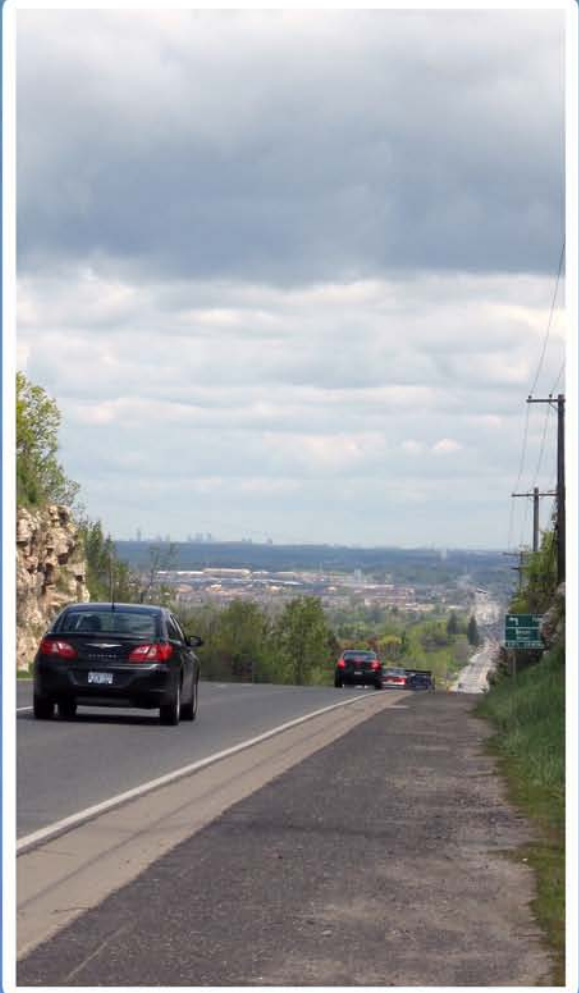




Hamilton

New East-West Road Corridor Class Environmental Assessment (Highway 6 to Brant Street)

ENVIRONMENTAL STUDY REPORT
April 2012



**New East-West Road Corridor
Class Environmental
Assessment**

Environmental Study Report

April 2012

Prepared by:

**Dillon Consulting
Limited**

In association with:

**Lura Consulting
The MBTW Group
Peto MacCallum Ltd.
Jacques Whitford**

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Preliminary Design Plates

Preliminary design plan and profile drawings of the proposed roadway improvements are included at the end of this report.

- Highway 6 Plate: 1
- E-W Road: Plates 1-7
- Parkside Plates: 1-2
- Upcountry Plate: 1-2
- Dundas Plates: 1-6
- Brant Plate: 1
- Typical Sections

List of Appendices (under separate cover)

- A. Public Consultation Information
- B. External Agency Consultation and Correspondence
- C. Drainage and Stormwater Management
- D. Air Pollution/Impacts
- E. Noise Pollution/Impacts
- F. Geotechnical
- G. Environmental Site/Geo-Environmental Assessment
- H. Archaeology
- I. Built Heritage
- J. Natural Environment
- K. Wells and Groundwater Monitoring
- L. Design Criteria
- M. Cost Estimate
- N. Phase 1 Report (SNC Lavalin)
- O. Phase 2 Report (Dillon)
- P. Record of One-Window Comments and Responses

- Q. Highway 6 Traffic Operations Review
- R. Species At Risk (SAR) Information

Executive Summary

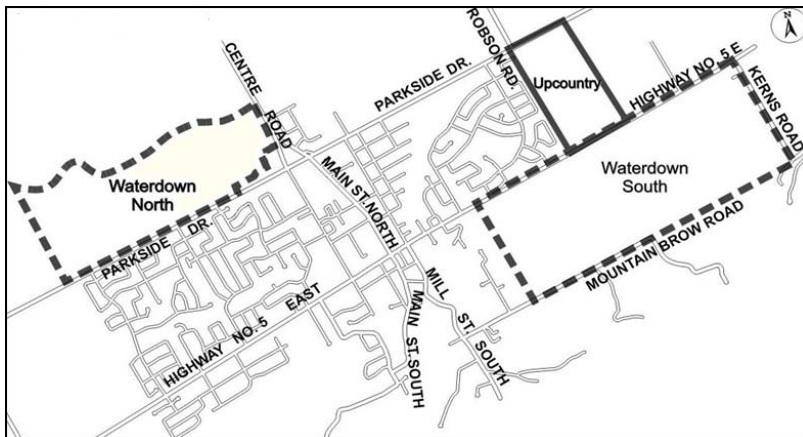
This Environmental Study Report (ESR) addresses four phases of the New East-West Road Corridor Class Environmental Assessment. These phases are:

1. Identify the Problem
2. Alternative Solutions
3. Alternative Design Concepts
4. Class Environmental Assessment Documentation

This main report includes a summary only of Phase 1 and Phase 2 work as this documentation had been released on the public record previously (Phase 1 report in July 2004 and Phase 2 report in February 2008). These reports are included in their entirety in the Appendix. The summary of this earlier work that is contained in this and other sections of the ESR has been essentially left intact as it was originally documented with qualifying/updating footnotes notes added only where it was considered important as current context for the reader.

Overview

In 1992, the Council for the former Town of Flamborough approved a “Preferred Growth Strategy” to allow for the expansion of the urban area around Waterdown. The Preferred Growth Strategy recommended that Waterdown North, Waterdown South and Upcountry Lands be placed within the urban boundary. Although initially adopted by Town of Flamborough Council in May 1992, a revised version of Official Plan Amendment (OPA) 28 and related Memorandum of Agreement were ultimately approved by Cabinet in June 2002 in response to a series of appeals.



City of Hamilton Official Plan Amendment 28 Areas

The approval of OPA 28 and the related agreement required the completion of:

- A Class Environmental Assessment for the Dundas Waste Water Treatment Plant expansion/diversion
- A Master EA Transportation Study
- A Waterdown South Subwatershed Study
- Secondary plans where Council deems necessary.

In September 1999, the former Town of Flamborough, the City of Burlington, the Regional Municipality of Halton and the City of Hamilton received the *Aldershot/Waterdown Master EA Transportation Network Master Plan Report* undertaken by Stantec Consulting Limited. The purpose of the study was to identify a future transportation network required to accommodate urban development in the communities of Waterdown and Aldershot. The report however did not receive Council approval from any of the involved municipalities.

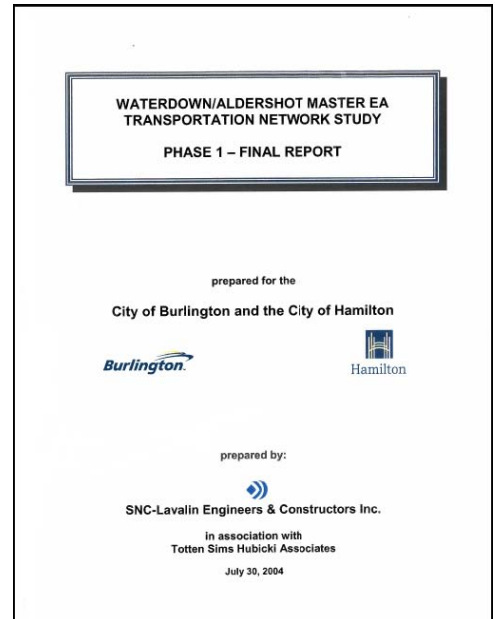
A Phase 1 Final Report of the *Waterdown/Aldershot Master EA Transportation Network Study* (refer to **Appendix N**) was completed in July 2004 by SNC-Lavalin. The purpose of Phase 1 was to “review all the land use and transportation network changes, either proposed or constructed, which may affect the study area conclusions and recommendations of the previous 1999 Stantec Transportation Master Plan Study. The Phase 1 report confirmed the need for additional transportation capacity in the Waterdown area spurred by future population and employment growth related to OPA 28. OPA 28 allowed for the expansion of the Waterdown urban area to accommodate residential growth to the year 2021. The report also recommended that the next phase consider all options to provide additional capacity in the Waterdown and Aldershot areas.

The *Waterdown/Aldershot Transportation Master Plan (WATMP) Phase 2 Report* prepared by Dillon Consulting Limited (Dillon) was subsequently completed in February of 2008. The purpose of the WATMP was to confirm the results of the Phase 1 work and to complete Phase 2 of the Municipal Class Environmental Assessment (Class EA) planning and design process. The Phase 2 Report provided a set of recommendations and a variety of measures to increase transportation capacity, including public transit, bicycle routes, transportation demand management and road improvements. The WATMP identified a series of next steps for the implementation of its recommendation including undertaking Phase 3, 4, and 5 of the Municipal Class EA planning and design process for road improvements in the east-west direction between Highway 6 and Brant Street.

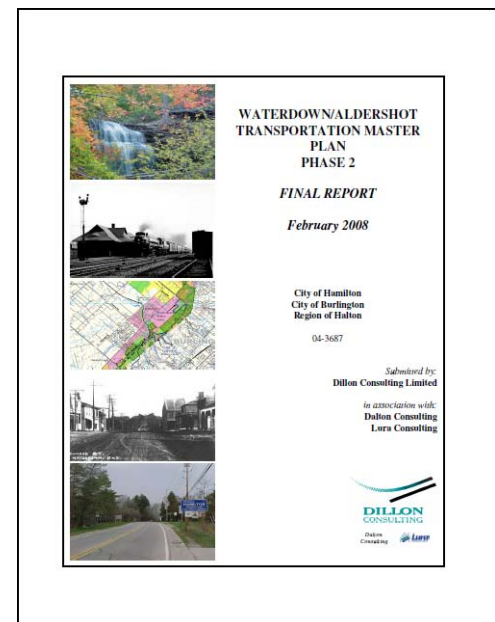
Transportation Master Plans (TMP) deal with area wide system and network requirements leading to the development of a series of overall transportation goals and objectives and the identification of preferred projects and initiatives that will be necessary to achieve them. A Class EA deals with a specific project identified in the TMP. The *WATMP Phase 2 Final Report (February 2008)* is part of the documentation of this Class EA and as such, is subject to the same review requirements (refer to **Appendix O**).

This project was carried out under the direction of a Project Partnering Group (Project Partners) with staff from the following participating municipalities:

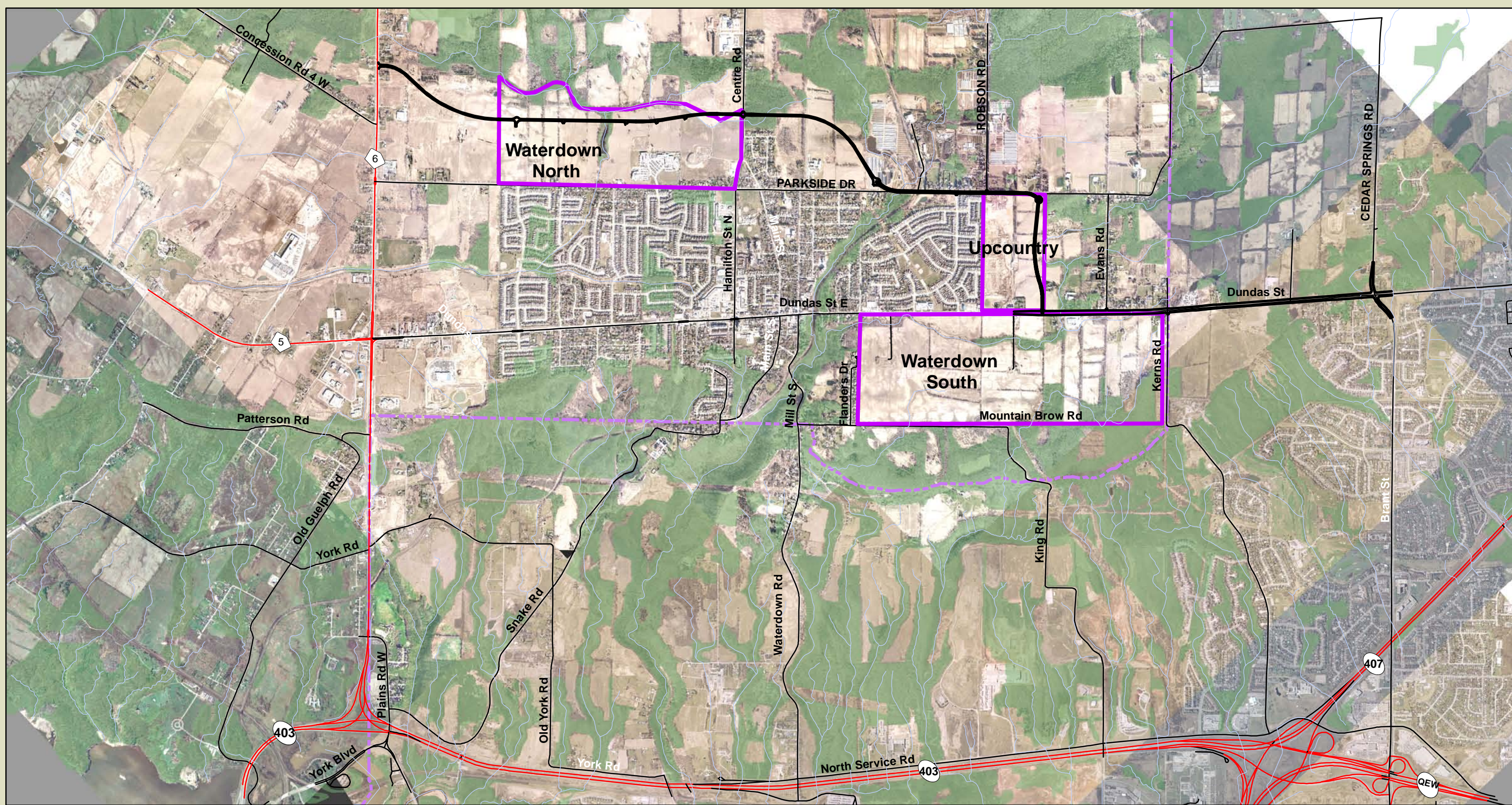
- City of Hamilton
- City of Burlington
- Halton Region



2004 Phase 1 Report








WATMP Phase 2 Report



New East - West Road Corridor - Key Plan

Legend

-  East - West Corridor Alignment
-  Municipal Boundary
-  Watercourse
-  Urban Expansion Area
-  Forested Areas



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 Map Checked By: PM
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 Date Modified: January 27, 2012
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 East - West Corridor - Preferred Option.mxd

The City of Burlington was not active in Phases 3 and 4 of this study as no roads or facilities under City of Burlington's jurisdiction will be directly affected by any of the New East-West Road Corridor facilities.

The Study Area for Phase 2 work is illustrated in *Exhibit 1-4, WATMP Phase 2 Study Area*. It extended from west of Highway 6 to east of Brant Street and from Concession 5 in the north to south of Highway 403. The WAMTP identified that in the east-west direction, one additional lane in each direction would be required to address the capacity deficiency. *Figure 1-2* illustrates the road components that comprise the New East-West Road Corridor. The New East West Road Corridor includes the following components:

- A new road corridor connecting to Highway 6 in the vicinity of Concession 4 Road and running easterly through the Waterdown North development lands and the Centre Road Woodlot/PSW and connecting to existing Parkside Drive west of the Grindstone Creek crossing
- Utilizing a section of existing Parkside Drive to east of the Robson Road intersection
- A north-south connection to Dundas Street running along the east side of the Upcountry development lands, and
- A section extending easterly along Dundas Street to the Brant Street intersection.

The Study Area for Phase 3 work was centred on the above road components. Alternatives were assessed that involved data gathering and alignment options in some sections within a relatively wide study corridor. This included a widened study area east of Centre Road to assess alternatives positioned both north and south in the Centre Road woodlot/ESA, route alternatives north and south of the Opta Minerals operations and alternative connections at Highway 6. The study area also extended east of Brant Street and west of Highway 6 to assess fit backs to the existing road network

Definition of the Problem (Phase 1 & 2)

Official Plan Amendment (OPA) 28 to the Town of Flamborough Official Plan allows for the expansion of the Waterdown urban area to accommodate residential growth to the year 2021. The three main expansion areas in OPA 28 are Waterdown North, Waterdown South, and Upcountry Lands. The OPA 28 lands consist of approximately 240 hectares of gross developable residential land. Population growth is expected to increase by 15,264 people upon build out.

The Phase 1 Final Report of the *Waterdown/Aldershot Master EA Transportation Network Study* was completed on July 30th, 2004 by SNC-Lavalin. The report confirmed the need for additional east-west and north-south capacity in the Waterdown/Aldershot area due to OPA 28, stating that additional capacity was needed in each direction. In late 2004, the *Waterdown/Aldershot Transportation Master Plan Phase 2* was initiated. This work included a review of the transportation analysis in the July 2004 Phase 1 Report as well as additional transportation modelling work to confirm the problem and provide detail on the



Concession 4 Road Looking East Toward Highway 6



Parkside Drive East of the Grindstone Creek Looking East

capacity requirements. The need for additional east-west capacity in the overall transportation network in the Waterdown North and Waterdown/Aldershot/Burlington area, due to the development of OPA 28 lands was confirmed. If no other growth took place except for OPA 28, there would still be a deficiency in the system. If background growth is considered, then an additional 254 vehicles (based on assumed growth rate of 1% per year of 2006 volumes until 2021) must be accommodated in addition to the unserved demand from OPA 28, equating to one arterial lane in each direction. The east-west deficiency identified in the *Waterdown/Aldershot Master EA Transportation Network Study, July 2004*, report was confirmed by the analysis undertaken in this study.

Based on assessment and comparative evaluation work the introduction of one additional lane of east-west capacity (i.e. new roadway capacity in each direction) was identified as a required transportation element to support the planned development.

Alternative Solutions

A number of possible transportation solutions to resolve the road capacity problem were initially identified, including:

- Do-nothing;
- Improved public transit;
- Transportation Demand Management; and
- New roadway capacity.

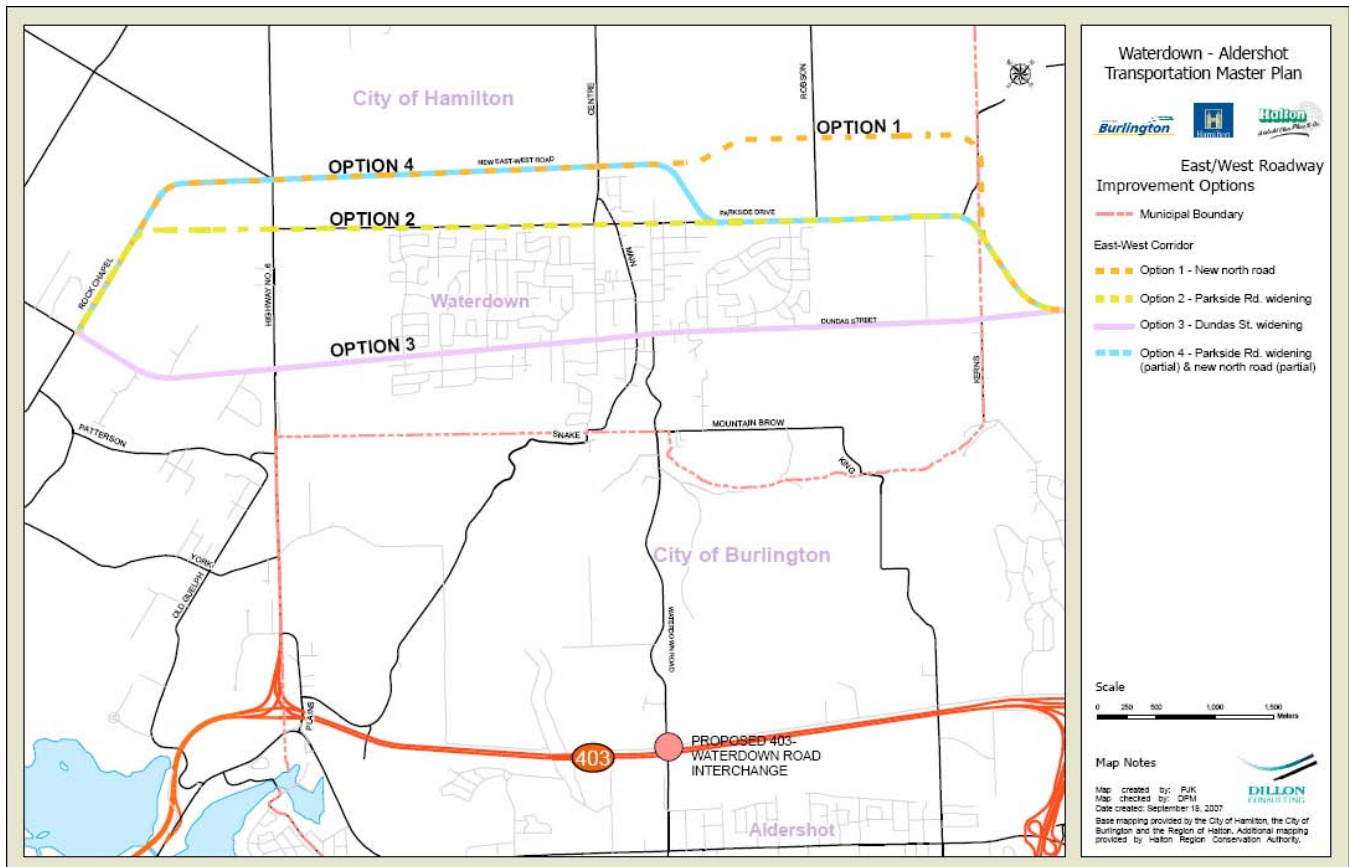
Attempts were made to solve as much of the problem as possible through non-roadway solutions such as improved public transit and Transportation Demand Management (TDM) measures. These solutions are considered preferred (by the project team and participants in this study) as they result in less reliance on the automobile and result in less environmental effects.

Several corridor alternatives were considered in the evaluation to provide the needed capacity to accommodate the development proposed in the OPA 28 lands in Waterdown. Each corridor alternative assumed a 5 % transit modal split and an additional 5 % reduction in vehicle trips due to TDM measures. Corridor alternatives were grouped into north-south alternatives for evaluation purposes. A pre-screening of corridor alternatives was conducted based on their ability to solve the transportation capacity problem. Alternatives that did not solve the problem (where 2021 screenline v/c continued to be greater than 0.85) were screened from further consideration. As a result of this pre-screening exercise, four east-west road improvement options were identified as being able to solve the roadway capacity deficiencies. Refer to the *Table 1- New Road Capacity Alternatives* and *Figure 1 - East-West Roadway Improvement Options*.

Table 1: New Road Capacity Alternatives

Option	Road Options Description	ROW Needs
Option 1 – New North Road	<ul style="list-style-type: none"> New north road with 2 lanes New North Link "By-pass" from Dundas Street West at Rock Chapel Road to Dundas Street East, east of Evans Road 	26-32 m
Option 2 – Parkside Drive Widening	<ul style="list-style-type: none"> Widen Parkside Drive to 4 lanes Parkside Drive from Dundas Street West at Rock Chapel Road to Dundas Street East, east of Evans Road 	30-43 m
Option 3 – Dundas Street Widening	<ul style="list-style-type: none"> Widening of Dundas Street to 4 lanes from Rock Chapel Road to Highway 6 at 30 m right-of-way (ROW), to 6 lanes from Highway 6 to Berry Hill Avenue at 43 m ROW, to 4 lanes from Berry Hill Avenue to a point just east of Pamela Street at 30 m ROW, and to 6 lanes from just east of Pamela Street to Dundas Street, east of Evans Road at 36 m ROW 	30–39 m (urban cross section)
Option 4 – Parkside Drive Widening & New North Road	<ul style="list-style-type: none"> Starting at the west, new 2 lane North Link "By-pass" ROW from Dundas Street West at Rock Chapel Road continuing as a new northern "by-pass" ROW, then swinging south past Centre Road to connect with Parkside Drive east of Churchill Avenue. Widening Parkside Drive to 4 lanes to Evans Road. From there a new connecting link from a point east of Evans Road heading south to connect with Dundas Street 	26-43 m

Figure 1: East-West Roadway Improvement Options



The road improvement alternatives were developed in Phase 2 as “corridors” and were not necessarily be considered as the specific routes. As well, it may be possible to reduce the ROW widths for a number of roadway sections and thus, reduce the level of “footprint” effects.

It was recommended that Option 4 (Hybrid North Route) be selected as the preferred alternative for the following reasons:

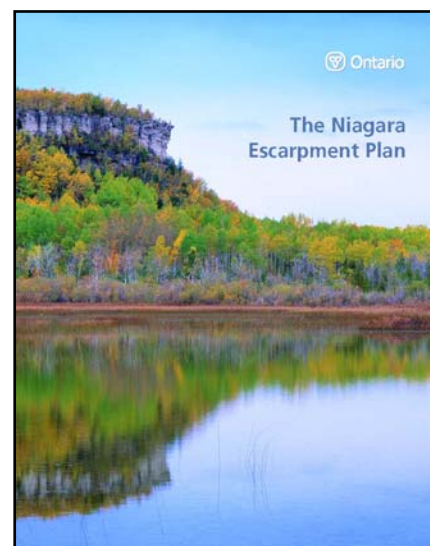
- That it avoids the most significant natural environmental effects associated with Option 1. There would be no removal of core ANSI or ESA areas and minimal loss (0.2 ha) of provincially significant wetlands. Removal of natural habitat is limited to edge areas and more detailed routing work should be able to lessen these effects;
- Option 4 has the least number of residential and business displacements;
- Option 4 largely avoids existing residential and business areas. There would be no impact on the downtown core area of Waterdown;
- The additional cost of Option 4 is only slightly more expensive than the cheapest (Option 1). Option 4 is significantly less expensive than Options 2 and 3. The options that require a road widening would be more expensive than a new green field route because it is assumed that a complete reconstruction of the widened road would be required. The existing infrastructure and utilities would likely not be salvageable and would need to be replaced;
- Option 4 will provide a higher level of service and is considered to be a safer alternative than the more urban options; and
- Option 4 also can serve as a by-pass to move truck traffic out of the Waterdown downtown area.

It is noted that significant concern was raised by a group of residents along Parkside Drive regarding the selection of Option 4 which would involve the widening of a portion Parkside Drive. An alternative alignment suggested by the Parkside Drive Residents Group was also considered in this study and is discussed in more detail in Section 5 of this report.

Existing Conditions

Much of the western portion of the study area is currently active agricultural lands, from Highway 6 to Centre Road. From just west of Borer’s Creek the lands are designated for residential development. Between Centre Road and Parkside Drive the area is forested to the west, with farmland to the east.

Lands to the north of Parkside Drive are located within the Greenbelt Plan Area and as such are subject to the Greenbelt Act (2005), and the designations of the Greenbelt Plan (2005). The eastern portion of the New East-West Road Corridor is located within the Niagara Escarpment Plan Area and as such is subject to Niagara Escarpment Planning and



The Niagara Escarpment Plan

Development Act (1973), and the designations of the Niagara Escarpment Plan (2005).

The main natural environmental issues of concern in the New East-West Road Corridor study area are watercourse crossings, federal and/or provincial Species at Risk, Provincially Significant Wetlands (PSWs), Environmentally Sensitive Areas (ESAs) and Areas of Natural and Scientific Interest (ANSI's). See *Figure 4-1* for Significant Natural Area locations (i.e. ESAs, Candidate ESAs, PSWs, ANSIs).

Several significant natural areas within the study area that have been designated as such by either the Ministry of Natural Resources, Hamilton Conservation Authority, Conservation Halton, or the municipalities. These include ESAs and ANSIs. The four main such areas are the Centre Road Woodlot/ESA, the Grindstone Creek Valley ESA, the Waterdown Escarpment Woods ESA and the Sassafras Woods ESA.

The Waterdown North Wetlands ESA is located immediately above the community of Waterdown. This 236 hectare area consists of small swamps along Grindstone Creek which help regulate stream flow and maintain water quality in Grindstone Creek above the Niagara Escarpment. This ESA is surrounded by cleared agricultural lands and fragmented by railway and hydro corridors. The Medad Valley ESA is located northeast of Waterdown. This 500 hectare forested natural area provides habitat for various rare and uncommon wildlife species. This ESA contains extensive upland and lowland forests that are relatively undisturbed and provide habitat for nationally, provincially and regionally rare species. The area is also used as a deer wintering range and is a natural corridor for wildlife movement. Adjoining land uses are primarily agricultural. The Centre Road Woodlot/ESA wetland feature located east of Centre Road is important because it provides linkages between natural features to the east (Lake Medad Valley Swamp) and to the west (Parkside Drive Wetland Complex) as well as two existing ESAs: the Millgrove South Woodlot ESA and the Waterdown North Wetlands ESA. The area is dominated by swamp vegetation communities, particularly Ash deciduous swamps.

Alternative Design Concepts

Numerous design concept assessments were carried out as part of Phase 3 work. The following text provides a brief overview of these assessments.

Western Alignment Alternatives

At the conclusion of Phase 2 work, the identified intersection with Highway 6 was at Concession 4 Road. To address concerns with respect to truck traffic infiltration (identified through the Neighbourhood Advisory Committee) a series of alignment alternatives were developed and evaluated for the connection location at Highway 6. These varied from alignments south of Concession 4 Road as well as alignments to the north. These were evaluated in close discussion with

the Ministry of Transportation regarding the potential for traffic operations and safety impacts along Highway 6. It was recommended to move the Highway 6 connection north of Concession 4 Road at a new T intersection and close existing Concession 4 Road on the west side of the highway.

Waterdown North Development/Centre Road Crossing

Several issue areas were identified in this analysis section:

- Borer's Creek Crossing Issue Area – to minimize effects on the creek, initially the proposed crossing location was located just south of where the two creek branches meet. The type of crossing structure (bridge) and the need to accommodate wildlife movement through the valley was noted as needing additional study. The road was been moved as far north as possible in this area to minimize the amount of development land north of the new road.
- separation from the Parkside Drive Wetland Complex – alternative buffer widths were considered to position the corridor adjacent to this ESA, a 30 m buffer between the wetland to the north and the new road was provided in consultation with the Hamilton Conservation Authority
- potential for impact to the Waterdown North development area
- Centre Road Woodlot/ Provincially Significant Wetland (PSW) Crossing Issue Area – There were several issues in the vicinity of the Centre Road area that were addressed including:
 - minimizing effects to Borer's Creek on the north side of the road alignment, west of Centre Road
 - minimize impacts to the Centre Road Woodlot/PSW's drainage outlet and the Borer's Creek tributary in the vicinity of Centre Road
 - intersection design and separation distance from Northlawn Avenue intersection (overlapping left turn lanes)
 - minimizing impacts to the Centre Road Woodlot/PSW itself
 - potential for impacts on the residents on the north side of Northlawn Avenue.
- Joe Sams Park Trail Crossing Issue Area – assessment of a grade separated crossing of this existing multi-use trail was required that involved considerations of road profile and path location.

Hydro Transmission Line Crossing Alternatives

Two alternative alignments in the vicinity of the hydro transmission line (north of Parkside Dive) were identified. The issues that were considered included:

- minimizing impacts to the Connon Nursery property
- encroachment onto the property of the retirement home (Alexander Place)
- agricultural impacts
- potential effects on the hydro transmission line.



Hydro Transmission Tower and Open Field

Parkside Drive

Within this analysis section the following issues were addressed:

- Grindstone Creek Crossing Issue Area – The type of creek crossing and required mitigation measures needed to be determined
- Parkside Drive Residential Effects Issue Area – Minimizing the impacts to the residential areas on both sides of Parkside Drive east of Grindstone Creek
- Type of intersections to provide at either end of this section (conventional versus roundabout).

Option 4 vs. 5 Alignment Review

The decision in Phase 2 to select Option 4 (that included the widening of Parkside Drive east of Grindstone Creek) over the Option 5 (a more northern route) alignment was reviewed as part of the Phase 3 Class EA work. Included in this review was a more detailed costing of the two options. As well a detailed examination of property/business disruption effects was undertaken. This involved additional routing assessments and more detailed evaluation of the alternatives.

Upcountry Development Area

The precise roadway alignment adjacent to the Upcountry Development lands (east side) required assessment in this section to minimize impacts to the future development lands and private properties to the east, as well as resolving the potential for floodplain impacts where the route parallels a tributary of the Grindstone Creek.

Dundas Street Widening (West of Kerns Road)

Dundas Street Residential Effects Issue Area – To minimize effects to residences/businesses on the north side of Dundas Street, opportunities for widening the road to the south were examined.

Bruce Trail/Dundas Street Crossing Alternatives

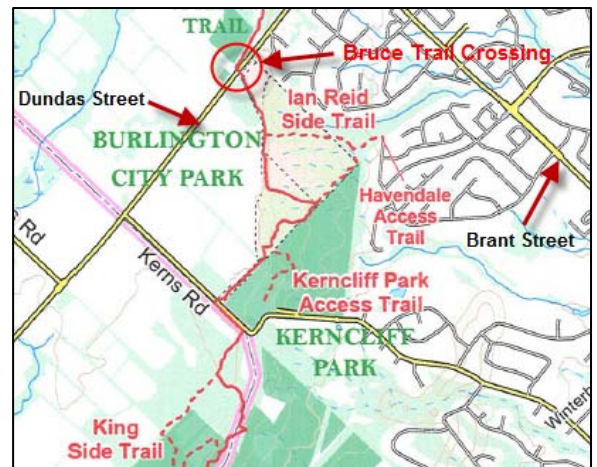
East of Kerns Road at approximately the brow of the escarpment is an existing Bruce Trail crossing of Dundas Street. This is currently utilized by between 500-1000 trail users per year and involves negotiating a four lane roadway with a central left turning lane. In the future with an additional lane in each direction, crossing at this location will involve negotiating six lane road plus a central left turning lane. Alternative treatments for this wider crossing were identified and evaluated.

Dundas Street Escarpment Cut Area

Road widening location alternatives were examined at the east end of Dundas Street near Brant Street. Issues that were considered included the need to widen the rock cut area through the escarpment, natural habitat on the north side of Dundas Street and the potential for impacts to residences on the south side of Dundas Street.



**Parkside Drive East of Grindstone Creek
Looking East**



Bruce Trail Crossing of Dundas



Dundas Street Escarpment Cut Area

Preferred Design Concept

The preferred design concept is described in detail in Chapter 6. Detailed plans and profiles along all road sections are provided at the back of the report. The following features are of note:

- At Highway 6 the new road will be located north of Concession 4 Road and the existing Concession 4 Road/Highway 6 intersection will be closed. The recommendation to close this intersection is based on the MTO requirement that the number of existing intersections along Highway 6 in this area cannot be increased due to public safety concerns and the impacts that an additional intersection would have on traffic operations on Highway 6. Locating the New East-West Road at the existing Concession 4 Road location was too close to Parkside Drive.
- East from Highway 6 the road will be 2 lanes with a rural cross section. Through the Waterdown North development lands easterly to Centre Road the road will be 3-lanes (addition of a centre left turn lane throughout) with curb and gutter. A multi-use pathway will be located along the south side of the corridor.
- For the urban section of road through the Waterdown North development easterly to Dundas Street it is recommended that a reduced design speed of 60 km/h (posted 50 km/h) be adopted to reduce impacts through the adjacent existing and future residential lands.
- Roundabouts are recommended at the western entry to the Waterdown North development and on both sides of the Parkside Drive section of the route.
- The crossing of the Centre Road Woodlot/PSW has been kept as far south as possible, consistent with minimizing impacts to this environmentally sensitive area. A series of pipe arch culverts will be provided to minimize disturbance to the wetland. Large culverts/structures will be provided at the crossings of Borer's Creek, Grindstone Creek tributaries (2) and at the Grindstone Creek.
- A relocation of the Joe Sam's Park pedestrian path is recommended in order to achieve proper grade conditions to allow for the introduction of a grade separation (path under new road). The path has been shifted to the east. A new multi-use pathway is recommended to connect to the Joe Sam's path from Centre Road along the south side of the new road.
- Dundas Street widening will consist of providing curbs and gutters and a 6 lane cross section with 5 m centre median. All urban road sections will be illuminated.
- A comprehensive landscaping and streetscaping concept has been developed throughout the corridor.



West Parkside Drive Roundabout



Example Multi-Use Path Treatment

Potential Impacts and Mitigation

The proposed New East-West Road Corridor has the potential to result in impacts to the environment, including the natural and social environment. Further, considerable public concern has been raised by some residents regarding the proposed road improvements including:

- Disturbance effects (e.g. noise and air quality)
- Increases in traffic volume (including truck traffic)
- Public Safety concerns
- Removal of natural habitat
- Effects to the character of the area
- Loss of property (along Parkside Drive).

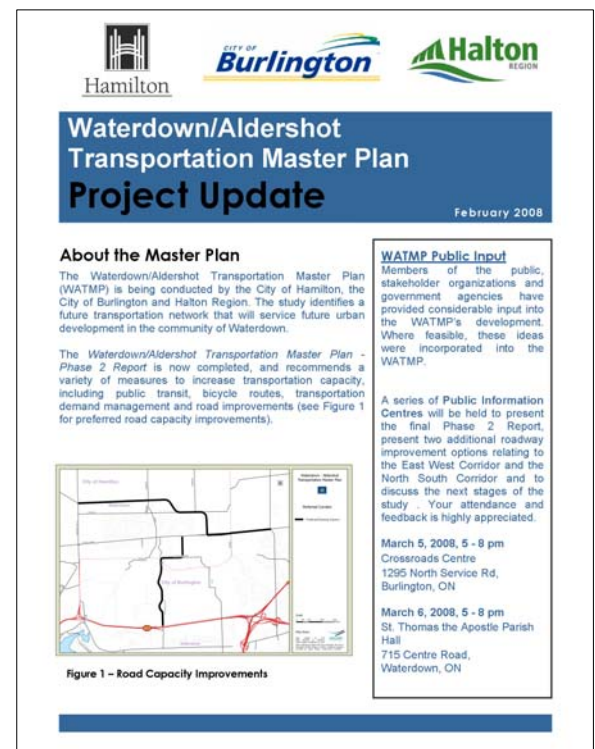
Attempts have been made to address these issues and reduce the potential for effects to the natural and social environment through the design of the road facility and the incorporation of many mitigation measures. Potential impacts and mitigation are described in the text below and in *Table 6-41*.

Public Consultation

Significant public consultation was carried out during Phase 1 and Phase 2. Refer to Section 7 and Appendix A for details of this earlier consultation. The public consultation process carried out during this phase of the project was designed to exceed the formal public notice and consultation requirements of the Class EA process. The consultation process included:

- Pre-consultation stakeholder identification and discussions;
- A final Stakeholder Advisory Committee meeting to wrap up the WATMP (Phase 2) and obtain input on the Class EA Phase 3 and 4 process;
- Release of the Path Forward Report;
- E-mail, print and mail notices to attend three Public Information Centres (PICs);
- Three rounds of Public Information Centres (PICs); (the first one to present the WATMP's conclusions, and the proposed Study Plan and Public Consultation and Communications process; the second one to present the alternatives, and the third one to present the preferred alternative or undertaking);
- Development of a Terms of Reference (ToR), recruitment and formation of the East-West Neighbourhood Advisory Committee (NAC), and holding five meetings (please see attached Terms of Reference and Recruitment procedure in Appendix A);
- A One-Window Communications Portal for stakeholders and the public;
- Project website (www.hamilton.ca/WaterdownTMP)
- Issuing of interim study reports for public review;
- One-on-one meetings with affected property owners;
- Newsletters; and
- Responding to public inquiries throughout the study process.

The WATMP recommendations regarding the New East-West Road Corridor generated significant concern for residents located along Parkside Drive (east of the Grindstone Creek crossing) and along Northlawn Avenue. These concerns are documented in the February 2008 WATMP Report. In the initial phases of the consultation program



Example Project Newsletter

for Phases 3 and 4, there was still debate regarding some sections of the alignment for the New East-West Road (e.g. in the vicinity of Parkside Drive, the routing through the Centre Road Woodlot PSW, Highway 6 connection location). Additional meetings were held with the residents of these areas to address their concerns.

The consultation approach focused communications activities around the initiation of the project, and Phases 3 and 4 of the study. Using this approach, input received could be considered by the Project Team and incorporated into each separate phase of the study. **Table 2** summarizes the East-West NAC meeting topics and **Table 3** summarizes of the East-West NAC’s main points of input by topic with an indication of how these were addressed during Phase 3 and 4 work.

Table 2: NAC Meetings

East-West NAC Meeting	Meeting Topics
Meeting #1 April 22, 2008	<ul style="list-style-type: none"> ▪ NAC Terms of Reference ▪ Phase 3 and 4 Work Plan ▪ Alternative Design Concepts – Assessing Alternatives and Criteria ▪ Consultation with Property Owners
Meeting #2 May 13, 2008	<ul style="list-style-type: none"> ▪ Alternatives Evaluation Methodology ▪ Issue Areas
Meeting #3 June 2, 2008	<ul style="list-style-type: none"> ▪ Evaluation Criteria ▪ Issues / Opportunities for Alternative Alignments
Meeting #4 June 12, 2008	<ul style="list-style-type: none"> ▪ Preliminary Evaluation of Alternatives ▪ Mitigation Options ▪ Update on Option 5
Meeting #5 October 28, 2008	<ul style="list-style-type: none"> ▪ Status of Concept Development Work ▪ Alternative Design Alignments: Preliminary Results of Evaluation ▪ Review of Draft Plans



Review of Proposals with the Public at June 2008 NAC Meeting



Review of Proposals with the Public at October 2008 NAC Meeting

Table 3: Summary of NAC Comments/Suggestions

Topic	Comments / Suggestions	How It Was Addressed/Response
<i>General</i>	<ul style="list-style-type: none"> ▪ The Project Team should consider creating a connection between the North-South route and the new East-West Road. 	<ul style="list-style-type: none"> ▪ The issue of connecting the two new roads was reviewed during Phase 3 and it was confirmed that a direct connection between them is not recommended. ▪ The two new roads serve different traffic and joining them up would not result in an increase in overall level of traffic service for the area. ▪ Creating a connection would involve shifting the Dundas Street intersection point of the new North-South Road approximately 1.0 km to the east where the New East-West Road Corridor is located. This would make it less attractive for many of the future residents in the Waterdown South development who wish to travel south and west to Waterdown Road. They would likely use other, new local roads for this move. For traffic potentially using the New East-West Road Corridor to access Waterdown Road, travelling east to go west (and then south) would result in out of the way travel and they would find quicker routes to do this. There would be relatively few motorists that would find the connection of the two routes beneficial.
<i>Evaluation Criteria Ranking</i>	<ul style="list-style-type: none"> ▪ The social and natural environment criteria are more important than the cost criterion. The approach to the criteria evaluation should follow the Phase 2 approach – that included a numerical evaluation. Phase 3 utilized a “reasoned argument” approach, which is considered by some NAC members as inconsistent with Phase 2. ▪ The criteria categories need to be consistent with Phase 2 criteria categories. 	<ul style="list-style-type: none"> ▪ At the start of Phase 3 an evaluation methodology report was produced and discussed with the NAC. ▪ The use of a numerical evaluation procedure in Phase 2 was appropriate due to the number of alternatives under consideration and the fact that they affected significantly different environments and varied widely in location. In Phase 3, the alternatives are much more focussed to specific corridors within similar impact categories and a qualitative approach that concentrated on the impact differences was more appropriate.
<i>Connection to Highway 6</i>	<ul style="list-style-type: none"> ▪ Residents expressed concern that a connection of the East-West Road with the Concession 4 Road might increase the number of trucks (gravel) using the East-West Road. ▪ The NAC suggested that the best connection point to Highway 6 would be just north of the 4th Concession Road. 	<ul style="list-style-type: none"> ▪ The Project Team identified and evaluated various alternatives that addressed this concern. ▪ The preferred concept does not provide for a through connection at Highway 6. As a result of the comparative evaluation undertaken by the Project Teams, the recommended connection point with Highway 6 is north of Concession 4 Road. The existing Concession 4 Road intersection with Highway 6 is recommended to be closed as MTO will not allow an increase in the number of intersections along Highway 6.
<i>Centre Road Crossing</i>	<ul style="list-style-type: none"> ▪ NAC members, including those living in the Hunter Park Survey indicated strong concerns about the alternative road alignments through the Centre Road Woodlot/PSW (and their proximity to Northlawn Avenue). NAC proposed that the Project Team consider a more northerly crossing of the PSW to avoid potential 	<ul style="list-style-type: none"> ▪ The Project Team subsequently evaluated a more northern alignment but maintained their recommendation that the more southerly option was preferred (Hamilton Conservation Authority agrees that this is the best route through the woodlot).

Topic	Comments / Suggestions	How It Was Addressed/Response
	<p>impacts on residences along Northlawn Avenue. Residents remain concerned about the potential for impacts from noise, light, air quality, vibrations and property values.</p> <ul style="list-style-type: none"> ▪ Concerns that the New East-West Road Corridor will be utilized by quarry trucks if the connection to Highway 6 is at Concession 4 Road. 	<ul style="list-style-type: none"> ▪ The preferred concept does not provide for a through connection at Highway 6
<p><i>Option 4 versus Option 5 (“Sawtooth” Option)</i></p>	<ul style="list-style-type: none"> ▪ Strong support for Option 5 over Option 4 by the residents of Parkside Drive. The Project Team ranked Option 5 (Opta) lower than Option 4 (widening of Parkside Drive). The NAC recommended the evaluation of a further Option 5 (Sawtooth). Some NAC members preferred this option to the recommended Option 4, due to lower social impacts along Parkside Drive Upon review, the Project Team subsequently ranked Option 5 (Sawtooth) lower than Option 4. 	<ul style="list-style-type: none"> ▪ The “Sawtooth” option was evaluated and found to have overall greater impacts than Option 4.
<p><i>Parkside Drive</i></p>	<ul style="list-style-type: none"> ▪ Request to investigate a three-lane Parkside Drive rather than a four-lane. The Project Team’s traffic projections indicate the need for four lanes along Parkside Drive. ▪ Support for a 50 km/h speed limit on Parkside Drive. ▪ Parkside Drive should stay open at Highway 6. ▪ Request to ensure that sidewalks are continuous along Parkside Drive. ▪ Request to consider a bridge over Grindstone Creek to reduce safety hazards. ▪ Suggestion that the East-West Road be placed as far north as possible from Parkside Drive (Option 5). ▪ Some NAC members recommended that no sidewalks be placed on the south side of Parkside Drive. ▪ There are remaining concerns about lighting, noise mitigation, and air quality impacts to residents backing on to Parkside Drive- in particular for two homes on Fellowes Crescent. 	<ul style="list-style-type: none"> ▪ Four lanes will be required to accommodate the increase in traffic from new developments. ▪ There is no recommendation to close Parkside Drive at Highway 6. ▪ This has been provided in the recommended concept. ▪ A new bridge will be provided over Grindstone Creek ▪ Option 5 was assessed in detail and found to have overall greater impacts ▪ Having no sidewalk on the south side of Parkside Drive was assessed in Phase 3 but providing sidewalks on both sides of the road was considered a requirement along this section of road ▪ Acknowledged. Lighting concerns will be addressed in the detailed design phase. Noise and air quality impacts were assessed and no mitigation was required.
<p><i>Natural Environment</i></p>	<ul style="list-style-type: none"> ▪ Concerns about impacts on a low ground watercourse located in the field north of the New East West Road adjacent to Highway 6. ▪ Concerns about wildlife crossings. ▪ Suggestion for pedestrian-friendly crossing at Joe Sams Park Trail. 	<ul style="list-style-type: none"> ▪ Acknowledged. Impacts will be assessed in detail during the detailed design phase. ▪ Acknowledged. This will be assessed further during the detailed design phase.

Topic	Comments / Suggestions	How It Was Addressed/Response
	<ul style="list-style-type: none"> ▪ Concerns that the natural environment criterion is of greater importance than the protection of residences from road impacts (such as noise, air quality, vibration, etc.). 	<ul style="list-style-type: none"> ▪ The evaluations considered the level of impacts and the ability to mitigate them when comparing the differences in impacts between social and natural environmental criteria, not just which criteria is more important.
<i>Social Concerns</i>	<ul style="list-style-type: none"> ▪ Safety concerns about fast moving traffic. ▪ Concerns about noise, air pollution and light pollution. ▪ Concerns about expropriation of residential properties. ▪ Concerns about negative effects on real estate values. 	<ul style="list-style-type: none"> ▪ Acknowledged. ▪ These and other potential social impacts were addressed during the study and it is recognized that they remain a concern to many area residents.

Three Public Information Centres were held during the study (March, June and November 2008). In addition to these three focused periods of consultation and communications activity, there were ongoing opportunities throughout the process for members of the public and stakeholders to receive information about the project (via the project website and other communications materials), and also to provide feedback to the project partners (e.g. through phone, fax, email, mail, and the project website).

Individual meetings with directly affected property owners were held throughout the project on an as required basis to discuss specific concerns and mitigation measures to address impacts. Table 5 contains a summary of the main points of input received at the PICs and throughout the public consultation process for Phases 3 and 4.



Public Discussion at November 2008 PIC

The following discusses some of the key issues that were raised by the public during the course of the EA Study:

Highway 6 and East-West Road Connection

At the outset of Phase 3, NAC members questioned the Project Team’s assumption that Parkside Drive would be closed in the future. This assumption is based on the Ministry of Transportation’s (MTOs) long term program to convert Highway 6 to a restricted access highway. MTO has completed the first phase of this work at the Highway 403/Highway 6 intersection north to Highway 5 (Dundas Street). Based on correspondence received from MTO by the Project Partners, it was established that while MTO have no current plans to close the Parkside Drive intersection, if they were to continue their program to convert Highway 6 to a full access control highway north from Dundas Street, Parkside Drive could not be developed as an interchange as there is not adequate separation distance between Dundas Street and Parkside Drive. It is possible that an “overpass” could be developed at the Parkside Drive intersection location.

The Project Team presented a number of options for the connection of the westerly portion of the New East-West Road Corridor to Highway 6. Many NAC members believed that the connection to Highway 6 should

be north of the Concession 4 Road intersection. The main concern from NAC members was regarding the possibility that quarry trucks will use the New East-West Road Corridor. The City of Hamilton investigated this concern, and noted that there will be a requirement to change the quarry licence (which directs quarry truck traffic to utilize certain routes) if other routes are to be used by quarry trucks. However, members of the community have requested that commitments be made that quarry trucks will not be permitted to utilize the route.

The Project Team concurred with the NAC position of locating the new road connection north of the Concession 4 Road intersection. In reviewing the proposed intersection location the MTO advised the Project Team that no new intersections could be created along Highway 6 thus requiring a re-examination of the Highway 6 connection options. A meeting was held with the residents in the area in June 2009 to review the connection location alternatives. These included options that connected with the Concession 4 Road as well as options to the north that would require the closure of the Concession 4 Road at Highway 6. A recommendation was made by the Project Team (through a comparative evaluation process) for a connection point north of Concession 4 Road and the closure of the Concession 4 Road at Highway 6. MTO concurred with the recommendation.

Centre Road Woodlot/PSW Crossing

Prior to the conclusion of the Phase 2 Transportation Master Plan, residents of the Hunter Park Survey residential subdivision (that includes Northlawn Avenue) actively participated in the process to identify alternative routes for the New East-West Road Corridor that would avoid the environmentally sensitive areas at the proposed Centre Road crossing, as well as the potential social impacts to the residents of Northlawn Avenue.

During Phase 3, members of the NAC and members of the public provided considerable input regarding the alignment of the new road through the Centre Road Woodlot/PSW. The Northlawn Avenue residents voiced concern with the proposed alignment being too close to their homes. The specific concerns expressed by these residents included: air quality, noise, street lighting effects, property values, water quality impacts, ecological impacts, concerns regarding the suitability of the soils in the woodlot and vibrations both during and post construction. The public provided advice relating to the importance of the social impact criteria and requested that the Project Team evaluate a more northerly alignment through the woodlot (which was undertaken). The residents also suggested that a route going south of the Hunter Park Survey (i.e. route the New East-West Road Corridor southerly on Centre Road to connect to Parkside Drive, thus avoiding potential impacts to residents on Northlawn Avenue). This option was examined during Phase 2 of the TMP study and was rejected due to significant social impacts along the affected section of Parkside Drive.

The Project Team selected an alignment that is approximately 100 m north of the Northlawn Avenue residences. This route was accepted by

Hamilton Conservation Authority as being least impactful to the woodlot/PSW. Residents along this route have stated that they wish to negotiate mitigation measures with the City of Hamilton.

Parkside Drive Routing (Options 4, Option5 (Opta), and Option 5 (Sawtooth))

Prior to the conclusions of the Phase 2 Transportation Master Plan, residents of Parkside Drive recommended alternative alignments and connections to Parkside Drive. Through meetings with the City of Hamilton and the Project Team, the Parkside Drive Residents Association recommended that the Project Team review an alternative Option 5 (which would be located within an identified area of land north of Parkside Drive).

The Project Team identified an alternative alignment through the Opta Minerals property and presented the results of this work at NAC Meeting #2. Option 5 (Opta) ranked lower than the Project Team's recommended Option 4 (widening of Parkside Drive) largely due to the impacts to Opta Minerals and the cost to acquire the property (see **Section 5.7**). NAC members requested that the Project Team review a refined Option 5 (identified as the "Sawtooth" option), that would wrap around the north of the Opta Minerals property yet avoid the ESA lands to the north of it.

At NAC Meeting #3, the Project Team advised that Option 5 ("Sawtooth") ranked lower than the preferred Option 4 (See **Section 5-7**). This conclusion was not supported by some NAC members and the residents of Parkside Drive continue to support the "Sawtooth" alignment. Local residents have advised that they wish to discuss mitigation and road design details for Option 4.

The following summarizes how the input received was considered and influenced the decision process and recommended road improvement design:

- ***Highway 6 Connection/Quarry Truck Traffic*** – the public expressed considerable concern regarding the potential for use of the New East-West Road Corridor by heavy trucks, particularly quarry trucks. Residents expressed concern that if the New East-West Road connects with the Concession 4 Road, that this would increase the potential for the new road to be used by quarry trucks. The potential for this has been greatly reduced by locating the New East-West Road/Highway 6 intersection north of the Concession 4 Road and the closing the existing Concession 4 Road/ Highway 6 intersection (as MTO will not permit any net increases in the number of intersections).
- ***Impacts to Hunter Park Survey/Northlawn Avenue Residents*** – as noted previously, considerable effort was made to examine possible alternatives through the Centre Road Woodlot/PSW to address Northlawn Avenue resident concerns regarding the proximity of the new road to their homes. The road has been located to balance the concerns of the residents and to minimize

effects to the PSW. The road is to be located about 100 m from the residences. No significant effects are expected to the Northlawn Ave residents. There is the potential for noise increases for the most eastern located residences (this increased noise levels would still be within Ministry of the Environment (MOE) limits). As described in Section 6.4.2, the City of Hamilton will monitor actual noise levels and implement mitigation measures if required.

- ***Effects on the Waterdown North Wetland Trail*** – The new East-West Road was aligned in consultation with the City of Hamilton Public Works Department to minimize effects on the future Joe Sam’s park expansion. Further, the City has committed to the implementation of an underpass to allow safe crossing of the new road for users of the Waterdown North Wetland Trail.
- ***Impacts on Alexander Place nursing home*** – Concern was expressed regarding the potential for effects to this facility. In response, the noise and air quality assessment identified receptor points at this facility and modeled future noise and air emissions at these locations. The results of this work indicated that the facility will not be significantly affected. (see Section 6.4.2)
- ***Option 4 vs. Option 5 Routing*** – Significant effort was spent by the project team in the review and assessment of alternative alignments to the widening of Parkside Drive (Option 4). See the summary above as well as Section 5-7.
- ***Social impacts along the section of Parkside Drive to be widened*** - It was the opinion of the Project Team that most of the social concerns raised by the residents regarding the widening of Parkside Drive could be addressed through mitigation and road design elements. Key features of the proposed widened roadway that are recommended to respond to residents’ concerns include:
 - Roundabouts at each end of the community that will serve as traffic calming measures and provide an opportunity for the introduction of gateway features;
 - Narrowed lanes & reduced boulevard widths;
 - On-road bicycle allowance;
 - Reduced road speeds (posted at 50 km/h – down from current 60 km/h);
 - Reduced property widths (26 m instead of the City standard 30 m);
 - Sidewalks on both sides of the roadway (currently they are on one side only);
 - Extensive streetscaping/ plantings;
 - Street and pedestrian lighting; and
 - Fence replacement and landscaping along the backlots of Fellowes Crescent properties.

Commitment to Future Work

Table 4, Commitments to Future Work details City of Hamilton and Halton Region’s commitments to further studies/work as this project advances toward and into the detailed design stage. Commitments for mitigation measures to address potential impacts are discussed in Section 6 of this report.

Table 4: Commitments to Future Work

Item	Future Work	Comments
1. Borer’s Creek Structure	Finalize configuration (hydraulic requirements)	<ul style="list-style-type: none"> • In discussion with Hamilton Conservation Authority • To include consideration of downstream Black’s Pond treatment options (off-lining)
2. Hydro Towers	Confirm hydro line crossing treatment	Follow-up discussions with Hydro One required.
3. Boulding Avenue Intersection Traffic Monitoring	Location: <ul style="list-style-type: none"> • Parkside Drive/Boulding Avenue intersection 	Initiate a traffic monitoring program at the Parkside Drive/Boulding Avenue intersection to assess through traffic issues (speed, ease of egress) and the potential need for a traffic signal
4. Bruce Trail Crossing	Location: <ul style="list-style-type: none"> • Kerns Road at Dundas Street 	The existing Bruce Trail crossing on Dundas Street located east of Kerns Road was recommended to be re-established at the Dundas/Kerns intersection. The final treatment to be resolved in discussion with the Bruce Trail Conservancy.
5. Edge Management Plans	Locations: <ul style="list-style-type: none"> • Borer’s Creek • Centre Road Woodlot • Woodlot/Wetland northeast of the Upcountry development • Nelson Escarpment Woods 	To be completed in discussions with Conservation Halton and the Hamilton Conservation Authority.
6. Vegetation Compensation Plans	Locations where the tree removals exist: <ul style="list-style-type: none"> • Borer’s Creek • Centre Road Woodlot • Woodlot/Wetland northeast of the Upcountry development • Nelson Escarpment Woods 	3:1 replacement ratio to be located on public lands (locations to be confirmed in discussions with Conservation Halton and Hamilton Conservation Authority).
7. Wildlife Crossings	Locations: <ul style="list-style-type: none"> • Potential new culvert located east of Joe Sam’s Park • Associated with recommended new structures (Borer’s Creek, Centre Road Woodlot culverts, Grindstone Creek, Grindstone Creek tributary at Dundas Street) 	Viability and treatment/configuration options to be assessed
8. Natural Hazard Mapping	Locations: <ul style="list-style-type: none"> • Borer’s Creek, Centre Road Woodlot, Grindstone Creek, Grindstone Creek tributary at Upcountry and at Dundas Street) 	Detailed natural hazard mapping to be completed at these locations. Assessment to include consideration of karst, floodplain, stable top of bank, meander belt as appropriate.
9. Noise Monitoring Study	Locations: <ul style="list-style-type: none"> • Northlawn Avenue • Parkside Drive • 1107 (Dundas Street (east of Kerns Road) 	Complete a noise monitoring program as these locations including establishing existing baseline noise conditions and post-construction conditions.
10. Light Pollution Study	Locations: <ul style="list-style-type: none"> • Nelson Escarpment Woods • Center Road Woodlot • Borer’s Creek crossing 	Requested by Conservation Halton

Item	Future Work	Comments
11. Species at Risk Assessment (SAR)	Follow-up work will be required related to additional field sampling/observation for species at risk	<ul style="list-style-type: none"> • The development of mitigation measures for marsh, field and woodland bird species will be dependent on additional breeding bird surveys if construction is to take place between May 15 and August 1. • An additional woodland vole survey will be required to maximize opportunities for observation • A work plan should be submitted outlining the proposed timing and methodology for the above work.
12. Stage 2 Archaeological Studies	Required throughout the corridor	Recommended in the Stage 1 study
13. Geotechnical	Required throughout the corridor	Geotechnical work was not completed during the Class EA due to property access issues.
14. Engineering Survey	Required throughout the corridor (with the exception of Dundas Street in Halton Region)	Geotechnical work was not completed during the Class EA due to property access issues.
15. Upcountry Section	Through additional floodplain assessment and data collection, confirm the alignment of the roadway adjacent to the Upcountry section of the corridor.	Additional field work is required to characterize the woodlot/potential wetland to the northeast of the Upcountry development (south of Parkside Drive). Additional floodplain modelling/assessment will be required to confirm the establishment of an east side Regional storm containment area through this location.

1. INTRODUCTION

Dillon Consulting Limited (Dillon) was retained by the City of Hamilton, City of Burlington and The Regional Municipality of Halton to undertake the requirements of Phases 3 and 4 of a Schedule C Municipal Class Environmental Assessment (EA) for the New East-West Road Corridor. The project was carried out by the City of Hamilton as part of an overall management and steering group (Project Partners) comprising representatives from the City of Hamilton, City of Burlington, and Halton Region. The group met regularly throughout the course of the project to review and direct the work of the project.

This section of the Environmental Study Report (ESR) introduces the project and its purpose, indicates the limits of the study and the study area, outlines the environmental study processes that were followed and the organization of the Project Team that carried out the work. This is provided as a background for the more detailed presentation of the transportation problem addressed in Chapter 2, alternative solutions to addressing the problem in Chapter 3, the existing conditions in Chapter 4, alternative design concepts in Chapter 5, details of the preferred design concept in Chapter 6, and the public and agency consultation in Chapter 7.

1.1 Background

In 1992, the Council for the former Town of Flamborough approved a “Preferred Growth Strategy” to allow for the expansion of the urban area around Waterdown. The Preferred Growth Strategy recommended that Waterdown North and Upcountry Lands be placed within the urban boundary appeals (refer to *Figure 1-1, OPA 28 Lands*). Although initially adopted by Town of Flamborough Council in May 1992, a revised version of OPA 28 and related Memorandum of Agreement was ultimately approved by Cabinet in June 2002 by Order in Council 1262/200, in response to a series of. The approval of OPA 28 and the related agreement required the completion of:

- A Class Environmental Assessment for the Dundas Waste Water Treatment Plant expansion/diversion
- A Master EA Transportation Study
- A Waterdown South Subwatershed Study
- Secondary plans where Council deems necessary.

In September 1999, the former Town of Flamborough, the City of Burlington, the Regional Municipality of Halton and the former Region of Hamilton-Wentworth received the *Aldershot/Waterdown Master EA Transportation Network Master Plan Report* undertaken by Stantec Consulting Limited. The purpose of that study was to identify a future transportation network required to accommodate urban development in the communities of Waterdown and Aldershot. However, the report did not receive Council approval.

Exhibits 1-1 and *1-2* illustrate two constraint areas that were addressed during the project.

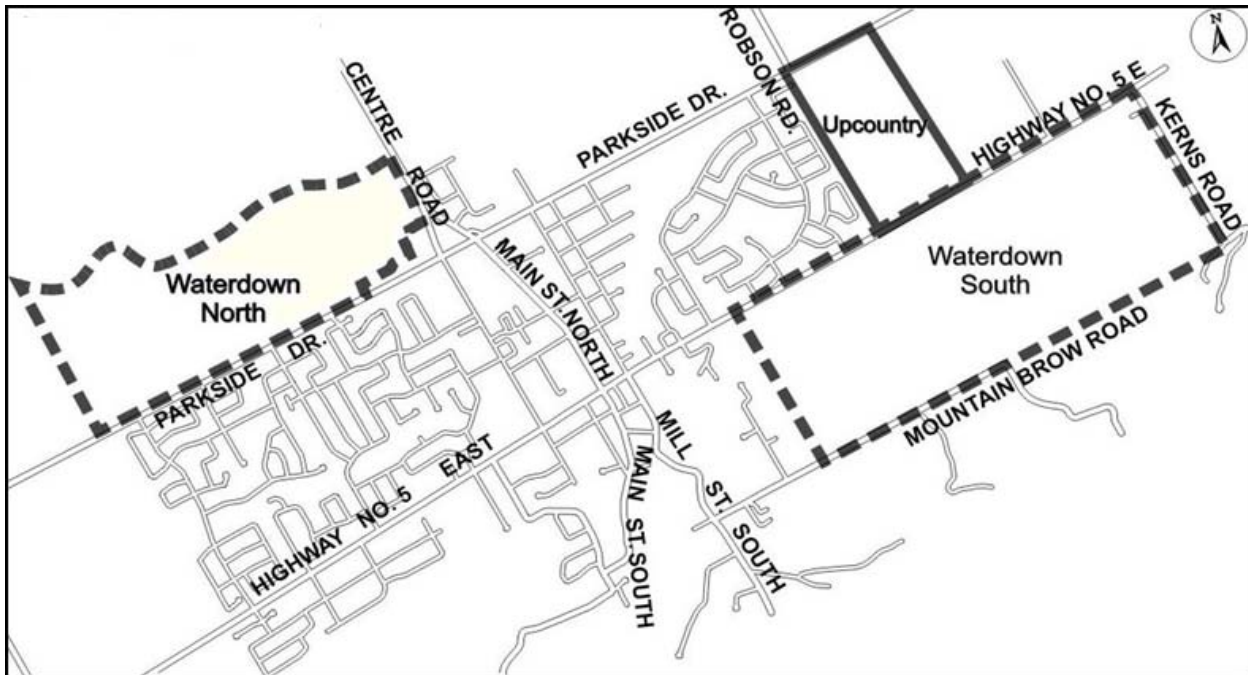


Exhibit 1-1: Parkside Drive Looking West toward Grindstone Creek Crossing



Exhibit 1-2: Centre Road Woodlot/PSW

Figure 1:1: OPA 28 Lands



A Phase 1 Final Report of the *Waterdown/Aldershot Master EA Transportation Network Study* was completed on July 30th, 2004 by SNC-Lavalin. The purpose of Phase 1 was to review all the land use and transportation network changes, either proposed or constructed, which may affect the study area conclusions and recommendations of the previous 1999 Stantec *Transportation Master Plan Study*. The report confirmed the need for additional east-west and north-south capacity in the Waterdown/Aldershot area due to OPA 28. The report also recommended that the next phase consider all options to provide additional capacity in the Waterdown and Aldershot areas.

Phase 2 of the Waterdown/Aldershot Transportation Master Plan (WATMP) (*Exhibit 1-3*) was subsequently completed in February of 2008. This study examined alternative ways to solve the identified problems as outlined in the Phase 1 study, giving recognition to environmental, social, economic, cost, and transportation service considerations. The purpose of the WATMP was to confirm the results of the Phase 1 work and to complete Phase 2 of the Municipal Class EA planning and design process. The study built on the previous Phase 1 work (from July 2004), completed a Phase 1 update and undertook Phase 2 work which resulted in recommendations to resolve the identified road capacity deficiencies. The Phase 2 Report (refer to *Exhibit 1-3*) provided a set of recommendations and a variety of measures to increase transportation capacity, including public transit, bicycle routes, transportation demand management and road improvements. The WATMP identified a series of next steps for the implementation of its recommendations including undertaking Phase 3 (Alternative Design Concepts), Phase 4 (EA Documentation), and Phase 5 (Detailed Design and Implementation) of the Municipal Class EA

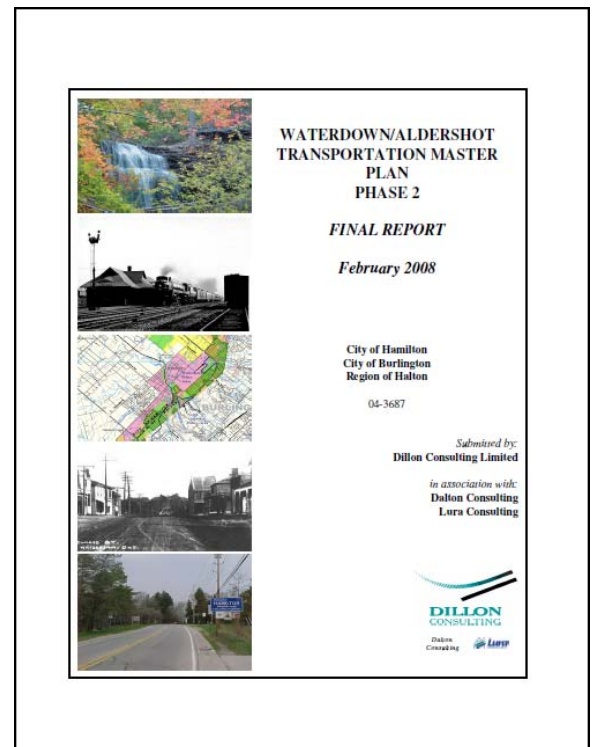


Exhibit 1-3: WATMP Phase 2 Report

planning and design process for road improvements in the Waterdown – Aldershot area.

1.2 Study Purpose

The purpose of the current work of the study was to complete Phases 3 and 4 of the Municipal Class EA process for the required lane additions and to provide an overall Environmental Study Report (ESR) for the project covering Phases 1 through 4. Phases 1 and 2 were carried out in previous studies identifying the overall problem and evaluating alternative solutions for addressing the problem. Phases 3 and 4 of the Municipal Class EA (Schedule C) required the examination of alternative methods of implementing the preferred solution identified in Phase 2 as well as detailing the requirements, impacts and mitigation measures associated with the preferred solution.

1.3 Study Area

The Study Area for Phase 2 work is illustrated in *Exhibit 1-4, WATMP Phase 2 Study Area*. It extended from west of Highway 6 to east of Brant Street and from Concession 5 in the north to south of Highway 403. The WATMP identified that in the east-west direction, one additional lane in each direction would be required to address the capacity deficiency. *Figure 1-2* illustrates the road components that comprise the New East-West Road Corridor. The New East West Road Corridor included the following sections:

- a new road corridor connecting to Highway 6 in the vicinity of Concession 4 Road and running easterly through the Waterdown North development lands and the Centre Road Woodlot/PSW and connecting to existing Parkside Drive west of the Grindstone Creek crossing
- utilizing a section of existing Parkside Drive to east of the Robson Road intersection (*Exhibit 1-5*)
- a north-south connection to Dundas Street running along the east side of the Upcountry development lands, and
- extending easterly along Dundas Street to the Brant Street intersection.

The Study Area for Phase 3 work was centred on the above sections. Alternatives were assessed within each of these that involved data gathering and generating alignment options within, in some of the sections, a relatively wide study corridor. The study area also extended east of Brant Street and west of Highway 6 to assess connections to the existing road network.

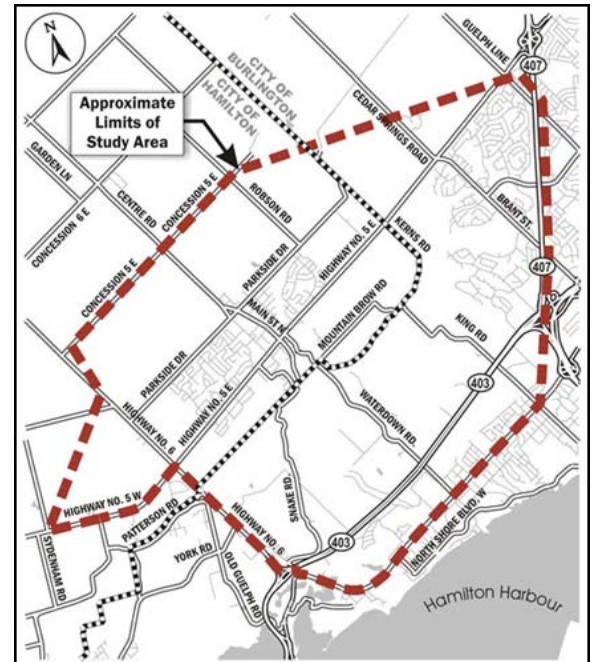


Exhibit 1-4: WATMP Phase 2 Study Area



Exhibit 1-5: Parkside Drive East of the Grindstone Creek (Looking East)

1.4 Class EA Study Process

The New East-West Road Corridor Class Environmental Assessment was carried out according to the approved process of the Municipal Engineers Association Municipal Class Environmental Assessment (October 2000, as amended in 2007). This is an approved planning document which describes the process that municipal proponents can follow in order to meet the requirements of Ontario's *Environmental Assessment Act* (EAA). The Class EA approach allows for the evaluation of the environmental effects of alternatives to a project and alternative methods of carrying out a project. It includes mandatory requirements for public input and expedites the environmental assessment of smaller recurring projects. Class EA's are a method of dealing with projects which display the following important common characteristics: recurring, usually similar in nature, usually limited in scale, having a predictable range of environmental effects; and, responsive to mitigating measures.

Projects are categorized according to their environmental significance and their effects on the surrounding environment. Planning methodologies are described within the Class EA and are different according to Class type: Schedule A projects are projects that involve minor modifications to existing facilities. Environmental effects of these projects are minimal and therefore the projects are considered pre-approved. Schedule A+ Projects are projects that also generally involve minor modifications to existing facilities and are considered to be pre-approved but a municipality is required to notify the public prior to project implementation. Schedule B Projects are projects that involve minor expansion to existing facilities. As there is some potential for adverse environmental effects, these projects are required to proceed through a screening process including public consultation. Schedule C Projects are projects that involve the construction of new facilities and/or major expansions to existing facilities. These projects must pass through the entire EA planning process outlined in the Municipal Engineers Association Class Environmental Assessment.

The New East-West Road Corridor project is considered to be a Schedule C project. Schedule C projects are projects that involve the construction of new facilities and/or major expansions to existing facilities. Such projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Class EA document. Schedule C projects require that an Environmental Study Report (ESR) be prepared and filed for a minimum 30-day review by the public. If concerns are raised that cannot be resolved, a Part II Order may be invoked. This is an appeal provision whereby a person or party with an outstanding concern may request the Minister of the Environment to make an order requiring a proponent to comply with Part II of the EAA before proceeding with a proposed undertaking to which the Class EA would otherwise apply.

All Part II Order ("bump-up") requests are reviewed by the Environmental Assessment and Approvals Branch of the Ministry of the Environment (MOE). MOE staff consult with the proponent and any



**Exhibit 1-6: Highway 6 north of Concession 4
Looking south**



**Exhibit 1-7: June 2008 E-W NAC Meeting
Discussion**

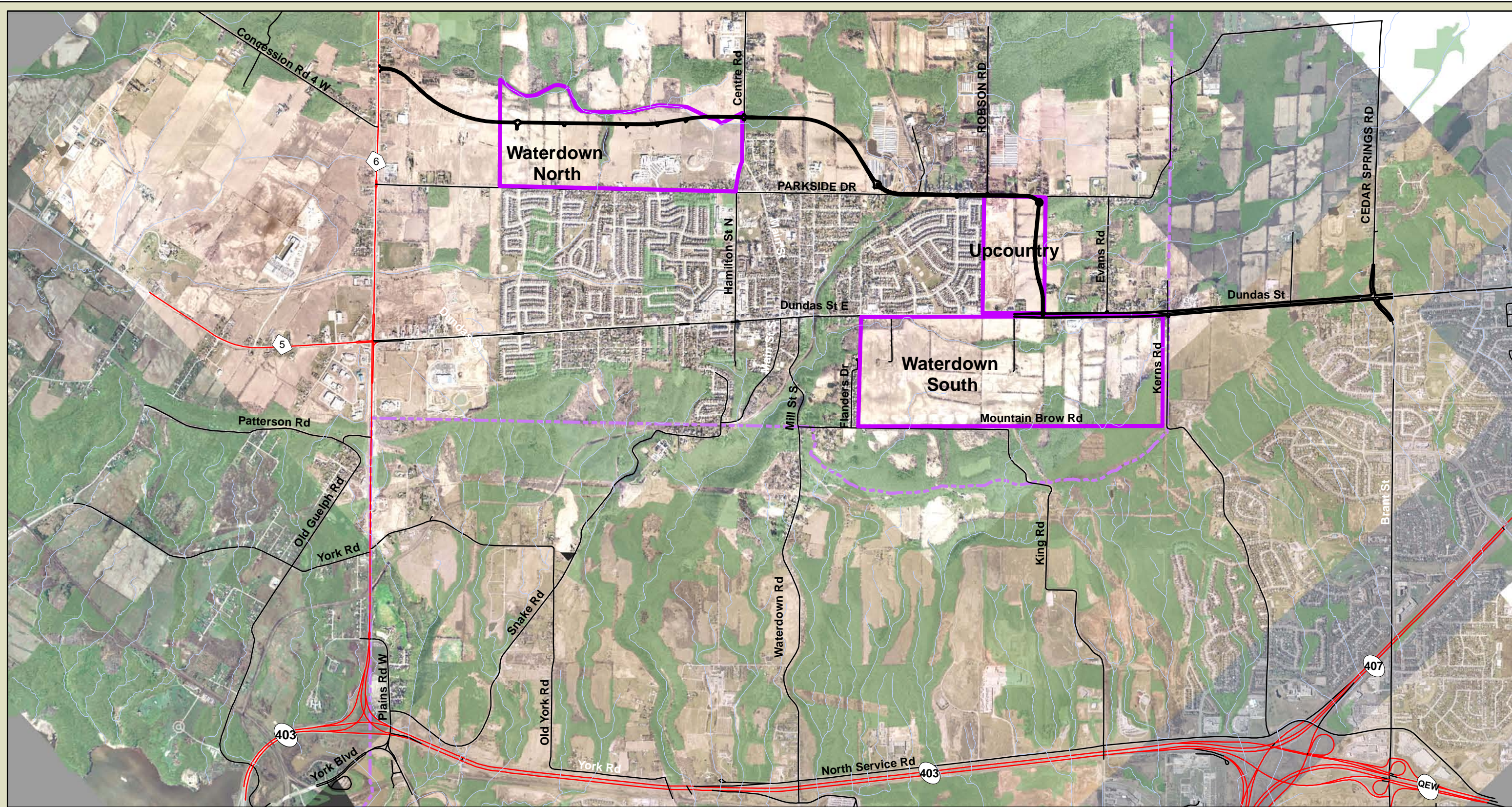


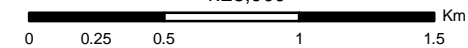
Figure 1.2 New East - West Road Corridor - Key Plan

Legend

- East - West Corridor Alignment
- Municipal Boundary
- Urban Expansion Area
- Forested Areas
- Watercourse



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Map Created By: PJK/SFG
 Map Checked By: PM
 Date Created: April 5, 2006
 Date Modified: January 27, 2012
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 East - West Corridor - Preferred Option.mxd

other agency or group potentially affected by the Minister's decision. Information is summarized by staff and a recommendation is made to the Minister who is ultimately responsible for a decision. Evaluation criteria for bump-up requests include the purpose of the EAA, factors suggesting that the proposed undertaking differs from other undertakings in the class to which the Class EA applies, the significance of these factors and differences, the nature of concerns raised by the requester(s), and the benefits of carrying out an individual EA. MOE staff also evaluate the applicability and effectiveness of other legislation and decision-making processes to address the concerns of the requester(s). Timelines for the MOE to review and come to a decision on a request typically range from 30 to 66 days, depending on the Class EA document. MOE has four options for a decision on a Part II Order ("bump-up") request:

- deny the request
- deny the request with conditions
- refer to mediation
- grant the request and require the proponent to undergo an individual EA

The ideology for the Class EA reflects the five key principals of planning as outlined in the EAA. They are:

- consultation with affected parties early in and throughout the process, such that the planning process is a co-operative venture.
- consideration of a reasonable range of alternatives, both the functionally different alternatives to the project (known as alternative solutions) and the alternative methods of implementing the preferred solution.
- identification and consideration of the effects of each alternative on all aspects of the environment.
- systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects.
- provision of clear and complete documentation of the planning process followed, to allow 'traceability' of decision-making with respect to the project.

The Class EA process includes five phases as follows:

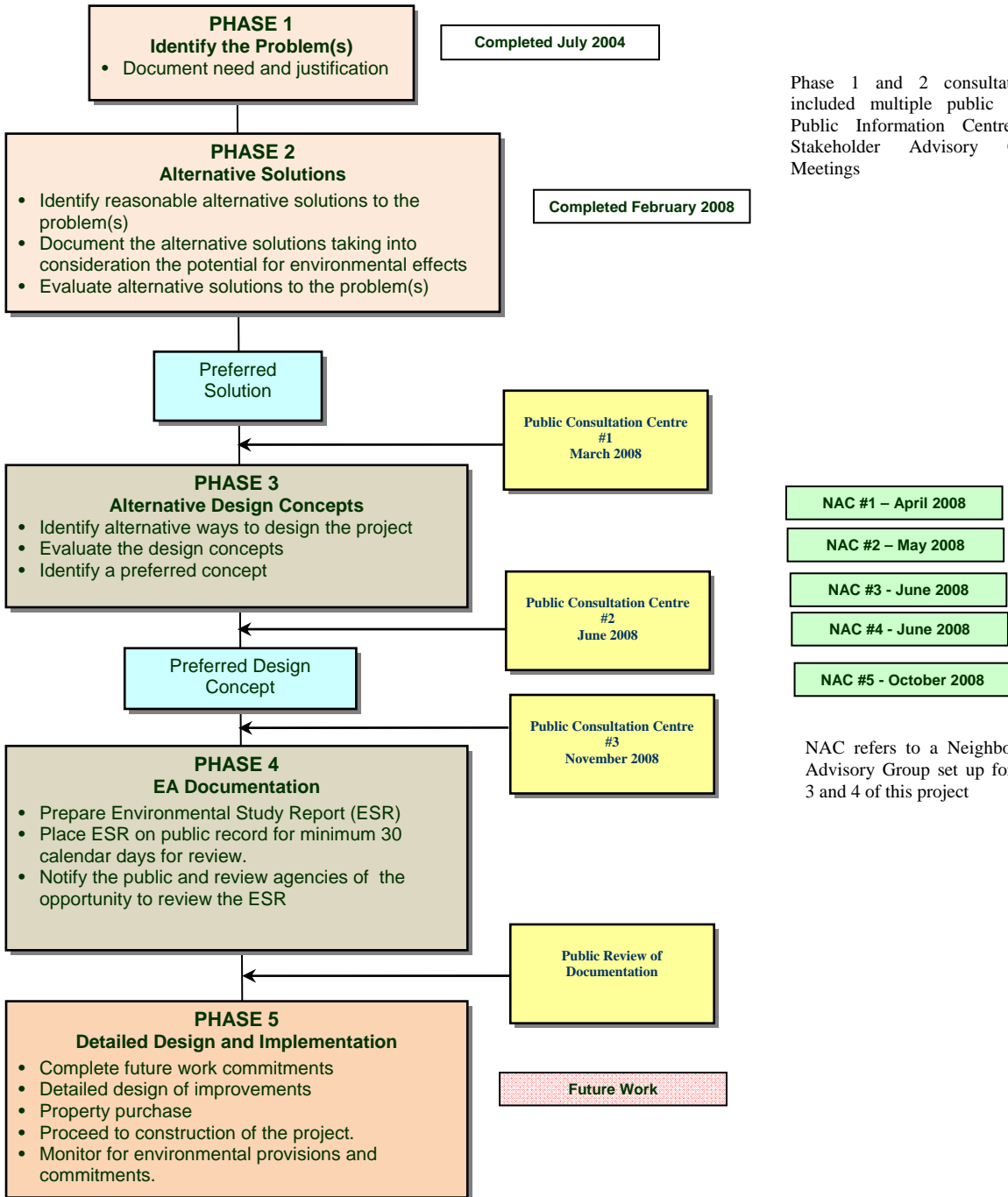
- Phase 1: Problem/Opportunity Identification.
- Phase 2: Alternative Solutions.
- Phase 3: Alternative Design Concepts.
- Phase 4: Environmental Study Report Documentation.
- Phase 5: Detailed Design and Implementation.

Figure 1-3, Municipal Class Environmental Assessment Process (Schedule C) on page 1-7, illustrates the general process followed on the New East-West Road Corridor project with the general timing for the main points of public involvement/phase completion.



**Exhibit 1-8: Dundas Street Looking East
Down the Escarpment**

Figure 1-3: Municipal Class Environmental Assessment Process (Schedule C)



Phase 1 and 2 consultation work included multiple public notices, 5 Public Information Centres and 5 Stakeholder Advisory Committee Meetings

NAC refers to a Neighbourhood Advisory Group set up for Phase 3 and 4 of this project

1.5 Class EA Relationship to the WATMP

Transportation Master Plans (TMPs) deal with area wide system and network requirements leading to the development of a series of overall transportation goals and objectives and the identification of preferred projects and initiatives that will be necessary to achieve them. A Class Environmental Assessment deals with a specific project identified in the TMP.

The Waterdown/Aldershot Transportation Master Plan (WATMP) followed the “Master Planning Process” as set out in Ontario legislation for Municipal Class Environmental Assessments. This process integrated the planning of municipal infrastructure requirements for existing and future land use, with the principles of environmental assessment planning. The WATMP was prepared to meet the requirements of the *EAA* and is to be used to support subsequent environmental assessments for specific infrastructure improvements.

The *Waterdown/Aldershot Master EA Transportation Network Study Phase 1 Report (July 2004)* and *WATMP Phase 2 Final Report (February 2008)* are part of the documentation of this Class EA and as such, are subject to the same review requirements. These reports are included as part of the Appendix materials (see *Appendices N* and *O*).

1.6 Project Organization

The project was carried out under the direction of a Project Partnering Group (Project Partners) comprising staff from the following participating municipalities:

- City of Hamilton
- City of Burlington
- Halton Region

The Project Partners provided general direction to a Project Team and supplied technical and environmental review and input to them throughout the study. A diverse Project Team undertook the environmental, technical and consultation work of the project. Team members were responsible for the following work:

- Dillon Consulting
 - Overall project management
 - Transportation planning and design
 - Drainage, stormwater management and hydraulic assessments
 - Structural planning
 - Natural environmental disciplines
 - Socio-economic and land use assessments
 - Hydrogeological and well impact assessments
 - Noise and air quality assessments
- Lura Consulting
 - Public consultation and facilitation
- MBTW Group
 - Landscaping and urban design

- Peto MacCallum Limited
 - Pavement and foundations assessments
 - Geo-Environmental site assessments
- Jacques Whitford
 - Archaeological assessments
 - Built heritage assessments

1.7 Report Outline

This Environmental Study Report (ESR) builds on the work of the previous phases of this project. In addition to including the Phase 1 and 2 work reports as appendix materials, the ESR provides a summary of the earlier studies plus details of additional Phase 3 data collection works relating to the existing environmental conditions, details of design alternatives, specifics of the recommended plan, the effects that may result from the undertaking, proposed mitigation and monitoring measures, and the net effects of the project. Consultation with a wide range of community stakeholders and agencies was an integral part of this EA process. The activities and results of the stakeholder consultation program are summarized in a separate section (Chapter 7), and Appendices A and P of this ESR.

The ESR has been divided into the following chapters:

1. Introduction
2. Identification of the Problem or Opportunity (Phase 1)
3. Alternative Solutions (Phase 2)
4. Existing Conditions
5. Alternative Design Concepts for Preferred Solution
6. Preferred Design Concept
7. Public Consultation and Communications

Additional reference materials generated during this study can be found in the Appendix. The following materials are provided:

- A. Public Consultation Information
- B. External Agency Consultation and Correspondence
- C. Drainage and Stormwater Management
- D. Air Pollution/Impacts
- E. Noise Pollution/Impacts
- F. Geotechnical
- G. Environmental Site/Geo-Environmental Assessment
- H. Archaeology
- I. Built Heritage
- J. Natural Environment
- K. Wells and Groundwater Monitoring
- L. Design Criteria
- M. Cost Estimate
- N. Phase 1 Report (SNC-Lavalin)
- O. Phase 2 Report (Dillon)
- P. Record of One Window Comments and Responses
- Q. Highway 6 Traffic Operations Review
- R. Species At Risk Information

2. IDENTIFICATION OF THE PROBLEM OR OPPORTUNITY

2.1 Introduction

As noted in Chapter 1, there is documentation on transportation capacity problems in Waterdown/Aldershot going back to the original *Master EA Transportation Network Study for the Waterdown/Aldershot Area* completed in 1999. Since that time, additional growth approved for the area has resulted in further study and updates to the transportation planning work.

This chapter of the Environmental Study Report briefly summarizes the growth planned for Waterdown, the challenges identified with the existing transportation network and the work done to define the problem and opportunity and fulfill Phase 1 of the Class EA process. The last section of this chapter summarizes the problem/opportunity which is the focus of this Class EA. For more detailed information the reader is directed to the following reports in the appendices to this ESR:

- Waterdown/Aldershot Master EA Transportation Network Study Phase 1, July 2004, *Appendix N (Exhibit 2-1)*
- Waterdown/Aldershot Transportation Master Plan Phase 2 Final Report, February 2008, *Appendix O*

2.2 Growth in Waterdown

Waterdown currently¹ has a population of 15,000 (2001 census). Official Plan Amendment (OPA) No. 28 to the Town of Flamborough Official Plan was approved by the Executive Council of the Provincial Government of Ontario on June 19, 2002. This OPA allows for the expansion of the Waterdown urban area to accommodate residential growth to the year 2021. The three main expansion areas in OPA 28 are Waterdown North, Waterdown South, and Upcountry Lands. These are illustrated in *Figure 2-1, OPA 28 Lands*.

The OPA 28 lands consist of approximately 240 hectares of gross developable residential land. The rate of development in the past has been approximately 300 building permits annually². This provides a 15 to 20 year supply of residential land if development continues at a similar rate. Population growth is expected to increase by 15,264 people upon build out. Conditions of approval for OPA 28 required the completion of a Master Environment Assessment Transportation Study.

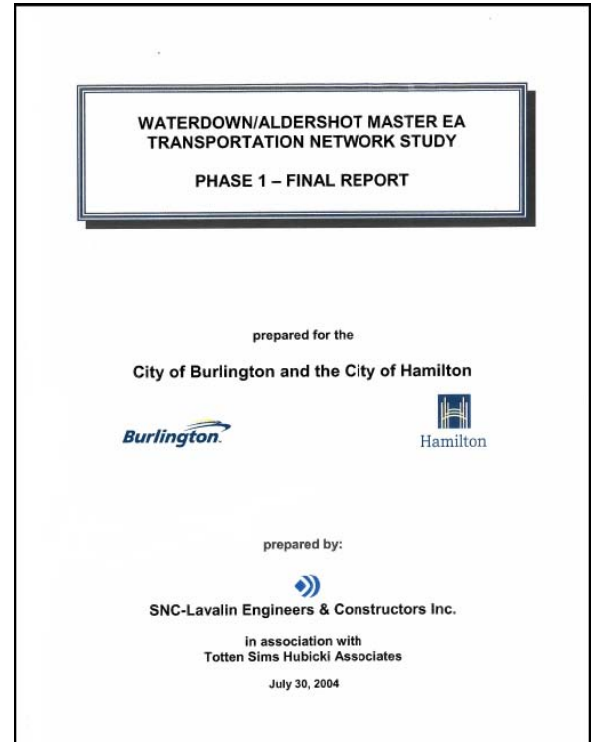
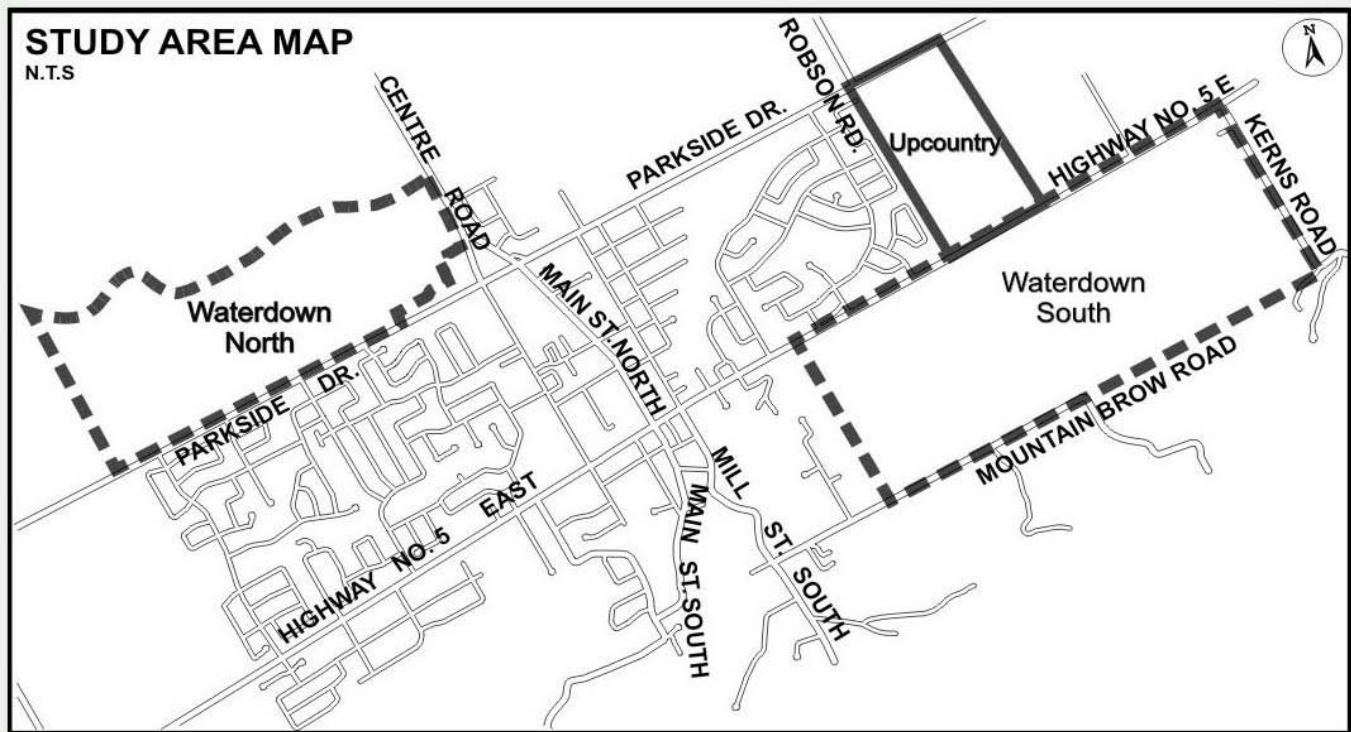


Exhibit 2-1: 2004 Phase 1 Report

¹ At the time of the Phase 1 and 2 studies

² Waterdown North lands are currently being serviced and the Upcountry development is partially built

Figure 2-1 – OPA 28 Lands



2.3 Existing Transportation Network

2.3.1 Major Road Network

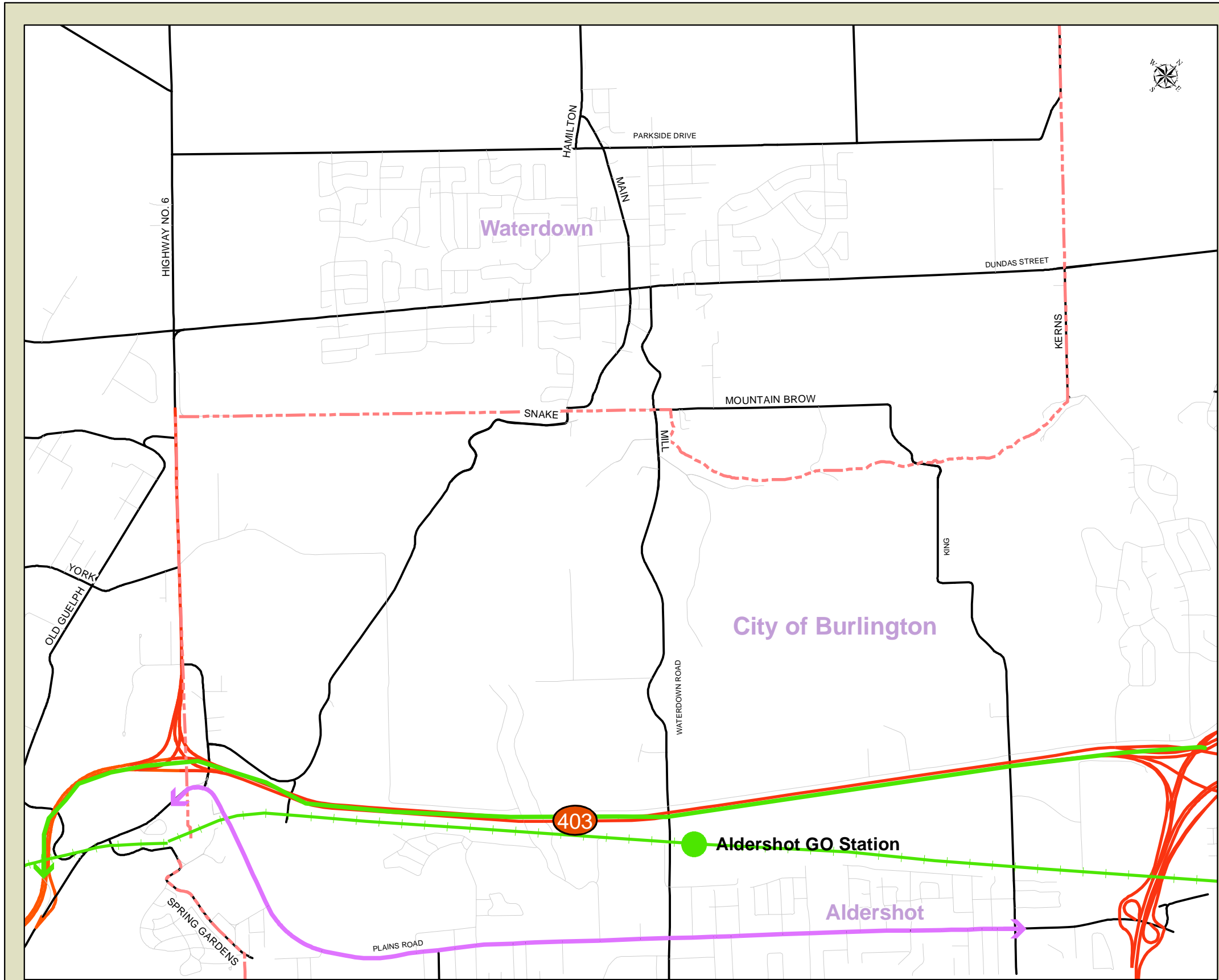
The report, *Waterdown/Aldershot Master EA Transportation Network Study Phase 1, July 2004*, identified that main gateways in and out of Waterdown are currently close to or at capacity during the peak periods. The primary east-west roads in the study area are Dundas Street/Highway 5, Highway 403 and the North Service Road. Dundas Street/Highway 5 is one of the major east-west gateways into and out of the study area. The character and jurisdiction of this road vary significantly. West of Highway 6, the road is under the jurisdiction of the Province of Ontario, with two travel lanes. East of Highway 6, Dundas Street has a 4 lane arterial road cross section, and is under the jurisdiction of the City of Hamilton. Through the Waterdown community, turning lanes are provided on the two-lane cross section with on-street parking. East of Kerns Road, Dundas Street (Regional Road 5) is under the jurisdiction of Halton Region and has four travel lanes.

Highway 403 is located along the southern portion of the study area. Access to the highway from the study area is available at Highway 6 and Waterdown Road for both eastbound and westbound traffic. Highway 6 has a 5-lane cross-section (3 lanes northbound and 2 lanes southbound) with recent conversion to an access controlled highway between Highway 403 and Dundas Street. Waterdown Road is another north-south gateway into and out of the study area, with connection to

Highway 403 and Plains Road. This 2 lane road is under the jurisdiction of the City of Burlington.

Figure 2-2 illustrates the area's existing road and transit network. **Table 2-1** illustrates the primary roadway characteristics in the study area.³

³ Note that the jurisdiction of Kerns Road is held jointly by the Cities of Burlington and Hamilton.



Waterdown - Aldershot Transportation Master Plan



Figure 2.2: Existing Road and
Transit Network

- - - Municipal Boundary
- GO Transit - Bus
- + - GO Transit - Rail
- Burlington Transit

Note:
Since Phase 2 work was completed
HSR has introduced bus service in
the Waterdown area.

Scale



Map Notes

Map created by: PJK
Map checked by: DPM/CC
Date created: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.



Table 2-1: Existing Primary Roadway Characteristics⁴

Street	From	To	Official Plan Road Classification	Jurisdiction
North-South Roads				
Highway 6	Highway 403 Dundas Street East	Dundas Street East Concession 5 East	Highway Highway	Province Province
Snake Road	Highway No. 6	Main Street	Collector	Burlington
Waterdown Road/Mill Street	Plains Road Mountain Brow Road	Mountain Brow Road Dundas Street East	Arterial Arterial	Burlington Hamilton
Hamilton Street/Centre Road	Dundas Street Parkside Drive	Parkside Drive Concession 5 East	Arterial Arterial	Hamilton Hamilton
Main Street	Snake Road	Centre Street	Collector	Hamilton
Robson Road	Parkside Drive	Concession 5 East	Collector	Hamilton
King Road	North Service Road	Mountain Brow Road	Collector	Burlington
Evans Road	Dundas Street	Parkside Drive	Arterial	Hamilton
Kerns Road	North Service Road	Dundas Street East	Collector	Burlington
Brant Street/Cedar Springs Road	Highway 407 Dundas Street East	Dundas Street East North study limit	Major Arterial Arterial	Halton Region Burlington

Phase 1 of the Municipal Class EA process as reported in the *Master EA Transportation Network Review of Aldershot/Waterdown (July 2004)* also identified existing critical turning movements at major intersections in the study area and screenline volumes for the major road network during the AM and PM peak periods. The results of the analysis indicate that “while most intersections are operating well, there are certain specific movements that are experiencing delays and evidence that capacity may soon be (or already has been) reached”.

Table 2-2, reproduced from the Phase 1 report, illustrates the congested movements at study area intersections during the AM and PM peak hour that exhibited a volume-to-capacity (v/c) ratio greater than 0.80. This is a numerical measure of the ratio between volume on a particular intersection turning movement and the available capacity to accommodate that volume. A v/c ratio greater than 0.80 generally means that critical capacity has been reached. This is represented as a high degree of congestion with long delays and queues at signalized intersections. Once a v/c ratio exceeds 1.0, this is defined as the point where the roadway section has failed, and the volume of vehicles on the roadway section has exceeded the available capacity to accommodate them. As illustrated, conditions during the PM peak hour are more congested than the AM peak hour, with a number of movements near to or at capacity. Key conclusions of the Phase 1 Work pertinent to this Class EA are provided below:

⁴ Note that Brant Street from the QEW north to Dundas Street is under the jurisdiction of Halton Region. North from there, Cedar Springs Road is under the City of Burlington’s jurisdiction from Dundas Street to Twiss Road

It is therefore recommended that Phase 2 of the Master EA process proceed in order to establish the location of the additional network capacity needs identified in this study. The study area for examining the location of these routes should be sufficient to consider all reasonable options.

In summary the main conclusions of this study are:

1. *The need for additional east-west capacity in the overall transportation network in the Waterdown North and Waterdown/Aldershot/Burlington area, due to the development of OPA 28 lands has been confirmed.*
2. *The need for additional north-south capacity in the overall transportation network in the Waterdown/Aldershot/Burlington area, due to development of OPA 28 lands, has been confirmed*
3. *All options to provide additional east-west and north-south capacity in the overall transportation network, to accommodate the additional demands due to the development of OPA 28 lands, need to be considered in the next phase of the Aldershot/Waterdown Transportation Master Plan Study Update (Municipal Class EA process–June 2000).*

Table 2-2: Current Critical Turning Movements

Intersection	Movement	Demand volume	v/c	Average delay/veh (s)
AM Peak Hour				
Dundas St. at Mill St.	EB through/right	985 through 53 right	0.88	EBT 33.3 EBR 33.2
Dundas St. at Evans Road	SB left/right	339 left 26 right	0.83	SBL 28.0 SBR 22.5
Regional Road 5. at Brant St.	EB through	1214	0.92	38.8
Hwy. 6 at Parkside Dr.	SB left	144	0.83	55.4
PM Peak Hour				
Hwy. 6 at Hwy. 5 / Dundas St.	WB left	432	0.85	62.8
Hwy. 6 at Parkside Dr.	SB left	155	0.83	43.1
Dundas St. at Hamilton St.	EB left	149	0.93	24.9
Dundas St. at Main St.	WB through	1040	0.89	30.9
Dundas St. at Mill St. ¹	WB through	927	0.83	56.6
Hamilton St. at Parkside Dr.	NB left	89	0.85	39.8
Regional Road 5 at Brant St. ²	NB left	385	1.10	NBL 233.3
	WB left	492	1.21	WBL 335.2
	WB through	1562	0.94	WBT 56
North Service Rd. at Brant St.	EB right	435	0.85	EBR 14.6
	WB left	378	0.82	WBL 349.7
	NB left	538	0.93	NBL 108.0
	NB through	1376	1.03	NBT 101.7
Kerns Rd. at North Service Rd.	WB through	680	0.86	32.3
King Rd. at North Service Rd.	WB through	630	0.91	105.3
Waterdown Rd. at North Service Rd.	WB through/left	274 left	0.96	WBL 95.3
		349 through		WBT 98.9

¹*There is significant recurring queuing westbound on Dundas Street in the PM peak where the 4 lane section ends approaching Mill Street, and this meters demand making the intersection appear to function, when in reality there is a capacity deficiency on Dundas Street.*

²*This intersection is in need of improvement by the addition of double left turn lanes (NBL, WBL). This need was also identified in the Transportation Master Plan for Regional Road 5 (Dundas Street) and 25 Corridors, undertaken by Halton Region in 1999.*

³*Source – Waterdown/Aldershot Master EA Transportation Network Study Phase 1 – Final Report, (July 30, 2004) SNC Lavalin*

2.3.2 Existing Transit Service

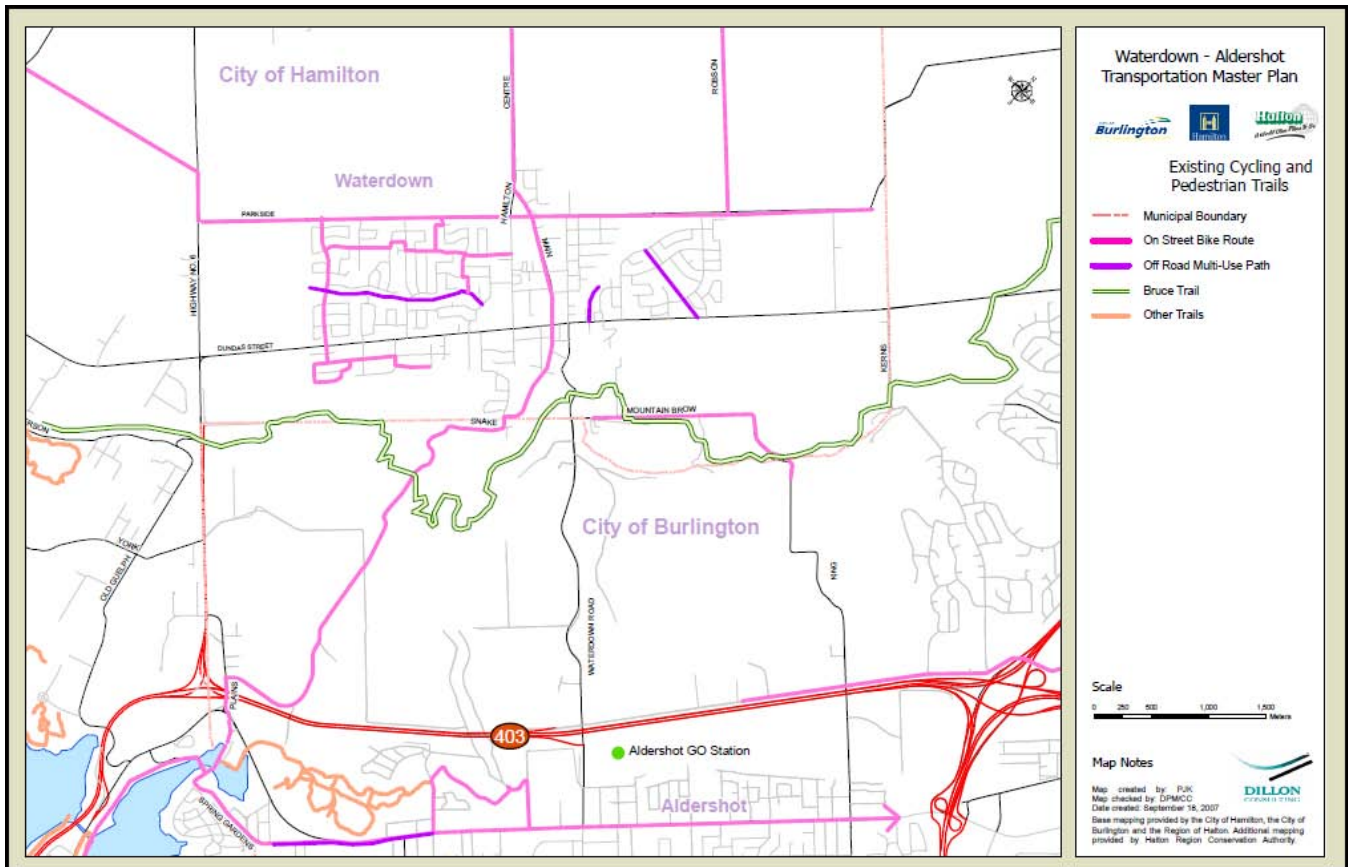
Existing transit service in the study area is limited to the Aldershot community and the Brant Hills and Tyandaga neighbourhoods in Burlington near Brant Street and a newly introduced service on Waterdown Road to the GO Station.⁵

2.3.3 Cycling Network

Within the study area, there are a number of east-west and north-south cycling routes designated by the City of Hamilton and City of Burlington. These are illustrated in **Figure 2-3**, on page 2-8. Some of the major routes include Parkside Drive between Highway 6 and Robson Road, Robson Road north of Parkside Drive, Mountain Brow Road, Main Street North and Centre Road between Dundas Street and Carlisle Road (north of the study area), and Plains Road. There exists a north-south disconnect in designated cycling routes between the communities of Waterdown and Aldershot.

