (ITS) technologies and systems, particularly in terms of improving the security, safety and efficiency of passenger and commercial vehicle processing. In particular, ITS could provide expedited processing, priority access, approach management and traveller information in support of the NEXUS and FAST systems at the Windsor-Detroit crossings.

The NEXUS and FAST systems are designed to expedite inspection and processing times for passengers and commercial vehicles as well as their drivers. Ensuring effective use of these programs and higher participation rates will require that users experience travel time or convenience benefits. This may require infrastructure improvements such as providing priority access lanes for NEXUS and FAST users to get around other vehicles queuing for inspection. ITS applications that can support these lanes include variable message signs (i.e. signs that can be automatically altered) to indicate priority lanes or radio frequency identification (RFID) to enforce their use by NEXUS/FAST participants only (refer to illustration in Exhibit 5.2).

EXHIBIT 5.2 – POSSIBLE APPLICATIONS FOR ITS AT BORDER CROSSINGS



The efficient use of a system of several border crossings can be managed well ahead of arrival through the implementation of traveller information systems. Real-time (i.e. up-to-the-minute) knowledge of the conditions at each crossing would allow more effective management of the border crossing system as a whole and provide useful guidance and information to cross-border travelers in determining the time and route of travel. Real-time information can be used to distribute resources and manage traffic at crossings and assist in the staffing of inspection resources. The media that could be used to disseminate this information could include dynamic signs at strategic road junctions, local low power radio (highway advisory radio), Internet information channels (which could be used for example, by truck dispatchers) and closed-circuit television. Such information dissemination would not only use these diversion strategies but also might influence the timing of arrival at the border.

Improvements to border processing can maximize the use of existing transportation corridors and would be consistent with government planning and tourism objectives in that they lead to improved flow across the border. Less congestion and delay may encourage cross-border travel, which in turn helps the regional tourism industry and the economies in general.

Improvements to border processing facilities may result in impacts to area features. However, the impacts can be avoided, minimized or mitigated through proper development and application of border processing technologies.

Improvements to border processing addresses one of the four needs of the undertaking as stated in Section 5.1.2, and should be a component of any solution to the transportation problems in the area. However, in itself it cannot meet the purpose of this undertaking and was not considered on its own as an alternative means of addressing the stated problems.

TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is the application of technologies, policies or other methods to reduce, shift or divert transportation demand.

Canadian residents employed in the US are the dominant proportion representing the majority of cross-border work and business travel. In 2004, there were approximately 2,000 fall weekday and 4,000 summer weekday vacation trips using the Detroit River crossings. This represented 5% of the international passenger car traffic on a typical fall weekday. Vacation travel was found to be much less affected by delays at the border as compared to same-day discretionary trips, as delays at the border represents a much smaller proportion of the travel time for longer-distance overnight trips.

There were approximately 15,000 same-day recreation, entertainment, and shopping trips using the Detroit River crossings on a summer weekday and 14,000 on a fall weekday in 2004. This represents 40% of cross-border travel on a summer 2004 weekday, but is a dramatic decrease from 27,000 trips and 49% of summer 2000 weekday trips.

This information, together with the findings of the Travel Demand Study undertaken for this project was used to evaluate the feasibility and practicality of TDM as a transportation alternative.

Demand Reduction Measures

Demand reduction measures for passenger trips in the area, such as ride sharing and use of transit would have little effect on the operations of the transportation network. In 2004, the average auto occupancy for cross-border trips at the Ambassador Bridge was 1.85 and at the Detroit-Windsor Tunnel was 1.75, which suggests that ride-sharing was already being practiced by cross-border travellers (typical occupancy rates for metropolitan areas are around 1.1 persons per vehicle). Further promotion of ride sharing can be expected to yield only marginal reductions in demand on the network.

Demand reduction measures for freight traffic in the area include use of rail and marine. These alternatives are discussed separately in this section.

Challenges and possible benefits of improving transit ridership are discussed under "New and/or Improved Transit and Marine Services".

Measures to Shift Demand

Shifting travel demand to less busy days of the week or off-peak periods of the day or to other international crossings was also considered. At present, congestion at the border crossings is not severe. However, based on the findings of the *Existing and Future Travel Demand Working Paper – November 2002* (available under separate cover) prepared as part of the P/NF Study, the transportation network exhibited attempts by users at that time to manage demand during peak travel periods throughout the week at that time. For example:

- The number of passenger cars crossing the Ambassador Bridge and Detroit-Windsor Tunnel was greatest on the weekend and Fridays when commercial vehicle traffic is lowest, suggesting drivers were deferring leisure trips to non-workdays;
- Commercial vehicle traffic volumes were found to be relatively low throughout the overnight hours;
- Weekday cross-border passenger car travel was characterized by morning and afternoon peaks; weekday cross-border commercial vehicle traffic was highest during mid-day periods, suggesting truckers attempted to avoid peak periods for passenger car travel; and,
- Weekday to weekend traffic volume comparisons suggested passenger car traffic diverted to the Detroit-Windsor Tunnel during the week to avoid high truck traffic levels on the Ambassador Bridge.

Given the degree of demand management currently practiced by network users, encouragement of any such measures would be expected to yield only marginal improvements to network operations once congestion becomes a recurring problem.

Measures to Divert Demand

One measure to reduce demand on the traffic network across the Detroit River is to divert travel demand to other international crossings outside of the area. Shifting passenger and commercial traffic to border crossings in the Sarnia-Port Huron area, for example, would preserve capacity on the Windsor-Detroit crossings.

The findings of the Travel Demand Study undertaken for this project identified a significant proportion of commercial vehicle traffic currently using the Ambassador Bridge on a weekday could also use the Blue Water Bridge without significant travel time increases.

There are a number of possible reasons why the Windsor-Detroit crossings are preferred by such trip-makers, including:

- Operators may be more familiar with the routing and comfortable with customs brokers at the Ambassador Bridge, resulting in the formation of travel habits;
- The Blue Water Bridge has experienced queues and delays as well;
- It is easier (or habitual) for the administrative departments of operators to deal with one bridge for matters such as pre-clearance papers;
- Voucher redemption programs and marketing by the Ambassador Bridge;
- Convenient rest stops en route to the Ambassador Bridge;
- There is better access to I-75 south of Detroit via Windsor, as travelling down I-94 via Sarnia-Port Huron requires going through the core of Detroit; and,

- There is a perception of a shorter trip distance via the Ambassador Bridge for more of the total trips between Ontario and Michigan.

Changes to border processing procedures under the FAST program to allow for the use of any border crossing in southwestern Ontario/southeastern Michigan, as well as increased education and awareness programs may encourage long-distance travellers to divert from the Windsor-Detroit border crossings. The findings of the Travel Demand Study indicated that diversion of traffic to the Blue Water Bridge could increase the timeframe at which the Windsor-Detroit crossings reach capacity by about 6 years. Achieving a high degree of diversion from these candidate trips would defer, but not eliminate the need for improvements to the transportation network across the Detroit River.

Other Measures

Other measures considered to reduce travel demand included:

- Incentives to encourage reduction of trips (e.g. promoting telecommuting); and
- Land use and transportation planning policies and other policies and procedures that result in less single occupancy vehicle use, less commuting, higher transit use, and more efficient use of the transportation network.

The development of effective measures to divert demand away from the Detroit River is made complicated by the bi-national nature of the transportation network. Implementation of some of these measures would require international agreement by various levels of governments in both countries, each with their own legislation and policies to address issues that are unique to them. Nevertheless, measures to reduce or change this aspect of travel demand may be effective in achieving some reduction in the growth of travel demand across the transportation network.

Summary

The nature of international travel demand on the transportation network means that implementing TDM measures alone will not eliminate the need for other network improvements to accommodate the 2035 travel demand. In addition, TDM does not address the need for reasonable options for maintaining the movement of people and goods on the transportation network. However, implementing TDM measures could provide some benefit to network operations, and would support other government and tourism objectives. In addition, TDM could be implemented in conjunction with border processing requirements with minor impacts to environmental features.

Therefore, TDM (including encouraging long distance trips to use the Blue Water Bridge) will be pursued by the Partnership as part of a long-term strategy. However, in itself, TDM is not a long-term solution to the international transportation needs at Windsor-Detroit.

TRANSPORTATION SYSTEMS MANAGEMENT

Transportation Systems Management (TSM) relates to a wide range of systems and technology to improve the efficiency and safety of existing and future highways. Driver messaging and directional signing, traffic metering, and incident monitoring can improve traffic flow during high congestion periods, bad winter weather, traffic accident, special events, etc.

Operations on the transportation network are carefully monitored by a number of sources, including local media, border agencies, border crossing operators and the trucking community. These various information sources provide updates of border crossing conditions, allowing motorists, and trucking dispatchers, to make informed choices about whether and where to travel. Improving communications and the increased use of technologies to better inform drivers may provide some benefit to network operations, but would not eliminate the need for other improvements, including additional road based capacity.

Localized improvements, such as improved signal timing and improvements to intersections may better utilize existing facilities and roads by increasing their efficiency, but would similarly yield only marginal improvements to network operations.

NEW AND/OR IMPROVED RAIL ALTERNATIVES

The capacity of the existing rail network has been determined to be sufficient to meet the long-term needs of rail transport. The rail network in the area is capable of accommodating projected 2035 demand, assuming mainline capacity on links outside the area also keep pace with the growth through investment in additions and renewals. Rail alternatives considered in this study were therefore of two types: 1) alternatives that provide new rail service and facilities where not currently provided across the Detroit River, and 2) alternatives that increase the use of rail.

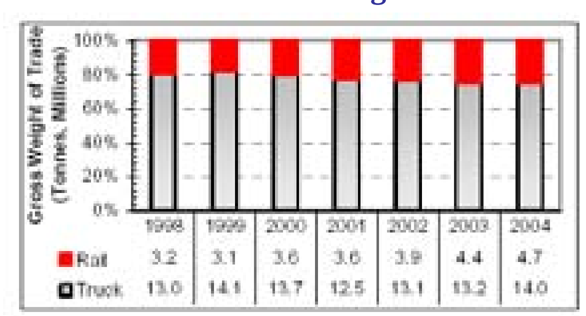
There is no international passenger rail service across the Detroit River, and rail presently carries approximately 20% of the value of international freight. Measures could be introduced to encourage the use of railway passenger services across the border. At present, there are no known plans for the introduction of passenger rail services across the Detroit River. It is unlikely that such a service could achieve appropriate ridership to sufficiently address network operational needs.

The modest shift of freight transport from truck to intermodal rail observed over the past five years at Detroit River and St. Clair River crossings (see Exhibit 5.3) has been supported by significant investment in intermodal facilities infrastructure. Although the existing rail crossing facilities have sufficient capacity, further growth will require continued investment, notably to mainline capacity in Canada, which is currently restricting cross-border intermodal rail growth. CP cancelled its *Toronto-Detroit Expressway* service in 2004.

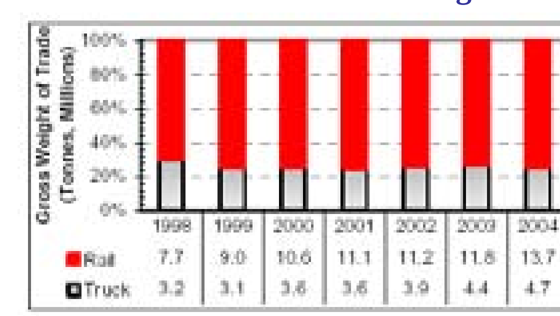
From a technical perspective, rail corridors are technically feasible to construct and implementing rail improvements would allow for the use of existing transportation corridors. In addition, a new or expanded international rail crossing, would provide an option for maintaining the movement of people and goods in cases of disruption to any of the existing border crossings on the transportation network.

EXHIBIT 5.3 - GROSS SHIPPING WEIGHT OF TRADE BY MODE FOR DETROIT AND ST. CLAIR RIVER CROSSINGS, 1998- 2004, CANADA TO US

Detroit River Crossings



St. Clair River Crossing



Given the present dominance of the truck mode in transporting freight at the Detroit River and St. Clair River crossings, the truck mode share is anticipated to remain constant over the study horizon. This is based on the relatively mature state of the auto industry's use of intermodal rail, as well as the significant proportion of the machinery and electronics goods that are transported at the border crossing, which are not conducive to intermodal rail.

However, the possible impact of alternatives that could divert demand from over-capacity road-based crossings, to other modes where there is excess capacity available was considered. This would involve fundamental changes in the transportation characteristics and behaviour currently exhibited by the passenger car and commercial vehicle users of the Detroit River border crossing facilities. This corresponds to a shift in the proportion of commercial vehicles to intermodal rail for trip markets that could be diverted where rail transportation has become (or is becoming) competitive with truck transportation in terms of price and service. Divertible traffic generally consists of relatively long-distance trips. The vast majority of traffic at the Detroit-Windsor Tunnel is considered non-divertible.

Consideration of a scenario involving significant diversion of freight to intermodal rail through major investments and transportation policies was considered and is documented in the *Travel Demand Forecast Working Paper* (refer to List of Supporting Documents). That paper concludes that, even under such an optimistic diversion scenario, rail improvements would defer, but not eliminate the need for improvements to the transportation network. This alternative would therefore only marginally improve congestion on the road-based transportation network.

As a result, delays and queuing on the road network would continue to occur and gradually worsen as traffic volumes increased. Such delays and queuing on the road-based network of this international trade corridor are not consistent with governmental planning objectives or tourism objectives. Similarly, improvements to rail would only partially address border processing needs. Improvements to rail may assist in the processing of freight traffic, but would have little benefit to truck and passenger vehicle inspection processes on the road network. Rail improvements would likely also result in impacts to environmental features within or adjacent to existing or proposed rail corridors, but these impacts could be avoided or mitigated to the extent possible as with the road alternatives.

As noted in the previously completed *Planning/Need and Feasibility Study*, improvements to rail services were recommended as part of a long-term border strategy. However, diversion of truck and passenger car traffic to intermodal rail will not in itself address the identified problems or meet the long-term transportation requirements.

NEW AND/OR IMPROVED TRANSIT AND MARINE SERVICES

Presently, transit and marine services across the Detroit River serve minor roles in the transportation network.

Transit

Currently, the only public transit available between Windsor and Detroit is the Tunnel Bus operated by Transit Windsor. In developing the travel demand projections, increased frequencies of existing services were assumed at levels to support a continuation of current market shares, but no new local or intercity services were included.

However, a number of alternatives for improving transit services can be implemented to provide choices for cross-border travelers. These alternatives include:

- Increase Tunnel Bus services - Current levels of service are rather low and increased services might encourage greater utilization.
- Extend Tunnel Bus or introduce new commuter express services to major destinations - For example, many Windsor residents work at the hospital complex in downtown Detroit. A direct bus to the hospital complex could encourage transfers. Similarly the other origins and destinations in Windsor-Detroit might be linked with a better bus service.
- Introduction of Ambassador Bridge bus service - Similar to the bus through the tunnel, a bus crossing Ambassador Bridge could provide connections between areas in Windsor and Detroit for local commuters and visitors.
- Alternative public transit systems - These could include new systems such as a gondola system across the river, the introduction of a passenger ferry service (possibly similar to the Seabus service in Vancouver), development of a shuttle rail service through the existing rail tunnel, extension of planned commuter rail services in the Detroit region to Windsor and other measures.

Improvements to transit services are not likely to adequately reduce travel demand on the road network sufficiently to overcome the need for road improvements. Transit improvements could make use of existing transportation corridors and can be implemented, in most cases, at a reasonable cost and in a relatively short timeframe (as compared to major infrastructure improvements).

However, delays and queuing on the road-based network would result even with the transit service improvements. This result is not consistent with planning or tourism objectives. Similarly, improvements to transit services would only partially address border processing needs (for example, transit improvements would only address passenger travel). Transit improvements may result in impacts to environmental features within or adjacent to existing or proposed new transit corridors, but these impacts could be avoided, minimized or mitigated to the extent possible as with other infrastructure improvement alternatives.

Marine

Marine services can be considered as being of two types – long-distance and local. Long-distance marine services are comparable to rail in that such services can reduce travel demand at the Detroit River crossings. Local ferry services are comparable to the Tunnel Bus service for passengers and an alternative road-based crossing for trucks and cars (the ferry terminals are accessed via the road network).

Long-distance shipping on the Great Lakes primarily serves bulk goods transport (e.g. ore, aggregates, salt). In the past, package freighters have operated on the Great Lakes. However, given the "just-in-time" inventory processes now practiced by many North American industries and the time sensitivities to many goods presently being transported by truck, the potential market for long-distance shipping is only a fraction of that which crosses the Windsor-Detroit border today.

The Windsor-Detroit Truck Ferry provides local ferry services. Currently, the truck ferry has a relatively small but vital role. The service is relied upon to ferry oversize shipments and hazardous goods across the Detroit River, but in no way restricts its use to these two markets. At the time of preparing this report, improvements to the terminal area, access road and dock are planned on the Canadian side to enhance the service. There are possibilities to increase the use of the service to divert passengers and other freight services from the bridge and tunnel. The ferry is currently operating at about 25% of capacity. The operation also has the capability of adding barges and tugs to increase its daily operating capacity. Others have expressed an interest in launching new truck and passenger ferry services on the Detroit River.

Adding or improving these marine services is technically feasible, can make use of use of existing transportation corridors along the riverfront and can be implemented, in most cases, at a reasonable cost and in a relatively short timeframe (as compared to major infrastructure improvements). It is possible that these services could be increased to the point that several hundred trucks per day could be transported across the border. This would be an important contribution to the overall capacity of the border crossing system. While the traffic demand analysis projects an increase of several thousand trucks per day. At full capacity and with additional barges, ferry services alone cannot provide sufficient transportation network improvements to meet the long-term needs of the region.

Delays and queuing on the road-based network would result even with the marine service improvements. This result is not consistent with planning or tourism objectives. Similarly, improvements to marine services would only partially address border processing needs (for example, new ferry services could increase border processing staffing requirements at the border). Marine services would likely also result in impacts to environmental features within or adjacent to existing or proposed marine terminals and facilities, but these impacts could be avoided, minimized or mitigated to the extent possible, as with other alternatives.

NEW AND / OR IMPROVED ROAD ALTERNATIVES WITH NEW OR EXPANDED INTERNATIONAL CROSSING

Expanding the road network will provide an option for maintaining the movement of people and goods and alleviating congestion. The majority of cross-border trips on the network currently use road-based transportation modes. This trend is likely to continue over the planning horizon of this study. Providing additional road-based capacity directly addresses the needs of the network. Through proper planning, such expansion can maximize use of existing corridors and be implemented in a manner consistent with planning and tourism objectives.

New or expanded border crossings must be designed to meet the long-term needs of border processing agencies. These needs include: size and flexibility of plaza area to accommodate border processing requirements, the ability to identify and separate low and high-risk traffic and security of the primary and secondary inspection areas. These improvements can be incorporated into existing border crossings or a new crossing.

Improvements to the existing crossings can provide some relief but would not fully address the need for reasonable options for maintaining the movement of people and goods in cases of disruption at any of the existing border crossings. Further, while improvements to existing crossings would achieve limited additional road capacity, such improvements are not likely to provide sufficient capacity to address future travel needs. However, improvements to the existing crossings can increase utilization of existing infrastructure and improve operations on the network.

New road alternatives, whether federal, provincial, state or municipally governed, will be designed to comply with design standards. Given the nature and extent of development and other land uses in the area, expansion of the road network will have an impact on natural, socio-economic and cultural features. The four transportation agencies that comprise the Partnership, in consultation with agencies, other government offices and departments, stakeholder groups and the public, will develop and apply methodologies to avoid, minimize or mitigate impacts to the extent possible, as appropriate.

'New and/or Improved Road Alternatives with New or Expanded International Crossing' is a feasible alternative and was carried forward for further study.

COMBINATIONS OF THE ALTERNATIVES

In order to satisfy the study goals and objectives, it is apparent from the traffic analysis, that several of the transportation planning alternatives, implemented in concert will be required to address future transportation needs across the Detroit River.

Border processing improvements will be required on a continuing basis. The implementation of these improvements is not under the direct control of the Partnership. However, the Partnership will continue to work with border processing agencies to encourage and support initiatives that improve border processing at the Windsor-Detroit crossings.

It is also clear that the only combination of alternatives that can practically accommodate a significant amount of increased demand for travel and effectively provide reasonable options for maintaining the movement of people and goods in cases of disruptions at any of the existing border crossings is one which includes 'New and/or Improved Roads with a New or Improved Crossing' alternative. All other alternatives, even in combination, will not provide sufficient long-term border capacity to meet future needs.

EVALUATION SUMMARY

The evaluation of transportation alternatives is summarized in graphic form in **Exhibit 5.4**.

EXHIBIT 5.4 – SUMMARY OF EVALUATION OF TRANSPORTATION ALTERNATIVES

Factor	Do Nothing	Border Processing	TDM/ TSM (including diversion)	Rail	Transit	Marine	New and/or Expanded Roadways
Transportation Network Improvement	○	◑	◑	◔	◔	◔	●
Transportation Opportunities	○	◑	●	●	●	●	●
Governmental Land Use, Transportation Planning and Tourism Objectives	○	●	◑	◑	◔	◔	●
Border Processing	○	●	◑	◑	◔	◔	●
Environmental Feasibility	◑	◑	◑	◑	◔	◔	◑
Technical Feasibility	N/A	●	●	●	●	●	●

Shading represents the degree to which the alternative addresses each factor, relative to the other alternatives

○ → ●

Low High

As illustrated in **Exhibit 5.4** and discussed in the preceding sections, the only transportation planning alternative that can meet the identified needs is one which includes the provision of New and/or Improved Roads with a New or Improved Crossing. This alternative has been identified as the most effective at addressing the transportation network requirements, border processing requirements, and provides the highest overall level of "support" to planning and tourism objectives. This alternative has a comparable degree of environmental and technical feasibility as the other alternatives on the basis that impacts could be avoided, reduced or mitigated to the extent possible as with other infrastructure improvement alternatives. It is also recognized that improved and expanded border processing capacity is an integral component of this solution.

In terms of addressing transportation network requirements for people and goods movement, a multi-modal approach provides choice for travellers and offers viable mechanisms to reduce auto use.

Although alternatives for travel demand management, rail, transit, ferries, etc. cannot independently address the diverse user needs, sufficiently alleviate traffic congestion on the transportation network nor effectively provide reasonable options for maintaining the movement of people and goods in cases of disruptions at any of the existing border crossings, these alternatives should be included as part a multi-modal strategy for the medium and long-term needs of the transportation network in the area.

6 ILLUSTRATIVE ALTERNATIVES FOR CROSSINGS, PLAZAS AND ACCESS ROADS

This chapter summarizes the generation, assessment and evaluation of the illustrative crossing, inspection plaza and access road alternatives. For further details, the reader is referred to the following document, which is available as a supporting document:

- *Generation and Assessment of Illustrative Alternatives Report (November 2005) (available)*

The illustrative alternatives were developed within the Preliminary Analysis Area (refer to Exhibit 2.1). The term “illustrative” is to describe the conceptual, “long list” alternatives determined from the PAA. This terminology was adopted on both sides of the border to promote the coordinated approach between the two EA processes.

Based on an evaluation of the illustrative alternatives, the study team identified an Area of Continued Analysis (ACA), which served as the basis for the development of the practical crossing, plaza and access road alternatives. The ACA is presented in Exhibit 6.16, at the end of this chapter. The term “practical” is used to describe the more refined alternatives that emerge from the assessment and evaluation of the broader level conceptual alternatives, i.e. the illustrative alternatives. For further information with regard to the generation, assessment and evaluation of the practical crossing, plaza and access road alternatives, the reader is referred to Chapter 8.

6.1 Generation of Illustrative Alternatives

Generally, the alternatives to be considered for a new or expanded border crossing can be categorized into the following components:

- A new or expanded crossing (tunnel or bridge)
- Plazas connected to the crossing (either directly or through a secure connection) for border agencies to inspect inbound and outbound drivers, passengers, vehicles and freight. These inspection plazas may also include other functions, such as toll collection and crossing maintenance facilities, and other border related services such as duty free shopping, brokerage offices, and other agency offices; and
- Controlled access roadways connecting the crossing plazas to the provincial or interstate freeway system.

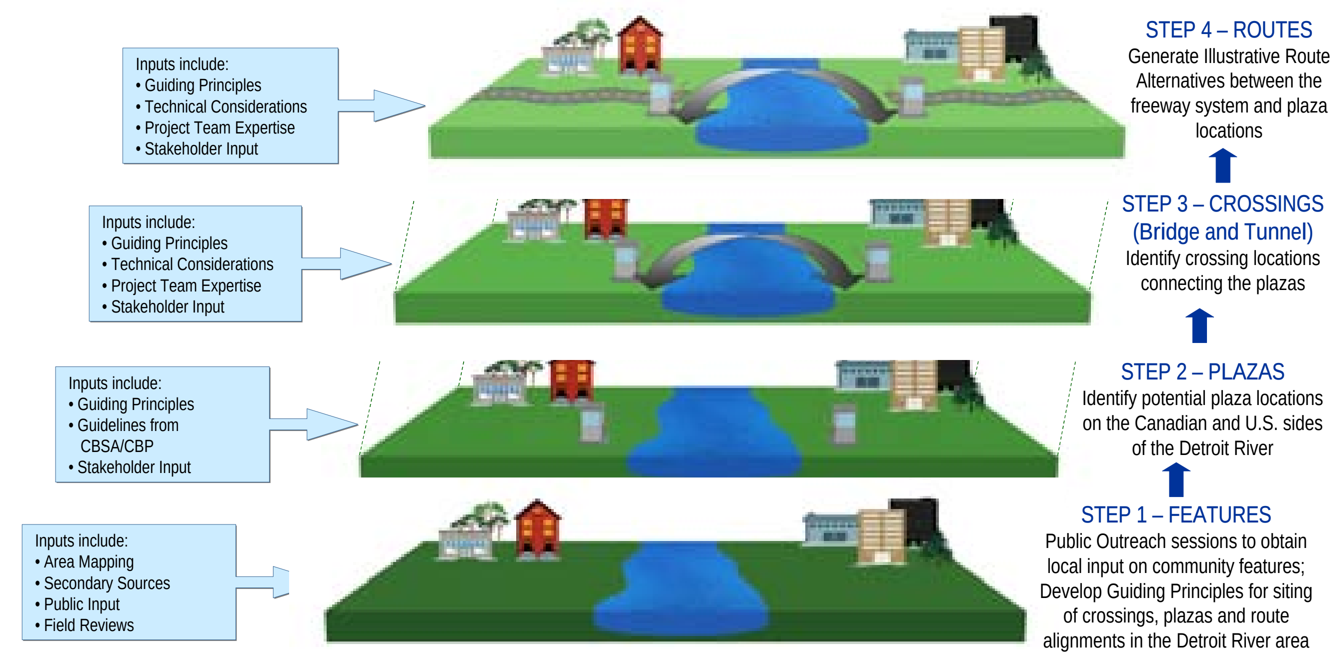
For this study, inspection plazas 30 to 40 ha (80 to 100 acres) in size were considered for new crossings, based on the preliminary assumption that international truck traffic will be distributed equally between the new crossing and the Ambassador Bridge.

Committed road and highway improvements were identified through consultation with the Southeast Michigan Council of Governments (SEMCOG), Ministry of Transportation (MTO), City of Windsor and a review of the relevant transportation plans of the respective agencies. Through this consultation it was confirmed that Highway 401 will ultimately be widened in the Windsor area from 0.5 km east of Highway 3 to 1.0 km east of County Road 42. On this basis, an ultimate six-lane cross-section was assumed for all access road alternatives. However, as discussed, in Section 6.1.3, it was envisioned that four lanes would be constructed initially.

The following steps were undertaken in the generation of illustrative alternatives (refer to Exhibit 6.1):

- Data collection for features in the Detroit River area. This step included Initial Public Outreach sessions (refer to Chapter 3) to obtain local input on community features;
- Develop guiding principles for siting of river crossings, inspection plazas and access road alignments in the Detroit River area;
- Identify potential inspection plaza locations on the Canadian and US sides of the Detroit River;
- Identify crossing locations connecting these plazas; and
- Generate illustrative access road alternatives between the freeway system and inspection plaza locations.

EXHIBIT 6.1 – DEVELOPMENT OF ILLUSTRATIVE ALTERNATIVES



As identified in the *DRIC OEA Terms of Reference (ToR), 2004*, the objectives for generating alternatives were to:

- Develop alternatives that are efficient/direct;
- Meet objectives and design requirements of Partnership agencies;
- Reflect the needs of border agencies; and
- Minimize/avoid impacts to significant features to the extent possible.

Due to the nature and extent of development in the Detroit River area, it was recognized that there are no opportunities to develop a new or expanded crossing with connections to the provincial and interstate freeway system without impacting some level of environmental and community features. The following guiding principles were developed to assist in the development of the illustrative crossing, inspection plaza and access road alternatives:

- Utilize existing infrastructure to the maximum extent - taking advantage of existing transportation and other linear corridors may improve usage of the transportation network and/or reduce impacts to other land uses;
- Seek areas or land uses that are compatible with transportation corridors and facilities, or areas in transition to compatible land uses - compatible areas are those that are considered to be less impacted by new crossing, inspection plaza and access road alignments than other land uses (e.g. industrial areas may be considered to be less impacted be a new inspection plaza than residential areas). Areas in transition allow the opportunity to incorporate new access road alignments in the area planning;
- Minimize impacts to significant natural features - such features are usually regionally unique, protected by legislation/designations and may preclude a transportation facility; and
- Minimize impacts to city centres - such areas generally provide a focus for cultural, social and economic activities.

The guiding principles reflect the objectives of the Partnership to address transportation needs, take advantage of transportation opportunities, and avoid generating unacceptable impacts to the extent possible.

6.1.1 Plaza Alternatives

The identification of possible sites for inspection plazas was the initial step in the development of illustrative alternatives. This was due to the relatively large associated property requirement and specific siting requirements unique to their purpose. The crossing alternatives and road alternatives were developed subsequently, based on the alternative plaza locations.

Building upon the guiding principles for generating illustrative alternatives, the following specific siting considerations were developed for generating alternative plaza sites in consultation with the Canadian Border Service Agency and the US Department of Homeland Security Customs Border Protection Branch:

- Proximity to Border: Canada Border Services Agency (CBSA) and US Customs and Border Protection (CBP) require that the plazas be located as close to the border as possible, to reduce security / monitoring requirements for border agencies. Where plazas cannot be directly connected to the bridge, secure connections would be required to prevent goods and travellers from avoiding inspection. In Canada, a secure roadway of 1500m (0.9 mi) was considered the maximum reasonable distance, subject to consideration of land use and line of sight concerns. (In the US, connecting the plaza directly to the crossing is the only acceptable alternative).
- Site Area: The site must provide adequate space to accommodate projected traffic demand, as well as turn-around opportunities for drivers and the installation of equipment systems prior to and after inspection points, on-site secondary inspection, some storage capacity for traffic queues on the plaza, and the ability to expand in the future. As discussed in the previous section, inspection plazas 30 to 40 ha (80 to 100 acres) in size were considered for new crossings.
- Adjacent Land Use: The site should be located away from residential areas, schools and other community uses. Sites should not be visible from neighbouring lands, but should provide good visibility to surrounding areas and approaches. Areas with significant development should also be avoided.
- Environmental Sensitivities: Consideration should be given to the presence of toxic and/or hazardous materials, wetlands and/or endangered species, cultural, social and economic impacts.
- Existing Easements and Right-of-Ways: Consideration should be given to gas lines, water and sewer lines, power and telecommunication lines, rail lines, and local and private roadways;
- Emergency Services and Access: The site should be served by more than one roadway to allow for roadway interruption; consideration should be given to response time for medical and fire emergency services, and proximity to hospitals.
- Site Topography: Relatively flat sites are preferred, with grades less than 2-3 %. Floodplains and/or elevations close to river or lake levels should be avoided.
- Water Availability: Consideration should be given to water sources and protection from sabotage or other threats of contamination.

On the basis of the guiding principles and the siting considerations identified by the study team, thirteen (13) potential plaza locations were identified on the Canadian side of the river (refer to Exhibit 6.2). The identification of plaza locations on the Canadian side was coordinated with the identification of plaza locations on the US side.

In urban areas, plaza sites were generally sized closer to the required footprint of 30 to 40 ha (80 to 100 acres) in recognition of adjacent land use features. In rural areas, where there are fewer land use features, plaza opportunity areas of substantial size were identified. These areas provide the maximum flexibility for accommodating a variety of configurations of plazas.

The plaza sites were divided into three geographical categories – east plaza sites, central plaza sites, and south plaza sites. Each site is illustrated and described briefly in Exhibits 6.3A to 6.3C.

EXHIBIT 6.2 – POTENTIAL PLAZA LOCATIONS (CANADIAN AND US)

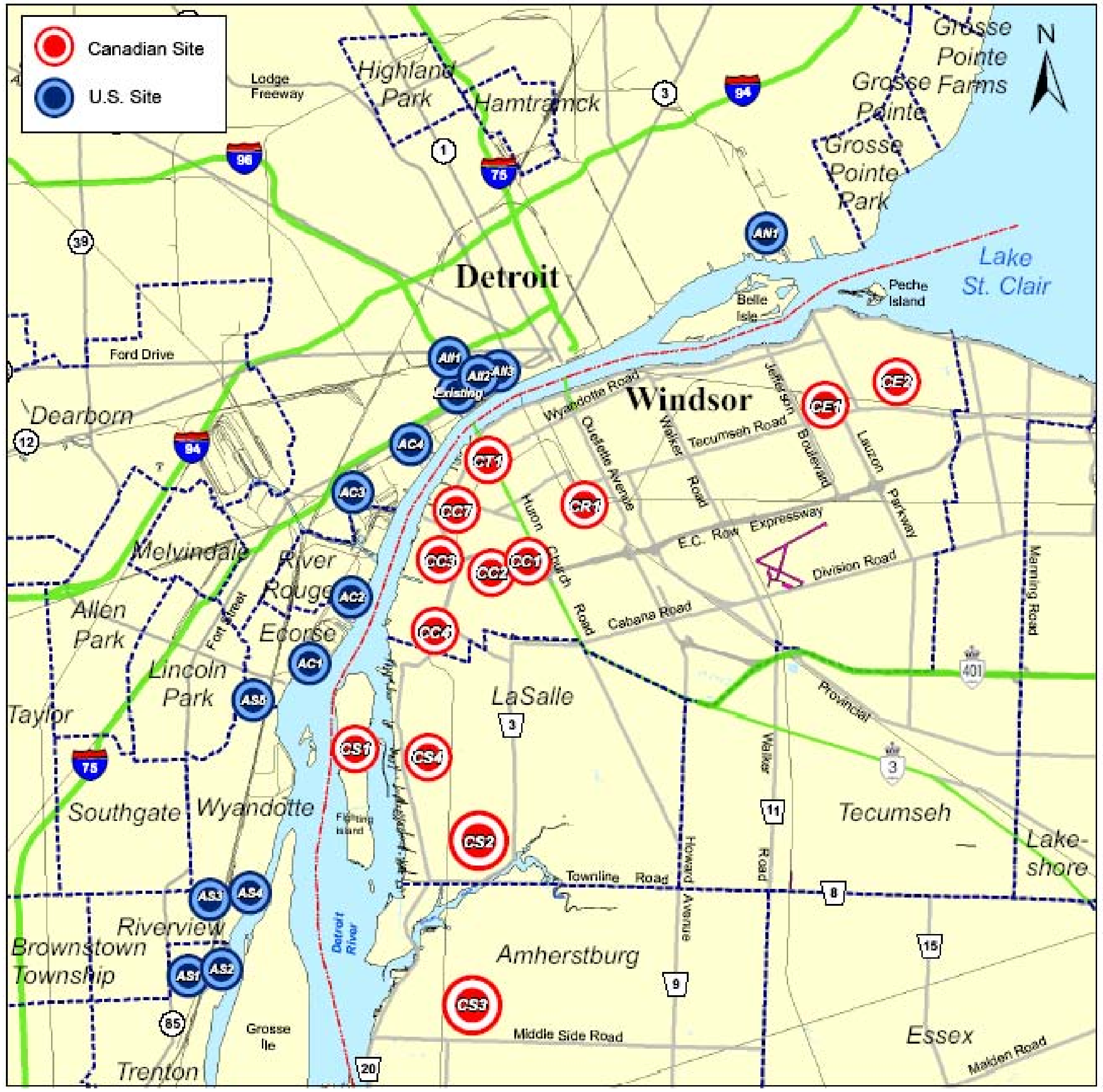
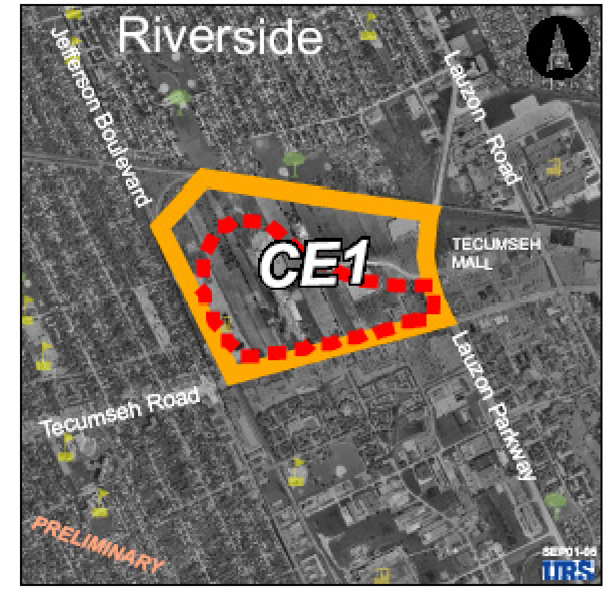


EXHIBIT 6.3A – EAST PLAZA SITES

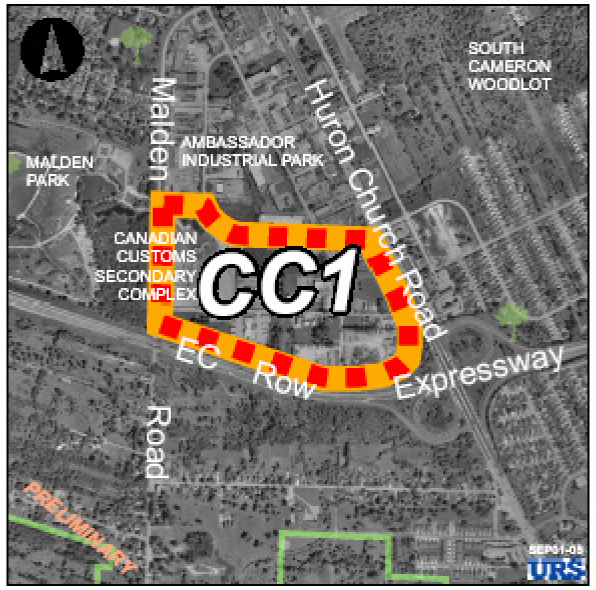


Plaza Site CE1
Size: 200 acres ±
Distance to River: 1.6 km

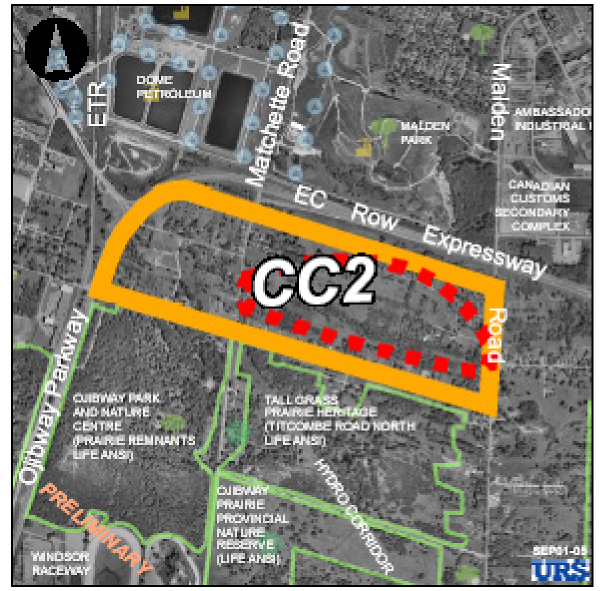
Plaza Site CE2
Size: 520 acres ±
Distance to River: 0.6 km

LEGEND
Broader Plaza Area
Area of Opportunity

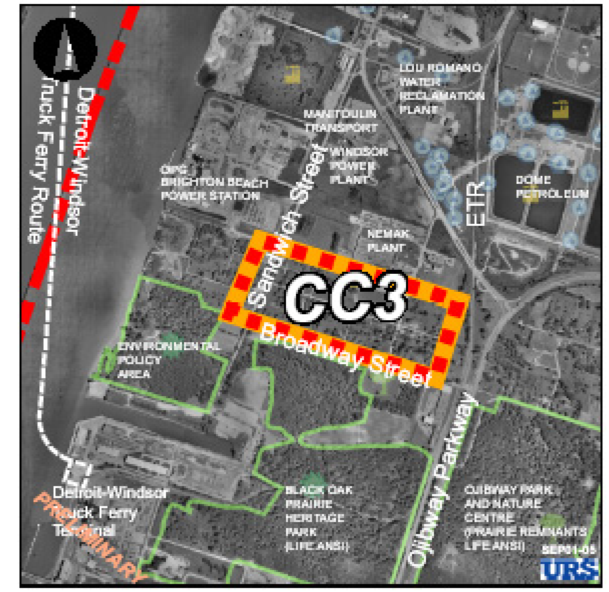
EXHIBIT 6.3B – CENTRAL PLAZA SITES



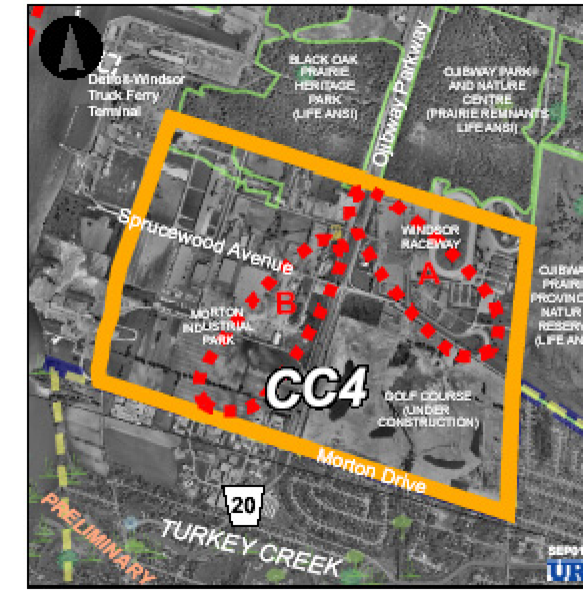
Plaza Site CC1
Size: 80 acres ±
Distance to River: 3.0 km



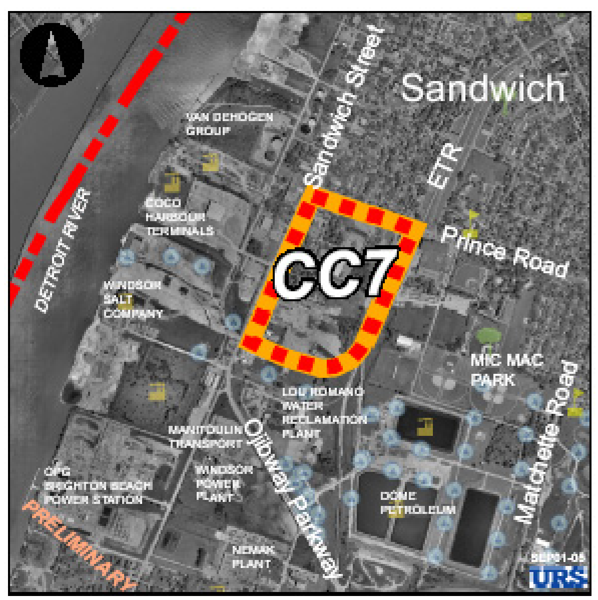
Plaza Site CC2
Size: 214 acres ±
Distance to River: 1.5 km



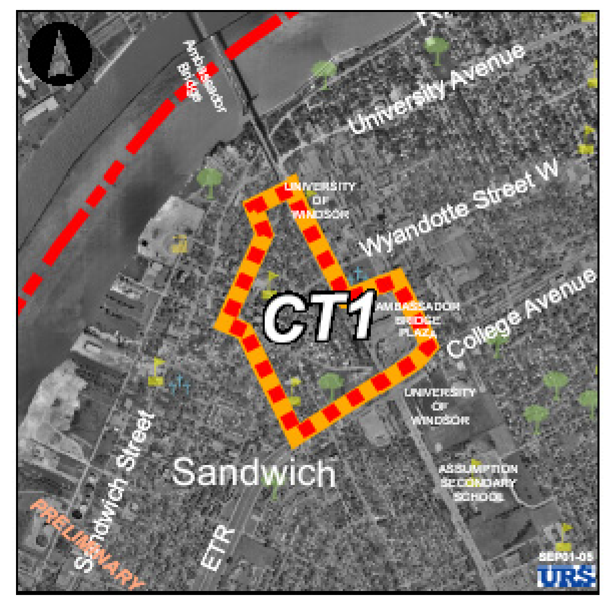
Plaza Site CC3
Size: 80 acres ±
Distance to River: 0.5 km



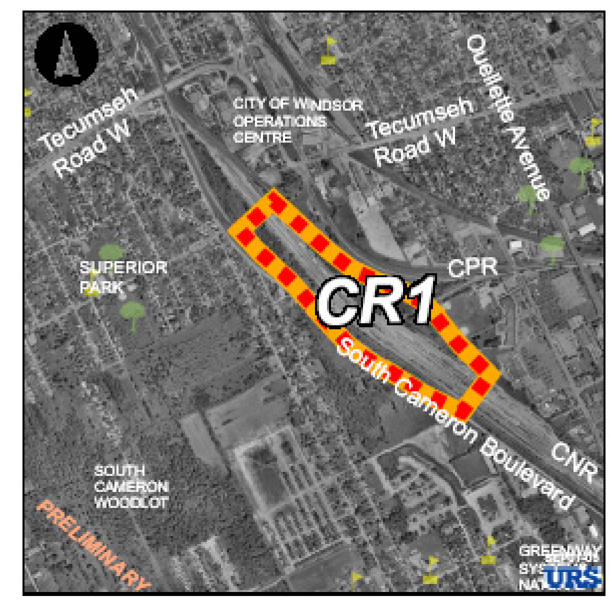
Plaza Site CC4
Size: 760 acres ±
Distance to River: 0.5 km



Plaza Site CC7
Size: 80 acres ±
Distance to River: 0.6 km



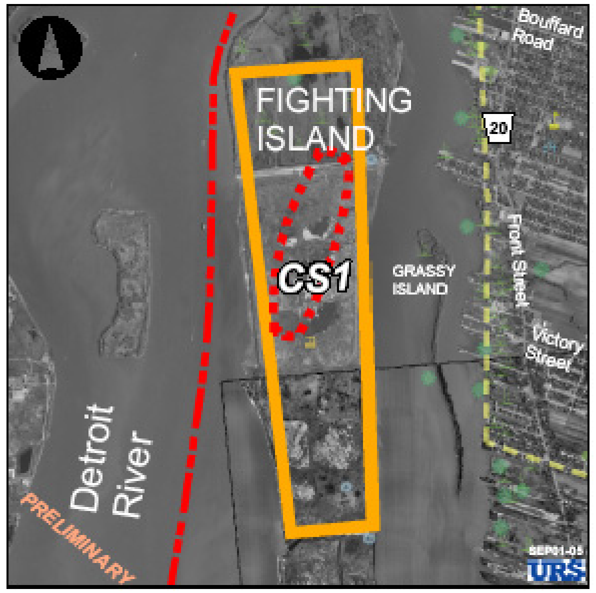
Plaza Site CT1
Size: 120 acres ±
Distance to River: 0.8 km



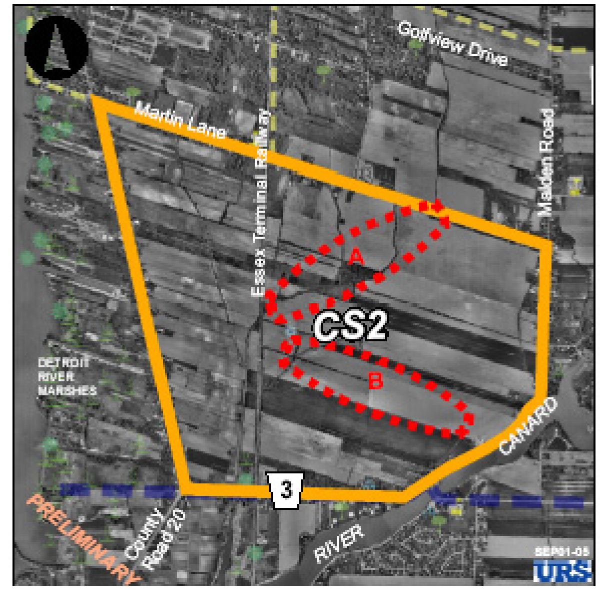
Plaza Site CR1
Size: 80 acres ±
Distance to River: 0.8 km

LEGEND
Broader Plaza Area
Area of Opportunity

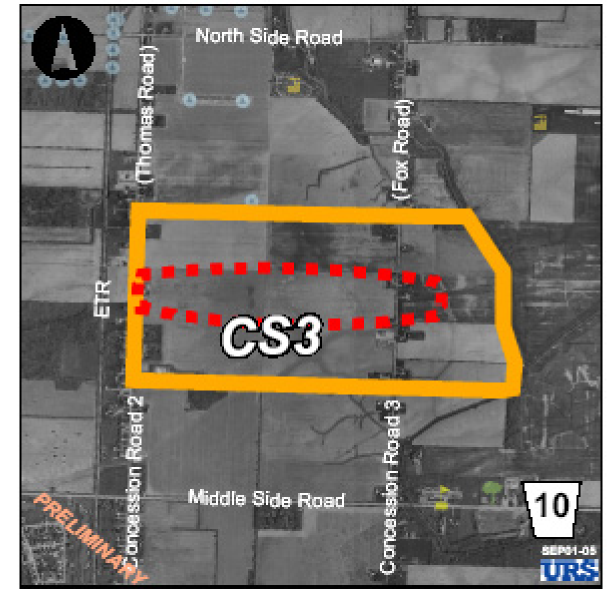
EXHIBIT 6.3C –SOUTH PLAZA SITES



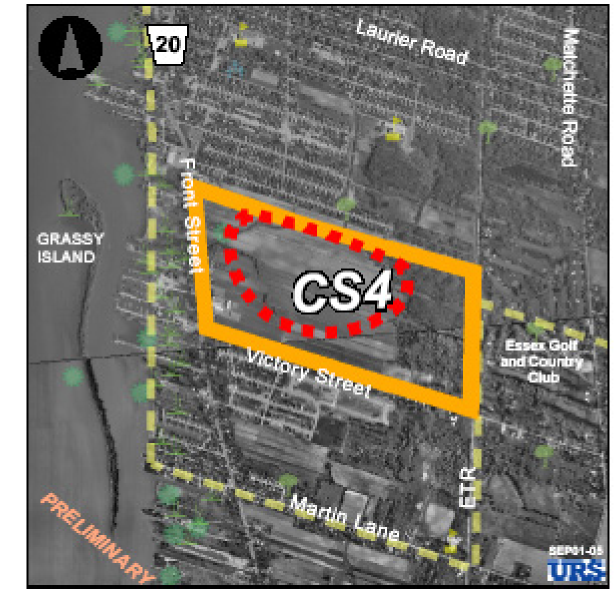
Plaza Site CS1
Size: 573 acres ±
Distance to River: N/A



Plaza Site CS2
Size: 1451 acres ±
Distance to River: 0.5 km



Plaza Site CS3
Size: 430 acres ±
Distance to River: 2.0 km



Plaza Site CS4
Size: 254 acres ±
Distance to River: 0.5 km

LEGEND
Broader Plaza Area
Area of Opportunity

6.1.2 Crossing Alternatives

Once the plaza locations were identified on the Canadian and US side of the Detroit River, the study team developed international crossing alternatives (bridge and tunnel options were considered) to connect the plaza sites. New crossing alternatives were developed based on providing six lanes over/under the Detroit River.

The Detroit River is an important waterway for marine traffic on the Great Lakes. Bridges are therefore required to span the river at a clearance of at least 46 m (150 ft) at the shipping channel, as defined by the US Coast Guard and Transport Canada – Navigable Waters Division. The height requirements and potential span lengths suggested that any bridge on the Detroit River north of Fighting Island would need to be either a suspension bridge or a cable-stayed bridge, as illustrated schematically in Exhibit 6.4.

The study team also undertook a review of available geotechnical information to assess the feasibility of constructing a tunnel below the Detroit River (refer to sketches in Exhibit 6.5 for schematic illustrations of the tunnel options considered).

The preliminary findings of the suitability of bridge and tunnel crossings are presented in Table 6.1. These findings suggested that:

- Rock tunnelling would be difficult and potentially not feasible due to the depth to bedrock in the upper portions of the river (refer to Exhibit 6.5), and the poor rock conditions in the lower portions of the river.
- Earth (bored) tunnelling may be feasible for crossings upriver of the Zug Island area, where depths of soft earth are suitable.
- Submerged tunnels in the Detroit River are not preferred due to the disruption to river sediment and impacts to shoreline natural areas such alternatives would have on the river. Initial discussions with Ontario Ministry of Natural Resources (MNR) and Michigan Department of Environmental Quality were held to discuss the possibility of using sunken tunnels. These agencies raised serious concerns as to the acceptability of this method of tunnel construction given that other less disruptive options were available.

Subsequent assessment of soft ground tunnelling upriver of Zug Island identified issues with respect to uplift and available soft earth cover over a new tunnel in this area of the river.

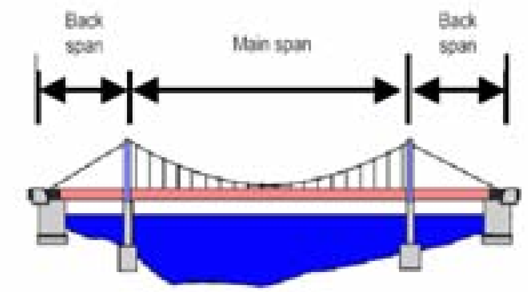
Both Canadian and US study teams concluded that for the purposes of the current EA study, roadway tunnels under the Detroit River were not practically feasible upriver of Zug Island. In addition, poor rock conditions downriver of the Zug Island area and inadequate soft earth cover led both the Canadian and US study teams to conclude that roadway tunnels are not practically feasible for all crossing locations.

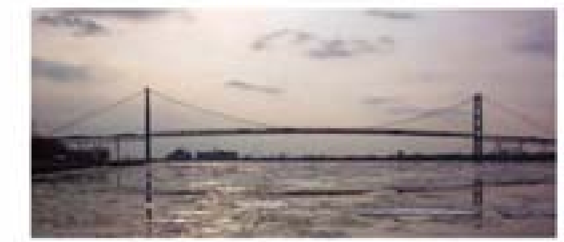
The illustrative crossing alternatives are shown on Exhibit 6.6.

EXHIBIT 6.4 – DETROIT RIVER BRIDGE OPTIONS NORTH OF FIGHTING ISLAND AREA

Suspension Bridge

Suitable for spans over 500m.

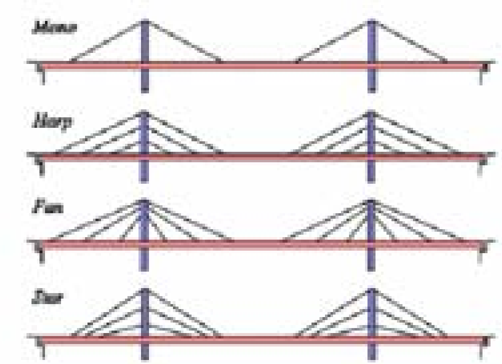




Typical Elevation (left) and Ambassador Bridge, Windsor/Detroit (right)

Cable Stayed Bridge

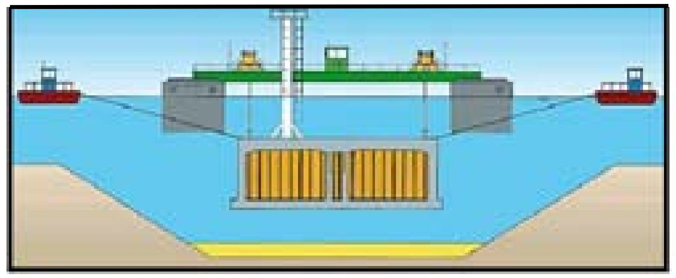
Suitable for spans up to 900m.




Typical Elevations (left) and Pont de Normandie, France (right)

EXHIBIT 6.5 – DETROIT RIVER TUNNEL OPTIONS CONSIDERED

Submerged Tunnel



Tunnel Boring Machine (Rock or Soft Ground Tunneling)

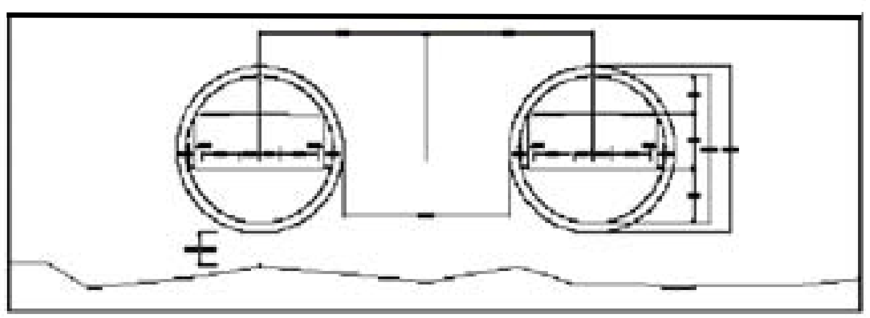


Image courtesy of Parsons Transportation/The Corradino Group

Triple-Tunnel

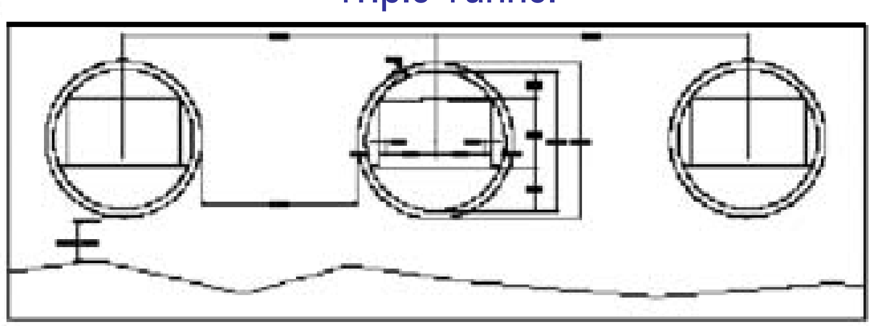


Image courtesy of Parsons Transportation/The Corradino Group

TABLE 6.1 – GEOTECHNICAL SUMMARY OF CROSSING OPTIONS AND CONCERNS

Location	Area of Fighting Island	Area of Zug Island	Area of Ambassador Bridge	Area of Belle Isle
Bridge	• Solution Mining • Foundations on bedrock, 15 to 20m below ground surface • Potential artesian groundwater • Methane and hydrogen sulphide • Approach embankments on compressible soils ✓Carried forward for continued study	• Solution Mining • Foundations on bedrock, 25 to 30m below ground surface • Methane and hydrogen sulphide • Potential artesian groundwater • Dry salt mining ✓Carried forward for continued study	• Solution Mining • Foundations on bedrock, 35 to 40m below ground surface • Methane and hydrogen sulphide • Potential artesian groundwater • Approach embankments on compressible soils ✓Carried forward for continued study	• Foundations on bedrock, 40 to 50m below ground surface • Methane and hydrogen sulphide • Potential artesian groundwater • Approach embankments on compressible soils ✓Carried forward for continued study
Immersed Tube	• Solution Mining • Excavations in bedrock required • Potential artesian groundwater • Sediment disturbance and disposal creates numerous environmental concerns X Not practically feasible	• Solution Mining • Excavations may penetrate near the bedrock interface • Potential artesian groundwater • Sediment disturbance and disposal • Dry salt mining X Not practically feasible	• Excavations may penetrate near the bedrock interface • Potential artesian groundwater • Sediment disturbance and disposal creates numerous environmental concerns X Not practically feasible	• Tunnel potentially seated on soft clay • Sediment disturbance and disposal creates numerous environmental concerns X Not practically feasible
Soft Ground Tunnel	• Solution Mining • Insufficient soft earth cover in river bed therefore not feasible for 13m diameter tunnel • Groundwater control X Not practically feasible	• Solution Mining • Insufficient soft earth cover in river bed therefore not feasible for 13m diameter tunnel • Groundwater control • Dry salt mining X Not practically feasible	• Insufficient soft earth cover therefore not feasible for 13m diameter tunnel • Groundwater control X Not practically feasible	• Groundwater control • Limited soft earth cover • Approach construction in soft soil X Not practically feasible
Rock Tunnel	• Solution Mining • Potential artesian groundwater • Approach construction, excavations of 15 to 20m • Use of double-shield rock TBM • Poor quality of rock X Not practically feasible	• Solution Mining • Groundwater control • Gas control • Approach construction, excavations of 25 to 30m • Dry salt mining areas • Use of double-shield rock TBM • Poor quality of rock X Not practically feasible	• Approach construction, excavations of 30 to 35m • Groundwater control • Gas control • Use of double-shield rock TBM • Uplift and lack of adequate cover X Not practically feasible	• Groundwater control • Gas control • Approach construction excavations of 40 to 50m, beyond practical limit • Use of double-shield rock TBM • Uplift and adequate cover X Not practically feasible

EXHIBIT 6.6 – ILLUSTRATIVE CROSSING ALTERNATIVES (X1 TO X15)

6.1.3 Access Road Alternatives

Illustrative access road alternatives connecting Highway 401 in the Windsor-Essex County area to the alternative plaza locations are illustrated on Exhibit 6.7 and were developed based on the guiding principles identified in Section 6.1. The significant features considered during the development of access road alternatives included the following:

Component	Feature
Natural Environment	Groundwater Quality and Quantity Surface Water Quality and Quantity Agricultural Lands Wetlands Areas of Natural and Scientific Interest (ANSI's) Environmentally Sensitive Areas (ESA's) Woodlands Wildlife Preserves Species at Risk / Endangered Species
Cultural Environment	Historical, Archaeological and Cultural Sites National, State & Provincial Parks, and Conservation/Recreational Areas
Social Environment	Landfills and Hazardous Waste Sites Areas of Residential Development Areas of Commercial / Institutional Development

The access road alternatives were developed as multi-lane freeways with the following design characteristics:

- Design speed of 120 km/h (75 mph);
- Initially 4 lane urban freeway, but will protect sufficient property for ultimate 6 lanes;
- 80 m (260 ft) to 110 m (360 ft) Right-of-Way;
- 3% maximum mainline grade;
- 650 m (2130 ft) minimum horizontal curve radius in urban areas; and
- 1700 m (5580 ft) minimum horizontal curve radius in rural areas.

Route optimization software (Quantm) was also used to aid in the generation of illustrative access road alternatives to verify the range of alternatives identified by the study team. Quantm utilizes a computerized approach that considers environmental features and cost data to identify optimal route locations. The information generated by Quantm was incorporated in the set of illustrative access road alternatives developed by the study team.

SOUTH ALTERNATIVES

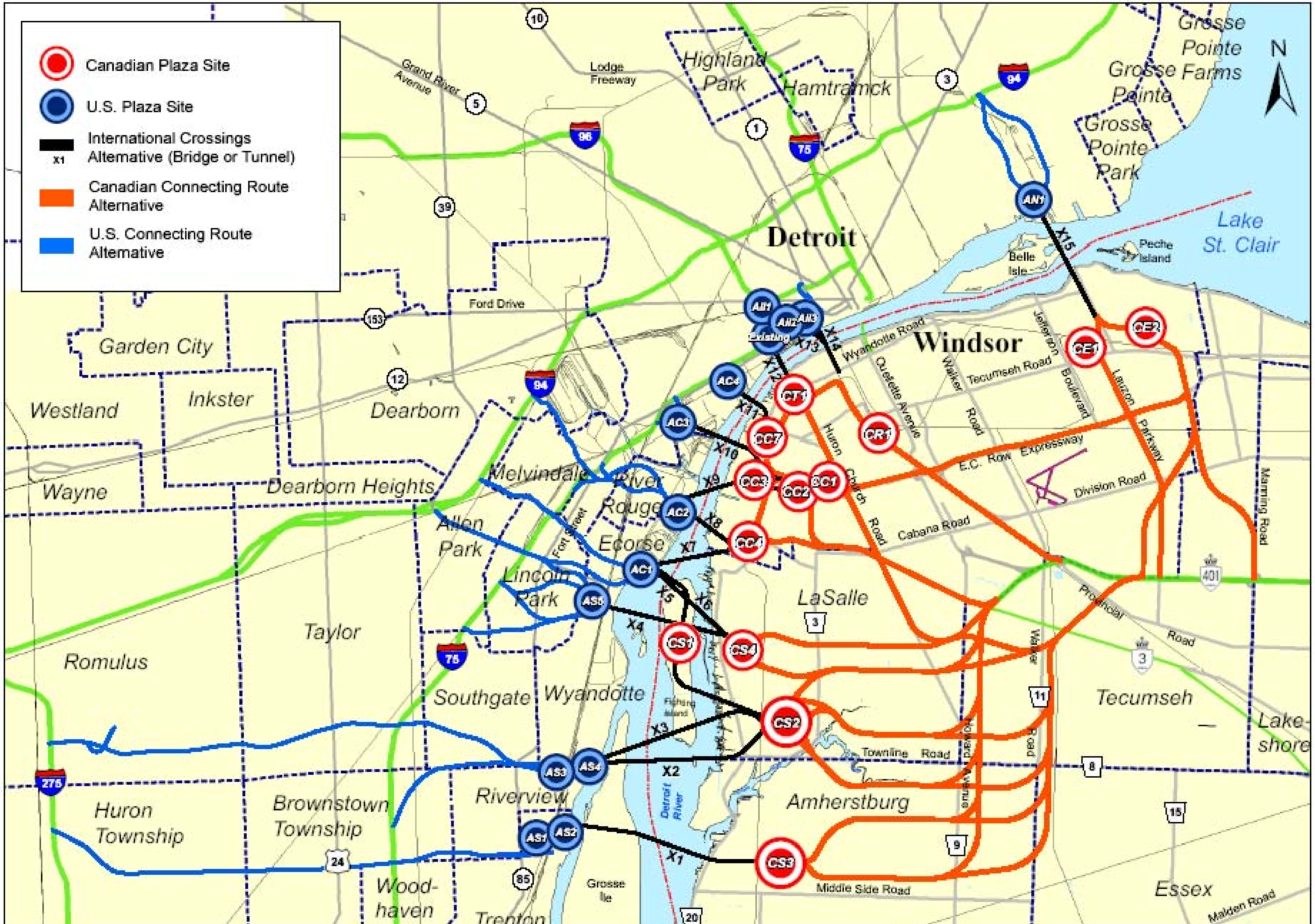
Considering the plaza locations along the Detroit River and the location of Highway 401, the study team developed alignments for access roads that would reduce impacts to land uses and avoid where possible impacts to key community features (refer to Exhibit 6.8A). The land use in the southern area is primarily agricultural. Therefore, alignments were developed which generally followed the property and field fabric in LaSalle, Amherstburg and Tecumseh. This resulted in alignments that were generally aligned east-west and north-south, rather than diagonally, to reduce impacts to agricultural operations and minimize landlocked severances.

The east-west access road segments connecting to Plaza CS3 were developed to avoid the active Allied Chemical Quarry between Concession Road 6 and Howard Avenue in Amherstburg. The north-south segments followed the rear lot lines paralleling Walker Road and Howard Avenue to avoid the existing development (agricultural buildings, residences and other retail/industrial uses) that is generally located along the frontages of these principle roads. The segment paralleling Howard Avenue connects into Highway 401 at the Highway 3 exchange. The segment that parallels Walker Road avoids the settlement area of Oldcastle in the Town of Tecumseh and connects into Highway 401 in the area of Concession Road 10, where Highway 401 is on tangent.

The east-west access road segments connecting to Plazas CS1 and CS2 were developed to avoid the clusters of residential development and improved lands (e.g. golf courses, race tracks) found south of the future urban area boundary in LaSalle. As can be seen in Exhibit 6.8A, one east-west access road segment (CF–CG) follows along this boundary north of the plaza, while another (SE-SM) is approximately one-half concession north of the LaSalle/Amherstburg municipal boundary. This latter segment swings north to avoid a crossing of the Canard River and the residential area along the north bank of the river near Malden Road. A third access road segment (SH-SM) is located approximately one-half concession south of the LaSalle/Amherstburg municipal boundary. This alternative crosses the Canard River immediately east of the settlement area along the south bank of the river. The connection to Plaza CS1 is aligned south of Martin Lane, parallel with the property fabric, which is generally perpendicular to the Detroit River. As with the other southern alternatives, the east-west segments were connected to two north-south segments, connecting to Highway 401 at either Highway 3 or near Concession Road 10.

The east-west segments connecting to Plaza CS4 in LaSalle include an alignment that follows the town's future urban area boundary, then swings south to avoid the Essex Golf and Country Club, which was identified as a significant community feature. The other access road segment is located south of Bouffard Road within the town's future urban area to determine whether there would be any advantage to having a new east-west freeway facility to serve this growing community, and whether the plans for the urban area of LaSalle could accommodate a new east-west transportation corridor. These east-west segments were also connected to the two north-south segments connecting to Highway 401 at either Highway 3 or at the end of the long tangent section near Concession Road 10.

EXHIBIT 6.7 – ILLUSTRATIVE CROSSING, PLAZA AND ACCESS ROAD ALTERNATIVES



CENTRAL ALTERNATIVES

Most of the central alternatives were located in the highly developed urban areas of Windsor and LaSalle (refer to **Exhibit 6.8B**). To reduce impacts to existing communities and neighbourhoods, existing transportation corridors were considered for a new freeway connecting the central plaza sites (CC1, CC2, CC3, CC4, CC7, CT1 and CR1) to Highway 401. The Huron Church/Talbot Road/Highway 3 corridor was one alternative, as was the former Canadian Southern (CASO) rail corridor (now the Detroit River Tunnel Partnership (DRTP) Rail Corridor). The E.C. Row Expressway corridor, with connections at Huron Church Road, the DRTP rail corridor, or a Lauzon Parkway Extension, were also considered as corridors for conveying international traffic between Highway 401 and the Detroit River.

A new highway corridor was considered in the Talbot Road area to bypass the existing residential uses that currently have direct access to Talbot Road. This segment (CC-CE-CI) passes within the designated urban area boundary of LaSalle, through an active development area, and along the Huron Church Line corridor to the Huron Church Road/Todd Lane area.

Other new highway corridors were developed in the area of Ojibway Prairie. One such segment parallels Todd Lane west of Huron Church Road along the Windsor/LaSalle municipal boundary, westerly to Ojibway Parkway. This alignment is derived from the recommended alignment for a truck bypass route connected to a traffic management centre in the Brighton Beach area identified in the *Windsor Gateway Study, Sam Schwartz Engineering, January 2005*.

Another segment parallels Todd Lane west of Huron Church Road along the Windsor/LaSalle municipal boundary to Malden Road, then follows the Malden Road corridor to the E.C. Row Corridor. This segment avoids severance impacts to the Ojibway Prairie Provincial Nature Reserve and the development along Huron Church Road north of Todd Lane/Cabana Road.

Alternative routes to using the Huron Church Road corridor to access the Ambassador Bridge were also developed. These included a new corridor from the western terminal of the E.C. Row Expressway along the Essex Terminal Railway (ETR) corridor to the Ambassador Bridge plaza (segment CP-CQ-CT). This segment is a part of what has been referred to locally as the Ambassador Ring Road concept. Another corridor was developed with a similar concept for using the ETR corridor to access the Ambassador Bridge from the DRTP Rail Corridor (segment CS-CT).

EAST ALTERNATIVES

To connect plazas CE1 and CE2 to Highway 401, access road segments were developed along the Lauzon Parkway/Concession Road 10 corridor and the Banwell Road/Manning Road corridor (refer to **Exhibit 6.8C**). North of the E.C. Row Expressway, existing transportation corridors were considered for a new freeway to reduce impacts to existing communities and neighbourhoods. South of E.C. Row, the land uses are primarily agricultural. Two segments were considered in the Concession Road 10 corridor: one segment along Concession 10, and another between Concession 9 and 10 to reduce impacts to agricultural operations, residences and other development that is presently along the frontage of Concession Road 10.

Connections between the Concession Road 10/Lauzon Parkway corridor and the Banwell Road corridor were provided via access road segments ED-EE and EG-EF (i.e. E.C. Row Expressway).

The illustrative crossing, plaza and access road alternatives were carried forward for analysis and evaluation to determine the practical alternatives to be carried forward for additional analysis.

EXHIBIT 6.8A – ILLUSTRATIVE ALTERNATIVES – SOUTH CORRIDOR – ACCESS ROAD ROUTES CONNECTING TO CROSSINGS X1, X2, X3, X4, X5 AND X6

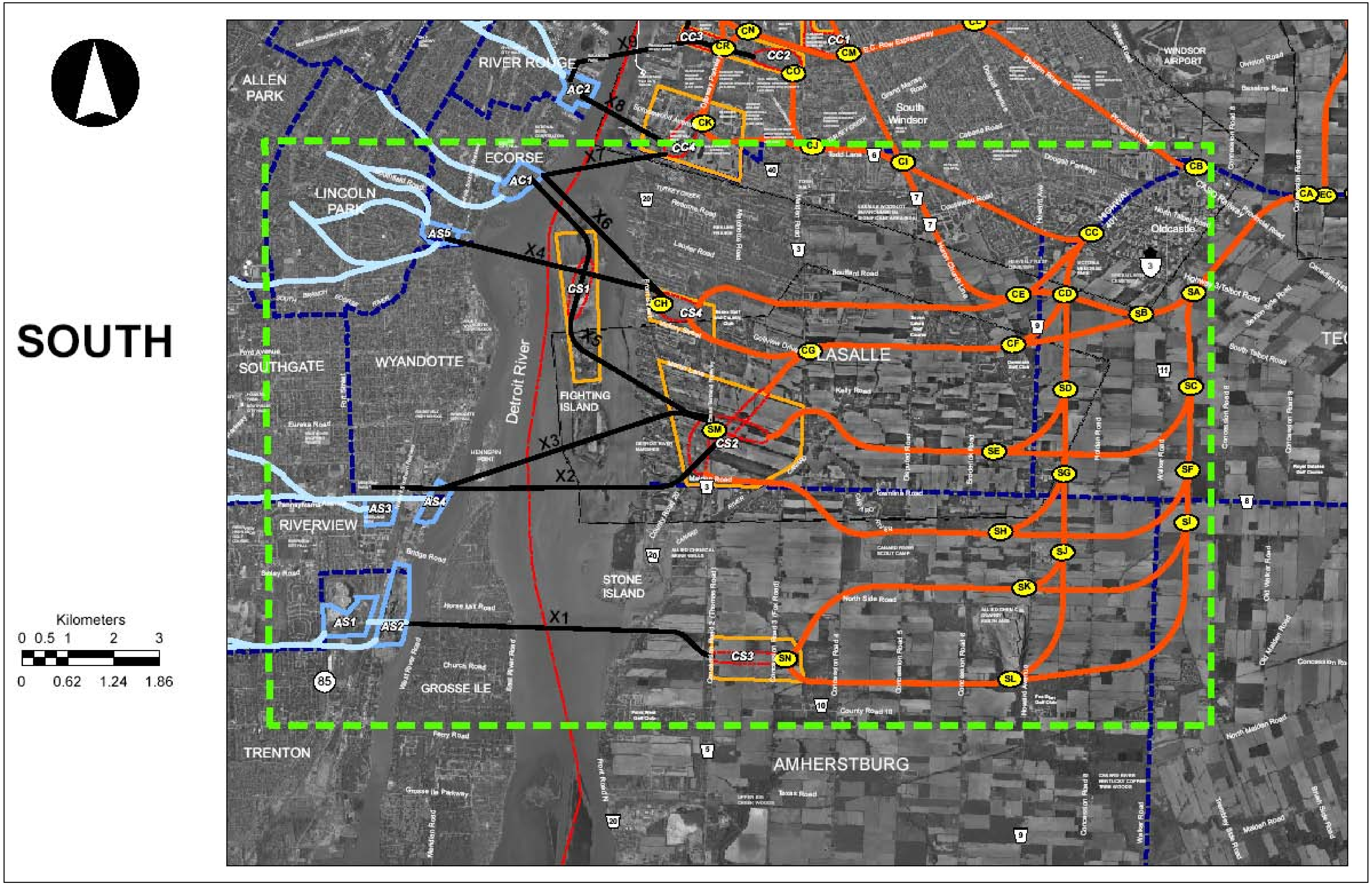


EXHIBIT 6.8B – ILLUSTRATIVE ALTERNATIVES – CENTRAL CORRIDOR – ACCESS ROAD ROUTES CONNECTING TO CROSSINGS X7, X8, X9, X10, X11, X12, X13 AND X14

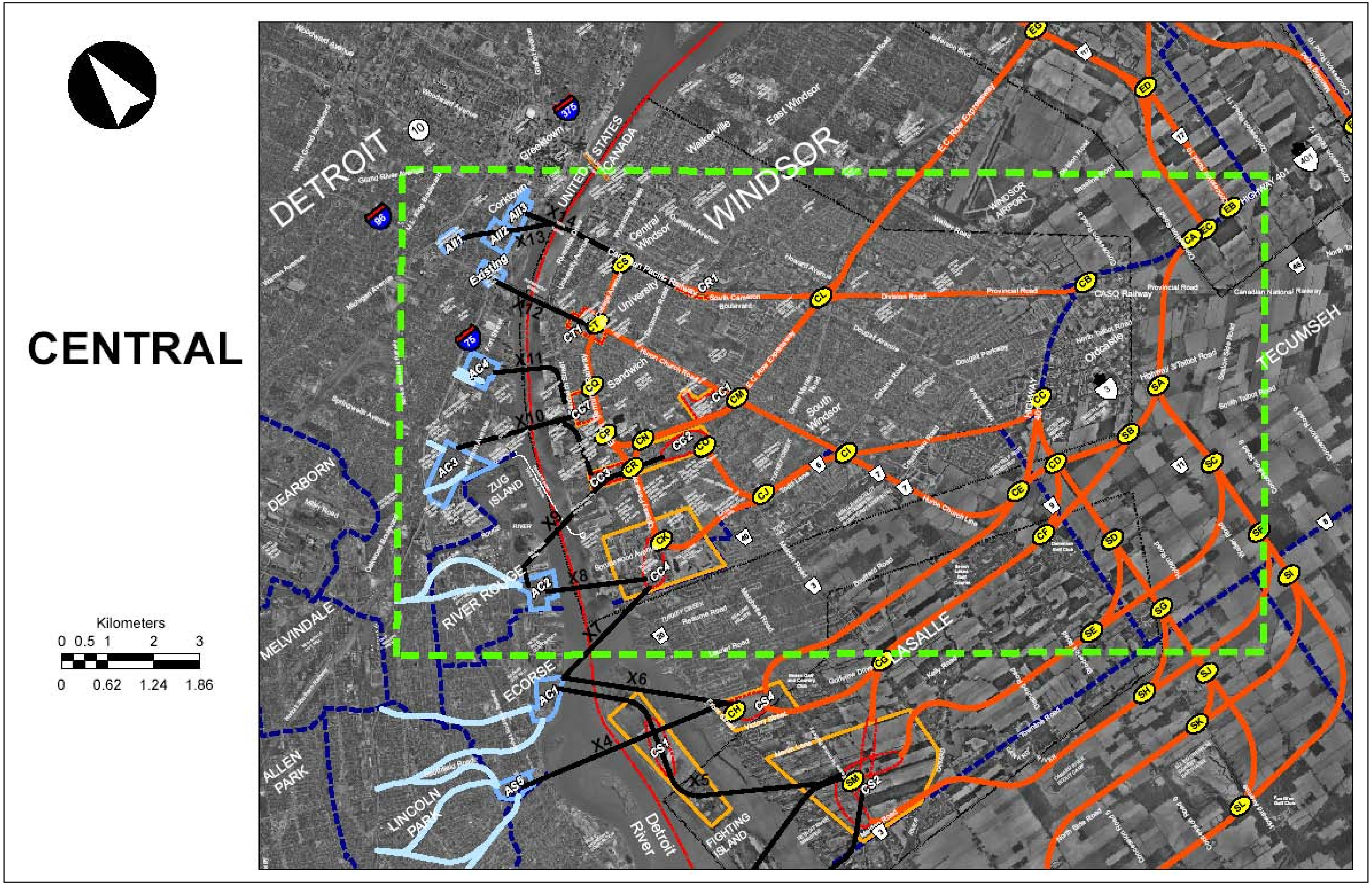


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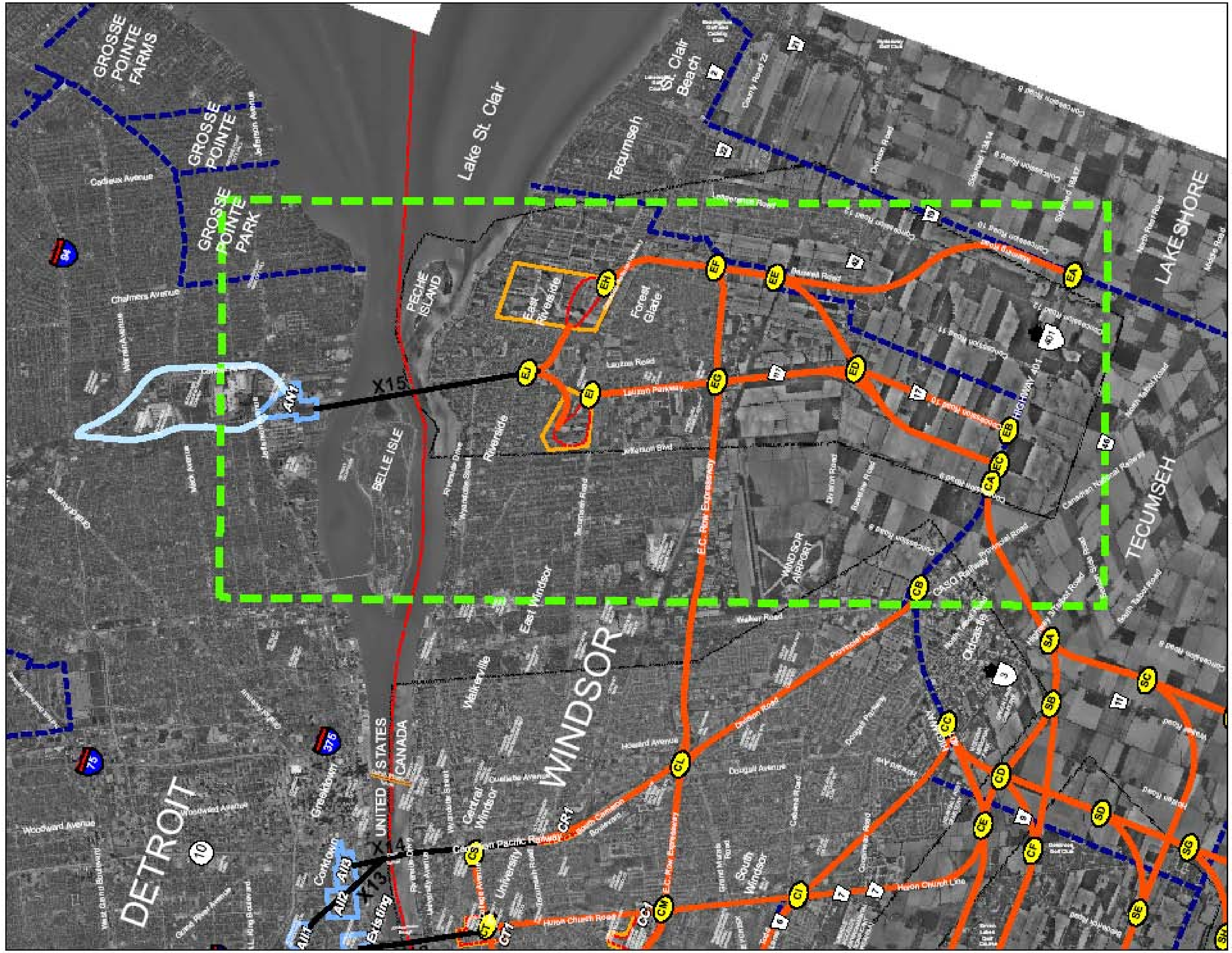
EXHIBIT 6.8C – ILLUSTRATIVE ALTERNATIVES – EAST CORRIDOR – ACCESS ROAD ROUTES CONNECTING TO CROSSING X15

EAST

Kilometers
0 0.5 1 2 3
0 0.62 1.24 1.86



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Ontario
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6.2 Process for Evaluating Illustrative Alternatives

Given the nature and extent of land uses and development along the Detroit River in both Canada and the US, it was recognized that it is not possible to develop a new or expanded river crossing, plaza and access road that entirely avoids impacts on local communities and the environment.

This section describes the evaluation approach implemented on the Canadian side for evaluating the illustrative crossing, inspection plaza and access road alternatives to identify an Area of Continued Analysis (ACA) within which to develop the more refined practical crossing, inspection plaza and access road alternatives.

6.2.1 Evaluation Sequence

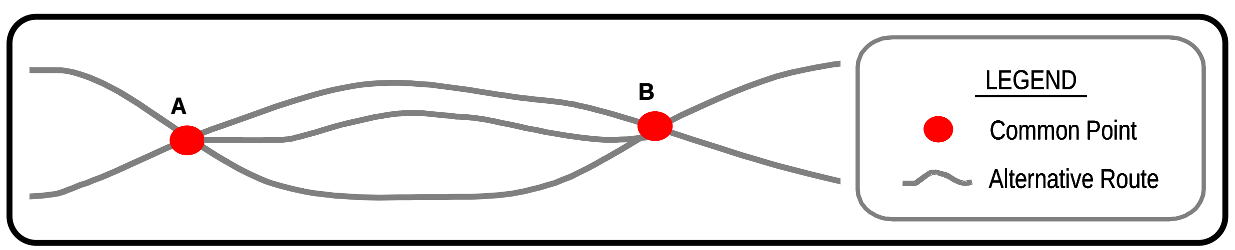
The illustrative crossing, inspection plaza and access road alternatives were evaluated following a multi-stage process, which is summarized in Section 6.3.

Initially, the illustrative crossing, plaza and access road alternatives were assessed and evaluated separately on the Canadian and US sides. The US study team used the same evaluation criteria as the Canadian study team, with modifications as appropriate to reflect the unique requirements and characteristics of the US study area.

The results of the US and Canadian analyses were compiled for an end-to-end assessment of illustrative crossing, plaza and access road alternatives for connecting Highway 401 in Ontario to the interstate freeway system in Michigan.

It should be noted that in evaluating the access road alternatives, an analysis was undertaken to determine preferred alternatives for portions of the PAA rather than comprehensively examining all combinations of alternatives for the entire region. Common points among the alternatives were identified, and alternative segments between each common point were evaluated. For example, in Exhibit 6.9, access road alternatives between common points "A" and "B" were compared to select a preferred alternative for that segment of the access road prior to assessing alternatives beyond common point "B".

EXHIBIT 6.9 – GENERIC ROUTE SEGMENT



6.2.2 Evaluation Criteria

Table 3.4 of the approved OEA ToR provides a listing of 18 proposed evaluation factors and 35 criteria for the current EA study (refer to Table 6.2). The Canadian and US study teams developed a revised evaluation table that simplified the number of factor areas to be considered from 18 to 7, to enable the public to more easily provide input to the study teams in terms of rating the importance of the factors.

The seven factors in the revised evaluation table are consistent with those of the approved OEA ToR and cover a broad range of issues, including the ability of the alternative to meet the Partnership's underlying transportation objectives, as well as natural, social, cultural, economic, and technical considerations.

Performance measures used in the analysis of illustrative alternatives include the 35 criteria from the approved OEA. These have been retained and added to, based on comments received during the public consultations.

The 7 evaluation factors and the performance measures used for the current EA study, as well as the corresponding criteria reference from Table 3.4 of the approved OEA ToR (where applicable) are shown in Table 6.3.

TABLE 6.2 – CRITERIA FOR EVALUATING ILLUSTRATIVE AND PRACTICAL ALTERNATIVES – FROM APPROVED OEA TOR

FACTOR	CRITERIA
Socio-Economic Environment	
Property and Access	• Impacts to residential areas (i.e. property, access impacts) • Impacts to commercial/industrial areas (i.e. property, access impacts) • Impacts to agricultural operations
Community Effects	• Nuisance impacts (e.g.. noise, lighting) • Impacts to cemeteries, schools, places of worship, unique community features • Effects on community activity / mobility • Effects on aesthetics / community character
Governmental Land Use Strategies	• Compatibility with government goals / objectives / policies • Effects on approved private development proposals
Cultural Environment	
Archaeology	• Impacts to historic/archaeological sites
Heritage and Recreation	• Impacts to built heritage features and cultural landscape units • Impacts to National, State/Provincial and local parks/recreation sites
Natural Environment	
Groundwater	• Impacts to groundwater recharge and discharge areas, as well as identified wellhead and source protection areas and areas susceptible to groundwater contamination
Aquatic Habitat, Fisheries, and Surface Water	• Impacts to critical fish habitat features (spawning, rearing, nursery, important feeding areas) • Number of watercourse crossings required • Impacts to water bodies, including channel realignments and fill
Agricultural	• Impacts to prime agricultural areas
Wetlands	• Impacts to Provincially Significant Wetlands and wetland function • Impacts to evaluated and unevaluated wetlands

FACTOR	CRITERIA
Wildlife	• Effects on species at risk / endangered species (vegetation, fish and wildlife) • Effects on ecologically functional areas such as connective corridors or travel ways
Special Areas	• Impacts to important wildlife areas such as deeryards, heronries, waterfowl areas, important bird areas (IBA). Other areas to be considered are any identified wildlife management, rehabilitation and research program sites. • Impacts to environmentally significant features such as Environmentally Sensitive Areas (ESAs), Areas of Natural and Scientific Interest (ANSIs) or other areas of provincial, regional or local significance and the functions of these features • Impacts to special spaces including the Detroit River, Conservation Authority Lands and NEPA 4(f) lands including the function of these features
Air Quality	• Effects on sensitive receptors to air quality • Air pollutants and GHG emissions
Woodlands	• Impacts to significant forest stands and woodlots (including interior forest habitat)
Resources	• Impacts to mineral, petroleum and mineral aggregate resources
Property Waste & Contamination	• Effect on operating and closed waste disposal sites • Impacts to other known contaminated sites
Technical Considerations	
Transportation	• Transportation Operations • Network Compatibility • Border Processing
Engineering	• Constructability Issues
Cost	• Cost

Note: The OEA ToR identified that this set of factors and criteria represents the minimum criteria to be considered during the evaluation of alternatives (practical and illustrative alternatives) and are subject to refinement and modification during the Integrated Environmental Study Process based on study findings and input received from stakeholders.

TABLE 6.3 – EVALUATION FACTORS AND PERFORMANCE MEASURES – CANADIAN SIDE

RATING FACTOR	PERFORMANCE MEASURE CATEGORIES	PERFORMANCE MEASURE	CORRESPONDING CRITERIA REFERENCE IN OEA TOR TABLE 3.4
Changes in Air Quality	Regional Burden	Analysis based on traffic model results.	25, 26
	Dispersion (CO and $PM_{2.5}$ and other Green House Gases/pollutants)	Analysis for key roadway links [to be measured at practical alternatives stage]	25, 26
Protect Community/ Neighborhood Characteristics	Traffic Impacts • Volumes by Vehicle Type • Local Access	Peak period volumes on specific links by mode (cars, trucks, and int'l. trucks). Number of streets crossed, closed, or connected with an interchange.	31, 33 31, 33
	Noise	Analysis based on traffic model results for key roadway links.	4
	Community Cohesion/Community Character	Encroachment/severance on neighborhood based on professional judgment. Impact on delivery of community services (function of road closures) based on professional judgment.	6, 7
	Acquisitions (Whole or Partial) • Residential • Business	Number of dwelling units by type; population estimate based on average persons per dwelling unit Number of business establishments; employment estimate based on average employees per business for area.	1 2

RATING FACTOR	PERFORMANCE MEASURE CATEGORIES	PERFORMANCE MEASURE	CORRESPONDING CRITERIA REFERENCE IN OEA TOR TABLE 3.4
	• Institutions • Farm Property / Structures	Number of institutions by type (church, schools, etc.). Operations/structures affected.	5 3
	Public Safety/Security (Plaza Only)	Assessment based on professional judgment.	NEW
Maintain Consistency with Existing and Planned Land Use	Land Use (existing and planned)	Designation of “consistent,” “not consistent,” or “not applicable” with goals, objectives and/or policies based on review of official planning documents.	8
	Development Plans	Designation of “compatible,” “not compatible,” or “not applicable” with plans for upcoming development that may not be covered by official plans.	9
	Contaminated Sites/Disposal Sites	Number of documented sites affected.	29, 30
Protect Cultural Resources	Historical	Number of listed sites affected.	10
	Parklands	Number of parks by type; number of hectares affected. Includes subset for Coastal Zone Management sites.	11
	Archaeological Sites	Number of known sites affected.	12
Protect the Natural Environment	Environmentally Significant Features	Area (in hectares) affected by type.	14-19, 21, 23, 24, 27

RATING FACTOR	PERFORMANCE MEASURE CATEGORIES	PERFORMANCE MEASURE	CORRESPONDING CRITERIA REFERENCE IN OEA TOR TABLE 3.4
	Surface Water Quality/Groundwater	Area of floodplains affected (hectares); number of water crossings (including secondary rivers and streams); Detroit River channel alteration; number and general location of in-water piers; wells/groundwater sources affected; number of water intakes affected.	13, 16
	Environmentally Significant Species/ Habitat	Area of habitat (hectares) affected by type; list of species; other significant features.	20, 23
	Farmland/Prime Agricultural Soils	Area affected (hectares) by soil type	17
	Other Natural Resources	Area affected measured by area of right-of-way.	28
Improve Regional Mobility	Highway Network Effectiveness • Service Levels • Vehicle kilometres of Travel • Vehicle Hours of Travel • Distance Traveled	 Level of Service (LOS) classification by major facility type. By major facility type. By major facility type. Average kilometres for car, local truck, and international truck.	 31, 32 31, 32 31, 32 31, 32
	Continuous/ongoing river crossing capacity (i.e. redundancy)	Assessment of availability of crossing options.	32, 33

RATING FACTOR	PERFORMANCE MEASURE CATEGORIES	PERFORMANCE MEASURE	CORRESPONDING CRITERIA REFERENCE IN OEA TOR TABLE 3.4
	Operational Considerations of Crossing System (River Crossing and Plaza)	Distance to plaza from international border; accessibility; serviceability; security; flexibility for expansion.	32, 33
Minimize Cost	Millions of $ (2005)	Length of alternative, preliminary construction costs, constructability including site constraints; geotechnical constraints; construction staging/ duration; traffic maintenance; risk assessment.	34, 35

6.2.3 Evaluation Methods

The approved *OEA ToR, 2004* identified two evaluation methods to be employed in the evaluation process: reasoned argument method and arithmetic method. Each method is summarized in the following sections:

REASONED ARGUMENT METHOD

The reasoned argument method was the primary evaluation method employed. This method highlights the differences in net impacts associated with the various alternatives. Based on these differences, the advantages and disadvantages of each alternative are identified. The relative importance of the impacts is examined to provide a clear rationale for the selection of a preferred alternative. The rationale that favours the selection of one alternative over all others is derived from the following sources:

- Government legislation, policies and guidelines;
- Existing Land Use and Municipal policy (i.e., Official Plans);
- Technical Considerations (i.e. degree to which the identified transportation problems are addressed);
- Issues and concerns identified during consultation with ministries, departments and agencies, municipalities, ratepayer and interest groups and the general public - including input obtained through the weighting of the relative level of importance of evaluation criteria (described in further detail in the next section); and
- Study team expertise.

ARITHMETIC METHOD

The arithmetic evaluation was the secondary method employed for this study. This method incorporates numeric values for both the level of importance of each environmental attribute (referred to as the weight) and the magnitude of the impact or benefit associated with an alternative (referred to as the score). The weight is multiplied by the score to obtain a total weighted score. The totals for each alternative are compared to determine the preferred alternative. The Arithmetic Method also allows for sensitivity testing as numerous weighting scenarios can be developed.

Weighting (level of importance)

For the evaluation of illustrative alternatives, separate Canadian and American weighting scenarios were developed to allow the Canadian and US teams to reflect the unique differences in study areas in the evaluation. Within Canada, one weighting scenario was developed by the Canadian study team (refer to Table 6.4). In addition, the Partnership recognized that input from the public, government ministries, departments and agencies, local municipalities and other stakeholders is essential to successful planning of major transportation improvements, such as the Detroit River International Crossing study. Stakeholders and interested individuals were encouraged to provide input to the evaluation of illustrative alternatives.

Public input to the weighting of the seven evaluation factors was obtained through a rating tool distributed at the first round of public consultation in June 2005. Rating tools were made available at Public Information Open Houses as well as at the local Project Office and on the project website. Interested members of the public were asked to provide the Project Teams with their opinion as to how highly (on a scale of 0 to 100) the Project Team should consider each of the factors in deciding on what alternatives to carry forward for additional study.

A total of sixty-one valid rating tools were received, including 45 responses from the general public, 15 responses from members of the Community Consultation Group (CCG) and one from a government agency.

The rating tools received from the public and other stakeholders were arithmetically combined and normalized to percentages. It is important to note that the public and CCG weighting scenarios were developed mathematically. The weighting scenarios therefore do not reflect a consensus among study participants. Individuals that participated in the rating exercise may hold views that vary significantly from those represented in the weighting scenarios.

In addition, more than 150 comment sheets were received during the first round of consultation. The most frequent comments received included concerns with:

- Protection of natural features;
- Reduction of impacts to residential areas; and
- Air quality/human health.

The range of views represented in the rating tools and comment sheets received from the first round of consultation provided the Canadian Project Team with an understanding of community values with respect to the relative importance of each environmental feature, which subsequently was considered in the Project Team Weighting.

Scoring (degree of impact)

Study team specialists with expertise in all of the environmental factors areas assessed the degree of impact and benefit and assigned a score for each alternative. The study team specialists based their assessment of impacts on field measurements, results of prediction models, secondary data sources and other means as appropriate.

The score assigned to each environmental attribute by the qualified specialist was based on the relative degree of impact or benefit generated. Relative impacts can range from those that are positive (benefit the environment) to negative (detrimental to the environment).

TABLE 6.4 – CANADIAN STUDY TEAM WEIGHTING SCENARIO

Factor	Rationale	Rating
Improve Regional Mobility	The study team considered this factor of highest importance as it reflects one of the primary purposes of the project; a new or expanded crossing and associated inspection plazas and freeway connections are essential to the international economies of Canada and the US, Ontario and Michigan and the local economies in the Windsor/Essex County-Detroit/Wayne County region. The new facility will serve the border transportation network well beyond the 30-year planning horizon of this study. Given that this project is likely to have an impact on the local communities, and over time, communities will adjust to the new transportation network, it is imperative that the selected improvements satisfy the long-term mobility needs of the border transportation network.	100
Protection of Community & Neighbourhood Characteristics	The study team considered this factor of high importance on the basis that the community and neighbourhoods are sensitive to impacts associated with a major transportation project such as the DRIC. The DRIC will provide direct freeway access from Highway 401 to the new/expanded crossing; as a high-volume, high-speed facility, this project will have an impact on properties and access that could change the function and character of a community or neighbourhood. Reducing the impacts on the community associated with the international traffic facility is a high priority of the study team.	90
Protection of Natural Environment	The study team considered this factor to be of high importance on the basis that the remaining woodlot, prairie and wetland features provide unique habitat for some rare and endangered species. Federal, provincial and local municipal designations have been placed on many of the remaining natural features in the Preliminary Analysis Area. Local municipalities have incorporated the sensitive natural areas into their local planning to preserve and protect these features for their habitat value, as well as their community recreational benefits.	90
Minimize Cost	The study team considered this factor to be of moderate to high importance on the basis that this factor addresses cost and constructability of the new or expanded crossing. This project will be paid for by government funds and/or through tolls paid by users; minimizing the costs of the project will reduce the costs to users and/or taxpayers. In addition, the objectives of this project call for a new or expanded crossing to be in place as quickly as possible to reduce the potential for disruption to the movement of people and goods at this crucial border crossing. Reducing construction impacts and risks is important for the timely completion of this project.	75
Changes to Air Quality	This factor was considered of moderate importance by the study team on the basis that transportation is a minor contributor to ambient pollutants in the Windsor-Essex area. The majority of airborne pollutants and toxics are from industrial sources in the Windsor-Detroit area and external sources. The study team observed that by giving greater importance to protection of community and neighbourhood characteristics and protection of natural features, impacts to sensitive receivers for air quality will be reduced.	70
Protection of Cultural Resources	The study team considered this factor to be of moderate importance on the basis that much of the project area is disturbed by development and/or agriculture. As well, the level of importance assigned to this factor reflects that impacts to such features can usually be mitigated to reduce the effects to the resource. MTO has established procedures to avoid or minimize impacts to archaeological features. Built features can usually be mitigated by avoidance or relocation of the feature.	70
Maintain Consistency with Existing and Planned Land Use	The study team considered this factor to be of moderate importance on the basis that many of the aspects of minimizing impacts to existing land use are addressed in the assessment of impacts to neighbourhoods and communities, and that future land use designations can be changed to reflect provincial and federal land use initiatives and priorities. It is recognized that the local municipalities in the Windsor-Essex County area have Official Plans that identify municipal planning objectives for land use and municipal aspirations for growth.	70

6.3 Analysis and Evaluation of Illustrative Alternatives – Canadian Side

6.3.1 Access Road Alternatives

As noted in Section 6.2, the illustrative access road alternatives were evaluated on a segmental basis. Common points among the alternatives were identified, and alternative segments between each common point were evaluated. The following sections summarize the evaluation of the illustrative access road alternatives.

SOUTH ALTERNATIVES – CORRESPONDING TO CROSSINGS X1, X2, X3, X4, X5 AND X6

As shown in Exhibit 6.10, the south alternatives share a common connection to Highway 401 at Highway 3, they all bypass the existing metropolitan areas of Windsor, LaSalle and Tecumseh, and they primarily traverse sparsely populated rural lands. Another defining characteristic common to the south alternatives is the width of the Detroit River, which varies from approximately 4,500 m at the north end of Grosse Ile to 2,500 m at the north end of Fighting Island. At these lengths, multi-span structures with piers in the river and/or on the islands in this area of the river would be required. In comparison, the width of the river in the central sections near the Ambassador Bridge is in the order of 600 to 900 m, and 1,500 m in the eastern sections of the river near Belle Isle.

Connecting Route to Plaza CS3/Crossing X1

Table 6.5 provides a summary of the evaluation of the route segments connecting to plaza CS3. The best way to Plaza CS3/Crossing X1 was determined as the combination of route segments CC-CD-SD-SG-SJ-SK-SN. Details of this assessment are included in the *Generation and Assessment of Illustrative Alternatives Report (November 2005)* (refer to List of Supporting Documents).

From the Highway 401/Highway 3 interchange, the alignment generally parallels Howard Avenue north-south through the Town of LaSalle into the Town of Amherstburg, and runs east-west along a line north of North Side Road to Plaza CS3.

Connecting Route to Plaza CS2/Crossing X2/X3 and Plaza CS1/Crossing X5

Table 6.6 provides a summary of the evaluation of the route segments connecting to plaza CS2 and the east portion of crossing X5. The best way to Plaza CS2 and the east portion of crossing X5 was determined as the combination of route segments CC-CD-CF-CG-SM. Details of this assessment are included in the *Generation and Assessment of Illustrative Alternatives Report (November 2005)* (refer to List of Supporting Documents).

From the Highway 401/Highway 3 interchange, the alignment generally aligns with the southern limit of the future urban area in the Town of LaSalle. At Malden Road, the alignment bears south-westerly across Martin Lane, to a plaza opportunity area designated CS2, which is a large area of agricultural land north of River Canard. Within this opportunity area, plazas can be configured to connect to Crossings X2 and X3. Crossing X2 is aligned to avoid Fighting Island and cross at 90 degrees to the Detroit River.

Connecting Route to Plaza CS2/Crossing X3

Similar to Crossing X2, Crossing X3 also connects to Plaza CS2. The X3 crossing/plaza/connecting route combination also incorporates the combination of route segments CC-CD-CF-CG-SM. The alignment of Crossing X3 crosses over the south end of Fighting Island, resulting in a slightly different location for Plaza CS2.

Connecting Route to Plaza CS4/Crossings X4 and X6

Table 6.7 provides a summary of the evaluation of the route segments connecting to plaza CS4. The best way to Plaza CS4 was determined as the combination of route segments CC-CD-CF-CG-CH. From the Highway 401/Highway 3 interchange the alignment also aligns with the southern limit of the future urban area in the Town of LaSalle. However, at Malden Road, the alignment continues westerly to a large open area west of the Essex Golf and Country Club, north of Victory Street. From Plaza CS4, connections to Crossing X4 over central Fighting Island to US Plaza AS5, and Crossing X6 to US Plaza AC1 were considered.

EXHIBIT 6.10 – SOUTH ALTERNATIVES

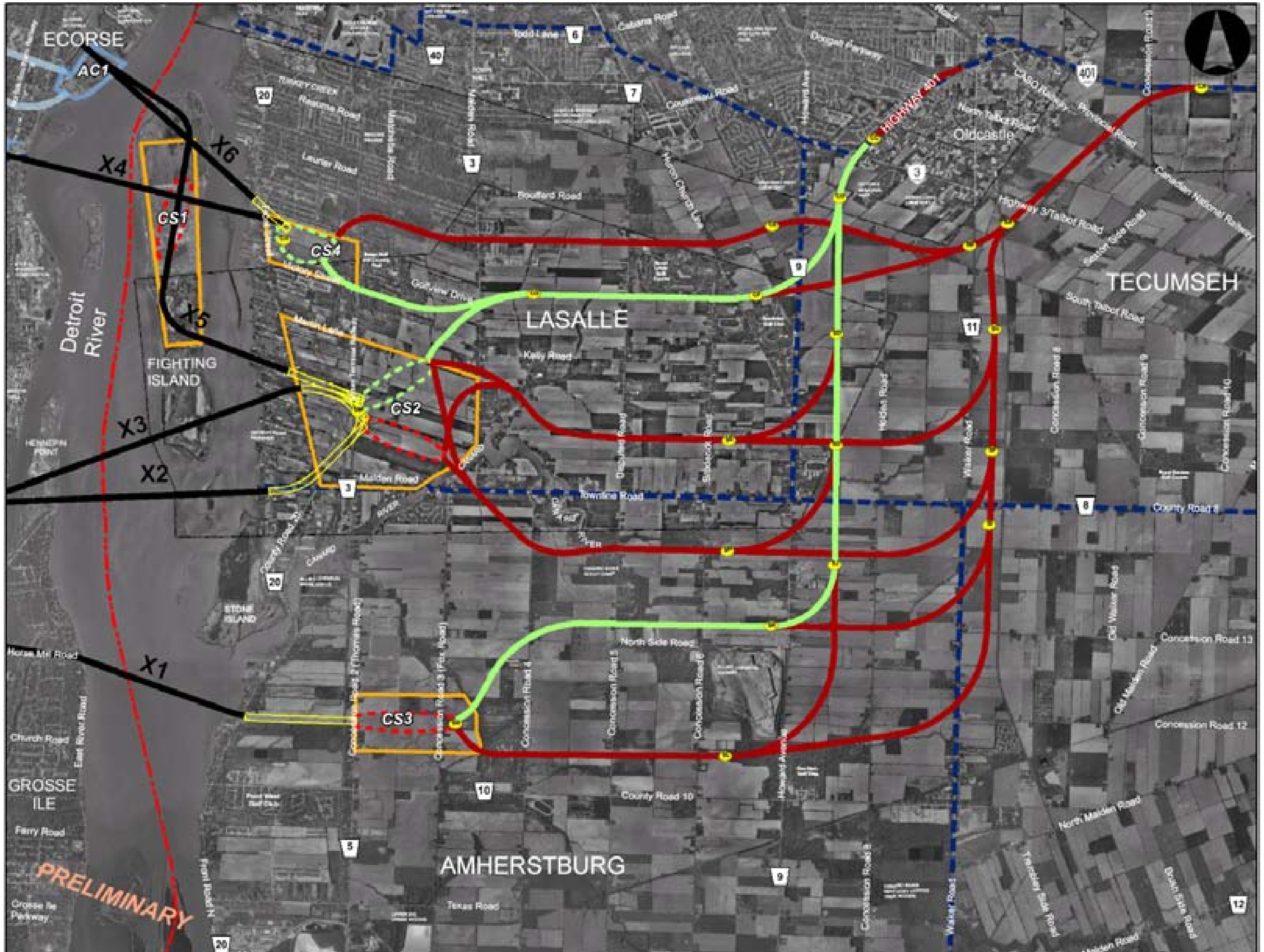


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TABLE 6.5 – SUMMARY OF ASSESSMENT OF SOUTH ROUTE SEGMENTS – CONNECTION TO PLAZA CS3/CROSSING X1

FACTOR	Howard Ave/North Side Road (CC-SK-SN)	Walker Rd/North Side Road (CA-SK-SN)	Howard Ave/Cty Rd 10 (CC-SL-SN)	Walker Rd/Cty Rd 10 (CA-SL-SN)
Changes to Air Quality	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis
Community and Neighbourhood Impacts	Impacts to agricultural area: Displacements: <10 households; <5 Businesses; <10 Farm building complexes Disruption: 60+ households within 250 m of centreline; <5 businesses; <20 farm building complexes	Impacts to agricultural area and hamlet of Paquette Corners: Displacements: 10+ households <5 Businesses; <10 Farm Building Complexes Disruption: 60+ households within 250 m of centreline; <5 businesses; 20+ farm building complexes	Impacts to agricultural area: Displacements: <5 households <5 Businesses; <5 Farm Building Complexes Disruption: 60+ households within 250 m of centreline; <5 businesses; 10+ farm building complexes	Impacts to agricultural area, MacGregor Square (development area) and hamlet of Paquette Corners: Displacements: 10+ households <5 Businesses; 5+ Farm Building Complexes Disruption: 80+ households within 250 m of centreline; <5 businesses; <20 farm building complexes
Consistency with Land Use	Impacts to rural agricultural uses; generally consistent	Impacts to rural agricultural uses; generally consistent; impacts to hamlet of Paquette Corners and Oldcastle settlement area and Trans-Canada Trail	Impacts to rural agricultural uses; generally consistent; impact to proposed gravel pit operation	Impacts to rural agricultural uses; generally consistent; impacts to MacGregor, hamlet of Paquette Corners and Oldcastle settlement area and Trans-Canada Trail
Impacts to Cultural Resources	2 known significant archaeological sites impacted; low potential for impacting unknown sites	3 known significant archaeological sites impacted; low potential for impacting unknown sites; impacts Trans-Canada Trail	3 known significant archaeological sites impacted; low potential for impacting unknown sites	4 known significant archaeological sites impacted; low potential for impacting unknown sites; impacts Trans-Canada Trail
Natural Environment	Proximity impacts to two ESA's; overall low impacts	Impacts a greater area of forest blocks than Howard Ave alternatives; overall low impacts	Direct impacts to natural features; overall low impacts	Impacts a greatest area of forest blocks than other alternatives; overall low impacts
Improve Regional Mobility	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic
Cost	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;
Conclusions	The Howard Avenue alternatives avoid impacts to Paquette Corners, as well as MacGregor and Oldcastle developments; North Side Road alignment preferred over Cty Rd 10 alignment due to lower impacts to cultural and natural features. Route segment CC-SK-SN is preferred.			

TABLE 6.6 – SUMMARY OF ASSESSMENT OF SOUTH ROUTE SEGMENTS – CONNECTION TO PLAZA CS2/CROSSING X2/X3 AND PLAZA CS1/CROSSING X5

FACTOR	Howard Ave/LaSalle Urban Boundary (CC-CF-SM)	Walker Rd/LaSalle Urban Boundary (CA-SB-CF-SM)	Howard Ave/North of Townline Road (CC-SE-SM)	Walker Rd/North of Townline Road (CA-SC-SE-SM)	Howard Ave/South of Townline Road (CC-SH-SM)	Walker Rd/South of Townline Road (CA-SF-SH-SM)
Changes to Air Quality	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis
Community and Neighbourhood Impacts	Impacts boundary of LaSalle future urban area and agricultural area: Displacements: <5 households <5 Businesses; 0+ Farm Building Complexes Disruption: 80+ households within 250 m of centreline; <5 businesses; <10 farm building complexes	Impacts boundary of LaSalle future urban area, parks and agricultural area, Displacements: <5 households <5 Businesses; <5 Farm Building Complexes Disruption: <50 households within 250 m of centreline; <5 businesses; 15+ farm building complexes	Impacts to agricultural area: Displacements: 10+ households; 0+ Businesses; 5+ Farm building complexes Disruption: <95 households within 250 m of centreline; <5 businesses; <15 farm building complexes	Impacts to agricultural area Displacements: <10 households 0+ Businesses; 10+ Farm Building Complexes Disruption: 70+ households within 250 m of centreline; <5 businesses; <30 farm building complexes	Impacts to agricultural area and hamlet of Loiselleville: Displacements: 5+ households; 0+ Businesses; <10 Farm building complexes Disruption: 140+ households within 250 m of centreline; <5 businesses; 20+ farm building complexes	Impacts to agricultural area: hamlets of Paquette Corners and Loiselleville: Displacements: <15 households; 0+ Businesses; 5+ Farm building complexes Disruption: 140+ households within 250 m of centreline; 0+ businesses; <25 farm building complexes
Consistency with Land Use	Impacts boundary of LaSalle future urban area and to rural agricultural uses; generally consistent	Impacts boundary of LaSalle future urban area and to rural agricultural uses; generally consistent; impacts to Oldcastle settlement area and Trans-Canada Trail	Impacts to rural agricultural uses; generally consistent	Impacts to rural agricultural uses; generally consistent; impacts to Oldcastle settlement area and Trans-Canada Trail	Impacts to rural agricultural uses; hamlet of Loiselleville generally consistent	Impacts to rural agricultural uses; generally consistent; impacts to Oldcastle settlement area and hamlets of Paquette Corners and Loiselleville and Trans-Canada Trail
Impacts to Cultural Resources	No known significant archaeological sites impacted; moderate potential for impacting unknown sites	No known significant archaeological sites impacted; moderate potential for impacting unknown sites	No known significant archaeological sites impacted; low potential for impacting unknown sites	No known significant archaeological sites impacted; low potential for impacting unknown sites	No known significant archaeological sites impacted; moderate potential for impacting unknown sites	No known significant archaeological sites impacted; moderate potential for impacting unknown sites
Natural Environment	Avoids impacts to Canard River; low impacts to other features	Avoids impacts to Canard River; higher impacts to forest blocks and watercourses than Howard Ave option;	Direct impacts to Canard River and marshes (provincially significant);	Direct impacts to Canard River and marshes (provincially significant);	Direct impacts to Canard River and marshes (provincially significant);	Direct impacts to Canard River and marshes (provincially significant);
Improve Regional Mobility	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic
Cost	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;
Conclusions	Alternatives south of Townline Road impact community of Loiselleville and provincially significant Canard River wetlands and are least preferred; alternatives following LaSalle future urban boundary avoid Canard River wetlands and are therefore preferred over other alternatives; Howard Avenue alternative identified as having slightly fewer impacts to community characteristics, land use, cultural resources and natural environment. Route Segment CC-SF-SM is preferred.					

TABLE 6.7 – SUMMARY OF ASSESSMENT OF SOUTH ROUTE SEGMENTS – CONNECTION TO PLAZA CS4/CROSSING X4 AND X6

FACTOR	Howard Ave/LaSalle Urban Boundary (CC-CF-CH)	Walker Rd/LaSalle Urban Boundary (CA-SB-CF-CH)	Howard Ave/Laurier Drive (CC-CE-CH)	Walker Rd/Laurier Drive (CA-SC-CE-CH)
Changes to Air Quality	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis
Community and Neighbourhood Impacts	Impacts boundary of LaSalle future urban area, residential area at Victory Street inside urban boundary; Displacements: 75+ households <5 Businesses; <5 Farm Building Complexes Disruption: 155+ households within 250 m of centreline; <5 businesses; 10+ farm building complexes	Impacts boundary of LaSalle future urban area, parks and agricultural area, Displacements: 75+ households <5 Businesses; <5 Farm Building Complexes Disruption: 125+ households within 250 m of centreline; <5 businesses; 15+ farm building complexes	Impacts to LaSalle's new community centre and recreation complex and planned Town Centre Displacements: <30 households; <5 Businesses; 0+ Farm building complexes Disruption: 215+ households within 250 m of centreline; <5 businesses; <10 farm building complexes	Impacts to LaSalle's new community centre and recreation complex, parks and planned Town Centre Displacements: <30 households <5 Businesses; 10+ Farm Building Complexes Disruption: 175+ households within 250 m of centreline; <5 businesses; <15 farm building complexes
Consistency with Land Use	Impacts boundary of LaSalle future urban area and residential uses near Victory Street;	Impacts boundary of LaSalle future urban area and residential uses near Victory Street; impacts to Oldcastle settlement area and Trans-Canada Trail	Not consistent with Town of LaSalle's existing and planned urban area uses; impact to new Town Centre	Not consistent with Town of LaSalle's existing and planned urban area uses; impact to new Town Centre; impacts to Oldcastle settlement area and Trans-Canada Trail
Impacts to Cultural Resources	No known significant archaeological sites impacted; high potential for impacting unknown sites	No known significant archaeological sites impacted; high potential for impacting unknown sites	No known significant archaeological sites impacted; high potential for impacting unknown sites	No known significant archaeological sites impacted; high potential for impacting unknown sites
Natural Environment	Minimal impacts to ETS[1]/habitat	Minimal impacts to ETS[1]/habitat; higher impacts to forest blocks and watercourses than Howard Ave option;	Direct impacts to <10 ha of ETS[1]/habitat	Direct impacts to <10 ha of ETS[1]/habitat; higher impacts to forest blocks and watercourses than Howard Ave option
Improve Regional Mobility	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic	Provides new freeway route; limited improvement for local Windsor area int'l traffic
Cost	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;	Comparable to other options for cost and constructability;
Conclusions	Laurier Drive alternatives impact LaSalle's future urban area and carry higher natural environment impacts; Alternatives that follow urban boundary have higher direct impacts to existing residential area at Victory Street; the impacts to the planned Town Centre for LaSalle are considered to be of higher significance so Laurier Drive alternatives are least preferred; Howard Avenue alternative following LaSalle future urban boundary identified as having slightly fewer impacts to community characteristics, land use, cultural resources and natural environment. Route Segment CC-CF-CH is preferred.			

[1] Endangered or Threatened Species

EAST ALTERNATIVE – CORRESPONDING TO CROSSING X15

The best way to Crossing X15 was determined as the combination of route segments EC-ED-EG-EI to Plaza CE1 (refer to **Table 6.8**). This route generally follows the alignment of Lauzon Parkway/Lauzon Road (see **Exhibit 6.11**). The proposed plaza site for this alternative is located north of Tecumseh Road west of Lauzon Road in an area currently occupied by 'big box' commercial uses, including Wal-Mart, Home Depot, Rona and other ancillary retail. The alignment of the crossing X15 is parallel to and adjacent to Lauzon Road. Due to the location of the shipping channel relative to the shoreline in this area of the Detroit River, a bridge crossing designed to provide the required navigational clearances would extend inland approximately 800 m. This area of the Detroit River features Belle Isle, a 390 ha (980 acre) urban park owned by the City of Detroit on the American side of the river, and Peche Island, a small day-use only provincial park on the Canadian side of the river.

RAIL CORRIDOR ALTERNATIVES – CORRESPONDING TO CROSSINGS X13 AND X14

The use of the former CASO rail corridor was considered in two ways. First, the study team considered the Detroit River Tunnel Partnership (DRTP) proposal for a two-lane truckway connecting to the refurbished rail tunnel. The study team also considered the use of the rail corridor for a new six-lane freeway connecting Highway 401 in Windsor to a new river crossing (bridge or tunnel) also connecting to the freeway system in Detroit. The rail corridor is identified in **Exhibit 6.12**.

Crossing X13 (DRTP Proposal)

DRTP is a partnership between two major private enterprises, Canadian Pacific Railway and Borealis Transportation Infrastructure Trust. CP Rail controls the operating rights on the rail corridor that extends from the Detroit River southerly to Highway 401 and beyond (segments CB-CL-CS).

In September 2002, DRTP filed a Notice of Intent to make application to the Canadian Transportation Agency for approval to construct the Canadian portion of the truckway project. DRTP had begun to prepare an environmental assessment in accordance with the *Canadian Environmental Assessment Act (CEAA)*.

A new truck route on the Canadian side will be built along the rail corridor from the existing tunnels to Highway 401. The truckway will make use of available portions of the rail right-of-way north of the Van der Water Yard. South of the Yard, the proposal will use the entire rail right-of-way by taking the CASO rail line out of service.

DRTP owns the rail corridor and additional properties adjacent to the rail corridor. Some additional property is required on the Canadian side in the vicinity of proposed grade separations at Howard Avenue, Walker Road, Cabana Road and 6th Concession Road.

Crossing X14 (Rail Corridor with Freeway and New Crossing)

As part of the generation of illustrative alternatives, the study team developed an option for a six-lane controlled access roadway that makes use of the rail corridor in connecting Highway 401 to the Detroit River.

This alternative utilizes the DRTP rail corridor to connect Highway 401 to the river. The assessment of this corridor was based on a 6-lane freeway designed for use by both truck and auto traffic; a right-of-way of 80 m was assumed for the freeway connection, which is wider than the existing rail corridor south of E.C. Row. In addition, this assessment has assumed that the use of the rail corridor south of Van der Water Yard by CN will be discontinued either through termination of lease agreements between CP and CN, or through agreements worked out through the Rail Rationalization Study being undertaken by the City of Windsor.

EXHIBIT 6.11 – EAST ALTERNATIVE – CROSSING X15

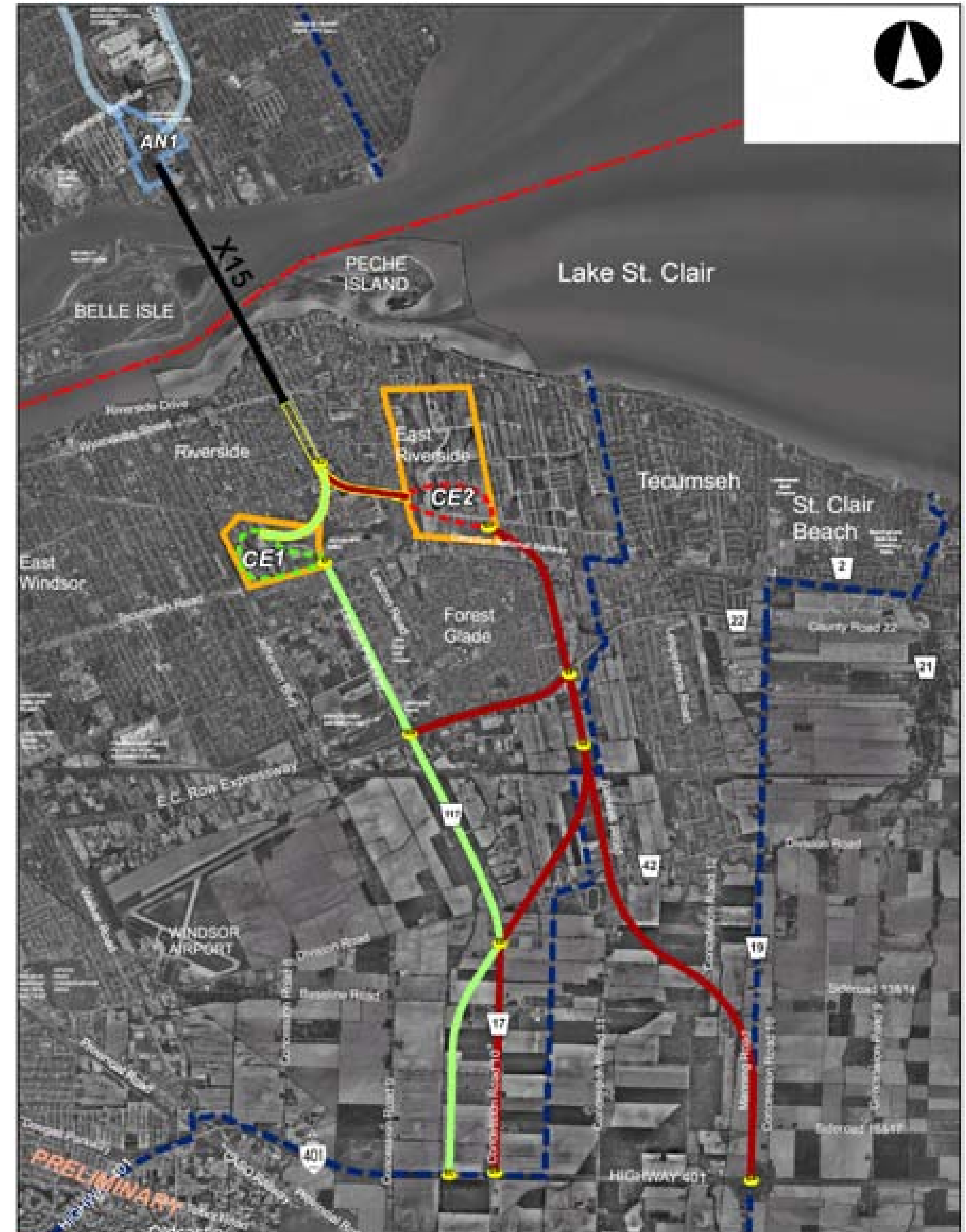
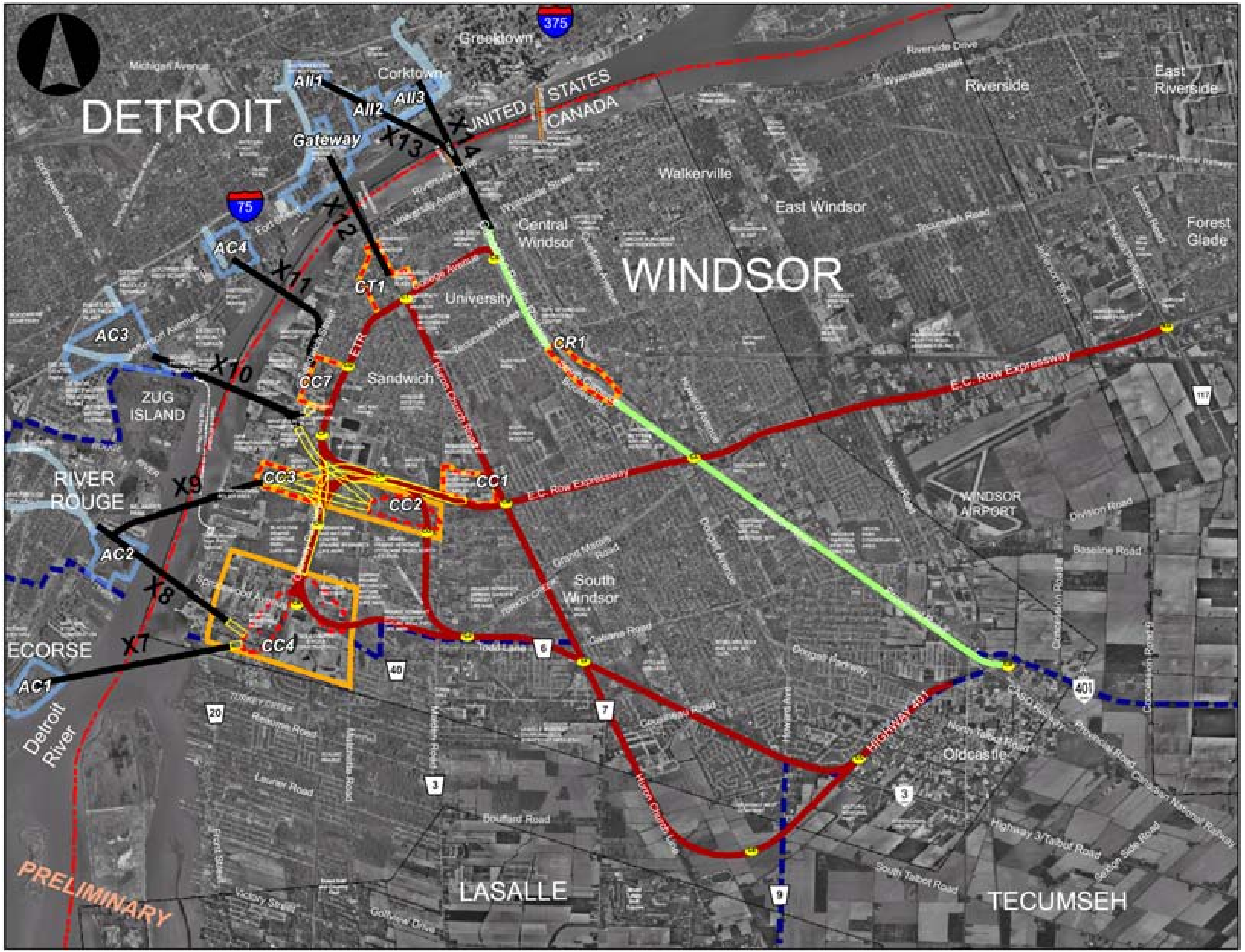


TABLE 6.8 – SUMMARY OF ASSESSMENT OF EAST ROUTE SEGMENTS – CONNECTION TO CROSSING X15

FACTOR	Con Rd 10/Lauzon Pkwy (EC-EG-EJ) to Plaza CE1	Manning Road/Banwell Road (EA-EF-EJ) to Plaza CE2	Manning Road/EC Row/Lauzon Pkwy (EA-EF-EG-EJ) to Plaza CE1	Con Rd 10/EC Row/Banwell Road (EC-EG-EH-EJ) to Plaza CE2
Changes to Air Quality	Small to moderate increase in pollutants on a system-wide basis;	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis	Small to moderate increase in pollutants on a system-wide basis
Community and Neighbourhood Impacts	Impacts urban areas of east Windsor north of EC Row; south of EC Row, impacts to agricultural area; following rear lot lines west of Con Rd 10 avoids impacts to 8 residences and 13 farm complexes fronting this road Displacements: 380+ households 15+ Businesses; <5 Farm Building Complexes Disruption: 1140+ households within 250 m of centreline; <75 businesses; <5 farm building complexes	Impacts urban areas of east Windsor north of EC Row; south of EC Row, impacts to agricultural area Displacements: 1030+ households <35 Businesses; <5 Farm Building Complexes Disruption: 1610+ households within 250 m of centreline; <10 businesses; <15 farm building complexes	Impacts urban areas of east Windsor north of EC Row; south of EC Row, impacts to agricultural area Displacements: 1020+ households 30+ Businesses; 5+ Farm Building Complexes Disruption: 1980+ households within 250 m of centreline; <10 businesses; <5 farm building complexes	Impacts urban areas of east Windsor north of EC Row; south of EC Row, impacts to agricultural area; following rear lot lines west of Con Rd 10 avoids impacts to 8 residences and 13 farm complexes fronting this road Displacements: 390+ households 15+ Businesses; <5 Farm Building Complexes Disruption: 1570+ households within 250 m of centreline; <75 businesses; <15 farm building complexes
Consistency with Land Use	Consistent with land uses south of EC Row; Plaza and route north of EC Row is not consistent with existing and planned land uses (residential/retail commercial)	Consistent with land uses south of EC Row; Plaza and route north of EC Row is not consistent with existing and planned land uses (residential/retail commercial); greater impacts to land use than Lauzon Pkwy options	Consistent with land uses south of EC Row; Plaza and route north of EC Row is not consistent with existing and planned land uses (residential/retail commercial)	Consistent with land uses south of EC Row; Plaza and route north of EC Row is not consistent with existing and planned land uses (residential/retail commercial); greater impacts to land use than Lauzon Pkwy options
Impacts to Cultural Resources	No known significant archaeological sites impacted; low to moderate potential for impacting unknown sites	1 known significant archaeological sites impacted; low potential for impacting unknown sites	No known significant archaeological sites impacted; low potential for impacting unknown sites	1 known significant archaeological sites impacted; low potential for impacting unknown sites
Natural Environment	Avoids designated Environmentally Significant Area but directly impacts 2+ha ETS[1]/habitat	Proximity impacts to 15+ ha designated Environmentally Significant Area; directly impacts 4+ha ETS[1]/habitat	Proximity impacts to 15+ ha designated Environmentally Significant Area; directly impacts 4+ha ETS[1]/habitat	Proximity impacts to 15+ ha designated Environmentally Significant Area; directly impacts 2+ha ETS[1]/habitat
Improve Regional Mobility	Provides new freeway route; limited improvement for local and long distance int'l truck traffic	Provides new freeway route; limited improvement for local and long distance int'l truck traffic; EA-EE-EF segment noted as being substantially more direct than the EC-EE-EF segment, reducing vehicle-km and vehicle-hours	Provides new freeway route; limited improvement for local and long distance int'l truck traffic; utilizes a portion of EC Row for international traffic; lower ability to provided continuous capacity for international traffic; EA-EE-EF segment noted as being substantially more direct than the EC-EE-EF segment, reducing vehicle-km and vehicle-hours	Provides new freeway route; limited improvement for local and long distance int'l truck traffic; utilizes a portion of EC Row for international traffic; lower ability to provided continuous capacity for international traffic; EA-EE-EF segment noted as being substantially more direct than the EC-EE-EF segment, reducing vehicle-km and vehicle-hours
Cost	Lower costs in comparison to other options for cost and constructability; 1 complex interchange at E.C. Row	Lower costs in comparison to other options for cost and constructability; 1 complex interchange at E.C. Row	Substantially higher costs and constructability risks in comparison to other options associated with widening and 2 complex interchanges at EC Row;	Substantially higher costs and constructability risks in comparison to other options associated with widening and 2 complex interchanges at EC Row;
Conclusions	All options resulted in high community impacts to area north of EC Row and overall low benefits to regional mobility. The route segments that did not use a portion of EC Row were preferred over other alternatives due to lower community and cost impacts and greater mobility benefits; Con Rd 10/Lauzon Parkway option has lower impacts to existing and planned land uses and natural features. Route Segment EC-EG-EJ to Plaza CE1 is preferred			

EXHIBIT 6.12 – RAIL CORRIDOR ALTERNATIVES – CROSSINGS X13 AND X14



CENTRAL ALTERNATIVES – CORRESPONDING TO CROSSINGS X7, X8, X9, X10, X11

In determining the best route to the plazas serving the central crossings (i.e. Plazas CC1, CC2, CC3, CC4, CC7), the Project Team considered connecting route alternatives that included:

- Widen E.C. Row Expressway from Huron Church Road easterly to Lauzon Parkway, with an extension of the Parkway southerly to Highway 401;
- Widen E.C. Row Expressway from Huron Church Road easterly to the DRTP Rail Corridor, with a new roadway connection constructed using the rail corridor southerly to Highway 401;
- Expand Huron Church Road/Talbot Road to a freeway from E.C. Row Expressway to Highway 401;
- A new route from Ojibway Parkway using E.C. Row Expressway/Malden Road or passing through Ojibway Prairie to north of Todd Lane, connecting to Huron Church Road, then expanding Huron Church Road/Talbot Road to a freeway to Highway 401; and,
- A new route from Talbot Road/Todd Lane utilizing a portion of the Huron Church Line to by-pass the Talbot Road area, connecting to Highway 3/Highway 401.

The illustrative crossing, inspection plaza and connecting route alternatives are shown in **Exhibit 6.13**. The results are summarized in **Table 6.9**. Recognizing the greater complexity of the trade-offs to be made in the evaluation of these segments, a discussion of the results of this analysis is provided below.

Changes to Air Quality

Changes to air quality were assessed on a system-wide basis. A new freeway from Highway 401 to the Detroit River was found to have no impact or low impacts to the regional airshed, with small to moderate increase in pollutants on a system-wide basis.

Impact to community and neighbourhood characteristics

Talbot Road is situated within the Town of LaSalle, along the Town's boundary with the City of Windsor. Lands south of Talbot Road in LaSalle are currently undergoing development to residential subdivisions. This development is a part of the Town's approved plans for the growth of the urban area that will see the population in the Town grow from more than 25,000 to between 35,000 and 40,000 by the year 2019. In the Town's development plans, Huron Church/Talbot Road is identified as the major transportation corridor serving this area of the Town. A new route aligned to by-pass the Talbot Road area and follow the Huron Church Line corridor would displace approximately 85 households, and disrupt approved development plans, in addition to disruption of planned local community retail and social services. The Talbot Road by-pass alternative would have a high impact to community cohesion and character in that the area between the new route and Talbot Road would be segmented by two major transportation facilities.

Huron Church/Talbot Road is a high volume multi-lane roadway serving international traffic. Between Cousineau Road and E.C. Row Expressway, the existing Huron Church/Talbot Road corridor dominates the character of the neighbourhoods. While recent development along this corridor has been built around a high volume road corridor, many of the residences along this corridor were built prior to 1990, when volumes, particularly truck volumes on the roadway began increasing substantially. Upgrading Huron Church Road/Talbot Road to a freeway will impact approximately 130 households, primarily single-family units. Although both alternatives have a high community impact, changing the Huron Church/Talbot Road corridor to a freeway has a relatively lower impact to community character and cohesion than a Talbot Road by-pass.

A new 80 m freeway right-of-way from Highway 401 to E.C. Row Expressway along the DRTP rail corridor would displace the rail corridor as well as the lands between the rail corridor and Provincial Road. Approximately 40 businesses would be displaced, including one major industrial use (ThyssenKrupp Falco), as well as commercial and retail uses, including retail shopping centres, supermarkets, car dealerships, etc. and mid-size industrial operations. Devonshire Mall, the Roundhouse Plaza and numerous other retail uses would also be affected by a new freeway facility in the rail corridor. The businesses along the rail corridor represent a more sizable portion of regional economic activity and some may not be easily replaced if impacted.

By comparison, approximately 20 businesses would be impacted by the expansion of Huron Church/Talbot Road, many of which are highway-oriented (e.g. accommodations, restaurants, gas stations). Few of these businesses would be considered to significantly contribute to the neighbourhood retail structure and none would be considered significant to the regional retail structure. The industrial businesses along this section of Huron Church/Talbot Road are also smaller and more related to auto and truck services. These businesses would be more likely to find alternative locations to provide this locally-oriented activity. The business impacts associated with the expansion of the Huron Church/Talbot Road corridor were considered to be substantially less than those of the rail corridor/E.C. Row alternative.

Although the number of residences disrupted (i.e. within 250m of the centreline) by upgrading Huron Church/Talbot Road is similar to the E.C. Row/Rail Corridor alternative (approximately 1370 households with either option), the change from a low volume rail line to a high volume freeway was considered to be a higher community impact.

As for the alternative that passes north of Todd Lane, the Project Team found that local neighbourhoods in the Todd Lane/Malden Road area strongly identify themselves with the natural features in this area of Windsor and LaSalle. The neighbourhoods are within walking distance of large wooded areas, many of which are designated natural areas, and a recreational trail system. Separating these neighbourhoods from the natural features with a new freeway corridor was considered as having a higher impact to the community character and cohesion in this area of Windsor/LaSalle than the expansion of Huron Church/Talbot Road.

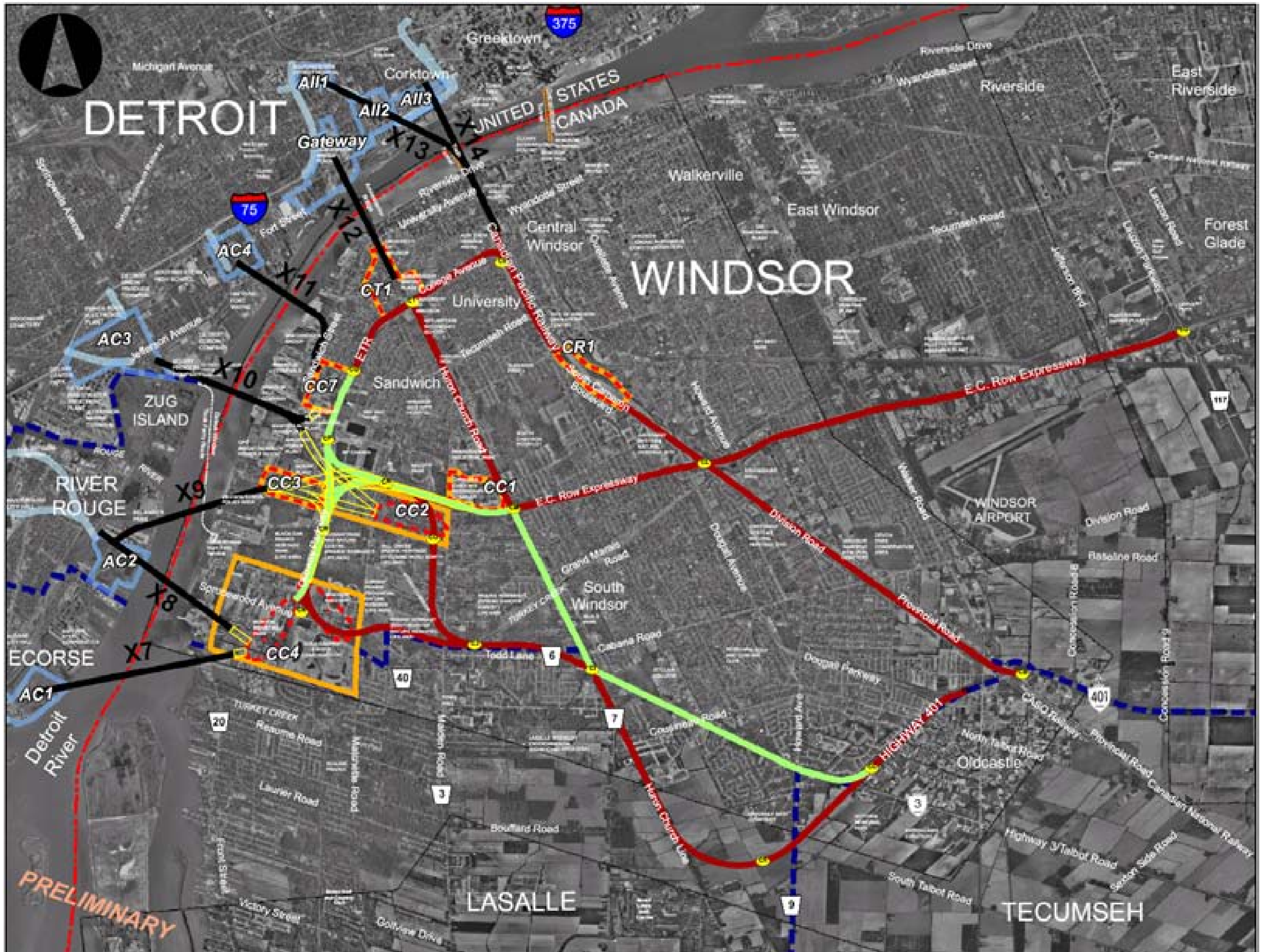
Consistency with existing and planned land use

Generally, alternatives that made use of existing infrastructure were considered to be more consistent with existing and planned land use than other alternatives. The alternative north of Todd Lane impacting the Ojibway Prairie Provincial Nature Preserve, Spring Garden Forest and other designated natural areas was considered to be highly inconsistent with local land use. The expansion of Huron Church/Talbot Road is considered compatible with existing and planned land use.

Impacts to Cultural Resources

All the alternatives would result in some impacts to cultural resources. The Todd Lane/Malden Road alternatives would have higher impacts than the others as they impact 4 known significant archaeological sites.

EXHIBIT 6.13 – CENTRAL ALTERNATIVES – CROSSINGS X7, X8, X9, X10 AND X11



Impacts to Natural Environment

An alternative extending from Huron Church Road towards the river north of Todd Lane would have significant impacts to the natural areas west of Huron Church, namely Ojibway Prairie Provincial Prairie Reserve and Spring Garden Forest. The Ojibway Prairie is designated as a Provincial Nature Reserve, Provincially Significant Life Science Area of Natural and Scientific Interest (ANSI), Environmentally Sensitive Area (ESA) and Candidate Natural Heritage Site (CNHS). Numerous plants and animals inhabiting this natural heritage area are designated as "special concern", "threatened" or "endangered" under the Species at Risk Act and vegetation communities located within this natural heritage area are considered extremely rare on a global and provincial basis. The Ojibway Prairie is connected to the Detroit River by the Black Oak Woods, thus creating an ecologically important landscape linkage. The Project Team specialists in natural environment noted that the local, provincial and national significance of the Ojibway Prairie cannot be overstated. More than 21 ha of this protected habitat area would be impacted directly with an alternative along Todd Lane, and more than 140 ha of features would be disrupted (i.e. are within 250m of the centreline).

Routes that severed portions of the Ojibway Prairie or created major barriers across natural corridors were considered to be a high impact. These high impact routes included the alignment north of Todd Lane as proposed by the *Windsor Gateway Study*[2], January 2005, as well as options that utilize the Malden Road corridor and the Ojibway Parkway corridor south of E.C. Row. In its assessment, the Project Team specialists noted that a large, contiguous natural area is more diverse and stable than a small, fragmented natural area. The approach used in the assessment also follows the ecological principle that natural corridors should be maintained as pathways for material flows and animal/plant migration/dispersion.

The Huron Church/Talbot Road alternative would avoid altogether the natural heritage areas designated as Provincial Nature Reserve, ANSI and ESA with one possible minor exception on the west side of Huron Church Road. However, the route would encroach along the perimeter of natural heritage areas identified as Candidate Natural Heritage Sites by Windsor/LaSalle and Potential Natural Heritage Features identified by the study team. These areas, such as along the west side of Huron Church Road, are located adjacent or in close proximity to the Ojibway Prairie and may support similar composition, structure and function as the Ojibway Prairie. As a result, while the Huron Church/Talbot Road route is far superior to routes that sever these designated features, there may still be substantial adverse environmental effects (both displacement and disturbance) that will require mitigation.

Improve regional mobility

Expansion of Huron Church/Talbot Road has a greater ability to provide continuous/ongoing capacity for the border transportation network as compared to widening of E.C. Row Expressway, while also providing the means to separate local and long-distance international traffic. The E.C. Row Expressway extends from the Ojibway Parkway near the river in the west end of Windsor, to County Road 22 in the Town of Tecumseh. Passing through central Windsor with interchanges at major north-south arterial roads, the expressway is a key link in the regional road network. Portions of this expressway are currently operating at or near capacity during peak travel periods. Studies have identified that expansion of this facility from the current 4 lanes to 6 to 8 lanes is required by 2021 to serve the projected growth in local traffic. Using E.C. Row east of Huron Church Road to convey international traffic to a new or expanded crossing will require additional widening of this facility to 10 to 12 lanes. While this widening can generally be accommodated within the existing right-of-way on the sections east of Dougall Avenue, west of this point, additional property will be required.

The major road network in the Windsor-Essex County region serves two primary functions: one function is to facilitate access to areas within Windsor-Essex County for local traffic. The second function, owing to the region's unique proximity to border crossings into the United States, is to efficiently convey international traffic to the border crossings to facilitate the movement of people and cross-border goods. Using E.C. Row Expressway to serve both of these primary functions would provide substantially fewer benefits to regional mobility. Reliable access to border crossings in this key trade corridor is of vital importance to the national, regional and local economies. Multiple freeway links connecting to the border crossings would improve regional mobility. A freeway facility on the Huron Church/Talbot Road corridor would have greater benefits to regional mobility than widening E.C. Row Expressway by:

- Serving long distance international traffic, while also providing a choice for local traffic;
- Providing additional roadway capacity to meet the long term needs of the region;
- Providing flexibility in the regional network to respond to incidences (such as collisions or maintenance) and unusual events; and
- Providing flexibility to respond to future changes, such as changes in local land use or changes in manufacturing processes or increased trade, resulting in increased goods movement.

On this basis, alternatives that required use of portions of E.C. Row Expressway east of Huron Church Road to convey international traffic were not preferred.

Cost

In terms of cost and constructability, the widening of the section of E.C. Row expressway from Huron Church Road to Lauzon Parkway to accommodate local and long distance international traffic as well as local east-west traffic, is more complex and would have a higher associated cost (approximately CDN $650 M) than either the construction of the new freeway on the rail corridor or on Huron Church Road/Talbot Road (approximately CDN$560 M). The rail corridor option would also require widening of a section of E.C. Row. The costs and constructability of this option were considered comparable to the Huron Church Road/Talbot Road option.

The constructability of the alternatives that involve a new alignment north of Todd Lane does not involve complex traffic management, but would require consideration of minimizing impacts to the sensitive natural features associated with the Ojibway prairie.

Conclusion

The HCR/Talbot Road (Segments CC-CI-CM) was preferred on the basis that this alternative:

- Would provide greater improvement to regional mobility than the alternatives that utilize the E.C. Row Expressway by providing another freeway connection leading to the border crossings.
- Would be less disruptive to existing and planned land uses than the Talbot Road bypass alternative and the Todd Lane/Malden Road/Ojibway alternatives; and

[2] Windsor Gateway Report, dated January 2005, Prepared by Sam Schwartz Engineering PLLC

- Would have less impacts to the important natural features west of Huron Church Road than the Todd Lane/Malden Road/Ojibway alternatives.

Although the options that would utilize all or a portion of E.C. Row Expressway would avoid the sensitive natural features west of Huron Church Road, the benefits to regional mobility associated with the Huron Church/Talbot Road alternative were considered of greater importance than the impacts to the edges of these features in selecting the alternative to carry forward for further study.

TABLE 6.9 – SUMMARY OF ASSESSMENT OF CENTRAL CONNECTING ROUTE SEGMENTS

FACTOR	HCR/ Talbot Road to ECR	ECR/Lauzon Pkwy	ECR/Rail Corridor	Talbot Road Bypass/HCR	HCR/Talbot Road – Todd Lane/ Malden Road
Changes to Air Quality	No to Low impact Small to moderate increase in pollutants on a system-wide basis	No to Low impact Small to moderate increase in pollutants on a system-wide basis	No to Low impact Small to moderate increase in pollutants on a system-wide basis	No to Low impact Small to moderate increase in pollutants on a system-wide basis	No to Low impact Small to moderate increase in pollutants on a system-wide basis
Community and Neighbourhood Impacts	Impacts along existing road corridor: Displacements: 130+ households 25+ Businesses; Disruption: 1260 households within 200 m;	Impacts along existing road corridor; creates new road corridor in rural area of east Windsor: Displacements: 40+ households; <10 Businesses; Disruption: 1850 households within 200 m;	Impacts along existing road corridor; creates new road corridor in urban area: Displacements: 40+ households 45+ Businesses; Disruption: 1890 households within 200 m;	Impacts along existing road corridor; creates new corridor in LaSalle Displacements: 85+ households 5+ Businesses; Disruption: 1300+ households within 200 m;	Impacts along existing HCR corridor and creates new corridor in natural areas: Displacements: 120+ households 25+ Businesses; Disruption: 1270-1370 households within 200 m;
Consistency with Land Use	Consistent as existing route to Ambassador Bridge; not consistent as freeway	Consistent as freeway; not consistent as primary route for int'l traffic to border crossing(s)	Consistent as freeway for ECR portion; not consistent as primary route for int'l traffic on ECR; not consistent in changing rail corridor to freeway in central urban area of Windsor	Not consistent with current/future residential community development	Not consistent with protected natural areas, residential community
Impacts to Cultural Resources	1 locally designated Heritage site; 2 known significant archaeological sites impacted	2 known significant archaeological sites impacted	2 Built Heritage sites; 2 known significant archaeological sites impacted	2 known significant archaeological sites impacted	2 Built Heritage Sites; 4 known significant archaeological sites impacted
Natural Environment	Impacts to edges of sensitive natural areas	Avoids sensitive natural areas; low impacts to other features	Avoids sensitive natural areas; low impacts to other features	Avoids sensitive natural areas; low impacts to other features	Severance impacts to designated natural areas
Improve Regional Mobility	Provides new freeway route; can separate int'l traffic and provide choice for local traffic	Widening of existing freeway; mixing of int'l and local traffic; no choice for local traffic	Widening of existing freeway; mixing of int'l and local traffic; no choice for local traffic	Provides new freeway route; can separate int'l traffic and provide choice for local traffic	Provides new freeway route; can separate int'l traffic and provide choice for local traffic
Cost	Comparable to other options for cost and constructability; traffic management	Higher costs; greater complexity of construction	Comparable to other options for cost and constructability; traffic management; complex freeway construction	Comparable to other options for cost and constructability; relocate municipal infrastructure	Comparable to other options for cost and constructability; mitigation of natural features impacts during construction

TWINNED AMBASSADOR ALTERNATIVE – CROSSING X12

The illustrative access road route alternatives assessed to connect to a twinned Ambassador Bridge included:

- Expanding the Rail Corridor to a freeway from Highway 401 to the area of College Avenue/ETR corridor, then following the ETR corridor westerly to the Ambassador Bridge.
- Various alternatives connecting Highway 401 to the area of Ojibway Parkway/Essex Terminal Railway (ETR) corridor, then following along the rail corridor to the Ambassador Bridge (often referred to as the Ring Road concept); and,
- Upgrading Huron Church/Talbot Road to a freeway.

The alternatives considered are identified in **Exhibit 6.14**.

DRTP Rail Corridor/ETR Corridor – Route Segments CB-CL-CS-CT

The use of the ETR corridor between the DRTP Rail Corridor and the Ambassador Bridge would have high community impacts, displacing an additional 175 households and 10 businesses.

The use of the ETR Corridor for a new freeway to the Ambassador Bridge is also considered to be equally inconsistent with land uses in the area, having a high impact to the central urban area of Windsor.

One advantage noted with this alternative is that a new freeway to the Ambassador Bridge using the rail corridors would improve regional mobility by having a greater ability to provide continuous/ongoing capacity in the road network for accessing the Ambassador Bridge.

Ring Road Concept – Route Segments CP-CQ-CT

The alternatives considered with the Ring Road concept included:

- Huron Church/Talbot Road and E.C. Row Expressway,
- An alignment from Huron Church/Talbot Road north of Todd Lane connecting to Ojibway Parkway near Windsor Raceway, and paralleling the ETR Corridor; and
- An alignment north of Todd Lane to Malden Road, along Malden Road to E.C. Row Expressway, and along E.C. Row Expressway to Ojibway Parkway/ETR.

All the alternatives were considered to have high negative impacts to community cohesion, character and function. The portion of the ring road from Prince Road to the Ambassador Bridge would sever the Sandwich neighbourhood. This was considered a highly negative effect on community structure and function. The ring road alternative was considered to have high negative impacts to land use, in that a new freeway through the established neighbourhood area of Sandwich is not consistent with existing and planed land uses in the area.

The ring road alternatives that impacted the Ojibway/Spring Garden designated natural features and the neighbourhoods adjacent to these features were the least preferred due to the higher impacts to natural environment and community features.

As with the DRTP Rail Corridor/ETR Corridor alternative, an advantage noted with the ring road alternative is that it would improve regional mobility by having a greater ability to provide continuous/ongoing capacity in the road network for accessing the Ambassador Bridge.

Upgrading Huron Church/Talbot Road – Route Segments CC-CI-CM-CT

Huron Church/Talbot Road has long served as the primary route to the Ambassador Bridge for commercial traffic, travellers and commuters. The community along the Huron Church Road north of E.C. Row Expressway has been affected by the existing transportation corridor and demonstrates a much lower degree of community cohesiveness than the areas impacted by the other alternatives connecting to the Ambassador Bridge.

Upgrading Huron Church Road north of E.C. Row to a freeway will displace approximately 30 residential units (including apartments). Another 800 residences would be disrupted (i.e. within 250 m of the centreline). Approximately 50 businesses would be displaced and another 25 businesses would be disrupted. The Huron Church corridor north of E.C. Row Expressway is highly tourism/traveller oriented, with a significant concentration of accommodation/restaurant businesses that are generally not highly valued in terms of community cohesion and function. Expanding Huron Church Road to a freeway was considered to have a moderate impact to community and neighbourhood characteristics.

Connecting to the Ambassador Bridge by expanding the Huron Church corridor north of E.C. Row Expressway to a freeway was considered to have lower impacts in terms of consistency with land use, in comparison to the other alternatives connecting to the Ambassador Bridge. The 2.2-kilometer section of Huron Church Road between E.C. Row and Tecumseh Road is characterized as a six-lane arterial road with 5 signalized intersections and more than 40 commercial and private entrances. Over the past 20 years, the City has reduced the number of street entrances and unsignalized intersections along Huron Church Road. Alternate access to many properties fronting Huron Church is available through parallel roads such as Ambassador Drive and Daytona Avenue. The land uses north of Tecumseh Road to the Ambassador Bridge plaza include a residential area along the west side, a shopping centre, Assumption High School, a fast food restaurant and a provincial tourist information centre. Also along this corridor at College Avenue is the University of Windsor Stadium and Recreation Complex. The University has recently completed a multi-million dollar upgrade of its stadium facility to accommodate international track and field events, such as the Pan-Am Games.

Expanding Huron Church Road to a freeway connecting to Ambassador Bridge provides the capacity required to meet the long-term travel demands of the region, but would not provide a new link in the network for accessing the crossing. The ability to provide continuous/ongoing capacity in the network (i.e. redundancy) is a stated objective of the Partnership. In the context of connecting to a twinned Ambassador Bridge (as opposed to a new crossing), using Huron Church was considered to provide only a low benefit to regional mobility, while the other alternatives offered a moderate benefit.

In addition, construction of a new freeway on the primary access route to the busiest border crossing between Canada and the US has greater constructability risks in terms of staging, traffic management and timing of construction to minimize congestion and delay, than other alternatives. These risks have greater potential of increasing the costs of this alternative relative to the others.

Summary – Connecting Route

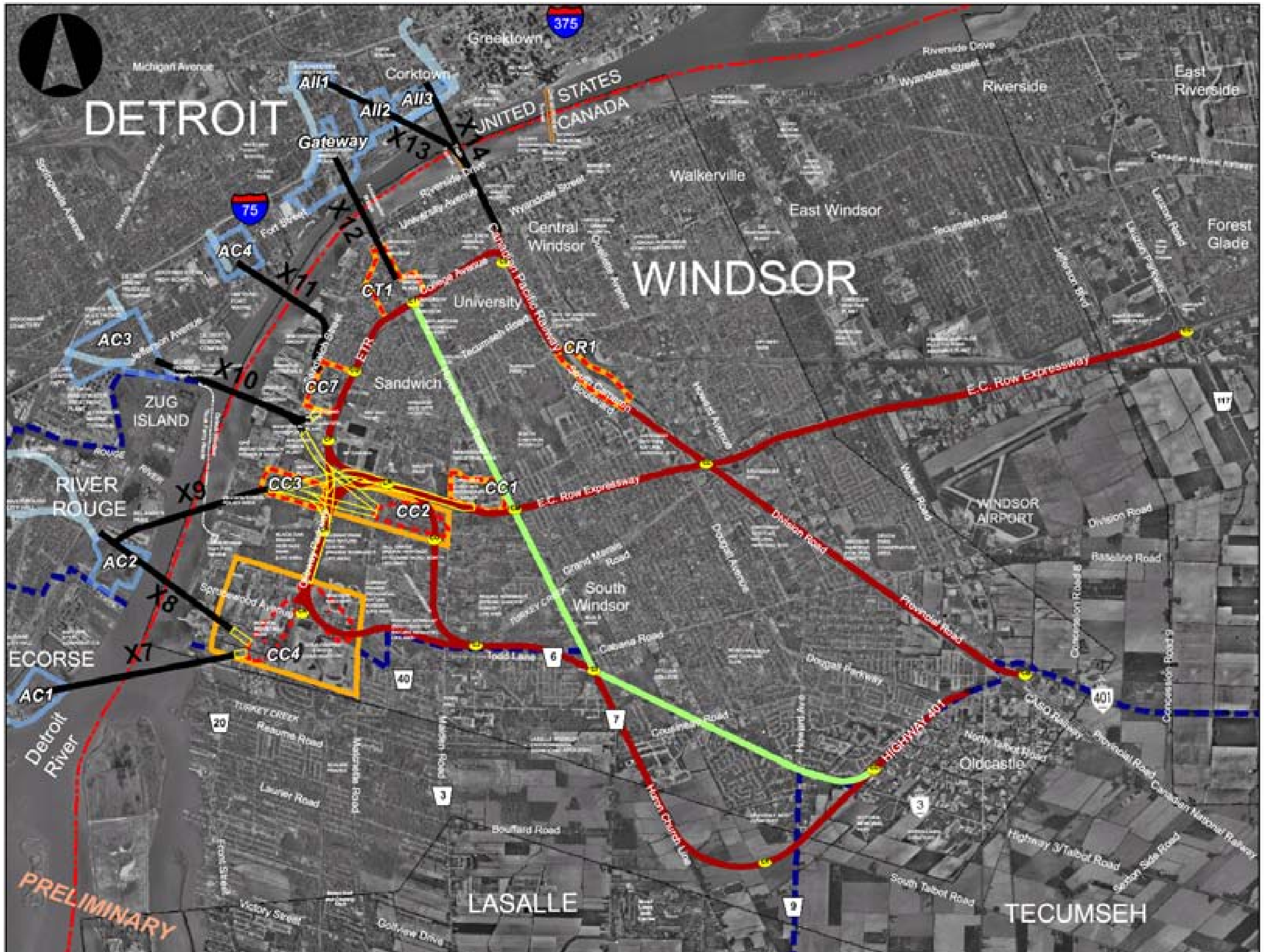
All alternatives for a new freeway connecting Highway 401 to a twinned Ambassador Bridge have a high impact to the urban area of Windsor. Expanding Huron Church Road to a freeway to the Ambassador Bridge has less overall impact than a new freeway corridor to the Ambassador Bridge. While using the Huron Church corridor provides a lower benefit to regional mobility and carries greater constructability concerns, the lower impacts to the community were considered of greater importance in determining which alternative to carry forward as the connecting route to the Ambassador Bridge.

The existing right-of-way of Huron Church Road is generally 36 m wide. Expansion of this corridor to a freeway will require an 80 m right-of-way, with interchanges at major crossing roads, grade separations and service roads as required to maintain access. As the primary connecting route to the Ambassador Bridge, disruptions to international trade, and maintaining safety and access for people and goods movement, as well as the high impacts to the urban area, are concerns that remain with this alternative.

In addition to the reasoned argument evaluation of the illustrative access road alternatives presented above, the study team undertook an arithmetic evaluation of the access road alternatives. These evaluations are documented in the *Generation and Assessment of Illustrative Alternatives Report (November 2005)* (refer to List of Supporting Documents). In these evaluations, the results of the Canadian study team were consistent with those of the public weighting scenario in every evaluation, i.e. the highest ranking access road segment identified by the study team weighting scenario was also the highest ranking access road segment as identified by the public weighting scenario in every evaluation.

The study team considered the results of the arithmetic method as a validation of the recommendations developed through the reasoned arguments presented in this report.

EXHIBIT 6.14 – TWINNED AMBASSADOR BRIDGE ALTERNATIVE – CROSSING X12



URS
Canada
U.S. Department of Transportation Federal Highway Administration
Ontario
MDOT Michigan Department of Transportation

6.3.2 Crossing/Plaza Alternatives

REASONED ARGUMENT METHOD

On the basis of the evaluation of the access road alternatives described in **Section 6.3.1**, the Canadian study team combined the preferred access road alternative with each of the corresponding illustrative crossing/inspection plaza alternatives and evaluated the illustrative crossing/inspection plaza/access road alternatives to identify the candidates for a short list of practical alternatives.

A summary of the evaluation of the illustrative plaza and crossing alternatives is provided in **Tables 6.10** to **6.12**. For further details with regard to the analysis and evaluation of the illustrative alternatives, the reader is referred to the *Generation and Assessment of Illustrative Alternatives Report (November 2005)* (refer to List of Supporting Documents).

Based on the results of the evaluation of crossing/plaza/access road alternatives, the Canadian study team brought forward the following preliminary recommendations for comparison to the US findings as part of an end-to-end evaluation:

- **Crossing X1, X2, X3 and X4 alternatives** were not carried forward. These alternatives do not meet Partnership objectives for improvement to regional mobility.
- **Crossing X5, X6 and X7 alternatives** were eliminated from further consideration due to issues of constructability/feasibility (refer to the *Generation and Assessment of Illustrative Alternatives Report (November 2005) for further details)*.
- **Crossing X8 and X9 alternatives** were subject to a review by both teams in determining whether to carry forward as practical alternatives. Crossing X8 and X9 alternatives were found to provide high benefits to regional mobility and avoid the community of Sandwich, but had higher impacts to natural features than other central alternatives on the Canadian side. In determining whether to carry these alternatives forward as practical alternatives, it was necessary to consider the impacts and benefits of these alternatives on the US side.
- **Crossing X10 and X11 alternatives** were carried forward for further study. These alternatives were found to have the best overall balance of meeting regional mobility needs and impacts to community features.
- **Crossing X12 alternative** was not carried forward due to the high community impacts, high potential for disruption to international traffic during construction and the limited ability to provide continuous/ongoing river crossing capacity;
- **Crossing X13 alternative** was eliminated from further consideration due to inadequate capacity to meet long-term needs and high community impacts.
- **Crossing X14 alternative** was not carried forward due to high impacts to communities and neighbourhoods in central and south Windsor.
- **Crossing X15 alternative** was not carried forward. This alternative does meet Partnership objectives for improvement to regional mobility and was found to have high community impacts;

These recommendations corresponded to an area of continued study on the Canadian side extending from the Windsor/ LaSalle border to the north end of the Sandwich Portlands (refer to **Exhibit 6.15**).

ARITHMETIC METHOD

The evaluation of illustrative crossing, plaza and access road alternatives was also conducted using an arithmetic method based on numerical weighting and scoring of impacts. As noted in the previous section, crossing X5, X6 and X7 alternatives were eliminated from further study on the basis that additional investigation of plaza sites CS1 on fighting Island and AC1 on the National Steel property determined that these sites were not feasible. As well, the DRTP two-lane truckway proposal (using crossing X13) was eliminated from further study on the basis that the capacity provided by this alternative was not sufficient to meet the long-term travel demand needs of the region. A new freeway tunnel as crossing X13 was also eliminated from further study due to issues of constructability.

The results of the arithmetic evaluation of the eleven crossing/plaza/access road alternatives are summarized in **Table 6.13**.

Unweighted Scores

The unweighted scores represent the total of the impact scores determined by the Canadian study team based on the degree of impacts or benefits of each alternative. Crossing X1 and X10 alternatives were ranked highest overall, with crossing X3, X4 and X11 alternatives also highly ranked.

The higher rankings of the crossing X10 and X11 alternatives can be attributed to the balance of benefits to regional mobility and impacts to the community that these options represent compared to the other alternatives.

The higher rankings of crossing X1, X3 and X4 alternatives can be primarily attributed to relatively low community impacts associated with these options due to the less developed rural areas these alternatives are located in. However, these southern alternatives do not meet Partnership objectives for providing free flow of people and goods at the border crossings through the year 2035 (the planning horizon year for this study). These alternatives were therefore not recommended for further study.

Crossing X8 and X9 alternatives had the lowest unweighted scores of the central alternatives, reflecting that these alternatives have less of a balance in terms of benefits to regional mobility and impacts to the community.

Weighted Scores

The weighted scores reflect the level of importance as well as the degree of impacts and benefits of each alternative. As mentioned previously, the Canadian study team developed a weighting scenario for the seven major evaluation factors. The study team weights were used to establish decision rules for the reasoned argument evaluation method described previously, as well to develop weighted scores for the arithmetic evaluation method.

In addition to the study team's weighting scenario, as described in **Section 6.2.3**, a weighting scenario was also developed by arithmetically combining the factor weights provided by individuals of the public through a rating tool exercise conducted as part of the first round of consultation in June 2005 (refer to **Chapter 3** for further details). A third weighting scenario was developed by arithmetically combining the factor weights submitted by individuals of the Community Consultation Group (CCG).

TABLE 6.10 – SUMMARY OF ASSESSMENT OF ILLUSTRATIVE ALTERNATIVES, CANADIAN SIDE, SOUTH AREA - HIGHWAY 401 TO DETROIT RIVER

FACTOR	CROSSING X1/PLAZA CS3	CROSSING X2/PLAZA CS2	CROSSING X3/PLAZA CS2	CROSSING X4/PLAZA CS4
Changes to Air Quality	NO IMPACT Slight decrease in pollutants on a system-wide basis	LOW IMPACT Small to moderate increase in pollutants on a system-wide basis	LOW IMPACT Moderate increase in pollutants on a system-wide basis	NO IMPACT Little to increase in pollutants on a system-wide basis
Community and Neighbourhood Impacts	LOW IMPACT Displacements: 10+ households < 5 Businesses; Disruption: 90+ households within 250 m of centreline; <5 businesses	LOW IMPACT Displacements: 10+ households; <5 Businesses; Disruption: 100+ households within 250 m of centreline; <5 businesses	LOW IMPACT Displacements: 10+ households 1+ Businesses; Disruption: 90+ households within 250 m of centreline; <5 businesses	LOW IMPACT Displacements: 80+ households <5 Businesses; Disruption: 380+ households within 250 m of centreline; <5 businesses
Consistency with Land Use	LOW IMPACT Access road primarily impacts rural areas of LaSalle and Amherstburg, which are somewhat consistent for a new freeway; plaza and crossing have limited impacts on planned land use	LOW IMPACT Access road primarily impacts rural areas/boundary of future urban area of LaSalle, which are somewhat consistent for a new freeway; plaza and crossing have limited impacts on current/planned land use	LOW IMPACT Access road primarily impacts rural area/boundary of future urban area of LaSalle, which is somewhat consistent for a new freeway; plaza and crossing have limited impacts on current/planned land use	MODERATE IMPACT Access road impacts primarily rural area/boundary of future urban area of LaSalle, which is somewhat consistent for a new freeway; plaza and crossing are within in the urban area boundary of LaSalle impacting current/ future residential land use – not consistent
Impacts to Cultural Resources	LOW IMPACT Impacts to 0 built feature, 3 known archaeological sites; moderate potential for impacting unknown sites	LOW IMPACT Impacts to 0 built feature, 1 known archaeological site; high potential for impacting unknown sites	LOW IMPACT Impacts to 0 built features; 1 known archaeological site; high potential for impacting unknown sites	LOW IMPACT Impacts to 0 built features; 1 known archaeological sites; high potential for impacting unknown sites
Natural Environment	MODERATE IMPACT Loss of 22+ ha of designated/ undesignated features; direct impacts to 17+ ha of ETS[3] /habitat;	HIGH IMPACT Loss of 55+ ha of designated/ undesignated features; direct impacts to 31+ ha of ETS[1] /habitat;	MODERATE IMPACT Loss of 33+ ha of designated/ undesignated features; direct impacts to 44+ ha of ETS[1] /habitat;	MODERATE IMPACT Loss of 21+ ha of designated/ undesignated features; direct impacts to 32+ ha of ETS[1]/habitat
Improve Regional Mobility	LOW BENEFITS Provides additional capacity/new crossing; inadequate benefits to existing crossings and key connecting roadways in Windsor which operate over capacity during daily peak travel periods in long term; does not meet Partnership objectives	LOW BENEFITS Provides additional capacity/new crossing; inadequate benefits to existing crossings and key connecting roadways in Windsor which operate over capacity during daily peak travel periods in long term; does not meet Partnership objectives	LOW BENEFITS Provides additional capacity/new crossing; inadequate benefits to existing crossings and key connecting roadways in Windsor which operate over capacity during daily peak travel periods in long term; does not meet Partnership objectives	LOW BENEFITS Provides additional capacity/new crossing; inadequate benefits to existing crossings and key connecting roadways in Windsor which operate over capacity during daily peak travel periods in long term; does not meet Partnership objectives
Cost	HIGH IMPACTS CDN$850 M[4] ; Constructability risks include construction of 2 km crossing over Detroit River on Canadian side	HIGH IMPACTS CDN$1030 M[2]; Constructability risks include active salt mines and construction of 2+ km crossing over Detroit River on Canadian side.	HIGH IMPACTS CDN $980 M[2]; Constructability risks include active salt mines, Fighting Island soils/ contamination issues and construction of 2+ km crossing over Detroit River on Canadian side.	HIGH IMPACTS CDN$870 M[2]; Constructability risks include active salt mines, Fighting Island soils/ contamination issues, construction of 2 km crossing over Detroit River/Fighting Island on Canadian side.
CONCLUSIONS: The Southern alternatives generally have lower impacts to community features, which is a primary objective of this project, and have comparable costs and constructability risks to the other alternatives. However, these alternatives do not provide adequate improvement to regional mobility in the long term. These alternatives are therefore not recommended for continued analysis.				

3 Endangered or threatened species
4 Preliminary planning costs of access road, plaza and one-half of crossing

TABLE 6.11– SUMMARY OF ASSESSMENT OF ILLUSTRATIVE ALTERNATIVES, CANADIAN SIDE, CENTRAL AREA - HIGHWAY 401 TO DETROIT RIVER

FACTOR	CROSSING X8/PLAZA CC4	CROSSING X9/PLAZA CC3	CROSSING X10/PLAZA CC3	CROSSING X11/PLAZA CC7
Changes to Air Quality	LOW IMPACT No noticeable change in regional air shed	LOW IMPACT No noticeable change in regional airshed	LOW IMPACT No noticeable change in regional airshed	LOW IMPACT No noticeable change in regional airshed
Community and Neighbourhood Impacts	MODERATE IMPACT Displacements: 130+ households 40+ Businesses; Disruption: 1600+ households within 250 m of centreline; 10+ businesses	MODERATE IMPACT Displacements: 150+ households; 40+ Businesses; Disruption: 1400+ households within 250 m of centreline; <10 businesses	MODERATE IMPACT Displacements: 140+ households 45+ Businesses; Disruption: 1450+ households within 250 m of centreline; 10+ businesses	MODERATE TO HIGH IMPACT Displacements: 180+ households 55+ Businesses; Disruption: 2080+ households within 250 m of centreline; <10 businesses
Consistency with Land Use	MODERATE IMPACT Huron Church/Talbot is somewhat consistent for a new freeway; plaza and crossing in active industrial areas considered consistent	LOW IMPACT Huron Church/Talbot is somewhat consistent for a new freeway; plaza and crossing in undeveloped industrial areas highly consistent	LOW IMPACT Huron Church/Talbot is somewhat consistent for a new freeway; plaza and crossing in undeveloped industrial areas highly consistent	LOW TO MODERATE IMPACT Huron Church/Talbot is somewhat consistent for a new freeway; plaza adjacent to residential not consistent; crossing in industrial areas consistent
Impacts to Cultural Resources	MODERATE IMPACT Impacts to 1 built feature, 3 known archaeological sites; high potential for impacting unknown sites	MODERATE IMPACT Impacts to 1 built feature, 6 known archaeological sites; high potential for impacting unknown sites	MODERATE IMPACT Impacts to 2 built features; 2 known archaeological sites; high potential for impacting unknown sites	MODERATE TO HIGH IMPACT Impacts to 10 built features; 2 known archaeological sites; high potential for impacting unknown sites
Natural Environment	HIGH IMPACT Severs Ojibway features from riverfront; Loss of approx. 26 ha of designated/ undesignated features; direct impacts to 25+ ha of ETS[5] /habitat;	HIGH IMPACT Potential for severing Ojibway features from riverfront; Loss of approx. 30 ha of designated/ undesignated features; direct impacts to 20+ ha of ETS[3] /habitat;	MODERATE IMPACT Loss of 20+ ha of designated/ undesignated features; direct impacts to 14+ ha of ETS[3] /habitat;	MODERATE IMPACT Loss of 25+ ha of designated/ undesignated features; direct impacts to 13+ ha of ETS[3] /habitat;
Improve Regional Mobility	HIGH BENEFITS Provides additional capacity/new crossing; existing crossings operate well; D-W tunnel approaching unstable flow in 2035	HIGH BENEFITS Provides additional capacity/new crossing; existing crossings operate well; D-W tunnel approaching unstable flow in 2035	HIGH BENEFITS Provides additional capacity/new crossing; existing crossings operate well;	HIGH BENEFITS Provides additional capacity/new crossing; existing crossings operate well;
Cost	HIGH IMPACTS CDN$1.5 B[6] ; Constructability risks include traffic/utility management on HCR/Talbot corridor, active mines, brine wells	HIGH IMPACTS CDN$1.4 B[4]; Constructability risks include traffic/utility management on HCR/Talbot corridor, active mines, brine wells	HIGH IMPACTS CDN$1.4 B[4]; Constructability risks include traffic/utility management on HCR/Talbot corridor, active mines, brine wells	HIGH IMPACTS CDN$1.2 B[4]; C``onstructability risks include traffic/utility management on HCR/Talbot corridor, active mines, brine wells

CONCLUSIONS:

The Central alternatives represent a reasonable balance between benefits to regional mobility and community impacts. These alternatives are recommended for continued analysis.

5 Endangered or threatened species
6 Preliminary planning costs of access road, plaza and one-half of crossing

TABLE 6.12 – SUMMARY OF ASSESSMENT OF ILLUSTRATIVE ALTERNATIVES, CANADIAN SIDE, X12, X14 AND X15 - HIGHWAY 401 TO DETROIT RIVER

FACTOR	CROSSING X12/PLAZA CT1	CROSSING X14/PLAZA CR1	CROSSING X15/PLAZA CE1
Changes to Air Quality	NO IMPACT Slight increase in pollutant levels on a system-wide basis vs. do nothing	NO IMPACT Little change in pollutant levels on a system-wide basis vs. do nothing	NO IMPACT Little change in pollutant levels on a system-wide basis vs. do nothing
Community and Neighbourhood Impacts	HIGH IMPACT **Displacements:** 420+ households 85+ Businesses; **Disruption:** 3490+ households within 250 m of centreline; 25+ businesses	HIGH IMPACT **Displacements:** 125+ households; 75+ Businesses; **Disruption:** 2180+ households within 250 m of centreline; 10+ businesses	HIGH IMPACT **Displacements:** 570+ households 40+ Businesses; **Disruption:** 2600+ households within 250 m of centreline; 40+ businesses
Consistency with Land Use	MODERATE IMPACT Huron Church/Talbot is somewhat consistent for a new freeway; plaza and crossing in historic residential area are highly inconsistent	HIGH IMPACT High impacts to land use; especially regional commercial uses; crossing, plaza and freeway highly inconsistent with local land uses and city plans	HIGH IMPACT Crossing, plaza and access road north of EC Row highly inconsistent with current and planed land uses; access road south of EC Row to Highway 401 is somewhat consistent
Impacts to Cultural Resources	HIGH IMPACT Impacts to 45 built features, 3 known archaeological sites; high potential for impacting unknown sites	HIGH IMPACT Impacts to 14 built features, no known archaeological sites impacted; moderate potential for impacting unknown sites	MODERATE IMPACT Impacts to 10 built features; no known archaeological sites impacted; moderate potential for impacting unknown sites
Natural Environment	LOW IMPACT Loss of 15+ ha of designated/ undesignated features; direct impacts to 11+ ha of ETS[7] /habitat;	HIGH IMPACT Loss of 21+ ha of designated/ undesignated features; direct impacts to 18+ ha of ETS[5] /habitat;	LOW IMPACT Loss of 13+ ha of designated/ undesignated features; direct impacts to 9+ ha of ETS[5] /habitat;
Improve Regional Mobility	HIGH BENEFITS Provides additional capacity/new crossing; existing crossings operate below capacity; D-W tunnel approaching unstable flow in 2035 during daily peak travel periods in long term	HIGH BENEFITS Provides additional capacity/new crossing; existing crossings and connecting roadways operate well during daily peak travel periods in long term;	LOW BENEFITS Provides additional capacity/new crossing; inadequate benefits to existing crossings and key connecting roadways in Windsor which operate over capacity during daily peak travel periods in long term; does not meet Partnership objectives
Cost	HIGH IMPACTS CDN$1.5 B[8] ; Constructability risks include traffic/utility management and access on HCR/Talbot Rd/Hwy 3; complex interchange at Huron Church and EC Row Expressway	HIGH IMPACTS CDN$1.9 B[6]; Constructability risks include interchange reconfiguration at Hwy 401; complex interchange at EC Row including reconfiguration of Howard and Dougall interchanges; traffic/utility management and access in Provincial Road corridor; maintenance of rail traffic.	HIGH IMPACTS CDN$1.6 B[6]; Constructability risks include interchange on EC Row/Lauzon Parkway; traffic/utility management and access on Lauzon Parkway/plaza area/new crossing
CONCLUSIONS: The Crossing X12 and X14 alternatives provide adequate improvements to regional mobility but have higher community impacts than the central alternatives. The crossing X15 alternative has high community impacts and does not provide adequate improvement to regional mobility in the long term. These alternatives are therefore not recommended for continued analysis.			

7 Endangered or threatened species
8 Preliminary planning costs of access road, plaza and one-half of crossing

EXHIBIT 6.15 – RECOMMENDED AREA OF CONTINUED STUDY, CANADIAN SIDE

TABLE 6.13 – SUMMARY OF RESULTS OF ARITHMETIC EVALUATION

ALTERNATIVE	UNWEIGHTED SCORE	RANK	CANADIAN PROJECT TEAM** WEIGHTED SCORE	RANK	CANADIAN PUBLIC*** WEIGHTED SCORE	RANK	CONSULTATION GROUP*** WEIGHTED SCORE	RANK
X1	21	1	305.32	2	312.46	2	309.71	2
X2	19	6	277.00	8	278.60	8	275.30	8
X3	20	3	292.93	4	295.14	5	292.41	5
X4	20	3	292.93	4	299.57	3	296.02	3
X5	Eliminated - not feasible*							
X6	Eliminated - not feasible*							
X7	Eliminated - not feasible*							
X8	18	9	271.69	10	267.84	10	264.27	10
X9	19	6	284.08	7	280.73	7	277.96	7
X10	21	1	312.40	1	314.39	1	312.37	1
X11	20	3	300.01	3	297.07	4	295.07	4
X12	19	6	287.62	6	289.21	6	288.79	6
X13 TRUCKWAY	Eliminated - not feasible*							
X14	18	9	275.23	9	276.32	9	275.10	9
X15	17	11	252.22	11	258.90	11	258.56	11

* - Crossing X5, X6, X7 and X13 alternatives were eliminated from further study and therefore were not ranked

**- Members of the Canadian Project Team collaboratively developed one set of weightings.

*** - Public and Canadian Consultation Group weightings were developed by arithmetically combining individual submissions on factor weightings

The results of the arithmetic evaluation indicated that:

- The Canadian study team, public and CCG weighting scenarios identified crossing X10 as the highest ranking alternative; consistent with the unweighted scores. This result reflects the balance of high benefits to regional mobility and generally low to moderate impacts to the community associated with the options in the Windsor portlands area.
- Crossing X1, X3 and X4 alternatives were highly ranked by the Canadian study team, public and CCG weighting scenarios, which is consistent with the unweighted scoring results. This reflects the effect on regional air quality (no change) and relatively low impacts to community and natural features, which were all highly weighted by most members of the public.
- The Canadian study team weighting scenario identified crossing X11 scenario as the third highest rated alternative (after X10 and X1). This weighted score reflects that the alternative has higher community impacts than the southern alternatives, but lower impacts than other alternatives in the urban area of Windsor (i.e. crossing X12 and X14 alternatives). This balance is also reflected in the public and CCG weighted score scenarios, where crossing X11 alternative was ranked fourth, higher than the other 'urban' alternatives.
- Crossing X8 and X9 alternatives had lower weighted scores than the other central crossing alternatives;

6.4 Analysis and Evaluation of Illustrative Alternatives – United States Side

The US study team analyzed 37 combinations (or systems) of illustrative crossing, plaza and access road alternatives connecting the 15 crossing locations at the Detroit River to the interstate freeway system in the US.

These alternatives were assessed in terms of the same seven performance factors used by the Canadian evaluation, however with certain unique criteria and measures that reflect the requirements and conditions on the US side of the Detroit River.

The US study team assessed the performance based on level of benefit or impact associated with each crossing/plaza/access road alternative. The performance of each system was compared to the others to identify the top performing systems which were recommended to be carried forward for comparison to the results of the Canadian evaluation as part of an end-to-end process.

For further details with regard to the analysis and evaluation of the illustrative alternatives on the US side, the reader is referred to the *Evaluation of Illustrative Alternatives on the United States Side of the Border, August 2005*.

A summary discussion of the findings of the US study team brought forward for an end-to-end evaluation is provided in this section of the report.

6.4.1 Downriver Alternatives – Crossings X1, X2, X3, X4, X5 and X6

Further investigation by the US study team into the feasibility of constructing an inspection plaza on lands currently used for slag processing and disposal related to the National Steel operation identified significant community impacts and unacceptable disruption to the steel mill operation. The US Team eliminated the AC1 plaza site from further consideration.

Crossing X5 and X6 alternatives were therefore eliminated form further consideration by the Canadian and US teams.

The US study team analyzed 21 crossing/plaza/access road alternatives in this area of the river. None were recommended to be carried forward on the basis that from the US perspective, they were not effective in meeting the needs of the project while reducing associated impacts, and were not cost-effective.

The findings of the US analysis of improvement to regional mobility supported the Canadian team's assessment that the downriver alternatives would not adequately meet the long-term needs of the regional transportation network. The US analysis found that a new downriver crossing would have limited improvement to traffic operations on the US freeway system in the region. The downriver alternatives had poorer performance than most of the alternatives in terms of improvements to regional mobility, and none were among the top performers overall.

In terms of protecting community/neighbourhood characteristics, four of the five crossing X4/Plaza AS5 alternatives were the top performers among the 37 alternatives analyzed; these alternatives feature a crossing in the Fighting Island area connected to a plaza site in Ecorse which is an abandoned industrial site. Of these, one alternative (X4/S5/Moran/I-75) was also among the top performers in constructability. The other downriver alternatives had poorer performance than the other alternatives in terms of community impacts.

The southern alternatives (downriver) also generally resulted in higher impacts to natural features than other alternatives considered; most of the southern alternatives had poorer performance than the other alternatives and none were among the top performers.

Five downriver alternatives were the top performers in terms of maintaining air quality. By virtue of their more direct end-to-end alignment between the interstate freeway system and Highway 401, the alternatives reduce total vehicle-miles and vehicle-hours on the US network, resulting in a slightly higher reduction in emissions than other alternatives.

6.4.2 North Alternatives – Crossing X15

The US study team analyzed two crossing/plaza/access road alternatives in Belle Isle/East Detroit area of the river. Neither was recommended to be carried forward on the basis that, from the US perspective, they were not effective in meeting the needs of the project while reducing associated impacts, and were not cost-effective.

The findings of the US analysis of improvement to regional mobility supported the Canadian team's assessment that a new crossing in the Belle Isle area would not adequately meet the long-term needs of the regional transportation network. The US analysis found that a new crossing in the Belle Isle area would have only limited improvement to traffic operations on the US freeway system in the region. Both alternatives had a poorer performance in improving regional mobility than most of the other alternatives.

The alternatives in the Belle Isle area were found to have poorer performance than most other alternatives in terms of impacts to community and neighbourhood characteristics, consistency with land use plans, impacts to cultural resources, and impacts to air quality.

While the north alternatives were found to perform better than most alternatives on the US side in terms of impacts to natural features and constructability, they were not among the best performers in these factor areas in comparison to other alternatives.

6.4.3 I-75/I-96 Area – Crossings X13 and X14

The US study team analyzed four crossing/plaza/access road alternatives in the 'Interstates' area, which includes the rail corridor proposed for the DRTP truckway (crossing X13 alternative).

The findings of the US assessment of the truckway proposal supported the Canadian analysis that the capacity provided by the truckway proposal is not sufficient to meet the long-term needs of the region. The US assessment found that the truckway had little benefit to mobility in terms of reducing congestion at the existing crossings in 2035. Further, the US analysis identified that with additional border capacity in place through another new or expanded road crossing on the Detroit River in addition to the DRTP proposal, the truckway will carry virtually no truck traffic during the 2035 peak travel periods.

In addition, on the US side, the truckway proposal connecting to I-75 was found to have negative community impacts and impacts to cultural features associated with the plaza and the crossing. In addition, the access road was determined to be incompatible with local land use, conflicting with plans for residential/commercial revitalization in this area of the City.

The US assessment of the truckway proposal concluded that the truckway proposal does not meet the needs of the Partnership and is not recommended to be carried forward for further analysis as a practical alternative under the current EA study. The DRTP could continue to seek US and Canadian permits/approvals for a truckway and new high clearance rail tunnel as part of a separate process. As a new freeway tunnel, the X13 crossing was determined not to be practically feasible and eliminated from further study.

Two crossing X14 alternatives connecting the rail corridor in Canada to a new plaza and road connection to the freeway system in downtown Detroit were considered on the US side. Overall, the crossing X14 alternatives performed better than most other alternatives, although neither was a top performer.

The X14/Plaza II2/Connection to M-10 alternative performed better than most alternatives in terms of community/neighbourhood impacts, consistency with local planning, protecting natural features and improving regional mobility. This alternative was also among the top performers in terms of constructability. The US analysis noted that a crossing and inspection plaza in this area of Detroit would negatively affect the local community including impacts to businesses, schools and residences.

The X14/Plaza II3/Connection to M-10 alternative performed better than most alternatives in terms of improving regional mobility. This alternative was also among the top performers in terms of protecting natural features and constructability.

Both alternatives had a poorer performance than most other alternatives in terms of protection of cultural features and maintaining air quality. The Corktown Historic District, several sites eligible for registration as nationally significant cultural sites and the City's Riverwalk were identified as important features potentially impacted by a new crossing/plaza/access road alternative in this area of the city.

The US analysis determined that neither of these alternatives was among the top overall performers on the US side. However, the X14 alternatives performed better than most alternatives overall. The US team carried both X14 alternatives forward to the end-to-end evaluation for consideration on the short list of practical alternatives.

6.4.4 I-75/I-96 Area – Crossing X12 Alternative

The crossing X12 alternative (twin Ambassador Bridge) was identified as one of the top overall performers on the US side in terms of effectiveness and cost-effectiveness.

The Ambassador Bridge is connected to three interstate freeways in Michigan. Construction is underway on the *Ambassador Bridge Gateway Project* in Detroit, Michigan. This project, by the Michigan Department of Transportation is expected to be completed by December 2009. It will connect the Ambassador Bridge plaza and the interstate freeway system.

Expansion of the existing bridge was the top performer on the US side in terms of community/neighbourhood impacts, consistency with local planning and protecting natural features and among the top performers in terms of constructability. This alternative also had a better performance than most alternatives in terms of improvement to regional mobility.

The notable impacts associated with the expansion of the Ambassador Bridge plaza include impacts to the local community: the plaza expansion will displace 26 homes and 7 businesses, disrupt 150 homes and have a negatively impact community cohesion and character in a disadvantaged area of the city;

The crossing X12 alternative was found to exhibit poorer performance than most other alternatives in terms of maintaining air quality and protecting cultural features. The expansion of the plaza and construction of a new span at this location would have a high impact to cultural resources, impacting eight candidate sites eligible for designation as nationally significant and 18 known archaeological sites; there is a high potential for more as yet undiscovered sites being disturbed by construction activity.

In comparison to other crossing alternatives, the impacts and costs associated with the crossing, inspection plaza and access road are less with the crossing X12 alternative than most other alternatives considered. The US team recommended the crossing X12 alternative for consideration on the short list of practical alternatives.

6.4.5 Central Alternatives – Crossings X7, X8, X9, X10 and X11

Further investigation by the US study team into the feasibility of constructing an inspection plaza on lands currently used for slag processing related to the National Steel operation identified significant community impacts and unacceptable disruption to the steel mill operation. The US Team eliminated the AC1 plaza site and crossing X7 from further consideration. Both the US and Canadian Teams therefore eliminated crossing X7 from further consideration.

The US study team analyzed eleven crossing/plaza/access road alternatives in the central area of the river. The findings of the US analysis supported the Canadian team's assessment that a new crossing in the central area would meet the long-term needs of the regional transportation network and provide high benefits to regional mobility. All eleven alternatives performed better than most of the other alternatives considered in terms of improvement to regional mobility; further, the eleven central alternatives were the top performers in this factor.

The US analysis of cost-effectiveness, which considered the benefits and impacts as well as cost of the crossing, plaza and access road on the US side, identified three central alternatives as being among the top overall performers:

- Crossing X11/Plaza AC4/Access Road Dragoon/I-75
- Crossing X10/Plaza AC3/Access Road Dearborn/I-75
- Crossing X10/Plaza AC3/Access Road Springwells/I-75.

These alternatives, located between Zug Island and the Ambassador Bridge, are located in an area of southwest Detroit that is a mix of industrial, residential, institutional and cultural land uses. Plazas AC3 and AC4 were identified as having negative impacts to community cohesion and character, as well as environmental justice impacts. Plaza AC3 would likely result in the displacement of approximately 300 residential units, while plaza AC4 would displace more than 60 residences. The AC4 plaza and access road to I-75 was found to be somewhat consistent with local plans, while plaza AC3 was not consistent with plans for residential redevelopment.

Other central alternatives that had overall better performance than most other alternatives included alternatives connected to Plaza AC2 (i.e. crossings X8 and X9). Plaza AC2 is sited on the grounds of the National Steel plant. The plaza site is currently used for storage of raw materials for the rolling mill adjacent to the site. The crossings X8 and X9 would directly impact this rolling mill. A new crossing and plaza in this area would require relocating the rolling mill without disrupting the mill's production. Unlike the slag pile issue identified with plaza AC1, relocating the rolling mill could likely be accomplished within other parts of the National Steel property without adversely affecting the mill's operations or the surrounding community. However, the relocation of the rolling mill would increase the constructability risks associated with the new crossing in terms of time and cost.

The US study team recommended these alternatives for consideration on the short list of practical alternatives as part of an end-to-end evaluation.

6.4.6 Conclusions – United States Side Evaluation

Following the assessment of 37 crossing/plaza/access road alternatives connecting the 15 crossings in the Detroit River to the interstate freeway system, the US study team identified an area of focus for a new border crossing system within which a short list of practical alternatives could be identified that would meet the needs of the border transportation network while having acceptable impacts on the US side (refer to Exhibit 6.14). This area extended from the River Rouge/Melvindale area in the south to the downtown Detroit/M-10 area.

6.5 End-to-End Evaluation of Illustrative Alternatives

The Canadian study team recommendations for alternatives to be carried forward as practical alternatives corresponded to an area of continued study on the Canadian side of the Detroit River extending from the Windsor/ LaSalle border to the north end of the Sandwich Portlands (Exhibit 6.15).

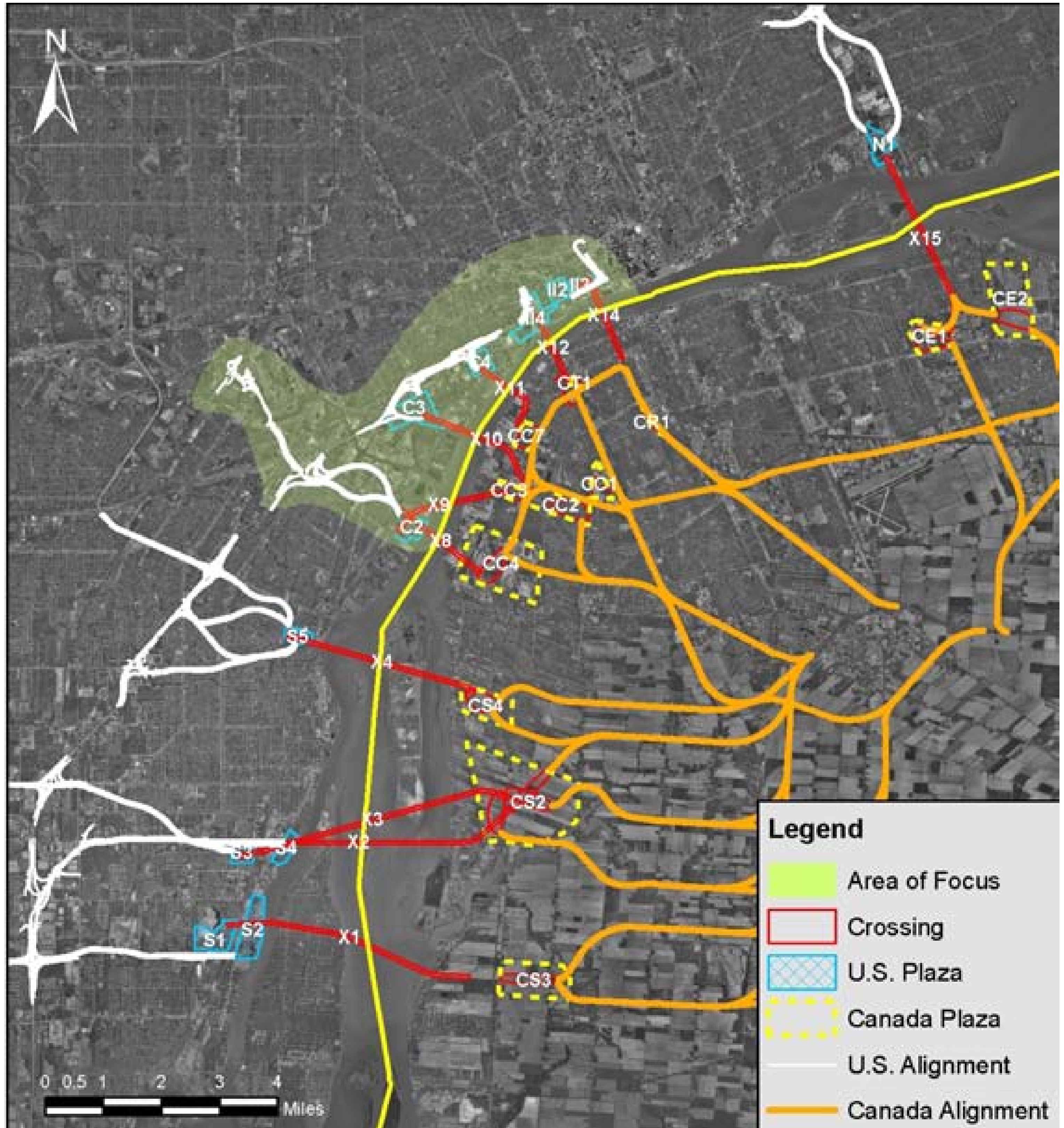
The US study team also identified an area of focus for a new border crossing system within which a short list of practical alternatives could be identified that would meet the needs of the border transportation network while having acceptable impacts on the US side (Exhibit 6.16). This area extended from the River Rouge/Melvindale area in the south to the downtown Detroit/M-10 area.

Based on the separate evaluations conducted by both study teams, the following conclusions were identified:

- Crossings X1, X2, X3, X4, X5, X6, X7, X13 and X15 should be eliminated from further study. This was jointly supported by the analysis of both study teams.
- Crossings X10 and X11 should be carried forward for further study. This was jointly supported by the analysis of both study teams.
- Crossings X8 and X9 to be reviewed in determining whether to carry forward as practical alternatives. Both teams recommended carrying forward Crossings X8 and X9 for consideration as practical alternatives. However, the analysis of both teams suggested these alternatives do not perform as well on either side of the river as other recommended crossing alternatives.
- Crossings X12 and X14 to be reviewed in determining whether to carry forward as practical alternatives. The US study team recommended both of these alternatives be carried forward for consideration as practical alternatives while the Canadian study team did not.

The Partnership, together with the Canadian and US study teams jointly reviewed the Crossing X8, X9, X12 and X14 evaluation results on an end-to-end basis in determining the final recommendations for alternatives to be carried forward for continued analysis.

EXHIBIT 6.16 – US AREA OF FOCUS FOR FURTHER ANALYSIS



6.5.1 Crossings X8 and X9

The Canadian evaluation identified that crossing X8 and X9 alternatives offer high regional mobility benefits. The Canadian Team also identified that, in terms of improvements to regional mobility, the crossing X8 and X9 alternatives offers slightly lower benefits to regional mobility than the other central alternatives (X10 and X11).

On the Canadian side, the crossing X8 and X9 alternatives have high impacts to the significant natural features in the Ojibway area of west Windsor. The access road alternative for crossing X8 follows the Ojibway Parkway; this alternative impacts the Black Oak Prairie Heritage Park and Ojibway Prairie complex. This alternative would result in the loss of more than 25 ha of designated and undesignated natural features and a similar area of endangered or threatened species habitat. More significantly, a new freeway in the Ojibway Prairie corridor would likely sever the linkage between the Black Oak Prairie area and the Ojibway Prairie Complex, resulting in a landscape scale impact.

The crossing X9 alternative directly impacts the Black Oak Prairie Heritage Park and an Environmental Policy Area along the riverfront. This alternative would result in the loss of approximately 30 ha of natural features, including direct impacts to more than 20 ha of endangered or threatened species habitat. The crossing X9 alternative would also threaten connectivity between the Ojibway Prairie complex and the riverfront.

The US study team identified constructability risks associated with Plaza AC2 (i.e. crossings X8 and X9). Plaza AC2 is sited on the grounds of the National Steel plant. The plaza site is currently used for storage of raw materials for the rolling mill adjacent to the site. The crossings X8 and X9 would directly impact this rolling mill. A new crossing and plaza in this area would require relocating the rolling mill without disrupting the mill's production. The relocation of the rolling mill would increase constructability risks associated with the new crossing in terms of cost and time, possibly impacting upon the Partnership's ability to meet the stated objective of completing the crossing by 2013.

On the basis that the X8 and X9 alternatives are not the top performers in either country, and that both alternatives have unique high impacts and risks, on an end-to-end basis, the disadvantages of these options outweighed the advantages.

Crossing X8 and X9 alternatives were eliminated from further study.

6.5.2 Crossing X12

In the evaluation of illustrative alternatives, the crossing X12 alternative was unique in that this alternative had relatively high negative impacts on the Canadian side in comparison to other Canadian alternatives, but relatively low negative impacts on the US side compared to other US alternatives. In terms of benefits provided to regional mobility, the alternative provides improved regional mobility for the border transportation network on both sides of the river, but was considered by the Canadian Team to have limited ability to provide continuous/ongoing capacity on the basis that this alternative would not provide a new crossing.

In consideration of the high community impacts to the residential area impacted by the expansion of the Canadian bridge plaza and the expansion of Huron Church Road to a freeway facility on the Canadian side, and the potential for disruption to border traffic during construction of the plaza and freeway, on an end-to-end basis, the disadvantages of this alternative outweighed the advantages.

Crossing X12 was eliminated from further study. The expanded US plaza of the Ambassador Bridge, with the improved connections to the interstate freeway system was carried forward within the Area for Continued Analysis as a possible US plaza site for a new crossing connecting to a new inspection plaza and connecting roadway on the Canadian side located downriver of the Ambassador Bridge.

6.5.3 Crossing X14

The Canadian Team determined that as a six-lane freeway with a new bridge or tunnel, the Rail Corridor alternative has a high benefit to regional mobility. However, a new freeway through central and south Windsor is not consistent with current and future land use plans for the City. This alternative would have high community impacts associated with a new freeway corridor through central and south Windsor in terms of impacts to regional commercial/retail areas and employment areas south of E.C. Row Expressway and negative impacts to community character and cohesion both in south Windsor and for the older neighbourhoods near the riverfront.

The Canadian study team also noted concerns with constructability of this alternative and concerns with the security/monitoring of the remote plaza approximately 2500 m (1.5 mi.) inland from the border.

On the basis that other alternatives provided comparable transportation benefits with lower community impacts, the Canadian study team did not recommend the rail corridor alternatives be carried forward for further study.

Two crossing X14 alternatives connecting the rail corridor in Canada to a new plaza and road connection to the freeway system in downtown Detroit were considered on the US side.

The X14/Plaza II2/Connection to M-10 alternative performed better than most alternatives in terms of community/neighbourhood impacts, consistency with local planning, protecting natural features and improving regional mobility; this alternative was also among the top performers in terms of constructability. The US analysis noted that a crossing and inspection plaza in this area of Detroit would negatively affect the local community including impacts to businesses, schools and residences.

The X14/Plaza II3/Connection to M-10 alternative performed better than most alternatives in terms of improving regional mobility. This alternative was also among the top performers in terms of protecting natural features and constructability.

Both alternatives had a poorer performance than most other alternatives in terms of protection of cultural features and maintaining air quality. The Corktown Historic District, several sites eligible for registration as nationally significant cultural sites and the city's Riverwalk were identified as important features potentially impacted by a new crossing/plaza/access road alternative in this area of the city.

The US team further noted that that neither of the X14 alternatives was among the top overall performers on the US side. In addition, other alternatives provided comparable transportation benefits with lower community impacts on the Canadian side, and other alternatives were more effective and cost-effective in terms of meeting the needs of the project and having acceptable impacts on the US side. On an end-to-end basis, the disadvantages of the rail corridor option outweighed the advantages.

Crossing X14 alternative was eliminated from further study.

6.6 Area of Continued Analysis

The results of the end-to-end evaluation of illustrative alternatives led to the identification of an Area of Continued Analysis (ACA) for possible practical crossing, plaza and access road alternatives (refer to **Exhibit 6.17**). These practical alternatives represent refinements of crossing alternatives X10 and X11, as well as possible alternatives connecting to the Ambassador Bridge Gateway and expanded plaza area on the US side. This area extends from Zug Island to the vicinity of the Ambassador Bridge on the US side, and from Broadway Avenue to Brock Street in Sandwich Towne on the Canadian side.

On the Canadian side, this area would encompass plazas CC2, CC3 and CC7 and be defined to provide sufficient area to enable a range of access road alignments and crossing alignments to be developed for continued analysis. The area would also accommodate refinement to the locations and alignments of crossing, plaza and access road alignments in the Ojibway Industrial Park area.

The residential community of Sandwich, Black Oak/Ojibway protected natural areas would serve to limit the extent of the Area of Continued Analysis on the Canadian side. The area also includes the Huron Church/Talbot Road corridor and the Highway 401 corridor from Highway 3 to Dougall Parkway.

As discussed in **Chapter 8**, these corridors were examined for freeway design alternatives, including interchange locations and configurations, crossing road treatments (closure or grade separation) and service roads for access.

On the US side, the area would encompass the area of southwest Detroit between the I-75 corridor and the riverfront between Zug Island and the Ambassador Bridge.

Possible improvements to connections to I-94 along Schaefer Road or Outer Drive were further examined by the US study team. A complete description of the US Team's evaluation of illustrative alternatives is documented in *Evaluation of Illustrative Alternatives on the United States Side of the Border, October 2007*.

EXHIBIT 6.17 – AREA OF CONTINUED ANALYSIS

7 DESCRIPTION OF THE AREA OF CONTINUED ANALYSIS

As described in more detail in Chapter 6, the assessment and evaluation of the illustrative crossing, plaza and access road alternatives led to the development of an Area of Continued Analysis (ACA), which is illustrated in Exhibit 7.1.

Within the Area of Continued Analysis, the study team generated, assessed and evaluated a number of practical crossing, plaza, and access road alternatives, which are described in Chapter 8. The following sections of this chapter are intended to provide the reader with an overview of the existing conditions within the ACA. For each section, the description of existing conditions corresponds to an Area of Investigation, which is generally consistent with an area encompassing the Practical Alternatives in the ACA. For more detailed information, the reader is referred to the following reports:

- *Draft Practical Alternatives Evaluation Working Paper – Air Quality Impact Assessment (May 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Noise and Vibration Assessment (May 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Social Impact Assessment (April 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Economic Impact (May 2008) (available);*
- *Draft Practical Alternatives Evaluation Assessment Report – Existing and Planned Land Use (May 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Archaeology (April 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Cultural Heritage (April 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage (April 2008) (available);*
- *Draft Practical Alternatives Evaluation Assessment Report – Stormwater Management Plan (March 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Waste and Waste Management (May 2008) (available);*
- *Draft Practical Alternatives Evaluation – Constructability Report for Plaza & Crossing Alternatives (May 2008) (available);*
- *Draft Level 2 Traffic Operations Analysis of Practical Alternatives (February 2008) (available);*

EXHIBIT 7.1 – AREA OF CONTINUED ANALYSIS

7.1 Air Quality

This section provides an overview of existing air quality conditions within the Area of Continued Analysis. For further details, the reader is referred to *the Draft Practical Alternatives Evaluation Working Paper – Air Quality Impact Assessment* (refer to List of Supporting Documents).

AREA OF INVESTIGATION

Since air quality is not limited by local political boundaries, a relatively broad area was included in the Air Quality Assessment. This comprised an approximate 10 km x 10 km area in West Windsor, from just south of the present Highway 401 terminus at Highway 3, 10 km north and 10 km west to the Detroit River.

CLIMATE AND METEOROLIGICAL DATA

Characterization of the existing climate and meteorological conditions in the vicinity of the Huron Church Road / Highway 3 corridor is important because these are the main forces driving contaminant transport (dispersion) in the atmosphere. The direction and speed of the wind dictates the location and distance from the source that the pollutants may travel. The factors that influence the contaminant mixing in the atmosphere are described below.

The Windsor-Essex area has a middle latitude humid continental climate affected by Lake Erie and Lake St. Clair. The region is characterized by pronounced seasonal differences of weather and by a highly variable day-to-day weather pattern. Some periods in summer are essentially humid tropical (high temperatures, high humidity, afternoon thunderstorms, etc.). Some periods in winter are effectively polar (very cold, clear, dry). Precipitation occurs throughout the year.

The surface meteorological data used in the air dispersion modelling was obtained from the Windsor Airport meteorological station (2000 – 2004) which is approximately 5 – 7 km east of the Huron Church Road / Highway 3 corridor. It is well exposed and represents the general wind flow pattern in the vicinity of the corridor since the area is generally flat. The upper air measurements used were from the closest upper air station in Pontiac, Michigan, which is located approximately 30 km northwest of the ACA. In order to be considered representative, the wind and temperature data should be obtained from within 100 km of the study area, and the upper air data (which is a regional parameter) should be within 300 km. The stations used for this study were well within these parameters.

Near-surface Temperature

Temperature and precipitation normals for the Windsor Airport (1971-2000) are presented in Table 7.1. “Normals” is the term commonly used for values of climatic elements averaged over a fixed standard period of years (usually 30 years).

Temperature near the surface of the earth controls the buoyant component of turbulence (vertical motion). Heat from the earth's surface heats the air near the ground causing it to rise. This mechanism reaches a maximum in early afternoon and is at a minimum near sunrise. This affects the dispersion of air pollutants through the influence of “thermal mixing” as the air mass rises.

Table 7.1 indicates that the mean (averaged over 30 years) daily minimum temperature is –8.1°C in January and daily maximum temperature is 28°C in July at the Windsor Airport site. The annual mean temperature is 9.4°C.

Precipitation

Precipitation acts as an atmospheric cleansing mechanism, as contaminants in the air are generally washed out by precipitation. More precipitation produces more washout. For this study, the role of precipitation in the removal of pollutants from the air was not considered, thereby generally providing conservatively high ground level concentrations.

As shown in Table 7.1 above, the Windsor area normally receives a total of 918.3 mm of precipitation per year; 805.2 mm of rainfall and 126.6 cm of snowfall. The maximum mean monthly rainfall is 96.2 mm, which occurs in September.

TABLE 7.1 - WINDSOR AIRPORT CLIMATE NORMALS (1971-2000)[1]

Temperature	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Daily Average (°C)	-4.5	-3.2	2	8.2	14.9	20	23	21.6	17	11	4.6	-1.5	9.4
Standard Deviation	2.9	2.7	2.1	1.6	2.1	1.3	1.1	1.2	1.3	1.7	1.7	2.7	0.8
Daily Maximum (°C)	-0.9	0.6	6.4	13	20.5	25	28	26.6	23	16	8.3	1.9	14
Daily Minimum (°C)	-8.1	-7	-2.4	3	9.3	15	17	16.6	12	6.2	0.9	-4.8	4.9
Precipitation													
Rainfall (mm)	29	33	55.6	81	80.7	90	82	79.7	96	64	67	47	805.2
Snowfall (cm)	35	28	20.6	4.3	0	0	0	0	0	0.7	8.3	30	126.6
Precipitation (mm)	58	57	75	85	80.8	90	82	79.7	96	65	76	75	918.3
Days with Rainfall													
>= 0.2 mm	5.7	5.6	9.4	12	11.8	11	10	10	11	11	11	7.9	115.7
Days With Snowfall													
>= 0.2 cm	13	9.1	6.7	2.3	0.03	0	0	0	0	0.3	3.8	10	45
Days with Precipitation													
>= 0.2 mm	15	12	13.9	13	11.8	11	10	10	11	11	13	15	146.7
Wind													
Days with Winds >= 52 km/hr	1.9	1.4	2.5	1.8	1.1	0.9	0.7	0.3	0.4	0.5	1.2	1.2	14
Days with Winds >= 63 km/hr	0.6	0.4	0.7	0.7	0.5	0.3	0.4	0.2	0.1	0.2	0.3	0.3	4.7

The meteorological file used in the air dispersion modeling for this study utilizes hourly temperatures for each day in the year.

Atmospheric Stability

Normally, temperature decreases with increasing height above sea level. The relationship of the actual vertical temperature to the near-surface temperature determines the atmosphere's ability to resist or enhance vertical motion. The amount of vertical motion is a measure of the stability of the atmosphere.

The atmosphere can have three general stability states - unstable, neutral and stable. The stability scale normally used for air quality simulations varies from very unstable (A) through neutral (D) to very stable (F). The stability class distribution for the Windsor Airport station for the period 2000 - 2004 is presented in Table 7.2. At this station, neutral stability conditions {D (neutral) + C (near neutral)} occur approximately 67% of the time and stable conditions (E, F) about 28% of the time. Stable conditions can produce higher concentrations of contaminants because of reduced turbulent mixing.

TABLE 7.2 - STABILITY CLASS DISTRIBUTION - WINDSOR AIRPORT (2000-2004)

Stability Class	% Frequency						Descriptor
	2000-2004	2000	2001	2002	2003	2004	
A	0.5	0.4	0.8	0.6	0.4	0.4	Unstable
B	4.2	3.6	4.6	4.4	4.4	3.9	
C	10.1	10.6	10.3	9.8	9.9	9.9	Neutral
D	57.0	56.0	56.2	57.1	57.0	58.6	
E	13.3	13.6	14.0	13.2	12.8	13.1	Stable
F	14.9	15.8	14.2	15.0	15.5	14.1	

The meteorological file used in the air dispersion modeling for this study requires hourly stability classes for each day in the year.

[1] Environment Canada website, http://www.climate.weatheroffice.ec.gc.ca/climate_normals/index_e.html

Wind Direction

Wind direction is reported as the direction from which the wind blows and is based on surface (10 meter) observations. In general terms, if the wind does not blow toward a receptor, there will be no impact from an upwind emission source. The wind blows in all directions with varying frequencies. Certain directions occur more frequently than others. These are known as the prevailing wind directions.

Exhibit 7.1 presents a wind rose for the Windsor Airport for the years 2000 - 2004. The prevailing wind is from the southwest, primarily during the summer months, with winds blowing from the west through southwest directions (i.e., from Southeast Michigan) approximately 32% of the time.

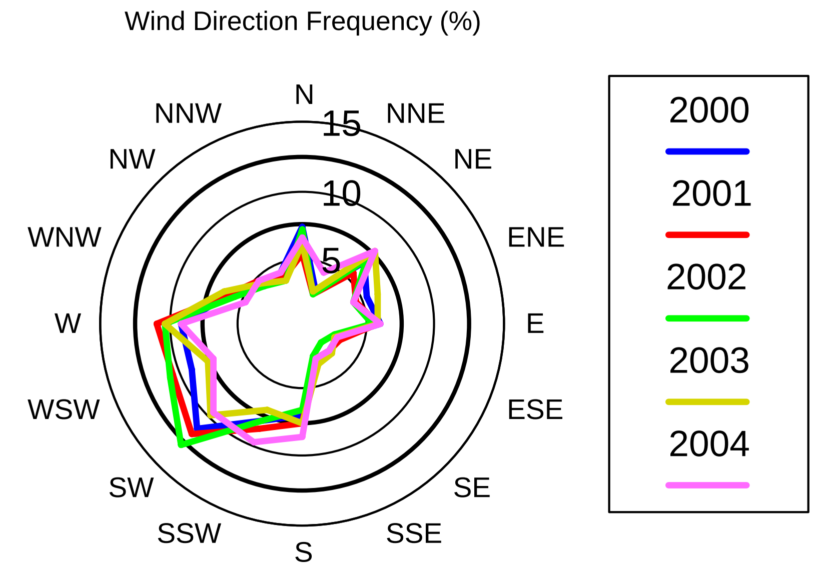
The dispersion modelling for this study uses the hourly wind directions of each day in the year.

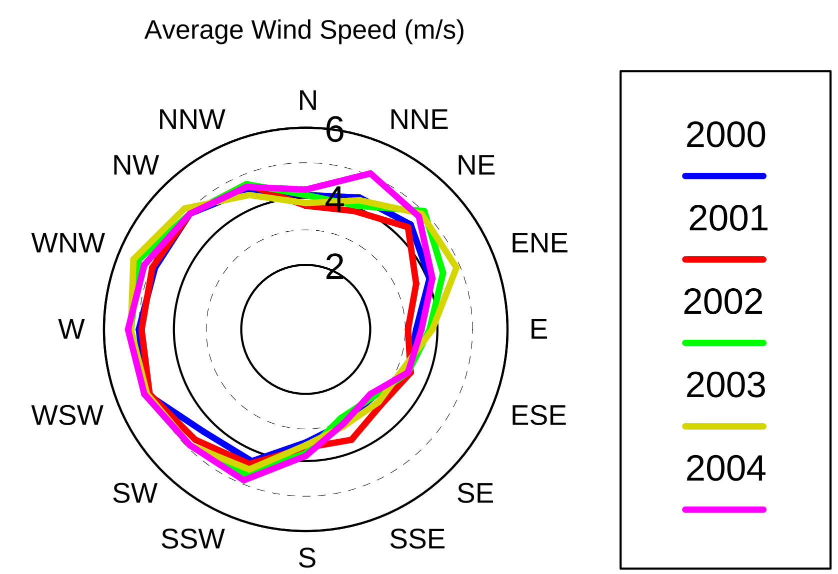
Wind Speed

Contaminant concentrations decrease with increasing wind speed as a result of atmospheric mixing. The wind speed used in the air quality modelling was based on surface observations from the Windsor Airport. Wind speed increases with height as surface friction is reduced. Variation of wind speed with height was built into the dispersion model used in this assessment. When wind speeds are high, there is good dispersion of gases and particles, but more potential for re-suspension of surface dust. When wind speeds are near zero, the primary mechanism of pollutant transport away from a source is via diffusion, which can lead to very high pollutant concentrations near the ground. Calms were recorded 4.3% of the time at the Windsor Airport meteorological station (Exhibit 7.2) during 2003 compared with 3.6% for the 2000 – 2004 period.

The meteorological file used in the air dispersion modeling for this study utilized hourly wind speed and directions for each day in the year.

EXHIBIT 7.2 - WIND ROSE - WINDSOR AIRPORT (2000 - 2004)





Mixing Height

Another very important parameter in the dispersion of contaminants from a source is the "mixing height". This is the vertical extent through which the plume can be mixed. With a higher mixing height, there is a larger volume of air available within which the pollutants can mix which results in lower concentrations. With a lower mixing height, the plume may become trapped resulting in higher concentrations.

The concept of mixing height is founded on the principle that heat transferred to the atmosphere at the earth's surface results in convection, vigorous vertical mixing and the establishment of a dry-adiabatic lapse rate[2]. For annual and 24-hour average concentrations, the mixing height does not have much effect on the modelled ground level concentrations[3]. For 1-hour average concentrations, however, mixing height is very important. The use of variable mixing heights, that are as close to the actual conditions as possible, improves the ability of the model to accurately predict downwind concentrations. For the sources that are close to the ground, the mixing heights do not play a major role.

The closest station having the upper air data necessary for this study is the Pontiac, Michigan. The mixing height data for each day in the 5-year meteorological period (2000 - 2004) was developed using the Holzworth methodology. The surface values and the mean monthly minimum (morning) and maximum (afternoon) mixing heights were then pre-processed through the US EPA meteorological pre-processor (PCRAMMET)[4] which combines surface and upper air measurements to create the hourly mixing heights which are required by the dispersion model. Missing data was filled in by interpolation. There were no significant blocks of data missing from this meteorological data set.

ASSESSMENT CRITERIA

Environment Canada and the Ontario Ministry of the Environment (MOE) have set air quality objectives, and air quality standards and criteria, respectively for various air pollutants.

Ontario Regulation 419/05 (O.Reg. 419/05) made under the *Ontario Environmental Protection Act* (EPA) defines maximum concentration levels for various air contaminants at a Point of Impingement (POI), arising from an industrial facility or similar operation. The POI is generally defined as the off property location where the maximum concentration resulting from a facility emission occurs. However, if there is a child care facility, health care facility, senior citizens' residence or long-term care facility or educational facility on the property in question these locations become the designated POI location.

In addition, Section 14 of the *EPA* it prohibits a facility or operation to cause an adverse effect. The definition of "adverse effect" in the *EPA* includes, but is not limited to:

- Impairment of the quality of the natural environment for any use that can be made of it; and,
- Loss of enjoyment of normal use of property.

The MOE, as a component of the MOE standard setting process, has developed a list of the Ambient Air Quality Criteria (AAQCs). The AAQCs are effect-based levels in air, with variable averaging time (e.g., 24 hour, 1 hour and 10 minutes) appropriate for the effect that it is intended to protect against. The AAQCs, which represent desirable levels in ambient air, are used for assessing general air quality and the potential for causing an adverse effect. The Standards Development Branch of the MOE publishes a set of guideline limits in *Ontario's Ambient Air Quality Criteria*[5].

Federal Air Quality Objectives encompass three levels of air quality objectives: maximum desirable level (MDL), maximum acceptable level (MAL) and maximum tolerable level (MTL). The MAL is intended to provide adequate protection against effects on soil, water, vegetation, materials, visibility, personal comfort and well-being. The MAL is considered to be a realistic objective. When the MAL is exceeded, the need for control action by a regulatory agency is indicated. Table 7.3 summarizes the applicable available criteria from the MOE and Environment Canada.

TABLE 7.3 - AIR QUALITY CRITERIA FOR $PM_{2.5}$ AND NO_X

Contaminant	Averaging Time	MOE AAQC µg/m³ (ppb)	Federal AQ Objective or Maximum Acceptable Level (MAL) (µg/m³)
NO_x (as NO_2)	1 h	400 (200)	-
	24 h	200 (100)	-
	Annual	-	100[1]
$PM_{2.5}$	24 h	-	30 *

Notes NO_x – nitrogen oxides – sum of nitrogen dioxide (NO_2) and nitric oxide (NO)
$PM_{2.5}$ includes all particulate matter with an aerodynamic diameter less than 2.5 µm – considered respirable
[1] MAL is for NO_2
- Indicates no criterion available
* comes into force in 2010

Emissions of NO_x and $PM_{2.5}$ from the vehicles traveling on the freeway and the local service roads, other local arterial roadways, local industry and transboundary pollution from the southeastern United States have the greatest potential to impact local air quality. NO_x is the sum of nitrogen dioxide (NO_2) plus nitric oxide (NO). At present, there is no annual provincial AAQC for NO_x, but there is a federal MAL for NO_2. The assessment was conservatively completed assuming that 100% of the NO_x is NO_2. Typically, NO_2 comprises approximately 60% of total NO_x. With respect to $PM_{2.5}$, the MOE does not currently have an AAQC for $PM_{2.5}$. Instead, they have adopted the Canada Wide Standard (CWS) for $PM_{2.5}$, which is a Federal air quality objective that comes into force in 2010. Unlike the POI criteria in Ontario Regulation 419, it is not a legally enforceable standard that can be applied to specific sources. However, non-attainment of the CWS may indicate that regional action is required to reduce emissions.

EXISTING AIR POLLUTANT CONCENTRATIONS

The MOE measures air contaminants at various locations throughout Ontario, and reports on the state of Ontario's air quality on an annual basis. These reports are known as "Air Quality in Ontario" reports.

The existing air quality is greatly influenced by local and long range (cross-border) contaminants generated in upwind urban and industrial areas. The predominant wind directions in Windsor are from the west to southwest, which bring contaminants from the heavily industrialized areas of Detroit, nearby

[2] Holzworth, G.C., 1967. Mixing Depths, Wind Speeds and Air Pollution Potential for Selected Locations in the United States. Journal of Applied Meteorology.

[3] Young, J.W.S. and Z. Radonjic 1993. Air Quality Simulations – *How Much Bias and Error Can Climate Introduce?* Paper presented at the 27th CMOS Congress, Fredericton N.B., June.

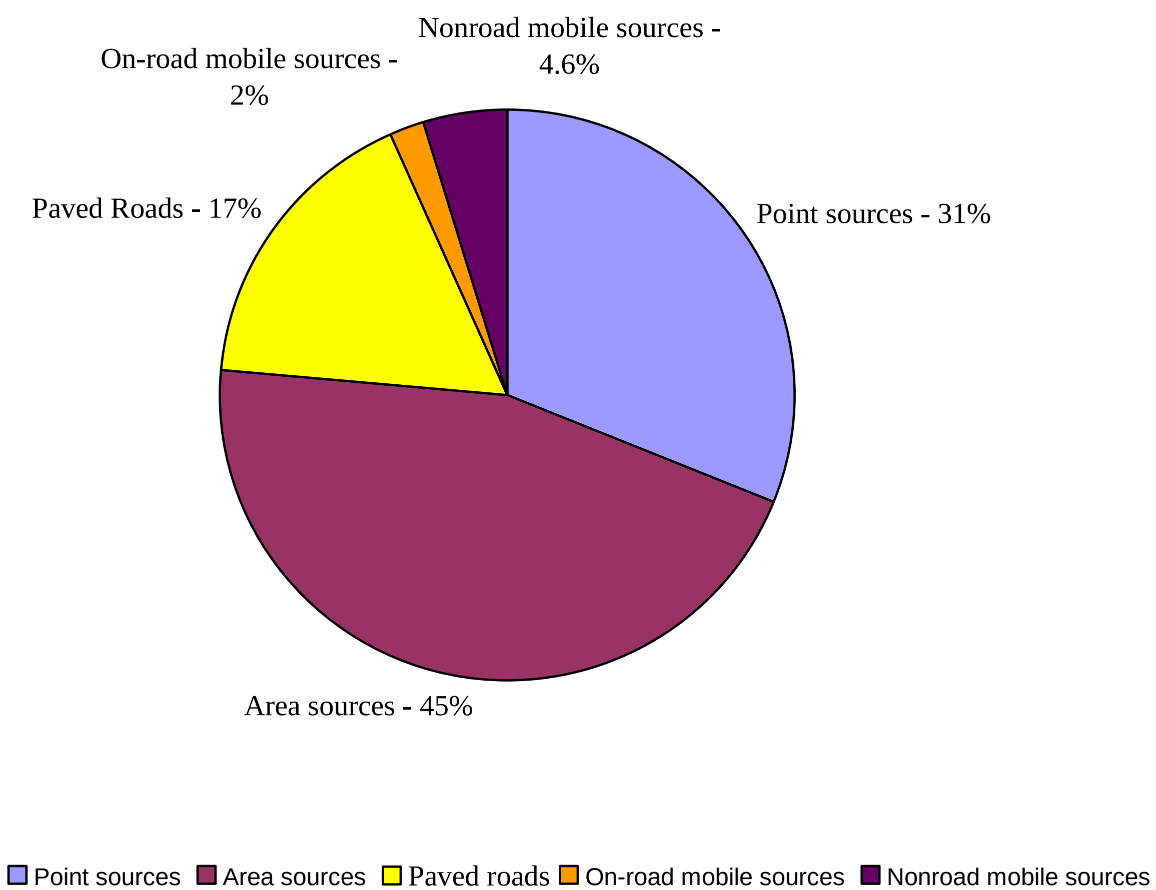
[4] United States Environmental Protection Agency 1995 (U.S.EPA). *User's Guide to CAL3QHC Version 2.0: A Modelling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections.* September.

[5] Ontario Ministry of the Environment (MOE) 2008. *Ontario's Ambient Air Quality Criteria,* February.

communities and beyond. Air quality impacts in the area are dominated by the substances that combine to produce smog or acid rain. This includes both NO_x and $PM_{2.5}$.

Exhibit 7.3 presents a breakdown of $PM_{2.5}$ emissions in Southwestern Ontario in 2000[6].

EXHIBIT 7.3 - $PM_{2.5}$ EMISSIONS IN SOUTHWESTERN ONTARIO (2000)



Ambient Monitoring Data

The MOE has historically operated a number of ambient air monitoring stations in Windsor. However, in recent years the number of fully operational stations has been reduced to two. These stations are located at:

- MOE Windsor Downtown – 467 University Ave. (Station #060204 C); and
- MOE Windsor West – College / South St. (Station #060211R).

As part of this EA study, the study team established two ambient air monitoring stations in the Area of Continued Analysis, along the existing Huron Church/Talbot Rd. corridor. The stations were located at:

- DRIC OPHL Station – The Ontario Public Health Laboratory; and
- DRIC SCC Station – South of St. Clair College.

The locations of the ambient air monitoring stations are presented in **Exhibit 7.4**.

Detailed results from the DRIC monitoring program are included separately in the *Draft Practical Alternatives Evaluation Working Paper – Air Quality Impact Assessment (May2008)* (refer to List of Supporting Documents).

The main purpose of the monitoring program was to collect data on the total pollutant concentrations of various pollutants that are routinely observed in the corridor. The monitoring program commenced in September 2006 and continued to October 2007.

The data was used to:

- Establish current conditions within the corridor;
- Assist in determining background air concentrations of the pollutants being measured; and,
- Benchmark the air dispersion modelling.

In addition to $PM_{2.5}$ and NO_2 which are discussed in this assessment, additional contaminants were included in the monitoring program and were considered in the analysis of the Technically and Environmentally Preferred Alternative (TEPA) (the reader is referred to **Chapter 10** for further detail on the assessment of the TEPA).

[6] Environment Canada Great Lakes Basin Airshed Management Framework Pilot Project

EXHIBIT 7.4 - MOE MONITORING STATION LOCATIONS AND DRIC MONITORING STATION LOCATIONS

To assess the existing air pollutant concentrations in the area, monitoring data from these two stations were obtained from the MOE[7]. The MOE AAQCs are based on Nitrogen Dioxide (NO_2) measurements rather than total NO_x, thus the NO_2 data has been presented. **Tables** 7.4 and 7.5 present a summary of the measurements for NO_2 and $PM_{2.5}$ respectively.

Table 7.6 presents a summary of the $PM_{2.5}$ and NO_2 measurements collected from the two DRIC stations from October 2006 to December 2006. These first quarter results were used to assist in establishing background concentrations for the modeling of the alternatives. While data is currently available for more than just the first quarter, the initial model runs were performed when only limited data was available. To keep the comparisons consistent between alternatives, the first quarter results were used for all alternatives. The reader is referred to **Chapter** 8 for more details on evaluation of alternatives.

Table 7.7 presents a summary of the $PM_{2.5}$ and NO_2 measurements collected from the two DRIC stations from November 2006 through October 2007. After being fully evaluated, this data were used as part of the final analysis of the TEPA. The reader is referred to **Chapter** 10 for more details on the assessment of the TEPA.

TABLE 7.4 - FIVE YEAR SUMMARY OF MOE MONITORING RESULTS – NO_2

Station ID	Station Location	Averaging Period	Nitrogen Dioxide (µg/m³)						
			Canada Wide Standard	Year					Ave
				2001	2002	2003	2004	2005	
#060211-R	College / South St.	Average	-	39	37	INS+	33	32	35
		90th Percentile	-	66	62	69	62	62	64
		1-Hour Maximum	400	130	175	182	176	133	159
		24-Hour Maximum	200	83	116	92	79	109	96
#060204-C	467 University Ave.	Average	-	36	36	INS	34	32	35
		90th Percentile	-	62	60	73	68	62	65
		1-Hour Maximum	400	163	130	150	182	124	150
		24-Hour Maximum	200	77	86	94	90	100	89

+ INS = Insufficient data available to compute a representative average

TABLE 7.5 - FIVE YEAR SUMMARY OF MOE MONITORING RESULTS – $PM_{2.5}$

Station ID	Station Location	Averaging Period	$PM_{2.5}$ (µg/m³)						
			Canada Wide Standard	Year					Ave
				2001	2002	2003	2004	2005	
#060211-R	College / South St.	Average	-	-	11.8	9.6	9.5	10.5	10
		90th Percentile	-	-	26	20	21	24	23
		1-Hour Maximum	-	-	74	64	56	74	67
		24-Hour Maximum	30**	-	56	41	38	52	47
		No. of Times above Benchmark	-	-	18	7	9	9	11
#060204-C	467 University Ave.	Average	-	9.4	9.8	8.5	8.6	10.4	9
		90th Percentile	-	20	21	19	19	24	21
		1-Hour Maximum	-	72	75	64	54	72	67
		24-Hour Maximum	30**	40	56	43	39	48	45
		No. of Times above Benchmark (30 µg/m³)	-	7	10	5	8	12	8

[7] Ontario Ministry of the Environment (MOE). *Air Quality in Ontario, 2000* – 2005 (Reports & Appendices), Queen's Printer for Ontario

TABLE 7.6 - SUMMARY OF DRIC 1ST QUARTER MONITORING RESULTS (OCT 06 – DEC 06)

Pollutant	Averaging Time	OPHL	SCC	Average of 2 Stations
NO_2 (1-hr), µg/m3	Max	85	85	85
	Min	0	0	0
	Average	27	21	24
	90th Percentile	47	39	43
NO_2 (24-hr), µg/m3	Max	52	50	51
	Min	2	2	2
	Average	26	21	24
	90th Percentile	43	32	38
$PM_{2.5}$ (24-hr), µg/m3	Max	48	46	47
	Min	8	8	8
	Average	21	20	21
	90th Percentile	32	29	31

TABLE 7.7 - SUMMARY OF DRIC MONITORING RESULTS (NOVEMBER 2006 – OCTOBER 2007)

Pollutant	Averaging Time	OPHL	SCC	Average of 2 Stations
NO_2 (1-hr), µg/m3	Max	104	110	107
	Min	0	0	0
	Average	27	23	25
	90th Percentile	50	44	47
NO_2 (24-hr), µg/m3	Max	68	52	60
	Min	3	3	3
	Average	27	23	25
	90th Percentile	43	36	40
$PM_{2.5}$ (24-hr), µg/m3	Max	48	46	47
	Min	8	7	8
	Average	20	21	21
	90th Percentile	32	33	33

It should be noted that the results collected at the DRIC monitoring stations are somewhat higher than those collected at the MOE monitoring stations. This was expected since the DRIC monitoring stations are located closer to a high traffic corridor (Huron Church/Highway 3), whereas the MOE stations are not subject to the same traffic influences. Thus, the MOE stations are not influenced by the same volumes of traffic.

Contribution from Upwind / Background Sources

Air dispersion models provide an estimate of the air pollutant concentrations resulting from emission sources that are specifically included in the model set-up and inputs. However, concentrations resulting from other, upwind (areas to the south and west of Windsor) sources are not included, but must be considered when assessing total expected air pollutant concentrations against relevant standards and guidelines. This is typically done by adding a "background component" to all model predicted results. MOE generally advocates the use of 90th percentile air pollutant concentrations obtained from ambient air monitoring stations for this purpose (i.e., background concentrations are lower 90% of the time). This approach is considered to provide a conservative estimate of background concentrations.

Data on the existing air pollutant concentrations in the Windsor area were obtained from the two MOE air monitoring stations. Given their locations in an urban setting, data from the MOE stations reflect local traffic. The MOE data therefore provided somewhat higher background concentrations of pollutants such as $PM_{2.5}$ and NO_2 than might otherwise be observed at stations further from traffic but upwind (i.e. south and west) of the study area. However, the two MOE stations were considered to be far enough away from the Huron Church/Highway 3 corridor that existing traffic conditions from this corridor would not be impacting the MOE monitors to any notable degree.

Tables 7.4 and 7.5 indicate that the average 90th percentile measured concentrations at each of the MOE stations are 23 and 21 ug/m^3 for 1-hour $PM_{2.5}$ and 64 and 65 ug/m^3 for 1- hour NO_2. The first quarter data from the two DRIC air monitoring stations were used in conjunction with the MOE monitoring data in determining the appropriate background concentrations.

As shown in Table 7.6, the average measured concentration at the DRIC stations for the first quarter of monitoring data (Oct 1 – Dec 31st, 2006) was 21 µg/m^3 for $PM_{2.5}$. This corresponds to the 22 ug/m^3 of the 90th percentile for the MOE monitoring stations. Therefore, for the purposes of background, a rounded value of 20 µg/m^3 was chosen. This value allows for a conservative approach to determining the possible combined effects of the roadway and other contributions to $PM_{2.5}$.

For NO_2, the average value from the DRIC monitoring stations is 24 µg/m^3. The 90th percentile value for the MOE monitoring stations is 65 µg/m^3. Because of the large discrepancy between the MOE and DRIC monitoring stations and the general acceptance by the MOE for 90th percentile values, a conservative rounded value of 70 µg/m^3 was chosen for background for NO_X.

Established background levels were re-evaluated in greater detail to reflect the full year of monitoring in the Huron Church/Highway 3 Corridor.

Table 7.8 presents the selected background concentrations used in the DRIC AQ assessment.

TABLE 7.8 - SUMMARY OF BACKGROUND CONCENTRATIONS USED IN DRIC AIR QUALITY ASSESSMENT

Pollutant	Averaging Time		
	1-hour	24-hour	Annual
NO_x	70 µg/m^3	70 µg/m^3	-
$PM_{2.5}$	-	20 µg/m^3	9 µg/m^3

7.2 Socio-Economic Environment

7.2.1 Noise and Vibration

This section provides an overview of noise and vibration conditions within the Area of Continued Analysis. For further details, the reader is referred to the *Draft Practical Alternatives Evaluation Working Paper – Noise and Vibration Assessment* (refer to List of Supporting Documents).

The receptors selected for noise impact assessment were those determined to be potentially most likely to be impacted (i.e., subject to frontline exposure) by the various alternatives. Multiple receptors were selected to capture the anticipated variations in exposure to noise from traffic based on the alignment of existing roads, the alignment of the proposed alternatives, and variations in traffic volumes. As was stated previously, receptors within the ROW were not considered as it was determined that these receptors will be displaced by the project. In some road segments, multiple receptors were selected to capture the anticipated variations in exposure to noise from traffic based on the alignment of existing roads, the alignment of the proposed access road alternatives, and potential variations in traffic volumes. On this basis, a total of 31 receptors closest to the practical access road alternative were selected. In addition, for the assessment of the practical plaza and crossings, there were 21 receptors selected.

For the vibration assessment, the Area of Investigation consisted of a distance of 25 m from the edge of the practical access road and 50 m from the practical crossing and plaza alternatives that are discussed in **Chapter** 8.

7.2.2 Neighbourhood and Community Characteristics

This section provides an overview of neighbourhood and community characteristics within the Area of Continued Analysis. For further details, the reader is referred to *the Draft Practical Alternatives Evaluation Working Paper – Social Impact Assessment* (refer to List of Supporting Documents).

It is important to understand the demographics of the study area in order to understand the degree of impact from project activities that may be experienced by residents. As part of the consultation carried out for this study, data collection as part of the Social Impact Assessment involved household questionnaires, social feature questionnaires, focus group sessions, input received as part of the public consultation efforts, stakeholder interviews, site visits, and review of various published secondary sources (e.g. Census Canada, City of Windsor).The demographic baseline for the ACA is presented in **Table** 7.9. For comparison purposes, the table provides data for the City of Windsor, Essex County, and the Province of Ontario. A higher percentage of residents within the ACA own their homes compared to the City of Windsor as a whole. The percentage of the population who are immigrants or visible minorities is lower in the ACA comparatively to the City of Windsor; however, it is similar to that of the Province. The largest percentage of residents within the ACA identified English as their first language.

TABLE 7.9 – DEMOGRAPHIC BASELINE[8]

GEOGRAPHIC BOUNDARIES	TOTAL DWELLINGS	TOTAL POPULATION	HOME OWNERSHIP		IMMIGRANT POPULATION 1996-2001 (%)	VISIBLE MINORITIES (%)	LANGUAGES		
			Own (%)	Rent (%)			English (%)	French (%)	Non-official languages (%)
Ontario*	4,219,41	11,410,046	68	32	18	19	71	4	24
Essex County*	141,300	374,975	73	27	20	11	73	4	22
City of Windsor*	88,533	208,402	65	35	27	17	68	4	28
Area of Continued Analysis	479	1,327	91	10	18	13	71	2	26

Project effects will impact people differently depending on their characteristics. Those members of society whose quality of life is vulnerable to changes within their community are referred to in Social Impact Assessments (SIA) as special populations. For this study, such populations include children, the disabled, ethnic minorities and adults over the age of 65. Estimates on the number of affected residents belonging to special populations were collected from the questionnaire data. Of those that completed the questionnaire, 21% are under the age of 18 years, 13% are over the age of 65 years, and 9% were identified as having special needs. Comparatively, based on Statistics Canada data, the City of Windsor is similar with 25% of the population under the age of 18 years, and 14% over the age of 65 years. There is no data specifically that identifies the percentage of the population with special needs.

In order to predict and evaluate the effects of the project on the community, an understanding of the characteristics of the community is required. The term “community” can mean different things to different people; however, it generally refers to the qualitative attributes relating to how people feel or identify with their surrounding environment. This project will impact the broader communities of South Windsor and LaSalle; however, within these broader communities are unique neighbourhood communities that will experience more specific impacts. It is for this reason that greater emphasis is placed on identifying the characteristics of these unique neighbourhood communities in this Section.

“Community characteristics” described include community character, the level of satisfaction residents feel toward living in their community, changes that have been observed in the last five to ten years, and the level of cohesion within the community. The business community within the ACA that provides services to the neighbourhood communities is also briefly described. Sources of information include questionnaires, focus group discussions, public information open houses, and stakeholder meetings and input from the Economic Impact Assessment (Hemson 2008).

[8] Statistics Canada. 2002. 2001 Community Profiles.

"Community character" is defined by physical attributes and features of the neighbourhood such as the age of the development, the surrounding environment (e.g. natural, urban), or demographics (e.g. family, seniors). This data was collected through site visits, questionnaires, and focus group workbooks and discussion.

Community cohesion is generally described as a measure of how tied together the community is. It can be a very difficult concept to get an understanding of and data to support; however, it is essential in understanding the community and the residents within it. Some of the information collected through various consultations gives an understanding of the cohesiveness of the community. Other sources of data include questionnaires, and focus group workbooks and discussion.

The use and enjoyment of property contributes to residents' feelings of satisfaction with the community. The presence of nuisance impacts, or physical disturbances such as excessive noise, dust, traffic and aesthetics, is also related to how residents use and enjoy their property. The presence of such nuisance features often defines what attributes residents dislike about their community.

SOUTH WINDSOR, LASALLE, AND TECUMSEH COMMUNITY CHARACTERISTICS

The ACA crosses through the communities of South Windsor, LaSalle, and Tecumseh. Within these broader communities are unique neighbourhood communities that share common characteristics.

The character of the broader community is a mixture of established and new residential development. The Highway 3/Huron Church Road transportation corridor defines the political boundary of Windsor and LaSalle between Howard Avenue and Todd Lane. The corridor is a mixture of urban land uses including pockets of residential development, highway commercial development, and natural areas. The Highway 3/Huron Church Road transportation corridor experiences high volumes of traffic from both local and international traffic. The corridor serves as the main access to the Ambassador Bridge and is subject to traffic congestion during delays and peak volumes at the border crossing. The width of the right-of-way and volume of traffic presents a barrier to the movement of pedestrians across the corridor. The underpass at the Grand Marais Drain is the only location that offers safe off-road passage for pedestrians and cyclists across the corridor. Common property uses in the residential neighbourhoods within the broader communities include gardening, relaxing, barbecuing, entertaining, children's activities, swimming (for those households with a pool), an appreciation for nature and bird watching, and yard work, done on a daily and/or weekly basis. The frequency of these activities would increase with favourable weather in the non-winter months.

NEIGHBOURHOOD COMMUNITY CHARACTERISTICS

Within the ACA, 17 unique neighbourhood communities were identified based on input from the focus group meetings. Focus group participants discussed what the terms "community" and "neighbourhood" meant to them and concluded by drawing the boundary of their community on a map. The delineation of community boundaries varied, for some the boundary was their immediate street, for others the boundary included a large part of South Windsor and LaSalle. Although focus group residents identified with being part of a broader community such as South Windsor or LaSalle, they, generally, identified more closely with their local neighbourhood community (e.g. Sandwich Towne, Huron Estates or Southwood Lakes).

Other sources of information used to help define the community boundaries included geographic features, municipal planning documents, and input received from PIOHs and stakeholder meetings. There are some areas within the ACA that are not obviously part of a distinct neighbourhood or community. These areas consist of residential in-fill and strip development adjacent to the existing transportation corridors.

Unique neighbourhood communities identified within the ACA are listed below and illustrated in **Exhibit 7.5**. The neighbourhood communities are discussed west to east starting from the Detroit River and ending at Highway 401.

1. Sandwich Towne South;
2. Ojibway Park to Malden Road;
3. Spring Garden Area;
4. Bethlehem Area;
5. Bellewood Estates;
6. Residential in-fill between Grand Marais Drain and Pulford Street;
7. Huron Estates;
8. Reddock Street;
9. East of Huron Church Road;
10. Villa Borghese;
11. Kendleton Court;
12. Talbot Road;
13. Heritage Estates;
14. Oliver Estates;
15. Shadetree Court;
16. Southwood Lakes; and
17. East of Howard Avenue.

Although similar due to their proximity to each other in South Windsor, LaSalle, and Tecumseh, characteristics for each one are identified and discussed in the sections below.

EXHIBIT 7.5 – UNIQUE COMMUNITIES AND NEIGHBOURHOODS WITHIN THE ACA

Sandwich Towne South

A portion of the ACA is within the southern portion of Sandwich Towne. The Sandwich Towne South neighbourhood is characterized by a mix of residential and industrial development, as illustrated in Exhibit 7.6.

Community Character

Sandwich Towne is located west of the Ambassador Bridge adjacent to the Detroit River. *The Olde Sandwich Towne Community Planning Study (October 2006)* defines the boundaries of Sandwich Towne as Huron Church Road, College Avenue on the east, Prospect Avenue on the south, and the Detroit River. The community has a rich history with aboriginal settlement dating back several hundred years prior to European settlement in the 1700's. Exhibit 7.6 illustrates the study area of the Community Planning Study boundary.

EXHIBIT 7.6 – SANDWICH TOWNE COMMUNITY PLANNING BOUNDARY

Over the course of this study, residents and other participants from Sandwich Towne made it known that the south boundary of the community of Sandwich was Prospect Avenue. In January 2007, during the DRIC study focus group mental mapping exercise, residents were asked to identify how they would physically define their community. The focus group mental mapping exercise yielded a community map with boundaries which were very similar to the study area identified with in the *Old Sandwich Towne Community Planning Study*.

Sandwich Towne is characterized as a community with a rich heritage evidenced by the many significant historical buildings and landmarks. The picture of the community that emerged through PIOHs and the focus groups was a community that still offers a friendly small-town feeling. Despite its multi-cultural and socially and economically diverse population, anecdotal evidence provided from focus group participants suggested that residents are caring, respectful of one another, and close knit.

Sandwich Towne struggles with the high proportion of properties owned by absentee landowners and left either vacant or rented.

In Sandwich Towne, there are a number of family-owned and run businesses which focus group participants indicated as part of the unique character of the community. The community's rich history is reflected in many unique features including the eclectic mix of architecture, the wall murals depicting historic events, ornamental lighting and streetscape, and the presence of the river. Many focus group participants also mentioned the parkettes and parks within Sandwich Towne as a unique feature contributing to the quality of life. Sandwich Towne was founded around the "four pillars" of society that are the freedom to worship, to assembly, to justice and to education. The intersection at Sandwich Street and Brock Street continues to emanate these founding values with a historic church, apartment building, historic MacKenzie Hall and jail, neighbourhood police station, and school, . As one participant stated, and echoed by many others, "Sandwich Towne is the oldest European settlement in Ontario and holds historical significance that needs to be preserved." Others stated, "It [Sandwich Towne] is the very beginning of Windsor."

Community Satisfaction

Focus group results showed that most people in general are very satisfied with Sandwich Towne as a place to live. When asked to comment on what they liked best about the community. The residents listed the best things about their community as being:

- People (friendly, proud of their heritage and community, respectful, caring);
- Heritage of community;
- Ethnic diversity;
- Small town feel;
- Convenience of having a business hub that provides essential services;
- Parks;
- Ability to walk to most destinations due to proximity, and
- Access to children's programming and activities.

The presence of nuisance impacts, or physical disturbances such as excessive noise, dust, traffic and aesthetics, is also related to how residents use and enjoy their property. The presence of such nuisance features often defines what attributes residents dislike about their community. Focus group participants where also asked to identify what they liked the least about the community. Respondents indicated the following:

- Noise and vibration from trucks on the Ambassador Bridge;
- Large corporations buying up multiple homes without communicating what the future use of the property may be;
- Students at the University and other neighbours not cleaning up their yards;
- Businesses closing, houses for sale and/or demolished;
- Air and noise pollution;
- Perception that the west end of Windsor (Sandwich Towne) is a "dumping" ground for undesirable services, facilities or businesses;
- Resistance to invest in Sandwich Towne;
- Possibility of two international bridges;
- Disruption to the historical area of Sandwich Towne; and
- Lack of services and business.

Community Change

Both positive and negative changes were identified in the community within the last five to ten years. Positive changes include:

- Growing awareness of historical aspects and their significance to Sandwich Towne;
- Improved attitude from City of Windsor administration, e.g. new or enhanced park development in Sandwich, new sidewalks, decorative street lights, plantings;
- Revitalization of Sandwich Street;
- Implementation of Sandwich Towne Festival;
- Improved attitude and self-respect of residents, e.g. increased community involvement, increased caring and pride in community;
- Residents choosing to stay and additional people moving in to the community; and
- Safer community.

Negative changes seen by residents in the last five to ten years include:

- Increase of absentee landlords and rental properties, often used for student housing or left abandoned;
- Selling of residential and business properties to big corporations;
- Decreased enrolment at Forster High School;
- Development of pockets of "illegal rooming" houses;
- Increased volume of trucks;
- Significant and mature tree species being cut down;
- Changes in the built form e.g. fires destroying buildings, and new development;
- Increased industry in the community; and
- New and younger families moving to Sandwich Towne, that don't appear to take pride in the neighbourhood.

Some of these changes are the result of community based action or initiatives to improve the community, while other changes infringe on future development goals. Change will continue in the future as the community strives to implement the recommendations of *The Olde Sandwich Towne Community Planning Study (October 2006)*, and in so doing create a vibrant community where residents are proud to live, work and play.

Community Cohesion

Some of the information collected through various consultations gives an understanding of the cohesiveness of the community. Other sources of data include questionnaires delivered to potentially displaced residents and focus group workbooks and discussion.

Through public consultation and the focus groups, Sandwich Towne was portrayed by many as a close knit community measured by close relations with neighbours.

Ojibway Park to Malden Road

This area is located between Ojibway Parkway and Malden Road south of the E.C. Row Expressway (as illustrated in Exhibit 7.11).

Community Character

The area is primarily a natural environment with trails and mature trees. Residential development, some of which dates back to the 1930's, occurs in a strip format along the road network, that is, Matchette, Beech, Chappus and Armanda Streets. Participants in the focus groups were asked to describe the current character of the community. Residents listed the natural environment and the feeling of living "in the country" with the amenities of the city.

Community Satisfaction

When asked to comment on what they liked best and least about the community, residents listed the best things about their community as being:

- Friendly neighbours in a well established community;
- Nature and wildlife;
- Easy access to E.C. Row, the City (downtown), and the University of Windsor;
- A country-in-the-city atmosphere;
- Close to work, family, schools; and
- Enjoyment of home and property with family and friends.

Some residents indicated that they did not have any dislikes concerning their community. However, those residents that did list the things they like the least, listed:

- Air quality;
- Noise;
- Truck traffic;
- Pollution;
- Volume of traffic on Armanda and Matchette; and
- No sidewalks and open ditches.