⁵ Subsequent to the completion of Phase 2, HSR added Route 18 (Waterdown) that accesses the Aldershot GO Station from the north on Waterdown.

Figure 2-3: Existing Cycling and Pedestrian Trails



2.3.4 Trails

A number of trails traverse the study area, the most notable being the Bruce Trail. The Bruce Trail is Canada's oldest and longest footpath, which provides the only public access to the Niagara Escarpment. The Bruce Trail is 782 km long, extending from Queenston on the Niagara Peninsula through Waterdown to Tobermory at the tip of the Bruce Peninsula. The trail has a number of picturesque views, scenic landscapes and 290 km of additional side trails. Through the study area, the Bruce Trail traverses the escarpment south of Dundas Street before heading north of Dundas Street and east of Kerns Road (refer to *Exhibit 2-2*). Within the New East-West Road Corridor there is a Bruce Trail crossing of Dundas Street just east of Kerns Road.



Exhibit 2-2: Dundas Street/Bruce Trail Sign

2.4 Planned Road Improvements

There are a number of planned roadway improvements that were considered when identifying transportation problems in the Waterdown Aldershot area. Planned improvements include:

Highway 6: Widening of Highway 6 to five lanes (3 northbound and 2 southbound) south of Dundas Street, and the construction of an interchange at Highway 6 and Dundas Street (EA was recently completed). These improvements are being undertaken by the Ontario Ministry of Transportation (MTO). A planning study will be initiated in the future by MTO to review the ultimate need and configuration of Highway 6 north of Highway 5/Dundas Street.⁶

Highway 5 – Widening of Highway 5 west of Highway 6. The Preliminary Design and Environmental Assessment Study is currently underway.⁷

Waterdown Road and Highway 403 Interchange – Improvements to the Waterdown Road/Highway 403 interchange in the City of Burlington, including the addition of an eastbound on-ramp (for eastbound traffic to enter Highway 403) and a westbound off-ramp (for westbound traffic to exit Highway 403)⁸. The City of Burlington completed construction of this project in 2011.⁹

2.5 Summary of Transportation Analysis – Defining the Problem

The Phase 1 Final Report of the *Waterdown/Aldershot Master EA Transportation Network Study* was completed on July 30th, 2004 by SNC-Lavalin. The purpose of Phase 1 was to “review all the land use and transportation network changes, either proposed or constructed, which may affect the study area conclusions and recommendations of the previous Transportation Master Plan Study undertaken by Stantec Consulting Ltd. in September 1999”.

The report confirmed the need for additional east-west and north-south capacity in the Waterdown/Aldershot area due to OPA 28, stating that additional capacity was needed in each direction.

The July 2004 report concluded based on the current network choices available, the main conclusion that can be drawn from these results is that both additional east-west capacity and north-south capacity is required for the study area around the Village of Waterdown and depending on what configuration this network would take, further improvements would likely be required in Burlington to receive this additional traffic, e.g., North Service Road widening. As this ultimately concludes, the next phase of this Master EA update has to analyze all

⁶ Construction on Highway 6 south of Dundas Street has been subsequently completed. Interchange construction is not currently programmed. MTO has no current plans for any planning studies of Highway 6 between Parkside Drive and Freelon.

⁷ This study is currently on hold

⁸ Northern limit of this work extends to just south of Craven Avenue

⁹ At the end of Phase 3, construction had started on the Waterdown Road and Highway 403 interchange.

potential north-south and east-west network improvement options in various combinations that could potentially cater to these very high traffic demands stemming from the future development of Waterdown and Aldershot.

Later in 2003, the *Waterdown/Aldershot Transportation Master Plan Phase 2* was initiated with a Draft Report completed in August 2005. This work included a review of the transportation analysis in the July 2004 Phase 1 report as well as additional transportation modelling work to confirm the problem and provide detail on the capacity requirements. The Phase 2 Draft Report also included identification and evaluation of alternative ways to solve the capacity problem identified. Significant consultation with the general public, stakeholder advisory committee, and agencies was undertaken on the Phase 2 project over a two and a half year period. Generally, there was agreement on the need for additional capacity but there was much discussion during this period on the alternative solutions.

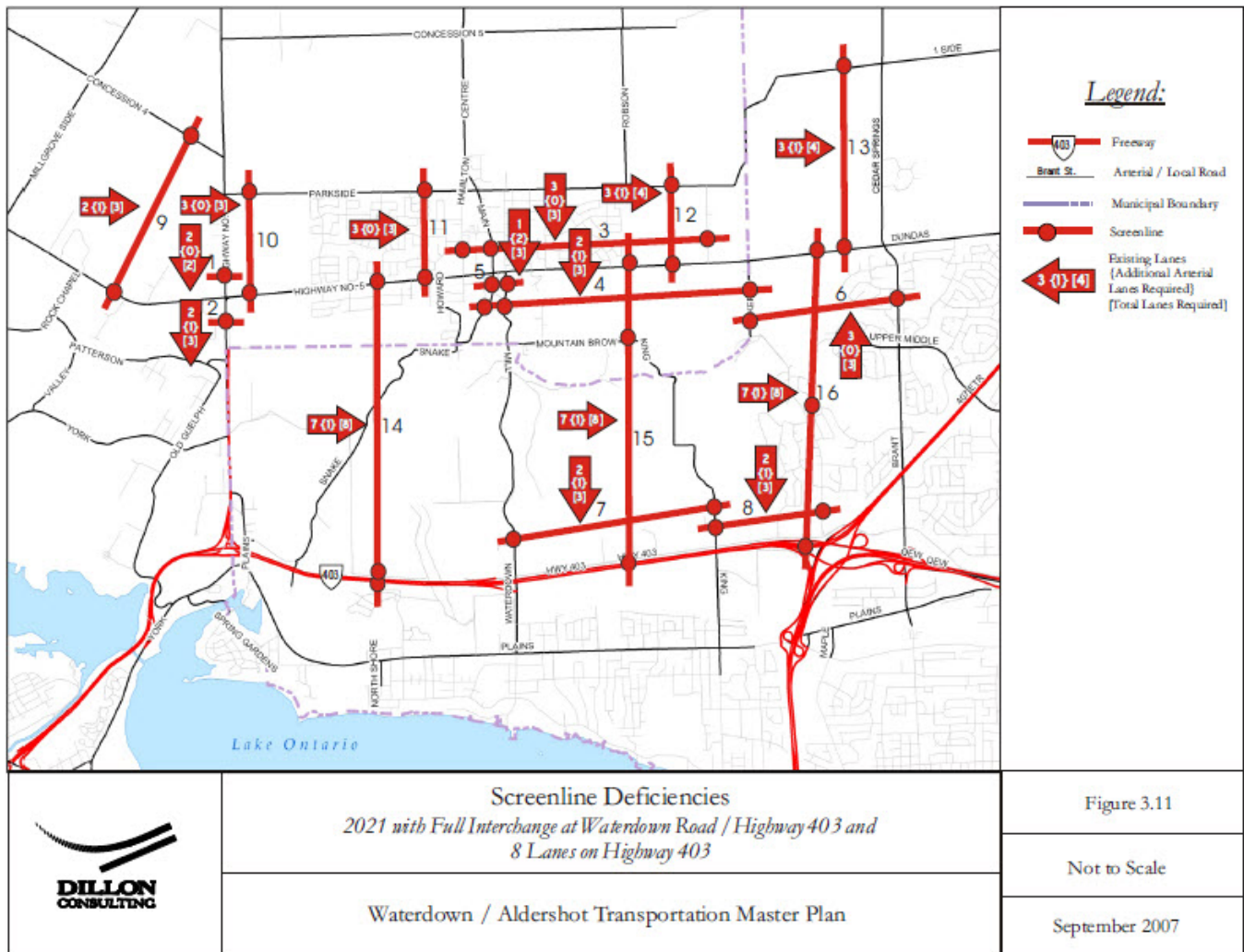
In February 2008 the *Waterdown/Aldershot Transportation Master Plan Phase 2 Final Report* was released. Two analyses were undertaken as part of the TMP Phase 2 work to confirm the problem identified in Phase 1 of the Class EA process. These were:

- Screenline Analysis – an imaginary line defined in the network that captures a broad corridor through which traffic flows; and
- “Bottom Up” Approach – a “building block” analysis that works from current conditions and adds anticipated traffic from growth.

The east-west screenline analysis evaluated the combined demand and capacity of key east/west links. Links that cannot accommodate the demand for design or operations reasons were not accounted for in the evaluation (i.e. Mountain Brow Road). The screenline analysis revealed deficiencies east of Mill Street in the eastbound direction. Given there are only two roadways servicing this demand (Dundas Street and the Highway 403), the findings were not surprising. Deficiencies were also found west of Highway 6 along Highway 5 and Concession 4. These deficiencies will be addressed by the MTO under upcoming assignments. The link analysis determined a need for one more lane of capacity east of Mill Street.

As presented in **Figure 2-4**, the screenline analysis reveals a deficiency in the southbound direction. For planning purposes, a v/c ratio greater than 0.85 is considered “critical” in this analysis. Other morning peak period (AM) models use 0.80 as the critical v/c ratio but a more conservative approach was used in this analysis, thus “triggering” system capacity improvements at more congested levels. PM based models use a critical v/c ratio of 0.90.

Figure 2-4: Screenline Deficiencies (Figure 3.11 of the WATMP)



The “bottom up” analysis revealed the following:

6,500 homes x 0.77 trips/home	=	5,005 trips
@ 75% outbound trips	=	3,754 trips
Less 10% for alternate modes	=	3,378 trips
Times 20.4% (eastbound)	=	689 trips

Current roadway volumes consume the current network capacity as follows:

Link	Capacity	Volume	Reserve
Parkside Drive	800	461	339
Dundas Street	1,000	1,131	---
Total	1,800	1,592	339

Therefore, if no other growth took place except for OPA 28, there would still be a deficiency in the system. If background growth is considered, then an additional 254 vehicles (based on assumed growth rate of 1%

per year of 2006 volumes until 2021) must be accommodated in addition to the unserved demand from OPA 28, equating to one arterial lane. The east-west deficiency identified in the *Waterdown/Aldershot Master EA Transportation Network Study, July 2004*, report is confirmed by the analysis undertaken in this study.

3. ALTERNATIVE SOLUTIONS¹⁰

Phase 2 of the Class EA process requires the identification and evaluation of alternative solutions to address the identified problem(s) or opportunity(s). For this project, this involved alternative ways to address the roadway improvements that form the basis of the transportation strategy to 2021. The alternative solutions to address identified capacity problems in the east-west direction were originally outlined in the *Waterdown/Aldershot Transportation Master Plan Phase 2 Report*. This section describes the alternative solutions that were identified and evaluated to select the preferred solution.

A number of possible transportation solutions to resolve the road capacity problem were initially identified including:

- Do-nothing;
- Improved public transit;
- Transportation Demand Management; and
- New roadway capacity.

Attempts were made to solve as much of the problem as possible through non-roadway solutions such as improved public transit and Transportation Demand Management (TDM) measures. These solutions are considered preferred (by the Project Team and participants to this study) as they result in less reliance on the automobile and result in less environmental effects. The following describes how these possible solutions were considered.

3.1 Identification of Alternative Solutions

3.1.1 Do Nothing

The Ontario EA Act requires the consideration of the do-nothing scenario. Typically, the do-nothing alternative does not solve the problem that has been identified but is used as a benchmark to better assess the impact of other alternatives. In some instances doing nothing could have less overall impact than some or all of the improvement alternatives.

The do-nothing alternative would mean that there would be no improvements to transportation infrastructure in the study area although transportation demand would increase as a result of new land development¹¹. The impact of the do-nothing alternative on the transportation system was modelled.



Exhibit 3-1: Upcountry Development looking south from Parkside Drive

¹⁰ Refers to work conducted during Phase 2 work related to alternative solutions

¹¹ *Exhibit 3-1* illustrates local area development that is underway

A do-nothing modeling scenario was tested that placed the 2021 traffic demands on the roadway using the existing (2001) roadway network and modal splits. Without any road modifications or reductions in modal split (proportion of non-vehicle travel methods) or auto occupancy, peak period traffic on primary corridors in Waterdown will reach critical capacity by 2021 with the development of the OPA 28 lands. The model shows an increase in east-west congestion.

East-west traffic will continue to be concentrated on Dundas Street, which will exceed capacity east of Main Street with a peak hour v/c ratio reaching up to 1.33 in the peak direction. Parkside Drive, east of Robson Road, will also reach a point of critical capacity during the peak periods, with a v/c ratio of 0.95 during the AM peak hour in the peak direction. Links to Dundas Street and Brant Street from Parkside Drive (Evans Road and No. 1 Side Road) will also be operating at or near capacity. In Burlington, Highway 403 and much of Plains Road will also operate at or near capacity in the peak direction during peak hours.

Another scenario was modelled based on road improvements to Highway 403 and changes in modal split and travel demand. The scenario assumed a full interchange at Waterdown Road at Highway 403, the widening of Highway 403 from 6 to 8 lanes, the introduction of transit service in Waterdown, resulting in an overall 5 % reduction in automobile trips, and the introduction of transportation demand management initiatives, further reducing automobile trips by 5 % (to arrive at a total 10 % reduction in trips). With these initiatives, congestion issues still continue on the majority of the corridors described above.

3.1.2 Improved Public Transit

Although at the time of the Phase 2 work there were no transit services within the Waterdown area, local and interregional transit services existed in the community of Aldershot and adjacent to the study area. Refer to Section 2.3.3 for the description of existing transit services in and adjacent to the study area.

Several transit opportunities are currently being examined to provide transit service in Waterdown and increase the transit modal split for both local and interregional trips. These include:

1. **Create an Inter-regional Terminal at the Aldershot GO Station** – the area has a significant amount of interregional transit service, however, it lacks an appropriate connection to Waterdown. The Aldershot GO Station would provide a good terminus for feeder services with connections to GO Rail, GO Bus, Burlington Transit, and VIA Rail.
 - a. As an initial step, provide a starter transit service beginning in 2008 (as outlined by the HSR) to/from the Aldershot GO Station to the existing urban area of

Waterdown¹². The terminus at the Aldershot GO Station will provide a local bus connection to GO Rail and VIA Rail services. As ridership levels increase and the community grows, the service should be extended to the new development areas and the service levels increased to help meet modal split targets.

- b. Reroute Burlington Transit Route 1 – Plains/Fairview West to connect to Aldershot GO Station. This will provide direct access to downtown Hamilton and the Burlington GO Station for Waterdown residents.
 - c. With the construction of new Waterdown Road ramps at Highway 403, discuss the opportunity for GO Transit to reroute the Highway 407 GO Bus to stop at the Aldershot GO Station, providing a direct connection to stops along Highway 407 between York University and McMaster University.
2. **Extend Interregional Dundas Service** – The Halton Transportation Master Plan identified opportunities to provide interregional transit service along Dundas Street, connecting downtown Hamilton to Toronto. Through Waterdown, this service is anticipated to provide 15-minute headways during the peak on Dundas Street, and south on Highway 6.
3. **Extension of Burlington Transit Routes** – opportunities exist to extend transit services from Burlington into Waterdown. These include:
- a. extend Burlington Transit Route 7 – Tyandaga- north on Kerns Road to Waterdown South area.
 - b. extend Burlington Transit Route 2 Brant – northwest along Dundas Street providing a direct downtown Burlington service for Waterdown residents.

Given the above transit opportunities, it was assumed that a transit mode split of 5% could be achieved in the study area. This mode split was assumed in the transportation capacity modeling work. As improved public transit in the study area can solve some of the transportation problem, it was retained as part of the overall solution. As it is not possible to solve the entire transportation problem through improved transit, other possible solutions are required.

3.1.3 Transportation Demand Management

Transportation Demand Management (TDM) strategies attempt to delay, defer or even eliminate the need for significant capital investment in new transportation infrastructure by:

- influencing auto demands in the commuter peak periods;

¹² Subsequent to the completion of Phase 2, HSR added Route 18 (Waterdown) that accesses the Aldershot GO Station from the north on Waterdown Road.

- promoting walking and cycling as alternatives to travel by private auto; and
- promoting public transit and ride sharing as alternatives to travel by private auto.

As part of the Transportation Master Plan process, TDM policies were identified that could:

- **Eliminate trips** – through appropriate land use planning and tele-working initiatives;
- **Reassign trips** – by encouraging the use of less congested corridors;
- **Reduce peak period trips** – investigating opportunities to shift schedule start and end time of major employers;
- **Link trips** – by mixed use planning, thereby promoting walking between activities;
- **Increase transit use** – through service and fare enhancements; and
- **Increase vehicle occupancy** – through ridesharing organizations.

It was assumed that TDM measures could reduce road capacity demand by 5 % and therefore was assumed to be included as part of the overall solution. As it is not possible to solve the entire transportation problem through TDM measures combined with improved public transit, other possible solutions are required.

3.1.4 New Roadway Capacity

The City of Hamilton Emme/2 Model was used to provide initial inputs to the Waterdown/ Aldershot TMP. Dillon reviewed the transportation model to 2021 as documented in the Phase 1 Report, and updated the model based on current population and employment estimates.

The initial step was to establish a 2021 “do nothing” scenario to confirm the need for road capacity improvements. Through this process, it was determined that additional north-south and east-west road capacity was needed to accommodate growth up to 2021. The approach considered all modes of travel to solve the transportation problem prior to increasing the capacity on the road network. This included transit, TDM, cycling and walking. A 2021 “do nothing” scenario was modelled which conservatively reduced single occupant automobile travel in the study area by up to 15 % through increased transit use and use of TDM measures. This 15 % decrease in automobile use also did not solve the north-south or east-west transportation capacity deficiency.

Several corridor alternatives were considered in the evaluation to provide the needed capacity to accommodate the development proposed in the OPA 28 lands in Waterdown. Each corridor alternative assumed a 5 % transit modal split and an additional 5 % reduction in vehicle trips due TDM measures. Corridor alternatives were grouped into north-south and east-west alternatives for evaluation purposes. A pre-screening of corridor alternatives was conducted based on their ability to

solve the transportation capacity problem. Alternatives that did not solve the problem (where 2021 screenline v/c continued to be greater than 0.85) were screened from further consideration. As a result of this pre-screening exercise, four east-west road improvement options were identified as being able to solve the roadway capacity deficiencies and are presented in *Table 3-1 and Figure 3-1*.

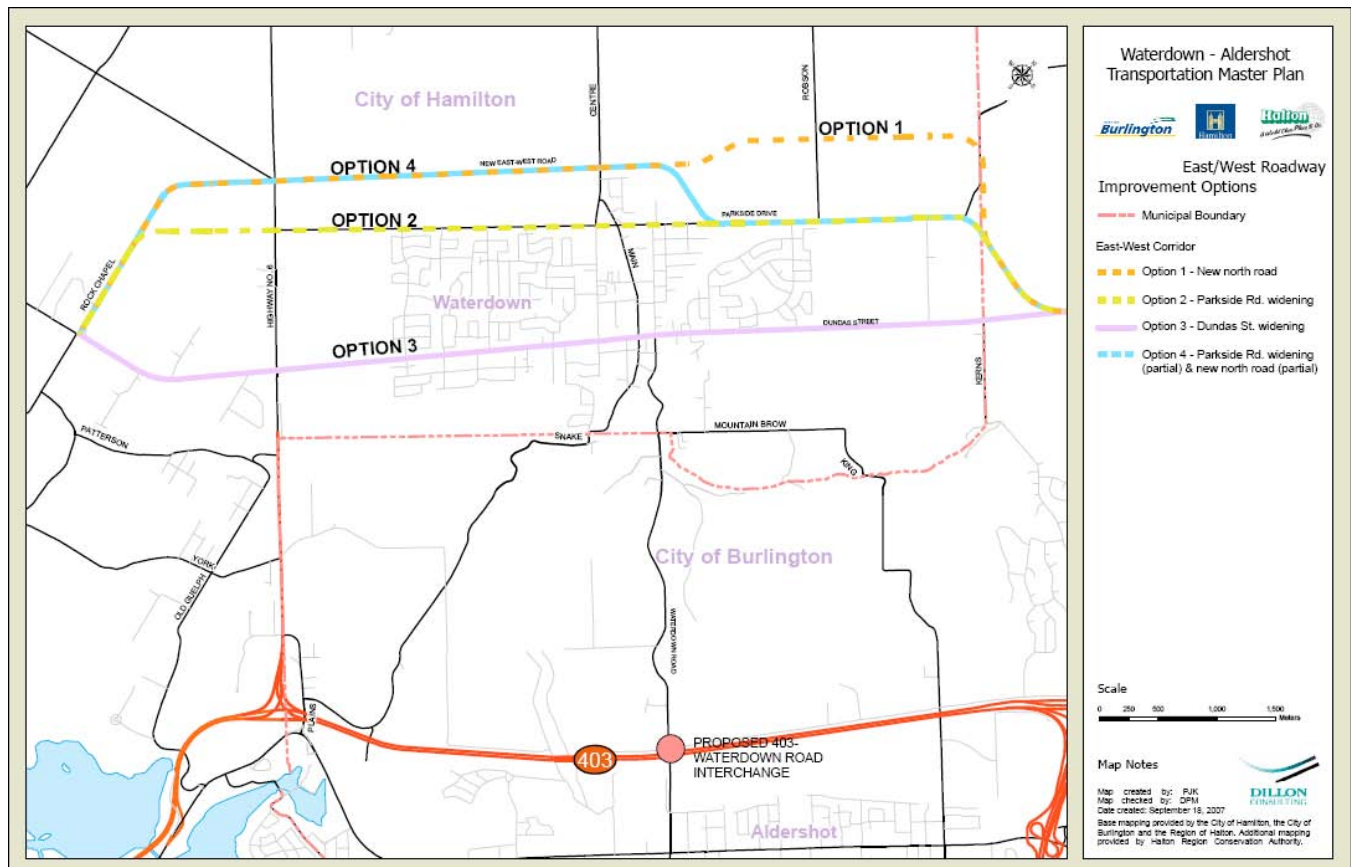
The road improvement alternatives were developed as “corridors” and should not necessarily be considered as the specific routes. As well, it may be possible to reduce the Right-of-way (ROW) widths for a number of roadway sections and thus, reduce the level of “footprint” effects.

Table 3-1: Alternative Road Improvement Options

Option	Road Options Description	ROW Needs ¹³
East-West Alternatives		
Option 1 – New North Road	<ul style="list-style-type: none"> New north road with 2 lanes New North Link "By-pass" from Dundas Street West at Rock Chapel Road to Dundas Street East, east of Evans Road 	26 - 32 m
Option 2 – Parkside Drive Widening	<ul style="list-style-type: none"> Widen Parkside Drive to 4 lanes Parkside Drive from Dundas Street West at Rock Chapel Road to Dundas Street East, east of Evans Road 	30 - 43 m
Option 3 – Dundas Street Widening	<ul style="list-style-type: none"> Widening of Dundas Street to 4 lanes from Rock Chapel Road to Highway 6 at 30 m ROW, to 6-lanes from Highway 6 to Berry Hill Avenue at 43 m ROW, to 4 lanes from Berry Hill Avenue to a point just east of Pamela Street at 30 m ROW, and to 6-lanes from just east of Pamela Street to Dundas Street, east of Evans Road at 36 m ROW 	30 - 39 m (urban cross section)
Option 4 – Parkside Drive Widening & New North Road	<ul style="list-style-type: none"> Starting at the west, new 2 lane North Link By-pass ROW from Dundas Street West at Rock Chapel Road continuing as a new northern by-pass ROW, then swinging south past Centre Road to connect with Parkside Drive east of Churchill Avenue. Widening Parkside Drive to 4 lanes to Evans Road. Then a new connecting link from a point east of Evans Road heading south to connect with Dundas Street 	26 - 43 m

¹³ The ROW widths assumed for the purposes of the evaluation were based on applicable road standards and the general characteristics of the existing roadways. It was anticipated that ROW width may be reduced through the implementation of specific road treatments (e.g. retaining walls). This would be investigated in subsequent study phases. In any event, all options were treated equally in this regard.

Figure 3-1: East-West Roadway Improvement Options



3.2 Evaluation Criteria

To guide the assessment and evaluation of the alternative road improvement solutions, a set of evaluation criteria and indicators was developed. The evaluation criteria were organized on the basis of the following five criteria groups that represent broad environmental components or areas of concern:

- **Natural Environment** – addresses the potential for effects to natural environmental features (terrestrial and aquatic);
- **Social Environment** – addresses the potential for effects to people, community features and cultural features;
- **Economic Environment** – addresses the potential for effects to business and economic development activity;
- **Cost** – addresses the capital cost of the alternative; and
- **Transportation Service** – addresses the level of improved transportation service that the alternative provides.

Under each of the five criteria groups several criteria were developed. The group specific criteria identify the specific components of the environment potentially affected by the proposed road improvement alternatives. For each criterion, one or more indicators were developed that were used to measure potential effect. **Table 3-2** presents the criteria and indicators that were considered in the evaluations.

Table 3-2: Evaluation Criteria and Indicators

Criteria Group	Criteria	Indicators
Natural Environment	Potential for impact on terrestrial features	Area of Provincially Significant Wetland removed (ha)
		Area of core ANSIs removed (<i>not including Provincially Significant Wetland</i>) (ha)
		Area of edge ANSIs removed (<i>not including Provincially Significant Wetland</i>) (ha)
		Area of core ESAs removed (<i>not including Provincially Significant Wetland</i>) (ha)
		Area of edge ESAs removed (<i>not including Provincially Significant Wetland</i>) (ha)
		Length of corridor adjacent to ESAs & ANSIs (<i>on both sides of new road corridor</i>) (m)
		Area of other woodlots removed (non ESA/ANSI) (ha)
		Area of wetland removed (ha)
		Area of other natural habitat removed (ha)
	Number of new Niagara Escarpment crossings	
Potential for impact on aquatic features	Number of watercourses crossed	
Social Environment	Potential for impact on residents	Number of residences displaced
		Number of residences within 25 m of the corridor (<i>widening of existing road</i>)
		Number of residences within 25 m of the corridor (<i>new road corridor</i>)
		Number of residences within 25-50 m of the corridor (<i>widening of existing road</i>)
		Number of residences within 25-50 m of the corridor (<i>new road corridor</i>)
		Number of residential properties required
		Area of residential properties required (ha)
	Potential for community character impacts	Length of route through existing residential communities (km)
	Potential for impact on community/recreation features	Number of community/recreation features displaced (e.g., schools, churches, parks, etc.)
		Number of community/recreation features within 25 m of the corridor
		Number of community/recreation features within 25-50 m of the corridor
	Potential for impact on cultural features	Number of cultural features removed
		Number of cultural features within 25 m of the corridor
Economic Environment	Potential for impact on business enterprises	Number of businesses displaced
		Number of businesses within 25 m of the corridor
		Number of businesses within 25-50 m of the corridor
		Number of commercial properties required
	Area of commercial properties required (ha)	
	Potential for impact on downtown core business area	Length of route through downtown core business areas (m)
Potential for impact on future land use	Area of land designated for development removed (ha)	
Potential for impact on agricultural land	Area of agricultural land designated for agriculture/rural removed (ha)	
Cost	Capital Cost (million \$)	Estimated capital cost
Transportation Service	Change in level of transportation service	Critical screenline volume/capacity ratio
		Mean network speed
		Average network volume/capacity ratio
	Change in safety levels	Number of residential property access points
		Number of commercial property access points
		Number of roadway access points

3.3 Evaluation Method

Since all road improvement options were considered capable to solve the transportation problem, the option that was identified to have the least overall impact was considered as the preferred option. The approach used to select the preferred east-west options involved the following three steps:

Step 1 – Determine the relative importance of the evaluation criteria groups/criteria – This was completed through a criteria ranking/weighting exercise with members of the Phase 2 Stakeholder Advisory Committee (SAC) and the public.

Step 2 – Determine the Simple Additive Weighting (SAW) scores – This is a computer tool used to assist in evaluations where there are large data sets. The tool highlights key differences among the alternatives to assist in decision making.

Step 3 – Considering the SAW scores and the data/impact levels, rationalize the selection of the preferred option(s) – the SAW results along with the actual data collected for the alternatives was considered to rationalize the selection of the preferred options.

It is noted that the Stakeholder Advisory Committee¹⁴ was involved throughout this process and the results of their involvement were made available for public review and comment. The evaluation of alternative solutions was the key discussion topic for all four rounds of PICs, five SAC meetings and numerous individual meetings with stakeholders.

3.4 Selection of Preferred Solution

The four east-west road improvement options that were compared are shown in **Figure 3-1**. Option 4 (New North Road Hybrid) had the lowest impact score (most preferred). This option involves the widening of the eastern section of Parkside Drive and then extending northward between Robson Road and Centre Road to a new east-west northern “green-field” road. To confirm the selection of Option 4 as the most preferred option using the SAW procedures, the differences among the options (considering the collected data), were reviewed through a reasoned argument approach as presented below. It was on the basis of the rationalization below that Option 4 was selected as the preferred alternative.

Natural Environment

As can be expected, Option 4 (New North Road Hybrid Option) has greater natural environmental effects than the more urban options (Option 2 - Parkside and Option 3 - Dundas) but has less natural environmental impacts than Option 1 – Northern Route. A key advantage of Option 4 over Option 1 is that it results in much less

¹⁴ The SAC was part of Phase 2 work only. During Phase 3 a Neighbourhood Advisory Committee (NAC) was formed.

Provincially Significant Wetland (PSW) area being affected, less ESA removed (edge area), less “other woodlot” removed, fewer number of watercourses crossed, and less length of route adjacent to ESA/ANSIs. As the ESA removal effects are edge habitat, it may be possible to avoid/minimize these effects through the routing of the roadway. A key advantage of Option 4 is that it avoids many of the natural feature removal effects associated with Option 1.

Social Environment

Option 4 is only slightly less preferred than Option 1 (New North Road) for the social criteria group, as Option 4 has more residences within 25 m of the roadway (53 versus 0). Option 4 is clearly preferred over the Dundas (Option 3) and Parkside (Option 2) options with far fewer residents being displaced and much fewer residences within 25 m of the ROW. As such, Option 4 would result in less disruption effects to residents. As well, Option 4 is expected to result in less community effects as it passes through a much shorter distance of existing residential areas as compared to Options 2 and 3. A key advantage of Option 4 is that it avoids much of the built up areas along Parkside Drive by swinging north before Centre Road, which is an area that has much residential development. This option also has the potential to provide an alternative route to truck traffic using the Waterdown downtown area.

Economic Environment

This criteria group considered effects to existing commercial areas, loss of agricultural land and loss of developable lands. There tended to be trade-offs among the options for all these criteria. As can be expected, Option 3 – Dundas Street has the potential for the greatest effect with 12 businesses displacements and the greatest number of businesses within 25 m that could be disturbed. It was therefore the least preferred for this criteria group. The remaining options were all relatively close. Option 4 and 1 have similar effects and scored second to Option 2 (Parkside) which is considered to have the lowest economic effects. Economic effects associated with Option 1 and 4 include the loss of agricultural land and loss of land designated for future development. As the greatest weight was assigned to the criteria considering effects to existing businesses and effects on the downtown core, the “northern” options tended to be preferred for this criteria group. A key advantage of Option 4 is that it avoids any effects to the Waterdown downtown core area.

Cost

Both capital and land cost were considered. On this basis, the costs ranged from \$28 million (Dundas Street) to \$14.9 million (New North Road). Option 4 was the second least expensive at \$18.2 million.

Transportation Service

All options were considered capable of solving the transportation service deficiency problem. Some options did provide greater service capacity than others. Also considered were safety levels, which assessed the number of access points along the roadways. For the northern route which is to pass through a large tract of land designated

for future development, an estimate of future access points was made based on available land use plans. Options 2 and 3 were considered to be the least preferred, in part due to the large number of access routes along these roadways, which would make them less safe than Options 1 and 4. Option 4 was considered slightly less preferred than Option 1 due to existing residential access points along Parkside Drive.

East – West Route Evaluation Conclusions

Based on the above, it is recommended that Option 4 (Hybrid North Route) be selected as the preferred option for the following reasons:

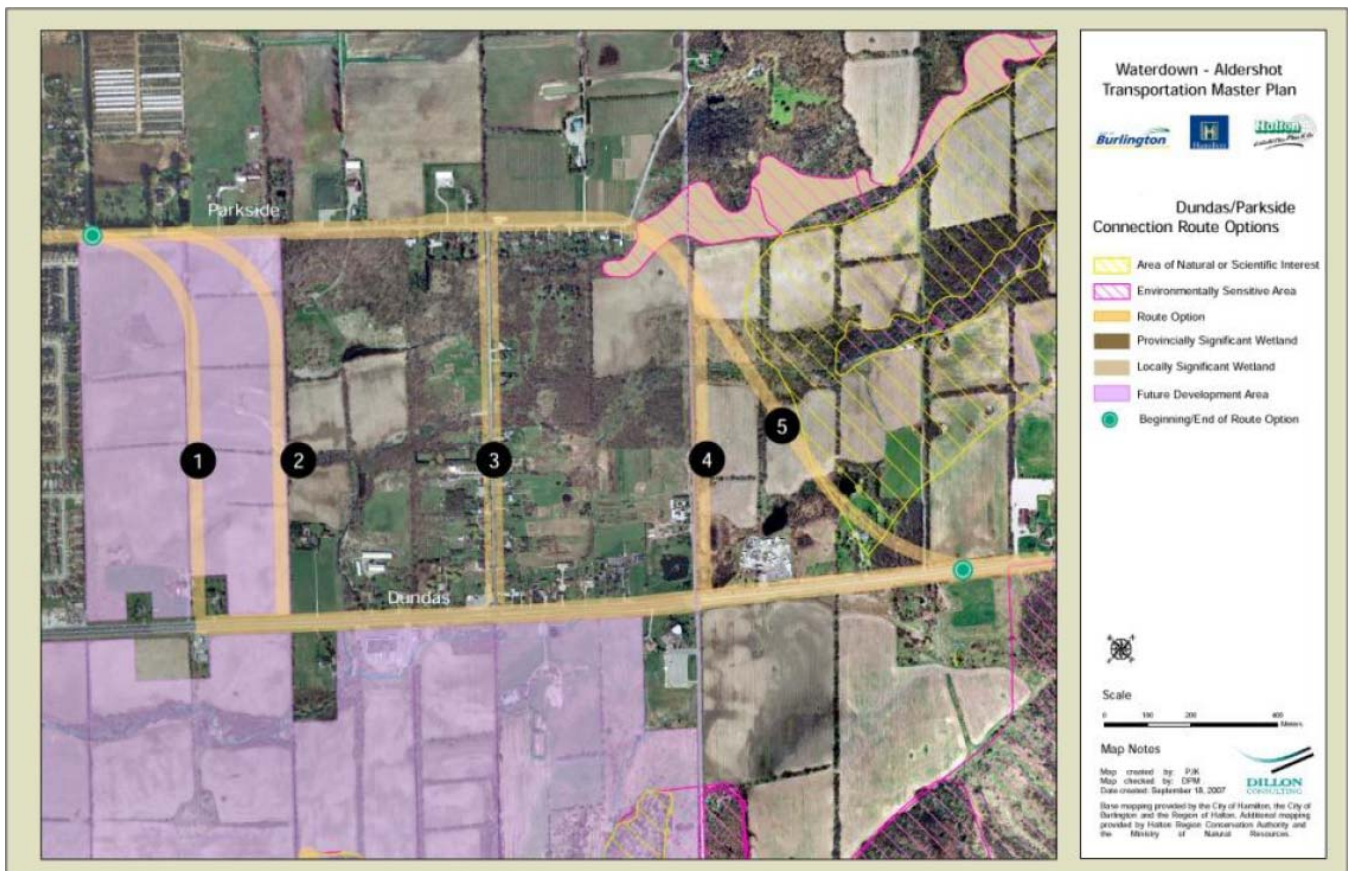
- It avoids the most significant natural environmental effects associated with Option 1. There would be no removal of core ANSI or ESA areas and minimal loss (0.2 ha) of Provincial Significant Wetlands. Removal of natural habitat is limited to edge areas and more detailed design routing work should be able to lessen these effects;
- Option 4 has the least number of residential and business displacements;
- Option 4 largely avoids existing residential and business areas. There would be no impact on the downtown core area of Waterdown;
- The additional cost of Option 4 is only slightly higher than the least expensive option (Option 1). Option 4 is significantly less expensive than Option 2 and 3. The options that require a road widening would be more expensive than a new green field route because it is assumed that a complete reconstruction of the widened road would be required. The existing infrastructure and utilities would likely not be salvageable and would need to be replaced;
- Option 4 will provide a higher level of service and is considered to be a safer alternative than the more urban options; and
- Option 4 also can serve as a by-pass to move truck traffic out of the Waterdown downtown area.

It is noted that significant concern was raised by a group of residents along Parkside Drive regarding the selection of Option 4, which would involve the widening of a portion Parkside Drive. An alternative alignment suggested by the Parkside Drive Residents Group was also considered in this study and is discussed in more detail in Section 5 of this report.

3.4.1 Hybrid Option – Dundas to Parkside Connection Options

When alternative east-west options were first assessed a number of possible routes to connect Dundas Street to Parkside Drive for the “Northern”, “Parkside” and “Hybrid” options were identified. To simplify the east-west route evaluation, the same representative connection route was identified/used for these three options. Recognizing that the Hybrid Parkside/Northern option (Option 4) was selected as preferred, the next step was to confirm the route to connect Dundas Street with Parkside Drive. **Figure 3-2** below illustrates the 5 connection route options that were identified. Option 2 had the lowest score and thus was preferred.

Figure 3-2: Dundas/Parkside Connection Route Options



From a natural environment perspective, Option 2 was ranked second most preferred with its only impact being the removal of 0.64 ha of “other woodlot”. With respect to the social environment, Option 2 was preferred as: it results in minimal displacement (only 2 residences); there are few residents in the vicinity of the alignment (and thus minimal disruption effects); and there will be no removal of built heritage features. Option 2 was also preferred from the perspective of the economic environment as it results in minimal effects on businesses and requires relatively minimal land designated for development and

agricultural land. From a cost perspective, Options 1 and 5 are less expensive than Options 2, 3, and 4. Option 2 is least preferred from a transportation perspective. However, the difference among the options in regards to transportation was identified to be minimal and all options can address the problem.

The disadvantages of Option 2 in regards to transportation and higher cost than two of the other options were not considered significant enough to offset its advantages as noted above. As such, Option 2 was identified to have the lower overall impact and was identified as the preferred option to connect Dundas Street with Parkside Drive (as part of the preferred Hybrid Option to resolve the east-west problem).

4. EXISTING CONDITIONS

4.1 Introduction

This chapter describes the existing environmental and social-economic conditions of the New East-West Road Corridor. Much of the information was generated during Phase 2 of the project and was augmented where necessary with more detailed assessments carried out during Phase 3 work. Additional detailed background reports are provided in the Appendix.

The information provided builds upon information collected during Phases 1 and 2 of the Master Plan process. Much of the existing community falls under the jurisdiction of the Niagara Escarpment Commission (NEC). The area is guided by the Niagara Escarpment Plan (NEP), an environmental land use plan that looks to protect, conserve and promote sustainable development to ensure that the Niagara Escarpment will remain a natural environment into the future. In addition the area is also guided by the Greenbelt Plan which serves to protect the agricultural land and ecological features of the area.

4.2 Land Use Designations

Several provincial policies affect land uses within the New East-West Road Corridor area, including the Greenbelt Plan (2005) and the Niagara Escarpment Planning and Development Act (2005). In addition, the New East-West Road Corridor is subject to a number of municipal Official Plans, including Halton's Regional Official Plan and the City of Hamilton's Official Plan. The policies and legislation affecting land uses within the corridor are presented below.

4.2.1 Greenbelt Plan

Lands to the north of Parkside Drive are located within the Greenbelt Plan Area and as such are subject to the Greenbelt Act and the designations of the Greenbelt Plan 2005 (*Exhibit 4-1*). Corridor segments are designated "Protected Countryside" in the east part of the study area.

The Greenbelt Plan builds upon other provincial policies, including the Provincial Policy Statement and the Niagara Escarpment Plan. The Greenbelt Plan protects agricultural uses, natural heritage features and open space linkages; protects surface and ground water sources; supports recreation, culture and tourism; supports rural economies; and supports infrastructure and natural resources.

Lands designated as "Protected Countryside" are intended to enhance the spatial extent of agriculturally and environmentally protected lands currently covered by the NEP while at the same time improving linkages between these areas and the surrounding major lake systems and watersheds. Section 4.2.1 of the Greenbelt Plan permits existing, expanded and new infrastructure within the Protected Countryside,

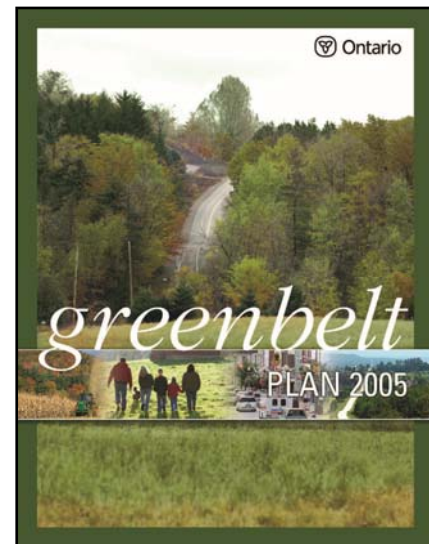


Exhibit 4-1: Greenbelt Plan 2005

subject to and approved under the Canadian Environmental Assessment Act, the Environmental Assessment Act, and the Planning Act and provided that it serves significant growth and economic development in southern Ontario beyond the Greenbelt.

4.2.2 Niagara Escarpment

The eastern portion of the New East-West Road Corridor is located within the Niagara Escarpment Plan Area and as such is subject to the Niagara Escarpment Act (1973), and the designations of the Niagara Escarpment Planning and Development Act 2005 (*Exhibit 4-2*).

The Niagara Escarpment Plan (NEP) protects unique ecologic and historic areas; maintains and enhances the quality and character of natural streams and water supplies; provides adequate opportunities for outdoor recreation; maintains landscape character; and ensures that all new development is compatible with the Niagara Escarpment Act. The plan includes seven land use designations with differing levels of protection, providing for various restrictions for development and site alteration.

Under Section 1.3 of the NEP, “essential transportation and utility facilities” are permitted in the Escarpment Natural Area. Under Section 1.4 of the NEP, “transportation and utility facilities” are permitted in the Escarpment Protected Area. Should lands hold designation under multiple plans and policies, the designations of the NEP supersede those of the Greenbelt Plan.

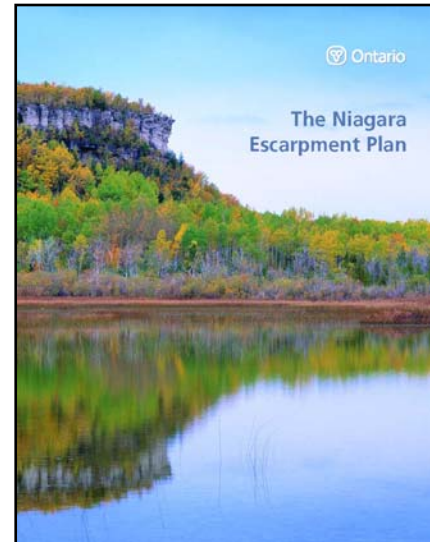


Exhibit 4-2: The Niagara Escarpment Plan

4.2.3 Other Plans Affecting the Study Area

Halton Region Official Plan

The lands east of Kerns Road fall within Halton Region (and within the City of Burlington’s municipal boundary). As illustrated by Map 1 of the Halton Regional Official Plan (2006), the corridor is designated “Greenlands B”.

As per section 131(7) of Halton’s Regional Official Plan, transportation and utility facilities are permitted on “Greenlands B” land areas.

At the time of writing this report, the Halton Regional Official Plan (2006) was currently under review to update its policies and designations to ensure conformity with the Greenbelt Plan as part of the Sustainable Halton Study/Regional Official Plan Amendment (ROPA) 38 where its policies and designations were being updated to ensure conformity with Places to Grow.

City of Hamilton Official Plan

The land west of Kerns Road falls within the City of Hamilton’s municipal boundary. The City of Hamilton Official Plan has recently been updated.

Under the 2006 draft approved Rural Hamilton Official Plan; lands located west of Kerns along Dundas Street are designated as “Neighbourhoods” and “Mixed Use-Medium Density” while lands along Parkside Drive are designated “Neighbourhoods” and “Open Space”.

At the time of writing this report, policies and designations affecting the urban area were under development, and are not referenced in the Rural Hamilton Official Plan. Furthermore, the Rural Hamilton Official Plan does not address non-airport related transportation policies. As identified in Section 4.2 of the Rural Hamilton Official Plan, such policies will be added by a future Official Plan amendment.

4.3 Natural Environment Features

4.3.1 Significant Natural Areas

The New East-West Road Corridor Class EA study area consists of the lands between Highway 6 and Centre Road, north Parkside Drive, curving east down to Parkside Drive, east along Parkside Drive to east of Robson Road, south along the east side of Upcountry subdivision to Dundas Street, and east along Dundas Street to Brant Street.

Additional detailed natural heritage data was collected during Phase 3. This was done as one exercise for both the Waterdown Road Corridor Class EA and the New East-West Road Corridor Class EA and, as such, the natural environmental mapping for most of this data covers both corridors. Once the natural environment inventory was completed, the natural features that could be impacted by the preferred road improvements were identified. Field data collection included a detailed vegetation survey, ecological land classification, an aquatic assessment, breeding bird survey and amphibian survey. Field data was supplemented with information obtained from the Ontario Ministry of Natural Resources’ Natural Heritage Information Centre (NHIC) database, Halton Natural Areas Inventory (from Conservation Halton) and natural heritage data managed by the Hamilton Conservation Authority.

The main natural environmental issues of concern in the New East-West Road Corridor study area were watercourse crossings, federal and/or provincial Species at Risk, Provincially Significant Wetlands (PSWs), Environmentally Sensitive Areas (ESAs) and Areas of Natural and Scientific Interest (ANSIs). See **Figure 4-1** for Significant Natural Area locations (i.e. ESAs, Candidate ESAs, PSWs, ANSIs). Other issues examined in this study concern regionally rare species and their habitat.

Millgrove South Woodlot ESA (also known as Logies Creek Swamp) is located on the southwest side of Highway No. 6. This 77 hectare forested natural area serves as the headwaters of two streams and provides habitat for significant species. This site is considered significant because it serves an important hydrological function and provides habitat for significant species. The forested natural area

includes silver maple and white elm dominated swamps as well as sugar maple-beech and trembling aspen-white ash upland areas. There is also a dugout pond, a cattail-Joe-Pye-weed marsh and cultural meadows. Significant species observed at the site include broad beech fern and ebony spleenwort. The ESA includes the Logies Creek Wetland Complex, which is a non-provincially significant wetland complex, made up of 10 individual wetlands, that are composed of two wetland types (91% swamp and 8% marsh). The ESA is bordered by agricultural fields and strip residential development along the peripheral roads.

Waterdown North Wetlands ESA is located immediately above the community of Waterdown. This 236 hectare area consists of small swamps along Grindstone Creek which help regulate stream flow and maintain water quality in Grindstone Creek above the Niagara Escarpment. The site is considered significant because it serves an important hydrological function. The swamps at this site are a part of the Lake Medad Valley Swamp Complex and include a wide range of species, predominantly broadleaf. In addition to the swamps, the ESA also includes upland wooded areas, cultural meadow and a spruce plantation. The ESA is surrounded by cleared agricultural lands and fragmented by railway and hydro corridors.

Medad Valley ESA is located northeast of Waterdown. This 500 hectare forested natural area provides habitat for various rare and uncommon wildlife species. The Medad Valley is considered significant because it serves important hydrological and ecological functions, it includes significant earth science features and it provides habitat for significant species. Lake Medad is within this ESA and much of the area has been designated as a Provincially Significant Wetland. The area is the headwaters of the Grindstone and Bronte Creeks. There are groundwater infiltration zones which support the Provincially Significant Wetland as well as the flow in the headwater streams. The ESA contains extensive upland and lowland forests that are relatively undisturbed and provide habitat for nationally, provincially and regionally rare species. The area is also used as a deer wintering range and is a natural corridor for wildlife movement. Adjoining land uses are primarily agricultural.

Highview Swamp is a non-provincially significant wetland complex made up of two individual wetlands. Both wetlands are swamp forest.

The Parkside Drive Wetland Complex includes a large tract of wooded area north of Parkside Drive. This area encompasses portions of Borer's Creek and its headwaters. The southern most extension of this area is perpendicular to the proposed alignment and includes forest and wetland community types. The main ecological community in this area is deciduous swamp with a small area of mineral marsh. Additionally, a small red oak forest is found at the south of this site. The southerly extension of this ESA is mainly associated with Borer's Creek and the riparian zone surrounding it.

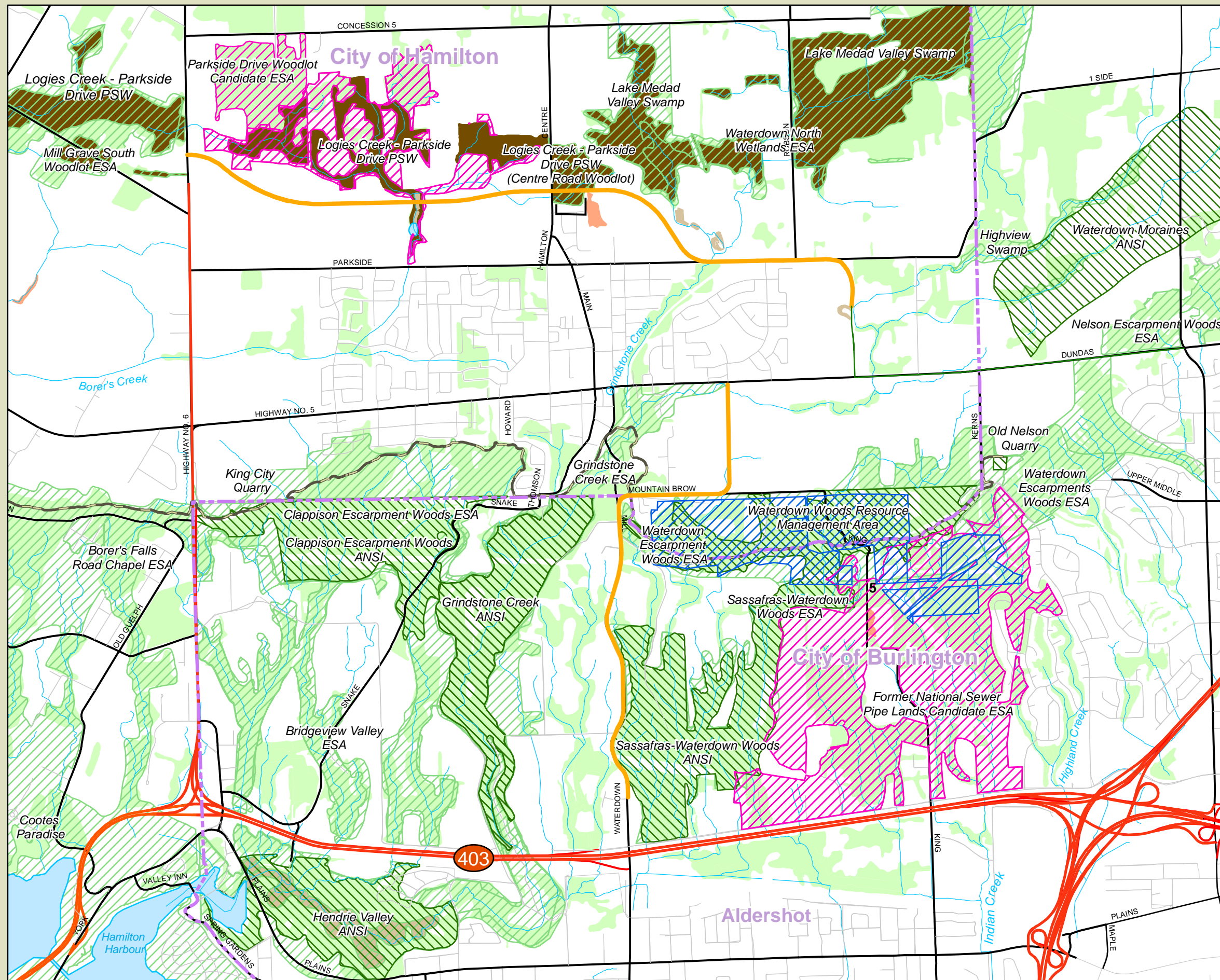
The **Centre Road Woodlot** (east of Centre Road) wetland feature is included into the Logies Creek - Parkside Drive PSW complex (Art

Timmerman, MNR, personal communication, September 2008) due to its demonstrated wetland function, proximity (within 750 m) to existing PSW units and hydrologic connectivity to the PSW via a tributary of Borer's Creek. It is also a part of the Waterdown North Wetlands ESA. This feature is important because it provides linkages between natural features to the east (Lake Medad Valley Swamp) and to the west (Parkside Drive Wetland Complex) as well as two existing ESAs: the Millgrove South Woodlot ESA and the Waterdown North Wetlands ESA. The area is dominated by swamp vegetation communities, particularly ash deciduous swamps.

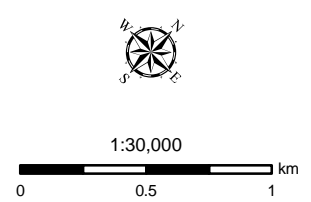
Nelson Escarpment Woods ESA is located at the east end of the study area and extends north from Dundas Street through the escarpment crossing area. In the study area, this ESA includes a section of the Niagara Escarpment located north of Highway 5 (Dundas Street) and west of Brant Street/Cedar Springs Road. This ESA is comprised of the Nelson Slope Forest Regional Life Science ANSI and the Waterdown Moraines Regional Earth Science ANSI. The Halton Natural Areas Inventory documented a diversity of flora and fauna throughout this ESA. Field assessment of the section of this ESA that abuts the study area did not document any federal or provincial species at risk (e.g. butternut). Breeding bird activity documented by Dillon field biologists within 200 metres north of Highway 5 (Dundas Street) was limited to species that are common in the province of Ontario. No regionally rare flora and fauna species were located in the ESA lands that will be disturbed by the project.

Waterdown Road Corridor and East - West Road Corridor Municipal Class EAs

Figure 4.1: Significant Natural Areas



- Legend**
- Municipal Boundary
 - Preferred Alignment
 - Provincially Significant Wetland
 - Area of Natural or Scientific Interest
 - Environmentally Sensitive Area
 - Candidate Environmentally Sensitive Area
 - Waterdown Woods Resource Management Area
 - Local Wetland
 - Woodlot
 - Other Natural Habitat
 - Niagara Escarpment



Map Notes

Map Created By: PJK/SFG
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 Date Created: April 5, 2006
 Date Modified: April 7, 2009
 File Path: I:\GIS\089020 - Waterdown\ Natural Environment Figures April 2009\ Mapping\Figure 2: Natural Areas.mxd
 Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

4.3.2 Ecological Land Classification and Vegetation

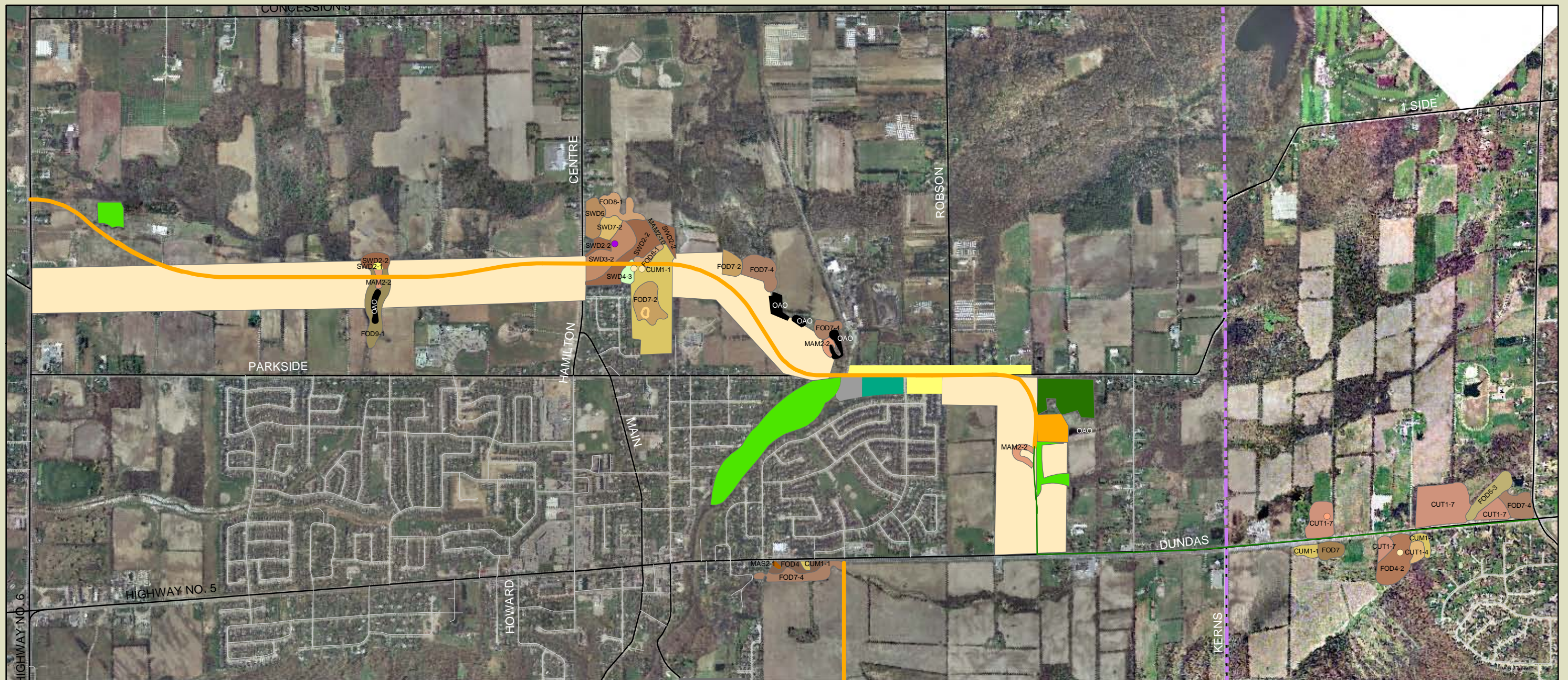
Ecological communities are the product of both the vegetation and physical substrates that comprise them. Ecological Land Classification (ELC) uses both parameters to objectively classify ecological communities according to the soil conditions, dominant vegetation communities, levels of disturbance and the natural versus anthropogenic forces that are driving the sustainability of the community. ELC has become the standard method of classifying ecological communities in Ontario and was conducted throughout the East-West Road Corridor Class EA study area, generally within 50 m of the preferred road alignment. Vegetation communities were then mapped on aerial photography according to ELC nomenclature to graphically represent the specific spatial pattern in the vegetation cover according to species composition, physiognomy, and physical site characteristics.

In order to more fully understand the vegetation in the study area, to preclude activity in areas with provincially and/or federally listed Species at Risk and to mitigate activity in areas with regionally significant species, a full botanical inventory was completed for the New East-West Road Corridor study area, primarily within 50 m of the preferred road alignment. The vegetation study involved traversing these study areas on foot and recording all the vegetation observed during the late summer/fall in 2007 and early summer/fall 2008.

Natural features were excluded from the field assessment if there was a 30 m displacement or greater from the preferred road alignment with a cultural attribute (i.e. agricultural field, urban development, etc.) between the road alignment and the feature. During field assessments, the location, abundance and condition of Regional rare and/or species at risk flora were documented. Regionally rare and/or provincially vulnerable vegetation communities were also noted. A geographic query on the NHIC database was also undertaken to identify historic element occurrences for species at risk and provincially vulnerable vegetation communities in the study area.

Twenty-two different ecological communities were identified through the ELC protocol including three cultural communities, nine different forest types, nine wetland types and one open water community (see *Figure 4-2*). These communities are summarized in detail in *Appendix J – Table B1*.

The results of the vegetation inventory are summarized in *Appendix J - Table B2*. The study area is comprised of approximately 70% native species and 30% exotic species. Based on the near urban setting of the site, this level of native vegetation indicates that exotic invasion is moderate, as exotic species in disturbed sites can often approach 50% of the species composition or higher.



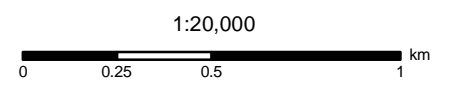
East - West Corridor Municipal Class EA

Figure 4.2: East - West Corridor Ecological Land Classification and Significant Plant Species

- CUM1-1: Dry-Moist Old Field Meadow
- CUT1-4: Grey Dogwood Cultural Thicket
- CUT1-7: Hawthorn - Buckthorn Cultural Thicket
- CUW: Cultural Woodland
- FOD4: Dry-Fresh Black Locust Deciduous Forest
- FOD4-2 : Dry-Fresh White Ash Deciduous Forest
- FOD5-3: Dry - Fresh Sugar Maple (Hardwood) Deciduous Forest
- FOD7: Fresh - Moist Lowland Deciduous Forest
- FOD7-2: Fresh - Moist Ash Lowland Deciduous Forest
- FOD7-4: Fresh - Moist Black Walnut Lowland Deciduous Forest
- FOD8-1: Fresh - Moist Poplar Deciduous Forest
- FOD9-1: Fresh - Moist Oak - Sugar Maple Deciduous Forest
- MAM2-2: Reed Canary Grass Mineral Meadow Marsh

- MAM2-10: Forb Mineral Meadow Marsh
- MAS2-1: Cattail Mineral Shallow Marsh
- OAO: Open Water
- SWD2-1: Black Ash Mineral Deciduous Swamp
- SWD2-2: Red Ash Mineral Deciduous Swamp
- SWD3-2: Silver Maple Mineral Deciduous Swamp
- SWD4-3: White Birch Poplar Mineral Deciduous Swamp
- SWD5: Ash Organic Deciduous Swamp
- SWD7-2: Yellow Birch Organic Deciduous Swamp
- Forest
- Cultural Field or Thicket
- Agricultural
- Deciduous Riparian Woodland
- Stormwater Management

- Residential
- Preferred Route
- Buildings
- Species at Risk**
- Butternut (Individual Tree)
- Butternut (Group of Trees)
- Rare**
- Smooth-Sheathed Sedge
- Cockspur Hawthorn



Map Notes
 Map Created By: PJK/SFG
 Map Checked By: DR
 Date Created: April 5, 2006
 Date Modified: August 4, 2009
 File Path: I:\GIS\089020 - Waterdown\
 Natural Environment Figures April 2009\
 Mapping\Figure 4 East West Corridor ELC.mxd
 Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

The vast majority of the native species found within 50 m on either side of the preferred road alignment were classified as S5 (**Secure** - Common, widespread, and abundant in the nation or province) in Ontario. Five species (i.e. smooth-sheathed sedge, butternut, black walnut, herbaceous carrion flower and bristly greenbrier) were identified as S4 (**Apparently Secure** - Uncommon but not rare; some cause for long-term concern due to declines or other factors). Impacts to provincially Secure and Apparently Secure species do not require mitigation or compensation.

One species, butternut (*Juglans cinera*) was identified as “S3?” in the NHIC database. This designation is given to species that are Vulnerable in the province due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation.

Centre Road Woodlot Provincially Significant Wetland

The Centre Road wetland unit’s hydrological function is to retain and convey flow from the catchment area east of Centre Road to a tributary of Borer’s Creek to the west. This wetland ESA also functions as wildlife habitat for birds, small mammals and a small amphibian population. Further, this feature is used by wildlife as an east-west migratory corridor, connecting wildlife habitat to the northeast with habitat to the northwest.

Field reconnaissance of this wetland revealed the presence of two endangered butternut trees (*Juglans cinerea*) in the southeast portion of the woodlot. The result of the butternut health assessment is discussed below. Further, the wetland contains smoothsheathed sedge (*Carex laevivaginata*), which was observed in the north-central section of this feature and is a regionally rare plant in the Hamilton-Halton area.

Butternut

Butternut is listed as endangered under the provincial Endangered Species Act and federal Species at Risk Act. The butternuts documented in the woodlot are located in the southern portion of the Centre Road Woodlot.

A butternut health assessment protocol utilized by the Forest Gene Conservation Association (Boysen personal communications 2008) was applied to the two butternuts in the Centre Road PSW unit to determine the condition of these trees and to establish if they are retainable under the 70-50-20 rule tree retention guidelines (Ostry et al, 1994). Terry Schwan, Guelph District Forester with the MNR, examined the butternut trees with Dillon staff and applied the protocol. One tree (Tree ID #111) was estimated to be a non-retainable butternut in poor condition. The other tree (Tree ID #116) was a butternut in retainable or good condition. This retainable butternut tree was confirmed to be a pure butternut strain through DNA analysis conducted at the Ontario Forest Research Institute.

4.3.3 Breeding Birds

Breeding bird surveys were conducted in the New East-West Road Corridor Class EA study area between June and July, 2007. The objective of the surveys was to document the breeding bird species and identify habitat that is used by a breeding bird. The breeding bird surveys followed the Ontario Breeding Bird Atlas Guide for Participants (Environment Canada, 2001). The surveys utilized standard 10-minute point counts and area searches to determine species diversity, abundance and breeding evidence. Four interior forest point counts, nine tilled agricultural point counts, and five roadside point counts were conducted. Area searches were also conducted in forest, tilled agricultural and edge/successional/open habitat area. Point count and area search locations are shown on **Figure 4-3**.

One point count and wandering transect surveys were conducted for each of the following PSWs:

- along the southern boundary of the Parkside Drive PSW Complex and Candidate ESA,
- in and immediately adjacent to the Centre Road Woodlot, a wetland unit in the Logies Creek - Parkside Drive PSW Complex, and
- in and along the southern boundary of the Lake Medad Valley Swamp PSW, northeast of the Centre Road Woodlot.

There were no provincial or federal species at risk observed.

4.3.4 Amphibian Surveys

Spring amphibian surveys were conducted in the New East-West Road Corridor Class EA study area in 2007 and 2008. Mid-season and late season amphibian point count surveys were undertaken in 2007 and an early-season survey was conducted in 2008. Surveys determined which potential habitat contained breeding amphibians and estimated the population size of the species that demonstrated breeding behaviour in these habitats. A summary of amphibians identified during the 2007 and 2008 surveys is given in Appendix J.

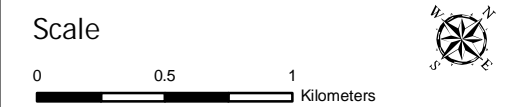
There were no federal or provincial species at risk observed during the amphibian surveys. The majority of the amphibians documented in the study area are ranked Secure (S5) in Ontario, signifying that they are common, widespread and abundant in Ontario. Further, two amphibians observed in the study area, western chorus frog (*Pseudacris triseriata*) and pickerel frog (*Rana palustris*), are ranked S4 or Apparently Secure; meaning they are uncommon, but not rare, and usually widespread in Ontario, with the possibility of a long-term conservation concern (Oldham et al., 2000).

In addition to the calling surveys, the Hamilton Herptofauna Atlas was searched for species that have been identified in the study area. This list includes twenty species in total (11 amphibians and 9 reptiles). The results of this search are presented in **Appendix J**.

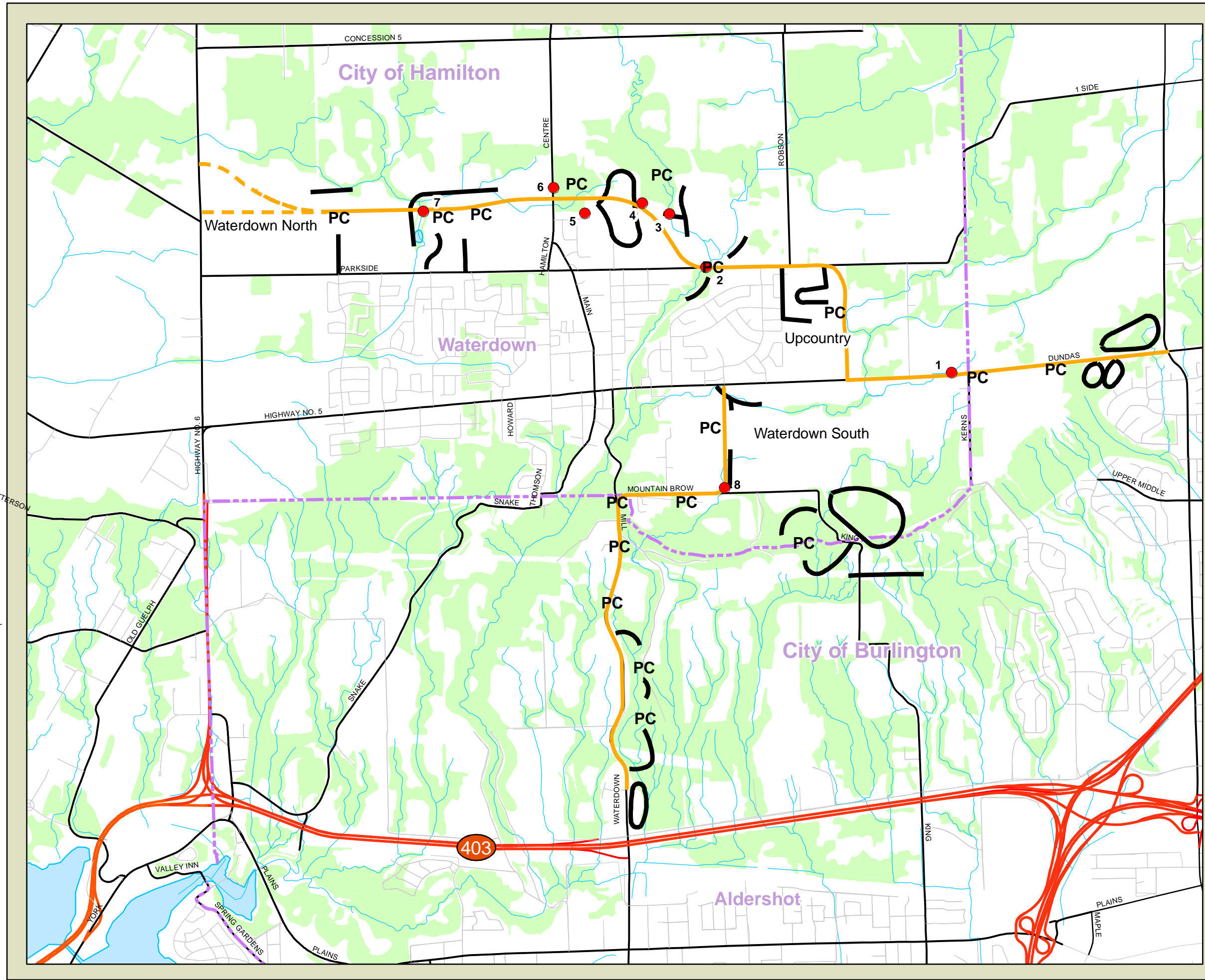
Waterdown - Aldershot Transportation Master Plan

Figure 4.3: Breeding Bird and Amphibian Point Count and Area Search Locations

- 1 Amphibian Point Count Location
- PC** Breeding Bird Point Count Location
- Breeding Bird Area Search Route
- Municipal Boundary
-
- Woodlot



Map Notes
 Map Created By: PJK/SFG
 Map Checked By: DR
 Date Created: April 4, 2008
 Date Modified: April 2, 2009
 File Path: I:\GIS\089020 - Waterdown\Natural Environment Figures April 2009\ Mapping\Figure 3 Point Count and Area Search Locations.mxd
 Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.



4.3.5 Wildlife

Incidental wildlife observations were recorded during field study of the New East-West Road Corridor Class EA study area. The majority of the incidental wildlife species observed is common in Ontario as well as in Halton Region and the City of Hamilton. There were no federal or provincial species at risk observed.

While vocalizations were used as an indicator of a mammalian species, no conclusive bobcat observations were documented during the Savanta 2009 or Dillon field surveys (i.e. visual observation, den, scat or tracks). Bobcat is the most widely distributed native felid in North America and can occupy a variety of habitats, including forest/open country habitat in the rural-agricultural landscape matrix (Woolf and Hubert 1998). Bobcat is considered *Extirpated* from Halton Region (Halton NAI 2006) and *Rare-Possibly Extirpated* from City of Hamilton (Vlasman 2005); however, range expansion into southern Ontario and other areas in the Great Lakes Region has been noted in human-disturbed areas (Patterson et al. 2003; Nowell and Jackson 1996; Rollings 1945). The cause of this range expansion is related to the increased availability of food resources for bobcat along the urban gradient as a result of higher concentrations of prey species in these areas.

4.3.6 Aquatic Resources

All watercourses that cross along the proposed routes in the New East-West Road Corridor Class EA study area generally drain in a southerly direction towards Hamilton Harbour of Lake Ontario. Grindstone Creek originates above the Niagara Escarpment in Flamborough and drains an area of 90 square kilometres making it one of the main tributaries discharging into the northwest-end of Hamilton Harbour (RBG, 2007). A smaller watercourse, Borer's Creek (also originates above the Niagara Escarpment, just north of Waterdown) passes southwesterly through mostly rural areas, close to the Dundas sanitary landfill site, before entering Cootes Paradise from north of the Willow Line below West Pond.

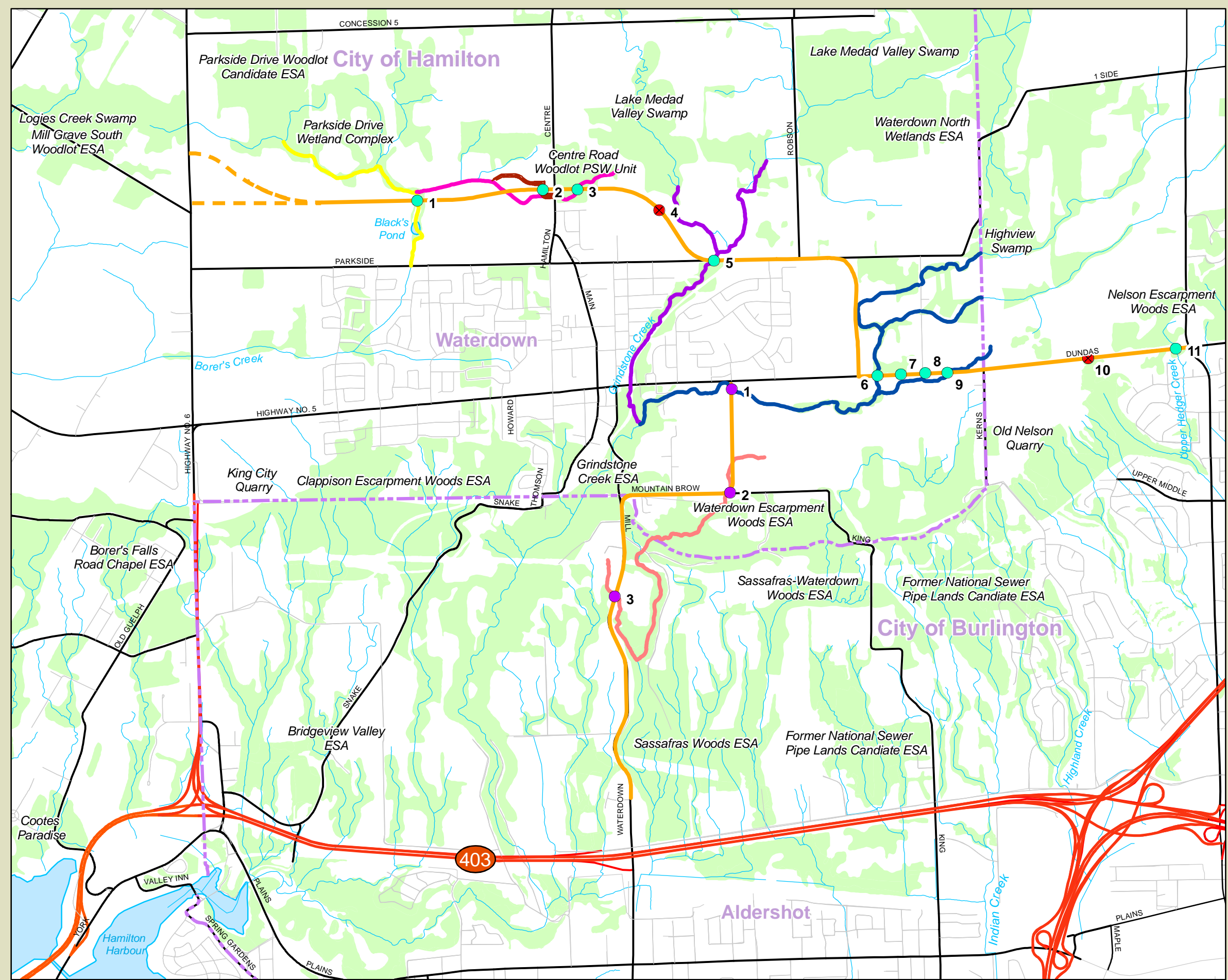
Please see **Figure 4-4** for orientation of watercourses within a regional context.

Historical Fish Species Information

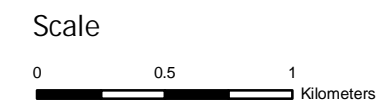
The existing Borer's Creek fishery information below pertains to the reaches upstream of Parkside Drive; specifically, a tributary that branches off to the northwest (known herein as the "Main Branch") and another tributary that branches off to the northeast (known herein as the "Eastern Tributary"), both of which converge just north of an online pond known as "Black's Pond" (see **Figure 4-4**).

Waterdown - Aldershot Transportation Master Plan

Figure 4.4: Aquatic Features



- Legend**
- 1 Waterdown Road Corridor Water Course Crossing
 - 1 East - West Corridor Watercourse Crossing
 - Drainage Conveyance
 - Main Branch (Borer's Creek)
 - Eastern Tributary (Borer's Creek)
 - Northwest Branch (Grindstone Creek)
 - Northeast Branch (Grindstone Creek)
 - Southern Branch (Grindstone Creek)
 - Preferred Alignment
 - Route to be Determined
 - Municipal Boundary
 - Proposed Borer's Creek West Tributary Alignment
 - Woodlot



Map Notes
 Map Created By: PJK/SFG
 Map Checked By: DR
 Date Created: April 5, 2006
 Date Modified: April 2, 2009
 File Path: I:\GIS\089020 - Waterdown\ Natural Environment Figures April 2009\ Mapping\Figure 6 Aquatic Features.mxd
 Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

Two species of fish were identified as 'Uncommon' according to the Fish Checklist for Halton Region. Specifically, the species were central mudminnow and largemouth bass. Only the largemouth bass was listed as 'Uncommon to Rare' in the City of Hamilton Natural Areas Inventory. Both of these species were identified in Borer's Creek as it passes near Parkside Drive. The remaining species were listed as 'Common'. No other regionally rare fish species were noted.

The historical fish community in both watersheds (above the escarpment) is indicative of typical warmwater habitats, dominated by tolerant baitfish. Many reaches in both systems contained northern pike and largemouth bass, which are top predators in warmwater systems. Pumpkinseed and brook stickleback were found in nearly all aquatic survey locations in both creek systems, while central mudminnow, creek chub, fathead minnow, and largemouth bass were also commonly observed in both watersheds. Central mudminnow prefers ponds or creek pools that are heavily vegetated with bottoms of organic material (Scott and Crossman, 1998). This observation might suggest that these systems transport and deposit significant amounts of detritus and sediment, combined with warm water and lower dissolved oxygen concentrations.

Largemouth bass and pumpkinseed typically inhabit shallow lakes and bays of larger lakes, and utilize submergent structure (i.e. logs, stumps) and both emergent and submergent vegetation as cover. They are nest-builders and are known to spawn in late spring to mid-summer (Scott and Crossman, 1998). Northern pike spawn on floodplains in the early spring, using emergent vegetation for attachment of their eggs (Scott and Crossman, 1998). Brown bullhead prefer shallow warm water habitat, and spawn over nests built in mud or aquatic vegetation.

For additional information on aquatic resources please refer to the complete Natural Environment Report located in *Appendix J*.

Field Work Results

Table 5 in *Appendix J* summarizes fish and fish habitat conditions observed during Dillon's field investigations, including preliminary sensitivity rankings at each of the anticipated watercourse crossings based on both existing and recent field observations. All potential watercourse crossings along the proposed New East-West Road Corridor in relation to the aquatic features are shown in *Figure 4-4, Aquatic Features*.

The proposed New East-West Road Corridor has nine watercourse crossings and two drainage feature crossings. The Grindstone Creek crossing at Parkside Drive (Crossing # 5) and the new Borer's Creek crossing (Crossing # 1) along the New East-West Road Corridor appear to be most sensitive to aquatic works due to their high sensitivity and fish habitat potential.

Borer's Creek – Main Branch/Black's Pond (Crossing # 1)

The proposed New East-West Road Corridor alignment crosses the main branch just downstream of the confluence with the Eastern Tributary (see *Figure 4-4*). Black's Pond is located south of the proposed crossing location. Although the photograph featured in *Exhibit 4-3* was taken at Parkside Drive (downstream of the actual a crossing), it serves as relevant representative depiction of current fish habitat conditions in this part of the watershed.

As seen in photograph, this creek conveys permanent flows and contains a typical warmwater fishery (both bait and sport fish). Habitat is best classified as mostly run morphology with decent canopy and in-stream cover. Substrate was predominantly rock and cobble on top of a clay base and covered with silt deposits. Fish were observed during field investigations. These conditions continue upstream up to, and including, the proposed crossing of the New East-West Road Corridor.



Exhibit 4-3: Borer's Creek at Parkside Drive

Borer's Creek – Eastern Tributary (Crossing # 2 and #3)

The proposed New East-West Road Corridor alignment crosses the Eastern Tributary at two locations as shown on *Figure 4-4*. As seen in the adjacent photograph (*Exhibit 4-4*), this tributary has been mostly altered to accommodate surrounding land use. Limited habitat is contained within steep and deep channel banks with little overhead canopy cover. Flow is intermittent and likely slow due to the presence and abundance of emergent in-stream macrophytes. Due to connectivity to downstream reaches containing fish, there is a possibility that hardy fish species periodically reach the culvert. The stream section that contains Crossing #2 is proposed to be realigned to the north using a natural channel design as part of adjacent development works.

There is no reasonable fish passage beyond the Centre Road culvert and into the wetland due to choked conditions, presence of riprap in the channel (barrier), and lack of a defined low-flow channel to convey sufficient depths to sustain fish. East of Centre Road there was a small defined channel as the gradient that dissipates into the woodlot headwater area of the PSW unit.



Exhibit 4-4: Borer's Creek Eastern Tributary

Drainage Conveyance (Crossing # 4)

The proposed New East-West Road Corridor alignment crosses a drainage feature that drains a catchment area west of the Northwest Branch of Grindstone Creek (see *Figure 4-4*). This drainage feature is considered direct fish habitat, as a defined bank and channel bottom are evident. This headwater area forms a small meadow marsh in the most upstream section. As it precedes east from the meadow marsh this drainage feature flows seasonally through a hedgerow, primarily subsurface.

Grindstone Creek – Northwest Branch (Crossing # 5)

The proposed New East-West Road Corridor alignment also crosses the Northwest Branch of Grindstone Creek at Parkside Drive (see **Figure 4-4**). The adjacent photograph (*Exhibit 4-5*) was taken from Parkside Drive looking upstream where the proposed crossing is located. As seen in photograph, this creek conveys permanent flows and contains a typical warmwater fishery (both bait and sport fish). Habitat is best classified as mostly run morphology with decent canopy but limited in-stream cover. The substrate was predominantly a mix of rock, cobble, and gravel on top of a clay base and covered with silt deposits. Fish were not seen during field investigations; however, the community has been well documented in previous literature. It should be noted that other road construction works were ongoing at the time of investigation which had disturbed portions of the adjacent banks and riparian vegetation.



Exhibit 4-5: Grindstone Creek Northwest Branch

Grindstone Creek – Northeast Branch (Crossing # 6)

The proposed New East-West Road Corridor crosses the Northeast Branch of Grindstone Creek at several locations. The representative photograph included to the right (*Exhibit 4-6*) was taken from Dundas Street looking downstream at Crossing # 6. As seen in Exhibit 4-6, this watercourse was flowing at the time of survey (100% run morphology) but does dry up during the summer months. During active flow, a warmwater fish community exists and likely over-summerers within limited refuge pools, mostly confined to the road culverts themselves. There is moderate overhead cover and limited in-stream cover. The substrate was predominantly a mix of rock, cobble, and gravel on top of a clay base and covered with silt deposits. During field investigations, numerous fish were seen congregating in deep refuge pool within the culvert itself.

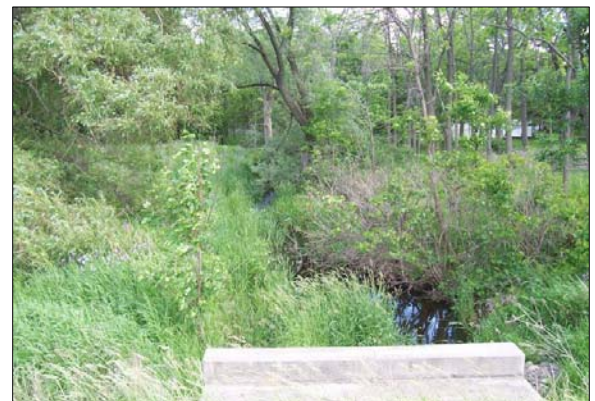


Exhibit 4-6: Grindstone Creek Northeast Branch

Grindstone Creek – Northeast Branch (Crossings # 7 and # 8)

Crossings #7 and #8 of the Northeast Branch of Grindstone Creek are similar in terms of the manicured landscape habitat type upstream of the culverts on the north side of Dundas Street. The representative photograph to the right (*Exhibit 4-7*) was taken from Dundas Street looking downstream at Crossing #8 of the proposed New East-West Road Corridor. This watercourse was dry and swale-like at the time of survey, but does flow intermittently during the spring months. Even during active flow, it not likely that fish migration is possible between downstream and upstream areas due to the fact that upstream of the culverts, aquatic habitat is limited to roadside ditches. There is low overhead cover and poor in-stream cover on either side of Dundas Street, as the swale runs through this manicured landscape. For a short distance downstream (south) of Dundas Street, there is no defined channel to convey low flows, as the flow meanders through swales and marsh areas.



Exhibit 4-7: Grindstone Creek Northeast Branch

Grindstone Creek – Northeast Branch (Crossing # 9)

This crossing of the Northeast Branch of Grindstone Creek is significantly different from the previous one in terms of habitat type. The representative photograph to the right (*Exhibit 4-8*) was taken from Dundas Street looking upstream from the proposed New East-West Road Corridor crossing site. As seen in the photograph, this watercourse was dry at the time of survey (exhibiting predominately swale-like conditions) but does flow during the spring months. During active flow, it is possible that existing upstream and downstream ponds are connected allowing a warmwater baitfish community to travel between the two where they likely remain over-summer and over-winter. There is low overhead cover but decent in-stream cover during active flow due to the abundance of emergent macrophytes. The substrate was predominantly detritus and silt. For a short distance downstream of Dundas Street, there is no defined channel to convey low flows, which has resulted in wide swale-like section.



Exhibit 4-8: Grindstone Creek Northeast Branch

Drainage Conveyance (Crossing # 10)

The proposed New East-West Road Corridor alignment crosses an existing drainage feature that drains a catchment area north of Dundas Street in the Upper Hager Creek subwatershed (see *Figure 4-4*). This drainage feature is not fish habitat as flows are never sufficient to allow upstream fish passage downstream of the culvert. This headwater area is conveyed along a roadside ditch upstream of the culvert. As it proceeds south from the culvert this drainage feature flows seasonally through woodlands prior to forming an intermittent channel approximately 200 m south of Dundas Street.

Upper Hager Creek – (Crossing #11)

Crossing #11 is a large culvert that crosses Dundas Street just west of Brant Street. Northwest of the crossing a wooded escarpment is the headwater area for this tributary. Surface water in this headwater area drains south to the culvert. South of Dundas Street (see photograph to the right (*Exhibit 4-9*) looking north), a defined channel with a silty-clay bottom is formed. The watercourse meanders south from the culvert through a manicured landscape with sparse to moderate vegetative cover on the banks and minimal in-stream emergent vegetation.



Exhibit 4-9: Upper Hager Creek

4.3.7 Drainage

The objectives of the drainage study were to evaluate the impacts of the proposed roadway improvements on the surface water systems, to assess potential impacts of roadway runoff on receiving watercourses, and to assist in the selection of appropriate management measures. The drainage study results will provide input and guidance to the detailed design process with the objective of achieving protection, preservation, and enhancement of the local subwatershed environments.

4.3.8 Data Collection

Background studies and information were collected and reviewed, and conditions associated with the road development were considered in the drainage analysis. Below is the list of documents reviewed:

Upcountry Estates Environmental Implementation Report, Paragon Engineering Ltd., May 1996

This Environmental Implementation Report was prepared in support of the Upcountry Estates development which is located within the New East-West Road Corridor study area. A preferred management strategy was proposed to maintain and enhance the natural environmental features within the Grindstone Creek subwatershed. A conceptual landscape restoration and rehabilitation plan was proposed for the reach of the Grindstone tributary along the east boundary of the Upcountry development site but with no consideration of the proposed roadway at that time. This conceptual stream corridor rehabilitation plan was considered in the New East-West Road Corridor drainage analysis.

Grindstone Creek Watershed Study, Conservation Halton, June 1998

In this study, the entire Grindstone Creek watershed was divided into four subwatersheds. Regeneration plans for each area were prepared to promote the integrity and legacy of the creek. The areas identified in the regeneration plans are located within the EA study area and therefore have been considered in the drainage analysis.

Waterdown North Master Drainage Plan (Waterdown North MDP), Philips Engineering Ltd., February 2007

This study provides hydrologic and hydraulic analysis results of the Borer's Creek watershed and recommended strategy for managing storm runoff from the proposed Waterdown North development. Stream flows derived from the continuous simulation by the hydrologic model QUALHYMO were used in the HEC-RAS model to evaluate existing and future hydraulic condition of the creek. The recommended stormwater management plan for the Waterdown North includes on-site detention ponds, stream realignment, and crossing structures along the proposed New East-West Road Corridor. The preferred stormwater management plan was incorporated into the road drainage stormwater management strategy.

4.3.9 Hydraulic Assessment

The evaluation of hydraulic conditions for the existing and proposed road crossing structures is summarized in the sections below. Detailed hydraulic and hydrological modelling outputs are provided in *Appendix C*.

Road Drainage Area Characteristics






The New East-West Road Corridor crosses two watersheds - the Borer's Creek and the Grindstone Creek in the jurisdictions of Hamilton Conservation Authority (HCA) and Conservation Halton (CH). The drainage features and road crossing structures are presented in *Figure 4-5*.

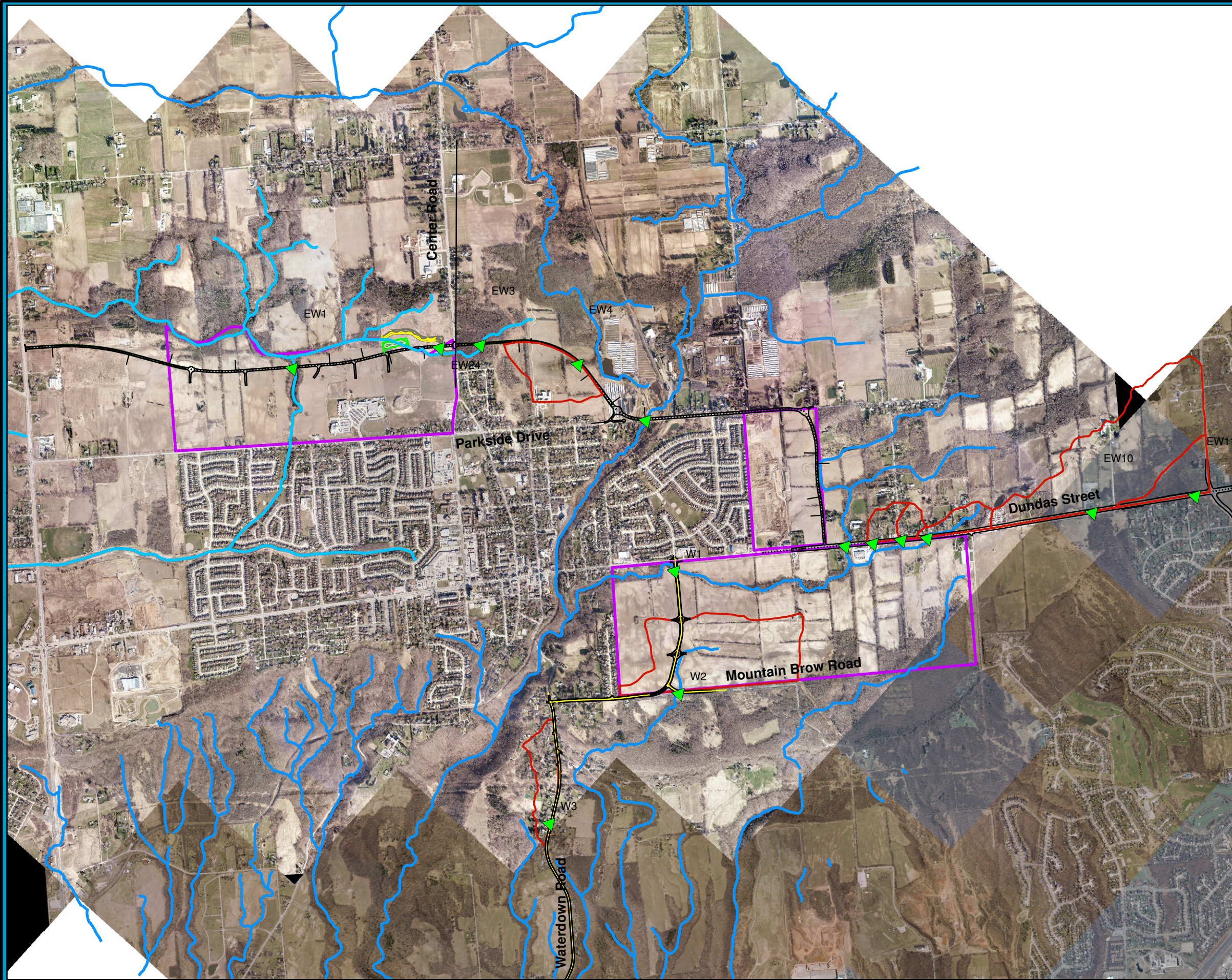
A total of 11 crossing structures associated with the New East-West Road Corridor improvements have been evaluated. Some are proposed new structures, while others are existing structures which are proposed to be extended or replaced due to road improvement works.

Proposed New East-West Roadway

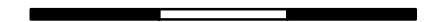
Figure 4.5 Road Crossing Structures

Legend

-  Road Crossing Structure
-  Catchment to Structure
-  UrbanExpansionBoundary
-  Borer's Creek System
-  Grindstone Creek System



Meters
1:25,000
425 212.5 0 425 850



Notes:
Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

Please note that the land uses depicted on this map reflect the land uses derived from the City of Hamilton and City of Burlington OPs and airphotos in order to derive the nature of the land use. Areas along Waterdown Road were classified as residential.



4.4 Geotechnical and Geo-Environmental Site Assessments

4.4.1 Geotechnical

A preliminary geotechnical investigation was conducted as part of this study. The primary objective was to provide information concerning the composition of the soil along the study corridor as well as the depth to bedrock at the structure locations to enable preliminary planning of road grades, site grading and construction work, design of the pavement structure and foundations for structures that may be required, and, finally, to identify constraints that may impact detailed design of the alignment.

The terrain is relatively flat to gently rolling except at the crossings of Borer's Creek west of Centre Road and Grindstone Creek on Parkside Drive, as well as near the east end of the study corridor where Dundas Street descends the Niagara Escarpment west of Brant Street. Topographic features to be considered for this project (from west to east) include:

- Borer's Creek crossing between Centre Road and Highway 6.
- wood lot crossing east of Centre Road.
- pedestrian walkway crossing east of Centre Road.
- Grindstone Creek crossing on Parkside Drive.
- the culvert under Dundas Street.
- the rock cut west of Brant Street.

The composition and quality of the rock exposed in the rock cut on Dundas Street west of Brant Street varies considerably both vertically and horizontally. The west section of the rock cut is about 1.5 m high and the rock changes from a dolostone/limestone at the west to a shaley limestone at the east of this section. The joint sets are widely spaced and the bedding planes range from close to moderately close. The eastern section of the rock cut ranges in height from 2 to 10 m with moderately close to wide joint sets and bedding planes. The rock in this zone consists of limestone.

The central portion of the rock cut is about 10 m high and consists of hard dolostone/limestone interbedded with shale/shaley limestone. Both the joints and bedding planes in the dolostone/limestone are moderately close to wide. The joints in the shale are close to wide; the bedding planes are close to moderately close. Blocky/disturbed sections of rock were also observed.

Published geologic maps indicate the overburden soil along the study corridor primarily consists of Halton Till, a layered deposit of silty clay and clayey silt till. The section north of Parkside Drive is near the boundary between deposits of lacustrine and outwash sand and the Halton Till. The drift thickness varies from 9 m to 12 m at Highway 6 and decreases towards the east to 6 m to 8 m where the alignment joins Dundas Street and is in a bedrock outcrop where it crosses the Niagara

Escarpment west of Brant Street. Bedrock along the proposed corridor consists of argillaceous dolostone and shale of the Lockport Formation.

The field work consisted of 13 boreholes typically advanced to depths of 3.5 m except at the location of structures at creek crossings and the walkway that were extended further to assumed bedrock. A borehole planned on the east side of Centre Road could not be drilled due to access constraints imposed by the heavily wooded area, the steeply sloped road embankment and the wet terrain. The composition of the soil within the wood lot was assessed by probing with a steel rod and correlation with the data revealed in the adjacent boreholes.

The subsurface stratigraphy revealed in boreholes drilled along the study corridor was somewhat variable. Sand and/or silty soils overlying/interlayered with silt till or clay till were the predominate soil deposits encountered below the surficial topsoil or fill to a depth of 3.5 m in the holes drilled between Highway 6 and Grindstone Creek. Near the Borer's Creek crossing, the sand was underlain by silt till; bedrock was encountered at a depth of 6.9 m, near elevation 227.6.

A borehole drilled near the proposed walkway encountered silty sand throughout the depth of sampled drilling; bedrock was assumed when auger refusal was met at 12.8 m, near elevation 229.7. The sand in a borehole drilled at the Grindstone Creek crossing was underlain by silt till and bedrock was inferred at a depth of 8.8 m, near elevation 225.0.

Probing in the woodlot east of Centre Road indicates soft/wet organic rich soil extends to a depth of 300 to 500 mm in this area and this soil is underlain by silt till. East of Grindstone Creek clayey silt/silty clay till was encountered below the surficial topsoil to the maximum depth of drilling. At the culvert crossing on Dundas Street, bedrock was inferred at a depth of 2.6 m.

Groundwater was observed in all boreholes except Borehole 9 and 13 during or at the completion of drilling at depths varying from 0.8 to 3 m. All Boreholes except 2, 9 and 13 caved at depths varying from 1.2 to 3.7 m on completion of drilling.

A full copy of the Geotechnical report is found in *Appendix F*.

4.4.2 Geo-Environmental Assessment

A Modified Phase I Environmental Site Assessment (ESA) was conducted to evaluate the potential for contaminants to exist along the corridor. The Modified Phase 1 ESA was also completed to document present land uses (refer to *Appendix G*). The Modified Phase I ESA identified several potential sources of contamination (PSC) at the time of this assessment that could impact the project, as outlined below.

PSC 1

Given the historical and existing use of a majority of this site and surrounding lands for agricultural purposes; there is the potential for contamination from pesticide and herbicide residues.

PSC 2

The potential exists for surface and/or subsurface contamination from road runoff including metals, pH and organic compounds, and compounds such as salt deposited on the road.

PSC 3

Given the presence of the CP Rail Line that crosses the Parkside Drive alignment east of Grindstone Creek; there is a potential for contamination from the possible use of slag ballast as well as possible spills from rail cars, which may include metals, Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs) and Petroleum Hydrocarbons (PHCs).

PSC 4

Given the presence of petroleum pipelines crossing this site; there is a potential for contamination in the event of pipeline leaks, spills or discharges, which may include metals, VOCs and PHCs.

PSC 5

Given the industrial operations at the Opta Minerals property and the storage of industrial wastes and material from site remediation; depending on waste handling/storage practices, the presence of aboveground storage tanks/underground storage tanks (ASTs/USTs) and chemicals used/stored at the property there is a potential for contamination including metals and inorganic parameters, VOCs, PHCs, Polychlorinated Biphenyls (PCBs) and PAHs.

PSC 6

The operation of at least five former and two current gas stations on Dundas Street East; in the event of spills, leaks or discharges indicates that there is a potential for contamination from materials such as metals, VOCs and PHCs.

PSC 7

Given the presence of a contractor's yard on Dundas Street; there is a potential for contamination from the maintenance and storage of heavy equipment and fuel storage including metals, VOCs and PHCs.

Regarding PSC 1, the potential for pesticide and herbicides residues would be predominantly limited to areas of continued, historic agricultural use and areas along the roadways that may have been sprayed for weed control. Based on our experience with similar projects however, elevated levels of pesticides and herbicides are not usually encountered above the applicable standards. In this regard, sampling and testing for pesticides/herbicides is not warranted at this time.

Regarding PSC 2, the potential for contamination from metals, pH and salt has been assessed as part of the geo-environmental screening component of this project. In addition, no visual or olfactory evidence of

contamination such as petroleum hydrocarbons (gas, diesel, oils) was noted in the samples obtained from the boreholes.

With respect to PSC 3 through 7 and given that none of the boreholes advanced during the geotechnical investigation were in these areas, it would be prudent to complete a geo-environmental soil sampling and chemical testing program to determine if the PSCs have impacted the road corridor. Alternatively, geo-environmental evaluation of these areas may be carried out during the construction phase, as the road works pass by the PSC locations.

It is noted that the road corridor is considered an “environmentally sensitive site” according to Section 41 of Ontario Regulation 153/04 due to its proximity to water bodies and since portions of the property are located within an area of natural significance.

The results of chemical analyses indicate that the tested soil samples complied with allowable background levels (Table 1 Standards), with the exception of Sodium Adsorption Ratio (SAR) in 4 of the 40 tested samples. When compared to the MOE Table 2 standards (potable ground water condition) and the Table 3 standards (non-potable ground water condition) for residential/parkland/institutional (R/P/I) property use, the measured concentrations of the tested parameters met the standards, with the exception of SAR in three of the 40 samples. When compared to the MOE Table 2 standards (potable ground water condition) and the Table 3 standards (non-potable ground water condition) for industrial/commercial/community (I/C/C) property use, the measured concentrations of the tested parameters met the standards.

The test results indicate the elevated levels of SAR were limited to the area of three boreholes. Soil in the area of Boreholes 1, 10 and 13 had levels exceeding the Table 1 standards and the Table 2 and 3 standards for R/P/I property use. Due to these elevated SAR levels, surplus soils from these areas may only be re-used off site at I/C/C property use locations.

It is noted that SAR is a physical, non-health related parameter typically affecting vegetation, and exceedances of this parameter are relevant to soils that must support plant growth. SAR levels are usually an indication of salts within the soil, and may include de-icing salts. Where a standard is exceeded solely because a substance has been used on a roadway for purposes of keeping traffic safe under conditions of snow and ice, the applicable site condition standard is deemed not to be exceeded. Accordingly, the surplus site material can be re-used on site and in locations where paved surfaces are to be constructed and continued de-icing salt applications can be expected to occur for traffic safety. In this regard, the elevated levels of SAR should not pose an environmental concern to the new road facilities and construction activities in the corridor. A full copy of the Phase 1 ESA Report can be found in *Appendix G*.