Community Change

When asked what changes they have seen in their community in the last five to ten years, focus group participants identified:

- Increased noise levels;
- Increased volume of truck traffic;
- Decrease air quality;
- Increased awareness and concern with health issues related to changes in the environment;
- Increased development (i.e. Housing development) and growth in neighbourhood.

Community Cohesion

Focus group results indicated that people feel very close knit, getting together with neighbours several times a week.

Spring Garden Area

The Spring Garden area is bounded by Malden Road, E.C. Row and the Huron Church interchange, and Spring Garden Road. This community is delineated in Exhibit 7.11. Residential development occurs in a strip along the road network, that is, Spring Garden and Malden. Future residential land use development is planned for the area between E.C. Row Expressway and Spring Garden Road.

Community Character

Spring Garden Road is a mix of older and newly built homes. When asked to describe the current character of the community, residents identified it as a private and older established area in a park-like setting, with easy access to all transportation arteries and areas of the city.

The natural setting in which Spring Garden is situated, and its related offerings (e.g. wildlife, trails, mature trees) is valued by residents as a unique feature that defines the character of their community. Being close to all conveniences yet still able to watch wildlife in the yard is a unique characteristic of the community. Residents are able to enjoy the conveniences of an urban lifestyle without living on a main transportation artery.

Community Satisfaction

Focus group results showed that people are very satisfied with their community. When asked to comment on what they liked best about the community. The residents listed the best things about their community as being:

- Hiking trails;
- Watching the wildlife in their habitat; and
- The open green space, and private lots.

Focus group results showed that the use of residential property for a variety of purposes such as social and recreational was important. Outdoor activities include children's activities, entertaining friends and relatives, gardening, nature appreciation, bird watching, and relaxing. These outdoor activities were enjoyed during all seasons of the year, due in part to large property size and rural/natural character of the properties. None of the focus group participants, when asked what they disliked about the community, indicated they had any.

Community Change

Changes in the community in the last five to ten years included the addition of new houses, heavier truck traffic and expanded shopping malls in the broader community.

Community Cohesion

Residents that participated in the focus groups were asked to identify how close knit they felt towards their community. The results showed most people felt close knit and that they had developed close relations with their neighbours.

Bethlehem Area

Adjacent to Spring Garden Road and located on the edge of the Spring Garden Road Prairie is an in-fill residential settlement that is characterized by new homes surrounded by a forested area. The north end of Bethlehem connects to Huron Church Road and Spring Garden Road. As seen in **Exhibit** 7.11, the ACA encroaches into this community. The alignment for the access road passes through this area.

Community Character

The homes along Bethlehem, 6th Street and Lamont Avenue were built within the last 10 years. Residents enjoy a quiet setting, as both Bethlehem and Lamont dead-end at the forested area. The forested area offers wildlife viewing and recreation trails. Residents value the natural setting and low traffic volumes due to the dead-end streets. The character of the community is new, friendly, and quiet, and consists predominantly of retirees. The neighbourhood is central to shopping and medical services.

Residents that participated in the focus groups were asked to identify features that they felt were unique to their community. Many of the same features, that is the tranquility of living adjacent to a natural area and the low traffic volume as a result of living on a dead end street, were identified that also define the character of the community. Residents also value the convenient access to the major transportation arteries, such as E.C. Row for cross town travel and Huron Line to Highway 3.

Community Satisfaction

Residents experience a range of satisfaction with their community from very satisfied to somewhat satisfied. Generally, however, residents are satisfied with their community. When asked to comment on what they liked best about the community, residents listed the:

- Friendly, tolerant of people (all ethnic peoples);
- Proximity of nature and wildlife;
- Quiet and tranquil neighbourhood; and
- Easy access to services.

The use and enjoyment of their property also contributes to their feelings of satisfaction. Residents use their property for a variety of purposes including social and recreational. Outdoor activities include children's activities, entertaining friends and relatives, gardening, nature appreciation, bird watching, relaxing, yard work, and casual maintenance. Participants indicated they enjoy outdoor activities during all seasons of the year and do so due to the location of their property adjacent to a natural area, and for personal enjoyment and satisfaction.

The presence of nuisance impacts, or physical disturbances such as excessive noise, dust, traffic and aesthetics, is also related to how residents use and enjoy their property. The presence of such nuisance features often defines what attributes residents dislike about their community. Those residents that listed the things they like the least, listed:

- Increase in traffic, especially truck traffic, on Huron Church Road;
- Noise; and
- Pollution.

Community Change

Community change was not as relevant to focus group participants, as this is a new area; however, residents did identify the efforts of the Ministry of Transportation in purchasing properties from developers in order to protect the natural lands in the vicinity.

Community Cohesion

Residents that participated in the focus groups were asked to identify how close knit they felt towards their community. Responses varied from not very close knit to very close knit. Some of the participants have close relations with a few neighbours and visit almost daily with neighbours, while others enjoy their privacy and rarely socialize with neighbours other than in casual greetings and conversations. The range in cohesion can be attributed, in part, to the length of time residents have lived in this relatively new development.

Anecdotal evidence from public meetings suggested that several residents relocated to Bethlehem Street for their retirement due to its proximity to the natural area.

Bellewood Estates

Bellewood Estates is an established sub-division development located north of Huron Church Road, between E.C. Row and Pulford Street (see **Exhibit** 7.11). Bellewood Estates extends from E.C.Row to Grand Marais Road, and from Huron Church Road to the Randolph Avenue area. Well over 1,000 homes, several schools and parks are located within Bellewood Estates.

Community Character

Much of Bellewood Estates is an established residential community. When asked to describe the character of their community, residents that participated in the focus groups identified individual homes and well maintained properties. Residents felt that home improvements evident within their community reflect pride in ownership and the expectation that property values will increase.

Other unique features identified in Bellewood Estates include the variety of elementary and secondary schools (Catholic, French, public) available in the area, the variety of churches, recreation areas (park, ice rink, gyms), and the availability of medical service. The location of Bellewood Estates provides convenient and easy access to Highway 401, the US border crossing, and downtown Windsor for work.

Community Satisfaction

Generally, residents are satisfied with their community. When asked to comment on what they liked best about their community, residents listed:

- Unique architecture of homes in Bellewood Estates, i.e. individual structures/appearance. There is not a uniform look to the homes as is common with "builder projects" or more recently built subdivisions;
- Pride in ownership is evident on each property through landscaping and the upkeep of homes; and
- Mature trees.

The focus group results showed people use their property for a variety of purposes including social and recreational. Outdoor activities include children's activities, entertaining friends and relatives, swimming, gardening, nature appreciation, bird watching, relaxing etc. These outdoor activities are enjoyed during all seasons of the year due in part to the property location or characteristics. On responding to what people liked least about their community, many indicated the increasing traffic on Huron Church Road and decreasing property values in their neighbourhood.

Community Change

When asked what changes they have seen in their community in the last five to ten years, the residents identified an increase in larger, more expensive housing. Residents also felt that the public parks and green spaces adjacent to Huron Church Road have been well maintained. A more recent change residents identified is that they feel their property values are threatened and that homeowners morale has decreased.

Community Cohesion

Focus group showed that many people felt their community was somewhat close knit or very close knit. Some residents indicated that they enjoy their privacy, and rarely socialize with neighbours, while others indicated that they have close relations with a few neighbours.

Residential In-fill Between Grand Marais Drain and Pulford Street

The residential in-fill between Pulford Street Grand Marais Drain is shown on Exhibit 7.11 and is within the ACA. The access road alignments may potentially affect this residential area.

Community Character

The area east of Bellewood Estates and the Grand Marais Drain is characterized as a relatively new in-fill residential development with the oldest home dating back to 1997. The area is quiet, and residents display their pride in home ownership through well maintained and well landscaped properties.

The well kept houses were identified as a unique feature by focus group participants. The home owners association was also identified as a unique feature. Due to the home owner association, residents have been able to meet and socialize with their neighbours. Other unique features include the proximity of the neighbourhood to the South Windsor recreation complex, and walking paths in a naturalized area, and the proximity of local business within walking distance.

Community Satisfaction

Generally, residents are very satisfied with their community. When asked to comment on what they liked best about their community, residents listed:

- Nice area, close to everything;
- Easy accessibility to the surrounding environs e.g. walking trails along Grand Marais drain and Oakwood area.

Property uses include a variety of purposes involving social and recreational uses. Outdoor activities include entertaining friends and relatives, gardening, nature appreciation, bird viewing, and relaxing. Residents engage in outdoor activities during all seasons for the pure enjoyment of it and the resulting beautifying effects. When asked to comment on what they like least about their community, those that responded identified their close proximity to Huron Church Road and the resulting truck traffic noise and pollution.

Community Change

When asked what changes they have seen in their community in the last five to ten years, the focus group results identified growth in terms of new subdivisions and businesses, and an increase in truck traffic on Huron Church.

Community Cohesion

Residents that participated in the focus groups felt that the community ranged from being somewhat close knit to very close knit. Several participants identified that relatives live in the community that they visit often or almost daily. When asked how frequently they socialize with their neighbours, most people provided a variety of responses from rarely, as they enjoy their privacy, to occasionally, as they enjoy close relations with a few neighbours.

Huron Estates

The community of Huron Estates is located south of Huron Church Road between Lambton Road and the Grand Marias Drain/Turkey Creek. As depicted on Exhibit 7.11, Huron Estates is located on the periphery of the ACA. Huron Estates backs onto the parkland adjacent to the drain and the Spring Garden Road.

Community Character

The character of Huron Estates is characterized as a friendly community, convenient to shopping and all major amenities with lots of mature trees and opportunities for wildlife viewing. Due to the limited access into Huron Estates, traffic is localized, thus creating a low volume of traffic, semi-quiet, peaceful and safe environment for raising families.

When asked to identify unique features of their community, the focus group identified the mature trees, wildlife, and proximity to Turkey Creek and the Grand Marais ditch. Some participants also identified very light local traffic within Huron Estates and the privacy of not having neighbours in their backyards.

Community Satisfaction

Generally, residents of Huron Estates are satisfied with their community. When asked to comment on what they liked best about their community, residents listed:

- Convenient to shopping and work;
- Low volume of traffic;
- Safe neighbourhood to raise children;
- Beautiful and quiet; and
- Great neighbours.

Residents use their property for a variety of purposes including social and recreational. Outdoor activities include children's activities, entertaining friends and relatives, gardening, nature appreciation, bird watching, and relaxing. Residents indicated they enjoyed outdoor activities during all seasons of the year. This sense of enjoyment was reportedly due to convenience, and the importance families placed on outdoor and family activities.

Residents were also asked to comment on what they liked the least about the community. Those residents that listed the things they like the least, listed:

- Huron Estates adjacent to heavy traffic on Huron Church Road;
- Property taxes increasing every year; and
- Pollution coming from Huron Church.

Community Change

When asked what changes they have seen in their community in the last five to ten years, residents identified the addition of the Windsor Crossing Outlet shopping mall; generally, increasing traffic volumes on Huron Church and, specifically, an increasing number of trucks.

Community Cohesion

Although Huron Estates is an established neighbourhood, the focus group responses varied in terms of how close knit they were and how involved with their neighbours they are. Some residents felt the community was very close knit, they know most of their neighbours and have close relations with many of their neighbours, while other felt the community was only somewhat close knit and enjoy their privacy, thus rarely socializing with their neighbours.

Reddock Street

Reddock Street is located on the periphery of the Spring Garden Road between the Grand Marais Drain and Todd Lane. Reddock Street was part of a larger planned development at one time; however, due to the natural significance of the Spring Garden Prairie, additional residential development was stopped. Reddock Street consists of a cluster of 16 households and approximately 44 residents which is located partly within the ACA as shown in Exhibit 7.11.

All residents on Reddock Street are long term residents and have been enjoying this parklike setting for many years. Trails are integrated into the neighbourhood from the Spring Garden Prairie.

Community Character

The character of Reddock Street is characterized as an isolated and tranquil neighbourhood in a forested area. Unique features of their community include the natural features and the limited number of homes on the street.

Community Satisfaction

Residents are generally satisfied with their community. When asked to comment on what they liked best about their community, residents listed the peaceful surroundings and its natural attributes.

Residents use their property for a variety of purposes including social and recreational. Outdoor activities include children's activities, entertaining friends and relatives, gardening, nature appreciation, bird watching, and relaxing. Residents indicated they enjoyed outdoor activities during all seasons of the year.

Residents were also asked to comment on what they liked the least about the community. Residents identified that noise from Huron Church Road is what they like the least.

Community Change

Little has changed on Reddock Street in the last five to ten years, the same families have lived on the street for over 16 years. The exception is the construction of one new home in the mid 1990s.

Community Cohesion

Due to the length of tenure of the residents and the isolation of the community, residents feel close knit.

East of Huron Church Road

Between Pulford Street and Lennon Drain is a mixture of land uses within the ACA, including open green space and highway commercial. From Lennon Drain to Cabana Road West is a strip of residential properties between the Villa Borghese neighbourhood and Huron Church Road. These residential properties adjacent to Huron Church Road are located within the ACA as shown on Exhibit 7.11.

Community Character

Residents living along Huron Church Road characterized their community as being severely impacted by the volume of truck traffic. Due to the close proximity of the heavily traveled road way to their property, residents feel increased levels of stress and extremely unsafe in accessing their property, due to the volume of trucks traffic.

Community Satisfaction

Focus group results indicated residents were very dissatisfied with their community as a place to live. When asked to comment on what they liked best about their community, residents were not able to identify one attribute, rather they offered that it is unsafe for children or pets to be outside. Residents that participated in the focus groups identified truck traffic as the thing they like the least about their community.

Community Change

Participating residents had not lived in the neighbourhood long enough to comment on changes in the community over the past five to ten years.

Community Cohesion

Residents that participated in the focus groups were asked to identify how close knit they felt towards their community. The results showed they were not very close knit, as they enjoy their privacy and do not get together with neighbours.

Villa Borghese

The Villa Borghese neighbourhood is located between Cabana Road West and the Lennon Drain on the east side of Huron Church Road. Exhibit 7.11 illustrates its location in relation to the ACA.

Community Character

Villa Borghese is characterized as a well established quiet and family oriented community. Neighbours are close and enjoy the convenience of easy access to services. A unique feature to Villa Borghese is that although the volume of traffic along Huron Church is high and unsafe, the volume of traffic within Villa Borghese is low.

Community Satisfaction

Generally, residents in Villa Borghese are either somewhat or very satisfied with their community. When asked to comment on what they liked best about their community, residents listed:

- The people;
- Multiple opportunities for outdoor activities (e.g. walking, bike riding); and
- Strong sense of community.

One focus group participant felt their strong sense of community was being destroyed by the proposed project (DRIC).

The use and enjoyment of their property also contributes to their feelings of satisfaction. Residents use their property for a variety of purposes, including social and recreational. Outdoor activities include children's activities, entertaining friends and relatives, gardening, nature appreciation, bird watching, and relaxing. Residents indicated they enjoy outdoor activities during all seasons of the year and do so due to the convenience, and their property characteristics.

Residents listed things they least liked in their community:

- Excessive traffic on Huron Church Road;
- Noise from truck traffic on Huron Church Road; and
- Pollution from truck traffic on Huron Church Road.

Community Change

When asked what changes they have seen in their community in the last five to ten years, residents identified increased noise and pollution from truck traffic on Huron Church, and Residents also expressed concern with regard to the DRIC planning process.

Community Cohesion

Residents that participated in the focus groups were asked to identify how close knit they felt towards their community. Most people identified that they felt close knit and that they had developed close relations with a few of their neighbours.

Kendleton Court

Kendleton Court is a new residential pocket north of Talbot Road, east of Cousineau Road. The development is shown on Exhibit 7.11 and is located within the ACA.

Community Character

The Kendleton Court development was built within the last five years. The area is very convenient to access services in the area.

Community Satisfaction

Generally, residents are satisfied with their new neighbourhood. When asked to comment on what they liked best about their community, residents listed the convenience to airports, sports venues, and the milder climate in Windsor.

Residents were also asked to comment on what they liked the least about the community. Those residents that listed the things they like the least, listed:

- Air pollution, and
- Smog and noise from trucks.

Community Change

Residents have not lived on Kendleton Court long enough to comment on changes other than the obvious in-filling of development.

Community Cohesion

Residents felt that their community is not very close knit. They were divided in terms of the relationship they experience with neighbours, some rarely visit with neighbours, however, others have close relations with a few neighbours and visit one or two times a week.

Talbot Road

The Talbot Road community is split by both political boundaries and the physical barrier presented by the existing transportation corridor. Talbot Road serves as the municipal boundary between the City of Windsor, located north of the transportation corridor, and the City of LaSalle, located to the south. Exhibit 7.11 illustrates the location of the Talbot Road community within the ACA.

Anecdotal evidence provided at the focus groups indicated that although residents would like to be able to cross the road and visit with neighbours, they don't due to the barrier imposed by the traffic along Talbot Road.

Talbot Road residents live on very unique properties that were originally built in a ribbon strip along the Talbot Road transportation corridor. Many of the homes are set back from the road on large wooded and very deep lots (100ft X 400ft +) thus creating an almost rural or pastoral atmosphere despite the fact that they are adjacent to a busy transportation corridor.

Community Character

Focus group participants described their community as caring and friendly, where neighbours help each other out. Concerns were expressed about declining property values, the inconvenience and "trauma" of road work, and the loss of character and beauty of the Talbot Road properties due to road developments.

When asked what they thought was unique about their community, in addition to the large deep lots, residents identified a number of natural features such as mature trees, and the presence of wildlife such as deer, fox, ducks and geese. Residents also felt that the relationship with their neighbours was unique in that they interact on a daily basis, enjoy neighbourhood BBQs and picnics in summer, and celebrate family life events (weddings, funerals) and other special or annual holiday events together. Residents also listed the proximity to shopping (Windsor Crossing Outlet Mall), church, parks, schools, and the International crossing as a unique feature of their community.

Community Satisfaction

Generally, residents are very satisfied with their community; however, some residents indicated that they are not satisfied due to the volume of traffic on Talbot Road/Highway 3, and specifically the volume of truck traffic and associated noise. The level of satisfaction did not seem to differ from the north (Windsor) side of Talbot Road to the south (LaSalle) side. When asked to comment on what they liked best about their community, residents listed:

- Neighbours/friends,
- Individual property – large lots, privacy, forest/trees, well maintained house and yard,

- Attractiveness of neighbourhood with large lots, many trees and walking areas,
- Similarity of education and background of neighbours; and
- Feeling like living in the country, in a forest glade, while living in the city.

One focus group participant offered, "Not one thing but the sum of the total makes it all work - accessibility to the Windsor Crossing Outlet mall and church across the street, access to the border and St Clair College and access to the forest behind our house".

Property use varies and includes social and recreational uses. Outdoor activities include children's activities, entertaining friends and relatives, gardening, nature appreciation, bird watching, and relaxing. Residents indicated they enjoy outdoor activities in their backyards during all seasons of the year and do so due to their unique property characteristics. When discussing how residents use and enjoy their property, one resident offered, " …we have a huge yard which we have (over the last 20 years) transformed into a hub of activity for ourselves, our kids and our grandkids – including gardens, pond, potting shed/green house, pool and games area."

Residents were also asked to comment on what they liked the least about the community. Those residents that listed the things they like the least, listed:

- Heavy truck traffic making it difficult to get out of the drive way;
- Perception that personal safety is compromised by heavy traffic;
- Noise, pollution and delays caused by trucks;
- Lack of city services; and
- Increasing volume of traffic on Talbot/Highway 3.

Community Change

When asked what changes they have seen in their community in the last five to ten years, the following was identified:

- Increased volume of traffic on Talbot Road/Highway 3;
- Increased difficulty (i.e. longer wait times) and danger in getting in/out of the driveway;
- A new shopping mall, and new school;
- A busier seniors living complex;
- Traffic noise all day every day, with a noticeable increase since the stop lights installed at St. Clair College; and
- Growing anxiety due to Talbot Road/Highway 3 proposals (including DRIC) and the consequential impact on property values.

Community Cohesion

Talbot Road/Highway 3 residents believe that they are a somewhat close knit group measured by their close relations with neighbours. Generally, the ties seem to be restricted to one side of the highway. The neighbours that socialize together live adjacent to each other on either the north or south side of Talbot Road/Highway 3.

For those that do have relatives in the community, they visit several times a week. One focus group participant stated, "we have created an environment where our grown children and their children meet at least once a week."

Heritage Estates

Heritage Estates is a large residential development located east of the Windsor Crossing Outlet Mall, north of Heritage Drive and west of Montgomery Drive. As Exhibit 7.11 illustrates, only a small portion of Heritage Estates is located within the ACA.

Community Character

Focus group participants had different attitudes about their community depending to some extent on where they were located; while some residents spoke of enjoying quiet areas outside in the Heritage Estates area, some residents along Homestead Lane felt less connected with their neighbours because their use of their outdoor space is curtailed due to existing noise levels from traffic on Highway 3.

Due to the diversity of land uses, some residents at the focus groups identified that they walk to work, recreational facilities, shopping, and to other amenities, thus reducing the dependency on the automobile and the need for a second car. Some residents also identified their proximity to St. Clair College as a unique feature.

Community Satisfaction

Focus group results indicated that residents had a range of satisfaction with their community from somewhat dissatisfied to very satisfied. When asked to comment on what they liked best about their community, residents listed:

- Walking distance to many amenities;
- Close proximity to church;
- Close proximity to major road ways, including Highway 401; and
- Safe neighbourhood.

The use and enjoyment of their property also contributes to their feelings of satisfaction. Residents use their property for a variety of purposes including social and recreational. Outdoor activities include children's activities, entertaining friends and relatives, gardening, nature appreciation, bird watching, and relaxing. People indicated they enjoy outdoor activities during all seasons of the year and do so due to the convenience, and their property characteristics.

Residents were also asked to comment on what they liked the least about the community. Those residents that listed the things they like the least, listed:

- Truck traffic;
- Noise from traffic; and
- The mess and noise associated with the construction of new homes and shopping plazas.

Community Change

When asked what changes they have seen in their community in the last five to ten years, some the residents did not identify anything, while others indicated that they have lived in the community less than five years. Those that did respond indicated they have observed an increase in traffic along Huron

Church, an increase in traffic with the expansion of Windsor Crossing Outlet Mall, the building of Heritage Plaza, a new school and many new homes in the area.

Community Cohesion

Some residents felt their community was very close knit and enjoyed close relationships with neighbours, while others felt it was not very close knit and that they rarely (that is, once or twice a year) socialized with neighbours.

Oliver Estates

This community is located from Montgomery Drive to Howard Avenue. Several of the residential streets within the area provide access directly onto Talbot Road. As identified in Exhibit 7.11, the ACA encroaches into the periphery of a portion of the neighbourhood.

Community Character

This section of the ACA is located in LaSalle and is part of an older community with many long-term residents. The community is presently characterized by residents as a mixed demographic with young families and retired seniors. The area, bound by Montgomery, 6th Concession Road and Howard Avenue was described by residents as quiet, conservative, and peaceful. Several participants identified the community as a family oriented residential area, others described the area as busy and complained of truck traffic noise from Highway 3.

Unique features valued by residents include mature trees, little traffic on neighbourhood streets, the architectural mix of old and new homes, and large lot sizes. Focus group participants also identified the multi-generational aspect of their community as a unique feature contributing to the character of the Oliver Estates area.

None of the streets in the community have sidewalks; however, with the exception of Montgomery Street, low volumes of traffic utilize the local road network and consequently, residents feel safe walking and cycling on the road. Montgomery serves as a connecting route between Highway 3/Talbot Road and other LaSalle neighbourhoods. As such, is used by commuter traffic in the morning and afternoon. Residents living on Montgomery complain of heavy traffic and excessive speed during these times.

Community Satisfaction

Generally, the residents living in this area are very satisfied with their community. When asked to comment on what they liked best about their community, residents listed:

- Safe community;
- Convenient to shopping, entertainment, church, and schools;
- Mature trees and wildlife;
- Time spent outdoors (walking, enjoying nature);
- Quiet residential streets; and
- Wide lots (i.e. houses are not too close in proximity to one another).

Residents use their property for a variety of purposes including social and recreational. Outdoor activities include children's activities, entertaining friends and relatives, gardening, nature appreciation, bird watching, and relaxing. Participants indicated they enjoy outdoor activities during all seasons of the year and do so due to the convenience, and properties characteristics.

Residents, asked to comment on what they disliked about the community, identified noise and pollution from truck traffic on Highway 401 and Howard Avenue.

Community Change

When asked what changes they have seen in their community in the last five to ten years, residents identified increased noise level from trucks, increased traffic on both Highway 3/Talbot Road and Howard Avenue, and increased difficulty in accessing Huron Church Road. Residents also observed an in-fill of new homes on vacant lots and the demolition of older homes that are replaced with modern homes. Other changes include the development of a trail system and parks throughout the area.

Community Cohesion

Generally, people felt their community was close knit. Some enjoyed close relations with a few neighbours, while others enjoyed their privacy and rarely socialized with their neighbours. Some residents also enjoyed having relatives living in the community that they visit often, in some cases, daily.Shadetree Court

The Shadetree Court is a new residential in-fill located north of Talbot Road immediately west of Howard Avenue. This new residential development is shown on Exhibit 7.11 and is located at the periphery of the ACA.

Community Character

Shadetree Court is part of a larger neighbourhood that is still being developed. Undeveloped lots are still available on Shadetree Court. Residents defined the character of this residential community as friendly, safe, and a beautiful place to live with churches, parks and shopping amenities in close proximity. Unique features identified include Mathew Rodzick Park, and Windsor Crossing Mall shopping and restaurants. The proximity to shopping and daily activities made the new subdivision attractive for retirement living for some residents.

Community Satisfaction

Generally, residents are very satisfied with their new community; however, some indicated that since the announcement of the proposed Practical Alternatives, they have become very dissatisfied. When asked to comment on what they liked best about their community, residents listed that they are close to the elementary school.

Residents were also asked to comment on what they liked the least about the community. Residents identified noise from truck traffic as a feature they liked least about the area.

Community Change

When asked what changes they have seen in their community in the last five to ten years, some focus group participants identified:

- The increase in truck traffic on Highway 3 and the associated increase in noise and pollution;
- A large number of homes for sale in last 12 months.

Some residents feel that the noise level from trucks has increased to the point where they feel they can no longer open the windows, or sit outside. Residents complained that the peace and relaxation they expect to enjoy in their home is disturbed by the increasing noise levels.

Community Cohesion

Some residents felt that their community is very close knit. They enjoy visiting almost daily with relatives that live in the community and get together almost daily with neighbours as well. Those that felt the community was close knit indicated that they know most of their neighbours, and they go out of their way to have close relationships with many of them. In contrast, other residents indicated that the community is not very close knit and provided anecdotal evidence that since it is a new subdivision, it will take another ten years to establish itself.

Southwood Lakes

Southwood Lakes, located north of the existing Highway 401 ROW and includes a mix of housing, lakes and parkland. The community is located on the periphery of the ACA, as illustrated in Exhibit 7.11.

Community Character

Unique to this community, several residents identified the larger City of Windsor as their community, and as such characterized their community as a border community with Detroit, Michigan. The City of Windsor is a close knit small neighbourhood in a larger city setting (Detroit).

Unique features of the Southwood community include its friendliness, close proximity to the U.S.A, access to cultural and sporting events and restaurants on both sides of the border, and, their local neighbourhood Social committee. Other features include the organized home ownership group, the similar lifestyles neighbours enjoy and the close proximity to all amenities.

Community Satisfaction

With the exception of the truck noise, generally, residents are very satisfied with their community. When asked to comment on what they liked best about their community, residents listed:

- Quiet, safe, comfortable, and peaceful;
- Small community (Windsor) that has access to the larger community (Detroit);
- Friendly neighbours, beautiful surroundings; and
- Privacy.

Residents use their property for a variety of purposes including social and recreational. Outdoor activities include entertaining friends and relatives, gardening, nature appreciation, bird viewing, and relaxing. Residents indicated they engage in outdoor activities during all seasons for the pure enjoyment of it and the resulting beautifying effects. When asked to comment on what they like least about their community, very few had any; however, those that had dislikes identified noise and pollution from truck traffic.

Community Change

When asked what changes they have seen in their community in the last five to ten years, people identified increased traffic volume and noise levels, neighbourhood growth (new homes built), and the presence of "For Sale" signs. Focus group participants who addressed the broader City of Windsor community identified the loss of employment in the automobile industry, the emergence of high technology industry, significant changes in multi-cultural attitudes, and a general feeling that community activism related to social, environmental, political and economic issues has increased.

Community Cohesion

When asked about community cohesion, residents felt a range from 'somewhat close knit' to 'very close knit'. Several had relatives in the community that they visit either daily or several times a week. In terms of their relationship with neighbours, residents indicated that they have close relations with a few or in some cases, many of their neighbours. It appears that at a minimum, they know most of their neighbours and go out of their way to develop close relationships with many of them. Getting together with neighbours also varies, between daily visits to two or three times per month.

East of Howard Avenue

The neighbourhood south of the Highway 401/3 corridor and east of Howard Avenue within the Town of Tecumseh consists of strip residential development along Howard and a cluster of residential lots on Mero Avenue (see Exhibit 7.11). The remainder of the area is predominantly active agricultural land. There are few homes in this section of the ACA and even fewer people attended the focus group meeting, consequently, data collected in this area is limited.

Community Character

Residents from the Mero Avenue area described their neighbourhood as quiet, with limited traffic, but with easy access to the major transportation routes (Howard Ave, Highway 401 and Highway 3).

Community Satisfaction

Mero Avenue residents are very satisfied with their community as a place to live. When asked what they like best about the community as a place to live, people identified the area, and their specific property and all it offers.

Residents use their property for a variety of purposes including social and recreational. Outdoor activities include entertaining, gardening, nature appreciation, bird viewing, children's activities, and relaxing. People engage in outdoor activities during all seasons due to the property characteristics. When asked to comment on what they like least about their community, none were identified.

Community Change

Focus group participants identified an increase in the traffic volume as a change they have seen in their community in the last five to ten years.

Community Cohesion

People generally felt they were a close knit with their neighbours, getting together often with neighbours, that is, at least 1 or 2 times a week.

BUSINESSES IN THE AREA OF CONTINUED ANALYSIS

Businesses in the Area of Continued Analysis provide a wide variety of services (e.g. accommodations, food, clothing, equipment, vehicular garage repair and gas facilities). The businesses serve both the local neighbourhood and the travelling public. The social impact assessment considered the displacement of businesses that serve the local community in terms of how such displacement may affect social patterns and community functions. Such businesses include:

- Golden Griddle;
- King Kone (seasonal);
- Petro Canada;
- Daytona Car Wash;
- Lambton Plaza (10 businesses);
- Tim Horton's;
- Fred's Farm Fresh;
- Alibis Sports Bar;
- Mac's;
- XTR Gas;
- Vachon Bakery Outlet; and,
- Wide array of stores in the Windsor Crossing Outlet Mall.

The *Economic Impact Assessment (May 2008)* addressed the economic impacts to the City and the region resulting from the displacement of businesses within the ACA.

Brighton Beach Industrial Park Area

Although not a “community”, the Brighton Beach Industrial Park area is located between the Detroit River shoreline to Ojibway Parkway

Community Character

Only a handful of homes still exist in this area as a result of the City land use designation to industrial uses and subsequent land purchase. Broadway Street is maintained with access off Ojibway Parkway, thus access to Broadway Park and Ojibway Black Oak Woods is maintained. Residents utilizing both parks drive to them via Broadway Street.

The community character of the neighbourhood is described as largely an industrial park area with few private dwellings in the south end near Ojibway Parkway and other private dwellings on the fringe of Sandwich Towne to the north. Industries present in the area include Hydro One, the Brighton Beach Power Station, the Windsor Power Plant, and the Nemak Plant among others.

Community Satisfaction

There is little community to speak of with respect to community satisfaction within the industrial park area.

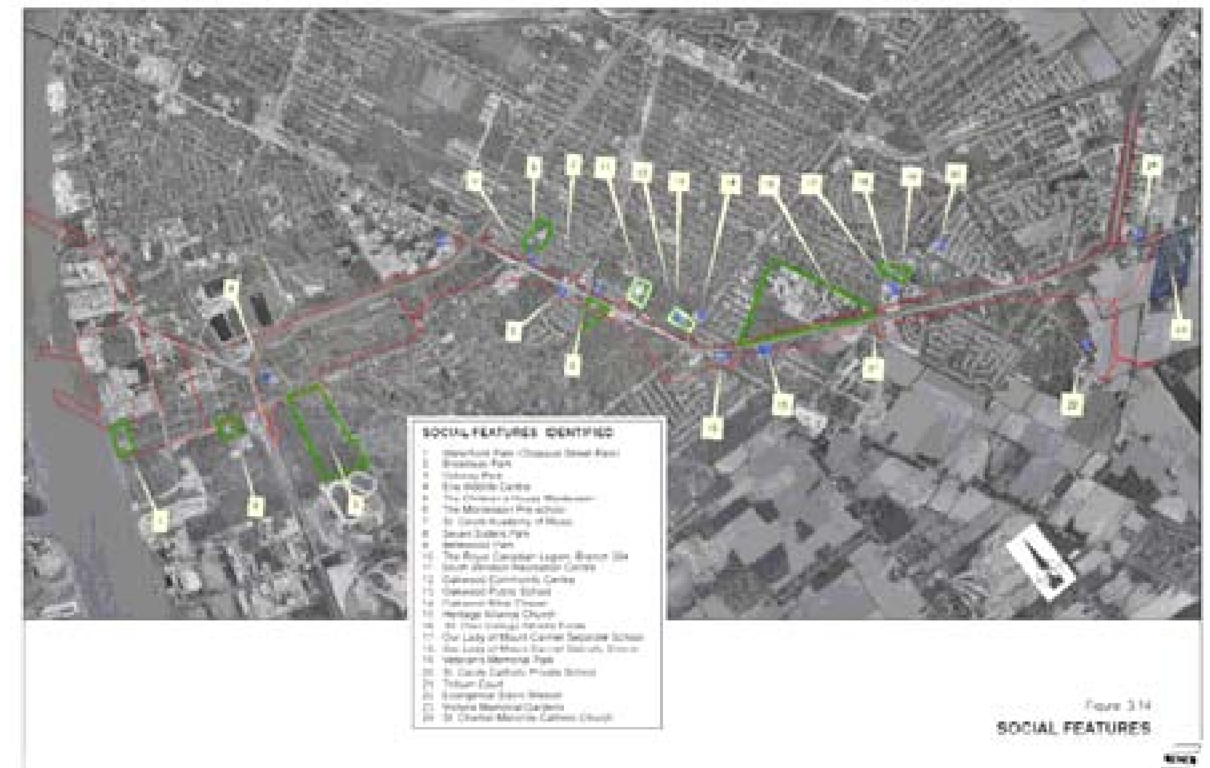
Community Change

With respect to community change, function and community cohesion there is little to speak of within this area of the ACA as the neighbourhood is characterized by industrial use. Although, ancillary effects to Sandwich Towne would be more appropriate to describe, displacement as a result of the plazas and crossings only affects two houses within this community and is not representative of the surrounding community at large. The potentially displaced dwellings are located in a land use transitional area where industrial land uses predominate.

SOCIAL FEATURES WITHIN THE AREA OF CONTINUED ANALYSIS

Social features identified within the Area of Continued Analysis, fall into either recreational (e.g. parks, community centres) or institutional (e.g. Churches, schools). Some of the features serve the neighbourhood community while others serve the broader community. The social features described below are identified in **Exhibit** 7.7 which illustrates the location of each social feature. For discussion purposes, the social features are grouped and presented from west to east (i.e. from the Detroit River to Highway 401).

EXHIBIT 7.13 – SOCIAL FEATURES ASSOCIATED WITH THE ACA



Institutional Social Features

The Erie Wildlife Rescue (EWR) is located within the Area of Continued Analysis. It is a registered charitable organization dedicated to the treatment and temporary care of injured, diseased, or orphaned wildlife, and their subsequent release into the appropriate habitats in the wild. The organization is based out of an old school building located on a cul-de-sac east from Ojibway Parkway on Chappus Street. The organization is situated on approximately 1ha of land surrounded by a natural bush-like setting. Although the organization has been around since 1979, they have occupied this present location for the last 10 years.

Membership is on a volunteer basis. Current membership is 80 people, with the addition of approximately 20 student volunteer staff. Core members, numbering 15 people, have been with the organization for more than 10 years. Many of the volunteers use the City of Windsor public transit to access the facility. At any one time six staff would be on hand providing services seven days a week during ‘summer’ months of May to August. During this period office hours run from 8 a.m. to 8 p.m.

weekdays, and 12 p.m. to 4 p.m. on weekends. Operation during 'non-summer' months is on an as-needed basis.

Current facilities on the property include a large school building which houses an administrative office, scrub area, exam area, food preparation area, media rooms/education rooms, animal care rooms and a nursery area. Approximately half the building is dedicated to animal care. There is one portable building on the premises which is used for fund-raising purposes. At least a quarter of an acre is occupied by an outdoor caging area that is used for pre-releasing conditions for animals.

Erie Wildlife Rescue provides two main services, a) a telephone advisory service for dealing with nuisance animals, and b) wildlife rescue and rehabilitation of injured, diseased or orphaned wildlife. The service catchment area is all of Essex County. In 2006, the telephone advisory service received 4,000 calls, and during the same year, 700 animals were treated and rehabilitated. Activities or programs include a) wildlife rehabilitation, b) education/orientation, c) fund-raising, and d) volunteer development. Wildlife rehabilitation is year-round; however, the majority of the activity occurs from May to August. Their education/orientation function comprises of monthly meetings held for volunteers. As a non-profit organization, fund-raising is critical to their continued success; consequently, five fundraisers are held annually, three in the spring and two in the fall. Fund-raising activities include yard sales and bake sales, bingo, a walkathon in the spring, and frozen cookie dough sales in the Spring and Fall. Grant applications to funding organizations, such as the Ontario Trillium Foundation, also contribute to their revenue.

The Children's House Montessori, located adjacent to the ACA on LaBelle Street in Bellewood Estates, is a member of the American Montessori Academy. It has been in its current location for 20 years. The Children's House Montessori provides education and daycare services for children from infant age through to senior kindergarten (age 5). This is the only facility that provides Montessori programming to infant age children in Essex County. Enrolment is at capacity at 396 students, and the school manages roughly 210 students per day during its regular hours (6:30 a.m. to 6 p.m.) from Monday to Friday. Families utilizing this facility come from LaSalle and South Windsor. Approximately 400 vehicles access the facility during the morning drop-off period.

The school facilities include a cafeteria, resource room, staff room, parent room, a number of class rooms and administration offices. Outside, three fenced and segregated play areas provide jungle gyms with slides and other equipment for infants, toddlers and preschool children. Bellewood Park, a community park located across the street is also used for stroller walks on a regular basis.

In addition to the academic and structured activities that include music, dance, and art, special education programs are offered to learning and physically impaired children. Approximately 30 physically impaired students from seven different local schools attend the Children's House Montessori for care before and after their regular school hours. The school also provides internship opportunities for early childhood educators. Approximately 20 volunteers assist the fulltime staff in this capacity.

The Montessori school has a unique relationship with nearby Bellewood Public School as it serves as a feeder school to Bellewood's kindergarten.

The Montessori Pre-school is located within the ACA in Lambton Plaza on the corner of Lambton and Huron Church Road. The Pre-school has been operating for nine years in the Lambton Plaza, open to children ages 3 to 5 years, the Pre-school operates Monday to Friday from 8:45 am until 3:15 p.m. The Pre-school is closed for the month of August. The majority of students come from a catchment area defined by South Cameron Blvd. to the north, Howard Avenue to the east, Malden Road to the south-west, and the University of Windsor to the west.

Children attend the Pre-School either for the morning or afternoon session only. There are no full-day students permitted as there is not an outdoor play space associated with the school. Combined, there are approximately 25 students and two full-time staff at the Preschool. Enrolment has been steady over the past five years and is expected to remain steady over the next three years.

St. Cecile Academy of Music located outside the ACA on Grand Marais Road West, has been in its present location for 22 years. In addition to being a private music school, it also offers a year-round nursery school Monday to Friday from 7:30 a.m. to 5:30 p.m. for children aged 2.5 years to 5 years of age. The nursery school serves a wide area including South Windsor, LaSalle and as far away as Bell River and Amherstburg. The proximity of the school to E.C.Row Expressway, Huron Church Road and Highways 3 and 401, provides convenient access to the facility regardless of the direction clients are traveling from.

The private music school offers various music and dance programming for children starting at age 3 up to adults. The music program is run from 3:30 to 9 p.m. weekdays and from 8 a.m. to 6 p.m. on Saturdays. During the summer, music programs are also offered weekdays from 7:30 a.m. to 7:00 p.m. Enrolment for the 2006- 2007 school year was between 600 and 700 students (including the Nursery School). Projections for the next three years indicate that enrolment is anticipated to increase to their facility capacity (900 students) in 2008.

The Royal Canadian Legion, Branch 394, is located within the ACA between Highway 3 and Huron Church Line. The Legion has been at this location since 1965. The Legion's membership of 700 comes from the City of Windsor, LaSalle, Tecumseh and parts of Essex County. With the exception of Christmas day, the Legion is open every day of the year from noon until 11 p.m. in the summer and 1 a.m. the rest of the year.

The facility includes a banquet hall with a capacity of 300 that is used for weddings, anniversaries, and dances; a sports room and bar; and, an all-purpose meeting room (with a capacity of 200). The lobby and hallway also serve as a memorial/museum with regiment displays and artifacts from the world wars. A cenotaph is located outside the entrance-way. Annual Remembrance Day services are held at the Legion cenotaph.

Programming at the Legion includes themed meals and events, that draw approximately 150 members, daily summer time BBQs, All-you-can-eat Sunday Breakfast, dart leagues (ladies, men and mixed), pool leagues, euchre and cribbage nights, seniors day events where typically between 100 and 125 seniors attend, and senior dinner and dancing. A large screen television in the sports room and bar provides coverage of televised sporting events, typically drawing approximately 100 members to these events. In addition, the banquet hall and/or meeting room is rented on Friday and Saturday nights for weddings, showers, and the like. The membership general meeting and executive meet once a month on-site.

Oakwood Public School is located outside the ACA on Cabana Road West, north of Huron Church Road. The school has been operating out of its present location for 40 years. The enrolment for the 2005/2006 school year for classes ranging from junior kindergarten to Grade 8 is 317 students. School enrolment has been increasing; however, the school boundaries for Oakwood Public School were re-defined to accommodate a new public school opening; consequently, enrolment was down by approximately 100 students for the 2006/2007 school year. Enrolment is anticipated to increase, with the School Board projecting enrolment to reach 282 by 2010. The catchment area for Oakwood Public School includes areas both north and south of Huron Church Road. The area south of Huron Church Road includes the Spring Garden neighbourhood, and the area bound by Malden Road to Todd Lane. North of Huron Church Road the catchment area is bound by the Grand Marais Drain to the west, Talbot Road to the east, Askin Avenue and Geraedts Drive to the north. Students from the neighbourhoods south of Huron Church Road are bused to the school, accounting for less than one-third of the student population.

Outdoor recreation facilities at the school include a baseball diamond, open playgrounds, playground equipment (swings, climbers, etc), and a soccer field. Adjacent to the school is the City of Windsor's Oakwood Bush that includes trails and a wildlife sanctuary. Learning opportunities provided by the bush are incorporated into the school curriculum by the teaching staff. The school adjoins the Oakwood Community Centre run by the City of Windsor. The Community Centre and School share facilities for programming purposes and have done so for many years. The school runs after school sport programs (soccer, track and field and cross country) in the spring and fall each year. Between 30 and 115 students participate in these programs. Community groups also use the school facilities (indoor and outdoor) on a regular basis throughout the year.

Oakwood Public School offers special education to 14 learning disabled students in the primary, junior and intermediate levels.

Oakwood Bible Chapel is located outside the ACA on Cabana Road West at Betts Avenue. The Bible Chapel has been in its present location since 1967 and draws parishioners from LaSalle and many parts of South Windsor. Membership is estimated at 350, with almost half of those consisting of youth and children. Hours vary throughout the week and are dependent on scheduled programming. The Bible Chapel does not have full time office hours. The building itself includes a sanctuary, kitchen, eleven classrooms and finished basement. The Manse associated with the Oakwood Bible Chapel provides accommodation for a family in need in the community. Although outdoor facilities are not provided at the Chapel, the parking lot is used by local youth as a skating boarding facility.

Oakwood Bible Chapel maintains an active junior and senior church school during both worship services on Sunday. Prayer meetings and bible studies are held on Tuesday mornings and evenings. Other functions that occur at the facility include weddings, funerals, conferences and daily bible school for one week in August. For weddings, conferences, and the daily bible school in August the facility has a capacity of 300, which is often filled during these events.

Other community groups regularly use the property, such as the Girls and Boys clubs, Revenue Canada outreach for Seniors, Gideons annual meeting and dinner, and IMPACT youth conference, all of which combined account for another 350 to 410 users.

The Heritage Park Alliance Church is located with the ACA on Highway 3, and was built in its present location in 1985. The Heritage Park Alliance Church consists of approximately 1300 families, accounting for the 1700 plus members and anticipates its membership to continue growing. The church members originate primarily in the City of Windsor and LaSalle; however, members come from throughout Essex County including Amhurstburg, Tecumseh, and Kingsville. Given the diverse geographic origin of its membership it is important to the Heritage Park Alliance Church that they maintain their existing access to Talbot Road/Highway 3.

The facility is open seven days a week and offers various programming most evenings. Three worship services are held each week, the first Saturday night and two Sunday morning. In addition, the facility also hosts an Indonesian worship service on Saturday that draws people from throughout Essex County. Other programs offered include an active nursery and children's program during worship services, a morning pre-school program for mothers and children during the week, various evening youth groups, adult electives, various meetings and functions related to church business, and weddings and funerals. Special productions/services are held at Christmas and Easter that draw upwards of 2,500 people.

The Chartwell Classic Oak Park LaSalle retirement community facility is located on Thirteenth Street outside the ACA south of the Huron Church Road / Highway 3 corridor. The facility has been at this location since September 2005. It houses 125 residents that come from West Windsor, South Windsor, LaSalle, Amherstburg and Michigan State.

The facilities include 113 suite residences with three interior courtyards, a raised gardening bed (to allow residents to garden while standing), 5.5 acres of open grounds surrounding the facility perimeter, a hall/theatre, and a small library. Facility access is controlled during designated visitor hours, and the facility doors are locked at nightfall.

Programming includes meals preparation (three times daily), laundry and housekeeping services, hairstyling and foot care services, physical fitness classes and a variety of social activities and planned excursions for residents. A physician is available on a weekly basis and operates on-call and with a staff of nurses who are available 24 hours a day. The facility has programming to accommodate co-op students and nurses training programs from local institutions and organizations. They also provide an opportunity for high school students to attain their requisite community hours through volunteer work at the facility.

Our Lady of Mount Carmel Separate School is located along the ACA north of Huron Church Road off Cousineau Road and has been in this location, since 1949. School enrollment for 2005/2006 school year for junior kindergarten through grade 8 is 575 students. Enrolment has been increasing over the past five years and is projected to continue to increase over the next three years to 650 in the 2008/2009 school year. The catchment area for the school is bound by Talbot Road, Highway 401, Dougall Parkway and Villa Maria Blvd. Approximately 90% of the students are bused, with the remaining walking via Cousineau Road and Mount Royal Drive.

In addition to the classrooms and administration office, facilities at the school include a library, and gymnasium inside the school. Outside facilities include an open playground, playground equipment, soccer field, and basketball area. The school does not offer any extra-curricular programmes after regular school hours; however, the school is used several times a week for community programs. Our Lady of Mount Carmel offers special education programming for students integrated in the regular classrooms. Approximately 10 volunteers assist at the school on a daily basis.

Our Lady of Mount Carmel Catholic Church is located along the edge of the ACA on Mount Royal Drive at Cousineau. The Church has been at this location for 52 years. Church parishioners come from between Spring Garden and Bouffard Road and Malden Road and Huron Church and Talbot Road. North of Talbot Road, Church parishioners come from between Cabana Road and Highway 401, Provincial Road to Talbot Road. Weekdays the Church is open 9 a.m. to 4:30 p.m. and 8:30 a.m. to 6:30 p.m. on Sunday.

Facilities at the Church include a meeting hall, church office and sanctuary. The Church does not have any outside facilities. Current membership for Our Lady of Mount Carmel Catholic Church is 5665 people, or 1872 families, 583 originating below Talbot Road and 1289 originating above Talbot Road.

In addition to the weekday and Sunday masses, the Church is also used for weddings and funerals. Several community groups, primarily consisting of adults or seniors use the facility for meetings throughout the week.

St. Cecile Catholic Private School. A part of the school ground south of the school buildings lies within the ACA and as such was included in the initial data collection for the practical stage. Additionally, Académie Ste. Cécile International School (ASCIS) is a coeducational, elementary and secondary school founded in 1993. Located on 27 acres of property off Cousineau Road for the last 10 years, the facilities include two main buildings with the larger building facility for secondary students and the smaller one for elementary school students. Aside from numerous classrooms and laboratories, the larger facility houses a cafeteria, hall, dance studio, chapel, and game room. The property also includes a number of sports and recreation facilities such as a baseball diamond, soccer fields, tennis courts, outdoor pools and open playground areas.

The school's facilities also serve as a boarding school for approximately 80 international students (from as far as Hong Kong, India and Korea). Locally, approximately 180 students come from as far as Belle River to Amherstburg.

Trillium Court is a Rent Geared to Income Housing community located partially within the ACA on the south west corner of Highway 3 and Sandwich Parkway, across from the Windsor Crossing Outlet Mall. It is managed by River Park Non-Profit Housing and falls under the jurisdiction of the City of Windsor Housing Services. The City of Windsor is the designated Municipal Service Manager responsible for the administration of social housing in the City and within County of Essex.

The housing at Trillium Court has some geared-to-income units consisting of duplexes and row houses. Three units are wheelchair accessible, 22 units are rented at market value, and all units adjacent to the Highway 3 have central air conditioning. The co-operative was built in 1989-1990. Units are predominantly occupied by families. Trillium Court is located close to schools and a City bus route.

Residents of Trillium Court can typically wait up to five years for a house after applying on the Centre Housing Registry. Currently, the waiting list on this registry totals 2000 families for all of Essex County, while the total number of geared-to-income units in the City of Windsor is 8,700. Trillium Court has a variable turn-over rate of 12 to 25 units per year. While the demand for geared-to-income housing in the area has been stable recently, it is expected to increase over the next three years.

The Evangelical Slavic Mission is located outside the ACA on Howard Avenue was identified as a social facility potentially disrupted by the project activities. It has been at its current location since 2001. The property includes a hall, church office, sanctuary, kitchen and dining areas, and 2 classrooms.

With a membership of roughly 50 people, the Mission provides services in funeral reception, marriage preparation counselling, and is a venue location for a variety of meetings (of religious and non-religious nature).

Victoria Memorial Gardens, a cemetery, is within the ACA along Highway 3. Recognizing that the junction where Highways 3 and 401 join Talbot Road will undergo some sort of re-alignment based on the access road alternatives, during the early data collection stage this Victoria Memorial Gardens was identified as a facility that may potentially become disrupted by project activities. The grounds hold approximately 8,000 funeral plots with some plots extending close to the property line boundaries. The Chapel and office area comprise the main building area. A funeral home is planned for the property lot abutting east of the Victoria Memorial Garden as permits for construction are forthcoming.

The St. Charbel Maronite Catholic Church is located adjacent to the ACA off Outer Drive in the Del Duca Industrial Park. The Church has been at this location for 16 years, a second property, 32 acres, located across Highway 3, is presently used for agriculture. Parishioners come from within a 15 km radius that includes Old Castle, LaSalle and Windsor. The Church is open 24 hours a day, seven day a week, with a pastor always on call, the administration office; however, is open from 8:30 a.m. until 2 p.m. on Mondays and as needed throughout the rest of the week. Regular masses are held every Saturday evening drawing between 100 and 500 parishioners, and mid-day Sunday drawing between 500 and 2,000 people depending on the occasion. Special services held at Christmas and Easter typically draw additional people. In July the festival of St. Charbel is held, which draws between 3,000 and 8,000 people from the community over three days. Weddings typically occur on Saturdays and baptisms on Sunday mornings. Presently there are approximately 1,000 members registered at the church.

The facility consists of the sanctuary, administration offices, and meeting rooms. A house manse for the pastors is located on-site. There are no outdoor recreation facilities.

Recreational Social Features

The Waterfront Park, also known as Chappus Street Park is located on Chappus Street and Water Avenue near the waterfront. The park is located within the ACA, and it is not known how long this 1 ha park has been at its current location. The park is accessible daily from 5:00 a.m. to mid-night, throughout the year, including holidays. Activities/programs that take place at the park include photography, non-motorized boat launches, hiking and walking, and bird watching. This park is a significant public right-of-way access to the water on the west side of the City of Windsor. Patrons include the local community, and people from throughout the City of Windsor and Essex County.

Broadway Park is located adjacent to the ACA, south of Broadway Street between Linsell and Scotten Streets. Broadway was once a neighbourhood park with a baseball diamond prior to the area being re-developed as an industrial park. This 9.51 ha park has been at its current location since 1987. There are plans to expand the park by acquiring three lots on the south side of Page Street between Reed and Dupont Avenues.

The park also serves as an entrance to Black Oak Heritage Park. The Black Oak Heritage Park is discussed in the Natural Environment Assessment (April 2007) and is not carried forward in the social impact assessment. The park is accessible daily from 5:00 a.m. to mid-night, throughout the year, including holidays. Activities/programs that take place at this park include an enclosed dog park, hiking and walking, parking centre and bird watching.

Ojibway Park is located predominantly outside the ACA between Ojibway Parkway and Matchette Road south of Broadway Street. Designated as a community/regional park, Ojibway Park is the hub of activity at the 350 ha Ojibway Prairie Complex as most visitors initially visit here before exploring other regions of the Complex.

Ojibway Park features a Nature Centre and several well kept, self-guided nature trails. The Nature Centre provides educational programming to school groups, service clubs and the public. Ojibway Park is connected to the West Windsor Recreationway. The park is accessible throughout the year, including holidays. It is closed mid-night to 5:00 a.m. and is open otherwise to the public. The park facilities include a baseball diamond, hiking trails, open play grounds, reception area with patio, ponds, dogpark, picnic areas, wildlife viewing areas, bike trails, and cross country ski paths. Activities/programs are extensive, ranging from fall and winter festivals, school field trips, nature guides, children camps, wildlife research to weddings, birthday parties and special functions. There are also activities for special needs groups such as the elderly and the handicapped. Patrons include the residents and non-residents from the City of Windsor and beyond.

Windsor Recreationway is a trail network that crosses through the ACA at several locations. The trail leads under Huron Church Road adjacent to the Grand Marais Drain and runs through the Spring Garden ANSI, Ojibway Park and connects with Malden and Mic Mac Parks north of E.C. Row Expressway via Malden Road. The trail permits cycling and walking. It is unknown how many use the trail system.

The Seven Sisters Park is a neighbourhood park located within the ACA west of Huron Church Road, parallel to the Grand Marais drain within the Spring Garden Natural Area. This greenbelt area was created over an eight-year period to capitalize on improvements made to the Grand Marais Drain. The park's name comes from the seven hills which were sculpted on the site using the excess fill from the widening of the drain. It was since left to naturalize and now covers 4.68 ha of land.

The park is connected to the West Windsor Recreationway and a bike path from California Street that leads through Spring Garden. There is a playground unit to serve the needs of the neighbourhood at Fazio Drive. The park has been at its location since 1970 and is accessible daily from 5:00 a.m. to midnight, throughout the year, including holidays. Activities/programs that take place at this park include walking, cycling, recreational play and jogging. Patrons include neighbourhood community residents and others from within Windsor.

Bellewood Park has been a neighbourhood park since 1985 and is located outside the ACA adjacent to Bellewood Public School on Labelle Street. Park development throughout the 1980s and early 1990s resulted in 6.39 ha of park facilities offering two double tennis courts, a basketball court, playground equipment, bike path, and a baseball diamond.

The park is accessible daily from 5:00 a.m. to mid-night, throughout the year, including holidays; however, access to the baseball diamonds and tennis courts are on a seasonal basis. Activities/programs that take place at this location are seasonal sports like baseball, basketball and tennis, and year-round activities like walking and open play. Park users originate predominantly from within Bellewood Estates neighbourhood; however, users do originate from throughout the City Windsor.

South Windsor Recreation Complex is located outside the ACA east of Huron Church Road, at Pulford Street. The Recreation Complex has been at its present location since 1970.

With the exception of June, when the centre is closed for annual maintenance, the core hours of operation are 8a.m. to 11p.m seven days a week. The Complex includes two fully enclosed ice pads and associated change rooms, a reception area, canteen, central common area, an all purpose meeting room and auditorium. Based on bookings and regular program schedules provided by the City of Windsor Recreation Department, the South Windsor Recreation Complex is actively used throughout the year.

The majority of users come from Windsor; however, tournaments (e.g. hockey) and competitions (Exhibit skating) would draw competitors from Essex County, the Province, and the United States. Regular programming includes minor hockey, Exhibit skating, sledge hockey, college/university hockey, public skating and ice rentals. The auditorium is rented for various types of parties (e.g. wedding or baby showers, anniversaries etc.), during the summer hockey camps utilize the auditorium, and martial art lessons are offered twice a week in the evenings throughout the year.

Oakwood Community Centre, located outside the ACA off Cabana Road West has been in this location for 33 years. It is physically linked to Oakwood Public School. The majority of users of this facility come from the local South Windsor neighbourhood, Heritage Estates, LaSalle and some sections of southwest Windsor. The Community centre is open daily including statutory holidays. Summer hours of operation are Monday to Friday 8 a.m. to 8 p.m.

The Centre consists of a gymnasium, various meeting rooms, kitchen, a common area or foyer and offices. The facility is wheelchair accessible and can accommodate up to 310 people. Numerous programs are provided seasonally by the City of Windsor Recreation department and include such activities as 'before and after' school programs, sports (e.g. indoor soccer, badminton, martial arts, floor hockey), dance, gymnastics, fitness classes, day camps, arts and crafts, preschool nursery, and educational programs. Numerous programs for seniors are also offered including wellness and fitness programs, and sedentary activities (e.g. cards, sewing etc). Facility room rentals are available for birthday parties, baby showers, workshops and church activities. Upwards of 7,000 users frequent the Community Centre over the course of a year.

The facility includes, a large multi-purpose room with a stage and audio visual equipment that serves as both the worship centre and gymnasium, various classrooms and meeting rooms on two levels, administration area, a small chapel, three kitchens, washrooms on both levels, a library, supply/resource rooms and lobby. Due to the significant growth they have experienced in recent years, and the projection of continued growth into the future, plans have been developed to add an additional 100,000 square feet onto the existing facility. To support these expansion plans, adjacent property has recently been acquired.

St. Clair College Athletic Fields are adjacent to Huron Church Road between the College entrance and Cousineau Road and are partially located within the ACA. The Athletic Fields include soccer fields, football, baseball, and cricket fields. The Athletic fields are utilized by the City of Windsor Recreation Department to run some of their league games for soccer and baseball.

Veteran's Memorial Park is located along the edge of the ACA north of Huron Church Road, west of Cousineau Road. Veteran's Memorial Park is bound by Mitchell Avenue, Mount Royal and Casgrain Drives. Its official designation by the City of Windsor is a neighbourhood park, thus its catchment area is predominantly the local neighbourhood. The park facilities include three fenced baseball diamonds, two fenced tennis courts, a bating cage, open green space, a children's play area and equipment, and a building that serves as a club house, canteen and washroom facility. Limited parking is available in a lot off of Cousineau, street parking is available on the neighbourhood streets around the park.

Delivery of Emergency Services

The ACA is served, in part, by the LaSalle fire, ambulance and police services. Further coverage within the ACA is provided by the City of Windsor fire and police services. The Ontario Provincial Police (OPP) jurisdiction includes Highway 401 and Highway 3 to the Todd Lane/Cabana Road intersection, and the northbound side of Howard Avenue ending at the Highway 3 intersection. They also provide police services for the Town of Tecumeseh. The OPP will also have jurisdiction to respond to motor vehicle collisions on the proposed new freeway. Hospitals with emergency services are the Windsor Regional Hospital located at 1995 Lens Avenue, Windsor; the Windsor Hotel- Dieu Grace Hospital, located at 1030 Quellette Avenue. These two hospitals provide emergency services to the residents within the ACA.

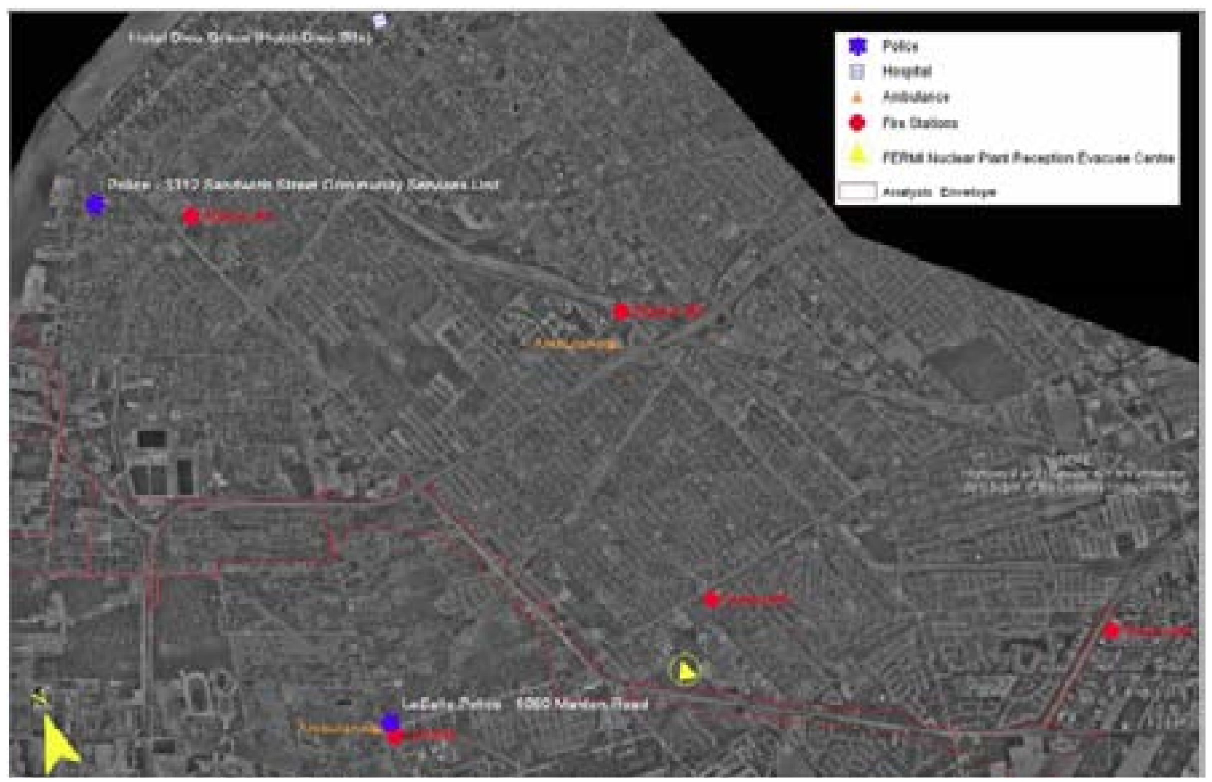
Exhibit 7.8 illustrates the location of the various municipal emergency services. As noted in the Exhibit, St. Clair College is a designated Evacuee Centre in the case of emergency resulting from the FERMI Nuclear Plant. The primary evacuation route is Regional Road 20 out of Amherstburg to E.C.Row Expressway and along Huron Church Road. The secondary evacuation route is up Howard Avenue to Huron Church Road.

All communities within the ACA are serviced by the City of Windsor Police and Fire or LaSalle Police and Fire. Ambulance services are provided by the County of Essex. Windsor Fire District 5 station is located on Cabana Road, east of the Huron Church/Talbot Road transportation corridor. Huron Church Road is used to access the service area in these communities in the ACA. Windsor Police are dispatched from their downtown headquarters on Goyeau Street. Windsor Police also rely on Huron Church Road to access adjacent neighbourhoods.

LaSalle Police and Fire are both dispatched from Malden Road complex. An ambulance dispatch is also located in the complex. Todd Lane or Sandwich Parkway are used by Emergency Services to access the LaSalle service area on Highway 3/Talbot Road.

The Windsor & Essex County Student Transportation Services provides school bus services to the area boards of education, the Greater Essex District School Board, the Windsor-Essex County Catholic District School Board, and Conseil Scolair de District des Ecoles Catholiques du Sud-Ouest.

EXHIBIT 7.8 – LOCATION OF EMERGENCY SERVICES WITHIN THE ACA



7.2.3 Economic Conditions

For the purposes of this study, a business is defined as any privately owned, for profit, entity that occupies a built space. Public utilities, such as the Windsor wastewater plant and the Ontario Power Generation (OPG) facility, and public institutions, such as schools and hospitals, were not considered businesses for the purpose of the economic impact assessment. However, it should be recognized that all possess attributes, such as employment and monetary revenues, like businesses. They are unique facilities that need to be addressed in terms of their own attributes and the essential public services they provide.

A list of 119 businesses identified within the ACA is provided in **Table** 7.10. It should be noted that businesses located within the Ambassador Industrial Park (principally located at the north-west intersection of Huron Church Road and the E.C. Row Expressway) and Del Duca Industrial Park (located south of Highway 401 between Talbot Road and Provincial Road), while partially located within the ACA, are not specifically included in the impact assessment as there are no significant economic impacts on any businesses within these business parks.

For further detail on the Economic Impact Assessment conducted within the ACA, the reader is referred to the *Draft Practical Alternatives Evaluation Working Paper – Economic Impact Assessment* (refer to List of Supporting Documents).

TABLE 7.10 – BUSINESSES ASSESSED WITHIN THE ACA

Businesses Located Along Access Road Huron Church Road – Highway 3	Businesses Located Within Plaza-Crossing Combinations West Windsor
Century Fire Equipment	CTX
Garry St. John Auto	Lafarge Windsor
Blue Bell Motel & Restaurant	CBM St. Mary's
Comfort Inn	Sterling Marine Fuels
Golden Griddle	Windsor Window Imaging
Feelgoods Restaurant	K-Scrap Resources
King Kone	Van Dehogen Group
Petro Canada	Vollmer & Associates
Lambton Plaza	The Auto Shop (Vollmer)
A.C. Soccer	Essex Aggregates
First Choice Restaurant	Windsor Salt Company
Gino's Pizza	Sure Seal
Lily's Nails	Agency Fuels
Montessori Preschool	Air-O Systems
C.K. Havana Shop	Judrick's Enterprises
Scholars Choice	Standard Induction Castings
Second Edition	Xcel Manufacturing
World Source Financial	Andlauer Transport
Outbreak Sportz	Harwood
Aqua Turf	Windsor Auto Parts
Euro Tech	Shurlok
Best Western	Globaltex 2000 Ltd.
Tim Horton's	Narmco Group
Fred's Farm Fresh	Novelletto Rosati Complex
LA Collision Auto Service	Southwestern Sales Corporation
Sand Castle Recreation	Karter Carriers
Joe's Woodcraft	Prism-Berlie
Mac's Variety	West Windsor Power – Suez Power Generation
Town and Country Animal Clinic	Nemak Canada[9]
Windsor Crossing Outlet Mall (45 stores)	A&P Metals
Alibi's Sports Bar	Mayson Machining
Autobahn Car Wash	Globe Manufacturing
XTR Gas & Convenience	Kenwil Services
Vachon Bakery Outlet	Howards Backhoe, Trucking and Bobcat
Natures Health	
Sleep Factory	
Dualfelx	
Weston Bakery	
Philips Tool & Mould	
Tyler Hard Chrome	
Hellenic Banquet Hall	
Daytona Carwash	

There are a number of distinct clusters of businesses in the ACA, following from Highway 401 through to the E.C. Row Expressway. As shown on **Exhibit** 7.9, these clusters, starting from the east, are:

1. Located at the current intersection of Highway 401 and Highway 3, west of Highway 3 along Outer Drive, is the primary concentration of industrial businesses.
2. Immediately north on Highway 3 there is a small concentration of commercial businesses at the intersection of Howard Avenue.
3. Further along Highway 3, after a largely residential section, at the intersection of Sandwich Parkway is the Windsor Crossing Outlet Mall, the single largest concentration of commercial businesses along the entire access road. There is one other commercial shopping plaza at this intersection.
4. Along Highway 3 from the Huron Church Line intersection area to Todd Lane / Cabana Road is a node of industrial, commercial and travel-tourism businesses.
5. Further along Huron Church is a mix of commercial and travel-tourism businesses, including a major chain hotel and a coffee shop.
6. At Huron Church Road and Lambton Road is another large concentration of commercial businesses, including the Lambton Plaza.
7. Finally, along Huron Church Road, between Lambton Road and the E.C. Row Expressway is a concentration of commercial and travel-tourism businesses including two hotel/motels.

Because of the scale and detail of information required for this study and its reliance on information voluntarily provided data gaps do exist. In terms of the survey, a number of businesses within the ACA chose not to participate. The response rate, as illustrated in **Table 7.11**, was more than 60% of the 75 businesses surveyed. While not complete, this is a reasonably high level of participation. The response rate was much higher for businesses along the access road in comparison to those businesses within the west Windsor industrial area. This is due primarily to the fact that most businesses within the ACA are smaller locally-owned establishments, whereas the majority of businesses within the west Windsor industrial area are large national and multi-national companies that typically have more restrictions on providing business information.

EXHIBIT 7.9 – BUSINESS CLUSTERS ALONG PROPOSED ACCESS ROAD

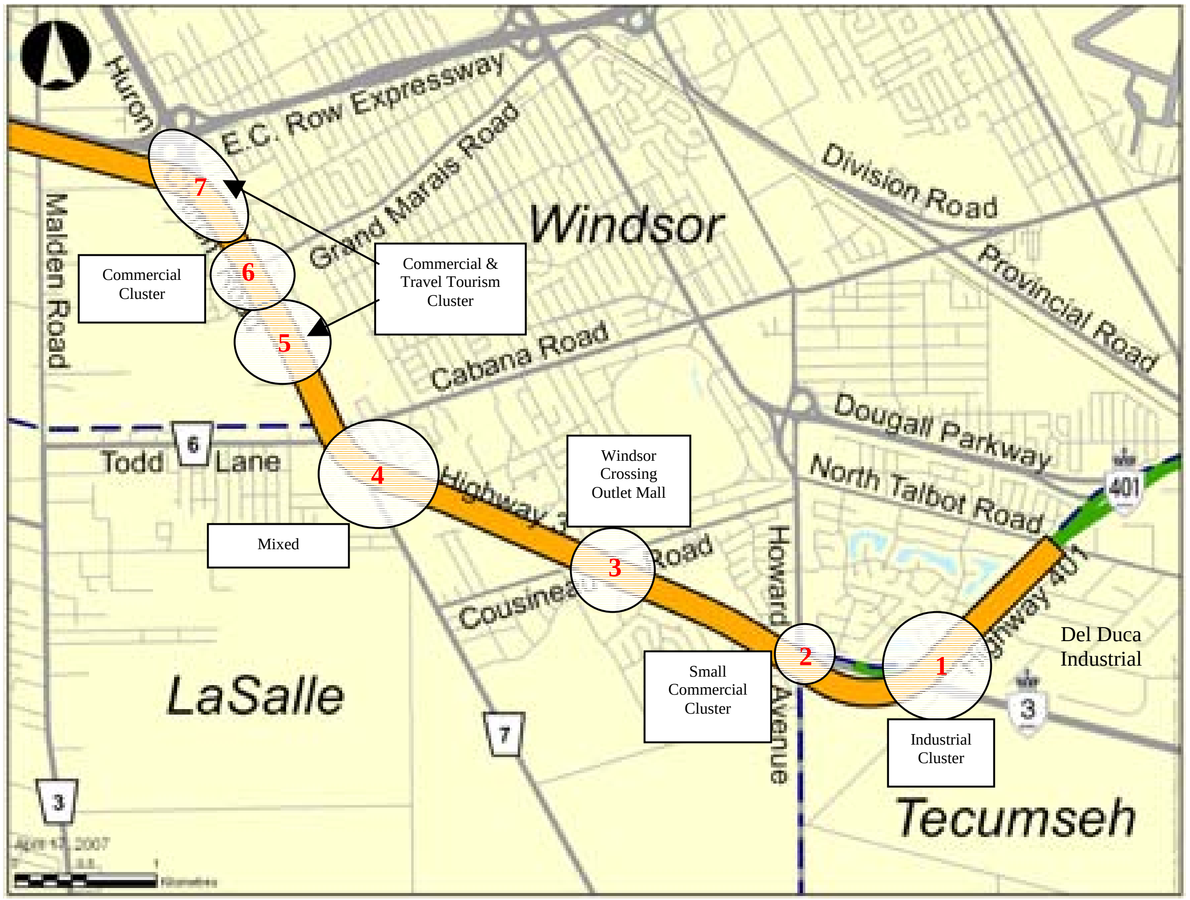


TABLE 7.11 – BUSINESSES SURVEY RESPONSE RATE WITHIN THE ACA

Section	Number of Businesses Contacted	Number of Businesses that Responded	Response Rate
Access Route	41	30	73%
West Windsor Industrial Area	34	17	50%
Total ACA	75	47	63%

Note: Windsor Crossing Outlet Mall is counted as one business within this table, as only one survey was administered on the basis that the mall is owned by a trust and reports as a collective business.

Furthermore, of the businesses that did respond, not all were willing to disclose certain pieces of information, such as gross revenues and employment Exhibits. Where other sources of information were not available, estimates were made for employment and gross revenues in order to provide complete economic impact assessments for the entire ACA. Estimates of employment and revenues were arrived at through a variety of methods, which included comparisons to similar businesses for which that data was available; for publicly traded companies, estimations were based on information provided in public documents, such as annual reports; and, through a variety of sources specific to some of the business sectors represented by the individual firms in the ACA.

7.3 Existing and Planned Land Use

PROVINCIAL POLICY STATEMENT

The assessment of impacts to land use for the practical alternatives required consideration of provincial and local municipal policies and objectives pertaining to land use, as well as types of land uses impacted directly by the project.

This study has considered a broad range of legislative policies, including those that relate to the *Provincial Policy Statement (PPS)*. The *PPS* was consulted throughout the illustrative alternatives and practical alternatives phase of the DRIC study, to ensure that alternatives being considered were in agreement with the policies developed in the PPS.

The PPS provides policy direction on matters of provincial interest related to land use planning and development. The *PPS* is issued under the authority of Section 3 of the Planning Act. The most recent *PPS*came into effect March 1, 2005. The *PPS*focuses growth within settlement areas and away from significant or sensitive resources and areas which may pose a risk to public health and safety.

Several policies within the Provincial Policy Statement are applicable to this study, and were taken into consideration during the development of the illustrative and practical alternatives. Policies related to healthy, liveable and safe communities; public space, park and open space; infrastructure and public service facilities; transportation systems; transportation, infrastructure corridors; natural heritage and cultural heritage and archaeology. These policies were taken into account in several other reports prepared by the study team, including the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage,* the *Draft Practical Alternatives Evaluation Working Paper – Archaeology,* and the *Assessment of Practical Access Road Alternatives- Improve Regional Mobility* Memo (refer to List of Supporting Documents).

The policies of the Provincial Policy Statement are intended to be used in conjunction with locally-generated policies regarding matters of municipal interest. Provincial plans and municipal official plans provide a framework for comprehensive, integrated and long-term planning that supports and integrates the principles of strong communities, a clean and healthy environment and economic growth, for the long term. Listed below are the various municipal plans and policies from the City of Windsor, the Town of LaSalle, and the Town of Tecumseh that pertain to this study.

7.3.1 City of Windsor Official Plan

The *City of Windsor Official Plan*[10] was adopted on October 25, 1999 by By-law 350-1999. The Plan was approved by the Ontario Ministry of Municipal Affairs and Housing, in part, on March 28, 2000. The remainder of the Plan was approved by an Ontario Municipal Board decision on November 1, 2002. Currently, the City of Windsor is reviewing the goals, objectives and polices stated in the official plan and is undergoing a public consultation process to update the various sections of the plan.

In considering the *City of Windsor Official Plan* during the development of the illustrative and practical alternatives, a number of policy areas outlined in the Official Plan were considered. Each policy area is discussed separately.

[10] www.citywindsor.ca

DEVELOPMENT STRATEGY

Pertains to the vision and growth concept envisioned for the next 10-20 years for the city. Recognizing that a new border crossing and access road could significantly influence future growth in the Windsor and Essex County region, the study team considered the vision and principles during the development of the illustrative and practical alternatives for the access road, plaza and crossing alternatives.

SUSTAINABLE, HEALTHY ENVIRONMENT

The sustainable, healthy environment policies pertain to achieving a sustainable transportation system where all modes of transportation play more of a balanced role. Providing greater opportunities to walk, cycle and take public transit are part of the goals for the sustainable, healthy environment policy section. Continuing to enhance the waterfront area, along with providing a Greenway System aimed to connect Windsor's neighbourhoods and creating a greater harmony between human activities and natural systems.

HEALTHY COMMUNITY

The Healthy Community section of the *City of Windsor Official Plan* centres on policies related to Healthy Communities. As stated in the Official Plan, the healthy community philosophy is rooted in the belief that people's social, economic, cultural and psychological well being is influenced by the physical environment in which they live, work and play. Land use planning actions should provide for activities and facilities which will foster lifestyle habits that improve community health.

ENVIRONMENT

Some of the objectives of the Environmental policies of the *City of Windsor Official Plan* include protecting, conserving and improving the quality and quantity of Windsor's natural features and functions; to establish recreational and natural linkages between open space areas and natural areas, and to improve atmospheric air quality.

LAND USE

Land use policies outlined in the Official Plan promote an environmentally sustainable urban development, a variety of open spaces, protection and conservation of environmentally significant and sensitive heritage features, and polices pertaining to the development of residential, industrial, business park, commercial, major institutional, open space, natural heritage, mixed use, waterfront residential, waterfront recreational, and waterfront port.

INFRASTRUCTURE

Transportation policies outlined in the Official Plan call for a sustainable, effective, and efficient transportation system that meets the needs of all users in a manner consistent with a healthy environment and vibrant economy. Objectives outlined in this area of the Official Plan relevant to thisstudy include:

- Protect long term transportation corridors
- Safe and efficient truck routes within and through Windsor
- Maintain a city-wide walking and cycling network
- Windsor's role as Canada's foremost international gateway.

In addition, the *City of Windsor Official Plan* speaks to "recreationways" which are defined as a network of multi-use pedestrian and cycling trails designed to serve recreational movements.

URBAN DESIGN

Urban Design policies are outlined in Section 8 of the Official Plan, and include policies and objectives aimed to:

- Achieve comfortable conditions along roads and in public spaces
- Achieve an attractive network of public spaces
- Encouraging infrastructure undertakings to retain and incorporate natural features and functions

HERITAGE CONSERVATION

Heritage conservation policies outlined in the City of Windsor Official Plan centre on identifying, recognizing, protecting, enhancing and managing the existing heritage resources that exist within the city.

These policies were reviewed during throughout the development of the illustrative and practical alternatives.

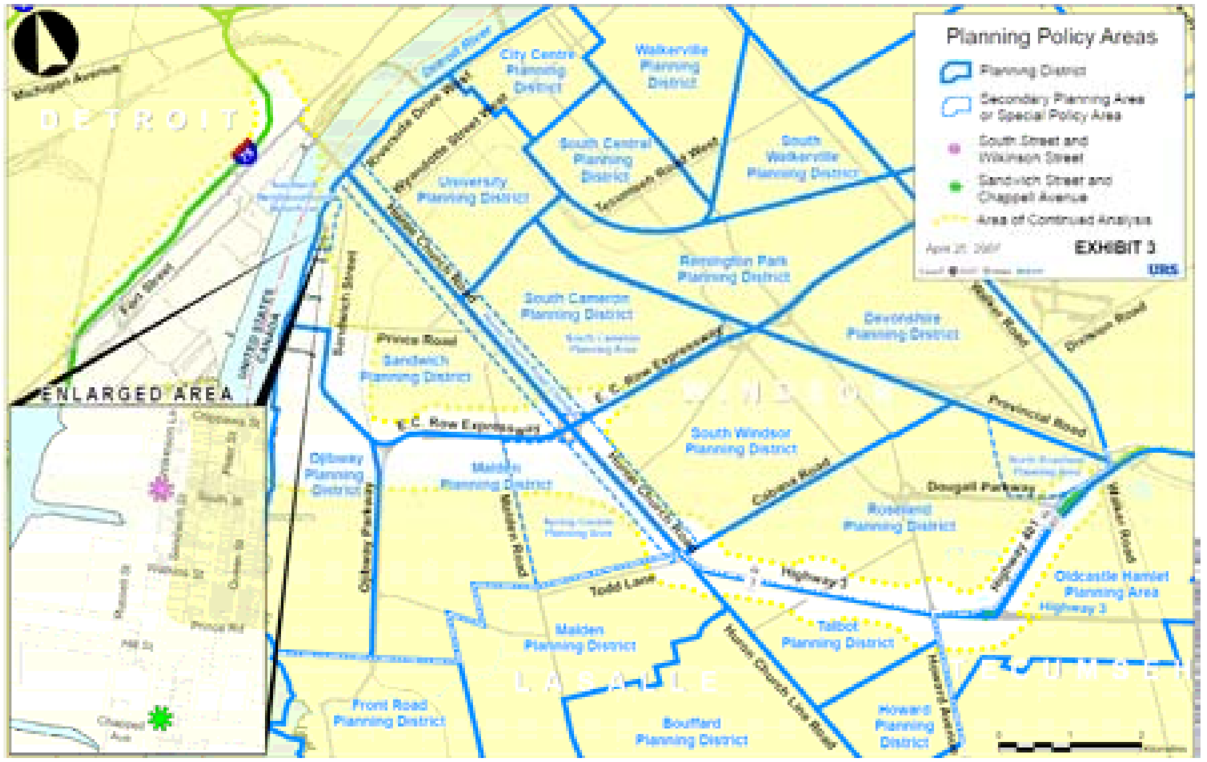
Exhibit 7.10 shows the planning policy areas and districts that are defined within the *City of Windsor Official Plan*. The City of Windsor is currently divided into a total of 19 planning districts, which are used to help facilitate future planning within the city. The 19 planning districts range in size from slightly more than 200 hectares to almost 1,135 hectares in size. These planning districts are established to provide a basis for developing more detailed planning policies. Only those planning districts that contain special policy areas relevant to the practical alternatives developed for this study area discussed in this section.

CITY OF WINDSOR SPECIAL POLICY AREAS

District Special Policy Areas are defined as areas where detailed policies are created for land use, infrastructure, transportation, environment, urban design or other areas are required beyond those that are provided within the Official Plan. In certain instances, where there is a conflict between a Special Policy Area provision and the Official Plan, the Special Policy Area will take precedence over the policies of an Official Plan.

The ACA includes all or a portion of four Special Policy Areas as defined in the *Windsor Official Plan*: Sandwich Neighbourhood Waterfront District, Sandwich Street and Chappell Avenue, South Street and Wilkinson Avenue, and the Huron Church Road Corridor. One Secondary Plan is affected by the ACA, the Spring Garden Planning Area. These Special Policy Areas and Secondary Plan areas are shown in Exhibit 7.10.

EXHIBIT 7.10 – PLANNING POICY AREAS



Sandwich Neighbourhood Waterfront

The Sandwich Neighbourhood Waterfront is comprised of the area bounded by Chewitt Street on the north, Russell Street on the east, Brock Street on the south and the Detroit River on the west depicted in Exhibit 7.11. This special policy area allows for the development of Waterfront Recreation land uses, as well as residential development no greater than fifteen storeys in height, on lands located at the south west corner of Mill Street and Russell Street. In addition, residential development is permitted no greater than three storeys in height on the south west corner of Chewitt Street and Russell Street. As a condition of planning approval, lands will be required to be conveyed to the City for public open space purposes, where preference will be made for lands extending along the Detroit River for the continuation of the waterfront linear park system.

Sandwich Street and Chappell Avenue

The Sandwich Street and Chappell Avenue Special Policy Area is comprised of a property known as Lot 28, on the south side of Sandwich Street and part of Lot 28 on the north side of Peter Street, located on the southeast corner of Sandwich Street and Chappell Avenue depicted in Exhibit 7.11. This Special Policy Area allows for the development of Adult Entertainment Parlours, in particular the building located at 3885 Sandwich Street. The building located at 3885 Sandwich Street was destroyed by fire in the fall of 2006, and the site is presently vacant.

South Street and Wilkinson Street

The South Street and Wilkinson Street Special Policy Area are located on the northeast corner of South Street and Wilkinson Street. This area is designated as a business park, however the only business park use that is permitted on these lands is a warehouse.

Huron Church Road Corridor

The Huron Church Road Corridor includes an area along the east and west sides of Huron Church Road from the Ambassador Bridge to Highway 3, as depicted in Exhibit 7.11. The Huron Church Road Corridor Special Policy states that development along Huron Church Road must have specific landscaping setbacks for new residential uses, and it guides the location for new commercial uses along the corridor. The landscaping setback requirements are as follows:

- Where non-residential development fronts Huron Church Road there shall be a minimum landscaped setback of ten (10) metres parallel to the road;
- Where residential development is proposed adjacent to Huron Church Road an open space corridor having a minimum width of 30 metres shall be provided;
- Where lands are proposed for redesignation to commercial centre or commercial corridor, the lands shall be located at a signalized intersection or be contiguous to lands already designated commercial centre or commercial corridor with access to a signalized intersection by means of a service road.

This Corridor Special Policy Area allows for development on the Huron Church Road Corridor to be uniform in appearance and in keeping with its status as an international gateway route, through the use of a landscaped setback abutting the road. The City of Windsor Official Plan has designated Huron Church Road as a Class I Arterial, and it is identified as a connecting link by the Ministry of Transportation.

The Official Plan states that a Class I Arterial Road:

- Shall be designed to carry high volumes of both passenger and commercial traffic for intra-city travel at moderate speeds;
- Usually consist of four or more divided or undivided travel lanes, with right-of-way widths no more than 36 metres;
- Intersections with major roads are permitted but local roads are discouraged;
- Direct access to abutting properties along Class I Arterial Roads is not permitted where other alternatives exist; and
- Commuter cycling lanes or bikeways are not permitted along the paved travel lanes, but may be permitted within the right-of-way.

Recently, an urban design master plan was developed for Huron Church Road. The *Huron Church Road Urban Design Master Plan and Development Guidelines (February 2006)* was developed to provide a design vision and framework for implementing design concepts on Huron Church Road between Cabana Road and College Avenue. The scope and analysis of the report focuses on the Primary Study Area, between College Avenue and Tecumseh Road. Design elements, streetscape installations and guidelines developed within this report are also meant to be implemented in the Secondary Study Area which is between Tecumseh Road and Cabana Road. This report presents design guidelines for lighting, planting, walkways, signage, public art, street furniture and property development.

As part of the current EA study, the study team incorporated some of the design guidelines and features suggested in this report into the Context Sensitive Solutions (CSS) concepts for this study. In addition, the setback and landscaping policies put forth for the Huron Church Road Corridor will be taken into consideration during future design stages.

Spring Garden Planning Area

The Spring Garden Planning Area (Official Plan Area #5) is bounded by E.C. Row Expressway on the north, Malden Road to the west, Todd Lane to the south, and Huron Church Road on the east (Exhibit 7.11). It is approximately 283 hectares in size, and is largely a residential community integrating an expansive natural area feature. The natural area was designated as an Area of Natural and Scientific Interest (ANSI) by the Ministry of Natural Resources (MNR) in 1984. As a result, the Spring Garden Planning Area has development restrictions placed upon it. The Secondary Plan allows for residential development only along the periphery of the natural area. The plan provides primarily for future residential development that complements the development that has already occurred within this planning area. Other land uses are permitted, in a limited capacity, as discussed below.

Permitted land uses in the Spring Garden Planning Area as defined by the Spring Garden Secondary Plan are as follows:

a) Low profile residential development in designated areas; comprised of single detached, semi-detached, duplex and multiple units up to 8 units; maximum density permitted is 30 units per gross hectare;

b) Single detached residences are the primary residential type allowed;

c) Low profile multiple use residences (e.g. semi-detached, row housing) are encouraged near E.C. Row Expressway and Huron Church Road;

d) Neighbourhood commercial uses are permitted in residential areas;

e) Minor institutional uses are permitted within residential areas; and

f) Light industrial uses; restricted to the Grand Marais Drain area.

The Secondary Plan requires that a buffer be placed between the right-of-way on Huron Church Road, Malden Road, and E.C. Row Expressway and future permitted land uses in order to mitigate for potential noise impacts. In addition, any future roadway network would have to follow the grid patterns prescribed within the Secondary Plan in order to prevent any impacts to the adjacent ANSI areas.

CITY OF WINDSOR ZONING BYLAWS

A municipality regulates the use and development of land, buildings and other structured through the provisions of zoning bylaws under the *Ontario Planning Act*. The purpose of a zoning bylaw is to regulate different land uses and development standards, to ensure that development takes place in conformity with policies set forth in the *City of Windsor Official Plan*.

The City of Windsor has developed a comprehensive listing of zoning bylaws that apply to the entire City. Within the ACA, the zoning bylaw designations vary from low, medium, and high residential districts, commercial and industrial districts, and institutional and green districts. A cross section of all types of zoning is represented within the ACA. Each zoning bylaw dictates what type of land use is permitted within a particular area of the City, the units allowed to be developed, the setback requirements, and it prescribes the infrastructure requirements needed to develop the land uses.

It is important to note the current zoning for various parcels found within the ACA that are currently vacant or open. Often parcels that are vacant or open and that are zoned for either residential, commercial, or industrial land uses will be developed once favourable market conditions exist. Within the ACA, lands that are currently vacant in the Brighton Beach Industrial Area are zoned for industrial land uses. These lands could be occupied by industrial uses if the economic market in Windsor requires such a use. Also, lands that are currently open or vacant in the Spring Garden Planning Area, are zoned for residential land use, with a hold provision which places a hold on the issuance of a building permit until specific development preconditions have been satisfied. Future residential demands would potentially require that residential development occur in this part of pending the stipulation as dictated in the zoning.

OLDE SANDWICH TOWNE COMMUNITY PLANNING STUDY REPORT

The *Olde Sandwich Towne Community Planning Study Report* was completed and adopted by Windsor City Council in the fall of 2006. The Report was developed with cooperation and input from Sandwich Towne residents along with business, government and other civic leaders. Participants formed task force subcommittees, which focused on six areas:

- Appearance and community image;
- Commercial development;
- Health care, education and community needs;
- Parks and open space and neighbourhood land use;
- Safety and crime; and
- Communications.

The *Olde Sandwich Towne Community Planning Study Report* was designed to provide direction for residents and business owners to actively participate in the plan making and priority setting process for the community. The Planning Study Report was adopted as the municipality's guide for future planning, capital budgeting and community improvement efforts in Sandwich. The Report was the result of an 18-month process and contains 29 recommendations to the community. Task Force members identified geographic realities, such as barriers, vacant lots, anchors of activity, connectors etc., that later were used to identify target areas within the study area to concentrate resources.

The plan outlines which organization should take the lead on each recommendation to develop an achievable timeframe and identify what resources are needed to achieve each recommendation. The plan outlines the continuation of industrial land uses in the waterfront area south of Watkins Road, as shown in Exhibit 7.11. The plan identified that the area south of Prince Road be changed to industrial from its current mix of residential and industrial land uses. It also suggests waterfront port improvements be made to existing industrial land uses to help facilitate and foster continued industrial viability within this area. Placing a new crossing within the waterfront port/industrial area of Sandwich is consistent with the prescribed land use of that area of Sandwich Towne, which is comprised of mostly industrial land uses.

7.3.2 Town of LaSalle Official Plan

The *Town of LaSalle Official Plan –LaSalle 2016- Healthy, Vibrant and Caring*[11] was adopted on October 14, 1997. The Plan was approved by the Ontario Ministry of Municipal Affairs and Housing (MMAH) on May 18, 1998. The document used for this report is the November 4, 2003 Office Consolidation, which incorporates Official Plan Amendment No. 1, provincially approved on November 4, 2003.

Within the ACA, the *Town of LaSalle Official Plan* has designated the Highway 3 area as one of five planning districts developed for the town, called the Talbot Planning District. The planning districts are designed to provide a framework for the implementation and administration of the Official Plan. The Talbot Planning District consists of mostly residential land uses, with two distinct areas of commercial land use along Talbot Road southeast and northwest of Sandwich Parkway. There are recreational land uses located throughout this district, along with a community facility.

As growth continues within the Town of LaSalle, plans for future roadway expansions are included in the Official Plan. In particular, the Official Plan includes a proposed expansion of Laurier Drive from Malden Road to Howard Avenue.

As stated in *the Town of LaSalle Official Plan*, the 'greenway system' is a cornerstone of the Official Plan, and represents a major new land use planning and resource management approach for the Town of LaSalle, to be implemented over a 10 to 20 year planning horizon. The essence of the Town of LaSalle 'greenway system' approach is providing linkages, areas to connect wildlife habitat areas to each other, human settlements to other human settlements, urban and rural areas, waterfront to non-waterfront lands, and people to nature. All new developments within the Town of LaSalle will be required to incorporate the 'greenway system' elements within their respective development plans to the greatest degree possible.

The *Town of LaSalle Official Plan* acknowledges that a Bi-National Transportation Study has been underway since 2003, and that in the event that a route will be located in the Town of LaSalle, it is approved in accordance with all applicable Environmental Assessment legislation. Additional transportation policies may be required to amend the Town's Official Plan. Highway 3 is classified as a Provincial highway in the *Town of LaSalle Official Plan*.

TOWN OF LASALLE ZONING BYLAWS

The Town of LaSalle has developed a comprehensive zoning bylaw for the entire town. The Talbot Planning District area of LaSalle is zoned residential, with a few parcels zoned commercial.

7.3.3 Town of Tecumseh Official Plan

The Town of Tecumseh is governed by three separate Official Plans[12]. The three official plans represent the three former municipalities, which include Tecumseh, St. Clair Beach, and Sandwich South. These three municipalities existed separately prior to the January 1st, 1999 amalgamation of the three areas into the current Town of Tecumseh municipality.

At present, the three official plans have not yet been consolidated into a single official plan and still govern their respective lands prior to amalgamation. The purpose of the Official Plan is to set forth the general policies concerned with the shaping and guiding of the physical growth and arrangement of the Tecumseh Planning Areas. The general polices are developed being mindful of the social and economic needs of the community in order to obtain the most desirable physical environment for the present and future inhabitants of the Town of Tecumseh.

The southeastern portion of the ACA is located within the Town of Tecumseh. Land uses found within this area of Tecumseh include several manufacturing and business parks, including the Del Duca Industrial Park, located adjacent to Highway 401. This industrial park contains businesses that manufacture a variety of goods, including automotive stampings, plastic injection molding, dies, fixtures, automation systems, custom machining, custom fabrication, automotive seating systems, capsule machines and capsules, vinyl doors and windows, commercial printing, canned vegetables and frozen foods, breads and rolls.

TOWN OF TECUMSEH ZONING BYLAWS

The Town of Tecumseh is governed by three separate zoning bylaws, in addition to the three separate Official Plans, representing the three municipalities that existed separately prior to the January 1st, 1999 amalgamation of the three areas. Currently, the three bylaws have not yet been consolidated into a single bylaw for the town and still govern their respective lands prior to amalgamation. The zoning for the lands located within the ACA in Tecumseh is industrial.

7.3.4 Existing Land Use

The Highway 3/Huron Church Road corridor has served as an access road to the Ambassador Bridge for over 75 years. The land uses along this corridor vary, ranging from commercial and industrial to residential and recreational. Commercial uses include fast food restaurants, speciality stores, hotels and motels, shopping centres and convenience stores. Residential land uses include single-family residences and multifamily residences. In order to facilitate an accurate description of the land uses throughout the ACA, it has been divided into six sections. A description of each follows.

Highway 401 from North Talbot Road to Highway 3

Land uses located along the north portion of this segment includes a portion of residential subdivision, called Southwood Lakes, which was constructed in 1997 as a single family residential community that surrounds four small lakes and features several parks. There is one institutional land use, the Extendicare Southwood Lakes Long Term Care Facility, located at the northwest corner of North Talbot Road and Highway 401. There are a number of parcels that are proposed for future residential development, located north of North Talbot Road along Highway 401. Land uses along the south side of Highway 401 include the Del Duca Industrial Park area in the Town of Tecumseh, where several automotive manufacturing related businesses operate (see Exhibit 7.17).

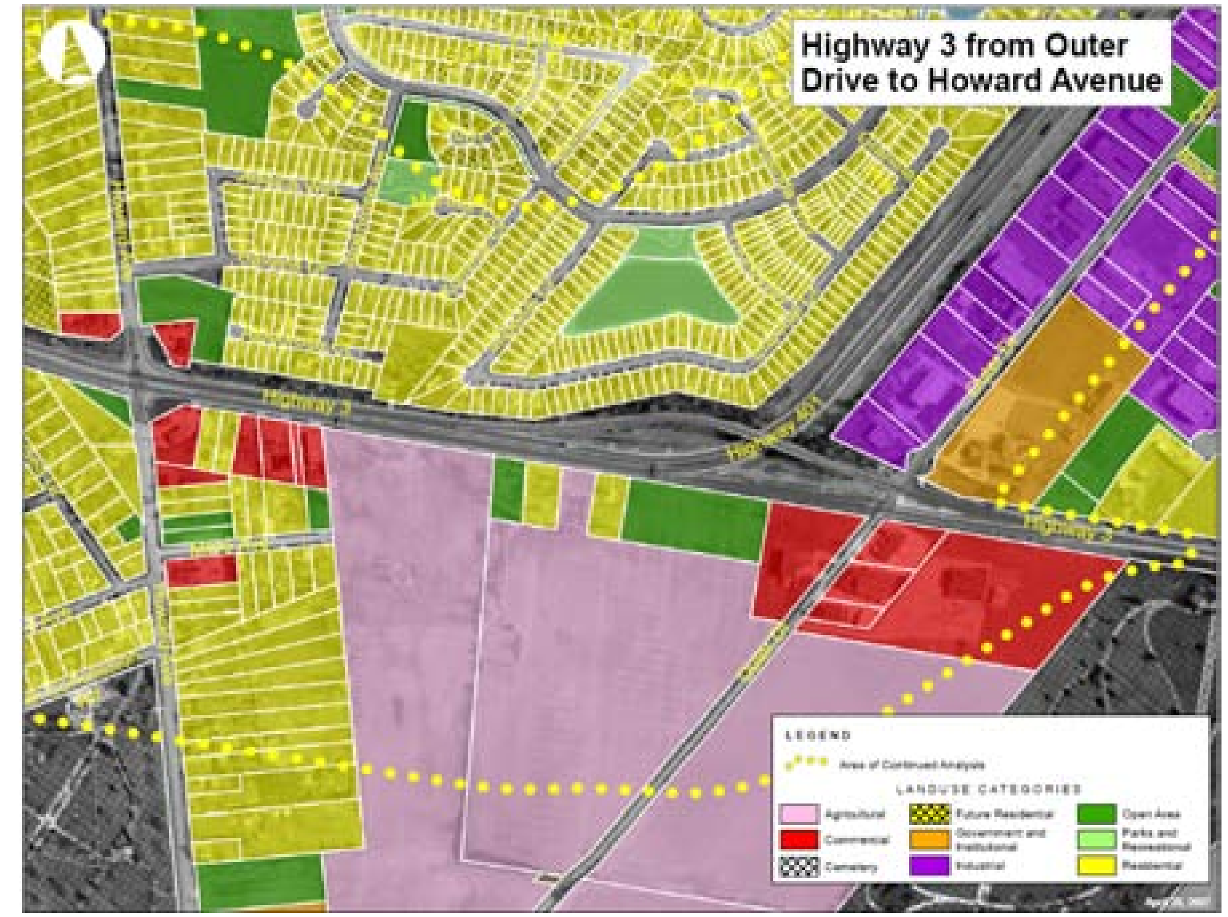
[11] www.town.lasalle.on.ca
[12] www.town.tecumseh.on.ca

EXHIBIT 7.11 – HIGHWAY 401 FROM NORTH TALBOT ROAD TO HIGHWAY 3

Highway 3 from Outer Drive to Howard Avenue

This segment contains a mixture of residential, industrial, vacant institutional and commercial land uses. On the north side of Highway 3, the majority of land uses are single-family residential units, with the exception of a vacant and commercial land use located on the northeast corner of Highway 3 and Howard Avenue. On the south side of Highway 3, land uses consist of vacant lands, commercial land uses, and some singlefamily residential land uses. South of Highway 3 is a large vacant area owned by the Ontario government (see Exhibit 7.12).

EXHIBIT 7.12 – HIGHWAY 3 FROM OUTER DRIVE TO HOWARD AVENUE

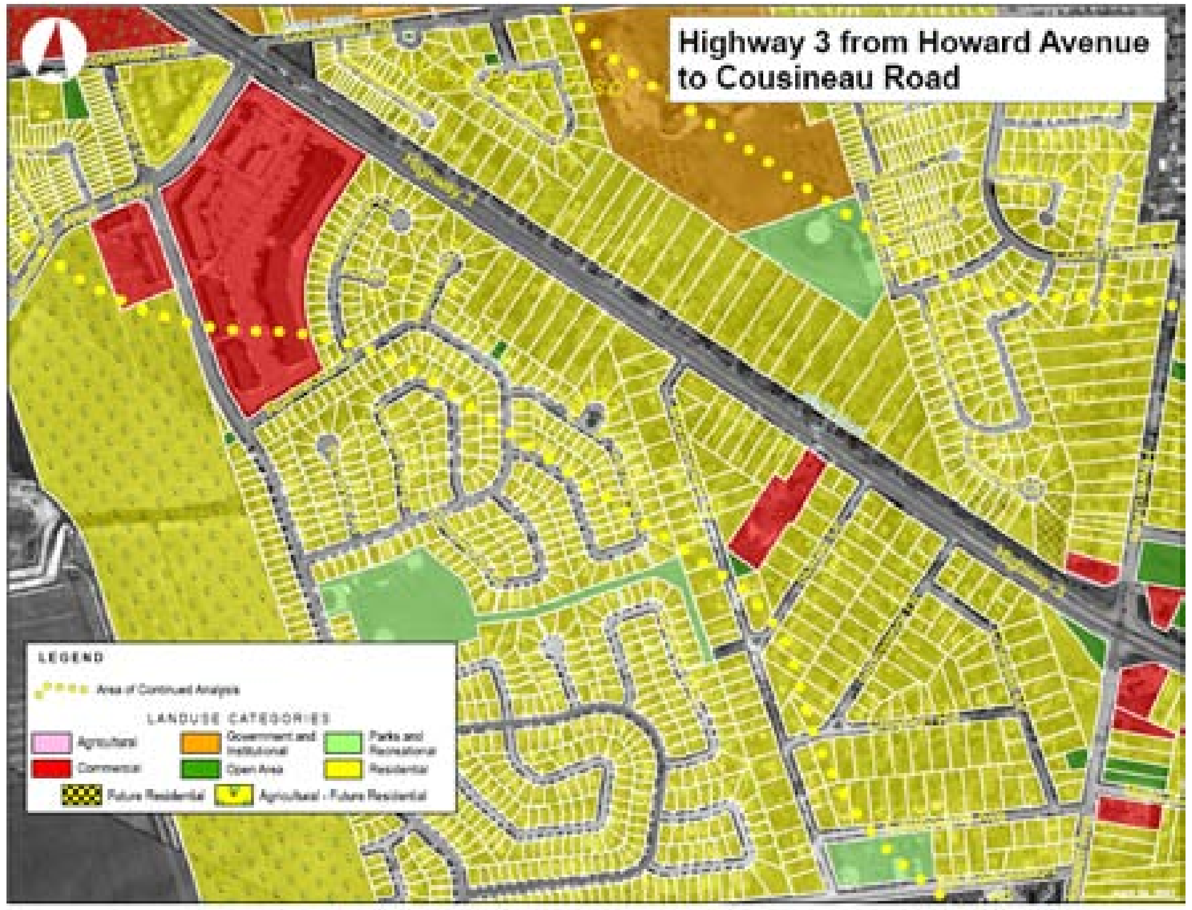


Highway 3 from Howard Avenue to Cousineau Road

This segment contains a mixture of residential and commercial land uses. Land uses found along the north side consist mostly of single-family residential units either fronting onto Highway 3 with direct highway access or backing onto Highway 3 without direct highway access. Land uses on the south side of Highway 3 between Howard Avenue and Cousineau Road consist mostly of single-family residential uses, with a few multi-family units, with driveways that connect directly to Highway 3.

There is no buffer between the residential land uses that exists in this section and Highway 3. This segment also contains the Windsor Crossing Outlet Mall, situated in the southeast corner of Sandwich West Parkway in the Town of LaSalle. The Windsor Crossing Outlet Mall is a 255,000 square foot open air mall that opened in 1999. It is a highway oriented commercial destination, catering to both local shoppers, and the traveling public. There is no buffer between the residential land uses that exist in this section and Highway 3. Included in this section are the Villa Paradiso residential subdivisions, consisting of mature and recently developed neighbourhoods surrounding the campuses of Acadamie Ste. Cecile Private School and Our Lady of Mount Carmel Separate School (see Exhibit 7.13).

EXHIBIT 7.13 – HIGHWAY 3 FROM HOWARD AVENUE TO COUSINEAU ROAD



Highway 3 from Cousineau Road to Lennon Drain

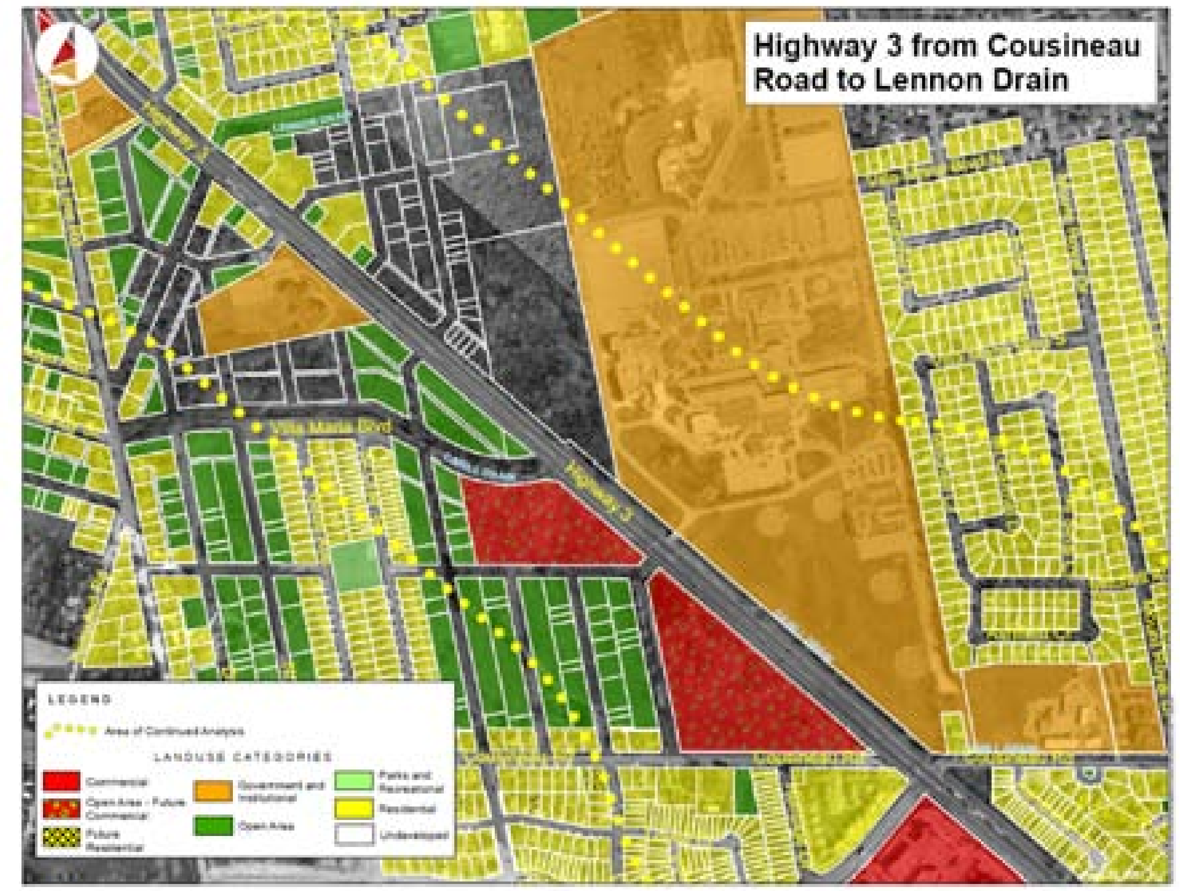
This segment contains residential, institutional, vacant and undeveloped land uses. St. Clair College opened in 1967 with 300 full time students enrolled in applied arts and technology courses. Over the past 40 years, the college has grown and is an important community resource. Today, over 20,000 students are enrolled in programs ranging from business programs, early childhood education, journalism, manufacturing engineering technology, and veterinary technologist. In 2004 the college completed construction on a 408 bed student residence.

St. Clair College features numerous athletic facilities such as sports fields (soccer, baseball, football) and fitness trails for joggers as part of their campus in the area of Cousineau Road and Highway 3. These athletic facilities are offered for rent the general public and community organizations.

Immediately to the west of St. Clair College are undeveloped parcels that are designated as an environmentally significant area (ESA). Land uses found on the south side of Highway 3 consist of mostly vacant, undeveloped areas, with a few single-family residences with direct access to Highway 3 east of the Lennon Drain. There is one parcel located within this segment that is undeveloped and currently for sale; it is zoned for commercial land uses. The Heritage Park Alliance Church is an institutional use located on the south side of Highway 3. The church has approximately 1,000 worshippers that attend from LaSalle, Windsor, and the surrounding region. The Heritage Park Alliance Church is also surrounded by undeveloped lands.

Lands south of Highway 3 are located in the Town of LaSalle. A portion of these lands are currently undergoing development to residential subdivisions. In the *Town of LaSalle's Official Plan*, Highway 3 is identified as the major transportation corridor serving this area of the Town. In addition, the Town's plan is to connect Normandy Street to Highway 3 at the St. Clair College main entrance, as outlined in the *Town of LaSalle Official Plan Transportation Plan* (see Exhibit 7.14).

EXHIBIT 7.14 – HIGHWAY 3 FROM COUSINEAU ROAD TO LENNON DRAIN



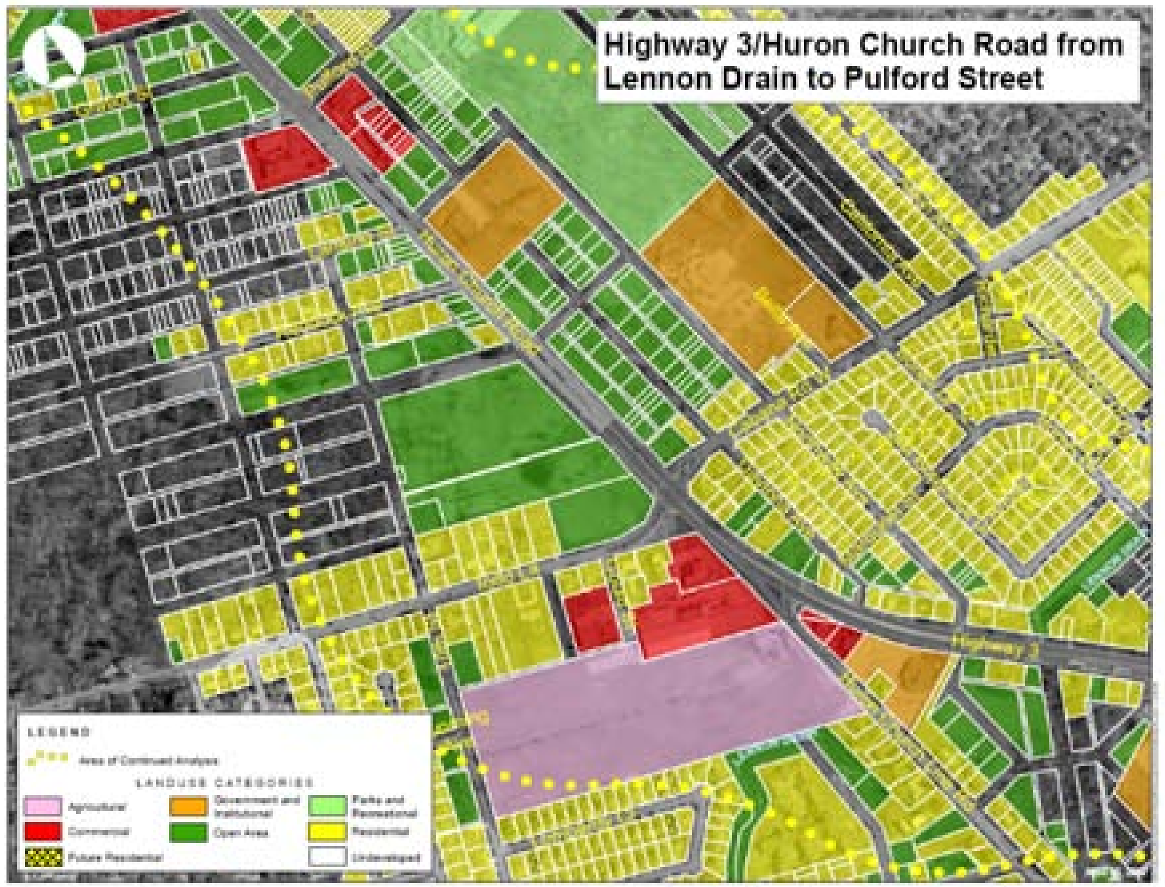
Highway 3/Huron Church Road from Lennon Drain to Pulford Street

The land uses within this segment contain a mixture of single-family residential, open areas, commercial and governmental land uses. Land uses that dominate the northeast side of Highway 3/Huron Church Road include residential land uses, including the Villa Borghese residential subdivision, which consists of single-family residential homes constructed in the early 1990's. The primary intersection in this area is the Todd Lane- Cabana Road West intersection, which provides an important connection between LaSalle and southwest Windsor.

This segment also contains open, undeveloped parcels, an institutional land use (Ministry of Ontario Public Health Laboratory), and some commercial land uses. Located east of Huron Church Road and north of Cabana Road West is the Oakwood Public Elementary School, Oakwood Community Centre, and Oakwood Woods, a natural area that is used by the students and community to observe nature.

Land uses on the south side on Highway 3/Huron Church Road included an institutional use (Royal Canadian Legion), commercial uses, open lands, and a hotel. North of Todd Lane on the west side of Huron Church Road is the Spring Garden Planning Area. Reddock Street, Lansing Street, Gratiot Street are all predominantly residential streets that are located adjacent to Huron Church Road as part of the Spring Garden Planning Area (see **Exhibit** 7.15).

EXHIBIT 7.15 – HIGHWAY 3/HURON CHURCH ROAD FROM LENNON DRAIN TO PULFORD STREET

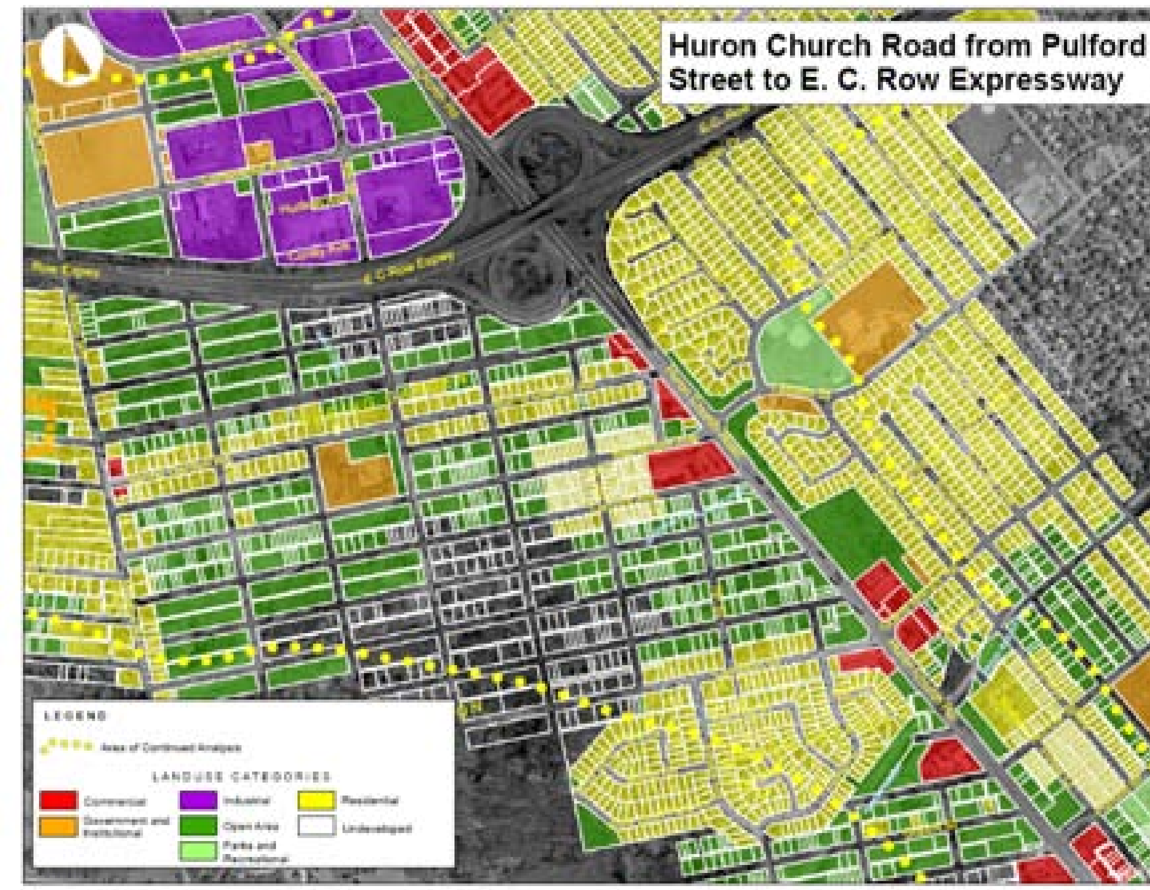


Huron Church Road from Pulford Street to E.C. Row Expressway

Land uses that exist on the east side of Huron Church Road consist of vacant areas between Pulford Street and Grand Marais Drain. On the east side of Huron Church Road, from north of the Grand Marais Drain to E.C. Row Expressway, there is a large residential subdivision constructed in the 1990's called Bellewood Estates, which consists of single family homes. Also located in the Bellewood Estates subdivision is the Bellewood Elementary School. In addition, the Children's House Montessori Pre-School is located in this area. Other land uses located between Grand Marais Drain and E.C. Row Expressway include open space and some commercial uses. Land uses on the west side of Huron Church Road between Pulford Street and Grand Marais Drain include vacant areas and commercial land uses. From south of Grand Marais Drain to E.C. Row Expressway, land uses include vacant areas, commercial land uses, including a hotel, and the Huron Estates residential subdivision, a single family residential subdivision constructed in the 1990's (see **Exhibit** 7.16).

North of the Huron Estates residential subdivision is a recently constructed new residential neighbourhood in the Lamont Avenue and Bethlehem Avenue neighbourhood. The majority of these homes are semi-detached and are constructed on approved lots in the Spring Garden Planning Area. Other single and multi family homes are located on Spring Garden Road, located between Huron Church Road and Malden Road. This area contains homes that were constructed over several decades, with some that were built in the 1930's and 1940's.

EXHIBIT 7.16 –HURON CHURCH ROAD FROM PULFORD STREET TO E.C. ROW EXPRESSWAY

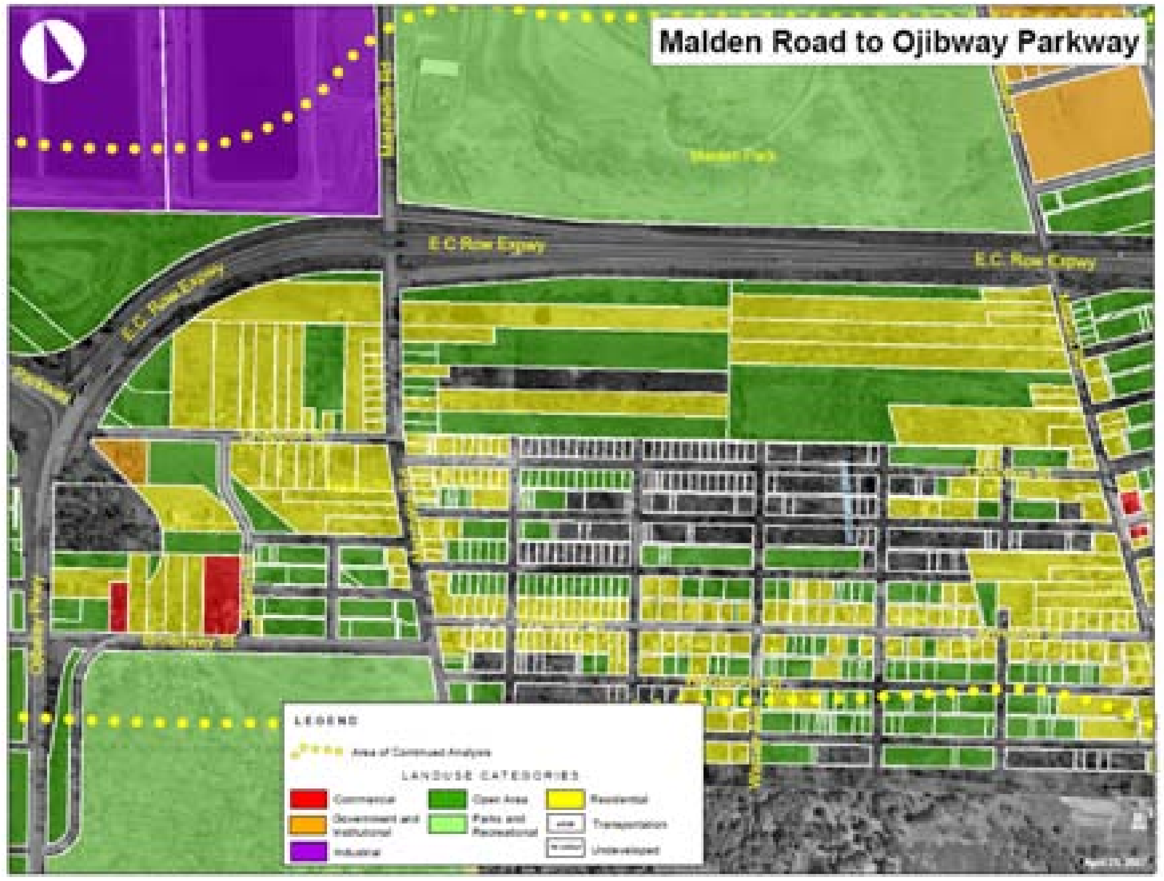


Malden Road to Ojibway Parkway

Land uses in this area include natural areas and single-family residential units. Armanda Street is an established residential neighbourhood that consists of mostly older, single family homes. In recent years, additional single-family residences have been constructed at the east end of Armanda Street towards Matchette Road. Approximately 20 homes have been constructed between 2004 and 2006. A bed and breakfast business is located on Chappus Street.

North of E.C. Row Expressway is Malden Park, a 70-hectare park, originally a former city landfill consisting of a 90 metre hill that contains paved and wood chipped hiking and bicycle trails. The park also features a reception centre with enclosed patio, naturalized concert center, additional hiking and walking trails and ponds and a toboggan hill. There are also picnic areas with tables and barbeques. The park features the highest elevation in Essex County (see **Exhibit** 7-17).

EXHIBIT 7.17 –MALDEN ROAD TO OJIBWAY PARKWAY

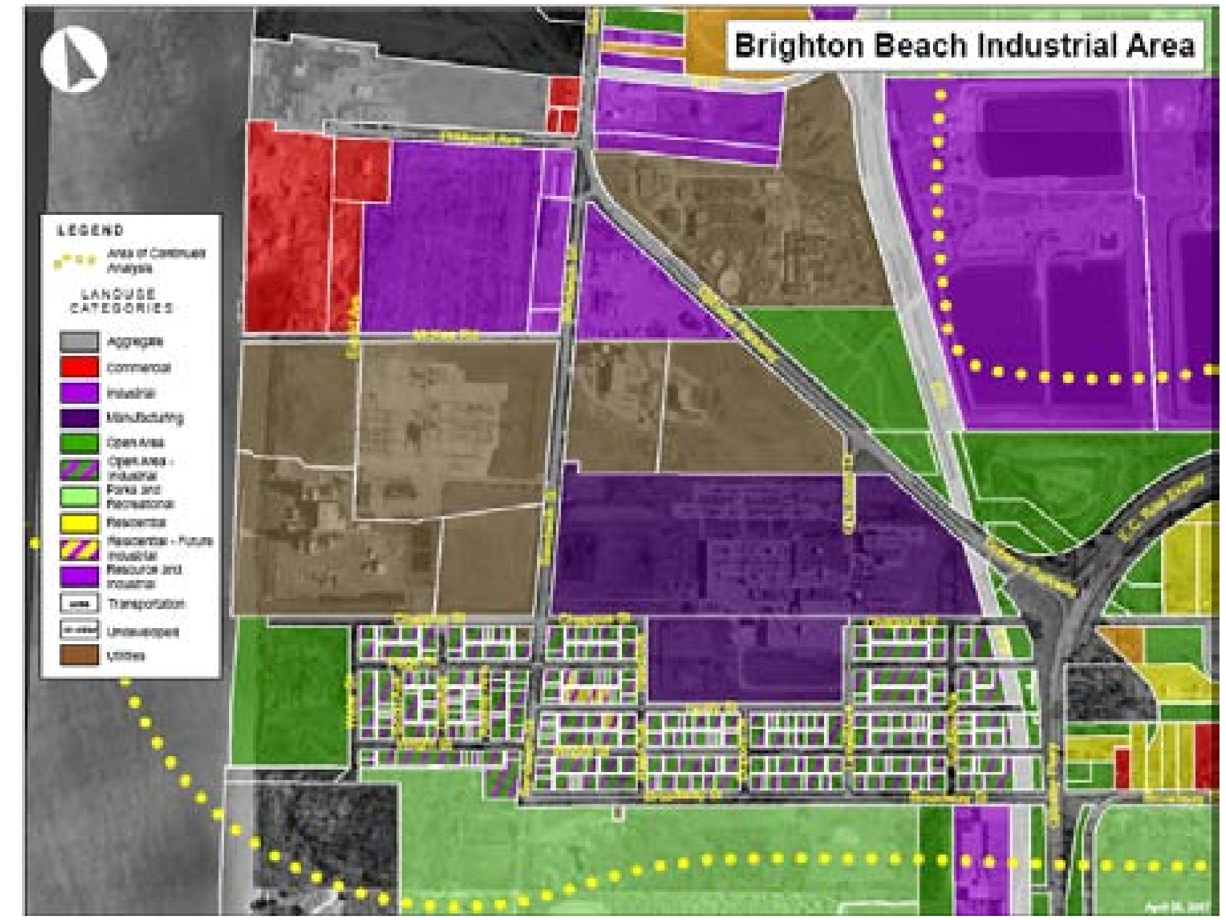


Brighton Beach Industrial Area

The Brighton Beach Industrial area is generally defined as the area bounded by Ojibway Parkway to the east, Broadway Street to the south, the Detroit River to the west, and Chappus Street to the north. The Brighton Beach area was a former residential neighbourhood, comprised of approximately 100 single-family homes surrounded by various industrial land uses. Beginning in the 1970's, the City of Windsor began purchasing the homes in the Brighton Beach area to assemble the land for a future industrial park. The Brighton Beach area is mostly vacant; however approximately half a dozen occupied homes and the original residential street network remains. The Brighton Beach area has been rezoned to allow for industrial uses.

North of the Brighton Beach area is the Nemak Plant, an automotive parts manufacturing facility, and the Windsor Power Plant. Northwest of Brighton Beach is the Ontario Power Generation Brighton Beach Power Station and Hydro One Keith Transformer Station. To the south is the Ojibway Black Oak Prairie, an Area of Natural or Scientific Interest (ANSI) that is protected from development (see Exhibit 7.18).

EXHIBIT 7.18 –BRIGHTON BEACH INDUSTRIAL AREA

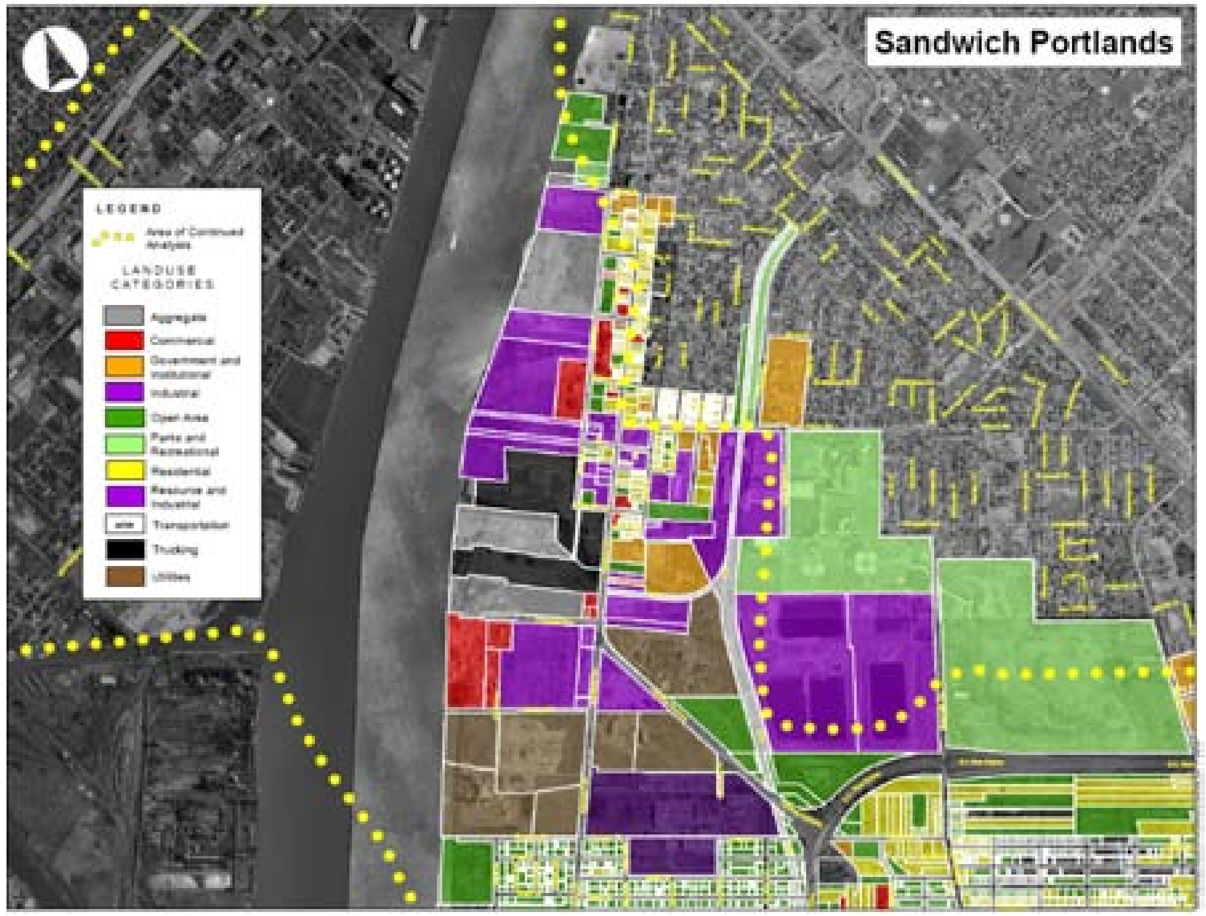


Sandwich Portlands

The Sandwich Portlands is located west of Sandwich Street, south of Brock Street, north of Prospect Avenue and adjacent to the Detroit River. The Portlands are adjacent to Sandwich Towne, a largely residential and historic area in the City of Windsor that was originally established in the early 1700s. The historic centre of Sandwich Towne is the intersection of Bedford and Brock Streets, where St. John's Church and Cemetery and Mackenzie Hall, built in 1796, are still located. The retail core area of Sandwich Towne (Mill Street and Sandwich Street) is an area identified within the Olde Sandwich Towne Community Planning Study as a priority area for heritage-compatible infill development. It is seen as an area where historic design guidelines could be developed to protect views and vistas, facades, streetscapes, and other features that area unique to Sandwich Towne.

Sandwich Towne is also surrounded by industrial land uses including the Nemak Plant, the Windsor Power Plant, Ontario Power Generation Brighton Beach Power Station, and Southwestern Sales, an aggregate storage company. Located along the waterfront is the Sandwich Portlands, an industrial area that contains several water-dependant businesses. The Sandwich Portlands is designated an industrial area that allows for industrial and business uses that require direct water access, multi-modal transportation facilities, docking facilities or dry docks (see Exhibit 7.19).

EXHIBIT 7.19 – BRIGHTON BEACH INDUSTRIAL AREA



7.4 Cultural Resources

This section provides an overview of archaeological and heritage resources that are existing within the Area of Continued Analysis. For further details, the reader is referred to the following reports:

- *Draft Practical Alternatives Evaluation Working Paper – Archaeology (April 2008) (available);*
- *Stage 2 Archaeological Assessment of the Detroit River International Crossing (October 2008) (pending); and*
- *Draft Practical Alternatives Evaluation Working Paper – Cultural Heritage (April 2008) (available).*

7.4.1 Archaeological Resources

The process of evaluating cultural heritage value is based on a number of overlapping considerations that are applied on a case-by-case basis. These considerations fall into three basic categories: information value, value as a public resource, and community value.

"Information" value refers to the likelihood that investigation of a site will contribute to an increased understanding of the past. Such an assessment must be carried out thorugh consideration of several major criteria: the degree to which a site will contribute to our understanding of the past (its cultural, historical or scientific value); the relative rarity or commonness of similar sites locally or regionally; its productivity or richness in terms of the artifacts it contains; and the degree to which it has been disturbed by more recent land uses or natural processes.

"Value as a public resource" refers to the degree that a site has intrinsic value to an enhanced understanding and appreciation of Ontario's past on the part of the general public.

"Value to a community" refers to whether the site has intrinsic value to a particular community, First Nation or other group.

Stage 1 and preliminary Stage 2 archaeological assessments of the Area of Investigation were undertaken from 2006 to 2008. The Area of Investigation is located within the Area of Continued Analysis, but is focused on the practical crossing, plaza and access road alternatives discussed in **Chapter** 8 of this report.

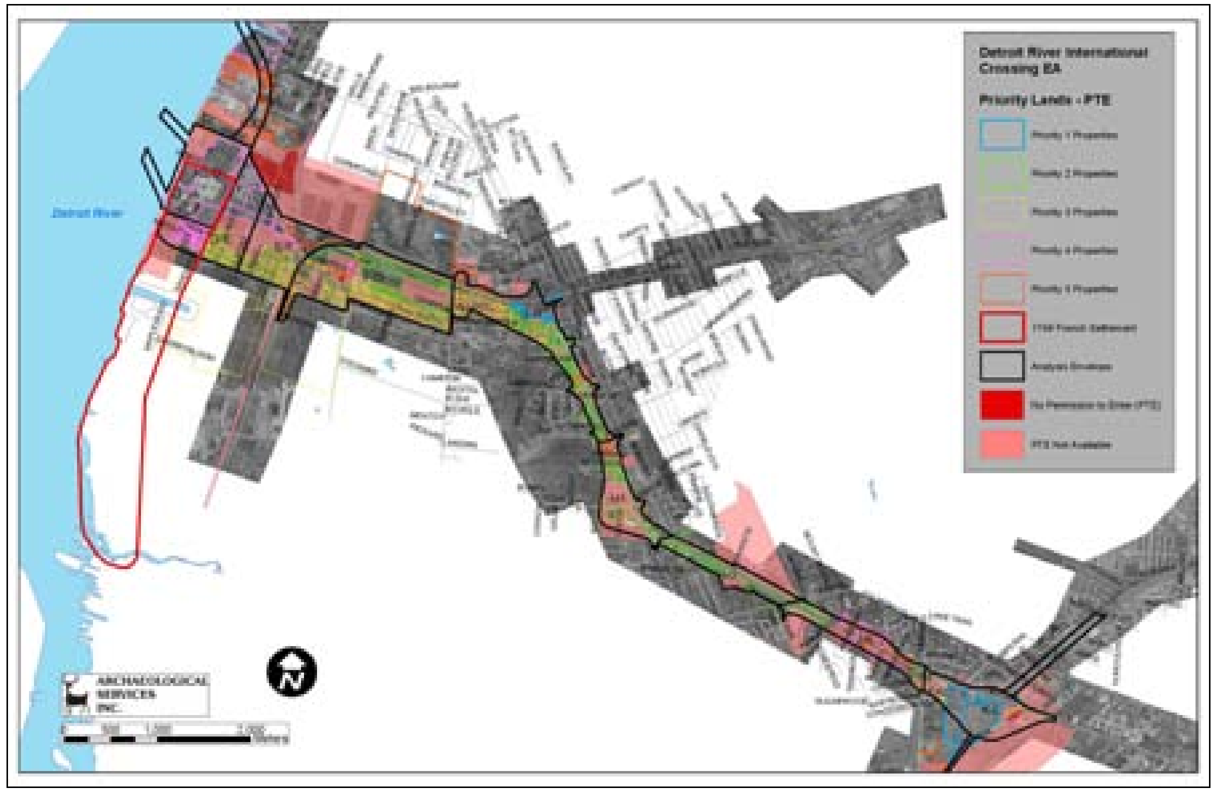
The Stage 1 assessment documented the archaeological and land use history of the area and its current geography and topography, in order to assess the potential for archaeological resources. The Stage 2 systematic field assessment investigated all areas with archaeological potential within the Area of Investigation, and for which permission to enter had been obtained.

The lands that were subject to archaeological assessment were assigned survey priorities (Priorities 1 to 5, with 1 being the highest), as summarized below:

- **Priority** 1 lands were those lands in close proximity to the E.C. Row and Lucier sites at the intersection of Huron Church and E.C. Row, as well as two large ploughed properties at Highway 401 which, during the summer of 2006, were at optimum surface condition (minimal crop growth) for pedestrian survey.
- **Priority** 2 lands were lands with potential for the presence of pre-contact archaeological sites in core areas common to all alternatives.
- **Priority** 3 lands were those lands which could be surveyed without further prior research and which would enable archaeology to be considered meaningfully during the comparative evaluation of practical alternatives (i.e., areas that represent the real choice between practical alternatives).
- **Priority** 4 lands were generally located in the western portion of the Area of Investigation, plaza and crossing areas which required additional background historical/map research prior to the start of field survey, due to the long history and intensive land use of the properties. In the eastern portion of the area of investigation, Priority 4 lands were identified that have a potentially higher likelihood of site integrity (relative to Priority 5) that were not assigned to Priority 1, 2, or 3.
- **Priority** 5 lands were, for the most part, those with a lower potential for archaeological site integrity, together with some additional marginal lands in the eastern portion of the area of investigation.

The survey priorities were based on expert judgment with respect to potential for the presence of archaeological sites, the need to identify significant sites as soon as possible in areas common to all of the practical alternatives, and the need to gather sufficient information to contribute meaningfully to the evaluation of practical alternatives with respect to potential impact to archaeological sites and areas of archaeological potential. See **Exhibit** 7.20 for Priority 1 through 5 lands originally indentified for Stage 2 archaeological assessment.

EXHIBIT 7.20 – PRIORITY 1 THROUGH 5 LANDS IDENTIFIED FOR STAGE 2 ARCHAEOLOGICAL ASSESSMENT



METHODOLOGY

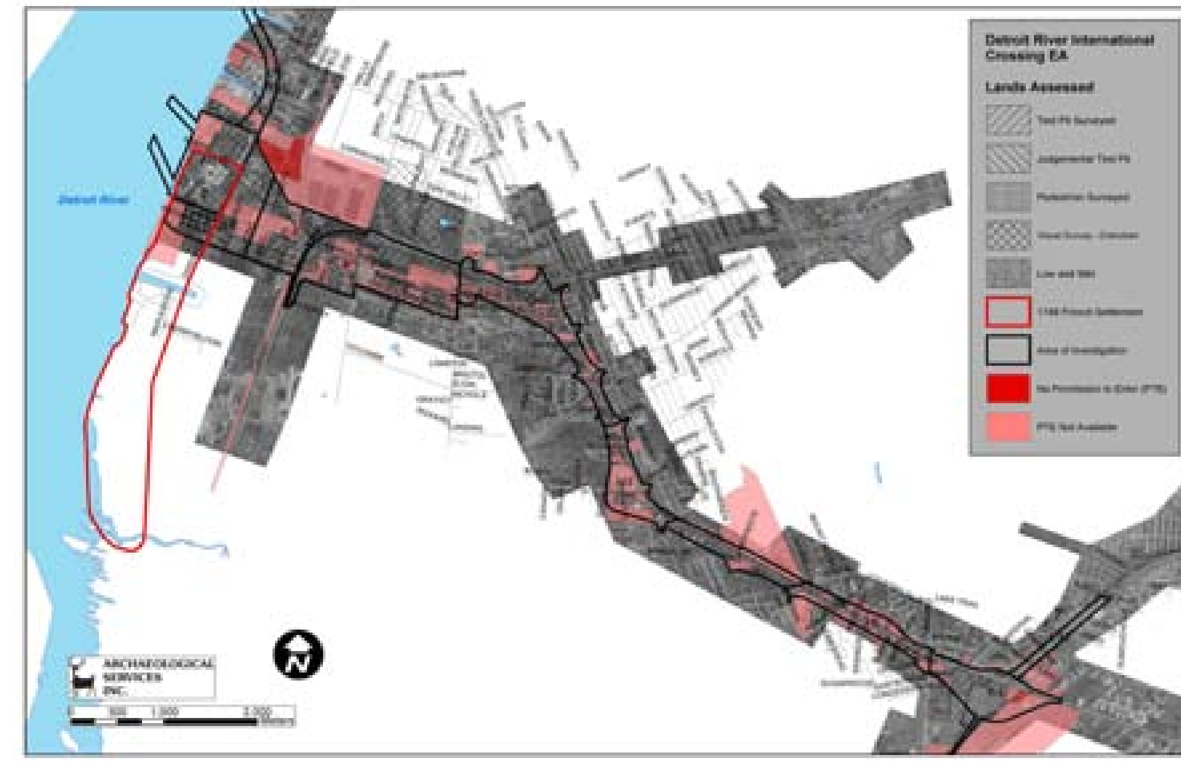
The Stage 2 archaeological assessment involved the documentation and inventory of archaeological resources within the Area of Investigation, and utilized two types of survey techniques: pedestrian and test pit. The lands assessed are mapped by survey method in **Exhibit** 7.21.

Pedestrian survey, employing a five metre transect interval, was conducted on lands with open surface visibility (e.g. lands that were ploughed, or with open, immature crops, and well-weathered), and it involved the location, mapping and collecting of artifacts observed on the surface. When artifacts were encountered, a 20 metre radius was intensively surveyed at 1 metre intervals.

Test pit survey, employing a mixture of 5 metre transect intervals and judgemental sampling, was conducted on lands with closed surface visibility (e.g. scrub farmland, windrows, lands within forest or valley floor, or with dense, mature crop), and it involved the location, mapping and collection of artifacts by shovel test pitting. Soil fills of all test pits were screened through 6-millimetre mesh to facilitate the recovery of artifacts and all test pits were back filled. When artifacts were encountered, the positive test pit was surrounded by additional test pits within 2.5 metres in the eight cardinal directions.

The Universal Transverse Mercator (UTM) grid coordinates of all sites and findspots were recorded using a hand-held GPS unit tied to the 1927 North American Datum (NAD27).

EXHIBIT 7.21 – PRIORITY 1 THROUGH 5 LANDS ASSESSED BY METHOD OF SURVEY



SURVEY COVERAGE

Permission to Enter (PTE) was originally obtained for this EA study in May 2006. During 2006 and 2007, one hundred percent of all Priority 1 lands in the Area of Investigation were assessed. There were no outstanding properties that required permission to enter for Priority 1. One hundred percent of all Priority 2 lands with PTE were surveyed. Of the remaining Priority 2 lands identified, PTE was either not granted or the PTE form was not returned. Ninety-eight percent of all Priority 3 lands with PTE were surveyed. Of the remaining Priority 3 lands identified, PTE was either not granted or the PTE form was not returned. Ninety-nine percent of all Priority 4 lands with PTE were surveyed. Of the remaining Priority 4 lands identified, PTE was either not been granted or the PTE form was not returned. Ninety-nine percent of all Priority 5 lands with PTE were surveyed. Of the remaining Priority 5 lands identified, PTE was either not granted or the PTE form was not returned. In 2006 and 2007, there were a total of 496 properties surveyed.

In 2008, PTE was requested from properties that required further investigation based on previous testing and / or that were within the refined region of Technically and Environmentally Preferred Alternative. From this, there were 146 properties surveyed. There were 260 outstanding properties (29%) that await permissions to enter or have other issues that require resolution prior to finalising the assessment.

Table 7.12 summarizes the properties that were assessed from 2006 to 2008, as well as those that have not been surveyed.

TABLE 7.12: SUMMARY OF PROPERTY ASSESSMENTS TO SEPTEMBER 30, 2008

	ASI		URS		Total	
	#	%	#	%	#	%
Assessed Properties	496	55	146	16	642	71
Outstanding	0	0	260	29	260	29
Total Properties	496	55	406	45	902	100

HISTORICAL CONTEXT

Stage 1 archaeological assessment of Priority 4 and 5 lands in the western portion of the Area of Investigation included a review of the historical information available and a further review of the City of Windsor Archaeological Master Plan (CRMGL 2005). Historical information revealed that the shore of the Detroit River has a long history of human occupation. Euro-Canadian occupational history is well documented from the mid-eighteenth century to present times.

The first detailed French map of the south (Ontario) shore was not produced until the mid-eighteenth century. Entitled “Carte de la Riviere Du Detroit”, this map was published by Chaussegros De Lery in Paris in 1749. It showed the first “nouvelle habitation française de 1749” with the land divided along the river into the long, narrow “seigneurial” allotments characteristic of the French ancien regime. A few farms were somewhat larger, such as a tract of approximately 700 metres in width occupied by Mr. Le Chevalier de Longueuil. The main area of the “nouvelle habitation” was situated along the Detroit River south of the area that would later become the old town of Sandwich. This area was known as Petite Côte.

According to the City of Windsor Archaeological Master Plan (CRMGL 2005:2-16), “European settlement on the south shore of the Detroit River began in 1749 when the governor at Quebec sponsored the movement of farming families to the area in order to promote Detroit as a granary for more distant outposts.” The settlers initially took up lots fronted onto the river in the Petite Côte area between the communities of Sandwich and Turkey Creek. Within a few years, this settlement had extended south well past Turkey Creek.

After the British Conquest of 1760 and after the American Revolutionary War, British names began to appear on landowners lists of the circa 1800 survey. Not until the nineteenth century were the inland areas of the township surveyed, using the standard British grid system where possible.

According to the City of Windsor Archaeological Master Plan (CRMGL 2005:2-17), although most of the French farmstead sites lie within areas that have undergone extensive nineteenth century development, none of them have ever been properly examined as archaeological sites. Furthermore, communities such as Brighton Beach, Ojibway and LaSalle may retain the most potential. As Windsor’s French settlement is the earliest of its kind in Ontario, the search for intact eighteenth century French sites, which may include the remains of building footings, foundations, and the remnants of palisades, is of potentially significant heritage value and interest.

Exhibit 7.22 illustrates the location of the eighteenth century French Settlement in relation to the Area of Investigation, the identified Priority 2, 3, 4 and 5 lands, lands that have been assessed in relation to the general location of the plaza and crossing alternatives, and areas identified as having no potential due to disturbance. In addition, a series of later historical maps (1877 Walling Historical Atlas; the 1905 McPhillips City of Windsor Map; and the 1967 Pathfinder, Metropolitan Windsor Map) are used to illustrate the changing landscape from the 1870s to 1960s within Priority 4 and 5 lands in the western portion of the Area of Investigation (Exhibits 7.23 to 7.25).

EXHIBIT 7.22 – LOCATION OF 1749 PETITE CÔTE FRENCH SETTLEMENT IN RELATION TO AREAS DEFINED AS HAVING NO POTENTIAL IN THE PLAZA AND CROSSING ALTERNATIVE LOCATIONS

Further investigation of the eighteenth century French settlement area, where it intersects with the Priority 3 and 4 lands, has narrowed the area of interest by confirming additional areas lacking archaeological integrity and subjecting residual areas to Stage 2 test-pit survey. The Area of Investigation is bounded in the north by McKee Avenue (now the northern limit of the Brighton Beach Generating Station), in the west by the Detroit River, in the south by the limits of the Area of Continued Analysis (essentially the westerly extension of Broadway Boulevard), and in the east by Sandwich Street. The land immediately to the south of this area has been designated as the Ojibway Industrial Park by the City of Windsor[13].

The northern half of this area, north of Chappus Street, is the Brighton Beach generating station. Opened in 2004, this facility was a joint project by ATCO Power Canada Ltd. and Ontario Power Generation Inc. to re-develop the former J. Clark Keith power plant site[14]. The J. Clark Keith power plant was originally a coal-fired plant that began production in 1951[15]. Eventually refitted to burn

[13] Dillon Consulting Limited, Next Ideas Inc., EDP Consulting, and Lapointe Consulting. 2007 City of Windsor Official Plan Update: Looking Back Summary Report – Economic Conditions. http://howardcorridoresr.city.windsor.on.ca/
[14] ATCO Power Canada Ltd. 2004 Brighton Beach Power Ltd. Official Opening – October 22, 2004 – Backgrounder. http://www.atcopower.com/Media_Centre/News_Releases/2004/ATCOPower-BrightonBeach-Backgrounder.pdf.
[15] Ontario Power Generation Inc. 2007 Historical Timeline. http://www.opg.com/education/whatwedo/HistoricalInfo% 20- %20for%20merge.pdf

natural gas, the plant was closed in 1984 and demolished in 1997[16]. In 1990, Hugh Daechsel, then with the Cataraqui Archaeological Research Foundation, carried out a "Phase 1 Evaluation of Heritage and Archaeological Resources" of the J. Clark Keith power plant site, concluding that the property was very disturbed and did not warrant any further archaeological investigation. A 1955 aerial photograph of the site (Exhibit 7.23) illustrates the original extent of disturbance on the property. When compared with the current extent of disturbance, associated with the Brighton Beach generating station (Exhibit 7.24), it becomes clear that only two small areas may have retained any archaeological integrity, and these were subjected to test pit survey, as illustrated in Exhibit 7.24. No archaeological remains were encountered in these areas.

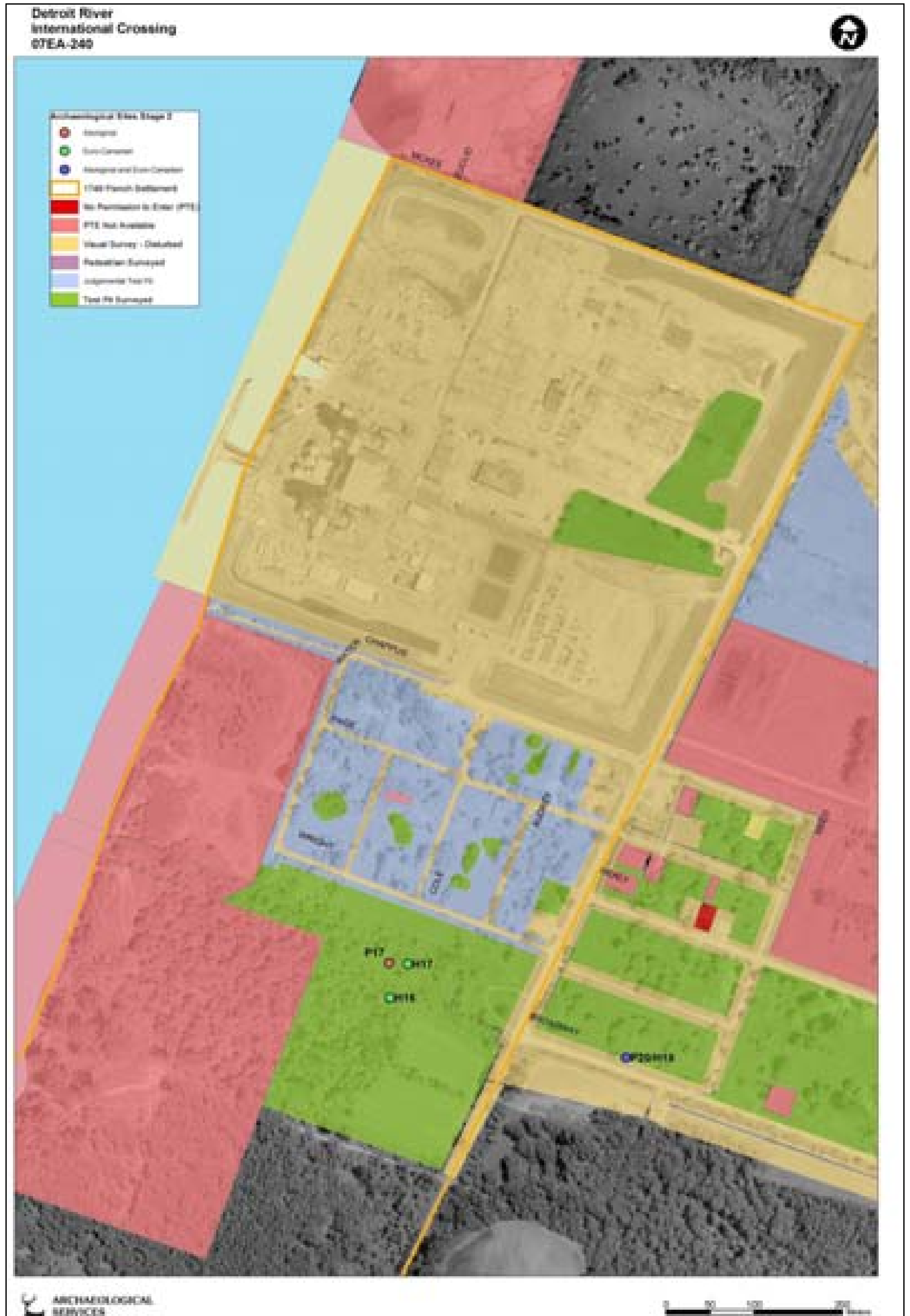
South of Chappus Street, a combination of judgmental and systematic test pit survey has been carried out within the precincts of a former residential subdivision that also appears in the 1955 aerial photograph of the area (Exhibit 7.23). No archaeological remains were encountered therein. However, systematic test pit survey to the south of this subdivision has yielded archaeological remains. Designated sites H16 and H17, together with nearby site H18, yielded mid-nineteenth century artifacts that have been tentatively attributed to farmsteads established in that area circa 1861.

The remainder of the French settlement area, located south of Chappus Street and west of Water Street, comprises an area where there had also once been some modern residential occupation, as illustrated in Exhibit 7.23. Situated along the waterfront, this area exhibits the highest potential for both eighteenth and nineteenth century occupation, as suggested by early maps (see Exhibit 7.24).

EXHIBIT 7.23 – J. CLARK KEITH POWER STATION AND ENVIRONS, 1955 (ONTARIO DEPT. LANDS & FORESTS 1955)

[16] ATCO Power Canada Ltd. 2004 Brighton Beach Power Ltd. Official Opening – October 22, 2004 – Backgrounder. http://www.atcopower.com/Media_Centre/News_Releases/2004/ATCOPower-BrightonBeach-Backgrounder.pdf.

EXHIBIT 7.24 – FRENCH SETTLEMENT AREA SHOWING BRIGHTON BEACH GENERATING STATION (FORMER J. CLARK KEITH POWER PLANT)



SURVEY RESULTS

During the 2006 and 2007 surveys, there were 43 archaeological components located within the Area of Investigation, including 23 Euro-Canadian and 20 Aboriginal assemblages. Summary details on these sites are provided in Table 7.13. Appendix C of the *Draft Practical Alternatives Evaluation Working Paper – Archaeology (April 2008)* (refer to List of Supporting Documents) contains a summary description of each site identified during the 2006 and 2007 field seasons.

All artifacts recovered from these sites were processed. Data analysis includes the evaluation of each site with respect to those that require further investigation through additional surface or sub-surface testing in order to assess the cultural heritage value of the individual archaeological site. Included in the data analysis is the registration of archaeological sites within the *Ontario Archaeological Sites Database (OASD)* by assigning numbers within the Borden system.

Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 kilometres east to west, and approximately 18.5 kilometres north to south. A four-letter designator references each Borden block, and sites within a block are numbered sequentially as they are found. The study area under review is located within the AbHr and AbHs Borden blocks.

During the recent 2008 surveys, there were 23 archaeological components located within the Area of Investigation (more specifically, within the location of the TEPA), including 9 Euro-Canadian and 14 Aboriginal assemblages. Summary details on these sites are provided in Table 7.14. *Stage 2 Archaeological Assessment of the Detroit River International Crossing (October 2008)* (refer to List of Supporting Documents) contains a summary description of each site identified during the 2008 field seasons

TABLE 7.13: SUMMARY OF ARCHAEOLOGICAL SITES FOUND TO SEPTEMBER 30, 2008

	ASI		URS		Total	
	Aboriginal	Euro-Can	Aboriginal	Euro-Can	Aboriginal	Euro-Can
Recommended for Clearance	2	12	10	6	12	18
Stage 3 Recommended	18	11	4	3	22	14
Total Sites	20	23	14	9	34	32

7.4.2 Heritage Resources

FIELD REVIEW RESULTS

The majority of the land adjacent to the Detroit River is currently being used for industrial purposes, with the exception of Black Oak Heritage Park and the land to the north and northwest of the park, in the Brighton Beach area. This land, extending to the west from Ojibway Parkway south of Chappus Street, north and west of Black Oak Heritage Park, is generally overgrown or wooded, and, in the northern part of it, between Chappus Street and Broadway Street and between Chappus Street and Wright Street, there is a subdivision-like arrangement of dirt streets surrounded by regenerated vegetation. This area, known locally as Brighton Beach (CLU 2), is an abandoned residential area that still contains a small concentration of nineteenth and early twentieth century heritage resources (BHF 15-17).

Within the industrial-use area north of Brighton Beach and south of Sandwich Towne, a cairn has been erected at the junction of Prospect Avenue and Sandwich Street / Ojibway Parkway by the *Historic Sites and Monuments Board of Canada* to commemorate a National Historic Event (BHF 12).

North of Ojibway Parkway, between Sandwich Street and the Essex Terminal Railway, and south of Sandwich Towne lies the Lou Romano Water Reclamation Plant. North of this industrial area, the landscape is a mix of industrial properties; relatively open areas of lawn, park, or less-intensive commercial/institutional/residential land use; and dense residential development. The southernmost part of Sandwich Towne is within the ACA, including two residential structures (BHF 13 and BHF 14) close to the shoreline.

Adjacent to the ACA is the core of Sandwich Towne (CLU 3) including the Sandwich First Baptist Church, a National Historic Site, at 3652 Peter Street, between Watkins Street and Prince Street. Two plaques have been placed at this site, one placed by the *Historic Sites and Monuments Board of Canada* and the other by the *Ontario Heritage Foundation*. The former Lido Venice Tavern at 3885 Sandwich Street was destroyed by fire in the summer of 2006. East of the Essex Terminal Railway and west of Huron Church Road north of Ojibway Parkway and E.C. Row Expressway the field review area features a variety of land uses.

The majority of the land immediately north of Ojibway Parkway and E.C. Row Expressway is currently used for industrial purposes and Malden Park, between Matchette Road and Malden Road south of Chappell Avenue is a former landfill site. East of Huron Church Road, south of E.C. Row Expressway, the land subject to field review is almost entirely an intensively-developed post 1960 residential area, with the exception of a number of small parks and institutional properties.

Huron Church Road itself is, for the most part, flanked by small industrial and commercial properties. There are a small number of heritage resources along the corridor including a 1961 Royal Canadian Legion Branch (BHF 2) and an early farmhouse perched on a rise above the convergence of Talbot Road and Huron Church Line (BHF 1). The land south of E.C. Row Expressway and west of Huron Church Road is predominantly open space, although residential development is evident on Spring Garden Road, Malden Road and Armanda Street. Two of the Malden Road properties are dated to the nineteenth century settlement of the area (BHF 10 and BHF 11) and one of them is on the Windsor Heritage Inventory. Within the relatively undeveloped area west of Huron Church Road and south of E.C. Row Expressway, and in many places remnant tree lines indicate the boundaries of long, narrow agricultural fields laid out according to the French seigneurial system.

IDENTIFIED HERITAGE RESOUCES

The ACA is largely free of significant cultural heritage resources, with the exception of Sandwich Towne (CLU 3). The remaining features are considered to be low in significance.

Within the ACA there are twenty (20) built heritage features and three (3) cultural landscapes. Tables 7.14A and 7.14B provide a summary of identified heritage features while Exhibits 7-25A and 7-25B show their location. Of these, one property (BHF 11) is listed on the City of Windsor's heritage inventory and one monument (BHF 12) was erected by the *Historic Sites and Monuments Board of Canada* to commemorate the Capture of Detroit. Eight BHFs pre-date 1900 (BHF 1, BHF 10, BHF 11, BHF 14, BHF 17, BHF 18, BHF 19 and BHF 20) and are related to agricultural settlement. Eight field-identified built heritage features were constructed in the first third of the twentieth century and are residences of the same general building type and era (BHF 3, BHF 4, BHF 5, BHF 6, BHF 7, BHF 8, BHF 9 and BHF 13). These houses represent the first suburban infill of rural agricultural lands in the early twentieth century. Also of interest is Branch 594 of the Royal Canadian Legion (BHF 2) which was constructed in the early 1960s.

The three cultural landscapes identified within the ACA comprise an unconfirmed tunnel associated with the underground railway in Sandwich Towne (CLU 1), the abandoned Brighton Beach subdivision (CLU 2) and the historic Sandwich Towne (CLU 3). Although no significant portion of the historic Sandwich Towne is within the ACA, Sandwich as a whole is heritage sensitive area. Therefore potential impacts such as the introduction of physical, visual, audible or atmospheric elements that are not in keeping with the resources and/or their setting are an important consideration for this area.

TABLE 7.14A – IDENTIFIED CULTURAL HERITAGE RESOURCES IN THE AREA OF CONTINUED ANALYSIS – CULTURAL LANDSCAPE UNITS (CLU)

FEATURE	ADDRESS	FEATURE TYPE	STATUS	APPROX. AGE
CLU 1	Chappel Street and Russel Street	Tunnels – unconfirmed oral report	Local lore	Pre-1900
CLU 2	Water Street to the west, Chappus to the north, Scotten to the east, and Broadway/Wright to the south	Brighton Beach housing subdivision	Field	Abandoned
CLU 3	Sandwich Towne	Historic settlement	Field	Pre-1900

TABLE 7.14B - IDENTIFIED CULTURAL HERITAGE RESOURCES IN THE AREA OF CONTINUED ANALYSIS – BUILT HERITAGE FEATURES (BHF)

FEATURE	ADDRESS	FEATURE TYPE	STATUS	APPROX. AGE
BHF 1	2746 Talbot Road	Farmhouse	Field	1860-1880
BHF 2	3920 Huron Church Line	Legion	Field	1961
BHF 3	3905 Huron Church Line	House	Field	1901-1939
BHF 4	3495 Huron Church Line	House	Field	1901-1939
BHF 5	2765 Reddock Avenue	House	Field	1901-1939
BHF 6	2261 Spring Garden Road	House	Field	1901-1939
BHF 7	2310 Spring Garden Road	House	Field	1901-1939
BHF 8	2290 Spring Garden Road	House	Field	1901-1939
BHF 9	2284 Spring Garden Road	House	Field	1901-1939
BHF 10	4784 Malden Road	House	Field	Pre-1900
BHF 11	4688 Malden Road	House	Windsor	Pre-1900

FEATURE	ADDRESS	FEATURE TYPE	STATUS Inventory	APPROX. AGE
BHF 12	Ojibway Parkway at Sandwich Street	Monument	Federal	Plaqued in 1927
BHF 13	261Hill Street	House	Field	1901-1939
BHF 14	3769 Russell Street	House	Field	Pre-1900
BHF 15	325 Page Street	House	Field	1901-1939
BHF 16	332 Healy Street	House	Field	Pre-1900
BHF 17	354 Healy Street	House	Field	Likely Pre-1900
BHF 18	2090 Spring Garden Road (moved from another location)	House	Field	Pre-1900
BHF 19	2369 Spring Garden Road	House	Field	Likely Pre-1900
BHF 20	1649 Chappus Road (original house integrated)	House	Field	Pre-1900

EXHIBIT 7.25A – CULTURAL HERITAGE FEATURES IN THE ACA

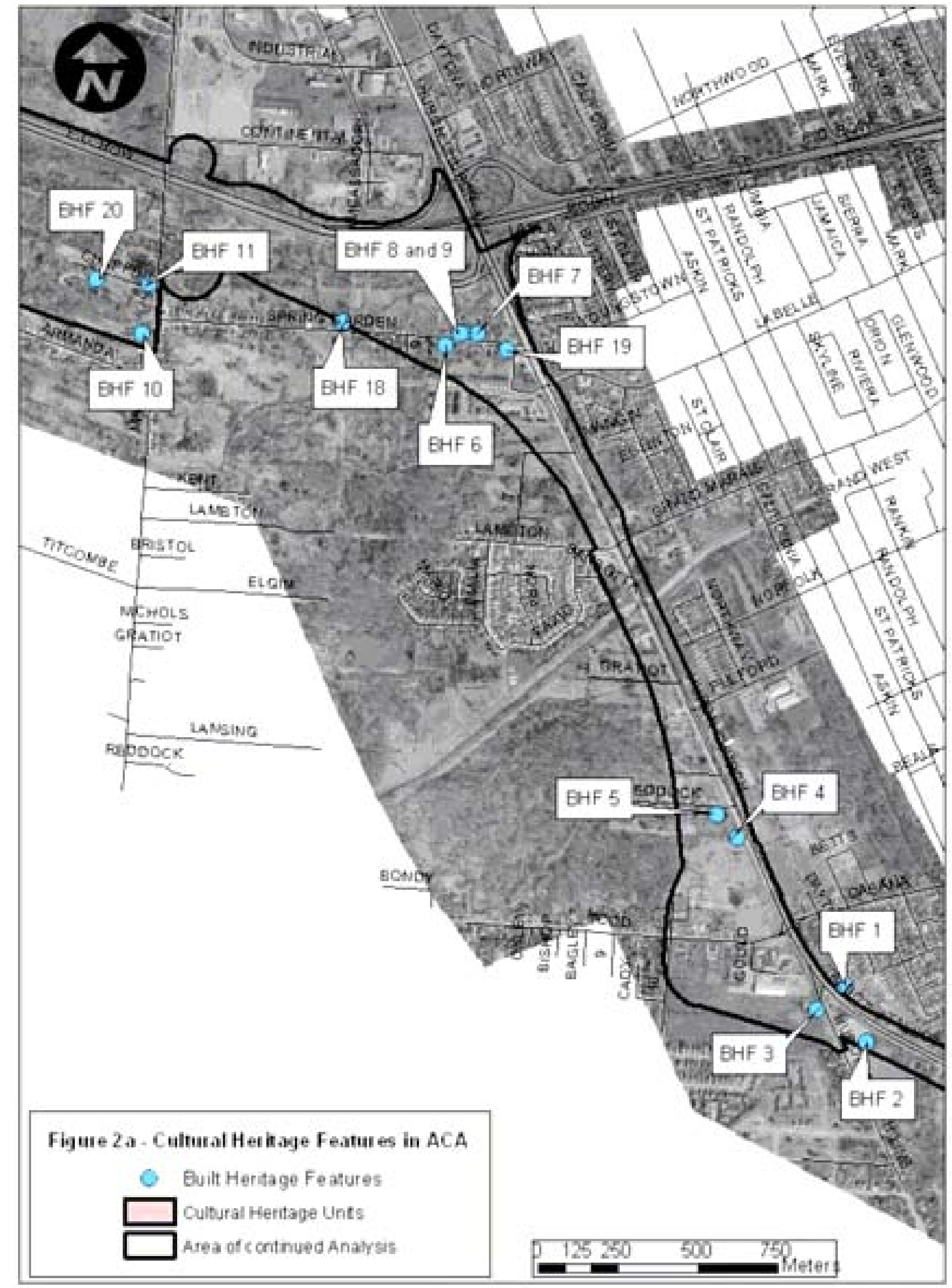
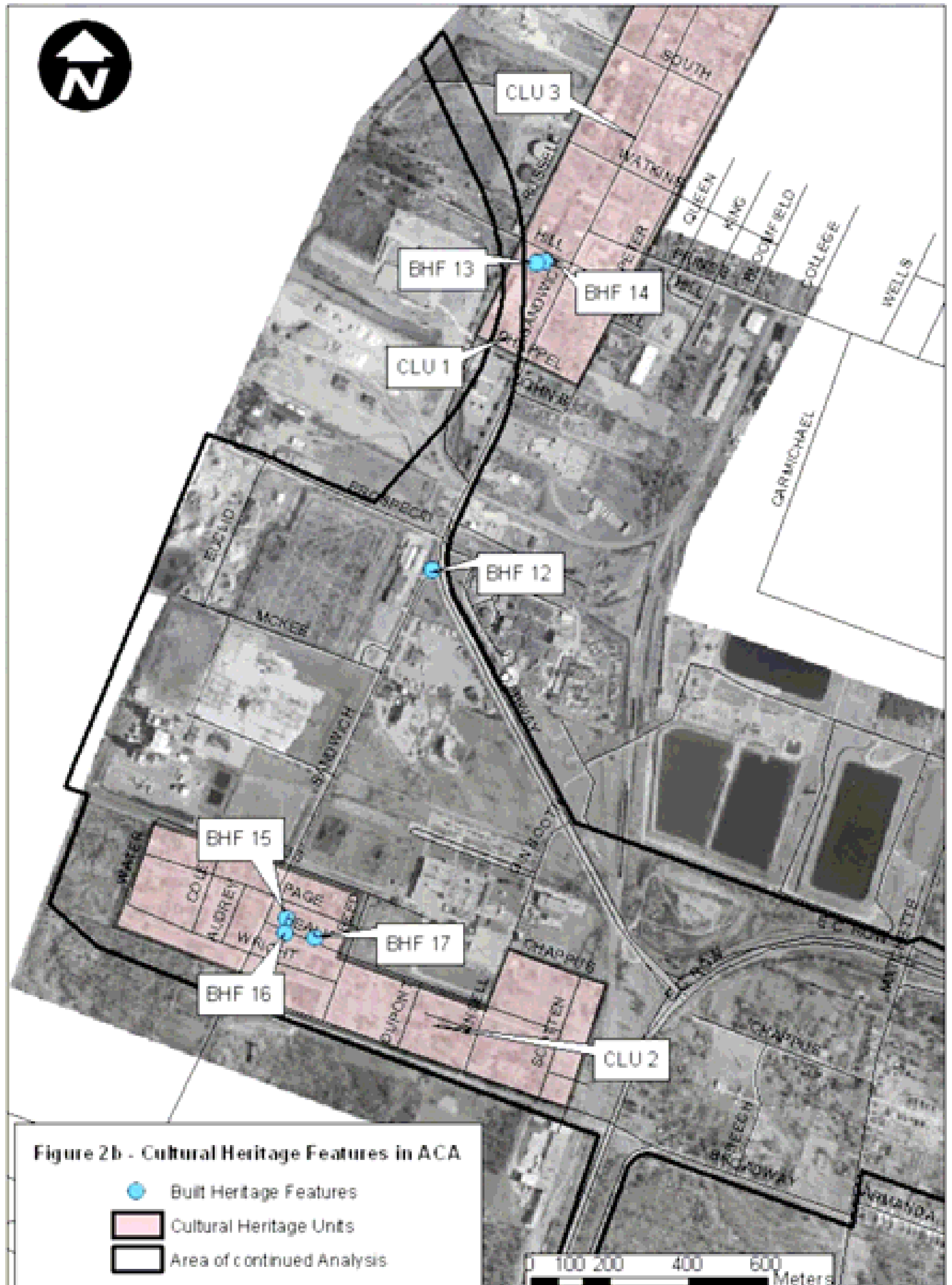


EXHIBIT 7.25B – CULTURAL HERITAGE FEATURES IN THE ACA



7.5 Natural Environment

Identification of natural heritage features such as fisheries, vegetation, wildlife, insects and designated natural areas was an important part of this study. The analysis of natural heritage features entailed collection and review of existing information, personal communications with local experts and detailed, and multi-season field investigations. An Area of Investigation (AOI) located within the Area of Continued Analysis (ACA) was defined for each biological discipline based the level of detail of secondary source information, the area of influence of the project and the level of effort required for field investigations.

This section provides an overview of existing conditions of the nautral environment within the Area of Continued Analysis. For further details, the reader is referred to *the Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents).

7.5.1 Vegetation and Vegetation Communities

DATA COLLECTION

The AOI for vegetation and vegetation communities includes all lands located within the maximum footprint area of the combined practical alternatives and adjacent lands located within 120 m of the right-of-way. This area corresponds approximately with the ACA. The study team investigated all vegetation communities located within the AOI to classify vegetation communities, inventory plants and confirm the presence/absence of species at risk.

The geographical extent, composition, structure and function of vegetation communities were identified through air photo interpretation and field investigations. Air photos were interpreted to determine the limits and characteristics of vegetation communities. In the office, a coding system was used to identify each polygon according to its general location. These polygons were confirmed, refined and classified through field investigations. Data collection sheets, including a checklist of vascular plants likely to occur in the AOI and vegetation community forms, were prepared in the office for completion in the field. Botanical inventories prepared previously for Areas of Natural and Scientific Interest (ANSIs), Environmentally Sensitive Areas (ESAs), Evaluated Wetlands and Candidate Natural Heritage Sites (CNHSs) were reviewed to familiarize the botanists with floral composition of the AOI and to assist with field identification. Information collected in the field was transcribed and verified in the office.

Field investigations of natural/semi-natural vegetation were conducted by LGL Limited on: April 17-21, 2006; May 15-19, 2006; June 12-16, 2006; July 24-28, 2006; August 21-24, 2006; and, October 2-6, 2006. Field crews typically consisted of two to four botanists working in tandem. Vegetation communities were surveyed several times throughout the year to capture the optimal growing season for the flora present.

Vegetation communities were classified according to the *Ecological Land Classification (ELC) for Southern Ontario: First Approximation and Its Application*[17]. The vegetation communities were sampled using a plotless method for the purpose of determining general composition and structure of the vegetation. Plant species status was reviewed for Canada (Committee on the Status of

[17] Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and Its Application. OMNR, Southcentral Sciences Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

Endangered Wildlife in Canada (COSEWIC 2006), Ontario (Committee on the Status of Species at Risk in Ontario (COSSARO 2006) and for Essex County[18]. Vascular plant nomenclature follows Newmaster et al.[19], with a few exceptions.

Every attempt was made to identify vascular plants in the field. Where a conclusive identification could not be made in the field, plant material was collected for examination in the laboratory. A GPS unit was used to record the location of species at risk whose identity could be confirmed in the field. Many species at risk and representative vegetation communities were also photographed for verification purposes.

DATA ANALYSIS

Vegetation Species

A total of 618 vascular plant taxa were recorded in the AOI. One-hundred and eighty-six taxa or 30 percent of the recorded flora are considered introduced and non-native to Ontario. Sixty-three species are considered Extremely Rare, Very Rare or Rare within the province (S1-S3) and eight are regulated under the federal *Species At Risk Act (SARA)* and the new *Ontario Endangered Species Act (ESA), 2007*. A list of vascular plants identified in the AOI is presented in Appendix B of the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents).

Vegetation Communities

Vegetation communities located in the AOI consist primarily of recently disturbed communities, including Cultural Woodlands (CUW1), Cultural Meadows (CUM1-1), Cultural Thickets (CUT1) and Cultural Savannahs (CUS1). In the past, these areas would have been dominated by a mixture of tallgrass prairie and natural savannah. As a result of anthropogenic influences, there has been a reduction in the frequency of fire, and an increase in agricultural activities and urban development. Non-prairie herbaceous plant species have invaded and now dominate the meadows and ground cover. Woody species have increased due to the lack of fire and now dominate in the form of CUW1, CUT1 and CUS1 communities. Despite the influence that humans have had on the composition and structure of the vegetation communities located within the AOI, remnant patches of Tallgrass Prairie (TPO2-1) exist on the periphery of the Ojibway Prairie Complex. The location of vegetation communities is presented in **Exhibit 7-26**. A detailed description of community types and their corresponding polygon codes is presented is presented in Appendix C of the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents).The general structure and composition of the predominant vegetation community types are described.

Wooded Cultural Communities

CUW1 communities are dominated by a mixture of adventive woody species such as eastern cottonwood (Populus deltoides ssp. deltoides), Freeman's maple (Acer X freemanii) and Manitoba maple (Acer negundo) and they have less than 60 percent tree cover. CUS1 communities have a lower percent tree cover at less than 35 percent and are made up of Manitoba maple, black walnut (Juglans nigra) and eastern cottonwood. CUT1 communities are clusters of shrubs, including gray dogwood (Cornus foemina ssp. racemosa), staghorn sumac (Rhus typhina) and common buckthorn (Rhamnus cathartica). All three community types have a high percentage of species that are considered introduced and non-native to Ontario. Three Cultural Plantations (CUPs) are present in the AOI including planted red oak (Quercus rubra), eastern white cedar (Thuja occidentalis) and Scots pine (Pinus sylvestris).

Cultural Meadow

CUM1-1 communities consist of species that are typical of disturbed sites. Based on the species composition of these sites, it is likely that they are regularly mown (manicured) or ploughed. Grasses and invasive forbs, such as wild carrot (Daucus carota), common reed (Phragmites australis), tall goldenrod (Solidago altissima var. altissima), orchard grass (Dactylis glomerata), Canada goldenrod (Solidago canadensis) and Kentucky bluegrass (Poa pratensis ssp. pratensis) are dominant. Colonization of these areas by woody species is limited. Some of the cultural meadow communities were cultivated in the past.

Deciduous Forests

There was a wide range of successional stages in the deciduous forest communities in the AOI. Communities ranged from young through mid-aged to mature. Many of the forests contained a high percentage of native species, while others were dominated by non-native species. Deciduous forests occurred in both upland and lowland areas. Forests with dry to fresh soil conditions were dominated by black oak, white oak, shagbark hickory (Carya ovata), Manitoba maple and black locust (Robinia pseudo-acacia). Forests with fresh to moist soil conditions were dominated by American elm (Ulmus americana), red ash (Fraxinus pennsylvanica), black willow (Salix nigra), black walnut, eastern cottonwood, sassafras (Sassafras albidum), pin oak, swamp white oak (Quercus bicolor) and Freeman's maple. Natural succession and anthropogenic disturbances have resulted in high forest diversity with a total of 12 ELC forest community types.

Tallgrass Prairie

A proportion of the meadow communities contain a greater abundance of early successional tallgrass prairie species. These meadows have the potential to be classified as either meadow or forb prairie, but there is no classification within the ELC manual for early successional forb prairie communities. Thus, a criterion was used to classify forb prairies as either CUM1-1 or TPO2-1 communities. This criterion was the amount of anthropogenic disturbance and the ratio of introduced to tallgrass species. The forb prairies in the AOI contain wild bergamot (Monarda fistulosa), ironweed (Vernonia gigantea), Canadian tick-trefoil (Desmodium canadense), gray-headed coneflower (Ratibida pinnata), rough-headed bush-clover (Lespedeza capitata), tall tickseed (Coreopsis tripteris), tall wild sunflower (Helianthus giganteus) and spiked blazing star (Liatris spicata). Conversely, the forb prairies contained a lesser proportion of tallgrass than in the tallgrass prairie communities. TPO2-1 communities have experienced the least amount of anthropogenic disturbance of the open communities found in the AOI. They contain a mixture of native tall grasses and prairie forbs, including Indian grass (Sorghastrum nutans), big bluestem (Andropogon gerardii), little bluestem (Schizachyrium scoparium), Virginia culver's root (Veronicastrum virginicum), colic-root (Aletris farinosa), ironweed and tall cord grass (Spartina pectinata). Past fire occurrence is evident in many of the healthy TPO2-1 communities.

Groundwater is known to play an important role in sustaining the tallgrass prairie communities. Hydrogeological conditions in the AOI consist generally of shallow surficial sand, silt and fill over unsaturated clayey silt over saturated silty clay over bedrock. The tallgrass prairie communities are sustained by the surficial sand, silt and fill layer (surface aquifer) that is saturated by rainfall.

[18] Oldham, M.J. 1993. Distribution and Status of the Vascular Plants of Southwestern Ontario. OMNR. Aylmer District Office, Aylmer Ontario.
[19] Newmaster, S.G., A. Lehela, P.W.C. Uhlig, S. McMurray and M.J. Oldham. 1998. Ontario. Plant List. OMNR, Ontario Forest Research Institute, Sault Ste. Marie, Ontario, Forest Research Information Paper No. 123.

Percolation downwards from the surface aquifer through the unsaturated clayey silt (aquatard) to the deep aquifer (saturated clayey silt and bedrock) is very slow. The groundwater table in the surficial aquifer is located approximately 2 to 3 m below ground surface, depending on site-specific conditions and the amount of rainfall.

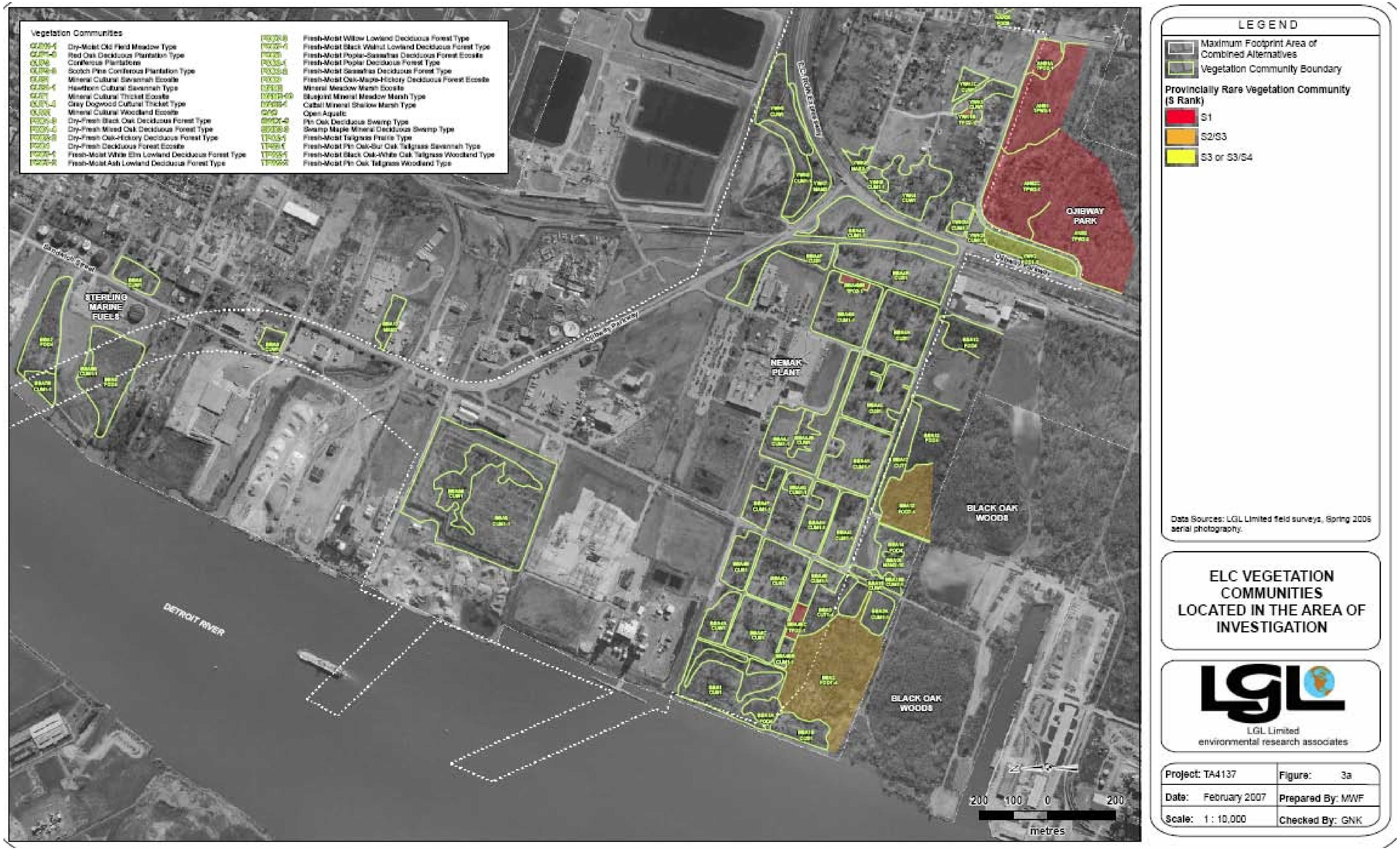
Oak Savannah and Woodland

One oak savannah community was found in the AOI and it was dominated by pin oak (Quercus palustris) and bur oak (Quercus macrocarpa). Two types of oak woodlands were encountered and they consist of black oak, white oak and pin oak. These communities contain many native drought resistant grasses and sedges, plus numerous tallgrass prairie forb species.

Wetlands

The wetlands in the AOI include swamps, marshes and open aquatic communities. The deciduous swamps are dominated by pin oak, Freeman's maple and eastern cottonwood. The meadow marshes are composed of common reed, European beggar-ticks (Bidens tripartita) and devil's beggar-ticks (Bidens frondosa), while the shallow marshes are made up of narrow-leaved cattail (Typha angustifolia). There was one small Open Aquatic (OAO) community that had an algal bloom in the mid-summer, which cleared up by the late summer.

EXHIBIT 7.26 – VEGETATIVE COMMUNITIES WITHIN THE ACA



Species at Risk

Eight species listed as Special Concern, Threatened or Endangered by COSEWIC or COSSARO and regulated under the SARA and the new OESA were recorded during field investigations (colic-root, willowleaf aster, Kentucky coffee-tree, spiked blazing star, Shumard oak, prairie rose, Riddell's goldenrod and butternut). Two species, summer snowflake, considered Globally Very Rare (G2) and butternut, considered Globally Rare to Uncommon (G3), were also recorded duing field investigations. Sixty-three species considered Extremely Rare (S1), Very Rare (S2) and Rare to Uncommon (S3) according to the NHIC were observed during field investigations. S-ranks are a ranking system for a species status in Ontario and are also applied by the NHIC. Species with an S-rank of S1 to S3 are considered extremely rare, very rare or rare within the province and were used to limit the scope of the investigation.

A list of provincially rare plant species located in the AOI is presented in Section 2.3.1.3 of the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents).

Many of the vegetation communities identified in the AOI are considered Provincially Extremely Rare (S1), Provincially Very Rare (S2) or Provincially Rare to Uncommon (S3), while others and/or the same communities are considered Globally Extremely Rare (G1) or Globally Very Rare (G2) (NHIC 1997). Notable communities include:

- 24 Fresh-Moist Tallgrass Prairies (TPO2-1) (G2 and S1);
- Four Pin Oak Mineral Deciduous Swamps (SWD1-3) (G2 and S2S3);
- Three Dry-Fresh Black Oak Deciduous Forests (FOD1-3) (S3);
- Two Dry-Fresh Mixed Oak Deciduous Forests (FOD1-4) (S3S4);
- Two Fresh-Moist Black Walnut Lowland Deciduous Forests (FOD7-4) (S2S3);
- Two Fresh-Moist Black Oak-White Oak Tallgrass Woodlands (TPW2-1) (G2 and S1);
- One Dry-Fresh Oak-Hickory Deciduous Forest (FOD2-2) (S3S4);
- One Fresh-Moist Pin Oak-Bur Oak Tallgrass Savannah (TPS2-1) (G1 and S1); and
- One Fresh-Moist Pin Oak Tallgrass Woodland (TPW2-2) (G1 and S1).

A list of provincially significant vegetation communities located in the AOI ordered by S-rank is presented in Section 2.3.1.3 of the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents). Based on a review of secondary source information, it is likely that most of these rare vegetation communities and species are represented in the designated Ojibway Prairie Complex ANSI, although further field investigations in areas located outside of the AOI would be required to substantiate this opinion.

There were numerous vegetation communities that contain a high diversity of provincially rare (S1 to S3) species. Twenty-one vegetation communities contained 10 to 18 S1 to S3 species. 43 vegetation communities contained one to four S1 to S3 species. A complete list of vegetation communities and the species of rare plants identified in these communities is presented in the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents).

7.5.2 Molluscs and Insects

DATA COLLECTION

The Area of Investigation for molluscs and insects included the ACA and its vicinity. The study team screened the AOI and its vicinity for the presence/absence of rare molluscs and insects.

The mollusc and insect investigation was based on secondary source information collected in 2006 through literature searches, review of databases and personal communications with local experts. Data was requested and obtained via email, fax, letter, personal communications, and from published and unpublished literature. The following organizations were contacted directly for data:

- Department of Fisheries and Oceans Canada – Sarnia District Office and Burlington District Office (Great Lakes Laboratory for Fisheries and Aquatic Sciences);
- Environment Canada – Karner Blue Recovery Team;
- Ontario Ministry of Natural Resources – Natural Heritage Information Centre (NHIC), Peterborough and Chatham Area Office;
- Essex Region Conservation Authority;
- Ojibway Nature Centre;
- Toronto Entomology Association (Ontario Insects);
- Toronto Zoo;
- University of Guelph – insect collection, and entomology and mollusc researchers; and
- University of Windsor – fisheries and mollusc researchers.

Background data collected was reviewed and compiled into two databases (molluscs and insects), since all of the data received related to these two invertebrate groups. Nomenclature and taxonomy follows the *University of Guelph Insect Collection Ojibway Prairie Species List*, recent journal articles and the *Natural Heritage Information Centre (NHIC)*.

Federal and provincial rankings administered by COSEWIC and COSSARO were considered during the species review. Due to the lack of evaluations of invertebrate species by COSEWIC and COSSARO, "S-ranks" were also considered during the investigation as many more invertebrates have received an S-rank.

DATA ANALYSIS

Molluscs are among the most conspicuous and familiar invertebrate animals and include such forms as clams, squids, octopods and snails. Data was reviewed and obtained on two classes of Mollusc phyla, the Bivalves (clams) and the Gastropods (snails).

Freshwater mussels (Unionids) are a type of Bivalve and are benthic sedentary animals with a life expectancy of 10 to 80 years depending on the species. Unionids spend the bulk of their life residing in the sediment of watercourses. However, as part of the larvae (glochidia) development, the offspring must attach to the gills of a host fish (or salamander for one species) and parasitize the host until they are sufficiently mature to drop off as juveniles. Many species of Unionids require specific host fish species for development. Unionids are among the most endangered organisms in North America[20], and considerable research has been done in Ontario to investigate our native species. In Ontario 28 of 41 native species are showing signs of decline[21], and 10 species are ranked federally and/or provincially as Endangered or Threatened. For further detail, the reader is referred to the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents).

Much less is known of the terrestrial and aquatic Gastropods of Ontario. Gastropods are divided into three groups, the Prosobranchs, Opisthobrachs and the Pulmonates. The Prosobranchs and Opisthobrachs posses gills and are purely aquatic, but only the Prosobranchs are a freshwater species. Pulmonates have lungs that enable them to respire oxygen from freshwater and/or the air. There are approximately 485 species of Gastropods in North America, none of which are ranked federally or provincially in Ontario.

Screening for Mollusc Species of Significance

Mollusc investigations in the Windsor area have been largely limited to the Detroit River, and very little data is available on the terrestrial Gastropods or the Unionids and Gastropods inhabiting the inland watercourses. Historically, numerous native species of Unionids were known to inhabit the Detroit River, however recent studies indicate that no native Unionids remain in the Detroit River due to pollution, habitat loss and competition with zebra mussels (Dreissena polymorha)[22, 23, 24, 25]. Screenings for the presence of native Unionids within the watercourses in the AOI and its vicinity were unable to confirm the presence of any federally or provincially ranked species. No known recent mollusc investigations have been conducted in the AOI and its vicinity (aside from the Detroit River). However, Snuffbox (Epioblasma triquetra) is known to occur within the County of Essex according to the NHIC.

Currently nine species are listed as Endangered and one species is listed as Threatened by COSEWIC, and eight species are listed as Endangered by COSSARO with two species pending a Threatened listing. For further detail the reader is referred to the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents). All Unionids are regulated under the Fisheries Act and eight of the ten listed species are regulated under the SARA and the new OESA, with two species pending regulation under SARA. There is the potential that these species may occur in the AOI and its vicinity as no comprehensive field investigations have been conducted of the Windsor area, and several of these species likely occurred in the Detroit River historically.

Data obtained from the MNR also indicates that two significant species of Gastropod occur in the AOI and its vicinity. For further detail the reader is referred to the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents). These two species (Mesodon pennsylvanicus and Mesodon zaletus) are ranked S1 and S1S2 respectively, meaning that they are Extremely Rare to Very Rare in Ontario. An additional eight provincially rare species are known to occur in the County of Essex and may occur in the AOI and its vicinity. There is the potential that these species and other rare Gastropods may occur in the AOI and its vicinity as no comprehensive field investigations have been conducted of the Windsor area. All aquatic Gastropods are regulated under the Fisheries Act.

Insects

There are an estimated 30,000 known species of insects in Canada and more than 2,055 species of insects have been reported in the Ojibway Prairie Complex alone. Insects are the most abundant fauna in the world, and there are more than 26 Orders of insects, including mayflies, damselflies and dragonflies, grasshoppers, cockroaches, termites, earwigs, stoneflies, lice, true bugs, thrips, beetles, fleas, true flies, caddisflies, moths and butterflies, and wasps and ants. Insects are present in all habitats and have a wide variety of forms and life cycles. Insects are generally under-investigated and under-protected; however, some research has been conducted in the Ojibway Prairie Complex area by researchers from the University of Guelph and other institutions. Considerable data has been gathered on the insects of the Ojibway Prairie but a lot of research still remains to be done. This area is known for its high species diversity and many rare species due to its geographic location and significant habitats.

Screening for Insect Species of Significance

The Ojibway Prairie Complex area has recently been relatively intensively investigated by entomologists, and there are several recent publications documenting researchers' findings. Given the sheer number of species present, most of the research efforts and publications have focused on select groups of insects. Records on insect species captured are maintained by the Ojibway Nature Centre and a database of insects of the Ojibway Prairie is maintained by the University of Guelph. In addition, there are several regular entomological activities organized at the Ojibway Prairie including an annual butterfly count organized by the North American Butterfly Association and a dragonfly count organized by the Toronto Entomology Association, in conjunction with the Ojibway Nature Center.

The *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents) presents the insects listed by COSEWIC and COSSARO and regulated under the SARA, the new OESA and the FWCA that were reviewed to determine if they were potentially present in the AOI and its vicinity. Of these species, the Monarch is known to occur in the AOI and its vicinity; however, it is highly unlikely that the remainder of the above mentioned species occur in proximity to the AOI and its vicinity given their current distributions and habitat requirements.

Much of the data recently published on the insects in the vicinity of the AOI is documentation of new species for Canada, Ontario or the region. Compilation of this data and other records indicates that there are at least 113 species of conservation concern known from this area. This includes one species of Diptera (true flies), 22 species of Auchenorrhyncha Hemiptera (hoppers), 13 species of Heteroptera Hemiptera (true bugs), 41 species of Hymenoptera (bees and wasps), 17 species of Lepidopera (moths and butterflies), 13 species of Odonata (damselflies and dragonflies), and six species of Orthoptera (grasshoppers, crickets and katydids). Seven other species of Odonata may also be present based on data from the NHIC Odonata Database indicating that they occur in the County of Essex, Town of Tecumseh and/or extreme southern Ontario.

Of the 120 species present (or potentially present), 69 species have been assigned an S-rank of S1 to S3 indicating that they are Extremely Rare, Very Rare or Rare to Uncommon within the province and five species have a rank of S4 or S5. A further 46 species are ranked SNR as there is insufficient data to rank the species. Since many of these species are new records for Ontario or Canada and are

[20] Metcalfe-Smith. J, A. MacKenzie, I. Carmichael, D. McGoldrick. 2005. Photo Field Guide to the Freshwater Mussels of Ontario. St. Thomas Field Naturalist Club Incorporated. St Thomas. Ontario.
[21] Ibid.
[22] Morris, T. Species at Risk Research Biologist. Department of Fisheries and Oceans Canada, Great Lakes Laboratory for Fisheries and Aquatic Sciences. Personal communications, May to August 2006.
[23] Ciborowski, J. Researcher, Department of Biological Sciences, University of Windsor. Personal communication, April 2006.
[24] Corkum, L. Researcher, Department of Biological Sciences, University of Windsor. Personal communication, April 2006.
[25] Mackie, G.L. Mollusc Biologist. Zoology Department, University of Guelph. Personal communication, May to December 2006.

under-documented, there is a strong likelihood that many of these species ranked SNR are also provincially rare.

The Monarch is listed as Special Concern by COSEWIC and COSSARO and regulated under the SARA and the new OESA. The Monarch and five other species of butterflies are also regulated under the FWCA, due to their interest to collectors. Monarchs are known to inhabit and migrate through the Windsor area; however, there are no known Monarch staging (stop over) areas in the vicinity of the AOI.

The *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents) provides a summary of significant insect species potentially present in the AOI and its vicinity.

The Entomological Importance of the Ojibway Prairie Complex and its Vicinity

The Ojibway Prairie Complex and its vicinity is a unique area composed of tallgrass prairies, savannahs, Carolinian zone vegetation, wetlands and forests. The diversity of rare habitats and plant species contributes towards the high diversity and rarity of insect species present.

Since the Ojibway Prairie is located partially in the AOI and similar habitats exist outside of the Ojibway Prairie Complex, efforts should be made to determine what further insect species of significance occur in the area. Sensitive species and locations should be identified through field investigations, further research and correspondence. Areas falling within the AOI should also be further investigated to determine if significant populations or habitat exist. Members of the entomology community should be further consulted to ascertain additional sensitivities. Impacts to Monarchs should also be further evaluated and efforts should also be taken to identify the main areas used by Monarchs for protection and/or mitigation.

The Ojibway Prairie Complex is truly one of the most entomologically unique and important areas in Canada. A review of recent publications on new records for Ontario and Canada indicates that there are many species which can only be found in the Ojibway Prairie, or at a few other locations that are provided in the *Draft Practical Alternatives Evaluation Working Paper* (refer to List of Supporting Documents).

New records include 16 new species for Canada and six new species for Ontario, which have only been found at the Ojibway Prairie. A further 37 new records for Canada and 29 for Ontario have only been found at the Ojibway Prairie and a few other sites. Amazingly, a new species to science was recently discovered in Ojibway Prairie[26]. This insect, Loxocera ojibwayensis, is a small Psilidae fly (Diptera) that has been named after the Ojibway Prairie, which is the only known site in the world for this species.

Refer to the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents) for a summary of recent significant records from Ojibway Prairie Complex vicinity, which includes four new local records of significant Orthoptera (grasshoppers).

[26] Buck, M. and S.A. Marshall. 2006. Revision of New World Loxocera (Diptera: Psilidae), with Phylogenetic Redefinition of Holarctic Subgenera and Species Groups. European Journal of Entomology. 103: 193-219.

7.5.3 Fish and Fish Habitat

DATA COLLECTION

Fish and fish habitat were surveyed at several stations located within the ACA and its vicinity. All watercourses/waterbodies located within the AOI were investigated to determine the presence/absence of fish habitat and the characteristics of the fish community present. Field investigations were conducted on: May 3-5, 2006; September 18-21, 2006; and, October 5, 2006.

The fish community was surveyed by visual observation or by fish collections using a backpack electrofishing unit, dip net or minnow trap at a total of 58 stations. The location of sampling stations is presented in **Exhibit 7.37** and described in **Table 7.15**. Prior to field investigations, a Permit to Collect Fish for Scientific Purposes was obtained from the MNR Area Office in Chatham and the Department of Fisheries and Oceans was contacted to determine if a Species at Risk Permit was required. All fish captured were identified in the field or preserved in alcohol for laboratory identification.

Fish habitat was characterized along each stream reach located within the AOI. Stream reaches were delineated using the boundary of the ACA, road or highway crossings or the confluence with another watercourse. The habitat survey was carried out following the *MTO Environmental Manual - Fisheries (MTO 1994)*, the *Draft Environmental Reference for Highway Design (MTO 2002)* and in accordance with the *MTO/MNR Fisheries Protocol*[27]. Physical features were surveyed in sufficient detail to enable mapping and identification of key habitat types. The physical habitat attributes assessed included:

- Stream dimensions and flow conditions;
- Water quality, including conductivity, pH, temperature and water colour;
- Stream morphology;
- Groundwater discharge areas;
- Substrate characteristics;
- Stream bank stability;
- In-stream cover;
- Riparian vegetation;
- Stream canopy cover;
- Stream gradient;
- Macrophytic (aquatic) vegetation;
- Instream barriers to fish movement;
- Critical habitats; and
- Potential fish habitat compensation measures.

[27] Ministry of Transportation of Ontariio (MTO)/Ministry of Natural Resources of Ontario (MNR). 1993. Fishereis Protocol for Protecting Fisheries Resources on Provincial Highway Undertakings.

TABLE 7.15 – FISH SAMPLING STATIONS

Station No.	GPS Coordinates	Drains	Habitat
1	0328333 4684598	Large Bay	Fish habitat
2	0328042 4683627	McKee Creek	Fish Habitat
3	0327835 4683101	Ditch	Not Fish Habitat
4	0327675 4682830	Healy Drain	Not Fish Habitat
5	0327582 4682648	Healy Drain	Seasonal Fish Habitat
6	0327120 4682805	Healy Drain	Seasonal Fish Habitat
7	0327060 4682524	Broadway Drain	Seasonal Fish Habitat
8	0327564 4682464	Healy Drain	Not Fish Habitat
9	0327433 4682299	Broadway Drain	Not Fish Habitat
10	0327491 4682145	Pond	Not Fish Habitat
11	0328028 4682098	Broadway Drain	Not Fish Habitat
12	0328099 4682253	Healy Drain	Not Fish Habitat
13	0328421 4681784	Susan Drain	Not Fish Habitat
14	0328591 4681910	NoName Drain	Not Fish Habitat
15	0328976 4681555	Susan and NoName	Not Fish Habitat
16	0328467 4682497	McKee Creek	Fish Habitat
17	0328823 4682421	McKee Drain	Fish Habitat
18	0329205 4682444	McKee Drain	Fish Habitat
19	0329110 4682267	McKee Drain	Fish Habitat Downstream Only
20	0329305 4682215	McKee Drain	Not Fish Habitat
21	0329696 4681545	Titcombe Drain	Seasonal Fish Habitat
22	0330185 4682207	Vernal pool	Not Fish Habitat
23	0329759 4681811	Titcombe Drain	Seasonal Fish Habitat
24	0330594 4681942	Basin Drain	Not Fish Habitat
25	0330569 4681911	Basin Drain	Not Fish Habitat
26	0330562 4681875	Basin Drain	Fish Habitat
27	0331273 4681458	Youngstown Drain	Seasonal Fish Habitat
28	0330924 4681537	Youngstown Drain	Seasonal Fish Habitat
29	0330822 4681556	Youngstown Drain	Seasonal Fish Habitat
30	0330700 4681553	Basin Drain	Fish Habitat
31	0330714 4681496	Basin and Youngstown	Fish Habitat
32	0330778 4681487	Youngstown Drain	Seasonal Fish Habitat
33	0330352 4681030	Basin Drain	Fish Habitat
34	0331391 4681255	Marentette Drain	Not Fish Habitat
35	0331082 4680897	Marentette Drain	Not Fish Habitat
36	0331256 4680379	Marentette and Turkey	Not Fish Habitat
37	0330880 4680589	Wetland	Not Fish Habitat
38	0331652 4680693	Turkey Creek	Fish Habitat
39	0331543 4680078	Standing water	Not Fish Habitat
40	0332332 4679259	Lennon Drain	Fish Habitat
41	0332477 4678862	Cahill Drain	Fish Habitat
42	0332915 4678928	Cahill and Talbot	Fish Habitat
43	0333348 4678533	Talbot Drain	Not Fish Habitat
44	0335132 4676696	Howard Ave, Noname, Dickson	Not Fish Habitat
45	0335166 4676667	Burke, NoName	Not Fish Habitat
46	0335467 4676542	Dickson, Benson	Fish Habitat
47	0335900 4677241	Burke Drain	Fish Habitat
48	0336718 4677364	Collins Drain	Seasonal Fish Habitat
49	0336309 4677566	Collins and Wolfe	Fish Habitat (Wolfe)
50	0336072 4677640	NoName	Not Fish Habitat
51	0335714 4677723	Wolfe Drain	Fish Habitat
52	0335269 4677923	NoName and Wolfe	Fish Habitat (Wolfe)
53	0334095 4678714	Cahill Drain	Fish Habitat
54	0333789 4678642	Cahill and Wolfe	Fish Habitat
55	0333191 4678972	Cahill and Wolfe	Fish Habitat
56	0332540 4679315	Lennon Drain	Fish Habitat
57	not recorded	pond	Fish Habitat
58	not recorded	McKee Creek	Fish Habitat

Data was recorded in the field using the standard MTO Field Collection Record forms and representative photographs were taken.

In addition, benthic samples were collected from six stations in the AOI (Stations 3 and 9) and its vicinity (Stations 1, 4, 5 and 6). Stations 2, 7 and 8 are located on watercourses located outside the AOI. The location of benthic sampling stations is presented in **Exhibit 7-27**. Samples were collected on March 9, 2005 (Stations 1 and 3), and March 10, 2005 (Station 4, 5, 6, and 9) using the traveling kick and sweep transect method. Three samples were taken at each station, two from riffles and one from a pool. Benthic organisms from each transect were identified separately and then replicate samples from each station were combined to achieve sufficient populations for analysis.

A habitat and substrate survey of the Detroit River at the locations of possible bridge piers in Canadian waters was conducted on October 5, 2006 using an underwater video camera and Ekman dredge. At each possible pier location, a SeaViewer underwater camera was deployed over the side of the boat and data recorded to a hand-held video recorder. GPS coordinates along transects were recorded simultaneously through a feature on the video camera system. Once all of the video runs were completed at the sites, the substrate was investigated using an Ekman dredge.

EXHIBIT 7.27 – BENTHIC, FISH, AND BIRD POINT COUNT SURVEY STATIONS

DATA ANALYSIS

Fish Species

Based on fisheries information provided by the Essex Region Conservation Authority (ERCA) and field investigations, a total of 21 species of fish inhabit streams located in the AOI, excluding the Detroit River. The fish community located in "inland" watercourses/waterbodies is comprised of resident warmwater sport and bait fish. Northern pike were observed spawning in several small drains located in the Chappus Road area. Table 7.16 presents the fish occurrence records for the watercourses containing fish as well as the historical fish records provided by ERCA.

Fish species in the Detroit River were recently sampled by four gear types (seine net, boat electrofishing, hoop net and Windemere trap) in the shallow offshore water of the Detroit River during July and August 2003[28]. The reach of the Detroit River sampled included Canadian waters from the confluence with Turkey Creek to the confluence with the River Canard. A total of 38 species of fish were captured. Based on this recent survey and historic fish records, a total of 69 species of fish are reported from the Detroit River. Table 7.17 presents the fish species known to inhabit the Detroit River.

Tables 9 and 10 in the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents) provide a list of fish species occurrence records for the Area of Continued Analysis excluding and including the Detroit River.

Fish Habitat

Drainage within the AOI is provided by a number of municipal agricultural drains that flow towards the Detroit River. The major drains include Cahill Drain, Lennon Drain and Grand Marais Drain (Turkey Creek) and Wolfe Drain. The following watercourses/waterbodies are located in the AOI:

- Detroit River;
- Basin Drain;
- Benson Drain;
- Broadway Drain;
- Burke Drain;
- Cahill Drain;
- Collins Drain;
- Dickson Drain;
- Grand Marais Drain (Turkey Creek);
- Healy Drain;
- Lennon Drain;
- Marentette Drain;
- McKee Creek;
- No Name Drain associated with Benson Drain;
- No Name Drain associated with Susan Drain;
- No Name Drain tributary of Wolfe Drain (at Highway 401);
- No Name Drain tributary of Wolfe Drain (at Howard Ave);
- Susan Drain;
- Talbot Drain;
- Titcombe Drain;
- Wolfe Drain;
- Youngstown Drain; and
- Unnamed pond.

All of the above listed waterbodies were surveyed for fish habitat potential. The watercourses and fish habitat located in the AOI are presented in Exhibit 7.28A to 7.28D.

[28] Lapointe, N.W.R., L.D. Corkum and N.E. Mandrak. 2005. A Comparison of Methods for Sampling Fish Diversity in Shallow Offshore Waters of Large Rivers. North American Journal of Fisheries Management 26:503-513.

EXHIBIT 7.28A – WATERCOURSES AND FISH HABITAT LOCATED IN THE AREA OF INVESTIGATION

EXHIBIT 7.28B – WATERCOURSES AND FISH HABITAT LOCATED IN THE AREA OF INVESTIGATION

Exhibit 7.28C – Watercourses and Fish Habitat Located in the Area of Investigation

EXHIBIT 7.28D – WATERCOURSES AND FISH HABITAT LOCATED IN THE AREA OF INVESTIGATION

The Detroit River and the inland watersheds within the AOI fall under the jurisdiction of the Essex Region Conservation Authority (ERCA), the Ontario Ministry of Natural Resources (OMNR) Aylmer District and the Department of Fisheries and Oceans (DFO). Most of the inland watercourses located in the AOI have been classified as drains by the ERCA using the Agricultural Municipal Drains Class Authorization System[29]. A single unconnected pond is located at the eastern limits of the AOI. Water courses that were confirmed to support fish habitat are described below.

Basin Drain

This watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse is permanent and supports a warmwater baitfish community downstream of the E.C. Row Expressway. Here the channelized watercourse flows through a muck and clay lined channel. Riparian vegetation consists of trees, shrubs and herbaceous vegetation. This fish habitat is considered marginal. Upstream of the E.C. Row Expressway the watercourse is mostly piped underground with a pool of open water upstream of the expressway. This upstream reach of Basin Drain is not fish habitat as the buried culvert under the expressway is a barrier to fish migration.

Benson Drain

This watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse is likely intermittent as flows were low in May and September 2006. It was determined that this watercourse likely supports a warmwater baitfish community as central mudminnow were captured downstream of South Talbot Road in Dickson Drain. This channelized watercourse flows through a clay lined channel. Riparian vegetation consists of trees, shrubs and herbaceous vegetation. This fish habitat is considered marginal.

Broadway Drain

This watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse is likely intermittent as there was no flow, and only standing pools of water in September 2006. It was determined that this watercourse likely supports a seasonal fish community when flows in the Detroit River are high enough to allow fish to migrate upstream over the gravel beach barrier. Only the reach downstream of Sandwich Street was determined to be fish habitat as the hot water entering the channel from a pipe at Sandwich Street likely presents a thermal barrier to fish movement. This channelized watercourse flows through a detritus lined channel. Riparian vegetation consists of trees, shrubs and fragmites. This fish habitat is considered marginal.

Burke Drain

This watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse is likely intermittent as there was no flow, and only standing pools of water in September 2006. It was determined that this watercourse supports a warmwater sportfish community. This channelized watercourse flows through a detritus and muck lined channel. Riparian vegetation consists of cattails. This fish habitat is considered marginal. Downstream of South Talbot Road this watercourse was dry and is not fish habitat.

Cahill Drain

Cahill Drain is separated into two reaches, one upstream of the confluence with Wolfe Drain, the other downstream of the confluence with Wolfe Drain. The upstream reach is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. The upstream reach is listed as a type E drain, indicating that it is permanent, the temperature regime is warmwater and sportfish are present. It was determined that this watercourse is permanent warmwater fish habitat. Only baitfish were captured in Wolfe Drain between the two reaches, however habitat potential exists for sportfish. Upstream of Wolfe Drain this channelized watercourse flows through a clay lined channel with herbaceous riparian vegetation. This fish habitat is considered marginal. Downstream of Wolfe Drain the channel is much larger and flows over a muck substrate. Here there is some channel definition and habitat heterogeneity. Riparian vegetation consists of trees, shrubs, and herbaceous vegetation. This fish habitat is considered important.

Collins Drain

This watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse is likely intermittent as flows were low in May and September 2006. It was determined that this watercourse likely supports a warmwater baitfish community as fathead minnow were captured downstream in Wolfe Drain, and no barrier to fish migration exists. This channelized watercourse flows through a clay and silt lined channel. Riparian vegetation consists of cattails and fragmites. This fish habitat is considered marginal.

Dickson Drain

This watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse is likely intermittent as flows were low in May and September 2006. It was determined that this watercourse supports a warmwater baitfish community. This channelized watercourse flows through a clay lined channel. Riparian vegetation consists of trees, shrubs and herbaceous vegetation. This fish habitat is considered marginal. The reach upstream of South Talbot Road was determined to be ephemeral and not fish habitat.

Grand Marais Drain (Turkey Creek)

This watercourse is listed as a type E municipal drain downstream of Huron Church Road, indicating that it is permanent, the temperature regime is warmwater and sportfish are present. The reach upstream of Huron Church Road is unclassified. It was determined that this watercourse is permanent and supports a warmwater sportfish community. This watercourse flows through a concrete lined channel. Even though fish habitat is homogenous, it supports a relatively diverse warmwater community. There is no riparian vegetation throughout this reach as the banks are also concrete lined. This reach is regularly cleaned out to maintain flood control. Despite the presence of sportfish, this fish habitat is considered marginal as the habitat exists in a concrete lined channel.

Healy Drain

This watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse is

[29] Department of Fisheries and Oceans Canada (DFO). 1999. A Class Authorization System for Agricultural Drains in the Southern Ontario Region.

likely intermittent as there was no flow, and only standing pools of water in September 2006. It was determined that this watercourse likely supports a seasonal fish community when flows in the Detroit River are high enough to allow fish to migrate upstream over the gravel beach barrier. Only the reach downstream of Sandwich Street was determined to be fish habitat as the buried culvert under Sandwich Street is a barrier to fish movement. This channelized watercourse flows through a detritus lined channel, which is choked with fragmites. This fish habitat is considered marginal.

Lennon Drain

This watercourse is listed as a type E municipal drain downstream of Huron Church Road, indicating that it is permanent, the temperature regime is warmwater and sportfish are present. It was determined that this watercourse is permanent and supports a warmwater sportfish community. Upstream of Talbot Road, the channelized watercourse flows through a silt, clay and geotextile substrate, with manicured grasses and a few trees as riparian vegetation. Between Talbot Road and Huron Church Line, the channelized watercourse flows through a riprap lined channel with herbaceous vegetation and a few shrubs providing shade to the channel. Downstream of Huron Church Line the watercourse flows through a clay channel with manicured grasses and a few trees as riparian vegetation. This fish habitat is considered important.

McKee Drain

This watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse is likely intermittent as there was no flow, and only standing pools of water in September 2006. It was determined that this watercourse likely supports a seasonal fish community as a northern pike was observed upstream of the E.C. Row Expressway in May 2006. This channelized watercourse flows through a muck and detritus lined channel, which is choked with fragmites. Upstream of Matchette Road the watercourse is piped under a residential property. This pipe is a barrier to fish migration and the watercourse upstream of this pipe is not fish habitat. This fish habitat is considered important.

McKee Creek

This watercourse is listed as a type E municipal drain downstream of Sandwich Street, indicating that it is permanent, the temperature regime is warmwater and sportfish are present. The reach upstream of Sandwich Street is listed as a type F drain, indicating that it is intermittent, the temperature regime and potential fish species are unknown. It wasdetermined that this watercourse is permanent and supports a warmwater sportfish community. This channelized watercourse flows through a muck lined channel. The banks upstream of Sandwich Street are lined with sheet piling. The riparian vegetation consists of fragmites, cattails, and herbaceous vegetation. Downstream of Sandwich Street, the channel flows through a series of double culverts and flows into a canal. A local fisherman indicated that in the spring walleye and perch often migrate upstream but are limited by the size of the double culverts and most cannot make it past this barrier. The removal of this barrier presents an excellent opportunity for habitat enhancement. This fish habitat is considered important.

Titcombe Drain

This watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse is intermittent as there was no flow, and only standing pools of water in September 2006. It was determined that this watercourse likely supports a seasonal fish community as a northern pike was observed in May 2006. This channelized watercourse flows through a silt and detritus lined channel. Riparian vegetation consists of trees, shrubs, herbaceous vegetation and manicured grasses. This fish habitat is considered important.

Wolfe Drain

Downstream of the confluence with Cahill Drain, the watercourse is listed as a type E municipal drain, indicating that it is permanent, the temperature regime is warmwater and sportfish are present. Upstream of the confluence with Cahill Drain, the watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse supports permanent warmwater baitfish habitat as flows were moderate in May and September 2006. Only baitfish were captured upstream of Talbot Road, however habitat potential exists for sportfish. This channelized watercourse flows through a clay lined channel. There is very little habitat heterogeneity. Riparian vegetation consists of shrubs, trees, and herbaceous vegetation. This fish habitat is considered important.

Youngstown Drain

This watercourse is listed as a type F municipal drain, indicating that it is intermittent, and the temperature regime and potential fish species are unknown. It was determined that this watercourse is likely intermittent as there was little flow in May and September 2006. It was determined that this watercourse likely supports a seasonal fish community. This channelized watercourse flows through a silt lined channel. Riparian vegetation consists mainly of herbaceous species. This fish habitat is considered marginal.

Unnamed Pond

This waterbody is unclassified. It was determined the waterbody to be permanent and to support a warmwater sportfish community. It appears to be man-made and it is not connected to any nearby drains. Substrate in the pond appears to be clay and muck. A few riparian trees and shrubs are found around the pond. This fish habitat is considered important.

Detroit River

Previous reports indicate that at least 69 species of fish inhabit the Detroit River[30]. These species are listed in Table 10 and include many sportfish as well as migratory species that use the river to move between Lakes Erie and St. Clair. Diverse habitat exists within the river, especially in the wetlands which are used by warmwater species for many of their life functions (spawning, nursery, foraging). Several provincially significant wetlands exist within the river or are associated with tributary river mouths. These wetlands cover an area of 462.5 ha. As reported in MDNR and MOE (1991)[31], 41 fish species have been reported to spawn within the Detroit River and an additional seven species are suspected of spawning. Manny et al.[32] reported that 25 species use the river as nursery habitat, including both warm and coldwater species.

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[30] Manny, B. A., T. A. Edsall and E. Jawarski. 1988. The Detroit River, Michigan: An ecological profile biological report. U.S. Fish and Wildlife Service, U.S. Department of Interior. Contribution No. 683 of the National Fisheries Research Centre - Great Lakes. Ann Arbor, MI. (in MDNR and MOE 1991)

[31] Ontario Ministry of the Environment and the Michigan Department of Natural Resources. 1991. Detroit River Remedial Action Plan. Stage 1. Sarnia, Ontario and Lansing, Michigan. June 3, 1991. 504 pp.

[32] Manny, B. A., T. A. Edsall and E. Jawarski. 1988. The Detroit River, Michigan: An ecological profile biological report. U.S. Fish and Wildlife Service, U.S. Department of Interior. Contribution No. 683 of the National Fisheries Research Centre - Great Lakes. Ann Arbor, MI. (in MDNR and MOE 1991)

The investigation in the vicinity of possible bridge piers was compromised by turbid water conditions. Strong northeast winds stirred up sediment in Lake St. Clair which was conveyed downstream in the Detroit River. As a result, visibility was reduced to less than 20 cm. For this reason, the camera, which is equipped with strong LED lights, did not record many features of the Detroit River bottom as it requires relatively clear water to operate. The strong current also made proper deployment difficult. Despite these problems, some substrate features were recorded intermittently by the underwater camera. These included short aquatic vegetation which was rooted to the substrates and details that enabled the camera to discern clay, sand and gravel substrates. No large or distinct habitat features (i.e. boulders, logs, etc.) were observed. The Ekman dredge did not deploy correctly due to the strong current and great depth (10-15 m). As a result, no full grab samples were taken. However, some substrate was attached to the Ekman as it was on the bottom of the river and consisted of clay and a clay/sand mix. The low-lying aquatic vegetation seen on the underwater video was also attached to some of the grab samples. The fish habitat in the Detroit River in the vicinity of the potential bridge piers is considered important.

Benthic Invertebrates

The Hilsenhoff Biotic Index (HBI) was used to evaluate water quality at benthic sampling stations. HBI values provide an indication of the levels of organic pollution in the water. Other metrics were also used to interpret water quality and habitat conditions at these stations such as species richness and percentage of intolerant species. Table 7.16 provides a summary of the metrics and HBI values for combined replicates for sampling stations. Results from individual replicates are not shown as they had too few organisms in each sample to analyze HBI values. Stations 2, 7 and 8 are located on watercourses found outside the AOI; therefore, they are not described.

The benthic surveys reveal that the habitat quality at all sampling stations is poor. All stations have been highly altered. Stations 1 and 6 in Cahill Drain have been channelized. Stations 3 and 4 in Turkey Creek have been straightened and have a concrete channel. Station 5 in Turkey Creek has had gabion reinforcement of the bank. Station 9 in Lennon Drain has been channelized and filled with rip rap material.

TABLE 7.16 - SUMMARY OF BENTHIC DATA FOR STATIONS LOCATED IN THE AOI

	Station 1 Cahill Drain	Station 3 Turkey Creek	Station 4 Turkey Creek	Station 5 Turkey Creek	Station 6 Cahill Drain	Station 9 Lennon Drain
Date sampled	9March05	9March05	10March05	10March05	10March05	10March05
abundance	338	256	196	125	293	347
richness	16	15	4	7	8	14
EPT abundance	5	0	0	2	0	0
EPT richness	2	0	0	1	0	0
% EPT	1.48%	0.00%	0.00%%	1.60%	0.00%	0.00%
# intolerant	2	3	1	1	0	2
% tolerant	80.00%	73.73%	75.00%	80.00%	100.00%	75.00%
% oligochaetes	26.63%	50.78%	0.00%	2.40%	6.83%	6.63%
% grazers	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
HBI	6.80	6.14	5.98	7.43	6.18	7.36
Water quality	Fairly Poor	Fair	Fair	Fairly Poor	Fair	Fairly Poor

Station 1 – Cahill Drain Downstream of Huron Church Line

Habitat conditions at this station were homogeneous. Substrate consisted of mainly silt. Riparian vegetation was composed of old field species with some shrubs and trees.

Water quality rating from the HBI value for this station was Fairly Poor. This indicates that there is significant organic pollution at this station. One species of mayfly (Ephemeroptera), and one species of caddisfly (Trichoptera) were found at this station. These organisms are usually indicators of good water quality, however the mayfly genus Caenis found at this station is tolerant of degraded habitat conditions. The percentage of tolerant organisms at this station was very high indicating that while species richness is average, the species present are tolerant of poor habitat and water quality conditions. Oligochaetes (worms) are found in habitats with fine sediments and a higher oxygen demand. The high percentage of oligochaetes at this station is an indicator of the poor habitat conditions. The lack of grazers at this station is an indicator of the lack of allochtonous material (such as leaf litter) in this system.

Station 3 - Turkey Creek Downstream of Huron Church Road

Habitat conditions at this station were homogeneous. Substrate consisted of a concrete channel with some gravel, sand, and silt. Riparian vegetation was limited to old field species along the concrete banks. Upstream of the sample station, there is no riparian vegetation as the banks are concrete.

Water quality rating from the HBI value for this station was fair. This indicates that there is fairly significant organic pollution at this station. No mayflies (Ephemeroptera), stoneflies (Plecoptera), or caddisflies (Trichoptera) were found at this station. These organisms are usually indicators of good water quality. Their absence may indicate that water quality at this station is poor. The percentage of tolerant organisms at this station was very high indicating that while species richness is average, the species present are tolerant of poor habitat and water quality conditions. The high percentage of oligochaetes at this station is an indicator of the poor habitat conditions. The lack of grazers at this station is an indicator of the lack of allochtonous material (such as leaf litter) in this system.

Station 4 - Turkey Creek Downstream of Dominion Boulevard

Habitat conditions at this station were homogeneous. Substrate consisted of a concrete channel with some sand, and silt deposits. There was no riparian vegetation as the banks were concrete.

Water quality rating from the HBI value for this station was fair. This indicates that there is fairly significant organic pollution at this station. Species richness was low at this station indicating that habitat diversity is low and conditions are degraded. No mayflies, stoneflies, or caddisflies were found at this station. Their absence may indicate that water quality at this station is poor. The percentage of tolerant organisms at this station was very high indicating that while species richness is average, the species present are tolerant of poor habitat and water quality conditions. Chironomids accounted for 99.5% of the sample. These organisms occupy the same habitat niche as the oligochaetes indicating the poor habitat conditions at this station. The lack of grazers at this station is an indicator of the lack of allochtonous material (such as leaf litter) in this system.

Station 5 – Turkey Creek Downstream of Malden Road

Habitat conditions at this station were more diverse then the rest of the stations. Substrate consisted of mainly silt with some cobble. Riparian vegetation was composed of old field species with some shrubs. Only one replicate was taken at this station, as only one transect downstream of the bridge was shallow enough to wade. Water depth was high upstream and downstream of the bridge.

Water quality rating from the HBI value for this station was fair. This indicates that there is fairly significant organic pollution at this station. Species richness was low at this station indicating that habitat diversity low and conditions are degraded. One species of caddisfly was found at this station that is somewhat intolerant of degraded habitat conditions. The percentage of tolerant organisms at this station was very high indicating that the species present are tolerant of poor habitat and water quality conditions. The lack of grazers at this station is an indicator of the lack of allochtonous material (such as leaf litter) in this system.

Station 6 – Cahill Drain Downstream of Malden Road

Habitat conditions at this station were homogeneous. Substrate consisted of mainly sand and silt. Riparian vegetation was composed of old field species with some shrubs.

Water quality rating from the HBI value for this station was fair. This indicates that there is fairly significant organic pollution at this station. Species richness was low at this station indicating that habitat diversity low and conditions are degraded. No mayflies, stoneflies, or caddisflies were found at this station. Their absence may indicate that water quality at this station is poor. The percentage of tolerant organisms was 100%, indicating that the species present are tolerant of poor habitat and water quality conditions. The lack of grazers at this station is an indicator of the lack of allochtonous material (such as leaf litter) in this system.

Station 9 – Lennon Drain Downstream of Huron Church Line

Habitat conditions at this station were homogeneous. Substrate consisted of rip rap. Riparian vegetation was composed of old field species with some shrubs.

Water quality rating from the HBI value for this station was fairly poor. This indicates that there is significant organic pollution at this station. No mayflies, stoneflies, or caddisflies were found at this station. Their absence may indicate that water quality at this station is poor. The percentage of tolerant organisms at this station was very high indicating that while species richness is average, the species present are tolerant of poor habitat and water quality conditions. The lack of grazers at this station is an indicator of the lack of allochtonous material (such as leaf litter) in this system.

Species at Risk

Six species of fish are listed as Endangered, Threatened or Special Concern by COSEWIC and COSSARO and eight are regulated under the new OESA. No species at risk are reported from “inland” watercourses located within the AOI. Spotted gar (Lepisosteus oculatus) is ranked S2 and is listed as Threatened by both COSEWIC and COSSARO. Its general provincial status is “at risk” likely due to its restricted range within Ontario, and it is tracked by the NHIC. Lake sturgeon (Acipenser fulvescens) is ranked as S3 and is currently listed as Not at Risk by COSEWIC and COSSARO; however, lake sturgeon is regulated under Schedule 5 of the new OESA. Longnose gar (Lepisosteus osseus) is ranked S4 and is not currently listed by COSEWIC or COSSARO, however, longnose gar is regulated under Schedule 3 of the new OESA. Two cyprinid species reported from the Detroit River are also considered to be at risk: silver chub (Macrhybopsis storeriana) and pugnose minnow (Opsopoeodus emiliae). Both are ranked S2 and are considered of Special Concern by COSEWIC and COSSARO and regulated under Schedule 5 of the new OESA. Both are currently tracked by the NHIC and have a general provincial status of “sensitive”. The last three species of concern are in the sucker family: bigmouth buffalo (Ictiobus cyprinellus), spotted sucker (Minytrema melanops) and river redhorse (Moxostoma carinatum). The bigmouth buffalo is ranked SU, meaning that it is unrankable at this time as more data is needed. The spotted sucker and river redhorse are both ranked S2. All three of these fish species are listed as Special Concern by COSEWIC and COSSARO and all three are regulated under Schedule 5 of the new OESA. The general provincial status of the bigmouth buffalo is “undetermined” and the river redhorse general provincial status is “sensitive”. The location of the possible bridge piers does not support critical habitat for any of these known species at risk.

7.5.4 Wildlife and Wildlife Habitat

DATA COLLECTION

The AOI for wildlife and wildlife habitat included all lands located within the maximum footprint area of the combined practical alternatives and adjacent lands located within 120m of the right-of-way. This area corresponds approximately with the ACA. The study team investigated all wildlife habitats located in the AOI to identify important habitat for wildlife, inventory wildlife and confirm the presence/absence of species at risk.

The purpose of the field investigations was to document wildlife habitat and wildlife occupation and to characterize the nature, extent and significance of animal usage within the AOI. Existing information on wildlife species previously found within the AOI came from various sources. The *Ontario Herpetofaunal Summary Database of the Natural Heritage Information Center (NHIC)* provided amphibian and reptile lists, locations and status. The *Ontario Breeding Bird Atlas (OBBA)* program provided up-to-date lists of birds breeding within specific areas of Ontario while information from The *Conservation Priorities for the Birds of Southern Ontario* provided lists of migratory bird species in Essex County designated as species for habitat protection by local municipalities. It also ranks bird species highly sensitive to disturbances of their breeding habitats. The *Atlas of the Mammals of Ontario* provided locations of species found in Essex County. More specific information about wildlife previously documented around the AOI came from communications with personnel from the Ontario Ministry of Natural Resources and the Ojibway Prairie Nature Center in Windsor.

Wildlife habitat was delineated on air photos and refined through ground-truthing. The Ecological Land Classification (ELC) system was used to describe wildlife habitat, where appropriate. In many cases, similar wildlife habitat polygons were combined into a single polygon to reduce duplication, while in others cases new wildlife habitat polygons were delineated in areas not classified according to ELC. For this reason, the wildlife habitat polygons do not correspond exactly with the vegetation community polygons. Several areas, including factories, retail outlets and residential areas with high density could not be accessed or do not support wildlife habitat; hence, these areas were not investigated. The methods described in the *Significant Wildlife Habitat Technical Guide (MNR 2000)* were used to establish the significance of wildlife habitat.

Methods used to collect in-field information were tailored to each vertebrate class (ie. amphibians, reptiles, birds and mammals). Once the specific wildlife units within the AOI were mapped and the methods of investigation were established, diurnal and nocturnal investigations took place. Data was collected by a field crew of one or two biologists working in tandem using aerial photo maps, a GPS unit, binoculars, cameras, a headlamp, field notebooks and a laptop computer. Field investigations were conducted on: April 12-14 and 18-21, 2006; May 1-4, 2006; June 4-7, 11-16, 18-24 and 29-30, 2006; July 1, 2006; September 17-21, 2006; November 22-23, 2006; and, February 21-23, 2007.

Herpetofauna (reptiles and amphibians) were inventoried using the Visual Encounter Survey (VES) method[33]. Data was collected by simply searching for animals in a likely habitat at a likely time. Reptile investigations started in late spring and early summer after species came out of their hibernacula. Following the VES methodology, early morning searches for snakes in suitable habitats included flipping over rocks, logs, boards, shingles or any material snakes would hide under through the night. From mid to late morning, rocks, logs and asphalt pathways, used for basking areas, were also investigated. By the afternoon, searches turned to habitats considered as snake hunting and feeding areas, like cultural meadows and areas in and around wetlands. Also, sheets of wood, laid out in different habitats to attract snakes for use as cover and warmth, were checked in the morning and late afternoons for activity.

Turtles were found by investigating their potential habitats, like creek drains or ponds, and observing them basking on logs in ponds during late mornings, swimming on the bottom of ponds in search of food or crossing over roads and pathways when moving from pond to pond during the day.

For amphibians, in the spring and early summer season when frog and toad activity was at its peak, nightly road cruises by vehicle and breeding call surveys were employed. By identifying frog and toad breeding calls during evening road cruises, locations of important breeding areas were found. Daytime searches of wetlands, identified as potential amphibian breeding areas, were also made. After the breeding season, wetlands were searched for amphibian egg masses and/or tadpoles to identify any frog or toad species found in these locations.

Prior to conducting bird surveys, aerial photos of the AOI and its surroundings were checked to see if there were areas of continuous forests, cultural thickets, etc. that could potentially be used as spring and fall migration corridors. These maps were also used to determine where preferred nesting habitats could exist during the breeding season. Any potential areas were then ground-truthed by simply observing and recording species in chosen habitats at the right time of year. During the spring and fall seasons, specific habitats throughout the AOI were monitored for areas of large bird movements and stopover points.

Two inventory methods were used to determine the breeding bird composition and locations of breeding activity in the AOI: the point-count method[34, 35]; and, nest surveys. Due to the large size of the AOI and the need to represent as many of the habitats as possible, non-random locations were selected for point-counts. These specific locations, selected in areas that maximized the amount of habitats covered per count, increased the number of species recorded in as short of time as possible. Each point-count station was recorded using a hand-held GPS unit. A total of 60 point-count stations were censused twice, a minimum of seven days apart, for a total of 120 point-count surveys. Point-counts were started 30 minutes before dawn and stopped by 0900 to 0930 hours. Five minutes of suitable bird observation and bird call listening times were standard per station (time increased to 10 minutes in areas of high environmental noise such as traffic or industrial activities). Station locations were at least 125 m or more apart to prevent bird identification overlap. The criteria of the *Breeding Bird Atlas (BBA)* breeding bird survey was used for identifying breeding bird behaviour (eg. carrying food to young, territorial song, etc.) as evidence of birds breeding within a location. Evening spot checks were also made in habitats considered to have owl species. Tape recordings of owl calls were played to induce a response for species identification.

[33] Heyer, W.R., M.A. Donnelly, R.W. McDiarmid, L.C. Hayek and M.S. Foster.1994. Measuring and Monitoring Biological Diversity. Standard Methods for Amphibians.

[34] Ralph, C.J., J.R. Sauer and S. Droege. 1995. Monitoring Bird Populations by Point Counts. Pacific Southwest Research Station, Albany, California.

[35] Bibby, C.J., N.D Burgess, and D.A. Hill. 1992. Bird Census Techniques. Published for the British Trust for Ornithology and The Royal Society for the Protection of Birds.

The second method used to identify species composition consisted of a nest survey performed in the summer and fall seasons. This was undertaken as a secondary method of data collection to determine breeding bird occurrence in particular habitats. In the summer season, most nests were located by focusing on the breeding behaviour of particular bird species. Early morning observations of female returning to their nests after morning forages were used to identify their nest location. Observations of other behavioural signals (eg. carrying nest-building materials, copulations, territorial disputes, etc.) were used to lead an observer to areas of high nest probability or directly to the nest itself. In the fall season, when breeding season was over and tree foliage disappeared, clumps of structured grasses in trees or fecal deposits under tree nest holes were used to identify nests. Nest locations were recorded and habitat types noted.

Mammals were inventoried using a variety of methods, such as the identification of tracks, trails, sounds, scats, smells and individual species behavioral signs, such as plant cuttings, nest sites, lodges, etc.[36]. As many habitats as possible were searched using the VES method. The investigator simply walked through an area searching for mammals using the variety of methods mentioned above. Evening road cruises by vehicle were made to spot mammals crossing roadways. Early morning walks just before sunrise and late afternoon walks just before dark were also made to catch mammal movements to and from their daytime haunts. These investigations were repeated in the same wildlife areas more than once to increase the accuracy of the species composition recorded. Species locations and the habitats they were sighted in were recorded. Daily mammal movement corridors which showed important connections between habitats were also recorded. Bats however, being volant mammals of the night, were difficult to identify in the field without the proper equipment. Since high frequency bat detectors were unavailable, secondary source information was relied upon to determine the bat species present in the AOI.

Any species at risk found in the field had its location recorded with a GPS unit and a photograph taken for verification, where possible. Data collected in the field from each of the vertebrate class investigations was transferred into a laptop computer on a daily basis. Field notes, GPS coordinates and photographs were downloaded into wildlife tables for future analysis. This data was analysized and used to determine the locations of sensitive habitats in the AOI.

DATA ANALYSIS

Wildlife Species

The natural heritage features of the AOI were divided into 124 wildlife habitat units. These units formed the basic habitats around which most of the terrestrial vertebrates were recorded. SARA species were searched for and priority species of conservation concern were noted. Four continuous seasons of data collection and in-field wildlife investigations within and around these wildlife units resulted in the compilation of 139 species (11 herpetofauna, 108 birds and 20 mammals). A list of terrestrial vertebrates recorded in the AOI is presented in Appendix F of the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents).

[36] Wilson, D.E., F.R. Cole, J.D. Nichols, R. Rudran and M.S. Foster. 1996. Measuring and Monitoring Biological Diversity. Standard Methods for Mammals.

Four amphibian species and seven reptile species were recorded in the AOI. Amphibians include frogs and toads since no salamanders were located anywhere in the the AOI. The absence of salamanders from the AOI was expected based on discussions with local experts and review of secondary information.

The majority of the amphibians were found at specific vernal ponds and creek drains during the breeding season. As a result, these locations were identified as important amphibian breeding areas. American toad (Bufo americanus) and/or western chorus frog (Pseudacris triseriata) were found in most of the breeding areas recorded. Only one pond, located near the east limits of the AOI, had green frog (Rana clamitans) egg masses. Chorus frogs were located predominantly in or around vernal pools within woodlots, whereas American toads and green frogs preferred ponds or creek drains in open areas. No leopard frog egg masses were found in any of the ponds investigated although adults were seen around creek drains throughout the summer.

Of the reptiles observed, snakes were recorded most often. The eastern foxsnake (Elaphe gloydi) was recorded on numerous occasions in wooded areas, along creeks, under buildings or under log piles in residential backyards. The other four species were located in tallgrass prairies, cultural meadows and cultural thickets under boards, tiles, rocks, or whatever they could hide under during the evenings and early mornings. Of these, Butler's gartersnake (Thamnophis butleri) was recorded only in the open tallgrass prairie (TPO2-1) habitats. Both the eastern foxsnake and Butler's gartersnake are regulated under the Fish and Wildlife Coordination Act (FWCA), as well as Schedule 1 under SARA and Schedule 4 under the new *Ontario Endangered Species Act (ESA), 2007*. These species are discussed along with other species at risk in a later part of this chapter.

Based on discussions with local experts, Butler's gartersnake was present in Malden Park prior to the construction of the E.C. Row Expressway and conversion of Malden Park into parkland. However, this population has been extirpated from Malden Park. This species has a strong affinity to prairie communities and a very small home range; therefore, it is very sensitive to habitat loss. A migrating painted turtle (Chrysemys picta) was found along Broadway Street just north of the Black Oak Woods. A snapping turtle (Chelydra serpentina) was observed in a creek drain north of Armanda Street near the east Chappus Road extension.

Birds comprised 108 of the 139 wildlife species recorded, with representatives in every habitat. Field survey data showed that 50 of these species were breeding birds that nested in about 75 % of the designated wildlife habitat units. Most of the remaining 58 species, observed primarily in the spring and fall seasons, were considered non-residents or migrants. These migrants were observed moving through the western two-thirds of the AOI, using the Detroit River, Black Oak Woods, Ojibway Park, Ojibway Prairie Provincial Nature Reserve, Spring Garden Forest, the deciduous forests around Reddock Avenue and the St. Clair College Prairie ESA as migration corridors. Many of the forests, woodlots and cultural thickets, north of these major natural heritage features and within the AOI, were being used as continuations of these major north-south migration corridors. Areas like the forests, woodlots and cultural thickets of Brighton Beach, the Malden Park forest connecting with the woodlots and cultural thickets around Chappus Street, the woodlots around E.C. Row Expressway just north of Spring Garden Park and the woodlots and cultural thickets on the south side of Talbot Road opposite St. Clair College, all contained hundreds of migrating birds during the spring and fall seasons and contributed to the continuation of a series of bird migration corridors going through the AOI. The entire AOI is located within two continental bird migration corridors associated with the Atlantic and Mississippi Flyways. The large forest on the west side of Huron Church Road, just south of Turkey Creek (north and south of Reddock Avenue) was identified as a stop-over area for birds of prey on migration. Hundreds of Broad-winged Hawks (Buteo platypterus), Red-tailed Hawks (Buteo jamaicensis), Coopers Hawk (Accipter cooperii), Goshawk (Accipiter gentilis) and Turkey Vultures (Cathartes aura) stopped in this forest to roost while on their journey southward.

Two species of swallows were located on the Turkey Creek Bridge on Huron Church Road. Up to 20 nests were found on the ceiling cross beams but only 11 were considered active at the time of investigation. Eight Barn Swallow (Hirundo rustica) nests, located on the ceiling beams at the center of the bridge, and three Cliff Swallow (Petrochelidon pyrrhonota) nests, located on the outside ceiling beams, were recorded.

Two wildlife units contained a large number of migratory bird nests as compared to most of the other units. W-BBA9 and W-NSG7 contained multiple nests from species such as Brown Thrasher (Toxostoma rufum), Gray Catbird (Dumetella carolinensis), American Robin (Turdus migratorius), American Goldfinch (Carduelis tristis), Willow Flycatcher (Empidonax traillii), Yellow Warbler (Dendroica petechia) and Mourning Dove (Zenaida macroura). The diversity of migratory bird species centralized in such small areas makes these habitats highly important.

Based primarily on evidence from signs such as trails, tracks, scats, smells, sounds, etc., evidence for mammal activity was recorded in every habitat type. Incidental observations were made of red fox (Vulpes vulpes) carrying food to their pups in wildlife unit W-BBA9 and 3 fox pups playing in the early morning hours opposite W-BBA4. The only European hare (Lepus europaeus) recorded was spotted in the cultural meadow of W-BBA20 whereas eastern cottontails (Sylvilagus floridanus) were observed in open areas thoughout the AOI. Individuals were seen moving through the cultural meadows in W-CH12 and W-LAM6 or feeding around human habitations such as St. Clair College or the residence front lawns along Montgomery Drive just west of Talbot Road. Grey squirrel (Sciurus carolinensis) dreys were found in nearly every forest and woodlot. The abundance of raccoons (Procyon lotor) was recorded primarily from observing their trails and tracks going from habitat to habitat. White-tailed deer (Odocoileus virginianus) was also recorded in nearly every habitat type. Tracks, trails, scats, bedding areas and direct observations indicated their presence in cultural meadows, cultural thickets, marshes and forests throughout the AOI. Road kills were another method used to determine mammal presence in particular habitats. Opossums (Didelphis virginianus) were found along Broadway Street just east of Ojibway Parkway and along Talbot Road next to a meadow marsh on the south side of the Heritage Park Alliance Church.

Migration corridors for mammals were seen through every habitat and connecting each of the habitat types. Of particular note, the Cahill Drain, connecting the St. Clair College Prairie ESA on the north side of Highway 3 to the deciduous swamp located on the south side of Highway 3 was heavily traveled by mammals in both summer and winter. Tracks of small mammals, muskrat (Ondatra zibethica), red fox, coyote (Canis latrans) and raccoon were recorded along Cahill Drain and under Highway 3 going in both directions. White-tailed deer showed no evidence of travel through the culvert but used the creek drain for travel on the north side of Highway 3. The fact that corridors were so abundant indicated high mammal activity and the importance of the remaining natural heritage features found in the AOI.

Winter investigations indicated that most of the AOI had a limited amount of wildlife activity. Herpetofauna were in hibernation and most of the breeding bird species had left the area. Only a few winter bird species remained using particular habitats as winter feeding areas. Trails and tracks showed that a few mammal species used certain portions of the AOI for traveling and bedding down.

Fox and coyote used frozen creek drains, open fields and human made paths through woodlots for winter travel. Raccoons, especially during their late winter breeding season, travelled from woodlot to woodlot. Random white-tailed deer travel corridors, to and from feeding areas, existed in the forests and cultural thickets between Turkey Creek and Cabana Road, between Spring Garden Road and E.C. Row Expressway and between Armanda Street and E.C. Row Expressway. Only a few deer bedding areas found in the AOI were located in the forested area of wildlife unit W-CH2 around Chappus Road north of Armanda Street. Most of the deer bedding areas appeared to be outside the AOI, concentrated in the Spring Garden Forest ANSI, while most of the feeding areas appeared to be in the AOI.

Wildlife Habitat

All the wildlife units contained one or more of 13 habitat types recognized in the AOI. These habitat types are described below. A detailed assessment of the significance of each wildlife habitat unit is presented in the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents). By analyzing each of the habitat types throughout the AOI, a pattern of species composition per habitat type became evident. The location of wildlife habitat units located in the AOI is presented in Exhibit 7.29.

EXHIBIT 7.29 – WILDLIFE HABITAT UNITS ASSOCIATED WITH THE AREA OF INVESTIGATION

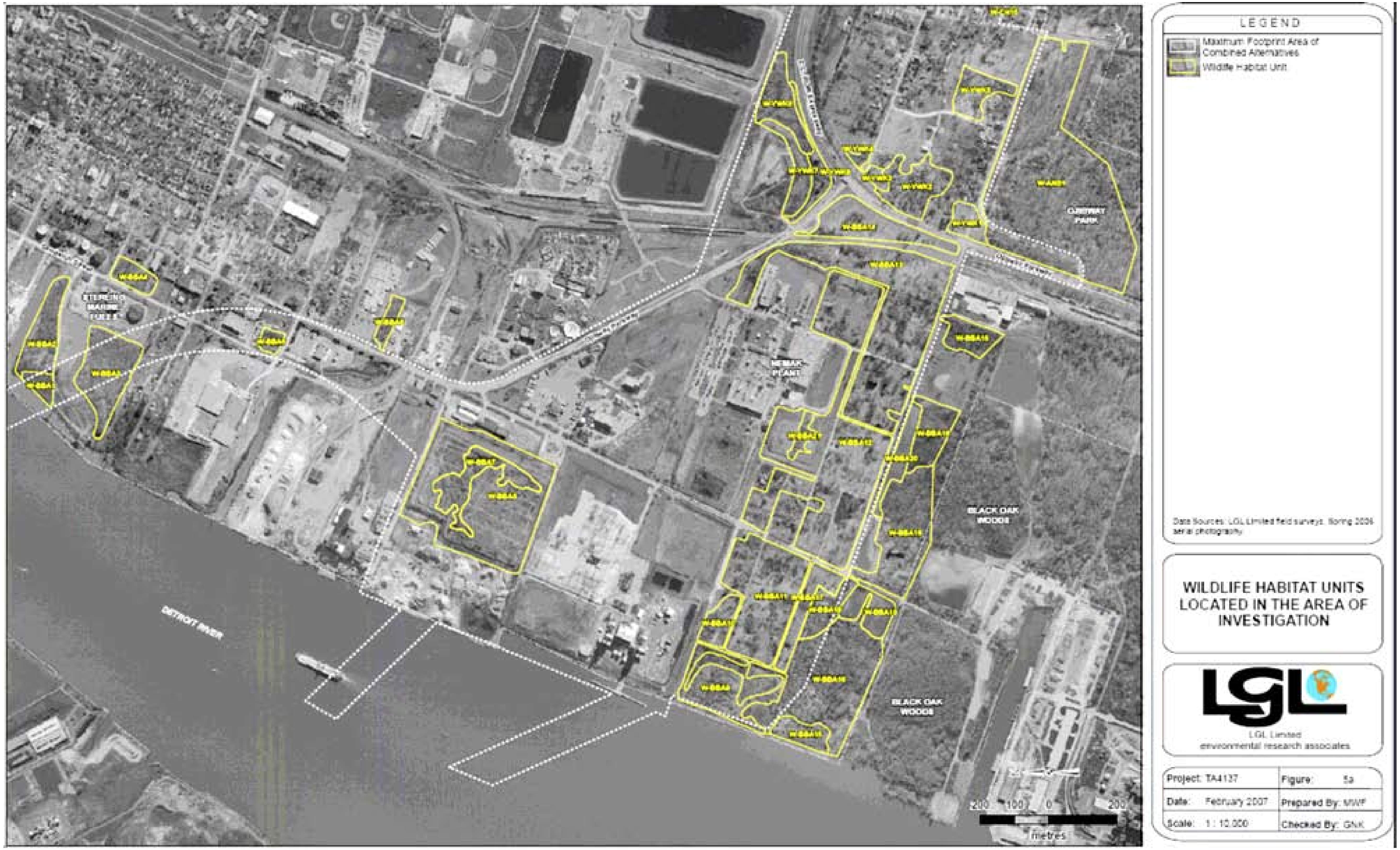


EXHIBIT 7.29 – WILDLIFE HABITAT UNITS ASSOCIATED WITH THE AREA OF INVESTIGATION (CONT'D)

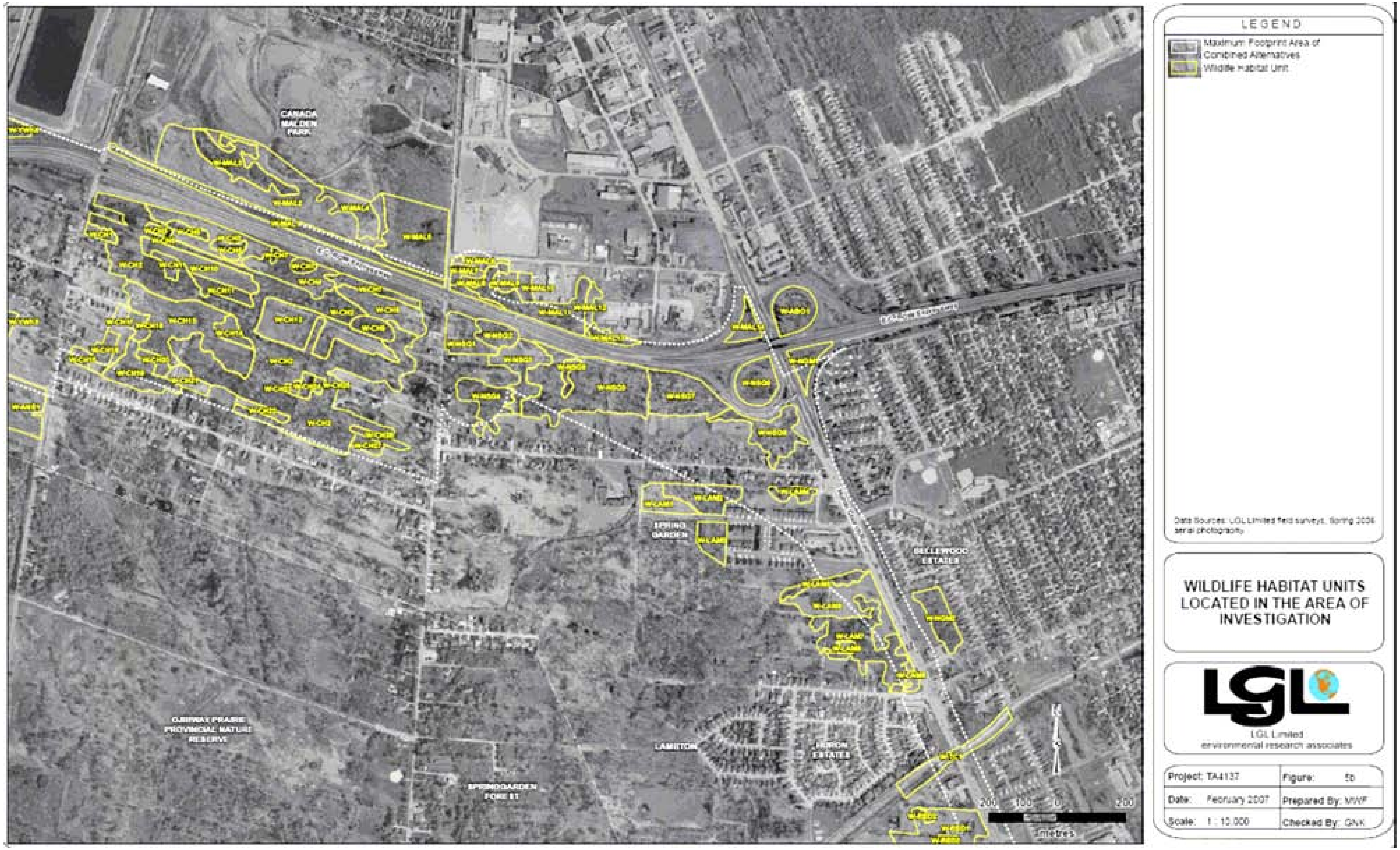
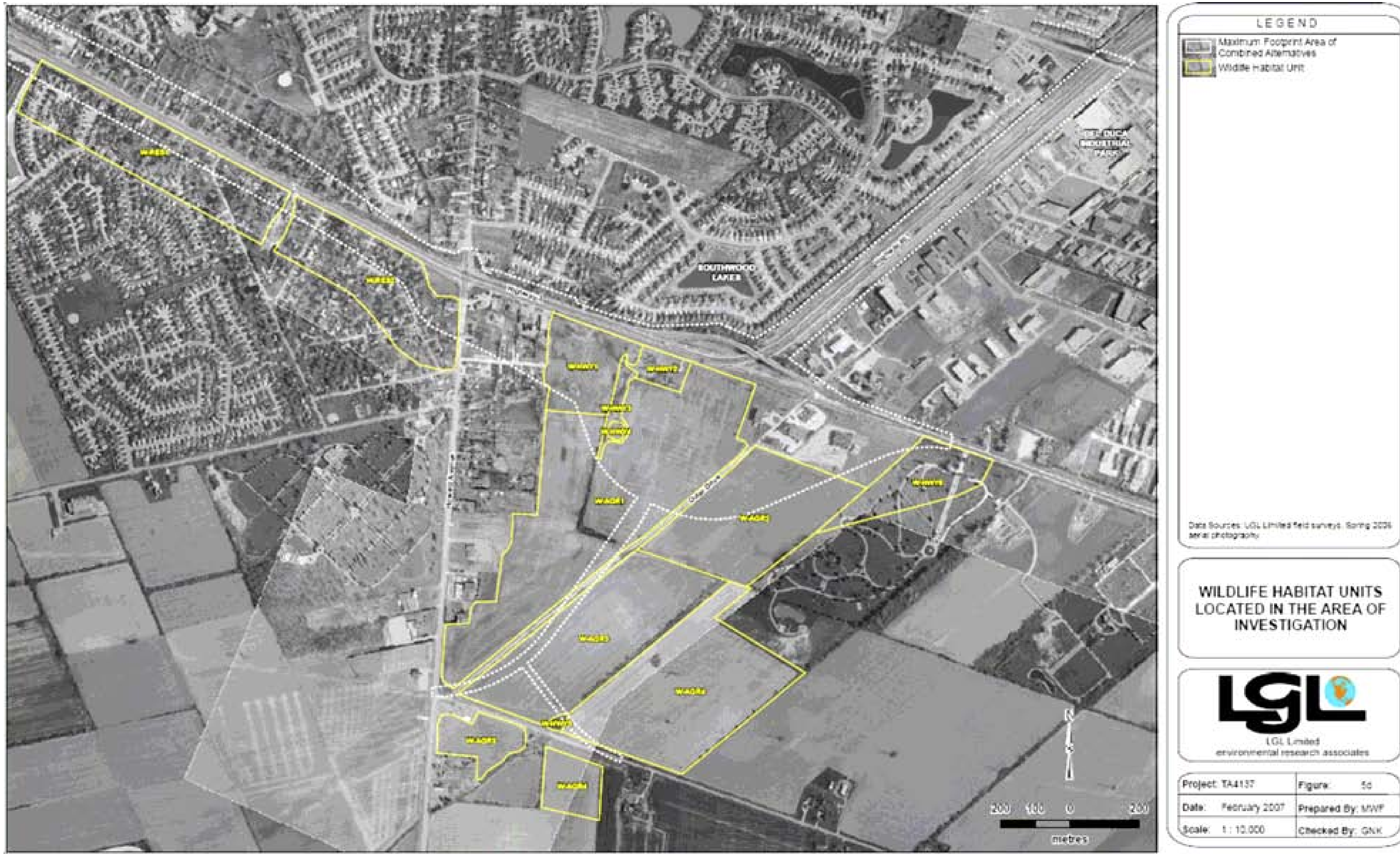


EXHIBIT 7.29 – WILDLIFE HABITAT UNITS ASSOCIATED WITH THE AREA OF INVESTIGATION (CONT'D)

EXHIBIT 7.29 – WILDLIFE HABITAT UNITS ASSOCIATED WITH THE AREA OF INVESTIGATION (CONT'D)



Deciduous Forests and Cultural Woodlots

Many wildlife species used the deciduous forests (FOD) and cultural woodlots (CUW) as migration corridors, living spaces and breeding areas. Besides their use for the seasonal migration of birds (noted above), mammals regularly used these habitats as corridors for daily movements to and from their feeding and resting areas in various habitats. Small mammals, red fox (Vulpes vulpes), raccoon (Procyon lotor), and white-tailed deer (Odocoileus virginianus) are a few species that used FODs and CUWs as a food source. Raccoons and other small mammals also used specific trees within the habitat for hibernation den sites while white-tailed deer used certain areas for winter deer yards protecting them from the elements. Forests and woodlots were also important breeding areas for wildlife. Chorus frogs were recorded calling and breeding at many of the vernal ponds found within some of these woodlots. Up to 23 species of migratory birds, many considered species of conservation priority, were recorded using the forests and woodlots for nest sites. Red-tailed Hawk, Eastern Wood Pewee (Contopus virens) and Baltimore Oriole (Icterus galbula) nested in the forest canopies while the understory contained nests of Indigo Bunting (Passerina cyanea), Wood Thrush (Hylocichla mustelina) and American Robin to name a few. Cavities in the trunks of dead standing trees were used by Tree Swallows (Tachycineta bicolor) and Black-capped Chickadees (Poecile atricapillus), whereas Downy Woodpecker (Picoides pubescens) and Northern Flicker (Colaptes auratus) excavated their own cavities in the trunks of live trees. Many of the woodlot trees were also used as den sites by small mammals and raccoons and dreys were constructed in them by gray squirrels (Sciurus carolinensis) for raising their young.