4.5 Well and Groundwater Assessment

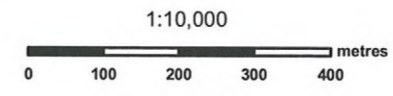
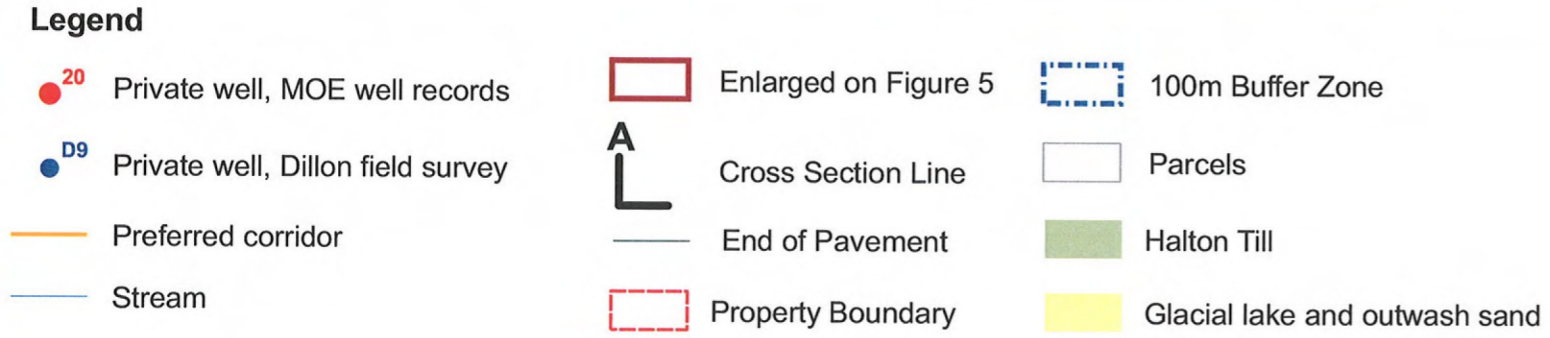
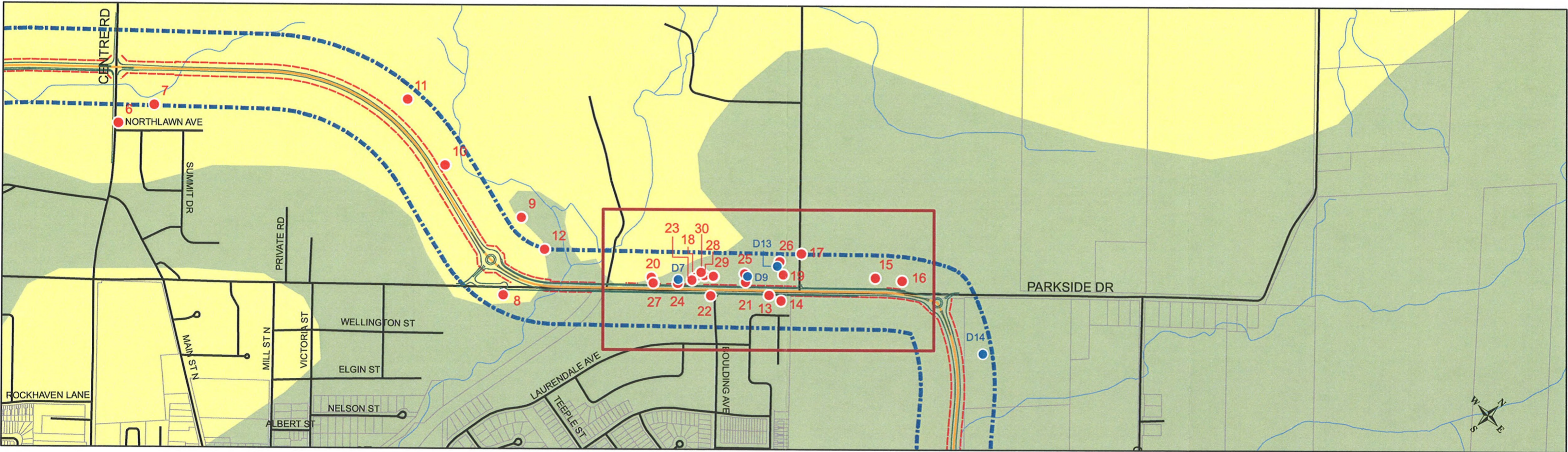
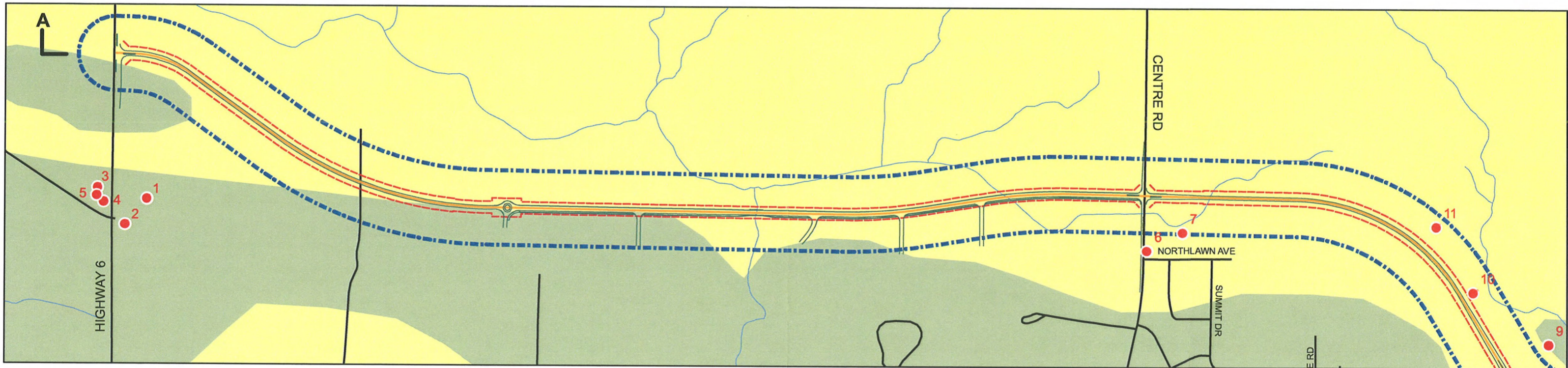
4.5.1 Introduction

The purpose of the well and groundwater assessment component of the Class Environmental Assessment was to assess the potential impacts of the proposed road construction on the groundwater system and private groundwater users along the preferred New East-West Road Corridor. This assessment was based on published geological reports and maps, Ministry of Environment (MOE) computerized well record data base, and a field survey of private wells along the corridor. The MOE records indicated 60 wells located within a 100 m wide zone along the preferred corridor. The computerized MOE records of these wells are in *Appendix K*. Selected information was extracted from these records and presented in a more usable form in *Table 1 of Appendix K*, and this provided the main data set for this assessment. A field survey was also done of private wells along the preferred corridor within the 100 m zone (*Figures 4.6 and 4.7*). A total of 29 wells were identified along the corridor, and the results are summarized in *Table 2 in Appendix K*.

4.5.2 Hydrogeology

Geological Setting

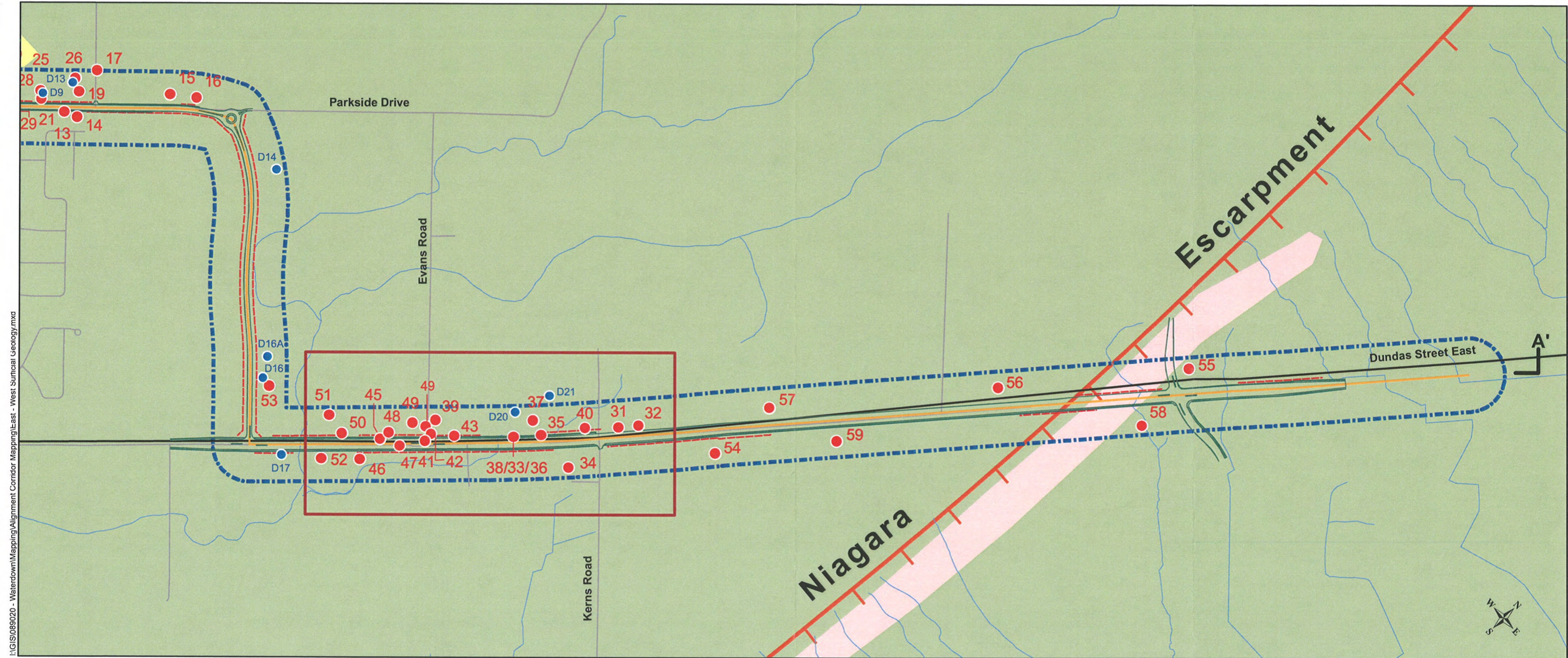
The regional geology in the area around the New East-West Road Corridor consists of glacial overburden overlying Paleozoic dolostone bedrock, and has been described by Karrow (1987), Johnson et al (1992), and the Ontario Geological Survey (OGS, 1982, 1984). The information from these reports was supplemented by geological logs in the MOE well records of private wells along the preferred corridor. The surficial geology along the corridor is shown in cross-Section A-A' in *Figure 4-8*. The Niagara Escarpment forms a cliff about 300 m high that trends northeast-southwest across the study area and is the major physiographic and geological feature in the area. The New East-West Road Corridor lies mostly above the Escarpment except for a small portion at the east end. Streams on the flat area above the Escarpment drain south-eastward off the Escarpment to Lake Ontario, the most prominent being Grindstone Creek. Cross-Section A-A' was constructed using the MOE well records of the private wells, and illustrates elements of the geology and hydrogeology along the corridor, including surface topography, topography of the bedrock surface, overburden thickness and the approximate position of the water table. Cross-Section A-A' shows that the ground surface reflects the highs and lows of the bedrock surface. Paleozoic bedrock formations are not differentiated.



Notes:
 Geology based on Karrow (1987).
 Private wells from MOE records summarized in *Table 1*
 Private wells from Dillon field survey summarized in *Table 2*
 MOE = Ministry of Environment

Private Wells and Surficial Geology Along the New East-West Road Corridor

Figure 4.6



Legend

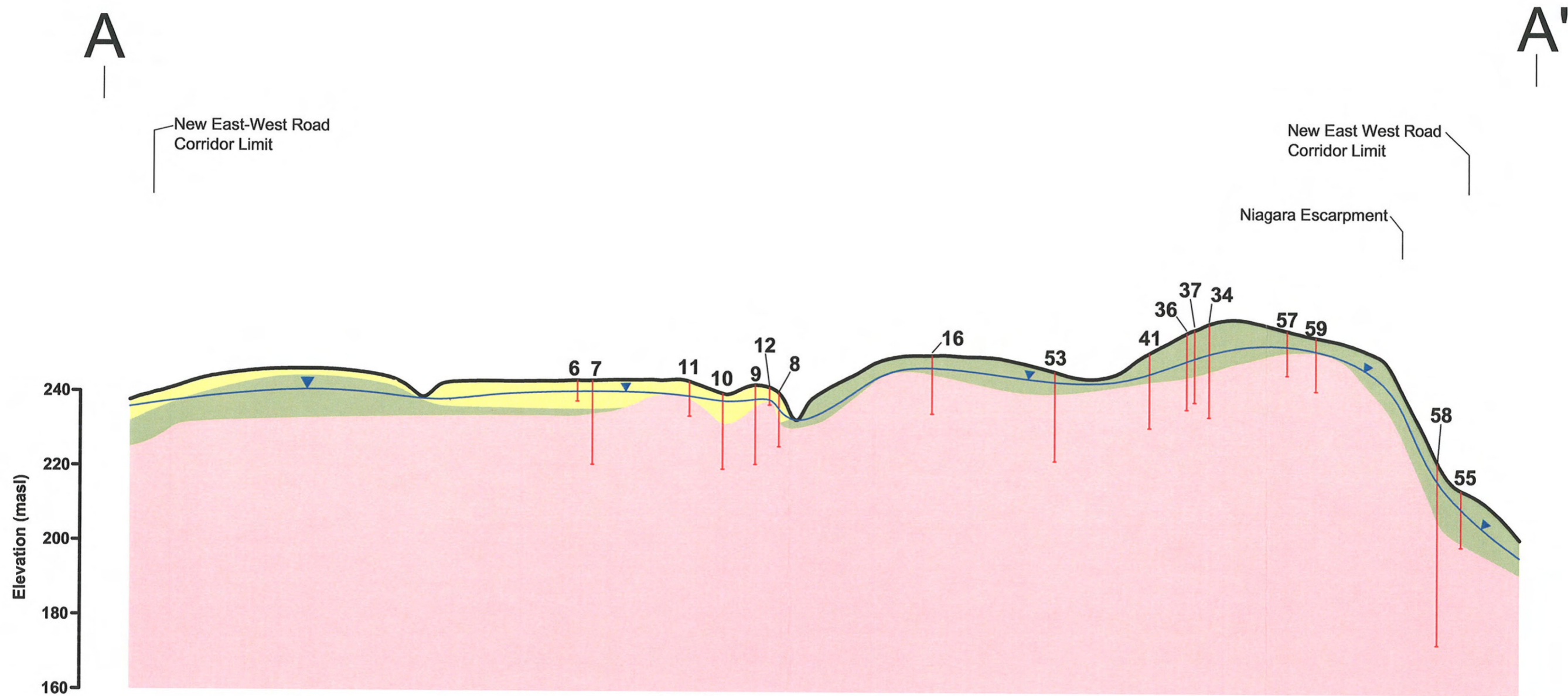
- ⁴² Private well, MOE well records
- ^{D14} Private well, Dillon field survey
- Preferred corridor
- Stream
- Niagara Escarpment
- A' Cross Section Line
- End of Pavement
- Property Boundary
- 100m Buffer Zone
- Parcels
- Halton Till
- Bedrock
- Enlarged on Figure 5



Notes:
 Geology based on Karrow (1987).
 Private wells from MOE records summarized in *Table 1*
 Private wells from Dillon field survey summarized in *Table 2*
 MOE = Ministry of Environment

Private Wells and Surficial Geology Along the New East-West Road Corridor		
	Figure 4.7	

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Legend

- Glacial lake and outwash sand
- Halton Till
- Bedrock (undifferentiated dolostones and shales)
- Water table (approximate)
- Private well

Notes:

Geological interpretation based on MOE well records (*Appendix A* and *Table 1*).
 Surface topography based on NTS sheet 30 M/5, 1:50,000.
 Cross-section line shown in *Figure 2*.
 Vertical exaggeration=25x.

<p>New E-W Road Class Environmental Assessment Hwy 6 to Brant</p>
<p>Figure 4.8 Cross-section A-A'</p>

Bedrock

The Amabel Formation forms the caprock of the Niagara Escarpment in this area, and is an important regional aquifer in Southern Ontario. Underlying the Amabel is the Queenston Formation, which consists mainly of red shale, and is exposed along streambeds below the Escarpment. The bedrock formations dip gently toward the southwest. Along the corridor east of Robson Road and above the Escarpment, the area has been referred to in OGS (1982, 1984) as a bedrock resource area. Quarries occur in the area to extract rock from the Amabel Formation for crushed stone, though there are no quarries near the corridor.

Overburden

The overburden in the study area consists of a regional till blanket (mainly Halton Till in this area) deposited by the advancing glacial ice, which is overlain in west of Waterdown by a deposit of glacial lake sand. The Halton Till is a low-permeability clay-silt unit that extends as a sheet across much of the area, and is generally the basal overburden unit in the area, except locally west of Waterdown, where the glacial lake sand rests directly on the bedrock (Wells 8 to 12). The glacial lake sand is a generally fine-grained, deep-water sediment (Karrow, 1987). The overburden thickness along the corridor as interpreted from cross-section A-A' ranges from 4 to 13 m, and averages about 8 m. The glacial lake deposit west of Waterdown was mapped as a sand and gravel resource area in OGS (1984), although no extraction pits were indicated along the corridor.

Groundwater Flow

The depth to the water table along the corridor is estimated at about 1 m, based on the MOE records. The reported static water levels in wells in **Table 1 in Appendix K** do not represent the water table, but rather piezometric levels of deeper zones in the bedrock. Groundwater generally flows southward and discharges to Lake Ontario. The predominant vertical component of groundwater flow is downward from the water table through the till and granular overburden and into the underlying bedrock. The plot indicates a strong vertical downward hydraulic gradient of about 0.9 m/m in the bedrock above the Niagara Escarpment. This means that groundwater moves downward from the water table, through the Amabel Formation toward deeper zones in the bedrock.

Potential Impacts of Road Construction

Potential impacts on wells due to external factors generally fall into two categories: impacts on groundwater quality and impacts on groundwater quantity. This section discusses each of these potential impacts on the private wells along the New East-West Road Corridor. Based on the available information we consider it unlikely

that the proposed road construction will cause any significant impacts on private wells along the corridor.

Potential Impacts on Groundwater Quality

This project will involve a new road and the widening of existing roads by about 3.5 m on each side. This proposed widening will reduce the setback from the widened road allowance of the existing wells on lots along the corridor. The reduced setback, combined with the increased traffic, could make some of the existing wells more susceptible to inflow of contaminants from surface sources, particularly road salt. The susceptibility of an individual well will depend on a number of factors, including the integrity of the well construction, the well's setback, the depth of the well and the type of the surficial geological material. In wells that are (possibly) improperly constructed, contaminants such as road salt that may be present at the water table along the road could reach the well intake by inflow along the annulus of the well (the clearance between the casing and the formation). Alternatively, such contaminants could migrate downward from the water table to the well intakes in the bedrock under the strong downward hydraulic gradient that exists in the saturated zone. The risk of downward migration is relatively low where the surficial material is low-permeability till. In the area of glacial lake sand west of Robson Road the potential for downward migration would be greater due to the higher permeability of the sand, particularly where the sand directly overlies the bedrock (Wells 8 to 12). The potential for downward migration is mitigated by the fact that almost all the wells in the MOE well records are deep bedrock wells. Of the 60 listed wells, 54 wells are >10 m deep with 14 of these wells being >20 m deep. The 6 relatively shallow (<10 m deep) wells (Wells 3, 5, 12, 18, 39, 41) are all located in the lower-risk till area.

Potential Impacts on Groundwater Quantity

Impacts on the groundwater quantity in wells (i.e. those involving a reduction in yield or an increase in drawdown) are typically caused by interference from another pumped well nearby. In this case, the proposed road construction along the preferred corridor will not have any foreseeable such impacts on the local wells, because the construction activities will not involve any groundwater extraction. In addition, no significant road cuts are proposed in areas where nearby wells exist.

4.6 Socio-Economic Environment

The proposed New East-West Road Corridor is located in both the City of Hamilton and the City of Burlington in Halton Region. The study area extends from Highway 6 north of 4th Concession to the Dundas Street and Brant Street intersection. Geographically, the section within

Hamilton has the characteristics that qualify it as a prime agricultural area. Over 60% of the total land base in the City of Hamilton is farmed, and 70% of those 140,000 acres within the Hamilton boundary qualify as prime agricultural land (My Hamilton 2008). Leading crops in the area include nursery products, greenhouse products, vegetables, poultry and egg, and cattle (City of Hamilton Agriculture Economic Impact and Development Study 2003). The New East-West Road Corridor is characterized with farming and related business, and is interspersed with small commercial activities and industrial minerals. The section within Halton Region (east of Kerns Road) is also rural in nature with environmental areas north of Dundas Street (Nelson Escarpment Woods). This portion of the corridor is dominated by the crossing of the Niagara Escarpment.

4.7 Existing Land Use

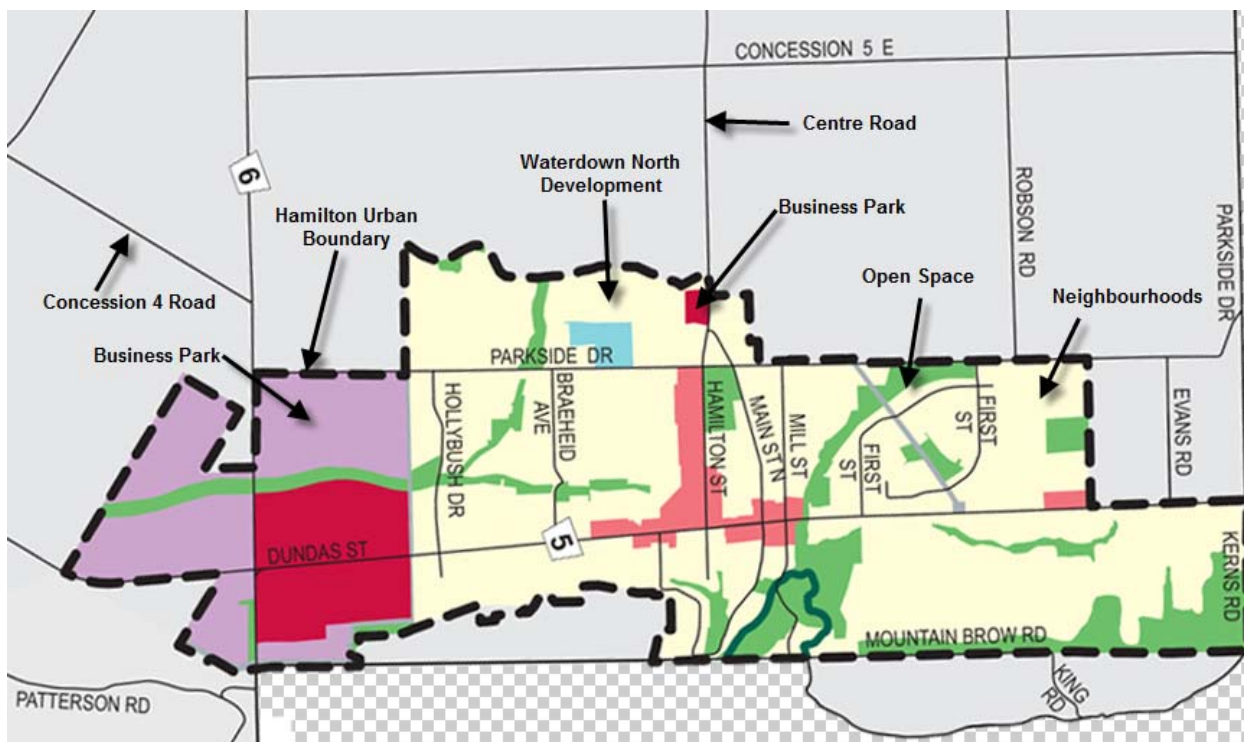
4.7.1 Residents and Recreation Community Features

The North Waterdown Development is located between Highway 6 and Centre Road. The proposed road runs directly north of the development. Approximately 300 meters south of the New East-West Road is a community use area that houses the YMCA, Allan G. Greenleaf Elementary School, and Waterdown District High School (*Exhibit 4-10*). Refer to *Figure 4-9* for the Hamilton Urban Land Use designations in the area.



Exhibit 4-10: Waterdown District High School

Figure 4-9: Hamilton Urban Area



The New East-West Road Corridor crosses Centre Road approximately 100 metres north of Northlawn Avenue. Eight homes back onto the woodlot that the proposed road intersects. East of the woodlot, the proposed road crosses the Joe Sam's Park Trail. The trail runs north-south from Joe Sam's Park down to Parkside Drive. Alexander Place nursing home is located north of Parkside Drive, adjacent to the Joe Sam's Park Trail.

Sixteen houses are located on the north side of Parkside Drive between the Grindstone Creek and Robson Road. An additional house is adjacent to the road with access via Robson Road. Five residences are located on the south side of the intersection of the New East-West Road Corridor with Parkside Drive.

To the south of Parkside Drive at Robson Road is the Upcountry Development. A total of approximately 700 homes are approved for building in Phases 1 and 2 of the development. The New East West Road Corridor curves south from Parkside Drive east of Robson Road and runs south along the east side of Upcountry Estates where it then intersects with Dundas Street.

The proposed road travels along Dundas Street to just east of Brant Street. This area along Dundas Street is primarily comprised of commercial and agricultural land, woodlots, and escarpment. Many of the residential properties in this section are single-detached houses and are associated with agricultural or rural use and related activities.

Nineteen houses front Dundas Street on the north side. Two houses are located on the south side. Bethel Christian Reform Church (*Exhibit 4-11*) is located on the south side of Dundas Street, west of Kerns Road. The section of road east of Kerns Road to Brant Street has several long residential driveways. The Canadian Reformed Church is situated on the north side of Dundas Street. Access to the Bruce Trail is located on the south side of the road.

4.7.2 Agriculture and Businesses

The Imperial Mushroom Company Limited is located off of Highway 6, south of the proposed route. Much of the existing land between Highway 6 and Centre Road is agricultural, however a significant portion of the area is set for residential development.

The New East-West Road Corridor intersects Parkside Drive west of Connon Nursery's production yard (*Exhibit 4-12*). Connon Nurseries is a grower, wholesaler, and retailer of plants and garden products. A series of greenhouses and outdoor crop areas are located east of the new road corridor immediately north of Parkside Drive. Connon Nurseries' head office and sales yard is located on Robson Road, north of Parkside Drive.



Exhibit 4-11: Bethel Christian Reformed Church



Exhibit 4-12: Connon Nurseries Production Yard on Parkside Drive



Exhibit 4-13: Opta Minerals Inc. on Parkside Drive

Opta Minerals Inc. (*Exhibit 4-13*) is located east of the Grindstone Creek crossing and the Canadian Pacific Railway, and north of Parkside Drive. During a meeting between Opta Minerals and Dillon, Opta Minerals indicated that their operations include the production of a magnesium-lime mixture (steel production alloy) and the production of slag from smelting plants into sand blasting materials.

The section of proposed roadway along Dundas Street contains many commercial properties, including a shopping plaza, Tim Hortons, and Sherry's Sauces and Such. Across the road from the shopping plaza is a chicken farm with products for sale on site. A Pioneer Gas station is located at the intersection of Dundas Street and Evans Road. Further east is a metal yard containing small vehicles as well as heavy equipment such as tractors, trucks, and excavators.

4.7.3 Archaeological Resources

A Stage 1 Archaeological Assessment was completed for the New East-West Road Corridor to be constructed on undeveloped land north of Parkside Drive between Highway 6 and Robson Road and north of Dundas Street between Robson Road and Evans Road in the City of Hamilton. The Stage 1 Archaeological Assessment was also completed for the proposed widening along Parkside Drive between Centre Road and Robson Road and Dundas Street between Evans Road and Brant Street. The Stage 1 Archaeological Assessment included a review of archival material and a site reconnaissance.

The assessment of archaeological potential for the corridor considered both prehistoric and historic period resources. Archaeological potential modeling for prehistoric era sites is based largely on the identification of landscape features which are either known to have attracted past habitation or land use, or which appear to have potential for attracting human use. These features include: navigable rivers and lakes; confluences of watercourses; smaller sources of potable water; ridges or knolls that overlook areas of resource potential; outcrops of high-quality stone for tool making; and, most importantly, combinations of these features. In general it has been demonstrated that areas within 200-300 m of watercourses, or other significant bodies of water (ASI, 1990; Cox, 1989), and in particular those areas with multiple water sources (Young et al., 1995), are considered to be of elevated archaeological potential.

Patterns of land use by historic Euro-Canadians to some extent mirror those of the prehistoric period. This is not surprising, since the same general needs must be met, i.e. proximity to potable water, access to natural resources, and a level, well drained habitation site. On the other hand, the Euro-Canadian conversion of both fertile and more marginal land for agricultural purposes, the development of non-water travel routes, the exploitation of different resources such as subsurface mineral deposits, and other differences in land use patterns make potential modeling of Euro-Canadian and other non-Aboriginal historic sites somewhat less reliable. Fortunately, these sites are more visible than their prehistoric counterparts, which helps offset this lower level of predictive reliability.

With well-drained soils, access to several watercourses, and proximity to a prominent vantage point at the Niagara Escarpment, the project area demonstrates many of the preferred landscape features associated with the presence of archaeological sites. Areas having elevated potential for undiscovered archaeological resources may require Stage 2 Archaeological Assessment, depending upon final project design.

The complete Stage 1 Archaeological Assessment Report can be found in *Appendix H*.

4.7.4 Built Heritage Resources and Cultural Lands

A Built Heritage Assessment was completed for undeveloped land north of Parkside Drive between Highway 6 and Robson Road and undeveloped land north of Dundas between Robson Road and Evans Road, in the City of Hamilton. Land along both sides of Dundas Street between Evans Road and Brant Street, in the City of Burlington was also included in the assessment. The assessment included a review of archival material and a windshield survey. In addition to several historic period residences previously identified as buildings of heritage interest, the current assessment identified one further building of potential cultural heritage significance. Only one of the identified resources had the potential for direct impact (Highway 6 at Concession 4 Road) and this impact was addressed through locating the new road well north of the property.

For the complete Built Heritage Assessment, see *Appendix I*.

4.8 Infrastructure

4.8.1 Road Network

PARKSIDE DRIVE

Parkside Drive is classified as a minor east-west arterial road in the City of Hamilton's Official Plan. Parkside Drive supports a considerable volume of east-west commuter traffic from the Waterdown community. At its west terminus, Parkside Drive connects with Highway 6 at a signalized T intersection. The municipal boundary with the City of Burlington represents the east terminus for Parkside Drive, at which point it feeds into Milborough Townline. The current posted speed limit on Parkside Drive is 60 km/h east of Grindstone Creek, and 50 km/h west of Grindstone Creek. Within the project limits, Parkside Drive is intersected by the following roads:

1. **Boulding Avenue**: This road is under the jurisdiction of the City of Hamilton and is located approximately 300 m east of the existing CP Rail line crossing. Boulding Avenue connects with Parkside Drive on the south side only, forming a T type intersection. The intersection is currently stop-controlled with

traffic on Boulding Avenue yielding to traffic on Parkside. Boulding Avenue serves as a collector road for the subdivision development on the south side of Parkside Drive.

2. **Robson Road:** This road is under the jurisdiction of the City of Hamilton and is located approximately 230 m east of Boulding Avenue. Robson Road connects with Parkside Drive on the north side only, forming a T type intersection. The intersection is currently stop-controlled with traffic on Robson Road yielding to traffic on Parkside Drive.

DUNDAS STREET

Within the project limits, Dundas Street is classified as a major east-west arterial road. West of Kerns Road, Dundas Street is under the jurisdiction of the City of Hamilton. East of Kerns Road, Dundas Street is under the jurisdiction of Halton Region. Dundas Street is currently a 5 lane section in the east part of the study area, through Waterdown it tapers back to a 2 lane cross section as it traverses the downtown area. Within the project limits, Dundas Street is intersected by the following roads:

1. **Evans Road:** This two lane rural road is under the jurisdiction of the City of Hamilton. Evans Road currently runs in a north-south direction between Parkside Drive and Dundas Street, terminating in T type intersections with both roads. The intersection with Dundas Street is currently signalized.
2. **Kerns Road:** This two lane rural road is under the joint jurisdiction of the City of Burlington and the City of Hamilton. Kerns Road is classified as a collector road in the City of Burlington's Official Plan. Kerns Road intersects with Dundas Street at a T type of intersection on the south side. The intersection is currently stop-controlled.
3. **Brant Street/Cedar Springs Road:** This major north-south road is under the jurisdiction of Halton Region south of Dundas Street. North of Dundas Street, Cedar Springs Road is under the jurisdiction of the City of Burlington. South of Dundas Street, Brant Street is classified as a major arterial. North of Dundas, Cedar Springs Road is classified as a minor arterial. The alignment along Brant Street is such that it intersects Dundas on a horizontal curve, forming a skew angle of approximately 73 degrees. The intersection is currently signalized.

4.8.2 Road Geometry

PARKSIDE DRIVE

As previously mentioned, Parkside Drive is currently posted at 60 km/h east of Grindstone Creek, and 50 km/h west of Grindstone Creek. Within the study limits, Parkside Drive is generally tangential with some

minor horizontal deflections that are within the accepted geometric standards.

The existing profile along Parkside Drive is characterized by its sag vertical curve at the Grindstone Creek crossing. This curve has a K factor of $K=10$ which is substandard for a road of this nature with no illumination. The approaching downgrades to Grindstone Creek are approximately 5.5%, which are within the accepted maximum of 6%. Other crest and sag vertical curves within the project limits were found to be within the accepted standards for the posted speed.

Within the study area, Parkside Drive consists of a rural two lane cross section with gravel shoulders and open ditches. West from Boulding Avenue, a sidewalk is currently installed on the south side of the road only. This sidewalk continues west beyond the project limits. The existing width of asphalt on Parkside Drive is approximately 7.0 m on average and the existing width of shoulders is approximately 1.0 m.

DUNDAS STREET

Dundas Street is currently posted at 60 km/h west of Kerns Road and 80 km/h east of Kerns Road. Within the project limits, Dundas Street is mostly tangential with some minor horizontal alignment deflections that fall within the accepted geometric standards.

The prevalent profile feature along this segment of Dundas Street is the long steep road grade (ranges from 4% to approximately 5.5% for about 1 km) as it traverses the Niagara Escarpment. Other grades and vertical curves within the study limits generally exceed the recommended design standards for a major arterial road.

Throughout most of the study area, Dundas Street generally consists of a four lane rural cross section with a two-way left turn lane/median and wide gravel shoulders and open ditches. A mountable curb and gutter system with catchbasins and ditch inlets is provided in the vicinity of the Niagara Escarpment rock cut, and extends beyond the eastern project limits. The existing width of asphalt on Dundas Street is approximately 18.0 m on average and the existing width of shoulders is approximately 3.0 m.

4.8.3 Traffic Signals and Illumination

PARKSIDE DRIVE

There are currently no traffic signals located within the study limits (from west of Grindstone Creek to east of Robson Road) on Parkside Drive. All intersections operate as stop-controlled intersections with vehicles on the side roads yielding to vehicles on Parkside Drive. Illumination is not currently provided on Parkside Drive within the study limits despite the presence of two 'T' intersections and a pedestrian sidewalk on the south side of the road, west of Boulding Avenue.

DUNDAS STREET

Two of the existing three intersections with Dundas Street are currently signalized. The intersection with Evans Road provides a dedicated eastbound left-turn lane, as well as a dedicated westbound right-turn lane onto Evans Road. A single north and southbound lane is provided on Evans Road at the north leg of the intersection. *Exhibit 4-14* shows the existing layout for this intersection.

The intersection with Cedar Springs Road/Brant Street provides dedicated eastbound and westbound left and right turning lanes. Dedicated northbound and southbound left turn lanes are also currently installed. The northbound curb lane on Brant Street is presently a forced right turn lane. *Exhibit 4-15* shows the existing layout for this intersection.

Within the study limits, illumination along Dundas Street is confined to partial (intersection) illumination only at crossing road locations.

4.8.4 Right-of-Way

The existing right-of-way (ROW) width on Parkside Drive varies from approximately 20 m west of the CP Rail tracks to between 23 m and 26 m elsewhere. The minimum right-of-way requirement identified for Parkside Drive, as specified in the City of Hamilton’s Official Plan (Schedule C-2) is 26 m. The 26 m right-of-way also represents the historic road allowance width being protected for along Parkside Drive.

The existing right-of-way width on Dundas Street varies from approximately 41 m in the vicinity of Evans Road to approximately 45.5 m elsewhere. The property line is not always consistent and fluctuates significantly at the rock cut area and at the approach to Brant Street. The minimum right-of-way requirement identified for Dundas Street in both the City of Hamilton’s Official Plan (Schedule C-2) and in Halton Region’s Official Plan is 47 m.



Exhibit 4-14: Existing signalized intersection at Dundas Street and Evans Road



Exhibit 4-15: Existing signalized intersection at Dundas Street and Brant Street

5. ALTERNATIVE DESIGN CONCEPTS FOR THE PREFERRED SOLUTION

5.1 Introduction

This section of the report discusses the design alternatives identified, developed, and evaluated during Phase 3 throughout the New East-West Road Corridor. *Figure 5-1* illustrates the seven analysis segments that were addressed (Sections N1 to N7). Presented in this section is an overview of the alternative design concepts. Section 5.2 discusses the evaluation methodology and the latter sections contain detailed presentation of the evaluation and selection rationale for the preferred alternative within each of the seven sections (Sections 5.3 to 5.11).

Identified within some of the road sections were distinct alignment alternatives and/or “issue areas” to be addressed. The alternative alignments were subject to an alternative evaluation process. In addition to the alignment alternatives, road cross section alternatives were also considered in some of the areas. Depending on the road/road section, this included the consideration of reduced design speeds, alternative treatments and locations for sidewalks/multiuse pathways, road median treatment options, bike lane considerations (on or off road), landscaping options, reduced lane widths, boulevard widths, etc.

The following outlines (by analysis segment) the issues that were considered and the alignment alternatives that were evaluated.

Segment N1 – Highway 6 Connection

At the conclusion of Phase 2 work, the identified New East-West Road intersection with Highway 6 was aligned with Concession 4 Road. To address concerns with respect to truck traffic infiltration (identified through the Neighbourhood Advisory Committee) a series of alignment alternatives were developed and evaluated for the connection location at Highway 6. These included alignments north and south of Concession 4 Road. These alignments were evaluated in close discussion with the Ministry of Transportation regarding the potential for traffic operations and safety impacts along Highway 6. Refer to *Exhibit 5-1* and *Exhibit 5-2* for that illustrate existing conditions in this area.

Segment N2 – Waterdown North Development/Centre Road

The location rationale in this segment was that the road should be located as far north as possible to maximize the amount of development land south of the new road, while recognizing the significant natural environmental constraints in the area. Several issues were identified in this segment:

- Borer’s Creek Crossing – The width of the Borer’s Creek valley varies significantly and placing the new road in a location that minimized the length of road and bridge in the valley was considered important. It was also considered necessary to



Exhibit 5-1: Highway 6 Connection Area



Exhibit 5-2: Concession 4 Road West of Highway 6 Looking East

confirm the type of crossing structure (bridge) and the need to accommodate wildlife movement through the valley.

- separation from the Parkside Drive Wetland Complex – alternative buffer widths were considered to position the corridor adjacent to this environmentally sensitive area.
- potential for impact to the Waterdown North development area
- Centre Road Woodlot/ Provincially Significant Wetland (PSW) – There were several environmental issues in the vicinity of the Centre Road area that required addressing including:
 - minimizing effects to Borer’s Creek on the north side of the road alignment, west of Centre Road
 - minimizing impacts to the Centre Road Woodlot/PSW
 - minimizing impacts to the Centre Road Woodlot/PSWs drainage outlet and the Borer’s Creek tributary in the vicinity of Centre Road.
- intersection design and separation distance from the Northlawn Avenue intersection (overlapping left turn lanes).
- potential for impacts on the residents on the north side of Northlawn Avenue.
- Joe Sam’s Park and Trail Crossing – the general potential for impacts to the proposed future park in this area and assessment of a grade separated crossing of the existing multi-use trail was required.

Segment N3 – Hydro Transmission Line Crossing

Two alternative alignments in the vicinity of the hydro transmission line (north of Parkside Dive) were identified. The issues considered included:

- minimizing impacts to the Cannon Nursery property
- encroachment onto the property of the retirement home (Alexander Place)
- agricultural impacts
- potential effects on the hydro line (refer to *Exhibit 5-3*)

Segment N4 – Parkside Drive

Within this segment the following issues were addressed:

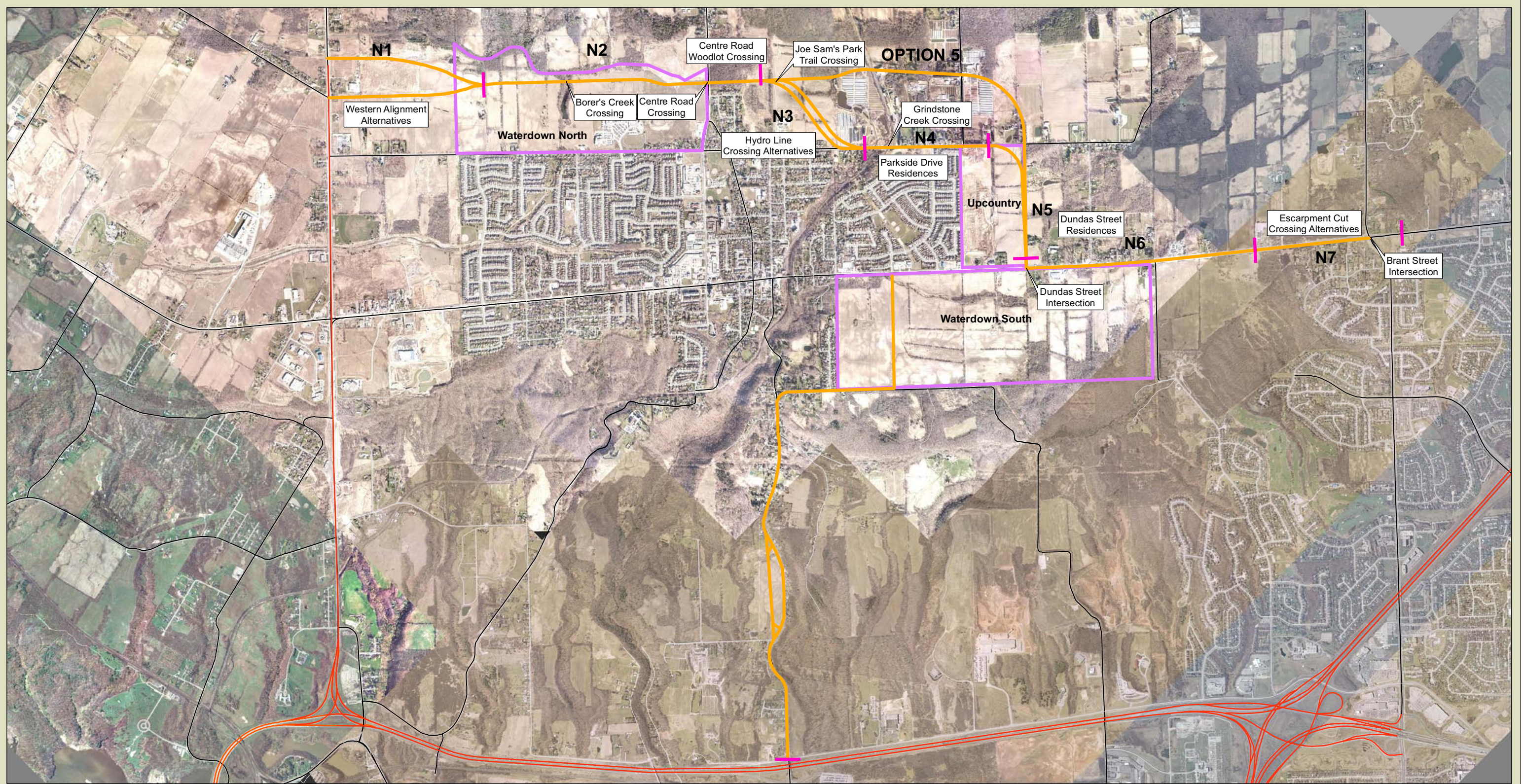
- Grindstone Creek Crossing – The type of creek crossing and required mitigation measures needed to be determined
- Parkside Drive Residential – Minimizing the impacts to the residential areas on both sides of Parkside Drive east of the Grindstone Creek through the investigation of available widening options (widen to the north, widen to the south, widen about the existing road centre-line). Refer to *Exhibit 5-4*
- Type of intersections to provide at either end of this section (conventional versus roundabout)



Exhibit 5-3: Hydro Tower and Open Field in Section N3



Exhibit 5-4: Parkside Drive East of Grindstone Creek Looking East (Section N4)



**Waterdown Road Class EA and New East - West Road Class EA
Alternative Design Alignments and Design Issue Areas**

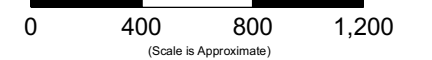
Legend

- Alignment Corridor Options
- Future Development Lands
- N1** Road Section Identifiers

May 8, 2008



1 : 12,500



(Scale is Approximate)



Figure 5.1

Option 4 vs. 5 Alignment Review

The decision in Phase 2 to select the Option 4 road alignment (that included the widening of Parkside Drive east of Grindstone Creek) over the Option 5 (a more northern route) alignment was reviewed as part of the Phase 3 Class EA work. Included in this review was a more detailed costing of the two options as well as a detailed examination of property/business disruption effects. This involved a detailed evaluation of the alternative alignments through this section of the corridor.

Segment N5 – Upcountry Development

The precise roadway alignment adjacent to the Upcountry Development lands (east side) required assessment in this section to minimize impacts to the future development lands and private properties to the east. An assessment was also required to resolve the potential for floodplain impacts where the route parallels a tributary of the Grindstone Creek. Refer to *Exhibit 5-5*.

Segment N6 - Dundas Street Widening (West)

Dundas Street Property Effects – To minimize effects to residences/businesses on the north side of Dundas Street, opportunities for widening the road to the south were examined.

Bruce Trail/Dundas Street Crossing Alternatives

In Segment 6, east of Kerns Road at approximately the brow of the escarpment, is an existing Bruce Trail crossing of Dundas Street (refer to *Exhibit 5-6*). This is currently utilized by between 500-1000 trail users per year and involves negotiating a four lane roadway with median. In the future with the additional two lanes, crossing at this location will involve negotiating six lanes plus median. Alternative treatments for this crossing were identified and evaluated.

Segment N7 – Dundas Street Escarpment Cut Area

Road widening location alternatives were examined at the east end of Dundas Street near Brant Street. The issues that were considered included: the need to widen the rock cut area through the escarpment, natural habitat on the north side of Dundas Street and the potential for impact to residences on the south side of Dundas Street.



Exhibit 5-5: Initial Construction in Upcountry Development Area (Section N5)



Exhibit 5-6: Bruce Trail Crossing of Dundas Street

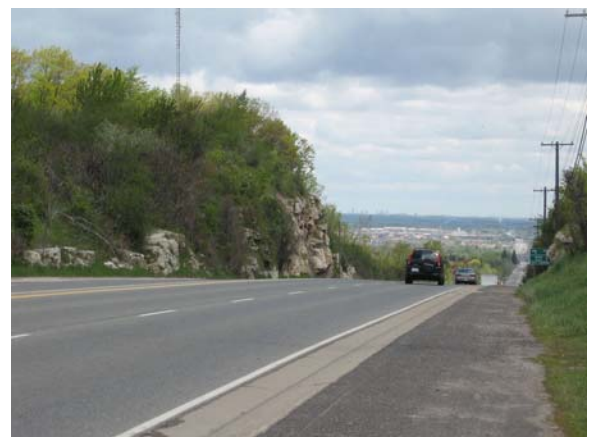


Exhibit 5-7: Dundas Street Escarpment Cut Area (Section N7)

5.2 Evaluation Methodology

The evaluation criteria developed during the Phase 2 work was the starting point for the Phase 3 alternative designs evaluation. Input on the criteria was received from the New East-West Road Corridor Neighbourhood Advisory Committee (NAC). The NAC members commented on the criteria and ranked their importance from high to low to assist in the evaluation. Refer to **Table 5-1, Evaluation Criteria and Indicators**. The table presents the criteria ranking suggested by the NAC as well as the rankings selected by the Project Team. It is noted that not all criteria were necessarily used in each evaluation as not all of them were applicable to each evaluation (e.g. the feature may not have been present in the segment under consideration). Data was collected on the basis of the criteria and was considered in the evaluation of the alternatives. Both quantitative and qualitative data was collected. Following this is a discussion of the alternative design evaluations that were conducted in this Class EA.

The use of a numerical evaluation procedure in Phase 2 of this Class EA was appropriate due to the large number of alternative road corridors that were considered which affected widely varying environmental conditions in different locations. In Phase 3, the alternatives considered (sections of roadway alignments) are much more focused in regards to potential environmental effects. As such, it was determined that a qualitative or “reasoned argument” approach was appropriate for the evaluation of alternative designs. The “reasoned argument” approach considers the advantages and disadvantages of each alternative (including the relative importance of the criterion, the sensitivity of the feature being affected, the magnitude/duration of the effect, and the ability to mitigate the effect). Trade-offs are then considered in selecting the preferred alternative.

Table 5-1: Evaluation Criteria and Indicators

Criteria Group	Criteria	Criteria Importance (NAC)	Criteria Importance Project Partners	Indicators
Social Environment	Potential for impact on residents	High	High	Number of residences displaced
				Amount of residential property removed (ha)
				Change in access to residential property
				Potential for change in air quality
				Potential for change in noise levels
				Potential for light pollution
				Potential for impact to wells and septic tanks
				Potential for traffic infiltration to existing residential areas and resulting effects
				Opportunity to enhance character of community
				Potential for negative change to community character and views in the area
Natural Environment	Potential for impact on community/recreation features	Medium	Medium	Removal of community/recreation property Disruption to use of community/recreation property
	Potential for effects on historical features	n/a	Medium	Potential for removal of heritage/archaeological features
	Potential for impact on terrestrial features	High-Medium	High-Medium	Amount, nature and significance of natural habitat removed Number of significant trees along existing roadway removed Potential for effects to adjacent habitat Fragmentation of natural areas Effect on terrestrial corridor connectivity/linkages Opportunity to enhance degraded natural areas (terrestrial and aquatic)

5. ALTERNATIVE DESIGN CONCEPTS

Criteria Group	Criteria	Criteria Importance (NAC)	Criteria Importance Project Partners	Indicators
Economic Environment	Potential for Impact on aquatic features	Medium	Medium	Amount and quality of aquatic habitat altered/disturbed/removed
	Potential for impact on business enterprises	Medium	Medium	Area of commercial properties required (ha) Potential for change to property values
	Potential for impact on residential property value	Medium	Medium	Potential for change (disruption or enhancement) to business operations
	Potential for impact on future land use	Medium	Medium	Potential for change to property values
	Potential for impact on agricultural land	Medium	Medium	Compatibility with future land use plans Area of designated agricultural land removed (ha)
Cost	Capital Cost (million \$)	Low	Medium	Estimated capital cost (including land acquisition)
	Operation and Maintenance Cost (million \$)	Low	Medium	Relative maintenance costs as reflected by road length and design features
Transportation	Change in traffic operations, delay and capacity	Low	Low	Potential to increase level of traffic service Ability to accommodate local and through traffic
	Potential for change to traffic and public safety levels	High	High	Potential to improve roadway operations, geometry and sightlines
	Opportunity to support transit use, pedestrians and cycling	Medium	Medium	Extent that alternative supports/promotes transit use, pedestrians and cycling

5.3 N1 – Western Alignment Alternatives

The development and evaluation of alternative alignment connections to Highway 6 was completed in three stages:

- **Stage 1:** Original three options developed, ending at Highway 6 (June 2008) – refer to Figure 5-2
- **Stage 2:** Five options developed that extended west of Highway 6 (October 2008) – refer to Figure 5-3
- **Stage 3:** Three revised options developed that consider the closing of Concession 4 Road (May 2009) – refer to Figure 5-4.

The following describes each of these stages.

Stage 1 Evaluation

During Phase 2 work, a straight-through alignment for the New East-West Road Corridor was recommended with a direct connection to Concession 4 Road (Alternative A-C). During the early East-West NAC meetings it became clear that there was considerable local concern with the issue of permitting quarry truck traffic to travel from west of Highway 6 (on Concession 4 Road) through or adjacent to residential areas to the east, notably Northlawn Avenue and Parkside Drive. Although there was considerable debate over the likelihood of quarry traffic using this section of road, a solution was developed that staggered the intersection with Concession 4 Road to make the through truck traffic move difficult. This was achieved by moving the connection point of the New East-West Road Corridor north of Concession 4 Road. **Exhibit 5-8** illustrates the general area for the alternatives. Refer to **Exhibit 5-9** and **Exhibit 5-10** that illustrate typical land use characteristics along two of the alternatives.

Initially, in discussion with the East-West Neighbourhood Advisory Committee (NAC) and for presentation at the first Public Information Centre in June 2008, three alternative alignments were developed and evaluated. These are shown on **Figure 5-2, Highway 6 Connection Options**.

Two alternative alignments for the northern connection were developed in discussion with local landowners. Alternative B-C placed the new intersection just south of a residential lot fronting on Highway 6. Alternative A2-C moved the connection further north, on the north side of the resident lot. This alternative does not sever the farm fields east of Highway 6. The northern options were generally preferred as they addressed the through traffic issue and provided further separation from Parkside Drive. An evaluation was undertaken of all three alternatives that concluded the northern most option (Alternative A2-C) was preferred largely due to creating less impact on the existing farm property that would be severed with alternative B-C. The farm owner thought that the severance created with Alternative B-C would render the farm inoperable due to the small size of the remnant parcels. This preliminary evaluation was provided to MTO for their comment and to the public at PIC #1 in June 2008. Detailed evaluation information is contained in **Appendix A**.



Exhibit 5-8: Highway 6 Connection Area



Exhibit 5-9: Looking Along Alternative B-C Alignment Toward Highway 6



Exhibit 5-10: Looking Along Alternative A2-C Toward Highway 6

Stage 2 Evaluation

The input received in Stage 1 led to the development of a second generation of alternatives. These are illustrated in **Figure 5-3, Alignment Alternatives at Highway 6 (With West Side Connection)**. MTO expressed concern with the initial alternatives as they increased the number of intersections along this stretch of Highway 6. Due to safety concerns they felt that any alternative should not increase the number of intersections and as such, the northern alternatives should connect back to Concession 4 Road utilizing a new road link on the west side of Highway 6. The existing Concession 4 Road just west of Highway 6 would have a local closure (e.g. cul-de-sac). Five alternatives were developed and evaluated, each of which had a new western leg connecting back to Concession 4 Road further to the west of Highway 6. An evaluation was carried out for the five alternatives and the southern alternative (Option 5) was identified as the preferred option (refer to **Appendix A**). Option 5 was preferred due to the high level of property and environmental impacts that the two northern options had on the west side of Highway 6. Both of these northern alignments would directly impact Logies Creek Swamp and the Mill Grave South Woodlot Environmentally Significant Area (ESA). Of the three remaining southern options, Option 5 (southern most) had the least property impacts.



Exhibit 5-11: Highway 6 Looking North from Parkside Drive

Stage 3 Evaluation

The revised assessment and evaluation was provided to MTO for additional input on Highway 6 traffic and operational aspects. This information was also presented for discussion at a special Highway 6/Concession 4 Road property owners meeting held in June 2009 (refer to **Exhibit 5-11** that illustrates the general Highway 6 conditions north of Parkside Drive).

The results of these further reviews and public input via the property owners meeting resulted in the following adjustments to the alternatives:

- Revision of the northerly options (Options 1 and 2) to eliminate the west-side link back to Concession 4 Road and the complete closing of Concession 4 Road just west of Highway 6.
- The selection of Option 5 as the preferred southern alternative (due to less property impacts and similar impacts against all the other factors).

Option 5 was re-named Option 3 and with the two other remaining southern alternatives (now referred to as Options 1, 2 and 3) were assessed and re-evaluated in more detail. A summary of the assessment is provided in **Table 5-2: Highway 6 Connection Alignments Evaluation Summary**. The alignments are shown in **Figure 5-4, Alignment Alternatives at Highway 6 (Final Alternatives)**. Option 3 had the alternative that Concession 4 Road could remain open with a revised road alignment on the west side of Highway 6 or closed at Highway 6. A detailed traffic operations assessment was completed for the options and submitted to MTO for their comments (refer to **Appendix Q**).

The assessment and evaluation considered the following factors:

- Social (potential for impacts on residents)
- Natural (potential for impact on terrestrial and aquatic features) – refer to *Exhibit 5-12*
- Economic (potential for impact on businesses, residential properties and agricultural lands)
- Cost (capital cost)
- Transportation (change in traffic operations, delay and capacity, potential for change to traffic and public safety)

MTO indicated a concern with the southern most alternative, Option 3. The distance of this intersection to the existing Parkside Drive intersection (380 m) is substandard resulting in overlapping left turn storage lanes with sight distance concerns and overall road operations and safety concerns. They further indicated that for Option 3 to be viable, the Parkside Drive/Highway 6 intersection would have to be closed when the New East-West Road Corridor project is implemented. The closing of the Parkside Drive intersection with Highway 6 was not considered appropriate at this time due to the impact it would have on local residential and commercial travel patterns. A possible future closing of this intersection would require assessment as part of overall Highway 6 upgrading north from Highway 5/Dundas Street, including the possible provision of a Parkside Drive overpass and additional local road network improvements east and west of Highway 6.

Either Option 1 or Option 2 provides acceptable spacing from the Parkside Drive intersection (880 m and 730 m respectively). Both options would create similar impacts to exiting residential driveways on Highway 6 due to the need for traffic islands associated with the new intersection on Highway 6. Both options would create additional frontage impacts (small road allowance widenings) to residential properties. Option 2 would result in the severance of the farm parcel on the east side of Highway 6 likely rendering it inoperable. In addition, Option 2 would impact a small watercourse that crosses under Highway 6 in the location of the future Option 2 intersection.

Option 1 was selected as the preferred alternative due to its lower overall property and natural environmental impact. It is also the less expensive option by approximately \$2.3 million.

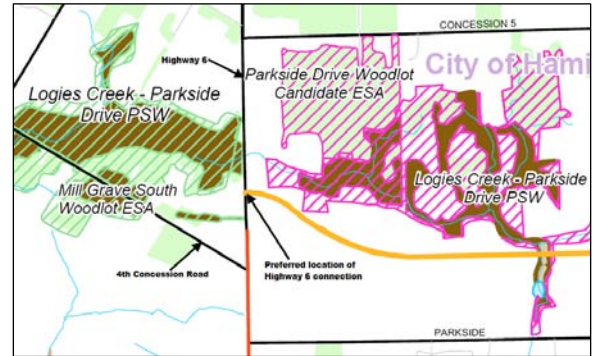
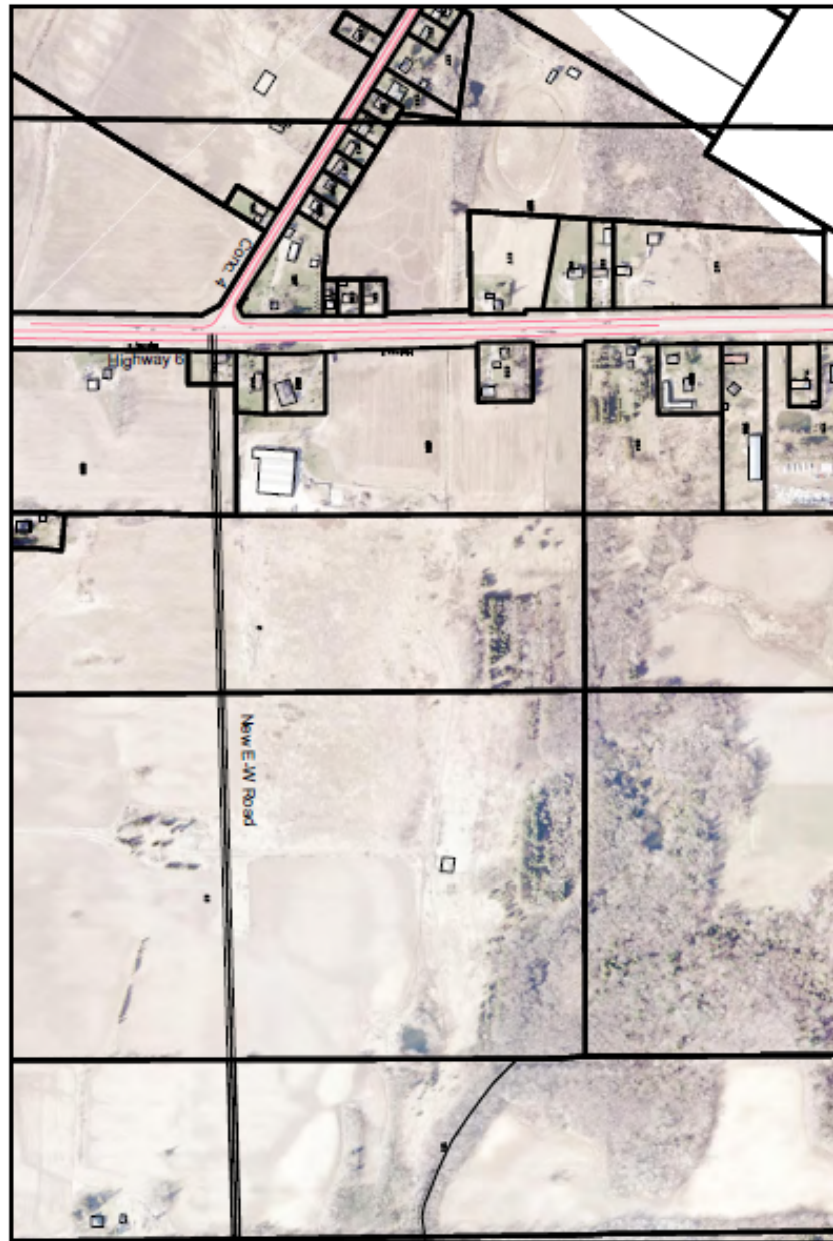
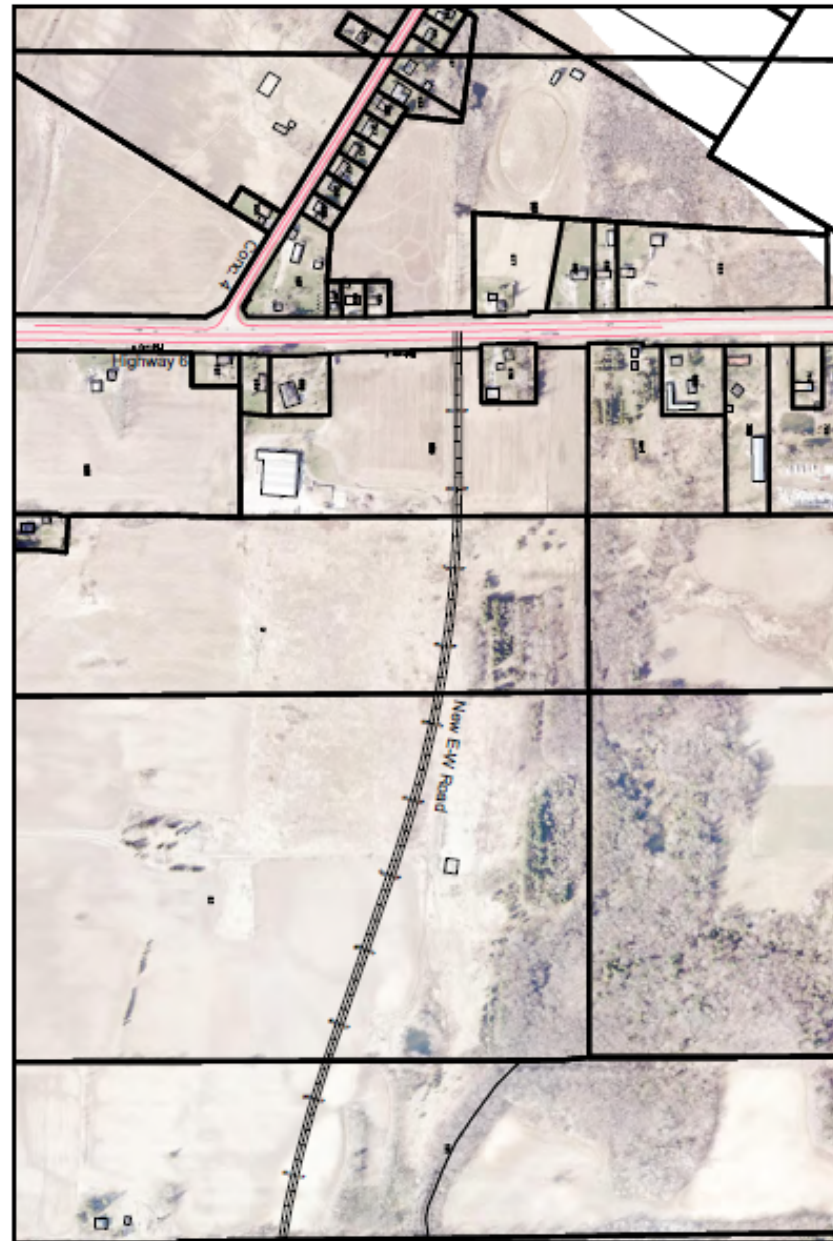


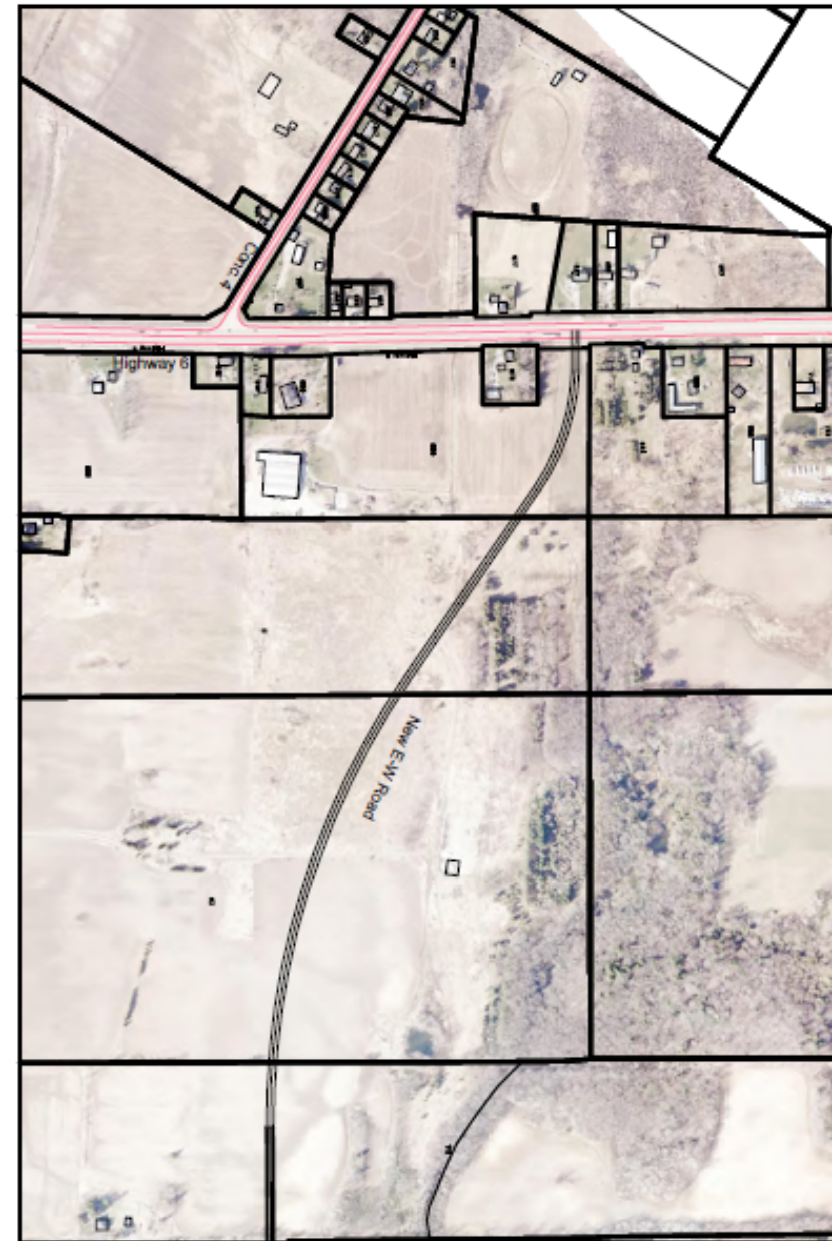
Exhibit 5-12: Significant Natural Areas Adjacent to Highway 6



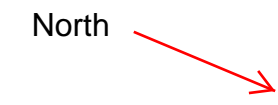
Alternative A-C



Alternative B-C



Alternative A-2C



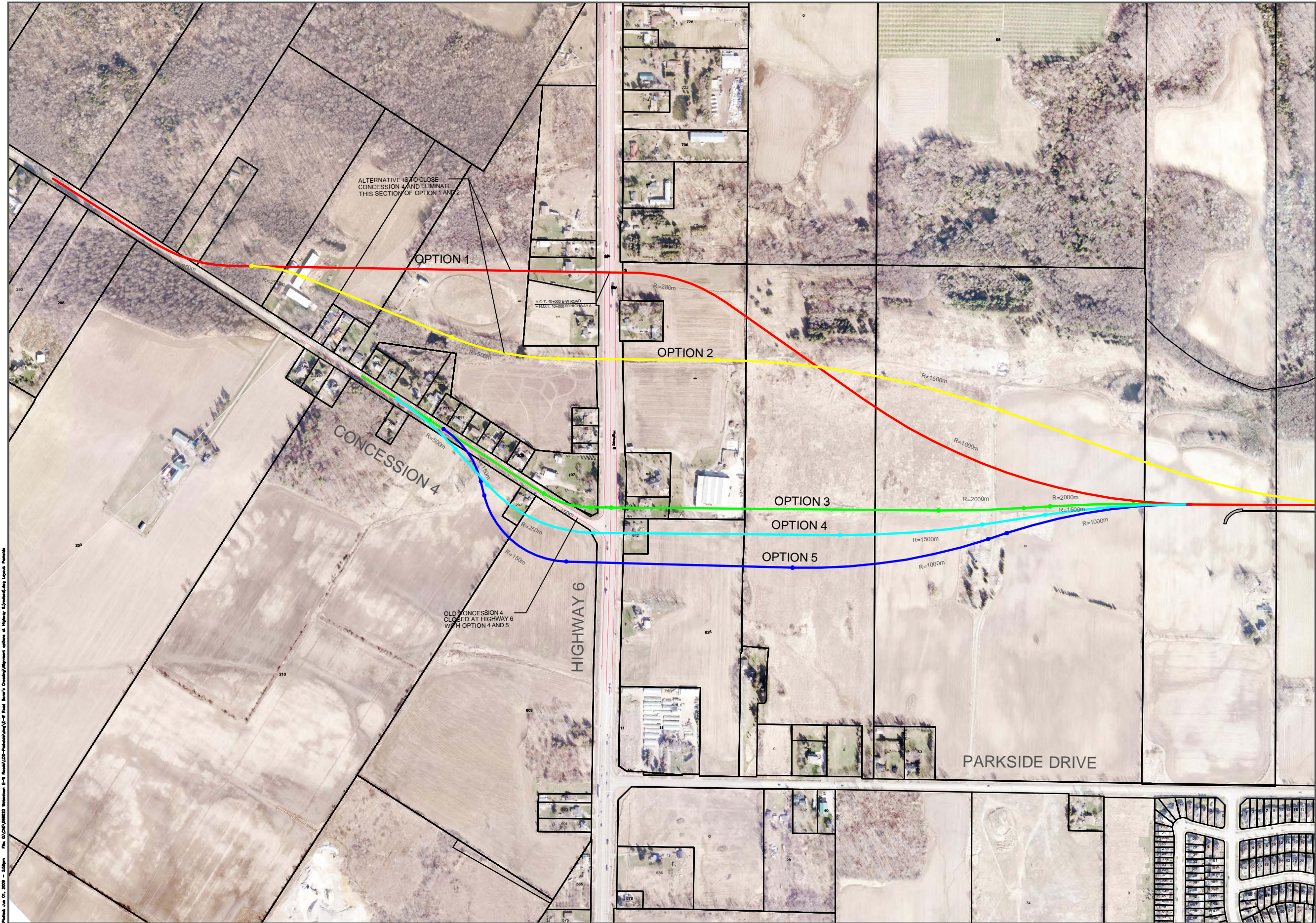
Highway 6 Connection Options



EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

CHECKED BY: JDM
DESIGN BY: JDM
DRAWN BY: GCSHZ
SCALE: AS SHOWN
DATE: JUNE 17, 2009
PROJECT No. 08-9020

Figure 5-2



ALIGNMENT ALTERNATIVE AT HIGHWAY 6 (WITH WEST SIDE CONNECTION)

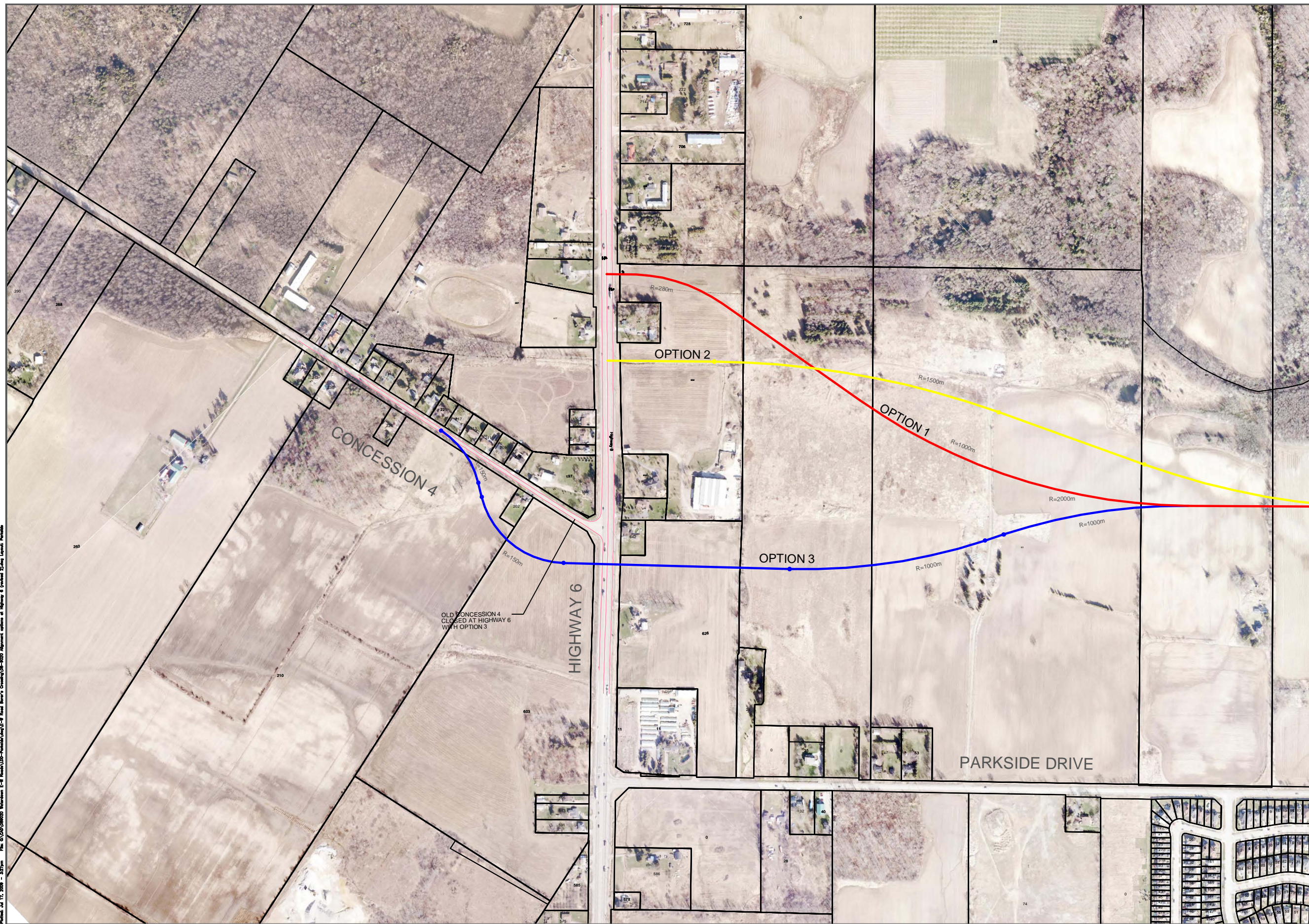


CHECKED BY: ---
 DESIGN BY: ---
 DRAWN BY: ---
 SCALE: NTS
 DATE: June 1, 09
 PROJECT No. 08-9020

NEW E-W ROAD
 CLASS ENVIRONMENTAL ASSESSMENT
 HWY 6 TO BRANT STREET

FIGURE 5.3

Printed: Jun 01, 2009 10:30am File: C:\DATA\08020\Mainstream E-W Road\LD-Plan\Map\Map-01.dwg User: E:\Users\J.Ding Layout: PlanSide



**ALIGNMENT ALTERNATIVES AT
HIGHWAY 6
(FINAL ALTERNATIVE)**



NEW E-W ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HWY 6 TO BRANT STREET

CHECKED BY: ---
DESIGN BY: ---
DRAWN BY: ---
SCALE: NTS
DATE: July 17, 09
PROJECT No. 08-9020

FIGURE 5.4

Plotted: Jul 17, 2009 - 3:27pm File: C:\GAD\080020\Workstation E-W Road\LD-Plan\Map\A\A-1 Road Bore's Crossing\08-9020 Alignment options at Highway 6 (Final) 21.dwg Layout: Plotable

Table 5-2: Highway 6 Connection Alignments Evaluation Summary

Criteria Group	Criteria	Indicators	Option 1	Option 2	Option 3
Social Environment	Potential for impact on residents	Number of residences displaced	None	None	None
		Amount of residential property removed (ha)	None	None	None
		Change in access to residential property	Access to residential property on west side of Highway 6 (immediately north of new intersection) will be limited to right-in, right-out access only, due to the need for a raised median island for traffic lights. Full access may be possible for residence on west side of highway opposite the intersection. This needs to be confirmed during detailed design. Old Concession 4 Road at Highway 6 to be closed affecting access to approximately 20 properties. Some of these residents have indicated that they do not use this intersection due to safety concerns.	Access to two residential properties on either side of Highway 6, immediately north of the new intersection will be restricted to right-in, right-out access only due to the need for a raised median island for traffic lights. Old Concession 4 Road at Highway 6 to be closed affecting access to approximately 20 properties. Some of these residents have indicated that they do not use this intersection due to safety concerns.	Access to one residential property on the east side of Highway 6, north of the new intersection will be restricted to right-in, right-out access only due to the need for a raised median island for traffic lights. Old Concession 4 Road at Highway 6 could be closed affecting access to approximately 20 properties. Some of these residents have indicated that they do not use this intersection due to safety concerns. If Concession 4 Road were left open on the west side with a new southerly alignment, this will result in disturbance to entrances for approximately 6 residences on Concession 4 Road.
		Potential for change in air quality and noise	Five residences within 100 m of the new roadway. Due to high volume traffic conditions along Highway 6, effects of the roadway are unlikely to be noticeable.	Five residences within 100 m of the new roadway. Due to high volume traffic conditions along Highway 6, effects of the roadway are unlikely to be noticeable.	Five residences within 100 m of the new roadway. Due to high volume traffic conditions along Highway 6, effects of the roadway are unlikely to be noticeable.
Natural Environment	Potential for impact on terrestrial features	Amount, nature and significance of natural habitat removed	As option is predominantly in agricultural land, no forested habitat will be removed.	As option is predominantly in agricultural land, no forested habitat will be removed.	As option is predominantly in agricultural land, no forested habitat will be removed.
		Number of significant trees along existing roadway removed	Minimal	Minimal	Minimal.
		Potential for effects to adjacent habitat	Higher potential due to close proximity to the Logies Creek Wetland ESA/PSW to the north of the alignment.	Higher potential due to close proximity to the Logies Creek Wetland ESA/PSW to the north of the alignment.	No sensitive habitat in close proximity to the alignment.
		Fragmentation of natural areas	None	None	None
		Effect on terrestrial corridor connectivity linkages	Minimal effects. Option predominantly runs through agricultural land.	Minimal effects. Option predominantly runs through agricultural land.	Minimal effects. Option predominantly runs through agricultural land.
	Potential for Impact on aquatic features	Amount and quality of aquatic habitat altered/disturbed/removed	Limited	Some disturbance will result as the alignment runs adjacent to a watercourse. This may impact aquatic habitat in this stream.	Limited
Economic Environment	Potential for impact on business enterprises	Area of commercial properties required (ha)	None	None	None
		Potential for change to property values	No businesses in proximity to the roadway.	No businesses in proximity to the roadway.	No businesses in proximity to the roadway.

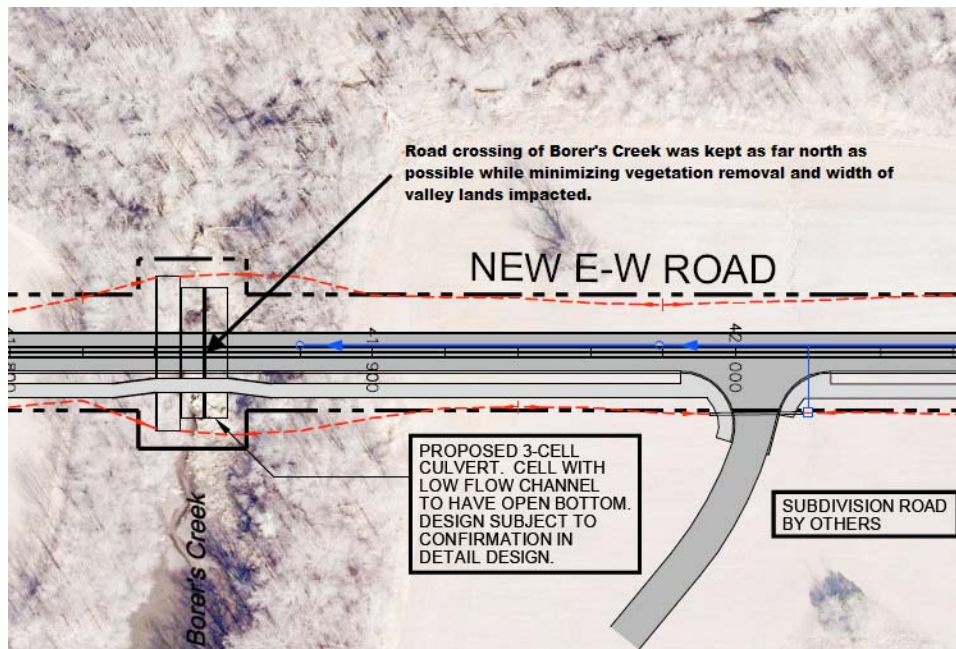
Criteria Group	Criteria	Indicators	Option 1	Option 2	Option 3
		Potential for change (disruption or enhancement) to business operations	No disruption (see agricultural effects)	No disruption (see agricultural effects)	No disruption (see agricultural effects)
	Potential for impact on residential property value	Potential for change to property values	Limited due to proximity to Highway 6 and high traffic volumes. Change in access may affect property values (Concession 4 properties)	Limited due to proximity to Highway 6 and high traffic volumes. Change in access may affect property values (Concession 4 properties)	Limited due to proximity to Highway 6 and high traffic volumes. Change in access may affect property values (Concession 4 properties). Option to leave intersection to Concession 4 Road open preserving existing access.
	Potential for impact on agricultural land	Area of designated agricultural land removed (ha)	Least amount of agricultural land being removed (4.3 hectares). Some limited amount of farm parcel fragmentation on east side of Highway 6.	Amount of agricultural land removed is approximately 9.6 hectares assuming severed parcel to the north will no longer be a viable farmed parcel of land High fragmentation of one parcel on east side of Highway 6.	Amount of agricultural land removed is approximately 4.6 hectares. Assumes no extension west of Highway 6. Greater parcel fragmentation than Option 1 but less than Option 2.
Cost	Capital Cost (million \$)	Estimated capital cost (including land acquisition)	Construction Cost: \$2,236,445 Property Cost: <u>\$1,337,500</u> Total: \$3,573,945	Construction Cost: \$2,911,235 Property Cost: <u>\$2,966,250</u> Total: \$5,877,485	Construction Cost: \$1,966,530 Property Cost: <u>\$1,412,500</u> Total: \$3,379,030 (east of Highway 6)
Transportation	Change in traffic operations, delay and capacity Potential for change to traffic and public safety levels	Potential to increase level of traffic service	All alternatives address capacity needs equally. Offers the best opportunity to implement co-ordinated traffic signals with Parkside Drive. The closure of Concession 4 Road will create the redistribution of traffic to other road sections and Highway 6 intersections to the north and the south. The existing volumes at this intersection are relatively low and the impact of this diverted traffic is not of concern.	All alternatives address capacity needs equally. Offers the poorest opportunity to implement co-ordinated traffic signals with Parkside Drive. The closure of Concession 4 Road will create the redistribution of traffic to other road sections and Highway 6 intersections to the north and the south. The existing volumes at this intersection are relatively low and the impact of this diverted traffic is not of concern.	All alternatives address capacity needs equally. Potential for signal co-ordination with Parkside Drive is less than Option 1, but better than Option 2. There will be sufficient intersection spacing to accommodate projected peak hour queues, but the shorter intersection spacing would likely result in some deceleration through the intersection in anticipation of downstream queues. The closure of Concession 4 Road will create the redistribution of traffic to other road sections and Highway 6 intersections to the north and the south. The existing volumes at this intersection are relatively low and the impact of this diverted traffic is not of concern.
		Potential to improve roadway operations, geometry and sightlines	Minimum Radius of 250 m is consistent with a design speed of 80 km/h. Provides best spacing (881 m) to Parkside Drive.	Minimum radius of 250 m is consistent with a design speed of 80 km/h. Provides less spacing (731 m) to Parkside Drive.	Minimum radius of 150 m is a substandard radius for a design speed of 80 km/h. Radius corresponds to a design speed of 65 km/h. Provides reduced spacing (380 m) to Parkside Drive. Slightly below required distance to accommodate back-to-back MTO left turn storage, parallel lane and taper requirements (total 390 to 397.5 m required). MTO has expressed concern with this alignment as it does not meet minimum geometric design requirements for intersection spacing (from Parkside Drive) including back-to-back left turn lanes. Further, MTO is concerned that the alignment does not provide minimum requirements for stopping sight distance and sight triangles. MTO has advised that they would only support this alternative if the existing Parkside Drive intersection was closed.

5.4 N2 – Waterdown North Development / Centre Road Woodlot Crossing

West of Centre Road (Waterdown North Development)

The road alignment through the Waterdown North Development lands was kept as far north as possible to minimize impacts to the future residential subdivisions in this area. Various alignments were developed that involved alternative crossing locations of Borer's Creek and buffer widths between the new road and the Parkside Drive Wetland Complex/ESA (refer to *Figure 5-5*). In discussion with the Hamilton Conservation Authority (meeting February 24, 2009 – refer to Appendix B) and further biological reviews, including woodlot drip line field surveys, a buffer of 30 m was adopted through this area (refer to Appendix J for additional information regarding buffer widths). The new road's northerly property line east and west of Borer's Creek was established on this basis, with only one small localized section of the woodlot's drip line being less than 30 m. This alignment crosses the creek within the narrow valley section at an acceptable location.

Figure 5-5: Borer's Creek Crossing/Waterdown North Area



Further to the east, the woodlot swings to the north and the alignment control for the new road was dictated by the most appropriate location to cross Centre Road and the Centre Road Woodlot/PSW. These considerations are discussed below.

Centre Road/Centre Road Woodlot Crossing

The New East-West Road Corridor requires the crossing of the Centre Road Woodlot PSW that is located on the east side of Centre Road (refer to *Exhibit 5-13* and *Exhibit 5-14*). The crossing of this woodlot

cannot be avoided due to the extent of the woodlot (i.e. it extends well to the north and is associated with the larger woodlot complex to the north-east) and presence of residences both north and south of the woodlot. The original alignment presented in the WATMP identified the alignment passing through the southern section of the woodlot relatively close to residents located along the north side of Northlawn Avenue within the Hunter Park Survey (an approximate 10 m buffer between the new road south property line and the north residential property boundary was recommended in Phase 2). Upon additional review of this alignment, it was determined that a further separation distance would be required between Northlawn Avenue and the New East-West Road Corridor to create longer spacing between the Northlawn Avenue and New East-West Road intersections. An alignment adjustment was also required to address environmental concerns. To avoid the need to relocate the Borer's Creek tributary that outlets the wetland via a culvert under Centre Road, the Centre Road crossing location was moved northerly to result in an approximate 10 m separation from the top of the bank of the watercourse and the new road property.

Three route options through the woodlot were then developed and presented to the NAC and the public at the PIC in June 2008. The two additional routes that were evaluated were located further north in the woodlot. It was indicated that the Project Team's preliminary preferred alternative was the southern alignment. Refer to Appendix A for a summary of this evaluation (Draft Minutes of Meeting: E-W NAC – June 2, 2008).

The residents from the Hunter Park Survey community expressed additional concerns associated with a new road through the woodlot and provided written submissions outlining their concerns including:

- That social issues should be considered of highest importance in the evaluation;
- The potential for noise and light pollution;
- Moving the road further north would result in less potential for property value effects;
- That it is their opinion that moving the road to the north end of the woodlot would result in less impacts to the woodlot;
- That a more northern alignment would result in less impacts to Borer's Creek;
- That the southern alignment is less preferred from a transportation perspective due to its proximity to Northlawn Avenue.
- The potential for vibration impacts.

The residents from the Hunter Park Survey also requested that a more northern route be assessed and that noise barriers be considered, both along the New East-West Road and Centre Road. It was understood that the Hunter Park Survey residents felt that this would minimize the area of woodlot/PSW to be removed. However, in developing a more northern route it was noted by the Project Team that the presence of residents at the north end of the woodlot (west side of Centre Road) restricts how far north the road can be moved. In developing the more



Exhibit 5-13: North Portion of Centre Road Woodlot/PSW



Exhibit 5-14: Centre Road Woodlot/PSW Looking South

northern route, a separation distance of about 60 m was maintained in both directions from the centre line of the roadway to the most southern residence at the north end of the woodlot and from the single residence south of the route located on the east side of Centre Road in the middle of the woodlot. **Figure 5-6** illustrates the alignment alternatives which included: the original alignments presented to the public in June 2008 (Alignments DE-1, DE-3, DE-4); Alignment DE-2, which is a revision to DE-1, was made to avoid creek impacts and existing butternut trees (165 m centre line to centre line distance was achieved between the new roadway and Northlawn Avenue); and DE-5 which is the new, more northern alignment that was developed at the request of the Northlawn Avenue residents.

Additional information collected as part of this evaluation included a geotechnical review, more detailed vegetation review and noise/air quality assessments. The geotechnical review confirmed that soil conditions in the southern portion of the woodlot appear to be suitable for road construction. Based on an initial survey, the organic soils in the area appear to be of a depth of about 1 m only.

The Hamilton Conservation Authority (HCA) was also consulted (refer to **Appendix B**, letter of January 27, 2009, meeting of February 24, 2009). The HCA expressed initial concern regarding the crossing of the woodlot/ESA/PSW. It was explained that to avoid the woodlot would require the removal of residences. The HCA also requested that further field work be conducted to confirm the presence/health of butternut trees in the woodlot. This additional survey work was conducted on September 22, 2008 in the presence of a forester from the Ministry of Natural Resources. The field survey identified one butternut tree (poor condition) and one butternut or possible butternut hybrid (good condition) in proximity to the southern alignment. Comments on the ecology of the woodlot are presented below:

Description of the Woodlot/Wetland

The wetland community covers greater than 90% of the woodlot area. This wetland feature has been included into the Logies Creek/Parkside Drive Provincially Significant Wetland (PSW) Complex (Art Timmerman, MNR, personal communication, September 2008) due to its demonstrated wetland function, proximity (within 750 metres) to existing wetland units in the PSW complex and hydrologic connectivity to these wetland units via a tributary of Borer's Creek.

The Centre Road wetland unit's hydrological function is to retain and convey flow from the catchment area east of Centre Road to a tributary of Borer's Creek. This wetland unit also functions as wildlife habitat for birds, small mammals and a small amphibian population. Further, this feature is used by wildlife as an east-west migratory corridor, connecting wildlife habitat in the northeast to habitat in the northwest. Field reconnaissance of this wetland revealed the presence of two butternut trees in the southeast portion of the feature. Butternuts are listed as endangered under the provincial Endangered Species Act and federal Species at Risk Act. Further, the wetland contains smooth-

sheathed sedge which was observed in the north-central section of this feature and is a regionally rare plant in the Hamilton.

In general, the northern portion of the wetland has greater ecological value. The northern section of the wetland is ecologically superior because it contains more vegetative cover (i.e. larger size), has better connectivity to extensive wildlife habitat to the northeast, has more sensitive wetland vegetation communities (i.e. wetland areas with organic soils) and demonstrated fewer signs of anthropogenic (edge) disturbance (i.e. invasive species, dumping, decreased biodiversity, etc.). Another sensitive area is located on the eastern edge of the wetland unit, where two butternut trees were documented.

A tributary that meanders through the wetland and its associated ephemeral pools is also ecologically sensitive as they provide aquatic habitat for breeding amphibians and contribute fish habitat to downstream aquatic resources. This tributary flows from northeast to southwest across the wetland. On the west side of the wetland the tributary flows into a culvert that crosses Centre Road and eventually converges with Borer's Creek west of the site.

Evaluation Results

A comparative evaluation of the four options (DE-2, DE-3, DE-4 and DE-5) was undertaken. Table 5-3 presents the assessment results. Note that the option DE-1 was the original southern alignment presented at the June 2008 PIC/NAC meetings and was modified, as represented now as option DE-2.

In comparing the four roadway alternatives through the woodlot, all of the options were considered to be very similar with respect to the Economic, Cost and Transportation criteria groups (the slight differences among these criteria groups were not considered to be major determinates in the selection process). The greatest difference among the options was with respect to the Natural Environment criteria group. The alignments that run through the middle of the forest result in the greatest impacts as they remove the largest area of forest and would result in the greatest fragmentation effects. In comparing Alignment DE-2 (southern route) to Alignment DE-5 (northern route), although Alignment DE-5 results in less forest being removed, due to the greater presence of organic soils and resultant species in the area, the forest is considered to be more ecologically sensitive and more vulnerable to disruption. As well, the northern route would create a barrier to the movement of wildlife from the woodlot/PSW to the larger ESA lands to the north. Alignment DE-2 will result in lower disruption effects and result in less fragmentation effects. As such, Alignment DE-2 was considered preferred from a natural environment perspective. This evaluation was reviewed with Hamilton Conservation Authority and they indicated support for the conclusions.

5. Alternative Design Concepts

Table 5.3: New East-West Road/Centre Road Woodlot Evaluation Tradeoffs Summary

Criteria Group	Criteria	Indicators	Alignment Option DE-2	Alignment Option DE-3	Alignment Option DE-4	Alignment Option DE-5
Social Environment	Number of residences displaced	None	None	None	None	None
		Amount of residential property removed (ha)	None	None	None	None
		Change in access to residential property	None affected	None affected	None affected	None affected
	Potential for change in air quality	The closest residences (along north side of Northlawn Avenue) to the alignment are about 140 m away (from road centre line to building). Minimal changes to air quality expected due to presence of a large treed buffer area – about 100 m wide)	The closest residence is about 55 m from road centre line which could experience air quality effects.	Residence about 40 m (from centre line) to the south which could experience air quality effects.	Roadway is about 70 m away (from centre line) from the residence to the north and south. There exists the potential for some increase in air emissions for this receptor.	
		Potential for change in noise levels	The closest residences (along north side of Northlawn Avenue) to the alignment are about 140 m away (from road centre line to building). Minimal changes to noise expected due to presence of a large treed buffer area – about 100 m wide.	The closest residence is about 55 m from road centre line which could experience increased noise effects.	The residence to the south is about 40 m away (from centre line) which could experience increased noise effects. The closest residence to the north of the alignment is about 100 m away. Changes to noise levels are possible as there are no trees on the west side of Centre Road to attenuate the noise levels.	
		Potential for light pollution	Effects from intersection lighting to the Northlawn Avenue residents expected to be minimal due to approximate 100 m treed buffer area.	Potential for effects from intersection lighting to one residence.	Potential for effects from intersection lighting to at least one residence north of roadway on east side of Centre Road.	
Potential for impact to wells and septic tanks	None expected as the roadway is well removed from residences.	None	None expected as the roadway is well removed from residences.	None expected as the roadway is well removed from residences.		
	Potential for traffic infiltration to existing residential areas and resulting effects	None	None	None		

5. Alternative Design Concepts

Table 5.3: New East-West Road/Centre Road Woodlot Evaluation Tradeoffs Summary

Criteria Group	Criteria	Indicators	Alignment Option DE-2	Alignment Option DE-3	Alignment Option DE-4	Alignment Option DE-5
Social Environment (continued)	Potential for community character impacts/change in views	Opportunity to enhance character of community	Land which route passes through is undeveloped and designated as either future development area, rural/agricultural area or open space. Minimal opportunity to enhance character of area.	Land which route passes through is undeveloped and designated as either future development area, rural/agricultural area or open space. Minimal opportunity to enhance character of area.	Land which route passes through is undeveloped and designated as either future development area, rural/agricultural area or open space. Minimal opportunity to enhance character of area.	Land which route passes through is undeveloped and designated as either future development area, rural/agricultural area or open space. Minimal opportunity to enhance character of area.
	Potential for impact on community/recreation features	Potential for negative change to community character and views in the area	Minimal effects as the roadway will be screened from views/is well removed from existing residences due to the woodlot.	Minimal effects as the roadway will be screened from views/well removed from existing residences due to the woodlot.	Roadway will be visible by at least one residence to the north (on west side of Centre Road.). Potential for change in character of the area.	Roadway will be visible by at least one residence to the north (on west side of Centre Road.). Potential for change in character of the area.
		Removal of community/recreation property	Lands to the east of the woodlot are a proposed area for the expansion of Joe Sams Park. Least amount of land removed that is proposed for the park.	Lands to the east of the woodlot are a proposed area for the expansion of Joe Sams Park. A greater area of proposed parkland would be removed than Option DE-2.	Cuts through lands proposed for Joe Sams Park expansion.	Lands to the east of the woodlot are a proposed area for the expansion of Joe Sams Park. A greater area of proposed parkland would be removed than current proposed park plan.
Natural Environment	Potential for effects on historical features	Disruption to use of community/recreation property	Cuts through lands proposed for Joe Sams Park expansion.	Cuts through lands proposed for Joe Sams Park expansion.	Cuts through lands proposed for Joe Sams Park expansion.	This alignment is considered to be more disruptive to future park users due to the longer length that cut through the proposed park lands.
	Potential for impact on terrestrial features	Potential for removal of heritage/archaeological features	Equal potential	Equal potential	Equal potential	Equal potential
Natural Environment	Amount, nature and significance of natural habitat removed	Potential for removal of heritage/archaeological features	Lowest amount of forest removed of the three southern natural deciduous forested swamp. Community type is not significantly different among Alignments DE-2, DE-3 and DE-4. The field survey identified one butternut tree (poor condition) and one butternut/butter nut hybrid (good condition) in proximity to the alignment. The trees have been avoided and would be unaffected by the roadway.	Slightly higher amount of forest removed than Option DE-2. Habitat type is natural deciduous forested swamp. Community type is not significantly different among Alignments DE-2, DE-3 and DE-4. No butternut trees are near this alignment.	Largest amount of forest removed of four alignments. Habitat type is natural deciduous forested swamp. Community type is not significantly different among Alignments DE-2, DE-3 and DE-4. No butternut trees are near this alignment.	Least amount of forest removed. However, the swamp community in this area is considered to be more ecologically sensitive than the other three alignments. Greater amount of organic soils encountered in this area. No butternut trees are near this alignment.
			Potential for impact on terrestrial features	Equal potential	Equal potential	Equal potential

5. Alternative Design Concepts

Table 5.3: New East-West Road/Centre Road Woodlot Evaluation Tradeoffs Summary

Criteria Group	Criteria	Indicators	Alignment Option DE-2	Alignment Option DE-3	Alignment Option DE-4	Alignment Option DE-5
Natural Environment (continued)	Number of significant trees along existing roadway removed	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
		Potential for effects to adjacent habitat	Second lowest length of new edge created. A series of culverts can be installed along the road to permit the flow of water under the roadway so as to prevent the drying of soil/effects on trees.	Intermediate due to intermediate linear length of new edge created.	Highest due to longest linear length of new edge created.	Although this route has less length through the forest (280 m vs. 330 m for Route DE-2), the adjacent habitat is considered to be more ecologically sensitive/vulnerable to disruption.
	Fragmentation of natural areas	Tied for lowest fragmentation as it leaves the largest undisturbed forest block (to the north of the road).	Tied for highest fragmentation impact as the larger sized remnant forest is smaller than the larger sized remnant forest for Options DE-2 and DE-5.	Tied for highest fragmentation impact as the larger sized remnant forest is smaller than the larger sized remnant forest for Options DE-2 and DE-5.	Tied for highest fragmentation impact as the larger sized remnant forest is smaller than the larger sized remnant forest for Options DE-2 and DE-5.	Tied for lowest fragmentation as it leaves the largest undisturbed forest block (to the south of the road).
		Effect on terrestrial corridor connectivity/linkages	Creates a barrier to the smallest area south of the main terrestrial corridor to the north of the three southern options. A series of culverts can be installed under the roadway to provide for the crossing of the roadway by small animals and amphibians.	Creates a barrier to the intermediate sized area south of the main terrestrial corridor to the north of the three southern options. A series of culverts can be installed under the roadway to provide for the crossing of the roadway by small animals and amphibians.	Creates a barrier to the largest area south of the main terrestrial corridor to the north of the three southern options. A series of culverts can be installed under the roadway to provide for the crossing of the roadway by small animals and amphibians.	Creates less barrier effect impacts within woodlot but will create a significant barrier to the migration of wildlife from the woodlot/PSW to the ESA lands to the northeast. The road will isolate the woodlot from the much larger Waterdown North Wetlands ESA lands.
	Opportunity to enhance degraded natural areas (terrestrial and aquatic)	Similar for all alignments.	Similar for all alignments.	Similar for all alignments.	Similar for all alignments.	Similar for all alignments.
		Amount and quality of aquatic habitat altered/disturbed/removed	All options require one crossing of east branch Borer's Creek (west of Centre Road).	All options require one crossing of east branch Borer's Creek (west of Centre Road).	All options require one crossing of east branch Borer's Creek (west of Centre Road).	All options require one crossing of east branch Borer's Creek (west of Centre Road).
Economic Environment	Potential for impact on business enterprises	Area of commercial properties required (ha)	None	None	None	None
		Potential for change to property values	None	None	None	None
	Potential for change (disruption or enhancement) to business operations	None	None	None	None	

5. Alternative Design Concepts

Table 5.3: New East-West Road/Centre Road Woodlot Evaluation Tradeoffs Summary

Criteria Group	Criteria	Indicators	Alignment Option DE-2	Alignment Option DE-3	Alignment Option DE-4	Alignment Option DE-5
Cost	Potential for impact on residential property value	Potential for change to property values	Property value effects to Northlawn Avenue residents are not expected due to the 100 m wide treed buffer area that would be maintained.	Potential for property value effects to one residence about 55 m away.	Potential for property value effects to one residence about 40 m away.	Potential for property value effects to residence to the north end of the roadway – closest is about 7 m away (no treed buffer area exists on the west side of Centre Road to screen the roadway).
	Potential for impact on future land use	Compatibility with future land use plans	None of the options have effects on future development plans.	None of the options have effects on future development plans.	None of the options have effects on future development plans.	None of the options have effects on future development plans.
	Potential for impact on agricultural land	Area of designated agricultural land removed (ha)	Alignments DE-2 and DE-3 pass through the least amount of vacant lands (west of Centre Road) that may be used for agriculture.	Alignments DE-2 and DE-3 pass through the least amount of vacant lands (west of Centre Road) that may be used for agriculture.	Alignments DE-4 and DE-5 pass through a greater amount of vacant lands (west of Centre Road) that may be used for agriculture.	Alignments DE-4 and DE-5 pass through a greater amount of vacant lands (west of Centre Road) that may be used for agriculture.
Transportation	Capital Cost	Estimated capital cost (including land acquisition)	Alignments DE-2 and DE-3 present the most direct routes resulting in least road length and least cost.	Alignments DE-2 and DE-3 present the most direct routes resulting in least road length and least cost.	Alignments DE-3 and DE-4 are less direct and longer and would result in higher costs.	Alignments DE-3 and DE-4 are less direct and longer and would result in higher costs.
	Operation and Maintenance Cost	Relative maintenance costs as reflected by road length and design features	All options have similar operating costs.	All options have similar operating costs.	All options have similar operating costs.	All options have similar operating costs.
Transportation	Change in traffic operations, delay and capacity	Potential to increase level of traffic service	All alignments address traffic capacity needs. The more southern alignments would have a shorter distance and are more direct.	All alignments address traffic capacity needs. The more southern alignments would have a shorter distance and are more direct.	All alignments address traffic capacity needs. The more northern alignments have a longer distance and are less direct.	All alignments address traffic capacity needs. The more northern alignments have a longer distance and are less direct.
	Potential for change to traffic and public safety levels	Ability to accommodate local and through traffic	All alignments can address local and through traffic needs.	All alignments can address local and through traffic needs.	All alignments can address local and through traffic needs.	All alignments can address local and through traffic needs.
	Opportunity to support transit use, pedestrians and cycling	Potential to improve roadway operations, geometry and sightlines	Potential to improve roadway operations, geometry and sightlines	Not applicable	Not applicable	Not applicable
	Opportunity to support transit use, pedestrians and cycling	Extent that alternative supports/promotes transit use, pedestrians and cycling	All alignments are equally supportive of alternate modes of transportation.	All alignments are equally supportive of alternate modes of transportation.	All alignments are equally supportive of alternate modes of transportation.	All alignments are equally supportive of alternate modes of transportation.

Social concerns have been expressed with the southern alignment (DE-2) by the residents along Northlawn Avenue. The road has been moved another 30 m north than presented at the June 2008 PIC to result in an approximate 100 m wide treed buffer area (from the edge of roadway to the back of the residential properties for most of the distance that the road parallels Northlawn Avenue). This wooded area will visually screen the roadway. A reduced posted speed (50 km/h) has also been recommended for this section.

Noise and air quality changes were modeled for alignment option DE-2. The noise modeling work has shown that noise levels for residents along Northlawn Avenue would increase for the residence EW 22 (the house furthest east of Centre Road on the north side of Northlawn Avenue) from a daytime/nighttime leq of 37/31.1 dBA for the year 2021 no-build scenario to a level of 42.6/36.6 dBA for the year 2021 with the new road in place. This represents a 5.5 dBA increase which is considered to be a “noticeable” increase. However, this resultant noise level is still within the range of a quiet residential area and well below the 60 dBA limit that would warrant mitigation. Further, residents along Northlawn Avenue located closer to Centre Road (i.e. further west than receptor EW22) would experience less of an increase due to their higher ambient noise levels. Receptor EW21 which is the closest residence to Centre Road would experience only a 0.3-0.2 dBA increase which is considered an insignificant increase. To the north of the alignment is a single home which is about 100 m away. For this receptor, the increase in noise level will be about 0.3 dBA which is considered insignificant. A noise barrier wall was therefore not recommended along the southern roadway alternative. However, due to the concerns expressed regarding the potential for noise impacts, it is recommended that a noise monitoring program be carried out in this area, before and after construction to determine exact noise levels and noise level changes. The need for any mitigation can be re-assessed at that time. For exact locations of receptors EW21 and EW22 refer to Figure A-1 in *Appendix E*.

Regarding air quality, the change in air quality parameters for carbon monoxide (CO), nitrogen oxides (NOx) and particulate matter (PM 2.5) were modeled for the same receptors along Northlawn Avenue as noted above. The future 2021 no-build scenario and future 2021 with the new road in place were modeled and compared. The analysis indicated that there would be no change in these parameters for these two receptor locations. For the single residence to the north, the receptor will experience the following increases: CO – 0.2 ppm, NOx – 5 ppb and PM2.5 -0.14 $\mu\text{g}/\text{m}^3$. These levels are several magnitudes below MOE criteria and therefore are not be of concern. Alignment DE-5 is in closer proximity to residences than alignment DE-2 (two residence are within 70 m of the roadway – twice as close as the Northlawn Avenue residences are to alignment DE-2). As well, the lands between the New East-West Road Corridor and the northern residence are open on the west side of Centre Road. Within 140 m of the alignment DE-5 there are 4 residences as compared to the nine residences within the same distance of alignment DE-2. It is expected however, that at least 2-3 of the residences within 140 m of alignment DE-5 would be affected by noise, air quality and lighting effects to a higher degree than any

residence along Northlawn Avenue due to shorter separation distance and the absence of trees in the buffer area. In comparing the social effects of alignment DE-2 to alignment DE-5, alignment DE-5 is expected to result in greater effects to a smaller number of people. Few social effects are expected to result from alignment DE-2. The noise and air quality modeling confirmed this. Overall though, the differences between these options from a social perspective were considered to be small.

In summary, in comparing the natural environmental and social effects of DE-2 versus DE-5, alignment DE-5 was argued to have greater natural environment effects, similar social effects, greater area of agriculture removed and greater effects on the proposed Joe Sam's Park expansion. As such, alignment DE-2 was recommended as the preferred alignment.

5.5 N3 – Hydro Transmission Line Crossing Alternatives

Two alternative alignments were investigated at the crossing of Hydro One's corridor east of the Centre Road Woodlot. Option 1 parallels the hydro corridor on its west side and crosses it to the south. Option 2 crosses the hydro corridor to the north and then parallels it to the east down to Parkside Drive. Option 2 increases the separation from the long term care facility from 150 m to 275 m but increases the impacts to the Cannon Nursery operation north of Parkside Drive. Based on discussions with the owners of the Cannon Nursery operations, it was felt that mitigation of the loss of property and disruption of existing out buildings could be achieved through property exchange. Option 2 was selected as the preferred alignment as it will minimize impacts to the nursing home. (refer to *Exhibit 5-15*). The overall assessment is provided in *Table 5-4*.

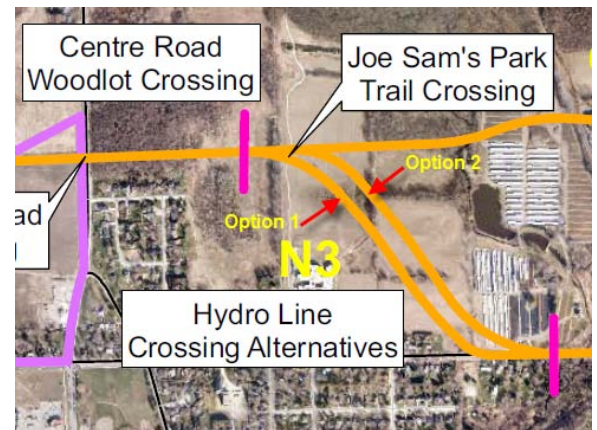


Exhibit 5-15: Hydro Line Crossing Alternatives

5.6 N4 – Parkside Drive

Considerable assessment was completed along Parkside Drive within the section where the road improvements will utilize the existing road. This involved the consideration of the most appropriate methods of widening the existing road (e.g. varying cross section elements, boulevard widths, sidewalk locations etc.). A lower design speed (60 km/h) is recommended through this area to enable the achievement of a tighter design with reduced pavement and property widths. Of note is that along this section of Parkside Drive, the City (and previously the Town of Flamborough) has been purchasing additional right-of-way to enable the conversion of the road to four lanes. Over time, the City has acquired the frontage of properties, when available, to accommodate the future widening of this road. The selected design includes the provision of roundabout treatments at each end of the Parkside Drive section which will serve to introduce traffic calming and gateway features to the area. Extensive landscaping and streetscaping recommendations have also been developed. These are outlined in detail in Chapter 6. Refer to *Exhibit 5-16* that illustrates typical existing residential frontage along Parkside Drive.



Exhibit 5-16: Typical North Side Residence along Parkside Drive

**Table 5.4 – New East West Road Phase 3 Class EA
Hydro Line Alternative Alignments**

Criteria Group	Criteria	Criteria Importance (NAC)	Criteria Importance Project Partners	Indicators	Option 1 East (E-F-G)	Option 2 West (E-G)
Social Environment	Potential for impact on residents	High	High	Number of residences displaced	None	None
				Amount of residential property removed (ha)	None	None
				Change in access to residential property	Both alternatives will result in similar change to the configuration of Parkside Drive.	Both alternatives will result in similar change to the configuration of Parkside Drive.
				Potential for change in air quality	No residences in close proximity to the alternative alignments.	No residences in close proximity to the alternative alignments.
				Potential for change in noise levels	No residences in close proximity to the alternative alignments. The alignment is about 150 m from the long-term care facility located north of Parkside Drive.	No residences in close proximity to the alternative alignments. The alignment is about 275 m from the long-term care facility located north of Parkside Drive.
				Potential for light pollution	No residences in close proximity to the alternative alignments.	No residences in close proximity to the alternative alignments.
				Potential for impact to wells and septic tanks	No residences in close proximity to the alternative alignments.	No residences in close proximity to the alternative alignments.
				Potential for traffic infiltration to existing residential areas and resulting effects	None	None
	Potential for community character impacts/ change in view	High	High	Opportunity to enhance character of community	Limited potential.	Limited potential
				Potential for negative change to community character and views in the area.	Both alignments affect Parkside Drive in a similar way.	Both alignments affect Parkside Drive in a similar way.
	Potential for impact on community/ recreation features	Medium	Medium	Removal Of community / recreation property.	Both alignments will result in the loss of agricultural designated land that is intended for future parkland (North Waterdown Wetlands Area). Roadway will result in a divide of the property.	Both alignments will result in the loss of agricultural designated land that is intended for future parkland (North Waterdown Wetlands Area). Roadway will result in a divide of the property.
				Disruption to use of community / recreation property	Both alignments have similar potential for disruption effects to users of future parkland. New roadway will allow for improved access opportunities to new roadway.	Both alignments have similar potential for disruption effects to users of future parkland. New roadway will allow for improved access opportunities to new roadway.
	Potential for effects on historical features	TBD	Medium	Potential for removal of heritage/ archaeological features.	No known features	No known features
Natural Environment	Potential for impact on terrestrial features	High-Medium	High-Medium	Amount, nature and significance of natural habitat removed	No notable habitat affected	No notable habitat affected
				Number of significant trees along existing roadway removed	None	None
				Potential for effects to adjacent habitat	No notable habitat affected	No notable habitat affected
				Fragmentation of natural areas	No fragmentation effects	No fragmentation effects
				Effect on terrestrial corridor connectivity/ linkages	No corridor effects	No corridor effects
				Opportunity to enhance degraded natural areas (terrestrial and aquatic)	Limited opportunity	Limited opportunity
	Potential for impact on aquatic features	Medium	Medium	Amount and quality of aquatic habitat altered/ disturbed/ removed	None	None

**Table 5.4 – New East West Road Phase 3 Class EA
Hydro Line Alternative Alignments**

Criteria Group	Criteria	Criteria Importance (NAC)	Criteria Importance Project Partners	Indicators	Option 1 East (E-F-G)	Option 2 West (E-G)
Economic Environment	Potential for impact on business enterprises	Medium	Medium	Area of commercial properties required (ha)	Greater area of land required from Connon Nurseries	Less area of land required from Connon Nurseries
				Potential for change to property values	No effect expected	No effect expected
				Potential for change (disruption or enhancement) to business operations	This option is more disruptive to the operations of the Connon Nursery Parkside Drive property. Both alignments will provide better access to the Connon Nursery property.	This option is less disruptive to the operations of the Connon Nursery Parkside Drive property. Both alignments will provide better access to the Connon Nursery property.
	Potential for impact on residential property value	Medium	Medium	Potential for change to property values	No effect expected	No effect expected
	Potential for impact on future land use	Medium	Medium	Compatibility with future land use plans	Both options split the Joe Sams Leisure Park planned park expansion area.	Both options split the Joe Sams Leisure Park planned park expansion area
Potential for impact on agricultural land	Medium	Medium	Area of designated agricultural land removed (ha).	Both alignments will result in the removal of a similar amount of agricultural land. This option results in less fragmentation of the affected farm parcel.	Both alignments will result in the removal of a similar amount of agricultural land. This option results in more fragmentation of the affected farm parcel.	
Cost	Capital Cost (million \$)	Low	Medium	Estimated capital cost (including land acquisition)	All options have a similar cost.	All options have a similar cost.
	Operation and Maintenance Cost (million \$)	Low	Medium	Relative maintenance costs as reflected by road length and design features.	All options have a similar cost.	All options have a similar cost.
Transportation	Change in traffic delay/capacity	Low	Low	Potential to increase level of traffic service	Both alignments can provide a similar level of traffic capacity	Both alignment can accommodate local and through traffic.
				Ability to accommodate local and through traffic	Both alignment can accommodate local and through traffic.	Both alignment can accommodate local and through traffic.
	Potential for change to traffic and public safety levels	High	High	Potential to improve roadway operations, geometry and sightlines	Not applicable	Not applicable
	Opportunity to support transit use, pedestrians and cycling	Medium	Medium	Extent that alternative supports/promotes transit use, pedestrians and cycling	Similar level of supportiveness	Similar level of supportiveness

5.7 Option 4 vs. 5 Alignment Review

Background

Option 4 (that includes the widening of Parkside Drive from west of Grindstone Creek to east of Robson Road) was previously selected over Option 5 (that stays north of Parkside Drive) as the preferred route in the evaluations undertaken in the Waterdown Aldershot Transportation Master Plan (WATMP), fulfilling Phase 1 and 2 requirements of the Class EA process. As a result of concerns expressed by the local community (primarily Parkside Drive residents) during Phase 2, the Project Partners agreed to a review of the feasibility of alternative routes including Option 5, a northerly oriented alignment. Through this review, Option 4 was confirmed as the preferred route. The results of this review were presented at the June 2008 NAC meeting. At that meeting an additional alternative (“Sawtooth”) was brought forward which was originally developed during the previous routing study as documented in the original Stantec Report (*Waterdown/Aldershot Master EA Transportation Network Master Plan Report, September 1999*). The Project Partners agreed to a review of the “Sawtooth” alternative that curves to the north of the Opta Minerals processing building (*refer to Exhibit 5-17*). A plan showing an alternative based on the original “Sawtooth” alternative was prepared and displayed at the June 2008 Public Information Centre. The following details the results of the further Phase 3 evaluations including consideration of the “Sawtooth” option and the originally preferred Option 4.



Exhibit 5-17: Opta Minerals Operation

Phase 3 Review of Alternative Routes

An alternative road alignment to those originally considered by the Project Partners for the New East-West Road was first presented by a Parkside Drive community representative to the City of Hamilton in a December 14, 2005 memo and was discussed with the City in a meeting with residents on December 16, 2005. A second written submission was made on a February 1, 2006 from the Parkside Drive East Citizens Group that outlined an alternative alignment for consideration (*refer to Exhibit 5-18*). This alternative was developed by the Project Team as Option 5.

The alignment submitted by the residents in the December 14, 2005 memo (presented as a “zone” on an air photo) encompasses the Connon Nursery and Opta Minerals properties. The “Option 5” route in the map that was attached to the residents’ February 1, 2006 memo (which was very conceptual), shows a different, more northern alignment than that suggested in the December 14, 2005 memo. On this map a hand drawn route for an “Option 5” appears to follow the northern, original Option 1 route to just east of Robson Road where it then drops south to pass along the east side of the Upcountry development lands. In the area east of Robson Road, where the route of Option 1 and the community suggested route differ, the effects of both routes are similar as they both largely extend through agricultural land located south of the Waterdown



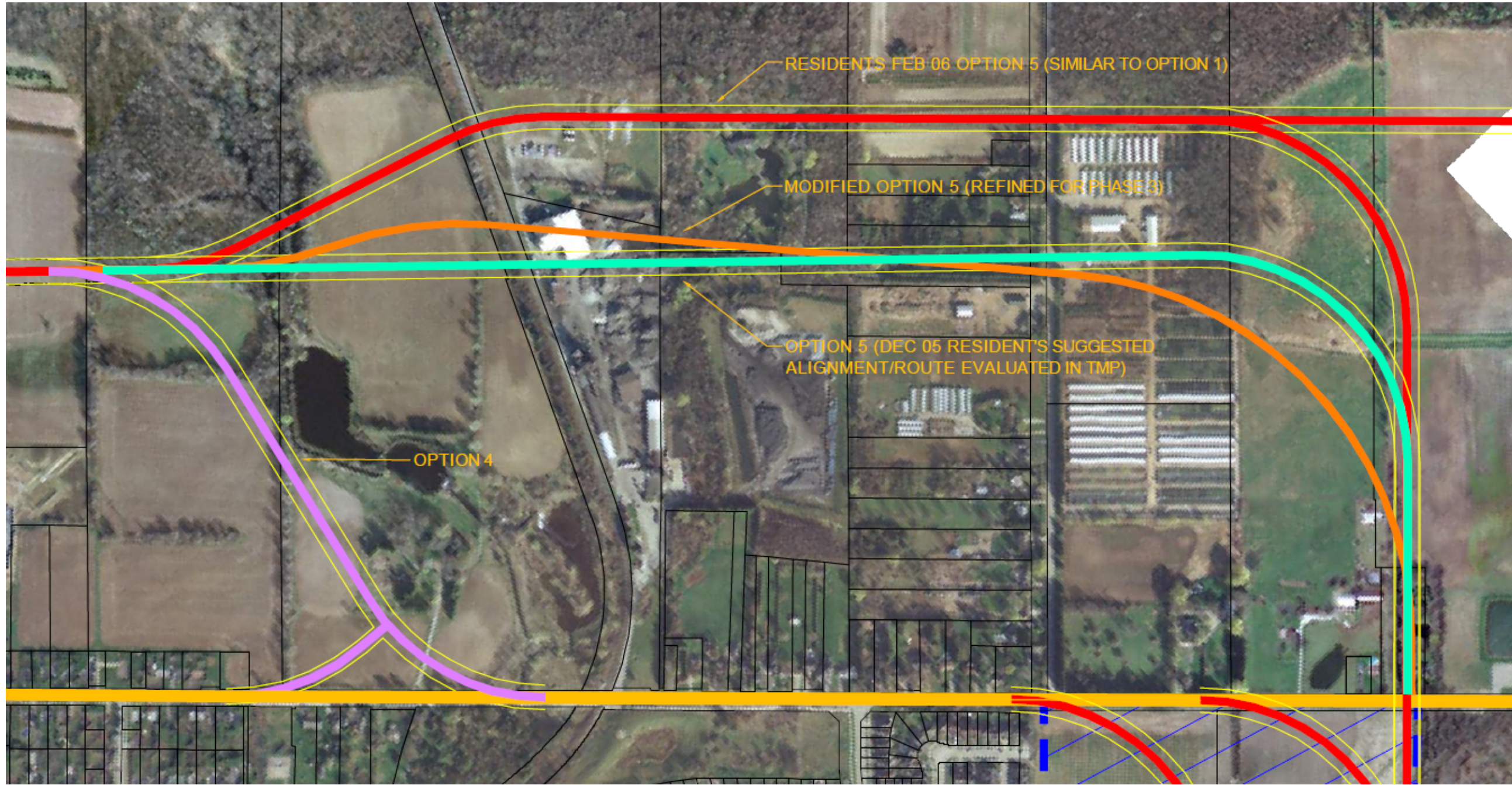
Exhibit 5-18: Northern Route Suggestion from the Parkside Drive East Citizens Group

North Wetland ESA. An exception is a southern extension of the ESA just east of Robson Road which both routes pass through).

The February 1, 2006 route alternative presented by the residents differs little from Option 1 that was evaluated in the WATMP (it incurs all of the same impacts to the PSW/ESA lands that Option 1 does west of Robson Road and passes through similar agricultural land east of Robson Road). This suggested northern option was not re-evaluated by the Project Partners as it was very similar to Option 1. Also, had Option 1 been selected as preferred, it would be subject to the same evaluation to confirm the alignment to connect it to Dundas Street which the preferred Option 4 was subject to (this is how the route for the extension through the Upcountry development lands was finalized, even though the original connector road route was along Kerns Road). This is documented in the Phase 2 WATMP Report.

Recognizing the above, the Project Team adjusted the alignment of the alternative route presented to them by the residents so that it served as a fundamentally different alternative to Option 1, which was already considered in the route evaluation and not selected as preferred, as documented in the WATMP Report. The Parkside Drive Community indicated verbally at a special meeting held on December 1, 2008, that their suggested route was conceptual only and they expected that the project team would be able to improve it through further analysis. This was done. The alternative alignment (identified as “Option 5”) that the Project Team developed, largely avoids the PSW/ESA lands located to the north, but needed to pass through the business properties of Opta Minerals and Connon Nurseries. In discussion with these business operators it was determined that impacts to these businesses could not be avoided with this alternative (without resulting in impacts to other features in the area). The routing of the Project Team’s proposed Option 5 was optimized as much as possible with the input from both of these business owners. Meetings were held with them to help determine the routing for the road. *Figure 5-7, Previous Road Alignment Options (North of Parkside Drive)* illustrates the various routes that were assessed in this area.

Figure 5-8, Option 5 shows the “Option 5” route that was evaluated against Option 4 by the Project Team as documented in the WATMP Report and once again re-evaluated in Phase 3, as documented below. It should be noted that the Parkside Drive Community subsequently indicated that they had never suggested that the revised “Option 5” route should go through the Opta Minerals northern building (see minutes of meetings with Parkside Residents Association, November 19, 2008 and December 1, 2008 in *Appendix A*), although the route was shown to the NAC/public in advance of the evaluation. The Project Team’s response was that the plan received from the group (*Exhibit 5-18*) shows a suggested northern corridor that is centered on the Opta Minerals building.



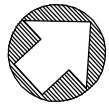
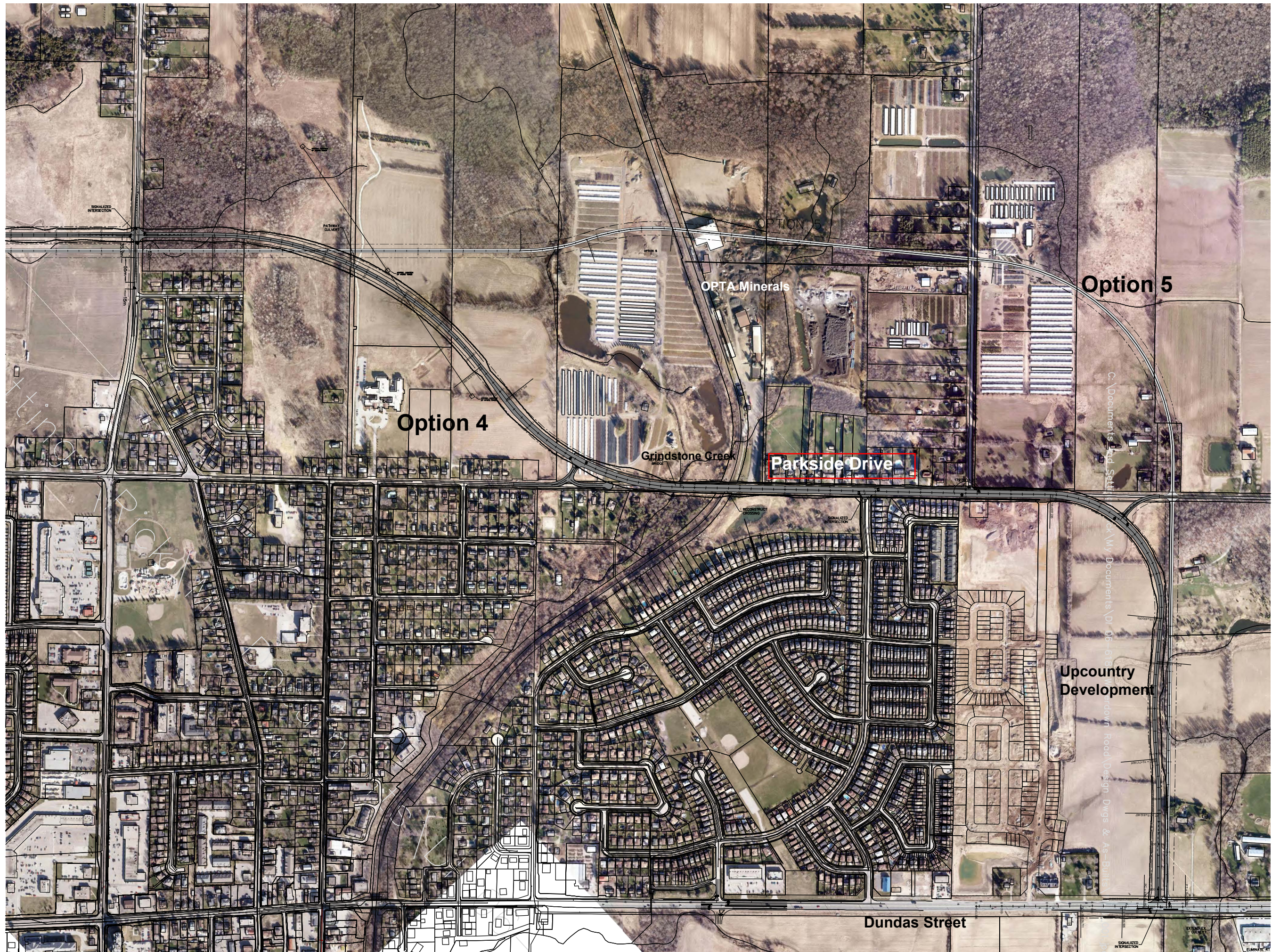
Previous Road Alignment Options North of Parkside Drive



EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

CHECKED BY: JDM
DESIGN BY: JDM
DRAWN BY: GCCSHZ
SCALE: AS SHOWN
DATE: JUNE 17, 2009
PROJECT No. 08-9020

Figure 5.7



Data Sources

Data provided by the Regional Municipality of Halton - Planning and Transportation Services



OPTION 5 ASSESSMENT



CHECKED BY: ---
 DESIGN BY: ---
 DRAWN BY: ---
 SCALE: ---
 DATE: April 10, 2008
 PROJECT No. 08-9020

NEW E-W ROAD
 CLASS ENVIRONMENTAL ASSESSMENT
 HWY 6 TO BRANT STREET

FIGURE 1

Option 4 versus Option 5 Re-Evaluation

The Option 5 alignment, as refined by the Project Team, was assessed and compared against Option 4 (Parkside Drive widening). The route location was adjusted in consultation with the landowner (Opta Minerals) through a number of meetings. As part of the assessment work, an economic impact and property value consultant was utilized to determine the impacts and costs to property and businesses along the two alignments. As well, more detailed road construction costing was undertaken to better reflect the costs of both Option 4 and 5. **Table 5-5** presents the results of the comparative evaluation. The same evaluation criteria that was utilized in the Phase 2 TMP was used in this evaluation.

Option 5 was considered preferred with respect to social (less disruption) and transportation considerations (less driveways = better for through traffic). There were, however, several disadvantages associated with Option 5 in comparison to Option 4 including:

- Greater business impacts to Connon Nursery and Opta Minerals – significant amounts of land would be needed which would require the relocation of Opta Minerals
- Greater effects on natural habitat and floodplain (3 additional creek crossings and the need to pass through ESA lands)
- Significantly higher cost
- Loss of land designated for agriculture
- Being located within the Greenbelt and on land that is not designated for development

The only distinct disadvantage associated with Option 4 is that it has the potential for greater social impacts than Option 5 including the potential for increased traffic disturbances, safety issues and the removal of some property (frontage strips of land). As well, the residents expressed many concerns regarding the widening of Parkside Drive including concern that the road would attract more truck traffic (Parkside Drive is currently designated as a truck route), change the community character, and that the road would offer less transportation service capacity potential (it cannot be expanded further). Further, it was the opinion of the residents that since the MOE Certificate of Approval (CoA) for the Opta Minerals property references that the entrance to Opta Minerals should be changed to a northern road to minimize truck traffic impacts, if developed, is strong reason for the selection of an alternative northern route. The MOE did respond that the original Opta Minerals CoA reference to an entrance relocation was made under a previous process, when a northern route was proposed as the recommended route (which was never endorsed by the municipality). It was recognized by the Project Team that the original CoA did acknowledge that a northern route could reduce truck traffic on Parkside Drive and address potential traffic/social impacts.

5. ALTERNATIVE DESIGN CONCEPTS

Table 5.5 New Waterdown East-West Road - Option 4 vs. 5 Review Tradeoffs Summary				
Criteria Group	Criteria	Option 4	Option 5	Tradeoff Summary
Social Environment	Potential for impact on residents	Approximately 30 residences either front or back directly onto the section of Parkside Drive to be widened. Property from about 15 residences along north side will be required (about 3 m of frontage depending on the property). Potential for increased noise and air quality effects (over future baseline) to 30 residences.	2 residences on Robson Road would be in close proximity to new roadway. One residence removed (on Parkside Drive). Increased traffic on Robson Road as a result of the new roadway would increase the potential for noise and air quality effects (about 12 residences).	Option 5 preferred as would result in fewer people being disrupted by new roadway widening. Traffic/truck volumes on Parkside Drive would be less than under Option 4.
	Potential for community character impacts	Rural character of Parkside Drive to be altered by development of a 4-lane urban cross section roadway. Proper road design and streetscaping initiatives can reduce some of the effects.	Potential for a change in character of a portion of Robson Road as a result of new intersection that would need to be constructed.	Option 5 preferred as change in community character to be less than for Option 4.
	Potential for impact on community/recreation features	No impacts to existing features.	No impacts to existing features. Option 5 passes through floodplain lands that local residents have suggested could be enhanced for parkland. There is a surplus of parkland in Ward 15. The City has no need or resources for additional parkland in this area.	No preference
Natural Environment	Potential for impact on terrestrial features	Limited amount of hedgerow habitat to be removed at western end (2 crossings of hedgerows).	Route crosses two sections of the Waterdown North Wetlands ESA (one of these crossings includes a PSW). Would result in removal of habitat and fragmentation of habitat. Conservation Halton is not supportive of this option.	Option 4 preferred due to limited natural features to be removed.

5. ALTERNATIVE DESIGN CONCEPTS

Table 5.5 New Waterdown East-West Road - Option 4 vs. 5 Review Tradeoffs Summary				
Criteria Group	Criteria	Option 4	Option 5	Tradeoff Summary
Natural Environment (continued)	Potential for impact on aquatic features	Requires replacement of an existing bridge crossing of the Grindstone Creek. Crosses Grindstone Creek floodplain.	Requires 3 new crossing of Grindstone Creek. Crosses a large area of floodplain. Would require significant channel works associated with two of the crossings. Impacts to fishery habitat likely.	Option 4 preferred as no new water crossings required and less potential floodplain and channel effects.
	Potential for impact on business enterprises	Some minor effects to Connon Nursery property (south end) on Parkside Drive Alignment can be adjusted to minimize property impacts. Option 4 improves access to the Connon property on Parkside Drive.	Impacts to Connon Nursery properties (north end of Parkside Drive property and Robson Road property). Will require relocation of Opta Minerals. Opta has voiced objection to the route. Would result in the loss of a local employer. Option 5 improves access to the Connon property on Robson Road.	Option 4 preferred due to less business impacts – principally avoiding the removal of the Opta Minerals business. Impacts to the Connon Nurseries operations are not considered significant with either option. Note that costs for property acquisition are included in the Cost criteria group.
Economic Environment	Potential for impact on future land use	Option 4 does not affect any designated development lands.	Option 5 does not affect any designated development lands. Option 5 passes through Greenbelt Lands. This option does not support the City's GRIDS policies of nodal development and making use of existing infrastructure. Extending the road north could also increase pressure to develop lands between Parkside Drive and the Option 5 alignment.	Option 4 preferred
	Potential for impact on agricultural land	Less agricultural land impacted. Loss of agricultural designated land at west end (as road travels south to Parkside Drive). Long term intent of this land is for parkland.	Greater amount of agricultural land affected. Agricultural designated land located west of rail tracks and east of Robson Road would be removed.	Option 4 preferred as less agricultural land removed

5. ALTERNATIVE DESIGN CONCEPTS

Table 5.5 New Waterdown East-West Road - Option 4 vs. 5 Review Tradeoffs Summary				
Criteria Group	Criteria	Option 4	Option 5	Tradeoff Summary
Cost	Capital Cost (\$)	Business impacts and land: \$613 K to \$853 K Residential Land: \$400 K Road Construction: \$11.4 M Approx Total Cost: \$12.6 M	Land and business impacts: \$12.3 M to \$20.3 M Road Construction: \$11.7 M Approx Total Cost: \$24 M to \$32 M	Option 4 preferred due to lower cost. (\$11.4 M to \$19.4 M)
<p>Costing Notes:</p> <ol style="list-style-type: none"> 1) Option 4 costs include full reconstruction of a 4-lane roadway for the section along Parkside Drive. Planned resurfacing costs for Parkside Drive have not been deducted from these costs (this would reduce the Option 4 road construction costs). 2) Potential land remediation costs on Opta Minerals property are not included with Option 5. There is potential for soil contamination at Opta Minerals property due to historical and present industrial activity. A Phase 2 Environmental Site Assessment is required to determine the nature and extent of contamination. 3) Cost variation between the low and high estimate for Option 5 due to potential Opta Minerals relocation costs associated with fugitive dust abatement at new site, loss of supplier relationship, loss of railroad access. 4) Some cost off-set is possible if property can be severed and resold – cost off-set would depend on extent of remediation required & land use options. 5) Development charges expected to cover the costs of the 2 new road lanes associated with Option 4. The remainder (including the reconstruction costs of the existing 2 lanes along Parkside Drive) to be covered by general tax levy. The additional costs associated with Option 5 would also need to be covered by general tax levy. 				
Transportation	Change in traffic capacity	Both road alignments can address capacity requirements. Residents have suggested that Option 4 cannot be expanded further. There has been no need identified to expand the road beyond the lanes identified.	Both road alignments can address capacity requirements. Option 5 better addresses through traffic volumes due to less entrances along the roadway.	Option 5 preferred
	Traffic/Public Safety	Higher volumes of pedestrians and entrances along Parkside Drive so less preferred with respect to safety. Truck traffic safety concerns of local community.	Low safety concerns due to expected low volumes of pedestrian traffic/fewer entrances.	Option 5 preferred

It was the opinion of the Project Team that most of the social concerns raised by the residents regarding the widening of Parkside Drive could be addressed through mitigation and road design elements. Key features of the proposed widened roadway include:

- Roundabouts at each end of the community that will serve as traffic calming measures;
- Narrowed lanes and reduced boulevard widths;
- On-road bicycle allowance;
- Reduced road speeds (posted at 50 km/h – down from current 60 km/h);
- Sidewalks on both sides of the roadway (currently one side only);
- Streetscaping/plantings/street furniture; and
- Street lighting.

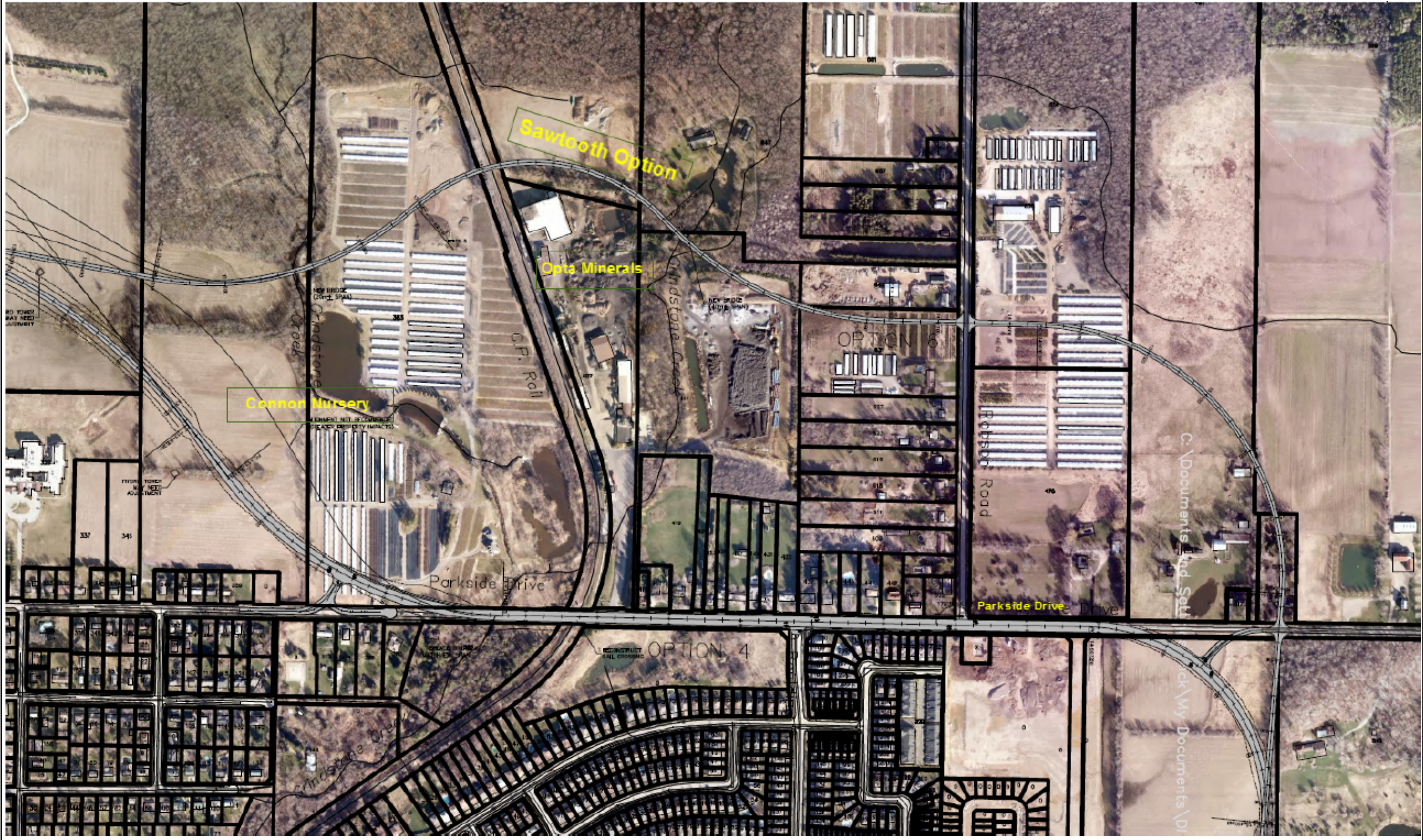
By implementing the above design elements it is expected that concerns regarding public safety and impacts on the character of the area can be mitigated. Regarding traffic related nuisance effects, noise levels were assessed for the future with and without the road improvements in place. Three receptor locations were analyzed along the section of Parkside Drive to be improved. For one receptor (west of the Grindstone Creek crossing), future daytime/nighttime sound levels will decrease with the road widening whereas for the other 2 receptors (one on the north side and one on the south side of Parkside Drive), future noise levels will be about the same after widening.

Based on the above, Option 4 (Parkside Drive widening) was confirmed as the preferred alternative.

Option 4 versus Sawtooth Option Evaluation

Upon reviewing that Option 4 was reconfirmed as the preferred route, the Parkside Drive community suggested another alignment option at the June 2008 NAC meeting that was originally proposed in an earlier study undertaken by Stantec Consultants in 1999. This alignment would involve the roadway wrapping around the north end of the Opta Minerals property. The design developed by Stantec was presented in a very conceptual manner in their report. **Figure 5-9** illustrates the “Sawtooth” option generated after the June 2008 NAC meeting. Further design modifications would need to be made to make this route acceptable from a traffic operations and road safety perspective. In particular the crossing of the rail line would need to be on tangent requiring the straightening of the roadway for approximately 50 m each side of the crossing. Safety concerns exist with this alignment as the existing Opta Minerals building will block rail corridor sight lines from the new roadway for westbound vehicles. As a result the alignment for this option was adjusted which resulted in a northerly shift causing additional environmental and social concerns.

The “Sawtooth” option was evaluated and compared to Option 4 as presented in **Table 5-6**. **Option 4 was confirmed as the preferred alternative.**



Sawtooth Option



DESIGNED BY: JDM
 DRAWN BY: GCSHZ
 DATE: JUNE 17, 2009
 PROJECT No. 08-9020

EAST-WEST ROAD
 CLASS ENVIRONMENTAL ASSESSMENT
 HIGHWAY 6 TO BRANT STREET

Figure 5-9

Table 5-6 – Option 4 vs. “Sawtooth” Option

Criteria Group	Option 4	Sawtooth Option
Social Environment	Potential for disruption effects to about 30 residents. Noise and air quality modeling results show that there will be little difference over future conditions with or without road widening. It is considered that impacts are not significant and/or can be mitigated.	Direct effects to residential property N/E of Opta Minerals. Two residents along Robson Road could be affected and one residence would be displaced (where new road would cross Parkside Drive). Presents opportunity for truck traffic associated with Opta Minerals to use this new northern roadway instead of Parkside Drive. However, this would require significant re-working of the Opta Minerals site layout at considerable cost.
Natural Environment	Minimal impact on the natural environment. Requires one crossing of Grindstone Creek.	Route crosses sections of the Waterdown North Wetlands ESA (one of these crossings includes a PSW). It is expected that these effects would be greater if the road is moved further north to maintain design/safety standards. The alignment would result in removal of habitat and fragmentation of habitat. Requires 3 new crossings of Grindstone Creek. Conservation Halton is not supportive of a north of Parkside option through this area.
Economic Environment	Impacts to Connon Nursery property just north of Parkside Drive (west of Grindstone Creek).	Greater impacts to Connon Nursery property although would provide better access to their facility on Robson Road if direct access to the new road is provided. Under the current alignment, it is expected that alterations would be required to Opta Minerals operations under their CofA due to the close proximity of the roadway and the potential for air quality effects. Agricultural land would be removed/fragmented east and west of Robson Road.
Cost	Property and business impact costs would be approximately \$1 M to \$1.2 M	Property and business impact costs would be approximately \$1.3 M to \$1.8 M (does not include potential cost regarding Opta Mineral operations due to close proximity of the road and the need to relocate their entrance, weigh scale operations and internal site access roads). Considered a more costly option
Transportation	Both roads can address capacity requirements. Lower speed facility. Expansion potential more difficult.	Both roads can address capacity requirements. Better addresses through traffic volumes due to fewer driveway entrances and higher posted speeds. Road would be longer so less direct. Has expansion potential (to 6 lanes) should that be required in the future. Rail crossing safety/sight line issues.

5.8 N5 – Upcountry Development

The general location of the connection between Parkside Drive and Dundas Street was initially identified in the Phase 2 work carried out as part of the WATMP. This location was along the east side of the Upcountry development lands. A reserve for this road was subsequently determined by the developer and adopted as the most appropriate alignment (refer to *Exhibit 5-19*). In Phase 3 of the Class EA, a roundabout was introduced at the intersection of old Parkside Drive and the New East-West Road where it curved to the south. Various locations for the roundabout were assessed (refer to *Figure 5-10*). The easterly location was preferred as it had less impact to the future development. A tributary of the Grindstone Creek flows adjacent to this area on the east side.

The easterly shifted alternative was recommended. It reduces the impacts to the development and results in minor impact increases to the woodlot along the south side of Parkside Drive to the east of the roundabout. Impacts to existing driveways on Parkside Drive will be similar with either alternative.

Figure 5-10: Alternative Roundabout Locations (Upcountry Area)

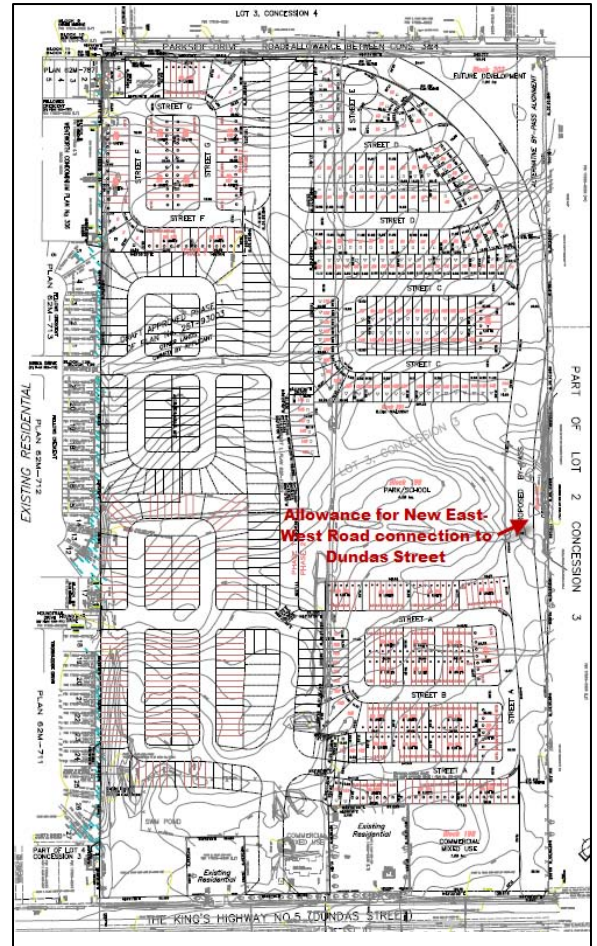
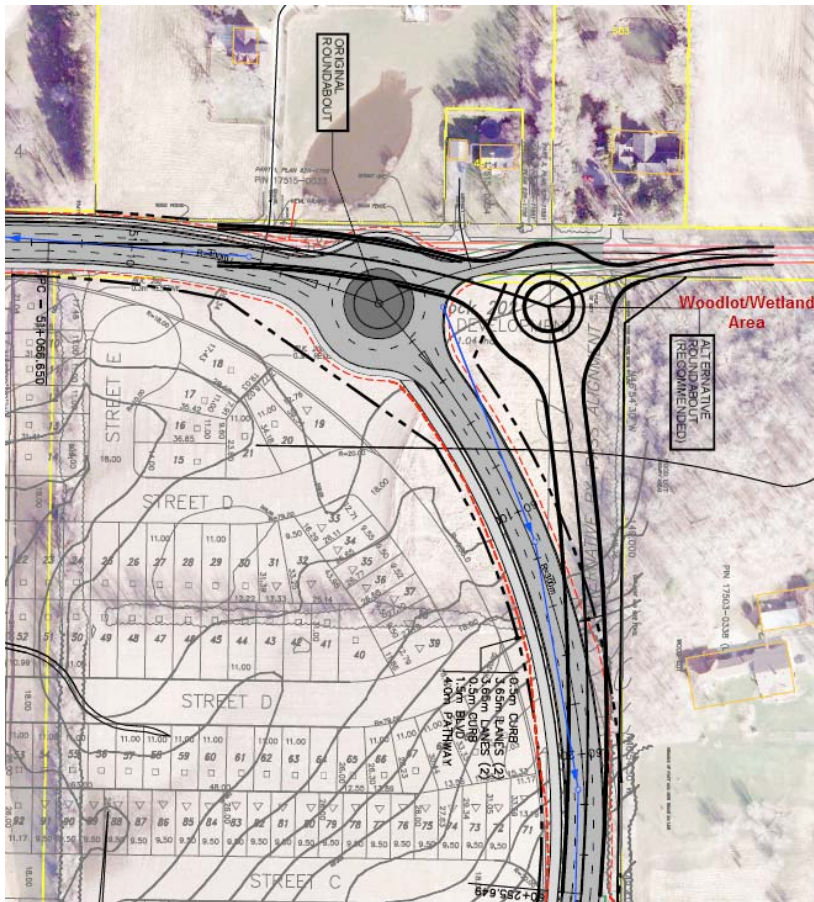


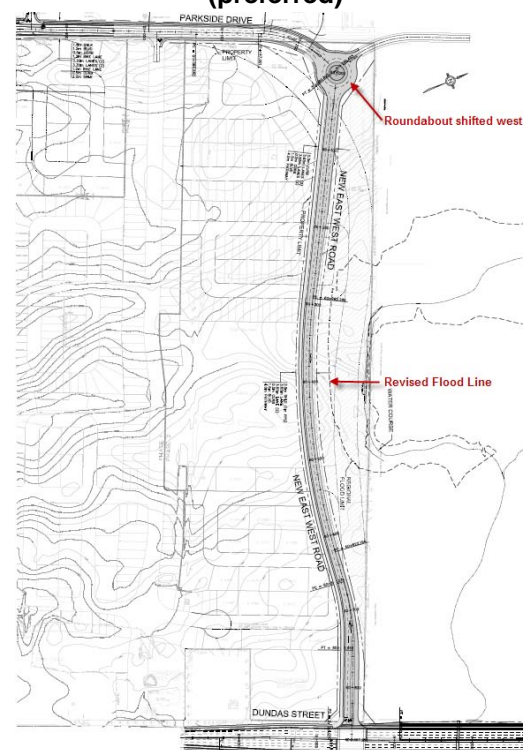
Exhibit 5-19: Upcountry Development Plan

Currently during the Regional Storm the Grindstone Creek tributary spills its banks and an area to the west within the Upcountry development lands floods. In order to preserve the existing flooding characteristics two relief culverts were proposed with the selected alignment that would become operational during the Regional Storm. Refer to *Figure 5-11*.

Figure 5-11: Easterly Alignment Alternative



Figure 5-12: Westerly Alignment Alternative (preferred)



Conservation Halton had the following comments regarding the Easterly Alignment alternative:

- the road location must consider the stable top of bank and meander belt associated with the watercourse
- the area to the east of the roundabout, outside the Upcountry property appears to be a wetland/swamp and maintenance of the hydrologic regime of the wetland will be required
- there is an additional requirement to mitigate the impacts to the flood plain adjacent to the Upcountry lands including to further address the storage and conveyance functions of the flood plain
- mitigation will be required for any impacts to fish habitat
- the preferred drainage plan for the new roadway should be to direct flows to existing/proposed stormwater management facilities within the Upcountry development
- normal criteria calls for a 15m buffer from new development to a watercourse's meander belt.

The general target location criteria (i.e. buffer to the new facilities) established by Conservation Halton for this area included the following:

- Regional storm flood plain plus an additional 15 metre regulated allowance

- Erosion lands (meander belt) plus an additional 15 metre regulated allowance
- Wetland plus an additional 30 or 120 metre regulated allowance (if the wetland is less than 2 ha, the additional regulated area is 30 metres from the wetland limit; if the wetland is greater than 2 ha, the additional area is 120 m from the wetland limit).
- As a result of these modifications, the Westerly Alignment option was considered as preferred. As part of the implementation of the eastern half of the Upcountry development, the design of this road section will be completed. The following work will be required as part of this design.

In consideration of the above comments/requirements and in consultation with Conservation Halton and the developer, a Westerly Alignment option was developed (refer to **Figure 5-12**). This option has the following main features:

- the new road has been shifted to the west, outside the meander belt zone of the watercourse
- the Regional Storm floodline is located entirely on the east side and the two proposed relief culverts are no longer required
- the Regional Storm floodline is no longer split by the new roadway
- the roundabout has been shifted to the west avoiding direct impacts to the wetland
- an approximate 15m buffer zone will exist between the eastern edge of new pavement and the new Regional Storm floodline
- grading will be required on the east side of the new road to provide suitable containment of the Regional Storm.

Figure 5-13 on the next page contains a cross section of the New East-West Road adjacent to the Upcountry development at Station 60+400 (looking south along the proposed alignment), which is roughly at the centre of the recommended alignment shift. It illustrates the relationship between the required roadworks and the new Regional storm storage area on the east side of the roadway. The depth of storage during the Regional storm will be approximately 1.0 m at this location. The plates at the end of this report illustrate the approximate extent of the resultant Regional storm floodline (Upcountry Plates 1 and 2).

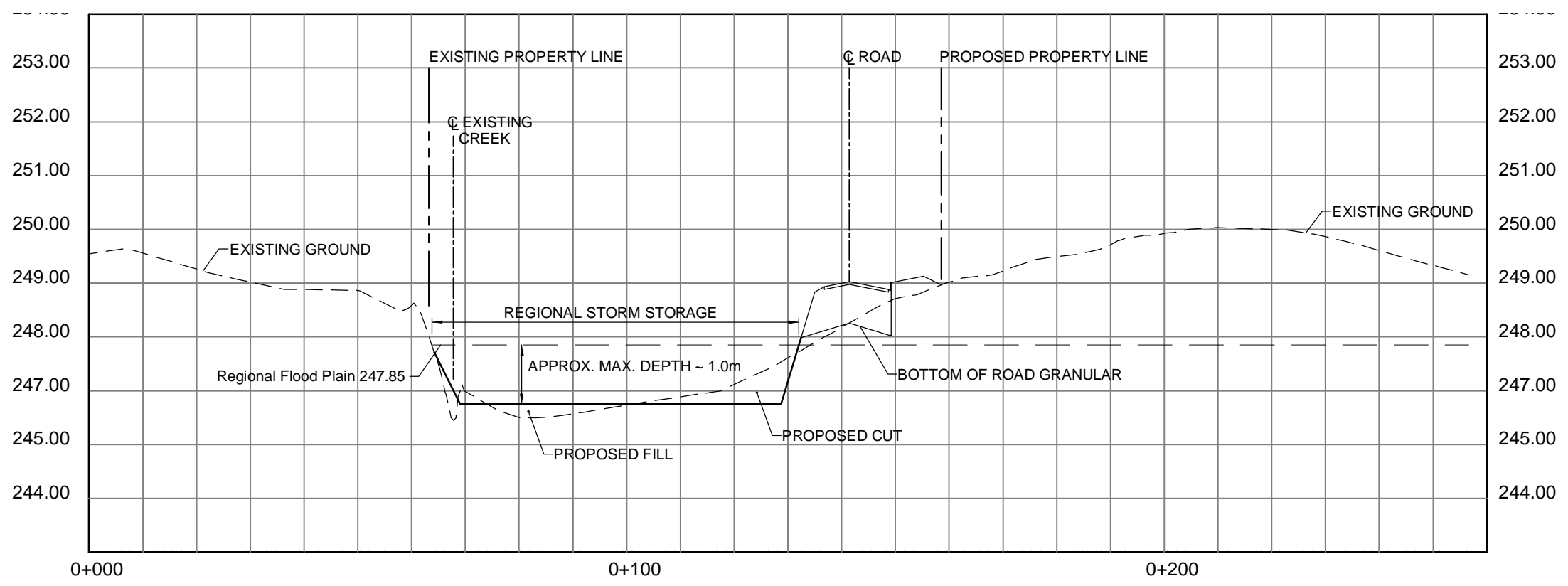
As a result of these modifications, the Westerly Alignment option was considered as preferred. As part of the implementation of the eastern half of the Upcountry development, the design of this road section will be completed. The following work will be required as part of this design:

1. Confirming the alignment recognizing the target 15 metre buffer between the new east edge of pavement and the Regional Storm floodline and avoiding direct impact to the wetland to the north-east. Slight alignment adjustments are acceptable provided that the roadway's horizontal alignment design criteria

are met, the intersection location at Dundas Street is maintained and the roundabout design recognizes the need to maintain existing residential property access on the north side of the roundabout. Conservation Halton has indicated that it is willing to consider some minor grading within the 15 metre allowance adjacent to the greatest of the flooding or erosion hazard line. The physical roadway and any associated sidewalk or hard surfaces should be 15 meters from these lines

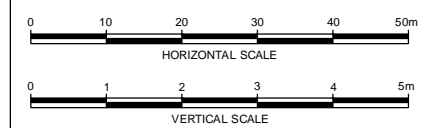
2. The full range of design storms must be modelled as part of the detailed design work to ensure that existing flood elevations and riparian storage volumes can be maintained and that there will be no increased flooding on adjacent lands due to the proposed roadway and floodplain configuration.
3. A detailed stable top-of-bank and meander belt natural hazards assessment be completed to confirm these features of the watercourse in this area.
4. Impacts of the proposed alignment on the storage and conveyance functions of the floodplain must be confirmed/finalized during detailed design.
5. Development of the new road drainage system should utilize to the extent possible existing/proposed stormwater management facilities within the Upcountry development.
6. Consideration should be given to utilizing any excess lands on the east side of the road as sites for tree planting compensation areas.
7. Additional field data should be collected to characterize the woodland/wetland area located adjacent to the north east corner of the Upcountry development.

Plotfile: Feb 22, 2012 - 5:50pm File: C:\CAD\0802020 Waterdown E-W Roads\LD0-Parkside\dwg\Improvement Plans\08-9020 Alignment Revisions (Waterdown E-W Road)\P&P.dwg Layout: Cross Section



NEW EAST-WEST ROAD
 STA. 60+400
 (LOOKING SOUTH)

LEGEND



DESIGN CROSS SECTION

STA. 60+400



NEW EAST-WEST ROAD
 CLASS ENVIRONMENTAL ASSESSMENT
 HIGHWAY 6 TO BRANT STREET

CHECKED BY: PAM
 DESIGN BY: JT
 DRAIN BY: GCC
 SCALE: AS SHOWN
 DATE: FEBRUARY 23, 2012
 PROJECT No. 08-9020

Figure 5-13

NOTE: VERTICAL SCALE HAS BEEN
 EXAGGERATED TO ILLUSTRATE
 GRADING & STORM LEVEL.

5.9 N6 - Dundas Street Widening (West)

Throughout the majority of Section N6 (to east of Kerns Road) the road has been shifted south to minimize impacts to the residential properties along the north side of Dundas Street. In this section there are approximately 15 properties, some fairly close to the existing road. Refer to *Exhibit 5-20*.



Exhibit 5-20: Section N6 Widening Along the South Side of Dundas Street

5.10 Bruce Trail Crossing at Dundas Street

Approximately 500 to 1000 Bruce Trail users per year cross Dundas Street between Kerns Road and Brant Street while walking the trail. This volume of use is well below the number that would, in itself, warrant the consideration of the introduction of an upgraded crossing treatment. However, due to the width of the proposed new road (six lanes plus left turn lane) and related safety concerns, alternative crossing treatments were assessed. *Table 5-7* contains a summary of the assessment. *Exhibit 5-21* illustrates the general area of the crossing.

Alternatives included the following:

- Do Nothing
- Median Refuge
- Pedestrian Cross Walk
- Pedestrian Signal
- Pedestrian Overpass
- Move Crossing to Kerns Road

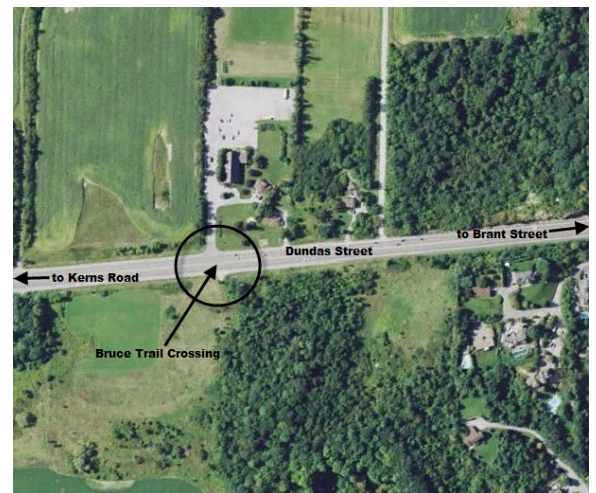


Exhibit 5-21: Bruce Trail Crossing of Dundas Street

The relocation of the existing crossing westerly 750 m to the Kern's Road intersection is the recommended alternative. This alternative would only be appropriate if traffic signals were installed at this location. Providing traffic signals at this location will need further review and assessment by the Project Partners.

Table 5.7: Dundas Street - Bruce Trail Crossing Alternative Treatment Assessment

Assessment Factor	Do Nothing	Median Refuge	Pedestrian Cross Walk	Pedestrian Signal	Pedestrian Overpass	Move Bruce Trail Crossing to Kerns Road
Description of Alternative	<ul style="list-style-type: none"> No treatment at existing crossing – trail users required to cross 6 lanes of traffic. 	<ul style="list-style-type: none"> Construct a raised median refuge island with pedestrian railings at existing crossing location. Pedestrians must negotiate crossing in two stages (half at a time). 	<ul style="list-style-type: none"> At existing crossing location install a standard cross walk with median refuge. Pedestrians will likely have to negotiate the crossing in two stages (half at a time). 	<ul style="list-style-type: none"> At existing crossing location install a pedestrian activated traffic signal. 	<ul style="list-style-type: none"> At existing crossing location install a pedestrian bridge with ramp structures at each end. 	<ul style="list-style-type: none"> Move the crossing of Dundas west approximately 1.0 km to Kerns Road. Install traffic signals at the Kerns Road-Dundas Street intersection. Install sidewalks along the north side of Dundas from the existing Bruce Trail crossing to Kerns Road.
Social Environment <ul style="list-style-type: none"> Potential for Impact on Bruce Trail Users 	<ul style="list-style-type: none"> Negotiating a major road crossing (6 lanes) may be uncomfortable / unattractive to trail users who will have to stop in an unprotected median to continue their crossing. 	<ul style="list-style-type: none"> Addresses ease of use and crossing comfort by providing at median refuge but will necessitate a two-stage crossing. 	<ul style="list-style-type: none"> Addresses ease of use and crossing comfort by requiring traffic to stop but will necessitate a two-stage crossing. 	<ul style="list-style-type: none"> Addresses ease of use and crossing comfort by requiring traffic to stop and enable a one-stage crossing. 	<ul style="list-style-type: none"> Complete separation of road and trail traffic would result in minimal impact to trail users. Minor concern regarding the need to negotiate two ramp structures 	<ul style="list-style-type: none"> Introduces significant length of new trail adjacent to busy municipal roads (1.0 km along north side of Dundas Street). May involve some out of the way travel for hikers and provides indirect access to bypassed trail section.
Transportation <ul style="list-style-type: none"> Change in Traffic Operations, Delay and Capacity Potential for Change to Traffic and Public Safety Levels Opportunities to Support Transit Use, Pedestrians and Cycling 	<ul style="list-style-type: none"> Essentially no change in road traffic operations, delay or capacity. Concern over the ability of trail users to cross 6 lanes safely (will likely require pedestrians to stop in the 2-way centre left turn lane). 	<ul style="list-style-type: none"> Essentially no change in road traffic operations, delay or capacity. Will provide protection for pedestrians stopped in the median. Addresses, to some degree, the crossing safety concerns but will still require crossing of active traffic lanes. May introduce a potential roadside hazard for motorists. More supportive of pedestrian use of trail system than the do nothing alternative. 	<ul style="list-style-type: none"> May result in some increased road traffic delays and reduced capacity. Cross walk would be out of character with the corridor and drivers expectations. Multi-lane approach to cross walk may create sight-line and safety issues. Concern with respect to appropriateness for use on a 7-lane road. Supportive of pedestrian use of trail system. 	<ul style="list-style-type: none"> May result in some increased road traffic delays and reduced capacity. Will introduce some measure of control over length of disruption to Dundas Street traffic through traffic signal timing. Use of traffic signals generally consistent with the character of the corridor. Supportive of pedestrian use of trail system. 	<ul style="list-style-type: none"> No road traffic delays. Complete separation of road and trail users results in the most safe alternative. Ramp structures will be more difficult to negotiate than at-grade alternatives for some users. Supportive of pedestrian use of trail. 	<ul style="list-style-type: none"> Results in trail users crossing at a signalized intersection and therefore addresses safety concerns. More supportive of pedestrian use of trail than the do nothing alternative.
Cost <ul style="list-style-type: none"> Capital Cost Operation and Maintenance Cost 	<ul style="list-style-type: none"> No cost 	<ul style="list-style-type: none"> Construction cost: \$35,000. Minimal annual maintenance costs. 	<ul style="list-style-type: none"> Construction cost: \$75,000. Some annual cost for operations and maintenance 	<ul style="list-style-type: none"> Pedestrian signal cost: \$200,000. Some annual cost for operations and maintenance. 	<ul style="list-style-type: none"> Bridge and stair tower cost: \$800,000. Some annual cost for maintenance. 	<ul style="list-style-type: none"> New sidewalk construction (\$120,000) and Kerns Road traffic signals (\$200,000). Annual cost for maintenance and operations.
Summary of Assessment	<p>Requiring trail users to cross 6 lanes (plus centre median) of relatively high speed traffic is not a preferred approach.</p> <p>Not recommended</p>	<p>Requires crossing in two stages.</p> <p>Not recommended</p>	<p>Inconsistent with general corridor traffic control measures will result in road crossing safety concerns. May result in reduced road capacity.</p> <p>Not recommended.</p>	<p>More costly than the cross walk alternative but will be safer and be more in character with general traffic control measures in the corridor. Will result in lower level of traffic service on Dundas Street due to the introduction of a new signal.</p> <p>Not recommended</p>	<p>Safest alternative but very costly. Does not impact level of traffic service on Dundas Street. Some concern that users will have to negotiate ramp towers at each end of the bridge.</p> <p>Not recommended</p>	<p>Addresses safety concerns but requires signalization of Kerns Road intersection. These signals will likely be required in the future in any event. Bypasses an existing section of the Bruce Trail.</p> <p>Recommended for further review by the Project Partners.</p>

5.11 N7 – Dundas Street Escarpment Cut Area

At the east end of the Study Area constraints to widening Dundas Street exist along both sides of the road. To the north is the escarpment area and existing rock face. To the south a residential area with frontage on Dundas Street relatively close to the road (refer to **Exhibit 5-22** and **Exhibit 5-23**).

Three basic alternatives were assessed in this area:

- Option 1: Widening to the North
- Option 2: Widening to the South
- Option 3: Widening on Both Sides (i.e. about centre-line)

Table 5-8 summarizes the evaluation of these options and the assessment trade-offs.

Option 3 (widen on both sides) was selected as preferred as it provides a reasonable balance between the environmental impacts associated with Option 1 (widening to the north), and the social impacts associated with Option 2 (widening to the south).



Exhibit 5-22: Dundas Street Escarpment Cut



Exhibit 5-23: Dundas Street Escarpment and Residential Areas (east end)

**TABLE 5.8
DUNDAS STREET - WIDENING OPTIONS AT EAST END, NEAR BRANT STREET
TRADEOFFS SUMMARY**

Criteria Group	Criteria	Indicators	Option 1 (Widening to the North)	Option 2 (Widening to the South)	Option 3 (Widening on both sides)
Social Environment	Potential for impact on residents	Number of residences displaced	None	None	None
		Amount of residential property removed (ha)	Requires some frontage from residential properties on the north side of Dundas Street, east of Brant Street (approximately 0.1 ha).	Requires considerable frontage from residential properties on the south side of Dundas street, west of Brant Street (approximately 0.3 ha).	Minor frontage impacts to residential properties on the south side of Dundas Street, west of Brant Street. (approximately 0.2 ha).
		Change in access to residential property	None affected	None affected	None affected
		Potential for change in air quality	Minimal effects expected.	Minimal effects expected.	Minimal effects expected.
		Potential for change in noise levels	Minimal changes expected. No mitigation required.	Minimal changes expected. No mitigation required.	Minimal changes expected. No mitigation required.
		Potential for light pollution	None	None	None
		Potential for impact to wells and septic tanks	Minimal effects expected.	Minimal effects expected.	Minimal effects expected.
	Potential for traffic infiltration to existing residential areas and resulting effects	None	None	None	
	Potential for community character impacts/ change in views	Opportunity to enhance character of community	Good opportunity for enhancement through landscaping features.	Good opportunity for enhancement through landscaping features.	Good opportunity for enhancement through landscaping features.
		Potential for negative change to community character and views in the area	Area is proposed to be urbanized with sidewalk and boulevard on south side. Currently a gravel pathway exists on the south side.	Area is proposed to be urbanized with sidewalk and boulevard on south side. Currently a gravel pathway exists on the south side.	Area is proposed to be urbanized with sidewalk and boulevard on south side. Currently a gravel pathway exists on the south side.
	Potential for impact on community/ recreation features	Removal of community/recreation property	None	None	None
		Disruption to use of community/recreation property	None	None	None
	Potential for effects on historical features	Potential for removal of heritage/archaeological features	Similar potential to encounter features.	Similar potential to encounter features.	Similar potential to encounter features.
Natural Environment	Potential for impact on terrestrial features	Amount, nature and significance of natural habitat removed	Significant loss of terrestrial habitat associated with the ESA lands on the north side of Dundas Street, west of Brant Street. Also results in extensive impacts to the existing rock outcrop.	None	Minor impacts to the ESA lands on the north side of Dundas Street, west of Brant Street. Some impacts to the existing rock outcrop.
		Number of significant trees along existing roadway removed	Not applicable	Not applicable	Not applicable
		Potential for effects to adjacent habitat	Similar potential for disruptions.	Similar potential for disruptions.	Similar potential for disruptions.
		Fragmentation of natural areas	None	None	None
		Effect on terrestrial corridor connectivity / linkages	None	None	None
	Opportunity to enhance degraded natural areas (terrestrial)	Similar potential	Similar potential	Similar potential	
	Potential for impact on aquatic features	Amount and quality of aquatic habitat altered/disturbed/removed	Not applicable	Not applicable	N/A

**TABLE 5.8
DUNDAS STREET - WIDENING OPTIONS AT EAST END, NEAR BRANT STREET
TRADEOFFS SUMMARY**

Criteria Group	Criteria	Indicators	Option 1 (Widening to the North)	Option 2 (Widening to the South)	Option 3 (Widening on both sides)
Economic Environment	Potential for impact on business enterprises	Area of commercial properties required (ha)	None	None	None
		Potential for change to property values	None	None	None
		Potential for change (disruption or enhancement) to business operations	None	None	None
	Potential for impact on residential property value	Potential for change to property values	None expected	None expected	Non expected
	Potential for impact on future land use	Compatibility with future land use plans	Compatible with official plan	Compatible with official plan	Compatible with official plan
Potential for impact on agricultural land	Area of designated agricultural land removed (ha)	Not applicable	Not applicable	N/A	
Cost	Capital Cost (million \$)	Estimated capital cost (including land acquisition)	Expected to have similar costs.	Expected to have similar costs.	Expected to have similar costs.
	Operation and Maintenance Cost (million \$)	Relative maintenance costs as reflected by road length and design features	Expected to have similar costs.	Expected to have similar costs.	Expected to have similar costs.
Transportation	Change in traffic operations, delay and capacity	Potential to increase level of traffic service	All alternatives address capacity needs.	All alternatives address capacity needs.	All alternatives address capacity needs.
		Ability to accommodate local and through traffic	No difference	No difference	No difference
	Potential for change to traffic and public safety levels	Potential to improve roadway operations, geometry and sightlines	No difference	No difference	No difference
	Opportunity to support transit use, pedestrians and cycling	Extent that alternative supports/promotes transit use, pedestrians and cycling	All alignments are supportive.	All alignments are supportive.	All alignments are supportive.
Evaluation Result Summary		<i>Option 3 (Widening on both sides) provides a reasonable balance between the environmental impacts associated with Option 1 (Widening to the North), and the social impacts associated with Option 2 (Widening to the South). Option 3 was therefore selected as the preferred alternative for this section of Dundas Street.</i>			

6. PREFERRED DESIGN CONCEPT

6.1 Introduction

The preferred design concept identified for the various road segments in Chapter 5 was further refined to incorporate comments received from the Project Partners, review agencies, NAC and members of the public. This section describes the key elements of the recommended design, the potential environmental effects, including the natural and social environment, and the recommended mitigation measures. Preliminary design plan and profile drawings of the proposed roadway improvements are included at the end of this report; please refer to the following plates:

- E-W Road: Plates 1-7
- Parkside Plates: 1-2
- Upcountry Plate: 1-2
- Dundas Plates: 1-6
- Brant Plate: 1
- Highway 6 Plate: 1

Specific topics addressed include the following:

- recommended road design criteria and standards
- description of the horizontal and vertical alignments
- cross section elements
- drainage and stormwater elements
- structural elements
- utilities
- landscaping and streetscaping aspects
- geotechnical and soils/pavement design
- entrance treatments
- intersection treatments
- property requirements
- construction staging and phasing
- cost estimates

NEW EAST-WEST ROAD

To address the 2021 road capacity demand requirements, it is recommended that a new east-west arterial road be created north of Parkside Drive. The new road will consist of a two lane rural cross section from the Waterdown North development limits to Highway 6, and from Centre Road south-east to Parkside Drive. Through the Waterdown North development area, it is proposed that the new road section consist of a three lane urbanized section with the centre lane acting as a left turning lane into local streets.

The recommended design for the rural segment of the road includes partially paved shoulders and open ditches, while the urbanized segment includes curb and gutter, storm sewers, as well as a multi-use asphalt pathway on the south side of the road and full illumination throughout. At the point of transition from a rural section to an urban section (the

western limits of the Waterdown North subdivision plan), it is proposed to install a three-leg roundabout to alert motorists of the change to an urban road condition. It is also recommended to place traffic signals at the new intersection with Centre Road. Initially, stop control may be adequate at this location, however this will depend on the rate of development.

Through the Centre Road Woodlot, located east of Centre Road a multi-use pathway is proposed on the south side behind the limit of grading. This pathway is to connect with the existing pathway to Joe Sam's Park. A pedestrian underpass structure will be constructed under the new East-West Road to link the trail system north and south of the road.

It is further recommended that the new facility be posted at 50 km/h.

PARKSIDE DRIVE

It is recommended that Parkside Drive be upgraded from a rural 2 lane section to an urban 4 lane section from the proposed intersection with the new East-West Road up to the proposed N-S link located at the east end of the Upcountry development lands. Roundabouts will be introduced at each of the above intersections to delineate the distinct character of the Parkside community and to act as traffic calming measures entering this mostly residential segment of the road.

The proposed design accommodates dedicated on-road bicycle lanes and sidewalks on both sides of the road. Full illumination will be provided throughout. Parkside Drive will be slightly realigned west of the western roundabout and east of the eastern roundabout in order to ensure continued use of the existing facility. Boulding Avenue and Robson Road would continue to operate as stop-controlled intersections. No additional lanes were identified for these sideroads.

At the Grindstone Creek crossing, it is proposed to replace the existing structure with a new 14 m span structure. The new bridge will accommodate 4 lanes of traffic, bicycle lanes, and sidewalks on both sides of the road.

It is recommended that the new 4 lane facility have a posted speed of 50 km/h.

UPCOUNTRY LINK

The recommendation from the WATMP study was to provide a north south arterial link between Dundas Street and Parkside Drive through the Upcountry Estates development lands. The location of the Upcountry Link was confirmed in this Class EA study. The recommended design is to accommodate a two-lane semi-urban road (urban on the west side only) with a multi-use pathway on the west side and full illumination throughout.

At the approach to the Parkside Drive roundabout, the proposed road will be widened to 4 lanes in order to coincide with the cross section

proposed on Parkside Drive. Traffic signals will be installed at the proposed new intersection with Dundas Street.

It is recommended that the new facility have a posted speed of 50 km/h.

DUNDAS STREET

Within the jurisdiction of the City of Hamilton (from Kerns Road to the new Upcountry Link), it is recommended to widen Dundas Street to a six-lane urban cross section - three lanes in each direction plus a continuous centre left-turn lane. West of the new Upcountry intersection, Dundas will taper back to the existing five lane cross section.

The proposed facility will also be equipped with dedicated on-road bicycle lanes and sidewalks on both sides of the road. Full illumination will be provided throughout. It is recommended that the reconstructed facility have a posted speed of 60 km/h.

Within the jurisdiction of Halton Region (from Kerns Road easterly), it is recommended to widen Dundas Street also to a six-lane urban cross section - three lanes in each direction plus a continuous centre left-turn lane. East of the Brant Street intersection, Dundas will taper back to the existing five lane cross section. Double left turn lanes are proposed at the Brant Street/Dundas Street intersection for northbound and westbound approaching traffic.

The proposed facility within Halton Region will be equipped with wide 4.2 m curb lanes and a sidewalk on the south side of the road. Full illumination will be provided throughout. It is recommended that the reconstructed facility have a posted speed of 60 km/h.

6.2 Design Criteria

Design Criteria (DCs) are formalized documents that specify the class of roadway to be provided, design elements, their dimensions and standards and property widths. The purpose of the DC is to summarize in one document the specific performance, dimensional and required components of the new road. For the objectives of the DC, the New East-West Road Corridor has been divided into 5 distinct sections. These sections are discussed in detail below.

SECTION 1: NEW EAST-WEST ROAD FROM HIGHWAY 6 TO PARKSIDE DRIVE (EXCLUDING WATERDOWN NORTH DEVELOPMENT AREA)

The New East-West Road will be designed in accordance with City of Hamilton Standards or (where necessary) the Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads. The Design Criteria (DC) for Section 1 of the New East-West Road Corridor is summarized in *Table 6-1* below. The full DC document is found in *Appendix L*.

Table 6-1: New East-West Road Design Criteria (outside Waterdown North)

	PRESENT CONDITIONS	DESIGN ^(a) STANDARDS	PROPOSED ^(b) STANDARDS
ROADWAY CLASSIFICATION	N/A	RAU 80	RAU 80
MIN STOPPING SIGHT DIST	N/A	115-140 m	185 m
EQUIVALENT MIN 'K' FACTOR	N/A	24 - 36 (Crest) 25 - 32 (Sag - Headlight) 12 - 16 (Sag - Comfort)	100 (Crest) 40 Sag
GRADES MAXIMUM	N/A	4% (c)	1.0%
MINIMUM RADIUS	N/A	250 m (d)	250 m
PAVEMENT WIDTH	N/A	3.7 m	2 traffic lanes at 3.65 m (e)
SHOULDER WIDTH	N/A	3.0 m	2.5 m (e) (f)
SHOULDER ROUNDING	N/A	0.5 m	0.5 m (g)
SIDEWALK	N/A	N/A	3.0 m (h)
MEDIAN WIDTH	N/A	1 – 4 m Flush	2 m Flush
LANE WIDTHS (thru lane -TL) - right turn - left turn - left turn adjacent to median	N/A	TL less 0.2 m TL less 0.2 m 3.0 m min.	3.50 m 3.50 m 3.00 m
RIGHT TURN LANE - taper ratio or length - parallel length	N/A	17:1 – 24:1 60 – 130 m	70 m (i) 60 m (i)
LEFT TURN LANE - taper ratio or length - parallel length	N/A	15:1 – 48:1 64.2 – 83.9 m	130 m (j) 50 m (j)
R.O.W. WIDTH	N/A	30 – 36 m	36 m (k)
POSTED SPEED	N/A	60 km/h	50 km/h

Notes:

- a) Design Standards are based on City of Hamilton Standards or (where necessary) TAC Geometric Design Guide for Canadian Roads (1999 Edition).
- b) The Proposed Standards meet or exceed City of Hamilton Standards.
- c) Based on rolling topography for RAU DS 80 km/h roads. (Table 2.1.3.1 of TAC).
- d) Based on maximum superelevation rate of 0.06 m/m. Minimum radius for reverse crown is 2000 m. Minimum radius for normal crown is 3000 m (Table 2.1.2.6 of TAC).
- e) Based on Hamilton STD No RD-113.05 for Industrial Rural Cross Section.

- f) Includes 1.0 m paved shoulder. It has been noted that an edge line rumble strip should be considered in rural sections.
- g) Rounding to be 1.0 m at locations where guide rail is required.
- h) Within the limits of the Centre Road Woodlot, a 3.0 m wide asphalt multi-use pathway is proposed to be installed behind the limit of grading (approximately 1 m from the ultimate right-of-way) on the south side of the road. This pathway will connect with the existing North-South trail leading to Joe Sam's Park.
- i) Based on MTO Geometric Design Standards for Ontario Highways, Table E7-1.
- j) Based on MTO Geometric Design Standards for Ontario Highways, Table E9-1.
- k) City of Hamilton Geometric Design Elements for Minor and Major Arterials specifies a right-of-way width of 30 m – 36 m.

SECTION 2: NEW EAST-WEST ROAD (THROUGH WATERDOWN NORTH)

The New East-West Road will be designed in accordance with City of Hamilton Standards or (where necessary) the TAC Geometric Design Guide for Canadian Roads. The Design Criteria (DC) for Section 2 of the East-West corridor is summarized in **Table 6-2** below. The full DC document is found in **Appendix L**.

Table 6-2: New East-West Road Design Criteria (through Waterdown North)

	PRESENT CONDITIONS	DESIGN ^(a) STANDARDS	PROPOSED ^(b) STANDARDS
ROADWAY CLASSIFICATION	N/A	UAU 60	UAU 60
MIN STOPPING SIGHT DIST	N/A	75 – 85 m	135 m
EQUIVALENT MIN 'K' FACTOR	N/A	10 - 13 (Crest) 15 - 18 (Sag - Headlight) 8 - 9 (Sag - Comfort)	70 (Crest) 25 (Sag)
GRADES MAXIMUM	N/A	6% (c)	0.7%
MINIMUM RADIUS	N/A	120 m (d)	1290 m
PAVEMENT WIDTH	N/A	3.5 m - 3.7 m	1 centre 2-way left turn lane at 3.0 m, 2 curb lanes at 3.65 m (e)
BOULEVARD WIDTH	N/A	3.0 m	3.0 m
SIDEWALK WIDTH	N/A	1.2 m min	4.0 m (f)
MEDIAN WIDTH	N/A	N/A	N/A
LANE WIDTHS (thru lane -TL) - right turn - left turn - left turn adjacent to median	N/A	TL less 0.2 m TL less 0.2 m 3.0 m min.	3.30 m 3.30 m 3.00 m
RIGHT TURN LANE	N/A	14:1 – 17:1	50 m (g)

	PRESENT CONDITIONS	DESIGN ^(a) STANDARDS	PROPOSED ^(b) STANDARDS
- taper ratio or length - parallel length		40 – 90 m	30 m (g)
LEFT TURN LANE - taper ratio or length - parallel length	N/A	15:1 – 42:1 50.4 – 62.2 m	100 m (h) 30 m (h)
R.O.W. WIDTH	N/A	30 – 36 m	32 m (i)
POSTED SPEED	N/A	40 - 50 km/h	50 km/h (j)

Notes:

- a) Design Standards are based on City of Hamilton Standards or (where necessary) TAC Geometric Design Guide for Canadian Roads (1999 Edition).
- b) The Proposed Standards meet or exceed City of Hamilton Standards.
- c) Based on rolling topography for UAU DS 60 km/h roads. (Table 2.1.3.1 of TAC).
- d) Based on maximum superelevation rate of 0.06 m/m. Minimum radius for reverse crown is 220 m. Minimum radius for normal crown is 1290 m (Table 2.1.2.4 of TAC).
- e) The 3 m continuous left turn lane is proposed to facilitate left turns into the future subdivision roads.
- f) A 4.0 m wide asphalt multi-use pathway is proposed on the south side of the road only. A sidewalk platform will be incorporated into the north side boulevard, however, no sidewalk is proposed at this time.
- g) Based on MTO Geometric Design Standards for Ontario Highways, Table E7-1.
- h) Based on MTO Geometric Design Standards for Ontario Highways, Table E9-1.
- i) City of Hamilton Geometric Design Elements for Minor and Major Arterials specifies a right-of-way width of 30 m – 36 m.
- j) A posted speed of 50 km/h is recommended in order to meet roadside safety clear zone requirements associated with planted boulevards, utility poles and illumination.
- k) A roundabout with an inscribed circle diameter of 36 m is proposed at the western limit of the Waterdown North development to delineate the transition from a rural cross section to an urban residential development. The roundabout will be designed to accommodate the turning path of a WB-19 design vehicle.

SECTION 3: PARKSIDE DRIVE WIDENING, FROM WEST OF GRINDSTONE CREEK TO EAST OF ROBSON ROAD

Parkside Drive will be designed in accordance with City of Hamilton Standards or (where necessary) the TAC Geometric Design Guide for Canadian Roads. The Design Criteria (DC) for Section 3 of the East-West Corridor is summarized in **Table 6-3** below. The full DC document is found in **Appendix L**.

Table 6-3: Parkside Drive Design Criteria

	PRESENT CONDITIONS	DESIGN ^(a) STANDARDS	PROPOSED ^(b) STANDARDS
ROADWAY CLASSIFICATION	RAU 60	UAU 60	UAU 60
MIN STOPPING SIGHT DIST	85 m	75 – 85 m	135 m
EQUIVALENT MIN 'K' FACTOR	15 (Crest) 10 (Sag)	10 - 13 (Crest) 15 - 18 (Sag - Headlight) 8 - 9 (Sag - Comfort)	25 (Crest) 18 (Sag) (c)
GRADES MAXIMUM	5.5%	6% (d)	4.7%
MINIMUM RADIUS	Tangent	120 m (e)	250 m
PAVEMENT WIDTH	3.5 m	3.5 m - 3.7 m	4 traffic lanes at 3.3 m, 1.2 bicycle lanes
BOULEVARD WIDTH	N/A (f)	3.0 m	1.5 m (g)
SIDEWALK WIDTH	1.5 m (h)	1.2 m Min	1.5 m (i)
MEDIAN WIDTH	No median	N/A	No Median
LANE WIDTHS (thru lane -TL) - right turn - left turn - left turn adjacent to median	No turning lanes	TL less 0.2 m TL less 0.2 m 3.0 m min.	3.30 m 3.30 m 3.00 m
RIGHT TURN LANE - taper ratio or length - parallel length	N/A	14:1 – 17:1 40 – 90 m	50 m (j) 30 m (j)
LEFT TURN LANE - taper ratio or length - parallel length	N/A	15:1 – 42:1 50.4 – 62.2 m	100 m (k) 30 m (k)
R.O.W. WIDTH	23 – 26 m	30 – 36 m	26 m (l)
POSTED SPEED	60 km/h (m)	40 -50 km/h	50 km/h (n)

Notes:

- a) Design Standards are based on City of Hamilton Standards or (where necessary) TAC Geometric Design Guide for Canadian Roads (1999 Edition).
- b) The Proposed Standards meet or exceed City of Hamilton Standards for roads with a design speed of 60 km/h. The one exception is the proposed minimum vertical curve at Grindstone Creek, which City standards stipulate should not be less than K=15. It should be noted that the existing curve at Grindstone Creek is a sag of K=10. Since it is proposed to illuminate the road throughout, the proposed sag of K=18 exceeds TAC standards for comfort and will not pose a sight distance or safety concern. See note 'c' for more details.
- c) A K=18 sag curve is proposed at the Grindstone Creek crossing. This will result in a grade raise of approximately 1.2 m at the structure. A smaller K curve is not recommended due to the

relatively sharp (4.5%) grades approaching and leaving the sag curve.

- d) Based on rolling topography for UAU DS 60 km/h roads. (Table 2.1.3.1 of TAC).
- e) Based on maximum superelevation rate of 0.06 m/m. Minimum radius for reverse crown is 220 m. Minimum radius for normal crown is 1290 m (Table 2.1.2.4 of TAC).
- f) Existing shoulder on Parkside Drive is approximately 1 m wide.
- g) A 1.5 m wide boulevard is recommended throughout. In areas of property constraint (south side of Parkside Drive from Boulding Avenue easterly), the boulevard has been eliminated.
- h) There is an existing 1.5 m sidewalk on the south side of Parkside only, from Boulding Avenue westerly. This sidewalk cannot be maintained in its current location and will need to be replaced.
- i) New sidewalks are proposed on both sides of Parkside Drive throughout. In the area where the sidewalk is located adjacent to the curb (south side of Parkside Drive, east of Boulding Avenue), the sidewalk width is increased to 2.0 m.
- j) Based on MTO Geometric Design Standards for Ontario Highways, Table E7-1.
- k) Based on MTO Geometric Design Standards for Ontario Highways, Table E9-1.
- l) City of Hamilton Geometric Design Elements for Minor and Major Arterials specifies a right-of-way width of 30 m – 36 m. However, due to property constraints, it is recommended to maintain a right-of-way width of 26 m. The 26 m width represents the historic ROW width being protected for along Parkside Drive.
- m) Posted speed changes to 50 km/h just west of Grindstone Creek.
- n) It is recommended to maintain the posted speed limit at 50 km/h throughout in order to meet roadside safety clear zone requirements associated with planted boulevards, utility poles and illumination.
- o) Two roundabouts with an inscribed circle diameter of 52 m are proposed at the west and east tie-in points between the new East-West Road and Parkside Drive. The roundabouts will be designed to accommodate the turning path of a WB-19 design vehicle.

SECTION 4: NEW EAST-WEST ROAD THROUGH UPCOUNTRY ESTATES

This segment of road will be designed as a hybrid section (semi-urban) in accordance with City of Hamilton Standards or (where necessary) the TAC Geometric Design Guide for Canadian Roads. The Design Criteria (DC) for Section 4 of the East-West Corridor is summarized in **Table 6-4** below. The full DC document is found in **Appendix L**.

Table 6-4: New East-West Road Design Criteria (through Upcountry Estates)

	PRESENT CONDITIONS	DESIGN ^(a) STANDARDS	PROPOSED ^(b) STANDARDS
ROADWAY CLASSIFICATION	N/A	UAU 60	UAU 60
MIN STOPPING SIGHT DIST	N/A	75 – 85 m	135 m
EQUIVALENT MIN 'K' FACTOR	N/A	10 - 13 (Crest) 15 - 18 (Sag - Headlight) 8 - 9 (Sag - Comfort)	35 (Crest) 30 (Sag)
GRADES MAXIMUM	N/A	6% (c)	1.5%
MINIMUM RADIUS	N/A	120 m (d)	300 m
PAVEMENT WIDTH	N/A	3.5 m - 3.7 m	2 traffic lanes at 3.65 m (k)
BOULEVARD WIDTH	N/A	3.0 m	1.5 m (e)
SIDEWALK WIDTH	N/A	1.2 m Min	4.0 m (f)
MEDIAN WIDTH	N/A	N/A	No Median
LANE WIDTHS (thru lane -TL) - right turn - left turn - left turn adjacent to median	N/A	TL less 0.2 m TL less 0.2 m 3.0 m min.	3.30 m 3.30 m 3.00 m
RIGHT TURN LANE - taper ratio or length - parallel length	N/A	14:1 – 17:1 40 – 90 m	50 m (g) 30 m (g)
LEFT TURN LANE - taper ratio or length - parallel length	N/A	15:1 – 42:1 50.4 – 62.2 m	100 m (h) 30 m (h)
R.O.W. WIDTH	N/A	30 – 36 m	30 m (i)
POSTED SPEED	N/A	40 -50 km/h	50 km/h (j)

Notes:

- a) Design Standards are based on City of Hamilton Standards or (where necessary) TAC Geometric Design Guide for Canadian Roads (1999 Edition).
- b) The Proposed Standards meet or exceed City of Hamilton Standards.
- c) Based on rolling topography for UAU DS 60 km/h roads. (Table 2.1.3.1 of TAC).
- d) Based on maximum superelevation rate of 0.06 m/m. Minimum radius for reverse crown is 220 m. Minimum radius for normal crown is 1290 m (Table 2.1.2.4 of TAC).
- e) As this is a hybrid roadway cross section (west side urban and east side rural), a 1.5 m boulevard is proposed on the west side of the road only. A 2.5 m shoulder (1 m partially paved) is proposed on the east side of the road.
- f) A 4 m wide asphalt multi-use pathway is proposed on the west side of the road throughout.

- g) Based on MTO Geometric Design Standards for Ontario Highways, Table E7-1.
- h) Based on MTO Geometric Design Standards for Ontario Highways, Table E9-1.
- i) City of Hamilton Geometric Design Elements for Minor and Major Arterials specifies a right-of-way width of 30 m – 36 m. The 30 m requested provides sufficient road allowance for the proposed 2 lane roadway.
- j) A posted speed of 50 km/h is recommended in order to meet roadside safety clear zone requirements associated with planted boulevards, utility poles and illumination.
- k) Based on later traffic and local road assessments, the need for a double left turn lane for southbound (eastbound) traffic approaching the Dundas Street intersection and the possibility of a new Upcountry subdivision intersection on the new East-West Road was identified. Giving this, it is recommended that the southbound (eastbound) section of this road contain two lanes. The final layout of this section of road will be finalized during the design phase.

SECTION 5: DUNDAS STREET WIDENING FROM NEW EAST-WEST ROAD TO BRANT STREET

Dundas Street will be designed in accordance with City of Hamilton and Halton Region Design Standards or (where necessary) the TAC Geometric Design Guide for Canadian Roads. The Design Criteria (DC) for Section 5 of the East-West Corridor is summarized in **Table 6-5** below. The full DC document is found in **Appendix L**.

Table 6-5: Dundas Street Design Criteria

	PRESENT CONDITIONS	DESIGN ^(a) STANDARDS	PROPOSED ^(b) STANDARDS
ROADWAY CLASSIFICATION	RAU 100	UAU 80	UAU 80
MIN STOPPING SIGHT DIST	185 m	115 – 140 m	185 m
EQUIVALENT MIN 'K' FACTOR	70 (Crest) 30 (Sag)	24 - 36 (Crest) 25 - 32 (Sag - Headlight) 12 - 16 (Sag - Comfort)	50 (Crest) 50 (Sag)
GRADES MAXIMUM	5.5%	5% (c)	5.5% (d)
MINIMUM RADIUS	4,500 m +	250 m (e)	2,130 m
PAVEMENT WIDTH	4 traffic lanes at 3.65 m (f)	3.7 m lanes	See Note (g)
BOULEVARD WIDTH	N/A (h)	3.0 m	3.0 m (i)
SIDEWALK WIDTH	N/A	1.5 m	2.0 m (j)
MEDIAN WIDTH	1.2 m Flush (f)	2 m Raised or Flush	5 m Flush
LANE WIDTHS (thru lane -TL) - right turn - left turn	3.25 m 3.25 m 3.0 m	TL less 0.2 m TL less 0.2 m 3.0 m min.	3.50 m 3.50 m 3.25 m

	PRESENT CONDITIONS	DESIGN ^(a) STANDARDS	PROPOSED ^(b) STANDARDS
- left turn adjacent to median			
RIGHT TURN LANE - taper ratio or length - parallel length	76 m 70 m	17:1 – 24:1 60 – 130 m	70 m (k) 60 m (k)
LEFT TURN LANE - taper ratio or length - parallel length	50 m 65 m	15:1 – 48:1 64.2 – 83.9 m	130 m (l) 50 m (l)
R.O.W. WIDTH	37 – 46 m	N/A	47 m (m)
POSTED SPEED	60 - 80 km/h (n)	N/A	60 km/h (o)

Notes:

- a) Design Standards are based on City of Hamilton and Halton Region Standards or (where necessary) TAC Geometric Design Guide for Canadian Roads (1999 Edition).
- b) The Proposed Standards meet or exceed City of Hamilton and Halton Region Standards for major arterial roads with a design speed of 80 km/h. The proposed grade of 5.5% matches the existing grade through the rock cut section of the Niagara Escarpment.
- c) Based on rolling topography for UAU DS 80 km/h roads. (Table 2.1.3.1 of TAC). The maximum grade for mountainous topography is 7%.
- d) Maintain existing grade through rock cut section of Niagara Escarpment. Maximum grade for mountainous topography is 7%.
- e) Based on maximum superelevation rate of 0.06 m/m. Minimum radius for reverse crown is 450 m. Minimum radius for normal crown is 2130 m (Table 2.1.2.4 of TAC).
- f) West of Evans Road, the existing pavement consists of 4 traffic lanes at 3.5 m each, and a 3.25 m centre turning lane.
- g) Within the City of Hamilton (from Kerns Road westerly), Dundas Street will be 6 traffic lanes at 3.65 m each, plus 1.5 m wide dedicated on-road bicycle lanes. Within Halton Region (from Kerns Road easterly), Dundas Street will be 4 lanes at 3.65 m each, plus 4.2 m wide curb lanes in each direction for a total of 6 lanes. The 4.2 m curb lane includes a provision for cyclists.
- h) Existing rural section has 3 m shoulders, except west of Evans Road where the shoulders are 2.5 m wide.
- i) The boulevard width may be reduced in areas of property constraint and through the rock cut area of the Niagara escarpment to minimize the amount of rock cut.
- j) Within the City of Hamilton, 2.0 m sidewalks are provided on both sides of the road. Within Halton Region, 1.5 m sidewalks will be provided on the south side of Dundas Street only.
- k) Based on MTO Geometric Design Standards for Ontario Highways, Table E7-1.
- l) Based on MTO Geometric Design Standards for Ontario Highways, Table E9-1.

- m) A 47 m right-of-way is based on Halton Region's Transportation Master Plan Regional Right-of-Way (ROW) Dimension Guidelines. It is noted that with the exception of a few properties, a 46 m right-of-way is currently available. Recent adoption by Halton Region Council (December 2009) of Sustainable Halton/ROPA 38 indicates a 50 m property width for Dundas Street. It is recommended that in the detailed design phase, where property is required on Dundas Street east from Kerns Road consideration be given to the 50 m standard.
- n) The current posted speed changes between Evans Road and Kerns Road.
- o) It is recommended to post the speed limit at 60 km/h for the entire section of road. The installation of planted boulevards, utility poles and illumination will need to be examined to ensure compliance with roadside safety requirements.

6.3 Recommended Plan

6.3.1 Horizontal Alignment

NEW EAST-WEST ROAD, FROM HIGHWAY 6 TO PARKSIDE DRIVE

This portion of the proposed corridor consists of developing a brand new arterial road right-of-way north of Parkside Drive. The new road will connect with Highway 6 at the western limit approximately 880 m north of Parkside Drive. From this point easterly, the proposed alignment is mostly curvilinear in character and swings to the south as it approaches the Waterdown North subdivision development lands. The shift to the south is required to maintain a 30 m buffer to the Waterdown North ESA located immediately to the north.

Through the Waterdown North subdivision, the proposed horizontal alignment is mostly tangential, except at the approach to Centre Road, where large radius (1290 m) reverse curves are installed to shift the road to the north. This north shift is required to maintain a proper separation between the new intersection at Centre Road and the existing intersection with Northlawn Avenue to the south. The north shift is also required to avoid impacts on two Butternut Tree specimens (a protected species) located within the Centre Road woodlot, just east of Centre Road and to minimize impacts to the outlet culvert from the woodlot.

East from the Centre Road Woodlot, the proposed alignment turns south-east as it approaches Parkside Drive. A two-lane roundabout is proposed at the intersection with Parkside Drive. It is proposed that a portion of Parkside Drive, immediately west of the new roundabout be re-aligned to provide continued access to the existing two-lane facility west of the project limits. The proposed layout is shown in *Exhibit 6-1*. Additional land requirements at the roundabout location may be identified during the detailed design stage.



Exhibit 6-1: West Parkside Drive Roundabout

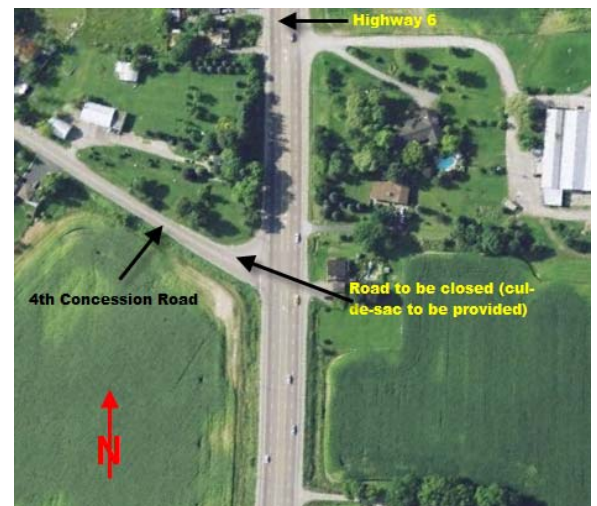


Exhibit 6-2: Concession 4 Sideroad Area

A new signalized intersection will be created where the New East-West Road meets Highway 6. Highway 6 is a provincial highway under the jurisdiction of the Ministry of Transportation of Ontario (MTO). A requirement from the MTO with respect to this project was that the number of intersections on Highway 6 could not be increased. In order to meet this requirement, it is proposed to close and cul-de-sac Concession 4 Road, just west of Highway 6. The location and general area of the proposed cul-de-sac is shown in *Exhibit 6-2*.

PARKSIDE DRIVE WIDENING

This segment of the New East-West Road Corridor makes use of the existing Parkside Drive right-of-way and consists of widening the existing two-lane road to a four-lane facility. Parkside Drive is mostly residential in character and is severely constrained by homes in close proximity to both sides of the road. While the horizontal alignment for Parkside Drive is generally tangential with some minor horizontal deflections, it has been carefully developed to mitigate impacts on adjacent properties.

West of Boulding Avenue the proposed alignment generally follows the existing road crown line. Between Boulding Avenue and Robson Road, the proposed centreline is shifted south by approximately 1.5 m to mitigate property impacts to residents on the north side of the road. East of Robson Road, the new centreline again follows the existing road crown line.

At the approach to the Upcountry link, the proposed alignment for Parkside Drive shifts to the south with a large radius (400 m) curve leading into the proposed two-lane Parkside East Roundabout. It is proposed that a portion of Parkside Drive, immediately east of the new roundabout be re-aligned to provide continued access to the existing two-lane facility east of the project limits. The proposed layout is shown in *Exhibit 6-3*. Additional land requirements at the roundabout location may be identified during the detailed design stage.

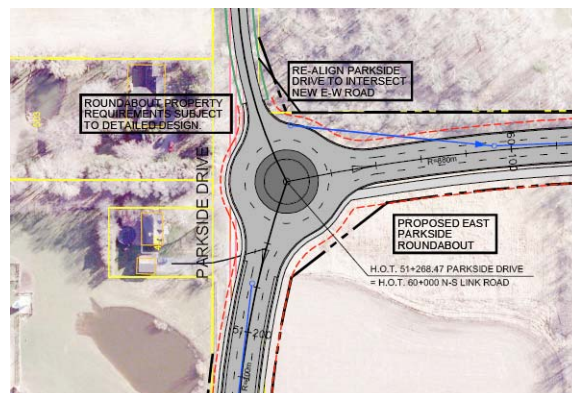


Exhibit 6-3: East Parkside Drive Roundabout

UPCOUNTRY LINK

This portion of the New East-West Road corridor consists of developing a brand new arterial road right-of-way between Parkside Drive and Dundas Street. The proposed alignment is generally situated at the eastern limit of the proposed Upcountry Estates subdivision. One exception is at the mid-way point between the two roads, where the proposed centreline turns west in order to avoid impacts to a tributary of the Grindstone Creek. The shift in alignment is accomplished with large radius (1150 m) reverse curves.

The possibility of providing one additional intersection between the proposed new arterial road and one of the subdivision roads will be further investigated by the City as part of the development process. A new set of traffic signals will be required where the Upcountry Link intersects Dundas Street.

DUNDAS STREET

This segment of the New East-West Road Corridor makes use of the existing Dundas Street right-of-way and consists of widening the existing four-lane road to a six-lane facility. Constraints encountered within the project limits include several adjacent residential properties and the rock face of the Niagara escarpment. As such, the horizontal alignment has been developed to mitigate property and physical impacts to the extent possible. The existing road centreline has been maintained where appropriate with equal widening occurring on both sides of the road. In areas where deflections from the existing are required due to constraints, these are achieved using large radius (2130 m minimum) curves.

Within the project limits, Dundas is intersected by the New East-West Road (Upcountry Link), Evans Road, Kerns Road, and Brant Street/Cedar Springs Road. With the exception of Brant Street/Cedar Springs Road, all other roads intersect Dundas Street at 'T' Type intersections. The intersection at Brant Street will need to be fully reconstructed as a result of the additional lanes (both through and turning) required. The layout of this intersection is somewhat complicated by the need for dual left-turning lanes and the existing 73 degree skew angle. In addition, the residence in the north-east quadrant is in very close proximity to the existing road. It is proposed to maintain the existing east edge of pavement on Cedar Springs Road north of Dundas Street and accommodate all widening to the west. Refer to the proposed design plates at the end of this report for additional layout details.

6.3.2 Vertical Alignment

NEW EAST-WEST ROAD, FROM HIGHWAY 6 TO PARKSIDE DRIVE

Between Highway 6 and Parkside Drive, the existing ground along the proposed new right-of-way is generally comprised of gently rolling terrain. One notable exception is at the Borer's Creek crossing, where the terrain drops substantially as it traverses the valley. The proposed profile matches Highway 6 elevations at the western limit of the project. From this point easterly, the proposed vertical alignment generally consists of gentle (0.7%) grades and flat vertical curves. In the vicinity of the Waterdown North roundabout, the profile has been adjusted to recognize the crossfall requirements for this roundabout. The proposed grade over Borer's Creek results in approximately 5 m of fill at this location.

A 1 m grade raise is required at the intersection between the New East-West Road and Centre Road. The profile along Centre Road will taper back to existing as quickly as practical north and south of the intersection. This raise in grade is necessary to prevent overtopping of the new road by the design storm event through the Centre Road Woodlot. East from the woodlot, the proposed profile continues to rise to an elevation of approximately 3.6 m above original ground. This high fill is required in order to install a new pedestrian underpass crossing for the Waterdown North Wetland Trail in Joe Sam's Park.

The trail will need to be relocated to cross the new road at this location. It should be noted that the wetland trail cannot be maintained in its current location because the presence of hydro towers prohibit the road from being elevated sufficiently at this point.

The approach to the west Parkside Drive roundabout has also been developed to include the necessary crossfall characteristics. These requirements result in a substantial amount of cut (approximately 3 m) at this location.

PARKSIDE DRIVE WIDENING

It is proposed to raise the profile at Grindstone Creek by approximately 1.2 m in order to address sight distance and hydraulic concerns associated with the existing bridge structure. The profile at this location is constrained by the presence of the CP Rail line immediately east of the existing bridge. The proposed profile must match the existing ground elevations at this location to avoid impacting the rail line. As a result, the existing grades approaching Grindstone Creek from the east are generally maintained and as flat a vertical curve as practical ($K=18$) has been provided for the new 14 m span bridge.

Other more minor modifications are recommended throughout the Parkside Drive profile to provide a smooth driving surface. It is not anticipated that major modifications to existing driveways will be required as a result of the proposed profile. Refer to the Preferred Design Concept: Parkside Drive Plates 1-2 at the end of this report for a layout of the proposed profile. At the approach to the east Parkside Drive roundabout, the profile has been adjusted to reflect the crossfall requirements for this roundabout. The proposed profile also limits grading impacts to the properties on the north side of the road at this location.

UPCOUNTRY LINK

The proposed profile for the Upcountry Link has been developed with regard for the East Parkside Drive roundabout and for the Dundas Street intersection. The profile has also been crafted to ensure it stays within the proposed 30 m right-of-way allowance. Refer to the Preferred Design Concept: Upcountry Plates at the end of this report for a layout of the proposed profile.

DUNDAS STREET

Given the constraints associated with this section of Dundas Street (adjacent residences, Niagara Escarpment, 4 lanes of traffic), the proposed profile generally aims to match the existing road centreline to the extent possible.

The proposed profile is well within accepted geometric design standards with one exception. In the vicinity of the Niagara Escarpment, the road consists of a long (approximately 1 km) and steep (5.5%) grade. This grade slightly exceeds the maximum grade recommended in the TAC manual (5%) for an urban arterial road with a design speed of 80 km/h in rolling topography. The proposed profile matches the existing road at

this location and it should be noted that the maximum grade for mountainous topography is 7%, as indicated in the design criteria.

The intersection with Brant Street occurs in a steep incline (-4.2%) and pavement elevations at this location will have to be carefully addressed at the detailed design stage to ensure proper drainage is provided. It is anticipated that Dundas Street will serve as the controlling road and the elevations on Brant Street will have to be adjusted to reflect the steep grade.

6.3.3 Recommended Road Elements and Typical Sections

NEW EAST-WEST ROAD, FROM HIGHWAY 6 TO PARKSIDE DRIVE

There are two basic cross sections within this segment of the New East – West Road:

Rural Section

From Highway 6 to the Waterdown North roundabout and from Centre Road easterly to Parkside Drive, it is proposed to implement a rural two-lane cross section. The rural section will consist of two 3.65 m lanes, a 2 m wide flush median, 2.5 m wide shoulders (1 m partially paved) and open ditches throughout. In the vicinity of the Centre Road Woodlot, a 3.0 m wide multi-use asphalt pathway will be installed on the south side of the road behind the limit of grading. This pathway will require pedestrian scale illumination for safety reason. Roadway illumination will not be provided in rural areas except at intersection locations. Refer to the New East-West Road Typical Sections Plate at the end of the report.

Some widening will be required on Centre Road to accommodate the proposed north and southbound left turns onto the New East-West Road, as well as the southbound left turn lane onto Northlawn Avenue. It is proposed to maintain the existing east edge of pavement and implement all widening to the west. Lane dimensions will be as indicated above for the rural cross section (3.65 m wide lanes).

Urban Section

Within the Waterdown North development lands, it is proposed to implement an urban three-lane cross section consisting of a 3.65 m lane in each direction plus a 3.0 m wide continuous centre turning lane. Curb and gutter will be provided throughout. The proposed design also includes a 3.0 m boulevard and 4.0 m wide multi-use asphalt pathway on the south side of the road. A grading platform for a potential future sidewalk is incorporated into the north side of the road. All urban sections will be fully illuminated throughout. Refer to the New East-West Road Typical Sections Plates at the end of this report.

PARKSIDE DRIVE WIDENING

The basic roadway cross section for Parkside Drive consists of four 3.3 m lanes (two in each direction) and 1.2 m wide dedicated on-road bicycle lanes. Curb and gutter will be provided throughout. It is proposed to include 1.5 m boulevards and 1.5 m sidewalks throughout. One exception is on the south side of Parkside Drive, east of Boulding Avenue, where the boulevard has been eliminated and a 2.0 m sidewalk is placed directly behind the curb to mitigate property impacts. It is recommended that the existing wooden fence at this location be replaced with a new fence including the consideration of use of a noise attenuating fence. Refer to the Typical Sections Plate at the end of the report.

UPCOUNTRY LINK

A semi-urban (hybrid) section is proposed as the basic roadway cross section for this segment of road. It is proposed to urbanize the west side of the road (facing the Upcountry development) and maintain the east side of the road rural with open ditch. The proposed cross section consists of a 3.65 m lane in each direction. Curb and gutter will be provided on the west side, as well as 1.5 m boulevard and a 4.0 m multi-use asphalt pathway. Full illumination will be provided throughout. At the approach to the East Parkside Drive roundabout, it is proposed to widen the road to four lanes (3.65 m each) in order to maintain lane continuity to/from Parkside Drive. In the area where four lanes are proposed, the east side will be urbanized to mitigate property impacts. Similarly, the east side has been urbanized at the approach to Dundas Street in order to mitigate grading impacts. Refer to the Typical Sections Plate at the end of the report.

DUNDAS STREET

Two distinct cross sections are proposed for Dundas Street based on road jurisdiction:

City of Hamilton

From Kerns Road westerly, it is proposed to reconstruct Dundas Street as a seven-lane urban cross section consisting of three 3.65 m lanes in each direction, a 5 m wide flush median and 1.5 m wide dedicated on-road bicycle lanes. Curb and gutter will be provided throughout, as will 3.0 m boulevards and 2.0 m sidewalks on both sides of the road. Full illumination will also be provided throughout. The possibility of the installation of traffic signals at the Kerns Road/Dundas Street intersection will be assessed in the detailed design phase.