Cultural Thickets

Being continuations of the some of the larger fragmented FOD and CUW migration corridors, cultural thickets (CUT) were also used by migratory birds as stop over areas for feeding while on their seasonal migrations. Many CUTs surrounded creek drains and provided protection from the elements for amphibian species breeding there. Numerous garter snakes (Thomnophis sirtalis) were recorded using this habitat for hunting during the day and hiding through the night. CUTs also linked larger habitats together so mammals used them as daily movement corridors from feeding areas to resting areas. Track evidence through corridors showed heavy use of CUTs by raccoon, red fox, coyote (Canis latrans) and white-tailed deer. Of most importance, CUTs provided a large number of breeding birds with a well protected habitat for their nests. Up to 14 species of migratory birds were recorded to use CUTs in the AOI for breeding. For example, wildlife unit W-NSG7 recorded numerous Gray Catbird nests, plus nests of Yellow Warbler, American Goldfinch and American Robin. Breeding bird evidence then accounted for another three to four species added to this unit.

Cultural Meadows

Cultural meadows (CUM), found in more wildlife units in the AOI than any other habitat, were used by wildlife as migration corridors, feeding and breeding areas. American toads were recorded many times in the habitat using it as a food source while Dekay's brown snakes (Storeria decayi) were recorded migrating through it to get to a wetter forest environment. Grassland bird species were recorded using these CUMs for food sources with increased numbers recorded during the migration periods. This habitat is also a breeding area for bird species such as Field Sparrow (Spizella pusilla), Savannah Sparrow (Passerculus sandwichensis) and Eastern Kingbird (Tyrannus tyrannus). White-tailed deer bedding areas were found throughout numerous CUMs in the area of investigation as were trails and tracks of raccoon, fox and coyote using these habitats as travel corridors and feeding zones.

Cultural Savannahs

Ten cultural savannahs were identified as wildlife habitat units. Breeding evidence for at least 12 species of migratory birds, such as Orchard Oriole (Icterus spurius), Gray Catbird, American Goldfinch, Willow Flycatcher and Yellow Warbler, was found. Numerous mammal corridors extended through these habitats connecting feeding areas and dwelling areas in surrounding habitats.

Tallgrass Prairies

Although represented in numerous wildlife units within the area of investigation, the area each tallgrass prairie (TPO) represents is relatively small in comparison to other habitats. However, they contain some of the most unique wildlife species. Every snake species recorded in the AOI was found in the TPO habitats. Snakes used this habitat for hunting their prey and as corridors to neighboring habitats. Bird nests and breeding bird behaviours indicated that species, such as Willow Flycatcher and Field Sparrow, nested in this habitat. Trail evidence also indicated that the TPO's were used by mammals as potential feeding areas and as movement corridors among surrounding habitats.

Meadow Marsh and Shallow Marsh

These meadows (MAM and MAS) attract wildlife species dependant on a greater amount of water during their life cycle. Many snake species, like foxsnakes, are attracted to these habitats for a food source. Up to 15 species of birds were recorded within MAMs and MASs of the AOI. Some species recorded, like American Woodcock (Scolopax minor), Yellow Warbler and Common Yellowthroat (Geothlypis trichas), prefer to breed in this type of habitat. Numerous mammal species, like cottontail (Sylvilagus floridanus), opossum (Didelphis virginianus), raccoon and deer used these habitats for feeding. Numerous trails throughout these habitats also showed their use as movement corridors among surrounding habitats.

Deciduous Swamps

Four wildlife units contained deciduous swamps (SWD). A combination of both forest and wetland species, such as Baltimore Oriole, Common Grackle (Quiscalus quiscula), Carolina Wren, Cooper's Hawk, Common Yellowthroat and Song Sparrow, were recorded. Trails and tracks from deer, coyote and raccoon were also observed.

Cultural Plantations

Not known for their biodiversity, cultural plantations (CUP) recorded a limited variety of wildlife. Foxsnakes were recorded moving through these habitats when located next to human residences. No breeding birds were recorded within these habitats but several species were observed using them as feeding areas. Mammals used them as protective migration corridors moving to and from surrounding habitats.

Open Water

The only open water (OAO) found was a pond in one of the agricultural areas. Trails leading to the pond indicated its use as a water and food source for mammals. Amphibians, such as green frog, bred there because it is a permanent water source. Birds, such as tree swallows, fed over the water and appeared to be nesting in the dead trees located on the northwest side of the pond.

Agricultural Areas

These areas are not recognized by the ecological land classification system (ELC), but were recorded as wildlife habitat units because of their uniqueness as breeding habitats to many species of birds. Found predominantly at the east end of the AOI, bird species such as Horned Larks (Eremophila alpestris), Killdeer (Charadrius vociferus), Spotted Sandpiper (Actitis macularius) and Vesper Sparrow (Pooecetes gramineus), used these tilled open fields to nest in. The edges of these agricultural fields consisted of tree rows, thickets and creek drains that provided additional nesting habitats. Kingbirds, Savannah Sparrows, Song Sparrows (Melospiza melodia), Canada Geese (Branta canadensis) and Mallard (Anas platyrhynchos) were all recorded nesting on the periphery of these agricultural fields.

Residential Areas

Also not recognized by ELC, these wildlife habitat units contained wildlife species particularly adapted to human presence. Snakes, such as the foxsnake, were recorded dwelling in backyard wood piles or under garages of individual homes. Birds, like Catbirds, Chipping Sparrows (Spizella passerina) and Mourning Doves, nested on or in close proximity to the residences themselves. Opportunistic mammals, like white-tailed deer, raccoon, striped skunk (Mephitis mephitis) and eastern chipmunk (Tamias striatus) used residential areas for foraging and den sites.

Species at Risk

None of the amphibians recorded in the AOI are listed by COSEWIC or COSSARO or regulated by legislation. Four of the reptile species are regulated under the FWCA. Two of these species, Butler's gartersnake and eastern foxsnake, are also regulated as Schedule 1 under the SARA and Schedule 4 under the new OESA. Butler's gartersnake was found in two separate locations on the south side of E.C. Row Expressway. Three foxsnakes were observed in two different field locations while another three were reported by local residents in two separate residential areas. Two of the three foxsnakes found during the investigations were located along the shoreline of Turkey Creek just west of the Huron Church Road Bridge. The other was found basking on the asphalt walkway just south of Spring Garden Road at the northwest corner of wildlife habitat unit W-LAM1. Two of the residential reports were in the woodlot and a residence backyard on the north side of Armanda Street, while the other was reported dwelling under the back corner of a garage next to a residence along the north side of Reddock Street just west of Huron Church Road. Both of these residential locations were verified by local biologists. The eastern Massasauga (Sistrurus catenatus catenatus) and the eastern hognosed snake (Heterodon platirhinos), both listed as Threatened by COSEWIC and COSSARO and regulated under the FWCA, Schedule 1 of SARA, and Schedule 4 of the new OESA, occur in the Ojibway Prairie Complex, but none were observed during field investigations.

The Migratory Birds Convention Act (MBCA) regulates 90 of the 108 bird species recorded. The FWCA regulates eleven species, primarily the birds of prey. The only avian species regulated by SARA is the Red-headed Woodpecker found in the Black Oak Woods between Ojibway Parkway and Matchette Road. The Red-headed Woodpecker is listed as Threatened by COSEWIC and Special Concern by COSSARO and regulated under Schedule 3 of SARA and Schedule 5 of the new OESA. The Red-headed Woodpecker is about to be uplisted to Schedule 1 of SARA. The Golden-winged Warbler, which was observed as a migrant in the AOI is regulated under Schedule 5 of the new OESA. Locally, 38 bird species are considered priority species of conservation concern by Bird Studies Canada for Essex County. Of these, 32 species are ranked as highly sensitive to any disturbances in or around their habitat.

Fifteen of the mammals recorded are regulated under the FWCA. No mammal species found in the AOI are regulated under SARA or the new OESA. The status of terrestrial vertebrate species recorded in the AOI is presented in the *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents).

7.5.5 Designated Natural Areas

DATA COLLECTION

The AOI for designated natural areas include the ACA and its vicinity. The study team investigated all designated natural areas in the AOI and its vicinity. Information on designated natural heritage areas was derived from the secondary sources consulted during the preparation of the *Environmental Overview Paper – Canadian Existing Conditions Volume 2 (Natural Sciences)* (refer to List of Supporting Documents). The information contained in the *Environmental Overview Report* was reviewed, updated and augmented to reflect the revised AOI.

DATA ANALYSIS

A number of Areas of Natural and Scientific Interest (ANSIs) and Environmentally Significant Areas (ESAs) and one Provincial Nature Reserve are located within the AOI. One of these natural heritage features has also been evaluated by Carolinian Canada. In addition, the City of Windsor and the Town of LaSalle have both undertaken biological inventories of the remnant forest and prairie habitat features not already designated and afforded some form of protection in planning documents to determine if these areas should be included under an Open Space/Greenway system policy. These areas are referred to as Candidate Natural Heritage Sites (CNHSs). This section provides a summary of these designated natural areas located in the AOI and its vicinity. The location of designated natural areas is presented in **Exhibit** 7.30.

Provincial Nature Reserve

Provincial Nature Reserves are areas selected to represent the distinctive natural communities and landforms in Ontario. Ojibway Prairie is a 65 ha Provincial Nature Reserve that was regulated under the Provincial Parks Act in 1977 to protect one of the largest remnants of tallgrass prairie and oak savannah in Ontario[37]. The dominant feature of this nature reserve is the tallgrass prairie plant community. Within the Ojibway Prairie Provincial Nature Reserve, 533 flowering plant species have been documented, of which more than 60 are of prairie and western affinity. It is home to more than 60 plants that are rare in Ontario as well as a number of animal species representative of prairie habitats[38, 39]. The Ojibway Prairie Provincial Nature Reserve forms one component of the Ojibway Prairie Complex ANSI.

Vegetation communities in the Provincial Nature Reserve include Old Field (27.5 ha), Forb Prairie (17 ha), Tallgrass Prairie (11.5 ha), Thickets (3 ha), Oak Savannah (4.5 ha), and Black Oak/Red Hickory Forest (1.5 ha). While some early successional tallgrass prairie species occur in Old Field communities, the majority of species with a prairie affinity are located within the remaining vegetation

[37] Ontario Ministry of Natural Resources. 2002. Ojibway Prairie Park Management Plan. Ontario Ministry of Natural Resources, Chatham Area Office. 9 pp.
[38] Ibid.
[39] Pratt, P. D. 1979. A preliminary life science inventory of the Ojibway Prairie Complex and surrounding area. Unpublished report prepared for the City of Windsor and the OMNR. 163 pp.

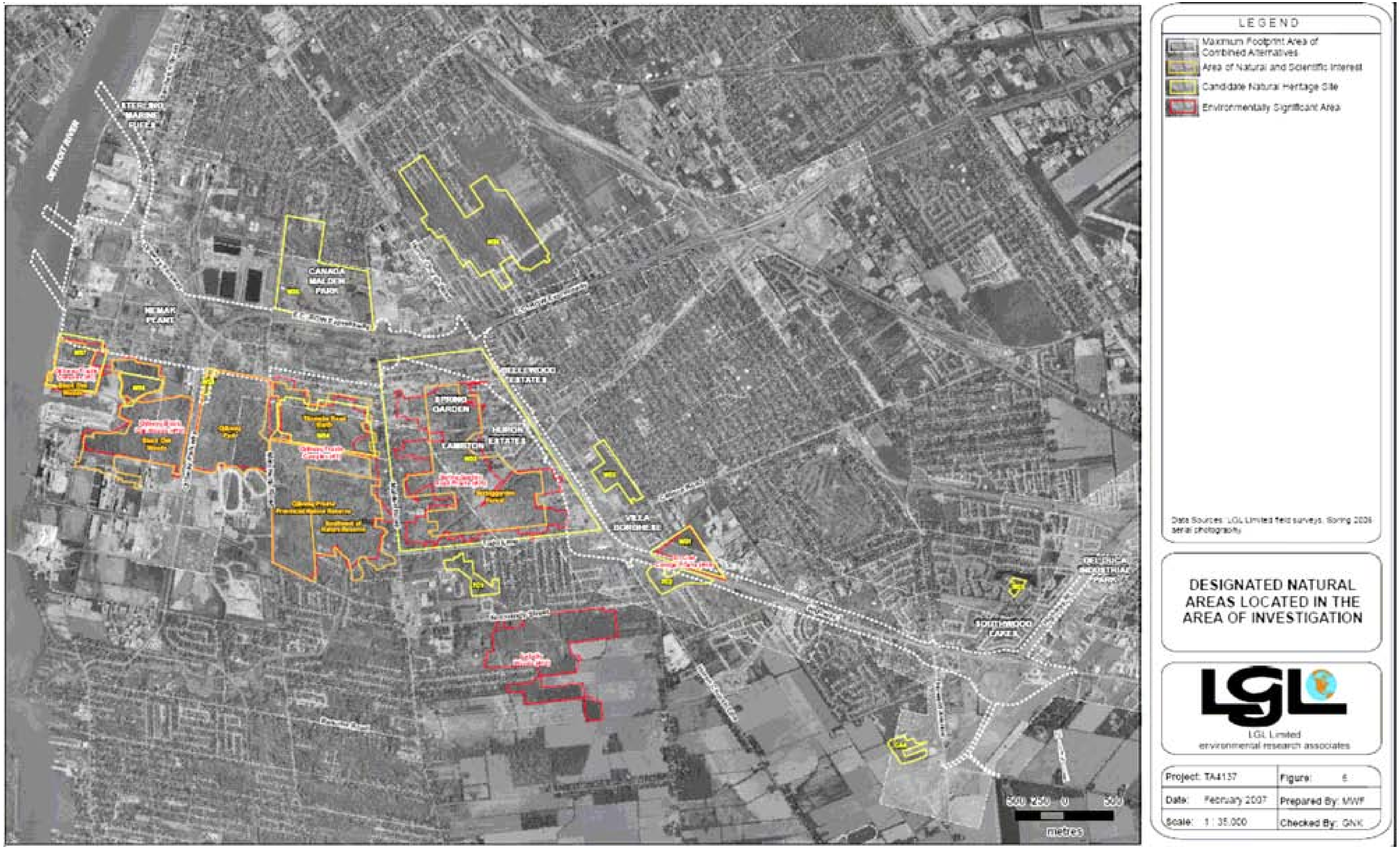
communities. The Provincial Nature Reserve contains two vegetation communities that are globally and provincially rare.

Moist-Fresh Tallgrass Prairie Type (TPO2-1) and Moist-Fresh Black Oak Tallgrass Savannah Type (TPS2) both have a global rank of G1 (Extremely Rare – having less than five occurrences in the overall range) and a provincial rank of S1 (Extremely Rare in Ontario – having less than five occurrences in the province).

The Provincial Nature Reserve provides habitat for three nationally and provincially Threatened wildlife species regulated under SARA and the new OESA including eastern foxsnake (Elpahe gloydi), Butler's gartersnake (Thamnophis butleri) and eastern hognosed snake (Heterodon platirhinos). Purple twayblade (Liparis liliifolia) and eastern prairire fringed orchid (Platanthera leucophaea), both nationally and provincially Endangered and regulated under SARA and the new OESA, are present in the reserve.

Colic-root (Aletris farinosa) and willowleaf aster (Symphotrichum praealtum), both nationally and provincially Threatened and regulated under SARA and the new OESA, are present in the reserve. Several provincially, regionally and/or locally significant species are also present in the Provincial Nature Reserve.

EXHIBIT 7.30 – DESIGNATED NATURAL AREAS ASSOCIATED WITH THE ACA



Evaluated Wetlands

There are no evaluated wetlands located in the AOI.

Areas of Natural and Scientific Interest

ANSIs in the AOI include several provincially and regionally significant Life Science ANSIs. According to the OMNR[40, 41], the Ojibway Prairie Complex provincially significant Life Science ANSI is comprised of the following areas:

- Ojibway Prairie Provincial Nature Reserve;
- Prairie Remnants (Ojibway Park) Life ANSI;
- Prairie Remnants (Titcombe Road North) Life ANSI;
- Prairie Remnants (Spring Garden Road) Life ANSI;
- Prairie Remnants (Black Oak Woods) Life ANSI; and
- Prairie Remnants (Southeast of Nature Reserve) Life ANSI.

These areas are identified on **Exhibit 7.40**.

Ojibway Prairie Provincial Nature Reserve

A summary of the features of the Ojibway Prairie Provincial Nature Reserve is discussed in **Chapter 4**.

Ojibway Park

Ojibway Park is a 64 ha site dominated by a Swamp White Oak Mineral Deciduous Swamp (SWD1-1), which has a provincial rank of S2S3 (Very Rare to Uncommon in Ontario – having five to 100 occurrences in the province). Prairie, savannah and woodland communities are also present. At least three different prairie communities have been identified in the park based on differing herbaceous layer species assemblages.

Woody species in savannah and woodland communities include pin oak, swamp white oak, black oak (Q. velutina), and red maple. Slender bush-clover (Lespedeza virginica), which is listed as Endangered by COSEWIC and COSARO and regulated under the SARA and the new OESA, is present in Ojibway Park. Several provincially, regionally and/or locally significant species are also present in Ojibway Park[42].

Titcombe Road North

This 40 ha site consists of tallgrass prairie and oak woodland communities. At least three different prairie communities have been identified in the Titcombe Road North ANSI based on differing herbaceous layer species assemblages. Woody species in woodland communities include black oak, white oak (Quercus alba) and red hickory (Carya ovalis).

[40] Ontario Ministry of Natural Resources. 1998. Natural Resources and Values Information System. Digital data for the City of Windsor and the Towns of LaSalle, Tecumseh and Amherstburg. Provided to LGL Limited on April 4, 2005.
[41] Ontario Ministry of Natural Resources. 2004a. Natural Resources and Values Information System. Digital data for the City of Windsor and the Towns of LaSalle, Tecumseh and Amherstburg. Provided to LGL Limited on April 4, 2005.
[42] Ontario Ministry of Natural Resources. 2002. Ojibway Prairie Park Management Plan. Ontario Ministry of Natural Resources, Chatham Area Office. 9 pp.

Data collected by LGL Limited to date does not provide details as to the presence/absence of significant species in this portion of the Ojibway Prairie Complex provincially significant Life Science ANSI[43].

Spring Garden Road

This 165 ha site consists of tallgrass prairie and oak savannah communities, all of which have a provincial rank of S1 (Extremely Rare in Ontario – having less than five occurrences in the province). Other vegetation communities present in Spring Garden Road ANSI include a large wetland and old field communities. The wetland was originally an artificially constructed lagoon and is presently the largest remaining wetland in the City of Windsor[44].

Spring Garden Road ANSI is home to approximately 475 species of plants, 66 species of breeding birds, 14 species of mammals, 10 species of reptiles, four species of amphibians and 66 species of butterflies. Many of the plant species have a prairie affinity (Woodliffe 1994). Purple twayblade, listed as Endangered by COSEWIC and COSSARO and regulated under SARA and the new OESA, is present in Spring Garden Road ANSI. Two species listed as Threatened by COSEWIC and COSSARO and regulated under the SARA and the new OESA are present including colic-root and spiked blazing star (Liatris spicata). American chestnut (Castanea dentata), listed as Threatened by COSEWIC and COSSARO and regulated under SARA and the new OESA, and prairie rose (Rosa setigera) and Riddell's goldenrod (Solidago riddellii), listed as Special Concern by COSEWIC and COSSARO and regulated under the SARA and the new OESA, are also present in Spring Garden Road ANSI. Several provincially, regionally and/or locally significant species are also present in Spring Garden Road ANSI[45].

Black Oak Woods

This 46 ha site is dominated by a Moist-Fresh Black Oak-White Oak Tallgrass Woodland community (TPW2-1). This community type has a global rank of G1 (Extremely Rare – having less than five occurrences in the overall range) and a provincial rank of S1 (Extremely Rare in Ontario – having less than five occurrences in the province). Dominant tree species include black oak and white oak, with some particularly large specimen trees situated at the north end of the woodland.

This ANSI is home to at least 24 prairie indicator species. Purple twayblade, listed as Endangered by COSEWIC and COSSARO and regulated under the SARA and the new OESA, willowleaf aster (Symphotrichum praealtum), listed as Threatened by COSEWIC and COSSARO and regulated under SARA, and American chestnut, listed as Threatened by COSEWIC and COSSARO and regulated under SARA and the new OESA are all present in Black Oak Woods ANSI. Several provincially, regionally and/or locally significant species are also present in Black Oak Woods ANSI[46].

Southeast of Nature Reserve

This 40 ha site located to the southeast of Ojibway Prairie Provincial Nature Reserve contains species and communities with a prairie affinity[47]. Data collected by LGL Limited to date does not specify the

[43] Ibid.
[44] Woodliffe, P. A. 1994. Spring Garden Road Prairie. OMNR, Chatham. Unpublished letter. 3 pp. + map.
[45] Oldham, M. J. 1994. Spring Garden Road Plant List. Natural Heritage Information Centre, Peterborough. Unpublished list. 7 pp.
[46] Ontario Ministry of Natural Resources. 2002. Ojibway Prairie Park Management Plan. Ontario Ministry of Natural Resources, Chatham Area Office. 9 pp.
[47] Ibid.

communities located within this portion of the Ojibway Prairie Complex provincially significant Life Science ANSI, nor does it provide details as to the presence/absence of significant species.

Environmentally Significant Areas

A number of ESAs are located in the AOI and its vicinity. Sixty-three (63) potential ESAs were inventoried in 1981 and/or 1982 and summarized by Oldham[48]. These ESAs were evaluated based on several physical, ecological, and social criteria, including:

- Significant Landforms;
- Linkage System;
- Migratory Stopover;
- Significant Communities;
- Hydrological Significance;
- Diversity;
- Significant Species;
- Size;
- Research/Education; and
- Aesthetic/Historical.

A location was deemed to be an ESA if at least two of the ten criteria were met. At that time, two ESAs were established within the AOI, including:

- Ojibway Black Oak Woods ESA (ESA #19); and
- Spring Garden Road Prairie ESA (ESA #29). An update of ESAs within Essex County was undertaken in 1991 to evaluate supplementary sites, including previously considered sites and newly identified candidate ESA sites. At that time, a resolution was passed that all PSWs and ANSIs in Essex County be included as ESAs (information on ESAs that are also ANSIs was provided previously). The Ojibway Prairie Complex ESA was designated as ESA #3 through this decision. An ESA update report was prepared by ERCA[49], which detailed the criteria met by locations not already designated as a PSW or ANSI. In addition to the above-referenced ANSIs, the following ESAs were identified in the AOI and its vicinity:
  - St. Clair College Prairie ESA (ESA #49); and
  - Sandwich West Woodlot/LaSalle Woods ESA (ESA #18).

A brief description of these ESAs is presented in Table 7.17.

Carolinian Canada Sites

Carolinian Canada is a coalition of groups, agencies and individuals working to halt the loss of and achieve a substantial increase in the size and quality of natural communities characteristic of Carolinian Canada. Members include Conservation Authorities, Federation of Ontario Naturalists, Ontario Stewardship, federal and provincial departments and ministries, Canadian Botanical Association, Ontario Federation of Agriculture, and other groups.

TABLE 7.17– SUMMARY OF ENVIRONMENTALLY SIGNIFICANT AREAS IN THE AOI AND ITS VICINITY

ESA Name/ Number	Significant Landforms	Linkage System	Migratory Stopover	Signigifcant Communities	Significant Habitats/ Hydrological Significance	Diversity	Significant Species	Size	Research/ Education	Aesthetic and/or Historical Values
Ojibway Prairie Complex (#3)										
Sandwich West Woodlot / LaSalle Woods (#18)		Linkage with Turkey Creek and Ojibway		Species assemblages include species with prairie affinity	Prairie Habitat	Good	Six SARA, Schedule 1 species, one SARA, Schedule 2 species, several provincially and locally significant species	115 ha	Associated with Brunet Park. Potential for Scientific research on prairie flora and fauna	
Ojibway Black Oak Woods (#19)		Linkage with Ojibway Prairie		Species assemblages include species with prairie affinity			One SARA, Schedule 2 species, several provincially and locally significant species			
Spring Garden Road Prairie (#29)		Linkage with Ojibway Prairie		Considered to be one of the best prairie remnants remaining in Essex County	Prairie habitat		Three SARA, Schedule 1 species, one SARA, Schedule 2 species, several provincially and locally significant species			Impressive display of fallblooming prairie wildflowers
St. Clair College Prairie (#49)					Species assemblages include species with prairie and savannah affinities	Good	Three SARA, Schedule 1 species, several provincially and locally significant species		The St. Clair College of Applied Arts and Technology is adjacent to this ESA	

In 1984, 38 sites were identified as critical natural areas in a study by the identification sub-committee of Carolinian Canada. One of the 38 Carolinian Canada sites is present within the AOI, the Ojibway Prairie Remnants (Site #31). The Ojibway Prairie Remnants site is now encompassed within the Ojibway Prairie Complex ANSI.

Candidate Natural Heritage Sites

The City of Windsor and the Town of LaSalle have both undertaken biological inventories of the remnant forest and prairie habitat features to determine their local significance. These Candidate Natural Heritage Sites (CNHSs) are summarized in Town of LaSalle[50] for the Town of LaSalle and in City of Windsor[51] for the City of Windsor.

In the Town of LaSalle, CNHSs were evaluated based on several physical and ecological criteria, including:

[48] Oldham, M. J. 1983. Environmentally Significant Areas of the Essex Region. Essex Region Conservation Authority, Essex, Ontario. 426 pp.

[49] Essex Region Conservation Authority. 1994. Environmentally Significant Areas Status Update. Unpublished report. Essex Region Conservation Authority, Essex, Ontario.

[50] Town of LaSalle. 1996. Candidate Natural Heritage Area Biological Inventory and Land Use Planning Policy Direction Discussion Paper No. 1. Prepared by Prince, Silani and Associates Limited. April 1996. 103 pp.

[51] City of Windsor. 1992. City of Windsor Candidate Natural Heritage Site Biological Inventory Evaluation Report. Prepared by Essex Region Conservation Authority and the City of Windsor Department of Planning and Department of Parks and Recreation. December 1992. 212 pp.

- Significant Ravine, Valley, River, and Stream Corridors;
- Habitat of Endangered, Threatened, and Vulnerable Species;
- Significant Woodlands;
- Significant Wildlife;
- Significant Wetland;
- Significant Ecological Function;
- Diversity;
- Significant Species;
- Significant Communities;
- Significant Earth Feature; and
- Condition.

In the City of Windsor, CNHSs were evaluated based on several physical and ecological criteria, including:

- Significant Ecological Function;
- Diversity;
- Significant Communities;
- Significant Species;
- Size;
- Representation;
- Condition; and
- Significant Earth Science Features.

Canadian Heritage Rivers System

The Detroit River flows in a north-south direction connecting Lake St. Clair in the north to Lake Erie in the south. Acting as an international border, the river connects American and Canadian communities culturally and economically. It also serves many ecological functions as part of the Great Lakes watershed.

The importance of the Detroit River as a natural heritage feature is only one component of its function. Parks Canada designated the Detroit River as a Canadian Heritage River, which recognizes its importance to Canadian history and culture. The Detroit River received American Heritage River designation in 1998 and Canadian Heritage River designation in 2001, making it the first River with dual designations.

7.5.6 Municipal Land Use Designations

TOWN OF LASALLE

Legal Status of Plan

The *Town of LaSalle Official Plan – LaSalle 2016 – Healthy, Vibrant and Caring*[52] was adopted on October 14, 1997. The Plan was approved by the Ministry of Municipal Affairs and Housing (MMAH) on May 18, 1998.

Environmental Designations

Section 2 identifies general development policies for various uses, including: woodlots; developments along inland watercourses; re-use of potentially contaminated sites; and, special policy area – species at risk.

Section 3 provides the land use designations for natural heritage sites, including permitted uses and other restrictions in the Town.

Two areas within the AOI are designated as Natural Environment: the Southeast of Nature Reserve ANSI and the Spring Garden Forest ANSI. The LaSalle Woods, located in the vicinity of the AOI, is also designated as Natural Environment. Areas designated as Natural Environment include: woodlots; wetlands; and prairie communities. These areas are recognized as playing an important role in keeping people physically, mentally and spiritually healthy. Permitted uses in these areas include: passive recreation; wildlife management; conservation uses; and, buildings/structures associated with these uses. The official plan states that utility corridors and inland watercourses should be used as linkages between natural heritage sites, and should be enhanced and maintained as wildlife habitat areas, recreational trails, bikeways and walkways. Preservation and management of areas designated Natural Heritage shall be via public purchase, private stewardship, conservation easements and management agreements.

Level of Protection

The Town of LaSalle, through its Official Plan has set a goal of creating a Greenway System, which will comprise trails, parks and woodlots for the benefit and enjoyment of wildlife and residents alike. As a municipal planning policy, this provides a reasonable level of protection for natural features within the proposed Greenway System.

Environmental land use designations within the Town of LaSalle are regulated by the Official Plan, which is approved under the Planning Act. The Official Plan, the Provincial Policy Statement and the Planning Act afford protection for provincially, regionally and locally significant designated natural areas.

CITY OF WINDSOR

Legal Status of Plan

The *City of Windsor Official Plan (2004)*[53] was adopted on October 25, 1999 by By-law 350- 1999. The Plan was approved by the Ontario Ministry of Municipal Affairs and Housing (MMAH), in part, on March 28, 2000. The remainder of the Plan was approved by an Ontario Municipal Board decision on

[52] www.town.lasalle.on.ca
[53] www.citywindsor.ca

November 1, 2002. This is an office consolidation of the Plan which incorporates the approved Plan plus subsequent Amendments.

Environmental Designations

Section 5, Volume 1 of the Official Plan identifies designations as being part of the 'Greenway System' on Schedule B of the City's Official Plan.

Section 6.8, Volume 1 of the Official Plan identifies permitted uses for each of the land use designations in the City. The Natural Heritage designation governs natural heritage areas located in the City.

Permitted uses within the Natural Heritage designation include nature reserves and wildland management. Ancillary uses may include recreation and leisure activities and facilities, provided the use is secondary and complementary to the main permitted use. If development is proposed, an *EER* is required to demonstrate that features and functions will not be adversely impacted. EERs are also required for any development on lands adjacent to those designated Natural Heritage.

Several overlays are subcategories to the land use designations and are identified as 'Development Constraint Area' on Schedule C of the City's Official Plan. These Constraint Areas, including Natural Heritage, Environmental Policy Areas and Candidate Natural Heritage Sites, afford various levels of protection to the City's natural environmental features.

Natural Heritage Policies identify areas under provincial protection (ie. Provincially Significant Wetlands and ANSIs). Environmental Policy Areas identify areas of significance that may permit development, subject to criteria, including: biological diversity; significant natural community; vulnerable, threatened or endangered species; low levels of disturbance; significant earth science features; and, visual, aesthetic or recreational importance to the City. Candidate Natural Heritage Sites contain potentially significant and/or sensitive environmental features or functions, which are subject to an *ERR* to determine if development is appropriate.

Several natural heritage land use designations are identified in the Schedules to the Official Plan. Three areas located in the AOI are designated as Natural Heritage: Ojibway Prairie Complex, Oakwood Bush and the eastern section of Malden Park. Two areas of the Titcombe Road North ANSI, a section of the Spring Garden Forest ANSI and the St. Clair College Prairie ESA are designated as Special Policy Area "A".

Secondary Planning Areas

The Official Plan – Volume 2 contains several Secondary Plans, some of which have natural feature components. The Spring Garden Planning Area is located in the AOI.

Spring Garden Planning Area

- Features in this area are recognized as significant, including Spring Garden Natural Area Complex (Schedule SG-1) and shall be conserved. Development must adhere to the Spring Garden Complex Management Plan.
- All lands within the Spring Garden Natural Area Complex shall be acquired in stages, by means of exchanges, parkland conveyance provisions (Planning Act), purchase by City based on independent appraisal, or purchase by appropriate government agencies.

Level of Protection

Lands included as part of the Greenway System may be protected via: conveyance/dedication as part of the planning system; land purchase; partnership arrangements with the ERCA or other group; conservation as a condition of planning approval; leases with private property owners to protect parts/all of the identified area; land exchange; donations/gifts/bequeaths from individuals/corporations; conservation easements; stewardship agreements; and other measures.

Environmental land use designations in the City of Windsor are governed by the Official Plan, the Provincial Policy Statement and the Planning Act. These laws, policies and plans afford protection to provincially, regionally and locally significant natural heritage areas.

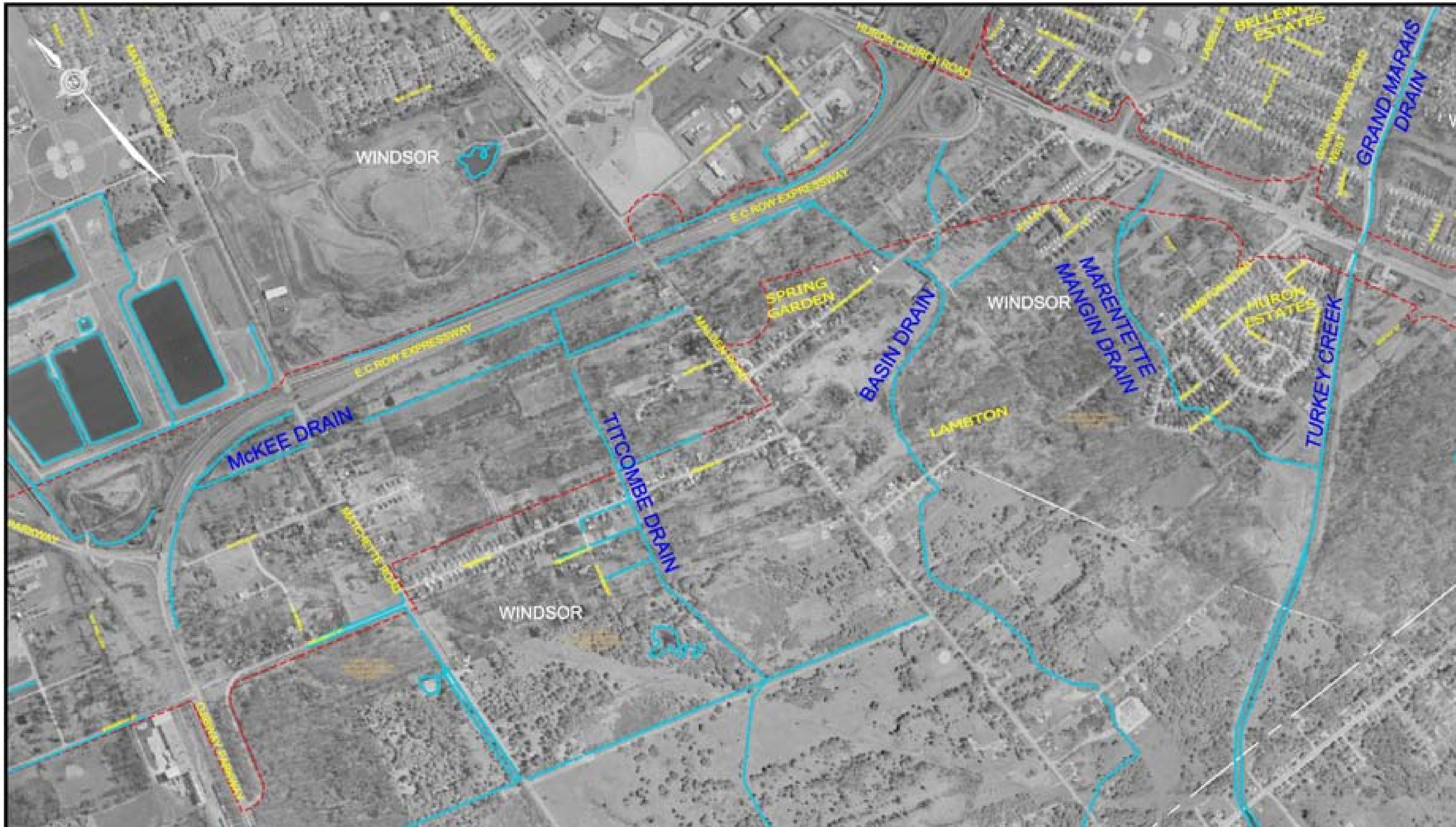
7.5.7 Drainage and Stormwater Management

Within the ACA there are nine recipient drainage systems: McKee Drain, Titcombe Drain, Basin Drain, Marentette Mangin Drain, Turkey Creek, Lennon Drain, Cahill Drain West Tributary, Cahill Drain and Wolfe Drain. The watercourse locations within the ACA are shown in Exhibit 7.31 A to C. All the drainage systems are part of the Turkey Creek system, which ultimately outlets to the Detroit River. All of the existing drainage systems have been impacted upon by urbanization, with Turkey Creek, Cahill Drain and Wolfe Drains being significantly altered. As an example, Turkey Creek upstream of Huron Church Road has been concrete lined to Dougall Avenue.

A number of hydrologic and hydraulic investigations have been completed on the existing drainage systems. However, as the investigations were conducted between the 1970s and the early 1990s, updates were required in order to refine the peak flows associated with each. The updated models would incorporate stormwater management plans that have been implemented in support of development.

For further information on existing drainage conditions within the Area of Contiued Analysis, the reader is referred to the *Draft Practical Alternatives Evaluation Working Paper – Stormwater Management Plan* (refer to List of Supporting Documents).

EXHIBIT 7.31A: EXISTING DRAINAGE CONDITIONS – OJIBWAY PARKWAY TO GRAND MARAIS ROAD WEST



LEGEND	DETROIT RIVER INTERNATIONAL CROSSING	200m 0m 200m 400m	JANUARY 2008
- - - - - ANALYSIS ENVELOPE ——— EXISTING WATER BODIES	STORMWATER MANAGEMENT STUDY OJIBWAY PARKWAY TO GRAND MARAIS ROAD WEST EXISTING DRAINAGE CONDITION		

EXHIBIT 7.31B: EXISTING DRAINAGE CONDITIONS –GRAND MARAIS ROAD WEST TO COUSINEAU ROAD

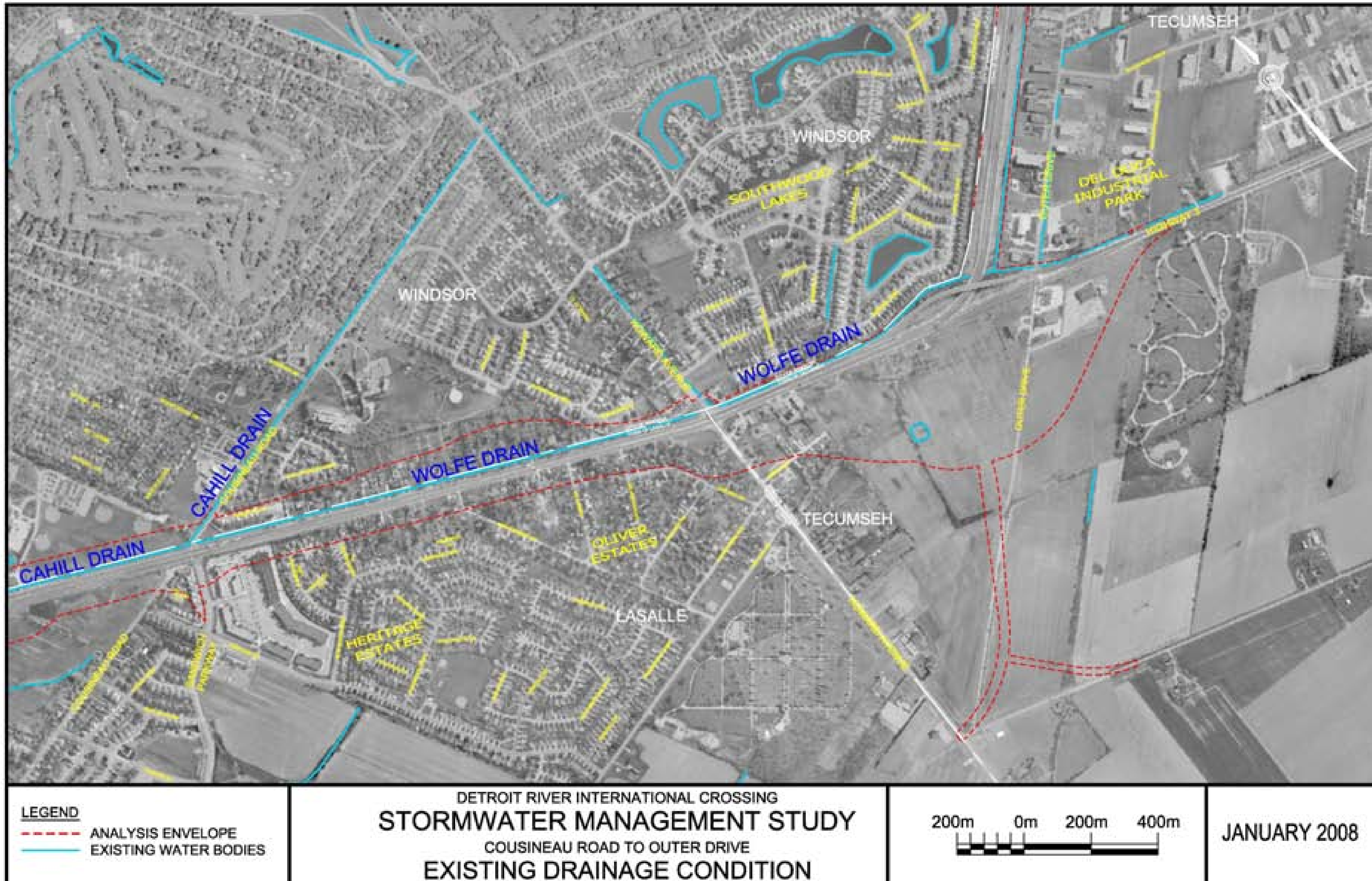
LEGEND
ANALYSIS ENVELOPE
EXISTING WATER BODIES

DETROIT RIVER INTERNATIONAL CROSSING
STORMWATER MANAGEMENT STUDY
GRAND MARAIS ROAD WEST TO COUSINEAU ROAD
EXISTING DRAINAGE CONDITION

200m 0m 200m 400m

JANUARY 2008

EXHIBIT 7.31C: EXISTING DRAINAGE CONDITIONS –COUSINEAU ROAD TO OUTER DRIVE



7.6 Transportation Network

This section provides an overview of existing traffic conditions within the Area of Continued Analysis. For further details, the reader is referred to *the Level 2 Traffic Operations Analysis of Practical Alternatives* (refer to List of Supporting Documents).

7.6.1 Existing Traffic Operations

The existing traffic operations within the ACA were characterized based on operations at existing intersections as well as on operations for the various roadways within the ACA.

INTERSECTION ANALYSIS

Traffic operations at existing intersections were described in terms of level-of-service (LOS). LOS evaluation uses a six-letter grade scale (A to F) to rank the overall traffic handling ability of an intersection or a road network based on delays experienced by vehicles. LOS A indicates excellent traffic operations with minimal delays, while LOS F represents failing conditions with long delays. Levels of service E and F are generally considered undesirable. Tables 7.18 and 7.19 summarize the associated delays and description of each level of service for signalized and unsignalized intersections, respectively.

TABLE 7.18 – LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service	Control Delay per Vehicle (s/veh)	Description
A	0 – 10	Operations with very low delay
B	> 10 – 20	This LOS generally occurs with good progression.
C	> 20 – 35	These higher delays may result from fair progression.
D	> 35 – 55	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, longer cycle lengths, or high volume-to-capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable. This level is considered by many agencies to be the limit of acceptable delay.
E	> 55 – 80	These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80	This level, considered to be unacceptable to most drivers, often occurs with over-saturation; that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and cycle lengths may also be major contributing causes to such delay levels.

TABLE 7.19 – LEVEL OF SERVICE CRITERIA FOR TWO-WAY STOP-CONTROLLED INTERSECTIONS

Level of Service	Control Delay per Vehicle (s/veh)	Description
A	0 – 10	Little or no delay
B	> 10 – 15	Short traffic delays
C	> 15 – 25	Average delays
D	> 25 – 35	Long delays
E	> 35 – 50	Very long delays
F	> 50	Extremely long delays with significant queuing and congestion

In addition to assessing level-of-service and delays, volume-to-capacity (v/c) ratios at the studied intersections were also determined. A v/c ratio is a measure of effectiveness that measures the ability of a roadway facility (typically a link or intersection) to accommodate its associated demand. It is calculated by dividing the actual demand on the facility by its theoretical capacity. A v/c ratio less than 0.85 generally indicates that the facility has the capacity to accommodate the existing demand, and vehicles will not experience undue congestion and delay. A v/cbelow 0.85 also indicates that the facility likely has the excess capacity to accommodate future demand. As the v/cratio approaches 1.0, delay and congestion may begin to occur, along with traffic instability. Finally, when the v/cratio exceeds 1.0, it indicates that the facility is operating over capacity, with no accommodations for future growth. Motorists will typically experience undue delay and congestion, and may have to wait through multiple signal cycles before proceeding through an intersection.

Tables 7.20 and 7.21 summarize Synchro output for peak direction LOS, delay per vehicle, V/C ratio and overall intersection LOS for the AM (Northbound) and PM (Southbound) peak hour, respectively.

TABLE 7.20 – EXISTING AM PEAK HOUR & DIRECTION (WESTBOUND/NORTHBOUND) INTERSECTION LEVEL OF SERVICE, HURON CHURCH ROAD/HIGHWAY 3 CORRIDOR

Intersection	LOS, Peak Through Movement (WB/NB)	Delay per vehicle(s), Peak Through Movement (WB/NB)	V/C Ratio, Peak Through Movement (WB/NB)	Overall Intersection LOS
College Ave.	A	2.9	0.59	B
Girardot St.	B	11.0	0.54	B
Tecumseh Rd.	C	28.7	0.75	C
Dorchester Rd.	A	2.3	0.49	A
Prince Rd / Totten St.	A	2.8	0.65	A
Malden Rd.	B	10.7	0.86	B
Northwood St. / Industrial Dr.	A	9.5	0.81	B
E.C. Row Ramp North	A	1.8	0.53	A
E.C. Row Ramp South	A	4.0	0.48	A
Labelle St.	A	7.7	0.76	B
Grand Marais Rd. / Lambton St.	B	13.9	0.73	B
Pulford St.	B	12.8	0.58	B
Cabana Rd. / Todd Ln.	C	33.9	0.80	D

Intersection	LOS, Peak Through Movement (WB/NB)	Delay per vehicle(s), Peak Through Movement (WB/NB)	V/C Ratio, Peak Through Movement (WB/NB)	Overall Intersection LOS
Huron Church Line	B	13.7	0.74	C
St. Clair College	B	12.4	0.56	A
Cousineau Rd.	C	22.4	0.74	C
Howard Ave.	C	27.3	0.75	C

TABLE 7.21 – EXISTING PM PEAK HOUR & DIRECTION (SOUTHBOUND/EASTBOUND) INTERSECTION LEVEL OF SERVICE, HURON CHURCH ROAD/HIGHWAY 3 CORRIDOR

Intersection	LOS, Peak Through Movement (SB/EB)	Delay per vehicle (s), Peak Through Movement (SB/EB)	V/C Ratio, Peak Through Movement (SB/EB)	Overall Intersection LOS
College Ave.	C	27.6	0.87	C
Girardot St.	A	6.3	0.66	A
Tecumseh Rd.	B	15.8	0.73	C
Dorchester Rd.	A	2.6	0.62	A
Prince Rd / Totten St.	A	4.8	0.69	A
Malden Rd.	B	11.9	0.85	B
Northwood St. / Industrial Dr.	A	6.2	0.76	B
E.C. Row Ramp North	A	8.3	0.81	B
E.C. Row Ramp South	A	2.9	0.62	A
Labelle St.	B	11.8	0.70	B
Grand Marais Rd. / Lambton St.	B	13.8	0.76	B
Pulford St.	A	8.3	0.54	A
Cabana Rd. / Todd Ln.	D	45.5	0.86	D
Huron Church Line	B	14.5	0.52	B
St. Clair College	A	5.6	0.56	B
Cousineau Rd.	C	27.4	0.75	C
Howard Ave.	D	39.6	0.90	C

During the AM peak hour, only the intersection of Highway 3 and Todd Lane/Cabana Road is operating at an overall LOS below LOS C. There are no peak-direction through movements operating below LOS C. The peak through movement (northbound) at the intersection of Huron Church Road and Malden Road is currently operating with a V/C ratio of 0.86, indicating that it is approaching its theoretical capacity.

For the PM peak hour, the intersection of Highway 3 and Cabana Road/Todd Lane is again operating below LOS C, with the eastbound through movement also operating at LOS D. This indicates that all traffic at this intersection is beginning to experience delay that is approaching unacceptable levels. There are four intersections within the studied corridor where southbound through movements are currently operating with V/C ratios of 0.85 or above, indicating that they are approaching their theoretical capacity.

TRAFFIC OPERATIONS ALONG EXISTING ROADWAYS

Travel time and arterial LOS are other means of evaluating traffic operations along a corridor. For the entire corridor between Highway 401 and the Ambassador Bridge, the existing morning peak hour northbound travel time was calibrated to be 13 minutes (800 seconds). The afternoon peak hour southbound travel time is nearly 13 minutes (770 seconds). These times are generally consistent with travel times observed in the field.

Table 7.22 shows arterial level of service. Generally, roadway links along the corridor operate with arterial LOS of C or better, supporting the overall corridor LOS. However, deficiencies were found around Tecumseh Road, Malden Road, Todd Lane/Cabana Road, Huron Church Line and Howard Avenue, which report lower LOS ranging from D to F. The arterial operating conditions on these links are consistent with the traffic volumes, turning movements, capacity and delay found at their associated intersections.

TABLE 7.22 – EXISTING ARTERIAL LEVEL OF SERVICE, HURON CHURCH ROAD/HIGHWAY 3 CORRIDOR

Segment	AM Peak Hour		PM Peak Hour	
	WB/NB	SB/EB	WB/NB	SB/EB
Ambassador Bridge-College St.	B	N/A	B	N/A
College St.-Girardot St.	B	B	A	B
Girardot St.-Tecumseh Rd. W	F	B	E	C
Tecumseh Rd. W-Dorchester St.	C	B	C	C
Dorchester St.-Prince Rd.	C	C	C	C
Prince Rd.-Malden Rd.	B	C	B	D
Malden Rd.-Industrial Rd.	C	B	B	B
Industrial Rd.-E.C. Row (north ramp)	B	B	C	C
E.C. Row (north ramp)-E.C. Row (south ramp)	B	B	B	B
E.C. Row (south ramp)-Spring Garden Rd.	B	C	B	C
Spring Garden Rd.-Lambton St.	C	B	C	C
Lambton St.-Pulford St.	B	B	B	B
Pulford St.-Todd Lane	F	C	F	D
Todd Lane-Huron Church Line	A	D	A	D
Huron Church Line-St. Clair College	A	A	A	A
St. Clair College-Cousineau Rd.	A	A	A	B
Cousineau Rd.-Howard Ave.	C	A	D	B
Overall	B	B	B	C

SUMMARY

Overall, the results indicate that corridor operations are constrained at select intersections throughout its length. These intersections create bottlenecks at critical locations, resulting in the degraded traffic operations shown at intersections such as Tecumseh Road and Todd Lane/Cabana Road. It should also be noted that the results presented in this section represent a snapshot of traffic conditions in February 2006, when traffic data was collected for this study.

Seasonal variations in traffic and other factors may result in different operating conditions at other times of the year. However, regardless of season, traffic operations have improved considerably since July 2004 when US-bound border processing capacity was added at the bridge, even though truck traffic has continued to increase. The improvements from pre-July 2004 traffic operations are due mostly to this expanded border processing capacity.

7.7 Constructability Issues

GEOLOGY / SUBSURFACE ENVIRONMENT

Further to the information presented in Chapter 4, an intensive geotechnical deep drilling program was initiated as part of this EA study to confirm the integrity of the underlying bedrock. This program was initiated due to an area of known historical solution mining of salt in the vicinity of two of the practical crossing alternatives (Practical Crossing Alternative B and Practical Crossing Alternative C) which are described in more detail in Chapter 8.

A Geotechnical Advisory Group, consisting of international experts on geotechnical engineering, was commissioned to provide technical guidance and review of this deep drilling program.

The findings of the deep drilling program identified significant risks in the vicinity of the approach structure for Crossing C (refer to Section 8.1.3).

Further details with regard to the results of the program are summarized in the *Draft Practical Alternatives Evaluation Constructability Report - Plaza and Crossing Alternatives* (refer to List of Supporting Documents).

7.8 Utilities

As part of the existing conditions investigations within the Area of Continued Analysis, the study team contacted utility companies and the municipalities to obtain information with regard to existing utility locations as well as future planned utilities. Based on this information obtained a composite utility plan was developed and is illustrated in Exhibit 7.32A to 7.32G.

EXHIBIT 7.32A – EXISTING UTILITY CONDITIONS (OJIBWAY PARKWAY TO MALDEN ROAD)

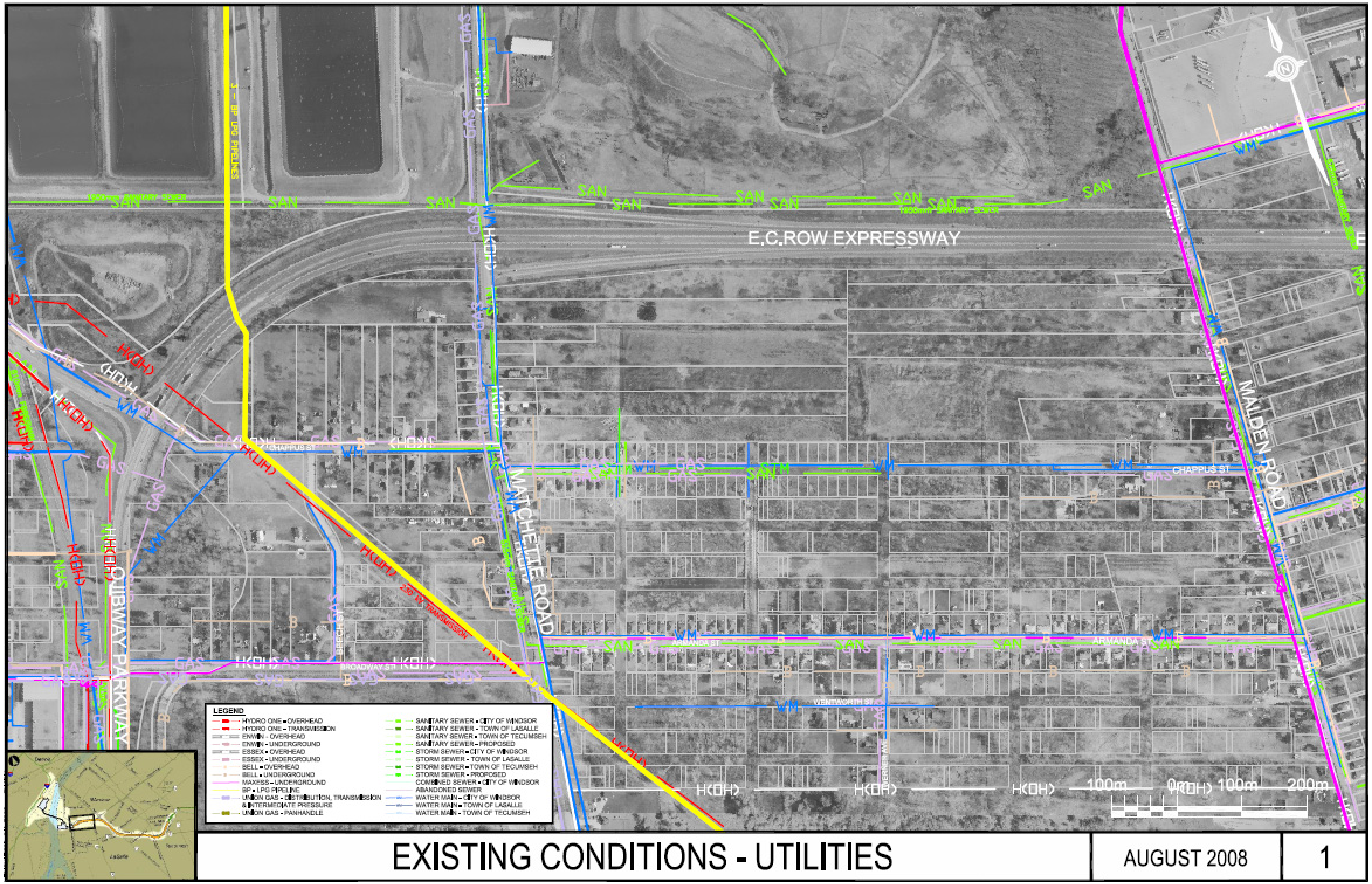
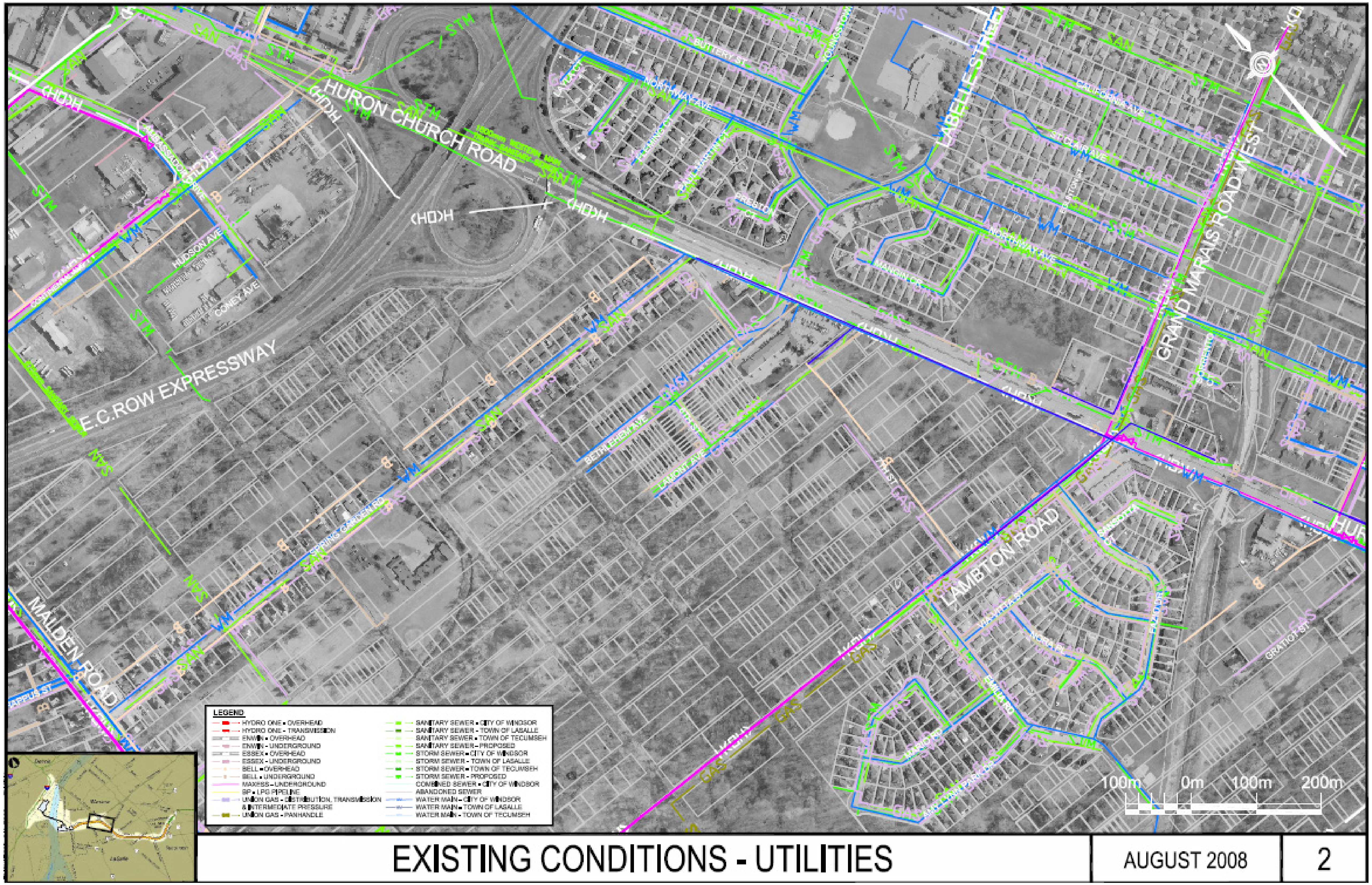
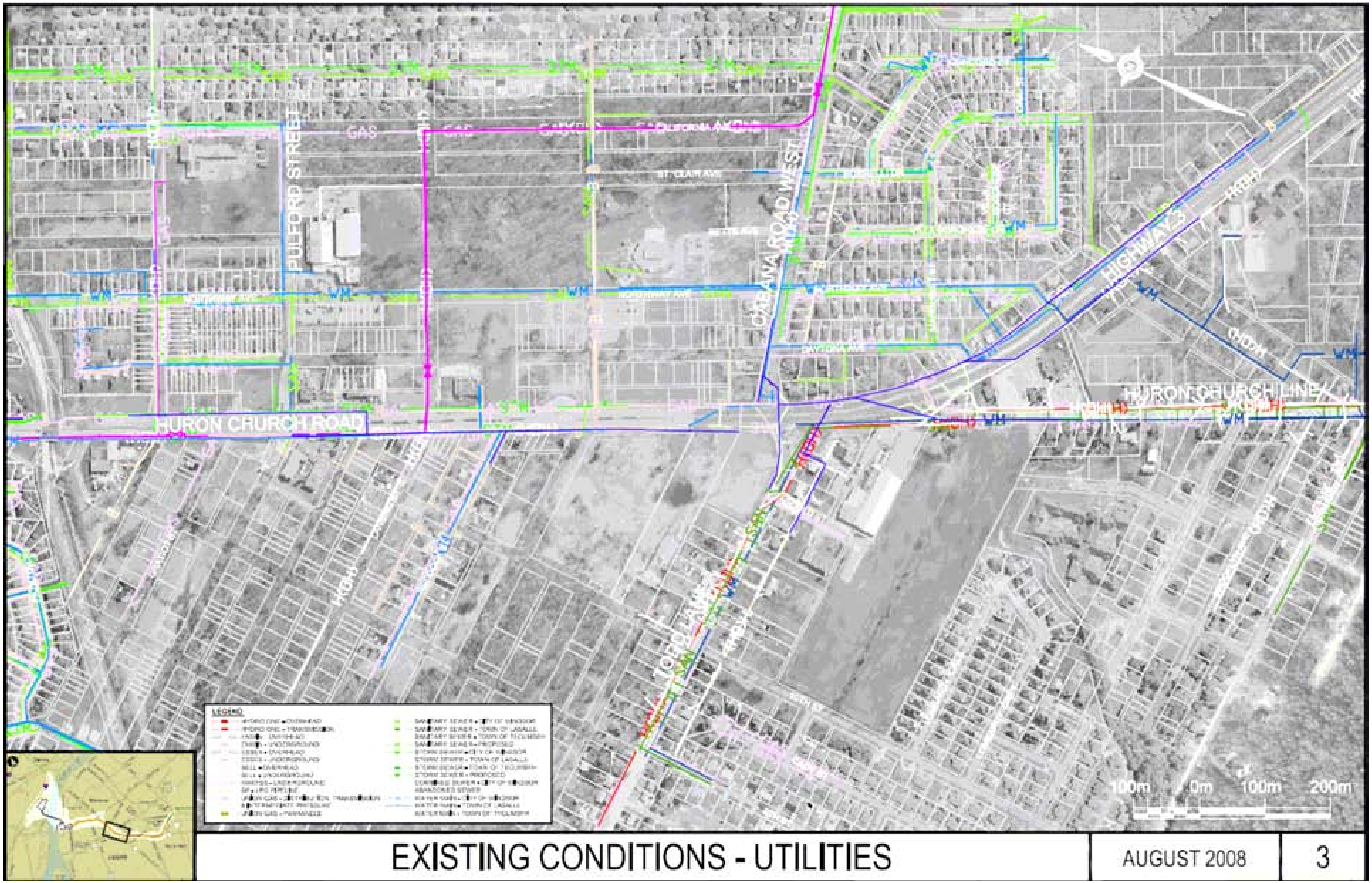


EXHIBIT 7.32B – EXISTING UTILITY CONDITIONS (MALDEN ROAD TO GRAND MARAIS ROAD WEST)



URS

EXHIBIT 7.32C – EXISTING UTILITY CONDITIONS (HURON CHURCH ROAD CORRIDOR / HURON CHURCH LINE)



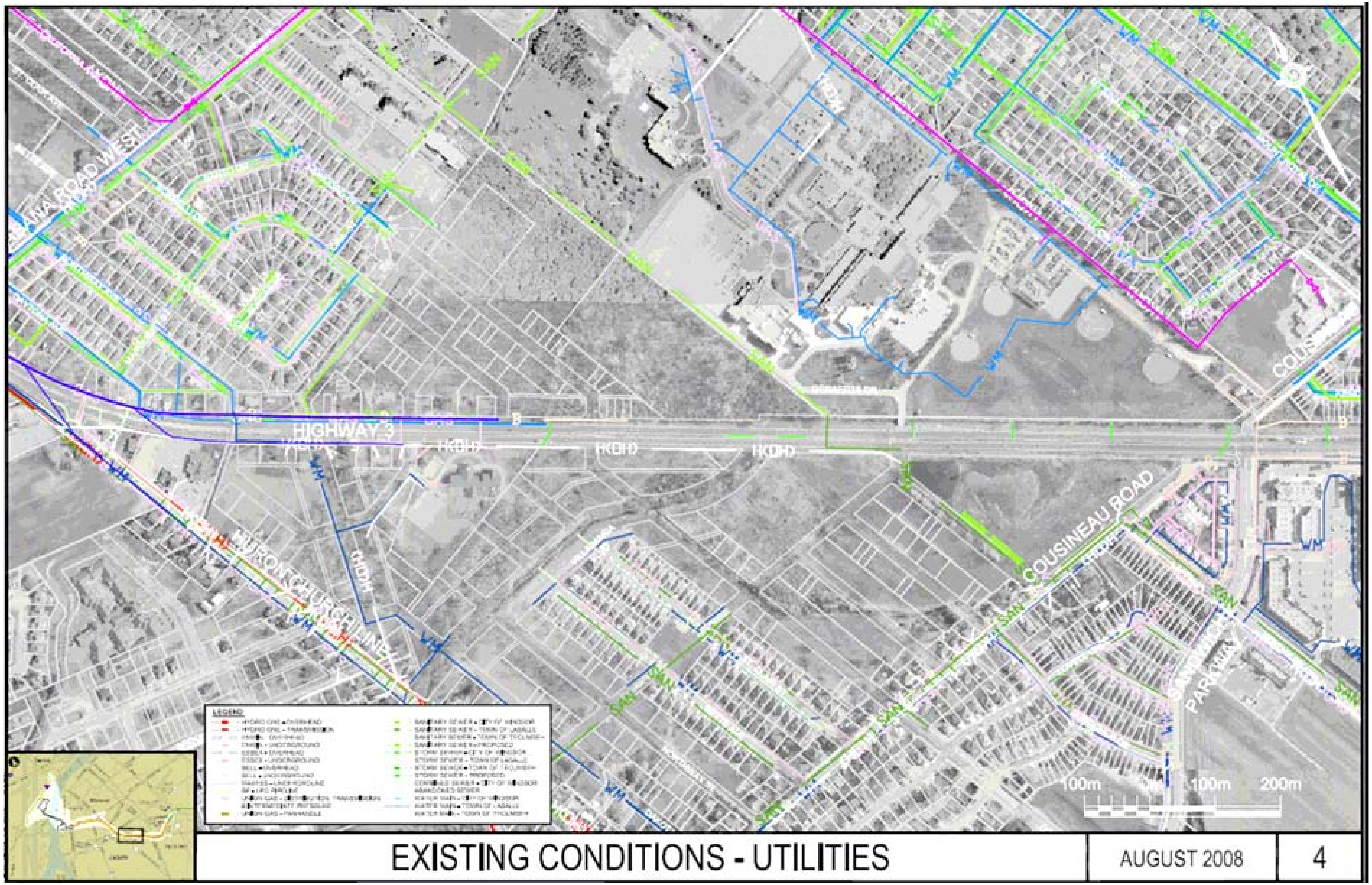
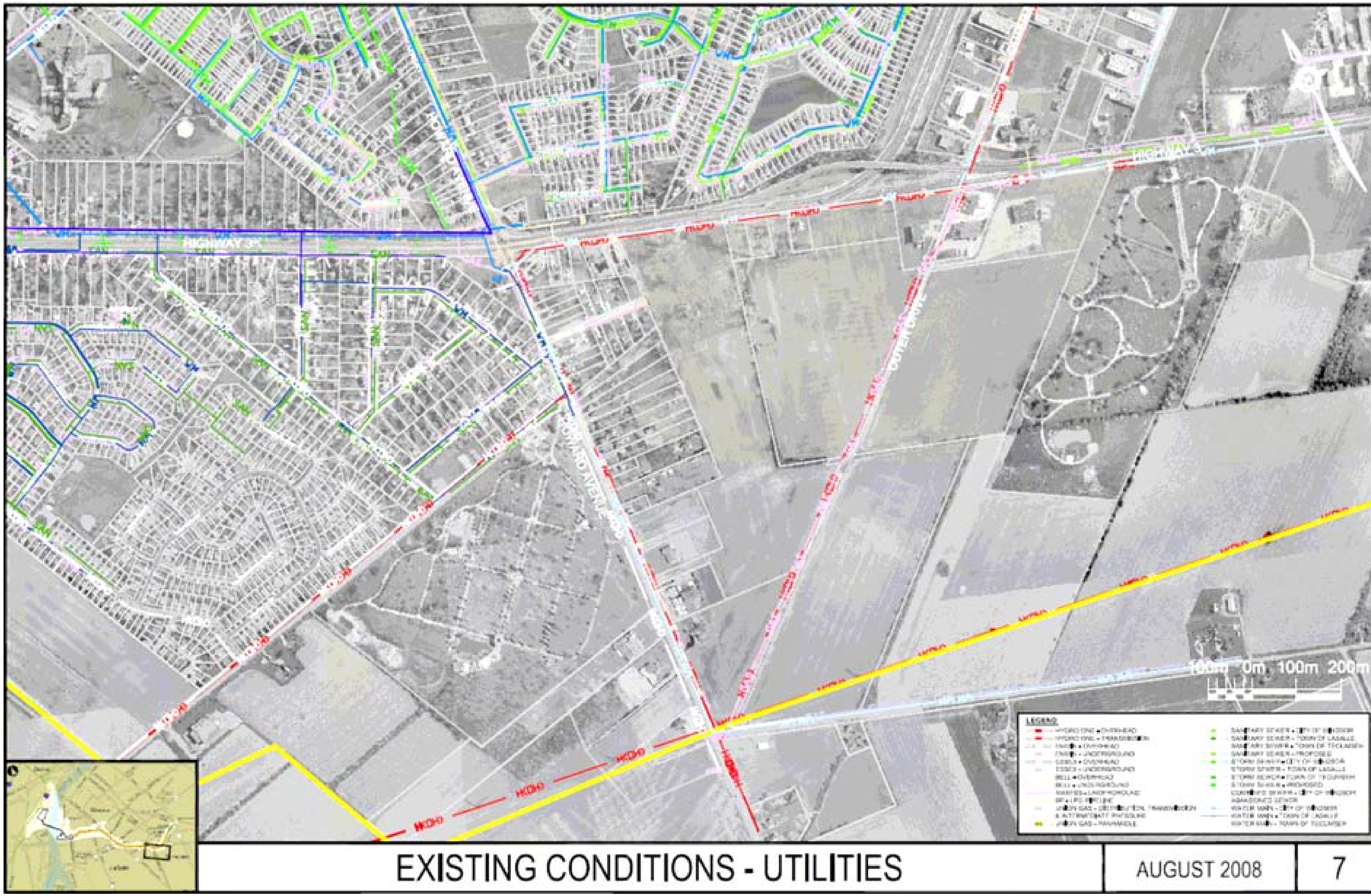

HIGHWAY 3
HURON CHURCH LINE
COUSINEAU ROAD
SANDWICH PARKWAY
LEGEND
100m
0m
100m
200m
EXISTING CONDITIONS - UTILITIES
AUGUST 2008
4

EXHIBIT 7.32E – EXISTING UTILITY CONDITIONS (COUSINEAU ROAD TO HOWARD AVENUE)

EXHIBIT 7.32F – EXISTING UTILITY CONDITIONS (HOWARD AVENUE TO NORTH TALBOT ROAD)

EXHIBIT 7.32G – EXISTING UTILITY CONDITIONS (NORTH TALBOT ROAD TO OUTER DRIVE)



8 PRACTICAL ALTERNATIVES FOR CROSSINGS, PLAZAS AND ACCESS ROADS

The term "practical alternative" is used to describe the more refined alternatives that emerge from the assessment and evaluation of the broader level conceptual alternatives, i.e. the illustrative alternatives. This terminology was adopted on both sides of the border to promote the coordinated approach between the two EA processes.

As described in more detail in Chapter 6, the assessment and evaluation of the illustrative crossing, plaza and access road alternatives led to the development of an Area of Continued Analysis (ACA). The development of the practical crossing, plaza and access road alternatives within this area was based upon the corresponding illustrative alternatives that were carried forward. For ease of reference, the relationship between the illustrative alternatives carried forward and the practical alternatives discussed in this chapter is summarized in Exhibits 8.1 to 8.3 in Section 8.1.2. Each exhibit corresponds to a particular practical crossing alternative, and shows the associated practical plaza alternatives. The corresponding illustrative crossing and plaza alternatives are also noted on the plans.

This chapter provides an overview of the generation, assessment and evaluation of the practical crossing, plaza and access road alternatives. For further details, the reader is referred to the following reports:

- *Draft Generation of Practical Access Road Alternatives Report (pending);*
- *Draft Generation and Assessment of Plaza and Crossing Alternatives Report (pending);*
- *Assessment of Practical Access Road Alternatives Memorandum – Improve Regional Mobility (May 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Air Quality Impact Assessment (May 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Noise and Vibration Assessment (May 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Social Impact Assessment (April 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Economic Impact (May 2008) (available);*
- *Draft Practical Alternatives Evaluation Assessment Report – Existing and Planned Land Use (May 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Archaeology (April 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Cultural Heritage (April 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Natural Heritage (April 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Stormwater Management Plan (March 2008) (available);*
- *Draft Practical Alternatives Evaluation Working Paper – Waste and Waste Management (May 2008) (available);*
- *Draft Practical Alternatives Evaluation - Constructability Report for Plaza & Crossing Alternatives (May 2008) (available);*
- *Draft Structural Planning Report for Practical Alternatives (May 2008) (available);*
- *Draft Preliminary Construction Cost Estimate Report for Practical Alternatives (Access Road and Inspection Plazas) (May 2008) (available);*
- *Draft Preliminary Analysis of Practical Alternatives (December 2006) (available);*
- *Draft Level 2 Traffic Operations Analysis of Practical Alternatives (February 2008) (available); and*
- *Selection of the Technically and Environmentally Preferred Alternative - Plaza and Crossing Alternative (pending).*

8.1 Practical Canadian Plaza and Crossing Alternatives

This section documents the factors considered in generating practical alternatives (bridge crossing, inspection plaza) as well as descriptions of the specific alternatives considered, an assessment of impacts and benefits associated with these alternatives and the evaluation leading to the identification of a technically and environmentally preferred alternative (TEPA). For further details, the reader is referred to the *Draft Generation of Practical Access Road Alternatives* (refer to List of Supporting Documents).

It should be noted that the US team published their Draft Environmental Impact Statement (DEIS) in February 2008. The DEIS contains technical analysis of the crossing alternatives, and the US plazas. This section of the report provides a summary of the analysis undertaken by the Canadian Team, as well as a summary of the analysis undertaken by the US team, based on the information in the DEIS, and our ongoing collaboration with the US team. The US team will announce their final decision through their Final Environmental Impact Statement (FEIS) in fall of 2008. In the meantime, the Canadian study team has the benefit of the information in the DEIS, and our ongoing collaboration with the US team.

8.1.1 General Criteria

CROSSINGS

The Canadian and US study teams considered the following technical objectives in generating the practical crossing alternatives:

- Maintain navigational clearances on the Detroit River;
- Locate crossing in area of sound bedrock;
- Avoid as much as possible areas sensitive to traffic impacts of crossing (e.g. noise, vibration, air quality) such as residential neighbourhoods;
- Minimize length of crossing;
- Maximum grade of approach to crossing is 5%; and

- Provide for 6 traffic lanes.

These technical objectives were derived based on consultation with agencies, municipalities, specialists (including traffic, highway design, foundations and structural specialists), and the public.

As noted in Chapter 6, the Detroit River is an important waterway for marine traffic on the Great Lakes. As such, bridges are required to span the river at a clearance of at least 46 m (150 ft) at the shipping channel defined by the US Coast Guard and Transport Canada – Navigable Waters Division. The height requirements and potential span lengths on the Detroit River suggest that any bridge on the Detroit River within the Area of Continued Analysis will need to be either a suspension bridge or a cable-stayed bridge. Additional consultation with US and Canadian government agencies and shipping operators led to the decision to not place any piers in the Detroit River for a new span. Piers in this section of the Detroit River were considered too hazardous to marine navigation.

The Canadian and US teams developed three practical crossing alternatives. The practical crossing and plaza alternatives are discussed in more detail in Section 8.1.2, and illustrated schematically in Exhibits 8.1 to 8.3.

PLAZAS

The following key considerations served as a basis in generating practical plaza alternatives:

- Proximity to Border: Canada Border Services Agency (CBSA) and US Customs and Border Protection (CBP) require that the plazas be located as close to the border (i.e. bridge crossing) as possible, to reduce security / monitoring requirements for border agencies. Where plazas cannot be directly connected to the bridge, secure connections would be required to prevent goods and travellers from avoiding inspection. In Canada, a secure roadway of 1500m (0.9 mi) was considered the guideline for a maximum reasonable distance, subject to consideration of land use and line of sight concerns.
- Site Area: The site must provide adequate space to accommodate projected traffic demand, as well as turn-around opportunities for drivers and the installation of equipment systems prior to and after inspection points, on-site secondary inspection, some storage capacity for traffic queues on the plaza, and the ability to expand in the future.

  For the current EA study, inspection plaza areas of 30 to 40 ha (80 to 100 acres) were considered for new crossings, based on the preliminary assumption that international truck traffic will be distributed equally between the new crossing and the Ambassador Bridge.

  To minimize visual and noise impacts and provide acceptable access for emergency vehicle services (fire, police, etc.), it was determined that the plaza elevation should not vary significantly from elevations of the adjacent lands and roadways.

  Plaza layouts and locations were influenced by proximity to the new international bridge and/or other bridges over existing highways or rail lines. As an example, the vertical clearance requirements for shipping extend to the edge of the Detroit River. The distance over which an approach structure would descend from the river crossing (assumed to be approximately 46 m above the riverbank to meet navigational clearance requirements) would be approximately one kilometre with a maximum grade of 5%.

  Geotechnical conditions were also considered in siting plaza alternatives. Specifically, the plaza alternatives were sited away from the known salt extraction areas north of Prospect Avenue.
- Adjacent Land Use: Locate the plaza in an area where surrounding land uses would not be overly sensitive to the continuous operation, noise and lighting of "Port-Of-Entry" facilities. Alternatively, the plaza could be located in areas where additional land would be available to screen and buffer the Port-Of-Entry from existing sensitive land uses.

  The site should be located away from residential areas, schools and other community uses. Sites should not be visible from neighbouring lands, but should provide good visibility to surrounding areas and approaches. Areas with significant development should also be avoided.
- Environmental Issues: Consideration should be given to the presence of toxic and/or hazardous materials, wetlands and/or endangered species; cultural, social and economic impacts.
- Emergency Services and Access: The site should be served by more than one roadway to allow for roadway interruption; consideration should be given to response time for medical and fire emergency services, and proximity to hospitals.
- Existing Easements and Right-of-Ways: Consideration should be given to gas lines, water and sewer lines, power and telecommunication lines, rail lines, and local and private roadways.
- Water Availability: Consideration should be given to water sources and protection from sabotage or other threats of contamination.

The siting of practical plaza alternatives was based on the results of the assessment of illustrative plaza alternatives, additional study within the Area of Continued Analysis (ACA) and consultation with border agencies, businesses, property owners and the public.

Input received at Public Information Open Houses in November 2005 and workshops in January 2006 (refer to Chapter 3) and correspondence with the public identified several specific community objectives that were considered in the generation of inspection plaza locations:

- Concern with impacts to Sandwich community; keep plaza south of Prospect Avenue;
- Keep away from natural features (Ojibway Prairie Area, Spring Garden ANSI, Black Oak Woods);
- Place plaza in the Brighton Beach industrial area;
- Keep plaza away from the sinkhole location;
- Place plaza on as much vacant land as possible; and
- Place plazas away from residential areas.

The study team developed three distinct plaza locations and four plaza alternatives which are described in detail in Section 8.1.2.

8.1.2 Description of Practical Plaza and Crossing Alternatives

A total of three practical crossing alternatives and four practical plaza alternatives were developed on the basis of the generation criteria discussed in Section 8.1.1.

PRACTICAL CROSSING ALTERNATIVES

Practical Crossing Alternative A

Practical Crossing Alternative A ('Crossing A') is within the X-10 corridor, and is illustrated in Exhibit 8.1. This crossing alternative connects to the south end of the plaza area on the US side of the river. Due to the distance required reach existing grade, the crossing connects only to Practical Plaza Alternative A ('Plaza A') on the Canadian side of the river.

Crossing A is the longest of the alternatives, with a main span of 1220 m. Piers within the river were not considered in the crossing alternatives. A clear span of 1220 m limits the type of bridge possible for Crossing A to a suspension bridge.

Crossing A completely avoids the known salt extraction wells in the area north of Prospect Avenue

Practical Crossing Alternative B

Practical Crossing Alternative B ('Crossing B') is illustrated in Exhibit 8.2, and is the other crossing within the X-10 corridor and connects to the south end of the plaza area on the US side of the river. The crossing connects to Plaza A and Plaza B1 on the Canadian side of the river. Crossing B has a main span of 870 m. A clear span of 870 m can be provided by both suspension and cable-stayed bridge types.

On the Canadian side of the river, Crossing B is aligned over an existing aggregate operation (Southwestern Sales) and vacant land owned by Ontario Power Generation (OPG). From these OPG lands, an approach structure connects to Plaza B or Plaza A.

The Crossing B main structure is situated just south of Prospect Avenue, south of the area of known brine wells. The crossing and approach structure avoid the known brine wells area.

Practical Crossing Alternative C

Practical Crossing Alternative C ('Crossing C') is within the X-11 corridor, and is illustrated in Exhibit 8.3. This alternative featured four distinct crossing-plaza combinations, including two ways of connecting to Plaza A (via the Brighton Beach area or parallel to the Ojibway Parkway), a connection to Plaza B, and a connection to Plaza C.

PRACTICAL PLAZA ALTERNATIVES

Practical Plaza Alternative A

Practical Plaza Alternative A ('Plaza A') is approximately 90 acres in size, and is bounded by Ojibway Parkway, E.C. Row Expressway, Malden Road and Armanda Road/Broadway Avenue. Plaza A connects to all three crossing alternatives and is located approximately 1.8 km to 3.5 km from the Detroit River (corresponding to Crossing C and Crossing A, respectively).

The site consists of primarily open space, woodlots and residential units that consist of established and recently constructed houses. Practical Plaza Alternative A is illustrated in Exhibits 8.1 to 8.3.

Approximately 150 m south of Plaza A is Armanda Street, a neighbourhood consisting of single-family houses. Plaza A would require existing Matchette Road to be closed between E.C. Row Expressway and just north of Armanda Street. Based on consultation with the municipalities, this portion of Matchette Road would need to realigned so that the current access provided by Matchette Road between Windsor and LaSalle can be maintained.

Practical Plaza Alternative B

Practical Plaza Alternative B ('Plaza B') is approximately 85 acres in size. Plaza B connects to Crossing C, and is illustrated in Exhibit 8.3. This alternative is located approximately 1.8 km from the Detroit River.

There are few residential units directly within the site, however, the site is adjacent to primarily industrial area that includes the Nemak Plant (automotive manufacturing plant) to the east, the Windsor West Power Plant to the east and OPG Brighton Beach Power Station to the west. Potential impacts to these utilities and industrial uses were considered in the analysis and evaluation of Plaza B (refer to Section 8.1.3).

Practical Plaza Alternative B1

Practical Plaza Alternative B1 ('Plaza B1') is approximately 80 acres in size, and is a variation of Plaza B. Plaza B1 connects to Crossing B, and is illustrated in Exhibit 8.2. This alternative has a different layout and footprint than Plaza B due to the alignment of the connection of Crossing B at the north end of the plaza. Plaza B1 is located approximately 0.8 km from the Detroit River.

This site is also situated within the Brighton Beach Industrial Subdivision, bounded by the Detroit River, Chappus Road, Ojibway Parkway and Broadway Street.

Practical Plaza Alternative C

Practical Plaza Alternative C ('Plaza C') is approximately 105 acres in size. Plaza C connects to Crossing C, and is illustrated in Exhibit 8.3. This alternative is located approximately 1.2 km from the Detroit River.

Plaza C is located on vacant lands owned by OPG, Southwestern Sales (an existing aggregate operation) and on the J. Clarke Keith Transformer Station, which would require relocation.

The plaza is sited directly adjacent to the Detroit River shoreline. Along the north limit is Prospect Avenue; on the east side is Sandwich Street and a trucking operation and the Windsor Power Plant; and to the south is Chappus Street and the Brighton Beach industrial area.

EXHIBIT 8.1 – PRACTICAL CROSSING ALTERNATIVE A AND CORRESPONDING PRACTICAL PLAZA ALTERNATIVES

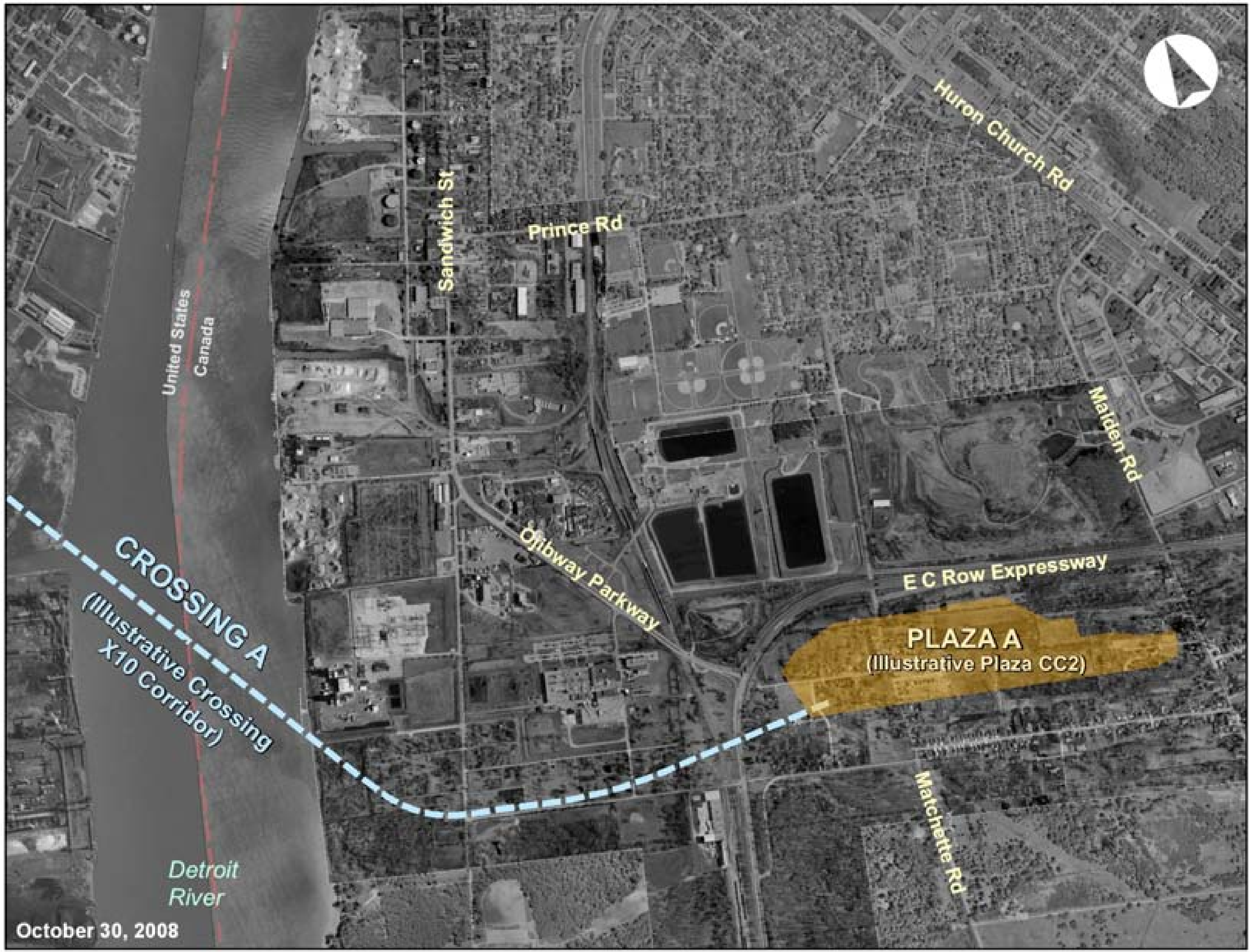
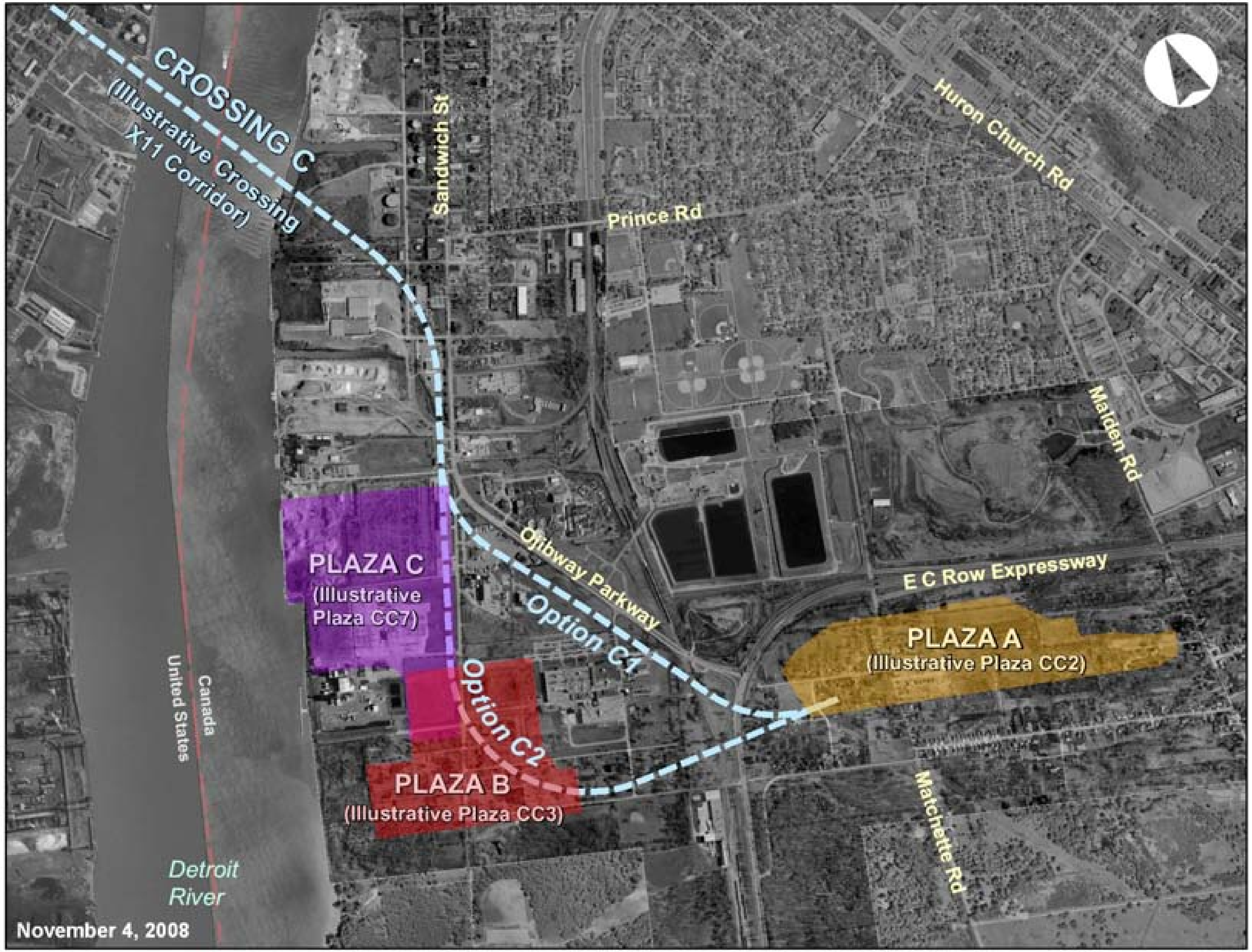


EXHIBIT 8.2 – PRACTICAL CROSSING ALTERNATIVE B AND CORRESPONDING PRACTICAL PLAZA ALTERNATIVES

EXHIBIT 8.3 – PRACTICAL CROSSING ALTERNATIVE C AND CORRESPONDING PRACTICAL PLAZA ALTERNATIVES



8.1.3 Analysis and Evaluation

The Canadian study team examined each crossing/Canadian plaza combination to determine the preferred Canadian plaza site for each crossing.

In December 2006, the initial analysis of these seven crossing/plaza combinations was presented together with the US plaza/crossing analysis at the fourth round of Public Information Open Houses (refer to **Chapter 3** for further details of this PIOH). The Canadian side information was updated over the summer of 2007 and presented at the fifth round of Public Information Open Houses in August 2007 (also summarized in **Chapter 3**).

For the purposes of the assessment, the alternatives were organized by crossing corridor to determine best plaza/crossing combination by corridor.

- Crossing A/Plaza A
- Crossing B/Plaza A
- Crossing B/Plaza B1
- Crossing C/Plaza A via Brighton Beach
- Crossing C/Plaza A via Ojibway Parkway
- Crossing C/Plaza B
- Crossing C/Plaza C

In accordance with the evaluation process developed for this study, the assessment and evaluation of these alternatives was undertaken following both a reasoned argument method, and an arithmetic method (weighted scoring). The reasoned argument method was the primary method, while the arithmetic method was the secondary method, which served as a basis of comparison for the evaluation findings.

REASONED ARGUMENT METHOD

Crossing A Corridor Alternatives

The geometric constraints posed by the navigational clearances over the Detroit River, the grade separation requirement at the Essex Terminal Railway (ETR) corridor, and the maximum design grade of the crossing and approach roadways eliminated the possibility for Crossing A to connect into a plaza in the Plaza B area (i.e. west of ETR). Similarly, a connection from Crossing A to Plaza C was deemed too circuitous and inefficient to be considered a reasonable alternative. Therefore, Crossing A was evaluated solely in combination with Plaza A, and as such, was carried forward in the assessment.

Plaza A is located along the south side of the E.C. Row Expressway between Malden Road and Ojibway Parkway. This alternative falls within Windsor's Malden Planning District, which is largely a residential community integrated with a protected natural area. Some of the residential areas along Matchette, Beech, Chappus and Armanda Streets date back to the 1930s. New residential development is also occurring on lands immediately south of E.C. Row Expressway. Current residents describe the character of the community primarily as having a natural setting, with the feeling of living in the country while enjoying the amenities of the city[1].

Table 8.1 provides a summary of the analysis of Crossing A-Plaza A. Further details of the analysis of this alternative are provided in a document entitled *Selection of the Technically and Environmentally Preferred Alternative - Plaza and Crossing Alternatives* (refer to List of Supporting Documents).

Crossing B Corridor Alternatives

Crossing B can connect to either Plaza A or Plaza B1. Plaza B1 is situated west of Ojibway Parkway on lands acquired by the City of Windsor for the purposes of establishing an industrial park. The Brighton Beach Industrial Park is named after the former Brighton Beach neighbourhood which previously occupied these lands. Over time, most of the residences have been acquired and removed so the area is generally vacant. The industrial area also includes the Brighton Beach and Windsor power plants, the Nemak Automotive manufacturing plant, a Hydro One transformer station, Windsor Salt, and aggregate storage facilities.

Table 8.2 provides a summary of a comparison of Plaza A and Plaza B1 alternatives with Crossing B based on the results of the analysis. Further details of the analysis of these alternatives are provided in a document entitled *Selection of the Technically and Environmentally Preferred Alternative - Plaza and Crossing Alternatives* (refer to List of Supporting Documents).

Crossing C Corridor Alternatives

Crossing C can connect to Plazas A, B and C. The connection from Plaza A to Crossing C was assessed assuming two different routes. One route paralleled the alignment of Ojibway Parkway, passing between the Nemak Plant and the City of Windsor's Lou Romano Water Reclamation Plant. The second route paralleled Broadway Street and Sandwich Street, passing through the Brighton Beach industrial area.

Plaza B is located in the Brighton Beach industrial area west of Ojibway Parkway and north of Broadway Street. Plaza C is located north of the Plaza B site, in the area west of Sandwich Street and south of Prospect Avenue. Residents of Sandwich have indicated to the study team that many consider Prospect Avenue as the southern limit of their community[2]. Portions of the Plaza C site are currently occupied by the Brighton Beach Power Station, the J. Clarke Keith Transformer Station as well as vacant land. A portion of the plaza site is also occupied by Southwestern Sales Corporation, which stores and distributes aggregate and other construction materials.

The results of the geotechnical deep drilling program discussed in **Chapter 7** identified the need to incorporate a cable-stayed or suspension bridge for the approach to Crossing C to mitigate the considerable issues associated with the uncertain bedrock integrity. This would result in a significant cost premium (approximately $325-million) as well as an impact to the construction schedule as compared to the other two crossing alternatives, which would feature more conventional approach structures.

Table 8.3 provides a summary of a comparison of Plaza A, B and C alternatives with Crossing C based on the results of the analysis. Further details of the analysis of these alternatives are provided in a

[1] Responses to Social Impact Assessment (SIA) Questionnaires distributed during the study

[2] As cited in SENES Social Impact Assessment Report (available as a supporting document) based on discussions with residents of Sandwich Towne over the course of the study

document entitled *Selection of the Technically and Environmentally Preferred Alternative - Plaza and Crossing Alternatives* (refer to List of Supporting Documents).

Evaluation of Crossing A, Crossing B and Crossing C Alternatives – Canadian Side

The results of the evaluations summarized in Tables 8.1 to 8.3 identified that Crossing A-Plaza A, Crossing B-Plaza B1 and Crossing C-Plaza B are the plaza-crossing alternatives to be considered on the Canadian side. Table 8.4 summarizes the characteristics, advantages and disadvantages of these three alternatives, as the decision on the preferred crossing is a bi-national decision. Section 8.1.4 summarizes the overall assessment of the plaza and crossing alternatives.

Further details of the analysis of these alternatives are provided in a document entitled *Selection of the Technically and Environmentally Preferred Alternative - Plaza and Crossing Alternatives* (refer to List of Supporting Documents).

ARITHMETIC METHOD

Crossing B Corridor Alternatives

In accordance with the evaluation process developed for this study, this assessment was also conducted using an arithmetic approach (weighted scoring), based on factor scores assigned by the factor specialists and factor weighting scenarios developed earlier in the study.

As described in Section 6.2.3 with regard to the evaluation of the illustrative crossing, plaza and access road alternatives, in addition to weighting scenarios developed by the study team, weighting scenarios were also developed based on public input and input from the Community Consultation Group (CCG). These weighting scenarios were also utilized for the evaluation of the practical crossing, plaza and access road alternatives.

The results of this assessment are presented in Table 8.5. As can be seen in the table, the arithmetic results are consistent with the reasoned argument evaluation considering both the unweighted and weighted scores, as well as across all three weighting scenarios. Plaza B1 is the preferred Canadian plaza for Crossing B.

Crossing C Corridor Alternatives

The results of the arithmetic method assessment of the Corridor C alternatives are presented in Table 8.6. In reviewing the results of the two methods, the study team was satisfied that the results of the reasoned argument are valid and appropriate. To some degree, the limitations of the 7-point scoring system utilized for this study underemphasize the difference between the two alternatives in terms of cost and constructability impacts. At the same time, the differences between these two alternatives in terms of their impacts to natural features are adequately reflected in the impact scoring.

The magnitude and significance of the cost and constructability impacts between the alternatives are considered to be greater than the magnitude and significance of the differences in natural features impacts. The Plaza B alternative is therefore preferred over the Plaza C alternative.

Evaluation of Crossing A, Crossing B and Crossing C Alternatives – Canadian Side

The results of the arithmetic method assessment of the preferred Crossing A, Crossing B and Crossing C alternatives are presented in Table 8.7. The results indicate that Crossing B-Plaza B1 is the highest ranking alternative, followed by the Crossing A-Plaza A alternative, and the Crossing C-Plaza B alternative, respectively. These results are consistent with those of the reasoned argument method presented in this section.

TABLE 8.1 – SUMMARY OF ANALYSIS – CROSSING A - PLAZA A

Evaluation Factor	Measure	Crossing A-Plaza A
Changes to Air Quality	Changes in $PM_{2.5}$ Concentration	Increases in $PM_{2.5}$ within 250 m of crossing and plaza under certain conditions; potential to influence air quality in Armanda Street/Matchette Road area
	Changes in NO_x Concentrations	Increases in NO_x within 250 m of crossing and plaza under certain conditions; potential to influence air quality in Armanda Street/Matchette Road area
Protection of Community and Neighbourhood Characteristics	Effect on Local Access – Number of Roads Crossed / Closed / Connected	7 crossings / 7 closings / 4 connections – Matchette Road realignment; Minor out-of-way travel
	Noise receptors with change in noise levels >5 dBA (2035; with mitigation; compared to future do-nothing)	1
	Potential Acquisitions Households	62
	Potential Acquisitions Businesses/Industries	1
	Social Features (institutional) displaced	1 – Erie Wildlife Rescue
	Overall Effect on Community Character/Cohesion	Greater impact on community character for Armanda Street/Matchette Road neighbourhood compared to other alternatives due to proximity of new plaza to this residential area;
Maintain Consistency with Existing and Planned Land Use	Consistency	Plaza location not consistent with existing land uses of the Malden planning district; impacts to existing and planned residential uses Crossing and approach are consistent as these are located in industrial area;
	Known Contaminated Sites Impacted – No./Area (ha)	4 sites/1 ha
Protect Cultural Resources	Designated built heritage features potentially displaced	1 Cultural Landscape Unit – Brighton Beach 1 Built Heritage Feature
	Direct impacts to Parks	Ojibway Park (0.7 ha)
	Potential archaeological sites affected	0 – pre-contact habitation site/Euro-Canadian homesteads 6 – pre-contact findspots
Protect the Natural Environment	Feature impacts	Loss of 2.98 ha of provincially rare vegetation communities Loss of 232 specimens/colonies of species at risk Approximately 7.38ha of designated natural areas within the 120m of proposed property limit
Improve Regional Mobility	2035 Average Daily Car and Truck Volume	Canadian plaza and crossing sized to accommodate average daily traffic of 39,000 vehicles (cars and trucks) in 2035.
	Distance from plaza to international border	2.5 km
	Canadian Plaza Operational Considerations	Good accessibility to/from local road network Good access to local utilities for site services Distance from border to plaza > 1.5 km is less desirable; requires on-going security monitoring; 700 m section of at-grade roadway through vacant lands also a security/monitoring concern Plaza provides sufficient size for addressing needs to 2035 and beyond; while there is flexibility to address new/expanded inspection functions within the plaza site, expansion of plaza beyond the identified footprint may be problematic due to existing land uses adjacent to the plaza site.
Cost and Constructability	Is it constructable?	Yes
	Key Issues	Length of main span (approx. 1200 m) means suspension bridge is only practical bridge type; Risk and additional cost associated with project timeframe is high due to magnitude of required construction and longer main-span.
	Construction cost, 2011 CDN $	$830-million (Malden Road to int'l border, including one-half of crossing construction cost)

TABLE 8.2 – SUMMARY OF ANALYSIS – CROSSING B ALTERNATIVES

Evaluation Factor	Measure	Crossing B -Plaza A	Crossing B -Plaza B1
Changes to Air Quality	Changes in $PM_{2.5}$ Concentration	Increases in PM2.5 within 250 m of crossing and plaza under certain conditions	
	Changes in NO_x Concentrations	Increases in NOx within 250 m of crossing and plaza under certain conditions	
Protection of Community and Neighbourhood Characteristics	Effect on Local Access – Number of Roads Crossed / Closed / Connected	4 crossings / 9 closings / 4 connections – Minor out-of-way travel; Matchette Road realignment	4 crossings / 12 closings / 4 connections – Minor out-of-way travel
	Noise receptors with change in noise levels >5 dBA (2035; with mitigation; compared to future do-nothing)	2	0
	Potential Acquisitions Households	65	36
	Potential Acquisitions Businesses/Industries	1	1
	Social Features (institutional) displaced	1 (Erie Wildlife Rescue)	
	Overall Effect on Community Character/Cohesion	Negative effect on community character for Armanda Street/Matchette Road neighbourhood due to displacement of homes and proximity of neighbourhood to new plaza	Negative effect on community character for Matchette Road/Chappus Street neighbourhood due to displacement of several homes to accommodate interchange connection at E.C. Row/Ojibway Pkwy
Maintain Consistency with Existing and Planned Land Use	Consistency	Plaza location not consistent with existing land uses and zoning in Malden Planning District Crossing and approach are located in Portland industrial area and are considered to be consistent	Plaza located in industrial area; more consistent with existing land uses and zoning Crossing and approaches are located in Portland industrial area and are considered to be consistent
	Known Contaminated Sites Impacted – No./Area (ha)	11 sites/5 ha	17 sites/24 ha
Protect Cultural Resources	Designated built heritage features potentially displaced	1 Cultural Landscape Unit - Brighton Beach 2 Built Heritage Features – house	1 Cultural Landscape Unit - Brighton Beach 3 Built Heritage Features – houses
	Direct impacts to Parks	Ojibway Park (0.7 ha)	Ojibway Park (0.7 ha)
	Potential archaeological sites affected	0 – pre-contact habitation site/Euro-Canadian homesteads 6 – pre-contact findspots	2 – pre-contact habitation site/Euro-Canadian homesteads 4 – pre-contact findspots
Protect the Natural Environment	Feature impacts	Loss of 2.70 ha of provincially rare vegetation communities Loss of 223 specimens/colonies of species at risk Approximately 2.38 ha of designated natural areas within 120m of proposed property limit	Loss of 1.09 ha of provincially rare vegetation communities Loss of 185 specimens/colonies of species at risk Approximately 10.96 ha of designated natural areas within 120m of proposed property limit
Improve Regional Mobility	2035 Average Daily Car and Truck Volume	Canadian plaza and crossing sized to accommodate average daily traffic of 39,000 vehicles (cars and trucks) in 2035.	
	Distance from plaza to international border	2.9 km	1.4 km
	Canadian Plaza Operational Considerations	Distance from border to plaza > 1.5 km is less desirable; requires on-going security monitoring; 700 m section of at-grade roadway through vacant lands also a security/ monitoring concern	Distance to plaza < 1.5 km is preferable; good (direct) sight lines between plaza and crossing
Cost and Constructability	Is it constructable?	Yes	
	Key Issues	No issues affecting cost and constructability identified	
	Construction cost, 2011 CDN $	$687-million to $751-million (Malden Road to int'l border, including one-half of crossing construction cost)	$648-million to $712-million (Malden Road to int'l border, including one-half of crossing construction cost)

Evaluation Factor	Measure	Crossing B -Plaza A	Crossing B -Plaza B1
Summary of Assessment	Both alternatives have similar effects on air quality and cultural resources and similar cost estimates. The Plaza A alternative displaces more residences and is considered to have a greater negative effect on the residential neighbourhood of Broadway Street/Matchette Road/Armanda Street. These greater effects are due to the proximity of the residential neighbourhood to the plaza. In addition to higher direct effects, the Plaza A alternative is determined to have higher indirect and nuisance effects for residences in proximity to the plaza site. Plaza B1 is located in an industrial park, and is therefore considered to have less community impacts and greater consistency with land use. The Plaza A alternative also results in a greater impact to natural features than the Plaza B1 alternative. Operationally, both plazas will operate well under future peak travel demand. However Plaza B1 is preferred over Plaza A based on the lower distance to the international border and the direct connection between the crossing and the plaza (less security/monitoring requirements). Based on this assessment, Plaza B1 provides more transportation and mobility benefits and fewer impacts. Plaza B1 is preferred to Plaza A for connecting to Crossing B.		

TABLE 8.3 – SUMMARY OF ANALYSIS – CROSSING C ALTERNATIVES

Evaluation Factor	Measure	Crossing C-Plaza A (via Ojibway Parkway)	Crossing C – Plaza A (via Brighton Beach)	Crossing C - Plaza B	Crossing C-Plaza C
Changes to Air Quality	Changes in $PM_{2.5}$ Concentration	Slight increases in PM2.5 within 250 m of crossing and plaza under certain conditions; potential to influence air quality in Armanda Street area and portion of Sandwich		Slight increases in PM2.5 within 250 m of crossing and plaza under certain conditions; potential to influence air quality in portion of Sandwich	
	Changes in NO_x Concentrations	Slight increases in NOx within 250 m of crossing and plaza under certain conditions; potential to influence air quality in Armanda Street area and portion of Sandwich		Slight increases in NOx within 250 m of crossing and plaza under certain conditions; potential to influence air quality in portion of Sandwich	
Protection of Community and Neighbourhood Characteristics	Effect on Local Access – Number of Roads Crossed / Closed / Connected	7 crossings / 4 closings / 4 connections – – minor out-of-way travel; Matchette Road realignment	7 crossings / 3 closings / 4 connections – minor out-of-way travel; Matchette Road realignment	7 crossings / 16 closings / 5 connections – minor out-of-way travel; Relocation of Broadway Street / Sandwich Street connection	5 crossings / 13 closings / 4 connections – minor out-of-way travel
	Noise receptors with change in noise levels >5 dBA (2035; with mitigation; compared to future do-nothing)	3	4	0	0
	Potential Acquisitions Households	64	66	38	35
	Potential Acquisitions Businesses/Industries	6	5	5	5
	Social Features (institutional) displaced	1 (Erie Wildlife Rescue)			
	Overall Effect on Community Character/Cohesion	Negative effect on community character for Armanda Street neighbourhood due to proximity of new plaza; Negative effect on community character for Sandwich due to proximity of new crossing.		Negative effect on community character for Sandwich due to proximity of new crossing.	
Maintain Consistency with Existing and Planned Land Use	Consistency	Plaza location not consistent with existing land uses of the Spring Garden Planning area; impacts to existing and planned residential uses Crossing and approaches located in occupied and vacant industrial areas; consistent	Plaza location not consistent with existing land uses of the Spring Garden Planning area; impacts to existing and planned residential uses Crossing and approaches located in occupied and vacant industrial areas; consistent	Plaza location in occupied and vacant industrial areas; consistent Crossing and approaches located in occupied and vacant industrial areas; consistent	Plaza location in occupied and vacant industrial areas; consistent Crossing and approaches located in occupied and vacant industrial areas; consistent
	Known Contaminated Sites Impacted – No./Area (ha)	22 sites/12 ha	29 sites/24 ha	29 sites/24 ha	30 sites/50 ha
Protect Cultural Resources	Designated built heritage features potentially displaced	2 Cultural Landscape Units – Brighton Beach; unconfirmed tunnel 1 Built Heritage Feature - house	2 Cultural Landscape Units – Brighton Beach; unconfirmed tunnel 2 Build Heritage Features – houses	2 Cultural Landscape Units – Brighton Beach; unconfirmed tunnel 3 Built Heritage Features – houses	2 Cultural Landscape Units – Brighton Beach; unconfirmed tunnel 2 Built Heritage Features – houses
	Direct impacts to Parks	Ojibway Park (0.7 ha)	Ojibway Park (0.7 ha)	Ojibway Park (0.7 ha)	Ojibway Park (0.7 ha)
	Potential archaeological sites affected	0 – pre-contact habitation sites/Euro-Canadian homesteads 5 – pre-contact findspots	0 – pre-contact habitation sites/Euro-Canadian homesteads 6 – pre-contact findspots	3 – pre-contact habitation sites/Euro-Canadian homesteads 4 – pre-contact findspots	1 – pre-contact habitation sites/Euro-Canadian homesteads 3 – pre-contact findspots
Protect the Natural Environment	Feature impacts	loss of 2.70 ha of provincially rare vegetation communities loss of 186 specimens/colonies of species at risk Approximately 1.73 ha of designated natural areas within 120m of proposed property limit	loss of 2.69 ha of provincially rare vegetation communities loss of 231 specimens/colonies of species at risk Approximately 1.48 ha of designated natural areas within 120m of proposed property limit	loss of 2.02 ha of provincially rare vegetation communities loss of 195 specimens/colonies of species at risk Approximately 14.82 ha of designated natural areas within 120m of proposed property limit	loss of 0.89 ha of provincially rare vegetation communities loss of 153 specimens/colonies of species at risk Approximately 7.77 ha of designated natural areas within 120m of proposed property limit

Evaluation Factor	Measure	Crossing C-Plaza A (via Ojibway Parkway)	Crossing C – Plaza A (via Brighton Beach)	Crossing C - Plaza B	Crossing C-Plaza C
Improve Regional Mobility	2035 Average Daily Car and Truck Volume	Canadian plaza and crossing sized to accommodate average daily traffic of 39,000 vehicles (cars and trucks) in 2035.			
	Distance from plaza to international border	3.0 km	3.9 km	2.3 km	1.6 km
	Canadian Plaza Operational Considerations	Good accessibility to/from local road network Good access to local utilities for site services Distance from border to plaza > 1.5 km is less desirable; requires on-going security monitoring; section of at-grade roadway through vacant land use also a security/monitoring concern Plaza provides sufficient size for addressing needs to 2035 and beyond; while there is flexibility to address new/expanded inspection functions within the plaza site, expansion of plaza beyond the identified footprint may be problematic due to existing land uses adjacent to the plaza site.	Good accessibility to/from local road network Good access to local utilities for site services Distance from border to plaza > 1.5 km is less desirable; requires on-going security monitoring; section of at-grade roadway through vacant land use also a security/monitoring concern Plaza provides sufficient size for addressing needs to 2035 and beyond; while there is flexibility to address new/expanded inspection functions within the plaza site, expansion of plaza beyond the identified footprint may be problematic due to existing land uses adjacent to the plaza site.	Good accessibility to/from local road network Good access to local utilities for site services Distance from border to plaza > 1.5 km is less desirable; requires on-going security monitoring; section of at-grade roadway through vacant land use also a security/monitoring concern Plaza provides sufficient size for addressing needs to 2035 and beyond; while there is flexibility to address new/expanded inspection functions within the plaza site, expansion of plaza beyond the identified footprint may be problematic due to existing land uses adjacent to the plaza site.	Good accessibility to/from local road network Good access to local utilities for site services Distance from border >1.5 km, however the road connection is elevated with direct connection to crossing; good (direct) sight lines between plaza and crossing Plaza provides sufficient size for addressing needs to 2035 and beyond; while there is flexibility to address new/expanded inspection functions within the plaza site, expansion of plaza beyond the identified footprint may be problematic due to existing land uses adjacent to the plaza site.
Cost and Constructability	Is it constructible?	Yes, but results of geotechnical investigations identified that there is a subsurface cavity caused by salt extraction activities in the vicinity of Sandwich Street and Prospect Avenue. Further uncontrolled settlements due to this cavity represent risks to the design and operation of the approach roadway connecting to Crossing C. It is not certain that further investigation will be successful in reducing or eliminating these risks.			
	Key Issues	Costs and risks associated with approach road crossing of brine well area Direct impact to Sterling Marine Fuels fueling depot	Costs and risks associated with approach road crossing of brine well area Direct impact to Sterling Marine Fuels fueling depot	Costs and risks associated with approach road crossing of brine well area Direct impact to Sterling Marine Fuels fueling depot	Costs and risks associated with approach road crossing of brine well area Costs and risks associated with relocation of Keith Transformer Station Direct impact to Sterling Marine Fuels fueling depot
	Construction cost, 2011 CDN $	$979-million to $1,049-million (Malden Road to int'l border, including one-half of crossing construction cost)	$985-million to $1,055-million (Malden Road to int'l border, including one-half of crossing construction cost)	$1,015-million to $1,085-million (Malden Road to int'l border, including one-half of crossing construction cost)	$1,142-million to $1,212-million (Malden Road to int'l border, including one-half of crossing construction cost)
Summary of Assessment		The Plaza A alternatives were considered to have higher overall impacts in comparison to the Plaza B and Plaza C alternatives. The Plaza A alternatives result in greater direct and indirect nuisance impacts to the residential and natural areas in the Matchette Road/E.C. Row/Armanda Street area due to the location of this plaza. In addition, the distance between the plaza and the border with the Plaza A alternatives is well beyond the desirable distance identified by Canada Border Services Agency, resulting in greater monitoring/security concerns compared to the other alternatives. Finally, the Plaza A alternatives offered no advantages over the Plaza B and C alternatives with the connection to Crossing C. The Plaza C alternative is noted as having slightly less impact on local air quality due to the layout of the plaza and greater buffer area provided around the apron area of the plaza in comparison to Plaza B. The Plaza C alternative was also found to have lower impacts to significant natural features than the Plaza B alternative. However, the Plaza C alternative carries substantially higher construction costs, and the potential to add several more years to the construction period than the Plaza B alternative due to the conflict with the Keith Transformer Station. The differences in air quality impacts between the Plaza B and C alternatives are notable, but of no consequence in this industrial area of west Windsor as no sensitive receivers are located within 250 m of either plaza. The difference in impacts to natural features between the Plaza B and C alternatives is predominately related to terrestrial communities of high significance and provincially rare specimens/colonies. The Plaza B option impacts two additional areas of high significance habitat, resulting in approximately one hectare more area impacted, and 195 specimens/colonies compared to 153 with the Plaza C alternative. In either case, mitigation of impacts through integration, relocation and salvage will be required for the habitat of high significance and provincially rare specimens/colonies with either alternative. Providing increased capacity, improving border processing capabilities and providing reasonable and secure crossing options in this important trade corridor are the primary objectives of this study and are highly important to the local, regional and national economies on both sides of the river. Approvals and staging for the relocation of the Keith Transformer Station can delay completion of the new crossing several years; in the meantime, increased congestion and delays on the border crossing network, extended disruption to communities due to increased infiltration of international traffic onto local streets, and failure to attract new employment to the region could negatively impact the local communities. The schedule risks and additional costs associated with the relocation of the Keith Transformer Station associated with the Plaza C alternative were considered to be of greater importance than the increased impacts to natural features. **Therefore, the Plaza B alternative was carried forward for further consideration.**			

TABLE 8.4 – EVALUATION OF CROSSING A, CROSSING B AND CROSSING C ALTERNATIVES – CANADIAN SIDE

Evaluation Factor	Measure	Crossing A – Plaza A	Crossing B – Plaza B1	Crossing C - Plaza B
Changes to Air Quality	Changes in $PM_{2.5}$ Concentration	Increases in PM2.5 within 250 m of crossing and plaza under certain conditions; potential to influence air quality in Armanda Street/Matchette Road area	Increases in PM2.5 within 250 m of crossing and plaza under certain conditions;	Increases in PM2.5 within 250 m of crossing and plaza under certain conditions; potential to influence air quality in portion of Sandwich
	Changes in NO_x Concentrations	I increases in NOx within 250 m of crossing and plaza under certain conditions; potential to influence air quality in Armanda Street/Matchette Road area	Increases in NOx within 250 m of crossing and plaza under certain conditions;	Increases in NOx within 250 m of crossing and plaza under certain conditions; potential to influence air quality in portion of Sandwich
Protection of Community and Neighbourhood Characteristics	Effect on Local Access – Number of Roads Crossed / Closed / Connected	7 crossings / 7 closings / 4 connections – Matchette Road realignment; Minor out-of-way travel	4 crossings / 12 closings / 4 connections – Minor out-of-way travel	7 crossings / 16 closings / 5 connections – minor out-of-way travel; Relocation of Broadway Street / Sandwich Street connection
	Noise receptors with change in noise levels >5 dBA (2035; with mitigation; compared to future do-nothing)	1	0	0
	Potential Acquisitions Households	62	36	38
	Potential Acquisitions Businesses/Industries	1	1	5
	Social Features (institutional) displaced	1 (Erie Wildlife Rescue)		
	Overall Effect on Community Character/Cohesion	Greater impact on community character for Armanda Street/Matchette Road neighbourhood compared to other alternatives due to proximity of new plaza to this residential area;	Less impact on community character compared to other alternatives; both plaza and crossing are situated in industrial area	Greater impact on community character of Sandwich compared to other alternatives due to proximity of new crossing to this residential area.
Maintain Consistency with Existing and Planned Land Use	Consistency	Plaza location not consistent with existing land uses of the Malden planning district; impacts to existing and planned residential uses Crossing and approach are consistent as these are located in industrial area;	Crossing and plaza are consistent as these are located in industrial area;	Crossing and plaza are consistent as these are located in industrial area;
	Known Contaminated Sites Impacted – No./Area (ha)	4 sites/1 ha	17 sites/24 ha	29 sites/24 ha
Protect Cultural Resources	Designated built heritage features potentially displaced	1 Cultural Landscape Unit 1 Built Heritage Feature (low significance)	1 Cultural Landscape Unit 3 Built Heritage Features (low significance)	2 Cultural Landscape Units 3 Built Heritage Features (low significance)
	Direct impacts to Parks	Ojibway Park (0.7 ha)	Ojibway Park (0.7 ha)	Ojibway Park (0.7 ha)
	Potential archaeological sites affected	0 pre-contact habitation sites/ Euro-Canadian homesteads 6 pre-contact findspots	2 pre-contact habitation sites/ Euro-Canadian homesteads 4 pre-contact findspots	3 pre-contact habitation sites/ Euro-Canadian homesteads 4 pre-contact findspots
Protect the Natural Environment	Feature impacts	Loss of 2.98 ha of provincially rare vegetation communities Loss of 232 specimens/colonies of species at risk Approximately 7.38 ha of designated natural areas within 120m of	Loss of 1.09 ha of provincially rare vegetation communities Loss of 185 specimens/colonies of species at risk Approximately 10.96 ha of designated natural areas within 120m of	Loss of 2.02 ha of provincially rare vegetation communities Loss of 195 specimens/colonies of species at risk Approximately 14.82 ha of designated natural areas within 120m of

Evaluation Factor	Measure	Crossing A – Plaza A	Crossing B – Plaza B1	Crossing C - Plaza B
		proposed property limit	proposed property limit	proposed property limit
Improve Regional Mobility	2035 Average Daily Car and Truck Volume	Canadian plaza and crossing sized to accommodate average daily traffic of 39,000 vehicles (cars and trucks) in 2035.		
	Distance from plaza to international border	2.5 km	1.4 km	2.3 km
	Canadian Plaza Operational Considerations	Good accessibility to/from local road network Good access to local utilities for site services Distance from border to plaza > 1.5 km is less desirable; requires on-going security monitoring; 700 m section of at-grade roadway through vacant lands also a security/monitoring concern Plaza provides sufficient size for addressing needs to 2035 and beyond; while there is flexibility to address new/expanded inspection functions within the plaza site, expansion of plaza beyond the identified footprint may be problematic due to existing land uses adjacent to the plaza site.	Good accessibility to/from local road network Good access to local utilities for site services Distance to plaza < 1.5 km is preferable; good (direct) sight lines between plaza and crossing Plaza provides sufficient size for addressing needs to 2035 and beyond; while there is flexibility to address new/expanded inspection functions within the plaza site, expansion of plaza beyond the identified footprint may be problematic due to existing land uses adjacent to the plaza site. It was also noted that this plaza is in reasonable proximity to the waterfront, offering an opportunity to incorporate marine inspection functions at the plaza, if required.	Good accessibility to/from local road network Good access to local utilities for site services Distance from border to plaza > 1.5 km is less desirable; requires on-going security monitoring; 400 m section of at-grade roadway through vacant lands also a security/monitoring concern Plaza provides sufficient size for addressing needs to 2035 and beyond; while there is flexibility to address new/expanded inspection functions within the plaza site, expansion of plaza beyond the identified footprint may be problematic due to existing land uses adjacent to the plaza site. It was also noted that these plaza is in reasonable proximity to the waterfront, offering an opportunity to incorporate marine inspection functions at the plaza, if required.
Cost and Constructability	Is it constructible?	Yes	Yes	Yes, but results of geotechnical investigations identified that there is a subsurface cavity caused by salt extraction activities in the vicinity of Sandwich Street and Prospect Avenue. Further uncontrolled settlements due to this cavity represent risks to the design and operation of the approach roadway connecting to Crossing C. It is not certain that further investigation will be successful in reducing or eliminating these risks
	Key Issues	Length of crossing (approximately 1200 metres) leads to cost and constructability risks	None identified	Costs and risks associated with approach road crossing of brine well area Direct impact to Sterling Marine Fuels fueling depot
	Construction cost, 2011 CDN $	$830-million (Malden Road to int'l border, including one-half of crossing construction cost)	$648-million to $712-million (Malden Road to int'l border, including one-half of crossing construction cost)	$1015-million to $1085-million (Malden Road to int'l border, including one-half of crossing construction cost)
Summary of Assessment		Overall, the Crossing A-Plaza A was found to have many disadvantages and few advantages over the other alternatives. This alternative was found to have higher impacts to community and neighbourhood features, land use and natural features than the other alternatives. In addition, this alternative was found to provide lower benefits to regional mobility compared to the other alternatives. This alternative has lower cost and constructability impacts than Crossing C-Plaza B. The cost and constructability issues with the Crossing C-Plaza B alternative are a serious disadvantage of this alternative. This alternative was also found to have greater community and cultural feature impacts to Sandwich. Overall, Crossing C-Plaza B was found to have many disadvantages, and no advantages, over Crossing B-Plaza B1 alternative. Crossing B-Plaza B1 offers more advantages and has no notable disadvantages when compared to the Crossing A and Crossing C alternatives. The crossing and plaza are situated away from residential areas and sufficiently close to the international border. This alternative has the lowest impacts to natural and community features, and is comparable to the other alternatives in terms of its impacts to air quality, land use and cultural features. No alternative provides greater benefits to regional mobility and this alternative has the lowest cost.		