Halton Region

From Kerns Road easterly, it is proposed to reconstruct Dundas Street as a six-lane urban cross section consisting of two 3.65 m centre lanes in each direction, a 4.2 m wide curb lane in each direction and a 5 m wide flush median. Curb and gutter will be provided throughout, as will a 3.0 m boulevard and 1.5 m sidewalk on the south side of the road only. The north side of the road will include a 1.5 m platform for illumination, and other roadside elements. The elimination of a wide boulevard and sidewalk on the north side helps to limit the amount of rock cut from the

escarpment face to the absolute minimum required. As such, the north rock face needs to be scaled back approximately 5 m from its current location. Typical cross sections for Dundas Street, including a section through the escarpment area are included in the Typical Section plates at the end of this report. Minimizing the extent of rock cut will require further assessment in detailed design.

6.3.4 Stormwater Management & Hydraulics

A drainage and hydrology study was completed as part of this project and is detailed in this section of the report. *Appendix C* contains further drainage assessment reference materials. The objectives of this drainage study were to evaluate the impacts of the proposed roadway improvements on the surface water systems, to assess potential impacts of roadway runoff on receiving watercourses, and to assist in the selection of appropriate management measures. The drainage study results will provide input and guidance to the detailed design process with the objective of achieving protection, preservation, and enhancement of the local subwatershed environments. Specifically, the purpose of this study was to undertake the following activities within the context of the New East-West Road Corridor:

- establish existing hydraulic conditions of the watercourses at existing and proposed crossing locations within the New East-West Road Corridor;
- establish design criteria;
- evaluate proposed road crossing structures to meet design criteria;
- identify the potential impacts on natural water systems and hydrologic processes resulting from proposed changes in land use, such as increased flooding and erosion potential and water quality impairment;
- identify specific opportunities for protection, enhancement and rehabilitation of local watercourses, including SWM measures that meet design criteria;
- prepare preliminary design details for watercourse crossings and SWM measures; and,
- identify criteria for the detailed design.

Specific drainage management goals include the following:

- to convey upstream run-off through the roadway without adverse impacts on the road, upstream and downstream lands;
- to convey runoff from the road right-of-way to downstream watercourses; and
- to ensure that runoff from the right-of-way does not adversely impact the natural environment of receiving water bodies.

Background studies and information were collected and reviewed, and conditions associated with the road development were considered in the drainage analysis. Below is the list of the main documents reviewed:

Waterdown North Master Drainage Plan (Waterdown North MDP), Philips Engineering Ltd., February 2007

This study provides hydrologic and hydraulic analysis results of the Borer's Creek watershed and recommended strategy for managing storm runoff from the proposed Waterdown North development. Stream flows derived from the continuous simulation by the hydrologic model QUALHYMO were used in the HEC-RAS model to evaluate existing and future hydraulic conditions of the creek. The recommended stormwater management plan for the Waterdown North includes on-site detention ponds, stream realignment, and crossing structures along the proposed New East-West Road Corridor. The preferred stormwater management plan was incorporated into the road drainage stormwater management strategy.

Upcountry Estates Environmental Implementation Report, Paragon Engineering Ltd., May 1996

This Environmental Implementation Report was prepared in support of the Upcountry Estates development which is located within the New East-West Road Corridor study area. A preferred management strategy was proposed to maintain and enhance the natural environmental features within the Grindstone Creek subwatershed. A conceptual landscape restoration and rehabilitation plan was proposed for the reach of the Grindstone tributary along the east boundary of the Upcountry development site but there was no consideration of the proposed roadway at that time. This conceptual stream corridor rehabilitation plan was considered in the New East-West Road Corridor drainage analysis.

Grindstone Creek Watershed Study, Conservation Halton, June 1998

In this study, the entire Grindstone Creek watershed was divided into four subwatersheds. Regeneration plans for each area were prepared to promote the integrity and legacy of the creek. The areas identified in the regeneration plans are located within the EA study area and therefore have been considered in the drainage analysis.

Grindstone Creek Subwatershed Study, Cosburn Patterson Wardman Ltd., January 1995

The Grindstone Creek Subwatershed Study area extends from Highway 403 in the south to north of Dundas Street and from the main Grindstone Creek Valley in the west to east of Waterdown Road, covering a 560 ha area. A Subwatershed Management Plan was recommended for future development and was considered in the drainage analysis.

HYDRAULIC ASSESSMENT

The evaluation of hydraulic conditions for the existing and proposed road crossing structures was based on the study objectives and is summarized in the sections below. Detailed hydraulic and hydrological modelling outputs are provided in **Appendix C**.

Road Drainage Area Characteristics

The New East-West Road Corridor crosses two watersheds - the Borer's Creek and Grindstone Creek watersheds which are within the jurisdictions of Hamilton Conservation Authority (HCA) and

Conservation Halton (CH), respectively. The drainage features and road crossing structures (existing and proposed) are presented in *Figure 6-1*.

A total of 11 crossing structures associated with the New East-West corridor road improvements have been evaluated. Some are proposed new structures, while others are existing structures which are proposed to be extended or replaced due to road improvement works.

Design Criteria

Consultation with the City of Hamilton and both HCA and CH was conducted at the beginning of the study. Comments on the preliminary road alignment were provided by CH in a letter dated September 17, 2008. Based on City of Hamilton Design Guidelines and comments from HCA and CH, the road crossing structures have been designed to meet the following design criteria:

- Based on the road classification and the span of the proposed structure, the appropriate design event should be determined according to the design flood criteria indicated in the MTO Directive B-100 (and as per the City of Hamilton Design Guidelines);
- Required freeboard (culverts) or clearance (bridges) of the structure is determined based on the design flood criteria;
- At existing watercourse crossings, upstream flood levels for the Regulatory event (i.e. Hurricane Hazel) have to be maintained or improved, if possible;
- At new watercourse crossings, the existing flood levels for the Regulatory event (i.e. Hurricane Hazel) are established so that it can be demonstrated that there are no adverse impacts on the flood hazard lands; and,
- Safe access and egress should be provided for both pedestrian and vehicular traffic during the flood event. As per MNR guidelines, safe access and egress is defined by a depth velocity product of less than $0.4 \text{ m}^2/\text{s}$, with a maximum flooding depth over the road of less than 0.3 m, and a maximum velocity over the road of less than 1.7 m/s.

HYDRAULIC EVALUATION OF ROAD CROSSING STRUCTURES






This section presents the evaluation of each of the existing and proposed structures along the corridor starting from the west and moving eastward. The design event and check flow for each structure were determined based on MTO Highway Drainage Design Standards January 2008 as shown in *Table 6-6*.

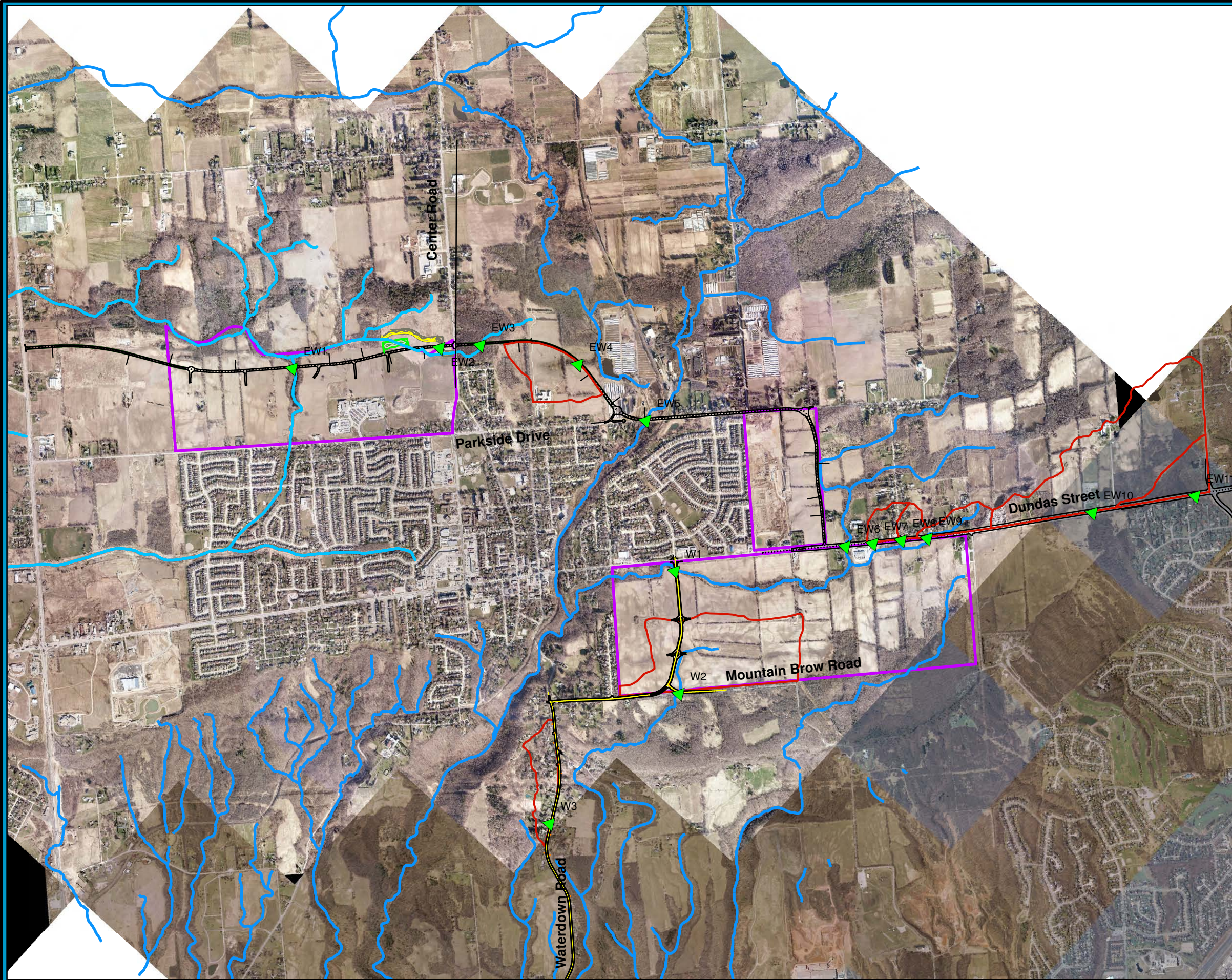
The freeboard/clearance at culvert/bridge crossings shall be greater than or equal to 1.0 m for freeways, arterials and collectors. The freeboard at water crossings shall be greater than or equal to 0.3 m for local roads. The minimum freeboard is measured vertically from the high water level for the design flow to the edge of the travelled lane. The clearance is measured vertically from the high water level for the design flow to the lowest point on the soffit.

Proposed New East-West Roadway

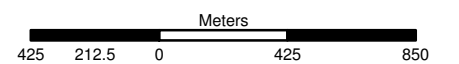
Figure 6.1 Road Crossing Structures

Legend

-  Road Crossing Structure
-  Catchment to Structure
-  UrbanExpansionBoundary
-  Borer's Creek System
-  Grindstone Creek System



1:25,000



Notes:
Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

Please note that the land uses depicted on this map reflect the land uses derived from the City of Hamilton and City of Burlington OPs and airphotos in order to derive the nature of the land use. Areas along Waterdown Road were classified as residential.



Table 6-6: Design Flow Return Period for Bridges and Culverts

Functional Road Classification	Return Period of Design Flows (Years)		Check Flow for Scour
	Total Span less than or equal to 6.0 m	Total Span greater than 6.0 m	
Freeway, Urban Arterial	50	100	130% of 100 year
Rural Arterial, Collector Road	25	50	115% of 100 year
Local Road	10	25	100% of 100 year

Crossing EW1, EW2 and EW3

The proposed New East-West Road Corridor crosses the Borer’s Creek system at three locations, EW1, EW2 and EW3. EW1 is located on the main branch of Borer’s Creek, while EW 2 and EW3 are located along the east tributary.

HEC-RAS models were established to evaluate these three new structures. Existing creek conditions were first established. Cross sections of the existing condition model were generated with consideration of the proposed road alignment to establish a point of comparison under the future condition. For proposed conditions, some existing sections were revised and others added to account for the road alignment and crossing locations. Also, cross sections in the future scenario have been developed based on the proposed creek realignment for a section of the east tributary. This creek realignment is proposed in the Waterdown North MDP to accommodate the proposed development.

Flow files were obtained from the Waterdown North MDP in which QUALHYMO hydrologic modelling was completed for the Borer’s Creek Watershed to identify design flows at selected flow points. The design flows for the entire east tributary with a total drainage area about 200 ha were determined in the MDP study. Flow transposition was conducted to identify flows to EW2 and EW3 based on their drainage areas. Design flows to these two crossing structures are listed in **Table 6-7** and assigned at associated cross sections in the model.

Table 6-7: Design Flow Transposition for Crossings EW2 and EW3

Catchment	Drainage Area (ha)	Design Event Flows (m ³ /s)						Regional Event
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr	
East Tributary	195	1.47	2.5	3.21	3.87	4.69	5.26	17.74
Crossing EW2	81	0.76	1.30	1.66	2.00	2.43	2.73	9.19
Crossing EW3	22	0.29	0.49	0.62	0.75	0.91	1.02	3.44

EW1 is located on the main branch of Borer’s Creek where a deep, wide valley exists. In addition to meeting the flood design criteria, the design of the proposed structure should minimize the disturbance to the

existing valley features. The cross section associated with the proposed structure in the existing condition model is RS 561.655.

EW2 is located within a realigned section of the creek proposed as part of the adjacent development. A new existing condition was first established based on the developer's proposed creek realignment prior to evaluating the impacts of EW2. At this stage, no detailed design and hydraulic analysis have been completed for the creek realignment by the developer. Only a preliminary plan was provided by the consultant (Metropolitan Consulting Inc.) for the Parkside Hills Subdivision development. The plan shows a low flow channel setting within the bank full channel which is proposed to convey the Regional event. Since the creek realignment design is not within the scope of this Class EA, cross sections of the proposed creek work were assumed based on the provided preliminary plan and existing topography. More detailed survey and hydraulic analysis should be conducted during the detailed design to verify the creek conveyance capacity and structure hydraulic conditions. The detailed design team must ensure that the proposed EW2 crossing, in combination with the creek realignment works, will not cause any adverse impacts on the existing flood levels. The cross section associated with the proposed structure in the existing condition model is RS 1687.198.

EW3 is located where the New East-West Road Corridor intersects the Centre Road Woodlot north of Parkside Drive and east of Centre Road. A wetland community covers greater than 90% of the woodlot area. This Centre Road Woodlot wetland feature has been recently included into the Logies Creek - Parkside Drive Provincially Significant Wetland (PSW) Complex (Art Timmerman, MNR, personal communication, September 2008) due to its demonstrated wetland function, proximity to existing PSW units (within 750 metres) and hydrologic connectivity to the PSW via a tributary of Borer's Creek. The proposed road bisects the woodlot wetland; therefore, the design of a road crossing here is not only to convey the flow downstream but also to provide a function to connect the wetland and maintain the existing hydrologic pattern of the woodlot wetland to the extent possible. The cross section associated with the proposed structure in the existing condition model is RS 2043.53. Proposed dimensions of these three structures are as follows:

Crossing EW1

A three-cell concrete box culvert is proposed at this water crossing. One cell with the dimension of 6.0 m (span) x 3.0 m (rise) x 36 m (length) is located at a lower elevation with 0.5 m embedded into the channel to allow the low flow channel to be constructed through the structure. The other two cells are set at a higher elevation with the dimensions of 6.0 m (span) x 2.0 m (rise) x 36 m (length) to convey high flows. Given the total span of the structure of 18 m and the urban section of the road, the design event for this structure is the 100 year event.

Crossing EW2

A concrete box culvert with the dimension of 6.0 m (span) x 1.7 m (rise) x 36 m (length) is proposed at this crossing location. The structure bottom is embedded into the channel with 0.5 m to allow the

construction of the low flow channel. Given the span of the proposed structure with 6.0 m and the urban section of the road, the design event for the structure is the 50 year.

Crossing EW3

A series of culverts along the road section within the Centre Road woodlot wetland are proposed to convey flows downstream and at the same time to connect the wetland separated by the proposed roadway. A total of 6 arch shaped open bottom CSP pipes are recommended with the dimension of 1.2 m (span) x 1.0 m (rise). This series of culverts makes the total span of the crossing of 7.2 m. With the rural section of the road, the design event for the structure is the 50 year event. Hydraulic conditions at the proposed structures at EW1, EW2 and EW3 are summarized in **Table 6-8** below

Table 6-8: EW1/EW2/EW3 Proposed Hydraulic Conditions

Structure	Design Event	Flow (m ³ /s)	Water Level at Inlet (m)	Water Level at Outlet (m)	Velocity (m/s)	Performance
EW1 (RS 538)	2 year	2.82	234.50	234.50	0.42	
	5 year	5.1	234.61	234.60	0.60	
	10 year	6.67	234.65	234.65	0.72	
	25 year	8.08	234.69	234.69	0.81	
	50 year	9.71	234.73	234.73	0.90	
	100 year	10.8	234.76	234.76	0.96	Design Event, 4.0 m freeboard
	Regional	40.64	235.18	235.19	2.11	Road not overtopped
EW2 (RS 1669)	2 year	0.76	238.67	238.67	0.26	
	5 year	1.3	238.81	238.81	0.35	
	10 year	1.66	238.89	238.88	0.39	
	25 year	2	238.95	238.95	0.43	
	50 year	2.43	239.02	239.01	0.48	Design Event, 1.9 m freeboard
	100 year	2.73	239.06	239.05	0.52	
	Regional	9.19	239.69	239.64	1.08	Road not overtopped
EW3 (RS 2023)	2 year	0.29	239.61	239.61	0.09	
	5 year	0.49	239.77	239.77	0.12	
	10 year	0.62	239.90	239.90	0.15	
	25 year	0.75	240.16	240.16	0.15	
	50 year	0.91	240.44	240.44	0.16	1.0 m
	100 year	1.02	240.47	240.47	0.18	
	Regional	3.44	240.64	240.60	0.6	Road not overtopped

Based on the span of the structure and road classification, the design event for EW1 is the 100 year event and for EW2 and EW3 the 50 year event. As detailed in the HEC-RAS outputs, there are no adverse impacts on the existing Regional flood levels caused by Crossing EW2 and EW3. Two cross sections upstream of EW1, RS 561.6553 and RS 587.4989, have some increases of the Regional water level at 0.11 m and 0.25 m, respectively. This is confined within the deep, wide valley of Borer’s main branch. These minor increases of the Regional water level would not cause any negative impacts to the adjacent properties and therefore are viewed as acceptable.

Crossing EW4

At this location, the proposed road crosses a regulated watercourse within the Grindstone Creek Watershed. It is not a permanent watercourse but a natural depression area associated with wetland features. The contours show a very flat topography around the wetland. During the frequent events, the rainfall runoff is mostly contained in the wetland and infiltrates into the ground. When less frequent events occur (e.g., 100 year or Regional storm), water levels build up and drives the flow towards Grindstone Creek. Since the proposed road disconnects the wetland and the downstream creek, a new crossing structure is required here.

Hydrologic modelling with Visual OTTHYMO 2.0 (VO2) was conducted to determine design flows to the proposed structure. Given the rural land use, the NASHYD command was used. Peak flows are reported in **Table 6-9**.

Table 6-9: Design Flows to Crossing EW4

	2 year	5 year	10 year	25 year	50 year	100 year	Regional Event
Design flow (m ³ /s)	0.27	0.48	0.64	0.85	1.0	1.2	1.8

Since it is a new structure, the existing hydraulic conditions of the watercourse were established first. Assuming uniform flow conditions, Bentley’s FlowMaster program was used to model the watercourse and determine the design water levels at the proposed road crossing location. The results are shown in **Table 6-10**.

Table 6-10: Existing Water Levels within the Watercourse at Crossing EW4

	2 year	5 year	10 year	25 year	50 year	100 year	Regional
Existing Water Level (m)	241.2	241.31	241.31	241.35	241.37	241.39	241.45

Bentley’s Culvert Master program was used to assess the proposed structure. A box culvert with the dimensions of 4.0 m (span) x 1.5 m (rise) x 30 m (length) is proposed here to meet the design criteria. Given

the span of the proposed structure and the road classification as rural arterial, the design event for the structure is the 25 year storm. Water levels at the design event and Regional event are 241.34 and 241.50 respectively.

Crossing EW5

Crossing EW5 crosses the main branch of the Grindstone Creek at Parkside Drive. Currently, there is a bridge structure with dimensions of 6.0 m (span) x 2.4 m (rise). HEC-RAS models for the Grindstone Creek system were provided by Conservation Halton and used here to evaluate the existing and proposed hydraulic conditions of the structure. Flow files were derived from the Grindstone Creek Flood Damage Reduction Study 1985.

The existing hydraulic performance of the structure is summarized in **Table 6-11**.

Table 6-11: Summary of Existing Hydraulic Conditions at EW5

Design Event	Flow (m ³ /s)	Water Level (m)	Velocity (m/s)	Performance
5 year	21.7	231.76	2.84	
10 year	24.9	231.89	2.96	
25 year	28.2	232.02	3.07	0.66 m clearance to the structure soffit
50 year	30.4	232.10	3.14	0.58 m clearance to the structure soffit
100 year	32.0	232.16	3.2	0.52 m clearance to the structure soffit
Regional Event	128.8	234.35	2.18	Road overtopped by 1.54 m, flow velocity 1.25 m/s

As shown in **Table 6-11**, the existing structure is overtopped during the Regional Event. With the proposed road upgrades there is an opportunity to resolve this flooding hazard. In order to accommodate a larger structure and meet associated structural design criteria, the existing relatively narrow creek valley upstream of the structure needs to be widened.

A reconnaissance-level site visit was conducted by Dillon geomorphologist to identify any channel improvement opportunities. It is likely that potential for floodplain cut (and reduction in velocity and shear) is possible, primarily on the west bank, upstream of Parkside Drive. The east bank upstream of Parkside Drive is considerably higher and more densely vegetated. A disturbance to this east bank is not recommended and may encounter opposition at the approvals stage. It is recommended that any proposed cut on the west bank be initiated (for EA level planning purposes) at approximately the 5-year water level. This approach will maintain the integrity of the low flow channel and, most importantly, will maintain sediment transport continuity through this reach. Failure to address the low flow section may lead to increased instability due to the deposition of coarser sediment (due to a wider section) and subsequent formation of secondary channels.

The five year event water level is 231.12 m within the channel without a structure in place. The channel widening at the west bank starts at this elevation with a 6.0 m bench cut to the west and a 3:1 bank slope up to meet the existing ground. The new geometry of the upstream section in the HEC-RAS model (RS 134.187) was created accordingly. Further detailed channel work should be conducted during the detailed design. Approval agencies should be consulted regarding the approvability of the channel works. A detailed morphological assessment should be conducted to accurately define the low flow channel's discharge.

The proposed road geometry and profile were input into the future condition HEC-RAS model to evaluate the proposed structure. A 14 m span bridge is required here to meet design requirements. Hydraulic results are summarized in **Table 6-12**. Given the span of the proposed structure (i.e. greater than 6 m) and the road classification as urban arterial at this section, the design event for the structure is the 100 year storm (as previously stated in Table 6-6).

Table 6-12: Summary of Future Hydraulic Conditions at EW5

Design Event	Flow (m ³ /s)	Water Level Inside Bridge US (m)	Water Level Inside Bridge DS (m)	Velocity (m/s)	Performance
5 year	21.7	231.42	230.93	3.34	
10 year	24.9	231.50	230.98	3.50	
25 year	28.2	231.58	231.03	3.67	
50 year	30.4	231.64	231.07	3.74	
100 year	32	231.67	231.09	3.83	1.22 m clearance to the structure soffit
Regional Event	128.8	234.27	234.27	3.63	Road overtopped with a depth of 0.18 m, flow velocity through the roadway is 0.85 m/s

Crossing EW6

Crossing EW6 is located where a tributary of Grindstone Creek crosses Dundas Street. Currently there is a concrete culvert with dimensions of 3.05 m (span) x 1.52 m (rise) x 26 m (Length). HEC-RAS models for the Grindstone Creek system were provided by Conservation Halton and used here to evaluate the existing and proposed hydraulic conditions of the structure. Design flows from the 5 year to 100 year and the Regional Events were obtained from the Grindstone Creek Flood Damage Reduction Study, 1985.

Existing hydraulic conditions at the structure are summarized in **Table 6-13**, indicating that the existing structure does not meet the flood

design criteria, i.e. it does not provide a sufficient freeboard under the design event (50 year) and safe access under the Regional Event.

Table 6-13: Summary of Existing Hydraulic Conditions at Crossing EW6

Design Event	Flow (m ³ /s)	Water Level at Inlet (m)	Water Level at Outlet (m)	Velocity (m/s)	Performance
5 yr Event	9.5	244.65	243.55	4.17	
10 yr Event	10.8	244.73	243.63	4.29	
25 yr Event	12	244.81	243.69	4.40	
50 yr Event	12.9	244.87	243.74	4.47	0.64 m freeboard to the road surface
100 yr Event	13.4	244.9	243.77	4.51	
Regional Event	42.2	246.58	246.5	1.18	Road overtopped with a depth of 0.62 m, flow velocity at 0.68 m/s

A new structure is required to accommodate the road widening and improve the existing hydraulic conditions. A concrete box culvert with the dimensions of 6.0 m (span) x 1.8 m (rise) x 54 m (length) is proposed. The proposed structure hydraulic conditions are summarized in **Table 6-14**, meeting the design criteria. The structure is embedded into the creek channel with 0.4 m to construct a low flow channel inside the structure. Some channel realignment works upstream of the structure are required to lower the structure inlet and provide the structure slope at 1.3%. Given the high velocity under the Regional Event, appropriate rip-rap protection should be designed during the detailed design stage to ensure the structure safety.

Table 6-14: Summary of Future Hydraulic Conditions at Crossing EW6

Design Event	Flow (m ³ /s)	Water Level at Inlet (m)	Water Level at Outlet (m)	Velocity (m/s)	Performance
5 yr Event	9.5	244.03	243.66	2.5	
10 yr Event	10.8	244.09	243.72	2.6	
25 yr Event	12	244.14	243.76	2.7	
50 yr Event	12.9	244.18	243.8	2.76	The design event with 1.82 m freeboard
100 yr Event	13.4	244.2	243.82	2.8	
Regional Event	42.2	244.8	244.1	4.3	Road overtopped with a depth of 0.16 m, flow velocity at 0.54 m/s

Crossing EW7, EW8, EW9, EW10 and EW 11

These existing five structures are located along Dundas Street and convey the upstream overland flows collected by side ditches to the downstream surface water systems of the Grindstone Creek Watershed. To minimize the impact to the existing drainage system, these five structures are maintained at the existing locations with appropriate upgrades to accommodate the proposed road improvements.

Design flows to each structure were determined by VO2 hydrologic modelling as summarized in **Table 6-15**.

Table 6-15: Design Flows to Each Crossing EW7 to EW11

Crossing Structures	Drainage Area (ha)	2 year Event	5 year Event	10 year Event	25 year Event	50 year Event	100 year Event	Regional Event
EW7	4.39	0.11	0.202	0.27	0.363	0.43	0.498	0.575
EW8	3.02	0.075	0.139	0.185	0.25	0.296	0.343	0.395
EW9	5.90	0.121	0.221	0.294	0.396	0.468	0.542	0.703
EW10	62.20	0.685	1.258	1.684	2.278	2.709	3.152	5.937
EW11	10.10	0.194	0.374	0.513	0.711	0.857	1.009	1.337

Information describing the existing structures (i.e. opening size, invert elevations, etc.) was obtained from road contract drawings and field survey provided by the City of Hamilton and Halton Region as summarized in **Table 6-16**. Bentley CulvertMaster was used to conduct hydraulic analyses of the structures. Existing hydraulic conditions were first determined to establish the design targets for the future condition. The results are also summarized in **Table 6-16**.

The function of these five structures is mainly for drainage conveyance not associated with any permanent watercourses or environmental features. Therefore, CSP pipes and a concrete box culvert are proposed without embedment. The proposed structure dimensions and hydraulic conditions are summarized in **Table 6-17**.

Under the proposed condition, crossings EW7 and EW8 do not meet the freeboard requirement but maintain or improve the existing hydraulic conditions. The proposed road work along Dundas Street is to maintain the existing road profile. Raising the road profile to meet the freeboard requirement may not be cost-effective. Proposed hydraulic conditions at Crossing EW9, EW10, and EW11 meet the design criteria.

Table 6-16: Existing Hydraulic Conditions of Crossings EW7 to EW 11

Crossing No.	Diameter (mm)	Length (m)	Upstream Invert (m)	Downstream Invert (m)	Design Water Level 50yr Event (m)	Regional Water Level (m)	Freeboard at 50yr Event (m)	Road Overtopped at Regional Event
EW7	750	32.8	247.552	247.247	248.22	248.35	0.78	No
EW8	750	32.9	252.064	251.854	252.62	252.62	Road overtopped	Yes
EW9	750	33.3	252.679	252.059	253.39	253.59	0.61	No
EW10	1400	32.1	250.556	250.481	251.89	251.92	Road overtopped	Yes
EW11	1000	54	220.324	215.667	221.21	221.49	1.79	No

Table 6-17: Proposed Hydraulic Conditions of Crossings EW7 to EW 11

Crossing No.	Diameter (mm)	Length (m)	Upstream Invert (m)	Downstream Invert (m)	Design Water Level 50yr Event (m)	Regional Water Level (m)	Freeboard at 50yr Event (m)	Road Overtopped at Regional Event
EW7	750	50	247.552	247.10	248.22	248.35	0.78	No
EW8	750	44	251.46	250.9	252.00	252.09	0.90	No
EW9	750	48	252.14	251.62	252.85	253.05	1.68	No
EW10	3000 mm x 1000 mm	44	250.9	250.4	251.60	252.08	1.07	No
EW11	1000	56	220.324	215.667	221.21	221.49	1.79	No

Floodplain Storage Analysis – Upcountry Section

The section of the originally proposed New East-West Road between Parkside Drive and Dundas Street divided the Regulated floodplain of the Grindstone Tributary1 West Branch (named in the HEC-RAS model provided by CH). The existing floodplain was encroached upon by the proposed roadway and the total storage affected was about 4,200 m³.

Based on hydraulic analysis and with consideration of the stream rehabilitation plan proposed in the *Upcountry Estates Environmental Implementation Report, May 1996*, two flow equalization culverts were originally proposed to connect the floodplain and maintain the storage at the west side of the roadway. These two culverts were to be located above the low flow level and allow for flow attenuation to the downstream water system during the extreme events by maintaining the natural floodplain storage. Preliminary sizing of the flow equalization culverts was conducted, assuming that during the Regional event (i.e. Hurricane Hazel) water levels build up upstream of the road and trigger the flow through the proposed culverts. Given the nature of the

Regional event (i.e. high flow volume but low intensity and a flow rate at $0.4 \text{ m}^3/\text{s}$) the time required to fill the total storage ($4,200 \text{ m}^3$) west of the roadway was estimated at 3 hours. To maintain the existing floodplain storage, two 1000 mm circular culvert were proposed.

Subsequent to the above analysis, as outlined in Section 5.8, an alternative was developed as the preferred alignment that placed the Regional storm floodline all on the east side of the roadway. This was accomplished by shifting the road to the west, further into the development. This eliminated the need for the above noted relief culverts. Preliminary hydraulic modelling was completed to verify that sufficient storage could be provided along the east side of the road during the Regional storm without increasing the floodline.

STORMWATER MANAGEMENT

The effects of urbanization and intensification are well documented and can dramatically alter the natural hydrologic cycle. As roads are built and corridors expanded, the amount of impervious area within a watershed increases. Increases in impervious areas increase the volume and peak rate of runoff, while decreasing groundwater recharge. Urbanization can also increase the type and amount of pollutants in surface water runoff. Older approaches to stormwater management have focused on efficiently collecting and conveying stormwater offsite. Newer approaches to stormwater management seek to retain natural features of drainage systems and provide onsite management to address water quality and water quantity goals. This approach views stormwater as a resource to be used to recharge groundwater and to supply fresh water to surface water features. Properly managing stormwater can avoid problems with erosion, flooding, and adverse impacts on natural drainage features.

As roadway improvement activities alter the watershed landscape, adverse impacts to receiving waters may result from changes in the quality and quantity of stormwater runoff. In addition to causing runoff volume impacts, stormwater can also be a major source of non-point source pollution within the urban environment. The type and quantity of pollutants carried by stormwater runoff, commonly resulting in non-point source pollution of receiving waters are highly variable. The pollutant characteristics of stormwater runoff are largely based on land use characteristics and vary with the duration and intensity of rainfall events.

Stormwater Management Targets

Reviews of background studies within the Grindstone and Borer's Creek Watersheds, the City of *Hamilton Stormwater Master Plan – Class EA Report* (City-Wide, May 2007 by Aquafor Beech Ltd.), *City of Hamilton Criteria and Guidelines for Stormwater Infrastructure Design* (September 2007) and consultation with staff from the City of Hamilton, HCA and CH were conducted to identify the stormwater management targets related to the proposed road improvements within the EA study area. The criteria are defined as follows:

Borer's Creek Watershed – Based on Waterdown North MDP

- Water quality control is Enhanced Level (80% Total Suspended Solids (TSS) Removal)
- Erosion control is based on maintaining existing erosion potential (continuous simulation modeling)
- Quantity control is generally not required

Grindstone Creek Watershed

- Water quality control is Enhanced Level (80% TSS Removal)
- Erosion control is based on 25 mm event
- Quantity control is post- to pre-development peak flow control

It is noted that given the small scale of the road improvements relative to the size of watersheds, and given constraints associated with road development, erosion and quantity control targets may not be met at some locations. Details at specific outlet locations are provided in later sections of this report.

Roadway Stormwater Management Alternatives

The MOE *Stormwater Management Planning and Design Manual* provides extensive lists of stormwater Best Management Practices (BMPs) in three categories: source, conveyance and end-of-pipe controls. The City of Hamilton also developed *City of Hamilton Stormwater Master Plan-Class Environmental Assessment Report (City-Wide)* in May 2007 to identify appropriate stormwater management strategies within the City. However, measures which are generally applicable to road runoff control are limited by the nature of the project, i.e. linear corridor with limited adjacent properties and multiple water crossing locations and outlets.

Sources control measures usually refer to the measures implemented at the lot level such as surface storage and reduced grading to allow greater ponding. Generally source control measures are not applicable to road runoff control. Conveyance control measures refer to BMPs that are used to transport stormwater from drainage areas to receiving waters. These measures may include grassed swales/ditches, pervious pipe systems, vegetated buffer strips and oversized pipes (i.e. super pipe storage). End-of-pipe stormwater management measures are located at the outlet of the drainage system. Measures may include wet ponds, dry ponds, wetlands, infiltration basins, and oil/grit separators (OGS).

Stormwater management practices were screened with the consideration of the practicality, feasibility, and limitations of each management option based on site specific conditions. The following site specific conditions were considered:

- Classification of receiving watercourses, sensitivity of aquatic resources;
- The proposed roadway classification and cross-sections (i.e. urban sections with sewer/ditch system and rural sections with ditches);

- The limited physical space within the roadway right-of-way to implement large-scale regional stormwater management facilities;
- The limited property available adjacent to the urban sections of the New East-West Road Corridor along Parkside Drive and Dundas Street, precluding the use of wet/dry ponds for quantity and erosion control of stormwater runoff;
- Local soils (clay/silt clay) having low percolation rates, limiting the use of infiltration type stormwater management practices;
- The high sediment loading caused by construction activities and winter sanding practices, which significantly reduce the life-expectancy of infiltration type stormwater management facilities; and,
- Location of proposed development SWM facilities (i.e. within Waterdown North, Upcountry development) that could accept road right-of-way and adjacent area drainage.

A variety of stormwater best management practices have been considered for use within the New East-West Road Corridor. The 'do nothing' alternative is generally eliminated on the basis that any modification to the lands contained within the right-of-way will result in some degree of environmental degradation whether it be on a temporary basis during construction or a permanent basis over the life expectancy of the reconstructed infrastructure. The proposed increase in imperviousness and construction activities within the right-of-way may result in negative effects such as reduced water quality, increased water quantity, degradation of in-stream aquatic resources, and erosion and sediment loading. These impacts result in the need for appropriate mitigation measures.

Extended detention stormwater management facilities can effectively provide quality/quantity and erosion control for surface runoff. In general, storage-type stormwater management facilities are not feasible for linear transportation facilities such as roads and highways. The general configuration and size of the drainage areas associated with a roadway make it difficult to meet design requirements such as minimum contributing drainage area and levels of imperviousness. Quality enhancement and erosion control is based on the premise of extended detention with a controlled outlet. Small contributing drainage areas results in impractical outlet sizes which are prone to clogging with debris during normal and winter operations. Space limitations within the existing right-of-way often result in undesirable pond geometry. Ponds having seriously compromised layout geometry generally under-perform and result in short-circuiting, significantly reducing long-term total suspended solids removal rates. Because of this, City of Hamilton has the intention to coordinate with developers of adjacent properties when a road corridor traverses proposed development lands and utilize their on-site stormwater detention facilities to centrally manage the road runoff.

Generally, infiltration facilities are not recommended to treat road runoff for either quantity or quality control because of the high Total Suspended Solids (TSS) load from the road surface which reduces the

facility life expectancy and limited performance during winter months when the ground is frozen. Also, road runoff may contain a high concentration of dissolved solids (i.e. chlorides) which could contaminate baseflow/groundwater through the use of infiltration type measures.

Grassed ditches have historically been associated with rural drainage and have been constructed primarily for stormwater conveyance. Stormwater management objectives have changed and grassed ditches are also being promoted to filter and detain stormwater runoff. Routing flow through wide, flat bottom ditches has a number of benefits with respect to stormwater quantity and quality control. Grassed swales and ditches can be effective for pollutant removal if designed properly. The water quality benefits associated with grassed ditches depend on the contact area between the water and the swale, as well as the swale slope. Grassed swales are most effective for stormwater treatment when a minimum channel slope is maintained (e.g. <1%) and a wide bottom width (> 0.75 m) is provided. Grassed swales with a slope of up to 2% can be used for water quality purposes, but effectiveness diminishes as velocities increase. Wide, flat bottom ditches provide a degree of peak flow attenuation that normally would not be achieved. Treatment of runoff is provided in a grassed swale by four processes: sedimentation, filtration, infiltration, and vegetative uptake. In swales with flat gradients, suspended particles within slow moving surface runoff has time to settle out or get captured by the vegetation. Soil conditions may also allow for some infiltration into the local topsoil within the swale or subsequently into the lower soil masses. Long residence times will allow for some minor vegetative uptake.

Special purpose stormwater management devices such as oil/grit separators having limited application are becoming more common for linear facilities such as roadways and highways. The drainage area characteristics and the point source outlet locations from local storm sewer systems servicing the New East-West Road Corridor make the use of an oil/grit separator a feasible alternative to providing quality treatment within the Study Area. An oil/grit separator requires a maintenance schedule similar to that of a standard roadside catch basin and has proven efficiency in removing trash, grit, suspended solids, and a range of oil and oil by-products from stormwater runoff. High volume commercial truck traffic with the potential for spills and limited space make an oil/grit separator a feasible alternative for addressing stormwater runoff quality from the corridor.

Recommended Stormwater Management Strategy

The proposed New East-West Road Corridor crosses the Borer's and Grindstone Creek systems at a several locations (see **Figure 6-2**). In general, right-of-way (ROW) runoff is directed to the receiving watercourse at these locations. This section outlines the different catchment characteristics, stormwater management targets, and specific road design requirements as well as the proposed stormwater management strategy for each outlet.

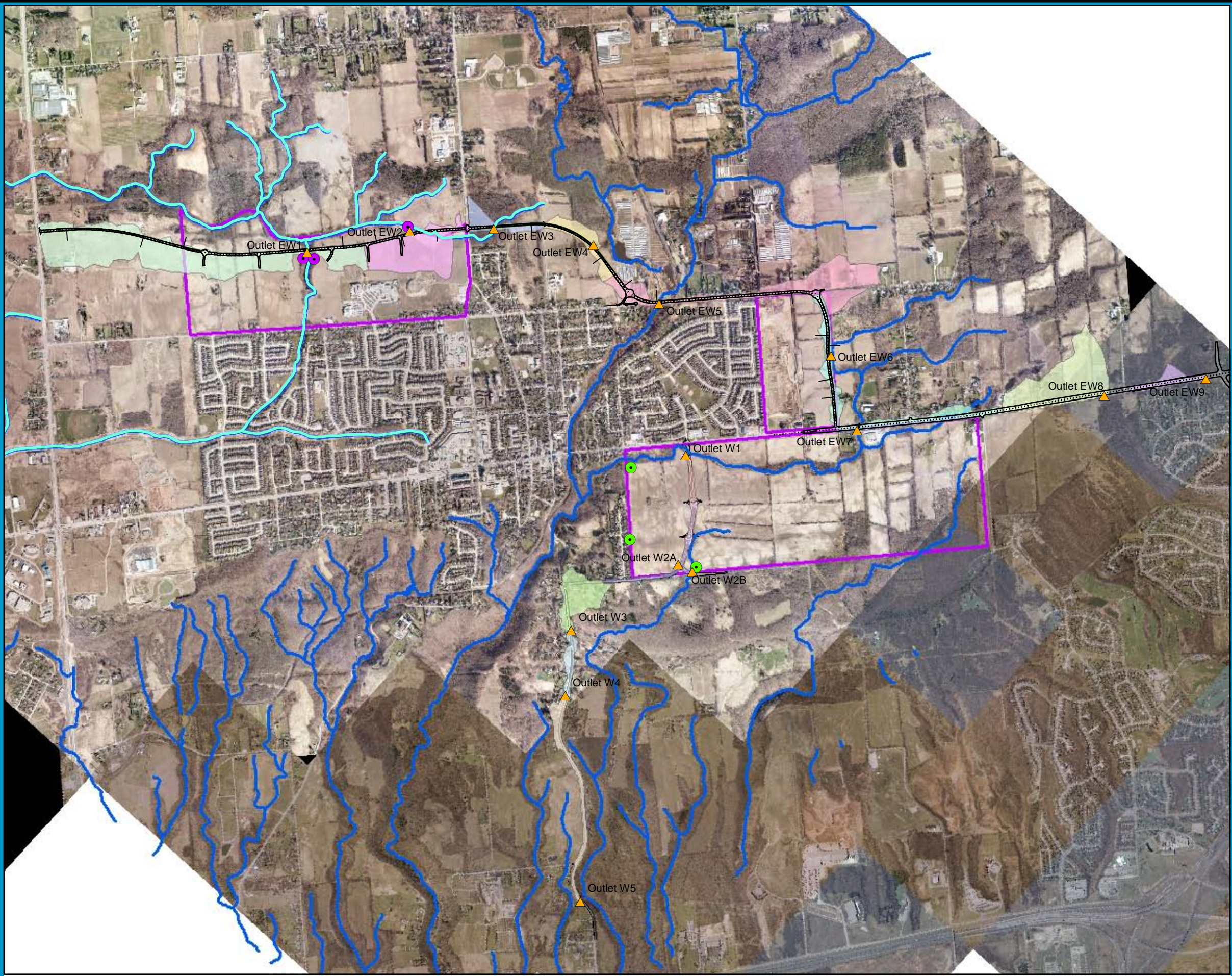
The construction of new roadways and improvements to the existing roads (i.e. changes in horizontal and vertical alignments) result in changes to existing drainage boundaries. A drainage scheme has been developed for the entire New East-West Road Corridor based on the recommended preliminary road design. The proposed road drainage pattern is shown in *Figure 6-2*.

Visual OTTHYMO (VO2) hydrologic modelling was conducted for each outlet under existing (no road improvement) and proposed (after road improvement) conditions to identify the road improvement impacts on receiving watercourses and to assist in selecting appropriate stormwater management measures.

Intensity – Duration-Frequency data from the Mount Hope rain gauge station were used to create input storm files. The 12 hour U.S. Soil Conservation Service’s (SCS) Type II design distribution for the 25 mm, 2 year, 5 year, 10 year, 25 year, 50 year and 100 year storm events, as well as the Regional event were simulated.

Proposed New East-West Roadway

Figure 6.2 Road Drainage Area and Outlet



Legend

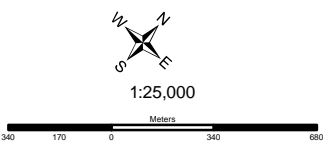
- ▲ Road Drainage Outlet
- Grindstone Creek
- Borer's Creek
- Urban Expansion Boundary

SWM Facility

- Quality/Erosion Control
- Quality/Quantity/Erosion Control

SWM Catchment

- OutletEW1
- OutletEW2
- OutletEW3
- OutletEW4
- OutletEW5
- OutletEW6
- OutletEW7
- OutletEW8
- OutletEW9
- OutletW1
- OutletW2A
- OutletW2B
- OutletW3
- OutletW4
- OutletW5



Notes:
Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.



The NASHYD command was applied given the rural land use along the corridor. Model input parameters in terms of catchment drainage areas, time to peak (T_p), and curve numbers (CN) were determined based on specific catchment characteristics. Typical values for other input parameters required in NASHYD include the number of linear reservoir ($N = 3$) and pervious area depression storage ($IA = 5$ mm).

As mentioned previously, due to property limitations and relatively small drainage areas, detention facilities are not practical means to achieve erosion and peak flow control. Also, the increases of peak flows within the road drainage boundary caused by the road improvement do not necessarily mean increased peak flows at the watershed scale. Therefore, at some outlet locations, there are only locally increased peak flows from the road drainage area.

Outlet EW1

Outlet EW1 is located on the main branch of Borer’s Creek. The proposed roadway intercepts overland flows from a large rural area south of the road which flow towards the west tributary of Borer’s Creek under existing conditions. The total drainage area to Outlet 1 is 38 ha. **Table 6-18** summarizes the catchment hydrologic parameters under existing and future conditions. The significant change of the T_p is due to the change of flow route. Under existing conditions, runoff flows overland to the Borer’s Creek West Tributary and through creek routing to the Outlet EW1 location. However, after the new road is built, this overland flow is intercepted by the road side ditch and the storm sewer system and is conveyed more directly to the watercourse and this increases the local discharge rate at Outlet EW1.

Table 6-18: Outlet EW1 Catchment Hydrologic Parameters

Outlet Location	Area (ha)	Existing			Future		
		T_p (hr)	CN(AMCII)	CN(AMCIII)	T_p (hr)	CN(AMCII)	CN(AMCIII)
EW1	38	2.04	87.0	94	0.56	88.2	94.8

Without any stormwater management measures, the peak flow rate for local ROW and adjacent area drainage would increase under future conditions, as indicated by VO2 modelling results in **Table 6-19**. These increases are due to the reduced flow travel time after the road and drainage system are built. **Table 6-20** shows the in-stream design flows at the Outlet EW1 location which were generated from about 600 ha of subwatershed. Although the future condition peak flows from the road drainage area can represent up to 40% of the total in-stream flows for some design events, the peaking time from the entire subwatershed is much longer than the peaking time from the road drainage; therefore the total peaks may not be affected.

Table 6-19: Outlet EW1 Existing and Future Hydrologic Conditions

Storm Event	Existing		Future	
	Peak flow (m ³ /s)	Runoff Volume (mm)	Peak flow (m ³ /s)	Runoff Volume (mm)
25 mm	0.135	7	0.369	7
2 yr	0.411	20	1.128	21
5 yr	0.718	34	1.947	36
10 yr	0.936	45	2.521	46
25 yr	1.230	59	3.284	60
50 yr	1.438	68	3.819	70
100 yr	1.649	78	4.357	80
Regional	3.059	192	4.738	193

Table 6-20: Peak Flows of Outlet 1 at Borer’s Creek (m3/s) (Developed by Waterdown North MDP)

2 year	5 year	10 year	25 year	50 year	100 year	Regional Event
2.82	5.1	6.67	8.08	9.71	10.8	40.64

As shown in *Figure 6-2*, a part of the ROW and local drainage contributing to Outlet EW1 (i.e. approximately 16 ha) is within the Waterdown North development area. Runoff from this section of the road will be managed by the development stormwater management plan. Two stormwater management facilities are proposed on either side of the main branch of the Borer’s Creek which provide runoff quality and erosion control. Therefore, the proposed impacts on Borer’s Creek would be mitigated by these two stormwater management ponds. ROW and adjacent land runoff from Highway 6 to the western boundary of the Waterdown North development also flows towards the main branch of Borer’s Creek given the existing topography and road design.

The drainage area is about 22 ha with a % imperviousness of less than 10% requiring approximately 840 m³ permanent pool storage for quality control. Any additional erosion control requirements beyond what is provided in the proposed SWM pond to the west of Borer’s Creek must be determined through continuous simulation modelling. The City is updating the North Waterdown MDP to accommodate changes to the North Waterdown development land and flooding issues downstream of the proposed development. The City and consulting team for the development are working together to accommodate the additional runoff volume to the sit’s stormwater management facilities. Analysis will be required during the detailed design phase of the SWM pond proposed on the west side of the Borer’s Creek.

Outlet EW2

The entire drainage area to Outlet EW2 is located within the Waterdown North development area. The catchment hydrologic parameters listed in *Table 6-21* only demonstrate the changes caused by the New East-West

Road Corridor but do not include the proposed land development. As such, the VO2 hydrologic modelling results presented in **Table 6-22** demonstrate the impacts on the existing hydrologic regime associated with proposed road improvement works. These impacts include marginal increases to runoff peaks flows and volumes, however based on the watershed study recommendations, peak flow control is not required. A stormwater quality and erosion control pond is proposed in the Waterdown North development on the north side of the proposed New East-West Road Corridor. ROW runoff will be managed by this SWM facility.

Table 6-21: Outlet EW2 Catchment Hydrologic Parameters

Outlet Location	Area (ha)	Existing			Future		
		T _p (hr)	CN(AMCII)	CN(AMCIII)	T _p (hr)	CN(AMCII)	CN(AMCIII)
EW2	15	0.45	88.0	94.8	0.46	89.1	95.0

Table 6-22: Outlet EW2 Existing and Future Hydrologic Conditions

Storm Event	Existing		Future	
	Peak flow (m ³ /s)	Runoff Volume (mm)	Peak flow (m ³ /s)	Runoff Volume (mm)
25 mm	0.160	7	0.173	8
2 yr	0.483	21	0.505	22
5 yr	0.846	35	0.874	37
10 yr	1.102	46	1.132	47
25 yr	1.444	60	1.475	62
50 yr	1.684	70	1.715	72
100 yr	1.926	80	1.956	82
Regional	1.948	193	1.939	193

Outlet EW3

Outlet EW3 is located at the woodlot/wetland east of Centre Road. Due to the proposed New East-West Road Corridor, the existing overland flow pattern and drainage area characteristics are modified (i.e. time to peak (T_p) and CN values). Under proposed (future) conditions, the T_p value is marginally higher due to the modified overland flow route. The CN value has a relatively large increase due to the large proportion of road area with a high % imperviousness compared to the relatively small total drainage area (i.e. 4.2 ha). Existing and proposed catchment parameters are presented in **Table 6-23**.

Table 6-23: Outlet EW3 Catchment Hydrologic Parameters

Outlet Location	Area (ha)	Existing			Future		
		T _p (hr)	CN(AMCII)	CN(AMCIII)	T _p (hr)	CN(AMCII)	CN(AMCIII)
EW3	4.2	0.56	78.7	90.0	0.58	84.9	93.5

Table 6-24 summarizes hydrologic modelling outputs under existing and future conditions. Under future conditions, results show moderate increases to both runoff peak flows and event volumes due to the increased CN values. Outlet EW3 discharges to the woodlot/wetland, where flow velocities are relatively slow. As modelled in HEC-RAS, the flow velocity near Outlet EW3 within the woodlot/forest is approximately 0.01 m/s for storms up to and including the Regional event. The wetland with a large storage volume provides significant flow attenuation. Therefore, any increases in peak runoff rates or volumes at the outlet would not increase erosion potential downstream of the wetland given the attenuation provided. It is also anticipated that flow attenuation will mitigate any peak flows from all the return period events. This section of the road is designed as a rural section with side ditches collecting the ROW and external area runoff. Wide bottom grass swales are proposed to treat stormwater runoff and provide 80% TSS removal. The treated runoff can be directed to the wetland to help maintain this feature.

Table 6-24: Outlet EW3 Existing and Future Hydrologic Conditions

Storm Event	Existing (Outlet EW3)		Future (Outlet EW3)	
	Peak flow (m ³ /s)	Runoff Volume (mm)	Peak flow (m ³ /s)	Runoff Volume (mm)
25 mm	0.023	4	0.032	6
2 yr	0.081	14	0.104	18
5 yr	0.151	26	0.186	32
10 yr	0.203	35	0.244	42
25 yr	0.276	47	0.324	55
50 yr	0.328	55	0.380	65
100 yr	0.382	64	0.438	74
Regional	0.513	182	0.516	190

Outlet EW4

Outlet EW4 discharges to a regulated wetland watercourse within the Grindstone Creek Watershed. Due to the proposed roadway, the existing overland flow pattern and drainage area characteristics are modified (i.e. T_p and CN values). Existing and proposed catchment parameters are presented in **Table 6-25**.

Table 6-25: Outlet EW4 Catchment Hydrologic Parameters

Outlet Location	Area (ha)	Existing			Future		
		T _p (hr)	CN(AMCII)	CN(AMCIII)	T _p (hr)	CN(AMCII)	CN(AMCIII)
EW4	5.0	0.35	86.5	94.0	0.24	88.3	94.8

Table 6-26 summarizes hydrologic modelling outputs under existing and future conditions. Minor increases to both runoff peak flows and volumes result. As per the hydraulic analysis presented for Outlet EW3, the wetland at Outlet EW4 has a very flat terrain and behaves like a natural depression area with flow attenuation potential. Therefore, these

minor increase peak flows would not increase downstream erosion potential or design event peak flow rates. Also, this section of the road is designed as a rural section with side ditches collecting ROW and external area runoff. Wide bottom grass swales are proposed to treat stormwater runoff and provide 80% TSS removal. Similar to Outlet EW2, the treated runoff can be directed to the wetland and maintain this feature.

Table 6-26: Outlet EW4 Existing and Future Hydrologic Conditions

Storm Event	Existing		Future	
	Peak flow (m ³ /s)	Runoff Volume (mm)	Peak flow (m ³ /s)	Runoff Volume (mm)
25 mm	0.054	7	0.075	7
2 yr	0.183	19	0.217	20
5 yr	0.320	33	0.366	34
10 yr	0.417	43	0.468	44
25 yr	0.548	57	0.612	57
50 yr	0.639	67	0.715	67
100 yr	0.732	76	0.819	76
Regional	0.697	189	0.691	183

Outlet EW5

Outlet EW5 is located on the main branch of Grindstone Creek at Parkside Drive. West of the outlet a new roadway is proposed while east of the outlet, the existing 2 lane road (Parkside Drive) is proposed to be widened to a 4 lane road. **Table 6-27** shows the existing and proposed catchment hydrologic parameters. Due to the new roadway, there is a decrease in the drainage area to Outlet EW5 which results in changes to the existing hydrologic regime. Namely, runoff peak flow rates and volume are reduced as presented in **Table 6-28**. This portion of the road is designed as an urban section with storm sewers to collect runoff from the ROW and side ditches to collect external runoff. Oil and Grit Separators (OGS) are recommended to be installed at the most downstream end of the storm sewer system to provide water quality treatment prior to outletting to the creek. A Stormceptor® unit STC 5000, or equivalent, is required to provide 80% TSS removal. Wide bottom flat swales are designed along the roadway to collect adjacent overland flows to the roadway and provide quality treatment. Ditch locations and cross sections are indicated in the road plan and profile drawings. Specific measures for quantity control (peak flow and erosion) are not required since there are no increases in peak flows or volumes.

Table 6-27: Outlet EW5 Catchment Hydrologic Parameters

Outlet Location	Area (ha)	Existing			Future		
		T _p (hr)	CN(AMCII)	CN(AMCIII)	T _p (hr)	CN(AMCII)	CN(AMCIII)
EW5	19.2 ¹ /18.3 ²	0.72	87.2	94.0	0.72	88.1	94.8

Notes: 1 existing drainage area
 2 future drainage area

Table 6-28: Outlet EW5 Existing and Future Conditions

Storm Event	Existing (Outlet EW5)		Future (Outlet EW5)	
	Peak flow (m ³ /s)	Runoff Volume (mm)	Peak flow (m ³ /s)	Runoff Volume (mm)
25 mm	0.147	7	0.150	7
2 yr	0.460	20	0.455	21
5 yr	0.799	35	0.785	36
10 yr	1.038	45	1.016	46
25 yr	1.357	59	1.323	60
50 yr	1.582	69	1.542	70
100 yr	1.815	79	1.764	80
Regional	2.236	192	2.135	194

Upcountry Section

Adjacent to the Upcountry development, runoff is discharged to at a tributary of Grindstone Creek parallel to the proposed new roadway. Based on the existing terrain, the road low point is located at this location. Due to the construction of the new roadway, the existing hydrological pattern requires modification. There is an increase in the contributing drainage areas to the outlet under the future conditions (see **Table 6-29**). Therefore, increases in peak flows and runoff volumes are expected compared to existing conditions. However, due to the small catchment area (i.e. 3 ha), the absolute values of peak flows and the increases are small. For example, the in-stream Regional flow rate at this location is 27.4 m³/s based on the total contributing area about 819 ha as reported in the HEC-RAS hydraulic model. The increased Regional flow of 0.09 m³/s due to the proposed road works is considered negligible compared to the total flow in the creek (see **Table 6-30**). The same assumption is made for all design events (i.e. 25 mm to 100 year) and therefore quantity control is not recommended.

To the west of the proposed road is the Upcountry Estates development and to the east side is existing rural development. This portion of the road is therefore designed as both an urban cross-section with a curb-catch basin-sewer system and as a rural cross-section with side ditches. The storm sewer system captures drainage from the west side of the road while side ditches capture runoff from the east side of the road. Wide bottom flat swales are proposed along the east side to provide water quality treatment for runoff from the ROW. It is recommended that runoff collected by the sewer along the west side be treated using an OGS device prior to discharging to the creek. Two Stormceptor® units STC 300 or equivalent are proposed at the south and north end of the sewer to provide 80% TSS removal. An alternative to the OGS is to coordinate with the Upcountry Phase 2 development on the west side and to treat runoff using proposed stormwater management facilities. This should be investigated further in the detailed design phase.

Table 6-29: Outlet at Upcountry Catchment Hydrologic Parameters

Outlet Location	Area (ha)	Existing			Future		
		T _p (hr)	CN(AMCII)	CN(AMCIII)	T _p (hr)	CN(AMCII)	CN(AMCIII)
EW6	2.40 ¹ /3.32 ²	0.2	88.0	94.8	0.2	94.0	97.5

Notes: 1 existing drainage area
 2 future drainage area

Table 6-30: Outlet at Upcountry Existing and Future Conditions

Storm Event	Existing (Outlet)		Future (Outlet)	
	Peak flow (m ³ /s)	Runoff Volume (mm)	Peak flow (m ³ /s)	Runoff Volume (mm)
25 mm	0.034	6	0.063	8
2 yr	0.102	19	0.180	22
5 yr	0.180	32	0.298	36
10 yr	0.235	41	0.379	46
25 yr	0.308	53	0.483	59
50 yr	0.359	62	0.556	68
100 yr	0.411	71	0.628	77
Regional	0.311	172	0.426	173

Outlet EW6

Outlet EW6 is located on a tributary of Grindstone Creek across Dundas Street. The proposed road improvements along Dundas include widening the existing 4 lane road to 6 lanes. The existing flow pattern is generally maintained but there is a small increase in the size and % imperviousness of the drainage area to Outlet EW6. **Table 6-31** shows the existing and proposed catchment hydrologic parameters. Since there is an increase in drainage area and percent imperviousness to Outlet EW6 under the future condition, peak flows and runoff volumes from the road drainage area increase moderately. Due to the limited road property, open detention facilities within the road right of way to mitigate these impacts are not feasible. Alternatives such as super pipe storage would be costly. Furthermore, when considering this 7.36 ha road drainage area located near the end of about a 680 ha larger rural subwatershed, these peak flow increases may be negligible.

This portion of Dundas Street has an urban cross-section with storm sewers collecting ROW runoff and side ditches collecting external area runoff. Wherever possible (i.e. no ROW area limitations), wide bottom flat swales along the road are recommended to improve runoff quality and attenuate flows. OGS devices are also recommended to be installed as part of the existing sewer system and to provide water quality treatment of runoff prior to discharging to Grindstone Creek. A Stormceptor® unit STC 1000 or equivalent is required at the end of the sewer west of the outlet. East of the outlet, there are three culverts across the road; therefore, four Stormceptor® units are required along

the sewer system east of Outlet EW6, which are STC 5000, STC 750, STC 1000 and STC 750.

Table 6-31: Outlet EW6 Catchment Hydrologic Parameters

Outlet Location	Area (ha)	Existing			Future		
		T _p (hr)	CN(AMCII)	CN(AMCIII)	T _p (hr)	CN(AMCII)	CN(AMCIII)
EW7	6.47 ¹ /7.36 ²	0.30	91.6	97.0	0.30	93.9	97.5

Notes: 1 existing drainage area
2 future drainage area

Table 6-32: Outlet EW6 Existing and Future Hydrologic Conditions

Storm Event	Existing (Outlet EW7)		Future (Outlet EW7)	
	Peak flow (m ³ /s)	Runoff Volume (mm)	Peak flow (m ³ /s)	Runoff Volume (mm)
25 mm	0.110	9	0.163	11
2 yr	0.105	25	0.417	27
5 yr	0.169	41	0.658	43
10 yr	0.212	52	0.817	54
25 yr	0.268	67	1.023	69
50 yr	0.306	77	1.165	79
100 yr	0.344	87	1.306	90
Regional	0.911	194	1.028	187

Outlet EW6

At Outlet EW 6, there is a 1400 mm culvert currently crossing Dundas Street which conveys the upstream overland flow to the downstream watercourse. Under the future conditions, a new crossing structure is proposed at the same location. Due to the large rural catchment area, widening of the road does not result in a significant change to the catchment hydrologic parameters. Existing and proposed catchment parameters are summarized in **Table 6-33**. Therefore, increases in runoff peak flows and volumes are marginal due to the road widening (see **Table 6-34**) and quantity control is not recommended for this outlet. Also, there are no increases in the 25 mm event and erosion control is not required.

This portion of Dundas Street has an urban cross-section with storm sewers collecting ROW runoff and side ditches collecting external area runoff. Wherever possible (i.e. no ROW area limitations), it is recommended to implement wide bottom flat swales along the road to improve runoff quality and attenuate flows. OGS devices are also recommended to be installed as part of the existing sewer system and provide water quality treatment of runoff prior to discharging to the creek. A Stormceptor® unit STC 6000 or equivalent is required here to provide 80% TSS removal.

Table 6-33: Outlet EW7 Catchment Hydrologic Parameters

Outlet Location	Area (ha)	Existing			Future		
		T _p (hr)	CN(AMCII)	CN(AMCIII)	T _p (hr)	CN(AMCII)	CN(AMCIII)
EW8	18.3 ¹ /18.8 ²	0.37	88.3	94.8	0.37	88.8	95.0

Notes: 1 existing drainage area
2 future drainage area

Table 6-34: Outlet EW7 Existing and Future Hydrologic Conditions

Storm Event	Existing (Outlet EW7)		Future (Outlet EW7)	
	Peak flow (m ³ /s)	Runoff Volume (mm)	Peak flow (m ³ /s)	Runoff Volume (mm)
25 mm	0.216	7	0.245	8
2 yr	0.704	21	0.744	21
5 yr	1.215	36	1.276	36
10 yr	1.572	46	1.646	47
25 yr	2.046	60	2.136	61
50 yr	2.378	70	2.478	71
100 yr	2.711	80	2.822	81
Regional	2.525	192	2.597	192

Outlet EW8

At Outlet EW8, there is a 1000 mm culvert across Dundas Street which conveys upstream overland flow to the downstream watercourse. This structure will not require replacement for hydraulic reasons. Due to the relatively small drainage area which includes both ROW surface and external areas, even a small increase in the ROW area represents a relatively large change in the catchment. For example, the road widening results in an increase in percent imperviousness and CN value of the catchment. This in turn causes increases in runoff peak flows and volumes. However, due to the limited ROW property, a stormwater detention pond is not feasible.

As per Outlet EW7, recommended stormwater management measures include wide bottom flat swales and OGS devices. A Stormceptor® unit STC 6000 is required here to provide 80% TSS removal.

Table 6-35: Outlet EW8 Catchment Hydrologic Parameters

Outlet Location	Area (ha)	Existing			Future		
		T _p (hr)	CN(AMCII)	CN(AMCIII)	T _p (hr)	CN(AMCII)	CN(AMCIII)
EW9	3.31 ¹ /3.86 ²	0.13	86.5	94.0	0.13	91.1	96.0

Notes: 1 existing drainage area
2 future drainage area

Table 6-36: Outlet EW9 Existing and Future Conditions

Storm Event	Existing (Outlet EW8)		Future (Outlet EW8)	
	Peak flow (m ³ /s)	Runoff Volume (mm)	Peak flow (m ³ /s)	Runoff Volume (mm)
25 mm	0.031	4	0.055	6
2 yr	0.108	12	0.161	15
5 yr	0.191	21	0.270	25
10 yr	0.251	28	0.344	32
25 yr	0.330	36	0.441	41
50 yr	0.386	43	0.508	48
100 yr	0.442	49	0.575	54
Regional	0.304	121	0.357	124

In addition to the stormwater management measures recommended for each outlet described above, the following general guidelines should be used as a basis for stormwater management during the detailed design to provide source, conveyance, and end-of-pipe control of surface water runoff minimizing any adverse impacts:

- Minimize disturbance of all existing well vegetated ditches and grassed slopes where grading is required.
- Promote some short-term stormwater ponding within the right-of-way ditches where sub-grade drainage is not adversely affected.
- Design the road storm sewers and ditch outlets with adequate erosion protection measures.
- Maximize the length of overland flow through ditches between outlets and points where stormwater leaves the right-of-way.
- Where ditch re-grading is required, consider utilization of flat bottom ditches in lieu of ‘v’ ditches to reduce velocities and erosion potential, promote peak flow attenuation and provide short-term stormwater storage.
- Appropriate erosion and sediment control plan during the road construction should be prepared and implemented.

Stormwater Management Summary

Outlet EW1: Runoff from the ROW and adjacent areas within the Waterdown North development will be managed by the proposed development stormwater management facilities. Under proposed conditions additional runoff (i.e. from areas between Highway 6 and west boundary of the Waterdown North development) will be conveyed to Outlet EW1. This drainage should be considered in the design of the proposed stormwater pond at the west side of the main branch of Borer’s Creek. Approximately 840 m³ permanent pool storage is required for runoff quality control. Any additional erosion control requirements beyond what is provided in the proposed SWM Plan for the area to the west of Borer’s Creek must be determined through continuous simulation modelling. The City and consulting team for the development will work together when updating the North Waterdown MDP to accommodate this additional runoff volume into site stormwater

management facilities. Analysis will be required during the detailed design phase of the SWM pond proposed on the west side of Borer's Creek.

Outlet EW2: The ROW and external areas tributary to Outlet EW2 is conveyed via the proposed drainage system to the Waterdown North development and therefore the runoff will be managed by the stormwater management pond within this development, on the north side of the New East-West Road Corridor. This facility will provide water quality and erosion control. Quantity control is not required.

Outlet EW3 and EW4: At these two outlets, due to the specific characteristics of receiving watercourses and rural cross-section of the road design, wide bottom flat grass swales are recommended to provide the required stormwater management controls and meet the SWM targets.

Outlet EW5, EW6, and EW7: at these three outlets, widening of the existing 2 lane road to 4 lane road result in minor increases to runoff peaks and volumes. OGS devices to treat the sewer runoff and open bottom flat swales to treat adjacent overland runoff towards the roadway are proposed.

Outlet at Upcountry and EW8: at these two outlets, the road improvement results in relatively large increases on runoff peaks and volumes compared to the existing conditions. However, considering the relatively small drainage areas to the outlets (approximately 3 to 4 ha) the increases relative to the total creek flows are negligible. Due to the road property limitations, detention facilities are not feasible to provide the runoff quantity and erosion control. OGS devices to treat the sewer runoff and wide bottom flat swales to treat adjacent overland runoff are proposed. For the section adjacent to the Upcountry development shared use of the developments SWM facilities should be investigated.

6.3.5 Structures

A number of new structures are required as part of this project. The design criteria and proposed design for these structures are discussed in this section of the report.

Borer's Creek Main Branch Crossing

A new three-cell concrete culvert is proposed to convey the main branch of Borer's Creek within the Waterdown North development lands. It is proposed that the main cell (the one containing the low flow channel) have an open bottom and be 6 m wide by 3.2 m high. The remaining two cells will be set at a higher invert elevations and have dimensions of 6 m wide by 2.2 m high. Please refer to *Figure 6-3A* for a preliminary general arrangement of this bridge.

The design criteria used for this crossing is as follows:

- Design Event = 100 year.

- Design Flow = $10.8 \text{ m}^3/\text{s}$
- Minimum freeboard to underside of structure = 0.8 m (1 m CHBDC)
- Provide structural opening to not preclude construction of future multiuse pedestrian trail.

The proposed design passes the 100 year event and there is no overtopping of the road during the Regional storm event. The proposed design flow complies with the design criteria and a freeboard of approximately $2 \text{ m} \pm$ is provided to the underside of the structure. The invert for the main cell structure is set 0.5 m below low flow channel invert. The invert for the remaining cells is set to the 2 year flood event.

It is also noted that flow velocities will be less than 1 m/s for the design storm event and greater than 2 m/s for the Regional storm event. In addition, it is expected that a multi-use trail can be accommodated (if required) within one of the two perched (6 m wide by 2.2 m high) culvert cells.

Borer's Creek Tributary Branch Crossing

As part of the Waterdown North development works (by others), it is proposed to realign a portion of this tributary branch to a location north of the New East-West Road. A structure will be required where the realigned creek crosses the proposed new road, just west of Centre Road. It is proposed to install a new 6 m wide by 2.2 m high concrete box culvert at this location. Please refer to *Figure 6-3B* for a preliminary general arrangement of this culvert.

The design criteria used for this crossing is as follows:

- Design Event = 50 year
- Design Flow = $2.43 \text{ m}^3/\text{s}$
- Minimum freeboard to underside of structure = 0.3 m (1 m CHBDC)

The proposed design passes the 50 year event and there is no overtopping of the road during the Regional storm event. The proposed design flow complies with the design criteria and a free board of approximately $0.34 \text{ m} \pm$ is provided to the underside of the structure. The invert for the structure is set 0.5 m below the low flow channel invert. Flow velocities will be less than 0.5 m/s for the design storm event and greater than 1 m/s for the Regional storm event.

Grindstone Creek Main Branch Crossing

This watercourse traverses Parkside Drive just west of the existing CP Rail line crossing. The existing structure has a 6 m span and accommodates two lanes of traffic. A separate pedestrian structure has been constructed on the south side adjacent to the bridge. It is proposed to raise the road at this location and replace both structures with a new 14 m span bridge that will accommodate 4 lanes of traffic, bicycle lanes, and sidewalks. Please refer to *Figure 6-4A* for a preliminary general



Exhibit 6-4: Existing Grindstone Creek at Parkside Drive (Upstream Face)



Exhibit 6-5: Existing Grindstone Creek at Parkside Drive (Downstream Face)

arrangement of this bridge. *Exhibit 6-4* and *Exhibit 6-5* illustrate the conditions upstream and downstream of this crossing.

The design criteria used for this crossing is as follows:

- Design Event = 100 year
- Design Flow = 32.0 m³/s
- Minimum freeboard to underside of structure = 0.8 m (1 m CHBDC)

The proposed design passes the 100 year event with some overtopping of the road during the Regional storm event. The proposed design flow complies with the design criteria and a freeboard of approximately 0.83 m ± is provided to the underside of the structure. Proposed abutments are located outside the limits of the low flow channel invert.

It is noted that upstream and at the structure, flow velocities will be greater than 3.8 m/s during the design and Regional storm events. These projected high velocities should be addressed at the detailed design stage of the project.

Grindstone Creek Tributary Branch Crossing

This watercourse crosses Dundas Street just east of the proposed new Upcountry link. The existing structure is an open bottom concrete culvert with dimensions of 3.05 m (span) by 1.52 m (rise). It is proposed to replace this culvert with a new 6 m wide by 2.2 m high open bottom concrete culvert. Please refer to *Figure 6-4B* for a preliminary general arrangement of this culvert.

The design criteria used for this crossing is as follows:

- Design Event = 50 year
- Design Flow = 12.9 m³/s
- Minimum freeboard to underside of structure = 0.3 m (1 m CHBDC)

The proposed design passes the 50 year event and there is no overtopping of the road during the Regional storm event. The proposed design flow complies with the design criteria and a free board of approximately 0.62 m ± is provided to the underside of the structure. The invert for the structure is set 0.5 m below the low flow channel invert.

It is noted that flow velocities will be greater than 2.5 m/s during the design storm event and greater than 4.0 m/s during the Regional storm event. These projected high velocities should be addressed at the detailed design stage of the project.

Pedestrian Underpass Crossing

The proposed road alignment crosses an existing wetland trail that extends from Parkside Drive into Joe Sam's Park. As a result, a new pedestrian structure is required to maintain trail connectivity. It is proposed to install a new 5.4 m wide by 2.9 m high concrete tunnel

crossing at this location. The proposed vertical alignment ensures that adequate vertical clearance is provided above the existing ground at this location to allow draining of the tunnel through conventional means (i.e. no pumping station required).

As the intent of the tunnel is to accommodate pedestrians, it is proposed that internal illumination be provided for the full length of the structure. For the structure location, as well as additional details regarding the proposed pathway realignment, please refer to the E-W Road Plate 6A at the end of this report.

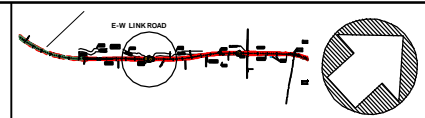
Retaining Walls

Retaining walls are recommended on the south side of Parkside Drive from station 50+180 to 50+300 in order to minimize grading impacts to the adjacent properties. The average height of wall at this location is approximately 2.6 m.

Retaining walls are also required on Dundas Street at the following locations to minimize property impacts:

- Station 10+980 to station 11+120, on the south side of the road. Average wall height at this location is approximately 3.6 m.
- Station 11+200 to station 11+480, on the north side of the road. Average height of wall at this location is approximately 1.2 m.
- Station 11+360 to station 11+540, on the south side of the road. Average height of wall at this location is approximately 2.6 m.

Additional retaining walls will be required on the west side of Brant Street/Cedar Springs Drive to reduce property impacts. These walls are necessary to contain the proposed grading within the existing right-of-way allowance. It is noted that south of Dundas Street, Brant Street is in high fill (approximately 7 m). The average wall height at this location is approximately 1.2 m. North of Dundas Street, Cedar Springs Road is in a cut condition. The average height of wall at this location is approximately 1.6 m.



KEY PLAN

GENERAL NOTES

- CLASS OF CONCRETE 30 MPa**
- CLEAR COVER TO REINFORCING STEEL**
 DECK TOP 70±20
 BOTTOM 40±10
 REMAINDER 70±20 UNLESS OTHERWISE NOTED.
- REINFORCING STEEL**
 REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED. BAR MARKS WITH THE PREFIX 'C' DENOTE COATED BARS. UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS 'B'.

CONSTRUCTION NOTES

- SEE ROADWAY DRAWINGS FOR CONSTRUCTION STAGING.

LIST OF DRAWINGS

S-1 GENERAL ARRANGEMENT

APPLICABLE STANDARD DRAWINGS

LEGEND

- PROPOSED ROW
- - - - - PROPOSED GRADING LIMIT



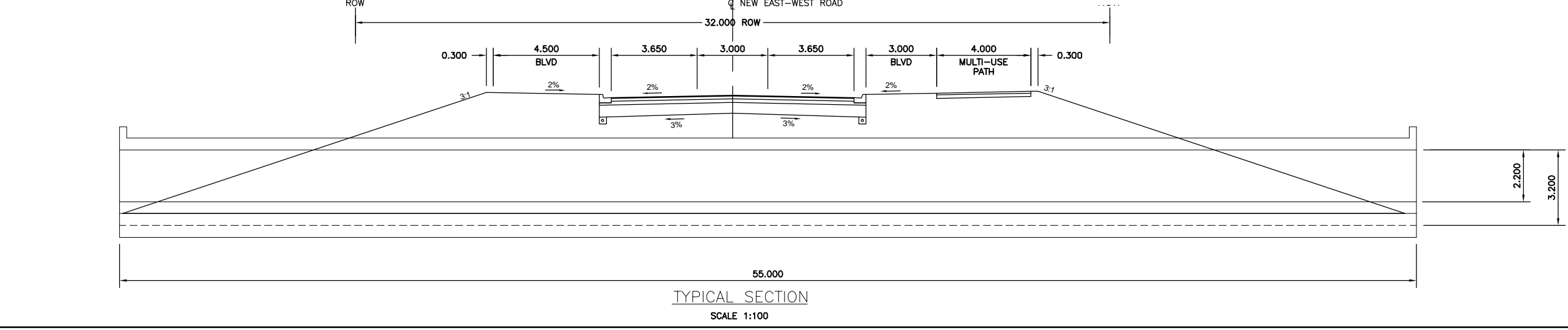
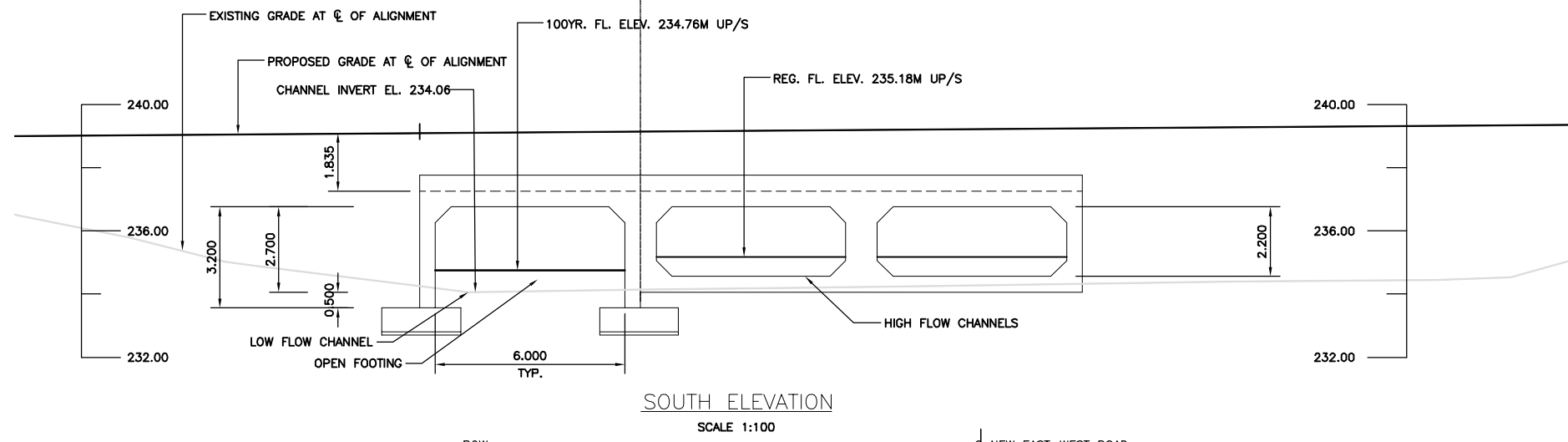
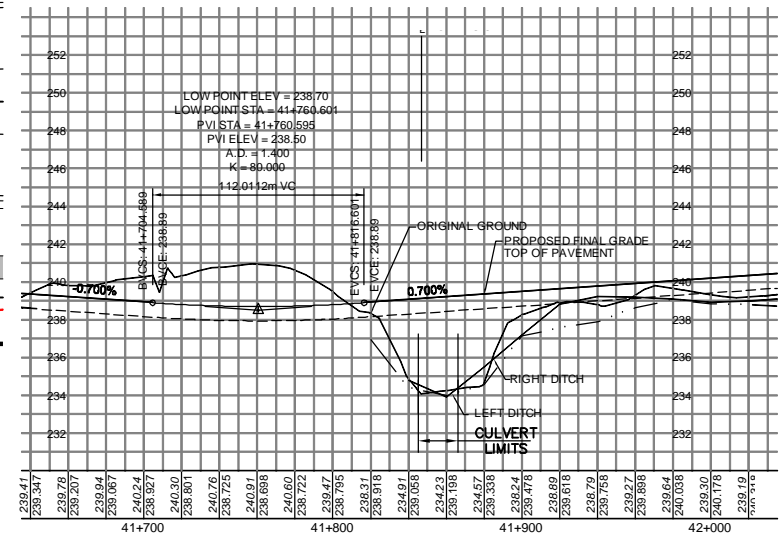
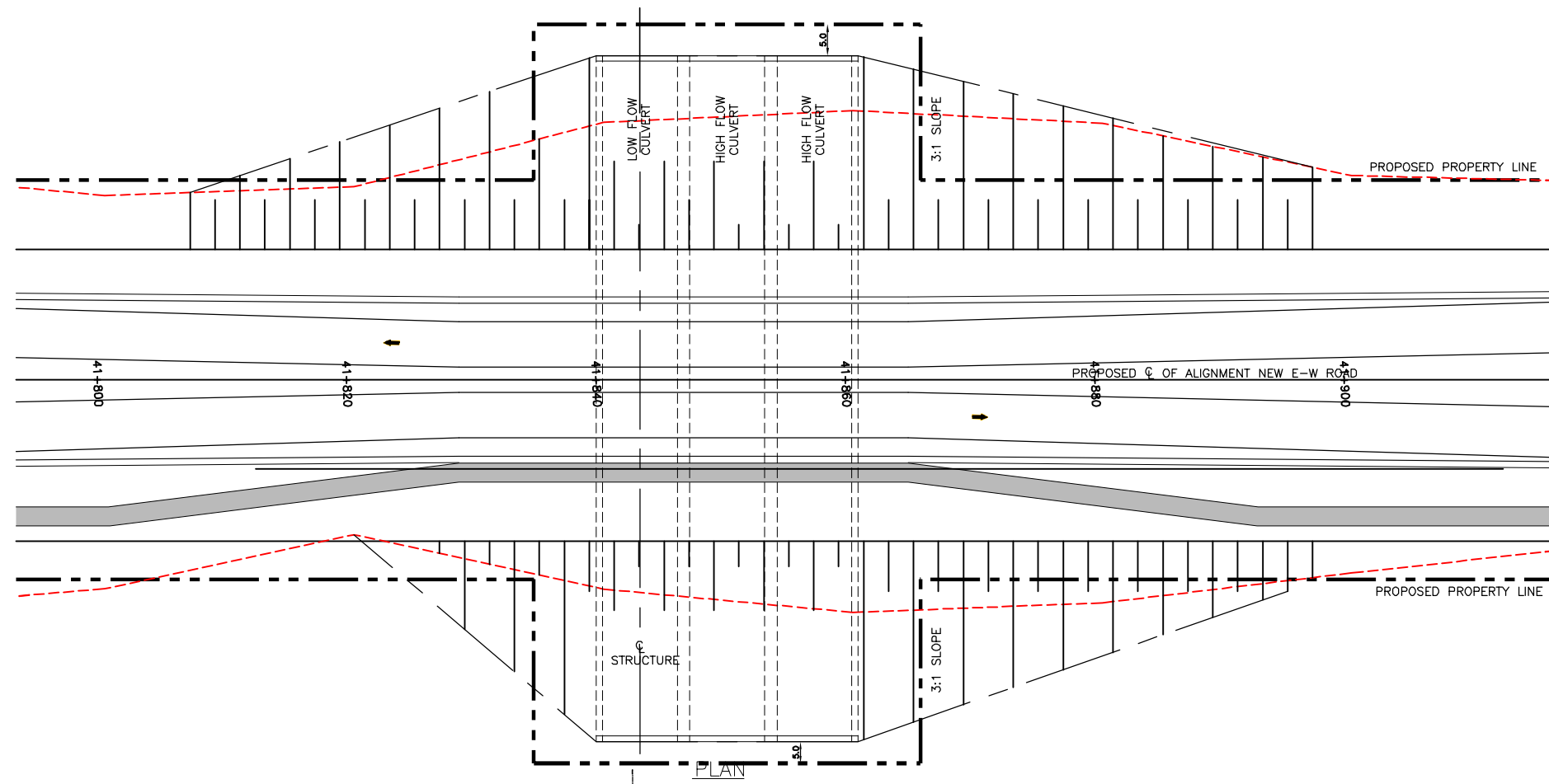
**PREFERRED DESIGN
BORERS CREEK CROSSING 1
GENERAL ARRANGEMENT**

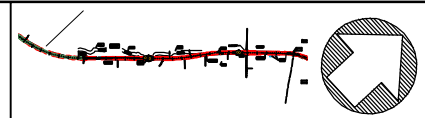
DILLON CONSULTING

NEW E-W ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HWY 6 TO BRANT STREET

CHECKED BY: AMS
 DESIGN BY: JDM
 DRAWN BY: JDM / AMS
 SCALE: AS SHOWN
 DATE: OCTOBER 2008
 PROJECT No. 08-0020

FIGURE 6-3A





KEY PLAN

GENERAL NOTES

- CLASS OF CONCRETE 30 MPa**
- CLEAR COVER TO REINFORCING STEEL**
 DECK TOP 70±20
 BOTTOM 40±10
 REMAINDER 70±20 UNLESS OTHERWISE NOTED.
- REINFORCING STEEL**
 REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED.
 BAR MARKS WITH THE PREFIX 'C' DENOTE COATED BARS.
 UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS 'B'.

CONSTRUCTION NOTES

- SEE ROADWAY DRAWINGS FOR CONSTRUCTION STAGING.

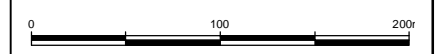
LIST OF DRAWINGS

S-1 GENERAL ARRANGEMENT

APPLICABLE STANDARD DRAWINGS

LEGEND

- PROPOSED ROW
- - - - PROPOSED GRADING LIMIT



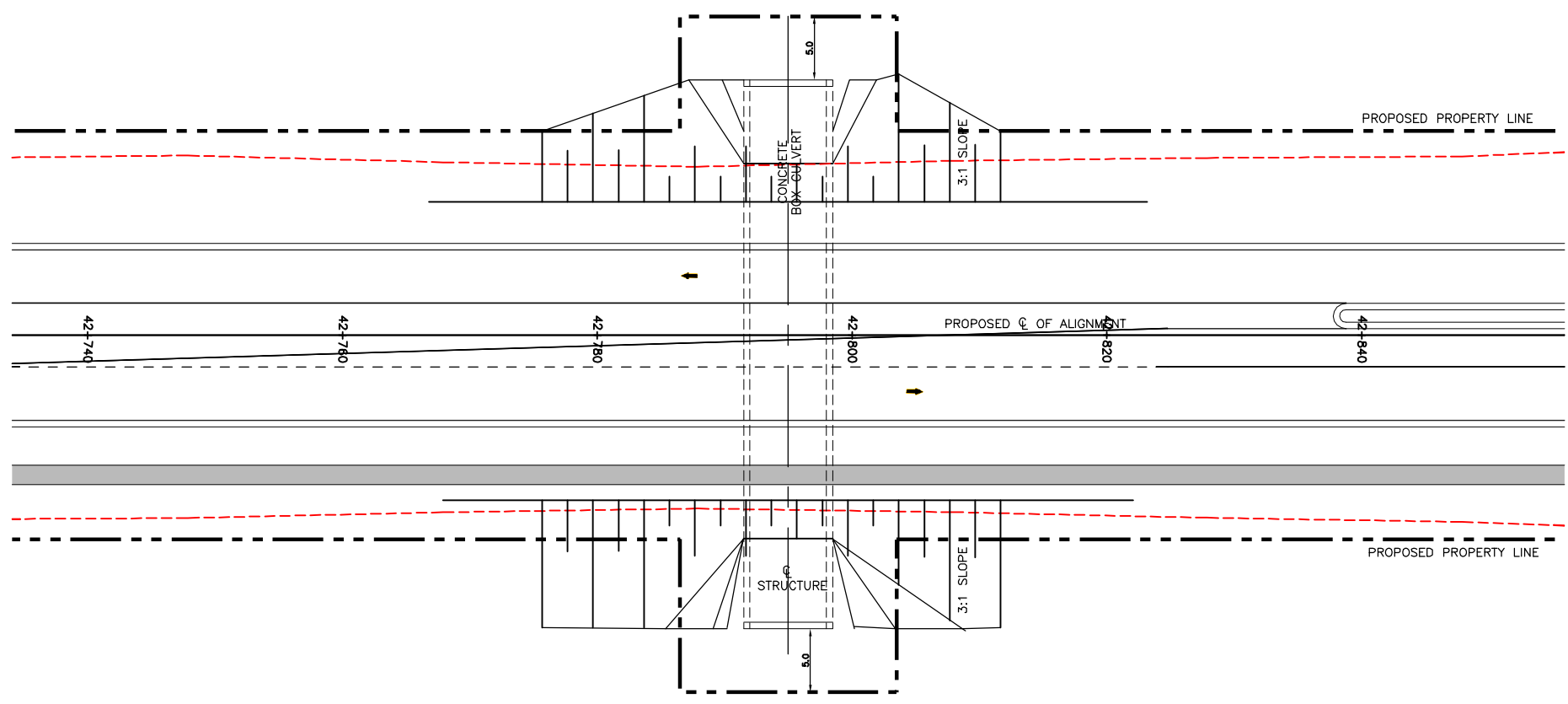
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BORERS CREEK CROSSING 2
GENERAL ARRANGEMENT**

DILLON CONSULTING

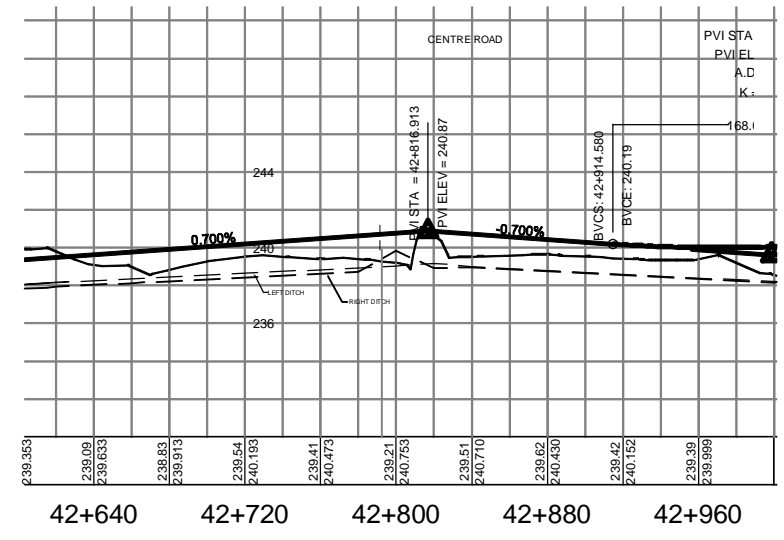
NEW E-W ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HWY 6 TO BRANT STREET

CHECKED BY: AMS
 DESIGN BY: JDM
 DRAWN BY: JDM / AMS
 SCALE: AS SHOWN
 DATE: OCTOBER 2008
 PROJECT No. 08-9020

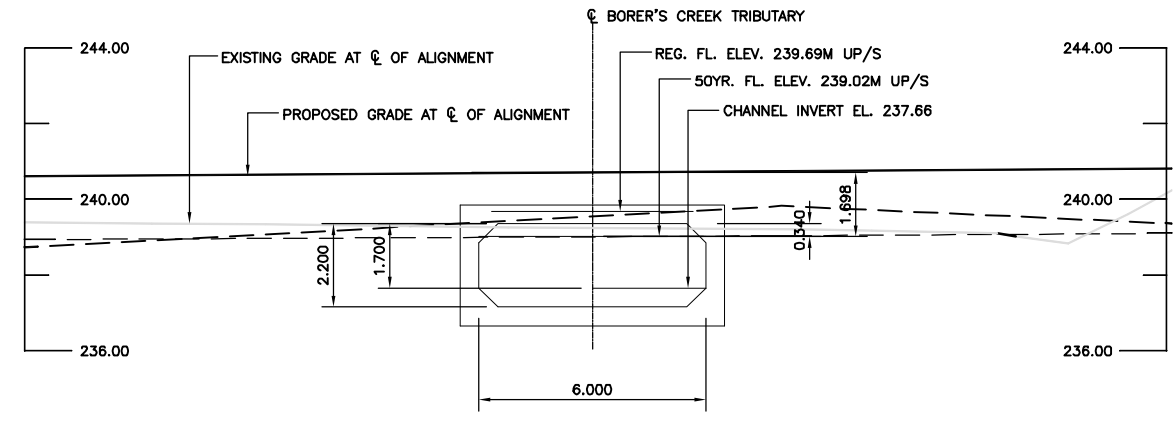
FIGURE 6-3B



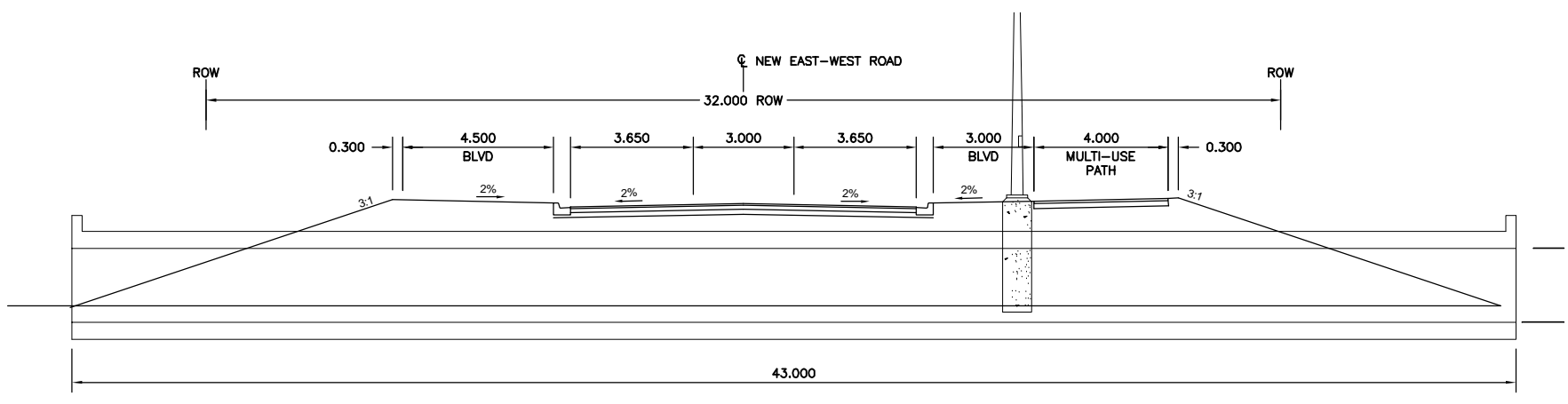
PLAN
SCALE 1:250



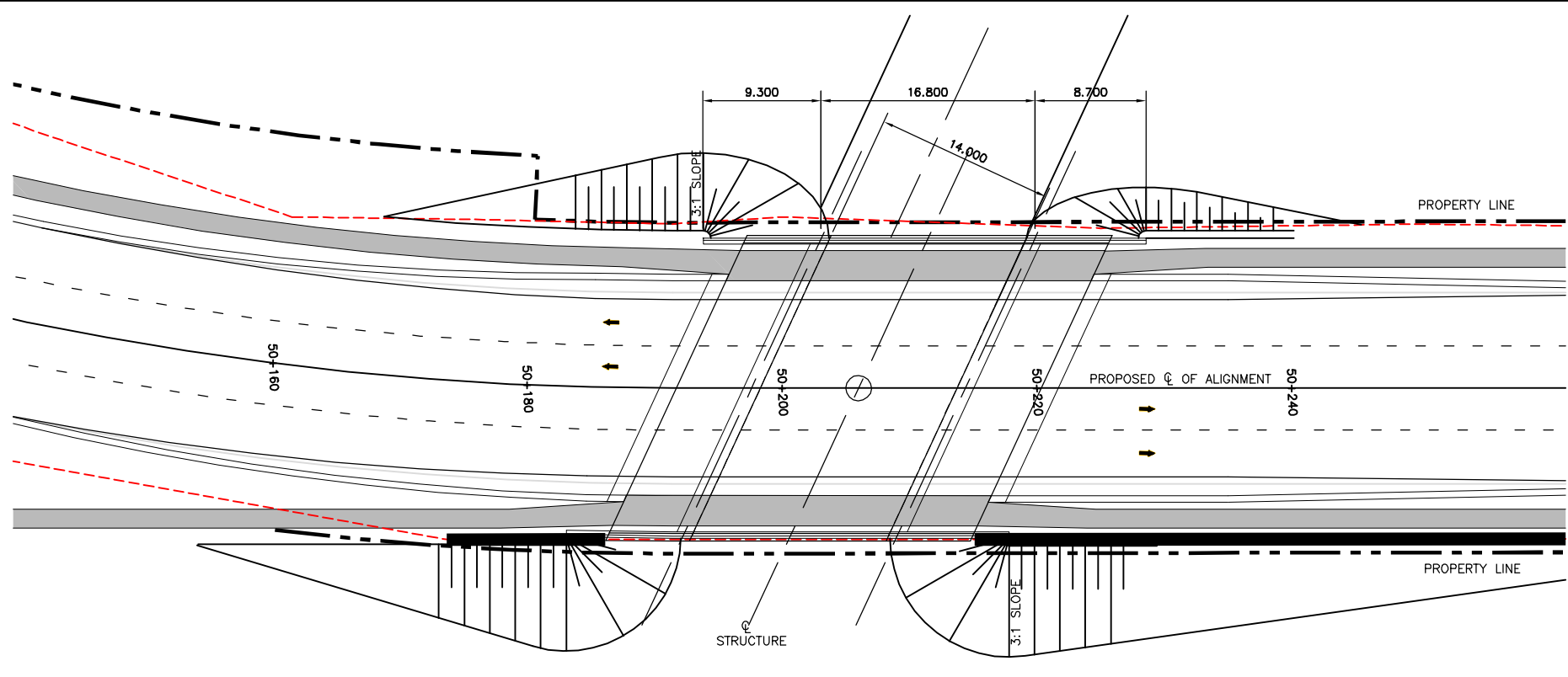
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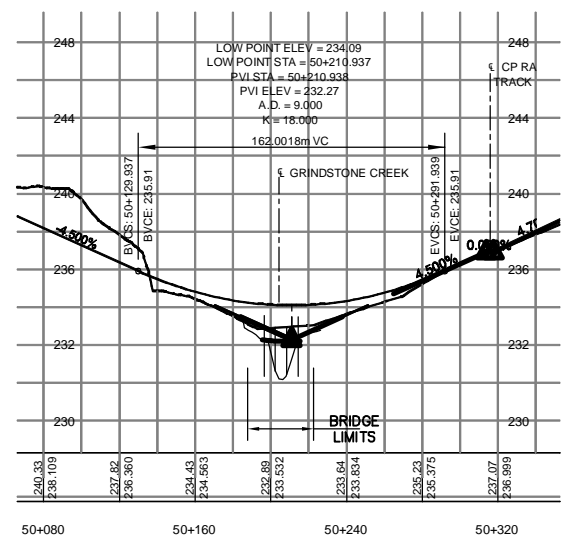
SOUTH ELEVATION
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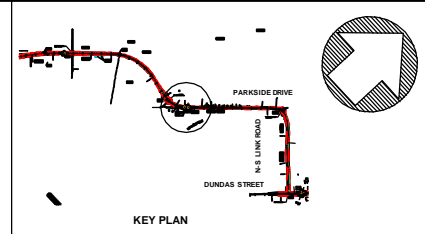
TYPICAL SECTION
SCALE 1:100



PLAN
SCALE 1:250



PROFILE
SCALE NTS



GENERAL NOTES

- CLASS OF CONCRETE 30 MPa**
- CLEAR COVER TO REINFORCING STEEL**
DECK TOP 70±20
BOTTOM 40±10
REMAINDER 70±20 UNLESS OTHERWISE NOTED.
- REINFORCING STEEL**
REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED.
BAR MARKS WITH THE PREFIX 'C' DENOTE COATED BARS.
UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS 'B'.

CONSTRUCTION NOTES

- SEE ROADWAY DRAWINGS FOR CONSTRUCTION STAGING.

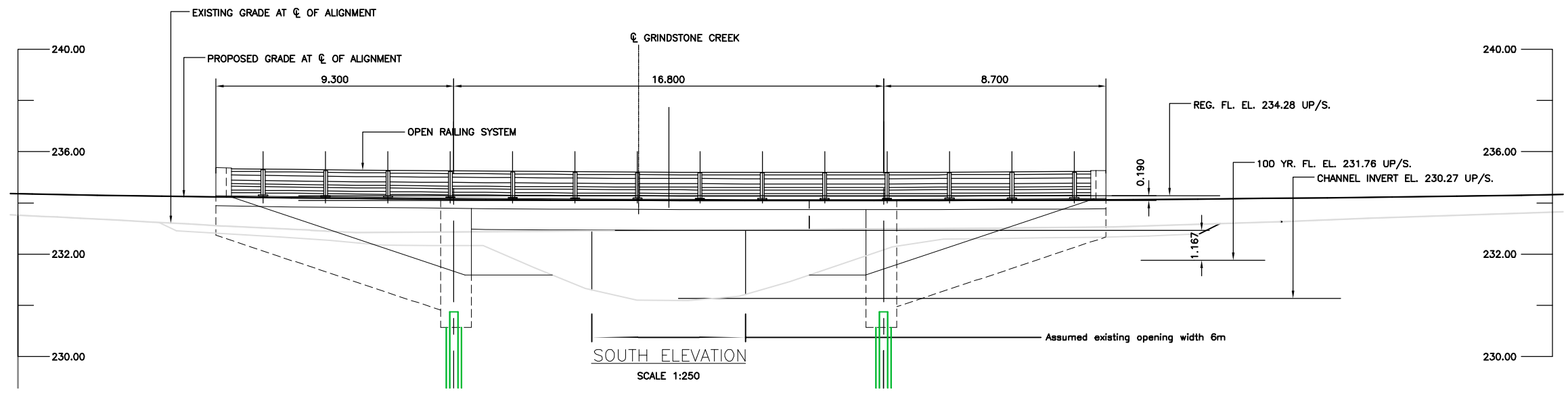
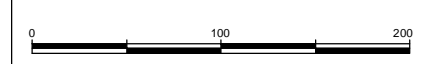
LIST OF DRAWINGS

S-1 GENERAL ARRANGEMENT

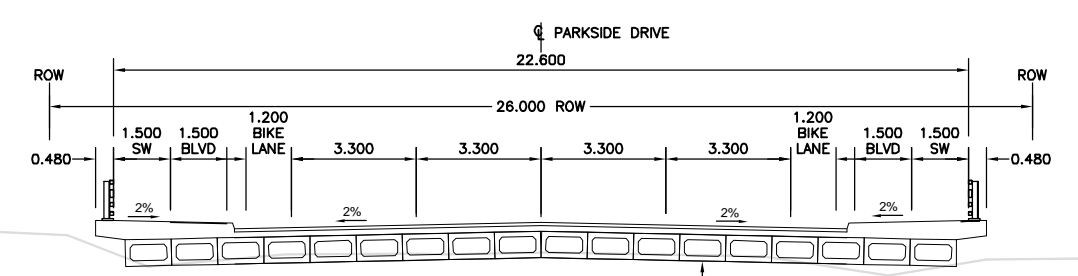
APPLICABLE STANDARD DRAWINGS

LEGEND

- PROPOSED ROW
- - - PROPOSED GRADING LIMIT



SOUTH ELEVATION
SCALE 1:250



TYPICAL SECTION
SCALE 1:100

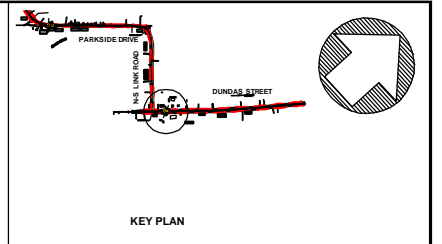
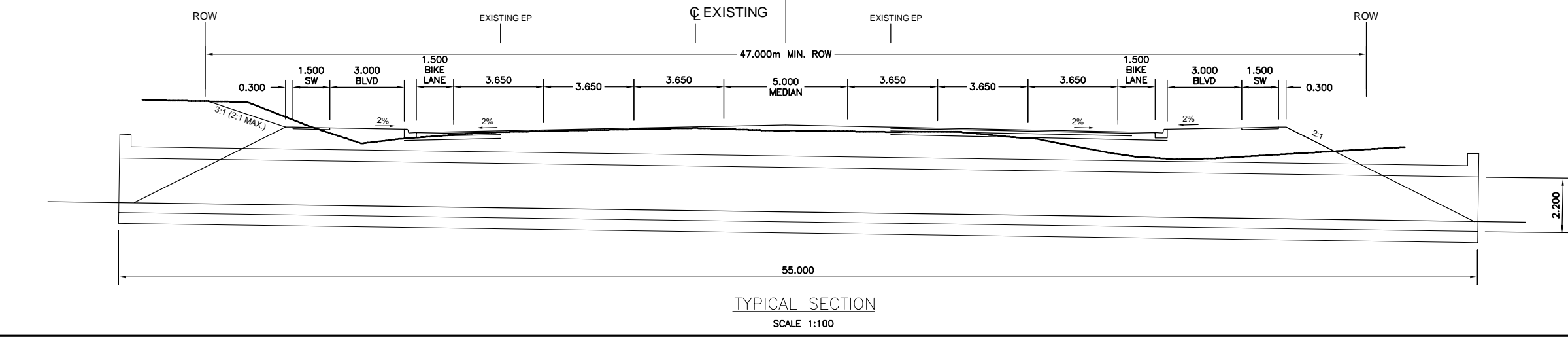
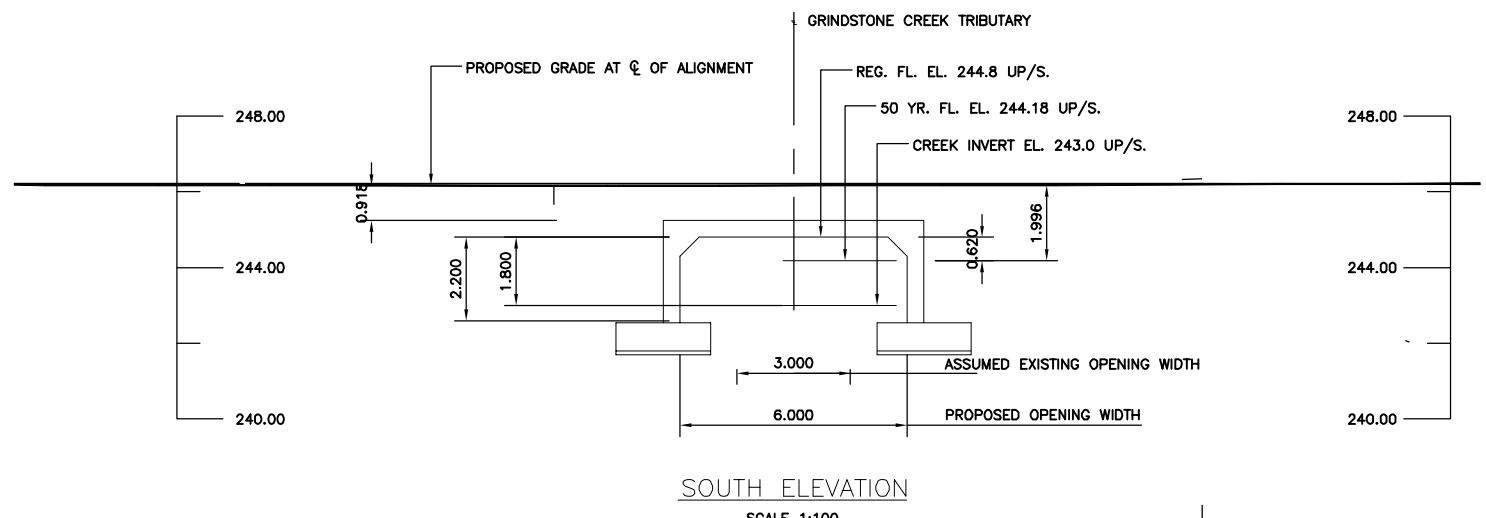
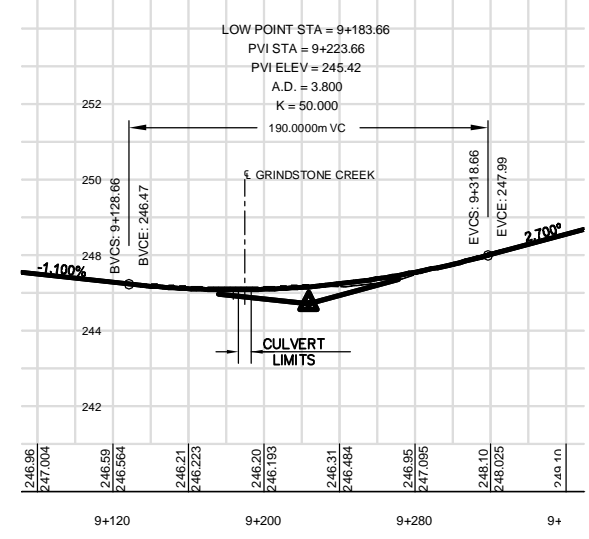
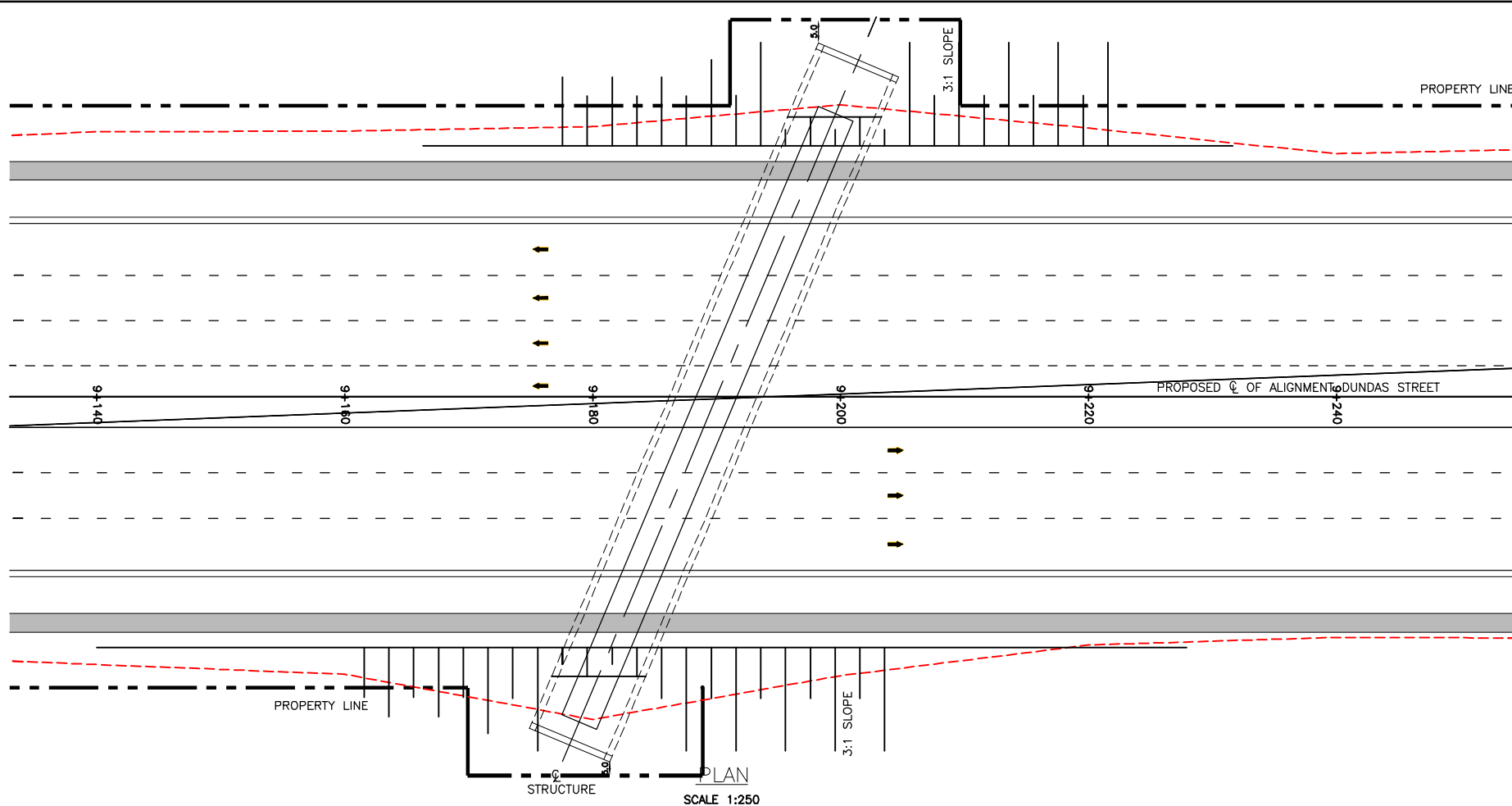
Hamilton Public Works
Halton REGION

**PREFERRED DESIGN
GRINDSTONE CK. CROSSING
GENERAL ARRANGEMENT**

DILLON CONSULTING
NEW E-W ROAD CLASS ENVIRONMENTAL ASSESSMENT HWY 6 TO BRANT STREET

CHECKED BY: AMS
DESIGN BY: JDM
DRAWN BY: JDM / AMS
SCALE: AS SHOWN
DATE: OCTOBER 2008
PROJECT No. 08-020

FIGURE 6-4A

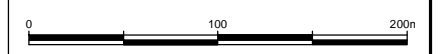


- GENERAL NOTES**
- CLASS OF CONCRETE 30 MPa**
 - CLEAR COVER TO REINFORCING STEEL**
DECK TOP 70±20
BOTTOM 40±10
REMAINDER 70±20 UNLESS OTHERWISE NOTED.
 - REINFORCING STEEL**
REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED. BAR MARKS WITH THE PREFIX 'C' DENOTE COATED BARS. UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS 'B'.

- CONSTRUCTION NOTES**
- SEE ROADWAY DRAWINGS FOR CONSTRUCTION STAGING.

- LIST OF DRAWINGS**
- S-1 GENERAL ARRANGEMENT
- APPLICABLE STANDARD DRAWINGS**

- LEGEND**
- PROPOSED ROW
 - PROPOSED GRADING LIMIT



Hamilton Public Works

Halton REGION

PREFERRED DESIGN
GRINDSTONE CK. TRIBUTARY CROSSING 2
GENERAL ARRANGEMENT

DILLON CONSULTING

NEW E-W ROAD CLASS ENVIRONMENTAL ASSESSMENT HWY 6 TO BRANT STREET

CHECKED BY: AMS
DESIGN BY: JDM
DRAWN BY: JDM/AMS
SCALE: AS SHOWN
DATE: OCTOBER 2008
PROJECT No. 08-9200

FIGURE 6-4B

6.3.6 Utilities

Utilities identified as part of this study are shown on the Preliminary Design plates provided at the end of this report. Several underground and above ground utilities will be impacted as a result of this project. The assessment of utility relocation requirements has been initiated; however, it is recommended that all utility companies be contacted early in the detailed design phase to confirm locates and establish relocation strategies.

HORIZON UTILITIES CORPORATION

Horizon Utilities own and operate aerial wood pole lines along the south side of Parkside Drive, along the south side of Dundas Street and along the east side of Highway 6. The poles on Parkside Drive and Dundas Street will be in conflict with the proposed works and will require relocation. Poles on Highway 6 in the vicinity of the New East-West Road will also be in conflict due to the addition of a right-turn lane at this location.

It is recommended that the pole line on Parkside Drive be relocated to the north side of the road since there is no allowance for a boulevard on the south side, east of Boulding Avenue. Landscaping work will need to be coordinated with Horizon to ensure proposed plantings are not in conflict with their lines.

Conflicts with the poles on the south side of Dundas Street and on the east side of Highway 6 are due to grading and it is expected that these pole lines can be relocated within the new road allowance. This should be confirmed with Horizon Utilities during the detailed design phase.

BURLINGTON HYDRO

Burlington Hydro own an existing hydro line on the south side of Dundas Street east of Kerns Road. This line will be in conflict with the proposed works and will require relocation.

BELL CANADA

Bell currently runs an aerial wood pole line on the north side of Parkside Drive. This line will be in conflict with the proposed works and will require relocation. Bell should be further contacted at the detailed design stage to explore the possibility of running their relocated aerial line as a tenant on the new Horizon Utilities hydro poles. Bell also owns and operates several buried cable and conduit lines along Parkside Drive. It is recommended that test pits be conducted during detailed design to identify potential conflicts.

Bell also owns an aerial line mounted on hydro poles on the south side of Dundas Street throughout the project limits. This line will be in conflict with the proposed design and will require relocation once hydro's new pole line has been installed. A pole line on the east side of Brant Street is not expected to be impacted by the proposed works at that location.

UNION GAS

An underground gas main is located on the south side of Parkside Drive from the west project limit to just east of the CP Rail line, after which point it continues east on the north side of Parkside Drive to just east of Robson Road. At some locations, the existing gas main will be located under the proposed widened roadway and relocation may be required.

Union Gas also owns an underground line along Dundas Street, on the north side of the road. This line terminates east of Evans Road. It is recommended that Union Gas be contacted and test pits be conducted during detailed design to identify potential conflicts and relocation strategies.

An underground gas main is also located on the west side of Highway 6 within the project limits. As the widening will be confined to adding a right-turn lane on the east side, it is expected that this line will be impacted; however, this should be confirmed at the design stage.

HYDRO ONE NETWORKS INC.

Hydro One owns and operates a large overhead hydro tower line that crosses the New East-West Road Corridor immediately east of the Centre Road Woodlot. The original ground elevation has been maintained at the crossing location; however, Hydro One should be further contacted at the design stage to ensure all potential conflicts have been resolved with the proposed road configuration.

IMPERIAL OIL AND SUN-CANADIAN PIPELINES

These companies own and operate underground north-south gas mains that cross the New East-West Road Corridor at approximately station 41+040. Although the proposed grading and ditching are not anticipated to impact this pipe, it is recommended that test pits be conducted during detailed design to confirm this.

COGECO CABLE

Cogeco owns and operates an aerial cable line on the south side of Parkside Drive as tenants on the existing Horizon Utilities pole line. This line will need to be moved as the hydro poles are relocated throughout.

Along Dundas Street, Cogeco operates an aerial cable line on the south side of the road as tenants on the existing Horizon Utilities pole line. This line also requires relocation as a result of the hydro line itself being relocated. Coordination between Cogeco and the hydro companies will be required during detailed design to ensure that the hydro design also suits Cogeco.

ROGERS COMMUNICATIONS INC.

Rogers confirmed that they do not have any existing or proposed plant within the study area and did not request to remain on the project mailing list.

TELUS

Telus confirmed that they do not have any existing or proposed plant within the study area and did not request to remain in the project mailing list.

TRANS NORTHERN PIPELINE

Trans Northern confirmed that they do not have any existing or proposed plant within the study area and did not request to remain in the project mailing list.

STORM SEWERS

A new storm sewer system is recommended for much of the proposed works. Through the Waterdown North subdivision lands, new storm sewers should be designed to City of Hamilton standards and will outlet into the new development ponds. This work will need to be coordinated with adjacent developers as part of the detailed design.

A new storm sewer system is also recommended along Parkside Drive. These sewers will also be designed to City of Hamilton standards and will outlet at Grindstone Creek. Through Upcountry Estates, a sewer system is proposed to contain drainage from the west side of the road (east side will be rural). It is expected that this runoff will be outlet to the stormwater management pond that is part of the Upcountry development.

Along Dundas Street, a new storm sewer system is proposed to be installed. From Kerns Road westerly, this new system should be designed to City of Hamilton sewer standards. From Kerns Road easterly, the system should be designed to Halton Region standards. It is proposed that the storm sewer currently in place on Dundas Street from approximately station 10+960 to east of Brant Street, will remain in place and operational. All catchbasins and leads will have to be reconstructed as a result of the widening. During detailed design, the capacity of this system should be confirmed to ensure that the system can handle the additional runoff.

SANITARY SEWERS

No sanitary sewers were within the project study limits. Throughout the course of this study there has been no request to include a sanitary sewer system as part of the proposed undertaking; however, this should be confirmed with the City of Hamilton/Halton Region at the detailed design phase of the project. There may be some local sanitary sewer installation along Dundas Street to provide drainage for portions of the Waterdown South development.

WATERMAINS

There is an existing 400 mm diameter trunk watermain on Parkside Drive, from east of Grindstone Creek to the Upcountry Estates development. This main does not currently provide water supply to area residents. The possibility of installing a new watermain to service local residents in this area should be further explored at the detailed design stage provided it meets the requirements of the Greenbelt Plan and complies with the cost recovery provisions of the Municipal Act. This trunk may be extended westerly to the proposed South Waterdown elevated reservoir and to provide local distribution system looping associated with the development of the Waterdown South Secondary Plan lands.

As part of the Waterdown North development, it is proposed to install new 300 mm and 400 mm diameter watermains along the New East-West Road right-of-way (400 mm in the vicinity of Borer's Creek only, 300 mm elsewhere).

No watermains have been identified along Dundas Street as part of this study. However, it is recommended that the appropriate departments at the City of Hamilton, Halton Region, and City of Burlington be contacted again during detailed design phase to confirm the absence of watermains as well as to ensure that no plans for future watermains along this corridor are proposed.

In addition, all watermain work should be carefully coordinated with Horizon Utilities to ensure that relocated poles will not be in conflict with either existing or relocated watermains.

6.3.7 Landscaping/Streetscaping

The MBTW Group was selected by the City of Hamilton to provide both landscape and streetscape recommendations for the preferred design concept. Acknowledging that the construction of the New East-West Road Corridor will result in repercussions on both the natural and built landscape environment, one of the principle purposes was to provide recommendations that would serve to both mitigate the impacts of the construction of the New East-West Road Corridor and also serve to enhance the corridor itself.

The development of a comprehensive streetscape system is integral to the development of the overall Waterdown community and essential in the creation of 'sense of place' and belonging. Streetscapes communicate image and character and directly affect the daily experience of residents. The design of the streetscape is based on the recognition that it forms a major component of the public domain. The streetscape for the new East-West Road Corridor has been designed and developed to ensure that the streetscape is attractive, walkable, and appropriately scaled so that it is human-scaled, and promotes social interaction and safety. The Design Objectives of a well designed streetscape are:

- To be visually attractive.

- Express and reinforce the role of the street within the New East-West Road Corridor and the adjacent Community Structure.
- Enhance special community features such as green connector roads and scenic drives.
- Promote an urban relationship between built form and public space.
- Achieve a pedestrian-scale environment for the public domain.
- Promote social interaction.
- Establish a level of landscaping and paving as part of the streetscape that is appropriate to the role and importance of the particular section of road within the overall New East-West Road Corridor.
- To mitigate the impact of the construction of the new expanded East-West Road Corridor upon both the natural and existing built environment.
- To create a safe and secure environment for the streetscape within the public domain.
- To enhance the character and identity of the community through landscape components such as street trees, street lighting, seating, and signage.

VISION

The New East-West Road Corridor traverses an incredibly diverse area that is characterized by agricultural lands, a large-scale commercial nursery operation, both rural residential and more urbanized residential neighbourhoods, areas both under construction as well as areas that are designated as future residential neighbourhood communities, in addition to areas of natural habitat; including Provincially Significant Wetlands (PSW) and Environmentally Sensitive Areas (ESA). The landscape vision for the new corridor includes the following objectives:

- To create a safe, visually attractive and pedestrian oriented expanded vehicular corridor with a well-connected street pattern, enhanced by a system of street trees and other vegetation as well as other landscape/streetscape elements that contribute to the landscape language that will identify the new Corridor;
- To preserve and enhance natural areas, wetlands and significant woodlots and create access and views to these amenities;
- To ensure that the special open space and natural features are enhanced with landscaping and are recognized through visual and pedestrian access such as the Bruce trail where appropriate;
- To enhance the sense of community and neighbourhood throughout the entire New East-West Road Corridor;
- To create a unified and cohesive streetscape that serves to enhance 'sense of place' surrounded by natural features for all existing and future residents.

INTENT

The intent of the overall landscape design for the new corridor was to specifically design not only a serviceable transportation route that

accommodated the anticipated traffic volumes but also to create a scenic thoroughfare that's enhanced with both naturalized and manicured landscaping of both the boulevards and where applicable, expanded road medians. The intent was to also integrate pedestrian access and traffic and enhance the setting of this new or enlarged roadway.

The general intent was to create a continuous landscape character for the New East-West Road Corridor that would act to unify the entire length of the corridor and would assist in creating a 'sense of place.' Signature or iconic features such as light poles, banners, signature planting as well as streetscape planting, street furniture all contribute to creating a sense of community, wholeness and belonging.

STREETSCAPE ELEMENTS

Multi-use Pathways and Trails

- Multi-use pathways should be integrated into the public realm streetscape where possible as these paths provide opportunities to integrate pedestrians in a friendly and safe environment (for an example, refer to *Exhibit 6-6*).
- These multi-use pathways or trails would include wheelchair accessibility that would also allow bikes, roller blades, and strollers to access the community in a safe manner, separate from the road traffic.
- These pathways would be illuminated by lower height, more pedestrian friendly light fixtures designed to illuminate the pathway surfaces (not just the roadway). As a design principle throughout the Corridor, all street lighting poles incorporate two fixtures to illuminate the roadway as well as pedestrian scaled luminaires intended to illuminate these pathways (refer to Street Lighting and Solar Powered Lighting sections for further information regarding lighting and illumination of walkways).
- Throughout the Corridor these multi-use pathways or trails act as a continuous system of linkages to the greater Open Space Network. Parks serve as the focal point for neighbourhoods with frontages on neighbourhood streets and access to internal streets. These pathways and trails serve to link the parks to the street, streetscape and community as a whole (for an example, refer to *Exhibit 6-7*).
- These multi-use pathways and trails provide community access into the natural environment through the pedestrian/bikeway pathway systems including the existing woodlots, wetlands, creeks and District Parks such as Joe Sams Park.
- Multi-use pathways and trails enhance the visual appeal of the community.
- Multi-use pathways and trails provide a variety of social and recreational opportunities for residents to interact.



Exhibit 6-6: Example of Multi-Use Path/trail in a Community Context



Exhibit 6-7: Example of Multi-Use Path/trail in an Open Space Context

Site Furniture

- Throughout the corridor, repetitive streetscape elements such as similar light fixtures - both road and pedestrian scale are integrated with the streetscape.
- In addition street furniture such as banners and hanging flower baskets could be incorporated onto the light poles to create identifiable streetscape features (for an example, refer to *Exhibit 6-8*).
- Other opportunities for street furniture such as benches, waste receptacles and bike racks are limited. If additional locations are identified, the features should be of a similar design to act as unifying elements.

Street Lighting

- Street lighting will be consistently designed and will provide for appropriate functionality.
- The location of streetlights is coordinated with the location of streetscape elements.
- Streetlights should also be located to light open spaces and community mailbox locations.
- Streetlight fixtures shall be located and designed in accordance with City of Hamilton and Halton Region standards.
- Similar styled iconic light standards should be used throughout the East-West Road for continuity and will be used to both identify and unify the entire corridor (refer to *Exhibit 6-9*).
- Streetlights may incorporate both luminaires intended to illuminate the roadway as well as specially oriented pedestrian scale luminaires or light fixtures, intended to illuminate the multi-use paths where pedestrian activities warrant such measures.
- These iconic street poles will incorporate elements such as decorative banners and flower baskets where applicable to unify and add character to the streetscape.
- The street light poles that will be used along the New East-West Road Corridor will be as per the City of Hamilton and Halton Region standards.

Solar Powered Lighting

- In areas where servicing may be problematic due to limited access and distance from transformers and municipal power sources, the possibility of integrating and incorporating solar powered LED fixtures is an interesting alternative (refer to *Exhibit 6-10*).
- Solar powered lights may also reduce disturbance to the natural environment as the lights function and operate independently and do not require conduits or connections to external power supplies.
- This solar powered alternative may be a realistic option in achieving desired pedestrian lighting levels along with



Exhibit 6-8: Example of hanging baskets

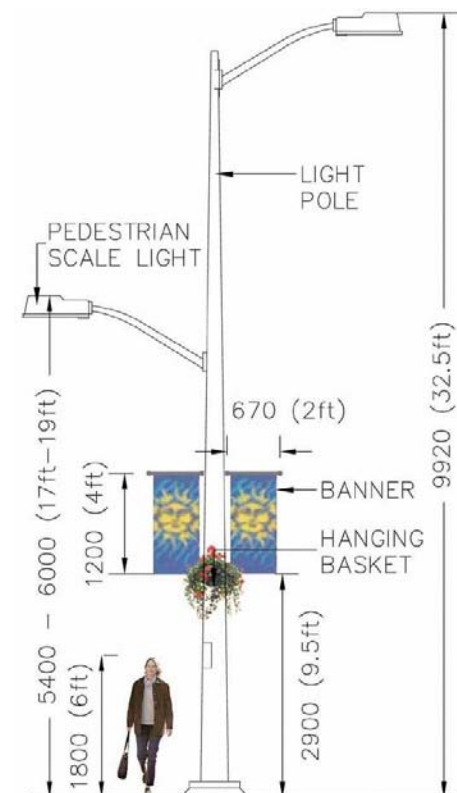


Exhibit 6-9: Example of iconic light standards for East-West Road Corridor

supporting CPTED (Crime Prevention Through Environmental Design) principles. CPTED is a multi-disciplinary approach to deterring criminal behaviour through environmental design. It is a proactive crime prevention strategy utilized by landscape architects, architects, urban planners, police services, security professionals and everyday users of space. CPTED contends that through proper environmental design the built environment can contribute to a reduction in the incidence of crime as well as the fear of crime and resulting in improved quality of life of individuals. CPTED principles emphasize the physical environment, the use of space and built elements, and natural human behaviour to create environments that are absent of “environmental cues” that cause opportunities for crime to occur. These “environmental cues” may be as basic as a well-lit space deterring criminal activity. Therefore the inclusion of physical features or elements such as the solar powered pedestrian lights along the new pedestrian pathways in the natural habitat and woodlot areas, enhance the opportunities for natural surveillance, one of the four principles of CPTED. Natural surveillance involves the placement of physical features and/or activities/people that maximizes natural visibility or observation. It is the "see and be seen" mentality. A person is far less likely to commit a crime if they think someone will see them do it. Furthermore, a person is less likely to walk into a dangerous situation if they can see what is up ahead. An individual when walking down a path needs to see not only the surface of the walkway for safety reasons but also be able to observe the periphery of the path for security reasons. Lighting levels must be provided not only for safety and security but also sufficient to determine facial features of individuals to act as a deterrent to potential criminal activity.

Utilities

- Utility structures such as hydro, telecommunications and cable boxes within the new subdivisions should be addressed in the preliminary stages of development in order to avoid negative streetscape impacts.
- Prior to approval of the development, all interested utilities and telecommunication providers shall be consulted to determine appropriate locations for large utility equipment and utility cluster sites, as required.
- The location of all utility structures shall be coordinated and located per road right-of-way cross-sections with the City of Hamilton and/or may also be located on other lands within easements.
- Alternative methods of containing utility services on or within streetscape features, such as street light poles that accommodate multiple utilities should be encouraged to reduce street clutter.
- Utilities should be located away from highly visible areas.
- Utilities should be visually screened with landscaping where possible.

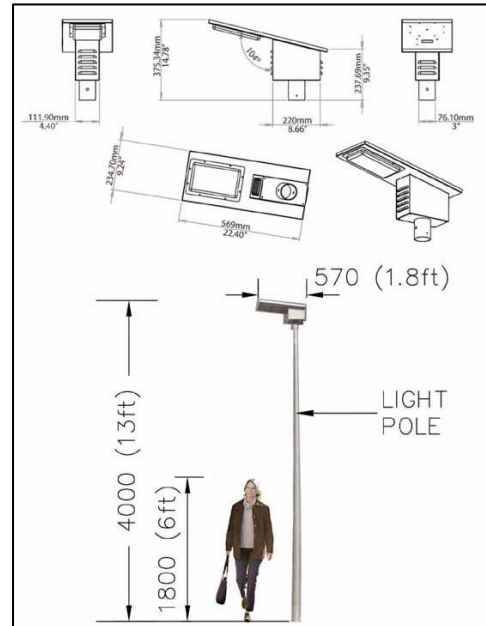


Exhibit 6-10: Example of Typical Solar Powered Pedestrian Scaled Light Pole and Fixture



Exhibit 6-11: Example of a Typical Gateway Feature

Edges and Gateway Features

- Edges and gateway features as a streetscape element play a particularly important role in the design of communities that are traversed by the new corridor. Edges and gateways provide the means to understand a community at its boundaries. As a streetscape element or feature, edges and gateways reveal the community's image and the character of different neighbourhoods and spaces as they apply to pedestrians, bicyclists and motorists.
- The design objectives of the edges and gateway features should promote the vision of the City of Hamilton for the adjacent community and convey the urban and pedestrian-oriented character and identity of the community (refer to *Exhibit 6-11*).
- Gateway features serve to create community 'nodes' at the intersections and create a 'sense of place' at prominent locations within the community along the corridor.
- Roads such as the New East-West Road Corridor serve not only as a mechanism to move traffic but they enhance community boundaries by providing streetscape elements along the edges of these roads to complement the adjacent community (refer to *Exhibit 6-12*).
- The landscape treatment of edges of communities and roadways as part of the streetscape help create the character of the corridor as a whole and contribute to the creation of a 'sense of place'.
- Gateway features should provide clear, recognizable, iconic and attractive entry points into the community and the various neighbourhoods from the New East-West Road Corridor.
- There should be a clear and consistent direction for the treatment of all similar edge conditions. Similar edge conditions and situations throughout the corridor should be addressed in a consistent manner, with exceptions being rare.

APPROACH

As stated, the general intent was to create a continuous landscape character for the entire East-West Road Corridor. One of the strongest visual elements is a continuous pattern of street trees. Throughout the Corridor, as illustrated in *Figures 6-5* through *6-24*, a continuous row of street trees creates a rhythm and living connection to the streetscape. Trees enhance and green our living environment and create a physical buffer to the roadway. In many instances the proposed street trees within the municipal boulevard and/or ROW are the only vegetation separating the residences or adjacent land uses from the New East-West Road Corridor (refer to *Exhibit 6-13*).

In addition, the proposed construction of the New East-West Road Corridor is dramatically impacting the natural environment, such as the existing woodlot and the bridge crossing of Borer's Creek. In other locations, the existing vegetation that currently screens the residential properties and serves as a buffer to the existing roadway will be impacted such that many existing trees may need to be removed. The



Exhibit 6-12: Example of Typical Community and Street Edge Landscaping and Streetscaping



Exhibit 6-13: Example of Typical GREEN Fabric of Street Trees



Exhibit 6-14: Example of a Typical Gateway Element and Feature

construction in the instance depicted in *Figure 6-18: Typical Parkside Drive Urban Section From Boulding Avenue east of Robson Road*, is impacting the existing vegetation and adjacent residences such that special landscape treatments have been proposed for these areas that warrant additional remediation measures. Areas along the New East-West Road Corridor of note include the following:

Figure 6-5: Gateway Feature Location at East-West Road and Highway 6

Figure 6-7: Typical 14 m Diameter Roundabout Section

Figure 6-9: Typical Gateway Feature Through Waterdown North Development

Figure 6-11: Gateway Feature Location at East-West Road and Centre Road

Figure 6-20: Typical East-West Road Section From Parkside Drive to Dundas Street

All of the aforementioned figures illustrate typical areas within the New East-West Road Corridor where the opportunity exists to introduce gateway features. Gateway features can be iconic streetscape elements such as columns, walls, signage, markers, special paving, or planters/planting. These gateway feature opportunities are located at prominent settings along the corridor nodes within the community, specifically at the intersections, and assist in creating a ‘sense of place’. As stated earlier, they also serve as landmarks within the streetscape for the entire Corridor and community at large (refer to *Exhibit 6-14*).

Figure 6-7: Typical 14 m Diameter Roundabout Section

Figure 6-14: Typical 19 m Diameter Roundabout Section

The recommended landscape treatment for both the 14 m and 19 m roundabouts are in keeping with the design recommendations and City of Hamilton standards. Streetscape elements such as planting, sodding, paving, as well as walkway and island layouts are in keeping with the general intent of the City of Hamilton’s guidelines and standards. Planting design will be developed at the detailed design phase.

Figure 6-11: Gateway Feature Location at East-West Road and Centre Road

Figure 6-12: Typical East-West Road Rural Section Just East of Centre Road

The existing woodlot at Centre Road is an important natural biotic community. This woodlot is located east of Centre Road and contains not only a Provincially Significant Wetland (PSW) but also two butternut trees that have been assessed as being Provincially Rare and Endangered Species. The New East-West Road Corridor divides this woodlot at a location that has been recommended by the Project Team to not only avoid the two butternut trees but also to minimize impact upon the woodlot community. Although new road construction will negatively impact the woodlot, the proposed location as well as the



Exhibit 6-15: Examples of Typical Woodlot Edge and Trailside Perennial Plantings

proposed construction techniques, mitigation measures and design criteria have been extensively studied by the Project Team. After many assessments and consultation sessions the alignment through the woodlot has received the endorsement of the Hamilton Conservation Authority.

The intent of the landscape strategy was to introduce measures that would mitigate the impact of this road's construction activity on the natural biotic community of the woodlot. The recommendations extended to minimizing the limit of the tree removal and woodlot disturbance to the grading limits within the road right-of-way and encouraging additional tree preservation where possible. It is suggested that the entire right-of-way not be clear-cut but rather the design limits the removal of existing trees where practical. Recommendations also include restoration planting to naturalize this entire edge of the woodlot with specific tree, woody shrub, herbaceous groundcover and perennial remediation planting recommended in consultation with the Team Biologists. The detailed design for this area will include detail planting plans and recommendations and the development of an Edge Management Plan in consultation with the Hamilton Conservation Authority (refer to *Exhibit 6-15*).

It was determined that the continuous street tree pattern would persist along the new roadway adjacent to the north edge of the proposed road, against the existing woodlot. Similar to the other plant material proposed within the environs of the woodlot, all tree species for the street tree planting within these areas should be in keeping with the natural communities within the woodlots and will be determined in consultation with the Project Team biologists. The street trees would be balanced on the south side of the new road by a 3.0 m wide multi-use pathway and an intermediary swath of predominately native shrubs and perennials that would act as buffer between the multi-use path and the new road. This re-vegetation zone would be comprised of species recommended in consultation with a biologist but essentially would be low growing material that would neither obstruct views or introduce potential hiding spots along this somewhat isolated stretch of walkway.

Due to the natural character of the woodlot east of Centre Road, this portion of the New East-West Road Corridor has intentionally been designed with a more rural character. In keeping with efforts to minimize the impact of this roadway on the natural environment, no overhead streetlights have been proposed to illuminate this section of roadway. Although this may be acceptable with respect to the safety of motorists, this is not acceptable with respect to the pedestrians utilizing the multi-use pathway. In order to illuminate both the walkway surface for safety and security reasons, and in keeping with CPTED principles, it is recommended that the multi-use pathway be illuminated with solar powered lights. These solar powered lights would operate independent of a municipal power source and the physical impact to the natural environment in their installation would be minimal. The intensity of these pedestrian scaled lights would not be overly invasive and would only be intended to illuminate the nearby walkway and not the road surface.

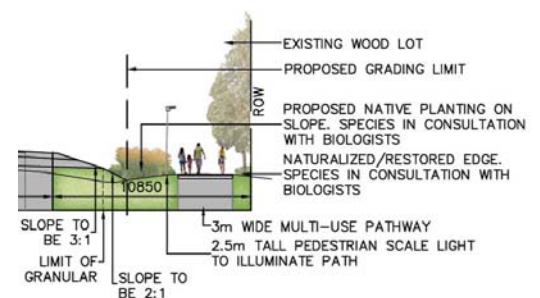


Exhibit 6-16: Typical Section Through 3.0 m Wide Multi-Use Pathway

Figure 6-13: Bridge Structure over Pedestrian Trail to Joe Sams Leisure Park

The design incorporates a trail connection under the proposed new East-West Road linking the multi-use trail/pathway that traverses the area east of the Centre Road woodlot to Joe Sam’s Park. The direct connection is a continuation of the 3 m wide trail and is illuminated at each end of the under-bridge link with a solar powered light. It is our recommendation that for security reasons the under-bridge linkage should also be illuminated (refer to *Exhibit 6-16*).

Figure 6-15: Neighbourhood Pocket Park Opportunity (Adjacent to Connon Nursery Land and Parkside Drive)

As the New East-West Road Corridor continues eastward from the Centre Road Woodlot, it connects with existing Parkside Drive and travels through the south western portion of the existing Connon Nursery tree farm and greenhouse operation north of Parkside Drive. Just as the New East-West Road Corridor crosses the south west corner of the Conon Nursery property is a proposed 19 m roundabout. As it continues east and exits the roundabout, the New East-West Road Corridor connects with Parkside Drive just west of the Grindstone Creek. In the final layout of the New East-West Road Corridor, the section of Parkside Drive to the west will be closed to form a cul-de-sac terminating the physical connection to the existing section of Parkside Drive just west of the Grindstone Creek bridge. This new reconfiguration of Parkside Drive in relation to the New East-West Road Corridor and the 19 m roundabout creates a triangular-like shaped remnant parkette block that is bound on the north by the New East-West Road Corridor, on the south by the proposed closed section of Parkside Drive and on the west by the road section that exists as the south arm of the roundabout.

This remnant block provides the opportunity for a small neighbourhood pocket park. The program for this space may be a simple passive parkette with benches, open green space, walkways and planting or it may include a small play area. The program and design of this space will be determined by the City of Hamilton Public Works Department. A typical park concept plan for a space like this triangle parkette is shown on *Exhibit 6-17*.



Exhibit 6-17: Typical Neighbourhood Parkettes

Figure 6-18: Typical Parkside Drive Urban Section from Boulding Avenue to East of Robson Road

The streetscape for this area is noteworthy in that this section of Parkside Drive is probably the most urbanized with the street cross section exhibiting a “village-like” character. The houses on the north side of Parkside Drive in this area are closer to the street and the rear lots of the houses on Fellows Crescent will come in closer proximity to the road edge with the expansion of Parkside Drive to four lanes.

The streetscape for this area will be characterized by the continuous green of the street tree network and also the dual headed light poles that

are proposed. These two luminaire poles are intended to illuminate the roadway as well as pedestrian-scale lighting to illuminate the new pedestrian sidewalks that will be installed on both the north and south side of the New East-West Road Corridor. These light standards will be the same iconic light poles with decorative banners that will be used throughout the New East-West Road Corridor for continuity and community identity. However, due to the village character of this area, the decorative banners on the light poles will alternate with decorative annual flower baskets as a means to animate the streetscape.

The streetscape treatment along the south side of Parkside Drive will be more urbanized, with the edge of the road coming closer to the rear yards of the existing residential community. This edge treatment of the streetscape for the New East-West Road Corridor interfacing with the rear of residential lots is a new streetscape condition but it is not unique within the corridor. The treatment for this type of scenario of rear lots adjacent to a restricted right-of-way should be typical for all similar edge conditions throughout the corridor.

Specific to this location, the streetscape treatment recommended includes a minimum 1.8 m high wood privacy fence on the south road property line with a buffer planting of a combination of large ornamental deciduous accent shrubs mixed with smaller coniferous and deciduous shrubs. This accent planting is not intended to be installed continuously along the fence line adjacent to the walkway but is intended to be planted in clusters (refer to *Exhibit 6-18*, *Exhibit 6-19* and *Exhibit 6-20*). This fence should be design recognizing traffic sound attenuation for the adjacent residents to the south.

Figure 6-24: Typical Dundas Street Rock Cut Section

The streetscape within this section of the New East-West Road Corridor is limited due to the existing rock formation that will need to be cut (blasted) in order to accommodate for the expansion of Dundas Street. On the north side of Dundas Street the streetscape is limited to streetlights to illuminate the roadway within a very confined boulevard. The network of street trees will continue along the south side of Dundas Street (where permissible) and in conjunction with the sidewalk and street lighting thus forming the language of the streetscape in this area.



Exhibit 6-18: Typical Residential Character Along North Side Parkside Drive



Exhibit 6-19: Typical Residential Character Along South Side Parkside Drive



Exhibit 6-20: Typical Rear Lots Planting Adjacent to Wood Privacy Fence



**NEW
EAST-WEST
ROAD**

LANDSCAPE/
STREETSCAPE
RECOMMENDATIONS
DRAWING KEY PLAN



Scale: As Noted

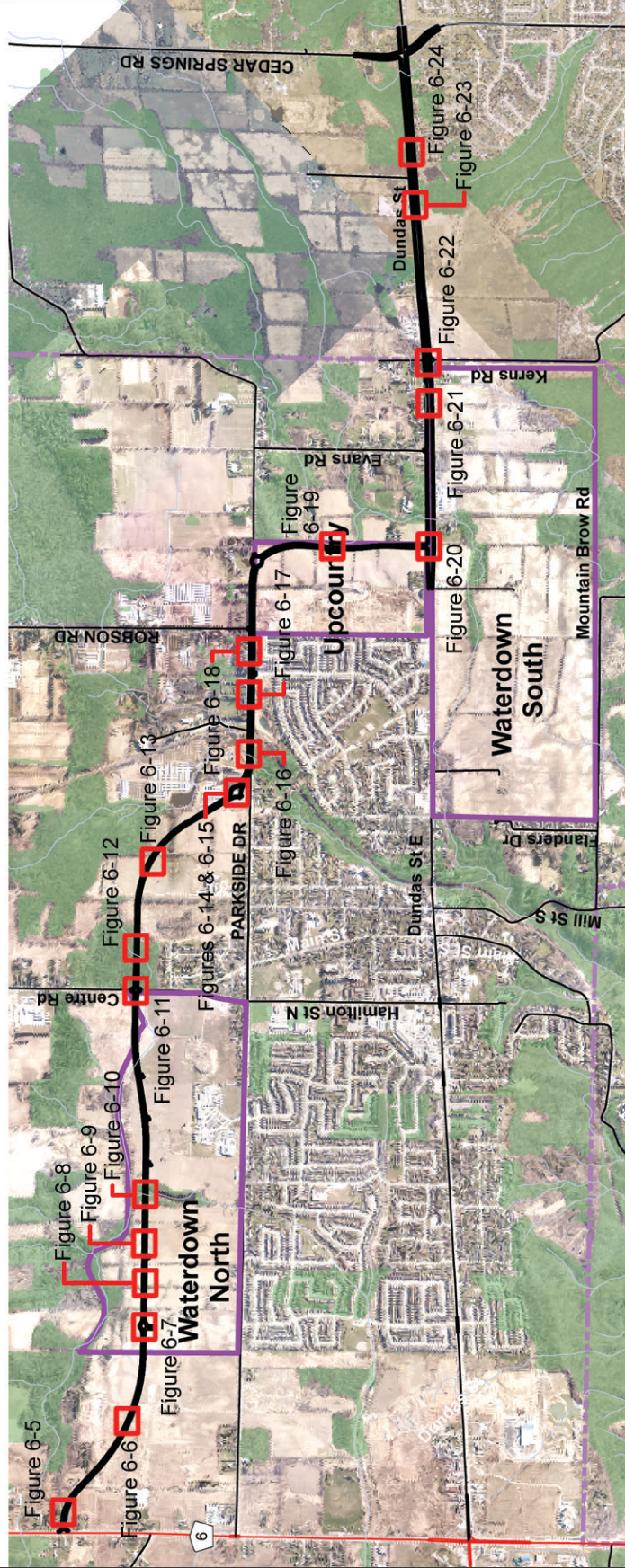


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Figure
6-5A

Legend

- East - West Corridor Alignment
- Municipal Boundary
- Watercourse
- Urban Expansion Area
- Forested Areas
- Location of Figures





NEW EAST-WEST ROAD

GATEWAY FEATURE LOCATION AT EAST-WEST ROAD AND HIGHWAY 6

the mbtw group

Scale: As Noted



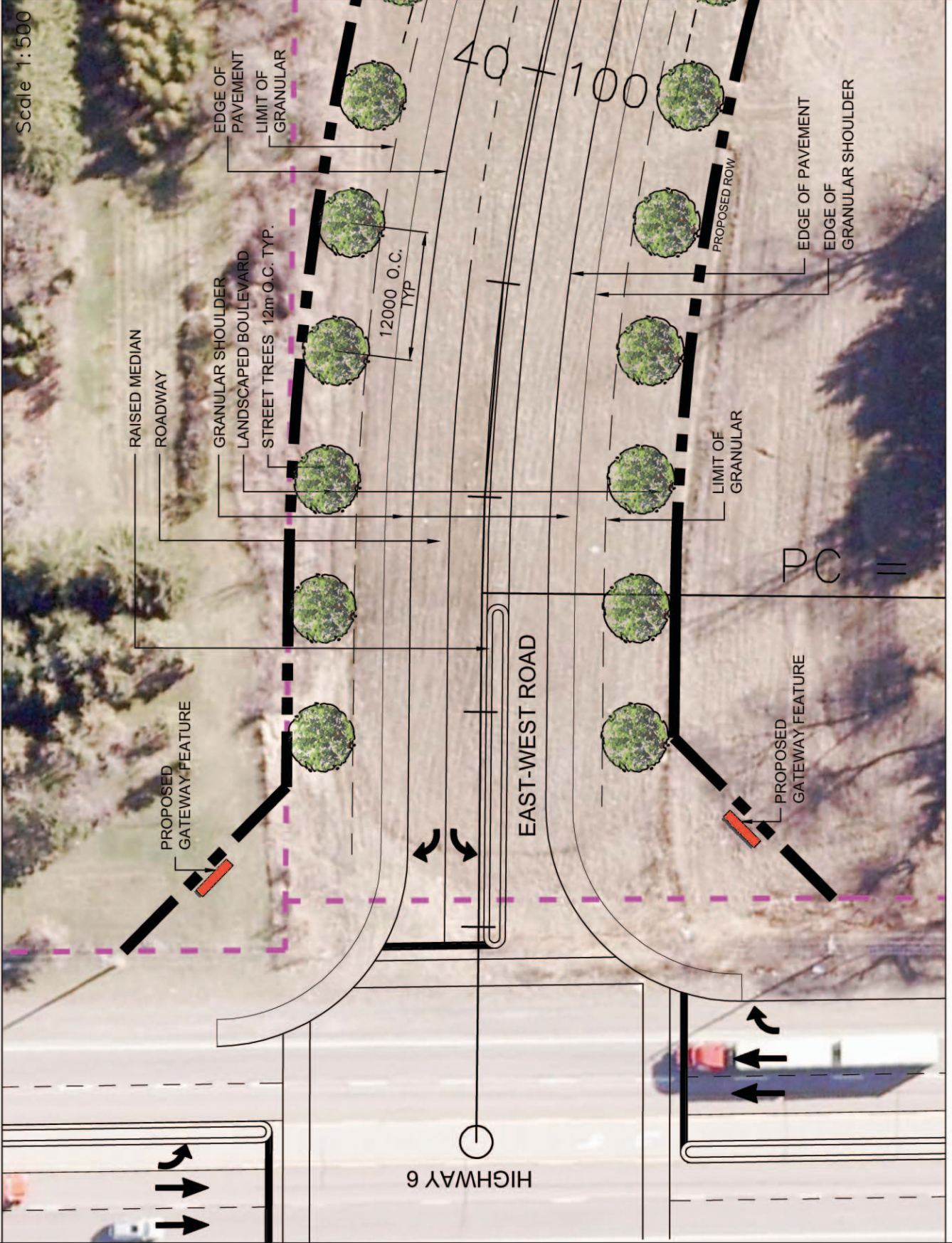
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Hamilton Public Works

Figure 6-5

Scale 1:500





NEW EAST-WEST ROAD

TYPICAL EAST-WEST ROAD RURAL SECTION FROM HWY 6 TO WATERDOWN NORTH DEVELOPMENT AND EAST OF CENTRE ROAD WOODLOT TO PARKSIDE DRIVE

the mbtw group

Scale: As Noted

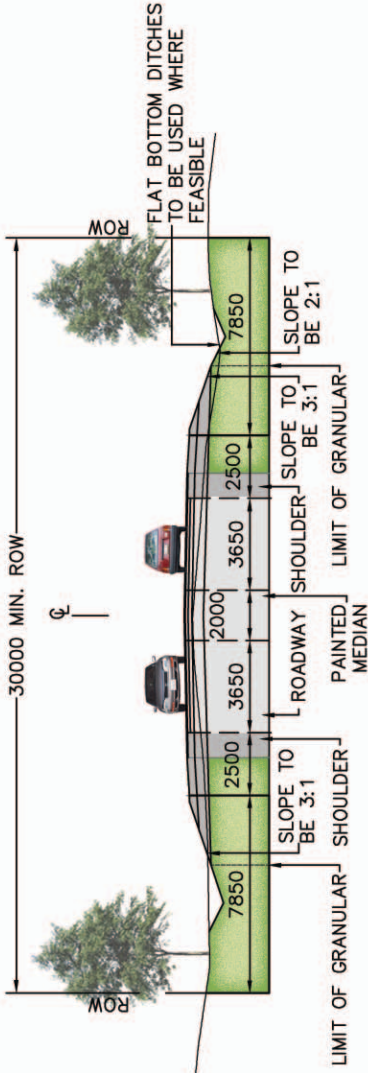


DILLON CONSULTING

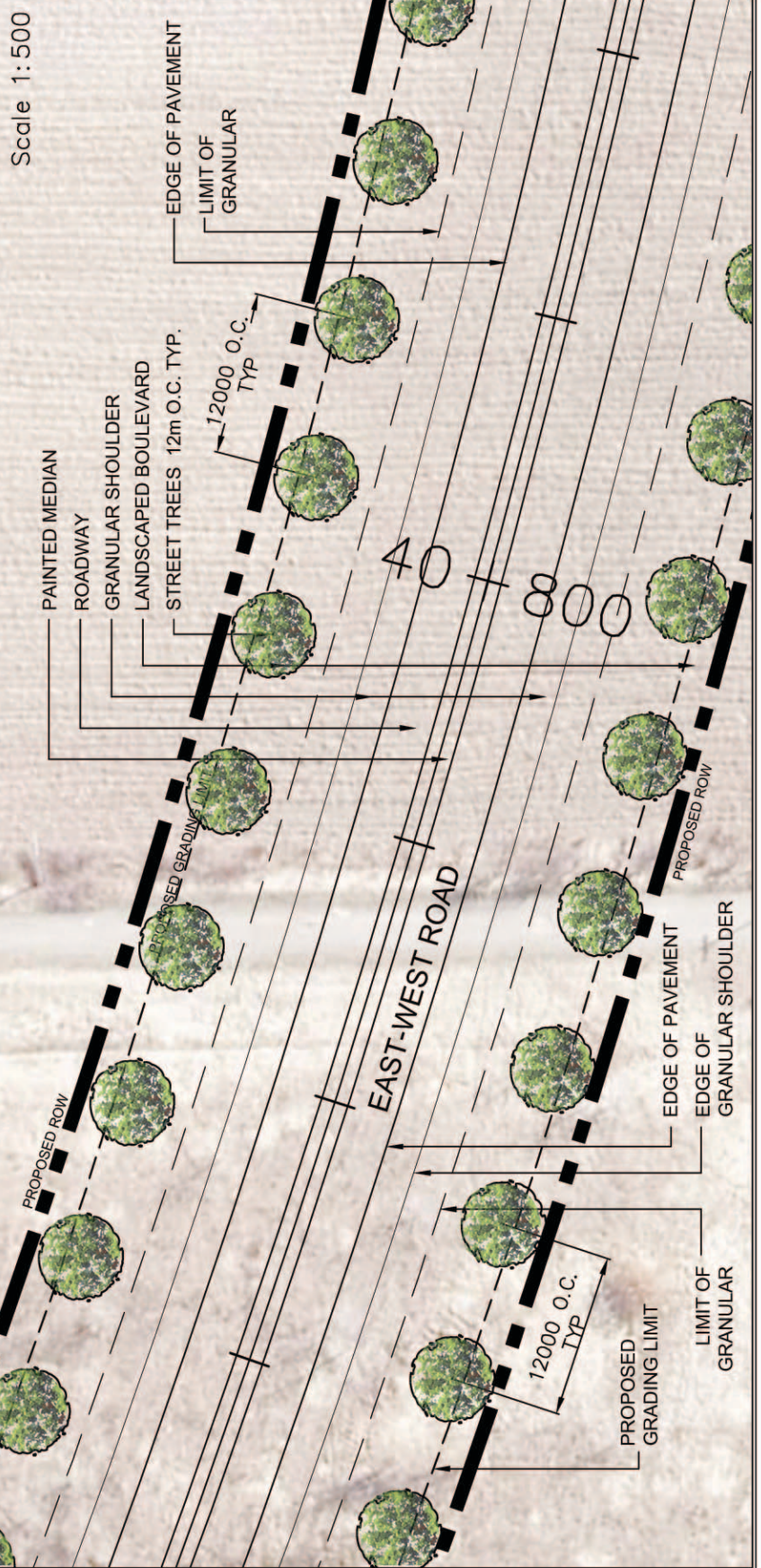


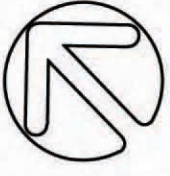
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Figure 6-6



Section thru East-West Road looking East. Scale 1:300





**NEW
EAST-WEST
ROAD**

TYPICAL 14M DIA.
ROUNDBOUT
SECTION

the mbtw group

Scale: As Noted

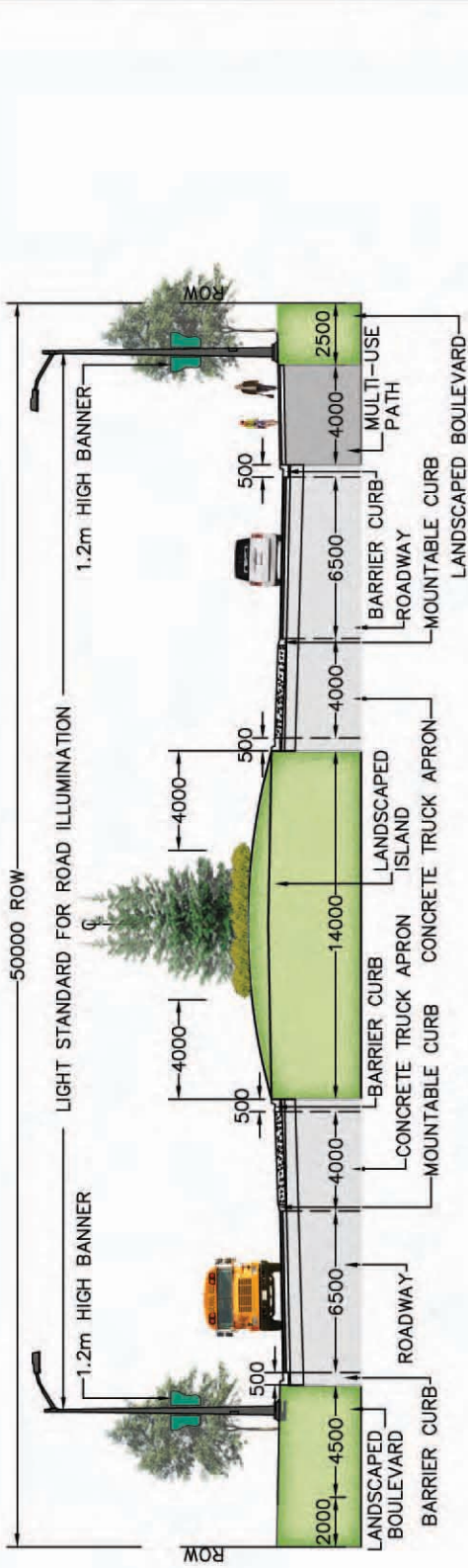


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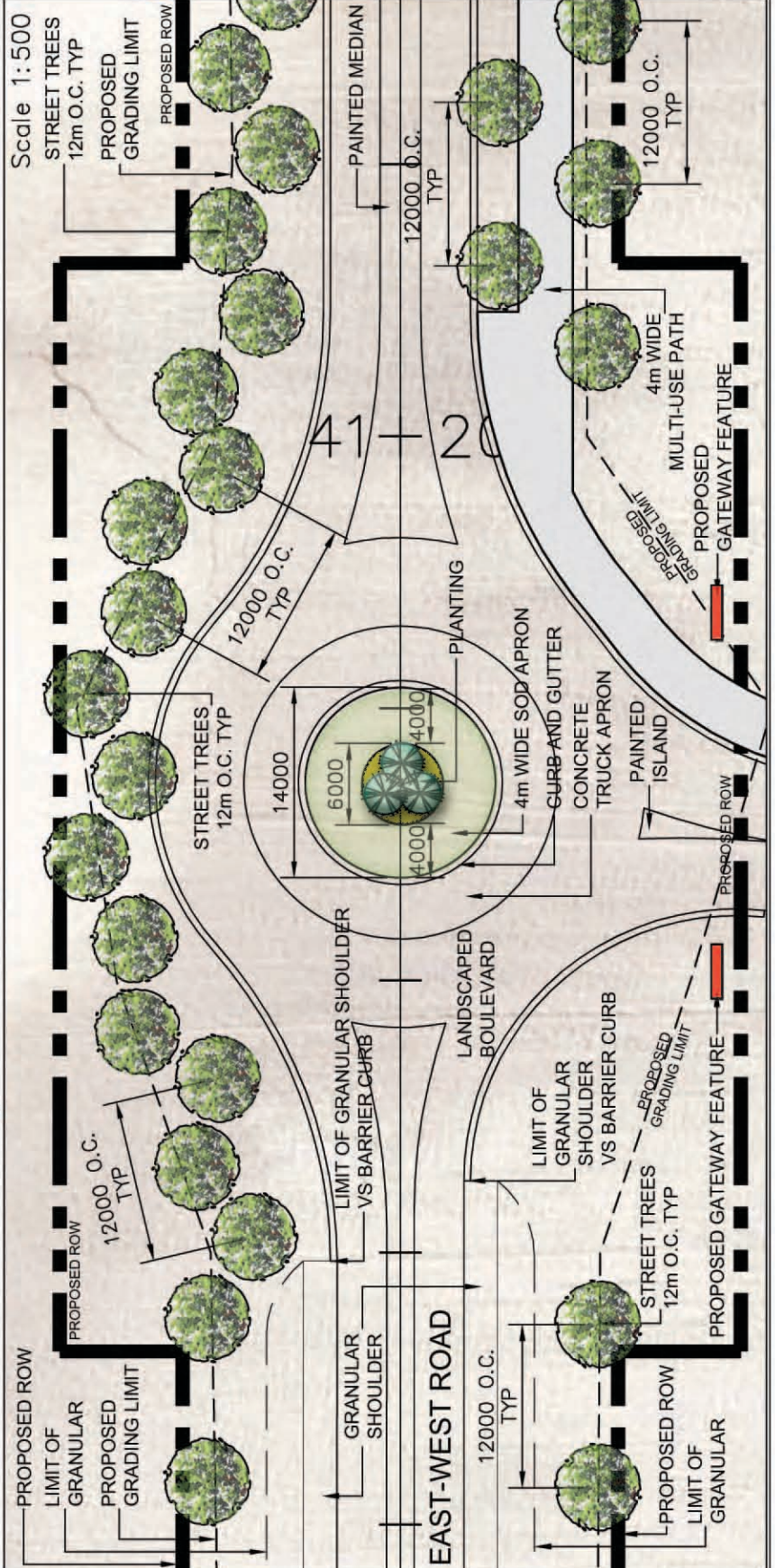


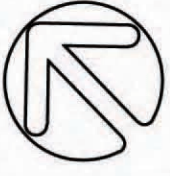
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Figure
6-7



Section thru East-West Road looking East. Scale 1:300





NEW EAST-WEST ROAD

TYPICAL EAST-WEST ROAD URBAN SECTION THROUGH WATERDOWN NORTH DEVELOPMENT

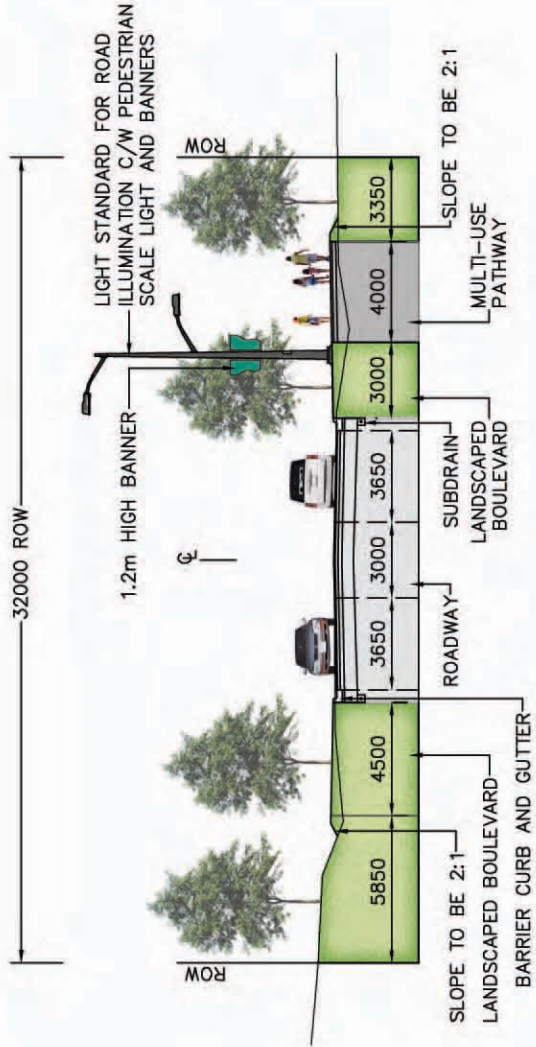
the mbtw group

Scale: As Noted

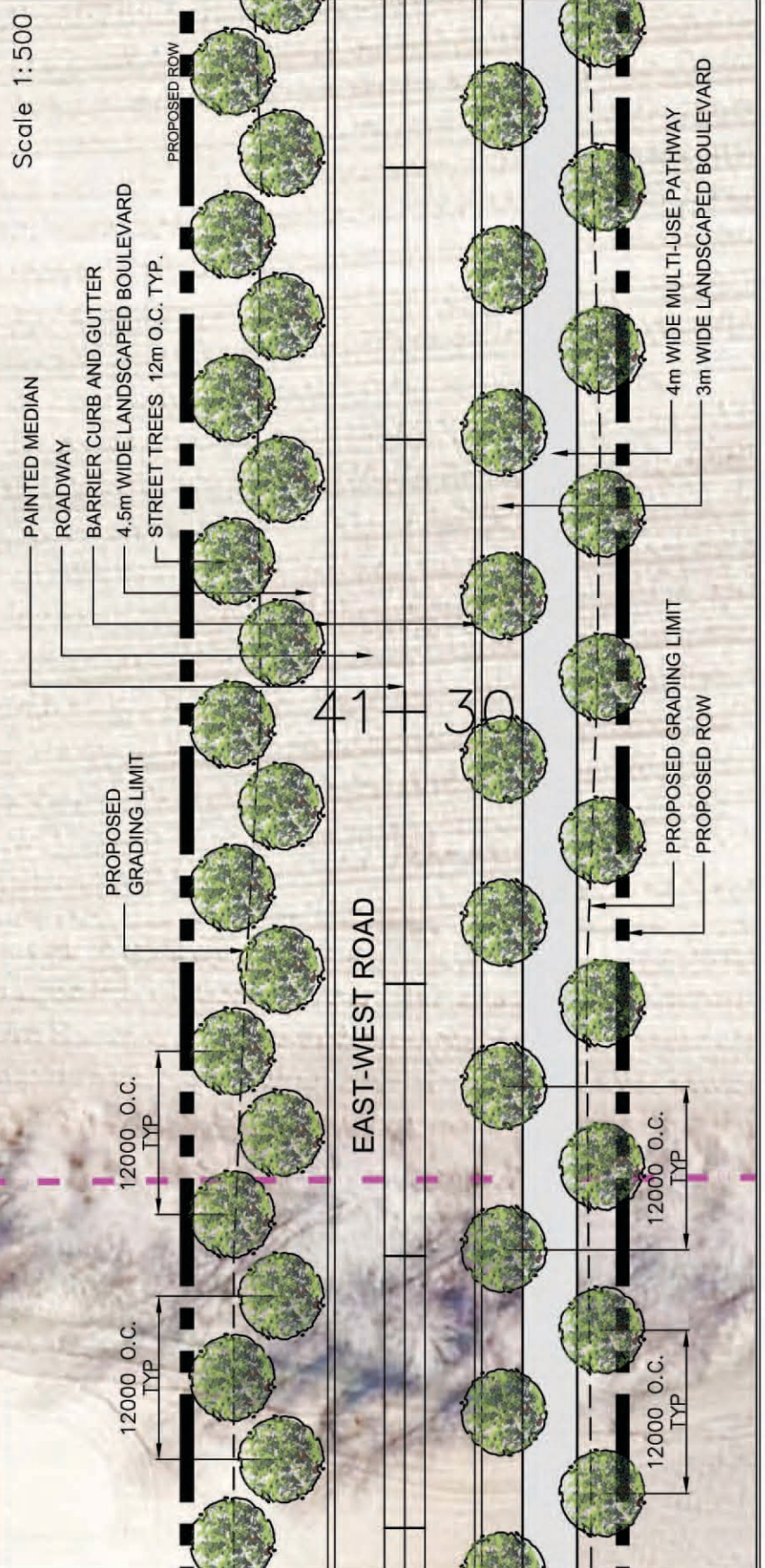


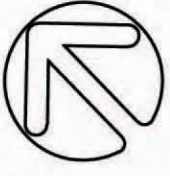
Hamilton Public Works

Figure 6-8



Section thru East-West Road looking East. Scale 1:300





**NEW
EAST-WEST
ROAD**

TYPICAL ENTRY
FEATURE THROUGH
WATERDOWN NORTH
DEVELOPMENT

the mbtw group

Scale: As Noted

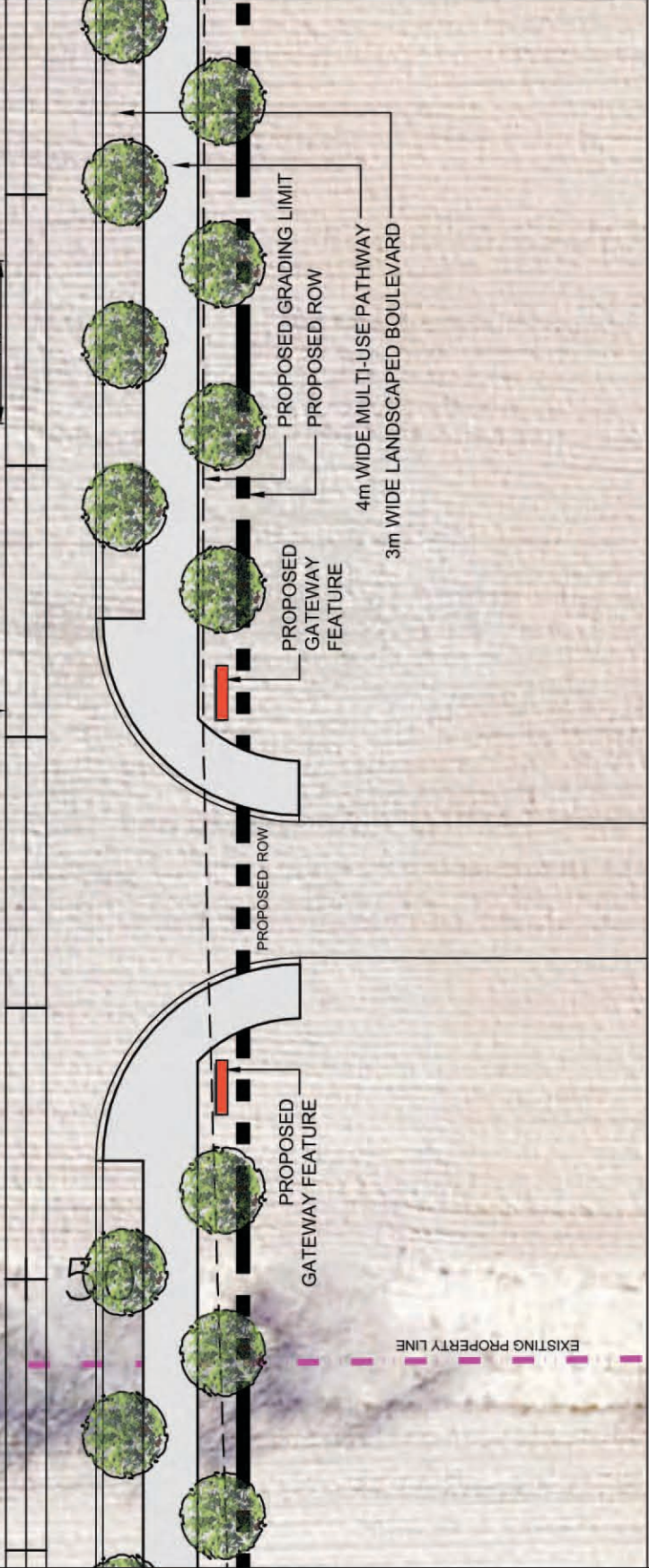
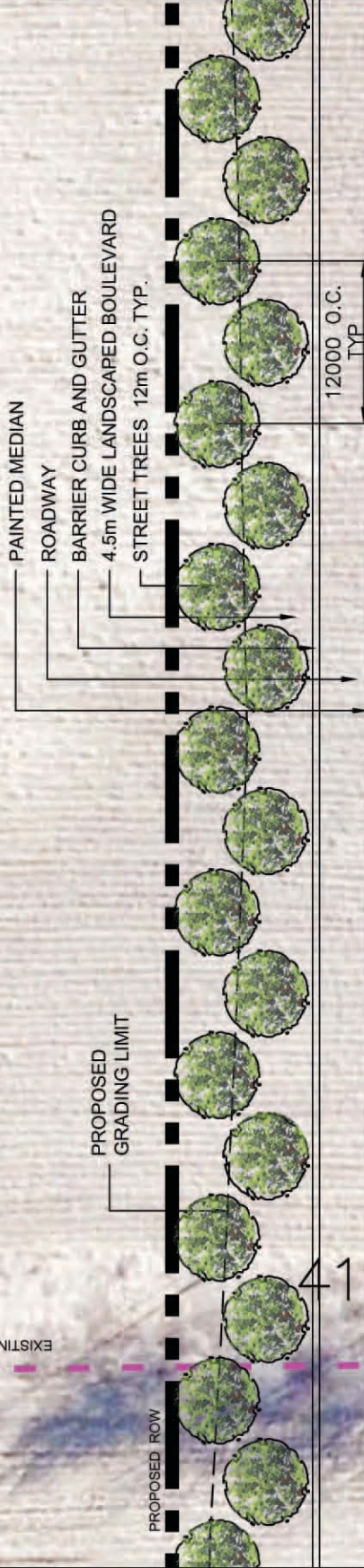


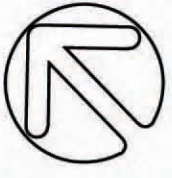
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**Figure
6-9**

Scale 1:500

EXISTING PROPERTY LINE





**NEW
EAST-WEST
ROAD**

TYPICAL PARKSIDE
DRIVE SECTION AT
BORER'S CREEK

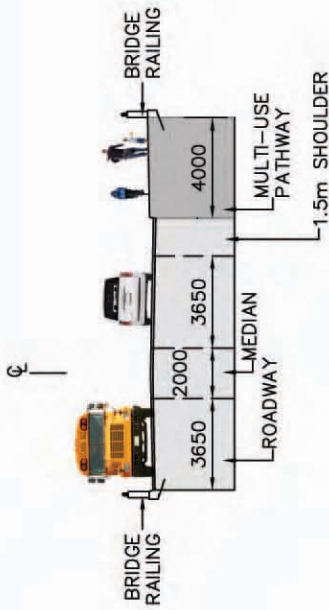
the mbtw group

Scale: As Noted

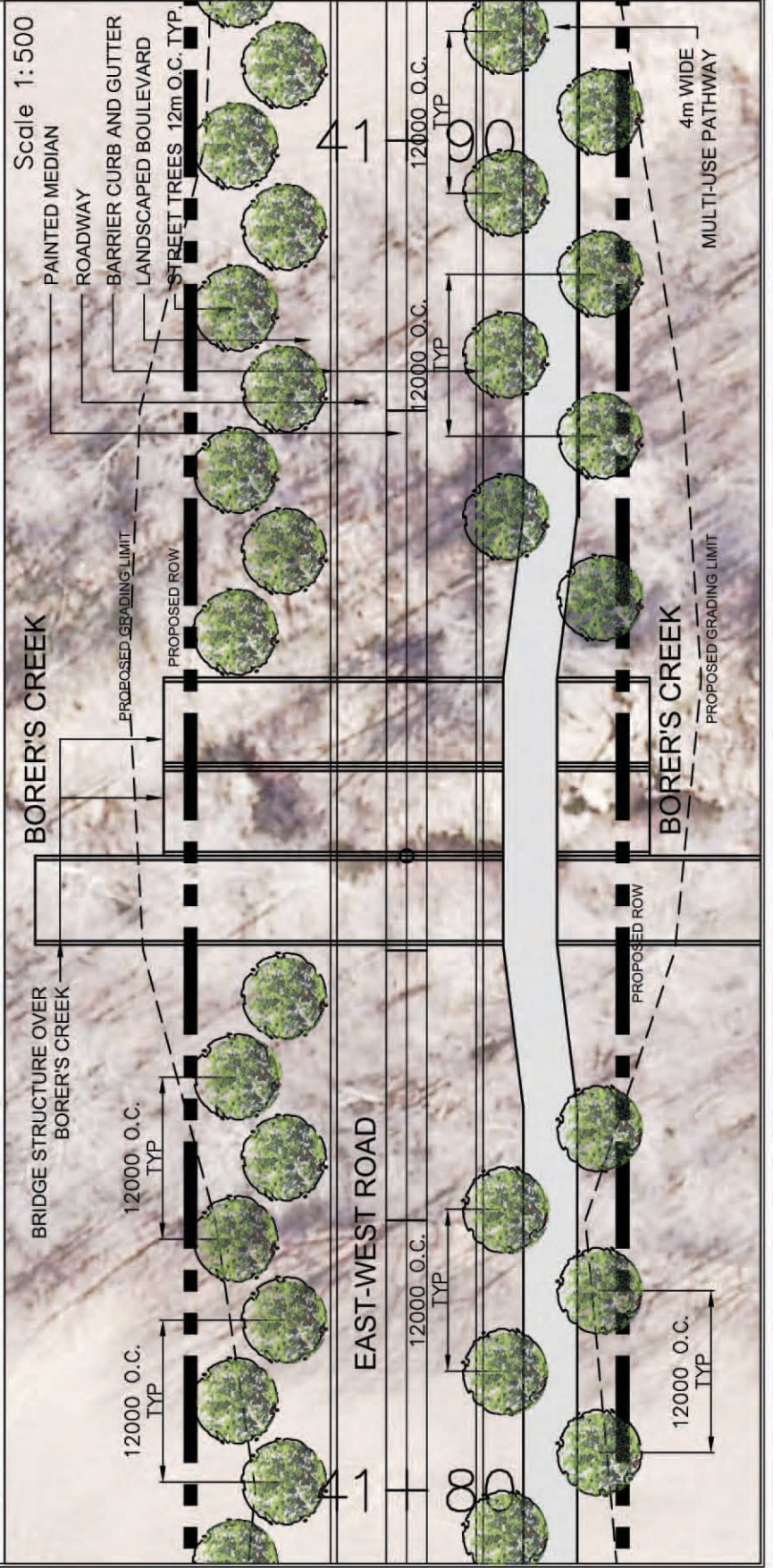


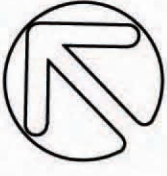
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**Figure
6-10**



Section thru East-West Road looking East. Scale 1:300





NEW EAST-WEST ROAD

GATEWAY FEATURE LOCATION AT EAST-WEST ROAD AND CENTRE ROAD

the mbtw group

Scale: As Noted



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Figure 6-11

Scale 1:500

NATURALIZED/RESTORED EDGE. SPECIES IN CONSULTATION WITH BIOLOGISTS

PROPOSED GRADING LIMIT

EAST-WEST ROAD

42 900
CENTRE ROAD

4m TALL PEDESTRIAN SCALE LIGHT TO ILLUMINATE PATH 15m O.C. TYP.

3m WIDE MULTI-USE PATHWAY

PROPOSED GATEWAY FEATURE

PROPOSED ROW

PROPOSED GATEWAY FEATURE

RAISED MEDIAN

STREET TREES 12m O.C. TYP.

12000 O.C. TYP.

12000 O.C. TYP.

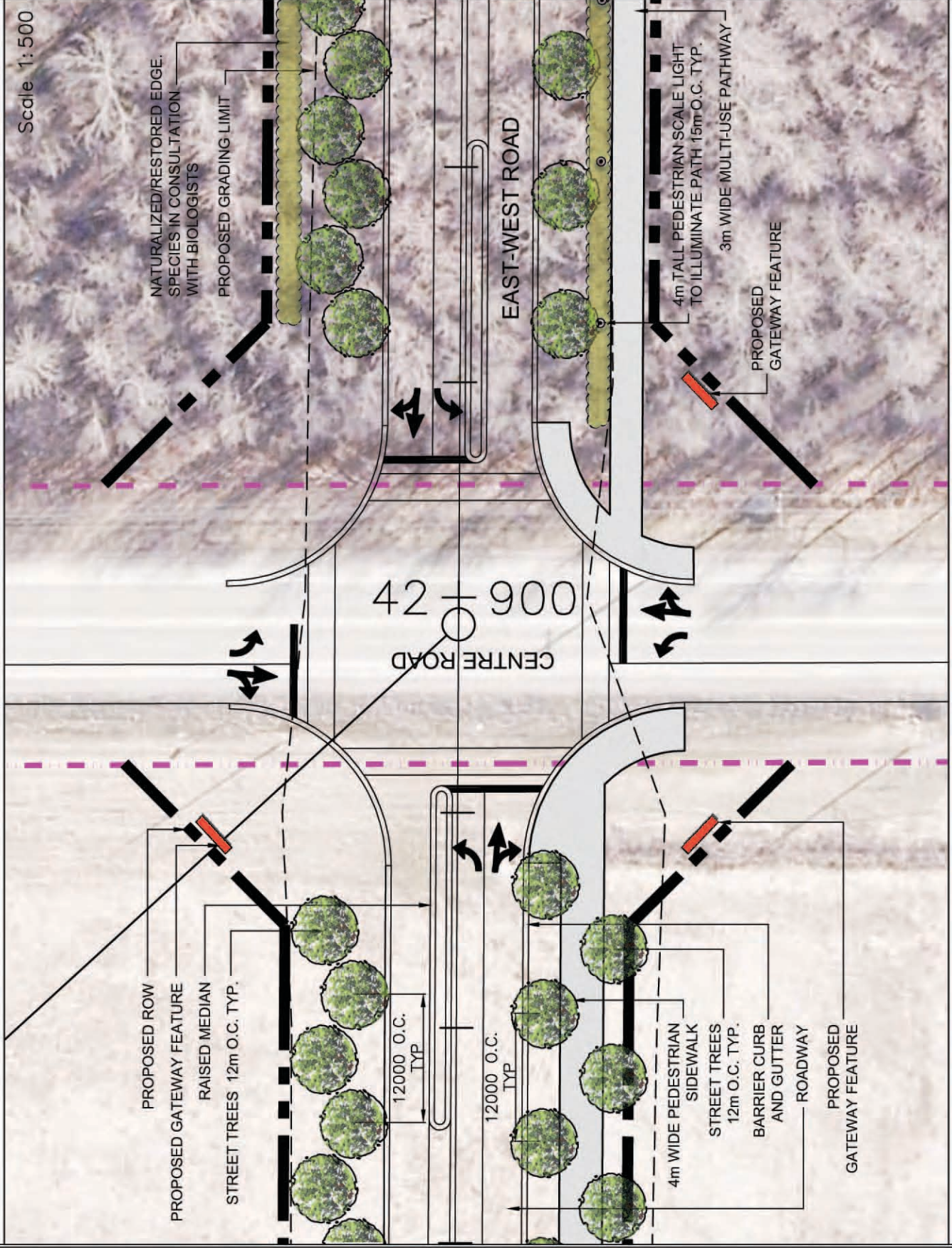
4m WIDE PEDESTRIAN SIDEWALK

STREET TREES 12m O.C. TYP.

BARRIER CURB AND GUTTER

ROADWAY

PROPOSED GATEWAY FEATURE





NEW EAST-WEST ROAD

TYPICAL EAST-WEST ROAD RURAL SECTION JUST EAST OF CENTRE ROAD

the mbtw group

Scale: As Noted

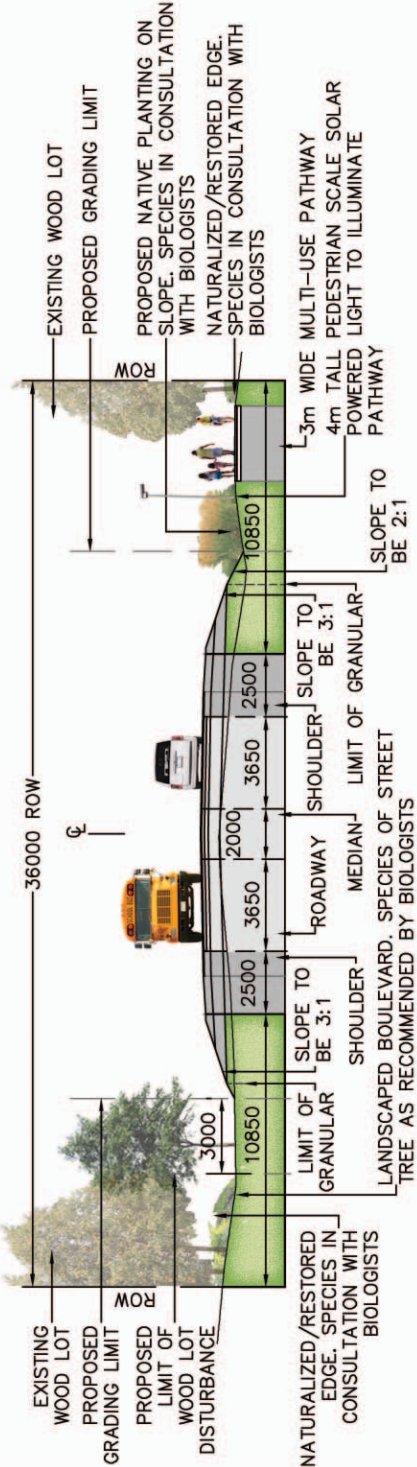


DILLON CONSULTING

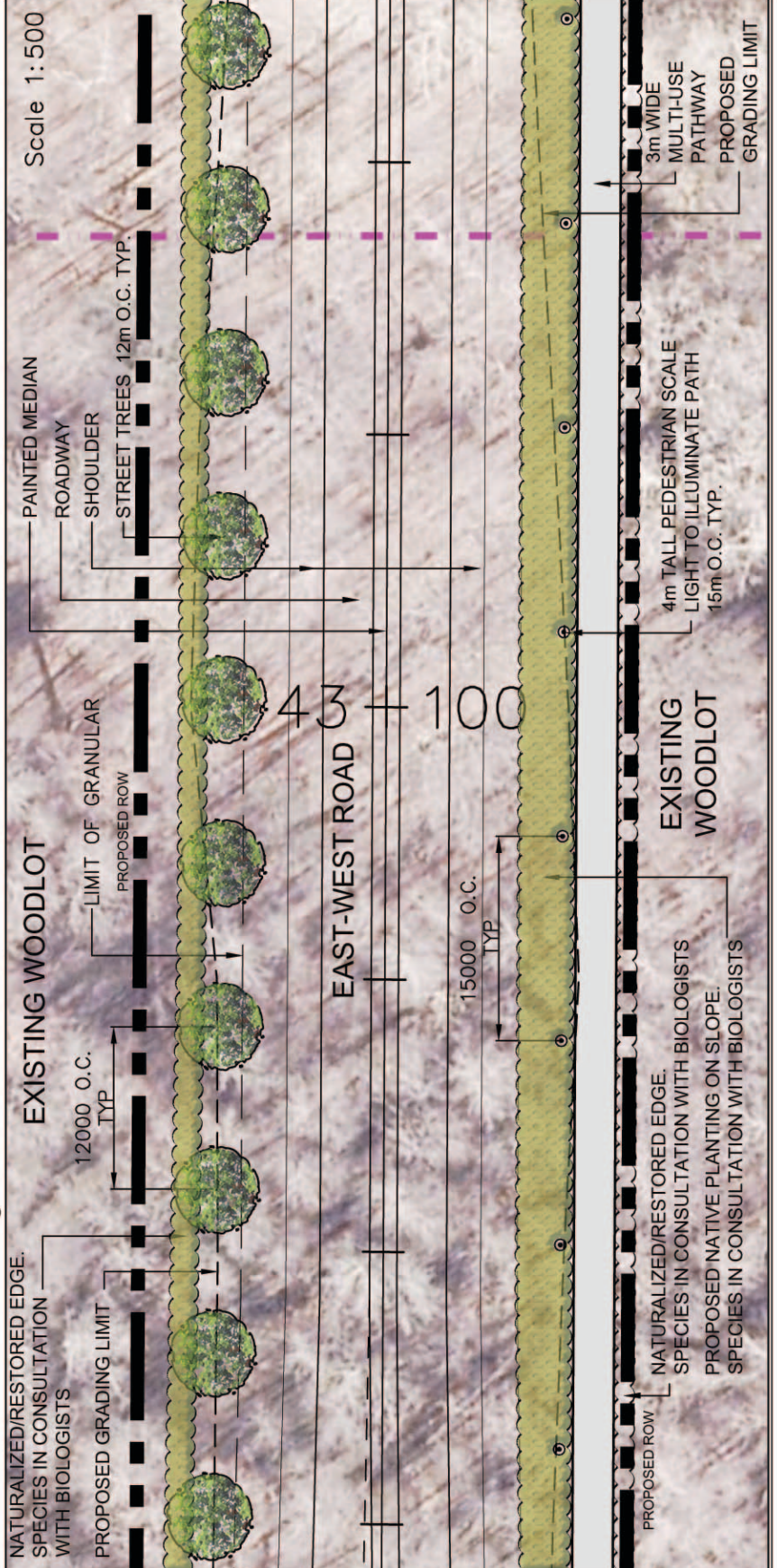


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Figure 6-12



Section thru Woodlot looking East. Scale 1:300





NEW EAST-WEST ROAD

BRIDGE STRUCTURE OVER PEDESTRIAN TRAIL CONNECTION TO JOE SAM'S LEISURE PARK



Scale: As Noted

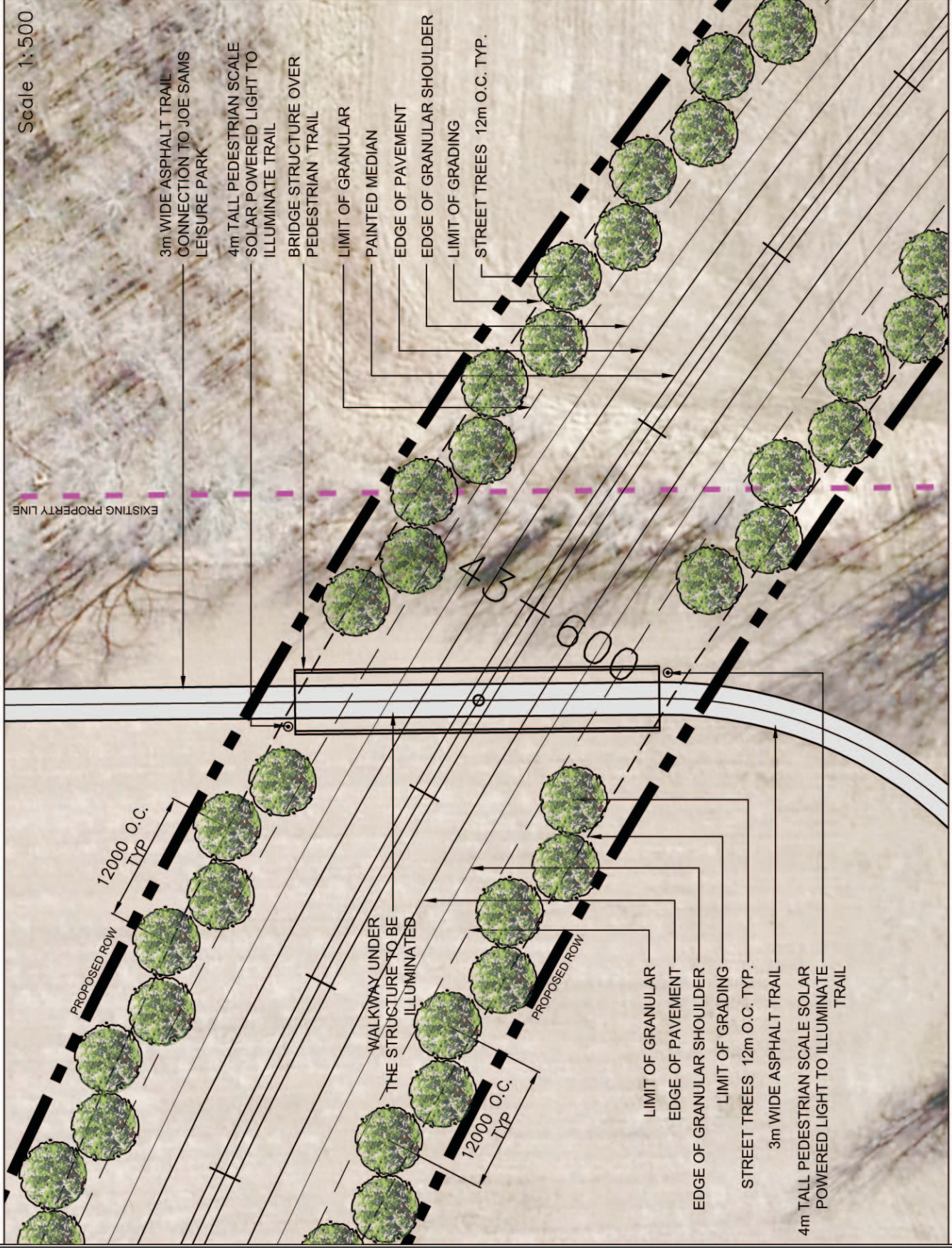


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Figure 6-13





NEW EAST-WEST ROAD

TYPICAL 19M DIA. ROUNDABOUT SECTION

the mbtw group

Scale: As Noted

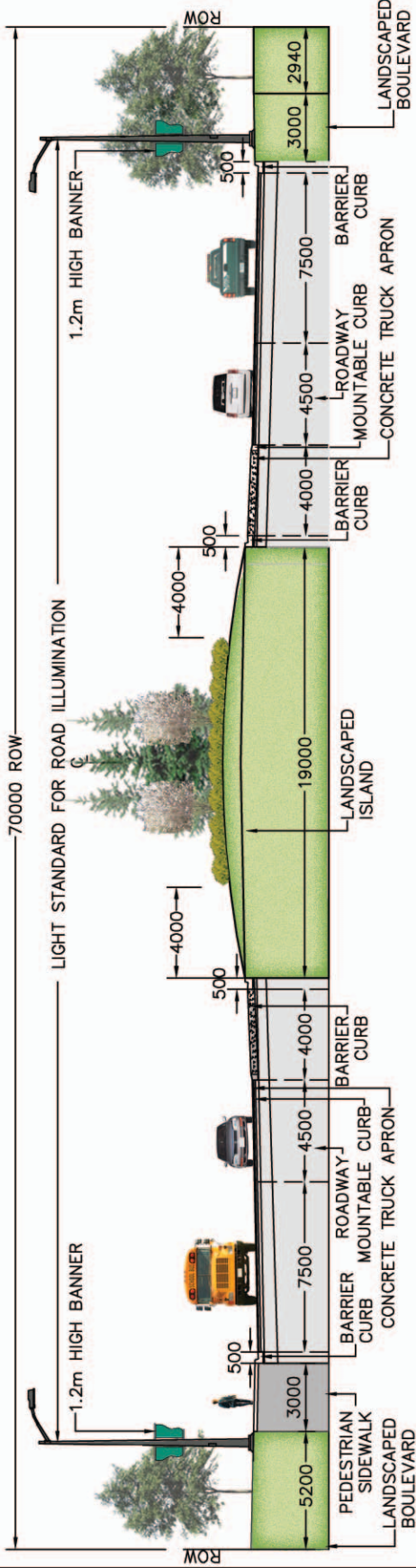


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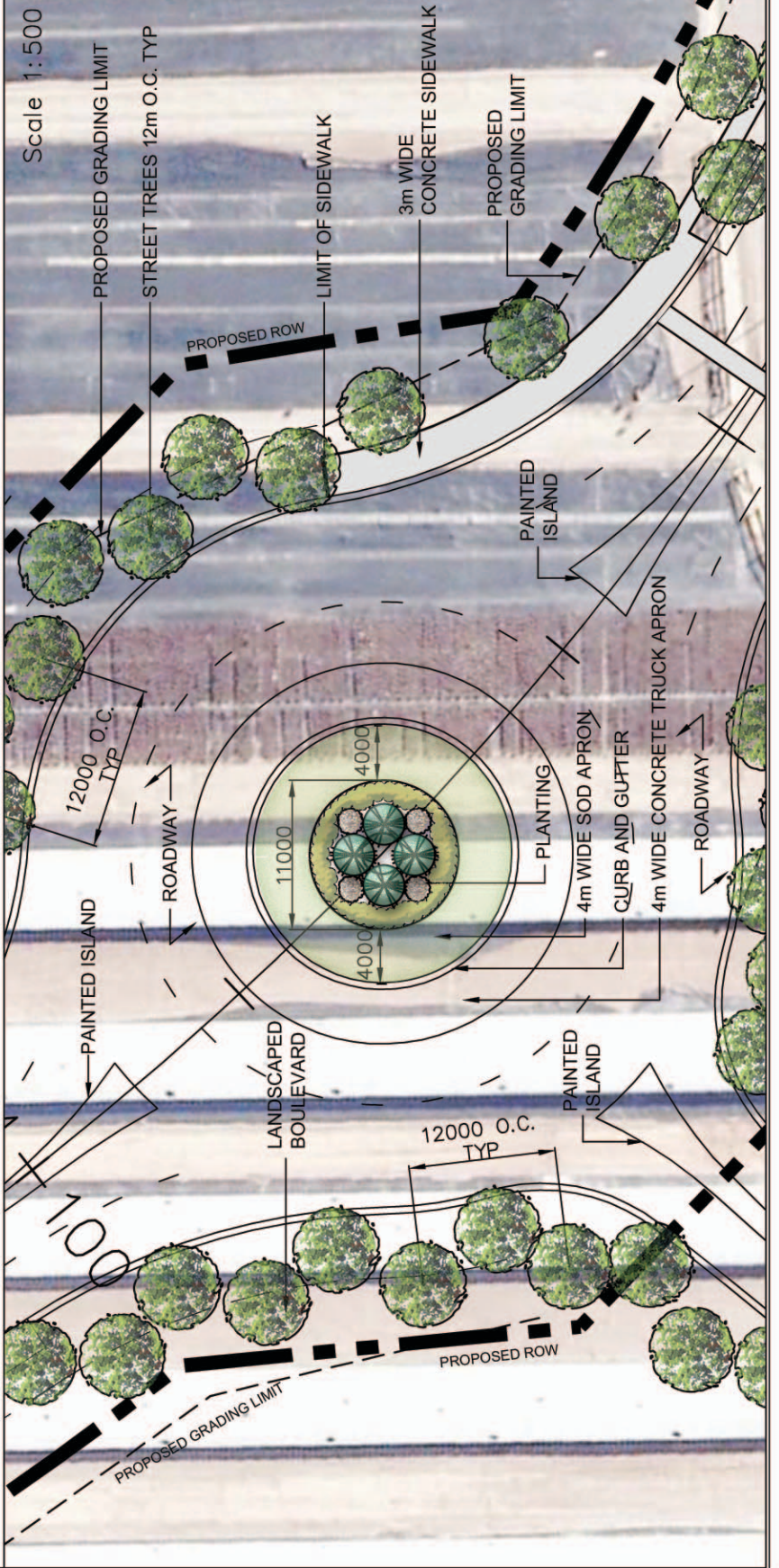


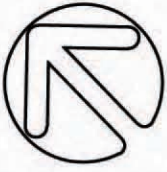
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Figure 6-14



Section thru East-West Road looking East. Scale 1:300





NEW EAST-WEST ROAD

NEIGHBOURHOOD
POCKET PARK
OPPORTUNITY

ARTIST'S
RENDERING
(Conceptual)

the mbtw group

Scale: As Noted

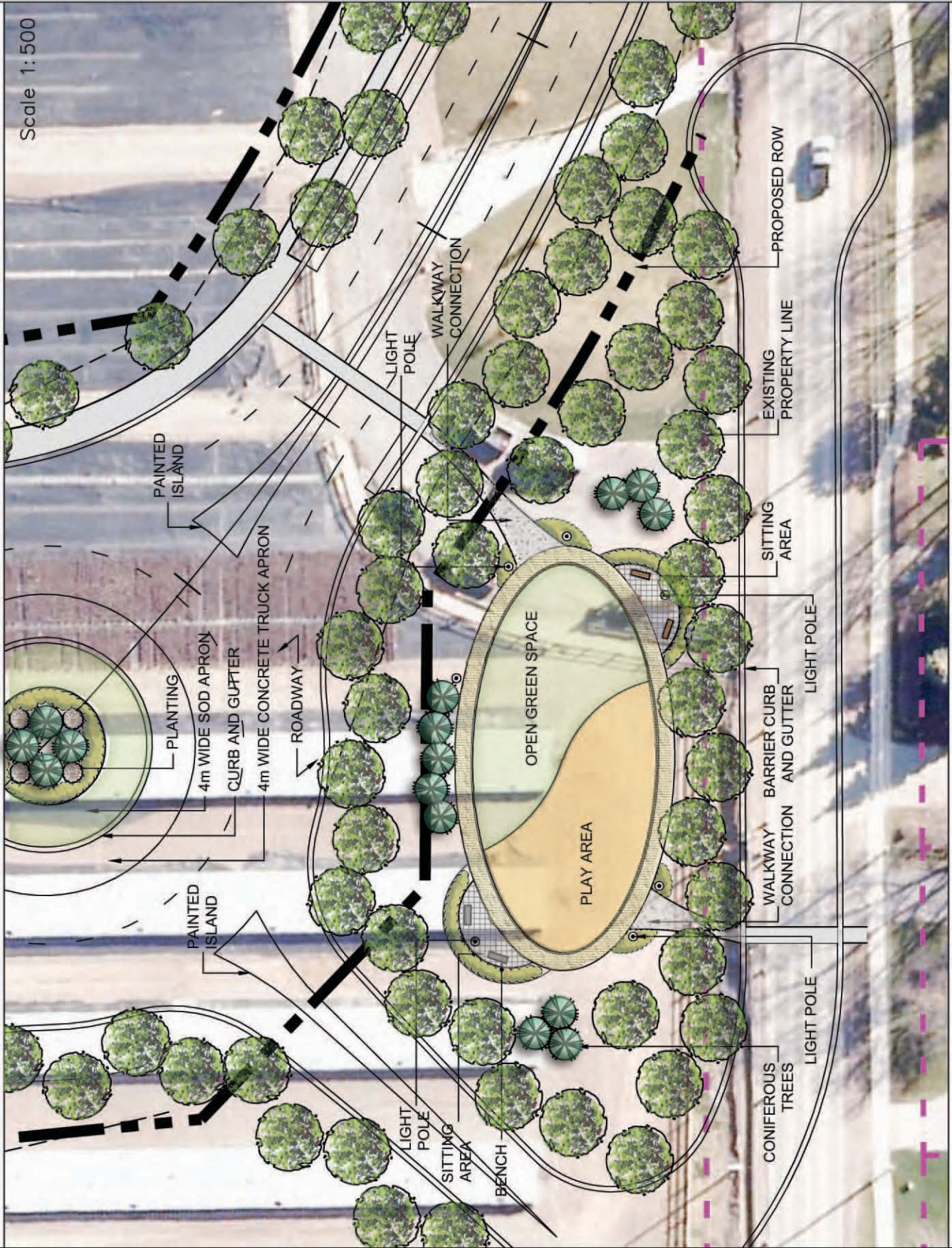


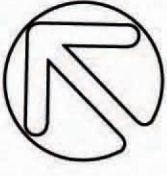
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Figure 6-15





**NEW
EAST-WEST
ROAD**

TYPICAL PARKSIDE
DRIVE SECTION AT
GRINDSTONE CREEK

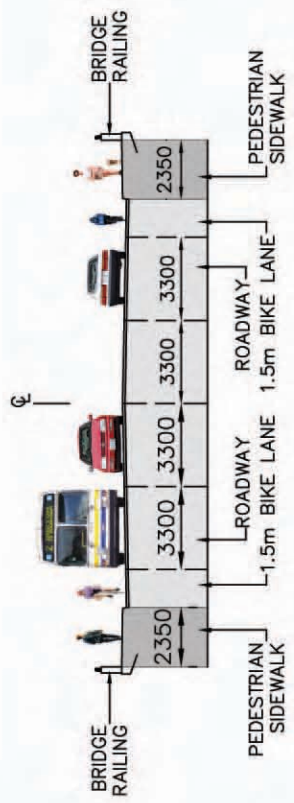
the mbtw group

Scale: As Noted



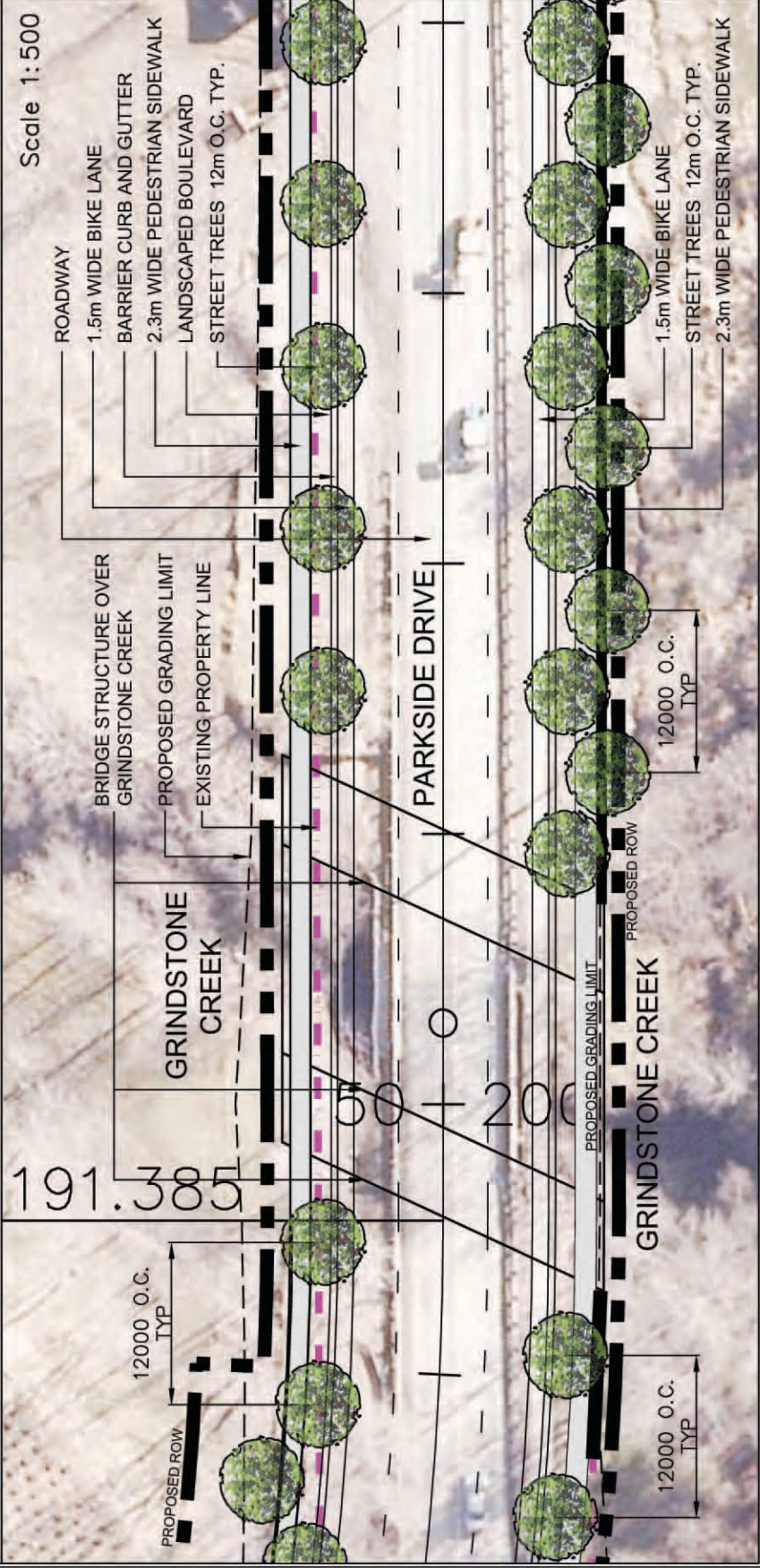
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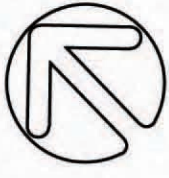
**Figure
6-16**



Parkside Drive looking at Grindstone Creek

Section thru Bridge Structure Over Grindstone Creek. Scale 1:300





NEW EAST-WEST ROAD

TYPICAL PARKSIDE DRIVE URBAN SECTION FROM WEST OF GRINDSTONE CREEK TO BOULDRING AVENUE

the mbtw group

Scale: As Noted

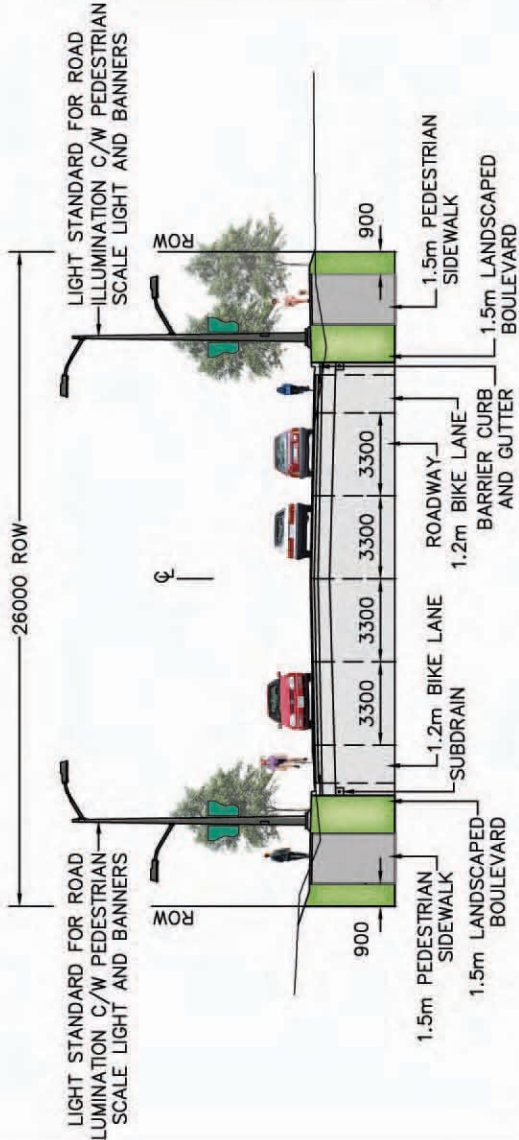


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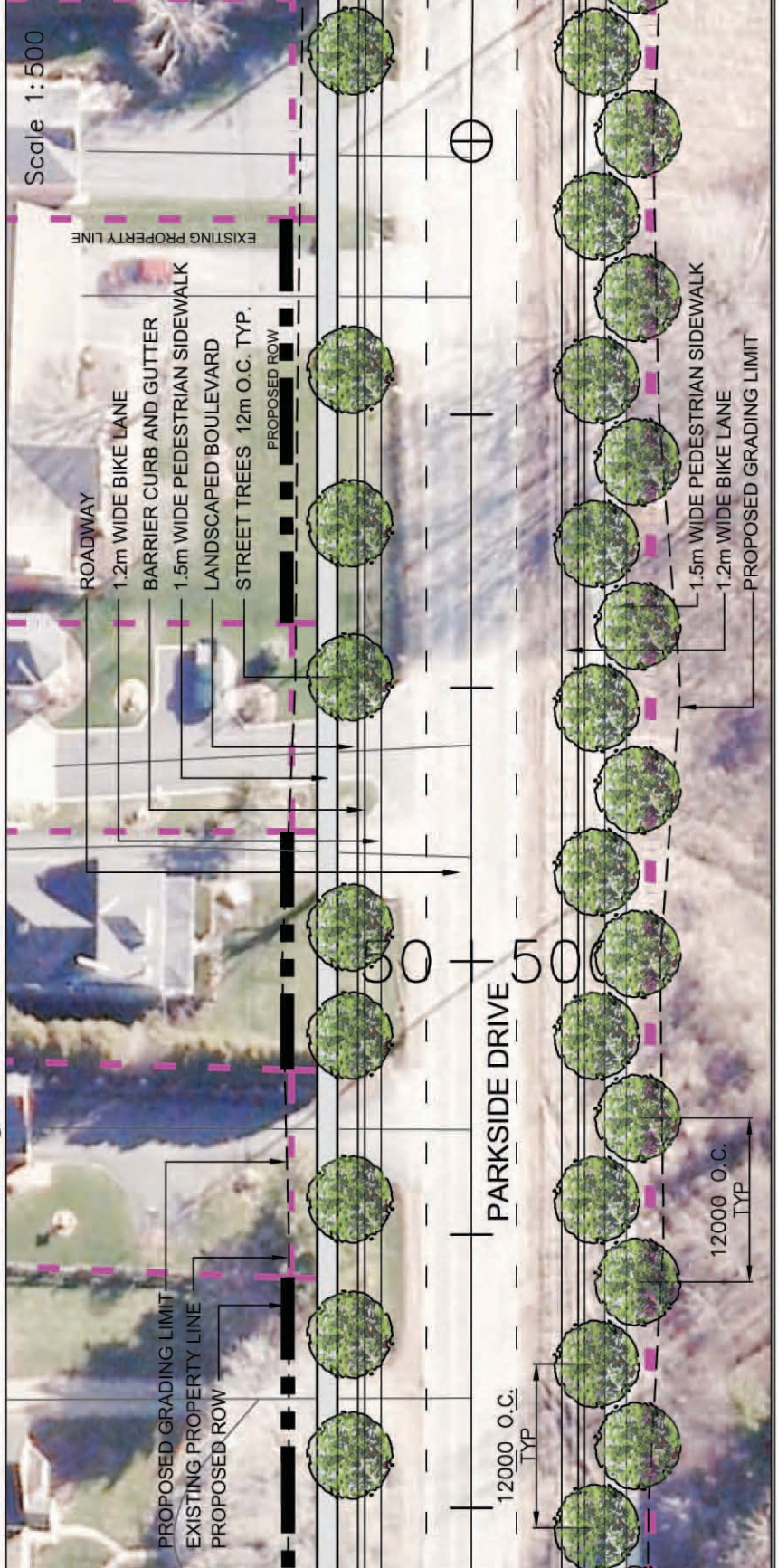
Figure 6-17

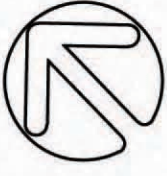


Parkside Drive #421 looking East.