TABLE 8.5 – RESULTS OF ARITHMETIC EVALUATION – CROSSING B ALTERNATIVES

Factor	Weight	Study Team Weighting			
		Plaza A		Plaza B1	
		Score	Weighted Score	Score	Weighted Score
Changes in Air Quality	12.39	2	24.78	2	24.78
Protection of Community and Neighbourhood Characteristics	15.93	1	15.93	2	31.86
Maintain Consistency with Existing & Planned Land Use	12.39	2	24.78	3	37.17
Protect Cultural Resources	12.39	3	37.17	3	37.17
Protect the Natural Environment	15.93	1	15.93	2	31.86
Improve Regional Mobility	17.70	5	88.50	6	106.20
Cost and Constructability	13.27	2	26.54	2	26.54
Total	100.00	16	233.63	20	295.58
Rank	Unweighted	2		1	
	Weighted		2		1

Factor	Weight	Public Weighting			
		Plaza A		Plaza B1	
		Score	Weighted Score	Score	Weighted Score
Changes in Air Quality	17.32	2	34.64	2	34.64
Protection of Community and Neighbourhood Characteristics	15.49	1	15.49	2	30.98
Maintain Consistency with Existing & Planned Land Use	12.89	2	25.78	3	38.67
Protect Cultural Resources	13.14	3	39.42	3	39.42
Protect the Natural Environment	16.34	1	16.34	2	32.68
Improve Regional Mobility	15.28	5	76.40	6	91.68
Cost and Constructability	9.54	2	19.08	2	19.08
Total	100.00	16	227.15	20	287.15
Rank	Unweighted	2		1	
	Weighted		2		1

Factor	Weight	Community Consultation Group Weighting			
		Plaza A		Plaza B1	
		Score	Weighted Score	Score	Weighted Score
Changes in Air Quality	17.30	2	34.60	2	34.60
Protection of Community and Neighbourhood Characteristics	13.88	1	13.88	2	27.76
Maintain Consistency with Existing & Planned Land Use	13.69	2	27.38	3	41.07
Protect Cultural Resources	13.12	3	39.36	3	39.36
Protect the Natural Environment	17.11	1	17.11	2	34.22
Improve Regional Mobility	14.83	5	74.15	6	88.98
Cost and Constructability	10.07	2	20.14	2	20.14
Total	100.00	16	226.62	20	286.13
Rank	Unweighted	2		1	
	Weighted		2		1

TABLE 8.6 – RESULTS OF ARITHMETIC EVALUATION – CROSSING C ALTERNATIVES

Factor	Weight	Study Team Weighting							
		Plaza A (via Ojibway Parkway)		Plaza A (via Brighton Beach)		Plaza B		Plaza C	
		Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Changes in Air Quality	12.39	2	24.78	2	24.78	2	24.78	2	24.78
Protection of Community and Neighbourhood Characteristics	15.93	1	15.93	1	15.93	2	31.86	2	31.86
Maintain Consistency with Existing and Planned Land Use	12.39	2	24.78	2	24.78	3	37.17	3	37.17
Protect Cultural Resources	12.39	3	37.17	3	37.17	3	37.17	3	37.17
Protect the Natural Environment	15.93	2	31.86	1	15.93	2	31.86	3	47.79
Improve Regional Mobility	17.70	5	88.50	5	88.50	5	88.50	6	106.20
Cost and Constructability	13.27	2	26.54	2	26.54	2	26.54	1	13.27
Total	100.00	17	249.56	16	233.63	19	277.88	20	298.24
Rank	Un-weighted	3		4		1		1	
	Weighted		3		4		2		1

Factor	Weight	Public Weighting							
		Plaza A (via Ojibway Parkway)		Plaza A (via Brighton Beach)		Plaza B		Plaza C	
		Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Changes in Air Quality	17.32	2	34.64	2	34.64	2	34.64	2	34.64
Protection of Community and Neighbourhood Characteristics	15.49	1	15.49	1	15.49	2	30.98	2	30.98
Maintain Consistency with Existing and Planned Land Use	12.89	2	25.78	2	25.78	3	38.67	3	38.67
Protect Cultural Resources	13.14	3	39.42	3	39.42	3	39.42	3	39.42
Protect the Natural Environment	16.34	2	32.68	1	16.34	2	32.68	3	49.02
Improve Regional Mobility	15.28	5	76.4	5	76.4	5	76.40	6	91.68
Cost and Constructability	9.54	2	19.08	2	19.08	2	19.08	1	9.54
Total	100.00	17	243.49	16	227.15	19	271.87	20	293.95
Rank	Un-weighted	3		4		1		1	
	Weighted		3		4		2		1

TABLE 8.6 – RESULTS OF ARITHMETIC EVALUATION – CROSSING C ALTERNATIVES (CONT'D)

	Community Consultation Group Weighting								
Factor	Weight	Plaza A (via Ojibway Parkway)		Plaza A (via Brighton Beach)		Plaza B		Plaza C	
		Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Changes in Air Quality	17.30	2	34.60	2	34.60	2	34.60	2	34.60
Protection of Community and Neighbourhood Characteristics	13.88	1	13.88	1	13.88	2	27.76	2	27.76
Maintain Consistency with Existing and Planned Land Use	13.69	2	27.38	2	27.38	3	41.07	3	41.07
Protect Cultural Resources	13.12	3	39.36	3	39.36	3	39.36	3	39.36
Protect the Natural Environment	17.11	2	34.22	1	17.11	2	34.22	3	51.33
Improve Regional Mobility	14.83	5	74.15	5	74.15	5	74.15	6	88.98
Cost and Constructability	10.07	2	20.14	2	20.14	2	20.14	1	10.07
Total	100.00	17	243.73	16	226.62	19	271.30	20	293.17
Rank	Un-weighted	3		4		1		1	
	Weighted		3		4		2		1

TABLE 8.7 – RESULTS OF ARITHMETIC EVALUATION – CROSSING A, CROSSING B AND CROSSING C ALTERNATIVES – CANADIAN SIDE

Factor	Weight	Study Team Weighting					
		Crossing A – Plaza A		Crossing B – Plaza B1		Crossing C - Plaza B	
		Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Changes in Air Quality	12.39	2	24.78	2	24.78	2	24.78
Protection of Community and Neighbourhood Characteristics	15.93	1	15.93	3	47.79	2	31.86
Maintain Consistency with Existing and Planned Land Use	12.39	2	24.78	3	37.17	3	37.17
Protect Cultural Resources	12.39	3	37.17	3	37.17	3	37.17
Protect the Natural Environment	15.93	1	15.93	2	31.86	2	31.86
Improve Regional Mobility	17.70	6	106.20	7	123.90	7	123.90
Cost and Constructability	13.27	2	26.54	2	26.54	1	13.27
Total	100.00	17	251.33	22	329.21	20	300.01
Rank	Un-weighted	3		1		2	
	Weighted		3		1		2

Factor	Weight	Public Weighting					
		Crossing A – Plaza A		Crossing B – Plaza B1		Crossing C - Plaza B	
		Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Changes in Air Quality	17.32	2	34.64	2	34.64	2	34.64
Protection of Community and Neighbourhood Characteristics	15.49	1	15.49	3	46.47	2	30.98
Maintain Consistency with Existing and Planned Land Use	12.89	2	25.78	3	38.67	3	38.67
Protect Cultural Resources	13.14	3	39.42	3	39.42	3	39.42
Protect the Natural Environment	16.34	1	16.34	2	32.68	2	32.68
Improve Regional Mobility	15.28	6	91.68	7	106.96	7	106.96
Cost and Constructability	9.54	2	19.08	2	19.08	1	9.54
Total	100.00	17	242.43	22	317.92	20	292.89
Rank	Un-weighted	3		1		2	
	Weighted		3		1		2

TABLE 8.7 – RESULTS OF ARITHMETIC EVALUATION – CROSSING A, CROSSING B AND CROSSING C ALTERNATIVES – CANADIAN SIDE (CONT'D)

		Community Consultation Group Weighting					
Factor	Weight	Crossing A – Plaza A		Crossing B – Plaza B1		Crossing C - Plaza B	
		Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Changes in Air Quality	17.30	2	34.60	2	34.60	2	34.60
Protection of Community and Neighbourhood Characteristics	13.88	1	13.88	3	41.64	2	27.76
Maintain Consistency with Existing and Planned Land Use	13.69	2	27.38	3	41.07	3	41.07
Protect Cultural Resources	13.12	3	39.36	3	39.36	3	39.36
Protect the Natural Environment	17.11	1	17.11	2	34.22	2	34.22
Improve Regional Mobility	14.83	6	88.98	7	103.81	7	103.81
Cost and Constructability	10.07	2	20.14	2	20.14	1	10.07
Total	100.00	17	241.45	22	314.84	20	290.89
Rank	Un-weighted	3		1		2	
	Weighted		3		1		2

8.1.4 Bi-national Evaluation of Practical Crossing and Plaza Alternatives

As discussed in **Section** 8.1.3, three crossing-plaza combinations were carried forward for consideration by the Canadian and US study teams:

- Crossing X-10A, with US Plaza P-a and Canadian Plaza A
- Crossing X-10B, with US Plaza P-a and Canadian Plaza B1
- Crossing X-11C, with US Plaza P-c and Canadian Plaza B

The analysis and evaluation of alternatives was based on the seven factor areas noted in the previous section. The following summarizes the findings documented in the *US Draft Environmental Impact Statement (DEIS), February 2008*, and the Canadian *Draft Generation and Assessment of Plaza and Crossing Alternatives Report (June 2008)*.

AIR QUALITY

In Canada, the plazas and crossings are located in areas where no major transportation facilities presently exist; all plaza and crossing alternatives therefore result in increases in concentrations of pollutants over the "Do Nothing" alternative. The results of the air quality modelling of the plaza and crossing combinations indicate that the greatest changes to air quality occur around the plaza areas as opposed to the crossings. The plazas connected to the Crossing X-10B and X-11C alternatives are located in industrial areas away from sensitive receptors. With Crossing X-10A, Plaza A has a greater buffer area around the tolling/inspection plazas, where vehicles stopping/queuing/starting up will occur. Nonetheless, impacts to adjacent residences may occur under certain conditions. All three crossing-plaza alternatives were found to have moderate impacts.

In the US, air quality will improve even under the "Do Nothing" alternative because of US Environmental Protection Agency rules and regulations under the *Clean Air Act* and the *National Ambient Air Quality Standards*. Regional air quality will also improve because of the closings of old manufacturing plants due to the decline in the economy and a shift to more service-oriented industries. Local air quality conditions in the Mexicantown area at the Ambassador Bridge are expected to improve with opening of the *Ambassador Bridge Gateway Project* in 2009. All of the new crossing/plaza alternatives will aid in improving air quality by spreading the automotive traffic in Southwest Detroit and reducing the number of heavy-duty diesel trucks within the neighborhoods. The Ambassador Bridge has Mexicantown as its neighbor to the east. The Delray neighborhood is located to the west of the new plaza. Mexicantown is an expanding, neighborhood. Splitting traffic between two bridges/plazas will reduce the pollution now concentrated in one area.

Overall, there was no preference for a particular Crossing/Plaza alternative based on the air quality factor.

COMMUNITY AND NEIGHBOURHOOD CHARACTERISTICS

In Canada, the Crossing X-10A impact to the Armanda Street/Matchette Road neighbourhood is considered of greater effect than the other alternatives. This assessment is based on there being a higher degree of change in neighbourhood character from park-like residential to industrial with the introduction of the Plaza A site.

The results of community consultation on the crossing alternatives indicate concern that the crossing X-11C alternative would have a notable impact to community character in Sandwich Towne. These concerns are related to potential increases in traffic and nuisance impacts (noise, dust) and the relative proximity of the new crossing to Ambassador Bridge. In addition, the Crossing X-11C alternative also has the potential to impact approximately 100 homes in Sandwich Towne with noise increases greater than 5 decibels (dB) – a level of increased noise which requires mitigation be considered. A noise barrier to reduce changes in noise levels to below 5 dB is estimated to cost approximately $CAD 20-million.

Crossing X-10B, with the plaza and crossing located in the industrial lands west of Sandwich Street is not expected to have a substantial impact to the community and neighbourhood features in this part of the city.

In the US, the X-11C Crossing would have a greater number of impacts to active residential and business units; albeit relatively few in comparison to the plaza and interchange.

Overall, from the perspective of protecting community and neighbourhood characteristics, the Crossing X-11C alternative was least preferred. Between the X-10 alternatives, X-10B is preferred based on lower residential impacts.

EXISTING AND PLANNED LAND USE

In Canada, the Crossing X-10A Alternative was considered to have higher impacts to land use in comparison to the other alternatives. This is reflective of the existing land use in the Malden Planning District, which is primarily residential, integrated with natural features. This land use would be heavily disrupted by Plaza A, which would be located on generally undeveloped lands south of E.C. Row between Malden Road and Ojibway Parkway. The other crossing alternatives are located generally within industrial lands in the Windsor port area and carry less impact to land use.

In the US, with the "Do Nothing" alternative, trends indicate continued industrialization of the Delray area will occur at the cost of the residential area that now exists. Existing land use patterns are expected to continue with little change in the remainder of the ACA. However, forecasts by Southeast Michigan Council of Governments (SEMCOG) indicate losses in population and jobs in the region that could lead to abandonment of some currently active land uses.

If the proposed crossing is built, positive land use changes are possible in the US. The vision is to create a better place to live, with a new crossing system as its neighbor. The 150-plus-acre plaza associated with Crossing X-10 or X-11 could be the separator of neighborhood uses to the west and logistics/industrial uses to the east. A number of households and businesses will be displaced if the project is constructed. If any of them choose to relocate in the Delray area that would help move the vision closer to reality. MDOT, in partnership with FHWA is exploring a number of concepts by which enhancements may be made to the Delray area if it becomes the "host community" for the project. These concepts are applicable with either an X-10 or X-11 Crossing.

With regard to contaminated sites, several known or high potential sites were identified on both sides of the river. Recommendations in both the US and Canadian studies include preliminary site investigations (PSI) for most of the medium- and high-rated sites. Further assessment of the regulatory status and site conditions of other sites is also recommended. The PSIs will be completed for the preferred alternative and access can be obtained by provisions in applicable federal/state/provincial law.

Overall, the X-10A crossing was identified as least preferred based on greater impacts associated with the Canadian plaza.

CULTURAL RESOURCES

In Canada, the alternatives impact six to seven archaeological sites which are either pre-contact habitation sites/ Euro-Canadian homesteads or pre-contact findspots, which are generally considered of low/medium significance. The Crossing X-11C alternative was noted as having a higher impact to the cultural landscape of the historic town of Sandwich. Although no significant portion of the historic town of Sandwich is directly affected, this crossing may impact the heritage sensitive area through introduction of physical, visual, audible or atmospheric elements that are not in keeping with the resources and/or their setting.

All of the alternatives have the same impact to Ojibway Park; a corner of the park (0.7 ha) is impacted near Ojibway Parkway/Broadway Street.

In the US, numerous areas were examined during the archaeological field study. Most locations produced little or nothing of archaeological value, because of the heavy degree of prior disturbance. No evidence of prehistoric or historic Native American land use was observed. It was determined that no prehistoric archaeological resources are affected by any of the practical alternatives. Three aboveground (built) heritage features are in, or partially in, the footprint of all practical alternatives and will require removal, resulting in an adverse effect to be mitigated.

In terms of parks and playgrounds in the US, South Rademacher Playground, South Rademacher Community Recreation Center and the Post-Jefferson Playlot are each located in the plaza area of every practical alternative and would be removed (used) by the plaza.

Overall, the Crossing X-11C alternative was least preferred.

NATURAL FEATURES

In Canada, all alternatives result in some loss of provincially rare specimens or colonies, impacts to ecological landscapes and impacts to terrestrial communities and ecosystems of high significance. The Crossing X-10A alternative has the greatest impact on provincially rare vegetation communities (2.98 ha (7.4 acres) impacted) and species at risk (232 specimens/colonies impacted). Given the regional importance of these natural features, the Crossing X-10A alternative was considered to be least preferred in terms of protecting the natural environment. Overall, the Crossing X-10B alternative was considered to have slightly lower impacts to natural features than Crossing X-11C.

In the US, Crossing X-11 would impact a total of 0.01 acre (0.004 ha) of low quality wetland at the edge of the Detroit River. Loss of this wetland will result in minimal impacts to wetland function and value.

Overall, Crossing X-10A was least preferred.

REGIONAL MOBILITY

In Canada, all three crossing alternatives are expected to work effectively under future (2035) peak travel demands and add additional border crossing and border processing capacity to the Detroit River border transportation network. The new crossing is expected to carry 2,300 vehicles in the PM peak hour from the US into Canada (the peak direction of travel) in 2035, which would provide substantial relief to Huron Church Road and reduce the likelihood of congestion on this arterial roadway. The variance noted by the US travel time analysis suggests the X-11 alternative could result in greater traffic volumes on Huron Church Road during peak travel periods to the point that intersections along Huron Church Road will remain congested as in the "Do Nothing" alternative, lowering the transportation level of service on this key roadway link in the border transportation network. By comparison, the X-10 crossing alternatives are more likely to result in improved transportation levels of service on Huron Church Road over the Do Nothing condition as well as the X-11 Alternative, thereby providing greater benefits to regional and local mobility.

Crossing X-10A was noted as having several security/monitoring concerns, including undesirable distance from Plaza A to the international border (2.5 km), no direct line of sight between the border and the plaza, and a 700 m section of at-grade roadway that is out of the direct line of sight from the plaza in the vacant portion of the Brighton Beach industrial park area.

In the US, there may be an increase in traffic due to additional development stimulated by the new border crossing. But, negative congestion effects are not expected either on major arteries or local neighborhood streets in the study area. Analyses that were part of the current EA study and the Detroit *Intermodal Freight Terminal Study* covering all of Southwest Detroit and East Dearborn indicate there is virtually no congestion now nor expected in the 25-year future. Further analysis undertaken by the US study team pertaining to travel time comparisons between Crossing X-11 and Crossing X-10 alternatives suggests the volume of traffic using the X-10 crossings could be as much as 50% more than the traffic using the X-11 crossing. This variance is reflective of differences in access and circulation between the US plaza layouts serving crossings X-10 and X-11.

Overall, Crossing X-10B is preferred.

CONSTRUCTABILITY

Two major factors influencing the cost and constructability of the new international crossing are: soundness of the bedrock and bridge length. The section of the Detroit River shoreline under consideration for the new international crossing has a history of salt mining activities. Each study team undertook extensive geotechnical testing of the bedrock conditions to a depth of approximately 500 m (1640 feet), i.e., below the salt producing layers. The purpose of this detailed geotechnical work was to determine whether there are any unknown brine wells in the area under consideration for future crossings, and to verify the limits of any subsurface influence of past salt mining activities.

In Canada, detailed geotechnical investigations in the area of Sandwich Street north of Prospect Avenue confirmed that there are underground conditions in this area, which could pose a risk to any roadway built in this vicinity. It is believed that the underground caverns left from previous brinewell activity in the area of Sandwich Street are interconnected with other caverns further west. These interconnected caverns are also believed to have caused a sinkhole to form immediately west of Sandwich Street. (In February 1954, the ground collapsed into a sinkhole about 8m (26 feet) deep at the center, 150m (490 feet) in diameter). Several buildings and railroad facilities were irreparably damaged during this incident.)

The proposed approach roadway to Crossing X-11C passes over the eastern end of the former solution mining well field and a subsurface anomaly that is suspected to be a brine-filled cavity, rubble zone and disturbed rock mass. Initial estimates suggest that the rock mass above this anomaly could subsidence ranging up to values on the order of 3m (10 feet). The proportion of such subsidence that has already occurred or may occur in the future cannot be quantified at this time because of uncertainties associated with the nature and position of the identified anomaly. Additional study will be required to refine the range of risks and orders of magnitude of future settlement that should be accommodated by design. The field exploration and testing program and historical data are not sufficient to clearly assess the three-dimensional extent, specific location, or potential limits of influence of this subsurface anomaly. The level of effort (investigation, testing, and analysis) that may be required to further refine these issues relative to the Crossing X-11C approach alignment is extensive and, if undertaken, may still be insufficient to consider supporting structures on the rock within and adjacent to the identified limits of solution mining influence within an acceptable degree of risk.

The Canadian study team has considered a 660 metre (2165 feet) long-span structure extending over the zone of influence of this brinewell area between Prospect Avenue and John B. Street. As noted, there still remains some risk as to the acceptability of this solution and the continual operation of this crossing, even with this mitigation. The constructability and maintenance risks associated with the approach roadway to Crossing X-11C were noted as significant disadvantages of the Crossing X-11C Alternative. This long-span structure will also have its own impacts on the character of the nearby community, as well as noise and aesthetic impacts. In addition, having two long-span structures on the Crossing X-11C alignment increases the construction and maintenance costs of this alternative.

In the US, the difference in impacts between Crossings X-10A and X-10B were indistinguishable except in how each can be built. The X-10A Crossing was developed to avoid the area around known historical brine mining in Canada. The alignment of the X-10A Crossing would start near the location of X-10B in the US and land in Canada southwest of the Brighton Beach Power Station. Analyses determined that the only feasible structure type for Crossing X-10A is a suspension bridge with an unsuspended back span. The X-10A bridge is the longest of the alternatives with a main span of 1200 metres (4,265 feet). Although suspension bridges with main spans exceeding that length do exist, this would become the longest bridge of its type in the Americas. The bridge analyses conducted by the US and Canadian study teams evaluated eight constructability factors. Of those, cost, risk to controlling cost, schedule duration, and risk to controlling the schedule were considered to be differentiating among the crossings. The estimated construction cost of the X-10A Crossing at $920-million is significantly greater than the other suspension bridges at Crossings X-10B and X-11 (X-10B @ $550-million and X-11 @ $600-million). The construction duration of 62 months for Crossing X-10A is over one year more than the other alignments.

Overall, Crossing X-10B was preferred.

OVERALL ASSESSMENT

The overall assessment of crossing alternatives based on the seven major factor areas are summarized in Table 8.8.

TABLE 8.8 – OVERALL ASSESSMENT OF CROSSING AND PLAZA ALTERNATIVES

Factor	Crossing Alternative (including plazas)		
	X-10A	X-10B	X-11C
Air Quality	No preference		
Community & Neighbourhood Characteristics		Preferred	Least Preferred
Existing & Planned Land Use	Least Preferred		
Cultural Resources			Least Preferred
Natural Environment	Least Preferred		
Regional Mobility		Preferred	
Constructability		Preferred	

Overall, Crossing X-10B was identified as the preferred alternative in three of the six factor areas in which a preference could be expressed. Both the X-10A and X-11C alternatives were identified as least preferred in two factor areas. Crossing X-10B was not identified as the least preferred in any factor area.

The constructability issues with the Crossing X-11C alternative are a serious disadvantage of this alternative. Overall, Crossing X-11C was found to have many disadvantages, and no advantages, over Crossing X-10B alternative.

Similarly, The Crossing X-10A alternative was noted as having higher community and natural impacts on the Canadian side and greater cost and constructability risks with no advantages on the US side.

In contrast, the Crossing X-10B alternative was found to have notable advantages on both sides of the river and no disadvantages in comparison to the other alternatives. Both the Canadian and US study teams identified Improve Regional Mobility as the most important factor area. It is also worth noting that the ownership model (based on public agency control) and contractual arrangements for construction and operation of the new crossing and plazas has not been finalized by the partner governments undertaking this study. Joint agreement on the preferred alternative from a constructability perspective is an equally significant conclusion of this evaluation.

For the purposes of the environmental studies in both countries, both a suspension bridge and a cable stay bridge are being carried forward. There are no substantive differences among these options. The final bridge type selection will be completed during subsequent stages of the project. Additional details of the two bridge options are provided in **Chapter** 9, and schematic illustrations of the two options are included in **Exhibit** 9.5.

8.2 Practical Access Road Alternatives

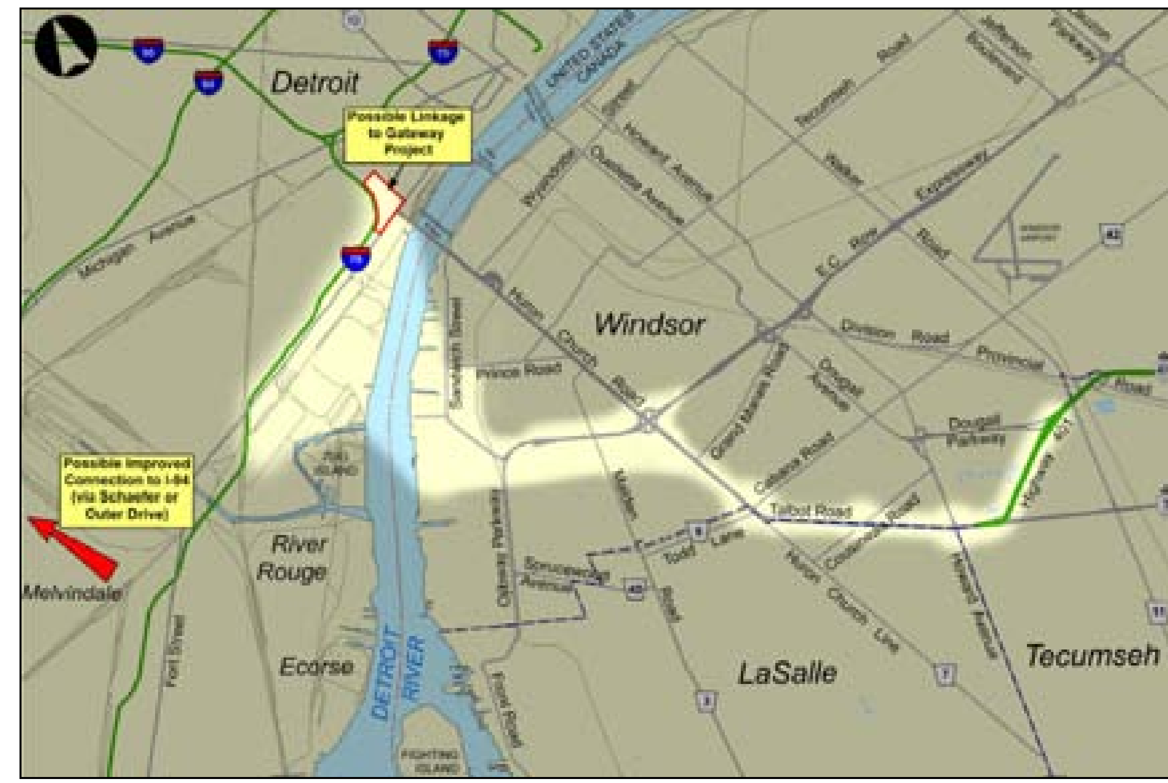
This section documents the factors considered in generating practical access road alternatives as well as descriptions of the specific alternatives considered, an assessment of impacts and benefits associated with these alternatives and the evaluation leading to the identification of a Technically and Environmentally Preferred Alternative (TEPA).

8.2.1 Generation of Practical Access Road Alternatives

As discussed in **Chapter** 6, the evaluation of the illustrative plaza, crossing and access road alternatives led to the identification of an Area of Continued Analysis (ACA) that would be studied further to develop practical crossing, plaza and access road alternatives for a new international crossing (refer to **Exhibit** 8.4).

The ACA was presented through consultation activities and documented in the *Draft Generation and Assessment of Illustrative Alternatives Report (November 2005)* (refer to List of Supporting Documents). In subsequent months, with technical parameters and in consultation with communities, municipalities, agencies, and other stakeholders, the study team developed a set of practical alternatives for the Canadian plaza, crossing, and access road. The initial practical alternatives were presented for comments at consultation activities held in March 2006 corresponding to the third round of PIOHs.

EXHIBIT 8.4 – AREA OF CONTINUED ANALYSIS



In general, the alternatives developed for the new access road were based on the premise that it would extend from Highway 401 at North Talbot Road to the new plaza. Based on the mobility needs of the project, as well as community/municipal consultation, the following objectives guided the generation of practical alternatives in the Huron Church Road/Highway 3 corridor.

- Separate international and local traffic;
- Maintain the local and regional function of the Huron Church Rd./Highway 3 corridor;
- Keep the existing traffic within the existing corridor during construction to minimize traffic infiltration onto other city streets; and

- Minimize the direct and indirect property impacts.

The study team considered four basic operational concepts:

- Integrated freeway with interchanges. Service roads provided, as needed, to maintain local access and circulation;
- Separate freeway paralleled by one-way service roads;
- Separate freeway paralleled by existing Huron Church Road/Talbot Road;
- Tunnel below a rebuilt Huron Church/Talbot Road corridor.

The study team concluded that Concept 1 (an integrated freeway with local service roads only as required) would not adequately achieve the above-noted objectives. Specifically:

- This alternative does not separate local from international traffic. Any future back-ups or congestion associated with delays at the border could cause back-ups on the freeway and impact local/regional traffic;
- As the new facility will be a fully controlled access facility, it will be impossible to achieve the same level of local and regional mobility as currently exists in the corridor;
- This concept does not offer any substantial advantages with respect to minimizing property impact along the right-of-way, however, it is clear that property impacts associated with interchanges at Todd Lane/Cabana and Cousineau would create both direct and indirect impacts on the adjacent communities.

The remaining three concepts were developed into five cross-section alternatives that better met the objectives. On this basis, the study team developed the following five initial access road alternatives between Highway 3 and the Malden Road area. It should be noted that even the at-grade alternatives listed below were largely below grade:

- At-grade six-lane freeway with parallel one-way service roads on either side of the freeway;
- Below-grade six-lane freeway with parallel one-way service roads on either side of the freeway;
- At-grade six-lane freeway with parallel service roads on one side of the freeway;
- Below-grade six-lane freeway with parallel service roads on one side of the freeway;
- Six lane freeway in a cut and cover tunnel with service roads on the surface.

In addition, in the area of Howard Avenue to Huron Church Line, the access road alternatives analyzed included two slightly different alignment options:

- Option 1 provides for widening the access road corridor primarily to the north (Windsor) side of Highway 3; and
- Option 2 provides for widening the access road corridor primarily to the south (LaSalle) side of Highway 3.

The study team developed the appropriate horizontal and vertical alignments for each of these five alternatives through consideration of the following issues:

- Minimizing direct property impacts; and
- Construction staging to maintain traffic within the corridor.

Once the horizontal and vertical alignments were developed, the appropriate right-of-way requirements were identified, considering the need for grading, drainage, utilities, berms/barriers and landscaping.

The access road alternatives were generated in accordance with Ontario Ministry of Transportation (MTO) geometric design guidelines. Each of the alternatives would operate under MTO jurisdiction as a provincial freeway. Freeways (i.e. 400 series highways) in Ontario typically operate with a posted speed of 100 km/h.

With the exception of the tunnel alternative, geometric design considerations (such as minimum radii, maximum grade and lane widths) consistent with a posted speed of 100 km/hr (design speed of 120 km/hr) were applied in generating the access road alternatives. The minimum radius applied to these alternatives was 650 m and the maximum grade was 3 percent. For the tunnel alternative, geometric design considerations were based on a posted speed of 80 km/hr (design speed of 90 km/hr). Although the minimum radius and maximum grade of the tunnel were the same as for the other alternatives, human factor considerations, and stopping sight distance requirements led to the reduction in posted posted speed.

For the section west of Huron Church Road to the river, all alternatives considered an access road at-grade with overpasses at Malden and Matchette Roads, which roughly matched the profile of the E.C. Row Expressway. This was required as a result of the poor soil conditions in this area, the proximity and profile of the E.C. Row Expressway, and other geometric constraints.

Typical cross sections of the Practical Alternatives are shown in Exhibit 8.6. All alternatives include a six-lane freeway and four-lane service road system.

Exhibit 8.5 – Typical Proposed Cross-Sections – Practical Alternatives (Not To Scale)

1 One-way service roads on either side of 6-lane freeway at grade.

1 One-way service roads either side of 6-lane freeway below-grade.

3 Cut and cover tunnel below rebuilt Huron Church Road/Highway 3 Corridor.

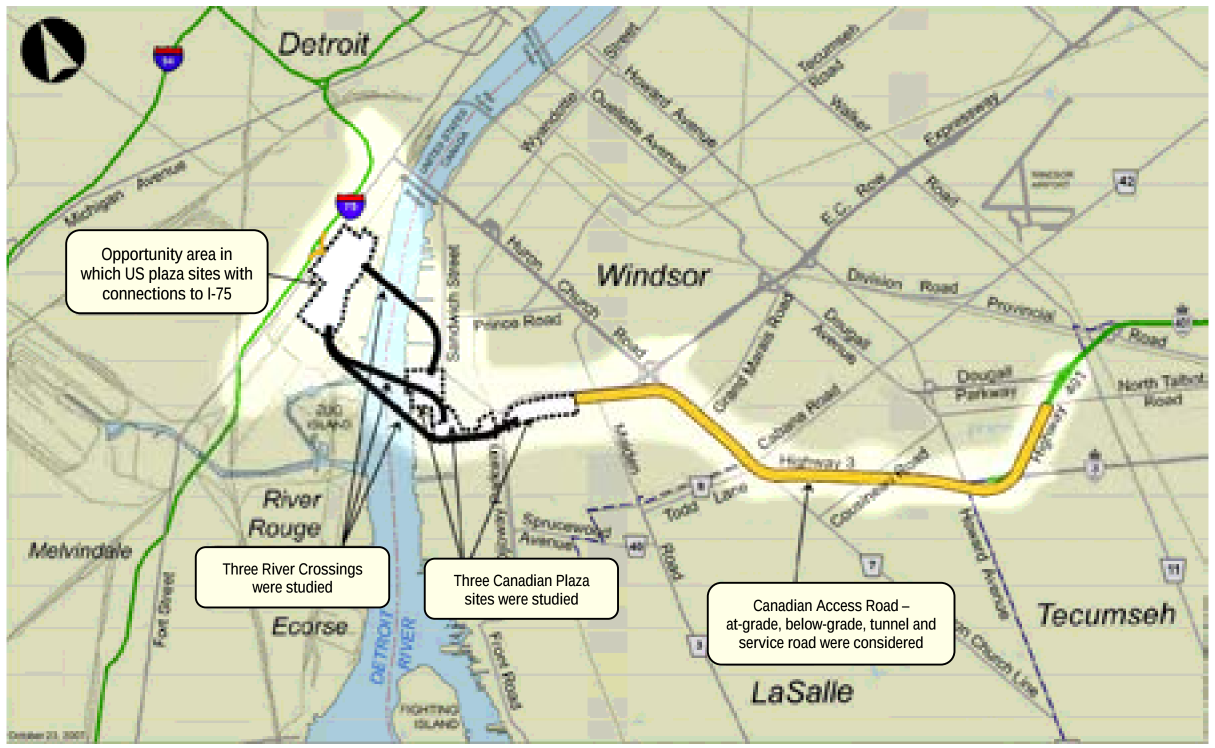
2 Six-lane freeway at grade, along side Huron Church/Highway 3.

2 Six-lane freeway below-grade, parallel to Huron Church/Highway 3.

8.2.2 Description of Practical Access Road Alternatives

The practical access road alternatives initially considered for the analysis are shown schematically in **Exhibit** 8.6 and are illustrated in additional detail in **Exhibits** 8.8 **to** 8.12.

EXHIBIT 8.6 – PRACTICAL CROSSING, PLAZA & ACCESS ROAD ALTERNATIVES



Input received at the third round of Public Information Open Houses, Workshops and correspondence with the public included several suggestions for the access road alternatives:

- Tunnel the access road from Cabana/Todd Lane to E.C. Row Expressway;
- Tunnel from Howard to Turkey Creek;
- Tunnel under the existing roadway;
- Incorporate air ventilation buildings into the design of the roadway;
- Create a controlled access freeway on the existing roadways;
- Provide local access roads on either side of the highway;
- Consider an interchange at Cousineau Road or Howard Avenue; and
- Avoid impacts to existing community facilities including schools and sports fields.

The five initial access road alternatives were presented to public at the third round of PIOHs in March 2006. At that time, the study team committed to presenting an update of the technical findings later in 2006. The preliminary results of the technical analysis of the five access road alternatives were presented to the public at the fourth round of PIOHs held in December 2006. Comments received during this round of consultation indicated that local residents wanted an access road to a new border crossing that:

- Takes trucks off local streets;
- Strong preference for depressed roadway, including tunnel;
- Reduces the amount of pollutants in the air;
- Improves the movement of border-bound traffic;
- Is not intrusive;
- Is state-of-the-art;
- Will not be determined on cost alone;
- Improves the quality of life; and,
- Provides a long-term solution.

In response to the above, the study team began developing a modified access road alternative that featured:

- A below-grade freeway from Howard Avenue to E.C. Row Expressway with 10 tunnel sections ranging from 120 m to 240 m in length, located in areas to provide community connectivity;
- A separate service road for local traffic to maintain access to neighbourhoods and local businesses;
- A widened right-of-way with buffer areas to reduce the potential nuisance effects of the roadway on adjacent neighbourhoods; and,
- Provision for recreational trails along the corridor, connecting to existing trails and providing new connections along and across the Huron Church Road/Highway 3 corridor.

This alternative, developed as a new alternative based on the below-grade and tunnel alternatives, was identified as The Parkway (refer to **Exhibit** 8.13).

EXHIBIT 8.7A– PRACTICAL ACCESS ROAD ALTERNATIVE 1A

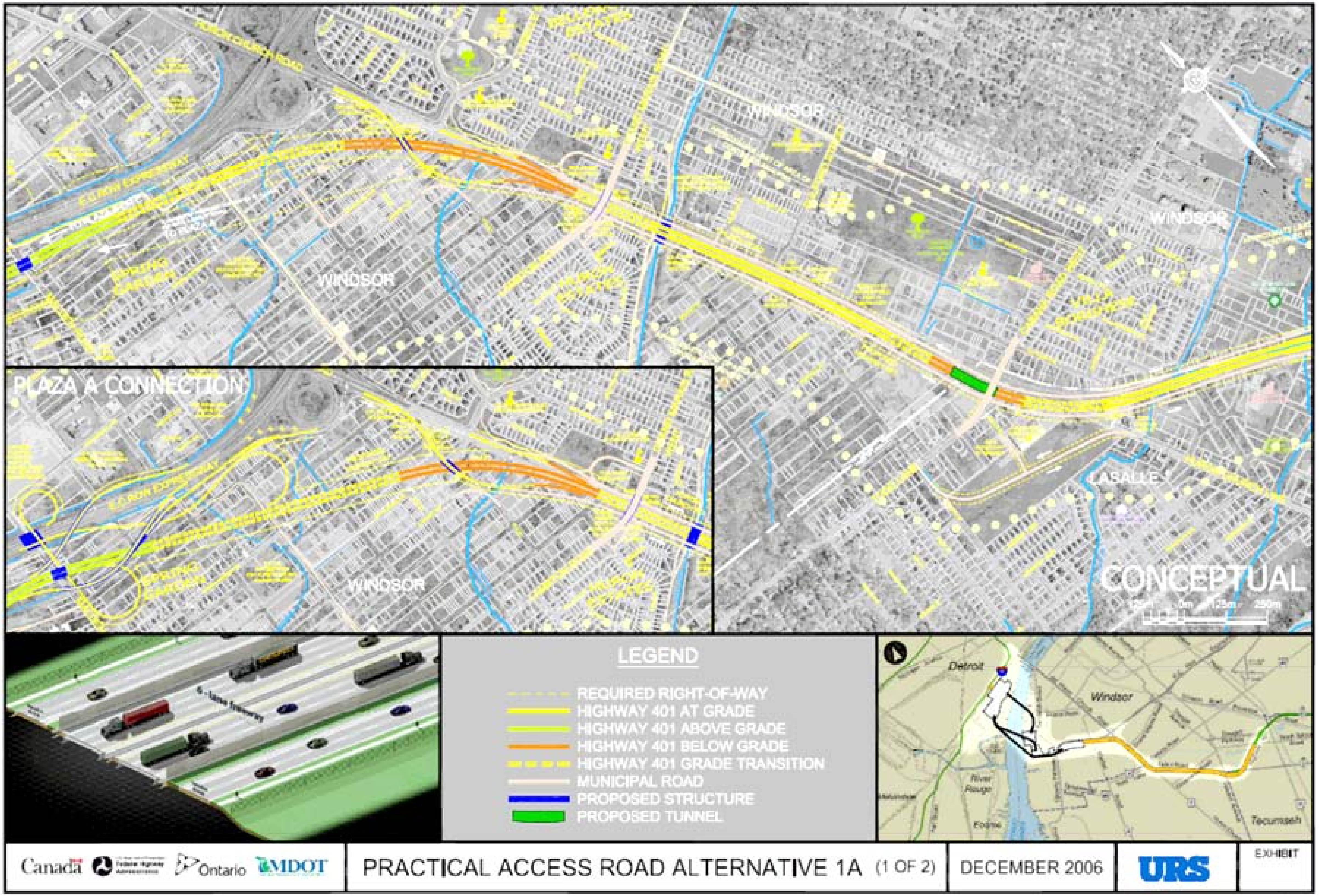


EXHIBIT 8.7B– PRACTICAL ACCESS ROAD ALTERNATIVE 1A

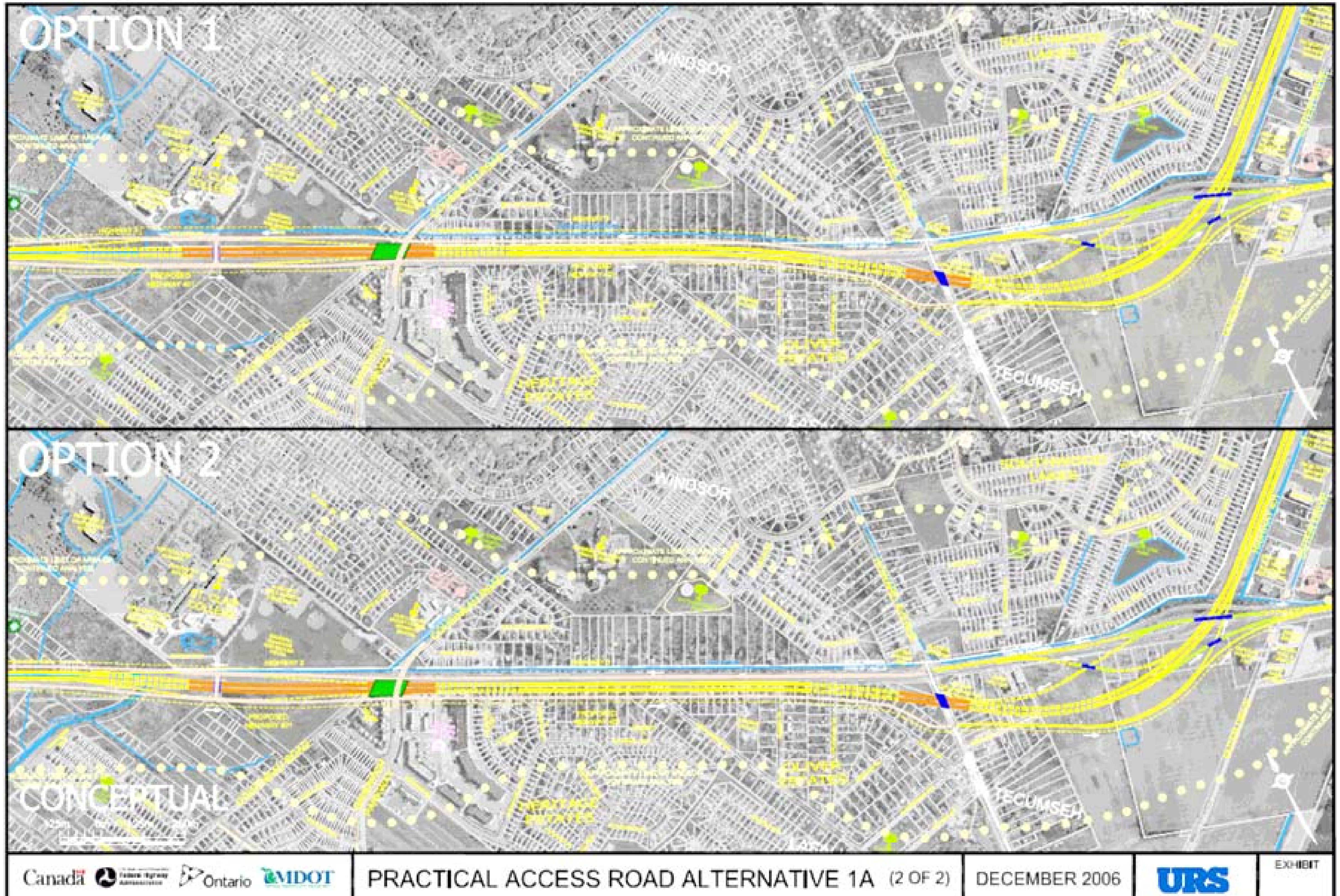


EXHIBIT 8.8A – PRACTICAL ACCESS ROAD ALTERNATIVE 1B

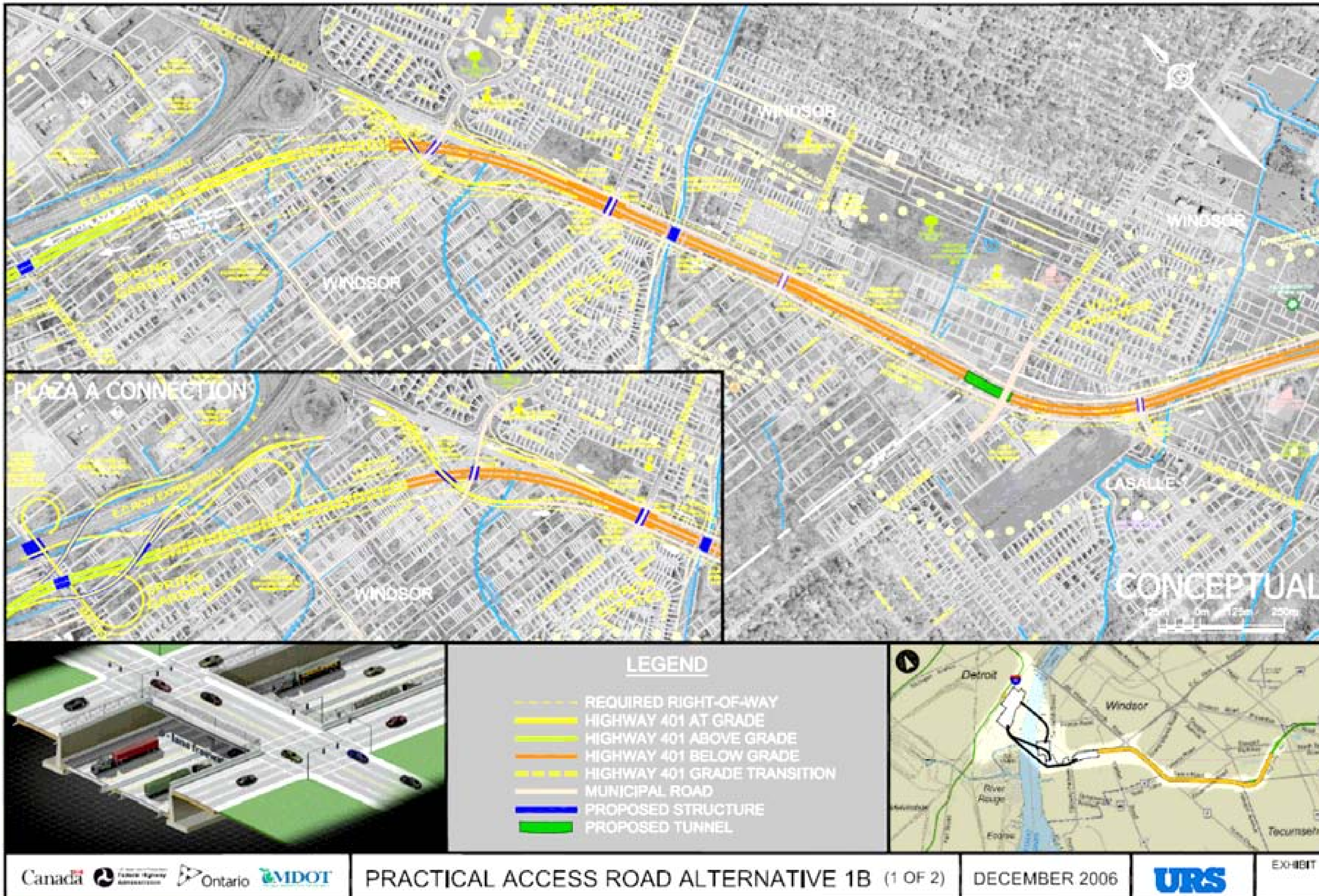
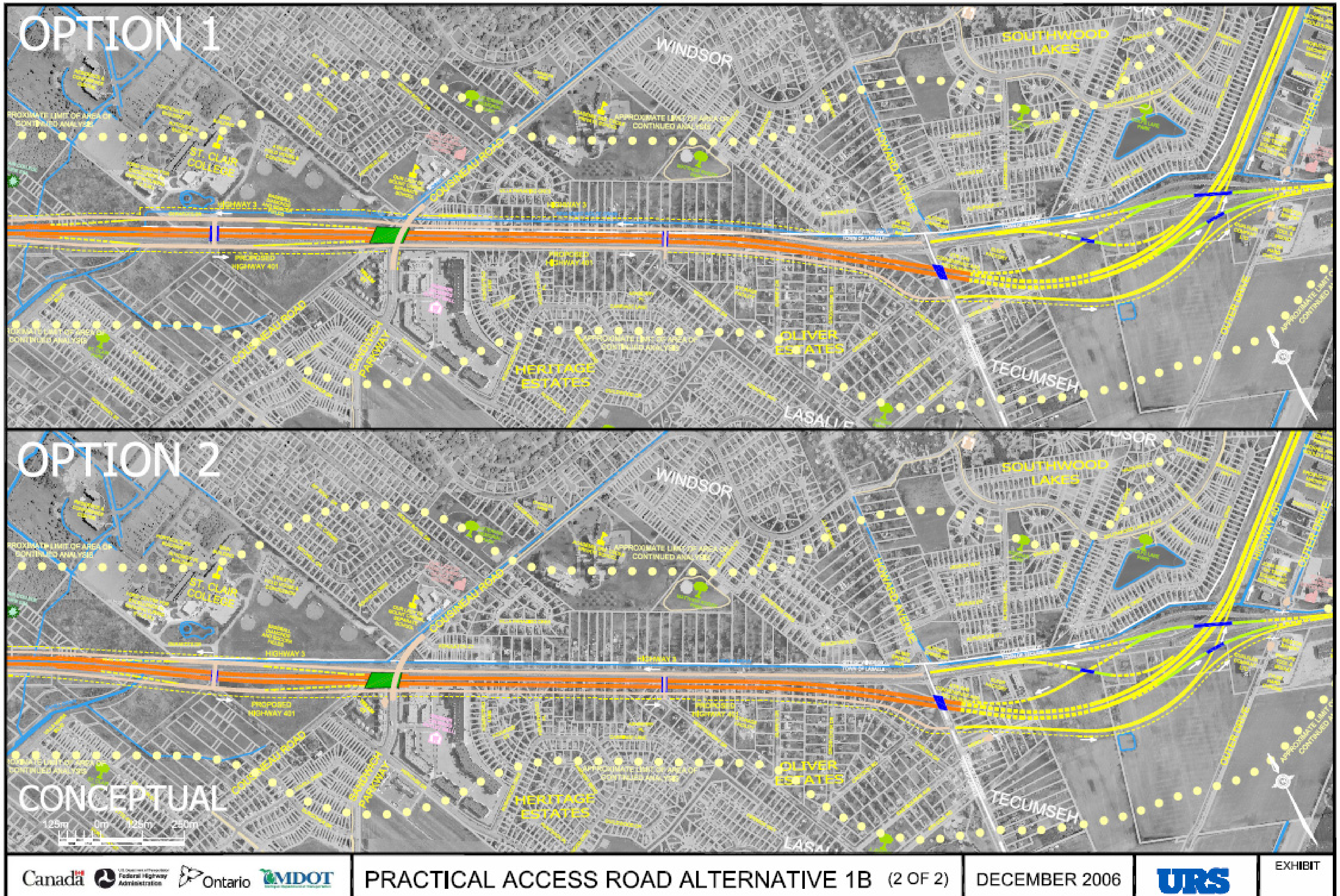


EXHIBIT 8.8B – PRACTICAL ACCESS ROAD ALTERNATIVE 1B



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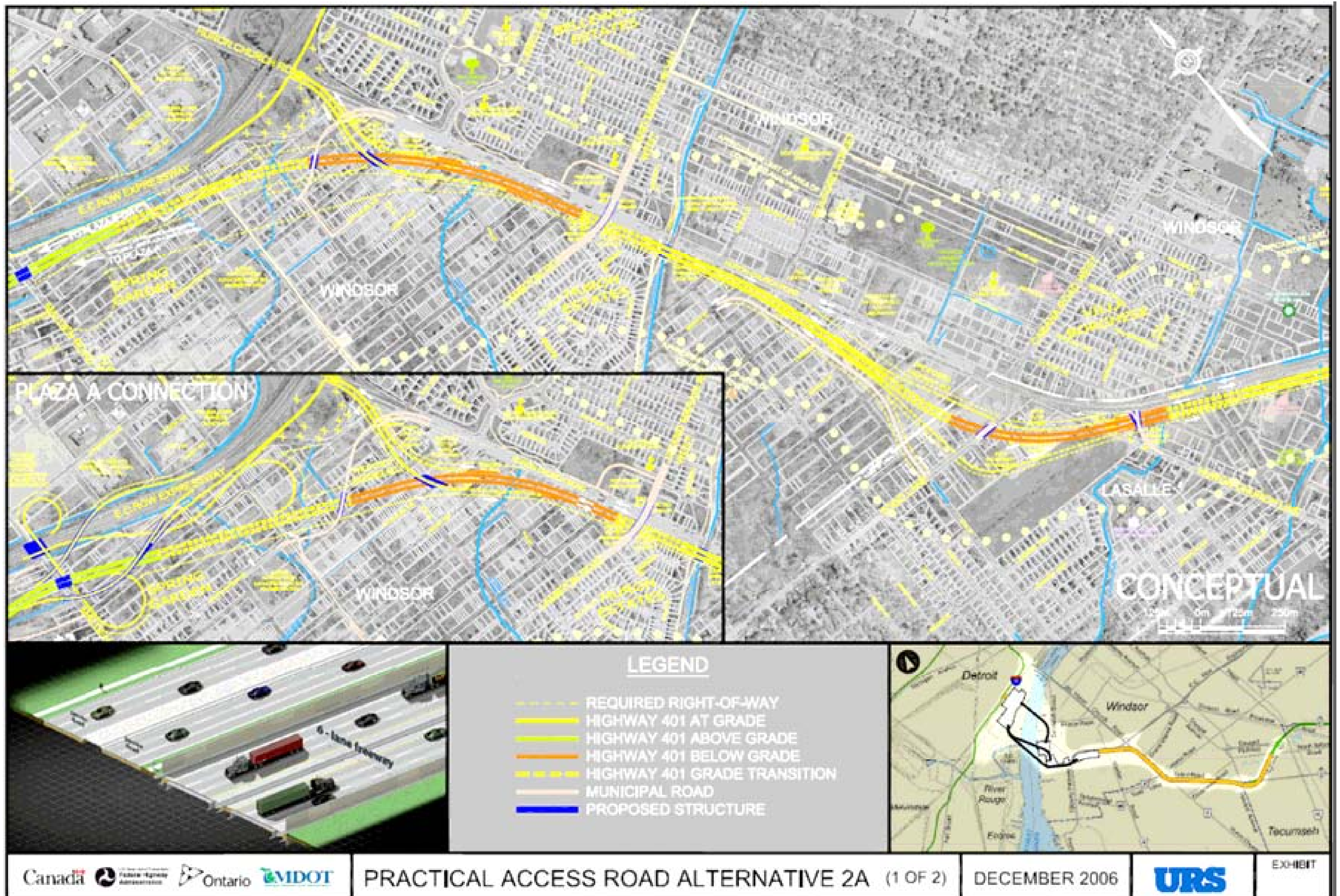
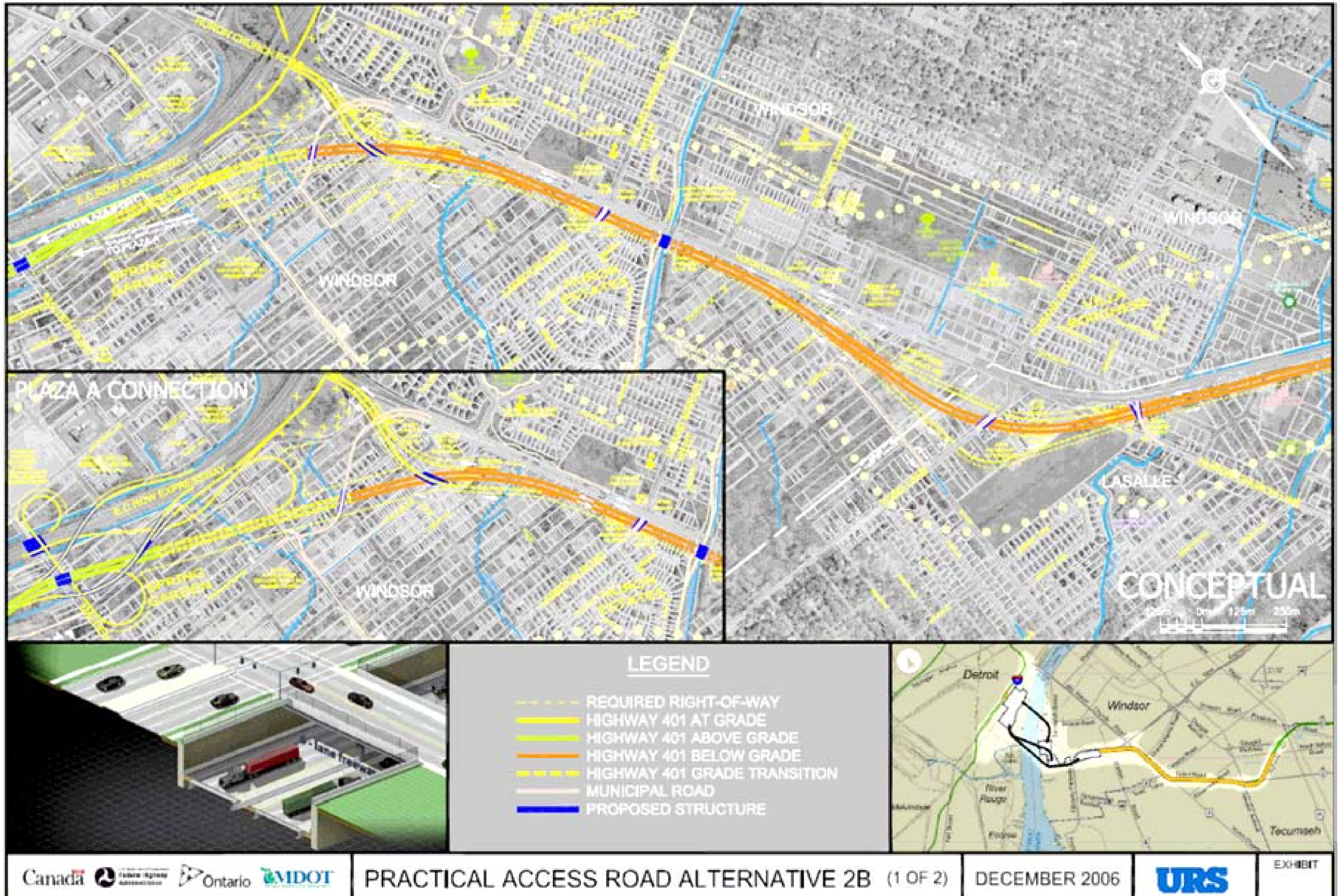


EXHIBIT 8.9B – PRACTICAL ACCESS ROAD ALTERNATIVE 2A

EXHIBIT 8.10A – PRACTICAL ACCESS ROAD ALTERNATIVE 2B



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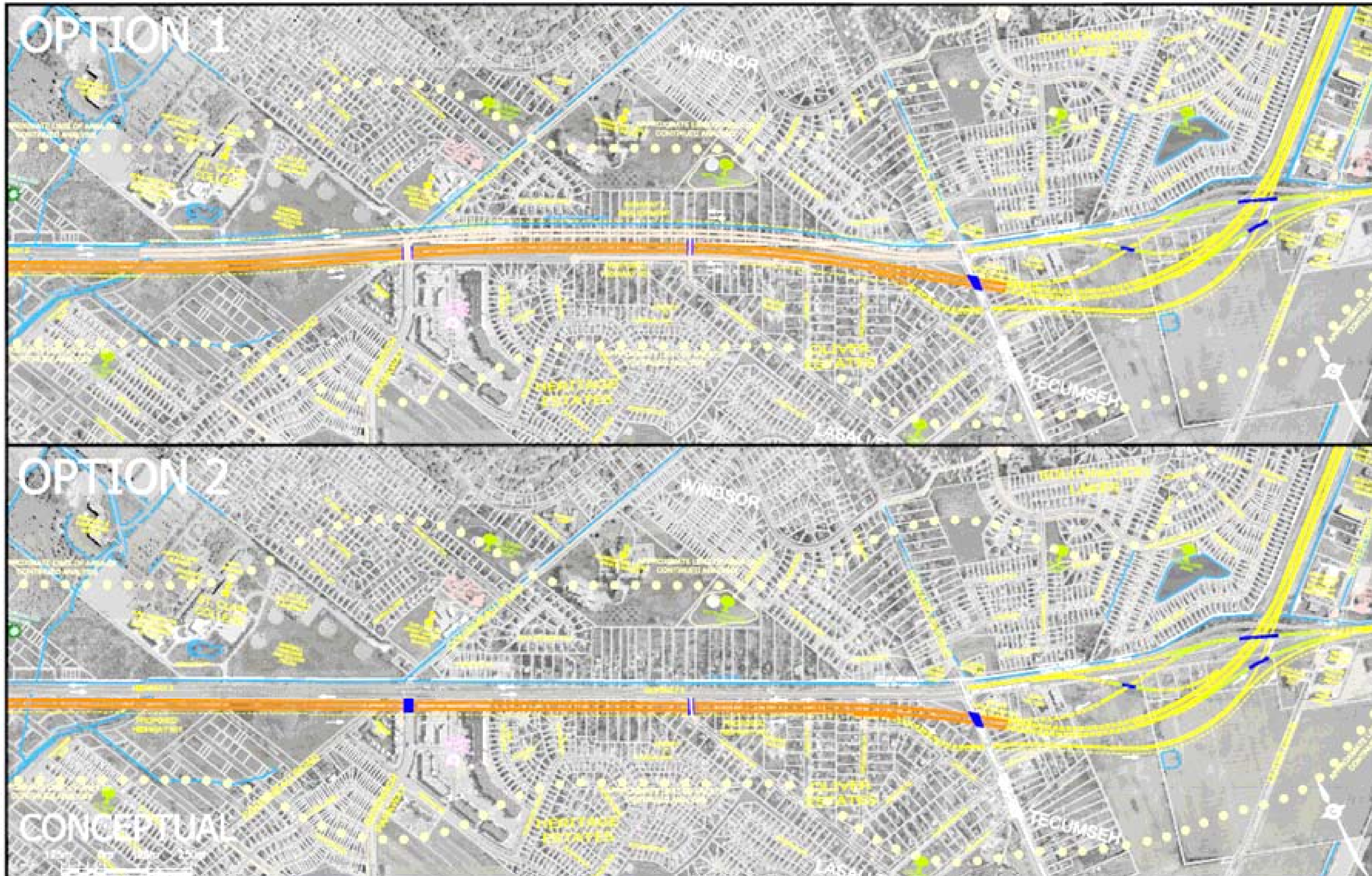


PRACTICAL ACCESS ROAD ALTERNATIVE 2B (2 OF 2) | DECEMBER 2006 | URS | EXHIBIT

EXHIBIT 8.11A – PRACTICAL ACCESS ROAD ALTERNATIVE 3

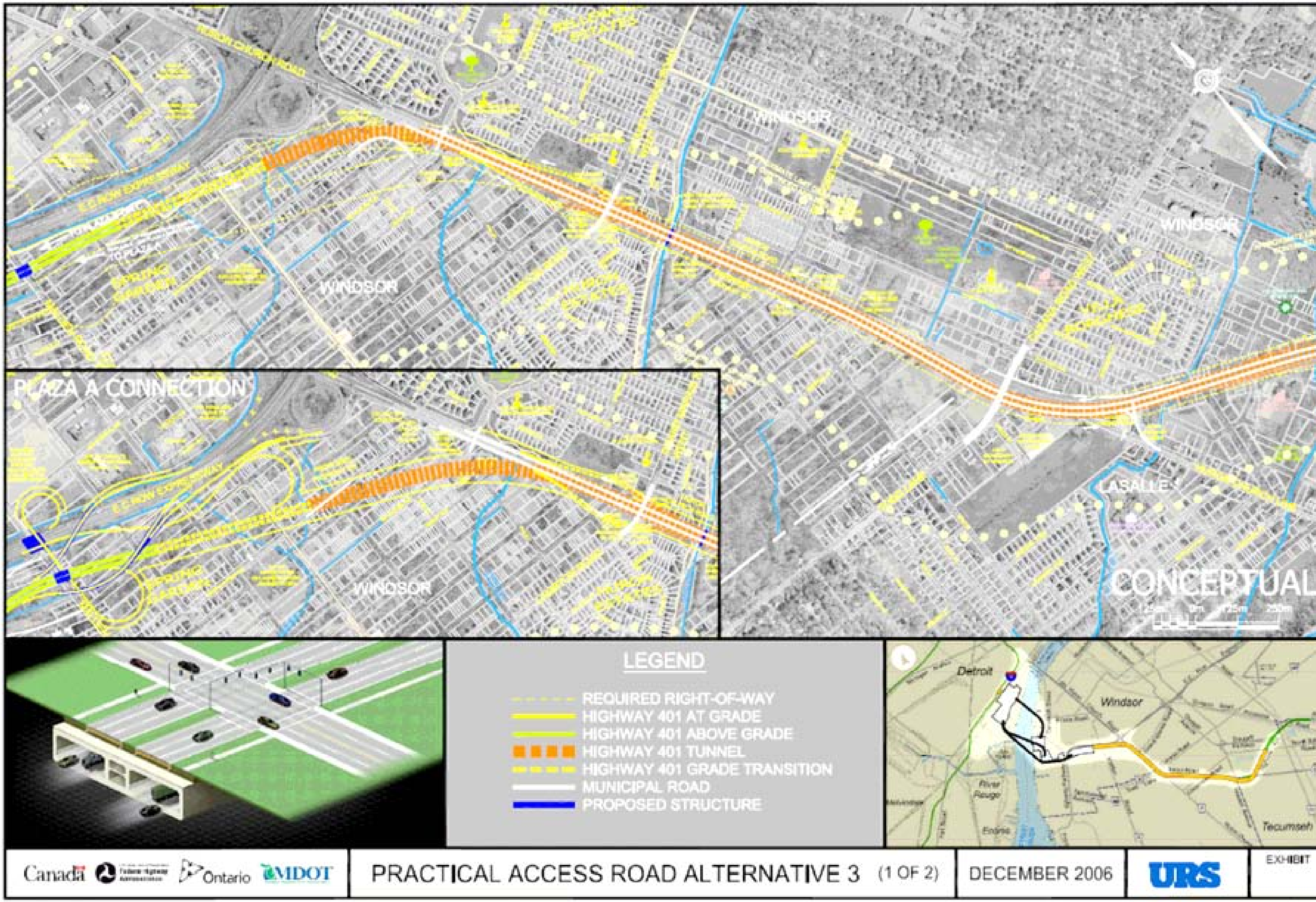
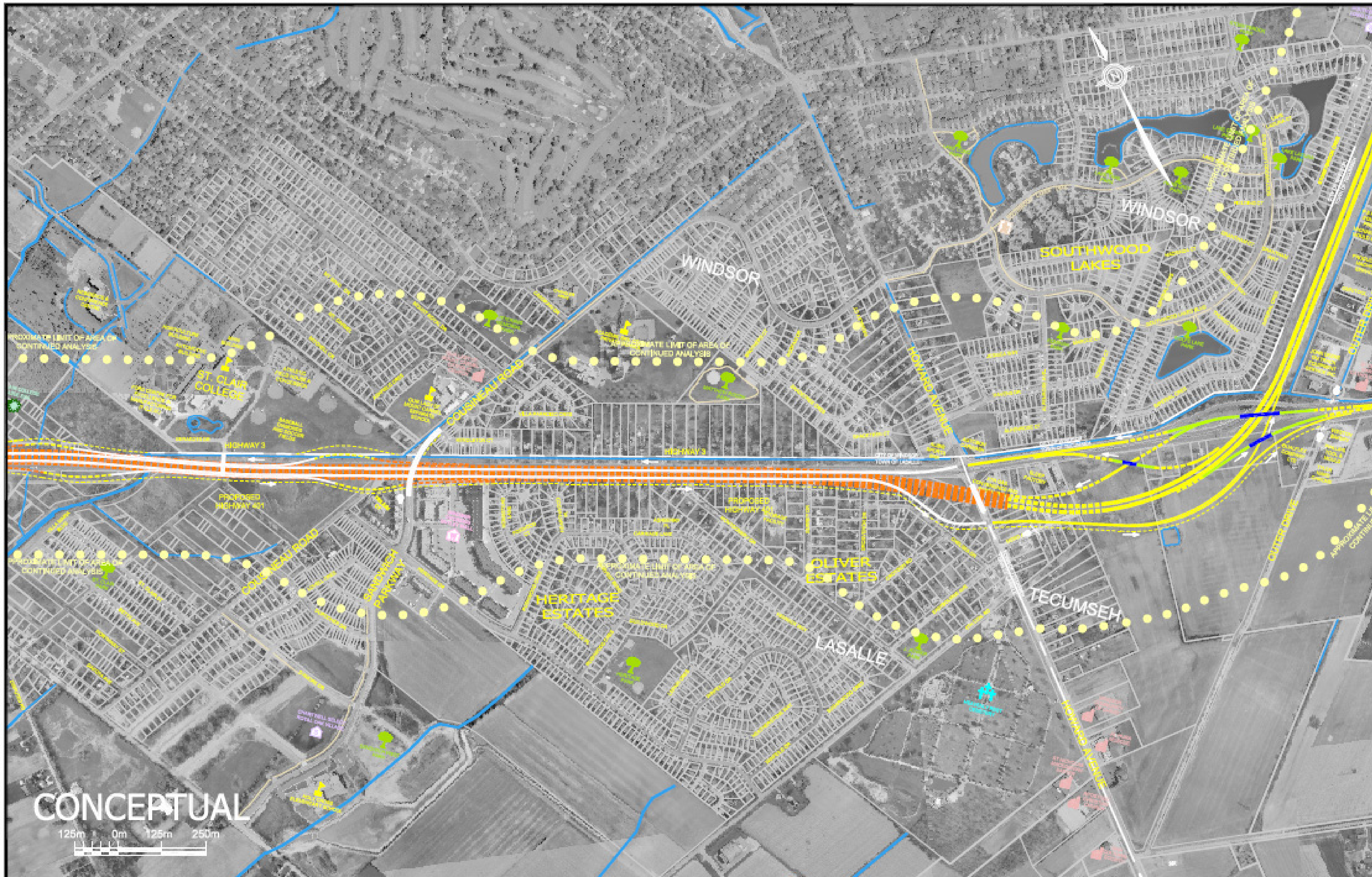


EXHIBIT 8.11B – PRACTICAL ACCESS ROAD ALTERNATIVE 3



Canada / Federal Highway Administration / Ontario / MDOT	PRACTICAL ACCESS ROAD ALTERNATIVE 3 (2 OF 2)	DECEMBER 2006	URS	EXHIBIT

EXHIBIT 8.12 – THE PARKWAY ALTERNATIVE

I.D.	Location of Tunnel	Tunnel Length (M)	Roof Area (Sq M)	I.D.	Location of Tunnel	Tunnel Length (M)	Roof Area (Sq M)
1	Spring Garden Road / Labelle Street	240	10,810	7	Huron Church Line	240	17,040
3	Grand Marais Road	120	9,550	9	St. Clair College	120	7,225
4	Pulford Street	120	9,705	10	Cousineau Road	170	9,590
5	Reddock Street	120	15,320	11	Hearthwood Place	165	14,805
6	Cabana Road	120	8,300	13	Howard Avenue	120	6,900

The ten tunnel sections of The Parkway were strategically placed to maintain existing access across and along the corridor, as well to provide new connections for roads, trails and wildlife linkages. The spacing between tunnel sections was also considered. Having two (or more) tunnel sections with insufficient space between them increases the risk that under certain emergency conditions, smoke from one tunnel section could be carried into the downwind tunnel section. The tunnel sections were developed with a minimum length of 120 m and were limited to a maximum length of 240 m. The minimum length of 120 m was determined to be a sufficient length to accommodate a community connection and allow for options for landscaping/green space to be placed on top of the tunnel so as to lessen any 'barrier effect' of the freeway for the neighbourhoods on either side of the access road. Highway tunnels longer than 240 m are subject to more complex fire and life safety requirements and regulations that would substantially alter the design, construction, operation and maintenance requirements. Table 8.9 provides the locations, lengths and rationale for the tunnel sections developed for The Parkway.

TABLE 8.9 – PARKWAY TUNNEL SECTION LOCATIONS, LENGTHS AND RATIONALE

Location	Length	Rationale for tunnel location/length
Bethlehem/ Labelle	240 m	Maintains existing road crossing at Labelle Street/Bethlehem Street. Provides improved connection between Bellewood neighbourhood/Bellewood Park/Bellewood School and Spring Garden/Bethlehem neighbourhoods/Spring Garden Forest/Windsor community trails. Tunnel length of 240 m provides opportunities for public space and gateway features to be incorporated in this area; this tunnel is situated at junction of The Parkway and Huron Church Road and is viewed by motorists entering Canada via the new crossing or the Ambassador Bridge.
Grand Marais Road/ Lambton Road	120 m	Maintains existing road crossing at Grand Marais/Lambton. Provides improved connection between Bellewood neighbourhood/Bellewood Park/Bellewood School and Huron Estates neighbourhood and Spring Garden Forest. Tunnel also provides improved connection for existing West Windsor Recreationway trail; presently trail passes under Huron Church Road at Grand Marais Drain; in times of high water flows in the drain, this trail is closed. With The Parkway, this trail will need to be relocated due to changes to Grand Marais Drain structure. Trail will be relocated to allow crossing of The Parkway and service road either via Grand Marais tunnel or Pulford Avenue tunnel. Tunnel length constrained by road profile at south end (freeway is not as deep at Grand Marais drain crossing as other locations) and location of exit ramp to service road as well as service road structure at north end.
Pulford Street	120 m	Provides improved connection between residential area on east side of Huron Church Road/South Windsor Recreation Complex and Huron Estates neighbourhood/Spring Garden Forest. Tunnel also provides improved connection for existing West Windsor Recreationway trail; presently, trail passes under Huron Church Road at Grand Marais Drain; in times of high water flows in the drain, this trail is closed. With The Parkway, this trail will need to be relocated due to changes to Grand Marais Drain structure. Trail will be realigned to allow crossing of The Parkway and service road either via Grand Marais tunnel or Pulford Avenue tunnel. Tunnel length constrained by road profile at north end (freeway is not as deep at Grand Marais drain crossing as other locations) and location of entrance ramp from service road at south end.
Reddock Street	120 m	Provides improved wildlife linkage and new community connection between Oakwood Bush/Oakwood School/Windsor community trails and Spring Garden Forest. Both the freeway and service road pass through this tunnel leaving a road-free connection at the surface. Tunnel length constrained by service road profile at north and south ends (service road profile rises from 7 m below grade to at-grade at intersections on both sides of tunnel).
Todd Lane/ Cabana Road	120 m	Maintains existing road crossing at Todd Lane/Cabana Road. Provides improved connection between Villa Borghese neighbourhood/Oakwood Bush/Oakwood School and Todd Lane neighbourhood and Spring Garden Forest. Tunnel length constrained by service road profile at north end and proximity of tunnel to the south.
Huron Church Line	240 m	Maintains an existing road connection for Huron Church Line and the service road. Provides improved wildlife linkage and improved community connection between Lennon Drain/St. Clair College environmentally sensitive area and Cahill Drain candidate natural heritage site lands/LaSalle Woods/LaSalle community trails.
St. Clair College Entrance	120 m	Maintains an existing road connection for the main entrance to the college and the service road. Provides improved wildlife linkage and improved community connection between St. Clair College environmentally sensitive area/athletic fields and Cahill Drain candidate natural heritage site lands/Windsor Crossing commercial area/LaSalle community trails. No residential neighbourhood in this immediate area, but as the main entrance to the college, this area is expected to have a relatively high volume of pedestrian and cyclist traffic. A length of 120 m was considered adequate for meeting the connectivity requirements at this location.
Cousineau Road/ Sandwich West Parkway	170 m	Maintains existing road crossing at Cousineau Rd/Sandwich West Parkway. Provides improved community connection between St. Clair College and athletic fields/Our Lady of Mt. Carmel School/Kendleton Court and Villa Paradiso neighbourhoods and Heritage Estates neighbourhood/Windsor Crossing commercial area/LaSalle community trails. Initially, tunnel extended further west of road crossing; during refinement, tunnel section was shortened by 50 m to enable extension to length of Hearthwood Place tunnel section; length of tunnel sections in this area is constrained by service road profile at east end (service road profile rises from 7 m below grade to at-grade at intersection at Cousineau/Sandwich West Pkwy). Given the extent of buffer area at west end of tunnel section, a length of 120 m was considered adequate for meeting the connectivity requirements at this location.
Hearthwood Place	165 m	Provides improved wildlife linkage and new community connection between Villa Paradiso and Kendleton Court neighbourhoods/Matthew Rodzik Park/new green space north of corridor and Heritage Estates neighbourhood/Windsor Crossing commercial area/LaSalle community trails. Both the freeway and service road pass through this tunnel leaving a road-free connection at the surface. Initially, tunnel for freeway and service road were the same length. The length of tunnel section is constrained by service road profile at west end (service road profile rises from 7 m below grade to at-grade at intersection at Cousineau/Sandwich West Pkwy). East limit of tunnel constrained by proximity of at-grade intersection at Montgomery Dr. and entrance ramp to freeway. During refinement, freeway section of tunnel extended westerly by 55 m to reduce aesthetic impacts to adjacent residences.

Location	Length	Rationale for tunnel location/length
Howard Avenue	120 m	Maintains existing road crossing at Howard Avenue. Provides improved community connection between Shadetree neighbourhood/Matthew Rodzik Park/new green space north of corridor and Oliver Estates neighbourhood/ LaSalle community trails. Tunnel length of 120 m provides opportunities for public space and Gateway features to be incorporated in this area; this is the first tunnel along the Parkway as viewed by motorists entering Windsor/LaSalle via Highway 401 or Highway 3.

The Parkway alternative was presented for public review and comment at the fifth round of PIOHs in August 2007. In addition, meetings with ministries, agencies, municipalities, consultation groups and other stakeholders were also held to review the preliminary analysis of the practical access road alternatives and discuss the features of The Parkway.

GREENLINKWINDSOR CONCEPT

In October 2007, the City of Windsor presented an access road concept entitled GreenLinkWindsor. Like The Parkway, the GreenLinkWindsor concept proposed a below-grade freeway with tunnel sections, a separate service road for local traffic, a wider right-of-way with buffer areas between the corridor and adjacent residential areas, and a continuous recreational trail system along the corridor (see **Exhibit 8.14**).

EXHIBIT 8.13 – GREENLINKWINDSOR[3]

Further details with regard to the study team's review of the GreenLinkWindsor proposal are documented in **Chapter 3** of this report.

The study team carefully considered the GreenLinkWindsor concept, as well as the comments provided by other stakeholders, including other municipalities, government agencies and the public. The comments received were used to refine The Parkway.

Based on this input, and on further deliberations by the study team, a number of refinements were made to The Parkway alternative in the period following the August 2007 Public Information Open Houses. These refinements were adopted to reduce the negative effects of The Parkway alternative and to improve the transportation benefits and community benefits to the extent practicable. Following is a discussion of the refinements that were adopted between August 2007 and April 2008:

Additional tunnel section at Spring Garden

The Parkway alternative did not initially include a tunnel section in this area. A 200 metre-long tunnel section was added to maintain the connection residents presently enjoy between Spring Garden residential area and vacant natural area adjacent to E.C. Row Expressway. The location and length of a tunnel section in this area is constrained by roadway profile at the west end and the proximity of the Labelle/Bethlehem tunnel to the south.

Location and length of tunnel at Oliver Estates revised

The Howard Avenue tunnel section was initially proposed in a location to maintain the existing road crossing at Howard Avenue as well as to provide improved community connection between Shadetree neighbourhood/Matthew Rodzik Park/new green space north of corridor and Oliver Estates neighbourhood/LaSalle community trails. As a result of comments provided through consultation events, including PIOH and subsequent community meetings with residents of Oliver Estates neighbourhood in particular to improve the effectiveness of connectivity between communities (nearer to residences), the tunnel section was shifted westerly from Howard Avenue to the area near Chelsea Drive. A tunnel section of 240 metres in this area provides for landscaping/public space and gateway features to be incorporated in this roof deck, and this is the first tunnel along The Parkway as viewed by motorists entering Windsor/LaSalle via Highway 401 or Highway 3. The Howard Avenue road crossing will be accommodated by a roadway overpass.

Other tunnel lengths and locations refined

Adjustments were made to some tunnel locations to provide improved tunnel spacing and better alignments and locations for road and trail alignments. While most of these refinements were minor in nature and did not change the length of the tunnel sections, the modifications made at the Cousineau/Sandwich West Parkway and Hearthwood Place tunnels are notable. The length of the Cousineau/Sandwich West Parkway tunnel section was reduced by 50 metres to 120 metres, while the section of tunnel covering the freeway at Hearthwood Place was lengthened by 55 metres to 220 metres. The net effect of these modifications was that there was more tunneled section would be provided near adjacent residential areas, resulting in greater connectivity improvements.

Pedestrian and cyclists trails refined

The Parkway alternative presented at the August 2007 Public Information Open Houses featured a concept for a continuous pedestrian/cyclist trail system parallel to and separate from the freeway and service road. This trail system concept included grade separations (i.e. overpasses) at most road crossings so as to limit the conflicts between pedestrians, cyclists and motorists. Refinements were made to the trail system concept including removing overpasses at certain road crossings and changing or eliminating sections of trail to reflect comments received from property owners whose property would be impacted to accommodate the trail system and concerned about loss of privacy due to the proximity of trail overpasses to their property. In addition, some overpasses were removed and trail locations changed to provide better access between the trail system and the local street system. In identifying the refinements, an important principle of the trail concept was retained, in that trail users are able to traverse The Parkway corridor from Howard Avenue to the Spring Garden/Bellewood Estates area without having to cross a lane of traffic.

3 Copyright 2007 www.GreenLinkWindsor.com

New loop ramp at Todd Lane

Consultation on The Parkway included meeting with municipal emergency services to discuss issues pertaining to emergency response to an incident in The Parkway corridor. In reviewing the proposed access points to the freeway section of The Parkway, it was identified that access to The Parkway for Windsor and LaSalle emergency services could be greatly improved with the provision of a freeway entrance ramp in the area of Todd Lane. Such a connection would provide direct access to the section of the freeway east of Todd Lane/Cabana Road which is important for emergency service access as there is a fire station on Cabana Road just west of Huron Church, and a LaSalle fire station on Malden Road just south of Todd Lane. Upon investigation of options for a new connection and the local constraints in this area, the study team developed a loop ramp connection from Todd Lane to the eastbound freeway. A signalized intersection at the ramp terminal will enable access to the eastbound freeway from Todd Lane for all eastbound and westbound vehicles on Todd Lane/Cabana Road, thereby providing improved access for local emergency services stationed near this area.

Highway 3/Howard Avenue Interchange modified to include a connection to Howard Avenue and the possible future Laurier Parkway Extension

In discussions with the Municipal Advisory Group (MAG), the study team identified that the section of Highway 401 between Highway 3 and Howard Avenue must address several transportation issues:

- To improve the design speed at this location over what is provided by the existing Highway 401 alignment, The Parkway includes a realignment of Highway 401 at the existing Highway 3 interchange.
- The Howard Avenue/Highway 3 intersection is a major intersection in the regional road network. This intersection would typically be a candidate site for an intersection with the new freeway. However, development in three quadrants of this intersection represents a constraint to interchange design and construction.
- There is also the opportunity to improve connections between Highway 3 and Highway 401 (all moves between these two provincial highways are presently not provided).
- The Essex-Windsor Regional Transportation Master Plan (October 2005) identified Highway 3, the Laurier Parkway extension to Howard Avenue, as well as Howard Avenue itself, as components of a regional road network. Improving connections between these roadways would improve regional mobility.

Upon review of existing and future land uses and transportation improvements in the area, the study team determined that a reasonable solution to providing/maintaining connectivity with the regional road network in this area and reducing property and indirect impacts is to provide a new interchange at Highway 3 in the vacant lands east of Howard Avenue, with new road connections to Highway 3 and to Howard Avenue. Such a roadway connection would allow north-south traffic destined to/from employment lands in the east to avoid the Howard Avenue intersection at the proposed service road. This would benefit traffic operations by reducing congestion for international traffic at the Howard Avenue/service road intersection. This connection would also improve continuity for north-south traffic in this area by providing a more direct connection between Howard Avenue, Laurier Parkway and Highway 401. It will also reduce the volume of traffic using the City of Windsor portion of Howard Avenue, which would be compatible with the City of Windsor's vision. Overall this connection would improve regional mobility between western Essex County, LaSalle and east Windsor/Tecumseh.

The refined Parkway alternative was identified as The Windsor-Essex Parkway (refer to **Exhibit 8.15**). The Windsor-Essex Parkway alternative was analyzed in accordance with the seven major factors and evaluated against the other at-grade and below-grade alternatives, as well as the cut and cover tunnel alternative. (Refer to **Section 8.2.3**).

EXHIBIT 8.14 – THE WINDSOR-ESSEX PARKWAY

I.D.	Location of Tunnel	Tunnel Length (M)	Roof Area (Sq M)	I.D.	Location of Tunnel	Tunnel Length (M)	Roof Area (Sq M)
1	Spring Garden	200	9,000	7	Cabana Road West	120	8,300
2	Ramp N-E and Labelle Street	240	10,810	8	Huron Church Line	240	14,400
4	Grand Marais Road West	120	9,550	11	St. Clair College	120	7,225
5	Pulford Street	120	9,705	12	Cousineau Road	120	7,225
6	Reddock St - Double Tunnel	120	15,320	13	Hearthwood Place - Double Tunnel	220	19,250
				15	Oliver Estates Area	240	13,200

Structures 3 9 10 14 16 17 18 are proposed as roadway overpasses

8.2.3 Analysis and Evaluation

The evaluation of practical alternatives for the Canadian access road was conducted in conjunction with the evaluation of the Canadian plaza-crossing-US plaza and US connecting road, leading to a 'technically and environmentally preferred' end-to-end solution connecting Highway 401 in Ontario to Interstate 75 in Michigan.

As noted previously, the approved *OEA ToR (2004)* identified two evaluation methods to be employed in the evaluation process: reasoned argument method and arithmetic method. These methods were employed in the analysis and evaluation of illustrative alternatives (refer to Chapter 6), as well as the analysis and evaluation of practical plaza and crossing alternatives (refer to Section 8.1). A similar approach was employed for the analysis and evaluation of the practical access road alternatives. While the same seven key factors were used, the performance measures were modified to make them applicable to the roadway alternatives considered. Table 8.10 provides a summary of the evaluation factors and performance measures for evaluating the practical access road alternatives.

TABLE 8.10 – PRACTICAL ACCESS ROAD ALTERNATIVES EVALUATION FACTORS AND PERFORMANCE MEASURES – CANADIAN SIDE

Rating Factor	Performance Measure Categories	Performance Measure
Changes in Air Quality	Regional Burden	Analysis based on traffic model results.
	Dispersion (CO and $PM_{2.5}$ and other Green House Gases/pollutants)	Analysis for key roadway links
Protect Community/ Neighborhood Characteristics	Traffic Impacts Volumes by Vehicle Type Local Access	 Peak period volumes on specific links by mode (cars, trucks, and int'l. trucks). Number of streets crossed, closed, or connected with an interchange.
	Noise	Analysis based on traffic model results for key roadway links.
	Community Cohesion/Community Character	Encroachment/severance on neighborhood based on professional judgment. Impact on delivery of community services (function of road closures) based on professional judgment.
	Acquisitions (Whole or Partial) Residential Business	 Number of dwelling units by type; population estimate based on average persons per dwelling unit Number of business establishments; employment estimate based on average employees per business for area.
	Institutions Farm Property / Structures	Number of institutions by type (church, schools, etc.). Operations/structures affected.
	Public Safety/Security (Plaza Only)	Assessment based on professional judgment.
Maintain Consistency with Existing and Planned Land Use	Land Use (existing and planned)	Designation of "consistent," "not consistent," or "not applicable" with goals, objectives and/or policies based on review of official planning documents.
	Development Plans	Designation of "compatible," "not compatible," or "not applicable" with plans for upcoming development that may not be covered by official plans.
	Contaminated Sites/Disposal Sites	Number of documented sites affected.
Protect Cultural Resources	Historical	Number of listed sites affected.
	Parklands	Number of parks by type; number of hectares affected. Includes subset for Coastal Zone Management sites.
	Archaeological Sites	Number of known sites affected.
Protect the Natural Environment	Environmental Significant Features	Area (in hectares) affected by type.
	Surface Water Quality/Groundwater	Area of floodplains affected (hectares); number of water crossings (including secondary rivers and streams); Detroit River channel alteration; number and general location of in-water piers; wells/groundwater sources affected; number of water intakes affected.
	Environmentally Significant Species/ Habitat	Area of habitat (hectares) affected by type; list of species; other significant features.
	Farmland/Prime Agricultural Soils	Area affected (hectares) by soil type
	Other Natural Resources	Area affected measured by area of right-of-way.
Improve Regional Mobility	Highway Network Effectiveness Service Levels Vehicle kilometres of Travel Vehicle Hours of Travel Distance Traveled	Level of Service (LOS) classification by major facility type. By major facility type. By major facility type. Average km for car, local truck, and international truck.

Rating Factor	Performance Measure Categories	Performance Measure
	Continuous/ongoing river crossing capacity (i.e. redundancy)	Assessment of availability of crossing options.
	Operational Considerations of Crossing System (River Crossing and Plaza)	Distance to plaza from international border; accessibility; serviceability; security; flexibility for expansion.
Cost and Construct-ability[4]	Millions of CAD$ (expressed in year 2011 dollars)	Length of alternative, preliminary construction costs, constructability including site constraints; geotechnical constraints; construction staging/ duration; traffic maintenance; risk assessment.

Between March 2006 and July 2007, the study team conducted the analysis of the five initial access road alternatives:

1) **Alternative 1A** - At-grade freeway with separate one-way service roads located on either side of the freeway
2) **Alternative 1B** - Below-grade freeway with separate one-way service roads located on either side of the freeway
3) **Alternative 2A** - At-grade freeway with separate service road located on one side of the freeway
4) **Alternative 2B** - Below-grade freeway with separate service road located on one side of the freeway
5) **Alternative 3** - Freeway in cut and cover tunnel with at-grade service road on top of tunnel

Preliminary findings of the analysis of the five initial access road alternatives were released for public review at Open Houses held in December 2006 and August 2007. Subsequently, the analysis of The Windsor-Essex Parkway alternative was undertaken and the results incorporated with those of the initial five access road alternatives. The evaluation of the six access road alternatives was conducted to identify the Technically and Environmentally Preferred Alternative (TEPA) for the access road. The results of this analysis and evaluation were presented at the sixth round of Public Information Open Houses in June 2008.

REASONED ARGUMENT METHOD

The results of the reasoned argument evaluation of the six access road alternatives are documented in a number of technical documents prepared by the study team. The key findings for each of the seven evaluation factors are presented in **Exhibit 8.16**. Further details of the analysis of these alternatives are provided in a document entitled *Draft Generation of Practical Access Road Alternatives Report* (refer to List of Supporting Documents).

[4] In the evaluation of Illustrative Alternatives, this factor was entitled Minimize Cost; for the evaluation of Practical Alternatives, the title of this factor was revised to Cost and Constructability to more adequately reflect the basis of the assessment from a cost and constructability perspective.

EXHIBIT 8.15 – SUMMARY OF PRACTICAL ALTERNATIVES EVALUATION – ACCESS ROAD

FACTOR/ MEASURE	ALTERNATIVE 1A 		ALTERNATIVE 1B 		ALTERNATIVE 2A 		ALTERNATIVE 2B 		ALTERNATIVE 3 	PARKWAY 
	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)		
Changes to Air Quality										
Results of modeling (before mitigation)	• Predicted concentrations of NO_x are lower in the future compared to today's values due to changes in fuels and vehicular technologies. • Concentrations of Volatile Organic Compounds (VOC's) predicted to be well below provincial standards.		• Predicted concentrations of NO_x are lower in the future compared to today's values due to changes in fuels and vehicular technologies. • Concentrations of Volatile Organic Compounds (VOC's) predicted to be well below provincial standards. • Depressed alternatives result in slightly lower $PM_{2.5}$ concentrations in comparison to the at-grade alternatives.		• Predicted concentrations of NO_x are lower in the future compared to today's values due to changes in fuels and vehicular technologies. • Concentrations of Volatile Organic Compounds (VOC's) predicted to be well below provincial standards.		• Predicted concentrations of NO_x are lower in the future compared to today's values due to changes in fuels and vehicular technologies. • Concentrations of Volatile Organic Compounds (VOC's) predicted to be well below provincial standards. • Depressed alternatives result in slightly lower $PM_{2.5}$ concentrations in comparison to the at-grade alternatives.		• Predicted concentrations of NO_x are lower in the future compared to today's values due to changes in fuels and vehicular technologies but NO_x concentrations are greater compared to non-tunnel alternatives over a broader area (greater dispersion from ventilation stacks) • Concentrations of Volatile Organic Compounds (VOC's) predicted to be well below provincial standards. • Tunnel results in lower concentrations of $PM_{2.5}$ in vicinity of the first 50m from the ROW compared to the other alternatives.	• Predicted concentrations of NO_x are lower in the future compared to today's values due to changes in fuels and vehicular technologies. • Concentrations of Volatile Organic Compounds (VOC's) predicted to be well below provincial standards. • Depressed alternatives result in slightly lower $PM_{2.5}$ concentrations in comparison to the at-grade alternatives.
Overall Assessment	• All access road alternatives represent an improvement to local air quality over the no-build alternative. • The assessment found essentially no difference among the access road alternatives in terms of the improvements provided to local air quality compared to the no-build alternative; the end-to-end tunnel and Parkway offer a slightly greater reduction in particulate concentrations within 50m of the ROW under certain conditions compared to the other alternatives. • All alternatives were considered to have an equally low impact to air quality.									
Protection of Community and Neighbourhood Characteristics										
Potential Acquisitions										
Residences	• 180-230	• 160-210	• 180-230	• 160-210	• 190-230	• 170-220	• 180-230	• 170-220	• 140-180	• 292-342
Businesses	• 31	• 45	• 31	• 45	• 26	• 40	• 26	• 40	• 43-45	• 48
Community Features Potentially Displaced	• 3 – Montessori Preschool, Royal Canadian Legion, Heritage Park Alliance Church	• 4 – Montessori Preschool, Royal Canadian Legion, Heritage Park Alliance Church, Trillium Court Housing (partial)	• 3 – Montessori Preschool, Royal Canadian Legion, Heritage Park Alliance Church	• 4 – Montessori Preschool, Royal Canadian Legion, Heritage Park Alliance Church, Trillium Court Housing (partial)	• 3 – Montessori Preschool, Royal Canadian Legion, Heritage Park Alliance Church (partial)	• 4 – Montessori Preschool, Royal Canadian Legion, Heritage Park Alliance Church, Trillium Court Housing (partial)	• 3 – Montessori Preschool, Royal Canadian Legion, Heritage Park Alliance Church (partial)	• 4 – Montessori Preschool, Royal Canadian Legion, Heritage Park Alliance Church, Trillium Court Housing (partial)	• 4 – Montessori Preschool, Royal Canadian Legion, Heritage Park Alliance Church, Trillium Court Housing (partial)	• 5 – Montessori Preschool, Royal Canadian Legion, Heritage Park Alliance Church, Trillium Court Housing (entire property), St. Clair College Athletic Fields
Noise Receptors with >5 dB increase (after mitigation)	• 1 (additional investigations in Malden Road/ Spring Garden area are required)	• 0 (additional investigations in Malden Road/ Spring Garden area are required)	• 1 (additional investigations in Malden Road/ Spring Garden area are required)	• 0 (additional investigations in Malden Road/ Spring Garden area are required)	• 0 (additional investigations in Malden Road/ Spring Garden area are required)	• 0 (additional investigations in Malden Road/ Spring Garden area are required)	• 0 (additional investigations in Malden Road/ Spring Garden area are required)	• 0 (additional investigations in Malden Road/ Spring Garden area are required)	• 0 (additional investigations in Malden Road/Spring Garden area are required)	• 0 (additional investigations in Malden Road/Spring Garden area are required)
Effect on Access	• 9 road closings • 20 local access connections to new transportation facility • No access to the new corridor from Cabana Road/Todd Lane; no access to Howard Avenue from Highway 401 Eastbound. • Full access to St. Clair College.		• 13 road closings • 14-15 local access connections to new transportation facility • Partial access to/ from the new corridor from/to Cabana Road/Todd Lane. • Full access to St. Clair College • No direct access to Howard Avenue.		• 15 road closings • 15 local access connections to new transportat'n facility • Full access to/ from new corridor from/to Cabana Rd/Todd Lane; no direct access to St. Clair College/Howard Ave	• 15 road closings • 14 local access connections to new transportat'n facility • Full access to/ from new corridor from/to Cabana Rd/ Todd Lane; no direct access to St. Clair College/Howard Ave	• 14 road closings • 10 local access connections to new transportat'n facility • Full access to/ from new corridor from/to Cabana Rd/ Todd Lane; no direct access to St. Clair College/Howard Ave	• 14 road closings • 11 local access connections to new transportat'n facility • Full access to/ from new corridor from/to Cabana Rd/ Todd Lane; no direct access to St. Clair College/Howard Ave	• 9 road closings • 13 local access connections to new transportation facility • No access to/from Cabana Road/Todd Lane; No access to Howard Avenue from Highway 401 Eastbound.	• 18 road closings • 17 local access connections to new transportation facility • No access to/from Cabana Road/Todd Lane from Highway 401 Westbound; No access to Howard Avenue from Highway 401 Eastbound

EXHIBIT 8.15 – SUMMARY OF PRACTICAL ALTERNATIVES EVALUATION – ACCESS ROAD (CONT'D)

FACTOR/ MEASURE	ALTERNATIVE 1A 	ALTERNATIVE 1B 	ALTERNATIVE 2A 	ALTERNATIVE 2B 	ALTERNATIVE 3 	PARKWAY 
	Option 1 (Widen to North on Hwy 3) / **Option 2** (Widen to South on Hwy 3)	**Option 1** (Widen to North on Hwy 3) / **Option 2** (Widen to South on Hwy 3)	**Option 1** (Widen to North on Hwy 3) / **Option 2** (Widen to South on Hwy 3)	**Option 1** (Widen to North on Hwy 3) / **Option 2** (Widen to South on Hwy 3)		
Impact on Community Character/Cohesion	• Overall, similar impacts to community compared to other alternatives • Communities of Spring Garden, Bethlehem Street, Reddock Street and Talbot Road (between Cousineau Road and Howard Avenue) Montgomery-Chelsea Drive and Mero Avenue will experience change to community character and cohesion • The displacement of households within the neighbourhoods will result in a change in character within each community • Reddock Street will experience a change in community character and cohesion due to the access road alignment encroaching into the community • The Bethlehem community will experience a change in character and cohesion due to development of Bethlehem Street to accommodate local traffic traveling from Spring Garden to Huron Church Road	• Overall, similar impact to community compared to other alternatives • Communities of Spring Garden, Bethlehem Street, Reddock Street, Kendleton Court, and Talbot Road (between Cousineau Road and Howard Avenue) and Mero Avenue will experience change to community character and cohesion • Below grade alternative has lower aesthetic impacts than the at-grade options • Reddock Street will experience a change in community character and cohesion due to the access road alignment encroaching into the community • Removes traffic from the viewshed of adjacent neighbourhoods	• Overall, similar impact to community compared to other alternatives • Communities of Spring Garden, Bethlehem Street, Reddock Street and Talbot Road (between Cousineau Road and Howard Avenue) and Mero Avenue will experience change to community character and cohesion • Over half of the households on Reddock Street will be displaced • The residential in-fill area of Kendleton Court will be displaced with option 1; no households will be displaced in Kendleton Court with option 2 • Talbot Road community will experience a change in character and cohesion due to the displacement of one entire side of Talbot Road, with either option 1 or option 2	• Overall, similar impact to community compared to other alternatives • Communities of Spring Garden, Bethlehem Street, Reddock Street and Talbot Road (between Cousineau Road and Howard Avenue) and Mero Avenue will experience change to community character and cohesion • All Kendleton Court households will be displaced with alignment option 1; with alignment option 2 only one Kendleton Court household is displaced • Provides for some aesthetic benefits to the community at large and to adjacent neighbourhoods • Removes traffic from the viewshed of adjacent neighbourhoods	• Overall, similar impact to community compared to other alternatives • Impacts to Spring Garden, Talbot Road, Bethlethem Street, Mero Avenue, and Montgomery-Chelsea Drive neighbourhoods • In the Talbot Road community, the displacement of households is limited to the LaSalle side of Talbot Road; resulting in a change in community character and cohesion as approximately one half of the community is displaced • Tunnel alignment to Plaza A will result in a displacement of 32 out of 48 households on Bethlehem Street; which will result in a change in character and cohesion • Lowest aesthetic impact, but visual impact of ventilation buildings, which are not compatible with the surrounding landscape; residents will have the ventilation buildings and stacks as part of their permanent viewshed	• Impacts to Spring Garden, Talbot Road, Bethlehem Street, Reddock Street, Kendleton Court, Trillium Court neighbourhoods • Talbot Road (between Cousineau and Howard) community will experience a change in character and cohesion due to the displacement of all the households on both sides of the street • Trillium Court community will be entirely displaced, resulting in a change to community cohesion and character • In the Kendleton Court community, the displacement of households is limited to one side of the street. • Parkway provides a greenspace buffer to adjacent neighbourhood communities, thus reducing the number of residents adjacent to the roadway. • Parkway provides connectivity between communities and community features that currently does not exist. • Greenspace buffer between residents and freeway/service roads will result in fewer residents experiencing long term nuisance effects
Overall Assessment	• Overall, all alternatives are considered to have a high impact to community characteristics. • All alternatives displace a high number of residences and businesses along the corridor and represent a substantive change to the local character and cohesion for the neighbourhoods along the corridor. • The separation of local and international traffic and the additional roadway capacity provided will deter infiltration of international traffic onto local municipal streets, providing a benefit to south/west Windsor and LaSalle. • The effects of loss of businesses along the corridor is offset by the ability of these businesses to locate elsewhere in the local area, improved access for these businesses over what is presently provided, and the benefits of thousands of direct and indirect project related jobs created by the construction of the new access road. • The at-grade alternatives and below-grade alternatives 2A and 2B do not provide any improvements to community cohesion and character. The end-to-end tunnel does not provide the same benefits to community character and cohesion as it does not improve linkages across the Huron Church/Highway 3 corridor over the current condition and reduces visibility for local businesses. • The Windsor-Essex Parkway has the highest displacement of homes and businesses, but provides a greater improvement to overall community character and cohesion of the corridor by improving linkages between neighbourhoods, buffering neighbourhoods from highway nuisance effects and providing new open space/recreational facilities along the corridor. These improvements result in a better long-term solution for the community. Based on the extent of long term improvements to community character and cohesion in south/west Windsor and LaSalle, the Windsor-Essex Parkway is slightly preferred over the other alternatives as having the least overall impacts to community and neighbourhood characteristics.					
Consistency with Existing & Planned Land Use						
Consistency	• Alternative utilizes Huron Church Road/ Highway 3 Corridor (major roadway, historical connection to border crossing); • Proposed facility is consistent with local Official Plans	• Alternative utilizes Huron Church Road/ Highway 3 Corridor (major roadway, historical connection to border crossing); • Proposed facility is consistent with local Official Plans	• Alternative utilizes Huron Church Road/ Highway 3 Corridor (major roadway, historical connection to border crossing) • Proposed facility is consistent with local Official Plans	• Alternative utilizes Huron Church Road/ Highway 3 Corridor (major roadway, historical connection to border crossing) • Proposed facility is consistent with local Official Plans	• Alternative utilizes Huron Church Road/ Highway 3 Corridor (major roadway, historical connection to border crossing) • Proposed facility is consistent with local Official Plans	• Alternative utilizes Huron Church Road/ Highway 3 Corridor (major roadway, historical connection to border crossing) • Proposed facility is consistent with local Official Plans including the Healthy Communities policies and objectives • Parkway provides opportunities for additional parkland & recreational features

EXHIBIT 8.15 – SUMMARY OF PRACTICAL ALTERNATIVES EVALUATION – ACCESS ROAD (CONT'D)

FACTOR/ MEASURE	ALTERNATIVE 1A 		ALTERNATIVE 1B 		ALTERNATIVE 2A 		ALTERNATIVE 2B 		ALTERNATIVE 3 	PARKWAY 
	Option 1 (Widen to North on Hwy 3)	**Option 2** (Widen to South on Hwy 3)	**Option 1** (Widen to North on Hwy 3)	**Option 2** (Widen to South on Hwy 3)	**Option 1** (Widen to North on Hwy 3)	**Option 2** (Widen to South on Hwy 3)	**Option 1** (Widen to North on Hwy 3)	**Option 2** (Widen to South on Hwy 3)		
Total area of land use impacts	• 78 ha	• 74 ha	• 75 ha	• 78 ha	• 81 ha	• 78 ha	• 80 ha	• 85 ha	• 65 ha	• 99 ha
Contaminated Sites/Potentially impacted area of high potential for contamination	• 17/9 ha	• 17/3.6 ha	• 18/3.5 ha	• 13/3.6 ha	• 17/4 ha	• 17/4 ha	• 16/3.8 ha	• 16/4 ha	• 16/3 ha	• 20/3 ha
Overall Assessment	• All the alternatives are developed in the same existing transportation corridor in Windsor and LaSalle and Tecumseh. • The nature of existing and planned land uses affected by all alternatives are essentially the same. • The Windsor-Essex Parkway demonstrates a greater consistency with local municipal planning in terms of meeting objectives that improve the quality of life for its residents. The tunnel sections over the below-grade freeway, additional buffer spaces along and across the corridor, opportunities for new recreational trails with connections to existing trails and wildlife linkages contribute to a corridor that better connects communities and natural features. • The Windsor-Essex Parkway alternative is preferred over the other alternatives.									
Protection of Cultural Resources										
Built Heritage Features Displaced	• 7 to 8 field identified built heritage features displaced		• 7 to 8 field identified built heritage features displaced		• 5 field identified built heritage features displaced		• 5 field identified built heritage features displaced		• 6 to 8 field identified built heritage features displaced	• 7 to 8 field identified built heritage features displaced
Disrupted	• 1 to 3 field identified built heritage features disrupted		• 1 to 3 field identified built heritage features disrupted	• 3 to 4 field identified built heritage features disrupted	• 6 field identified built heritage features disrupted		• 6 field identified built heritage features disrupted		• 3 to 5 field identified built heritage features disrupted	• 3 to 4 field identified built heritage features disrupted
Parks	• 1 Impacted – Property taking • 5 impacted – potential disruption to access	• 6 Impacted – Potential disruption to access	• 1 Impacted – Property taking • 5 impacted – potential disruption to access	• 6 Impacted – Potential disruption to access	• 1 Impacted – Property taking • 5 impacted – potential disruption to access	• 6 Impacted – Potential disruption to access	• 1 Impacted – Property taking • 5 impacted – potential disruption to access	• 6 Impacted – Potential disruption to access	• 1 Impacted – Property taking • 5 impacted – potential disruption to access	• 1 impacted-Property taking • 5 impacted – potential disruption to access • adds 240 acres of additional parkland and greenspace, and over 20 km of new recreational trails with the Windsor-Essex Parkway design
Archaeology Disturbance or destruction of known significant archaeological sites	• 1 to 2 small pre-contact habitation sites • 9 pre-contact findspots	• 1 to 2 small pre-contact habitation sties • 9 pre-contact findspots e.g. no known sites of high to moderate significance impacted	• 1 to 2 small pre-contact habitation sites • 9 pre-contact findspots	• 1 to 2 small pre-contact habitation sites • 9 pre-contact findspots	• 2 to 3 small pre-contact habitation sites • 10 to11 pre-contact findspots	• 2 to 3 small pre-contact habitation sites • 10 pre-contact findspots	• 2 to 3 small pre-contact habitation sites • 10 to 11 pre-contact findspots	• 2 to 3 small pre-contact habitation sites • 9 to 10 pre-contact findspots	• 1 to 3 small pre-contact habitation sites • 8 pre-contact findspots	• 3 to 4 small pre-contact habitation sites • 15 to 17 pre-contact findspots
Overall Assessment	• In terms of reducing impacts to built heritage features and cultural landscapes, Alternatives 2A and 2B with the alignment connecting to Plaza A have the lowest impacts. Alternatives 1A and 1B have the highest impacts, regardless of the connecting plaza alignment considered. • All the access road alternatives impact a similar number of existing municipal parks; only the Windsor-Essex Parkway provides over 100 ha (240 acres) of new open space suitable for active/passive recreational faculties and over 20 kilometres of additional recreational trails, with connections to the existing trail systems. • Given that no access road alternatives have sites with human remains or large pre-contact Aboriginal (village) sites (based on the evidence to date), all access road alternatives are assessed to have low to medium archaeological impact to known archaeological sites. • Overall, the Windsor-Essex Parkway was considered to be the preferred access road alternative on the basis of greater benefits to cultural resources by way of increasing the amount of park space and trails available to local residents, with similar low impacts to built heritage and archaeological features, compared to the other alternatives.									

EXHIBIT 8.15 – SUMMARY OF PRACTICAL ALTERNATIVES EVALUATION – ACCESS ROAD (CONT'D)

FACTOR/ MEASURE	ALTERNATIVE 1A		ALTERNATIVE 1B		ALTERNATIVE 2A		ALTERNATIVE 2B		ALTERNATIVE 3	PARKWAY
										
	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)		
Protection of Natural Environment										
Fish and Fish Habitat	• No critical fish habitat impacted by any access road alternatives									
Plant/Vegetation Species	• 0.44 ha to 1.43 ha of provincially rare vegetation impacted	• 0.50 ha to 1.53 ha of provincially rare vegetation impacted	• 0.43 ha to 1.46 ha of provincially rare vegetation impacted	• 0.54 ha to 1.46 ha of provincially rare vegetation impacted	• 1.19 ha to 2.22 ha of provincially rare vegetation impacted	• 1.18 ha to 2.22 ha of provincially rare vegetation impacted	• 0.82 ha to 1.86 ha of provincially rare vegetation impacted	• 0.82 ha to 1.86 ha of provincially rare vegetation impacted	• 0.50 ha to 1.48 ha of provincially rare vegetation impacted	• 1.47 ha to 2.54 ha of provincially rare vegetation impacted
Wildlife Species and Habitat	• 102 to 142 specimens/colonies of species at risk	• 92 to 134 specimens/colonies of species at risk	• 112 to 152 specimens/colonies of species at risk	• 103 to 152 specimens/colonies of species at risk	• 122 to 162 specimens/colonies of species at risk	• 116 to 155 specimens/colonies of species at risk	• 105 to 145 specimens/colonies of species at risk		• 92 to 131 specimens/colonies of species at risk	• 141 to 180 specimens/colonies of species at risk • wider right of way/buffer areas provides greater opportunities for restoration and enhancement of natural features along the corridor
Overall Assessment	• Overall, all the access road alternatives are considered as having similar impacts to natural features. While no one access road alternative was identified as being preferred over all others, the alternatives that avoid the Malden Road/Spring Garden area (i.e. those with the access road alignment connecting to plazas B/C) are slightly preferred.									
Improvements to Regional Mobility										
Highway Capacity	• Six lane freeway with controlled access and service roads provides sufficient capacity to meet future (2035) travel demand; Peak Hour LOS (2035) = C									
Continuous Capacity	• All alternatives provide comparable access between the service roads and the cross streets with slight differences: • Safety of controlled access freeway for access road is greatly increased compared to present arterial roadway with signalized intersections and other entrances/conflict points • Provides increased local and regional mobility over the "do nothing" alternative • Provides substantial travel time savings for local traffic when compared to the "do nothing" alternative		• Safety of controlled access freeway for access road is greatly increased compared to present arterial roadway with signalized intersections and other entrances/conflict points • Provides increased local and regional mobility over the "do nothing" alternative • Provides substantial travel time savings for local traffic when compared to the "do nothing" alternative		• Safety of controlled access freeway for access road is greatly increased compared to present arterial roadway with signalized intersections and other entrances/conflict points • Provides increased local and regional mobility over the "do nothing" alternative • Provides substantial travel time savings for local traffic when compared to the "do nothing" alternative		• Safety of controlled access freeway for access road is greatly increased compared to present arterial roadway with signalized intersections and other entrances/conflict points • Provides increased local and regional mobility over the "do nothing" alternative • Provides substantial travel time savings for local traffic when compared to the "do nothing" alternative		• Safety of controlled access freeway for access road is greatly increased compared to present arterial roadway with signalized intersections, other entrances/conflict points • Provides increased local and regional mobility over the "do nothing" alternative • Provides substantial travel time savings for local traffic when compared to the "do nothing" alternative • The positive effects of tunnels on safety include elimination of adverse weather conditions and increased driver attention and/or slower speeds due to the confined driving space • Elements of tunnel driving that negatively affect safety may include limited visibility due to tunnel walls and light changes at the portals; it is much more difficult to control events in a tunnel crash; motorists' escape is not simple, and it is harder for emergency response teams to reach the crash site • The consequences of a crash in a tunnel are greatly increased over those on an open road, however, the frequency of catastrophic events is low, and the occurrence of general traffic crashes (on a tunneled freeway) is marginally less than on an open road	• Safety of controlled access freeway for access road is greatly increased compared to present arterial roadway with signalized intersections and other entrances/conflict points • Provides increased local and regional mobility over the "do nothing" alternative • Provides substantial travel time savings for local traffic when compared to the "do nothing" alternative • Provides more favourable traffic operations on the service road than the other alternatives • Provides higher degree of mobility between the service road and the new freeway when compared to the other alternatives.

EXHIBIT 8.15 – SUMMARY OF PRACTICAL ALTERNATIVES EVALUATION – ACCESS ROAD (CONT'D)

FACTOR/ MEASURE	ALTERNATIVE 1A		ALTERNATIVE 1B		ALTERNATIVE 2A		ALTERNATIVE 2B		ALTERNATIVE 3	PARKWAY
										
	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)	Option 1 (Widen to North on Hwy 3)	Option 2 (Widen to South on Hwy 3)		
Reasonable and Secure Options	• All access road alternatives provide freeway connection to a river crossing as well as connections to Huron Church Road at E.C. Row enabling choice between new and existing crossings									
Overall Assessment	• All alternative provide a significant improvement to regional mobility by getting long distance truck traffic off local streets and providing full freeway access to/from the border. The local and regional function of the existing Highway 3/Huron Church Road corridor is improved by providing parallel service roads which can be designed to meet the needs of the community. • The Windsor-Essex Parkway provides better access between the local street system and the freeway, providing greater benefits to regional mobility than the other alternatives. This advantage led to the determination that the Windsor-Essex Parkway is preferred over the other access road alternatives.									
Cost and Constructability										
Estimated Construction Cost ($CAD 2011 dollars), North Talbot Road to Malden Road	• $750 M to $920 M		• $1.19 B to $1.36 B		• $620 M to $790 M		• $1.03 B to $1.20 B		• $3.6 B to $3.78 B	• $1.5 B to $1.6 B
Key Constructability Issues	• Traffic management during construction • Availability of resources and materials • Utility relocations • Watercourse crossings • 0.3 km zone requiring soil stabilization techniques		• Traffic management during construction • Availability of resources and materials • Utility relocations • Watercourse crossings • Soil stabilization techniques required over 2.5 km		• Traffic management during construction • Availability of resources and materials • Utility relocations • Watercourse crossings • 0.3 km zone requiring soil stabilization techniques		• Traffic management during construction • Availability of resources and materials • Utility relocations • Watercourse crossings • Soil stabilization techniques required over 2.5 km		• Traffic management during construction • Availability of resources and materials • Utility relocations • Watercourse crossings • Soil stabilization required over 2.5 km • Testing, commissioning and maintenance of tunnel support systems (ventilation, lighting communications, etc.)	• Traffic management during construction • Availability of resources and materials • Utility relocations • Watercourse crossings • Soil stabilization required to over 2.5 km • Additional annual maintenance will be required for the Cahill and Lennon Drains
Overall Assessment	• The at-grade alternatives have the lowest construction costs and the least constructability risks, while the end-to-end tunnel alternative carries the highest costs and greatest constructability risks. The below-grade alternatives, including the Windsor-Essex Parkway, carry estimated costs much less than the tunnel alternative, with lower cost and constructability risks. • Alternative 2A, which is an at-grade alternative with a parallel two-lane service road is the preferred alternative based on cost and constructability. This alternative requires the least cost and least constructability risks. The new freeway could be built alongside much of the Huron Church/Highway 3 corridor without interfering with traffic. This alternative also avoids below-grade construction at Grand Marais Drain, which is an area of high risk construction.									
Evaluation Summary	• The Windsor-Essex Parkway was identified as preferred or slightly preferred over the other access road alternatives in four of the seven key factor areas considered. In two of the seven factor areas, no clear preference was identified; in the area of Cost and Constructability, the at-grade alternative 2A was identified as the preferred alternative. The Windsor-Essex Parkway was the second-most expensive alternative and is identified as having greater cost and constructability risks than the other alternatives expect for the tunnel alternative. • Overall, the Windsor-Essex Parkway was considered to provide a better balance of impacts and benefits than the at-grade alternative 2A. The advantages of the Windsor-Essex Parkway in terms of providing greater protection to community and neighbourhood characteristics, a greater consistency with existing and planned land use, greater protection of cultural features and greater improvements to regional mobility than alternative 2A. • Although alternative 2A has more cost and constructability advantages, it offers much less community, land use, cultural and mobility advantages than the Windsor-Essex Parkway. The study team therefore identified the Windsor-Essex Parkway as the preferred access road alternative.									

The results of the access road alternatives evaluation are summarized in Table 8.11:

TABLE 8.11 – SUMMARY OF EVALUATION OF PRACTICAL ACCESS ROAD ALTERNATIVES

Factor	Preferred Alternative
Changes to Air Quality	No Clear Preference
Protect Community and Neighbourhood Characteristics	Windsor-Essex Parkway
Maintain Consistency with Existing and Planned Land Use	Windsor-Essex Parkway
Protect Cultural Resources	Windsor-Essex Parkway
Protect the Natural Environment	No Clear Preference
Improve Regional Mobility	Windsor-Essex Parkway
Cost and Constructability	Alternative 2A

The Windsor-Essex Parkway was identified as preferred over the other access road alternatives in four of the seven key factor areas considered. In two of the seven factor areas, no clear preference was identified. In the area of Cost and Constructability, the at-grade Alternative 2A was identified as the preferred alternative. The Windsor-Essex Parkway alternative was the second-most expensive alternative and is identified as having greater cost and constructability risks than the other alternatives except for the tunnel alternative.

Overall, The Windsor-Essex Parkway was considered to provide a better balance of impacts and benefits than the at-grade Alternative 2A. The advantages of The Windsor-Essex Parkway provides greater protection to community and neighbourhood characteristics, more compatibility with existing and planned land use, greater protection of cultural features and greater improvements to regional mobility than Alternative 2A.