Section thru Parkside Drive looking East. Scale 1:300





**NEW
EAST-WEST
ROAD**

TYPICAL PARKSIDE
DRIVE URBAN
SECTION FROM
BOULDER AVENUE
TO EAST OF
ROBSON ROAD



Scale: As Noted



DILLON
CONSULTING

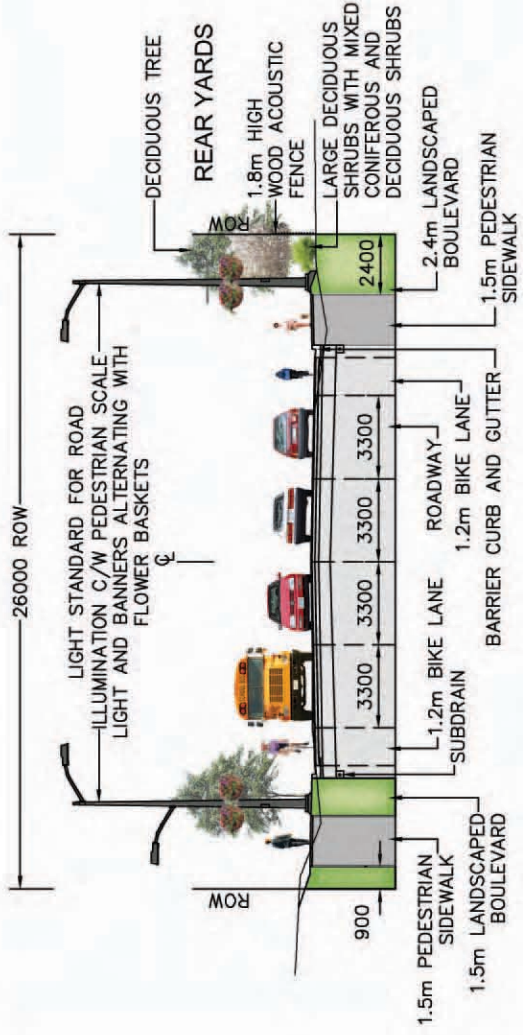


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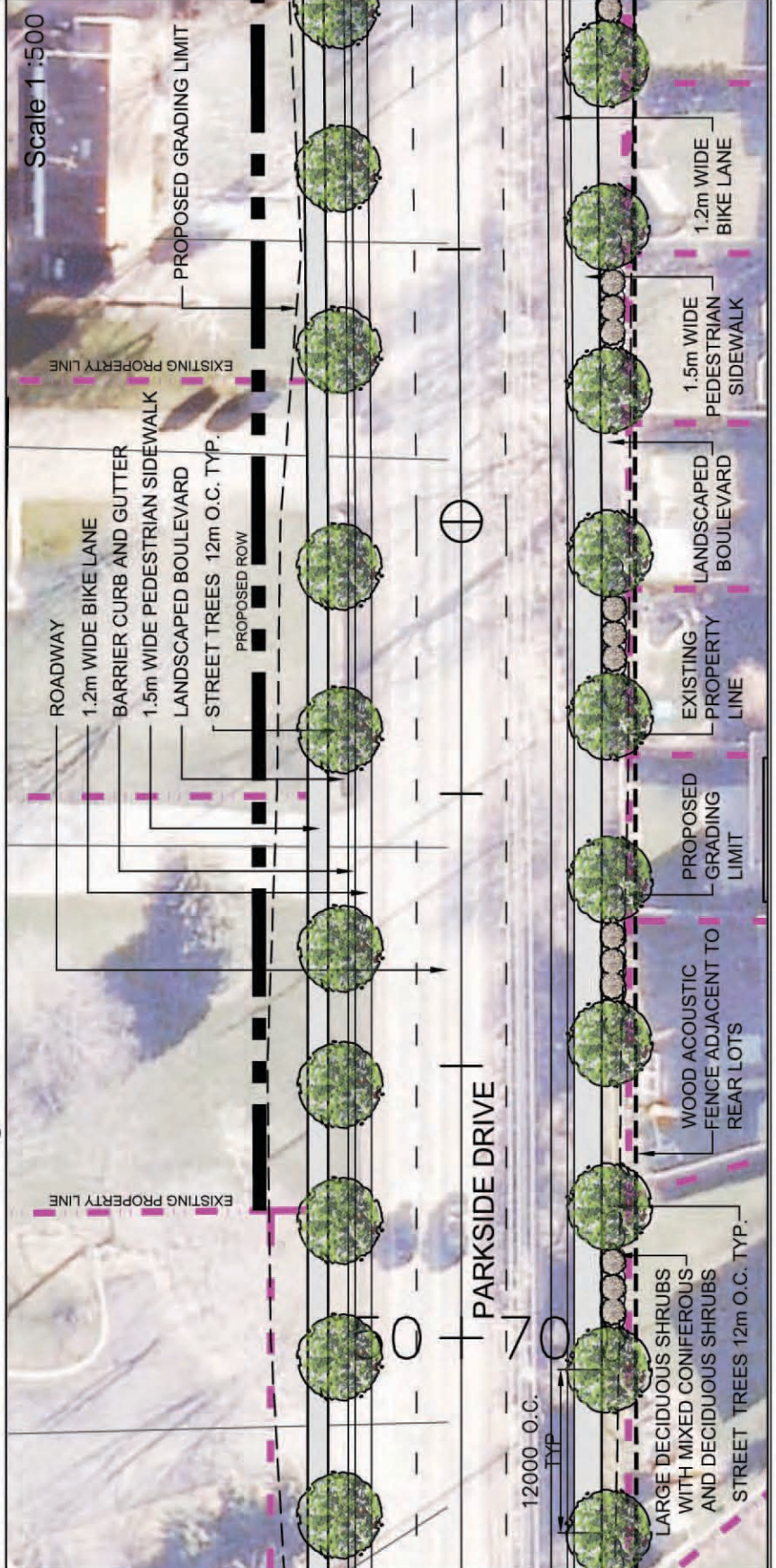
Figure
6-18



Parkside Drive #443 looking East.



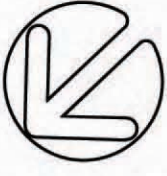
Section thru Parkside Drive looking East. Scale 1:300



Scale 1:500

PARKSIDE DRIVE

12000 O.C.
TYP.



**NEW
EAST-WEST
ROAD**

TYPICAL
EAST-WEST ROAD
SECTION FROM
PARKSIDE DRIVE
TO DUNDAS STREET

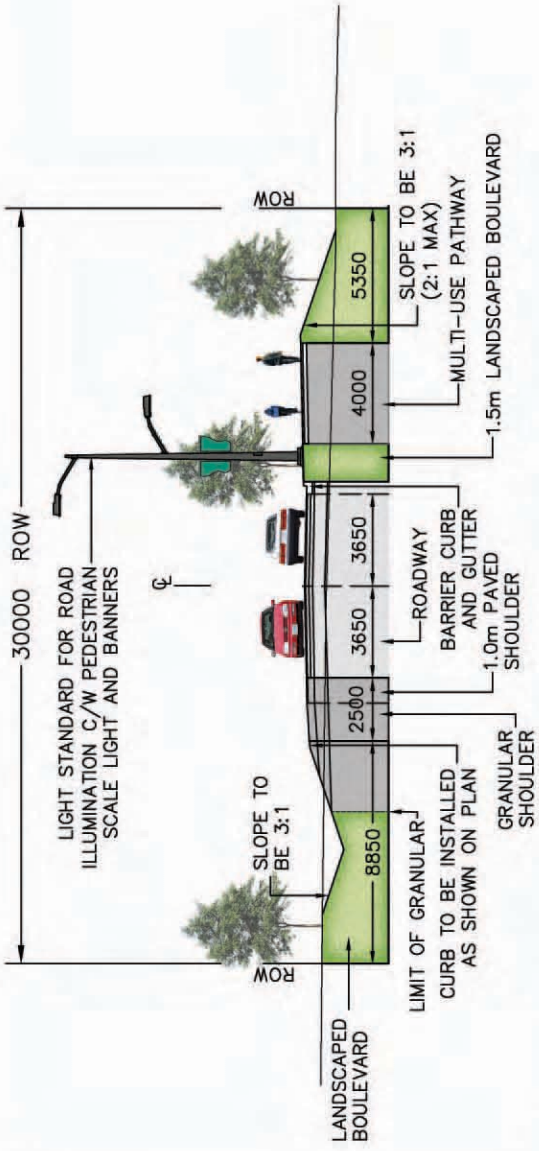
the mbtw group

Scale: As Noted

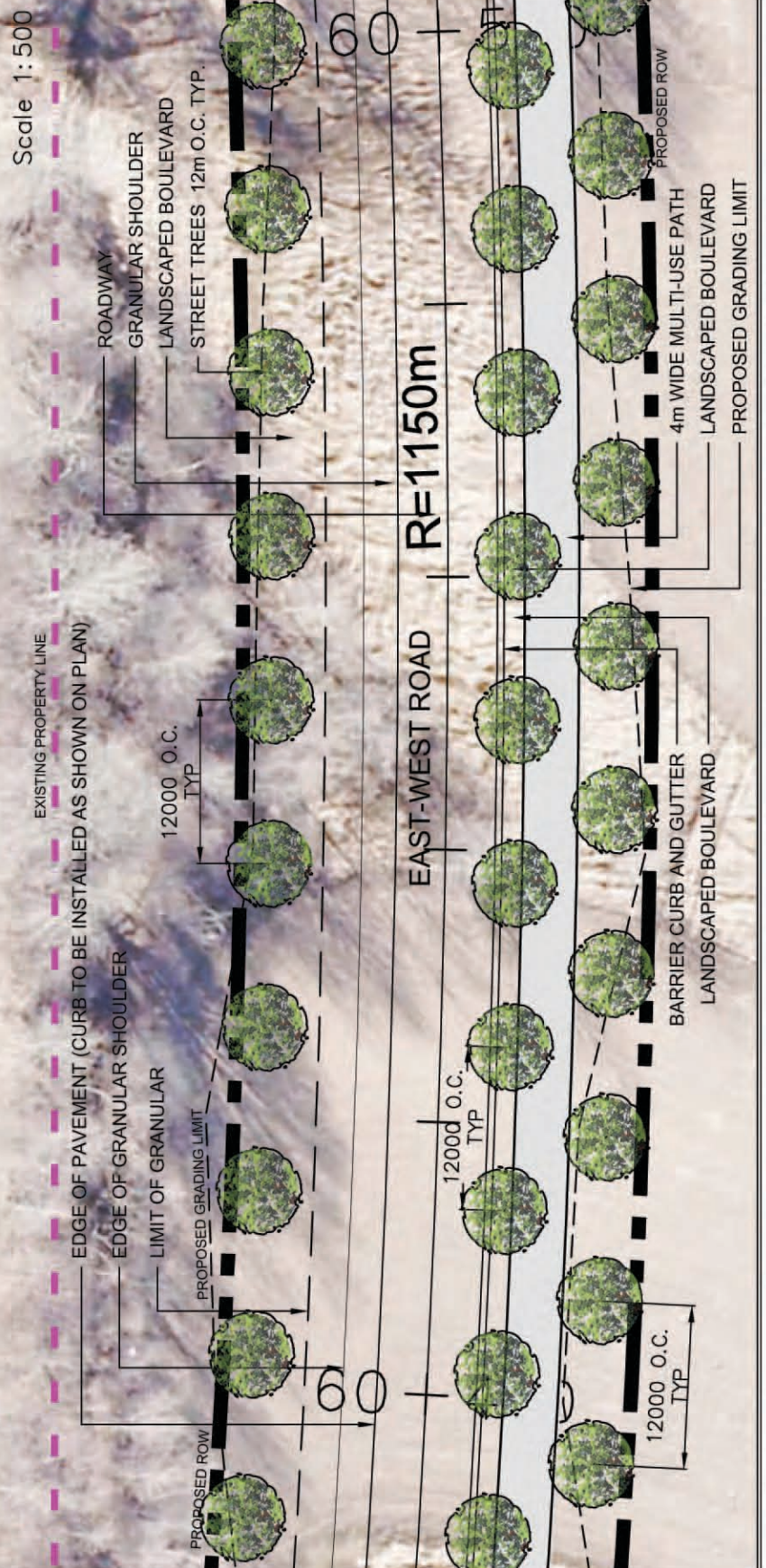


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**Figure
6-19**

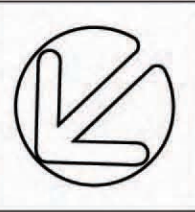
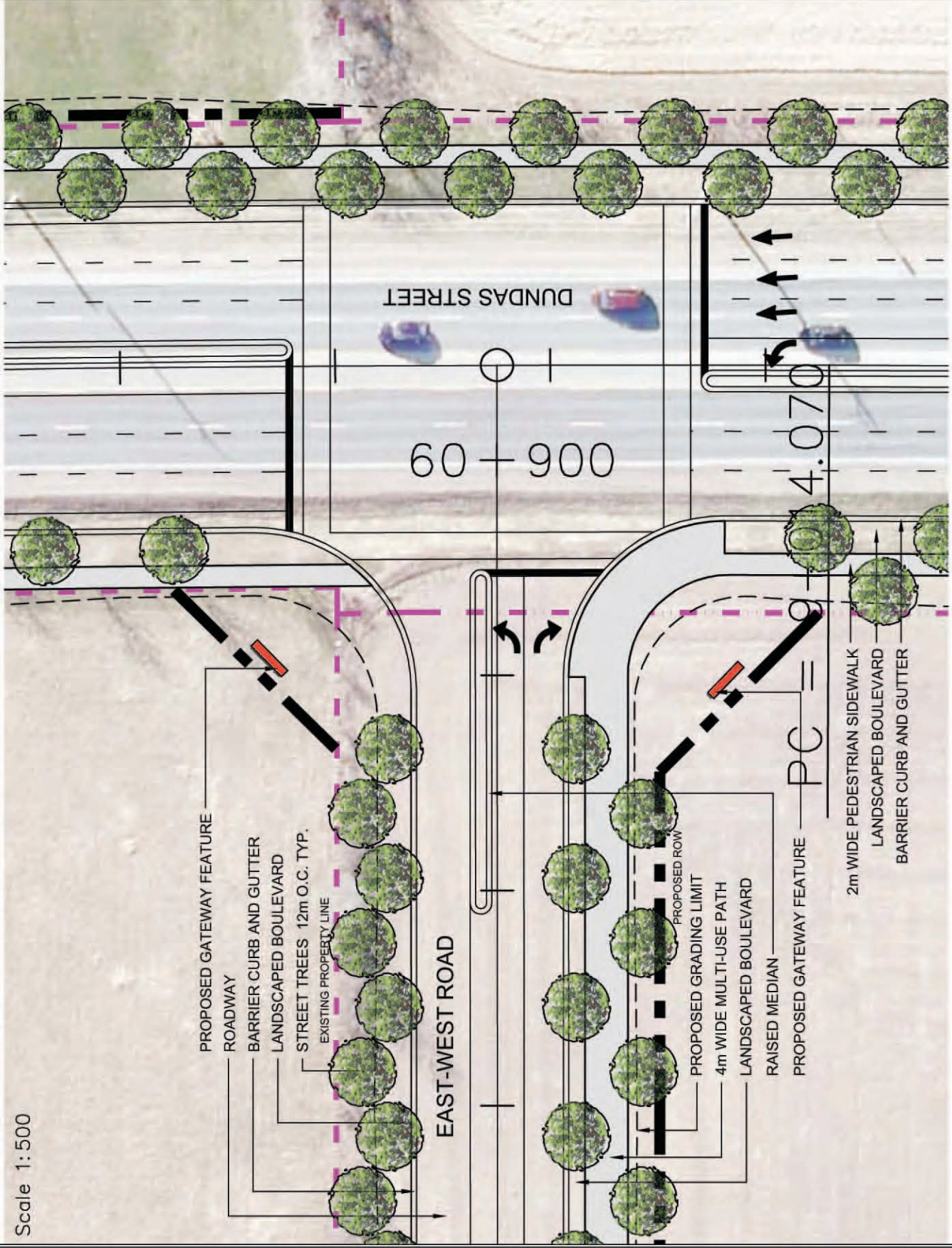


Section thru East-West Road looking South. Scale 1:300 Note: Actual location of roadway to be confirmed in detailed design phase.



Note: Intersection subsequently revised to provide double left turn lane (southbound) on the New East-West Road

Scale 1:500



**NEW
EAST-WEST
ROAD**

GATEWAY FEATURE
LOCATION AT
EAST-WEST ROAD
AND
DUNDAS STREET

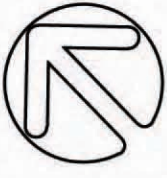
the mbtw group

Scale: As Noted



**Hamilton
Public Works**

**Figure
6-20**



NEW
EAST-WEST
ROAD

TYPICAL DUNDAS
STREET SECTION
EAST-WEST ROAD
TO KERNS ROAD

the mbtw group

Scale: As Noted

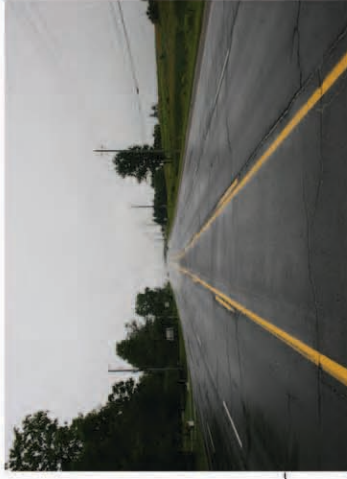


DILLON
CONSULTING

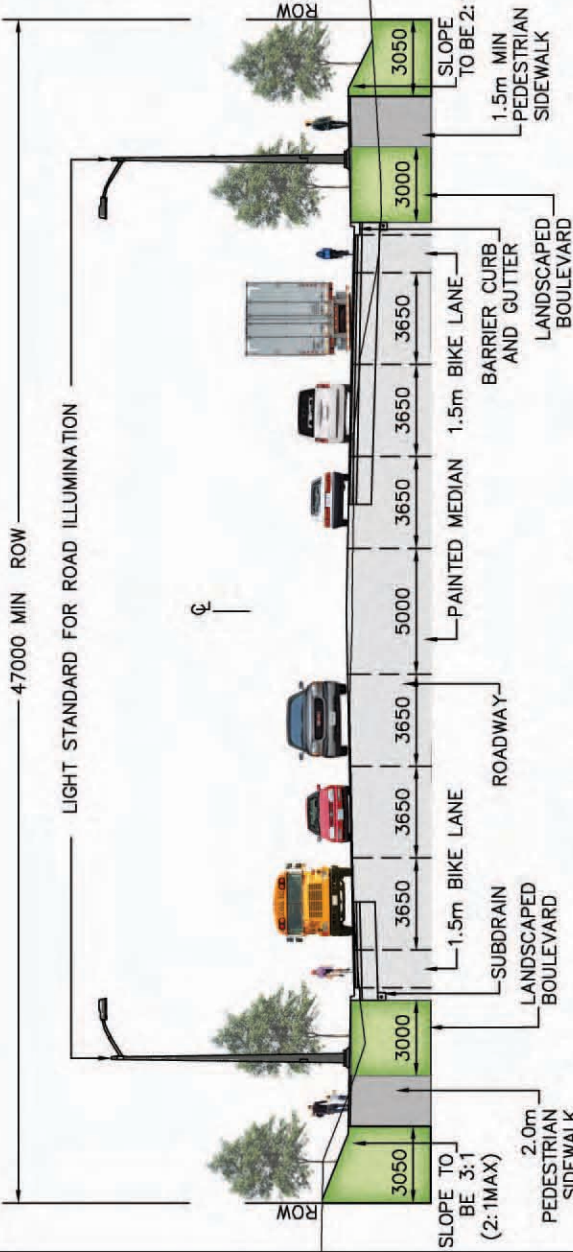


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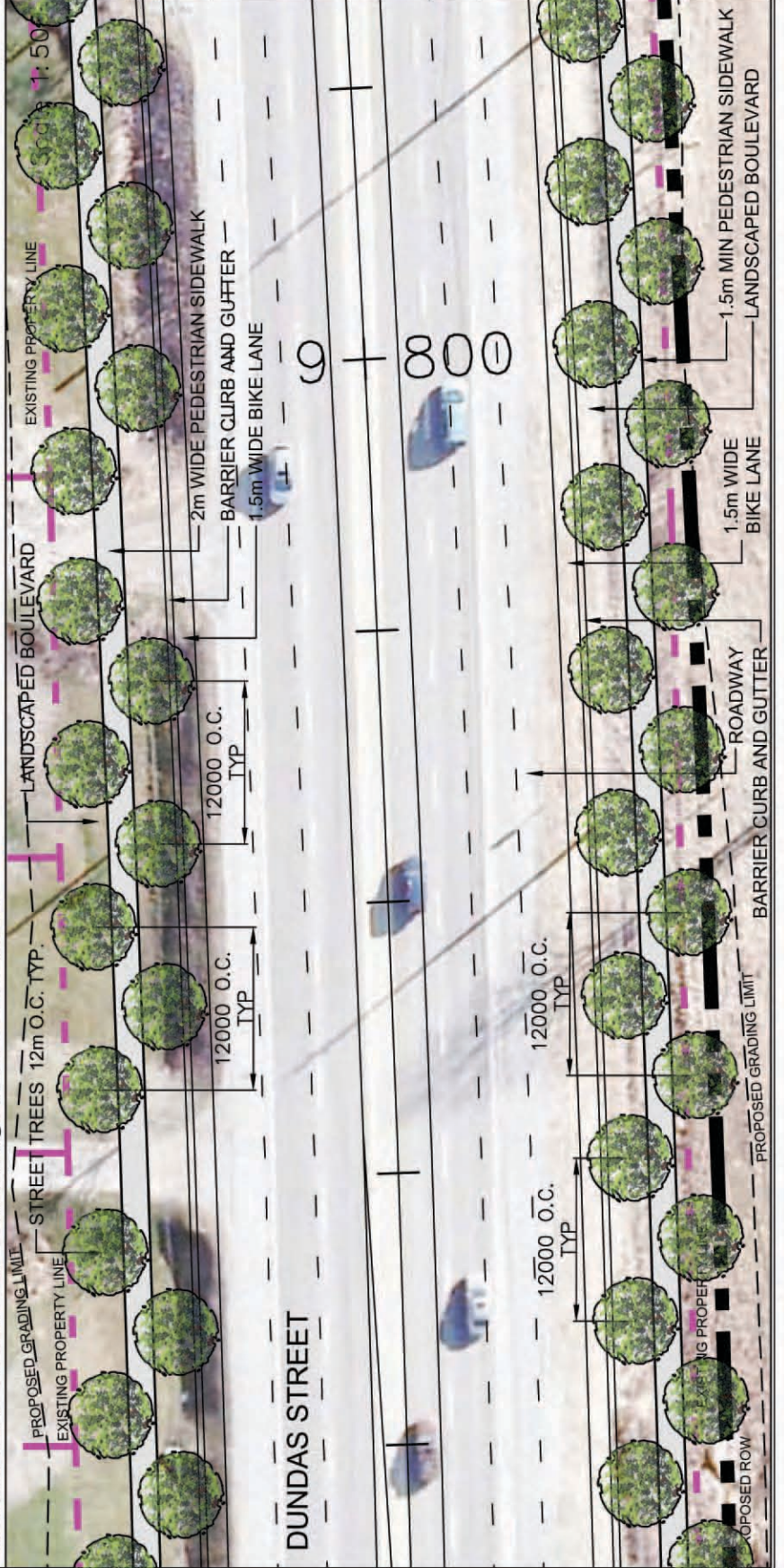
Figure
6-21

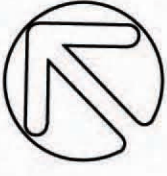


Dundas Street #561 looking East.



Section thru Dundas Street looking East. Scale 1:300





NEW EAST-WEST ROAD

GATEWAY FEATURE LOCATION AT DUNDAS STREET AND KERNS ROAD

the mbtw group

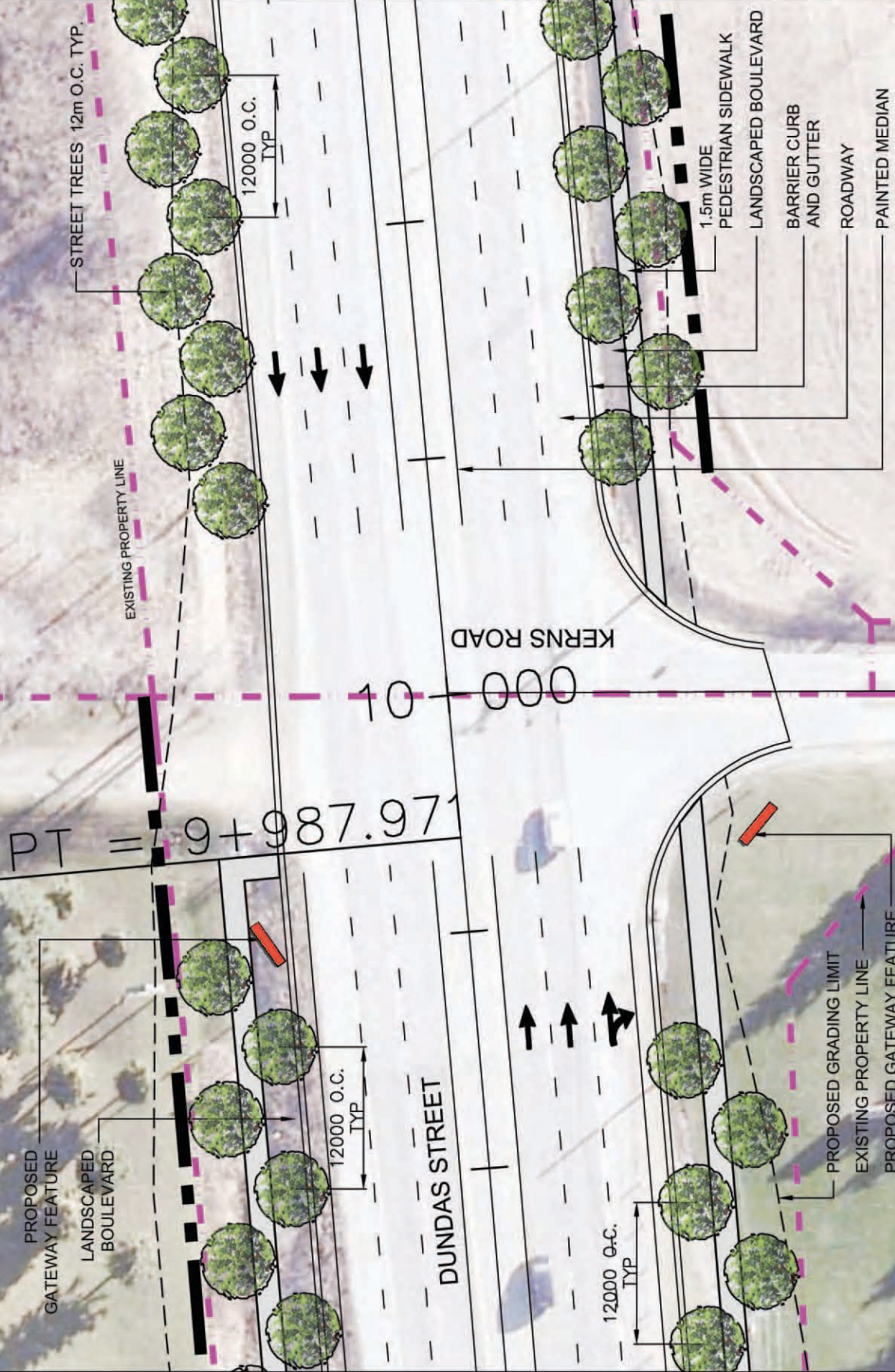
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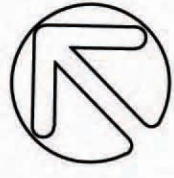


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Figure 6-22

Scale 1:500





**NEW
EAST-WEST
ROAD**

TYPICAL DUNDAS
STREET SECTION
FROM KERNS ROAD
TO BRANT STREET



Scale: As Noted

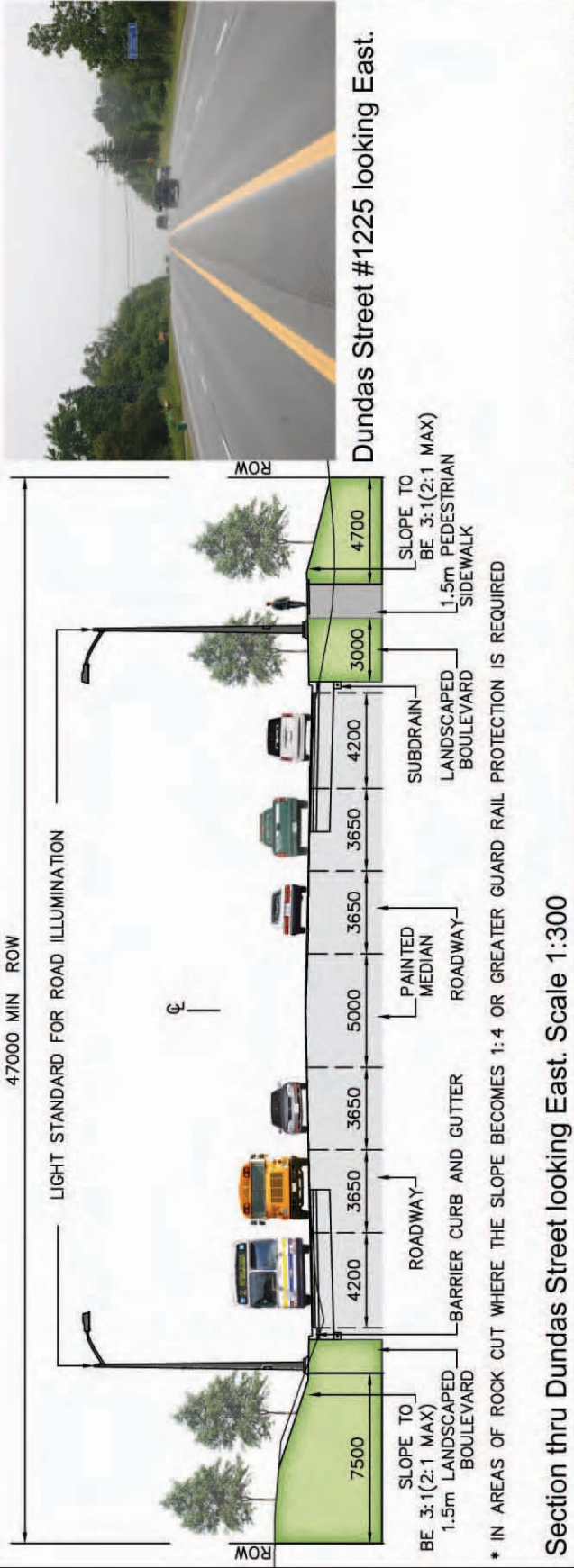


DILLON
CONSULTING

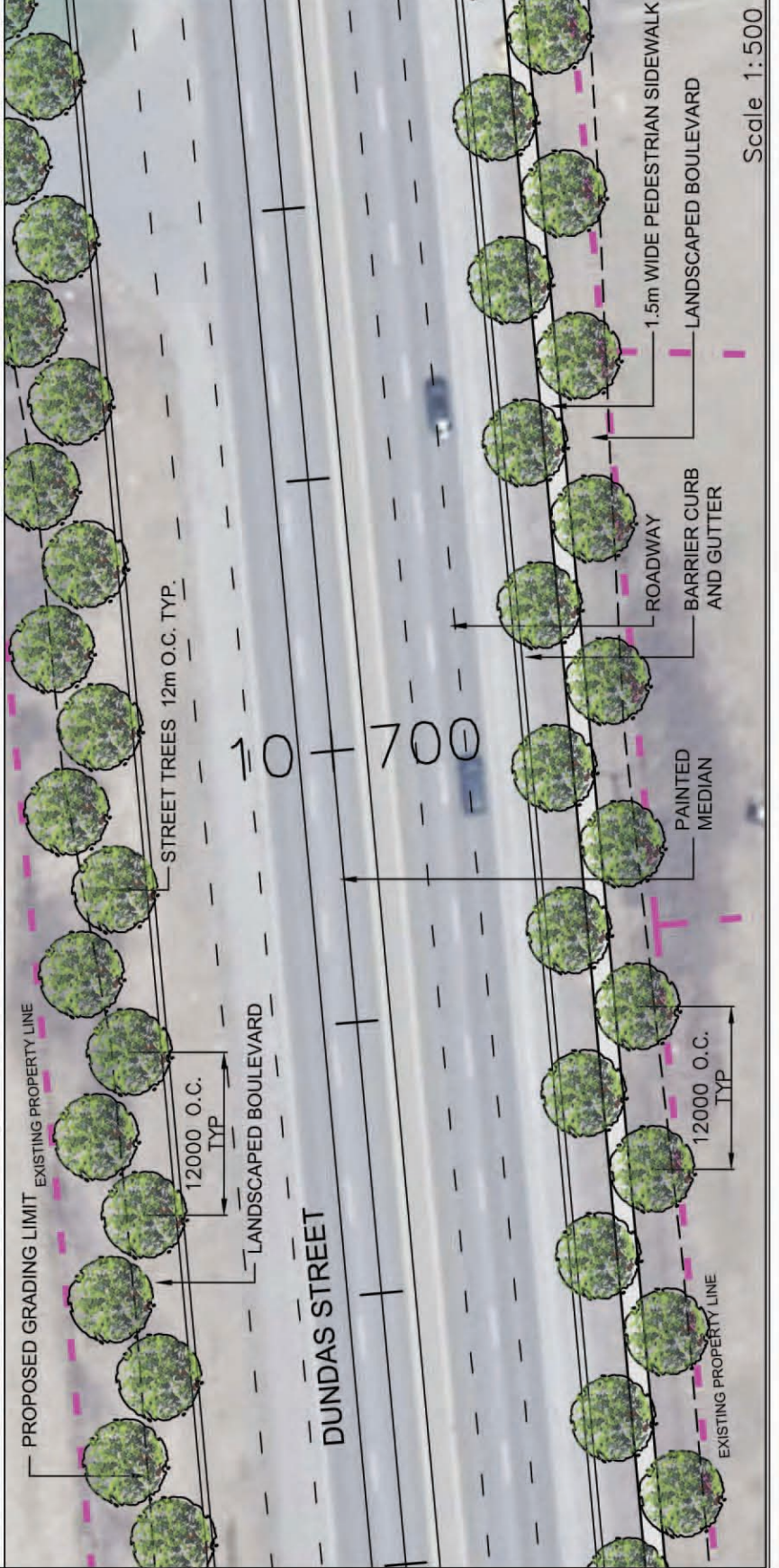


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Public Works

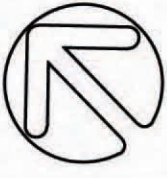
Figure
6-23



Section thru Dundas Street looking East. Scale 1:300

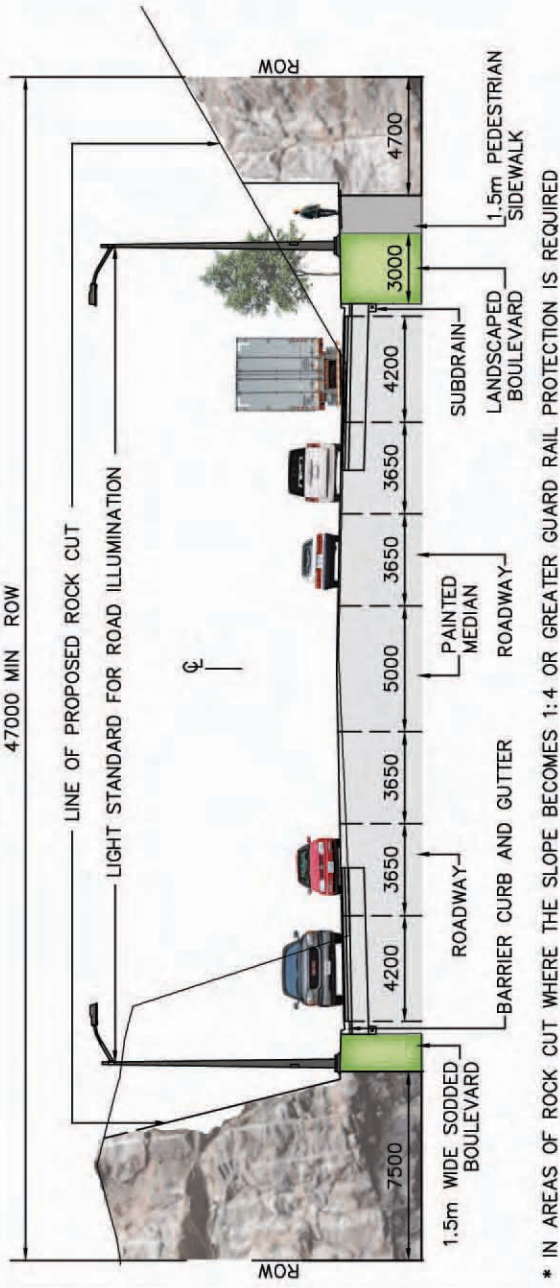


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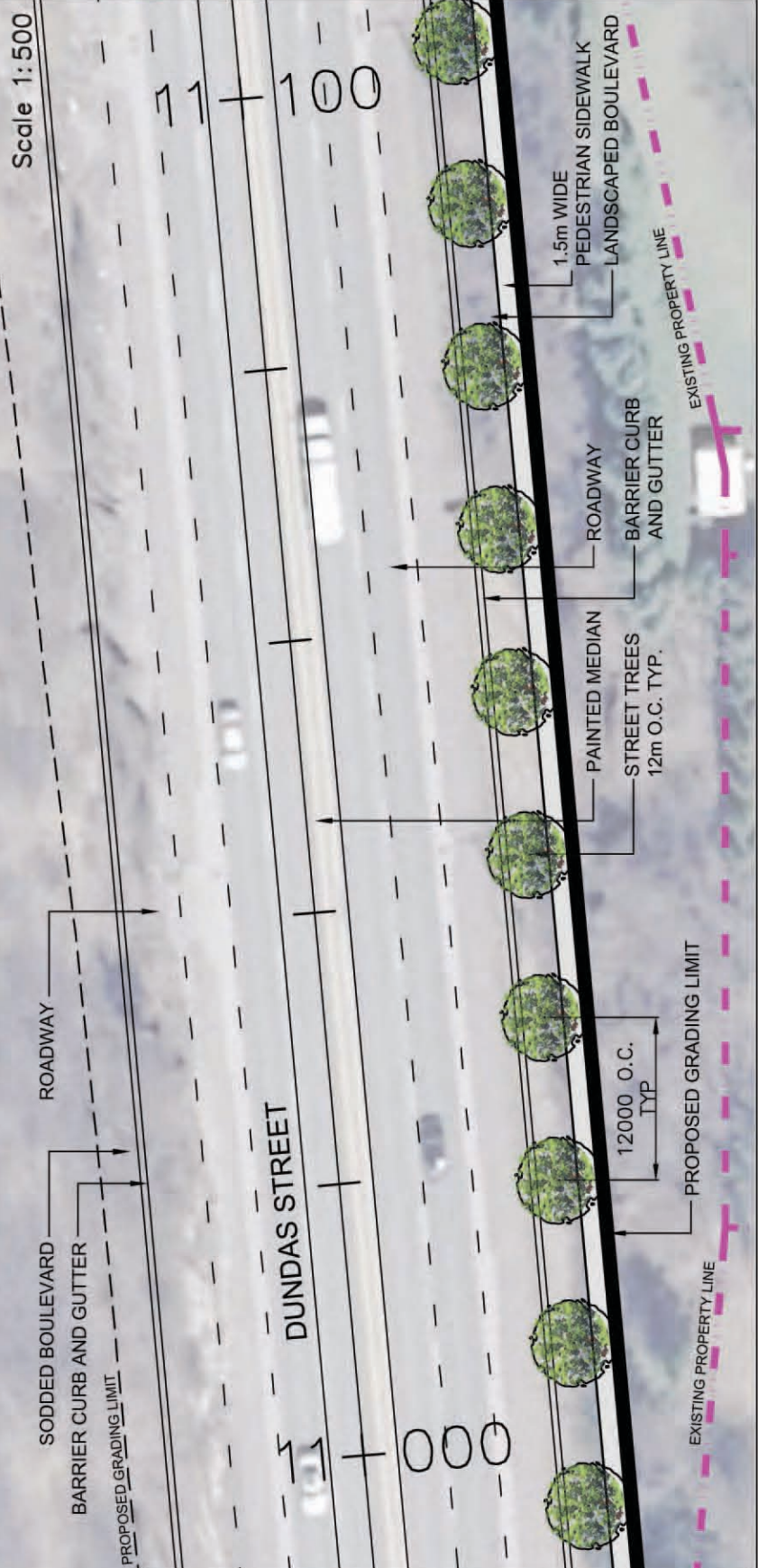
**NEW
EAST-WEST
ROAD**

**TYPICAL DUNDAS
STREET ROCK CUT
SECTION**



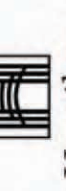
* IN AREAS OF ROCK CUT WHERE THE SLOPE BECOMES 1:4 OR GREATER GUARD RAIL PROTECTION IS REQUIRED

Section thru Dundas Street looking East. Scale 1:300



the mbtw group

Scale: As Noted



**Hamilton
Public Works**

**Figure
6-24**

6.3.8 Geotechnical

The soil within the anticipated depth of excavation for general site grading and road pavement construction is expected to consist of topsoil and fill underlain by predominantly native silty sand/sand and clayey silt/clayey silt till. The surficial 300 to 500 mm in the woodlot east of Centre Road consists of soft/wet organic rich soil. Excavation slopes should be cut at an inclination of 2 horizontal to 1 vertical (2H:1V). A 2 m wide berm with a reverse slope should be provided for earth cuts greater than 6 m high for erosion control and maintenance purposes. Fill slopes should also be inclined at 2H:1V and be provided with a 2 m wide berm with reverse slope if greater than 8 m in height (ref.: OPSD 202.010). An interceptor ditch should be provided at the top of the earth cut (ref.: OPSD 200.020).

Reuse of the native silty sand/clayey silt as bulk fill in other areas of the project is considered to be suitable. Reuse of the organic rich soil in the woodlot is not suitable for bulk fill but should be suitable for use as topsoil during final grading. The predominant soil type to be exposed in earth cuts in the section from Highway 6 to the pedestrian walkway east of Centre Road is likely to comprise silty sand/sand and clayey silt. In the remaining section to Brant Street based on visual observations and experience are sand/sandy soils that are classified as low and moderately erodible. Conventional erosion protection systems on exposed slopes should be suitable.

The preliminary design drawings indicate excavation of bedrock will be required for widening of Dundas Street within the existing rock cut at the escarpment between Stations 10+975 to 11+125. Excavation of the shaley rock and some of the dolostone/limestone rock by mechanical means (line drilling, hoe ram, jack hammering and/or rock splitting) should be feasible.

It is expected that blasting of the limestone/dolostone with widely spaced joints and bedding planes will be required and implementation of measures to minimize the potential for structural damage to existing underground utilities and nearby buildings implemented. This could involve seismic monitoring during blasting operations as well as a photographic and condition survey of nearby foundations/buildings prior to construction to document existing deficiencies. It is noted that the Niagara Escarpment Commission has requested that alternatives to rock blasting be investigated. This will be assessed in the detailed design phase of the project.

The subgrade for the pavement structure is expected to consist predominantly of silty sand/clayey silt. Based on the estimated strength and frost susceptibility of the anticipated subgrade and assuming adequate drainage, it is considered that the standard pavement structure for a major arterial road will be suitable. Based on the estimated strength and frost susceptibility of the anticipated subgrade and assuming adequate drainage, it is considered that the standard City of Hamilton pavement structure (*Table 6-37*) for a major arterial will be suitable:

Table 6-37: Pavement Structure

Pavement Component	Thickness (mm)
Top Course - Asphaltic Concrete HL-1	40
Binder Course - Asphaltic Concrete HL-8 (HS)	120
Granular A Base Course	150
Granular B Type II Subbase Course	450

Conventional procedures are considered to be suitable for preparation of the subgrade as well as construction of the pavement structure and associated drainage.

BORER’S CREEK OVERPASS STRUCTURE

Borehole 4, advanced in the vicinity of Borer’s Creek, encountered very loose to loose silty sand with soft to firm clayey silt layers to 2.1 m depth, and compact silty sand and stiff to very stiff clayey silt to 3.7 m depth. Hard clayey silt till was penetrated below this depth to the auger refusal depth of 6.9 m. Deep foundations consisting of H or pipe pile sections driven to bedrock are the preferred foundation system to support the overpass structure. For preliminary design purposes, an allowable capacity equivalent to 60% of the structural capacity of the pile section selected is considered to be suitable.

Use of spread footings constructed on the hard silt till encountered at a depth of 3.7 m could be considered to support the structure. It should be noted however that excavations to 3.7 m depth along with implementation of groundwater control methods will be required for this option. Caissons bearing on the hard till at a depth of 4.0 m are also considered to be a suitable foundation system. It is anticipated however, that basal heave/loss of soil is likely to be experienced when drilling through the silty sand below the water table. The following bearing resistance, shown in **Table 6-38**, is suitable for preliminary design of shallow foundations and caissons.

Table 6-38: Bearing Resistances at Borer’s Creek

	Hard Till About 3.7 m Below Grade (kPa)
Factored Bearing Resistance at Ultimate Limit State (ULS)	900
Bearing Resistance at Serviceability Limit State (SLS)	600

PEDESTRIAN WALKWAY STRUCTURE

Borehole 7, advanced near the pedestrian walkway, penetrated very loose to loose silty sand to the termination of drilling on assumed bedrock at 12.8 m depth. H or pipe pile sections driven to bedrock encountered at 12.8 m depth are the preferred foundation type for supporting this structure from a geotechnical perspective. An allowable capacity equivalent to 60% of the structural capacity of the pile section selected is considered to be suitable for preliminary design.

GRINDSTONE CREEK

Borehole 9 advanced in the vicinity of the Grindstone Creek crossing, identified the presence of loose to compact sandy silt fill to 2.1 m depth. Cobbles and concrete pieces were observed in the upper 1.4 m of this material while charcoal and slag were observed below 1.4 m. A thin layer of firm alluvial silt underlain by a loose sand layer was contacted to 2.9 m depth below the fill. Compact to very dense sandy silt till was encountered below the sand layer to 8.8 m depth, where refusal to the drilling equipment was encountered. Similar to the Borer’s Creek, deep foundations consisting of H or pipe pile sections driven to bedrock are the preferred foundation type for supporting the Grindstone Creek crossing. For preliminary design purposes an allowable pile capacity consisting of 60% of the structural capacity of the pile section selected is considered to be suitable.

Shallow foundations may be considered to support the structure, however, excavation to 2.9 m depth along with groundwater control methods to keep the foundation excavation dry will be required for this option. Alternatively caissons bearing on the compact to dense sandy silt till at 2.9 m depth could be considered.

The following bearing resistance, shown in *Table 6-39*, is suitable for preliminary design of shallow foundations and caissons:

Table 6-39: Bearing Resistances at Grindstone Creek

	Compact to Dense Till About 2.9 m Below Grade (kPa)
Factored Bearing Resistance at Ultimate Limit State (ULS)	600
Bearing Resistance at Serviceability Limit State (SLS)	400

CULVERT REPLACEMENT ON DUNDAS STREET

Borehole 13, drilled at the location of the culvert replacement on Dundas Street encountered topsoil fill to 1.4 m depth underlain by very stiff to hard silt till to the auger refusal on probable bedrock at a depth of 2.6 m. The culvert replacement should be supported by footings founded on bedrock at 2.6 m depth. A factored bearing resistance of 4000 kPa is recommended for sizing footings bearing on bedrock for preliminary design purposes. Appropriate measures will be required to deal with the flow of water during construction of the foundation.

PROPOSED RETAINING WALLS – DUNDAS STREET

The preliminary design drawings indicate construction of two retaining walls is planned in this area, one on the south side of Dundas Street from Station 10+975 to 11+125 and one on the north side from Station 11+175 to 11+475. It is considered that use of spread footings founded on bedrock or the very stiff to hard clay till indigenous to this area are feasible means of supporting the retaining walls. A factored bearing resistance at ULS of 300 kPa and 200 kPa at SLS is considered to be suitable for preliminary design of footings constructed on the clay till.

6.3.9 Entrance Treatments

HIGHWAY 6

Two driveways along Highway 6 will be directly impacted by the construction of the proposed New East-West Road Corridor. The driveway at 687 Highway 6 is currently located directly across from the proposed westbound turning lanes. It is proposed to re-align this driveway slightly to the south to line up with the proposed eastbound lanes. This should eliminate any potential driver confusion approaching the intersection. Screening (trees) will be provided opposite the westbound lanes to reinforce the fact the road terminates at this location. See *Exhibit 6-21* for the proposed layout.

The driveway at 689 Highway 6 will be located in front of a raised traffic island creating a right-in, right-out situation. The driveway cannot be easily realigned without acquiring property easements from adjacent owners. Nonetheless, this option should be further explored in detailed design. Other possibilities for providing continued access include shortening the proposed traffic island. The location of this driveway can also be seen in *Exhibit 6-21*.

PARKSIDE DRIVE

As previously discussed, a portion of Parkside Drive will be realigned in the vicinity of the West Parkside Drive Roundabout to maintain continued access west of the roundabout. The existing road will be maintained (even though it has been re-aligned) and cul-de-sacked in order to provide driveway access to residents at 374, 376, 380, and 386 on the south side of the road. In addition to the above, the driveway into 383 Parkside Drive (Cannon Nurseries) on the north side of the road will also need to be realigned. The proposed layout at this location is shown in *Exhibit 6-22*.

In the vicinity of the East Parkside Drive Roundabout, it will be necessary to realign the driveways to 487 and 497 Parkside Drive to maintain continued access. The proposed layout at this location is shown in *Exhibit 6-23*. This layout will need to be finalized as part of the roundabout/Upcountry alignment modifications that will be assessed as part of this development.

There are approximately 29 existing driveways along the segment of Parkside Drive that will be impacted by the proposed works. The majority of these driveways are located on the north side of the road. Although some minor changes are proposed to the existing road profile, it is expected that the proposed works will not negatively impact the vast majority of these. Driveways on the north side of the road will also require an adjustment in their grades in order to match the new road edge of pavement.

A few residents on this stretch of road currently back out onto Parkside Drive into a live lane of traffic. Although this condition cannot be easily eliminated due to property constraints (i.e. turnarounds cannot be installed); the addition of sidewalks and boulevards, as well as the

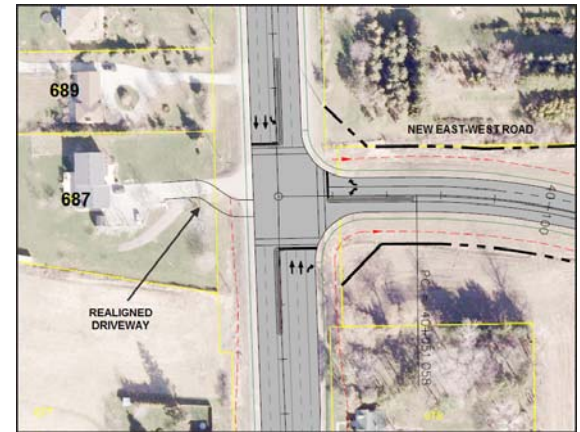


Exhibit 6-21: Proposed Driveway Realignment



Exhibit 6-22: Parkside Drive realignment at West Roundabout

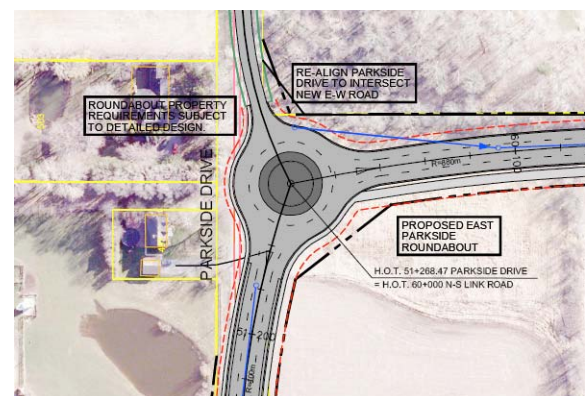


Exhibit 6-23: Parkside Drive realignment at East Roundabout

addition of bicycle lanes and an extra lane of traffic will provide an improvement from the existing conditions. The reduction in posted speed will also aid in improving the overall safety of the corridor.

DUNDAS STREET

There are approximately 36 existing driveways along Dundas Street - 23 of which are located within the City of Hamilton and the remainder located in Halton Region. The vast majority of driveways within the Hamilton boundary are located on the north side of the road. The proposed profile for Dundas Street will match the existing to the extent possible and it is expected that the proposed works will not negatively impact these driveways. All driveways will require an adjustment in grade to match the new edge of pavement.

6.3.10 Intersection Treatments

NEW EAST-WEST ROAD, FROM HIGHWAY 6 TO PARKSIDE DRIVE

Starting at the west project limits and travelling east, the following roads intersect the New East-West Road:

- **Highway 6** – This major north-south highway is under the jurisdiction of the MTO. The New East-West Road will connect to Highway 6 on the east side only, forming a ‘T’ type intersection. It is proposed to signalize the intersection between these two roads. A new northbound right-turn lane and a southbound left-turn lane will be incorporated into the intersection design. The MTO will need to be consulted during the detailed design phase to finalize the specifics of this intersection.
- **Waterdown North Roundabout** – It is proposed to install a single lane roundabout at the western limits of the Waterdown North development lands. This will serve to alert drivers of the difference in road designation from rural to urban. The roundabout will have an inscribed circle diameter of 36 m and be designed to accommodate the turning path of a WB-19 design vehicle. For the proposed layout at this location, please refer to *Exhibit 6-24*.
- **Subdivision Sideroads** – Construction and layout of subdivision sideroads connecting with the New East-West Road will be the responsibility of adjacent developers and must be approved by the City of Hamilton.
- **Centre Road** – This road is under the jurisdiction of the City of Hamilton. It connects with the New East-West Road at a new four-leg intersection. It is proposed to signalize the intersection between these two roads and add north and southbound turning lanes on Centre Road. For the proposed layout at this intersection, please refer to *Exhibit 6-25*.
- **West Parkside Drive Roundabout** – Parkside Drive is a minor arterial road under the jurisdiction of the City of Hamilton. It will be locally realigned to connect with the New East-West

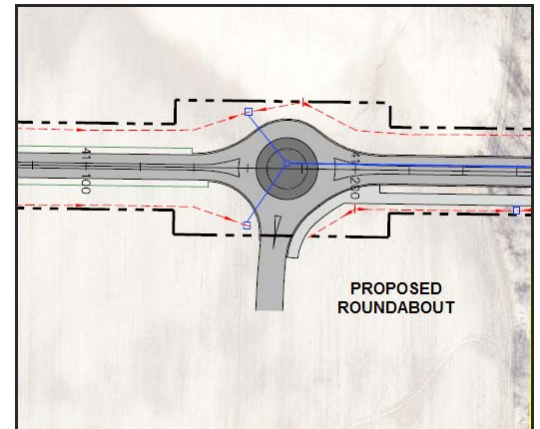


Exhibit 6-24: Waterdown North Roundabout

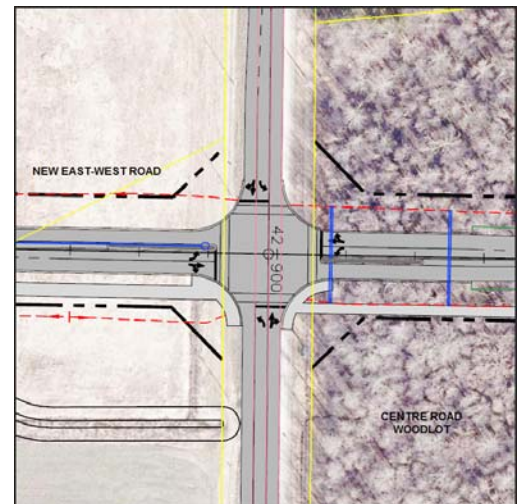


Exhibit 6-25: Centre Road Intersection

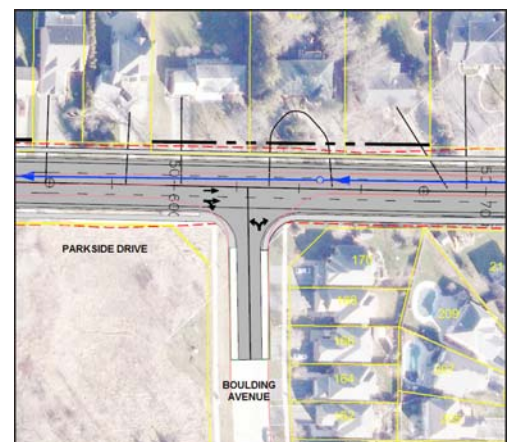


Exhibit 6-26: Boulding Avenue Intersection

Road at the proposed West Parkside Drive Roundabout. The new roundabout will have an inscribed circle diameter of 52 m and will accommodate the turning path of a WB-19 design vehicle. The proposed layout at this location can be seen in Exhibit 6-22.

PARKSIDE DRIVE WIDENING

Continuing from the West Parkside Drive Roundabout and travelling east, the following side roads intersect Parkside Drive:

- **Boulding Avenue** – This road is under the jurisdiction of the City of Hamilton. It connects with Parkside Drive on the south side only, forming a ‘T’ type intersection. This existing road, located approximately 300 m east of the existing CP Rail line is currently stop-controlled with vehicles on Boulding Avenue yielding to vehicles on Parkside Drive. It is proposed to maintain the stop-control intersection arrangement. For the proposed layout at this intersection, please refer to *Exhibit 6-26*.
- **Robson Road** – This road is under the jurisdiction of the City of Hamilton. It connects with Parkside Drive on the north side only, forming a ‘T’ type intersection. This existing road, located approximately 230 m east of Boulding Avenue is currently stop-controlled with vehicles on Robson Road yielding to vehicles on Parkside Drive. It is proposed to maintain the stop-control intersection arrangement. For the proposed layout at this intersection, please refer to *Exhibit 6-27*.
- **East Parkside Drive Roundabout** – Parkside Drive will be widened to four lanes and a two lane roundabout is proposed at the location where Parkside Drive connects with the proposed Upcountry link. East of the roundabout, Parkside Drive will be locally realigned to connect with the proposed East Parkside Drive Roundabout. The new roundabout will have an inscribed circle diameter of 52 m and will accommodate the turning path of a WB-19 design vehicle.

DUNDAS STREET

Continuing from the East Parkside Drive Roundabout and travelling south, there are no intersections proposed within the Upcountry Estates development lands. The next intersection is Dundas Street. Starting at this intersection and travelling east, the following roads intersect Dundas Street:

- **New Upcountry Link** – The New East-West Road will connect to Dundas Street on the north side only, forming a ‘T’ type intersection. It is proposed to signalize the intersection between these two roads. A new eastbound left-turn lane is proposed on Dundas. A southbound left-turn lane is also incorporated into

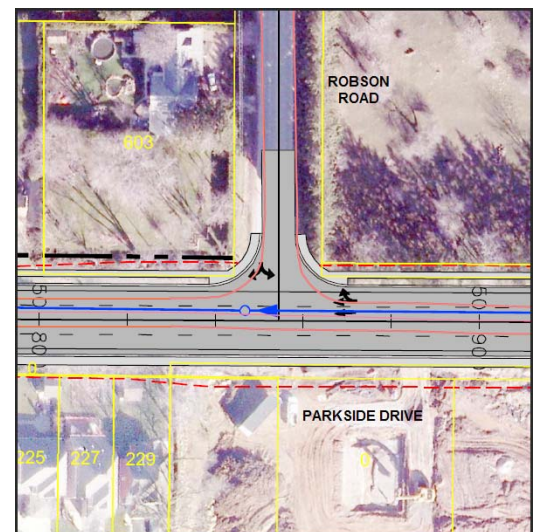


Exhibit 6-27: Robson Road Intersection

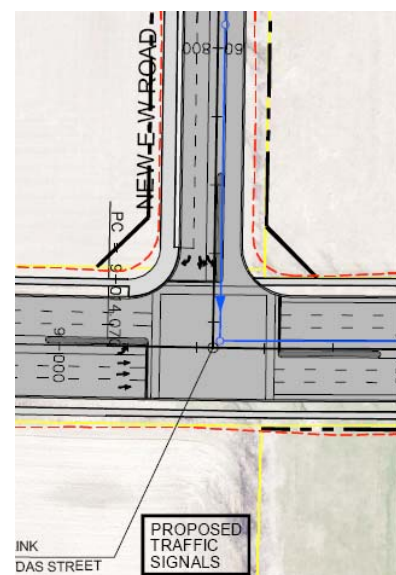


Exhibit 6-28: Dundas Street Intersection

the intersection design. The layout of this intersection is depicted in *Exhibit 6-28*.

- **Evans Road** – This road is under the jurisdiction of the City of Hamilton. It connects with Dundas Street forming a ‘T’ type intersection. This existing road, located approximately 490 m east of the New Upcountry connection road, is currently signalized. It is proposed to maintain the signalized intersection arrangement. For the proposed layout at this intersection, please refer to *Exhibit 6-29*.
- **Kerns Road** – This road is under the jurisdiction of the City of Burlington. It connects with Dundas Street on the south side only, forming a ‘T’ type intersection. This existing road, located approximately 470 m east of Evans Road is stop-controlled with vehicles on Kerns Road yielding to vehicles on Dundas Street. It is proposed to maintain the stop-controlled intersection arrangement. The requirement for traffic signals will be assessed during detailed design. As indicated in Section 5.10 the relocation of the existing Dundas Street/Bruce Trail crossing (located just east of Kerns Road) to Kerns Road has been recommended. With this relocation traffic signals will be required at Kerns Road. For the proposed layout at this intersection, please refer to *Exhibit 6-30*.
- **Brant Street/Cedar Springs Road** – This road is under the jurisdiction of Halton Region on the south side and the City of Burlington on the north. The road intersects with Dundas Street to form a full intersection. Brant Street is located approximately 1.56 km east of Kerns Road. The intersection is currently signalized and it is proposed to maintain the signalized arrangement. Double left-turning lanes will be added to in the westbound and northbound directions. The intersection will need to be relocated slightly to the west in order to mitigate property impacts in the north-east quadrant. For the proposed layout at this intersection (plan and profile), please refer to the plates at the end of this chapter.

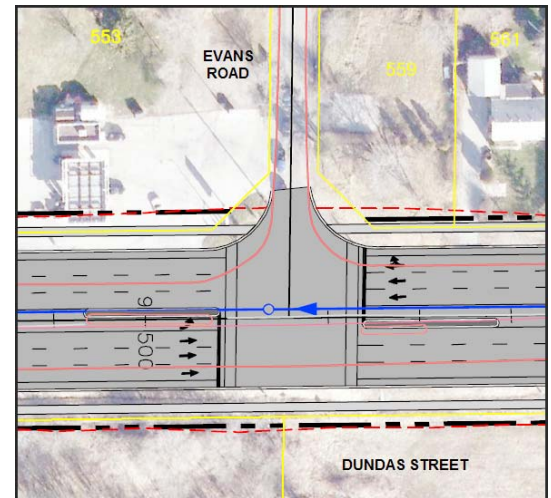


Exhibit 6-29: Evans Road Intersection

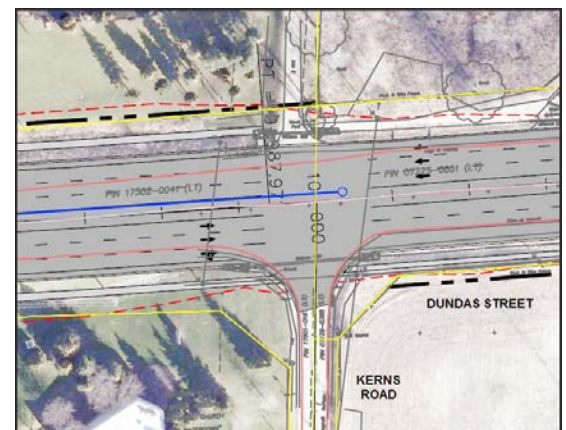


Exhibit 6-30: Kerns Road Intersection

6.3.11 Property

Right-of-way requirements for the New East-West Road Corridor, which are described in this section, are subject to detailed design. In general, the basic right-of-way requirements are as follows:

- A right-of-way of 36 m is proposed along the New East-West Road Corridor from Highway 6 to the Waterdown North development lands and from east of Centre Road to Parkside Drive.
- Through the Waterdown North development lands, a road right-of-way of 32 m is proposed.
- A right-of-way of 26 m is proposed along Parkside Drive. This is consistent with the historical right-of-way allowance that the City has been protecting for.

- A right-of-way of 30 m is proposed through the Upcountry Estates development lands.
- A right-of-way of 47 m is proposed along Dundas Street, both in the City of Hamilton and in Halton Region.

Additional right-of-way may be required at some locations to accommodate grading. The extent of property requirements is shown on the plates at the end of this report and is summarized in **Table 6-40** below. It is noted that these property requirements are preliminary and should be confirmed during detailed design. In the Halton Region section of Dundas Street it is recommended that the Region's new Sustainable Halton/ROPA 50 m right-of-way standard for Dundas Street be considered in those areas where additional property will be required to accommodate the proposed widening. A general right-of-way width of 46 m currently exists for most of Dundas Street.

Table 6-40: Property Requirements

Property Affected (Address and/or Location)		Approx. Additional Property Required	Comments
<i>New East-West Road (Excluding Waterdown North Development)</i>			
1	654 Highway 6	STA 40+022 to STA 40+260	1.26 ha ± - Mushroom farming operation fronting onto Highway 6 - Severed land north of road ROW to be acquired - Full access from Highway 6 maintained
2	XX Parkside Drive	STA 40+260 to STA 40+558	0.98 ha ± - Agricultural land parcel - not clear if land is farmed - Property to the north of new road ROW is severed - Property fronts onto Parkside Drive - no defined driveway.
3	63 Parkside Drive	STA 40+558 to STA 41+038	1.79 ha ± - Agricultural land parcel. Land appears to be farmed - Property to the north of new road ROW is severed - Property fronts onto Parkside Drive - Property access (south of road ROW) is maintained
4	Address # not applicable - (City owned Property, Centre Road Woodlot)	STA 42+910 to STA 43+135 and STA 43+380 to STA 43+613	1.67 ha ± - Property is part of the Centre Road Woodlot - Property fronts onto Centre Road and Concession 5 Road - Property forms part of the Joe Sam's Park complex
5	752 Centre Road	STA 42+135 to STA 42+380	0.88 ha ± - Property is privately owned - Undeveloped property fronting onto Parkside Drive - No access exists onto Parkside Drive or Centre Road
6	Address # not applicable (STA 43+613 to STA 43+991	1.36 ha ± - Agricultural land parcel. Land appears to be farmed - Property to the north of new road ROW is severed - Property fronts onto Parkside Drive - Property access (south of road ROW) is maintained
<i>Parkside Drive - North Side</i>			
7	383 Parkside Drive	STA 43+991 to STA 50+300	1.88 ha ± - Property is site of the Connon Nurseries operation - Property south of ROW will be severed - Property fronts onto Parkside Drive - Access to property will be maintained
8	411 Parkside Drive	STA 50+394 to STA 50+400	0.002 ha ± - Property is privately owned - Property fronts onto Parkside Drive - no defined driveway
9	415 Parkside Drive	STA 50+400 to STA 50+415	0.005 ha ± - Residential property fronting onto Parkside Drive - Full access to property maintained
10	419 Parkside Drive	STA 50+446 to STA 50+477	0.063 ha ± - Residential property fronting onto Parkside Drive - Full access to property maintained

Property Affected (Address and/or Location)			Approx. Additional Property Required	Comments
11	427 Parkside Drive	STA 50+492 to STA 50+509	0.006 ha ±	- Residential property fronting onto Parkside Drive - Full access to property maintained
12	435 Parkside Drive	STA 50+592 to STA 50+624	0.012 ha ±	- Residential property fronting onto Parkside Drive - Full access to property maintained
13	437 Parkside Drive	STA 50+624 to STA 50+654	0.011 ha ±	- Residential property fronting onto Parkside Drive - Full access to property maintained
14	441 Parkside Drive	STA 50+654 to STA 50+682	0.010 ha ±	- Residential property fronting onto Parkside Drive - Full access to property maintained
15	447 Parkside Drive	STA 50+709 to STA 50+740	0.012 ha ±	- Residential property fronting onto Parkside Drive - Full access to property maintained
16	449 Parkside Drive	STA 50+740 to STA 50+770	0.012 ha ±	- Residential property fronting onto Parkside Drive - Full access to property maintained
17	453 Parkside Drive	STA 50+770 to STA 50+801	0.012 ha ±	- Residential property fronting onto Parkside Drive - Full access to property maintained
18	603 Robson Road	STA 50+801 to STA 50+844	0.018 ha ±	- Residential property fronting onto Robson Road - Full access to property maintained
19	487 Parkside Drive	STA 51+085 to STA 51+200	0.005 ha ±	- Agricultural lands fronting Parkside Drive - Full access to property maintained - Property requirement includes sight triangle
Parkside Drive - South Side				
20	386 Parkside Drive	STA 50+108 to STA 50+293	0.027 ha ±	- Residential property fronting onto Parkside Drive - Full access to property maintained
Dundas Street - North Side				
21	513 Dundas Street	STA 9+060 to STA 9+182	0.020 ha ±	- Agricultural lands fronting Dundas Street - Full access to property maintained
22	531 Dundas Street	STA 9+182 to STA 9+343	0.028 ha ±	- Agricultural lands fronting Dundas Street - Full access to property maintained
23	545 Dundas Street	STA 9+343 to STA 9+461	0.050 ha ±	- Residential property fronting onto Dundas Street - Full access to property maintained - Home is in very close proximity to proposed roadway
24	553 Dundas Street	STA 9+461 to STA 9+527	0.023 ha ±	- Petrol Station fronting onto Dundas Street - Northwest corner of Dundas Street and Evans Road - Fuel pumps in very close proximity to proposed roadway
25	559 Dundas Street	STA 9+538 to STA 9+568	0.004 ha ±	- Vacant lot at northeast corner of Dundas Street and Evans Road - No access exists onto Dundas Street
26	561 Dundas Street	STA 9+590 to STA 9+568	0.004 ha ±	- Residential property fronting onto Dundas Street - Full access to property maintained
27	563 Dundas Street	STA 9+590 to STA 9+612	0.004 ha ±	- Residential property fronting onto Dundas Street - Full access to property maintained
28	565 Dundas Street	STA 9+612 to STA 9+634	0.004 ha ±	- Residential property fronting onto Dundas Street - Full access to property maintained
29	567 Dundas Street	STA 9+634 to STA 9+655	0.004 ha ±	- Residential property fronting onto Dundas Street - Full access to property maintained
30	571 Dundas Street	STA 9+655 to STA 9+675	0.003 ha ±	- Residential property fronting onto Dundas Street - Full access to property maintained
31	591 Dundas Street	STA 9+834 to STA 9+883	0.011 ha ±	- Residential property fronting onto Dundas Street - Full access to property maintained
32	601 Dundas Street	STA 9+883 to STA 10+002	0.017 ha ±	- Agricultural lands fronting Dundas Street - Full access to property is maintained

Property Affected (Address and/or Location)			Approx. Additional Property Required	Comments
33	3042 Cedar Springs Road	STA 11+206 to STA 11+544	0.125 ha ±	- Residential property fronting Cedar Springs Road - No access to property exists from Dundas Street - Full access to property maintained
34	2065 Dundas Street	STA 11+697 to STA 12+005	0.167 ha ±	- Residential property fronting Dundas Street - Full access to property is maintained
Dundas Street - South Side				
35	518 Dundas Street	STA 9+059 to STA 9+165	0.011 ha ±	- Residential property fronting Dundas Street - Full access to property maintained
36	Address # Not Applicable	STA 9+338 to STA 9+530	0.034 ha ±	- Farmlands facing Dundas Street - Access to property is not clear
37	562 Dundas Street	STA 9+530 to STA 9+870	0.059 ha ±	- Agricultural lands fronting Dundas Street - Full access to property maintained
38	1050 Dundas Street	STA 10+000 to STA 10+321	0.073 ha ±	- Agricultural lands fronting Dundas Street - Full access to property maintained - This property owned by the City of Burlington
39	1126 Dundas Street	STA 10+321 to STA 10+727	0.048 ha ±	- Vacant Lands, large acreage facing Dundas Street - Full access to property maintained
40	1312 Dundas Street	STA 11+131 to STA 11+175	0.010 ha ±	- Residential property fronting onto Dundas Street - Full access to property maintained. - Property provides access to 6 residential properties (1276, 1280, 1286, 1296, 1300, 1312 Dundas Street)
41	1322 Dundas Street	STA 11+175 to STA 11+183	0.004 ha ±	- Residential property fronting onto Dundas Street - Full access to property is maintained
42	1326 Dundas Street	STA 11+183 to STA 11+247	0.031 ha ±	- Residential property fronts onto Dundas Street - Full access to property is maintained
43	1336 Dundas Street	STA 11+247 to STA 11+278	0.016 ha ±	- Residential property fronting onto Dundas Street - Full access to property is maintained
44	1348 Dundas Street	STA 11+278 to STA 11+338	0.033 ha ±	- Residential property fronts onto Dundas Street - Full access to property maintained
45	1358 Dundas Street	STA 11+338 to STA 11+398	0.002 ha ±	- Residential property does not front onto Dundas Street - Small parcel of land required at west end of property - Full access to property maintained - No access exists onto Dundas Street

It should be noted that the new 32 m right-of-way required for the New East-West Road through the Waterdown North development lands will be established through the development process. The 30 m right-of-way required for the road through the Upcountry Estates development will also be established through the development process. Additional property along the Upcountry development may be required to accommodate the road width (west side). This will be assessed in more detail in the design phase.

6.3.12 Construction Staging and Phasing

Construction of the New East-West Road should be considered in the following four functional stages:

- Parkside Drive and connection to Dundas Street

- Dundas Street/Brant Street Intersection
- New East-West Road west of Parkside Drive to Highway 6
- Dundas Street widening

Phase 1: Parkside Drive widening and connection to Dundas Street

Phase 1 consists of the widening of Parkside Drive and the north-south connection from Parkside Drive to Dundas Street (bypassing Evans Road), in preparation for additional traffic that will be generated in subsequent phases. This phase will also include the roundabouts at the west and east end of the Parkside Drive section.

Phase 2: Dundas Street/Brant Street Intersection

The Dundas Street/Brant Street intersection widening should proceed as Phase 2. This section already serves as a constraint to corridor capacity, and conditions will continue to deteriorate as development proceeds in North and South Waterdown and as the New East/West Corridor increases east/west capacity through Waterdown.

Phase 3: New East/West Road Corridor

The New East/West Road, between Highway 6 and Parkside Drive should proceed as Phase 3. This section of the study area has some surplus capacity (on Parkside Drive and Dundas Street) to accommodate growth in traffic due to development in North Waterdown or traffic attracted to it due to the improved connection to Dundas Street. However the New East-West Road will need to be completed before a substantial number of residential units in Waterdown North are occupied. This phase would also need to include the closure of the Highway 6/Concession 4 intersection, either concurrently or as a prerequisite.

Phase 4: Dundas Street Widening

The fourth and final phase should be the widening of Dundas Street across the escarpment to Brant Street. Currently the primary capacity constraints on Dundas Street are the lane reductions in downtown Waterdown and the intersection at Brant Street. Addressing these constraints will increase the effective capacity of Dundas Street, which will allow the widening of this section to be deferred until the final phase of construction. Construction of this phase should be linked to the pace of development that is ultimately achieved in Waterdown.

6.4 Description of Potential Impacts, Proposed Mitigation and Commitments

The proposed New East-West Road Corridor through the north part of Waterdown has the potential to result in impacts to the environment, including the natural and social environment. Further, considerable public concern has been raised by some residents regarding the proposed road improvements including:

- Disturbance effects (e.g. noise and air quality)
- Increases in traffic volume (including truck traffic)

- Public safety concerns
- Removal of natural habitat
- Effects to the character of the area
- Loss of property (along Parkside Drive)

Attempts have been made to address these issues and reduce the potential for effects to the natural and social environment through the design of the road facility and the incorporation of many mitigation measures. This section of the ESR describes potential impacts of the preferred road design and the Project Partner's commitment to mitigation. Potential impacts and mitigation are described *Table 6-41* as well as the report sections immediately following the table.

**Table 6.41 – East West Road Corridor Phase 3 Class EA
Net Effects Assessment**

Criteria Group	Criteria	Indicators	Description of Effect	Mitigation	Net Effect
Social Environment	Potential for impact on residents	Potential for displacement of residents/ residences	No residences will be displaced as a result of the project.	None required	None
		Amount of residential property removed (ha)	Based on the preliminary design, about 20 residential properties, primarily along Parkside Drive will be impacted. On Parkside Drive the maximum amount of property required from a residential property is 0.027 ha and most are in the order of 0.012 ha.	Residents will be offered fair market value for the loss of property.	Due to the relatively small amount of property required per property, and that land owners will be compensated for their property loss, the net resulting effects are minimal.
		Change in access to residential property	Other than on one or two properties on Highway 6 at the new intersection, there will be no change in access to residential property. Where existing driveways are impacted, they will be reconstructed. The treatment of the affected Highway 6 entrances will be resolved in the design phase in discussion with the owners and MTO.	None Required	No adverse effects are expected.
		Potential for change in air quality	<p>Air quality levels were modeled and compared for the future “build” and “no build” scenarios. For residents along Northland Ave., Parkside Dr. and Dundas St., the change in air emissions will be negligible and any increases are within applicable guidelines and standards.</p> <p>Potential for construction related air quality effects from dust creation and typical combustion emissions from construction equipment. Possible traffic diversion could also increase emissions along some roadways. These effects will be temporary.</p>	<p>No specific air quality mitigation measures are proposed.</p> <p>Follow best construction best practices including the use of dust suppressants as required and ensure that construction equipment is in good working condition.</p>	No net adverse effects are expected
Potential for change in noise levels	<p>Noise levels were modeled and compared for the future “build” and “no build” scenarios. The increases in sound levels are considered to be not significant or imperceptible for most of the receptors.</p> <p>The exception to this is for residential receptor EW22 (eastern end of Northlawn Ave.) in which the increase would be noticeable (an approximate 9 dBA increase). It should be noted that the daytime sound level at this receptor was still predicted to be relatively quiet at 46 dBA which is typical of suburban daytime levels as defined by the MOE.</p> <p>Some short term noise effects are expected during the construction period of the project to residents along Northlawn Ave., Parkside Dr. and Dundas St.</p>	<p>No mitigation is recommended as the noise levels are within the MOE limits for a suburban area. However as a result of the potential increase in estimated sound levels, monitoring of the traffic generated sound levels after the construction of the new East-West Road is recommended for the residences along Northlawn Ave.</p> <p>New residences in the subdivisions of Waterdown North and Upcountry urban development areas may need sound barriers to be installed to mitigate potential noise generated by traffic along new East-West Road and Centre Road, and the new north-south link between Parkside Drive and Dundas Street East serving the Upcountry area.</p> <p>Standard construction mitigation measures are to be implemented to minimize noise levels during construction (e.g. keep equipment in good working conditions, meet applicable City of Hamilton noise by-laws)</p>	Noise level increases are within applicable MOE standards. No net adverse effects are expected.		

Criteria Group	Criteria	Indicators	Description of Effect	Mitigation	Net Effect
		Potential for light pollution	The existing level of illumination along the corridor is either non-existent or below what would be required for an urban arterial road. The street lighting plan will be developed as part of the road detailed design work. No to minimal effects are expected to residents.	No specific mitigation measures are expected to be required.	No net adverse lighting effects are expected
		Potential for impact to wells and septic tanks	Due to the character of the wells and their location relative to the road, impacts on wells are not expected from road development. Impacts to septic systems will be identified during the detailed design stage.	During detailed road design work, additional geotechnical work would be completed to identify areas where groundwater could be encountered during construction. If these areas exist, specific construction techniques would be utilized which may include temporary pumping of ground water from the excavated areas. If septic systems are affected by road development, these systems would need to be relocated/replaced to ensure that a system to manage sewage is maintained for each residence.	No net adverse effects to wells and ground water are expected. If required, appropriate mitigation measures would be put in place to ensure that there are no adverse net effects to septic systems.
		Potential for traffic infiltration to existing residential areas and resulting effects	Some concern was expressed by existing residents in the community located between Parkside Dr and Dundas St. of the potential for traffic infiltration from vehicles using Boulding Ave.	The improved roadway is not expected to increase the potential for traffic infiltration along Boulding Ave. It is recommended that this be monitored and that mitigation measures be put in place if this is identified to be a problem.	The potential for increased infiltration effects into existing residential areas is not anticipated.
	Potential for community character impacts/ change in views	Potential change to community character and views in the area	The existing residential areas along Hwy 6, Northlawn Ave., Parkside Dr. and Dundas St. can be described as being suburban-rural in nature. These residential areas are on the edge of Waterdown/Burlington urban areas located to the south. Existing arterial roads, which contribute to the character of these areas, are in the vicinity of all of these areas. The intersection of the new road with Hwy 6 is not expected to change the character of the area given the influence of Hwy 6 in this area. In regards to Northlawn Ave, the new road cuts to the north of these residences (about 100 m away) which back onto the woodlot. Existing trees in the woodlot will serve, at least partially, as a visual screen. Substantial changes to the character of this residential area are not expected. In regards to Parkside Dr., the widened roadway will result in the area becoming more urban in character. Finally, the widening of Dundas Street from 4 to 6 lanes will result in some minor to moderate changes to the character of this area given the dominance of the existing roadway. Further land development plans west of Centre Rd and south of Parkside Dr. will contribute to these areas becoming more suburban in character.	In regards to Parkside Dr, the proposed widened road has been designed to maintain this character as much as possible. Landscape treatments have been recommended to keep in character with the "rural" nature of the area.	Despite the proposed design for the new road facility, some change to the character of the areas that the roadway passes through will result. It is anticipated that the overall effect will be minimal as a result of the proposed mitigation.

Criteria Group	Criteria	Indicators	Description of Effect	Mitigation	Net Effect
	Potential for impact on community/recreation features	Removal of community/recreation property	The new East-West road cut through lands that are the intended area for the expansion of Joe Sams Park that is located further to the north. The proposed road also crosses an existing trail that provides access to the Waterdown North Wetlands ESA.	Plans for the Park expansion area have been reviewed and discussions held with City park staff to ensure that the alignment minimizes effects on the planned park expansion. Further, a pedestrian underpass is to be provided so that pedestrian access across the new road is maintained for trail users.	Some loss of future parkland will result from the road development. Through careful road alignment significant effects to the future park are avoided. The provision of a pedestrian underpass will allow access through this area. As a result of these mitigation measures, no significant effects are expected.
		Disruption to use of community/recreation property	See description above regarding the Waterdown North Wetlands trail. The Bruce Trail crosses Dundas Street at a point that is 650 m west of Brant Street. There are currently no provisions for the crossing of Dundas St at this location.	Given that Dundas Street is to be widened from 4 to 6 lanes at the Bruce Trail crossing point, it is recommended that the crossing be moved westerly to the Kerns Road intersection where a future traffic signal may be installed to facilitate pedestrian crossing. This will require additional discussion with the Project Partners during the design phase.	Minimal negative effects with the implementation of the recommended mitigation.
	Potential for effects on historical features	Potential for removal of heritage/archaeological features	Based on the Archaeological Stage 1 Report that was completed, there is potential for archaeological resources along the corridor. Stage 2 investigations are recommended to confirm the potential for resources. No built heritage features were identified in the vicinity of the road corridor.	A Stage 2 Archaeological Assessment is to be undertaken to confirm resources/mitigation requirements.	The Stage 2 assessment will confirm the potential for effects on archaeological resources. Mitigation measures as required will be put in place.
Natural Environment	Potential for impact on terrestrial features	Amount, nature and significance of natural habitat removed	The new/widened roadway will result in the removal of the following habitat: <ul style="list-style-type: none"> 0.33 ha of riparian habitat from the crossing of Borer's Creek (Oak-Sugar Maple Deciduous Forest and Forb Mineral Meadow Marsh vegetation communities), 0.68 ha of the Centre Street Woodlot PSW; A portion of a hedgerow located to the north of Parkside Dr; 0.35 ha of the Nelson Escarpment Woods ESA located on the north side of Dundas Street. 	A minimum compensatory tree replacement plan based on the area of the natural community removed is to be implemented at a rate of 3:1. Compensatory tree plantings should be detailed in a Restoration Plan for the floodplain of Borer's Creek. The development of Edge Management Plans have been recommended throughout the corridor in detail design.	As a result of the compensatory tree planting that will be undertaken and the implementation of the Edge Management Plans, net negative effects to natural habitat will be minimized.
		Number of significant trees along existing roadway removed	There will be some additional trees (not associated with ESAs) removed in some sections of the road corridor. Most of these are along the section of Parkside Drive that is to be widened.	Compensatory tree planting will be undertaken along Parkside Drive as per the landscape plan to minimize the effects from tree loss.	As a result of the compensatory tree planting that will be undertaken, net negative effects of tree loss will be minimal.

Criteria Group	Criteria	Indicators	Description of Effect	Mitigation	Net Effect
		Potential for effects to adjacent habitat	<p><u>Parkside Drive Wetland PSW/ESA</u> A buffer are of 30 m south of the Parkside Drive Wetland PSW/ESA was established with HCA to minimize disturbance effects to this natural feature. Wildlife habitat degradation, especially in the riparian zone of Borer's Creek and Black's Pond as well as along the southern edge of the PSW/Candidate ESA, could result from increased disturbances associated with the road during the construction and operation stages of the East-West road development.</p> <p>Construction activities will result in short terms disturbance effects to wildlife along the edge areas.</p> <p><u>Centre Street Woodlot PSW</u> A lone retainable butternut tree (confirmed to be a pure butternut strain through DNA analysis conducted at the Ontario Forest Research Institute) is located about 11 m from the road grading limit and is susceptible to injury.</p> <p>The breeding habitat for birds could be affected by vegetation removal in the road right-of-way through the Centre Road PSW unit. The only area-sensitive avian species of conservation concern observed in this area were associated with open-country habitat adjacent to the woodlot. As such, the overall diversity of area-sensitive birds around the woodlot is not expected to be altered significantly by the new disturbance from the road.</p> <p>Potential for increased susceptibility at the edges of the PSW unit to undesirable invasive and/or exotic plant proliferation. The creation of new woodlot edges along the road corridor will allow disturbances (i.e. exotic species, light, noise, debris, etc.) to penetrate deeper into the woodlot. Moreover, increased wind exposure could augment desiccation and tree blow-down along the new woodlot edges.</p> <p>Potential for alteration of the hydrology in the PSW which could result in impacts to existing vegetation.</p> <p>Construction activities will result in short terms disturbance effects to wildlife along the edge areas.</p>	<p><u>Parkside Drive Wetland PSW/ESA</u> In order to mitigate human disturbance on the PSW/Candidate ESA lands, an Edge Management Plan (EMP) should be developed that involves a 30 m vegetative buffer from southern dripline of this natural feature. This buffer would deter the introduction of non-native invasive flora species from colonizing disturbed areas after road construction is complete and agricultural activities cease.</p> <p><u>Centre Street Woodlot PSW</u> In order to mitigate the injury to the lone retainable butternut tree, establishing a tree protection zone with a tree protection barrier (TPB) fence of 5 m from the trunk is recommended.</p> <p>As a protection measure for potential breeding birds or nests in the PSW unit, it is recommended that any tree removal be done outside the breeding bird period (April 15th to August 15th).</p> <p>An Edge Management Plan (EMP) should be developed for the north and south edges of the road right-of-way prior to commencement of vegetation removal and road construction. The objective of the EMP will be to deter non-native invasive flora species from colonizing natural and landscape areas post-construction.</p> <p>To mitigate altering the hydrology of the wetland, six flow equalization culverts will be installed along the road alignment. With a series flow equalization culverts at low elevations along the road alignment, the hydrologic balance will be maintained between existing and post-construction conditions.</p>	With the implementation of an EMP, including native species plantings within the buffer area, net disturbance effects should be minimal.

Criteria Group	Criteria	Indicators	Description of Effect	Mitigation	Net Effect
			<p><u>Lake Medad Valley Swamp PSW</u> The East-West Road Corridor grading limit is proposed to be located approximately 90 m from the southern wetland boundary of the Lake Medad Valley Swamp PSW, 38 m from the southern boundary of the Waterdown North Wetland ESA.</p> <p>Construction activities will result in short terms disturbance effects to wildlife along the edge areas.</p> <p><u>Nelson Escarpment Woods ESA</u> Vegetation removal along the edge of the ESA will not impact provincial <i>species at risk</i> or regionally <i>rare</i> flora or fauna; however, it could leave the edge of this feature vulnerable to the colonization of invasive exotic flora. Some concerns have been expressed regarding the potential impacts of rock blasting in this area.</p> <p>Given the disturbance associated with high traffic volumes currently experienced along Highway 5 (Dundas Street), road widening is not expected to have a measurable negative affect on the wildlife habitat potential of the ESA in this area. For the most part, habitat generalist species were documented in this area, which is anticipated to be consistent with post-development conditions.</p>	<p><u>Lake Medad Valley Swamp PSW</u> An Edge Management Plan is recommended for the 15 m non-forested area between the southern dripline of the ash deciduous forest and the road corridor. Planting native vegetation in this 15 m area will enhance the 38 m natural buffer that extends from the ESA to the East-West road corridor. The EMP should be developed in consultation with the OMNR and/or HCA and implemented prior to commencement of vegetation removal and road construction.</p> <p><u>Nelson Escarpment Woods ESA</u> The EMP should detail the planting of native vegetation adjacent to the road right-of-way as mitigation to prevent the introduction and proliferation of invasive exotic species. In Detail design alternatives to rock blasting will be investigated (e.g. mechanical means of rock removal).</p>	
		Fragmentation of natural areas	<p><u>Parkside Drive Wetland PSW/ESA</u> The development of the East-west road will fragment the upland forest habitat that surrounds Black's Pond (south of the road alignment) from the main wetland habitat of the Parkside Drive PSW Complex (north of the road alignment) from the crossing of the Borer's Creek valley.</p> <p><u>Centre Street Woodlot PSW</u> The crossing of the PSW results in fragmentation of amphibian and small mammal habitat in the PSW unit. In order to minimize the disturbance on the PSW unit, the road was aligned as far south as possible to reduce fragmentation and maintain connectivity between the ecologically sensitive, organic swamp communities in the northern section of the woodlot and the natural features to the northeast.</p>	<p><u>Parkside Drive Wetland PSW/ESA</u> See mitigation below re: connectivity effects.</p> <p><u>Centre Street Woodlot PSW</u> A restoration initiative is recommended to compensate for the habitat fragmentation due to the loss of vegetation in road right-of-way.</p>	The road has been aligned to mitigate fragmentation effects. Further, design of the roadway and compensation plantings contributes to a further reduction of these effects. While some negative effects will remain, they have been minimized.

Criteria Group	Criteria	Indicators	Description of Effect	Mitigation	Net Effect
		Effect on terrestrial corridor connectivity / linkages	<p><u>Parkside Drive Wetland PSW/ESA</u> Habitat fragmentation, from the crossing of the Borer's Creek valley, could result in a barrier for terrestrial wildlife movement, isolating the pond area from the PSW lands to the north. This is considered to be a minor impact due to limited wildlife activity that was observed in and around Black's Pond and that the Pond is to be surrounded by residential development.</p> <p><u>Centre Street Woodlot PSW</u> The construction of the road through the PSW will effect the movement of wildlife to/from the remaining southern portion of the PSE that has be split off from the larger northern portion.</p>	<p><u>Parkside Drive Wetland PSW/ESA</u> The proposed Borer's Creek crossing structure is a three-cell, box culvert with an open-bottom, low flow channel in the central cell. The large opening of the main cell (i.e. 6m x 3m) should enable wildlife passage.</p> <p><u>Centre Street Woodlot PSW</u> The proposed six hydrology equalization culverts will serve as an eco-passage during dry periods in the wetland. This would also reduce animal mortality in the road RoW.</p>	Road design minimizes impacts on the movement of wildlife in the two affected natural areas.
	Potential for Impact on aquatic features	Amount and quality of aquatic habitat altered/disturbed/removed	The road corridor will result in the crossing of the Grindstone Creek – Northeast Branch, which is considered to be of "high" sensitivity. Bridge and culvert installations can negatively affect existing fish habitat by removing or temporarily disturbing habitat that exists under the physical footprint of the new structure.	The mitigation plan for this is to be developed by the developer of the roadway as part of the plan of subdivision approval process that will be undertaken.	With the implementation of appropriate mitigation measures, net negative effects to fisheries and fish habitat will be minimal. DFO approval is expected to be required for this crossing.
Economic Environment	Potential for impact on business enterprises	Area of commercial properties required (ha)	<p>About 1.89 ha of property will be required from Connon Nursery located on the north side of Parkside Dr. Discussions have been held with the owners regarding the need for this property. It is anticipated that the Nursery can continue to operate at this location.</p> <p>Some frontage property will be required from at least one commercial operation (a storage area) along Dundas St.</p>	Business owners will be compensated for the loss of property by the City of Hamilton.	No net effects are expected as a result of financial compensation being provided.
		Potential for change (disruption or enhancement) to business operations	<p>The alignment of the road through the Connon Nursery property will require alterations to this business. Currently the lands are used nursery operations including greenhouse facilities. The new road/road improvement will improve access to the facility which could create business opportunities for them.</p> <p>Regarding the long-term care facility (Alexander Place) along Parkside Dr., increases in air emissions and noise levels will be minimal and are well within MOE criteria.</p>	Business owners will be compensated for the loss of property by the City of Hamilton.	Minimal net effects are expected as a result of financial compensation being provided. Connon Nursery operations will be temporarily disrupted from having to move their facilities from the road alignment area.
	Potential for impact on future land use	Compatibility with future land use plans	<p>The new road through the North Waterdown development area will form the northern boundary of this development. No impacts are expected.</p> <p>The road connection between Parkside Drive and Dundas Street runs along the eastern boundary of the Upcountry development. No impacts are expected.</p>	The proposed road provides needed access to these two development areas. No specific mitigation is required.	No to minor net effects

Criteria Group	Criteria	Indicators	Description of Effect	Mitigation	Net Effect
	Potential for impact on agricultural land	Area of designated agricultural land removed (ha)	In aligning the road, attempts were made to minimize the removal of agricultural land. About 4.33 ha of land designated for agricultural will be removed (largely at the western end of the project area).	Landowners will be compensated for the loss of agricultural land.	No to minor net effects
Transportation	Change in traffic operations, delay and capacity	Potential to increase level of traffic service	The 4-lane road design as proposed will address future (2021) traffic service level requirements.	No mitigation required	No net effects
		Ability to accommodate local and through traffic	All road segments can accommodate local and through traffic	No mitigation required	No net effects
	Potential for change to traffic and public safety levels	Potential to improve roadway operations, geometry and sightlines	<p>The new segments of the East-West corridor will be constructed to City of Hamilton/Halton Region standards and their design incorporates safety features such as sight line distances, grades, turning radii, etc.</p> <p>The proposed works on Parkside Drive and through the Centre Road woodlot area includes a reduction in posted speed (from 60km/hr to 50 km/hr). In conjunction with the proposed roundabouts on either side of Parkside Drive, the reduction in speed will act as a traffic calming feature that should improve the overall safety of the corridor. The road profile at Grindstone Creek is also being raised to address an existing deficient profile and sight line concerns at this location. The new structure will be approximately 1.2 higher than currently exists.</p>	No mitigation required	No net effects
		Extent that alternative supports/promotes transit use, pedestrians and cycling	<p>The 4-lane design supports transit along the corridor. A multi-use asphalt pathway is proposed within the Waterdown North development on the south side of the road. This pathway is extended through the Centre Road Woodlot and connects with the existing trail leading into Joe Sam's park.</p> <p>Dedicated on-road bicycle lanes and concrete sidewalks are proposed on both sides of Parkside Drive to encourage pedestrian and cycling users. Through the Upcountry development lands, a multi-use asphalt pathway is proposed on the west side of the road.</p> <p>Dundas Street will be equipped with dedicated on-road bicycle lanes and sidewalks from the New East-West Road intersection up to Kerns Road. Between Kerns Road and Brant Street, Dundas will have 4.2m wide "share the road" curb lanes and a concrete sidewalk on the south side only.</p>	No mitigation required	No net effects
	Opportunity to support transit use, pedestrians and cycling				

6.4.1 Natural Environment

The proposed New East-West Road Corridor improvements have the potential to impact natural heritage features. This includes direct and indirect impacts to Provincially Significant Wetlands (PSWs), Environmentally Sensitive (Significant) Areas (ESAs) and Areas of Natural or Scientific Interest (ANSIs). The potential natural heritage impacts within the New East-West Road Corridor are discussed below. The proposed road either encroaches into and/or is aligned in close proximity to the following significant natural areas (refer to *Figure 6-25*):

- Parkside Drive PSW Complex
- Centre Road Woodlot PSW/ESA
- Lake Medad Valley Swamp PSW (Waterdown North Wetlands ESA);
- Nelson Escarpment Woods ESA.

The New East-West Road Corridor route involves nine watercourse crossings and two drainage conveyance culvert crossings. The impact to these natural heritage features necessitates mitigation measures that reduce or eliminate these impacts as directed by both federal provincial legislation including: the federal Fisheries Act and the following provincial legislation; the EA Act, the Lakes and Rivers Improvement Act, Conservation Authorities Act, Migratory Bird Convention Act and the Fish and Wildlife Conservation Act. Mitigation measures to reduce or eliminate these impacts are also directed by the Province of Ontario under *Section 2.1 Natural Heritage* of the 2005 Provincial Policy Statement, which states:

“2.1.1 Natural features and areas shall be protected for the long term.

2.1.2 The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.

2.1.3 Development and site alteration shall not be permitted in:

- a. significant habitat of endangered species and threatened species;*
- b. significant wetlands in Ecoregions 5E, 6E and 7E; and*

2.1.4 Development and site alteration shall not be permitted in:

- a. significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;*
- b. significant woodlands south and east of the Canadian Shield;*
- c. significant valleylands south and east of the Canadian Shield;*
- d. significant wildlife habitat; and*

- e. significant areas of natural and scientific interest unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.*

2.1.5 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

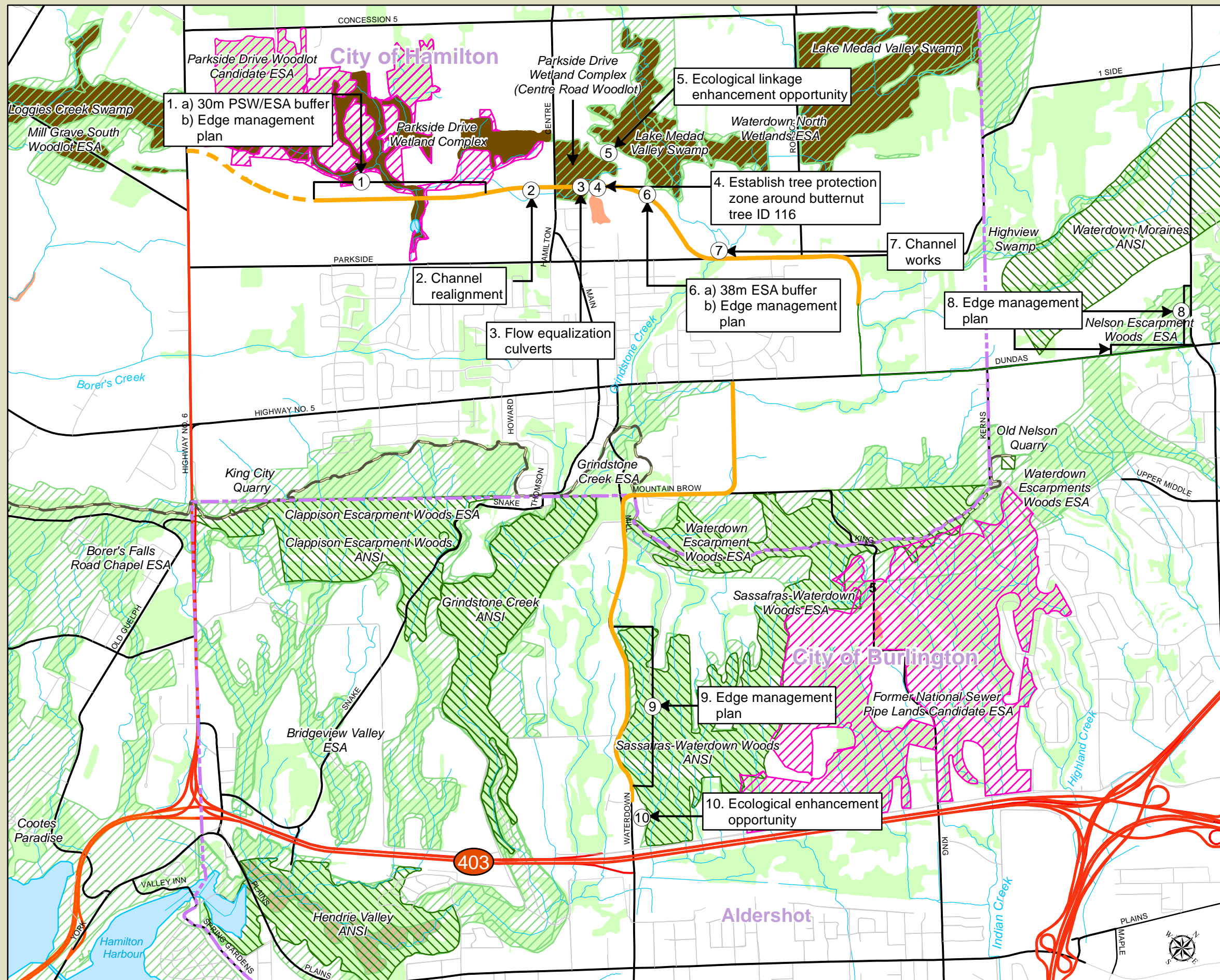
2.1.6 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.3, 2.1.4 and 2.1.5 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.”

Requirements of the Provincial **Greenbelt Plan** have been addressed, including Section 4.2.1.2, by minimizing the amount of natural heritage system being traversed and/or occupied by the proposed new infrastructure and minimizing, to the extent possible, negative effects on the area's natural systems. This has been achieved by the following means:

- The new road corridor avoids traversing Logies Creek Swamp/Mill Grave South Woodlot ESA by recommending that the road not be extended west of Highway 6.
- The new road corridor has been kept south of the Parkside Drive Woodlot/Candidate ESA and the Parkside Drive Wetland Complex, and it is recommended that a buffer of 30 m be maintained between the new road north property line and the wetland forest drip line.
- The road crosses Borer's Creek at its narrowest section, minimizing the impact to the ESA
- The new corridor crosses the Centre Road Woodlot/ESA as far south as possible and at a location where the width of woodlot is relatively narrow thus minimizing the amount of woodlot severed. This results in less existing vegetation removed and does not directly impact the drainage outlet of this ESA.
- The recommended location of the corridor along Parkside Drive avoids the need to traverse near the natural areas to the north and close to the Lake Medad Valley Swamp ESA/PSW.
- Where the route passes adjacent to the Nelson Escarpment Woods ESA along Dundas Street west of Brant Street, the road has been kept as far south as possible and a retaining wall is recommended to minimize direct impacts on the natural area.
- The completion of edge management plans (EMPs) has been recommended at specific locations throughout the road corridor
- A minimum compensatory tree replacement plan based on the overall area of vegetation removed is recommended at a 3:1 replacement ratio.

Waterdown Road Corridor and East - West Road Corridor Municipal Class EAs

Figure 6-25: Mitigation and Restoration Opportunities



Legend

- ① Mitigation
- Municipal Boundary
- Preferred Alignment
- Route to be Determined
- Provincially Significant Wetland
- ▨ Area of Natural or Scientific Interest
- ▨ Environmentally Sensitive Area
- ▨ Candidate Environmentally Sensitive Area
- Local Wetland
- Woodlot
- Other Natural Habitat
- Niagara Escarpment

Scale

0 0.5 1 Kilometers

Map Notes

Map Created By: PJK/SFG
 Map Checked By: DR
 Date Created: April 5, 2006
 Date Modified: April 29, 2009
 File Path: I:\GIS\089020 - Waterdown\Natural Environment Figures April 2009\Mapping\Figure 6 Mitigation and Restoration Opportunities.mxd
 Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

DRAFT

Terrestrial Impacts and Mitigation

In this section, the impacts and mitigation strategies for terrestrial natural heritage features are discussed proceeding from west to east in the corridor.

Parkside Drive Provincially Significant Wetland (PSW) Complex

The proposed New East-West Road Corridor intersects the southern portion of the Parkside Drive PSW Complex and Candidate ESA. The crossing of the PSW Complex north of Parkside Drive/west of Centre Road is located at the main branch of Borer's Creek, just north of Black's Pond. Black's Pond is an online pond in Borer's Creek caused by a dam structure at the southern end of the pond. Borer's Creek has been identified as a sensitive aquatic feature with warmwater fishery resources. The impacts to aquatic features are discussed in the next section of this report.