Although Alternative 2A has more cost and constructability advantages, it offers much less community, land use cultural and mobility advantages than The Windsor-Essex Parkway. The study team therefore identified The Windsor-Essex Parkway as the preferred practical access road alternative.

ARITHMETIC METHOD

The evaluation of practical access road alternatives was also conducted using an arithmetic method based on numerical weighting and scoring of impacts. The arithmetic evaluation of the practical access road alternatives was conducted in the same manner as the arithmetic evaluation of the practical plaza and crossing alternatives (refer to Section 8.1) and also utilized the weighting scenarios developed based on public input and input from the Community Consultation Group (CCG). The results of the arithmetic evaluation of practical access road alternatives is provided in Table 8.12.

TABLE 8.12 – ARITHMETIC EVALUATION OF PRACTICAL ACCESS ROAD ALTERNATIVES

Factor	Weight	1A		1B		2A		2B		3		Parkway	
	Study Team	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Air	12.39	3	37.17	3	37.17	3	37.17	3	37.17	3	37.17	3	37.17
Community	15.93	1	15.93	1	15.93	1	15.93	1	15.93	1	15.93	1	15.93
Land Use	12.39	2	24.78	2	24.78	2	24.78	2	24.78	2	24.78	2	24.78
Cultural	12.39	3	37.17	3	37.17	3	37.17	3	37.17	3	37.17	3	37.17
Natural	15.93	3	47.79	3	47.79	3	47.79	3	47.79	3	47.79	3	47.79
Mobility	17.70	6	106.20	6	106.20	6	106.20	6	106.20	6	106.20	7	123.90
Cost/Constructibilty	13.27	3	39.81	2	26.54	3	39.81	2	26.54	1	13.27	2	26.54
Total	100.00	21	308.85	20	295.58	21	308.85	20	295.58	19	282.31	21	313.28
Rank	Unweighted	1		4		1		4		6		1	
	Weighted		2		4		2		4		6		1

Factor	Weight	1A		1B		2A		2B		3		Parkway	
	Public	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Air	17.32	3	51.96	3	51.96	3	51.96	3	51.96	3	51.96	3	51.96
Community	15.49	1	15.49	1	15.49	1	15.49	1	15.49	1	15.49	1	15.49
Land Use	12.89	2	25.78	2	25.78	2	25.78	2	25.78	2	25.78	2	25.78
Cultural	13.14	3	39.42	3	39.42	3	39.42	3	39.42	3	39.42	3	39.42
Natural	16.34	3	49.02	3	49.02	3	49.02	3	49.02	3	49.02	3	49.02
Mobility	15.28	6	91.68	6	91.68	6	91.68	6	91.68	6	91.68	7	106.96
Cost/Constructibilty	9.54	3	28.62	2	19.08	3	28.62	2	19.08	1	9.54	2	19.08
Total	100.00	21	301.97	20	292.43	21	301.97	20	292.43	19	282.89	21	307.71
Rank	Unweighted	1		4		1		4		6		1	
	Weighted		2		4		2		4		6		1

Factor	Weight	1A		1B		2A		2B		3		Parkway	
	Community Consultation Group	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Air	17.30	3	51.9	3	51.9	3	51.90	3	51.90	3	51.90	3	51.90
Community	13.88	1	13.88	1	13.88	1	13.88	1	13.88	1	13.88	1	13.88
Land Use	13.69	2	27.38	2	27.38	2	27.38	2	27.38	2	27.38	2	27.38
Cultural	13.12	3	39.36	3	39.36	3	39.36	3	39.36	3	39.36	3	39.36
Natural	17.11	3	51.33	3	51.33	3	51.33	3	51.33	3	51.33	3	51.33
Mobility	14.83	6	88.98	6	88.98	6	88.98	6	88.98	6	88.98	7	103.81
Cost/Constructibilty	10.07	3	30.21	2	20.14	3	30.21	2	20.14	1	10.07	2	20.14
Total	100.00	21	303.04	20	292.97	21	303.04	20	292.97	19	282.90	21	307.80
Rank	Unweighted	1		4		1		4		6		1	
	Weighted		2		4		3		4		6		1

Unweighted Scores

The unweighted scores represent the total of the impact scores determined by the study team based on the degree of impacts or benefits of each alternative. As can be seen in Table 8.12, the two at-grade alternatives (1A and 2A) and The Windsor-Essex Parkway were ranked highest overall. This reflects similarities in the balance of benefits and costs – the at-grade alternatives were found to be the lowest cost alternatives with the least constructability issues. The Windsor-Essex Parkway provides more benefits to regional mobility at higher costs than the at-grade solutions.

The rankings of the other alternatives reflect the higher impacts, lower benefits and/or increased costs compared to the higher ranked alternatives.

Weighted Scores

The weighted scores reflect the level of importance as well as the degree of impacts and benefits of each alternative. The results indicate that:

- The results of the weighted scoring were the same in terms of how each alternative was ranked among the three weighting scenarios considered
- The study team, public and CCG weighting scenarios identified The Windsor-Essex Parkway as the highest ranking alternative; consistent with the unweighted scores, this result reflects the

balance of high transportation benefits, comparable community and natural features impacts and comparable cost and constructability impacts

- The cut and cover tunnel alternative was the lowest ranked by all three weighting scenarios. This result reflects the relatively few benefits of a tunnel alternative in comparison to the other alternatives, at a much higher cost with greater constructability impacts.

The study team considered the results of the arithmetic method as a validation of the recommendations developed through the reasoned argument method presented **Exhibit 8.16**. As such, The Windsor-Essex Parkway was selected as the technically preferred access road alternative for this study.

The Technically and Environmentally Preferred Alternative (TEPA) for this study therefore consists of The Windsor-Essex Parkway, together with Crossing X-10B, connecting to Plaza B1 in Canada. Further details with regard to the TEPA are provided in.

9 DESCRIPTION OF THE TEPA

The Technically and Environmentally Preferred Alternative (TEPA) has been developed to a concept design level, with sufficient detail as to confirm feasibility of the proposed infrastructure and to identify the property requirements and the environmental impacts. This concept design is intended to provide a sufficient level of detail on which to base a decision regarding approval of the undertaking and to guide the development of more detailed designs during subsequent design phases of the study.

This chapter provides a description of the recommended crossing, international plaza, approach freeway and service road network that together form the Technically and Environmentally Preferred Alternative. The concept design described in this chapter is presented in the concept design plates included in Appendix A. Impacts on environmental features as a result of the recommended plan as well as proposed measures for mitigation are described in Chapter 10. For further details of the information presented in this chapter, the reader is referred to the following reports:

- *Bridge Conceptual Engineering Report (February 2008) (available);*
- *Draft Practical Alternatives Evaluation – Constructability Report for Access Road Alternatives (May 2008) (available);*
- *Draft Practical Alternatives Evaluation Assessment Report – Stormwater Management Plan (March 2008) (available);*
- *Draft Level 3 Traffic Operations Analysis of Windsor-Essex Parkway (pending); and*
- *Draft Pavement Engineering for Planning Report – Area of Continued Analysis (March 2008) (available).*

9.1 Concept Design Features – Detroit River Crossing

The new river crossing will be constructed to link new inspection plazas on the Canadian and US sides of the Detroit River, and will be a key component of the new end-to-end transportation system that will link existing Highway 401 to the US Interstate system. The crossing will be constructed on the X10-B alignment and will consist of both a main bridge that will span the entire width of the Detroit River, and approaches to the main bridge constructed on piers that will connect to plazas in both Canada and the US. For the purposes of the environmental studies in both Canada and the US, both a suspension bridge and a cable-stayed bridge are being carried forward to subsequent stages for analysis, evaluation and selection of the preferred bridge type. The final bridge type will be recommended at the completion of subsequent stages of the project. Exhibit 9.1 illustrates the location of the proposed crossing.

EXHIBIT 9.1 – PROPOSED CROSSING LOCATION

9.1.1 Geometrics

GENERAL

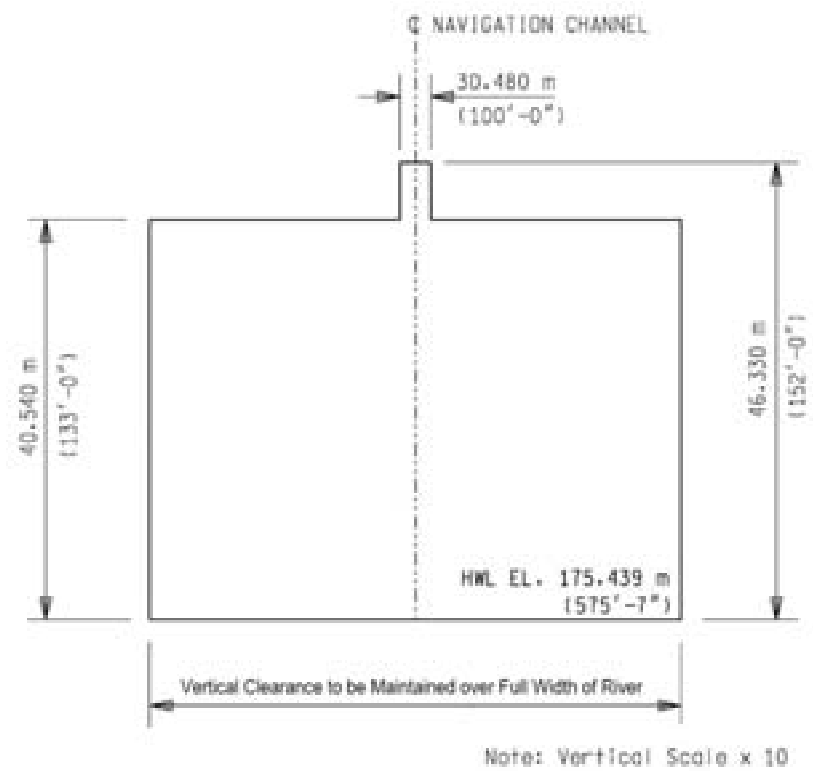
The Detroit River is a major commercial shipping lane and important waterway for marine traffic on the Great Lakes. As such, a navigation clearance box (envelope) of adequate size will be provided so as not to restrict marine traffic along the channel. The navigation envelope shown in Exhibit 9.2 will be provided by the new crossing, and has been developed based on consultations with the US Coast Guard and Transport Canada, as well as shipping industry representatives. This navigation envelope is intended to provide, at a minimum, the same navigation clearance as that provided by the Ambassador Bridge.

The proposed crossing will avoid the placement of piers in the Detroit River for both the suspension bridge and cable-stayed bridge options. The decision to avoid piers in the river was made based on consultation with US and Canadian government agencies and shipping operators, as piers in this section of the Detroit River were considered to be too hazardous to marine navigation.

The main towers (for the suspension bridge option) or pylons (for the cable-stayed option) will be located near the edge of the river bank. On the Windsor side of the Detroit River, these will be located on land within the Southwestern Sales property. Piers will be spaced between 45 m to 60 m apart along the approach structure between the main span bridge and Canadian inspection plaza, and will be extended until the vertical alignment is within approximately 4 m of the existing ground. The "touch-down" point of the approach will be located directly north of the Canadian plaza.

The proposed main crossing will have a main span length of between 840 m and 855 m, depending on the final bridge type selection. The main span bridge crosses the Detroit River at a skew angle of approximately 69 degrees to the centerline of the navigation channel. On the Canadian side of the river, the crossing is aligned over an existing aggregate operation (Southwestern Sales) and vacant land owned by Ontario Power Generation. The main structure is situated just south of Prospect Avenue, south of the area of known brine wells. The recommended crossing and approach structure avoid the known brine wells area, and avoid major industries such as Brighton Beach Power Station, West Windsor Power Plant and Windsor Salt.

EXHIBIT 9.2– DETROIT RIVER NAVIGATION ENVELOPE



DESIGN CRITERIA

Geometric elements of the approach to the main bridge and of the main span bridge itself have been designed to meet the standards set forth in the *Geometric Design Standards for Ontario Highways (GDSOH)*. The details of these geometric design elements are provided in the following paragraphs. Both the approach from the plaza and the main bridge itself will have a posted speed of 60 km/hr and a design speed of 80 km/hr.

The main river crossing structure is subject to the design codes of both the US and Canada and the bridge will be designed using the International System of Units (SI units). The design shall meet the requirements of the *AASHTO LRFD Bridge Design Specifications, SI Units, 4th Edition*, and the *Canadian Highway Bridge Design Code, CAN/CSA S6-06 (S6)*, and in general the more restrictive code shall govern.

A design life of 75 years will be used for statistical assessment of appropriate loads, in accordance with *AASHTO LRFD Bridge Design Specifications Article 1.2 – Definitions*. The service life of the bridge for assessing serviceability of all components will be 120 years. For specific components where it is not practicable to achieve a 120-year life, these components will be designed with the ability to be replaced. Examples of such components include, but are not limited to, stay cables, bearings, expansion joints, deck wearing surface, navigation lighting, and roadway lighting.

CROSS-SECTION

Both the main span bridge and the approach from the plaza to the main bridge will consist of six-lanes, with three lanes in either direction. All six lanes will be 3.75 m in width. Fully paved shoulders 3.0 m wide will be provided on the right side of the travelled lanes in either direction, along with a 1.0 m flush median. The outside shoulder width provides the flexibility to accommodate cyclists, subject to the policies of the border agencies. Concrete barriers will be provided to the outside of the shoulders, and a 1.6 m wide barrier protected sidewalk will be provided on one side of the crossing.

Additional details of the main span bridge and approach cross-sections are provided in **Exhibits** 9.3 and 9.4. It should be noted that the structural depth shown in **Exhibit** 9.3 and the girder sizing and spacing shown in **Exhibit** 9.4 are conceptual only, and are subject to change during subsequent stages of design.

EXHIBIT 9.3– TYPICAL CROSS-SECTION – MAIN SPAN BRIDGE

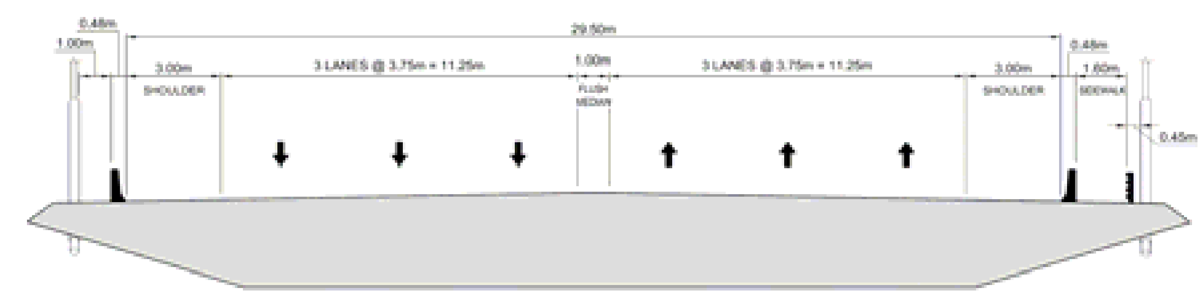
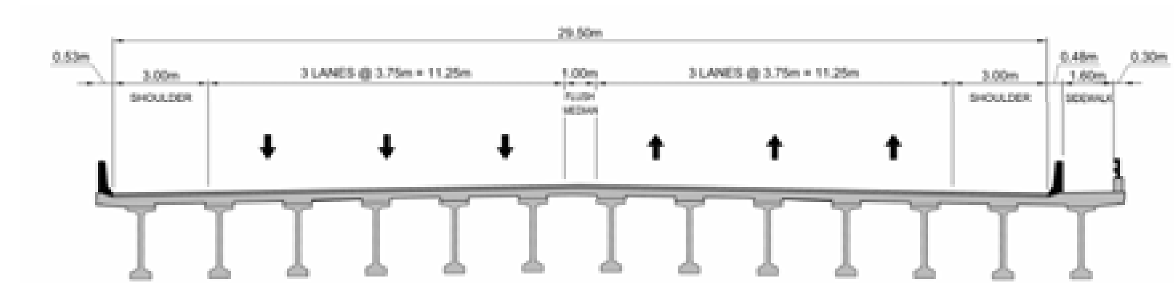


EXHIBIT 9.4– TYPICAL CROSS-SECTION – APPROACH BRIDGE



HORIZONTAL ALIGNMENT

The entire length of the main span bridge will be constructed on a tangent alignment for either the suspension bridge or cable-stayed bridge option. A horizontal curve has been provided between the tangent portion of the main span bridge and the Canadian Plaza. This horizontal curve has a radius of 400 m, which exceeds the minimum radius of 250 m that is required for an 80 km/hr design speed.

The approach to the bridge will cross over McKee Road, which provides private access to local industrial operations. Should the final location of the approach piers interfere with access to McKee Road, a realignment of McKee Road will be provided. A realignment of Sandwich Street will be provided where the approach to the main span bridge connects to the proposed plaza.

VERTICAL ALIGNMENT

The vertical alignment of the main span bridge will exceed the clearance requirements identified in the navigation envelope shown in **Exhibit 9.2**, with a clearance of at least 46 m at the shipping channel defined by Transport Canada – Navigable Waters Division and the US Coast Guard. The maximum grade of the crossing will be 5%. The vertical sag and crest curves will meet or exceed the minimum requirements set forth in the GDSOH for an 80 km/hr design speed. Minimum clearance requirements will be met or exceeded at McKee Road and realigned Sandwich Street.

9.1.2 Design Features

The main span bridge will be either a suspension bridge or a cable-stayed bridge. The final bridge type will be selected during subsequent stages of the project. The primary design features of the two bridge alternatives are described below. Additional details of the two bridge alternatives are provided in the *Bridge Conceptual Engineering Report, February 2008* (refer to List of Supporting Documents). The height of both the suspension bridge towers and cable-stay bridge pylons are a function of the length of the main span, and as such there is little flexibility in this overall height. Schematic illustrations of the two bridge alternatives are included in **Exhibit 9.5**.

SUSPENSION BRIDGE

The suspension bridge alternative consists of an 855 m suspended main span across the Detroit River, with unsuspended backstay spans of approximately 250 m at either end. The main span would be supported at either end by a reinforced concrete tower extending approximately 140 m above their footings. The tower height is a function of the main span bridge length and has been established based on an historically efficient cable span-to-sag ratio of 10:1. Each tower would consist of two tower legs that would rest atop solid pedestals, which in turn would be fixed to a pile-supported footing. The tower legs would have dimensions of approximately 28 m by 18 m at their base, and would be supported by 3.0 m diameter drilled shafts.

The bridge deck would be a steel orthotropic box girder structure approximately 35 m wide and that is continuous from tower to tower. Between the two main towers, the deck would be supported at appropriate intervals by wire rope suspenders connected to the main cables. The main cables would be comprised of galvanized steel wires, while the suspender ropes would be fabricated of galvanized, high-strength wire rope. The suspender ropes would be designed such that they could be removed at isolated locations for inspection, maintenance or replacement without closing the bridge to traffic. Once the full weight of the bridge is hanging from the suspender ropes, both the main cable wires and the suspender ropes would be coated for corrosion protection and waterproofing.

The main cables would be supported at either end of the towers by gravity anchorages. These anchorages would use a combination of self weight, passive soil resistance and direct load transfer to bedrock to resist the pull of the suspension cables. The anchorages at either end of the bridge represent a significant portion of the cost of the suspension bridge alternative, and would have dimensions of approximately 65 m by 56 m. The anchorage on the Windsor side of the river would be constructed on land owned by Ontario Power Generation (OPG).

CABLE-STAYED BRIDGE

The cable-stayed alternative consists of an 840 m main span and symmetric 320 m side spans. The main span would be supported at either end by reinforced concrete pylons extending approximately 250 m above their footings. The height of the concrete pylons above the bridge deck is a function of the main span bridge length, and has been established as 20-25% of the main span length which correlates to a historically efficient stay angle. Two alternative pylon shapes have been investigated. A-frame and inverted Y shaped pylons were chosen based on structural capacity and wind resistance forces. These options would be reviewed further should the cable-stayed alternative be selected as the preferred bridge option. Each pylon would include two pylon legs that would rest atop a drilled shaft supported footing. The pylon legs would be spaced approximately 60 m apart at their base and have dimensions of approximately 21 m by 21 m. The legs would then be supported by 2.5 m diameter drilled shafts, which would extend down into bedrock. The stay cables would be designed such that they can be removed at isolated locations for inspection, maintenance or replacement without closing the bridge to traffic.

The main span bridge deck would be approximately 35 m wide and could accommodate both steel and concrete construction. Between the two main pylons, the deck would be supported at 15 m intervals by prestressed stay cables. The side spans of the bridge would be supported by three piers spaced at 80 m intervals, along with a larger main anchor pier. The bridge deck would be developed as a hybrid design with a concrete box girder for the side spans and a portion of the main span near the towers, and with a steel orthotropic box girder for the centre portion of the main span. It is recommended that the side span bridge deck be constructed of concrete to increase the mass of the deck and minimize uplift in the anchor piers.

EXHIBIT 9.5 – CONCEPTUAL ILLUSTRATIONS OF ALTERNATIVE BRIDGE TYPES

CABLE-STAYED BRIDGE

SUSPENSION BRIDGE

9.1.3 Right-of-Way Requirements

The TEPA Crossing will have a standard width right-of-way of 80 m between the Canadian Plaza and the Detroit River. This will accommodate either bridge structure types.

9.1.4 Illumination

Full illumination will be provided along the entire length of the crossing, along both the approach from the plaza to the main span bridge, and on the main span bridge itself. Additional details of illumination along the crossing will be considered during future design stages.

9.1.5 Construction Methods and Staging

The approach from the plaza to the main span bridge and the main span bridge itself can be constructed using typical construction methods. Construction of the approach and main bridge will be completed in such a manner so as to minimize disruption to the surrounding community and to maintain local access to residences and businesses.

A general concept for construction of the main span bridge has been developed for both the suspension bridge and cable-stayed bridge alternatives. Additional details of construction methods to be employed for construction of the main span bridge are included in the *Bridge Conceptual Engineering Report* (refer to List of Supporting Documents).

It should be noted that construction methods and staging are the responsibility of the selected contractor, subject to the provisions and specifications of the contract. The implementing authorities will develop these contract documents to be in accordance with this Environmental Assessment. The following planning level assessment and specifications of methods and staging has been developed to confirm basic feasibility.

UTILITY RELOCATION

The relocation of existing utilities and other municipal services will be required. This utility relocation stage is often completed prior to the primary construction stages. Relocations and approvals will generally take place in the early stages of construction to minimize risk to construction schedules. Numerous utilities are located within the crossing alignment and will require relocation, including hydro, Bell, Union Gas, Cogeco, steam pipes and municipal watermains and sanitary sewers. The approach to the main bridge will impact the overhead hydro connection between the Hydro One Keith Transformer Station and the adjacent hydro tower lines, and the connection will need to be buried beneath the approach structure.

SUSPENSION BRIDGE CONSTRUCTION

For the suspension bridge alternative, it is anticipated that construction would be completed in five major stages, as generally described below.

Tower and Anchorage Foundations

Following mobilization, work would begin on the tower and anchorage foundations. The tower foundations consist primarily of drilled shafts and a footing, and construction methods would involve conventional techniques for drilled shafts and footings of this size. The anchorage foundations have been designed similar to those at the Ambassador Bridge. Further design phases of the project will involve additional subsurface testing to determine soil properties and select the most cost effective foundation type.

Tower and Anchorage Construction

The second primary stage of construction involves construction of both the towers and the anchorages themselves. Reinforcement for the towers can be prefabricated off-site as much as practicable and placed by crane. Concrete can be placed by pump truck for the initial stages of tower construction, though with increasing height during later stages the concrete can be delivered by tower crane. Temporary supports may be required to mitigate problematic wind conditions as the tower legs extend higher. Anchorage construction consists of mass concrete pours, wall construction and slab construction, all of which can be accomplished with conventional construction techniques for the respective methods.

Main Cable and Suspender Installation

When the towers are complete and the anchorage construction advanced far enough to receive suspension system components, construction of the suspension system can begin. To provide access for cable spinning operations, a catwalk can be erected from anchorage to anchorage that follows the free cable profile. The catwalk system is comprised of several support and hand strands, open mesh flooring and sides, frames at regular intervals, and several cross bridges between cables. A storm system is provided to stabilize the catwalk in high winds and provide for profile adjustment as necessary.

Bridge Deck Fabrication

The bridge deck can be fabricated at an off-site location in a number of smaller segments. The size of the segments would be limited by transport methods and equipment available to hoist the segments into place. Once fabricated, the segments could be trial assembled on the ground, either on-site or at a nearby yard.

Bridge Deck Erection and Finishing

After trial assembly of the fabricated deck segments, the segments would be transported to the site, likely by barge. The segments can be hoisted into place by a pair of lifting gantries supported by, and spanning the two main cables. Once lifted into position, the weight of the segments would be transferred to the permanent suspenders and the segments connected to one another. When the deck is complete, operations would begin to install the electrical/mechanical systems, roadway barriers, deck water proofing, and so forth.

CABLE-STAYED BRIDGE CONSTRUCTION

For the cable-stayed bridge alternative, construction would be completed in five major stages, similar to the general stages for construction of the suspension bridge option.

Pylon and Anchor Pier Foundations

Following mobilization, work would begin on the pylon and anchor pier foundations. Construction of both the pylon and anchor pier foundations can be completed in a similar manner as for the tower foundations for the suspension bridge option.

Pylon and Anchor Pier Construction

The second primary stage of construction involves construction of both the pylons and the anchor piers themselves. Construction of the pylons and anchor piers can be completed independent of each other and completed using similar construction methods as for the suspension bridge option.

Bridge Deck Fabrication

As with the suspension bridge option, the bridge deck can be fabricated at an off-site location in a number of smaller segments. The segments would be trial assembled on the ground.

Stay Cable and Bridge Deck Erection

After trial assembly of the fabricated deck segments, the segments can be transported to the site and the main span erected in a cantilever manner from each tower, with a stay cable installed as each segment of the bridge deck is erected. Construction of the side spans can be accomplished concurrent with the tower construction, and completed in advance of the main span construction. Side span stay cable installation would mirror the main span stay cable installation.

Finishing Works

When the main span deck is complete, operations would begin for the finishing works, including construction of the electrical/mechanical systems, roadway barriers, deck water proofing, and so forth.

9.1.6 Considerations for Subsequent Development

Subsequent stages of design of the crossing will involve further investigations regarding bridge materials, foundations, structural monitoring and security, maintenance and durability requirements, a site-specific wind evaluation and additional geotechnical field investigations at anticipated foundation locations. Details of these issues are documented in the *Bridge Conceptual Engineering Report* (refer to List of Supporting Documents).

The Detroit River International Crossing bridge represents a major structure and warrants consideration of the visual attributes and quality of the crossing. While the aesthetic development of the bridge has not been a primary objective during the conceptual development stage, there has been an awareness of the magnitude and importance of the crossing and attention was given to providing a logical and well proportioned structure. Subsequent stages of the bridge design will consider the visual quality and aesthetic development of the design. A series of Context Sensitive Design Workshops have been conducted in parallel with the development of the bridge concepts and the results of those workshops should be reasonably factored into the subsequent visual development of the bridge.

9.2 Concept Design Features – Plaza

The new international plaza on the Canadian side of the Detroit River crossing will be situated within the Brighton Beach Industrial Subdivision. The plaza will be bounded by the Detroit River, Chappus Road, Ojibway Parkway and Broadway Street, and was previously identified as Inspection Plaza B1 in the development and evaluation of practical plaza alternatives (refer to Chapter 8).

The plaza is situated west of Ojibway Parkway mostly on lands acquired by the City of Windsor for the purposes of establishing an industrial park. The Brighton Beach Industrial Park is named after the former Brighton Beach neighbourhood which previously occupied these lands. Over time, most of the residences have been acquired and removed so the area is generally vacant. The existing industrial area also includes the Brighton Beach and West Windsor power plants, the Nemak Automotive manufacturing plant, a Hydro One transformer station and aggregate storage facilities. Exhibit 9.6 illustrates the location of the proposed international plaza.

EXHIBIT 9.6 – PROPOSED PLAZA LOCATION

9.2.1 Layout of Plaza Facilities and Operations

GENERAL

A conceptual layout of the plaza facilities is presented in the concept design plates in Appendix A. Although the precise layout of the various facilities within the plaza may be modified during future design phases of the plaza, the type and function of the major facilities within the plaza will remain generally unchanged. The final layout of the plaza will be based on consultation with the Canada Border Services Agency (CBSA). Ultimate ownership and operation of the plaza will be under the direction of the Government of Canada.

The international customs plaza will be built to accommodate projected border traffic to beyond the 2035 design year. The plaza will include 29 inbound primary inspection lanes and 9 toll collection lanes. In addition to providing general traffic lanes for both passenger and commercial vehicles, the plaza will include dedicated NEXUS and FAST lanes to improve border crossing processing capabilities. The plaza layout illustrated in the concept design plates shows a fully developed plaza.

Initial construction of the plaza may not include the fully developed plaza, as the plaza may be developed in stages.

The final design of the plaza will incorporate a local access road along the edge of the plaza that will provide continuity for traffic between Sandwich Street and Broadway Street as well as access for plaza employees. Local access will also be provided at the north end of the plaza from a realigned Sandwich Street to the Brighton Beach Power Station and Keith Transformer Station.

PLAZA FACITILIES

The major facilities that will be included within the plaza include outbound toll booths, an outbound inspection area for occasional use, a primary inspection area for inbound vehicles, and a secondary inspection area for inbound vehicles. Both the primary and secondary inbound inspection areas will be divided into passenger and commercial areas, while some primary inspection lanes will be flexible for use by both cars and trucks. The plaza will also consist of a duty free shop for use by outbound vehicles, a maintenance building, a main building designated for employee use along with employee parking, and drainage facilities including, but not limited to, a stormwater management/retention pond to treat runoff from the plaza. A local service road will also be provided within the plaza for internal use.

In general, vehicles entering the Canadian plaza from The Windsor-Essex Parkway on the Canadian side will pass through the outbound toll booths and outbound inspection area if being utilized. Vehicles will then have the option of stopping at the duty free shop before proceeding to the new international bridge crossing. Primary and secondary inspection for vehicles heading to the US will occur at the new customs plaza to be constructed on the US side of the crossing. Inbound vehicles entering the Canadian plaza from the bridge will be divided between passenger and commercial truck traffic, and will proceed through the primary inspection lanes. If necessary, passenger vehicles will proceed to the secondary inspection area designated for passenger vehicles, and commercial vehicles will proceed to the secondary inspection area designated for commercial vehicles. Vehicles will then proceed through the plaza and to The Windsor-Essex Parkway.

9.2.2 Property Requirements

The plaza will be approximately 55 hectares (137 acres) in size. This area will encompass all primary and secondary inspection areas, toll booths, buildings and parking within the plaza, as well as all stormwater management features. During future design stages of the project, the specific sizing and layout of the plaza may be subject to minor revisions, however the location of the plaza will generally remain unchanged.

9.2.3 Illumination

The international customs plaza will be fully illuminated. Additional details of the proposed illumination within the plaza will be determined during future design stages.

9.2.4 Construction Methods and Staging

Construction of the plaza will primarily involve relocation of utilities, topsoil stripping, placement of fill, construction of drainage components (i.e. sewers and catchbasins) and other utilities, construction of foundations for various plaza structures, plaza buildings, and paving. It is anticipated that each of these components can be constructed using normal construction methods. Construction of the customs plaza will be completed in such a manner so as to minimize disruption to the surrounding community and to maintain local access to residences and businesses.

9.2.5 Utilities

A number of utilities and other municipal services are located in the vicinity of the plaza that will require removal or relocation. The utility relocation stage is generally completed prior to the main construction stage. Relocations are anticipated to take place in the early stages of construction to minimize risk to construction schedules. Utilities in the vicinity of the plaza include hydro, Bell, Union Gas, Cogeco, steam pipes and municipal watermains and sanitary sewers. Significant utilities that will require relocation at the plaza include gas pipelines connecting to the Brighton Beach Power Station and the West Windsor Power Generation Plant, steam lines from the West Windsor Power Plant connecting to Archer Daniel Midland and Windsor Salt, and the various Hydro One transmission and distribution connections from the Keith Transformer Station which includes an international connection. Significant work might also be required at the Keith Transformer Station to accommodate future expansion and to protect the existing station from salt contamination.

9.2.6 Drainage

The proposed plaza will consist primarily of impervious asphalt and building rooftops, which would, if unmitigated, contribute to increased pollutant loadings (oil, coolant, gasoline, etc.), roadside grit and garbage (gravel, sand, cigarette butts), infrequent pollutant spills, and localized increase of overland runoff to the receiving watercourses. Therefore, stormwater management for the plaza will be required to provide quality treatment for the catchment area. As the site is located adjacent to the Detroit River with direct access, no quantity control measures are considered necessary. Enhanced quality treatment will be provided in accordance with the MOE document *Stormwater Management Planning and Design Guidelines*, which requires the removal of a minimum of 80% total suspended solids.

As illustrated in the plaza layout included in the concept design plates of Appendix A, stormwater management retention ponds will be constructed generally along the southern edge of the plaza property, with a smaller facility constructed in the north-east corner of the plaza. The size, location and configuration of these ponds will be refined during future design stages for the plaza. Minor storm runoff will be conveyed to the stormwater management ponds through a series of storm sewers, with the major storm runoff flowing overland to the facilities. The stormwater management ponds will outlet to the Detroit River through a natural channel in the southwest portion of the plaza through an outlet structure controlling the release rate to the Detroit River. Due to the flat topography of the plaza location, portions of the plaza may be elevated to facilitate positive drainage, thereby reducing or eliminating any requirement for pumping stormwater from the plaza.

As the future design of the plaza progresses, opportunities to incorporate acceptable alternative stormwater solutions may be identified. Alternative stormwater solutions for the plaza that may be considered include permeable pavers, perforated storm sewer pipes, Green Roof systems, and infiltration basins. These alternative solutions will be designed to provide additional upstream quality and quantity control of runoff prior to reaching the stormwater management ponds. Additional analysis will be performed during subsequent design stages to assess the effectiveness and feasibility of these solutions at the plaza location. ·Measures to reduce the area of impervious surface associated with the new plaza will also be investigated during future design phases.

9.3 Concept Design Features – The Windsor-Essex Parkway

The Windsor-Essex Parkway consists generally of a six-lane freeway portion connecting existing Highway 401 to the new inspection plaza, a four-lane service road connecting existing Highway 3 to existing Huron Church Road, and a multi-use recreational trail network. The conceptual design features of each of these components are presented in this section.

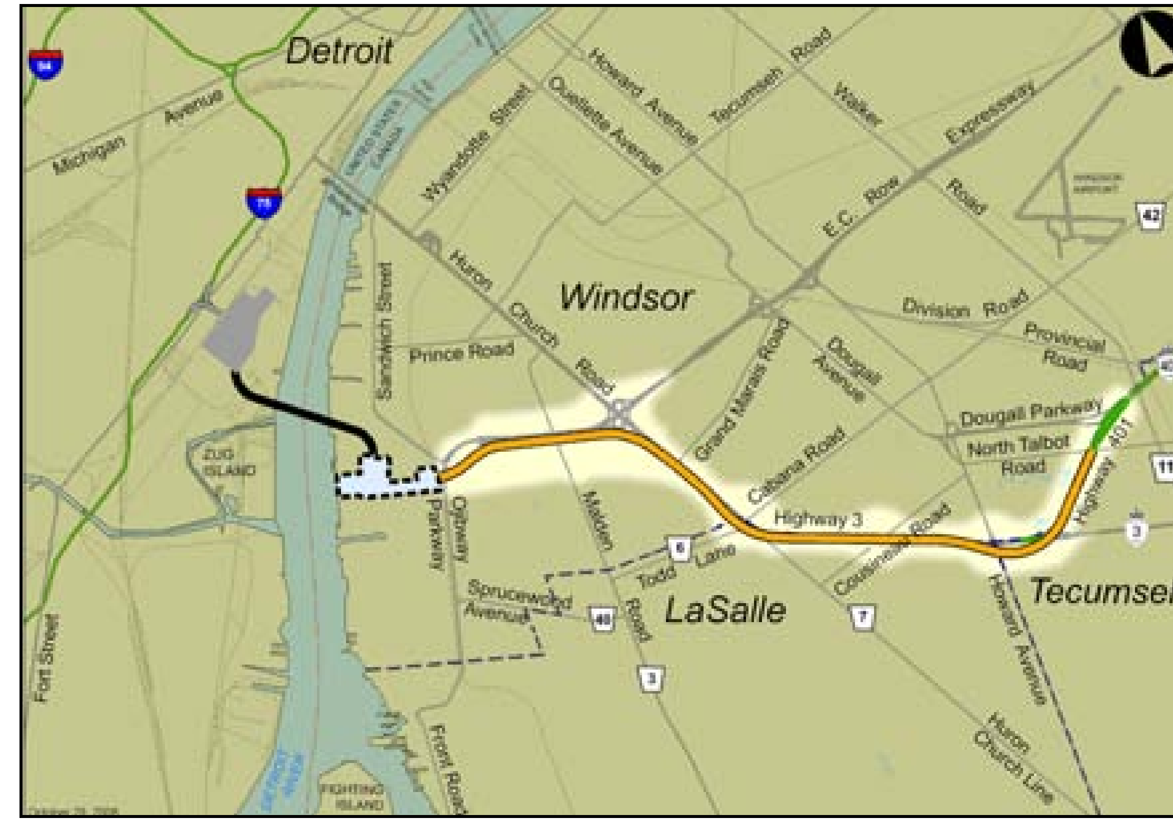
9.3.1 Geometrics

GENERAL

In general, the freeway portion of The Windsor-Essex Parkway is a six-lane urban freeway with paved shoulders and a paved median with Ontario Tall Wall concrete median barrier. The freeway connects the proposed new inspection plaza to the existing alignment of Highway 401 in the vicinity of North Talbot Road. From west to east, The Windsor-Essex Parkway corridor generally follows existing E.C. Row Expressway from Ojibway Parkway easterly to Huron Church Road, and then follows Huron Church Road from E.C. Row Expressway southerly to Highway 3. The corridor then follows Highway 3 easterly to existing Highway 401 and finally follows existing Highway 401 to North Talbot Road. Between Huron Church Road north of Bethlehem Avenue/Labelle Street and existing Highway 3 east of Outer Drive, The Windsor-Essex Parkway includes a four-lane service road. The service road will provide local community connections and access to the freeway, and will replace the existing local function of the Highway 3/Huron Church Road corridor. Exhibit 9.7 illustrates the full Windsor-Essex Parkway corridor.

Geometric elements of The Windsor-Essex Parkway have been designed to meet or exceed the standards set forth in the *Geometric Design Standards for Ontario Highways* (GDSOH). Details of these geometric design elements are provided in the following paragraphs. Additional information regarding the conceptual design of The Windsor-Essex Parkway is presented in the concept design plates located in Appendix A.

EXHIBIT 9.7 – THE WINDSOR-ESSEX PARKWAY CORRIDOR



CROSS-SECTION

All six through-lanes on the freeway portion of The Windsor-Essex Parkway will be 3.75 m in width and shoulders will be fully paved and 3.0 m in width (median and outside). The total width of the paved median will be 6.8 m which allows for two shoulders 3.0 m in width and an Ontario Tall Wall concrete median barrier which is 0.8 m in width. Median shoulder widths may be increased locally at horizontal curves to provide adequate safe stopping sight distances.

Where speed change lanes are required in the vicinity of interchanges and access points, the width of these auxiliary lanes will be 3.5 m and the adjacent outside shoulder will be 2.5 m in width in accordance with GDSOH guidelines.

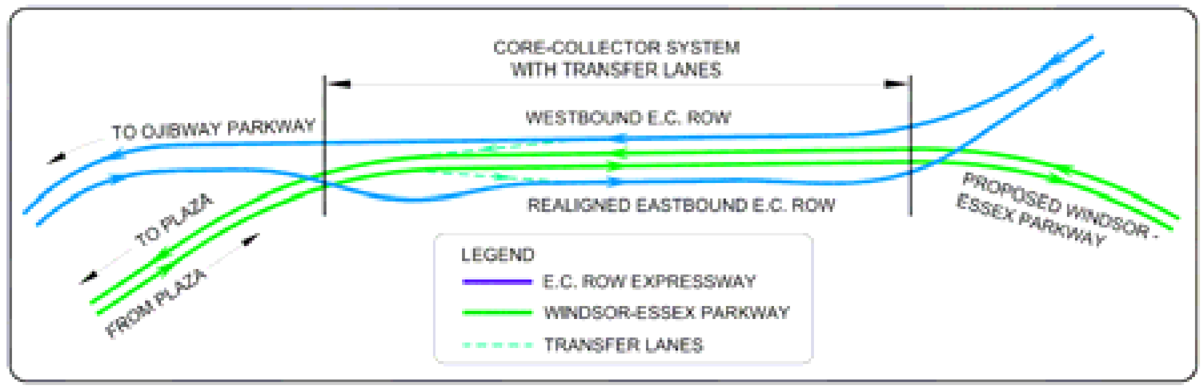
The proposed service road typically consists of four lanes 3.75 m in width with paved outside shoulders 2.5 m wide and a 1 m wide flush median. Right turn lanes 3.5 m in width and left turn lanes 3.0 m in width are provided locally at intersections where projected traffic volumes warrant such auxiliary lanes.

From the proposed customs plaza easterly approximately 1 km to where the freeway portion of The Windsor-Essex Parkway approaches E.C. Row Expressway approximately 0.3 km east of Matchette Road, the proposed freeway is on an earth embankment and situated south of existing E.C. Row Expressway.

From approximately 0.3 km east of Matchette Road to approximately 0.4 km west of Huron Church Road, the freeway portion of The Windsor-Essex Parkway and E.C. Row Expressway are integrated into a core-collector system. In this section, the eastbound and westbound lanes of E.C. Row Expressway diverge and the freeway portion of The Windsor-Essex Parkway is aligned between them.

The eastbound and westbound lanes of E.C. Row Expressway serve as the "collector" lanes of the system and the eastbound and westbound lanes of the freeway portion of The Windsor-Essex Parkway form the "core". Transfer lanes will be provided along the core-collector system to connect the two freeways. Both the core and collector lanes (the proposed freeway and E.C. Row Expressway lanes) in this section will follow the existing profile of E.C. Row Expressway. Although the initial design of The Windsor-Essex Parkway through this section had the freeway beside the E.C. Row Expressway, the core-collector system was developed to reduce impacts to the Spring Garden community and adjacent to natural features. A schematic illustration of the core-collector system is included in Exhibit 9.8.

EXHIBIT 9.8 – CORE-COLLECTOR SYSTEM SCHEMATIC



From north of Bethlehem Avenue/Labelle Street to approximately 1.0 km east of Howard Avenue, the proposed freeway is below-grade and will incorporate open cut sections with vegetated side slopes where feasible. Retaining walls, either partial-height or full-height, will be utilized in localized areas to minimize property requirements and associated impacts throughout the corridor. Within this section, the location of the service road relative to the freeway varies. From north of Bethlehem Avenue/Labelle Street to east of Huron Church Line, the proposed service road is adjacent to the proposed freeway on the east/north side. From east of Huron Church Line to approximately 0.7 km west of Howard Avenue, the proposed service road is situated on the south side of the proposed freeway. From 0.7 km west of Howard Avenue to approximately 0.3 km east of Howard Avenue, the proposed service road is once again located adjacent to the proposed freeway on the north side. East of this location, no service road is proposed.

Although the freeway cross-section will incorporate open cut sections where feasible, retaining walls have been utilized in numerous locations to minimize property requirements and associated impacts throughout the corridor. Retaining walls have also been utilized in combination with open cut sections to reduce the depth of open cut, as discussed in Section 9.3.1.

From approximately 1.0 km east of Howard Avenue to North Talbot Road, The Windsor-Essex Parkway is predominantly at existing grade. There is no service road proposed through this section.

Exhibits 9.9 and 9.10 include additional details regarding elements of the access road and service road cross-sections. Exhibit 9.9 includes typical cross-sections of The Windsor-Essex Parkway along the Huron Church Road / Highway 3 corridor, including adjacent service roads. Exhibit 9.10 includes typical cross-sections of The Windsor-Essex Parkway with no adjacent service roads, including at-grade and above-grade cross-sections along with the core-collector system adjacent to E.C. Row Expressway.

EXHIBIT 9.9 – TYPICAL CROSS-SECTIONS – THE WINDSOR-ESSEX PARKWAY WITH SERVICE ROAD

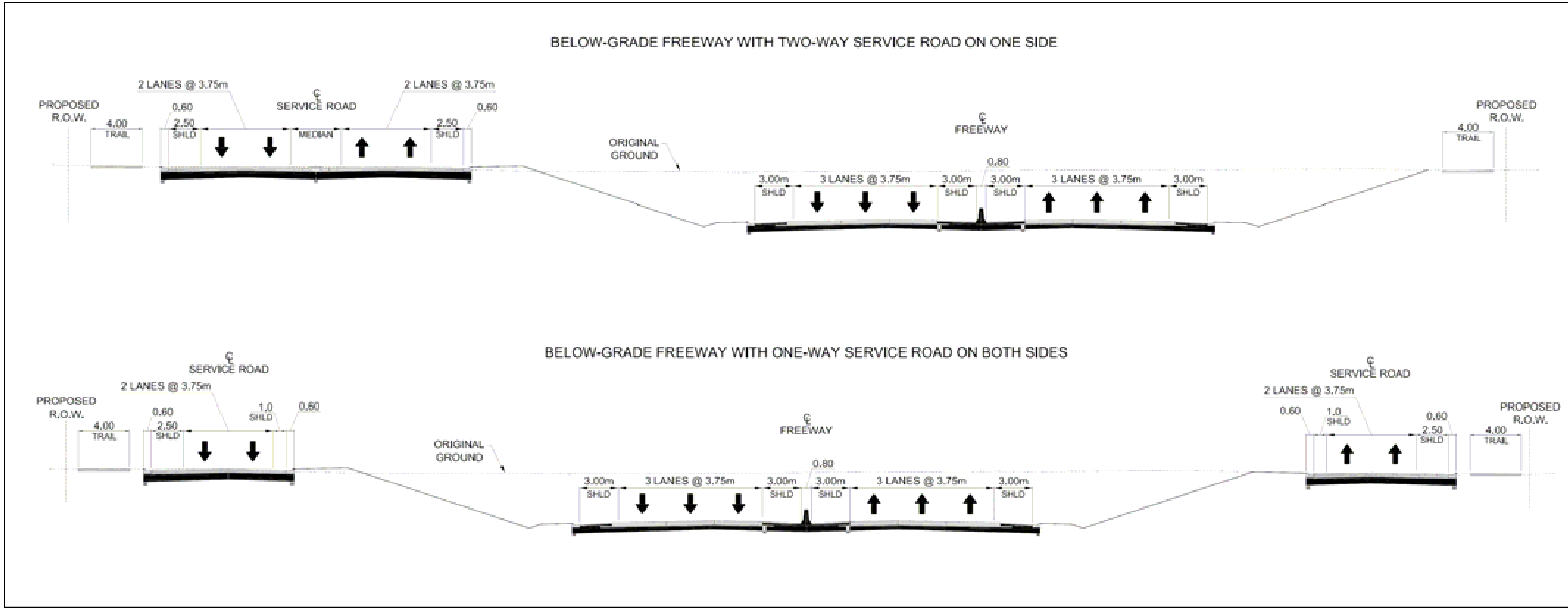
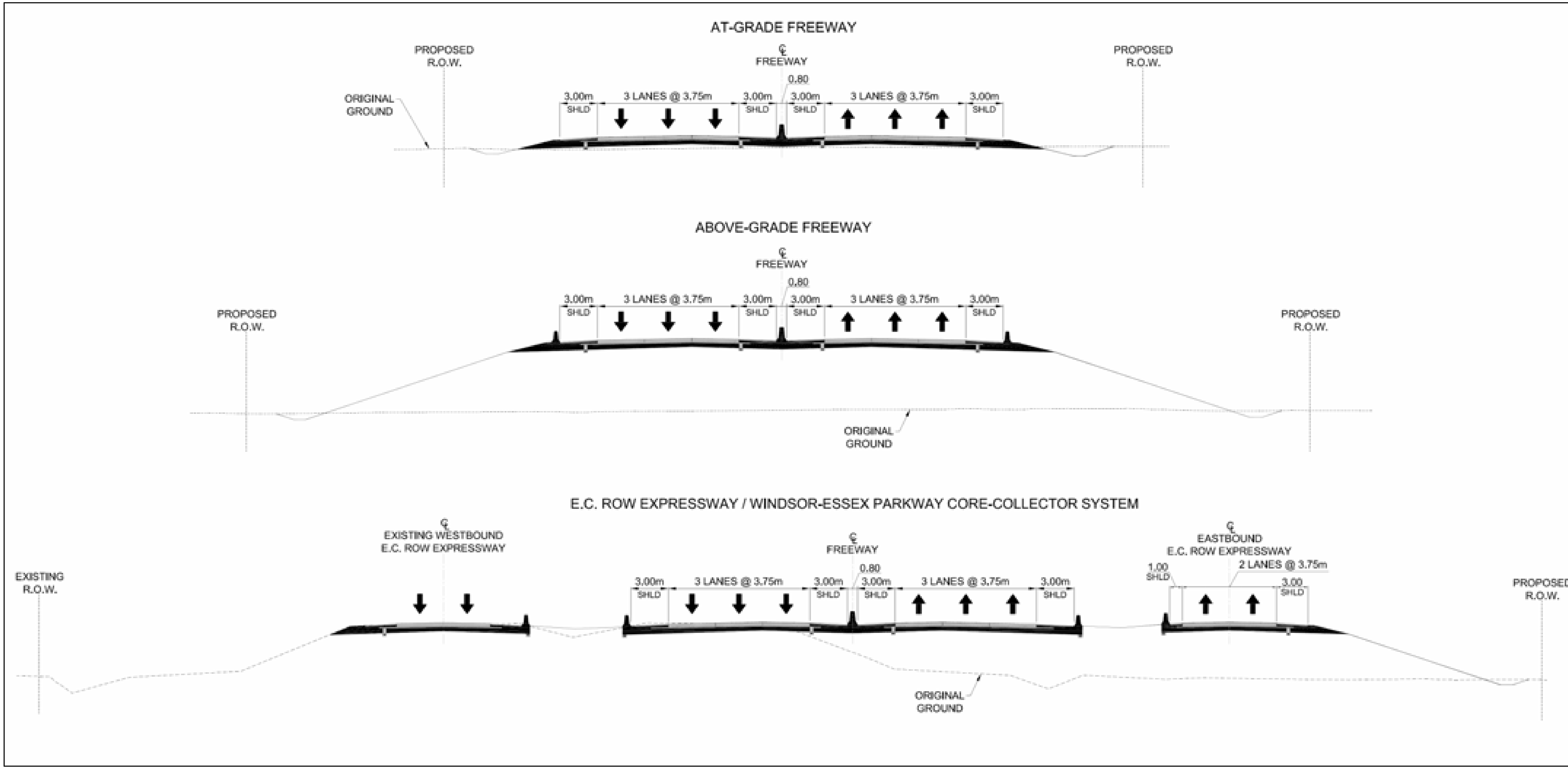


EXHIBIT 9.10 – TYPICAL CROSS-SECTIONS – THE WINDSOR-ESSEX PARKWAY WITH NO SERVICE ROAD



HORIZONTAL ALIGNMENT

Freeway

The horizontal alignment elements of the freeway portion of The Windsor-Essex Parkway were designed to meet or exceed the requirements set forth in the GDSOH.

Due to the termination of the proposed freeway at the new customs plaza, there is a need to slow traffic and change driver expectations as they approach the plaza. As such, the design speed of the proposed freeway varies along its length. Between the customs plaza and Huron Church Road, the design speed is 100 km/h. Between Huron Church Road and Huron Church Line, the design speed is 110 km/h. Between Huron Church Line and North Talbot Road, the design speed is 120 km/h.

There are a total of ten horizontal curves proposed for the alignment of the freeway portion of The Windsor-Essex Parkway. Radii of these curves range between 850 m and 10,000 m and all exceed minimum curve radius requirements for the proposed design speed as per the GDSOH. Table 9.1 summarizes the horizontal curves for the proposed freeway.

TABLE 9.1 – SUMMARY OF FREEWAY HORIZONTAL CURVES

Horizontal Curve Location	Roadway Design Speed	Minimum Required Radius	Proposed Radius
East of Ojibway Parkway	100 km/h	420 m	850 m
East of Matchette Road	100 km/h	420 m	1,100 m
North of Bethlehem Ave./Labelle St.	110 km/h	525 m	1,200 m
North of Lambton Rd./Grand Marais Rd. W	110 km/h	525 m	3,000 m
Pulford St.	110 km/h	525 m	3,000 m
Todd Lane/Cabana Rd. W	110 km/h	650 m	1,100 m
St. Clair College	120 km/h	650 m	7,000 m
Montgomery Drive	120 km/h	650 m	2,000 m
East of Howard Avenue	120 km/h	650 m	850 m
West of North Talbot Road	120 km/h	650 m	10,000 m

Illustration of the horizontal alignment of the freeway portion of The Windsor-Essex Parkway is presented in the concept design plates in Appendix A.

Service Road

The horizontal alignment elements of the service road portion of The Windsor-Essex Parkway were designed to meet or exceed the requirements set forth in the GDSOH. Between existing Highway 3 at the south limit of the proposed improvements and 0.5 km south of Huron Church Line, the service road has been designed for a design speed of 100 km/hr. There are a total of 14 horizontal curves associated with this stretch of the service road alignment. All of these horizontal curves exceed the curve radius requirements for a design speed of 100 km/hr (420 m).

From 0.5 km south of Huron Church Line to the north limit of the proposed improvements, the service road has been designed for a design speed of 80 km/hr. There are a total of 7 horizontal curves associated with this stretch of the service road alignment. All of these horizontal curves meet or exceed the curve radius requirements for a design speed of 80 km/hr (250 m).

Illustration of the horizontal alignment of the service road portion of The Windsor-Essex Parkway is presented in the concept design plates in Appendix A.

VERTICAL ALIGNMENT

Freeway

The vertical alignment of the freeway portion of The Windsor-Essex Parkway has been developed to a concept level of detail to allow for future refinements based on more detailed structural design as well as geotechnical and constructability considerations in subsequent phases of design. The vertical alignment of the proposed freeway will adhere to general principles as outlined in this section of the report.

For the purposes of description of the proposed freeway vertical alignment, elevations are described qualitatively using the following terms:

Below-grade – Top of pavement is between 4 - 8 m below the existing ground level;

Shallow Below-grade – Top of pavement is 0 – 4 m below the existing ground level;

At-grade – Top of pavement is between the existing ground level and 2 m above the existing ground level;

Above-grade – Top of pavement is more than 2 m above the existing ground level.

Transition – Profile is transitioning between "Below-grade" and "Above-grade".

The qualitative description of the freeway portion of The Windsor-Essex Parkway is tabulated section-by-section in Table 9.2.

TABLE 9.2 – QUALITATIVE DESCRIPTION OF PROPOSED FREEWAY ELEVATION

Freeway Section	Qualitative Elevation of Freeway Top of Pavement	Comment
From proposed plaza to approx. 0.3 km east of Matchette Road	Above-grade	Proposed freeway crosses over ETR, Ojibway Parkway and Matchette Road
From approx. 0.3 km east of Matchette Road to approx. 0.3 km west of Malden Road	At-grade	Proposed freeway generally follows existing E.C. Row Expressway profile
From approx. 0.3 km west of Malden Road to approx. 0.4 km east of Malden Road	Above-grade	Proposed freeway crosses over Malden Road
From approx. 0.4 km east of Malden Road to approx. 0.8 km east of Malden Road	Transition	Proposed freeway transitions between Above-grade and Below-grade
From approx. 0.8 km east of Malden Road to approx. 0.2 km north of Turkey Creek	Below-grade	Proposed freeway crosses beneath local roads, proposed service road and various tunnel sections
From approx. 0.2 km north of Turkey Creek to approx. 0.3 km south of Turkey Creek	Shallow Below-grade	Proposed freeway crosses above Turkey Creek while remaining as far below existing ground level as possible
From approx. 0.3 km south of Turkey Creek to approx. 0.6 km east of Howard Avenue	Below-grade	Proposed freeway crosses beneath local roads, proposed service road and various tunnel sections
From approx. 0.6 km east of Howard Avenue to existing Highway 3 Underpass	Transition	Proposed freeway transitions from Below-grade to At-grade
From Existing Westbound Highway 3 Underpass to North Talbot Road	At-grade	Proposed freeway matches existing Highway 401 profile

As discussed in the *Horizontal Alignment* section, the design speed of the freeway portion of The Windsor-Essex Parkway varies along its length. All elements of the vertical alignment of the proposed freeway meet or exceed the requirements set forth in the GDSOH for the proposed design speeds.

The minimum grade on the proposed freeway is 0.5 % which meets the requirements of the GDSOH for a freeway with an urban drainage system. The maximum grade of the proposed freeway is 3.0% which meets the GDSOH requirements for freeways.

Illustration of the vertical alignment concept of the proposed freeway is presented in the concept design plates in Appendix A.

Service Road

As discussed in the *Horizontal Alignment* section, the design speed of the service road portion of The Windsor-Essex Parkway varies along its length. All elements of the vertical alignment of the service road meet or exceed the requirements set forth in the GDSOH for the proposed design speeds.

The proposed service road is predominantly at-grade throughout the corridor to tie into the existing local road network. However, in two localized areas (north of Todd Lane/Cabana Road West and east of Cousineau Road/Sandwich West Parkway) the proposed service road is below-grade for short distances where they pass beneath tunnel sections.

Illustration of the vertical alignment concept of the proposed service road is presented in the concept design plates in Appendix A.

INTERCHANGES AND ACCESS POINTS

Interchanges and access points between the proposed freeway, proposed service road and side roads are included in The Windsor-Essex Parkway design concept to facilitate mobility and local access in the corridor and provide the opportunity for border-bound motorists to choose a border crossing.

Many of the access points of the proposed freeway have been sited to optimize mobility in the corridor and at several locations it is not appropriate to describe the access points as "interchanges". As such, interchange spacing guidelines set forth in the *Geometric Design Standards for Ontario Highways (GDSOH)* were not applied for site selection but, instead, guidelines for spacing successive entrance and/or exit terminals were employed to ensure suitable operations.

Illustration of access point ramp locations and ramp geometrics is presented in the concept design plates in Appendix A.

Modern Roundabout at The Windsor-Essex Parkway/Highway 3/Howard Avenue Diversion

As part of The Windsor-Essex Parkway design concept, a modern roundabout is proposed for the intersection of realigned Highway 3, the proposed Howard Avenue diversion and the proposed freeway on and off-ramps east of Howard Avenue. The conceptual design of this roundabout has been developed in accordance with guidelines in the US Federal Highways Administration (FHWA) document entitled *Roundabouts: An Informational Guide* as well as Section 26 of the *State of Wisconsin Facilities Development Manual* which describes roundabout guidelines. British Colombia and Kansas Department of Transportation standards were also applied. The proposed modern roundabout has an inscribed diameter of 65 metres and a two-lane cross-section. Highway 3 forms the east leg, the proposed service road forms the west leg, an off-ramp and on-ramp from The Windsor-Essex Parkway forms the north leg and the proposed Howard Avenue diversion forms the south leg of the roundabout. Illustration of the proposed roundabout is presented in the concept design plates in Appendix A.

CARPOOL LOTS

The Ontario Ministry of Transportation has constructed and operated a network of carpool lots across southern Ontario since 1979. Carpool lots are constructed as a means of encouraging ride sharing and reducing congestion and vehicular emissions. The current Environmental Assessment study has considered the provision of carpool lots within the road network of The Windsor-Essex Parkway, and one site has been identified as a potential carpool lot location. This site is located on the east side of the Howard Avenue diversion, south of the proposed roundabout at realigned Highway 3. Further design stages of the project will include additional study as to the layout and feasibility of providing this carpool lot.

9.3.2 Crossing Roads

Numerous local, collector and arterial crossing roads intersect with The Windsor-Essex Parkway corridor. As part of the concept design of The Windsor-Essex Parkway, it is proposed that some of these crossing roads be provided with interchanges at the proposed freeway, some connected with the proposed service road, some grade separated from the corridor and some closed. These crossing roads are summarized below. Illustration of crossing road treatments as part of the conceptual design of The Windsor-Essex Parkway is presented in the concept design plates in Appendix A.

FULL OR PARTIAL INTERCHANGES

Full or partial interchanges at the proposed freeway are proposed for the following crossing roads:

- Ojibway Parkway (full moves interchange)
- Todd Lane/Cabana Road West (partial moves interchange)
- Highway 3 (full moves interchange)

The Highway 3 interchange includes a modern roundabout that also provides access for the proposed Howard Avenue diversion to and from the interchange ramps on the proposed freeway. This configuration effectively provides a full moves interchange for the proposed Howard Avenue diversion south of the corridor.

INTERSECTIONS WITH PROPOSED SERVICE ROAD

Intersections with the proposed service road are proposed for the following crossing roads:

- Labelle Street/Bethlehem Avenue
- Lambton Road/Grand Marais Road West
- Pulford Street
- Todd Lane/Cabana Road West
- Huron Church Line
- Geraedts Drive (St. Clair College)
- Sandwich West Parkway/Cousineau Road
- Montgomery Drive
- Howard Avenue
- Outer Drive

Traffic on the proposed service road will have access to and from the proposed freeway in several locations along the corridor. These access points effectively provide access to and from the proposed freeway for all of the above listed crossing roads.

In addition, the roundabout at the proposed Highway 3 interchange includes a connection to the proposed service road which provides for access to and from the service road for Highway 3 and the proposed Howard Avenue diversion.

GRADE-SEPARATED CROSSINGS

Grade-separated crossings with no access to The Windsor-Essex Parkway are proposed for the following crossing roads:

- Matchette Road (overpass)
- Malden Road (overpass)
- North Talbot Road (underpass)

ROAD CLOSURES

The following roads formerly having access to the Huron Church/Highway 3 corridor are proposed to be closed at the boundary of The Windsor-Essex Parkway corridor:

- Gratiot Street (City of Windsor)
- Lansing Street (City of Windsor)
- Reddock Street (City of Windsor)
- Surrey Drive (Town of LaSalle)
- Grosvenor Drive (Town of LaSalle)

Access from Reddock Street to the proposed service road will be provided via a new road connection between Reddock Street and Todd Lane. Alternatively, a connection may be constructed between Reddock Street and Gratiot Street and connected to the service road at the Pulford Street intersection. The construction of a Pulford Street connection to the Reddock Street to Gratiot Street connection will be dependent on the results of future consultation with the City of Windsor and local property owners, and will consider approved development plans for this area.

ADDITIONAL ROAD IMPROVEMENTS

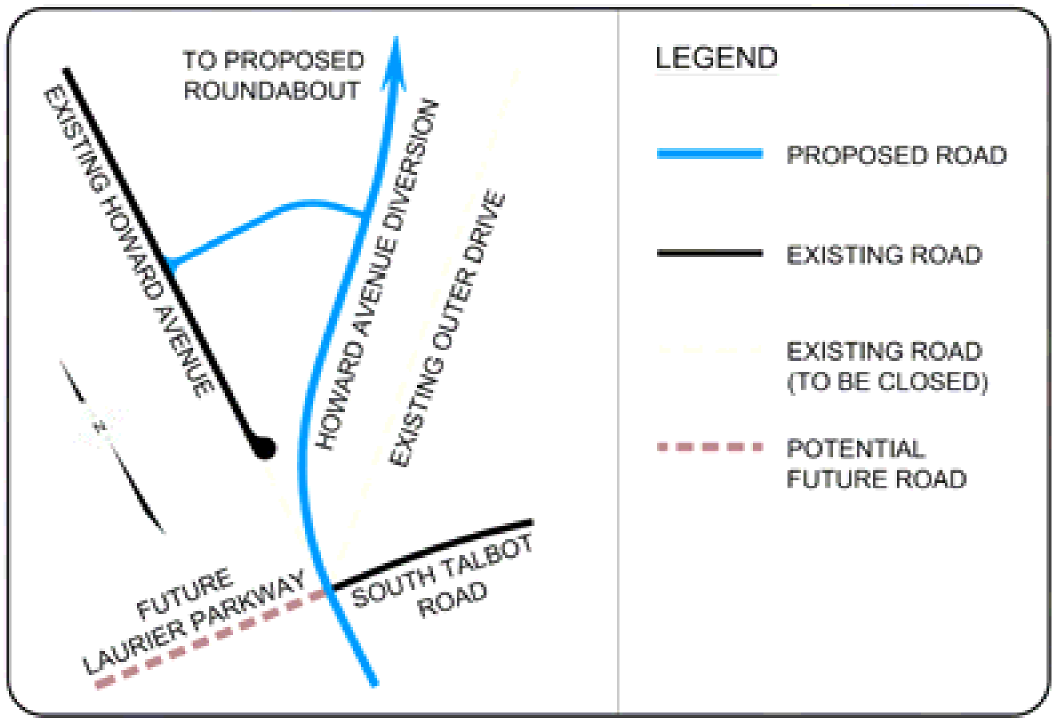
The concept design of The Windsor-Essex Parkway includes the addition of a double left turn lane for the northbound approach of Ojibway Parkway at the existing intersection with the E.C. Row Expressway. The second left turn lane is required based on anticipated traffic operational concerns at the intersection. A second receiving lane will also be added to the northwest approach of the intersection to handle the additional left turn lane.

The concept design of The Windsor-Essex Parkway includes a realignment of existing Highway 3 east of Outer Drive, east of the freeway portion of The Windsor-Essex Parkway. The existing Highway 3 /

Outer Drive intersection will be removed, and the connection from Outer Drive to Highway 3 will be provided via a new connecting road.

Howard Avenue will be realigned to the east to connect to the Howard Avenue diversion near South Talbot Road. This Howard Avenue diversion will replace Outer Drive and will form the south leg of the proposed roundabout described in Section 9.2.1. A schematic illustration of the proposed improvements at the Howard Avenue diversion is provided in **Exhibit 9.11**.

EXHIBIT 9.11 – HOWARD AVENUE DIVERSION SCHEMATIC



9.3.3 Right-of-Way Requirements

The property requirements for The Windsor-Essex Parkway are dependent upon the location of the service road, the proposed trail network, stormwater management ponds and watercourse realignments, and utility corridors. Where possible, existing rights-of-way have been utilized to minimize the impact to the surrounding environment and property owners. Property requirements are also dependent on providing buffering for surrounding communities and for protection of environmental features. Opportunities will be sought to forge partnerships with parties to restore and enhance required property with native and endangered species, and to transfer lands within The Windsor-Essex Parkway to parties that can best protect sensitive areas.

From the proposed customs plaza easterly to Huron Church Road, the freeway portion of The Windsor-Essex Parkway will be integrated with the E.C. Row Expressway. This integration maximizes use of the existing E.C. Row Expressway right-of-way to minimize impact to the Spring Garden community and to adjacent natural features. Additional property required for The Windsor-Essex Parkway through this area will include property obtained for environmental mitigation and wildlife buffering purposes, for stormwater management ponds and for provision of the trail network. Through this section, the typical right-of-way to be required beyond the existing E.C. Row Expressway right-of-way is approximately 200 m (290 m total) with the maximum additional requirement being approximately 300 m (390 m total).

From north of Bethlehem Avenue/Labelle Street southerly to Todd Lane/Cabana Road West, The Windsor-Essex Parkway freeway and adjacent service road utilize the existing right-of-way of Huron Church Road. In addition to obtaining property for the freeway, service road and realigned crossing roads, additional property required through this section will include property required for stormwater management ponds, the proposed interchange at Todd Lane/Cabana Road West, environmental mitigation features, the proposed trail network and for utility corridors. Although the property requirement through this section is highly variable, the additional right-of-way requirement beyond the existing Huron Church Road right-of-way averages approximately 185 m (240 m total) with the maximum additional requirement being approximately 265 m (total width of 320 m).

From Todd Lane/Cabana Road West easterly to existing Highway 3, The Windsor-Essex Parkway freeway and adjacent service road utilize the existing right-of-way of Highway 3 to minimize impacts to adjacent properties. In addition to obtaining property for the freeway, service road and realigned crossing roads, additional property required through this section will include property obtained for stormwater management ponds, the proposed interchange west of Howard Avenue, environmental mitigation features, the proposed trail network and for utility corridors. Through this section, the additional right-of-way requirement beyond the existing Highway 3 right-of-way averages approximately 200 m (240 m total) with the maximum additional requirement being approximately 280 m (total width of 320 m).

From existing Highway 3 easterly to North Talbot Road, the freeway utilizes the existing Highway 401 right-of-way. No additional right-of-way is required in this section.

The property requirements described above are based on the concept design as it has been developed for the Environmental Assessment Study. The concept design is subject to more detailed study, which may change some elements of the concept design, and therefore the property requirements may also change.

Additional details of the right-of-way requirements of The Windsor-Essex Parkway are presented in the concept design plates in **Appendix A**.

9.3.4 Construction Methods and Staging

A general concept for construction staging of the freeway, service road and sideroad crossings has been developed as part of this Environmental Assessment Study to ensure that The Windsor-Essex Parkway can be constructed in a feasible manner while minimizing disruption to the surrounding communities and local traffic patterns as much as possible. In order to ensure minimal disruption, maintaining four lanes of traffic in the Highway 3/Huron Church Road corridor as well as the E.C. Row Expressway corridor has been established as a principle for development of the staging concept. This principle will be a key requirement in the development of detailed staging plans in future design phases. Additional details of the conceptual construction staging plan are included in the *"Draft Practical Alternatives Evaluation – Constructability Report for Access Road Alternatives"* (refer to List of Supporting Documents). The general construction staging concept outlined below and presented in the report will be subject to refinement during future design stages of the project.

It should be noted that construction methods and staging are the responsibility of the selected contractor, subject to the provisions and specifications of the contract. The implementing authorities will develop these contract documents to be in accordance with this Environmental Assessment. The following planning level assessment and specifications of methods and staging has been developed to confirm basic feasibility.

HURON CHURCH ROAD/HIGHWAY 3 CORRIDOR

The general construction staging concept for the freeway and service road consists of four primary stages preceded by an initial utility relocation stage. This preliminary staging concept is described generally below.

Utility Relocation

Early work would likely focus on the relocation of utilities and other municipal services. There are numerous utilities located within the corridor, including hydro, Bell, Union Gas, communication, cable television as well as municipal services such as watermains, storm sewers, municipal drains and sanitary sewers. These existing utilities within The Windsor-Essex Parkway corridor are discussed in Section 7.6 and are illustrated in the concept design plates in Appendix A. Further details regarding utility relocation are included in Section 9.3.12.

Stage 1

This first primary construction stage would focus on building the proposed service road, the realignment of the existing municipal roadways (where necessary), and the construction of any temporary staging roads. During this stage, traffic will remain primarily on the existing Highway 3 / Huron Church Road with some routing onto localized temporary staging roads within the corridor.

Stage 2

The second primary construction stage involves shifting local traffic to the new service road and temporary staging roads to allow for the excavation of the proposed freeway and construction of associated retaining walls, underpasses and tunnel sections. Construction of the remainder of the service road will be completed during this stage.

Stage 3

During the third primary construction stage, traffic will be fully relocated onto the service road while construction would focus on completion of the freeway portion of The Windsor-Essex Parkway.

Stage 4

During the fourth and final primary construction stage, the new freeway and service road facilities will be fully opened to traffic while efforts would focus on final construction details in the corridor, including the connection to Howard Avenue.

E.C. ROW EXPRESSWAY CORRIDOR

The general construction staging concept for The Windsor-Essex Parkway within the E.C. Row Expressway corridor will consist of two primary construction stages preceded by an initial utility relocation stage.

Utility Relocation

Early work would likely focus on the relocation of utilities and other municipal services. There are numerous utilities located within the corridor, including hydro, Bell, Union Gas, cable television as well as municipal services such as watermains, municipal drains and sanitary sewers.

Stage 1

This first primary construction stage would focus on construction of the realigned eastbound lanes of E.C. Row Expressway and associated structure, creating space between eastbound and westbound lanes for the proposed freeway portion of The Windsor-Essex Parkway which forms the core lanes of this core-collector system. During this stage, traffic will remain on the existing E.C. Row Expressway lanes.

Stage 2

The second primary construction stage involves shifting eastbound E.C. Row Expressway traffic to the newly constructed realignment of eastbound E.C. Row Expressway lanes (eastbound collectors). This will allow for construction of the freeway portion of The Windsor-Essex Parkway (core lanes) and associated structures.

9.3.5 Structures

TUNNEL SECTIONS

There are 11 tunnels proposed as part of The Windsor-Essex Parkway, ranging in length between 120 m and 240 m. These tunnels have been strategically located to maintain and enhance existing access along the corridor, as well as to provide new connections for roads, trails and wildlife linkages. In addition to providing local connections across the freeway portion of The Windsor-Essex Parkway, landscaping/public space will be provided on top of the tunnels so as to lessen any 'barrier effect' of the freeway for the neighbourhoods on either side of The Windsor-Essex Parkway.

Design details of each of the 11 individual tunnels will be confirmed during the future design phase of this project, including structural type and abutment selection. The provision of landscaping on top of each of the tunnels will include the placement of up to 1 m of topsoil along the entire tunnel area. The structural implications of providing this additional weight on each of the structures will be finalized during future stages of design. In addition, the precise location and length of these tunnels may be subject to further refinement during these future stages of design.

The general location, length and rationale/benefits of providing each of the 11 tunnels included as part of The Windsor-Essex Parkway are summarized in Table 9.3. The 11 tunnels are also identified on the concept design plates in Appendix A.

TABLE 9.3 – SUMMARY OF THE WINDSOR-ESSEX PARKWAY TUNNELS

Tunnel Name	General Location	Length	Rationale for tunnel location/length
Spring Garden	Spring Garden Road	200 m	Maintains connection between Spring Garden residential area and vacant natural area adjacent to E.C. Row Expressway. Tunnel length of 200 m provides opportunities for public space and Gateway features to be incorporated in this area; this tunnel is the first tunnel along The Windsor-Essex Parkway as viewed by motorists entering Canada via the new crossing. The location and length of this tunnel is constrained by the freeway profile at the west end (profile begins rising from below-grade to above-grade) and the proximity of the Labelle/Bethlehem tunnel to the south.
Labelle	Bethlehem Avenue / Labelle Street	240 m	Maintains existing road crossing at Labelle Street/Bethlehem Street. Provides improved connection between Bellewood neighbourhood/Bellewood Park/Bellewood School and Spring Garden/Bethlehem neighbourhoods/Spring Garden Forest/Windsor community trails. Tunnel length of 240 m provides opportunities for public space and Gateway features to be incorporated in this area; this tunnel is situated at junction of The Windsor-Essex Parkway and Huron Church Road and will be viewed by motorists entering Canada via both the new bridge / The Windsor-Essex Parkway and the Ambassador Bridge / Huron Church Road.
Grand Marais	Grand Marais Road/ Lambton Road	120 m	Maintains existing road crossing at Grand Marais/Lambton. Provides improved connection between Bellewood neighbourhood/Bellewood Park/Bellewood School and Huron Estates neighbourhood and Spring Garden Forest. Tunnel also provides improved connection for existing West Windsor Recreationway trail; presently this trail passes under Huron Church Road at Grand Marais Drain; in times of high water flows in the drain, this trail is presently closed. With The Windsor-Essex Parkway, this trail will be relocated to allow crossing of the freeway and service road via either the Grand Marais or Pulford Avenue tunnels. The tunnel length is constrained by the freeway profile at the south end (freeway is not as deep at the Grand Marais drain crossing as other locations) and distance between the exit ramp and the service road as well as the service road structure at north end.
Pulford	Pulford Street	120 m	Provides improved connection between the residential area on the east side of Huron Church Road/South Windsor Recreation Complex and Huron Estates neighbourhood/Spring Garden Forest. Tunnel also provides improved connection for existing West Windsor Recreationway trail; the existing trail passes under Huron Church Road at Grand Marais Drain; in times of high water flows in the drain, this trail is presently closed. With The Windsor-Essex Parkway, this trail will be relocated to allow crossing of the freeway and service road via either the Grand Marais or Pulford Avenue tunnels. The tunnel length is constrained by the freeway profile at the north end (freeway is not as deep at Grand Marais drain crossing as other locations) and distance between the entrance ramp and the service road at the south end.
Oakwood	0.3 km north of Todd Lane / Cabana Rd. W	120 m	Provides improved wildlife linkage and new community connection between Oakwood Bush/Oakwood School/Windsor community trails and Spring Garden Forest. Both the freeway and service road pass through this tunnel leaving a road-free connection at the ground surface. Tunnel length is constrained by service road profile at north and south ends (service road profile rises from below-grade to at-grade at intersections on both sides of tunnel).
Todd / Cabana	Todd Lane / Cabana Rd. W	120 m	Maintains existing road crossing at Todd Lane/Cabana Road. Provides improved connection between Villa Borghese neighbourhood/Oakwood Bush/Oakwood School and Todd Lane neighbourhood/Spring Garden Forest. Tunnel length constrained by the service road profile at the north end and proximity of tunnel to the south.
Villa Borghese	Huron Church Line	240 m	Maintains an existing road connection for Huron Church Line and the service road. Provides improved wildlife linkage and improved community connection between Lennon Drain/St. Clair College environmentally sensitive area and Cahill Drain candidate natural heritage site lands/LaSalle Woods/LaSalle community trails.
St. Clair College	St. Clair College Entrance	120 m	Maintains an existing road connection for the main entrance to the college and the service road. Provides improved wildlife linkage and improved community connection between St. Clair College environmentally sensitive area and athletic fields, Cahill Drain candidate natural heritage site lands, Windsor Crossing commercial area, LaSalle community trails and future residential development in LaSalle. No existing residential neighbourhood in this immediate area, but as the main entrance to the college, this area is expected to have a relatively high volume of pedestrian and cyclist traffic. A length of 120 m was considered adequate for meeting the connectivity requirements at this location.

Tunnel Name	General Location	Length	Rationale for tunnel location/length
Cousineau	Cousineau Road	170 m	Maintains existing road crossing at Cousineau Rd/Sandwich West Parkway. Provides improved community connection between St. Clair College and athletic fields/Our Lady of Mt. Carmel School, and Villa Paradiso neighbourhoods with Heritage Estates neighbourhood/Windsor Crossing commercial area/LaSalle community trails. When The Windsor-Essex Parkway was introduced in 2008, this tunnel was shortened by 50 m from the previous version, to enable the extension of the Hearthwood Place tunnel section. However, based on further consideration, public feedback, and the decision to purchase additional properties on Homestead Lane and Kendleton Court to provide additional buffer spacing, the tunnel is now proposed to be 170 m long. Length of tunnel in this area is constrained by the service road profile at the east end (service road profile rises from below grade to at-grade at intersection of Cousineau/Sandwich West Pkwy), and proximity to Hearthwood Place tunnel.
Hearthwood	Hearthwood Place	165 m	Provides improved wildlife linkage and new community connection between Villa Paradiso neighbourhood/Matthew Rodzik Park/new green space north of corridor and Heritage Estates neighbourhood/Windsor Crossing commercial area/LaSalle community trails. Both the freeway and service road pass through this tunnel leaving a road-free connection at the ground surface. When The Windsor-Essex Parkway was introduced in 2008, the freeway portion of this tunnel was proposed to be 220 m long. However, based on difficulties associated with the construction of an "L-shaped" tunnel, public feedback, and the decision to provide additional buffer on both sides of the freeway in this area, the tunnel length has been adjusted downwards to 165 m. (Note: In order to provide additional buffer in this area, additional properties on Homestead Lane and Kendleton Court will be purchased). Length of tunnel section is constrained by service road profile at the west end (service road profile rises from below grade to at-grade at intersection of Cousineau/Sandwich West Pkwy), and the proximity to Cousineau tunnel. East limit of tunnel constrained by proximity of at-grade intersection at Montgomery Dr. and entrance ramp to freeway.
Oliver Estates	0.3 km west of Howard Avenue	240 m	Provides improved community connection between Shadetree neighbourhood /Matthew Rodzik Park/new green space north of corridor and Oliver Estates neighbourhood/ LaSalle community trails. Tunnel length of 240 m provides opportunities for landscaping/public space and Gateway features to be incorporated in this area; this is the first tunnel along The Windsor-Essex Parkway as viewed by motorists entering Windsor/LaSalle via Highway 401 or Highway 3.

ROADWAY UNDERPASSES/OVERPASSES

In addition to the 11 tunnel sections described above, there are 14 underpass and overpass structures proposed as part of The Windsor-Essex Parkway allowing grade-separation between the freeway, service road, ramps and side roads. The general location and function of these underpass and overpass structures are summarized in Table 9.4. These underpass and overpass structures are also included on the design plates in Appendix A.

TABLE 9.4 – SUMMARY OF THE WINDSOR-ESSEX PARKWAY UNDERPASS AND OVERPASS STRUCTURES

Name and General Location	Description and Function
Ojibway Parkway / ETR Overpass at The Windsor-Essex Parkway, east of plaza	Eight-lane overpass structure (six general purpose lanes and two auxillary lanes) providing grade-separation between existing Ojibway Parkway/ETR and freeway portion of The Windsor-Essex Parkway, directly east of the new plaza.
Matchette Road Overpass at The Windsor-Essex Parkway	Eight-lane overpass structure (six general purpose lanes and two auxillary lanes) providing grade-separation between existing Matchette Road and freeway portion of The Windsor-Essex Parkway, south of existing E.C. Row Expressway.
Eastbound E.C. Row Expressway Overpass, east of Matchette Road	Three-lane overpass structure providing grade-separation between realigned eastbound E.C. Row Expressway and freeway portion of The Windsor-Essex Parkway, east of Matchette Road.
Malden Road Overpass at The Windsor-Essex Parkway	Overpass structure providing grade-separation between existing Malden Road and realigned E.C. Row Expressway/freeway portion of The Windsor-Essex Parkway. Depending on the final separation between The Windsor-Essex Parkway and both eastbound and westbound E.C. Row Expressway, separate structures may be constructed for the freeway and for E.C. Row Expressway. Removal of the existing Malden Road structure at eastbound E.C. Row Expressway may also be required as part of construction of this structure.
Eastbound E.C. Row Expressway Overpass, west of Spring Garden Tunnel	Three-lane overpass structure providing grade-separation between realigned eastbound E.C. Row Expressway and freeway portion of The Windsor-Essex Parkway, west of Spring Garden Tunnel.
Eastbound Service Road Underpass, west of Grand Marais Road/Lambton Street	Two-lane underpass structure providing grade-separation between eastbound service road and freeway portion of The Windsor-Essex Parkway, west of Grand Marais Road/Lambton Street.
Service Road Overpass, east of Pulford Street	One-lane overpass structure providing grade-separation between westbound service road and vehicles entering westbound freeway portion of The Windsor-Essex Parkway, east of Pulford Street.
Eastbound Service Road Underpass, east of Huron Church Line	Two-lane underpass structure providing grade-separation between eastbound service road and freeway portion of The Windsor-Essex Parkway, east of Huron Church Line.
Westbound Service Road Underpass, east of Cahill Drain	Two-lane underpass structure providing grade-separation between westbound service road and freeway portion of The Windsor-Essex Parkway, east of Cahill Drain and west of St. Clair College Tunnel.

Name and General Location	Description and Function
Service Road Underpass near Montgomery Street	Four-lane underpass structure providing grade-separation between service road and freeway portion of The Windsor-Essex Parkway, west of Howard Avenue.
Howard Avenue Underpass at The Windsor-Essex Parkway	Two/Three-lane underpass structure providing grade-separation of Howard Avenue and freeway portion of The Windsor-Essex Parkway.
Highway 3 Underpass at East of Howard Avenue	Four/Five-lane underpass structure providing grade-separation between realigned Highway 3 and freeway portion of The Windsor-Essex Parkway, east of Howard Avenue.
Ramp E-E/W Underpass, south of existing Highway 3 and east of Howard Avenue	One-lane underpass structure providing grade-separation over freeway portion of The Windsor-Essex Parkway for vehicles exiting from westbound freeway.
North Talbot Road Underpass at existing Highway 401	Two-lane underpass structure providing grade-separation for North Talbot Road across Highway 401. New structure required to replace existing North Talbot Road structure due to widening of Highway 401 to six-lanes at this location.

RETAINING WALLS

A significant portion of the freeway section of The Windsor-Essex Parkway is below grade, while the service road and crossing roads are at (or close to) existing ground level. Although the freeway cross-section will incorporate open cut sections with vegetated side slopes where feasible, retaining walls will be utilized in numerous locations to accommodate roadway geometrics and to minimize property requirements and other associated impacts throughout the corridor. Retaining walls have also been utilized in combination with open cut sections to ensure side slope stability, as discussed in Section 9.3.1. Further details regarding the height and locations of retaining walls along the corridor will be determined during future design stages of the project.

PEDESTRIAN/CYCLIST OVERPASSES

As discussed in Section 9.3.6, a multi-use trail network will be incorporated into The Windsor-Essex Parkway to provide safe and continuous recreational travel along the length of the corridor for cyclists and pedestrians. The trail network will consist of 8 grade separations, or pedestrian overpasses, at locations where the trail system crosses side roads or the proposed service road. Although the trail network is subject to refinement during future design phases, the concept presented in this Environmental Assessment Report provides for a continuous pathway throughout the corridor that is grade separated at locations where a roadway is encountered. The locations of the pedestrian overpasses along The Windsor-Essex Parkway are presented in the concept design plates in Appendix A. It is recognized that further design work on the trail system may alter the location of the pedestrian overpasses identified in the report, along with the pedestrian overpasses identified in the concept design plates. Future decisions regarding the trail network will involve additional consultation with the public and local municipalities.

9.3.6 Multi-use Trail Network

The concept design of The Windsor-Essex Parkway includes an extensive multi-use trail network along the length of the corridor. The conceptual trail network design was developed in part based on feedback received at various Context Sensitive Design workshops held during the study. The trail network provides for a continuous path between the existing trail at the Malden Road/E.C. Row Expressway underpass and the Howard Avenue diversion, with grade separated trail crossings allowing cyclists and pedestrians to travel the length of the corridor without encountering a motor vehicle. The proposed trail network concept also includes numerous alternate paths through the corridor with at-grade crossings of roadways allowing access to the continuous trail network from several locations outside The Windsor-Essex Parkway. Cyclists and pedestrians will be able to choose between the continuous trail, with overpasses, or an alternate route, with at-grade intersections.

Grade-separated trail crossings of roadways will be typically achieved using conventional bridges and approaches on earth embankments in such a way as to ensure grade separations are not seen as a "barrier" to potential users. Vertical grades on the trail throughout the network (including approaches to grade separations) will be limited to a maximum of 5% to ensure all grades are easily negotiated by cyclists and pedestrians.

At-grade trail crossings of roadways will be designed in accordance with appropriate standards for pedestrian and cyclist crossings to ensure safe and efficient use of the trail network. The typical width of the multi-use trail is 4 m to allow for use by both pedestrians and cyclists.

Future design and consultation stages of The Windsor-Essex Parkway will include a consideration of issues such as winter maintenance of the trail system and the surface treatment to be provided along the trail.

Illustration of the proposed concept for the multi-use trail network of The Windsor-Essex Parkway is presented within the concept design plates in Appendix A. Further design work on the trail system may alter the location of the pedestrian overpasses identified in the report, along with the pedestrian overpasses identified in the concept design plates. Future decisions regarding the trail network will involve additional consultation with the public and local municipalities.

9.3.7 Drainage and Stormwater Management

This section generally describes the proposed drainage components of The Windsor-Essex Parkway including watercourses/drains adjacent to and crossing the corridor as well as the proposed stormwater management plan. Illustration of the proposed drainage system is presented within the concept design plates in Appendix A of this document, and additional details of the proposed drainage system and assessment methodology are included in the *Draft Practical Alternatives Evaluation Assessment Report – Stormwater Management Plan* (refer to List of Supporting Documents). Additional information pertaining to proposed drainage and fisheries impacts as well as potential mitigation measures are presented in Section 10.4.5.

ASSESSING DRAINAGE AND STORMWATER MANAGEMENT IMPACTS

The Ontario Ministries of Transportation (MTO) and Environment (MOE) have developed specific protocols for assessing drainage impacts which must be applied to all transportation projects in the province. In general terms, the drainage impact is determined by comparing the existing condition runoff effects within the study area to the proposed condition runoff effects.

For all development projects, quality and quantity treatment of runoff is necessary. Stormwater quality is degraded by increased pollutant loadings (oil, gravel, garbage, etc), measured based on the total impervious percentage increase over the existing condition. The MOE document "Stormwater

Management Planning and Design Manual" outlines the increase in pollutants over the development area, as well as providing guidelines for potential mitigations. Increases to surface runoff which exceed the existing peak flows to the watercourse will negatively impact the watercourse floodline and erosion condition. This can be mitigated by providing stormwater management practices which provide quantity control and erosion treatment to runoff from the study area, or resizing impacted crossing structures in order to prevent increases in floodlines. However, additional mitigation may also be required in specific circumstances.

Roadway drainage impact is determined by the number and frequency of flooding within the travel lanes. Flooding of the travel lanes can result in lane closures, traffic delays, or even accidents associated with hydroplaning.

ADJACENT WATERCOURSES AND CROSSINGS

There are numerous existing watercourses adjacent to and crossing The Windsor-Essex Parkway corridor. These primarily include the Wolfe Drain, Cahill Drain, Lennon Drain, Grand Marais Drain, Basin Drain, Youngstown Drain, Titcombe Drain and McKee Drain. Where watercourses cross the proposed freeway, culverts/structures have been designed to convey the 100-year storm without negatively impacting the upstream flood elevations. Where watercourses cross local roads, culverts/structures are designed to convey the 10-year and 25-year storms for spans less than 6 m and greater than 6 m respectively. The following paragraphs describe the manner in which flows in these watercourses will be conveyed as part of The Windsor-Essex Parkway conceptual design.

Wolfe and Cahill Drains

Wolfe and Cahill Drains currently run parallel to Highway 3 conveying runoff from the developed area north of the corridor and crossing The Windsor-Essex Parkway in the vicinity of St. Clair College. The drains have been sized to convey between the 10 and 25-year storm before overtopping Highway 3, with overland flows spilling to the south. Proposed construction of The Windsor-Essex Parkway will require improvements to the conveyance capacity of the drain channels, as well as the drain alignments.

Between Howard Avenue and St. Clair College, the Wolfe/Cahill Drain is re-aligned to the north of the proposed service road in a naturalized channel containing meanderings, vegetation and other measures to enhance the fish habitat. The channel is designed to convey the 100-year storm peak flows without impacting the proposed freeway or upstream floodlines. Due to the below-grade section of the freeway in this area, this Wolfe/Cahill Drain flow will be conveyed to the south side of the corridor through a submerged concrete culvert. The culvert will consist of three 2.0 m diameter concrete pipes, with one pipe acting as a low-flow conveyance pipe, and the remaining two pipes conveying higher storm events.

The West Cahill Drain Tributary currently crosses Highway 3 west of the primary Cahill Drain Crossing at St. Clair College. In an effort to limit the number of submerged culvert crossings under the highway, the tributary will be diverted along the north side of the proposed service road to a confluence with the main Cahill Drain before crossing the service road and freeway at a single location. As the existing tributary connects with the Cahill Drain immediately downstream of Highway 3, this diversion is not considered significant.

Fish passage systems will be provided at the Cahill Drain to provide safe fish passage across the below-grade freeway portion of The Windsor-Essex Parkway. Fish locks are being proposed to raise and lower migrating fish across The Windsor-Essex Parkway thereby maintaining access to upstream spawning areas. This method has proven to be effective in other applications.

Lennon Drain

Lennon Drain currently provides drainage to the residential community east and west of the drain. An existing on-line stormwater management pond is located immediately upstream of the existing Highway 3 crossing, providing quantity storage to the drain and decreasing the overall size requirements for the current crossing structure. To be conservative, this existing stormwater management pond was not considered when sizing the crossing associated with The Windsor-Essex Parkway.

Due to the below-grade section of the freeway in this area, the Lennon Drain will also be conveyed to the south side of the corridor within a submerged concrete culvert. The culvert will consist of a 3.0 m x 1.5 m concrete box culvert structure. The structure has been sized to convey peak flows associated with the 100-year storm without impacting the upstream flood elevations.

As with the Cahill Drain crossing, fish locks are being proposed at the Lennon Drain to raise and lower migrating fish across The Windsor-Essex Parkway thereby maintaining access to upstream spawning areas.

Grand Marais Drain

Grand Marais Drain currently provides drainage for approximately 2800 ha of upstream drainage area. This drain is conveyed under Highway 3 in a concrete lined channel approximately 7 m below existing grade. The concrete lined channel includes a concrete lined low flow channel with concrete lined flood banks.

The low existing elevation of the Grand Marais Drain channel provides the opportunity for the freeway to cross above the channel while still remaining below the existing ground level. As such, the Grand Marais Drain flow will be conveyed below the proposed service road and access road within a three-cell 10.0 m x 2.0 m concrete box culvert. The structure has been sized to convey peak flows associated with the 100-year storm without impacting the upstream flood elevations.

Basin Drain

Basin Drain begins at the outlet of the existing 2.1 m x 1.5 m box culvert on the south side of the E.C. Row Expressway. The box culvert is an outfall for a storm sewer system providing drainage for the upstream industrial development.

The vertical alignment of the freeway portion of The Windsor-Essex Parkway rises from below-grade to above-grade between the Spring Garden tunnel and Malden Road in such a manner that the access road is approximately at-grade where it crosses the Basin Drain. As such, the existing Basin Drain storm sewer outfall can be extended or re-aligned to provide conveyance beneath the proposed freeway.

Youngstown Drain

The existing alignment of the Youngstown Drain, which originates within the loop ramp in the southwest quadrant of the existing E.C. Row Expressway/Huron Church Road interchange, currently crosses the proposed freeway alignment where the freeway is proposed to be below-grade. In an effort to limit the need for submerged culvert crossings, the runoff originating within the loop ramp will be realigned to the drainage channel flowing on the north side of the E.C. Row Expressway, connecting to Basin Drain upstream of the proposed culvert. Since the existing drain connects with Basin Drain approximately 200 m downstream of the proposed realignment, the diversion is not considered significant.

Titcombe Drain

Titcombe Drain is a small conveyance channel beginning immediately south of the E.C. Row Expressway. The drain currently conveys a small area from Malden Road to Titcombe Drain southerly.

In the vicinity of Titcombe Drain, the freeway portion of The Windsor-Essex Parkway (core lanes) and realigned E.C. Row Expressway (collector lanes) are above-grade. The proposed freeway (core and collectors) does not impact the drain itself, but will have a minor impact on the drainage area of the drain. Therefore, an analysis will be completed during subsequent design phases to confirm that the existing (pre-construction) peak flow rates of Titcombe Drain will be the same after construction of The Windsor-Essex Parkway.

McKee Drain

McKee Drain currently conveys runoff from an area immediately south of E.C. Row Expressway and west of Titcombe Drain, ultimately discharging to the Detroit River. The existing drain runs parallel to E.C. Row Expressway to west of Matchette Road, where it crosses E.C. Row Expressway. The location of the freeway portion of The Windsor-Essex Parkway will require minor realignments to McKee Drain.

East of Matchette Road, the McKee Drain will be realigned along the south side of the proposed freeway. The existing crossing at Matchette Road will be replaced with a new concrete box culvert, discharging to the existing downstream portion of McKee Drain on the north side of the proposed freeway. Between Matchette Road and the E.C. Row Expressway crossing, McKee Drain will be realigned to the north in an effort to maximize the area available for a proposed stormwater management facility. Downstream of the E.C. Row Expressway, McKee Drain will follow the existing flow route to the Detroit River.

STORMWATER MANAGEMENT PLAN

Runoff Conveyance

Runoff from the service road portion of The Windsor-Essex Parkway and below-grade sections of the freeway portion of The Windsor-Essex Parkway (generally within the Highway 3/Huron Church Road corridor) will be captured and conveyed within an urban drainage system consisting of catch basins and storm sewers. The storm sewer system for the proposed freeway will be designed to accommodate the 100-year storm in order to prevent flooding into the driving lanes. The storm sewer system for the proposed service road will be designed to accommodate the 10-year storm.

In below-grade sections of the proposed freeway, several pumping stations are required at the various low points in order to pump stormwater runoff that has been collected in the storm sewer system to the stormwater management ponds at ground-level. Three individual pumps will be provided at each pumping station, with each individual pump capable of handling 50% of the runoff from the 100-year storm. Storage facilities will also be provided at each pumping station for excess runoff volumes. Additional details of the pumping stations will be confirmed during subsequent design phases.

Where the proposed freeway is above-grade along The Windsor-Essex Parkway/E.C. Row Expressway core-collector system, runoff will be captured and conveyed within a median storm sewer system discharging to right-of-way ditching consisting of enhanced grassed swales and roadside ditches. Where the proposed freeway is at-grade east of existing Highway 3, runoff from the proposed freeway will be captured and conveyed within a rural-type drainage system consisting of enhanced grassed swales and roadside ditches.

Stormwater Management

The existing section of Highway 3 in the vicinity of The Windsor-Essex Parkway does not currently provide either quality or quantity treatment for runoff from the highway. Therefore, in the existing condition, all pollutant loadings from Highway 3 are discharged directly to the receiving watercourses. In an effort to improve this existing situation, stormwater management providing quality, quantity and erosion treatment will be provided for both the freeway and service road portions of The Windsor-Essex Parkway prior to being discharged to downstream watercourses. To achieve this, stormwater management wetponds are proposed throughout The Windsor-Essex Parkway that are designed to provide *Enhanced Protection Level* treatment as outlined in the Ministry of the Environment (MOE) document entitled *Stormwater Management Planning and Design Manual*. In addition, as part of the concept design, oil/grit separators are proposed at various locations along the proposed service road to provide additional quality treatment for runoff.

A total of 9 stormwater management wetponds are proposed within the corridor as part of The Windsor-Essex Parkway concept design to provide quality, quantity and erosion treatment of roadway runoff before being discharged to existing watercourses. The wetponds will provide removal of 80% of total suspended solids (TSS), as well as providing erosion attenuation of the 25mm storm for 24 hours. In addition, the stormwater management ponds will provide quantity storage to control peak flows in receiving watercourses during rainfall events up to and including the 100-year storm.

9.3.8 Traffic Operations

A detailed traffic analysis (micro-simulation analysis) of the traffic operations for the freeway portion of The Windsor-Essex Parkway between the new customs plaza and North Talbot Road has been undertaken using a VISSIM model. This VISSIM model also incorporated the service road portion of The Windsor-Essex Parkway as well as all key intersections and ramp terminals for the purpose of obtaining travel times, anticipated speeds, delays and traffic queues. The 95th percentile queue lengths (which are the queue lengths expected to occur only 5% of the time) at signalized intersections were used to determine required storage lengths at intersections to accommodate the anticipated demand. It should be noted that the micro-simulation analysis was performed for both year 2035 AM and year 2035 PM peak hours.

Results of the traffic analysis are summarized in this section. Additional information regarding the results of the traffic analysis completed as part of this study can be found in the *Draft Level 3 Traffic Operations Analysis of Windsor-Essex Parkway* (refer to List of Supporting Documents).

TRAFFIC VOLUMES

The section of the proposed freeway that carries the most traffic is between Labelle Street and Grand Marais Road in the southbound direction, just downstream from the first on-ramp from the proposed service road. This section carries approximately 3,000 vehicles per hour during the PM peak hour (2035), which corresponds to Level of Service (LOS) “C” operations, with 23% commercial vehicles in the traffic flow. Traffic flow will be at or near the free-flow speed of the freeway, although freedom to manoeuvre within the traffic stream will be somewhat restricted. All other mainline segments operate at LOS "C" or better, and it is expected that traffic on the freeway will operate at free-flow speeds through the 2035 horizon year.

TRAVEL TIME

As previously mentioned, the proposed freeway facility is expected to operate at free-flow conditions between Howard Avenue and the new plaza. The VISSIM analysis (year 2035) demonstrated that travel times to the new crossing from Highway 401 east of the Highway 3 interchange in both AM and PM peak hours would be in the 6 to 7-minute range. Travel times to the Ambassador Bridge (with the new crossing in place) are anticipated to be in the 10-minute range during both AM and PM peak hours. The Base Case (future no-build) microsimulation analysis (year 2035) showed travel times to the Ambassador Bridge in the 18-minute range during the AM peak hour, while inbound traffic (Canada-bound) was found to take over 25 minutes to travel between the Ambassador Bridge and east of the Highway 401/Highway 3 interchange during the PM peak hour. Exhibits 9.12 and 9.13 summarize a comparison of travel times between The Windsor-Essex Parkway and Base Case scenarios.

EXHIBIT 9.12 – TRAVEL TIME COMPARISON: WESTBOUND/NORTHBOUND FROM EAST OF HIGHWAY 3/HIGHWAY 401 I/C TO THE NEW CROSSING AND THE AMBASSADOR BRIDGE

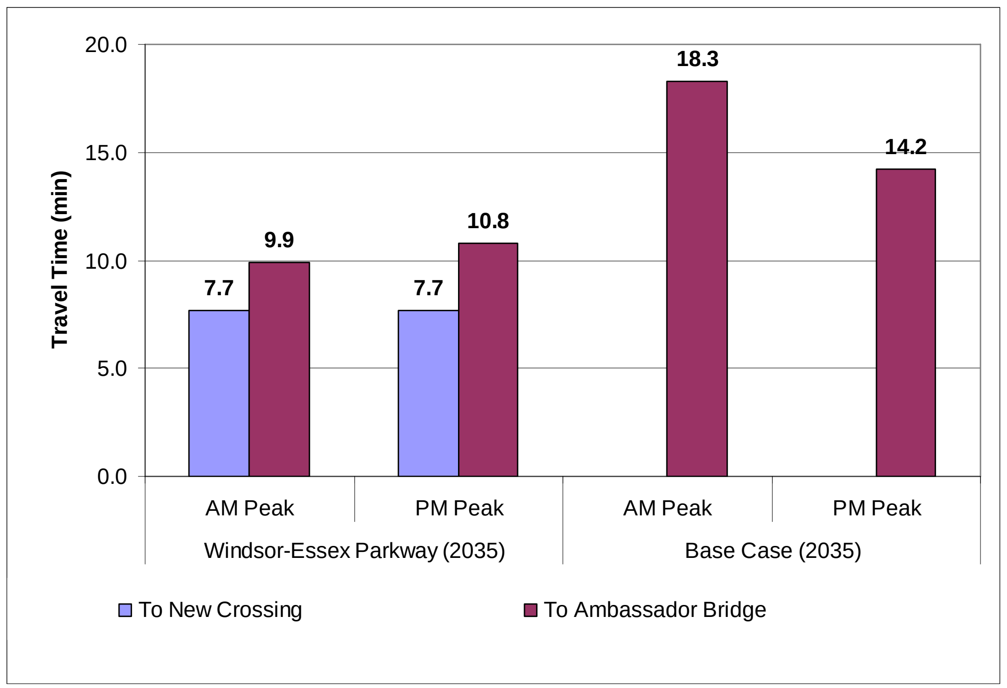
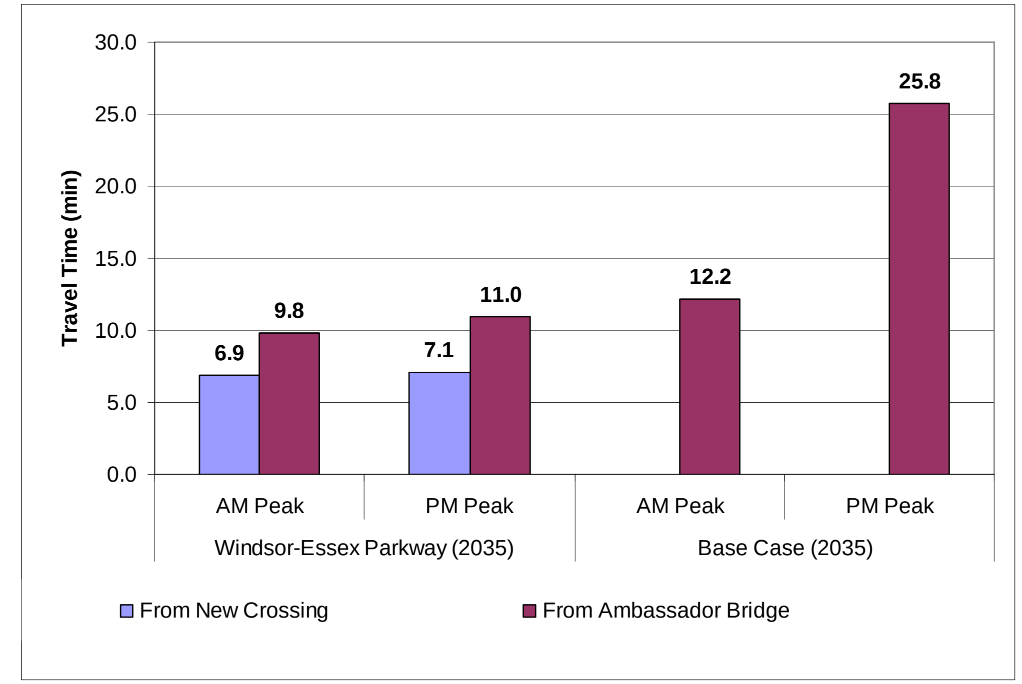


EXHIBIT 9.13 – TRAVEL TIME COMPARISON: EASTBOUND/SOUTHBOUND FROM THE NEW CROSSING AND THE AMBASSADOR BRIDGE TO EAST OF HIGHWAY 3/HIGHWAY 401 I/C



INTERCHANGES AND ACCESS POINTS

As discussed in Sections 9.3.1 and 9.3.2, numerous interchanges and access points between the proposed freeway, proposed service road and crossing roads are included in the concept design of The Windsor-Essex Parkway to facilitate mobility and local access in the corridor and maximize the opportunity for cross-border motorists to choose a border crossing. The following ramps to and from the proposed freeway are proposed as part of The Windsor-Essex Parkway:

Northbound/westbound:

1. To Howard Avenue/Highway 3/Laurier Parkway extension/proposed service road (off-ramp);
2. From Highway 3/Laurier Parkway extension, east of Howard Avenue (on-ramp);
3. From proposed service road, west of Howard Avenue (on-ramp);
4. To proposed service road, west of St Clair College (off-ramp);
5. From proposed service road, north of Cabana Road (on-ramp);
6. To proposed service road, south of Labelle Street (off-ramp);
7. From westbound collector lanes (E.C. Row Expressway), west of Malden Road;
8. To Ojibway Parkway (off-ramp); and
9. From Ojibway Parkway (on-ramp).

Southbound/eastbound:

1. To Ojibway Parkway (off-ramp);
2. From Ojibway Parkway (on-ramp);

3. To eastbound collector lanes (E.C. Row Expressway), west of Malden Road
4. From proposed service road, south of Labelle Street (on-ramp);
5. To Cabana Road West/ Todd Lane (off-ramp);
6. From Cabana Road West / Todd Lane (on-ramp);
7. To proposed service road, east of Huron Church Line (off-ramp);
8. From proposed service road, west of St Clair College (on-ramp);
9. From proposed service road, west of Howard Avenue (on-ramp);
10. To Highway 3/Laurier Parkway extension, east of Howard Avenue (off-ramp); and
11. From Highway 3/Laurier Parkway extension/proposed service road (on-ramp).

INTERSECTIONS/RAMP TERMINALS

All key intersection operations including ramp terminals were analyzed using the VISSIM software package. All intersections are expected to operate at LOS "C" or better through the year 2035, which corresponds to an average delay per vehicle of between 20 to 35 seconds.

Additionally, the 95th percentile traffic queues at the study area intersections were calculated. Results of this queue-length analysis indicate that queues are not anticipated to extend to the upstream intersections.

Windsor-Essex Parkway/Highway 3/Howard Avenue Diversion Roundabout

Analysis of the proposed roundabout at The Windsor-Essex Parkway/Highway 3/Howard Avenue Diversion was performed using both VISSIM (micro-simulation) and ARCADY (Assessment of Roundabout Capacity and Delay) – a static analysis software for roundabout assessments. The following provides a brief summary of the analysis results.

The VISSIM analysis indicate that the roundabout is anticipated to operate well with an overall Level of Service "B" during the year 2035 PM peak hour, which corresponds to an average delay per vehicle of between 10 to 20 seconds.

Results of the ARCADY analysis indicate similar anticipated operation performance measures such as queue lengths and delays during the year 2035 PM peak hour in comparison with the results from VISSIM.

As such, both the VISSIM and ARCADY analyses confirmed that the roundabout will be operating below capacity in the 2035 horizon year.

EMERGENCY SERVICES ACCESS

The study team met with municipal staff and the municipal emergency services representatives to identify access requirements for local emergency services. These discussions identified that:

- A means of accessing the proposed freeway eastbound and westbound at Todd Lane/Cabana Road West is very important. Windsor Fire has a station just east of Huron Church Road on Cabana Road West and LaSalle Municipal Emergency Services has a facility at Malden Road/Normandy Road. Services based at these facilities would require access to the new freeway primarily via Todd Lane/Cabana Road West to best respond to incidents on the freeway.
- A means of accessing the proposed freeway westbound at Howard Avenue is also desirable. Such a connection would facilitate access to incidents in the westbound lanes between Howard Avenue and Cousineau Road/Sandwich West Parkway.

The Windsor-Essex Parkway has been developed to accommodate the requested access by inclusion of an eastbound on-ramp at Todd Lane/Cabana Road West, a westbound on-ramp from the proposed service road west of Todd Lane/Cabana Road West and a westbound on-ramp from the proposed service road west of Howard Avenue.

9.3.9 Illumination

Full illumination will be provided along the median of the freeway portion of The Windsor-Essex Parkway, between North Talbot Road and the customs plaza. Conventional illumination systems will be provided on the outside of the service roads and side roads, and throughout some sections of the trail system. Interchanges and intersections within The Windsor-Essex Parkway will also be adequately illuminated. Illumination will be designed to provide sufficient lighting for the roadways while limiting light trespass beyond the roadways.

Illumination within the tunnel sections of the freeway will be designed to ensure driver's eyes can adjust to the changing lighting conditions between the tunnel and open sections of the freeway. Adaptive lighting will be provided that varies the strength of illumination depending on the time of day and lighting conditions outside the tunnel, and illumination density may be gradually reduced from the portal to the interior of the tunnels.

Additional details of the illumination system will be determined during subsequent stages of design of The Windsor-Essex Parkway. Further stages of design will also include the consideration of renewable energy sources to power portions of the illumination system, including the use of solar panels to power lighting along the trail system.

9.3.10 Advanced Traffic Management System (ATMS)

The Windsor-Essex Parkway will include an Advanced Traffic Management System (ATMS). In keeping with the concept of creating an Intelligent Border Crossing, the ATMS system will help to reduce travel delay and travel time uncertainty, enhance safety, reduce the costs associated with cross-border travel, and reduce the negative impacts of the border crossing to surrounding communities. The ATMS system will assist in the rapid detection and response to incidents and dissemination of incident, roadway condition, and travel time information to motorists and other stakeholders including, but not limited to, border services agencies, local communities, law enforcement and public safety agencies, commercial fleets, and broadcast media.

OVERVIEW OF ATMS ELEMENTS

The ATMS elements of the TEPA include the following:

- Variable Message Signs (VMS)
- Closed Circuit Television (CCTV)
- Vehicle Detection
- Communications System

- Queue Warning System (QWS)

Variable Message Signs (VMS)

VMS will be placed on the mainline and adjacent arterials at decision points, and at key locations for travel times. All VMS will be mounted over the roadway except for arterial signs which will be on the side of the road. VMS will be used to inform motorists of potential diversion routes, slow traffic ahead, incidents ahead, lane designations for customs and maintenance activities, etc. VMS can also be used to inform motorists of travel times to key destinations such as customs and toll booths.

Closed Circuit Television (CCTV)

CCTV will be used to monitor the roadway operations. Cameras will be positioned to provide full coverage of the roadway and all tunnel sections, and each VMS will also be visible from a camera. Cameras will provide full pan/tilt/zoom capability, and, as a secondary consideration, will provide viewing of ramps and cross streets. One camera will be placed in each direction of travel at all tunnel sections in order to provide full viewing in both directions. Cameras at tunnel sections will be positioned such that the cameras will monitor traffic in the tunnel from behind the vehicles in order to eliminate the blooming effect created by vehicle headlights and thus ensure a clear view of traffic in the tunnel.

Vehicle Detection

Vehicle detectors will be placed at regular intervals along the freeway and the ramps using minimally invasive detectors in each traveled lane of both directions of travel. These detectors will have closer spacing in tunnel sections to enhance detection capability. The vehicle detectors will be monitored to determine congestion levels and the occurrence of incidents. The vehicle detection system will be capable of providing speed, volume, occupancy, and vehicle length classifications by using dual detectors in each lane at every detector location on the mainline. Presence detectors will be provided on on-ramps at future ramp metering locations; ramp metering will eventually allow for the management of congestion that occurs as a result of incidents, border crossing delays, and demand exceeding capacity of the roadway.

Communications System

Communications will consist of a single mode fiber optics system within the project area. The communications system shall connect all ATMS elements within the project area and connect these elements to a hub that will be located near the Highway 401/Highway 3 interchange to the Western Region Traffic Operations Centre (London TOC). Connections to other systems and users are expected to be made from the London TOC. The communications network will provide sufficient bandwidth to support full motion video at 30 frames per second from each camera simultaneously as well as data from all field devices and provide a two-way path for command and monitoring of all field devices. The connection from the hub to the London TOC will be via leased media. A repeater system will also be required in the tunnel sections for use by emergency personnel.

Queue Warning System (QWS)

The purpose of the QWS is to alert drivers of downstream congestion, in the rare event of traffic queues caused by delays at the border crossing. The goal of the QWS is to reduce rear end collisions that typically occur at the back of the queue. The QWS will be fully automated and does not require operator input. As part of the QWS, certain vehicle detectors approaching the border crossing in the westbound direction will be designated as queue detectors to detect in real time when traffic queues have developed. An overhead VMS will positioned at each queue detection station. The QWS will display a queue message at the overhead VMS immediately upstream of where the queue is detected so that vehicles have time to reduce their speed and be prepared to stop when they reach the back of the queue. The QWS will also inform London TOC operators of when traffic is starting to queue.

9.3.11 Pavement

Existing roadways of all classification within the Study Area are currently surfaced with either rigid (concrete) or flexible (asphaltic concrete) pavements. Current improvements to Highway 401 east of the Study Area are mostly being completed using concrete pavements. Preliminary pavement designs have been completed as part of this study for the purposes of preliminary cost estimating and identifying feasible rigid and flexible pavement designs to be carried forward to subsequent design phases. Additional details of the preliminary pavement designs are included in the *Draft Pavement Engineering for Planning Report – Area of Continued Analysis* (refer to List of Supporting Documents).

Pavement surface has significant influence on the generation of noise from the roadway and therefore must be considered carefully during subsequent design phases. Design of the pavement surfaces to be used for all elements of The Windsor-Essex Parkway will be carried out in such a way that the generation of noise from roadway elements does not exceed the noise levels assumed within the acoustic modelling carried out within this Environmental Assessment for the purposes of identifying impacts to surrounding communities and mitigation strategies.

9.3.12 Utilities

There are numerous utilities located along The Windsor-Essex Parkway corridor that will require protection, relocation or abandonment as a result of the proposed plan. Utilities within the corridor include, but are not limited to the following:

- City of Windsor – water mains
- City of Windsor – sanitary sewers
- Town of LaSalle – water mains
- Town of LaSalle – sanitary sewers
- Town of Tecumseh – water mains
- Hydro One – aerial transmission lines
- Hydro One – aerial distribution lines
- Enwin – aerial and buried distribution lines
- Essex Powerlines – aerial and buried distribution lines
- Union Gas – various pressures and distribution lines
- Union Gas – Union Gas Panhandle Pipeline
- BP Canada – Liquid Petroleum Gas (LPG) lines
- Bell Canada – telephone and communications, aerial lines and buried duct

- Cogeco – cable TV and communications

It is anticipated that utility relocation will generally be completed prior to the primary stages of construction, as described in Section 9.3.4, but may be included within a design-build contract. Any existing utilities along the proposed Windsor-Essex Parkway corridor that are no longer required as a result of property acquisitions will be removed. Utilities that must be maintained parallel to The Windsor-Essex Parkway will be relocated to utility corridors running on either side of the service road, where possible and as required. Where design requirements or grading limits are such that the utility corridors cannot be located adjacent to the service roads, utility corridors will be located either along the proposed trail system or along the new limits of the right-of-way. In these situations, the trail system will be designed to allow access to the utility corridors for maintenance purposes. Where the utility corridors are located at the limits of the proposed right-of-way, a maintenance access road will be provided above the utility corridor. This access road could be constructed with either granular or geo-textile material, in order that vegetation be allowed to grow while still providing a stable driving surface for vehicles accessing the corridor.

It is anticipated that utilities that are required to cross The Windsor-Essex Parkway will be located within the tunnel sections, where available. These utilities will be located above the roof of the tunnel, within the topsoil that will be placed for landscaping purposes. Special insulation or heating will be required for water mains crossing the tunnels to protect them from freezing. In areas where utilities that are required to cross the freeway and service road cannot make use of the tunnels, separate utility bridges may be required.

Where the freeway will be constructed at or above existing ground between Ojibway Parkway and west of Huron Church Road, existing aerial plant will be relocated below ground. It is not anticipated that any existing buried plant will require relocation along either Malden Road or Matchette Road. Relocations for buried plant will be required along Ojibway Parkway and Chappus Street. At the east end of The Windsor-Essex Parkway east of Howard Avenue, utilities running along existing Highway 3 and Outer Drive will be relocated to follow the realigned roadways.

The following is a list of some of the major utilities to be impacted by The Windsor-Essex Parkway, along with the potential strategy for relocation. Complete details of the proposed utility relocation strategy will be confirmed during future design stages of the project.

- 500mm water main connecting the City of Windsor to the Towns of LaSalle and Tecumseh. This water main may be relocated to a utility bridge crossing the freeway near Howard Avenue. The metering station connections to the Towns of LaSalle and Tecumseh can be relocated to the south side of the freeway.
- 300mm sanitary sewer force main connecting the Town of LaSalle to the City of Windsor. This force main may be relocated to cross under the freeway in the vicinity of St. Clair College. This work may also require crossing under the relocated Cahill Drain.
- Existing sanitary sewers at Lambton Road and Spring Garden Road will require redirection to eliminate existing crossings across the future below-grade freeway. These sanitary sewers may be redirected to connect to an existing sanitary sewer in the Second Avenue road allowance.
- The Union Gas Panhandle Pipeline runs underneath Lambton Road and Grand Marais Road and is a major pipeline connection between the United States and Canada. This pipeline will likely require relocation due to construction of the Grand Marais Tunnel. The relocated pipeline will likely be relocated near the Turkey Creek/Grand Marais Drain to minimize the depth required to cross below the freeway.
- Hydro One transmission lines in the vicinity of Ojibway Parkway and Matchette Road at the proposed freeway. The elevation of these lines will be increased at this location to meet the clearance requirements between the lines and the above-grade freeway.
- Three BP Canada LPG lines between Ojibway Parkway and Matchette Road will cross the proposed freeway. The impacts of the freeway crossing these pipelines in fill will require further review.

10 ENVIRONMENTAL EFFECTS AND MITIGATION OF THE TECHNICALLY AND ENVIRONMENTALLY PREFERRED ALTERNATIVE (TEPA)

This section identifies the impacts on environmental features resulting from the Technically and Environmentally Preferred Alternative (TEPA) as described in Chapter 9 and discusses the proposed measures for mitigation. The TEPA refers to The Windsor-Essex Parkway, Plaza B1 and Crossing X-10B. The reader is referred to Chapter 8 for a summary of the evaluation of the practical crossing, plaza and access road alternatives for further details on the selection of the TEPA. Technical reports addressing the mitigation for the TEPA have been prepared as part of this study to address the environmental and engineering factors outlined throughout this chapter. This chapter provides a summary of the key findings from these reports.

For more detailed information, the reader is referred to the following supporting documents:

- *Technically and Environmentally Preferred Alternative – Air Quality Impact Assessment Report (pending)*
- *Technically and Environmentally Preferred Alternative – Human Health Risk Assessment Report (pending)*
- *Technically and Environmentally Preferred Alternative – Social Impact Assessment Report (pending)*
- *Technically and Environmentally Preferred Alternative – Noise & Vibration Impact Assessment Report (pending)*
- *Technically and Environmentally Preferred Alternative – Natural Heritage Assessment Report (pending)*
- *Technically and Environmentally Preferred Alternative – Cultural Heritage Resource Assessment Report (pending)*
- *Technically and Environmentally Preferred Alternative – Stage 2 Archaeological Assessment Report (pending)*
- *Draft Practical Alternatives Evaluation Working Paper – Economic Impact (May 2008)(available)*
- *Draft Practical Alternatives Evaluation Working Paper – Waste and Waste Management (May 2008) (available)*
- *Draft Practical Alternatives Evaluation Assessment Report – Existing and Planned Land Use (May 2008) (available)*

It should be noted that these factors, with the exception of the Human Health Risk Assessment have been used at every evaluative stage leading to the development of the TEPA. The Human Health Risk Assessment was conducted for the TEPA.

To facilitate the reader's understanding of this section, some background information drawn from the technical reports is included for each factor.

The methodologies for the various investigations are consistent in the work plans which were a part of the approved *OEA Terms of Reference (ToR)*, May 2, 2004.

For each factor, including the Human Health Risk Assessment, the analysis of the environmental effects has been made of the future "No-Build" case and for the TEPA.

10.1 Air Quality

ASSESSING AIR QUALITY IMPACTS

The Ontario Ministry of the Environment (MOE) as a component of the MOE standard setting process has developed a list of the Ambient Air Quality Criteria (AAQCs). The AAQCs are effect-based levels in air, with variable averaging time (e.g., 24-hour, 1 hour and 10 minutes) appropriate for the effect that it is intended to protect against. The AAQCs, which represent desirable levels in ambient air, are used for assessing general air quality and the potential for causing an adverse effect. The Standards Development Branch of the MOE publishes a set of guideline limits in *Ontario's Ambient Air Quality Criteria* (MOE, 2008). These criteria are not enforceable and with certain contaminants such as acrolein, the AAQCs are set below ambient background concentrations.

Federal Air Quality Objectives encompass three levels of air quality objectives: maximum desirable level (MDL), maximum acceptable level (MAL) and maximum tolerable level (MTL). The MAL is intended to provide adequate protection against effects on soil, water, vegetation, materials, visibility, personal comfort and well-being. The MAL is considered to be a realistic objective. Air quality effects of the TEPA and future No-Build have been assessed using a combination of existing air monitoring data and air dispersion modelling. Air dispersion modelling must be used to assess the impacts of future changes, such as implementation of the alternatives, and changes in fuels, vehicle technologies and traffic volumes. The predictive air quality model (CAL3QHCR) used is specifically designed to assess impacts from roads and highways. The model incorporates the differences between moving vehicles, and queued vehicles that are idling, as well as differences in road elevations and other parameters.

Potential air quality effects from roadways decrease with increasing distance from the roadway. Therefore, the greatest effects will occur immediately adjacent to the roadway.

The existing air quality is greatly influenced by local and long range (cross-border) contaminants generated in upwind urban and industrial areas. The predominant wind directions in Windsor are from the west to southwest, which bring contaminants from the heavily industrialized areas of Detroit, nearby communities and beyond. Air quality impacts in the area are dominated by the substances that combine to produce smog or acid rain. A report by the Ministry of the Environment on *Transboundary Air Pollution in Ontario (2005)* indicates that for Windsor, eliminating all Ontario sources of emissions of $PM_{2.5}$ and NO_2 will have no impact on air quality during smog days due to the significant contribution from transboundary sources. Table 10.1 summarizes the applicable available criteria from the MOE and Environment Canada.

TABLE 10.1 - AIR QUALITY CRITERIA FOR ASSESSED CONTAMINANTS

Contaminant	Averaging Time	MOE AAQC µg/m³ (ppb)	Federal AQ Objective or Maximum Acceptable Level (MAL) (µg/m³)
NO_x (as NO_2)	1 h	400 (200)	400
	24 h	200 (100)	200
	Annual	-	100[1]
$PM_{2.5}$	24 h	30	30 *
PM_{10}	24 h	50 (interim)	-
PM	24 h	120	120
	Annual	60	70
Acrolein	24 h	0.08	-
	½ hr	0.24	-
SO_2	1 hr	690	900
	24 hr	275	310
	Annual	55	62
Carbon Monoxide (CO)	1 hr	36,200	36,200
	8 hr	15,700	15,700
Carbon Dioxide (CO_2)	-	-	-
VOC	-	-	-
1,3 Butadiene	-	-	-
Benzene	-	-	-
Acetaldehyde	½ hr	500	-
	24 hr	500	-
PAHs[2]	24 hr-	22.5	-
Formaldehyde	24 hr	65	-

Notes
NO_x – nitrogen oxides – sum of nitrogen dioxide (NO_2) and nitric oxide (NO)
$PM_{2.5}$ includes all particulate matter with an aerodynamic diameter less than 2.5 µm – considered respirable
[1] MAL is for NO_2
- Indicates no criterion available
comes into force in 2010
2 – surrogate of naphthalene used

ASSESSMENT METHODOLOGY

The analysis was completed using the following approach:

- Compile data on contaminants listed in the *Air Quality Work Plan* (refer to List of Supporting Documents), which was approved by regulatory agencies;
- Determine background concentrations;
- Input traffic data for future conditions with TEPA (including access road, plaza and crossing);
- Calculate pollutant emissions from the highway corridor for existing and future conditions;
- Use air dispersion model (CAL3QHCR) with meteorological data from Windsor Airport to determine future air pollutant concentrations in the vicinity of the corridor (essentially all of west Windsor) and at sensitive receptor locations (such as schools and residences); and,
- Compare pollution concentrations corresponding to future “Build” and future “No-Build” conditions.

Data on the existing air pollutant concentrations in the Windsor area was obtained from the two MOE air monitoring stations located on College Avenue and on University Avenue.

Traffic projections were developed for the EA study for all main roads in the corridor for each year considered in the assessment, which were 2015, 2025 and 2035. This included the future “No-Build” case (i.e. expected traffic volumes if no new access road/crossing is built), as well as for the TEPA.

Emission rates from these vehicles were input into the CalTrans CAL3QHCR roadway dispersion model, which is accepted for use in Ontario by the MOE and is supported by Environment Canada. Improvements in fuels and technologies legislated to occur over the next several years and historical fleet turnover rates were considered in these emission rates. The model incorporated meteorological data from Windsor Airport, to determine predicted air pollutant concentrations at over 2400 receptor locations in West Windsor.

PREDICTED AIR QUALITY IMPACTS

In general, the air quality assessment shows that potential impacts from The Windsor-Essex Parkway would be small and limited to areas in close proximity to the road. Overall the implementation of The Windsor-Essex Parkway will slightly mitigate future transportation related air quality impacts within the study area over the future “No-Build” alternative because it provides a wide right-of-way and improvements in traffic flow, by eliminating stop-and-go conditions caused by the traffic signals that exist in the Highway 3 / Huron Church Road corridor today.

The study found that in comparing future conditions to existing conditions for both future “No-Build” and with The Windsor-Essex Parkway, air quality will improve for gaseous pollutants due to newer engine technologies and fuels despite the predicted increase in traffic due to population growth, but could slightly deteriorate for particulate based compounds due to road dust arising from increased traffic flows.

The results of the study show, that the existing air quality in the study area is typical of an urban setting, which is characterized by elevated pollutant concentrations in relation to rural areas, with periodic compromised air quality due to particulate based contaminants, which typically occurs during smog events.

Overall, based on the results of the study, the air dispersion modeling demonstrated that the potential air quality impacts arising from either future “No-Build” or TEPA would be very small and limited to nearby the roads.

In general terms, The Windsor-Essex Parkway will mitigate future transportation related air quality impacts within the study area for gaseous contaminants but may result in a higher concentrations of PM within a limited distance from The Windsor-Essex Parkway. However, by implementing The Windsor-Essex Parkway, air quality improvements will be realized outside the Area of Continued Analysis, as traffic will be returned to the corridor, instead of infiltrating throughout local streets.

Results for air quality in the vicinity of the proposed plaza will decrease within approximately 250 m from the Plaza property boundary by 2035. The highest impacts will likely occur within 50 to 100 m of the boundary. Given the location of the plaza in an industrial area, impacts to sensitive areas are avoided.

The results for the proposed crossing indicate that the maximum predicted concentrations of $PM_{2.5}$ and NOx are generally similar to those of The Windsor-Essex Parkway. Given the location of the crossing impacts to air quality for sensitive areas are not predicted.

The Ministry of the Environment (MOE) publishes air quality conditions in different locations, including Windsor, in Ontario through their Air Quality Index (AQI). This information is available to the public on an hourly basis. The AQI is an indicator of air quality based on the highest pro-rated hourly pollutant measurements of six common air contaminants, of which NO_2 and $PM_{2.5}$ are considered. The range of concentration of the contaminants determines the Air Quality Index. When $PM_{2.5}$ is the driver for air quality, a change of about 6 $\mu g/m^3$ is required to move the Index from one rating to another. For NO_2 the concentration differences required to move the Index from one rating to another is about 100 $\mu g/m^3$.

Air quality impacts generally follow expected trends based on the changes in vehicle emission factors and increases in traffic volumes over time. In summary, results of the modelling indicate that:

- the concentrations of the contaminants decrease as the distance from the roadway increases;
- with the exception of 1hr concentrations of $PM_{2.5}$ and NOx under maximum conditions in the vicinity of the proposed plaza, there are no differences in concentrations relating to The Windsor-Essex Parkway that would cause the AQI to be degraded;
- gaseous contaminants generally reduce over time, though the reduction is partially off-set by the increase in traffic; and
- the PM concentrations increase with time, as traffic volumes are predicted to increase from 2015 through 2035.

While not specifically included in the analysis, traffic conditions along Huron Church Road north of the E.C. Row towards the Ambassador Bridge are expected to decrease by approximately 20% with The Windsor-Essex Parkway. Congestion and traffic queuing should also decrease accordingly, thereby resulting in further air quality improvements.

Mitigation Measures

The construction of the TEPA has the potential to affect the air quality in the vicinity of the site during the construction phase. As with any construction site, these emissions will be of relatively short duration and are unlikely to have any long-lasting effect on the surrounding area. Dust impacts should be mitigated through the use of proper controls, such as:

- periodic watering of unpaved (unvegetated) areas;
- periodic watering of stockpiles;
- limiting speed of vehicular travel;
- use of water sprays during the loading, unloading of materials;
- sweeping and/or water flushing of the entrances to the construction zones; and,
- use of calcium chloride.

Road sweeping practices in accordance with maintenance standards will be employed to reduce silt loading on The Windsor-Essex Parkway.

These types of controls aid in minimizing impacts to the environment during the construction phase.

10.1.1 Human Health Risk Assessment

The primary objective of the Human Health Risk Assessment (HHRA) was to help determine the potential for an overall adverse effect on human health for residents in the immediate area of the TEPA.

Human Health Risk Assessments are used to determine if a particular chemical poses a significant risk to human health. If it were possible to prevent humans from being exposed to chemicals then there would be no need to conduct a risk assessment. Since it is impossible to prevent such exposure, and since exposure to many naturally occurring substances also pose health risks, risk assessments become an important tool in evaluating these risks.

Risk assessment helps scientists and regulators identify serious health hazards and determine ways to reduce exposure so that there is no significant health risk to the public. The term “human health risk assessment” is often misinterpreted because people think that a risk assessment will provide information as to whether an exposure to a chemical causes a current health problem or symptom that they are experiencing. Risk assessments do not provide this information; studies that look for these types of linkages are generally epidemiological studies. These studies generally include a survey of health problems in a community and provide a comparison of these health problems to other cities, communities or populations as a whole.

While both of these types of studies are important, health risk assessments and epidemiological studies have different objectives. Most epidemiological studies examine whether past chemical exposures may be responsible for documented health problems in a specific group of people whereas Human Health Risk Assessments evaluate whether current or future chemical exposures will pose health risks to a broad population such as a city or a community. The scientific methods used in a Human Health Risk Assessment cannot be used to link individual illnesses to past exposures to chemicals; additionally, health risk assessments and epidemiological studies cannot prove that a specific chemical caused an individual’s illness.

The methods followed in this risk assessment are consistent with procedures outlined by regulatory agencies such as Environment Canada, Health Canada, the Canadian Council of Ministers of the Environment (CCME) and the United States Environmental Protection Agency (U.S. EPA) and the Ontario Ministry of the Environment. Regulatory bodies use risk assessments to determine drinking water guidelines, site clean-up criteria, and the safe use of pesticides, to name a few. Human Health Risk Assessments use both sound science and professional judgment and are a constantly developing process.

Health Canada has carried out a preliminary epidemiological study in the Windsor area related to mortality and cancer incidence for the period 1979-1999. The results suggest a potential risk for diseases associated with long-term air pollution exposure such as bronchitis, emphysema, lung cancer and lung cancer incidence and mortality from circulatory diseases. These diseases were attributed to transborder air pollution but are preliminary in nature and further studies are underway to assess chronic cardiorespiratory outcomes in relation to air and traffic pollution.

Human Health Risk Assessment Process

Three horizon years (2015, 2025 and 2035) were evaluated in the risk assessment.

The methods followed in this risk assessment comply with procedures outlined by regulatory agencies such as Ontario Ministry of the Environment, Environment Canada, Health Canada, the Canadian Council of Ministers of the Environment (CCME) and the United States Environmental Protection Agency (U.S. EPA).

The chemicals of concern identified in the Air Quality Impact Assessment (refer to Section 10.1) were gaseous air pollutants (nitrogen oxides (NO_2), and sulphur dioxide (SO_2)), fine particulate matter ($PM_{2.5}$), and volatile organic compounds (VOC) such as acrolein, acetaldehyde, benzene, formaldehyde and 1,3-butadiene. The Human Health Risk Assessment used four different steps as provided in the various regulatory frameworks. They are:

- the problem formulation stage, in which the various chemicals of concern, receptors, exposure pathways, and scenarios are identified;
- the exposure assessment, where predicted exposures are calculated for the various receptors and chemicals of concern;
- the hazard assessment, in which exposure limits for the chemicals of concern are determined; and,
- the risk characterization stage, where the exposure and hazard assessment steps are integrated.

Since the TEPA for the Detroit River International Crossing is currently in the planning stage, it is not possible to directly measure emissions associated with the proposed roadway, their potential effect on the ground level air concentrations or possible health outcomes in the community. Therefore, various mathematical models for the prediction of emission rates were used. These are summarized in the document entitled *Technically And Environmentally Preferred Alternative - Air Quality Impact Assessment* (refer to List of Supporting Documents) to determine the exposure to various human receptors considered to be representative of the community. The risk assessment included exposure through inhalation and ingestion of chemicals associated with vehicle emissions through direct deposition to vegetation, as well as deposition to soils and uptake by vegetation.

Assessment Methodology

The Human Health Risk Assessment involved a comparative evaluation between the TEPA for the Detroit River International Crossing and the existing conditions or future "No-Build" scenario in the local area as outlined in the Air Quality Impact Assessment (Section 10.1).

The possibility of short-term (1 hour, 8 hour, 24 hour) and long-term (annual) adverse human health outcomes were assessed based on exposures at the maximum concentration that would occur at different areas along the roadway. The use of the maximum predicted pollutant concentrations in each area covered the range of air concentrations that potentially could occur from activities on the roadway. Conservative assumptions of exposure were used in the assessment to ensure that risks were not underestimated and this most likely resulted in an over-estimate of exposure. One example of a cautious assumption is that it was assumed that residents were exposed to vehicle emissions 24 hours a day, 7 days a week over their entire lifetime.

The Human Health Risk Assessment results were expressed as deterministic hazard quotients and cancer risk levels for long-term exposures, as well as hazard quotient values for both short-term and long-term exposures to gaseous air pollutants. In general, regulatory agencies such as Health Canada, the Ontario Ministry of the Environment and the U.S. EPA concur that a hazard quotient value below one (1) (for assessing gaseous air pollutants since they include background), a hazard quotient of 0.2 (for pathways assessment examining direct and indirect exposure from air pathways) and an incremental life-time cancer risk level of one in a million (1×10^{-6}) are not considered significant and are legislated by the Ontario Ministry of the Environment. The use of an incremental risk limit of 1×10^{-6} as set out by the Ontario Ministry of the Environment is more stringent than the 1×10^{-5} incremental risk limit that is acceptable to Health Canada and the U.S. EPA.

Predicted Human Health Risks

The short-term and long-term health risk associated with exposure to the gaseous air pollutants (SO_2 and NO_2) was assessed based on using a hazard quotient value of 1 since background exposures were taken into account. The results showed that:

- The emissions of sulphur dioxide (SO_2) arising from vehicles traveling along the roadway for the future "No-Build" and TEPA scenarios were similar to background. Therefore, short-term risks arising from exposure to SO_2 were no different to background and the TEPA does not result in any increased risk in comparison to the future "No-Build" scenario. Given that the annual concentrations for SO_2 for the TEPA are no different than future "No-Build" and background the same conclusion (as short term) would hold for long-term exposure to SO_2.
- The short-term and long-term risks associated with NO_2 were similar to background. In general, the short term and long term risks associated with exposure to NO_2 for the TEPA are lower than the future "No-Build" scenario, indicating that there is less risk to residents in communities surrounding The Windsor-Essex Parkway for the TEPA scenario.

There are no health based thresholds for Total Particulate Matter; the World Health Organization has concluded that fine particulate matter ($PM_{2.5}$) is more hazardous to health than coarser particles. Fine particulate matter ($PM_{2.5}$) background concentrations in the Windsor area are relatively high and are above health based toxicity reference values. The predicted concentrations for background exposure to $PM_{2.5}$ accounts for a significant portion of the hazard quotient for both the future "No-Build" and TEPA scenarios. In general, the TEPA scenario results in lower hazard quotients than the future "No-Build" scenario. Thus, the results of the risk assessment associated with $PM_{2.5}$ demonstrate that in general, future risks to residents in communities adjacent to the TEPA will be lower than the future "No-Build" scenario.

The incremental cancer risk values for long-term exposure to carcinogenic VOCs were above the regulatory risk level of one-in-a-million (1×10^{-6}) as was background exposure. However, the incremental risks for the TEPA were no different than the risks associated with background. Thus, the TEPA does not result in increased incremental cancer risks over background.

Hazard quotients for non-carcinogenic VOCs (predicted exposure dose ÷ chronic toxicity reference value) for background, future "No-Build" and the TEPA scenarios were below 0.2 for benzene and 1,3-butadiene. Hazard quotients for acrolein, acetaldehyde and formaldehyde were all above 0.2 for background for the future "No-Build" and the TEPA scenarios. However, the hazard quotients for the TEPA were no different than the risks associated with background. Thus, the TEPA does not result in increased incremental adverse health risks over background.

Conclusions

Based on the risk assessment, the following key conclusion can be drawn:

- Predicted concentrations of gaseous air pollutants, fine particulate matter, and Volatile Organic Compounds for the future "No-Build" and TEPA scenarios are not much different from each other and background. Thus, the TEPA does not result in an increased health risk over the future "No-Build" or background scenarios.

An evaluation of the uncertainties in various measurements and methods used in the risk assessment indicated that the risks have been over-estimated as a result of the assumptions made about exposure which were generally conservative (i.e. assumptions were made to overestimate exposures). The results of this uncertainty analysis support the overall conclusion of the assessment that the TEPA does not result in an increased health risk over the future "No-Build" or background scenarios.

10.2 Socio-Economic Environment

10.2.1 Noise and Vibration

The Ontario Ministries of Transportation (MTO) and Environment (MOE) have developed a series of policies and guidelines for assessing noise impacts from transportation projects which must be applied to all MTO projects in the province. In general terms, the noise impact is determined by comparing the predicted noise levels after implementation of the TEPA with the predicted future "No-Build" noise levels experienced by sensitive receptors. Typically, where the predicted TEPA noise exceeds the future "No-Build" noise levels by 5 or more decibels (dB), mitigation measures to reduce the predicted levels to within 5 dB of the future "No-Build" levels, are to be considered.

Vibration impact is usually evaluated in terms both human response to building vibration and potential for structural damage to buildings. It is generally accepted that 0.14 mm/sec is the threshold of vibration perception for the average person. As the vibration level increases from this threshold, the average person will become increasingly uncomfortable. At 50 mm/sec, vibrations are likely to cause structural damage to buildings. Sources of vibration include traffic and construction activities.

Assessment Methodology

The methodology for estimating noise levels consisted of the following key steps for evaluation of the TEPA:

- Traffic data were established for the base year (2006), as well as for future years (2015, 2025 and 2035), representing baseline conditions and conditions for the TEPA. Also, certain key information was determined, including Annual Average Daily Traffic (AADT), percentage of automobiles, percentage of heavy and medium trucks, speed limit, road elevation, local topography, surrounding ground conditions, etc.
- Sensitive noise receptors along the TEPA route were identified. The receptors selected for assessment were those that were anticipated to be those likely to have the greatest impact (i.e. subject to frontline exposure) by the TEPA. Multiple receptors were selected to capture the anticipated variations in exposure to noise from traffic based on the alignment of existing roads, and variations in traffic volumes. On this basis, a total of 41 receptors were selected along The Windsor-Essex Parkway.
- Baseline (future "No-Build") and TEPA noise levels were estimated at each of the receptors, using the MOE's STAMSON traffic noise model. This was performed for 2015, 2025, and 2035. The key inputs to the STAMSON noise model are: traffic volume, percentage of automobiles, percentage of heavy and medium trucks, posted speed limit, road gradient, road surface type, local topography, surrounding ground surface cover, noise source height, receptor height and source to receptor distance.
- The impact of the plaza/crossing was assessed based on two groups of receptors; a total of 21 and 13 receptors were identified in Sandwich Towne and areas between Ojibway Parkway to Malden Road, respectively.
- The CADNA-A noise model was used to estimate receptor noise levels for the plaza and crossing. This model can be used to predict noise levels from both stationary and mobile noise sources. The modelling approach considered vehicle queuing, idling and acceleration. The key inputs to this model included maximum hourly vehicular traffic (cars and trucks), plaza layout, vehicle sound levels, and locations of vehicles at plaza sites.

The methodology used for estimating vibration impacts consisted of the following key steps:

- Identify areas within the proximity to The Windsor-Essex Parkway that were potentially vulnerable to ground-bourne vibrations.
- Receptors within the potentially vulnerable areas were identified for vibration monitoring.
- Ground vibration levels were measured at two locations (side by side) at each of eight receptors. The traffic at each location was monitored over a period of 30 minutes. The monitoring was conducted over two different days to identify any differences in the vibration patterns. (Note: If traffic is busy, truck speed reduces considerably, thereby reducing the vibration levels).

Predicted Noise and Vibration Impacts

The following points summarize the noise and vibration impacts predicted at receptor locations near the TEPA:

- Without mitigation, noise exceedances of >5 dB were observed at many of the receptors along The Windsor-Essex Parkway when compared to the future "No-Build" sound levels. In several cases, an exceedance of >10 dB was predicted.
- The noise generated solely from the plaza location is not expected to cause a high noise impact at the receptors closest to the plaza. In most cases, the receptors are more than 50 m (164 ft) away from the plaza. However, the noise modeling results show that a high noise impact (> 10 dB above future "No-Build" receptor sound levels) is predicted for some of the receptors in closest proximity to the approach roadway to the plaza. The potentially affected receptors are located in the Ojibway Parkway to Malden Road area.
- Baseline vibration levels were measured in 2006 at eight locations, including areas close to a church and houses. The Windsor-Essex Parkway plan was reviewed to identify residences, hospitals and other potentially vulnerable receptors, within 25 m from the edge of the roadway. The results showed for the most part that, the levels measured were within the threshold of perception

limit of 0.14 mm/sec. These levels decay slowly with distance at close proximities to the road edges and should the roadway contain an expansion joint, etc., these levels may increase to the threshold level of perception. Hence, as a precautionary measure, receptors within 25 m from the edge of the roadway were counted as potential locations where vibration levels could potentially reach the threshold value of 0.14 mm/sec

- In terms of construction related noise, additional details on construction equipment quantities, work schedules and duration will be available during subsequent phases of design. However, based on past experience, it is anticipated that activities such as clearing, excavation, soil compaction, roadway construction, etc., would increase sound levels at receptor locations in close proximity to construction staging and work areas. A wide variety of mitigation measures can be employed to reduce construction noise at receptor locations. These measures are discussed in the next section.

Mitigation Results

While a number of specific mitigation measures are identified below, there will be an opportunity for refinement to these measures during the subsequent design phases of the project and through ongoing consultation with residents during the next stages of the project.

- Mitigation measures were identified to address operation effects for the TEPA as outlined below: In all cases, for receptors located in areas along The Windsor-Essex Parkway, the proposed 5 m high noise barrier where required was effective in reducing the predicted project noise to within 5 dB of the estimated baseline noise levels, except for night time at one receptor located in Spring Garden Road. The noise barrier locations are illustrated in the plan included in Appendix B – Conceptual Noise Mitigation Plans.
- The installation of a 5 m high acoustic barrier along the segment of the proposed approach roadway that leads to the Plaza is sufficient to mitigate noise levels for receptors in the Ojibway Parkway to Malden Road area.
- The vibration measurements, for the most part, were within the threshold of perception limit of 0.14 mm /sec for all locations measured. It is determined that vibration mitigation measures are not required for the TEPA since vibration levels are not expected to approach 50 mm/sec which is the threshold for structural damage.

The following measures will be undertaken to mitigate noise during the construction phase of the TEPA:

- Ensure that all construction equipment used is in good repair, fitted with functioning mufflers, and complies with the noise emission standards outlined in MOE guidelines.
- To the greatest extent possible, limit the most noisy construction activities to daytime hours.
- Where the sequencing of construction permits, permanent noise barriers and/or berms may be built during the early phases of construction in order to reduce construction noise levels at receptor locations.
- Maximize the distance between the construction staging areas and nearby receptors to the greatest extent possible.
- Maintain construction haul roads to prevent potholes and ruts to avoid the loud noise caused by construction vehicles travelling over uneven road surfaces.
- Develop a process for receiving, investigating and addressing construction noise complaints received from the public.

Consultation with communities will continue during the design and construction stages, to provide additional opportunities for input on noise mitigation measures.

Conclusions

Based on the noise and vibration analyses completed, the following key conclusions can be drawn:

- Without mitigation, there is a potential for high noise impacts from the TEPA.
- Mitigation measures were identified to address operation effects for the TEPA as outlined below: In all cases, for receptors located in areas along The Windsor-Essex Parkway, the proposed 5 m high noise barrier where required was effective in reducing the predicted project noise to within 5 dB of the estimated baseline noise levels, except for night time at one receptor located in Spring Garden Road. These receptors could potentially benefit from lower noise levels with The Windsor-Essex Parkway in place as compared to the future “No-Build” alternative".
- For the Plaza, a potential noise impact was identified for receptors in the Ojibway Parkway to Malden Road areas that are in the vicinity of the proposed approach roadway. However, the receptor sound levels can be reduced to within 5 dB above the future “No-Build” sound levels with a 5 m high acoustic barrier installed on the proposed approach roadway.
- Through the use of best practices, noise can be mitigated during the construction and operating phase.
- There will be opportunities for public input into specific noise mitigation measures during the next stages of design and construction.

10.2.2 Protection of Community and Neighbourhood Characteristics

Social impacts occur when a project negatively or positively affects the way of life or lifestyle enjoyed by people, their social patterns, the social structure or character of communities, and/or the local or regional services and facilities. The Social Impact Assessment (SIA) examined the effects to areas within South and West Windsor, and the Towns of LaSalle, and Tecumseh as a result of the proposed project. Within these broader communities a number of smaller neighbourhood communities were identified and also studied as part of the social impact assessment.

Assessment Methodology

The methodology and tools for predicting the social impacts of the proposed Windsor-Essex Parkway, Plaza, and Crossing included both quantitative and qualitative data. Social data collection for this study included use of the social household questionnaire data, public consultation activities and comment forms, context sensitive solution workshops, and the review of information provided by the Ministry of Transportation (MTO) property agents. In addition, input from other disciplines was also incorporated.

The household questionnaire was initially administered to residents potentially displaced by one or more of the practical alternatives in July 2006. The household questionnaire was intended to capture information about the affected population, their sense of attachment (tenure, status of ownership), property usage, and the perceived effect of the TEPA on their use and enjoyment of their property. Due to design refinements, including the addition of the green space buffer with The Windsor-Essex Parkway, additional households, not previously approached to complete a questionnaire, were identified. In addition, those households within the TEPA that did not previously complete a questionnaire were also identified. For all of these households, residents were provided an opportunity to complete the questionnaire by telephone over a two week period in late August 2008.

A similar approach was taken in July 2006 for identifying and collecting data from social features displaced or potentially disrupted by the project. A facility-specific questionnaire was developed to collect data for potentially displaced or disrupted social features and was administered during an interview with the facility manager. The questionnaire and interviews collected information on programs, the service catchment area, number of users, and access to the facilities.

The Public Information Open Houses (PIOH) held June 18 & June 19, 2008 and the Context Sensitive Solution Workshop held on June 24 & 25, 2008 (CSS) provided the opportunity to obtain qualitative data from attendees. The PIOH and CSS were particularly helpful in gaining insight with respect to:

- Neighbourhood community character and cohesiveness;
- Satisfaction with the community as a place to live;
- Perceptions of the various components (tunnel locations, length, green space usage) of The Windsor-Essex Parkway alternative and related issues/concerns on how the proposed access road, may or may not effect residents and the community; and
- Unique features related to individual properties, and/or the neighbourhoods within the area of investigation.

Several neighbourhood meetings were also conducted at the request of residents (including two with Spring Garden/Bethlehem and Armanda Street residents, and one with Oliver Estates). These neighbourhood meetings were particularly helpful in gaining insight with respect to:

- Specific neighbourhood concerns;
- Specific neighbourhood design improvements, and
- Perceptions of how the TEPA would impact residents and the neighbourhood.

PREDICTED SOCIAL IMPACTS

The Windsor-Essex Parkway

In response to consultation input during the analysis and evaluation of practical alternatives, The Windsor-Essex Parkway was designed to address community objectives expressed by municipalities and residents. These objectives included the removal of truck traffic from local streets and an overall improvement to the quality of life for residents living adjacent to the existing transportation corridor. Other benefits provided by The Windsor-Essex Parkway include improving cross border traffic flow, separation of local and freeway traffic, the addition of over 300 acres of a green space buffer between the freeway/local service roads and adjacent residents, eleven tunnels providing greater connectivity between neighbourhood communities on both sides of the Highway 3/Huron Church Road corridor; and, providing opportunities for 20 km of recreational trails.

The Windsor-Essex Parkway will result in displacement of approximately 360 homes, located along the periphery of neighbourhoods from Howard Avenue to Ojibway Parkway; changes to cohesion and character in some neighbourhood communities; the loss of 48 businesses; and, overall disruption and nuisance effects to both residents and the travelling public during the construction period.

Community neighbourhoods from Ojibway Parkway to Malden Road, Spring Garden Road, Bethlehem Avenue, Kendleton Court, Reddock Avenue, Talbot Road (Highway 3), and Oliver Estates will experience a greater change in character and cohesion than other neighbourhood communities located along the corridor due predominately to the loss of residential properties in the neigbhourhood.

The social features that are displaced by the project serve the broader community, and include the Montessori Pre-School, the Royal Canadian Legionand the Heritage Park Alliance Church, and Trillium Court Housing. In all cases, the Ministry of Transportation will assist these parties where possible to help ensure a seamless transition for the relocation of the facilities, programs and services offered by these social features.

The displacement of businesses along the proposed access road will have limited overall economic impact. Despite the immediate loss of revenue and employment, the loss of business will be offset by gains in other businesses, or the displaced businesses will relocate to other areas.

Noise attenuation for the effects of The Windsor-Essex Parkway have been addressed by locating much of the roadway below grade and through the construction of noise barriers where necessary. Commitments are also being made to ensure that construction noise is addressed through specific measures outlined under the noise and vibration section of this report (Section 10.2.1).

Emergency service providers have been consulted and are aware that they will need to reassess their resources, level of service, access routes for The Windsor-Essex Parkway, and in general, their ability to access their entire area of coverage, in order to ensure provincially mandated response times are met.

During construction, MTO has committed to maintaining traffic flow in the Highway3/Huron Church Road corridor, and utilizing best practices for dust suppression and noise attenuation. Although by its very nature, the construction phase will result in disruption and nuisance effects to residents and the travelling public, the MTO commitment will minimize these impacts.

Plaza and Crossing

The plaza is located within the industrial lands along the Detroit River. Within the industrial park, there are only a handful of residents that did not move out with the creation of the industrial park. The five properties remaining will be displaced by the new plaza and crossing.

The only social feature to be displaced is the Erie Wildlife Rescue. This is a regional facility with unique requirements; however, its continued programming and services are not dependant on its existing location.

Generally, due to the presence of the industrial park, the plaza will have limited social impacts. As discussed in the Economic Impact Assessment (Section 10.2.3), there are impacts associated with the loss of industrial park space; however, from a community perspective, the plaza will not change community character, and will impact few residents.

Nuisance impacts to residential areas associated with the operation of the plaza and crossing are not anticipated, given the significant distance from these areas.

MITIGATION MEASURES

The Windsor-Essex Parkway design was developed based on mitigating the predicted social impacts of the original five practical alternatives (the at-grade, below grade and tunnel alternatives) discussed in Chapter 8.

Other mitigation measures recommended to reduce the social impact on the broader and neighbourhood communities include those that are currently taking place and those actions that will take place during future design stages:

- Implementation of the "willing seller-willing buyer" property purchase program;
- Fair market value for properties required for the project;
- Develop and maintain regular communications with emergency services and the municipalities with regard to changes to the road network, municipal services, etc.
- Implement a communication process to manage disruption effects experienced by residents;
- For residents in Oliver Estates, assess the need for improvements to Montgomery Drive.
- For residents in the Ojibway Parkway /Spring Garden/Bethlehem area, protect and maintain and landscape as much as possible to enhance the lands between the residences and the facility.

CONCLUSION

Despite the potential for impacts for a project of this magnitude, community consensus dating back to the time of the *Planning Need and Feasibility (PNF) Study (2001 to 2004)* supports the need for the project. For those who are directly impacted (businesses and residences displaced), strategies such as advance purchases have been offered as detailed in the mitigation measures. As detailed in Chapter 3, meetings with residents directly impacted by the TEPA have occurred, resulting in adjustments to the TEPA and in some cases, additional property acquisition. For those neighbourhoods and residents that are more immediately impacted by the project, a wide range of strategies have been employed to mitigate predicted impacts.

The extensive level of consultation associated with this project has provided MTO with strong insights into community impacts and therefore the ability to design and mitigate around those impacts to the extent that is feasible. With the commitments that MTO has made with regard to minimizing impacts to the neighbourhoods during construction, that is, maintaining access and traffic flow, implementing best practices for dust suppression and noise attenuation, residents will experience effects typical to a highway construction project.

It is recognized that the project will impact the adjacent neighbourhood communities to varying degrees. Through continued consultation with those impacted, residents can be empowered to control and manage the changes that affect them and their quality of life. Similarly, while the displacement of businesses along the Highway 3/Huron Church Road corridor that serve the local neighbourhoods will potentially cause a change in social patterns and community function, the displacement of businesses along the proposed access road will have limited overall economic impact. Despite the immediate loss of revenue and employment, the loss of businesses will be offset by gains in other businesses, or the displaced businesses will relocate to other areas.

The result is that once the project has reached its operational phase, The Windsor-Essex Parkway will provide a solution to the long standing transportation problems in the area and will provide a greenspace buffer along the corridor, improved traffic flow, improved connectivity between neighbourhoods, and an overall improvement to air quality.

10.2.3 Economic Impacts

Individual business impacts were analysed in terms of two categories: Displaced businesses and disrupted businesses. Displaced businesses would cease to operate at their current location due to the physical alignment of The Windsor-Essex Parkway, plaza or crossing. These businesses will be financially compensated. A disruption to a business occurs when the proposed roadway, plaza or border crossing encroaches on a business' property, decreases the amount of passing traffic, or alters traffic access and/or visibility. When physical disruptions requiring property acquisition occur, financial compensation will be provided.

The positive and negative impacts of the alternatives on businesses beyond the ACA were also assessed. This included the impact of the alternatives on the businesses located along Huron Church Road north of the E.C. Row Expressway.

Through the property acquisition process, displaced businesses are offered fair market value for their businesses which will provide them an opportunity to relocate if they so choose. The *Economic Impact Assessment Report* (refer to List of Supporting Documents) documents that there are many opportunities for businesses to relocate.

PREDICTED ECONOMIC IMPACTS

The TEPA will result in the following direct economic impacts:

Access Road Alternatives	Number of Businesses Displaced	Number of Businesses Disrupted	Gross Revenues Displaced ($ Millions Average)	Number of Jobs Displaced	Assessed Property Value Displaced ($Millions)
Windsor-Essex Parkway	48	31	$43.60	361	$29.10
Plaza -Crossing	1	2	*Suppressed for confidentiality*	5	$0.13

MITIGATION MEASURES

Besides financial compensation for physically disrupted businesses requiring property acquisition, several other forms of mitigation may be used to assist businesses:

- Allow signage at certain intersections/interchanges to make motorists aware of businesses/business clusters, as policies permit
- Efforts will be made during the construction phase to ensure access is maintained to operating businesses.
- The service road network will allow for adequate access to existing commercial corridors.

Conclusion

In summary, businesses displaced by the construction by the TEPA will have adequate opportunities to re-establish in suitable locations within the study area.

10.2.4 Impacts to Existing and Planned Land Use

The Windsor-Essex Parkway with its provision for buffer space adjacent to the corridor, and the opportunities for various recreational land uses such as trails and greenspace is consistent with local municipal planning policies.

Potential impacts result from land use being changed from either residential, commercial, open space, industrial, or vacant to a transportation-related use.

When examining the various Official Plan policies, The Windsor-Essex Parkway is consistent with the development strategy, healthy communities, environment, land use, infrastructure, urban design and heritage conservation policies of the *City of Windsor Official Plan* and greenway land use policies of the Town of LaSalle. The Windsor-Essex Parkway provides opportunities to connect communities and provide new open space and parklands in areas that previously did not have such land uses. In addition, The Windsor-Essex Parkway provides opportunities to create new recreation way land uses, as supported in the *Town of LaSalle Official Plan.*

The proposed plan will not have a significant impact on the development plans outlined in the Official Plans of the *City of Windsor, Town of Tecumseh, Town of LaSalle, and Essex County.* Opportunities to minimize potential property impacts associated with The Windsor-Essex Parkway will be reviewed during future design stages in consultation with municipalities.

The international plaza on the Canadian side of the bridge crossing will be situated within the former Brighton Beach residential neighbourhood, which is currently zoned for industrial land uses. Over time, most of the residences have been acquired and removed so the area is generally vacant. Heavy industrial land uses surround these sites and are considered more compatible with the activities that are associated with a plaza. Government and institutional land use impacts for the plaza consist of less than one hectare of impacts. Additionally, there are no agricultural land uses in the vicinity of the plaza crossing alternatives.

The bridge crossing is also located in a predominately industrial area, and will impact water dependant industrial land uses. Water dependant industrial land uses are often hard to relocate, due to the lack of available industrial waterfront property.

Conclusion

In summary, The Windsor-Essex Parkway provides opportunities to develop new recreation and open space land uses for both the *City of Windsor, Town of Tecumseh, Town of LaSalle and Essex County*. This is consistent with the existing official plan policies for all affected municipalities.

10.2.5 Property Acquisition Process

In order to reduce uncertainty for property owners affected by the TEPA, MTO and TC are proceeding with property acquisition on a willing buyer/willing seller basis. Compensation will be provided at fair market value, which is determined at the time of purchase by a property appraisal report forming the basis for negotiations. Other ancillary costs are negotiated on a case-by-case basis.

In some locations, it may be necessary to acquire property on a temporary basis, in order to facilitate a particular construction operation. Compensation will also be provided with respect to temporary property requirements. Upon completion of construction, temporary property will be returned to the owner. All reasonable attempts will be made to restore the land to its original condition.

If the Environmental Assessment (EA) study has been approved by the Minister of the Environment, MTO and TC will initiate purchase of all the remaining lands required for construction.

If an amicable agreement cannot be reached, MTO and TC will proceed in accordance with the provisions of the applicable Expropriations Act. MTO and TC respect owners rights under the laws of Ontario and Canada, and those rights will be fully explained to applicable residents.

Conclusion

The advance purchase process initiated by MTO and TC has been beneficial in reducing uncertainty for affected parties.

10.2.6 Waste and Waste Management

An area of investigation was established for the Waste and Waste Management report that encompasses directly impacted properties associated with the TEPA. For the purposes of this discussion, "directly impacted" properties refers to those properties in which all or a portion is situated within the proposed land requirements of the crossing, plaza or The Windsor-Essex Parkway. Neighbouring and adjacent properties that are not situated within the proposed property requirements have not been visited; however, as part of the evaluation of specific sites, adjacent properties were evaluated. This evaluation focused on the potential for the presence of pre-existing contaminants and wastes.

The MTO has established guidelines related to environmental protection, including "*Environmental Protection Requirements, for Transportation Planning and Highway Design, Construction, Operation and Maintenance, April 2004*" and the "*Environmental Standards and Practices User Guide, December 2006"* (ESP Guide). The ESP Guide is further divided into specific sections including Section 9, *Contaminated Property and Excess Materials Management* which covers the identification and management of contaminated property referred to as MTO's contaminated property process.

Assessment Methodology

MTO's contaminated property process has the following major stated goals:

- identify past and present site activities;
- evaluate the existing environmental liabilities, current environmental performance, and environmental risk of a property; and
- determine and undertake contamination management.

To achieve these goals, the process has been broken down into the following six (6) steps:

1) Contamination Overview Study (COS): is a general overview of the study area to identify properties/areas with the potential for site contamination.
2) Preliminary Site Screening (PSS) is a quick and broad review of a single property to determine the potential for contamination.

3) Phase 1 Environmental Site Assessment (ESA): is a detailed review and non-intrusive investigation to identify actual, or potential contamination on, in, or adjacent to, a property. The Phase I ESA must be prepared according to the *Canadian Standards Association Z768-01 Phase I Environmental Site Assessment.*
4) Phase 2 Environmental Site Assessment (ESA) is an intrusive site investigation to confirm and delineate the extent of suspected environmental liabilities and property contamination issues that have been identified in previous steps. The Phase II ESA is typically conducted as part of the future design phases.
5) Site Management is the management of contamination at the site and can include preparing the Remedial Work Plan / Site Management Plan, conducting remedial work and carrying out confirmatory sampling, and it may involve both facilities and property.
6) Risk Assessment is the management of the site based on the risk associated with the contamination on that specific site; this is unlike the above assessments that compare results to contaminant criteria.

The Contamination Overview Study (COS) undertaken for this study involved record reviews and study area reconnaissance. Collected data (i.e., base land use, select environmental databases, aerial photographs, available technical reports, historical topographic maps and fire insurance plans) was analyzed to identify known contaminated sites. Data was further analyzed to evaluate the relative potential and severity for contamination. Ratings of Known, High, Moderate or Low potential for contamination were applied to properties impacted by the TEPA. The assignment of ratings was based on the potential likelihood and severity of contamination based on land use and URS' estimate of relative risk. Properties that were rated Known, High or Medium were identified for further investigation.

RESULTS

In addition to the COS and PSS has been conducted on approximately 36 individual properties. To thoroughly evaluate each site, the review also included a review of historical aerial photographs, a review of available City Directories, a request for fire insurance plans and inspection reports provided by Risk Management Services (RMS, formerly CGI).

The properties visited to date have primary been commercial/light industrial properties which were initially developed in the 1950s and 1960s. Based on site visits, interviews, and historical information, the Areas of Concern (AOC) identified to date are associated with:

- former gasoline service stations,
- former landfills
- former vehicle repair facilities,
- former auto wreckers,
- facilities with on-site fuel storage,
- existing autobody shops,
- former coal and coal slag and coal ash storage facilities,
- industrial facilities with septic systems (which increase the likelihood of contaminants entering soil or groundwater), and
- potential for contaminated fill materials to have been imported to the sites during development.

No actual contamination has been noted on these properties; however the potential for contamination has been identified, based on previous usage. The types of contaminants that may have impacted soil or groundwater can cover a broad range, including, but not limited to:

- volatile organic compounds,
- waste materials, including material legally and illegally deposited,
- chlorinated solvents,
- polyaromatic hydrocarbons (PAHs)
- petroleum hydrocarbons,
- polychlorinated biphenyls (PCBs), and
- heavy metals.

Structures may contain asbestos-containing materials, lead-based paints, and PCBs in electrical equipment. To evaluate the presence of these materials, a Designated Substance Survey (DSS) may be required prior to demolition. A DSS will identify the type, location and concentration of any Designated Substances on-site so that applicable measures can be taken to ensure the safety of those working on the site and the general public during the removal.

MITIGATION

To reduce the uncertainty of whether contamination is present, Phase II ESAs are being conducted on properties identified as having contamination potential. The Phase II ESA is an intrusive investigation, involving sampling and analysis of soil, water or other components. To assess the environmental quality of the soil and groundwater, the laboratory analytical results will be compared to applicable site restoration standards provided in *Soil, Groundwater and Sediment Standards for Use Under Part XV.1* of the *Environmental Protection Act* (EPA), dated March 9, 2004 (MOE SCS). These standards are referred to in *Ontario Regulation 153* under the EPA called the *Record of Site Condition Regulation (O.Reg.153/04)*. O. Reg. 153/04, which came into effect October 1, 2004, applies to properties that require the filing a Record of Site Condition (RSC) either due to a zoning bylaw change to a more sensitive use (e.g. industrial to residential) or for voluntary purposes. O.Reg.153/04 presents a methodology for the environmental assessment of properties in Ontario. Although O.Reg.153/04 does not apply to sites where an RSC is not filed, it is anticipated that the general requirements of the regulation will become the de facto guideline. It should be pointed out that the site restoration standards provided in Ontario Regulation 153/04 is currently under review and amendments are introduced which are expected to pass in the earlier part of 2009.

If contamination to soil and/or groundwater is identified, a Phase III ESA may be required. Phase III ESA generally defines the lateral and aerial extent of impacted zones and examines options for managing the contamination or cleaning up the site. Actions could include risk assessments to determine whether the contamination represents a potential threat to human health or the environment or remediation activities which could include excavation and off-site disposal, or on site treatment, in-situ or ex-situ remediation or monitoring of natural attenuation.

Conclusion

These standard practices for assessing contamination will ensure the contamination risks associated with properties acquired by the ministry are identified and mitigated.

10.3 Cultural Resources

10.3.1 Archaeological Resources

Archaeological resources are considered to be elements of the environment as defined in both the *Ontario and Canadian Environmental Assessment Acts* as well as the *Ontario Planning and Heritage Act* and in the *Provincial Policy Statement (2005)*.

Archaeological sites are generally described as the physical remains of past human activity. They can take a range of forms from small scatters of artifacts to the remains of structures and can range in size from a single, isolated object to large and complex sites containing thousands of artifacts covering a hectare or more. The relative significance of any one site is measured on the basis of its temporal and cultural associations, information and contextual values and degree of integrity or disturbance.

Archaeological Assessment in the development process is conducted in four stages:

Stage 1: Background Research and Assessment of Archaeological Potential,

Stage 2: Field Survey to identify sites that may be present within the study area,

Stage 3: Site testing to evaluate the character, age and extent of sites identified at Stage 2 and,

Stage 4: Mitigation through either avoidance or excavation and documentation.

Each stage represents a distinct element in the overall process of archaeological assessment and each builds on the results of previous stages. To date, Stage 1 and 2 archaeological assessments have been conducted for a significant portion of the proposed TEPA.

Assessing Impacts to Archaeological Resources

In Ontario, the Ministry of Culture (MCL) acts as the regulatory body for the conduct of archaeological and heritage assessments and their concurrence with all work and reporting is a regulatory requirement under the *Ontario Heritage Act*. The identification and assessment of impacts to archaeological resources, including reporting, is conducted under archaeological licence issued by the Ministry of Culture (MCL). Standards for field methodology for work by archaeological consultants are described in two technical guidelines set out by MCL. *The Archaeological Assessment Technical Guidelines* (1993) describes the requirements that must be met in order to satisfy the Ministry of Culture that all work is completed appropriately. The Draft *Standards and Guidelines for Consulting Archaeologists* (2006) set out the standards and practices for archaeologists in greater detail. However, they have not been formally adopted by MCL. As a matter of policy, the Ministry of Transportation (MTO) mandates that consultants working on MTO projects adhere to the 2006 Draft standards. The 2006 Standards have been followed throughout the EA study.

Assessment Methodology

The methodology for the archaeological assessment consisted of the following key steps for evaluation of the TEPA:

As part of the assessment of the illustrative and practical crossing, plaza and access road alternative a Stage 1 Assessment of archaeological potential was completed for the original study area and Area of Continued Analysis (refer to Chapter 4 and Chapter 7, respectively). This required detailed research on known archaeological resources within these area as well as land-use history and physiographic conditions including drainage, soils, vegetation cover and land disturbance. This assessment included a detailed field review of the study area to verify the research results. From this research and field review, a determination was made regarding the potential for encountering archaeological resources within the study area.

Stage 2 Assessment was undertaken in those areas determined to have archaeological potential. Because the TEPA passes through an area that is largely urbanized, the main determinant of overall survey coverage is access to individual properties.

Stage 2 assessment was conducted using two methods – Pedestrian and test-pit survey. In the case of the former, open lands that are suitable for cultivation are ploughed and allowed to weather for at least two weeks. Following weathering, the subject lands are surveyed at five metre intervals to identify any archaeological materials visible on the ground surface.

Test Pit Survey was used in areas that have forest, scrub, or other, heavy vegetation cover or are too small (*i.e.* less than one hectare) to allow for plough access. This form of survey consisted of digging small (30cm by 30 cm) test-holes at regular intervals across each property. The survey interval for most projects is five metres. All soils from the test-pits are screened through 6mm mesh to aid in the identification of archaeological materials. In both pedestrian and test-pit surveys, all identified site locations are systematically recorded using hand-held GPS units and subsequently mapped at 1:5000 or larger scale.

Upon completion of Stage 2 Assessment, those sites considered to be of potential significance are recommended for Stage 3 Assessment. Stage 3 Assessment requires the excavation of a series of one metre by one metre test units across the site area to firmly establish its size, age, cultural affiliation, and whether there are intact subsurface features present across the site.

Upon completion of Stage 3, a determination is made as to whether the site warrants a further Stage 4 assessment, mitigation or can be considered free of further archaeological concerns. The main criteria for determining whether a site has archaeological significance are:

1. *Information potential for the site*. This is includes evaluation of the site's integrity (extent of past disturbances to the site, extent of a multi-component mix to deposits, etc.), Rarity or Representativeness (locally, regionally and provincially), Cultural-Temporal Affiliations. (age, aboriginal/European pioneer associations, etc.), Potential Data Productivity (settlement and artifact distribution data, subsistence and ecological data, cultural behaviour, artifacts yields, etc.), Site Context (temporal and spatial, inter-site relationships, demonstrated relationship to known historic events, people, etc.), Potential for the presence of human remains
2. *Perceived Value potential.* This is the value the site may have to a local community or specific groups. As noted in the 1993 Technical Guidelines, a site may have low information potential but still have a high value because of its significance to a particular cultural group or because it can be used for educational opportunities.

PREDICTED IMPACTS TO ARCHAEOLOGICAL RESOURCES

A Stage 1 and preliminary Stage 2 Archaeological Assessments of areas with archaeological potential within or in close proximity to the proposed TEPA, and for which permission to enter had been obtained was undertaken for 496 parcels, or 55% of the 902 parcels in The Windsor-Essex Parkway). Forty-three archaeological sites have been identified in this area (14 Aboriginal, 17 Historic and 6 with both an aboriginal and historic component), and recommended 29 of these for further Stage 3 assessment. Twenty-four of the 29 sites lie within the TEPA.

A Stage 2 assessment of the project area for the TEPA was conducted and survey crews investigated 146 parcels (16% of the 902 parcels in the project). There remain 260 parcels that await Stage 2 assessment, with 253 pending permissions to enter. There are currently 7 properties outstanding (incomplete or pending ploughing) for which permissions to enter have been granted. Twenty-three (14 Aboriginal and 9 Euro-Canadian) additional archaeological sites have been identified and 7 of these (4 Aboriginal and 3 Euro-Canadian) have been recommended for Stage 3 assessment.

MITIGATION MEASURES

Mitigation of impacts to archaeological sites takes only two forms: Avoidance and Mitigative Excavation. Avoidance often includes measures to stabilize a site to protect against erosion and other passive impacts. Where a site is avoided it is often necessary to designate the site area as “off limits” for construction equipment to prevent against damage to artifacts and features.

Mitigative excavation involves the complete excavation and recording of all site areas to be disrupted or otherwise altered by an undertaking. Where only a portion of the site is subject to impacts protective measures will be required to ensure that remaining site areas are not damaged by construction and operational activities.

The mitigative requirements in advance of construction of the TEPA are not known at this phase of the project because the archaeological assessment has not been completed to the extent that would allow for determination of all impacts and required mitigation alternatives.

For the construction phase the following measures apply:

- Should deeply buried archaeological remains be found on the property during construction activities, the Manager, Heritage Operations unit, Ontario Ministry of Culture, should be notified immediately.
- In the event that human remains are encountered during construction, the proponent must immediately contact both the Ontario Ministry of Culture and Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ontario Ministry of Government Services, Consumer Protection branch.

CONCLUSIONS

Based on the archaeological assessment completed to date, the following key conclusions can be drawn:

- Archaeological resources have been identified within the TEPA.
- The exact nature, extent and significance of these resources will not be known until the completion of the Stage 2 and 3 assessments within the TEPA.
- Upon completion of Stage 2 & 3 assessment, determination of the extent of impacts to significant archaeological resources can be made.
- Where significant archaeological resources are encountered, mitigation will be required. This will entail either avoidance or mitigative excavation.

10.3.2 Built Heritage Resources

Built Heritage Resources are described under three broad headings: Built Heritage Features (BHF), Built Heritage Resources (BHR) and Cultural Landscape Units (CLU). Generally, a BHF is understood to be “an individual part of a cultural heritage landscape such as buildings or structures of various types, cemeteries, planting and landscaping structures, etc that contribute to the heritage character of the cultural heritage landscape”. In other words the Term Built Heritage Feature acts as a catch-all term that includes individual BHR and CLU features.

A BHR is defined as “one or more significant buildings, structures, monuments, installations or remains associated with architectural, cultural, social, political, economic or military history and identified as being important to a community. These resources may be identified through designation or heritage conservation easement under the Ontario Heritage Act, or listed by local, provincial or federal jurisdictions”.

Cultural landscapes are “(a) defined geographical area of heritage significance that has been modified by human activities and is valued by a community. It involves a grouping(s) of individual heritage features such as structures, spaces, archaeological sites and natural elements, which together form a significant type of heritage form, distinctive from that of its constituent elements or parts. Examples may include, but are not limited to, heritage conservation districts designated under the *Ontario Heritage Act*; and villages, parks, gardens, battlefields, main streets and neighborhoods, cemeteries, trail ways and industrial complexes of cultural heritage value”.

The analysis of impacts to Built Heritage features within the TEPA has included four major elements:

- The identification of BHF’s within the TEPA,
- Assessment of Cultural Heritage value or interest for all identified BHF’s,
- Description of Impacts; and,
- Identification of mitigation options and requirements.

ASSESSING IMPACTS TO BUILT HERITAGE FEATURES

As described in the Ministry of Transportation’s *Environmental Guide for Built Heritage and Cultural Landscapes* the assessment of impacts to identified Built Heritage Features (BHF) includes preparation of detailed documentary research for a historical review, determination of heritage value for individual BHF’s, followed by the specific description of impacts.

The Practical Alternative Evaluation Working Paper, Cultural Heritage (March 2008, hereafter *Working Paper 2008* refer to List of Supporting Documents) has identified 13 Built Heritage Features within the TEPA. A detailed documentary research was conducted for all features identified to be of potential interest within the revised TEPA. This research included reference to Registry Plans and abstracts, local histories, archival maps, and secondary sources. Based on these findings, a field review of these features, and the application of the Criteria listed in Regulation 9/06 of the *Ontario Heritage Act (R.S.O.*

1990), seven Built Heritage Features have been rejected as potential Cultural Heritage Resources, while six (five residences and one institutional structure) are recommended for continuing analysis and determination of impacts. These include5 residential structures and a single CLU. All six features are considered to be of Cultural Heritage Value or Interest.

PREDICTED BUILT HERITAGE IMPACTS

Impacts to Built Heritage Resources are generally classed as direct or indirect. Direct impacts include loss or significant alteration of BHF's and loss of overall contextual integrity as a result of an undertaking. Indirect impacts are generally less severe and include, but are not limited to, encroachment of non-sympathetic elements in proximity to a feature and introduction of noise, dust, vibration and other elements that may affect the long-term stability and integrity of the resource. For the EA, all of the impacts to identified BHF are direct. In all, there are six BHR's for which, removal of the structure will be required.

The following features have some potential as heritage resources according to the Criteria for determining Cultural Heritage Value or Interest for architectural, historical or community associative reasons. This is based on their application of Ontario Regulations 9/06 and 10/06. Further investigation is recommended for the following:

- BHR 1: 2746 Talbot Road, Windsor
- BHR 2: Legion Branch 594, 3920 Huron Church Line Road, La Salle
- BHR 7: 2310 Spring Garden Road, Windsor
- BHR 8: 2290 Spring Garden Road, Windsor
- BHR 9: 2284 Spring Garden Road, Windsor
- BHR 19: 2369 Spring Garden Road, Windsor

MITIGATION MEASURES

Mitigation measures were investigated for the six Built Heritage Features. All mitigation options will require a Built Heritage Resource Documentation Report. This report includes detailed photo-documentation of the structure and a plan of salvage for character contributing architectural elements.

Only two mitigation options are considered practical for the TEPA:

1. Relocation of individual structures within the City of Windsor or,
2. Salvage of significant architectural elements followed by demolition.

Where relocation is recommended, the City of Windsor Heritage Committee should be consulted.

CONCLUSIONS

Based on the Built Heritage analyses completed for the TEPA, the following key conclusions can be drawn:

- Without mitigation, there is a potential for the loss of six heritage features with cultural heritage value or interest within the TEPA.
- A Built Heritage Documentation Report will be required for all six Built Heritage Features.
- Relocation of individual structures may be done through MTO's Heritage House Relocation programme.
- For those features not deemed sufficiently noteworthy for relocation, salvage and demolition will be recommended.

10.4 Natural Environment

The potential environmental impacts on fisheries, vegetation, wildlife and designated natural areas associated with the TEPA as well as proposed mitigation measures have been assessed as described in the following sections.

10.4.1 Natural Heritage

Natural heritage is defined in Ontario as:

"features and areas, including significant wetlands, significant coastal wetlands, fish habitat, significant woodlands, significant valley lands, significant habitat of endangered and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area" (OMMAH 2005).

The natural heritage investigation is guided by government legislation, regulations, policies and guidelines within federal, provincial and municipal jurisdictions. The primary source documents for the natural heritage investigation included:

- Canadian Biodiversity Strategy;
- Federal Fisheries Act;
- Federal Species at Risk Act;
- Federal Migratory Birds Convention Act;
- Canada Wildlife Act;
- Canadian Federal Policy on Wetland Conservation;
- Ontario Biodiversity Strategy;
- Ontario Endangered Species Act;
- Ontario Fish and Wildlife Conservation Act;
- Ontario Water Resources Act;
- Ontario Planning Act and the Provincial Policy Statement;
- Ontario Conservation Authorities Act; and,
- Implementation Strategy: Areas of Natural and Scientific Interest.

In addition, the Ontario Ministry of Transportation (MTO) has developed environmental practices and standards for highway design and construction. The environmental practices include environmental design criteria, stormwater management practices/best management practices, *Ontario Provincial Standards, Standard Special Provisions* and *Non-standard Special Provisions*. The environmental standards developed by MTO involve a comprehensive, current and consistent end-results oriented approach to environmental compliance that encompasses all environmental factors for all highway activities from planning through to operation and maintenance.

Assessing Natural Heritage Impacts

MTO has developed a guidance document for assessing natural heritage impacts from transportation projects. The *Environmental Reference for Highway Design (MTO 2006)* provided a framework for natural heritage investigations including defining the study area, collecting data, determining significance, assessing environmental effects and identifying environmental protection measures. In addition, the *MTO/DFO/MNR Fisheries Protocol (2006)* establishes a procedure for addressing fisheries issues on MTO projects.

Assessment Methodology

A description of the methods for data collection and analysis and the results of the analysis for the Area of Investigation are summarized in Chapter 7 and documented presented in the *Practical Alternatives Evaluation Working Paper – Natural Heritage* (refer to List of Supporting Documents). For the TEPA, the natural heritage investigation served to update, verify and augment existing conditions information and to conduct effects assessment, including identification of mitigation and monitoring measures as it pertains to natural heritage.

The impact assessment is specific to each biological discipline (i.e. vegetation, fisheries, wildlife, etc.) and is based on two general categories of impacts: displacement and disturbance effects. Displacement effects include loss or destruction of natural heritage areas, attributes or functions located within the TEPA. Disturbance effects include disruption or disturbance to natural heritage areas, attributes or functions located on adjacent lands within 120 m of The Windsor-Essex Parkway and plaza site. A summary of the results of the impact assessment for each biological discipline is presented in the sections below.

10.4.2 Wildlife and Wildlife Habitat

Assessment Methodology

In 2008 the spring and summer wildlife investigations concentrated around the four wildlife species at risk identified in 2006 during the practical alternatives stage: Golden-winged Warbler, Red-headed Woodpecker, Butler's garter snake (*Thamnophis butleri*) and Eastern foxsnake.

Field observations were undertaken throughout the spring and summer months in areas where the two bird species at risk had been recorded in 2006 and in potentially new habitats in the study area. A mark-recapture population study was initiated for Butler's gartersnake and radio telemetry study to track Eastern foxsnake movements was also initiated to determine locations of their hibernacula.

The Golden-winged Warbler was observed in the Brighton Beach area in 2006, while the Red-headed Woodpecker was observed in the Black Oak Woods in 2006. Intensive observations during the 2008 spring migration and breeding season failed to confirm the presence of these species in the study area.

The Butler's gartersnake population study determined that approximately 200 adult snakes inhabit the study area. Over 50 neonates were also discovered in August confirming that the population is reproducing successfully. A number of hibernacula locations for this species were found in the same area.

One Eastern foxsnake was tracked and its movements in the fall led to areas of potential hibernacula which will be further investigated next spring. Based on anecdotal evidence, numerous easterm foxsnake hibernacula exist within the proposed area of The Windsor-Essex Parkway.

Potential Environmental Effects

The construction of the TEPA will result in the displacement of wildlife and wildlife habitat and potential mortality to species at risk. Portions of provincially significant wildlife habitat may be lost. Areas located adjacent to the right-of-way may be affected by light trespass, noise and human intrusion during the construction and operations phase. The Windsor-Essex Parkway may also create barriers to wildlife movement.

Portions of the habitat of the Butler's gartersnake and Eastern foxsnake may be displaced by construction of The Windsor-Essex Parkway. It is possible that a new crossing of the Detroit River may result in migratory and resident bird mortality along the Detroit River, given that the Detroit River is host to large bird migrations and resident bird populations. Studies indicate that avian mortalities at tall structures have been found to be a function of structure size, visibility, migration times, weather conditions, and lighting.[1] The degree to which the new crossing may result in bird mortality depends on these factors, as well as the species, population size and the behaviour of the migratory and resident birds present. In general, lighting should be kept to a minimum and used only where necessary for safety purposes. Architectural lighting to highlight the aesthetics of the bridge should be developed in consideration with the effect of the migrating birds.

Mortality to wildlife species may also result during clearing and grubbing activities during construction.

Mitigation Measures

Extensive efforts have been made to avoid and minimize impacts to Butler's gartersnake and Eastern foxsnake populations including refinements to the alignment of The Windsor-Essex Parkway. Habitat restoration and enhancement will be implemented to create new and higher quality habitat for these species. A snake barrier will be installed along side portions of the construction area to prevent snakes from entering the work zone and redirect snake movements to safer areas, like the restored habitat. Permanent snake barriers will also be installed to prevent snake mortality during facility operation. Options for permanent protection of critical Butler's gartersnake habitat will be developed in later consultation phases.

The presence/absence of Eastern foxsnake hibernacula within the study area will be investigated during the subsequent design stages to determine the potential for impacts. The creation of new snake nesting areas and hibernacula will occur to compensate for any losses of habitat. Snakes will be captured and relocated prior to construction to avoid mortality.

Habitat restoration and enhancement will be used to replace habitat lost during construction. Areas of habitat to be retained will be clearly marked in the field and protected from construction activities. Wildlife salvage will be carried out prior to clearing/grubbing to reduce the risk of wildlife mortality. Restoration and enhancement of habitat located along The Windsor-Essex Parkway will be used at

[1] Manville, A.M. II. 2000. *The ABCs of Avoiding Bird Collisions at Communications Towers: The Next Steps*. Proceedings of the Avian Interactions Workshop, December 2, 1999. Charleston S.C., Electric Power Research Institute.

strategic locations to reconnect significant wildlife habitat located on both sides of The Windsor-Essex Parkway.

The site plan for the inspections plaza incorporates several mitigation measures including: landscaping and the establishment of setbacks and a stormwater detention pond. On the south side of the inspections plaza, a stormwater detention pond is proposed in association with a vegetative buffer. The stormwater detention pond also provides buffer width between the plaza and the Black Oak Woods to the south.

Where practical, lighting used at the plaza should be focused downwards and shielded where necessary to prevent light spillage into nearby natural areas such as the Black Oak Woods. Wildlife salvage should be performed on-site prior to vegetation removals. Vegetation removals will be avoided in the vicinity of species at risk and their habitat during the growing season.

Disturbance to wildlife during the operations phase will be mitigated through fencing berming, light shielding and prohibiting access to significant wildlife habitat by humans. Measures to mitigate potential bird mortality from the Detroit River Bridge will be investigated in greater detail during later design phases.

A continued study of the Butler's garter snake population and the restoration area should be carried out once the TEPA is constructed. The effects of The Windsor-Essex Parkway's proximity to the remaining Butler's garter snake population and their hibernacula should be monitored. A strategy should be developed to ensure permanent protection of the Butler's garter snake population and their habitat.

Eastern Foxsnake tracking should continue to determine their egg laying sites and hibernacula sites. Knowing these locations could assist in preventing future conflicts with this species. Education programs to inform the public of the benefits and harmlessness of snakes should be promoted.

The species, populations and behaviours of migratory and resident bird species should be further studied in the vicinity of the Detroit River crossing. Radar studies, acoustic studies and point count surveys should be carried out to provide input to bridge design and lighting.

CONCLUSIONS

The population of Butler's gartersnake and Eastern foxsnake are anticipated to remain stable following construction of this project

The bridge design will be developed during later design phases. The selection of the technically and environmentally preferred bridge type (suspension or cable-stay) should take into consideration the potential adverse effects of bridge design on migratory birds. Enhancement and restoration of habitat located along The Windsor-Essex Parkway will result in a net gain of habitat quantity and quality and will re-establish connections between designated natural areas. Tunnels in selected areas including the Oakwood Tunnel will provide the opportunity to reduce existing barriers for wildlife and enhance wildlife movement.

Two permits and approvals under the *Ontario Endangered Species Act,* 2007 and the federal *Species at Risk Act* will need to be obtained during future design stages. Detailed mitigation strategies will be developed in order to obtain the permits.

10.4.3 Vegetation and Vegetation Communities

A rare vascular plant survey in all vegetation communities located within the TEPA and the adjacent lands within 120 m of the right-of-way and plaza site was conducted to confirm the presence/absence of species at risk and to classify additional vegetation communities not inventoried in 2006. The study was designed to investigate potential effects of encroachment by the TEPA on species of conservation concern. The rare vascular plant survey examined the study area for species regulated by the federal *Species At Risk Act* and the new *Ontario Endangered Species Act, 2007*. Field investigations were performed in June, July, August, September and October 2008, to provide reliable information on rare vascular plant species presence, location, population size and management concerns.

ASSESSMENT METHODOLOGY

A floristic survey of the area in the vicinity of the TEPA of investigation was carried out to ensure that all species encountered were sufficiently evaluated to confirm or to rule out the possibility of rarity. Information on rare vascular plants, native biodiversity, and elements of special concern was collected locally from the Essex Region Conservation Authority (ERCA), provincially (Natural Heritage Information Centre (NHIC)) and federally (Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Descriptions, illustrations and photographs of all potentially rare vascular plant species present were collected and compiled for field use. A series of approximately parallel transects in a search unit was used to maximize coverage of the area. Spacing of the transects depended on the density of the vegetation cover, visibility and plant morphology.

The location and abundance of each specimen/colony was recorded in the field using a differential GPS unit. Points, lines and polygons were used to delineate the location of each rare vascular plant population. Lines were used when rare vascular plants were located in a linear pattern, while polygons were used when rare vascular plant species were situated in a non-linear pattern. UTM coordinates recorded on the PDA were downloaded and mapped on an orthorectified digital air photo using GIS.

RESULTS

Vegetation Communities

A total of 5.08 ha of high significance (S1-S3 SRank), 6.52 ha of moderate significance (natural ELC) and 80.99 ha of low significance (cultural) vegetation communities are located within the TEPA. S-ranks are a ranking system for a species status in Ontario and are also applied by the NHIC. Species with an S-rank of S1 to S3 are considered extremely rare, very rare or rare within the province and were used to limit the scope of the investigation. These low significance vegetation communities have been further subdivided through the use of floristic quality assessment (FQI) into 39.06 ha of moderate FQI (< 35) and 41.93 ha of low FQI (< 20) vegetation communities.

A total of 24.02 ha of high significance, 16.73 ha of moderate significance and 53.46 ha of low significance vegetation communities are located on adjacent lands within 120 m of the TEPA. The low significance vegetation communities are broken down into 0.04 ha of high FQI (> 35), 21.01 of moderate FQI and 32.41 ha of low FQI vegetation communities.

Species At Risk

A total of eight species at risk regulated as threatened or special concern under the federal *Species at Risk Act* and the *Ontario Endangered Species Act*, 2007 are found within the TEPA. This total includes 418 climbing prairie rose, 929 colicroot, two planted common hoptree, one planted dwarf hackberry, 951 dense blazing star, 20 Kentucky coffee-tree, 1,285 Riddell's goldenrod and 11,676 willowleaf aster located within the right of way for The Windsor-Essex Parkway and the plaza site. No rare ELC communities or rare vascular plants are present within the right of way for the proposed crossing. The adjacent lands located within 120 m of The Windsor-Essex Parkway right of way and plaza site support one American chestnut, 511 climbing prairie rose, 14 colicroot, 2,114 dense blazing star, 21 Kentucky coffee-tree, 443 Riddell's goldenrod, 24 Shumard oak, 27,874 willowleaf aster.

Potential Environmental Effects

Construction of the TEPA may result in the loss of area, attributes or ecological function of vegetation communities. Vegetation, vegetation communities and species at risk will be displaced within the TEPA and potentially indirectly impacted in the adjacent 120 m lands by physical destruction, clearing and other construction requirements. Alterations in water quantity may affect the soil moisture regimes of adjacent vegetation communities.

Operation of the TEPA will require winter maintenance activities such as sanding, which may introduce exotic invasive plant species into the TEPA, unless the soils are adequately sterilized to remove unwanted seeds and fruits. Salting in the winter may affect salt intolerant plant species adjacent to The Windsor-Essex Parkway. Modifications to baseflow and increased imperviousness of the natural lands within the grading limits have the potential to alter water quantity changing the soil moisture regime of neighboring vegetation communities.

During construction, areas located within the plaza that are to remain in a natural state (i.e. perimeter buffers, etc.) should be clearly marked in the field using construction fencing. Construction fencing should also be used around the perimeter of the inspections plaza to mark the limit of construction areas and sensitive off-site areas including the Black Oak Woods. Edge management measures should be identified during later design stages to reduce edge effects such as windrow, increased light and wind penetration, drainage modifications and invasion by exotic or invasive plant species. Erosion and sedimentation control shall be used on-site during construction to prevent the migration of sediments and stormwater off-site. Rare, threatened and endangered plant species located within the footprint of plaza facilities should be transplanted prior to vegetation removals. Landscape plantings within the plaza site should be limited to native, non-invasive species typical of the tallgrass prairies/Carolinian forest. Restoration, enhancement and land securement opportunities should be explored for lands adjacent to the plaza site, in particular, the Black Oak Woods.

Mitigation Measures

The area for vegetation removals has been minimized to the extent possible based on the selection of the TEPA and the associated refinements, Areas that should be protected during construction will be delineated prior to construction start and no activities will be permitted in these areas.

The landscape plan will identify areas for protection, enhancement and restoration. The landscaping plan will include detailed prescriptions for vegetation management including edge management plans, soil management plans, use of native and non-invasive plant materials, prairie disturbance regimes, control of exotic and invasive species and management of species at risk. The landscaping plan will be prepared in later design stages.

Restoration and enhancement measures included in the landscaping plan will be designed to achieve no net loss of vegetation area, attributes or function as a result of this project. An array of restoration and enhancement techniques will be identified including seeding, planting (plugs and seedlings) or transplanting (sod) that includes only native species present within the TEPA. Appropriate locations for removal of invasive exotic plant species through the use possible measures such as herbicides, weed torches and prescribed burns will also be identified. The above mitigation techniques will also be employed with the objective of achieving a net benefit to all regulated species at risk populations within the TEPA.

Opportunities to forge partnerships with parties to relocate species to lands in public ownership, to otherwise restore and enhance these lands with native and endangered species and to transfer lands within The Windsor-Essex Parkway to parties that can best protect sensitive areas will be sought.

Vegetation removals will be avoided in the vicinity of species at risk and their habitat during the growing season.

Follow-Up and Monitoring

During construction, an environmental inspector should schedule site visits during critical stages (such as prior to and during clearing operations) to ensure that construction activities are not causing any harm in areas that are to be protected. Post-construction monitoring should occur to ensure successful plant establishment and reproduction. Prairie management should be an ongoing and long-term process that should involve the cooperation of appropriate parties to remove invasive exotics, burn as frequently as possible, protect high significance vegetation communities and species at risk.

Conclusions

A total of approximately 100 ha of vegetation communities will be removed to construct the TEPA. At the same time, the design of The Windsor-Essex Parkway affords the opportunity to establish approximately 100 ha of green space using restoration and enhancement approaches. As a result, the proposed project is expected to result in an overall net benefit to vegetation communities and to species at risk populations. In addition, there are opportunities to partner in enhancements to other lands in public ownership adds another opportunity for overall benefits. MTO will consider entering into agreements with organizations for the transfer and long-term management of surplus lands.

Two permits under the *Ontario Endangered Species Act, 2007* and the federal *Species At Risk Act* will need to be obtained during future design stages. Detailed mitigation strategies will be developed in order to obtain the permits.

10.4.4 Molluscs and Insects

Assessment Methodology

During the evaluation of practical alternatives stage secondary source data on molluscs and insects was reviewed and compiled into two databases (molluscs and insects). For the assessment of the TEPA impacts, the scope of the investigation was limited to provincially and federally regulated species present.

Results

Based on a review of secondary sources of information and discussions with regulatory agencies and experts on aquatic invertebrates, no provincially or federally regulated mollusc species at risk are known to occur in the study area. As a result, no impacts to mollusc species at risk are anticipated.

One provincially and federally regulated species of insect is known to occur in the study area: the Monarch (*Danaus plexippus*). The Monarch is regulated as Special Concern in Schedule 1 of the federal *Species At Risk Act* and Schedule 5 of the new OESA.

Potential Environmental Effects

Vegetation clearing and grubbing for construction has the potential to impact Monarchs, since the larval stage feeds exclusively on milkweed and the adults feed upon nectar flowers, which are found in prairies, meadows and gardens, as well as more disturbed areas. Not only will clearing activities remove host plants, they may also kill juveniles and adults. Contaminants from emissions and spills, as well as those used for highway and roadside maintenance have the potential to poison host plants and the Monarchs themselves. Mowing of vegetation, if conducted from late spring to early fall, can remove larval feeding plants (milkweeds) and adult nectar plants as well.

Mitigation Measures

Impacts to Monarchs cannot be avoided entirely given the magnitude and nature of the proposed works, and the cosmopolitan nature of this species. The area for vegetation removals has been minimized to the extent possible, and areas that should be protected during construction will be delineated prior to construction start. To avoid impacts to species at risk and their critical habitat, vegetation removals will be avoided in the vicinity of species at risk and their habitat during the growing season.

The areas for restoration and enhancement will result in the creation of new Monarch habitat as those areas will be intentionally or naturally seeded by host plants. Following construction other disturbed areas that revegetate are also likely to self-seed with host plants and create additional Monarch habitat.

The construction limits will be delineated with sensitive areas identified prior to the start of construction. Good housekeeping practices will be employed to prevent the contamination of habitat adjacent to the work area. In the event of an upset or spill, a quick and effective response to contain the spill and clean up the area will be employed. No follow-up or monitoring programs specific to Monarchs are recommended.

Conclusion

No significant adverse effects to Monarchs are anticipated as a result of this project. The mitigation measures prescribed for Monarchs will also reduce potential impacts to other insect species.

10.4.5 Fish and Fish Habitat

Assessment Methodology

In April 2008, a detailed field investigation of fish habitat and fish presence was conducted in areas of known or potential Northern Pike (*Esox lucius)* spawning and in areas that would likely be altered by the proposed project. Detailed air photos were used to record fish habitat and Northern Pike presence within Cahill, Wolfe and Collins Drains, Lennon Drain, Youngstown Drain, Basin Drain, Titcombe Drain and McKee Drain/Creek. Other, smaller drains were investigated for fish habitat presence, specifically for potential Northern Pike habitat, during the spring spawning period for this species.

Northern Pike presence, and the presence of spawning habitat, was identified in Cahill and Wolfe Drains, Lennon Drain, Titcombe Drain and McKee Creek (the portion nearest the Detroit River). Northern Pike were absent from Collins Drain, Wolfe Drain upstream of Talbot Road/Highway 3, Cahill Drain upstream of Talbot Road/Highway 3, Youngstown Drain, Basin Drain and McKee Drain, although all of these watercourses/drains were connected to downstream Northern Pike habitat. Most habitat within the study area can be categorized as having low overall sensitivity and significance with few having moderate to high sensitivity.

Potential Effects to Fish and Fish Habitat

Impacts to fish and fish habitat have the potential to occur as a result of the construction and operation of the TEPA.

Permanent loss and/or impacts to fish habitat may result from the following:

- Barriers to fish passage: the construction of submerged culverts at Cahill and Lennon Drains may cause barriers to fish passage that will be permanent in nature.
- Loss of fish habitat: the loss of habitat through enclosure or physical destruction will likely occur in 10 of the 15 watercourses/drains within the study area (excluding the Detroit River). The enclosures may result from five culvert extensions and three new crossings. Physical destruction may occur at four watercourses/drains where realignment may be required. Although occurring within the construction phase of the project, these effects will be permanent.
- Effects to Water Quality and Quantity: The TEPA will increase the overall impervious area and traffic loadings. This may potentially have a negative impact on the recipient watercourses by increasing the peak flows and the pollutant loadings. This will lead to negative watercourse impacts such as degraded fish habitat, increased floodlines upstream and increased erosion downstream.

Details of stormwater quality and quality assessment are outlined in Section 9.3.7.

Construction related impacts of building of the TEPA may result in the following:

- Changes to water quality and quantity: water quality may be affected through activities associated with general construction and site preparation, which could release sediments to the watercourses/drains. The refueling of construction vehicles and the oils, greases and other lubricants used in their maintenance have the potential to affect water quality. In-water work, and associated damming and unwatering have the potential to alter water quantity. These effects are temporary in nature.
- Alterations to baseflow: these effects are consistent with those listed for water quantity above. Groundwater drawdown may be required to construct below grade sections of The Windsor-Essex Parkway. This may result in temporary reductions in baseflow within watercourses. These effects are temporary in nature.
- Mortality of fish species: during construction, the direct mortality of fish is possible in areas where unwatering occurs. Fish could become entrained or impinged on pump intakes or stranded in unwatered areas. Increased sedimentation and the discharge of deleterious substances from spills also have the potential to cause mortality of fish.

Impacts as a result of operations phase for the TEPA on fish and fish habitat include the following:

- Changes to water quality and quantity: winter maintenance activities (sanding, salting) have the potential to affect water quality through release into the watercourses/drains. The increased imperviousness of the drainage area for the watercourses/drains has the potential to alter water quantity through increased run-off and decreased infiltration.

- Alterations to baseflow: these effects are consistent with those listed for water quantity above.
- Changes in water temperature: the thermal regime of the receiving watercourses/drains may be altered by storm water run-off or removal of riparian vegetation that provides shading, especially during summer, when run-off can become superheated through contact with paved surfaces resulting in thermal shock when it reaches fish habitat.

Mitigation of Potential Effects to Fish and Fish Habitat

The following mitigation measures can be employed to address the above noted impacts of the construction and operation of the TEPA.

Permanent loss and/or impacts to fish habitat may be mitigated by the following:

- Barriers to fish passage: Culverts, designed using fish-friendly methods, and channels, designed using natural channel design principles, should not form barriers to fish passage during operations. Fish passage systems should be designed and operated at Cahill and Lennon Drains to provide safe fish passage across The Windsor-Essex Parkway which bypass the submerged culverts. Fish locks are being proposed to raise and lower migrating fish across The Windsor-Essex Parkway thereby maintaining access to upstream spawning areas. This method has proven to be effective in other similar applications.
- Loss of fish habitat: The extent of fish habitat affected can be minimized through engineering structures to fit within the smallest possible footprint areas. Culvert lengths and extensions can be minimized through the use of headwalls, wingwalls and guide rails and extensions should match the inverts of the existing culverts and streambeds. New crossing structures should be constructed using fish-friendly designs including appropriate horizontal and vertical clearances, open bottoms, countersinking, etc. Realigned channels should be designed using natural design principles to enhance new habitat over existing habitat. Riparian vegetation should be maintained where possible. A fish habitat compensation plan will be prepared during later design stages to ensure no net loss of the productive capacity of fish habitat.
- Effects to Water Quality and Quantity: Stormwater runoff from the within the existing study area of The Windsor-Essex Parkway does not currently receive quality or quantity treatment. Stormwater runoff associated with The Windsor-Essex Parkway and the plaza will be treated in stormwater management wet ponds designed in accordance to the MOE document "Stormwater Management Planning and Design Manual" for Enhanced Protection Level. This will require the removal of 80% of total suspended solids (TSS), as well as providing erosion attenuation of the 25mm storm for 24 hours. In addition, the stormwater management ponds will provide quantity storage to control peak flows from The Windsor-Essex Parkway to pre-development rates. This approach will lead to overall enhancements to water quality and net benefits to fish and fish habitat for receiving watercourses along The Windsor-Essex Parkway and will prevent water quality impacts to the Detroit River associated with operation of the plaza. In addition, deck drains are not proposed on the crossing and runoff will be collected for quality treatment prior to discharging to the river.
- In addition, the removal of 30 entrance culverts and the plan to provide a natural channel configuration for a significant area of the Wolfe Drain will result in a gain of fish habitat.

Stormwater quality control that will be provided with The Windsor-Essex Parkway will lead to an overall enhancement to water quality and a net benefit to fisheries.

Construction related impacts of building of The Windsor-Essex Parkway may be mitigated by the following:

- Changes to water quality and quantity: best construction practices should be employed to reduce the potential for spills and materials/equipment from entering water. Maintenance, fuelling and storage should occur at least 30 m from watercourses/drains. Debris should be prevented from entering watercourses/drains and a spill response plan should be developed. Sediments should be prevented from reaching sensitive areas through erosion and sediment controls and exposed soils stabilized as soon as possible. A storm water management plan should be developed and implemented to treat run-off during operations.
- Alterations to baseflow: the increases in impervious surfaces and areas of soil compaction should be minimized to facilitate as much infiltration of surface water as possible. Management of storm water through the development and implementation of a storm water management plan will address potential reductions in baseflow. Methods that encourage infiltration will be investigated. Flows in watercourses will be monitored during dewatering activities and measures will be implemented in the event that baseflow is significantly affected.
- Barriers to fish passage: water flow should be maintained during construction.
- Mortality of fish species: the magnitude of effects should be minimized through the employment of timing windows for in-water work, commencing work only when all materials are present and staging of work to minimize duration. Work should be performed in the dry and isolated fish should be captured and relocated by qualified personnel.

Impacts as a result of operations phase on fish and fish habitat can be mitigated by the following:

- Changes to water quality and quantity: in general, storm water management throughout the TEPA will improve water quality and quantity (through attenuation of peak run-off flows) over what exists currently. Run-off from the crossing and plaza will be collected and conveyed to stormwater detention facilities for treatment. No deck drains will be provided on the bridge.
- Alterations to baseflow: a storm water management plan should be developed and implemented to ensure that reductions in baseflow do not occur.
- Changes to water temperature: a storm water management plan will be developed which will address the treatment of run-off and investigate methods to reduce its temperature prior to discharge into receiving watercourses/drains.
- Barriers to fish passage: culverts, designed using fish-friendly methods, and channels, designed using natural channel design principles, should not form barriers to fish passage during operations. Fish passage systems should be designed and operated at Cahill and Lennon Drains to provide safe fish passage across The Windsor-Essex Parkway which bypass the submerged culverts. Fish locks are the preferred option for a fish passage system.

Monitoring

An environmental inspector will need to be present on site during critical in-water work activities. Post-construction monitoring is typically prescribed in the federal *Fisheries Act* authorization. The terms and conditions of the federal *Fisheries Act* authorization will be met. Post-construction monitoring, if prescribed, will determine the effectiveness of environmental protection and compensation measures, identify problem areas and recommend corrective measures.

The performance of the fish locks should be monitored for at least two years after construction to ensure that they are functioning properly. The target species for the locks is Northern Pike. During spring migration (March/April), a fish passage study using mark-recapture or radio-telemetry could assist in determining the effectiveness of fish passage. Both techniques apply in the assessment of passage success. In order to assess downstream passage, similar studies should be repeated later in the spring (late April/May) to see if fish are successfully migrating back to summer habitats.

Conclusions

A Letter of Intent and Application will be prepared during later design stages to secure a federal *Fisheries Act* authorization for this project. Watercourse reaches will be restored and enhanced to maintain no net loss of the productive capacity of fish habitat as a result of this project. A fish passage system, likely fish locks, will ensure that fish will have access to upstream habitats in Cahill and Lennon Drains in perpetuity. Enhancements to realigned reaches and the removal of entrance culverts along Wolfe Drain will augment the productive capacities of these systems and will result in an overall net gain of habitat area.

10.4.6 Designated Natural Areas

Designated natural areas or environmental policy areas are identified by regulatory agencies or municipalities for conservation purposes. These areas include: Areas of Natural and Scientific Interest (ANSIs); Provincially Significant Wetlands (PSWs); Environmentally Sensitive Areas (ESAs); Candidate Natural Heritage Sites (CNHS) and areas designated for protection in municipal official plans.

Assessment Methodology

Secondary source information on designated natural areas was collected and reviewed to identify the extent and major ecological functions for which the area was designated. Field investigations were used to confirm and reconcile the boundaries of the designated natural areas where encroachment may occur. The *Ontario Wetland Evaluation System* (OMNR 2002) was also used to evaluate the significance of several wetland units located in the study area.

Numerous designated natural areas are located in the study area for the TEPA including:

- Detroit River Canadian Heritage River;
- Black Oak Woods ANSI, ESA and CNHS;
- Ojibway Park ANSI, ESA and CNHS;
- Spring Garden Forest ANSI, ESA and CNHS;
- St. Clair College Prairie ESA and CNHS;
- Oakwood Bush CNHS;
- Canada Malden Park CNHS;
- Candidate Natural Heritage Site TC2; and,
- Potential PSWs to be determined.

Additional designated natural areas identified during the practical alternatives stage are located beyond the vicinity of for the TEPA.

Potential Environmental Effects

The potential environmental effects on designated natural areas are similar to the effects on vegetation and wildlife. Construction of the TEPA may result in the loss of area or ecological function for which an area is identified. Operation of the TEPA is not anticipated to result in significant impacts.

Mitigation Measures

Mitigation measures for the loss of area or ecological function of designated natural areas are similar to the mitigation measures identified for vegetation and wildlife. In addition, MTO will discuss the dedication of protected, enhanced or restored lands with appropriate agencies to ensure permanent protection and conservation.

Follow-Up and Monitoring

Monitoring requirements are similar to those identified for vegetation and wildlife.

Conclusions

A total of 5.47ha of designated natural area will be displaced by the TEPA including the Black Oak Woods (1.68ha of a total area of 46 ha), Ojibway Park (0.51ha of a total area of 64 ha), TC2 (3.28ha of a total area of 9.0 ha) and 27.06ha of designated natural area which is located on adjacent lands. However, the major ecological functions for which these areas are identified will be maintained. Further opportunities are created, as noted below, for the dedication of new areas for protection.

As discussed, in the next section, the landscaping plan prepared for the TEPA identifies close to 100 ha of MTO-owned lands that are available for protection, enhancement and restoration. Opportunities to dedicate portions of these lands to appropriate parties for protection will be discussed at later design stages. Lands will be available to be dedicated for protection including provincially rare vegetation communities, habitat for species at risk, wildlife corridors and other ecological functions. As a result, a net gain in the extent of designated natural areas with important ecological functions will result from the TEPA.

10.4.7 Landscape Plan

The landscape plan represents an overall mitigation strategy to help ensure the TEPA is designed and constructed in a manner that is sensitive to community expectations. The plan sets out guidelines that will direct the planning and design of the open spaces, natural areas and trails associated with the TEPA. This plan also outlines a strategy for including aesthetic and design considerations in all new construction, including, but not limited to, structural elements, landscaping, barriers, way finding, and lighting.

A key focus of the TEPA is to provide additional greenspace and recreational opportunities for surrounding communities. The plan includes over 300 acres of greenspace / parklands. The types of greenspaces will be consistent with community goals and landscaping concept.

The proposed TEPA is unique from an urban design and landscape standpoint in the following ways:

- its integration into the adjacent communities through the inclusion of open spaces accessible by pedestrians such as landscaped tunnels and open spaces adjacent to the roadway and embankments;

- the opportunity that it provides for ecological restoration and enhancement, including linking existing natural heritage areas;
- its inclusion of a multi-use trail system;
- the opportunity to provide an enhanced gateway to Canada, Ontario and the City of Windsor after crossing the border from Detroit.

The Windsor-Essex Parkway will be experienced both by drivers on the highway and service roads and by members of adjacent communities. The Windsor-Essex Parkway will also serve as an international gateway and as an integral part of the urban fabric of the adjacent communities. The Windsor-Essex Parkway will require a unique approach to its urban design and the design of its open spaces, natural areas and multi-use trail system. As a major national gateway, the facility will be designed as a landmark that will be known not only for its function but its form and presence within the landscape.

Elements of the plaza must also be designed in recognition of its importance as a gateway and to buffer its presence in the vicinity of sensitive natural area.

CONTEXT-SENSITIVE SOLUTIONS

The Detroit River International Crossing study included an extensive consultation process that incorporated several types of events designed to inform stakeholders about the study and to generate feedback and public/stakeholder input on the evolving study. Landscape and urban design issues were introduced and discussed with stakeholders within a Context-Sensitive Solutions (CSS) approach.

"Context sensitive solutions (CSS) "is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist.

Events such as Bus Tours, Public Information Open Houses, and Workshops helped to shape a suitable approach in establishing urban, landscape and aesthetic designs of the TEPA. A variety of visualization tools including three-dimensional models, precedent images, photo-simulations and video allowed stakeholders to clearly understand the landscape, aesthetic and urban design implications of the practical alternatives and later the TEPA.

Introducing Landscape Principles and Themes

At public workshops in June 2006, landscape & urban design issues were introduced and broadly discussed in relation to the practical alternatives. Opportunities for mitigation were discussed and precedent images were presented.

Landscape Impacts and Visualizations

At public workshops in October 2006 a series of themes was introduced as possible landscape and urban design treatments for the TEPA. Each theme was applied to representative areas within each of the practical alternatives through the use of photo-simulations and sketch images.

The three themes were created in order to gauge interest in different approaches to design. The "Motor City" theme showed an approach to landscape and urban design that, while historically sensitive to the local history of automotive production, was at the same time focused on contemporary design. The "Rose City" theme showed an approach to design that was highly ornate, higher-maintenance and included design references from the late 19th and early 20th century. Public reaction was strongly in favour of "Carolinian", the theme that reflected the least ornate, most ecologically sensitive, and maintenance conscious design.

From these workshops, it was clear that landscape, environmental and urban design for the TEPA should respect local natural heritage, focus on connections between human and natural communities and should consider maintenance of large open spaces as part of the design.

In August 2007, a PIOH was held that included high-resolution photo-simulations of the tunnels and a series of views of the facility from adjacent areas.

Moving Forward with Landscape Solutions

Following the establishment of the TEPA, consultation regarding landscape and urban design solutions turned towards the establishment of the urban design, aesthetic and landscape guidelines outlined in this report.

In July 2008, a draft landscape zone plan was discussed at public workshops. It was clear from the workshops that stakeholders remained focused on ecological principles and a green facility. Additionally, it was clear that the open spaces associated with the TEPA should be focused primarily on providing a passive rather than active recreation function and that the most ecologically sensitive solutions should be pursued.

LANDSCAPE MITIGATION

The following measures have been identified during the assessment and CSS process as appropriate means of mitigating the landscape and visual impacts of the proposed TEPA.

Urban Design & Aesthetic Planning

As a gateway to Canada, the TEPA will be a major landmark and a cultural symbol. As such, the visual and aesthetic impact of the facility and its integration into the landscape will be the subject of an urban design and aesthetic plan for the highway. This plan will serve to unify all the visible aspects of the facility into a central visual and formal theme that can be deployed throughout future design by various design professions. The urban design and aesthetic plan will address the visual aspects of the form, finish and materials used in the landscape and open spaces as well as in proposed structures (e.g. bridges, abutments, retaining walls, noise attenuation and safety barriers). The urban design and aesthetic plan will establish streetscaping principles for the TEPA. The urban design and aesthetic plan will adhere to CSS principles and will be developed as part of a consultation process with local stakeholders. The aesthetic planning process will also allow for the establishment of partnerships with federal, provincial and local arts councils to provide for the creation and funding of public art associated with gateway features.

Landscape Design & Planning

Open spaces that are associated with The Windsor-Essex Parkway will be designed according to the following principles:

UNIFIED: The open spaces associated with The Windsor-Essex Parkway will be considered as a unified whole. These spaces will be planned to function in an integrated manner and to present a unified aesthetic and visual environment for drivers and community users.

GREEN: The vision for The Windsor-Essex Parkway is to create a green corridor that supports new, viable natural communities and links existing natural areas.

CONNECTION: The Windsor-Essex Parkway is an opportunity to create connections between communities. Emphasis will be placed on creating connections rather than destinations.

INTEGRATION: The Windsor-Essex Parkway passes through three municipalities, the Towns of Tecumseh and LaSalle within Essex County, and the City of Windsor. Plans for The Windsor-Essex Parkway open spaces must integrate seamlessly within the urban design, parks and recreation plans for these three municipalities as well as local and regional natural heritage/greenlands systems.

GATEWAY: The Windsor-Essex Parkway will be designed as a unique and recognizable gateway into Canada, to Windsor-Essex and to Ontario.

Future landscape planning and design phases will include a CSS-based consultation process with local stakeholders to establish appropriate site-specific landscape treatments.

Landscape Elements

The landscape plan produced during later design phases will include the following landscape elements:

Landforming & Berms

Detailed grading can mitigate landscape and visual impacts by:

- Its use in the creation of habitat and fisheries compensation areas;
- creating aesthetic interest;
- creating gateway features; and,
- visual and noise screening.

Locations for detailed grading will be identified as required to fulfill these functions. Detailed grading can contribute to accommodating the fill generated from excavation.

Vegetation

Vegetation within the proposed facility will perform a variety of mitigation functions, depending on its location and adjacencies. Vegetation functions include:

- screening;
- ecological restoration, enhancement and protection;
- wildlife habitat and linkage;
- aesthetics; and,
- erosion protection.

Species and size combinations as well as methods of planting, establishment and maintenance will vary according to the function or combinations of functions performed by proposed vegetation in specific areas. Vegetation strategies will adhere to guidelines for ecological restoration, enhancement and protection outlined in the *Technically and Environmentally Preferred Alternative – Natural Heritage Assessment Report* (refer to List of Supporting Documents).

Multi-Use Trails & Crossings

The Windsor-Essex Parkway will include approximately 20 km of multi-use trails that will run from end-to-end and will cross the highway and service roads connecting communities on either side of The Windsor-Essex Parkway.

The proposed multi-use trail system associated with The Windsor-Essex Parkway will not only allow pedestrians, cyclists and rollerbladers to travel from end-to-end without encountering a motor vehicle, it will also connect communities to each other along and across The Windsor-Essex Parkway.

The vision for the trail system is to provide:

- a trail that can be used as a neighbourhood amenity for strolling, exploration and exercise;
- a trail that can be used as a viable active (non-motorized) transportation corridor through Windsor, Tecumseh and Lasalle, connecting to important neighbourhoods in a dynamic city; and,
- a trail that connects communities to each other across The Windsor-Essex Parkway, providing safe routes to school, neighbours, parks, local businesses and community facilities.

The multi-use trail is part of an active transportation network for the city of Windsor and will be integrated into existing and planned regional and local cycling and active transportation networks.

Landscape Amenities

A limited number of rest stops and meeting areas will be incorporated into the open spaces within The Windsor-Essex Parkway. These rest stops will include landscape amenities that will function as:

- Lookouts to major views;
- Meeting places;
- Rest for pedestrians & cyclists;
- Safety & EMS access; and,
- Amenities may include signage, shelter, washrooms, benches, fountains, emergency telephones, etc.

Landscape Types

Each of the landscape types listed below employs a different combination of landscape elements such as detailed grading, vegetation, multi-use trails and landscape amenities to create site-appropriate mitigation measures. Where these landscape types are adjacent to the service road or municipal roads that cross The Windsor-Essex Parkway, streetscaping and urban design principles established in the Urban Design and Aesthetic Plan will be applied.

Gateway Landscapes function to provide an aesthetic, sculptural and memorable gateway to Windsor, Ontario and Canada. They will integrate gateway and welcome features including monumental landforms into the design.

Screening Landscapes create a visual and noise screen / barrier to buffer residences and natural features. The screening landscape is a combination of one or more screening methods (sound barrier, vegetation, berming, fence), depending on the site characteristics and safety and engineering requirements.

Stormwater Management Landscapes combine stormwater management with landscape amenity & recreation elements and are located in areas where stormwater management ponds are planned.

Ecological Landscapes are the predominant landscape type within the TEPA. Ecological landscapes will provide natural open spaces that knit the TEPA into the natural landscape of the city and provide a setting for a multi-use trail system. There are three main types: ecological protection landscapes, where existing sensitive habitat and vegetation are protected; ecological enhancement landscapes, where the ecological function and complexity of existing habitat and open spaces is improved; and ecological restoration landscapes, where new habitat will be created to extend and connect habitat within and around the TEPA.

Roadside Landscapes are located on the embankments of the freeway portion of The Windsor-Essex Parkway as well as between ramps and access roads and other areas inaccessible to pedestrians. This landscape type includes geometrically strong plantings, mowing patterns and structural elements that provide a green, aesthetic driving experience for users of the freeway portion of The Windsor-Essex Parkway.

The Multi-Use Trail travels through the various landscape types and allows pedestrians and cyclists to experience the landscape of the TEPA. Construction materials and alignments of the Multi-use trail will vary depending on site and landscape type.

CONCLUSION

CSS workshops using visualizations, photography, and three-dimensional modelling have helped establish a suitable approach to the urban, landscape and aesthetic design of the TEPA. Mitigation measures to reduce or improve visual and landscape impacts will include:

- the development of clear urban design and aesthetic guidelines to guide all aspects of future design;
- the use of landforming and vegetation strategies to improve views, aesthetics, ecological function and screening; and,
- the inclusion of a multi-use trail system and pedestrian accessible open space within the facility.

These mitigation measures will improve the visual character, aesthetic presence and landscape impact of the TEPA. The result of the landscape and visual impact mitigation will be a landscape that is unified, green, connected, integrated, and functions as a culturally significant gateway.

10.5 Summary of Environmental Effects and Mitigation

ID #	Environmental Element/Concern and Potential Impact	Concerned Agencies	Summary of Environmental Effects and Mitigation
1.0	AIR QUALITY	MOE/ EC/ MTO	In general, the air quality assessment shows that potential impacts from The Windsor-Essex Parkway would be small and limited to areas in close proximity to the road. Overall the implementation of The Windsor-Essex Parkway will slightly mitigate future transportation related air quality impacts within the study area over the future "no-build" alternative because it provides a wide right-of-way and improvements in traffic flow, by eliminating stop-and-go conditions caused by the traffic signals that exist in the Highway 3 / Huron Church Road corridor today. Results for air quality in the vicinity of the plaza will decrease within approximately 250 m from the Plaza property boundary by 2035. The highest impacts will likely occur within 50 to 100 m of the boundary. Given the location of the plaza in an industrial area, impacts to sensitive areas are avoided. The results for the crossing indicate that the maximum predicted concentrations of $PM_{2.5}$ and NOx are generally similar to those of The Windsor-Essex Parkway. Given the location of the crossing impacts to air quality for sensitive areas are not predicted. Road sweeping practices in accordance with maintenance standards will be employed to reduce silt loading on The Windsor-Essex Parkway. Various mitigation measures will be employed during construction to minimize adverse air quality effects such as dust impacts through the use of proper controls, such as: • periodic watering of unpaved (unvegetated) areas; • periodic watering of stockpiles; • limiting speed of vehicular travel; • use of water sprays during the loading, unloading of materials; • sweeping and/or water flushing of the entrances to the construction zones; and, • use of calcium chloride. These types of controls aid in minimizing impacts to the environment during the construction phase.
2.0	HUMAN HEALTH RISK ASSESSMENT	HC / EC	• The emissions of sulphur dioxide (SO_2) arising from vehicles traveling along the roadway for the future "No-Build" and TEPA scenarios were similar to background. Therefore, short-term risks arising from exposure to SO_2 were no different to background and the TEPA does not result in any increased risk in comparison to the future "No-Build" scenario. Given that the annual concentrations for SO_2 for the TEPA are no different than future "No-Build" and background the same conclusion (as short term) would hold for long-term exposure to SO_2. • The short-term and long-term risks associated with NO_2 were similar to background. In general, the short term and long term risks associated with exposure to NO_2 for the TEPA are lower than the future "No-Build" scenario, indicating that there is less risk to residents in communities surrounding The Windsor-Essex Parkway for the TEPA scenario. • In general, the TEPA scenario results in lower hazard quotients than the future "No-Build" scenario. Thus, the results of the risk assessment associated with $PM_{2.5}$ demonstrate that in general, future risks to residents in communities adjacent to the TEPA will be lower than the future "No-Build" scenario.

ID #	Environmental Element/Concern and Potential Impact	Concerned Agencies	Summary of Environmental Effects and Mitigation
3.0	NOISE & VIBRATION	MOE/ MTO	***Noise Mitigation During Construction and Operation*** The following measures will be undertaken to reduce noise during the operating phase: • Mitigation measures were identified to address operation effects for the TEPA as outlined below: In all cases, for receptors located in areas along The Windsor-Essex Parkway, the proposed 5 m high noise barrier where required was effective in reducing the predicted project noise to within 5 dB of the estimated baseline noise levels, except for night time at one receptor located in Spring Garden Road. The following measures will be undertaken to mitigate noise during the construction phase of the TEPA: • Ensure that all construction equipment used is in good repair, fitted with functioning mufflers, and complies with the noise emission standards outlined in MOE guidelines; • To the greatest extent possible, limit the most noisy construction activities to daytime hours; • Where the sequencing of construction permits, permanent noise barriers and/or berms may be built during the early phases of construction in order to reduce construction noise levels at receptor locations; • Maximize the distance between the construction staging areas and nearby receptors to the greatest extent possible; • Maintain construction haul roads to prevent potholes and ruts to avoid the loud noise caused by construction vehicles travelling over uneven road surfaces; • Develop a process for receiving, investigating and addressing construction noise complaints received from the public; and, Consultation with communities will continue during the design and construction stages, to provide additional opportunities for input on noise mitigation measures. • Based on the field monitoring results, it is expected that the vibration levels caused by the TEPA will comply with MOE criteria. For this reason, no measures are being proposed to mitigate vibration levels.
4.0	PROTECTION OF COMMUNITY AND NEIGHBOURHOOD CHARACTERISTICS	MTO/ MOE	***Protection of Community and Neighbourhood Characteristics*** Mitigation measures recommended to reduce the social impact on the broader and neighbourhood communities include: • Implementation of the "willing seller-willing buyer" property purchase program; • Fair market value for properties required for the project; • Implement a communication process to manage disruption effects experienced by residents; • Develop and maintain regular communications with emergency services and the municipalities with regard to changes to the road network, municipal services, etc.; • For residents in the Ojibway Parkway /Spring Garden/Bethlehem area, protect and maintain and landscape as much as possible to enhance the lands between the residences and the facility; and, • For residents in Oliver Estates, assess the need for improvements to Montgomery Drive.

ID #	Environmental Element/Concern and Potential Impact	Concerned Agencies	Summary of Environmental Effects and Mitigation
5.0	ECONOMIC IMPACTS	MTO	***Economic Impacts*** Through the property acquisition process, displaced businesses are offered fair market value for their businesses, which will provide them an opportunity to relocate if they so choose. The *Draft Practical Alternatives Evaluation Working Paper – Economic Impact (May 2008)* documents that there are many opportunities for businesses to relocate. Besides financial compensation for physically disrupted businesses requiring property acquisition, several other forms of mitigation may be used to assist businesses: • Allow signage at certain intersections/interchanges to make motorists aware of businesses/business clusters, as policies permit; • Efforts will be made during the construction phase to ensure access is maintained to operating businesses; and, • The service road network will allow for adequate access to existing commercial corridors.
6.0	WASTE AND WASTE MANAGEMENT	MTO/ MOE	***Waste and Waste Management*** If contamination to soil and/or groundwater is identified on properties being acquired, a Phase III ESA may be required. Phase III ESA generally defines the lateral and aerial extent of impacted zones and examines options for managing the contamination or cleaning up the site. Actions could include risk assessments to determine whether the contamination represents a potential threat to human health or the environment or remediation activities, which could include excavation and off-site disposal, or on site treatment, in-situ or ex-situ remediation or monitoring of natural attenuation. Should any contaminated materials be encountered during construction, caution will be exercised while handling and disposing of contaminated materials. Excess materials will be managed in accordance with normal MTO practices (as governed by OPSS 180, or the most current standard at the time of construction).
7.0	ARCHAEOLOGICAL RESOURCES	MCL / MTO	***Archaeological Resources*** The mitigative requirements in advance of construction of the TEPA are not known at this phase of the project because the archaeological assessment has not been completed to the extent that would allow for determination of all impacts and required mitigation alternatives. However, assessments have been completed on areas exhibiting the greatest archaeological potential, therefore further significant archaeological finds are not anticipated. The following Ministry of Culture conditions apply should archaeological resources be encountered during construction: • Should deeply buried archaeological remains be found on the property during construction activities, the Manager, Heritage Operations unit, Ontario Ministry of Culture, should be notified immediatelyl; and, • In the event that human remains are encountered during construction, the proponent should immediately contact both the Ontario Ministry of Culture and Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ontario Ministry of Government Services, Consumer Protection branch.
8.0	BUILT HERITAGE RESOURCES	MCL / MTO	***Built Heritage Resources*** All mitigation options will require a Built Heritage Resource Documentation Report. This report includes detailed photo-documentation of the structure and a plan of salvage for character contributing architectural elements. Only two mitigation options are considered practical for the TEPA: • Relocation of individual structures within the City of Windsor; or

ID #	Environmental Element/Concern and Potential Impact	Concerned Agencies	Summary of Environmental Effects and Mitigation
			• Salvage of significant architectural elements followed by demolition. Where relocation is recommended, the City of Windsor Heritage Committee should be consulted.
9.0	WILDLIFE AND WILDLIFE HABITAT	MNR/ MTO	**Wildlife and Wildlife Habitat Mitigation Measures** Extensive efforts have been made to avoid and minimize impacts to Butler's gartersnake and Eastern foxsnake populations including refinements to the alignments of The Windsor-Essex Parkway. The following mitigation measures can be employed to address impacts to these species and others as a result of the construction and operation of The Windsor-Essex Parkway. • Habitat restoration and enhancement will be implemented to create new and higher quality habitat. • Areas of habitat to be retained will be clearly marked in the field and protected from construction activities. • Wildlife salvage will be carried out prior to clearing/grubbing to reduce the risk of wildlife mortality. • Restoration and enhancement of habitat located along The Windsor-Essex Parkway will be used at strategic locations to reconnect significant wildlife habitat located on both sides of The Windsor-Essex Parkway. • A snake barrier will be installed along side portions of the construction area to prevent snakes from entering the work zone and redirect snake movements to safer areas, like the restored habitat. • Options for permanent protection of critical Butler's gartersnake habitat will be developed in later consultation phases. • The creation of new snake nesting areas and hibernacula will occur to compensate for any losses of habitat. • Snakes will be captured and relocated prior to construction to avoid mortality. • Areas of habitat to be retained will be clearly marked in the field and protected from construction activities. • Restoration and enhancement of habitat located along The Windsor-Essex Parkway will be used at strategic locations to reconnect significant wildlife habitat located on both sides of The Windsor-Essex Parkway. • Disturbance to wildlife during the operations phase will be mitigated through berming, light shielding and prohibiting access to significant wildlife habitat by humans. • Measures to mitigate potential bird mortality from the Detroit River crossing such as bridge design and lighting will be investigated in greater detail during future design phases. • The effects of The Windsor-Essex Parkway's proximity to the remaining Butler's garter snake population and their hibernacula should be monitored. • Monitoring could be a continued process and a strategy should be developed to ensure permanent protection of the Butler's garter snake population and their habitat. • Foxsnake tracking should continue to determine their egg laying sites and hibernacula sites. Knowing these locations could assist in preventing future conflicts with this species. • To avoid impacts to species at risk and their critical habitat, vegetation removals should not occur during the growing season in specified areas. • Permits under the *Ontario Endangered Species Act, 2007* and the federal *Species At Risk Act* will need to be obtained during future design stages. Detailed mitigation strategies will be developed in order to obtain the permits.

ID #	Environmental Element/Concern and Potential Impact	Concerned Agencies	Summary of Environmental Effects and Mitigation
			The following mitigation measures can be employed to address impacts to these species and others as a result of the construction and operation of the plaza and crossing. • The site plan for the inspections plaza incorporates several mitigation measures including: berming, landscaping, the establishment of buffer areas/setbacks and a stormwater detention pond. • On the south side of the inspections plaza, a stormwater detention pond is proposed in association with a vegetative buffer. • The stormwater detention pond enhances the buffer width between the inspection plaza and the Black Oak Woods to the south. • On the west side of the inspections plaza, a 30 m setback is proposed from the Detroit River to inspection plaza. The 30 m setback will be maintained and enhanced with a vegetative buffer to screen the plaza from view, to promote wildlife passage along a naturalized shoreline and to reduce the potential for erosion to occur. • Lighting used at the inspections plaza should be focused downwards and shielded where necessary to prevent light spillage into nearby natural areas such as the Black Oak Woods. • Wildlife salvage should be performed on-site prior to vegetation removals. Vegetation removals will be avoided in the vicinity of species at risk and their habitat during the growing season.
10.0	VEGETATION AND VEGETATION COMMUNITITES	MNR / MTO / MUNICIPALITIES	**Vegetation and Vegetation Communities** A total of approximately 100 ha of vegetation communities will be removed to construct the TEPA. At the same time, the design of The Windsor-Essex Parkway affords the opportunity to establish approximately 100 ha of green space using restoration and enhancement approaches. As a result, the proposed project is expected to result in an overall net benefit to vegetation communities and to species at risk populations. In addition, there are opportunities to partner in enhancements to other lands in public ownership adds another opportunity for overall benefits. The following mitigation measures can be employed to address impacts to Vegetation and Vegetation Communities as a result of the construction and operation of the TEPA. • The area for vegetation removals has been minimized to the extent possible based on the selection of the TEPA and the associated refinements. Areas that should be protected during construction will be delineated prior to construction start and no activities will be permitted in these areas. • The landscape plan will identify areas for protection, enhancement and restoration. The landscaping plan will include detailed prescriptions for vegetation management including edge management plans, soil management plans, use of native and non-invasive plant materials, prairie disturbance regimes, control of exotic and invasive species and management of species at risk. The landscaping plan will be prepared in later design stages. • Restoration and enhancement measures included in the landscaping plan will be designed to achieve no net loss of vegetation area, attributes or function as a result of this project. An array of restoration and enhancement techniques will be identified including seeding, planting (plugs and seedlings) or transplanting (sod) that includes only native species present within the TEPA. Appropriate locations for removal of invasive exotic plant species through the use possible measures such as herbicides, weed torches and prescribed burns will also be identified. The above mitigation techniques will also be employed with the objective of achieving a net benefit to all regulated species at risk populations within the TEPA. • Opportunities to forge partnerships with parties to relocate species to lands in public ownership, to otherwise restore and enhance these lands with native plants and species at risk and to transfer lands within The Windsor-Essex Parkway to parties that can best protect sensitive areas will be sought.

ID #	Environmental Element/Concern and Potential Impact	Concerned Agencies	Summary of Environmental Effects and Mitigation
			• Vegetation removals will be avoided in the vicinity of species at risk and their habitat during the growing season. • Two permits under the *Ontario Endangered Species Act, 2007* and the federal *Species At Risk Act* will need to be obtained during future design stages. Detailed mitigation strategies will be developed in order to obtain the permits. *Monitoring Activities* • During construction, an environmental inspector will make frequent random site visits to ensure that construction activities are not causing any harm in areas that are to be protected. • Post-construction monitoring should occur to ensure successful plant establishment and reproduction. • Prairie management should be an ongoing and long-term process that should involve the cooperation of appropriate parties to remove invasive exotics, burn as frequently as possible, protect high significance vegetation communities and species at risk.
11.0	MOLLUSCS AND INSECTS	MNR / MTO	**Molluscs and Insects** The following mitigation measures can be employed to address impacts to Molluscs and Insects as a result of the construction and operation of the TEPA. • Impacts to Monarchs cannot be avoided entirely given the magnitude and nature of the proposed works, and the cosmopolitan nature of this species. The area for vegetation removals has been minimized to the extent possible, and areas that should be protected during construction will be delineated prior to construction start. No significant adverse effects to Monarchs are anticipated as a result of this project. The mitigation measures prescribed for Monarchs will also reduce potential impacts to other insect species. • To avoid impacts to species at risk and their critical habitat, vegetation removals will be avoided in the vicinity of species at risk and their habitat during the growing season. The areas for restoration and enhancement will result in the creation of new Monarch habitat, as those areas will be intentionally or naturally seeded by host plants. Following construction other disturbed areas that re-vegetate are also likely to self-seed with host plants and create additional Monarch habitat. The construction limits will be delineated with sensitive areas identified prior to the start of construction. Good housekeeping practices will be employed to prevent the contamination of habitat adjacent to the work area. In the event of an upset or spill, a quick and effective response to contain the spill and clean up the area will be employed. No follow-up or monitoring programs specific to Monarchs are recommended.
12.0	FISH AND FISH HABITAT	MTO/ MNR/ DFO	**Fish and Fish Habitat** • The construction of submerged culverts at Cahill and Lennon Drains may cause barriers to fish passage that will be permanent in nature. • The loss of habitat through enclosure or physical destruction will likely occur in 10 of the 15 watercourses/drains within the study area (excluding the Detroit River), The enclosures may result from five culvert extensions and three new crossings. Physical destruction may occur at four watercourses/drains where realignment may be required. Although occurring within the construction phase of the project, these effects will be permanent. • Effects to Water Quality and Quantity: The TEPA will increase the overall impervious area and traffic loadings. This may potentially have a negative impact on the recipient watercourses by increasing the peak flows and the pollutant loadings. This will lead to negative watercourse impacts such as degraded fish habitat, increased floodlines upstream and increased erosion downstream. The following mitigation measures can be employed to avoid or reduce impacts of the construction and operation of the TEPA. Permanent loss of fish

ID #	Environmental Element/Concern and Potential Impact	Concerned Agencies	Summary of Environmental Effects and Mitigation
			habitat may be mitigated by the following: • Barriers to fish passage: Culverts, designed using fish-friendly methods, and channels, designed using natural channel design principles, should not form barriers to fish passage during operations. Fish passage systems should be designed and operated at Cahill and Lennon Drains to provide safe fish passage across The Windsor-Essex Parkway, which bypass the submerged culverts. Fish locks are being proposed to raise and lower migrating fish across The Windsor-Essex Parkway thereby maintaining access to upstream spawning areas. This method has proven to be effective in other similar applications. • Loss of fish habitat: The extent of fish habitat affected can be minimized through engineering structures to fit within the smallest possible footprint areas. Culvert lengths and extensions can be minimized through the use of headwalls, wingwalls and guide rails and extensions should match the inverts of the existing culverts and streambeds. New crossing structures should be constructed using fish-friendly designs including appropriate horizontal and vertical clearances, open bottoms, countersinking, etc. Realigned channels should be designed using natural design principles to enhance new habitat over existing habitat. Riparian vegetation should be maintained where possible. A fish habitat compensation plan will be prepared during later design stages to ensure no net loss of the productive capacity of fish habitat. • Effects to Water Quality and Quantity: Stormwater runoff from the within the existing study area of The Windsor-Essex Parkway does not currently receive quality or quantity treatment. Stormwater runoff associated with The Windsor-Essex Parkway and the plaza will be treated in stormwater management wet ponds designed in accordance to the MOE document “Stormwater Management Planning and Design Manual” for Enhanced Protection Level. This will require the removal of 80% of total suspended solids (TSS), as well as providing erosion attenuation of the 25mm storm for 24 hours. In addition, the stormwater management ponds will provide quantity storage to control peak flows from The Windsor-Essex Parkway to pre-development rates. This approach will lead to overall enhancements to water quality and net benefits to fish and fish habitat for receiving watercourses along The Windsor-Essex Parkway and will prevent water quality impacts to the Detroit River associated with operation of the plaza. In addition, deck drains are not proposed on the crossing and runoff will be collected for quality treatment prior to discharging to the river. • In addition, the removal of 30 entrance culverts and the plan to provide a natural channel configuration for a significant area of the Wolfe Drain will result in a gain of fish habitat. • Stormwater quality control that will be provided with the Windsor-Essex Parkway will lead to an overall enhancement to water quality and a net benefit to fisheries. Construction related impacts of building of the TEPA may be mitigated by the following: • Changes to water quality and quantity: best construction practices should be employed to reduce the potential for spills and materials/equipment from entering water. Maintenance, fuelling and storage should occur at least 30 m from watercourses/drains. Debris should be prevented from entering watercourses/drains and a spill response plan should be developed. Sediments should be prevented from reaching sensitive areas through erosion and sediment controls and exposed soils stabilized as soon as possible. A storm water management plan should be developed and implemented to treat run-off during operations. • Alterations to baseflow: the increases in impervious surfaces and areas of soil compaction should be minimized to facilitate as much infiltration of surface water as possible. Management of storm water through the development and implementation of a storm water management plan will address potential reductions in baseflow. Methods that encourage infiltration will be investigated. Flows in watercourses will be monitored during dewatering activities and measures will be implemented in the event that baseflow is significantly affected. • Barriers to fish passage: water flow should be maintained during construction. • Mortality of fish species: the magnitude of effects should be minimized through the employment of timing windows for in-water work, commencing work only when all materials are present and staging of work to minimize duration. Work should be performed in the dry and

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			isolated fish should be captured and relocated by qualified personnel. Impacts as a result of operations phase for the TEPA on fish and fish habitat can be mitigated by the following: • Changes to water quality and quantity: in general, storm water management throughout the project area will improve water quality and quantity (through attenuation of peak run-off flows) over what exists currently. Run-off from the crossing will be collected and conveyed to stormwater detention facilities for treatment. No deck drains will be provided on the bridge. • Alterations to baseflow: a storm water management plan should be developed and implemented to ensure that reductions in baseflow do not occur. • Changes to water temperature: a storm water management plan will be developed which will address the treatment of run-off and investigate methods to reduce its temperature prior to discharge into receiving watercourses/drains. • Barriers to fish passage: Culverts, designed using fish-friendly methods, and channels, designed using natural channel design principles, should not form barriers to fish passage during operations. Fish passage systems should be designed and operated at Cahill and Lennon Drains to provide safe fish passage across The Windsor-Essex Parkway which bypass the submerged culverts. Fish locks are the preferred option for a fish passage system. *Monitoring Activities* • An environmental inspector should be present on site during critical in-water work activities. Post-construction monitoring is typically prescribed in the federal Fisheries Act authorization. The terms and conditions of the federal Fisheries Act authorization will be met. Post-construction monitoring, if prescribed, will determine the effectiveness of environmental protection and compensation measures, identify problem areas and recommend corrective measures. • The performance of the fish locks should be monitored for at least two years after construction to ensure that they are functioning properly. The target species for the locks is Northern Pike. During spring migration (March/April), a fish passage study using mark-recapture or radio-telemetry could assist in determining the effectiveness of fish passage. Both techniques apply in the assessment of passage success. In order to assess downstream passage, similar studies should be repeated later in the spring (late April/May) to see if fish are successfully migrating back to summer habitats.
13.0	DESIGNATED NATURAL AREAS	MNR/ MTO	**Designated Natural Areas** The landscaping plan prepared for the TEPA identifies close to 100 ha of MTO-owned lands that are available for protection, enhancement and restoration. Opportunities to dedicate portions of these lands to appropriate parties for protection will be discussed at later design stages. Lands will be available to be dedicated for protection including provincially rare vegetation communities, habitat for species at risk, wildlife corridors and other ecological functions. As a result, a net gain in the extent of designated natural areas with important ecological functions will result from the TEPA. • Mitigation measures for the loss of area or ecological function of designated natural areas are similar to the mitigation measures identified for vegetation and wildlife. *Monitoring Activities* Monitoring requirement are similar to those identified for vegetation and wildlife.

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14.0	URBAN DESIGN AND AESTHETICS	MTO / MUNICIPALITIES	**Urban Design and Aesthetic Plan** • This urban design and aesthetic plan will serve to unify all the visible aspects of the facility into a central visual and formal theme that can be deployed throughout future design by various design professions. The urban design and aesthetic plan will establish streetscaping principles for the TEPA. • The urban design and aesthetic plan will adhere to CSS principles and will be developed as part of a consultation process with local stakeholders.
15.0	LANDSCAPE PLAN	MTO / MUNICIPALITIES	**Landscape Plan** Mitigation measures to reduce or improve visual and landscape impacts will include: • the development of clear urban design and aesthetic guidelines to guide all aspects of future design; • the use of landforming and vegetation strategies to improve views, aesthetics, ecological function and screening; and, • the inclusion of a multi-use trail system and pedestrian-accessible open space within the TEPA. These mitigation measures will improve the visual character, aesthetic presence and landscape impact of the TEPA. The result of the landscape and visual impact mitigation will be a landscape that is unified, green, connected, integrated, and functions as a culturally significant gateway.

10.6 Commitments to Future Work

The following outlines commitments to future environmental work to be undertaken during subsequent design stages of this project.

10.6.1 Air Quality

The air quality modeling demonstrates that overall, implementation of TEPA will slightly reduce future transportation related air quality impacts within the study area. Therefore, the TEPA will act as a small mitigation measure for future transportation related air quality impacts within Windsor Region.

Best practices for maintenance will be employed to minimize dust levels from operation of The Windsor-Essex Parkway and thereby minimizing the risk of localized elevated fine particulate matter levels.

10.6.2 Socio – Economic Environment

Noise

Where the project noise exceeds the background/existing noise levels by 5 or more decibels (dB), mitigation measures including sound barriers are to be considered for the project. Additionally, final recommendations with respect to the location, height, etc. of noise barriers, berms or a combination of both will be reviewed during future design stages.

Consultation with communities will continue during the design and construction stages, to provide additional opportunities for input on noise mitigation measures during both the construction and operation stage.

Existing and Future Land use

Opportunities to minimize potential property impacts associated with the TEPA will be reviewed during future design stages in consultation with municipalities and property owners.

Property and Waste Contamination

To reduce the uncertainty of whether contamination is present, a Phase II ESA should be conducted during future design phases. Phase III work will be undertaken as necessary to further investigate and mitigate possible contamination as necessary.

10.6.3 Natural Environment

Follow-up work, including field investigations will be undertaken as required to facilitate the development of mitigation measures,compensation plans, and to obtain necessary permits and approvals.

Wildlife and wildlife habitat

The following measures will be employed during future design stages:

- Options for permanent protection of critical Butler's gartersnake habitat will be developed in later consultation phases.
- The presence/absence of Eastern foxsnake hibernacula within the vicinity of the TEPA will be investigated during subsequent design stage to determine the potential for impacts.
- A continued study of the Butler's garter snake population and the restoration area is necessary once the proposed highway is completed.

Migratory Birds

Migratory bird species have been identified. However, populations and behaviours of migratory and resident bird species should be further studied in the vicinity of the Detroit River crossing. Radar studies, acoustic studies and point count surveys should be carried out to provide input to bridge design.

Vegetation

Effective techniques for mitigating impacts for individual species at risk and significant plant communities will be further investigated in discussion with agencies and other interested parties toward the achievement of overall net benefits and permitting under the *Ontario Endangered Species Act, 2007* and the federal *Species At Risk Act.*

Molluscs and Insects

The following measures will be employed during subsequent design stages to protect Monarch populations and habitat:

- Opportunities to minimize vegetation removals will continue to be examined in the design stage, and areas that should be protected during construction will be delineated prior to construction start.
- Following construction other disturbed areas that revegetate are also likely to self-seed with host plants and create additional Monarch habitat.
- The construction limits will be delineated with sensitive areas identified prior to the start of construction.

Fisheries

Measures to mitigate impacts to fish habitat will be developed in the subsequent design phase in consultation with Fisheries and Oceans Canada. A Letter of Intent and Application will be prepared during subsequent design stages to secure the required federal *Fisheries Act* authorizations for this project.

Designated Natural Areas

MTO will discuss the dedication of protected, enhanced or restored lands located within the right-of-way for The Windsor-Essex Parkway to appropriate agencies and other stakeholders to ensure permanent protection, conservation and research.

Landscape plan

The overall Landscape Plan for the TEPA will be developed through ongoing consultation with the adjacent communities. The multi-use trail is part of an active transportation network for the City of Windsor and will be integrated into existing and planned regional and local cycling and active transportation networks.

EMERGENCY SERVICE

Emergency service providers have been consulted and are aware that they will need to reassess their resources, level of service, access routes for the freeway, and in general, their ability to access their entire area of coverage, in order to ensure provincially mandated response times are met. Future consultation with emergency services will take place. Additional resources required should be identified and planned for.

10.6.4 Cultural Environment

Assessments of Archaeological Resources and Built Heritage Resources will continue during subsequent design stages.

10.7 Project Monitoring

PROJECT SPECIFIC TECHNICAL MONITORING

During construction, MTO or its agent will ensure that the implementation of the mitigating measures and key design features are consistent with the approvals of the EA and in accordance with the contract. In addition, MTO or its agent will assess the effectiveness of its environmental mitigating measures to ensure the following:

- Individual mitigating measures are providing the expected control and/or protection;
- Composite control and/or protection provided by mitigating measure is adequate;
- Additional mitigating measures are provided as required for any unanticipated environmental conditions which may develop during construction;
- Information is available for the overview assessment of mitigating measures; and,
- Environmental monitoring, after a project is completed, may involve follow-up monitoring of significant measures and /or significant concerns.

10.7.1 Implementation of Environmental Monitoring Framework

INSPECTION BY CONSTRUCTION ADMINISTRATION STAFF

Construction is subject daily to general on-site inspection to ensure the execution of the environmental component of the work and to deal with environmental problems that develop during construction. This is the primary method for compliance monitoring.

SITE VISITS BY ENVIRONMENTAL STAFF

Regular site visits by well qualified and experienced Construction Administration environmental staff to ensure mitigation elements are being carried out. The timing and frequency of such site visits will be determined by the schedule of construction operations, the sensitivity of environmental concerns and the development of any unforeseen environmental problems during construction.

11 COMMITMENTS TO CONSULTATION, COMPLIANCE MONITORING AND PERMITS/ APPROVALS

The Ministry of Transportation (MTO) and Transport Canada (TC) are committed to maintaining consultation efforts to keep interested parties informed of activities, future design phases and project implementation. Additionally, MTO and TC are committed to ensure that compliance monitoring of commitments made during the EA and subsequent phases, including necessary permits and approvals, are adhered to. The section below describes the approach to achieve successful consultation, compliance monitoring, permits, approvals and environmental management.

11.1 Consultation

The Ministry of Transportation is committed to the development of consultation plans that will assist future design phases of the project.

Generally these consultation plans will involve an outline of committed communications with agencies, municipalities, First Nations, public, property owners, and other stakeholders as deemed necessary.

These consultation plans will be made available for public input at the outset of the future design phase to ensure they outline appropriate commitments made during the EA including changes as described in the amending procedure (refer to Chapter A). Components that outline specific consultation requirements will be consistent with commitments made throughout the EA.

Examples of components of the future consultation plan can include:

- Commitments outlined in Chapters 9 and 10 relative to commitments to further work with public and external agency stakeholders etc. in addressing environmental impacts;
- Landscape plan elements for The Windsor-Essex Parkway;
- Noise mitigation design;
- Construction staging and associated mitigation elements; and
- Future discussion concerning property.

In terms of the amending procedure outlined in Chapter A, there is the opportunity for consultation with affected parties on issues of minor and major changes throughout the study.

All background study files and documentation including the study mailing list will be provided to the future design team.

11.2 Compliance Monitoring Plan

The purpose of compliance monitoring is to ensure that provisions of the EA are followed and complied with. Compliance monitoring can be conveyed through a Compliance Monitoring Plan (CMP), which is used as a tool to document, track and record compliance and monitoring efforts on a project. Future provisions that are subject to compliance monitoring are as follows:

- Mitigation measures;
- Ongoing consultation;
- Additional studies and work to be carried out;
- Obtaining necessary Conditions of Approval from MOE (CoA), and;
- All other commitments made during the preparation and review of the EA.

The CMP will describe the actions required to address the commitments of MTO and to provide the indicators to be used to verify compliance and the schedule to be followed for completion of the commitments. The CMP will include, but is not limited to, the commitments outlined in Chapters 9 and 10.

A specific requirement to conduct the monitoring and timing to document the results will be identified. It is the commitment that the CMP will be made available to the MOE, or its' designate upon request, in a timely manner during an on-site inspection, audit or in response to a pollution control incident or otherwise.

This CMP will be structured to identify the parties responsible, provide the program scope and actions required during each phase, outline the consultation methods to be used and the schedule to be followed to confirm compliance and the submission of the report.

11.3 Permits / Approvals Required

The following is a list of permits and approvals that will be required during the design phases of the EA:

- A Letter of Intent and Application will be prepared during later design stages to secure Federal Fisheries Act approval.
- Permit under clause 17(2)(d) of the *Ontario Endangered Species Act, 2007*.
- Permit under the federal *Species At Risk Act*.

11.4 Environmental Management Systems

An Environmental Management System (EMS) is the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining a proponent's environmental policy and Sustainable Development Strategy.

MTO is committed to ensure that an EMS is in place to guide the operation and maintenance of The Windsor-Essex Parkway. The system will be designed to ensure that the facility is operated and maintained in a manner that is consistent with the principles that were derived in the EA process relative to environmental sustainability and sensitivity to community expectations. The system will ensure that the operation and maintenance of the facility is subject to continual review and improvement and is adaptive to new practices and technologies which help to meet overall objectives.

11.5 Summary of Commitments to Consultation, Commitments to Compliance Monitoring and Permits/Approvals Required

During future design phases, commitments made in the EA regarding design works and environmental analysis and impact assessment, development and incorporation of mitigation measures, obtaining of regulatory agency approvals and permits, and consultation with interested and potentially affected stakeholders will be monitored. The monitoring activities will be integrated with the design schedule for each segment to ensure timely verification that the commitments have been met by appropriate design solutions before construction activities commence.

In addition, environmental protection measures will be stipulated in all appropriate construction specifications that will form the contractual basis for carrying out the project works.