The potential terrestrial impacts to the Parkside Drive PSW Complex include:

- Pond habitat fragmentation;
- Alteration to the hydrology of the PSW;
- Loss of vegetative cover in the road alignment;
- Introduction of invasive plant species in disturbed areas of the road right-of-way; and
- Road disturbance impacts.

Pond Habitat Fragmentation

The development of the road will fragment the upland forest habitat that surrounds Black's Pond (south of the road alignment) from the main wetland habitat of the Parkside Drive PSW Complex (north of the road alignment). One herpetofauna species (Midland painted turtle) was noted in the pond, while previous studies have documented green frogs in the pond (Savanta, 2009). Herpetofauna as well as small mammals and birds that inhabit the pond area are common in the region and are not area-sensitive. Habitat fragmentation could result in a barrier for terrestrial wildlife movement, isolating the pond area from the PSW lands to the north. This is considered to be a minor impact of the road development due to limited wildlife activity that was observed in and around Black's Pond. Mitigation of the habitat fragmentation impacts involved designing a culvert/bridge crossing that will allow fish and wildlife passage under the road alignment. The watercourse crossing structure is a three-cell, box culvert with an open-bottom, low flow channel in the central cell. The large opening sizes of each cell (i.e. 6 m x 3 m and 6 m x 2.5 m) should enable wildlife passage. As such, no further mitigation measures are required to address the fragmentation of the pond habitat.

Alteration to the Hydrology of the PSW

Regarding hydrologic impacts to the PSW, it is noted that a large portion of the lands located south of the PSW are proposed for development. Based on the large rural area of the Borer's Creek Watershed, the local impact of increasing the impervious surface along

the New East-West Road Corridor in between Highway 6 and Centre Road is not anticipated to affect the hydrology of the surrounding area including the Parkside Drive PSW Complex lands. Moreover, the 2007 Waterdown North Master Drainage Plan has been developed for post-development conditions for all of the subwatersheds of North Waterdown to protect water quality and quantity as well as minimize erosion and flooding. This Drainage Plan takes into consideration the proposed development of the lands south of the PSW and details mitigation strategies in order to maintain water resources (i.e. hydrology) in the watershed. In addition, the bridge crossing of Borer's Creek will be engineered to maintain flow conveyance between the upstream and downstream wetland areas as to not alter runoff in the PSW.

Loss of Vegetative Cover in the Road Alignment

The loss of 0.33 ha of vegetative cover in the riparian area of Borer's Creek, where the New East-West Road Corridor crosses through the PSW, is not considered to be a significant impact. Road development will result in the removal of trees and other vegetation associated with the Oak-Sugar Maple Deciduous Forest and Forb Mineral Meadow Marsh vegetation communities. Tree species in this disturbance area include red oak, red (green) ash, black cherry, trembling aspen and sugar maple. It is recommended that a minimum compensatory tree replacement plan based on the area of the natural community removed be implemented at a rate of 3:1.

Compensatory tree plantings should be detailed in a Restoration Plan for the floodplain of Borer's Creek, which in some locations, overlaps the 30 m buffer to the PSW/Candidate ESA. The Restoration Plan for the Borer's Creek floodplain should be generated in consultation with the City of Hamilton and the HCA. Further, tree selection should be determined using Conservation Halton's Landscape Planning Guidelines (CH, 2005) and be based on the type of habitat to that is being restored, the localized conditions (e.g. soil type, soil moisture regime, shade tolerance, etc.) and should complement the species documented in adjacent natural areas.

Introduction of Invasive Plant Species in Disturbed Areas of the Road Right-of-way

Disturbances related to road infrastructure development and succession of agricultural lands to a naturalized landscape could result in an increased susceptibility along the edges of the PSW to proliferation of invasive exotic plant species. It is recommended that a 30 m vegetative buffer be established along the southern dripline of the PSW/Candidate ESA (see **Figure 6-25**). Establishing a vegetative buffer involves planting native species in and adjacent to newly or routinely disturbed areas. Planting the vegetative buffer would deter the introduction of non-native invasive flora species from colonizing disturbed areas after road construction is complete and agricultural activities cease.

Road Disturbance Impacts

Moderately sensitive wildlife habitat was documented in and along the southern edge of the PSW/Candidate ESA lands based on the abundance and diversity of wildlife species inventoried in this area and the sensitivity of wetland vegetation communities to ecological disturbance. Wildlife habitat degradation, especially in the riparian zone of Borer's Creek and Black's Pond as well as along the southern edge of the PSW/Candidate ESA, could result from increased disturbances associated with construction and operation stages of the New East-West Road Corridor's development. Typical road disturbance impacts include traffic mortality, noise, light and general anthropogenic disturbances associated with urban development (i.e. human encroachment, dumping, domestic pets, etc.). Further, traffic mortality is known to have a significant negative effect on the local density of frogs and toads (Fahrig *et al.*, 1995). Another study documented the terrestrial habitat range for amphibians from 159 to 290 m and from 127 to 298 m for reptiles (Semlitsch and Bodie, 2003).

Similarly, the pollutants typically related to direct road runoff (i.e. hydrocarbons, salt, metals, etc.) could have a deleterious effect on the PSWs vegetation communities and surface water quality. Environmental impacts of road salts most frequently cited in literature are damaging to roadside vegetation, soil, and surface water (Transportation Research Board, 1991). Trees and other roadside vegetation, such as shrubs and grasses, can be harmed by salt or other chloride de-icers through changes in soil chemistry as well as splash and spray on foliage and branches. The symptoms of salt damage in trees are similar to those of drought: inhibited growth, browning and falling needles and leaves, and sometimes dying limbs and premature plant death (Transportation Research Board, 1991).

One comprehensive report that evaluated scientific literature, agency testimonials and a field study on wetland buffer use and effectiveness reported that:

- *Buffers of less than 15 m (50 feet) in width are generally ineffective in protecting wetlands;*
- *Buffer widths effective in preventing significant water quality impacts to wetlands are generally 30 m (100 feet) or greater;*
- *Buffers from 15 m (50 feet) to 45 m (150 feet) are necessary to protect a wetland from direct human disturbance in the form of encroachment (e.g. trampling, debris).*

Source: Wetland Buffers: Use and Effectiveness (Castelle et al. 1992).

Given that the New East-West Road Corridor is proposed to be the northern extent of a residential subdivision, the human disturbances are expected to be higher than that of a road infrastructure development alone. In order to mitigate human disturbance on the PSW/Candidate ESA lands, an Edge Management Plan (EMP) should be developed that involves a 30 m vegetative buffer from southern dripline of this natural feature. The EMP should detail a planting plan with resilient native trees, shrubs and seed mixes appropriate for the buffer area at a density that would discourage the colonization and proliferation of invasive

exotic plants and reduce noise impacts. Planting this buffer with a high density of hardy, thorny, fruit-bearing shrub species would deter human encroachment, protect the vegetation along the dripline from the common physical and chemical road impacts such as trampling, dumping, salt spray, etc. and encourage wildlife utilization within the PSW/Candidate ESA lands. A 30 m vegetative setback from the natural feature would also provide a disturbance buffer for wildlife habitat north of the road alignment. Designing a stormwater management (SWM) plan to contain and treat contaminants in the road runoff is also a recommended mitigation technique for water quality impacts.

As a protection measure for potential breeding birds or nests in or adjacent to the PSW/Candidate ESA, it is recommended that vegetation (i.e. trees, shrubs, etc.) removal or disturbance be done outside the primary breeding bird period (April 15th to August 15th). This measure will prevent the loss of incubating eggs or newly hatched young.

Centre Road Woodlot Provincially Significant Wetland (PSW) Unit

The New East-West Road Corridor intersects the Centre Road Woodlot PSW unit north of Parkside Drive and east of Centre Road. The new road, with a right-of-way width of 36 m, crosses the PSW unit about 92 m from its southern edge. This PSW unit is approximately 14.1 ha in size and is included in the Waterdown North Wetlands ESA. This wetland unit also met the criteria for inclusion into the Logies Creek-Parkside Drive PSW Complex due to its demonstrated wetland function, proximity (within 750 m) to the existing PSW and hydrologic connectivity to the PSW via a tributary of Borer's Creek.

The potential terrestrial impacts to the PSW unit include:

- Injury to an endangered butternut tree;
- Vegetative cover in the road alignment to be cleared;
- Habitat fragmentation (amphibians/small mammal habitat);
- Breeding bird disturbance impacts;
- Introduction of invasive plant species in disturbed areas of the road right-of-way; and
- Alteration to the hydrology of the PSW.

These potential impacts are described below.

Potential Injury to an Endangered Butternut Tree

Field reconnaissance of this PSW unit revealed the presence of two butternut trees (*Juglans cinerea*) south of the preferred road alignment (see **Figure 6-25**). The condition of two butternut trees was assessed by a Dillon Arborist and MNR Guelph District Forester, Terry Schwan. It was determined that one butternut was retainable and the other non-retainable under the butternut health assessment protocol used by the Forest Gene Conservation Association (Boysen personal communications 2008 and Ostry *et al.* 1994) This lone retainable butternut tree was confirmed to be a pure butternut strain through DNA analysis conducted at the Ontario Forest Research Institute.

While the New East-West Road Corridor will avoid the healthy/retainable butternut tree, it is vulnerable to injury due to its proximity (11 m) to the grading limit of the adjacent construction activity proposed in the road right-of-way. Butternuts are listed as endangered and are protected under the provincial **Endangered Species Act**. The retainable butternut observed in this location had a 12 cm dbh and demonstrated no obvious symptoms of butternut disease. In order to mitigate the injury to the lone retainable butternut tree, establishing a tree protection zone with a tree protection barrier (TPB) fence is recommended. The TPB should surround the tree at a distance of 5 m from the trunk.

It should also be noted that smooth-sheathed sedge (*Carex laevivaginata*), which is a regionally rare plant in the Hamilton area, was observed 87 m north of the grading limit of the preferred road alignment in the PSW unit. As such it will be unaffected by the road development.

Vegetative Cover in the Road Alignment to be Cleared

An estimated 0.68 ha treed area in a 1.20 ha section of the road right-of-way located in the southern section of the Centre Road Woodlot PSW unit will be removed to accommodate the road. The area of vegetation removal corresponds to the 0.68 ha road grading limit disturbance area. The composition of the wet forest and swamp habitat in the grading limit disturbance area is predominantly red maple, silver maple, cottonwood, trembling aspen, red (green) ash, black ash and American elm trees.

Tree removal of this magnitude represents a significant direct impact of the project that cannot be fully mitigated. In light of this, a restoration initiative is recommended to compensate for the loss of vegetation in the road right-of-way. The objective of this compensatory tree planting plan should be to strengthen the ecological connectivity between the Centre Road Woodlot PSW unit and other areas within the natural heritage system located to the northeast (e.g. Lake Medad Valley Swamp/Waterdown North Wetlands) - see **Figure 6-25**. It is recommended that a minimum compensatory tree replacement plan based on the area of the natural community removed be implemented at a rate of 3:1. Tree selection should be determined using Conservation Halton's Landscape Planning Guidelines (CH, 2005). Further, restoration plans should be generated in consultation with the MNR and/or Conservation Halton.

Habitat Fragmentation (amphibians/small mammal habitat)

Fragmentation of amphibian and small mammal habitat in the PSW unit is another impact of the proposed New East-West Road Corridor. Severing of woodlands can result in residual patch sizes that are too small to support sensitive species (Ontario Ministry of Transportation 2006). In order to minimize the disturbance on the PSW unit, the road was aligned as far south as possible to reduce fragmentation and maintain connectivity between the ecologically sensitive, organic swamp communities in the northern section of the woodlot and the natural features to the northeast. The full rationale for the routing of the

road at this location is provided in Section 5 of this report. Even though the alignment does not encroach into organic swamp habitat, the removal of trees will fragment the woodlot into two sections. The larger northern fragment is 10.42 ha and the smaller southern fragment is 2.61 ha. The road right-of-way will also fragment the northern section of the PSW unit from the small woodlot and open country area to the southeast of the PSW where amphibians and small mammals were observed.

Amphibians that are sensitive to ecological disturbance were documented in the PSW unit and in the vicinity of the smaller woodlot to the southeast (i.e. American toad, green frog, gray treefrog). The partial or complete displacement of these amphibian species from the southern portion of the PSW unit and the small woodlot is probable as a result of the increased disturbance and isolation of this southern habitat from natural areas to the northeast caused by the road corridor fragmentation. Mitigation options for wildlife impacts to the PSW unit are constrained by the proximity of this feature to an existing residential subdivision to the south. Road design options could be incorporated in order to minimize or prevent herpetofauna movement across the road surface. As discussed above, a restoration initiative is recommended to compensate for the habitat fragmentation due to the loss of vegetation in road right-of-way. Consideration should be given during the detailed design stage to providing amphibian movement capability in the six culverts that are recommended for installation within the woodlot. In addition, the potential for a new, dry culvert to the west was identified (west of the hydro line crossing at approximately Station 43+320) that could provide an additional wildlife linkage in this area.

Breeding Bird Disturbance Impacts

The breeding habitat for birds could be affected by vegetation removal in the road right-of-way through the Centre Road PSW unit. The only area-sensitive avian species of conservation concern observed in this area were associated with open-country habitat adjacent to the woodlot. As such, the overall diversity of area-sensitive birds around the woodlot is not expected to be altered significantly by the new disturbance from the road; however, the federal Migratory Bird Convention Act (1994) and the provincial Fish and Wildlife Conservation Act (1997) prevents the destruction or disruption of nests, eggs or hatched young. As a protection measure for potential breeding birds or nests in the PSW unit, it is recommended that any tree removal be done outside the breeding bird period (April 15th to August 15th). This measure will prevent the loss of incubating eggs or newly hatched young.

Introduction of Invasive Plant Species in Disturbed Areas of the Road Right-of-way

In addition to the direct impact of vegetation removal in the right-of-way disturbance zone, there is an indirect impact that could result in an increased susceptibility at the edges of the PSW unit to undesirable invasive and/or exotic plant proliferation. The creation of new woodlot edges along the road corridor will allow disturbances (i.e. exotic species, light, noise, debris, etc.) to penetrate deeper into the woodlot. Moreover, increased wind exposure could augment desiccation and tree blow-down along the new woodlot edges. In order to mitigate this

indirect impact, an Edge Management Plan (EMP) should be developed for the north and south edges of the road right-of-way prior to commencement of vegetation removal and road construction. The objective of the EMP will be to deter non-native invasive flora species from colonizing natural and landscape areas post-construction. In order to achieve this, the EMP should specify the location and density of appropriate native plant species to be planted in the disturbed areas associated with the road right-of-way.

Alteration to the Hydrology of the PSW

In order to mitigate altering the hydrology of the wetland, which could lead to a change in the composition of the wetland vegetation, six flow equalization culverts will be installed along the road alignment. With a series of flow equalization culverts at low elevations along the road alignment, the hydrologic balance will be maintained between existing and post-construction conditions. In addition, culverts could also serve as an eco-passage during dry periods in the wetland, thus reducing animal mortality in the right-of-way.

Lake Medad Valley Swamp Provincially Significant Wetland

The New East-West Road Corridor grading limit is proposed to be located approximately 90 m from the southern wetland boundary of the Lake Medad Valley Swamp PSW, 38 m from the southern boundary of the Waterdown North Wetland ESA and approximately 15 m from the vegetative dripline of a fresh-moist ash deciduous forest to the north. Wildlife surveys conducted in this PSW in 2007 observed area-sensitive, regional conservation priority birds (e.g. mourning warbler and chestnut-sided warbler) and sensitive amphibian species (e.g. pickerel frog and American toad). In addition, pickerel frogs are listed as 'Rare' in Hamilton's Natural Areas Inventory database.

The ELC surveys along the southern edge of this PSW in 2007 documented a black walnut lowland deciduous forest over 100 m from the road corridor as well as an ash lowland deciduous forest community. Black walnut lowland deciduous forests are provincially rare. These lowland deciduous forest communities are situated along the southern edge of the PSW/ESA and are functioning as a natural buffer to the PSW/ESA lands. The flora and fauna of wetlands and provincially rare vegetation communities are generally sensitive to ecological disturbance. It is recommended that an Edge Management Plan (EMP) be generated for the 15 m non-forested area between the southern dripline of the ash deciduous forest and the road corridor. Planting native vegetation in this 15 m area will enhance the 38 m natural buffer that extends from the ESA to the East-West road corridor. The EMP should be developed in consultation with the MNR and/or HCA and implemented prior to commencement of road construction.

Nelson Escarpment Woods Environmentally Sensitive

The Nelson Escarpment Woods ESA located north of Dundas Street and west of Cedar Springs Road includes a section of the Niagara

Escarpment and is comprised of the Nelson Slope Forest Regional Life Science ANSI and the Waterdown Moraines Regional Earth Science ANSI. As a result of road widening along the north side of Dundas Street and the west side of Cedar Springs Road, the following impacts could occur:

- Loss of edge vegetation in the Nelson Escarpment Woods ESA and in the provincially significant Black Walnut Lowland Deciduous Forest;
- Introduction of invasive plant species in disturbed areas of the road right-of-way; and
- Increased road disturbance impacts, including potential construction stage impacts from rock blasting.

Loss of edge vegetation in the Nelson Escarpment Woods ESA and the Black Walnut Forest

Removal of approximately 0.35 ha of vegetation and disturbance along the edge of the ESA feature is an encroachment impact of the East-West Road Corridor road expansion. This is expected to have a minor impact on a black walnut deciduous forest vegetation community with a S2S3 SRank and considered provincially significant in Ontario. The area with the black walnut deciduous forest is an inclusion of the larger deciduous forest of the Nelson Escarpment Woods ESA that was previously documented as cultural woodland in the Halton Natural Areas Inventory (NAI) (2006). Cultural vegetation communities are generally managed, not sustained naturally and typically less sensitive to disturbance.

It is recommended that mitigation consist of an Edge Management Plan (EMP) that details vegetation removal, control of invasive and exotic pioneer plant species and compensatory restoration for the southern and eastern edges of the ESA. Tree replacement is recommended in a location within the Nelson Escarpment Woods ESA. It is recommended that a minimum compensatory tree replacement plan based on the area of the natural community removed be implemented at a rate of 3:1. Tree selection should be determined using Conservation Halton's Landscape Planning Guidelines (CH, 2005).

Introduction of Invasive Plant Species in Disturbed Areas of the Road Right-of-way

Vegetation removal along the edge of the ESA will not impact provincial species at risk or regionally rare flora or fauna; however, it could leave the edge of this feature vulnerable to the colonization of invasive exotic flora. The EMP noted above should also detail the planting of native vegetation adjacent to the road right-of-way as mitigation to prevent the introduction and proliferation of invasive exotic species.

Increased Road Disturbance Impacts

Given the disturbance associated with high traffic volumes currently experienced along Dundas Street, road widening is not expected to have a measurable negative affect on the wildlife habitat potential of the ESA in this area. For the most part, habitat generalist species were documented in this area, which are anticipated to be consistent with post-construction conditions. During the detailed design phase

alternatives to rock blasting will be assessed for the removal of the rock on the north side of the widened road. It is also noted that the lands being considered along this section lie within the Niagara Escarpment Development Control area and a permit or permits will be required from the NEC for the works. Continued discussion with the NEC will be required.

General Breeding Bird Mitigation Measures

As a protection measure for breeding birds, it is recommended that any tree and shrub removal be done outside the breeding bird window. The breeding bird season is from April 15th until August 15th for most passerines. This measure will prevent the loss of incubating eggs or newly hatched young. Some short-term disturbance to local wildlife will occur during the construction period due to the physical disruption of habitat associated with construction (i.e. vegetation clearing, equipment movement, earthworks, etc.). The Migratory Birds Regulation under Section 6 of the Migratory Birds Convention Act (MBCA) prohibits the disturbance, destruction or removal of a nest, egg or nest shelter of a migratory bird. The Ontario Fish and Wildlife Conservation Act (OFWCA) prohibits the destruction or taking of nests or eggs of wild birds, except for American crows, brown-headed cowbirds, common grackles, house sparrows, red-winged blackbirds or starlings. The Act also prohibits the capturing, killing or harassment of endangered species.

To avoid contravening the MBCA or the OFWCA, vegetation clearing should not occur between April 15th and August 15th to avoid disturbing breeding or nesting birds. Further, general construction activities should not occur in ANSIs, ESAs, or PSWs during the breeding bird period. If vegetation clearing and/or general construction must occur during this time period, a qualified avian biologist should develop a nesting survey protocol for the disturbance areas. Under this protocol, areas should be inspected every three days at minimum. If breeding bird activity is observed within the construction area, specific mitigation measures should be adopted. This includes the prohibition of clearing or construction until after the nesting period or the establishment of appropriate buffers around active nests to avoid direct impacts on breeding birds and/or their habitats.

Aquatic Habitat Impacts and Mitigation

The proposed construction of new road sections and widening of existing roads will require some localized encroachment. The majority of the crossings have undergone some level of disturbance in the past as a result of the surrounding land use and ongoing development. There is also potential for indirect impacts (e.g. disturbance during fish reproductive periods) on the natural environment if appropriate mitigation measures are not implemented and maintained during construction.

With respect to fish and fish habitat at the crossing locations along the New East-West Road Corridor, both new culvert installations and clear-span structures will be required to accommodate either a new road

crossing or the widening of an existing road (e.g., Dundas Street). In addition, channel realignments may be required along the New East-West Road Corridor. The potential for realignment largely depends on the final details of the proposed crossings and their locations as they relate to the watercourses in question. All of these works have the potential to negatively affect fish and fish habitat. The following watercourses are affected:

- Borer's Creek;
- Drainage Ditch to Grindstone Creek;
- Grindstone Creek (Northeast and Northwest Branches);
- Drainage Ditch to Upper Hager Creek; and
- Upper Hager Creek.

Bridge and culvert installations can negatively affect existing fish habitat by removing or temporarily disturbing habitat that exists under the physical footprint of the new structure (e.g., abutments, headwalls, culvert bottom). See **Table 6-42** for a description of the potential impacts by crossing. Improperly installed and lengthy culverts can restrict or prevent fish passage by causing flows that are too strong for fish to negotiate or creating a perched situation (when the outlet is "perched" above the normal water level). New culverts should be installed along a straight section of the channel and embedded sufficiently so that water can flow through the inlet and outlet naturally, allowing fish to successfully negotiate the structure. If that is not possible, additional channel realignments or slight design modifications may be required to allow flows to convey through new structures gradually and smoothly.

Potential installation of some culverts will also involve enclosing short additional reaches of the channel, resulting in some localized alteration of habitat conditions. The physical habitat where the anticipated works are proposed includes permanent and intermittent Type 2 habitat, ephemeral Type 3 habitat and overland drainage swales. Please refer to **Table 6-42** for more information pertaining to existing habitat conditions at each crossing.

Culvert installation and channel works have the potential to degrade water quality, obstruct fish movement, and interfere with sensitive periods for fish. Further, removal of riparian vegetation has the potential to negatively affect fish populations downstream because of important nutrient and food contributions resulting from fallen leaves and woody debris. With proper mitigation measures in place during and after construction, the proposed works will mitigate the indirect impacts of construction activities and sediment and erosion loading into the Grindstone and Borer's Creek systems.

Stormwater Management

The effects of stormwater runoff can have a significant impact on the health of aquatic ecosystems, including fish and fish habitat. The main impacts of uncontrolled stormwater on a watercourse include the introduction of contaminants and impurities, nutrient loading,

fluctuations in thermal regime, and the release of silt-laden water causing sedimentation of onsite and downstream habitats.

Stormwater management plans are typically finalized during the detailed design stage. The stormwater management plan for this project will consider an increased runoff potential along the road corridor due to an anticipated increase in the impermeable land surface area associated with road construction. Road construction projects typically involve an assortment of stormwater management ponds, sewer systems, and drainage ditches. Online ponds can cause an aquatic impact by increasing the water temperature in a watercourse; however, as long as the receiving watercourses are warmwater systems, the ponds are naturalized and are properly designed to facilitate fish movement to downstream reaches. In these cases, they can be an acceptable mitigation technique in stormwater management from a fisheries perspective.

To protect permanent sections of Borer's Creek and Grindstone Creek during and after construction, it is likely that a normal (Level 2) stormwater treatment level will be imposed. Level 2 requires that 70% of total suspended solids (TSS) must be filtered out prior to release into their respective systems. Generally, this level of treatment is sufficient for watercourses containing warmwater fish communities and habitat. As such, no significant effects would be expected with this level of protection being in place.

6. PREFERRED DESIGN CONCEPT

Table 6-42: Existing Fish & Fish Habitat Conditions Summary

#	Crossing Location for Watercourses & Drainage Features (Sensitivity Rating)	Crossing Type	Flow (Directly Supports a Fishery)	Potential Impacts	Mitigation
1	Borer's Creek – Main Branch/Black's Pond (High)	Three cell box culvert with low flow channel through the open bottom center cell. Opening sizes: 6 m x 3 m and 6 m x 2.5 m	Permanent (Yes)	1-5	1-5
2	Borer's Creek – Eastern Tributary (Low)	A concrete closed bottom box culvert with 0.5 m embedded. Dimension: 6 m x 1.7 m x 36 m	Intermittent (Yes)	1-5	1-5, work during dry periods when necessary
3	Borer's Creek – Eastern Tributary (Low)	A series of 6 arch shaped open bottom CSP culverts. Opening: 1.2 m x 1.0 m	Intermittent (No)	2, 3, 5	2, 3, 5
4	Drainage ditch connected to Grindstone Creek Northwest Branch (Low)	CSP concrete culvert (open bottom). Opening: 4.0 m x 1.5 m	Intermittent (Yes)	2, 3, 5	2, 3, 5
5	Grindstone Creek – Northwest Branch (High)	A 14 m span bridge	Permanent (Yes)	2, 3, 5 – no direct in-water work	2, 3, 5

6. PREFERRED DESIGN CONCEPT

Table 6-42: Existing Fish & Fish Habitat Conditions Summary

#	Crossing Location for Watercourses & Drainage Features (Sensitivity Rating)	Crossing Type	Flow (Directly Supports a Fishery)	Potential Impacts	Mitigation
6	Grindstone Creek – Northeast Branch (Moderate)	A concrete open bottom box culvert. Dimensions: 6 m x 1.8 m x 54 m	Intermittent (Yes)	1-5	1. stockpile and replace with existing (or better) 2. limit removal, re-vegetate exposed surfaces 3. implement sediment and erosion control plan 4. work during fishery timing window or dry periods 5. implement environmental management plan 1-5, work during dry periods when necessary
7	Grindstone Creek – Northeast Branch (Low)	750 mm CSP pipe	Intermittent (No)	3, 5	3, 5
8	Grindstone Creek – Northeast Branch (Low)	750 mm CSP pipe	Intermittent (No)	3, 5	3, 5
9	Grindstone Creek – Northeast Branch (Low)	750 mm CSP pipe	Intermittent (Yes)	3-5	3-5
10	Drainage ditch connected to Upper Hager Creek (Low)	Closed bottom box culvert 3. m x 1.0 m	Intermittent (No)	3, 5	3, 5
11	Upper Hager Creek (tributary) (Low)	1000 mm CSP pipe	Intermittent (No)	3, 5	3, 5

General Aquatic Design-Related Mitigation Measures

In order to protect aquatic habitat, any in-water work should be conducted within the appropriate fisheries window. Additionally, an approved sediment and erosion control program should be installed and monitored to ensure that watercourses are not degraded by construction activities.

During the detailed design and construction phase of the project, appropriate mitigation measures must take into consideration the elimination or minimization of water quality impacts and erosion/sedimentation impacts to watercourses and fish habitat impacts. Strategies that involve retention of existing riparian and terrestrial vegetation are favoured. In addition to the standard environmental mitigation measures typically associated with road construction works (e.g., clean equipment, sediment and erosion controls, proper construction sighting and stabilization after construction, etc.), further mitigation measures specific to this project may include, but are not limited to:

- Using non-intrusive structures such as clear span bridges or open-footing culverts (where necessary);
- Installing sufficiently embedded closed-bottom culverts;
- Minimizing the length of culverts installed;
- Ensuring that culverts are properly installed so as to not obstruct fish movement (including seasonal movement) or cause wash-out (erosion). This may involve setting the culvert bottom 10 – 20% of the diameter or height below the channel grade and placing suitable substrates inside;
- Minimizing the removal of existing vegetation (other than invasive emergents already growing in the channel) and existing habitat to the extent required for construction;
- Ensuring that new culverts and spans are installed in such a manner that they convey flows gradually and continuously so that a backwater effect or an in-stream barrier is not created;
- Ensuring the embankment fill materials do not, and will not encroach on culvert inlets and outlets;
- Ensuring the culvert capacity is equivalent to, or exceeds, the hydraulic capacity of the creek or drain; and
- Treating stormwater runoff to a normal (formally Level 2) standard of TSS removal prior to discharge into the watercourse.

General Aquatic Construction-Related Mitigation Measures

In addition to the typical construction-related mitigation measures used to prevent negative impacts to aquatic and terrestrial features during and after construction (i.e. entry of deleterious substances, filtering dewatering effluent, coffer dam construction, etc.), measures that could be undertaken include, but are not limited to:

- Conducting all channel/ditch/culvert works in dry conditions by using cofferdams, temporary diversions, or taking advantage of dry conditions due to natural intermittent/ephemeral periods (i.e. late summer or fall);

- Ensuring that any isolated pools or temporary diversions are checked for fish and removed by a qualified aquatic biologist prior to dewatering activities;
- Relocating any stranded fish in culvert or construction zones using appropriate techniques to reaches downstream of the proposed works;
- Adhering to the appropriate MNR timing window for in-water works to protect warmwater fish during their sensitive spawning and nursery periods;
- Not working during or immediately after spring runoff or significant rainfall events;
- Ensuring the survival of any wildlife, including nesting birds, that may be encountered during construction;
- Retaining as much existing bank vegetation as possible to help ensure bank stability and erosion control;
- Installing protective fencing to delineate the edges of construction zones, protect bank vegetation, and existing aquatic habitat in the channel/ditch;
- Using sandbags, silt fencing, or straw bales to build an in-channel filter downstream of the in-water work zone to minimize the transport of sediments originating from the construction site(s); and,
- Re-vegetating all exposed areas as soon as possible after construction with native shrubs and ground cover (e.g., hydroseed, various mulches, or erosion control blankets) to expedite root-system development and growth to quickly stabilize exposed soils.

Future Aquatic Works Required

The following measures could be required in order to obtain regulatory permits and agency approvals and to ensure the protection of aquatic habitat and fisheries resources:

- Undertake additional site-specific aquatic surveys to update and confirm the existing conditions and refine mitigation as appropriate;
- Analyze the technical feasibility of taking the Black's Pond section of Borer's Creek offline as compensation for potential harmful alteration, disruption or destruction (HADD) caused by the New East-West Road Corridor; particularly, the impact of the new road crossing of the Borer's Creek floodplain;
- Further analysis of the footprint of all culvert installations and extensions by a qualified hydrologist in order to ensure smooth transitions and flow patterns between inlet and/or outlet as well as the existing channel;
- Collect, analyse, and incorporate the detailed information from technical specialists (e.g. hydrologists, engineers, surveyors, fluvial geomorphologists, and fish habitat biologists, as required) for any proposed channel realignments;
- Consult Conservation Halton (CH), Hamilton Conservation Authority (HCA), and the MNR to confirm the list of permits and approvals required to undertake the proposed project, including potential responsibilities under the Fisheries Act,

Navigable Water Protection Act, Public Lands Act, Lakes and Rivers Improvement Act, and the Conservation Authorities Act. Potential channel realignments and some of the culvert installations may result in a HADD if impacts are not mitigated and may require prior authorization from Fisheries and Oceans Canada (DFO);

- If CH or HCA determines that a HADD will occur, they will forward the project onto DFO for their review if the impacts cannot be mitigated. If necessary, a Fish Habitat Compensation Plan, including appropriate supporting documentation, photographs, and drawings may be required as a condition of DFO approval; and
- Consult with CH, HCA, and/or DFO to properly identify suitable and realistic habitat compensation/enhancement opportunities, if applicable.

As per CH and HCA's Level 2 agreement with DFO, the conservation authority (CA) will identify if HADD(s) will occur as a result of the proposed work at each crossing. If the potential HADD cannot be fully mitigated, the file will be forwarded to DFO for review and decision. It is anticipated that HADDs can be avoided at these crossings provided the right combination of mitigation measures listed above are prescribed and maintained during construction. The need for the above measures would be determined through the detailed design process for the New East-West Road Corridor.

6.4.2 Social Environment

The potential for social impacts from the New East-West Road Corridor includes both direct loss to property from the physical widening of existing roads (e.g. Parkside Drive, Dundas Street, Highway 6) and from changes in traffic volumes.

Direct Loss of Property

No residences will require relocation as a result of the road development. Frontage property would be required from about 20 residences, most of them along Parkside Drive. The amount of property required from any one residence will be relatively minor with most in the order of 0.12 ha. The property owners will be financially compensated for their property at fair market value. This compensation would also include the loss of other related assets including for example fences, gates and trees. The process for property acquisition was of interest to the public and this has been discussed at NAC meetings and at Public Information Centres.

Change in Character

The development of the New East-West Road Corridor may potentially affect the character of four residential areas: near the intersection with Highway 6 and along Northlawn Avenue, Parkside Drive and Dundas Street (west of Brant Street). These areas are all on the edge of more dense suburban development located to the south and exhibit a semi-

rural character. Either existing highways or arterial roads are in the vicinity of all of these areas.

- The development of the New East-West Road Corridor intersection with Highway 6 is not expected to change the character of the area given the dominating influence that Highway 6 has on this area.
- With regards to Northlawn Avenue, the New East-West Road Corridor cuts to the north of these residences (about 100 m away) through a woodlot/PSW. The existing trees in the woodlot will partially screen/buffer the roadway for the residences which back onto the woodlot. At the far eastern end of this subdivision views of the road are expected as the woodlot does not extend across the back of all residences on Northlawn Avenue. Substantial change to the character of this residential area is not expected given that the road runs along the back of these residences; that there is a 100 m separation distance of the road from the residences and that the woodlot will provide some amount of screening.
- In regards to Parkside Drive, the widened roadway will result in the area becoming more urban in character.
- Finally, the widening of Dundas Street from 4 to 6 lanes will result in some minor changes to the character of this area as the 4 lane Dundas Street has already influenced the character of this area.

Further, land development plans west of Centre Road (Waterdown North) and south of Parkside Drive (Upcountry) will contribute to these areas becoming more suburban in character. To minimize the impact on the corridor, particularly along Parkside Drive, a road design and landscape plan has been developed to retain the character of these areas as much as possible.

While there will be some change to the rural character of this area, the intent of the design as proposed is to mitigate these effects.

Disturbance Effects

Disturbance effects to residents will occur during both the construction and operation periods. Appropriate construction practices will be applied to minimize noise and air quality effects during the construction period (e.g. act in accordance with the City of Hamilton's noise bylaw). Construction practices will also ensure the safety of residents and other road users.

Future land development activity in the Waterdown area (Waterdown North) will result in increased traffic along existing road sections (Parkside Drive) which could lead to some increases in disturbances to residents. It should be noted that road traffic volume increases will occur along existing road sections whether the proposed New East-West Road Corridor and associated improvements (i.e. Parkside Drive and Dundas Street widening) are implemented or not. To better understand the nature of these effects, noise and air quality modeling exercises were undertaken as described below:

Noise

Operations Noise Impacts

An acoustic impact assessment study was carried out as part of the project. The study used existing and projected future (2021) traffic information and the Ontario Ministry of Environment predictive road traffic noise model ORNAMENT/STAMSON to predict the acoustical impact of the proposed roadway improvements. The details of the noise assessment are presented in **Appendix E**.

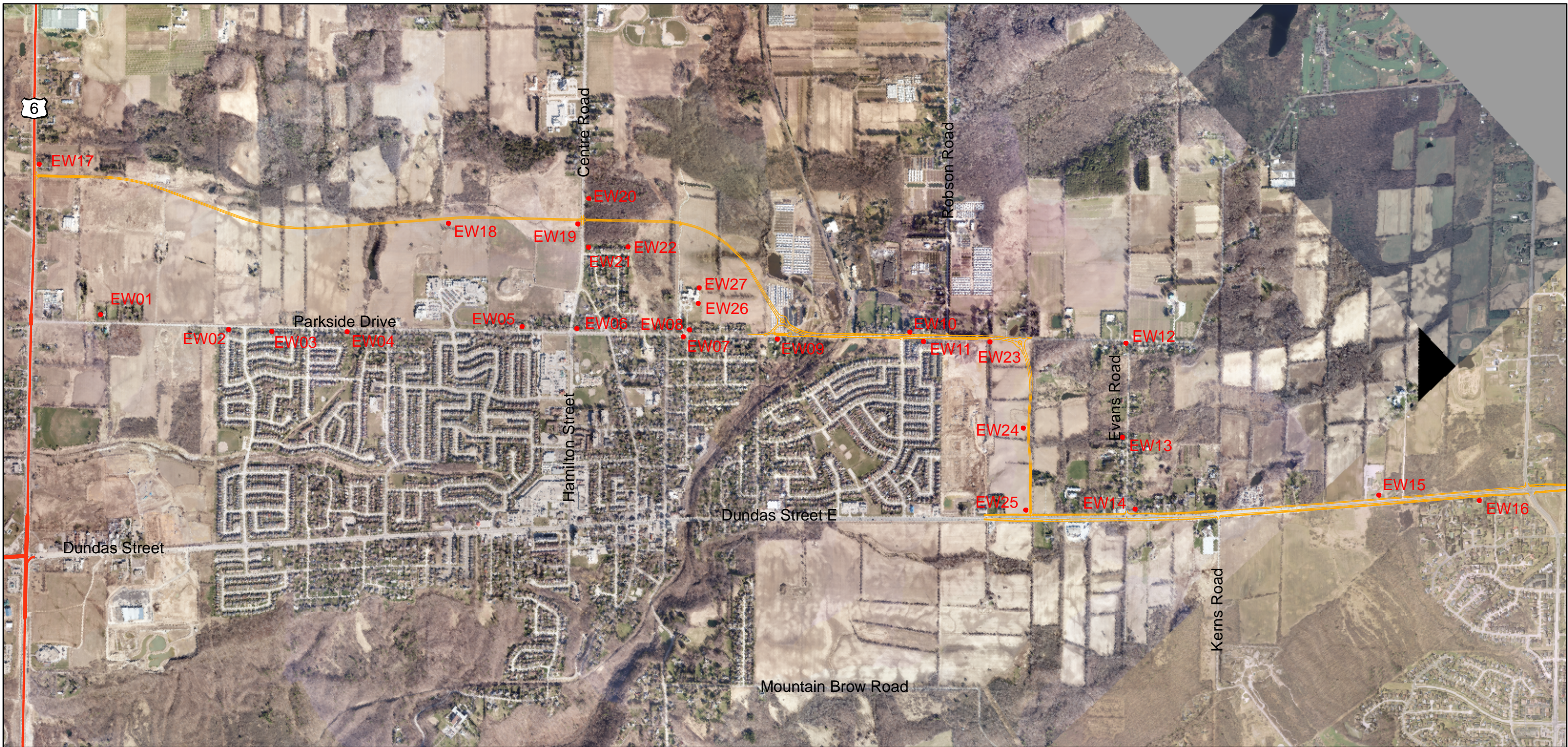
Twenty-six noise sensitive residential receptors were selected for this assessment and are identified in **Figure 6-26**. The residential receptors were chosen for their potential to be impacted by road traffic noise sources based on their relative location (proximity) to the roads and the configuration of the roadways.

In order to study the noise impact of the proposed corridor improvements, the impact at sensitive receptors due to the predicted traffic conditions for the mature state of development (future “Build” scenario) was compared against a scenario in which there was no road project (future “No-Build” scenario). An assessment of the current noise impact at the same receptors as a result of existing traffic conditions was also performed to establish a baseline.

The predicted day time Leq(16) and night time Leq(8) levels are presented in Table 4-1 of the Noise Assessment Report (Appendix E). There is a predicted increase in sound levels (future no-build vs. future build scenarios) at:

- receptor EW11 on the widened section of Parkside Drive;
- receptor EW20 on Centre Road;
- receptors EW21 and EW22 on Northlawn Avenue;
- receptor EW27 at the northeast area of the nursing home due to the new East-West Road section above Parkside Drive.

The increases in sound (from future no-build to future build scenarios) were considered to be insignificant and not perceptible for receptors EW11 (Parkside Drive), EW20 (Centre Rd.), EW21 (Northlawn Ave), and EW27 (north side of nursing home on Parkside Drive) as they were less than 3 dBA. For EW22 (east end of Northlawn Ave), the increase in sound levels due to traffic on the New East-West Road was predicted to be noticeable over that of the future no-build scenario, with day time and night time levels increasing by approximately 9 dBA. However, the day time Leq(16) and night time Leq(8) are fairly quiet at only 46 dBA and 40 dBA respectively which are similar to a residential area. For receptor EW22, there would be a direct line of sight to the New East-West Road Corridor east of the Centre Road woodlot. No mitigation is recommended as the noise levels are within the MOE limits for a suburban area. However as a result of the potential increase in estimated sound levels, monitoring of the traffic generated sound levels after the construction of the New East-West Road Corridor is recommended. Mitigation measures may be warranted depending on the monitoring results.

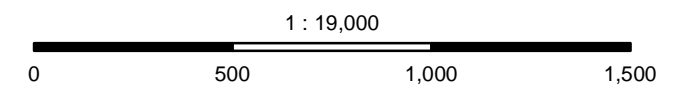


Legend

- Receptor Locations
- Proposed East - West Corridor Alignment Option



East - West Road Class
Environmental Assessment



Noise Assessment
Receptor Locations

Figure 6-26

It should be noted that for noise receptors south of Parkside Drive fronting on Fellowes Crescent, east of Boulding Avenue, who will have their backyards adjacent to the widened road, the existing wooden backyard fence is recommended for replacement due to conflict with grading and vegetation removal. The new fence should provide additional acoustical screening and should be designed accordingly. Even though noise mitigation is not specifically required at this location according to the assessment criteria, the future noise levels with or without the road widening will be relatively high. This acoustical fence provision has been discussed with some of the affected owners on Fellowes Crescent over a series of meetings and information exchanges.

The sound level increase at EW27 (nursing home on Parkside Drive) was higher at the second floor units of the nursing home than the ground floor units or the outdoor living area due to less ground attenuation. The increases over the future no-build scenario were deemed imperceptible during the day time and night time periods as they were all less than 3 dBA. It should be noted that the day time Leq(16) and night time Leq(8) were only 45 dBA and 38 dBA at the second floor level, respectively which can be considered similar to a quiet residential area. By contrast, the south-eastern side of the nursing home facility (receptor EW26) was not influenced by the New East-West Road Corridor but dominated by noise generated by traffic on Parkside Drive. It was predicted that lower noise levels in comparison to the future no-build scenario would result at this location.

Receptors along Dundas Street East were also predicted to have lower ambient sound levels by approximately 2 dBA due to the reduced speed limits from 80 km/h to 60 km/h.

Also considered were the future noise levels for future residential areas (e.g. Waterdown North and Upcountry developments). The potential future residential receptors in the Waterdown North development represented by EW18 and EW19 (middle of the proposed development, and eastern end of the proposed development near the intersection of the New East-West Road with Centre Road, respectively) indicated that day time Leq(16) levels ranged from 58 to 64 dBA and night time Leq(8) levels from 51 to 57 dBA. Future residential receptors in the Upcountry development modelled by EW23, EW24 and EW25 (on the redeveloped Parkside Drive, in the middle of the proposed development, and near the intersection of New East-West Road Corridor with Dundas Street, respectively) were predicted to have day time Leq(16) that range from 60 to 66 dBA, and night time Leq(8) levels of 53 to 59 dBA. For proposed new noise sensitive land uses such as residential subdivisions, when the daytime Leq(16) are above 60 dBA, the MOE (1997b) recommends that outdoor noise control measures such as barriers be considered in order to reduce the Leq(16) to below 60 dBA and as close as possible to 55 dBA, as technically and economically feasible. A noise barrier and further site mitigation measures may be required for any proposed development in the area currently identified as Waterdown North, particularly near the intersection with Centre Road. These lands are currently zoned for agricultural use with no development and therefore not defined as noise sensitive receptors. It is recommended

that noise impact at potential receptors be re-assessed as part of any proposed development in order to incorporate site specific characteristics into the model.

Construction Noise Impacts

The construction of the proposed New East-West Road Corridor has the potential to affect the local ambient sound levels in the vicinity of the construction site. However, construction activities are non-stationary and variable such that noise sources themselves are non-stationary and can vary depending on time of day and from day-to-day. Activities are influenced by the progression in construction phases, type of construction, weather, season, terrain and time of day.

In an effort to minimize noise and vibration impacts during the construction phase, construction activities of the roadways will act in accordance with the City of Hamilton's Noise By-Law (by-law No. 03-020). Construction will be limited also to between the hours of 07:00 a.m. and 7:00 p.m. and the proper maintenance of all equipment will be ensured.

Air Quality

Operations Air Quality Impacts

The objective of the air quality assessment is to consider vehicular emission impacts on the current and future ambient air quality in the vicinity of the New East-West Road Corridor. The following are the key conventional air contaminants pollutants associated with vehicular traffic and which were assessed in this study.

- Carbon monoxide (CO);
- Oxides of nitrogen (NO_x); and
- Respirable particulate matter (PM_{2.5}).

The gaseous emissions (i.e. CO and NO_x) are associated with tailpipe emissions only, whereas particulate matter (PM_{2.5}) emissions are associated with re-suspension of road dust, vehicular braking and tailpipe emissions.

The same twenty-six receptors considered in the noise assessment (described in the previous section) were also used in the air quality study as sensitive receptors. As with the noise assessment, the future "no-build scenario" was assessed and compared to the future "build scenario". A detailed description of the results of the air quality modelling is presented in the Air Quality Report contained in **Appendix D**.

The future build scenario assumes the closure of Parkside Drive at Highway 6 (i.e. Parkside Drive without access to Highway 6). This represents a worst-case scenario for determining air quality impacts since there will be greater increase in peak hourly volumes with this closure than with the current road configuration (i.e. without closure).

For receptor EW17 on Highway 6 near the intersection with the New East-West Road Corridor, NO_x concentrations was predicted to increase by approximately 8 ppb under the future build scenario in comparison to the future no-build scenario. The predicted concentrations in CO and PM_{2.5} for the future build scenario increased by a negligible amount over the concentrations predicted under the future no-build scenario. However, it should be noted that a NO_x concentration comparison between the future build scenario and the no-build scenario indicated a decrease in concentration of approximately 35 ppb for the future build scenario. Negligible change was predicted in the CO and PM_{2.5} concentrations between the current and future scenarios.

For receptors along Northlawn Avenue (EW21 and EW22) it was predicted that there would be no change in the concentrations of NO_x, CO and PM_{2.5} between the future build and future no-build scenarios. Due to the separation distance between the receptors and the New East-West Road Corridor, the impact of the new roadway was predicted to be negligible. NO_x concentrations were predicted to decrease by up to 10 ppb under the future build scenario in comparison to the current condition. Changes in the CO and PM_{2.5} concentrations are predicted to be insignificant.

The assumption regarding the closure of Parkside Drive at Highway 6 resulted in reduced peak hourly volumes along Parkside Drive from Highway 6 to Grindstone Creek in comparison to the future no-build scenario. Corresponding to this reduction in peak hourly volumes, the predicted concentrations of the modelled contaminants were all lower under the future build scenario for the receptors along this section of Parkside Drive (i.e. receptors EW01 to EW09) when compared to the future no-build scenario. However, the reductions were considered insignificant for CO and PM_{2.5} as they were less than 1 ppm for CO and less than 1 µg/m³ for PM_{2.5}, and reductions in NO_x was 10 ppb or less. Comparison of the predicted NO_x concentrations between the future build scenario and the current condition indicated a decrease in concentration of up to 17 ppb for the future build scenario. Negligible change was predicted in the CO and PM_{2.5} concentrations between the current and future conditions.

For the section of Parkside Drive east of Grindstone Creek that will undergo improvement (i.e. widened from two to four lanes), there is an insignificant change in the concentrations of the contaminants at receptors that are along this section of the roadway when compared to the future no-build scenario. Predicted changes in CO concentrations were less than 1 ppm, changes in NO_x were on the order of 1 ppb, and changes in PM_{2.5} were less than 1 µg/m³. It should be noted that for both the future no-build and future build scenarios that a similar future volume of traffic is predicted for this section of Parkside Drive (despite it being only a 2 lane road under the future no-build scenario). This additional traffic volume is being generated by the future development that is assumed to be in place in the Waterdown area by 2021 and which would potentially utilize this roadway. It is further noted that when air contaminant levels for existing conditions are compared to the air contaminant levels under the future build scenario that a decrease of

approximately 10 ppb is predicted for NO_x. A negligible change in CO and PM_{2.5} is predicted for the receptors along this section of Parkside Drive that is to be improved.

On Dundas Street (modelled by receptors EW14 to EW16), changes in CO and PM_{2.5} between the future build and no-build scenarios were insignificant as they were less than 1 ppm and 1 µg/m³, respectively. For NO_x there was both an increase of 5 ppb at EW15 and a decrease of 3 ppb at EW14 (with no change at EW16 near Dundas Street and Brant Street) that was predicted between the future build and no-build scenarios.

The maximum predicted cumulative concentrations (background plus predicted levels) for the future build condition for NO_x, CO and PM_{2.5} are below their respective MOE and Canadian Council of Ministers of the Environment (CCME) air quality standards. Therefore, the concentrations of the air contaminants at potential future residential receptors along the New East-West Road Corridor (EW18 and EW19 in the Waterdown North development, and EW23 to EW25 in the Upcountry development) would also be expected to be below these limits.

In summary, for the receptors selected for the purposes of this assessment, the future build scenario resulted in changes in the predicted air quality that was not considered to be significant when compared to the air quality impacts predicted for the future no-build scenario.

Construction Air Quality Effects

The construction phase of the proposed New East-West Road Corridor development has the potential to affect the air quality in the vicinity of the roadway. Emissions which are associated with construction activities are primarily dust and typical combustion emissions from construction equipment such as CO, NO_x, SO₂ and Volatile Organic Compounds (VOCs). As with any construction site, these emissions will be of relatively short duration and unlikely to have any effect on the surrounding areas.

During the construction phase, in order to reduce/control dust emissions, effective dust suppression methods, such as on-site watering of active areas, sweeping of paved areas, (e.g. street and parking lot), as well as limiting the travel speed of the nearby roads to reduce re-suspension of road dust are recommended. During the construction phase, it is recommended that the “*Best Practices for the Reduction of Air Emissions from Construction and Demolition activities* (March 2005)” prepared by ChemInfo Services Inc. in conjunction with Construction & Demolition Multi-Stakeholders Working Group for Environment Canada be implemented.

In addition to the construction activities that would impact the local air quality, traffic congestion and re-routing of the traffic during the construction phase has the potential to further impact the local air quality. This may be more noticeable during the widening of Parkside

Drive and Dundas Street East. During the widening of Parkside Drive between Grindstone Creek and the New East-West Road Corridor linking Parkside Drive to Dundas Street, there is a potential for increased traffic and therefore air quality impacts along Hamilton Street North, Main Street North, Mill Street North, Dundas Street between Hamilton Street and Evans Road, and Evans Road as traffic may be re-directed along these routes. During the widening of Dundas Street, there is a potential for increased traffic and air quality impacts along Side Road 1/Milborough Line, Parkside Drive, Kerns Road, Waterdown Road/Mill Street South, Hamilton Street North, Main Street North, Mill Street North, and Dundas Street west of Pamela Street.

Other Effects

Other effects that were considered in the assessment of the facility included: the potential for light pollution, the potential for impacts to wells and septic tanks and the potential for traffic infiltration. The potential for these effects are described in *Table 6-41*.

6.4.3 Economic Environment

The development of the road will, in some locations, require the removal of land that will result in some economic effects. At the western end of the project area, the New East-West Road Corridor will result in the removal of about 4.33 ha of land designated for agricultural uses. This will affect the agricultural activities of farmers who use/own these properties. The landowners will be compensated for the loss of their land at fair market value.

About 1.89 ha of property will be required from Connon Nursery located on the north side of Parkside Drive. This is one of several properties used by Connon Nursery in the area. Discussions have been held with the owners regarding the need for this property. It is anticipated that the Nursery can continue to operate at this location (north of the alignment). The alignment of the road through the Connon Nursery property will require alterations to this business. Currently, the lands are used for nursery operations including greenhouse facilities. Connon Nursery operations will be temporarily disrupted from having to move their facilities from the road alignment area. Connon Nursery will be compensated for the loss of land. Minimal net effects are expected as a result of financial compensation being provided. The road improvements at this area will improve access to the facility which could create business opportunities for them.

Some minimal frontage property will be required for at least one business along Dundas Street. These effects are expected to be minor. Land owners will be compensated for property loss.

The New East-West Road Corridor will not significantly affect any development activity in the area. The road will provide needed access to the Waterdown North development.

6.5 Estimated Construction Costs

A preliminary cost estimate has been prepared for the construction of the New East-West Road Corridor including the reconstruction of Parkside Drive and Dundas Street. This estimate presented below is based on present day costs and excludes HST.

Table 6-43: Preliminary Construction Cost Estimate

ROAD SECTION	COST ELEMENT	Cost
New Road west of Parkside Drive to Highway 6		
	ROADWORKS	\$6,991,000
	STRUCTURES	\$2,148,300
	LANDSCAPE	\$980,000
	ELECTRICAL	\$608,000
	PROPERTY	\$2,328,800
	PATHWAY/SIDEWALK	\$1,415,700
	UTILITIES	\$595,900
	CONTINGENCY	\$1,274,000
	ENGINEERING	\$1,274,000
	Subtotal	\$17,615,600
Parkside Drive		
	ROADWORKS	\$3,380,300
	STRUCTURES	\$1,086,700
	LANDSCAPE	\$147,500
	ELECTRICAL	\$228,000
	PROPERTY	\$1,286,50
	PATHWAY/SIDEWALK	\$324,000
	UTILITIES	\$258,300
	CONTINGENCY	\$542,500
	ENGINEERING	\$542,500
	Subtotal	\$7,796,300
Upcountry Link		
	ROADWORKS	\$1,822,200
	STRUCTURES	\$N/A
	LANDSCAPE	\$135,000
	ELECTRICAL	\$291,000.00
	PROPERTY	N/A
	PATHWAY/SIDEWALK	\$401,000
	UTILITIES	\$132,500
	CONTINGENCY	\$278,200
	ENGINEERING	\$278,200
	Subtotal	\$3,338,300
Dundas Street (West of Kerns Road)		
	ROADWORKS	\$2,400,000
	STRUCTURES	\$528,000
	LANDSCAPE	\$150,000
	ELECTRICAL	\$612,000
	PROPERTY	\$345,900
	PATHWAY/SIDEWALK	\$318,300
	UTILITIES	\$200,400
	CONTINGENCY	\$420,900

ROAD SECTION	COST ELEMENT	Cost
	ENGINEERING	\$420,900
	Subtotal	\$5,396,400
Dundas Street (East of Kerns Road)		
	ROADWORKS	\$5,509,400
	STRUCTURES	\$1,208,900
	LANDSCAPE	\$335,000
	ELECTRICAL	\$720,000
	PROPERTY	\$519,000
	PATHWAY/SIDEWALK	\$297,400
	UTILITIES	\$373,700
	CONTINGENCY	844,400
	ENGINEERING	\$844,400
	Subtotal	\$10,652,200
	TOTAL	\$44,798,700

6.6 Commitments to Future Work

It is recommended that Additional studies be carried out during or prior to the detailed design phase to finalize the required mitigation measures. These include the development of Edge Management Plans, completion of Slope Stability Studies to identify the stable top of bank at various locations (Borer’s Creek crossing, Grindstone Creek crossing and two crossing locations on a tributary of the Grindstone Creek), and the completion (where required due to the need for channel works) of fluvial geomorphology assessments. **Table 6-44, Commitments to Future Work**, details City of Hamilton and Halton Region’s commitments to further studies/work as this project advances toward and into the detailed design stage. Commitments for mitigation measures to address potential impacts are discussed in **Section 6.4** of this report.

Table 6-44: Commitments to Future Work

Item	Future Work	Comments
1. Borer’s Creek Structure	Finalize configuration (hydraulic requirements)	<ul style="list-style-type: none"> In discussion with Hamilton Conservation Authority To include consideration of downstream Black’s Pond treatment options (off-lining)
2. Hydro Towers	Confirm hydro line crossing treatment	Follow-up discussions with Hydro One required.
3. Boulding Avenue Intersection Traffic Monitoring	Location: <ul style="list-style-type: none"> Parkside Drive/Boulding Avenue intersection 	Initiate a traffic monitoring program at the Parkside Drive/Boulding Avenue intersection to assess through traffic issues (speed, ease of egress) and the potential need for a traffic signal
4. Bruce Trail Crossing	Location: <ul style="list-style-type: none"> Kerns Road at Dundas Street 	The existing Bruce Trail crossing on Dundas Street located east of Kerns Road was recommended to be re-established at the Dundas/Kerns intersection. The final treatment to be resolved in discussion with the Bruce Trail Conservancy.
5. Edge Management Plans	Locations: <ul style="list-style-type: none"> Borer’s Creek Centre Road Woodlot 	To be completed in discussions with Conservation Halton and the Hamilton Conservation Authority.

Item	Future Work	Comments
	<ul style="list-style-type: none"> Woodlot/Wetland northeast of the Upcountry development Nelson Escarpment Woods 	
6. Vegetation Compensation Plans	<p>Locations where the tree removals exist:</p> <ul style="list-style-type: none"> Borer's Creek Centre Road Woodlot Woodlot/Wetland northeast of the Upcountry development Nelson Escarpment Woods 	3:1 replacement ratio to be located on public lands (locations to be confirmed in discussions with Conservation Halton and Hamilton Conservation Authority).
7. Wildlife Crossings	<p>Locations:</p> <ul style="list-style-type: none"> Potential new culvert located east of Joe Sam's Park Associated with recommended new structures (Borer's Creek, Centre Road Woodlot culverts, Grindstone Creek, Grindstone Creek tributary at Dundas Street) 	Viability and treatment/configuration options to be assessed
8. Natural Hazard Mapping	<p>Locations:</p> <ul style="list-style-type: none"> Borer's Creek, Centre Road Woodlot, Grindstone Creek, Grindstone Creek tributary at Upcountry and at Dundas Street) 	Detailed natural hazard mapping to be completed at these locations. Assessment to include consideration of karst, floodplain, stable top of bank, meander belt as appropriate.
9. Noise Monitoring Study	<p>Locations:</p> <ul style="list-style-type: none"> Northlawn Avenue Parkside Drive 1107 (Dundas Street (east of Kerns Road) 	Complete a noise monitoring program as these locations including establishing existing baseline noise conditions and post-construction conditions.
10. Light Pollution Study	<p>Locations:</p> <ul style="list-style-type: none"> Nelson Escarpment Woods Center Road Woodlot Borer's Creek crossing 	Requested by Conservation Halton
11. Species at Risk Assessment (SAR)	Follow-up work will be required related to additional field sampling/observation for species at risk	<ul style="list-style-type: none"> The development of mitigation measures for marsh, field and woodland bird species will be dependent on additional breeding bird surveys if construction is to take place between May 15 and August 1. An additional woodland vole survey will be required to maximize opportunities for observation A work plan should be submitted outlining the proposed timing and methodology for the above work.
12. Stage 2 Archaeological Studies	Required throughout the corridor	Recommended in the Stage 1 study
13. Geotechnical	Required throughout the corridor	Geotechnical work was not completed during the Class EA due to property access issues.
14. Engineering Survey	Required throughout the corridor (with the exception of Dundas Street in Halton Region)	Geotechnical work was not completed during the Class EA due to property access issues.
15. Upcountry Section	Through additional floodplain assessment and data collection, confirm the alignment of the roadway adjacent to the Upcountry section of the corridor.	Additional field work is required to characterize the woodlot/potential wetland to the northeast of the Upcountry development (south of Parkside Drive). Additional floodplain modelling/assessment will be required to confirm the establishment of an east side Regional storm containment area through this location.

7. PUBLIC CONSULTATION AND COMMUNICATIONS

This chapter:

- Summarizes the Phase 2 consultation activities and inputs;
- Outlines the objectives to be achieved, and the mechanisms utilized relating to public consultation and communications during Phase 3 and 4 of the New East-West Road Corridor Class EA;
- Describes the public consultation and communications program that was conducted during Phase 3 and 4;
- Summarizes the outcomes of the consultation program, the comments received from the public and agencies with the provided responses; and,
- Evaluates the effectiveness of the program.

Public consultation and communications was an important part of the work undertaken in the New East-West Road Corridor Class Environmental Assessment (Class EA). The consultation program allowed for local knowledge, interests and concerns of the public and stakeholders to be understood and taken into account.

7.1 Summary of Phase II Work Consultation

An extensive public and agency consultation program was undertaken as part of the Waterdown Aldershot Transportation Master Plan (WATMP) process (Phase I and II of the Class EA). The connected consultation process exceeded the minimum requirements of the Municipal Class EA Process. The WATMP consultation activities included multiple public notices, Public Information Centre events (5), Stakeholder Advisory Committee meetings (5), agency meetings, presentation to Councils, issuing of interim study reports for public review, information postings on the project website, and responding to project related comments, issues and concerns.

The Phase II consultation work focused consultation and communications activities around four study stages:

1. Confirm Approach to the Study;
2. Review and Confirm Issues, Alternatives and Criteria;
3. Develop and Seek Feedback on Alternatives; and
4. Develop and Review Draft Transportation Master Plan (two drafts – 2006, and 2007)

The consultation activities that were undertaken and the inputs received are documented in Section 7.0 of the WATMP Report (see *Appendix O*). *Table 7-1* presents a summary of the issues and concerns relating to the preferred New East-West Road Corridor that was identified through the TMP consultation process.



Exhibit 7-1: October 2008 NAC Meeting

Table 7-1 – Summary of Issues and Concerns from the TMP Process Regarding New East-West Road Corridor

- There is a need for creative solutions to the problem – concern that the recommended solution will not solve the problem.
- Opposition to the east-west route on the basis of cost, environmental impact to wetlands and ESAs, and lack of evaluation of other alternatives.
- Basis for the assessment – Concern expressed that documentation was not available on how the screening and evaluation process was conducted. Report needs to be reviewed and discussed by the public before decisions are made.
- Road safety – Enforce reasonable speed limits on busy roads; prevent winter accidents by designing the road appropriately.
- Concern regarding the cost estimates of the proposed route.
- Safety of hikers and cyclists on the Bruce Trail needs to be a priority.
- Connect N/S and E/W routes; this will reduce traffic congestion on Dundas Street and Highway 6.
- Development is not welcome in Waterdown, concerns surrounding OPA 28. Politicians encouraged lobbying for the revocation of OPA 28.
- Protect environmentally sensitive areas and wildlife.
- Real estate values have diminished since this TMP study.
- Concerns that truck traffic will increase and continue to move through residential areas.
- Need to continue to involve local residents in the planning process; it was suggested that another round of public meetings be held prior to final study recommendations being made.
- Concern about the health and safety of the children; schools need to be built to accommodate for growth.
- Participants would like to receive more information about the project.

7.2 Phase 3-4 Consultation Approach

In developing the public consultation and communications program for the New East-West Road Corridor Class EA, the Project Partners (City of Hamilton and Halton Region) retained Lura Consulting, a neutral third-party expert in public consultation and communications, to assist in providing facilitation, managing stakeholder communications, and providing meeting organizational and reporting services.

7.2.1 Approach to Developing the Public Consultation and Communications Program

The consultation and communications program for the Class EA built on the program that was developed and implemented for the Waterdown-Aldershot Transportation Master Plan (WATMP).

The consultation and communications approaches were informed by input received from members of the public as a result of the WATMP consultations. Recommendations contained in the WATMP included:

- Improving communications through the initiation of a One-Window communications centre;
- Establishing an New East-West Road Corridor Neighbourhood Advisory Committee;

- Ensuring that correspondence from members of the public is responded to within a specified time period (e.g. 10 business days);
- Providing adequate resources to enable meetings with affected members of the public when required;
- Considering a newsletter/flyer to provide frequent updates to affected members of the public as new information becomes available. Include information on timing of decisions, and mechanisms for participation;
- Consider holding community-neighbourhood meetings to discuss study findings as the project progresses; and,
- Continue to convene PICs before significant decisions are made.

Prior to the initiation of the Phase 3-4 Class EA process, the Project Team developed a draft Path Forward Report (see *Appendix A*) that outlined the approach to be followed for the Phase 3-4 Class EA and consultation and communications process. The approach was built on the goals and principles of the WATMP consultation process.

7.2.2 Strategies for Public Consultation and Communications Activities

To successfully achieve the consultation and communications objectives, the following strategies were utilized:

- Get and keep people engaged;
- Correctly identify target stakeholder groups;
- Have contact early and often;
- Provide clear, concise, relevant information – as early as possible;
- Demonstrate how ideas from previous consultations have been/will be considered;
- Time and focus public engagement and consultation activities to match decision milestones in the Environmental Assessment;
- Manage meetings for maximum effectiveness;
- Provide several mechanisms to provide information and collect feedback (meetings, web-site, internet, email, fax, mail, phone, personal contact); and,
- Demonstrate how feedback will be/was considered.

7.2.3 Key Study Messages

At the outset of the Environmental Assessment (EA) process, a number of key messages were identified to guide the process. These key messages are identified below and are separated into ‘process’ messages, and ‘content’ messages.

Process Messages

- The study is a joint project being led by the City of Hamilton and Halton Region.
- The study is following the Municipal Engineers’ Association Class Environmental Assessment Process.
- The study is guided by the Project Partners.

- Stakeholder agencies were engaged both individually and through project meetings.
- Public consultation is an essential component of the project. This will be achieved through the establishment of a Neighbourhood Advisory Committee (NAC), Public Information Centres (PICs), individual meetings and communications.

Content Messages

- Although initially adopted by Town of Flamborough Council in May 1992, a revised version of OPA 28 and related Memorandum of Agreement was ultimately approved by Cabinet in June 2002 by Order in Council 1262/2002, in response to a series of appeals and the required completion of an Environmental Assessment Master Transportation Study.
- Development plans have been proposed to the City of Hamilton, however, these cannot be fully implemented until transportation alternatives are identified and a Transportation Master Plan is completed.
- The approved development includes approximately 6,500 new residential units and limited commercial/retail. The residential development will support an additional estimated population of approximately 20,000 people, with about half of the units planned for north of Dundas Street and the other half for south of Dundas Street.
- As confirmed in the WATMP transportation infrastructure is required to support the new development, particularly to move people east, west, and south to places of employment.
- The Class EA will look at alternatives for the New East-West Road Corridor, including improving existing infrastructure (roads and bridges) and constructing new infrastructure, and the provision and improvement of cycling and pedestrian infrastructure.
- A second Class EA is being undertaken for the Waterdown Road widening. The two studies took place in parallel to one another.

7.3 Phase 3-4 Public Consultation and Communications Activities

Under the Municipal Engineers' Association Class EA Process, for Phase 3 and 4, there are two mandatory points of public contact including:

1. During Phase 3, the public is invited to provide input into the identified alternatives and mitigation measures; and,
2. At project completion, a notice of project completion is to be issued, again, inviting comment on the recommended solution.

The Project Partners designed the public consultation process to exceed the minimum public notice and consultation requirements of the Class EA process. The consultation process included:

- Pre-consultation stakeholder identification and discussions;

- A final Stakeholder Advisory Committee meeting to wrap up the WATMP (Phase 2) and obtain input on the Class EA Phase 3 and 4 process;
- Release of the Path Forward Report;
- E-mail, print and mail notices to attend three Public Information Centres (PICs);
- Three rounds of Public Information Centres (PICs); (the first one to present the WATMP's conclusions, and the proposed Study Plan and Public Consultation and Communications process; the second one to present the alternatives, and the third one to present the preferred alternative or undertaking);
- Development of a Terms of Reference, recruitment and formation of the East-West Neighbourhood Advisory Committee (NAC), and holding five meetings (please see attached Terms of Reference and Recruitment procedure in Appendix A);
- A One-Window Communications Portal for stakeholders and the public;
- Issuing of interim study reports for public review;
- One-on-one meetings with affected property owners;
- Newsletters (refer to **Exhibit 7-2**); and
- Responding to public inquiries throughout the study process.

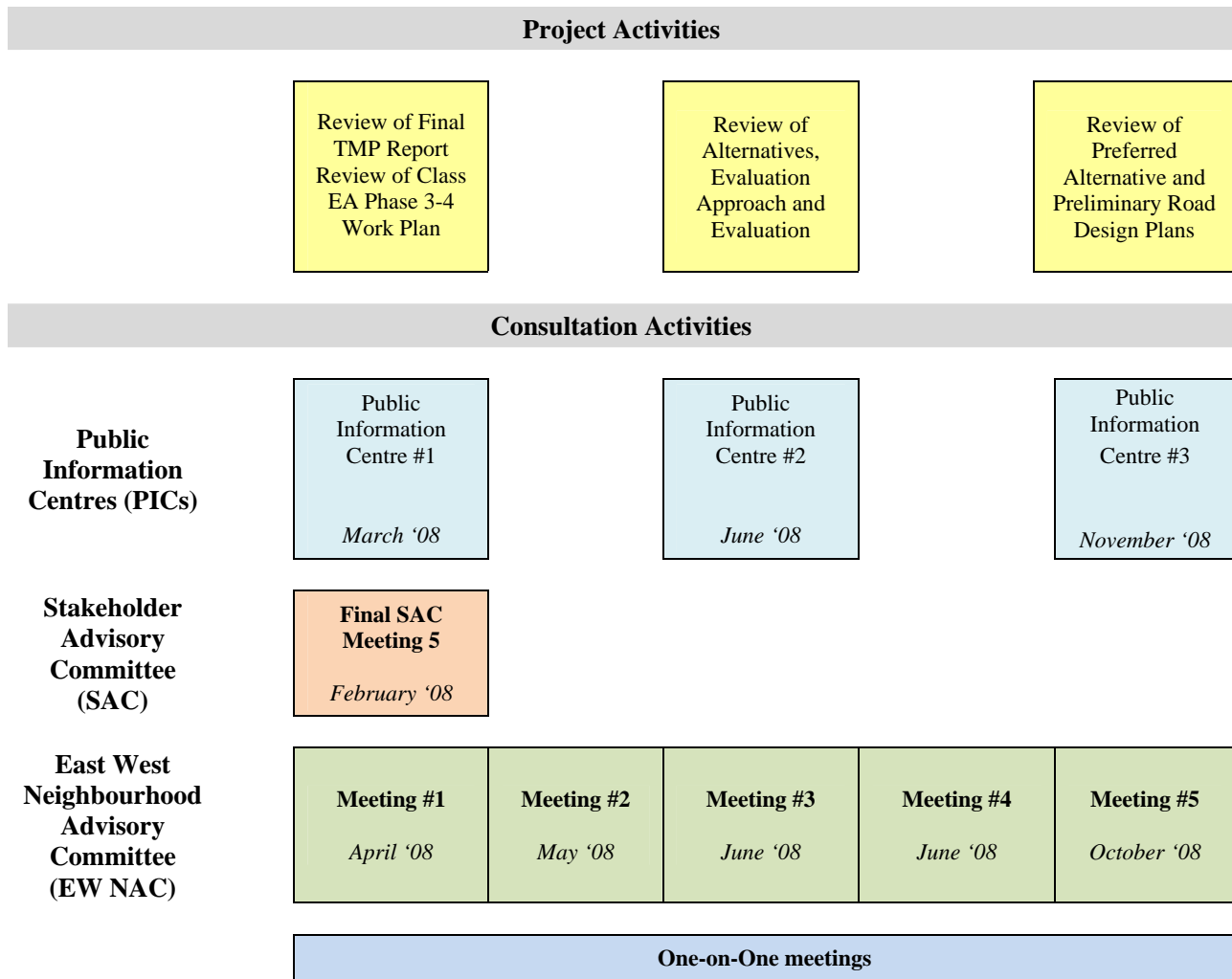
The WATMP recommendation regarding the New East-West Road Corridor generated significant concern for residents located along Parkside Drive (east of the Grindstone Creek crossing) and along Northlawn Avenue. These concerns are documented in the February 2008 WATMP Report. In the initial phases of the consultation program for Phases 3 and 4, there was still debate regarding some sections of the alignment for the New East-West Road (e.g. in the vicinity of Parkside Drive, the routing through the Centre Rd Woodlot PSW, and the Highway 6 connection location).

In addition to the formal consultation that was held, there were ongoing opportunities throughout the process for members of the public and stakeholders to receive information about the project (via the project website and other communications materials, as developed), and also to provide feedback to the Project Partners (e.g. through phone, fax, email, mail, and the project website). **Figure 7-1** depicts the work plan in relation to the public consultation. It demonstrates the integration between the two activity streams.



Exhibit 7-2: Example Project Newsletter

Figure 7-1 – Work Plan Overview (Phase 3 and 4)



For detailed information on the issues raised by the public and stakeholders and the responses that were provided (by the Project Team) refer to **Appendix P** and **Table 7-5**. Minutes from Public Information Centres (PICs) and East-West Neighbourhood Advisory Committee (EW NAC) meetings, and submissions from members of the public are provided in **Appendix A**. Comments from government agencies and other stakeholder groups can be found in **Appendix B**. Refer to **Appendix O** for complete information regarding the public program carried out during Phase 2.

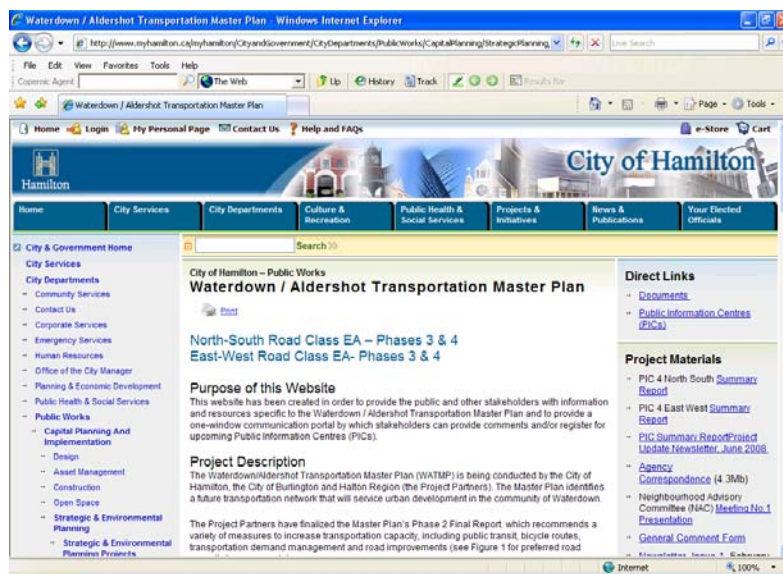
7.3.1 Communications Activities

An effective communications program creates awareness of a project and opportunities for involvement and participation. It should also provide information in a clear, concise way that enables the public and stakeholders to understand the issues that need to be addressed, and the different considerations that influence the decision-making process. The following communications activities were undertaken throughout Phase 3 and 4:

Study Web Page

A study web page was developed in the project initiation phase of the study. The purpose of the web page was to provide the public-at-large with the most up-to-date information available on the study progress, and act as a medium for the exchange of information (i.e. the ability to download reports, presentation materials, etc.). The web page is located at: www.hamilton.ca/WaterdownTMP

Figure 7-2 – Project Web Page



E-Mail, Verbal and Written Communications

Throughout the study, members of the Project Team were available to receive information, obtain input and ensure that responses were provided through the One-Window Communications Portal established by the Neutral Community Facilitator's Office:

Neutral Community Facilitator's Office
36 Hunter Street East, 6th Floor
Hamilton, ON L8N 3W8
Tel. (905) 818-8464
Fax (905) 528-4179
Email: info@waterdown-aldershot.ca

Consultation Communications

At various stages throughout the study, communications materials were developed to assist consultation activities, including:

- Path Forward Report
- Presentations at Neighbourhood Advisory Committee (NAC) meetings
- Display boards at Public Information Centres (PICs)
- Pre-meeting notification/invitations (through ads and e-mail communications to the study mailing area and mailing list)
- Project website updates
- Newsletters
 - Waterdown/Aldershot Transportation Master Plan Update – February 2008
 - Waterdown/Aldershot Public Information Centre #1 – March 2008
 - Notice of Public Information Centre #2 – June 24 & 26, 2008
 - Notice of Public Information Centre #3 – November 3 & 6, 2008.

Path Forward Report

At the onset of Phase 3, a *Path Forward Report* was developed as a basis for consultation with the community. The report set out the results of the Transportation Master Plan, the current status and the proposed path forward to be followed in the Phase 3-4 Class EA. The purpose of the report was to assist all stakeholders, including landowners, businesses, review agencies, the public, and other interested parties, to understand the background of the study, provide input on the Class EA process and consultation and communications process, and to facilitate input. The *Path Forward Report* is contained in **Appendix A**.

7.3.2 Consultation Activities

Public Information Centres (PICs)

Public Information Centre #1

The first Public Information Centre for the East-West Road Class Environmental Assessment took place on March 6, 2008 in Waterdown, and was intended to update the community on progress that had occurred during the two-year hiatus, and to obtain public input on the next steps. It also served as an opportunity to solicit applications for the East-West Neighbourhood Advisory Committee (East-West NAC). Display panels were provided presenting information on the following topics:

- Project History Overview;
- Waterdown-Aldershot Transportation Master Plan (TMP) Report Recommendations;
- Recommended Road Improvements;
- Waterdown Transit Update;
- Endorsement of Recommendations;
- Burlington Council Resolution;
- Changes to the final TMP Report;

- Consultation Program – Phase 2;
- Stakeholder Concerns;
- Steps Ahead for Phase 3 & 4;
- Phase 3 Issues to Address;
- Waterdown Road - Phase 3;
- New East-West Road - Phase 3;
- Planned Consultation Program;
- Phase 3 & 4 Study Schedule; and
- “Your Comments”.

The purpose of the PIC was to present the final *Phase 2 Report (Transportation Master Plan)* and to discuss the proposed technical work program and public consultation and outreach plan for Phase 3 (contained in a *Path Forward Report*). A summary of the meeting and the input that was received is provided in **Appendix A**.

Public Information Centre #2

The second Public Information Centre took place on June 24, 2008 at the St. Thomas the Apostle Parish Hall in Waterdown. This PIC covered the following information:

- Waterdown-Aldershot Transportation Master Plan (TMP) Report Recommendations;
- Recommended Road Improvements;
- Class EA Phase 3 & 4 Process;
- Phase 3 Issues to be Addressed;
- Consultation Program;
- Neighbourhood Advisory Committee (NAC) Role to Date;
- Phase 3 Evaluation Criteria;
- New East-West Road Alternatives;
- Western Alignment Evaluation;
- Centre Road Crossing Evaluation;
- Power Line Alignments Evaluation;
- Dundas Street Alignments Evaluation;
- Option 5 versus Option 4 Review;
- Phase 3 & 4 Study Schedule; and
- Next Steps.

The purpose of the PIC was to provide an overview of the preliminary results of the evaluation of alternatives, mitigation options and issues identified; and to obtain feedback from the public. A summary of the meeting and the input that was received is provided in **Appendix A**.

Public Information Centre #3

The third Public Information Centre took place on November 5, 2008 at the St. Thomas the Apostle Parish Hall in Waterdown. This PIC covered the following information:

- Waterdown-Aldershot Transportation Master Plan (TMP) Report Recommendations;
- TMP Recommended Road Improvements;
- Class EA Phase 3 & 4 Process;

- Evaluation Criteria;
- Public & Agency Consultation;
- Connection at Highway 6 alternatives;
- Section West of Centre Road;
- Centre Road Woodlot Crossing, alternatives & Evaluation results;
- Parkside Drive Evaluation (Option 4 & Sawtooth Option Effects);
- Option 4 confirmed as preferred;
- Preliminary Designs;
- Dundas Street Options;
- Impact Concerns and proposed mitigation; and,
- Schedule.

The purpose of the PIC was to provide an overview of the preferred road alignments, streetscape designs, mitigation options and issues identified; and to obtain feedback from the public. A summary of the meeting and the input that was received is provided in *Appendix A*.

Residents' Meeting: Highway 6 and Concession 4 Connection (June 2, 2009)

A residents' meeting was held on June 2, 2009 to review the location options for connecting the New East-West Road with Highway 6. Residents in the area were sent invitations to the event through the mail. Display panels provided information on the advantages and disadvantages of the different Highway 6 road connection options.

A summary of the meeting and the input that was received is provided in *Appendix A*. Some of the issues expressed included:

- The public shared a general feeling that if Concession 4 is connected with the New East-West Road Corridor, traffic on Concession 4 will inevitably increase and that the road cannot handle any more traffic.
- The Concession 4 Road/Highway 6 intersection is unsafe. Many residents indicated that they would not be concerned with the closure of it.
- Residents expressed different opinions regarding their preference for the location of the new intersection location. There appeared to be support for a more northern connection location among the attendees.
- A number of residents were concerned about the "hill" on Highway 6 to the north of Concession 4 Road and the blind spots associated with it. They feel that this may be an issue with some of the options.

East-West Route Neighbourhood Advisory Committee

The East-West Neighbourhood Advisory Committee (East-West NAC) was formed to obtain input from members of the public and

community stakeholders on the development of the East-West Road Class EA. Its mandate was to provide a forum for in-depth discussion of project issues with a group of interested citizens and stakeholders. Responsibilities assigned to the East-West NAC include:

- To provide a balanced, inclusive discussion and advisory forum for community members and stakeholders;
- To review and provide comments on the alternative design concepts, evaluation criteria and preferred design;
- To provide a forum for the discussion of issues, opportunities and solutions; and,
- To discuss other relevant matters that the Project Team refers to the Neighbourhood Advisory Committee for feedback.

The East-West NAC reported through the Project Team to the City of Hamilton and Halton Region.

Meetings

The East-West NAC held five meetings in total during the study period. **Table 7-2** presents the NAC's meeting plan, which identifies the key work steps anticipated for the NAC over the course of Phase 3 and 4.

Table 7-2 – East-West NAC Meeting Schedule

East-West NAC Meeting	Meeting Topics
Meeting #1 April 22, 2008	<ul style="list-style-type: none"> ▪ NAC Terms of Reference ▪ Phase 3 and 4 Work Plan ▪ Alternative Design Concepts – Assessing Alternatives and Criteria ▪ Consultation with Property Owners
Meeting #2 May 13, 2008	<ul style="list-style-type: none"> ▪ Alternatives Evaluation Methodology ▪ Issue Areas
Meeting #3 June 2, 2008	<ul style="list-style-type: none"> ▪ Evaluation Criteria ▪ Issues/Opportunities for Alternative Alignments
Meeting #4 June 12, 2008	<ul style="list-style-type: none"> ▪ Preliminary Evaluation of Alternatives ▪ Mitigation Options ▪ Update on Option 5
Meeting #5 October 28, 2008	<ul style="list-style-type: none"> ▪ Status of Concept Development Work ▪ Alternative Design Alignments: Preliminary Results of Evaluation ▪ Review of Draft Plans

Membership

To ensure a balanced representation, the East-West Neighbourhood Advisory Committee is comprised of representatives from:

- Local Residents – including six residents from Parkside Drive;
- Environmental Organizations;
- Community Organizations; and
- Business Organizations.

NAC recruitment took place through an application process. All applicants were accepted and invited to participate in the NAC. Throughout the process, members of the public participated in the NAC discussions.

Terms of Reference

A draft Terms of Reference (ToR) was prepared which outlined the guidelines and purpose of the East-West NAC and for Phases 3 and 4 of the New East-West Road Corridor Class EA. The ToR presented the operational basis for the meetings that would take place over. The East-West NAC members reviewed their ToR at their first meeting.

The East-West NAC's Terms of Reference and Meeting Minutes are presented in *Appendix A*.

Land Developer Discussions

Discussions were held with Country Green Homes and MC2 in July 2008, both of which own land within the Waterdown North Development area and would be affected by the New East-West Road Corridor. The discussions largely focused on the alignment of the New East-West Road Corridor including the crossing location of Borer's Creek, the setback distance from the ESA lands to the north and connections to the New East-West Road for future development. More recent discussions have been made with MC2 Homes regarding the setback to the ESA to the north and with the Upcountry developer regarding the road alignment. These discussions are ongoing and are documented in *Appendix B*.

7.4 Technical Advisory Committee Inputs

To provide technical input to the study process a Technical Advisory Committee (TAC) was assembled that included representatives from the following agencies (in addition to the Project Partners):

- Conservation Halton and Hamilton Conservation Authority
- Ministry of Environment
- Ministry of Transportation
- Niagara Escarpment Commission

The TAC held meetings in 2008 on May 12, July 12 August 12 and September 17. Additional discussion and correspondence was held with some agencies to address specific issues. Minutes of the TAC meetings and comments received from the agencies are contained in *Appendix B*.

Key issues discussed with the TAC as they relate to the New East-West Road Corridor project included:

- Natural heritage field surveys (timing and scope);
- Alignment evaluation criteria;
- The need for detailed descriptions of mitigation measures to minimize effects on the natural features;
- Watercourse crossing requirements to minimize effects on fish habitat and flow conveyance;
- Connection locations with Highway 6;
- Effects to the Centre Road Woodlot PSW;
- Setback distance from the Parkside Drive PSW/ESA; and
- The need to specify the locations of encountered flora/fauna.
- Alignment and floodplain impacts along the Upcountry section

In addition, the MOE held discussions with some residents (at their request) regarding their concerns relating to the preferred alignment selection in some sections of the New East-West Road Corridor.

Detailed comments were provided by Conservation Halton and Hamilton Conservation Authority on the Alternatives Evaluation Framework and the Natural Environment Conditions Report. These comments and the Project Team's responses to them are contained in *Appendix B*.

7.5 City of Hamilton and Halton Region Council Consultation

The recommendations contained in this Class EA. were endorsed by Hamilton City Council in June 2010 and by Halton Region's Council in September 2010.

7.6 First Nations Consultation

Provincial and federal agencies that were consulted regarding First Nation consultation included:

- The Department of Indian and Northern Affairs;
- Ontario Secretariat of Aboriginal Affairs (OSAA); and
- Ministry of Attorney General.

Indian and Northern Affairs Canada (INAC) responded in letters dated March 21, July 10 and Nov 14, 2008 and indicated that they are not

aware of any claims litigation or comprehensive claims in the project area.

The following First Nation communities and organizations were sent a letter in early June 2008 to invite them to PIC #2 and to confirm their interest in the results of the WATMP Phase 2 work and involvement in the Phase 3 and 4 work:

- Six Nations of the Grand Council;
- Mississaugas of the New Credit;
- Huron-Wendat First Nation;
- The Métis Nation of Ontario;
- The Chiefs of Ontario;
- Assembly of First Nations; and
- The Association of Iroquois and Allied Indians (AIAI).

A letter (May 29, 2008) was received by the Huron-Wendat First Nation indicating that they are not able to comment on specific projects due to a lack of financial support by the Province of Ontario.

The AIAI submitted a letter on June 24, 2008 that provided some general advice regarding First Nation consultation. No specific comments to the project were made.

The Assembly of First Nations submitted a letter on July 17, 2008 that provided some general advice regarding First Nation consultation. No specific comments to the project were made.

The Six Nations of the Grand River First Nations responded with a letter on September 29, 2008 indicating that they would like to be forwarded the Archaeological Assessment.

A meeting was held with Mississaugas of the New Credit First Nations on January 23, 2009. During the meeting, Dillon presented the project background and the current proposed design concept and accepted feedback from Chief Bryan LaForme. The presentation and meeting minutes can be found in *Appendix B*.

The above identified First Nation communities will receive notice of the ESR completion for review and comments. Further, offers to meet with these communities will be made.

7.7 Community Issues and Results of the Consultation and Communications Program

This section summarizes the input that was received by the local community and how these issues were responded to and considered in the preparation of the Class EA. This input was obtained through a variety of means as indicated previously. The issues and comments were documented in a database as they were received. The full documentation of comments/questions received from the public and the corresponding responses from the Project Team are contained in

Appendix P. Table 7-5 (located at the end of this chapter) presents a summary of the public input received and the responses that were provided. While attempts were made to respond to the issues in a timely manner, this was not always possible due to either the volume of comments that were received during certain periods of the study, the number of reviewers that many of the responses required, or because the information that was being requested was not yet available. The residents did at times voice frustrations that their questions were not be responded to in a timely manner. Attempts were made by the Project Team to address concerns as quickly as was possible but time lags in many of the responses did occur. In all cases however, responses were provided to all questions and concerns that were received from the public throughout the course of Phases 3 and 4.

Table 7-4 presents a summary of the comments and suggestions received from the NAC.

Table 7-4 – Summary of East-West NAC Feedback

Topic	Comments / Suggestions
<i>General</i>	<ul style="list-style-type: none"> ▪ The Project Team should consider creating a connection between the North-South route and the New East-West Road Corridor.
<i>Evaluation Criteria Ranking</i>	<ul style="list-style-type: none"> ▪ The social and natural environment criteria are more important than the cost criterion. The approach to the criteria evaluation should follow the Phase 2 approach – that included a numerical valuation. Phase 3 utilized a “reasoned argument” approach, which is considered by some NAC members as inconsistent with Phase 2. ▪ The criteria categories need to be consistent with Phase 2 criteria categories.
<i>Connection to Highway 6</i>	<ul style="list-style-type: none"> ▪ Residents expressed concern that a connection of the East-West Road with the Concession 4 Road might increase the number of trucks (gravel) using the East-West Road. ▪ The NAC suggested that the best connection point to Highway 6 would be just north of the 4th Concession Road. ▪ <i>As a result of the comparative evaluation undertaken by the Project Team, the recommended connection point with Highway 6 is north of the Concession 4 Road. The existing Concession 4 Road intersection with Highway 6 is recommended to be closed as MTO will not allow an increase in the number of intersections along Highway 6.</i>
<i>Centre Road Crossing</i>	<ul style="list-style-type: none"> ▪ NAC members, including those living in the Hunter Park Survey indicated strong concerns about the alternative road alignments through the Centre Road Woodlot PSW (and their proximity to Northlawn Avenue). The NAC proposed the Project Team consider a more northerly crossing of the PSW, to avoid potential impacts on residences along Northlawn Avenue. The Project Team subsequently evaluated this alignment but maintained their recommendation that the more southerly option is preferred (which Hamilton Conservation agrees with). Residents remain concerned about the potential for impacts from noise, light, air quality, vibrations and property values. ▪ Concerns that the New East-West Road Corridor will be utilized by quarry trucks if the connection to Highway 6 is at Concession 4 (which is no longer the case).
<i>Option 4 versus Option 5</i>	<ul style="list-style-type: none"> ▪ Strong support for Option 5 (Opta or Sawtooth) over Option 4 by the residents of Parkside Drive. The Project Team ranked Option 5 (Opta) ranked lower than the

Topic	Comments / Suggestions
<i>("Sawtooth" Option)</i>	Project Team's Option 4 (widening of Parkside Drive). The NAC recommended the evaluation of a further Option 5 (Sawtooth). Some NAC members preferred this option to the recommended Option 4, due to lower social impacts along Parkside Drive. Upon review, the Project Team subsequently ranked Option 5 (Sawtooth) lower than Option 4.
<i>Parkside Drive</i>	<ul style="list-style-type: none"> ▪ Request to investigate a three-lane Parkside Drive rather than a four-lane. The Project Team's traffic projections indicate the need for four lanes along Parkside Drive. ▪ Support for a 50 km/h speed limit on Parkside Drive. ▪ Parkside Drive should stay open at Highway 6. ▪ Request to ensure that sidewalks are continuous along Parkside Drive. ▪ Request to consider a bridge over Grindstone Creek to reduce safety hazards. ▪ Suggestion that the East-West Road be placed as far north as possible from Parkside Drive (Option 5). ▪ Some NAC members recommended that no sidewalks are placed on the south side of Parkside Drive. ▪ There are remaining concerns about lighting, noise mitigation, and air quality impacts to residents backing on to Parkside Drive, in particular for two homes on Fellowes Crescent.
<i>Natural Environment</i>	<ul style="list-style-type: none"> ▪ Concerns about impacts on a low ground watercourse located in the field north of the New East West Road adjacent to Highway 6. ▪ Concerns about wildlife crossings. ▪ Suggestion for pedestrian-friendly crossing at Joe Sams Park Trail. ▪ Concerns that the natural environment criterion is of greater importance than the protection of residences from road impacts (such as noise, air quality, vibration, etc.).
<i>Social Concerns</i>	<ul style="list-style-type: none"> ▪ Safety concerns about fast moving traffic. ▪ Concerns about noise, air pollution and light pollution. ▪ Concerns about expropriation of residential properties. ▪ Concerns about negative effects on real estate values.

The following discusses some of the key issues that were raised by the public during the course of the EA Study. A comprehensive summary of public comments and the Study Team responses is contained in **Table 7-5** at the end of this section of the report.

Highway 6 and East-West Road Connection

At the outset of Phase 3, NAC members questioned the Project Team's assumption that Parkside Drive would be closed in the future at Highway 6. This assumption was based on the Ministry of Transportation's (MTO's) long term program to convert Highway 6 to a restricted access highway. MTO has commenced this work at the Highway 403/Highway 6 interchange north to Highway 5 (Dundas Street) and this section is now complete. Based on correspondence

received from MTO by the Project Team¹⁵, it was established that while MTO has no current plans to close the Parkside Drive intersection, if MTO were to continue its program to convert Highway 6 to full access control highway north of Dundas Street, Parkside Drive could not be developed as an interchange as there is not adequate separation distance between Dundas Street and Parkside Drive. It is possible that an “overpass” could be developed at the Parkside Drive intersection location. MTO will undertake a future study to determine this.

The Project Team presented a number of options for the connection of the westerly portion of the New East-West Road Corridor to Highway 6. Many NAC members believed that the connection to Highway 6 should be north of the Concession 4 Road intersection. The main concern from NAC members is regarding the possibility that quarry trucks will use the new East-West route. The City of Hamilton investigated this concern, and has noted that there will be a requirement to change the quarry licence (which directs quarry truck traffic to utilize certain routes). However, members of the community have requested that commitments are made that quarry trucks will not be permitted to utilize the route.

The Project Team concurred with the NAC position of locating the new road connection north of the Concession 4 Road intersection. In reviewing the proposed intersection location, the MTO then advised the Project Team that no new intersections could be created along Highway 6. This in turn required a re-examination of the Highway 6 connection options. A meeting was held with the residents in the area in June 2009 to review the connection location alternatives. These included options that connected with the Concession 4 Road as well as options to the north that would require the closure of the Concession 4 Road at Highway 6. A recommendation was made by the Project Team (through a comparative evaluation process) for a connection point north of the Concession 4 Road and the closure of the Concession 4 Road at Parkside Drive. MTO concurred with the recommendation.

Centre Road Woodlot/PSW Crossing

Prior to the conclusion of the Phase 2 Transportation Master Plan, residents of the Hunter Park Survey residential subdivision (that includes Northlawn Avenue) actively participated in the process to identify alternative routes for the New East-West Road Corridor that would avoid the environmentally sensitive areas at the proposed Centre Road crossing, as well as the potential social impacts to the residents of Northlawn Avenue.

During Phase 3, members of the NAC and members of the public provided considerable input regarding the alignment of the new road through the Centre Road Woodlot PSW. The Northlawn Avenue residents voiced concern with the proposed alignment being too close to their homes. The specific concerns expressed by these residents

¹⁵ February 5, 2007 email from Joe Costantino of MTO

involved: air quality, noise, street lighting effects, property values, water quality impacts, ecological impacts, concerns regarding the suitability of the soils in the woodlot and vibrations both during and post construction. The public provided advice relating to the importance of the social impact criteria and requested that the Project Team evaluate a more northerly alignment through the woodlot (which was undertaken). The residents also suggested that the route go south of the Hunter Park Survey (i.e. route the East-West roadway southerly on Centre Road to connect to Parkside Drive, thus avoiding potential impacts to residents on Northlawn Avenue). This option was examined during the Phase 2 of the TMP study and was rejected due to significant social impacts along the new section of Parkside Drive to be widened.

The Project Team selected an alignment that is approximately 100 m metres north of the Northlawn Avenue residences. This route was accepted by Hamilton Conservation Authority as being least impactful to the woodlot/PSW. Residents along this route have stated that they wish to negotiate mitigation measures with the City of Hamilton.

Parkside Drive Routing: Options 4, Option5 (Opta) and Option 5 (Sawtooth)

Prior to the conclusions of the Phase 2 Transportation Master Plan, residents of Parkside Drive recommended alternative alignments and connections to Parkside Drive. Through meetings with the City of Hamilton and the Project Team, the Parkside Drive Residents Association recommended that the Project Team review an alternative Option 5 (which would be located within an identified area of land north of Parkside Drive).

The Project Team identified an alternative alignment through the Opta Minerals property and presented the results of this work at NAC meeting #2. Option 5 (Opta) ranked lower than the Project Team's recommended of Option 4 (widening of Parkside Drive) largely due to the impacts to Opta Minerals and the cost to acquire the property (see **Section 5**). NAC members requested that the Project Team review a refined Option 5 (identified as the "Sawtooth" option), that would wrap around the north of the Opta Minerals property yet avoid the ESA lands to the north of it.

At NAC meeting #3, the Project Team advised that Option 5 ("Sawtooth") ranked lower than the preferred Option 4 (See **Section 5**). This conclusion was not supported by some NAC members and the residents of Parkside Drive continue to support the "Sawtooth" alignment. Local residents have advised that they wish to discuss mitigation and road design details for Option 4. Refer to Minutes of NAC Meeting #3 (June 2, 2008) in **Appendix A**.

The following summarizes how the input received was considered and influenced the decision process and recommended road improvement design:

- *Highway 6 Connection/Quarry Truck Traffic* – the public expressed considerable concern regarding the potential for use of the New East-West Road Corridor by heavy trucks, particularly Quarry trucks. Residents expressed concern that if the new East-West Road connects with the Concession 4 Road, this would increase the potential for the new road to be used by quarry trucks. The potential for this has been greatly reduced by locating the New East-West Road/ Highway 6 intersection north of the Concession 4 Road and the requirement to close the existing intersection of Concession 4 Road with Highway 6 (as MTO will not permit any increases in the number of intersections).
- *Impacts to Hunter Park Survey/Northlawn Avenue Residents* – as noted previously, considerable effort was made to examine all possible alternatives through the Centre Road Woodlot PSW to address Northlawn Avenue resident concerns regarding the proximity of the new road to their homes. The road has been located to balance the concerns of the residents and to minimize effects to the PSW. The road is to be located about 100 m from the residences. No significant effects are expected to the Northlawn Avenue residents. There is the potential for noise increases for the most eastern located residences (this increased noise levels would still be within MOE limits). As described in **Section 6.4.2**, the City will monitor actual noise levels and implement mitigation measures if required.
- *Effects on the Waterdown North Wetland Trail* – The New East-West Road Corridor was aligned in consultation with City of Hamilton Parks Department staff to minimize effects on the future Joe Sam's Park expansion. Further, the City has committed to the implementation of an underpass to allow safe crossing of the new road for users of the Waterdown North Wetland Trail.
- *Impacts on Alexander Place nursing home* – Concern was expressed regarding the potential for effects to this facility. In response, the noise and air quality assessment identified receptor points at this facility and modeled future noise and air emissions at these locations. The results of this work indicate that the facility will not be significantly affected (See **Section 6.4.2**).
- *Option 4 vs. Option 5 Routing* – Significant effort was spent by the Project Team in the review and assessment of alternative alignments to the widening of Parkside Drive (Option 4). See the summary above as well as **Section 5.7**.
- *Social impacts along the section of Parkside Drive to be widened*
It was the opinion of the Project Partners that most of the social concerns raised by the residents regarding the widening of Parkside Drive could be addressed through mitigation and road design elements. Key features of the proposed widened roadway that are recommended to respond to residents' concerns include:

- Roundabouts at each end of the community that will serve as traffic calming measures and provide an opportunity for the introduction of gateway features;
- Narrowed lanes & reduced boulevard widths;
- On-road bicycle allowance;
- Reduced road speeds (posted at 50 km/h – down from current 60 km/h);
- Reduced property widths (26 m instead of the City standard of 30 m);
- Sidewalks on both sides of the roadway (currently one side only);
- Extensive streetscaping/plantings;
- Street and pedestrian lighting; and
- Fence replacement and landscaping along the backlots of Fellows Crescent properties.

7.8 Evaluation of Consultation and Communications Program

Monitoring and evaluation of the public consultation and communications program implementation is an important component of the consultation process that was implemented on an ongoing basis throughout the project. Typical tools used by the Project Team to facilitate the assessment of the success in meeting the objectives of the program included:

- Ongoing documentation of process-related feedback and suggestions received throughout the process;
- Regular check-in with the Project Partners;
- Communications with members of the Neighbourhood Advisory Committee and members of the public; and,
- Regular reports to the Project Partners of the status of the issues and responses.

The following section provides a summary of how effective the consultation and communications plan was in achieving specific objectives. In addition, issues and suggestions are provided for future stages and other Class Environmental Assessments that may be undertaken by partner organizations.

Get and keep people engaged: The study had numerous opportunities for public input, with three formal opportunities for public meetings and five East-West NAC meetings. The Project Team adapted to requests from NAC members for additional meetings.

Correctly identify local neighbourhood stakeholders: Local neighbourhood stakeholders were identified at the onset of Phase 3, and the East-West NAC was established. During Phase 3 and 4, everyone who wished to be involved in the process had access to it.

Have contact early and often: Communications occurred during Phase 3 and 4 on a scheduled basis according to the study work plan. The volume of input from members of the public was significant. Members

of the public identified a number of issues and suggestions that were considered by the Project Team on a continual basis. The Project Team had anticipated this, and as a result, had established the One-Window communications system. However, in some cases, the technical schedule did not permit materials to be provided ahead of meetings. In these cases, members of the public were provided with adequate time after the materials were introduced to provide their comments. The Project Team made itself available as much as possible, and made clear that they were open and receptive to comments throughout the process.

Some members of the public expressed concern about the delay in receiving responses to their questions or copies of draft technical reports. There were three periods of time where this was an issue: the first, in the summer of 2008, when a considerable amount of technical work was being done, and public comments were being considered during this work; the second in November 2008, when members of the public requested documents from the project team that were not yet completed; and the third, during the completion of the ESR.

Provide clear, concise, relevant information – as early as possible:

Due to the nature of this project and the need to incorporate input from the public, the Project Partners and other stakeholders from earlier stages, information presented at the PICs and to the NAC was completed just prior to consultation events. Information was clear and relevant, which enabled members of the public to provide constructive input and advice to the Project Team. Throughout this process, the Project Team considered a number of alternatives and suggestions from members of the public in the technical work. Three PICs were held, along with 5 NAC meetings.

Demonstrate how ideas from previous consultations have been/will be considered:

At each NAC meeting and public event, the Project Team presented the input from previous stages, and how it had been addressed and/or incorporated.

Time and focus public engagement and consultation activities to match decision milestones in the East-West Road Class EA work plan:

Input was received and considered on an ongoing basis throughout the study. Discussions at formal meetings were focused on the relevant stage of the study plan, and community requirements. Suggestions from members of the public were considered and incorporated into the study where possible.

Manage meetings for maximum effectiveness:

The Open House design for Phase 3 and 4 Public Information Centres (PICs) was an effective way of receiving input. In addition, members of the public who preferred not to speak directly to a member of the Project Team were able to provide comments through written comment forms and workbooks. The Project Team received advice from some members of the public that future PICs should take the form of a formal presentation followed by a question and answer period.

The Neighbourhood Advisory Committee discussions were facilitated in a number of formats. These included: presentations and questions/answers; working sessions in small groups; and hands-on commentary on display boards and maps. NAC members reviewed and approved minutes from their previous discussions.

Provide several mechanisms to distribute information and collect feedback (web-site, internet, email, fax, mail, phone, personal contact): Numerous mechanisms were used and proved successful. Some delays in responses to issues were experienced during the second half of Phase 3 and Phase 4, and further efforts should be taken to ensure quick turnaround in the future.

Demonstrate how feedback will be/was considered: Members of the Project Team worked closely with the public at specific stages in the study, and communications were established on a regular basis. The issue/response matrix documents all issues and responses, and is attached in **Appendix P**.

Table 7-5 is provided on the following pages. This table summarizes the issues that have been received from public stakeholders during the New East-West Road Class EA – Phase 3 & 4 and the responses from the Project Team. This document is divided into two sections: Section 1 contains comments on the New East-West Road Corridor and Section 2 contains general comments.

This Section 1 presents all input received throughout the public consultation process for Phase 3 and 4 organized by roads or section of road, namely;

- N1- East of Highway 6
- N2- Waterdown Road North / Centre Road Crossing
- N3- Hydro Transmission Line Crossing Alternatives
- N4- Parkside Drive
- N5- Upcountry Development
- N6- Dundas Street Widening (West)
- N7- Dundas Street Escarpment Cut

Section 2 presents the input received throughout the public consultation process for Phase 3 and 4 that cannot be attributed directly to a specific area but rather reflect topics of concern on the general aspects and impacts of the study. It also summarizes the main points of input received at the PICs and throughout the public consultation process received from January 2008 to May 29, 2009.

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

TOPIC	QUESTION/CONCERN	RESPONSE	REFERENCE
Section 1: NEWEAST-WEST ROAD CORRIDOR			
N1- East of Highway 6			
	Concerned about safety at the existing Highway 6 and 4th Concession intersection.	A safety assessment of this intersection will be carried out as part of the Class EA Phase 3 work.	NAC East-West Issue Table – June 2, 2008
	Concerned about impacts on a low ground watercourse located in the field north of the New East-West Road adjacent to Highway 6.	Potential impacts to the watercourse in this area will be investigated.	NAC East-West Issue Table – June 2, 2008
	Suggestion to move the current (proposed) Intersection of Highway 6 and proposed N1 north to avoid wet ground area.	Comment noted. This will be investigated.	NAC East-West Issue Table – June 2, 2008
	Suggestion for Highway 6 to crest just north of 4th Concession and slope downward toward 4th Concession.	This will be considered in the positioning of the future intersection.	NAC East-West Issue Table – June 2, 2008
	Suggestion to limit access to Highway 6 through an interchange.	An at-grade intersection at Highway 6 is proposed at this time. A future grade separated interchange may be provided as part of MTO Highway 6 corridor upgrading.	NAC East-West Issue Table – June 2, 2008
	Suggestion that the northern option is preferred.	Comment was recorded.	Comment from June 24 workbook
	Suggestion to use the northern option with a signalized intersection. (Parkside Drive has to stay open to Highway 6)	Comment was recorded.	Comment from June 24 workbook
	Suggestion that if the MTO objects to the Project Team's current Highway 6 alignment, the East-West road be re-aligned with Parkside Drive just east of Highway 6 (roundabout similar intersection) and Parkside Drive end at Centre Road (Widen Centre and Parkside)	The realignment of the east-west road to the existing Parkside Drive intersection could be problematic due to limited interchanges allowed on Highway 6. The widening of Parkside Drive east of Centre Road would not be a viable option due to significant social impacts.	ID# 280, 282, 348
	The placement of the New East-West Road will affect MTO's decision to accept design.	Acknowledged. The new intersection at Highway 6 will be subject to MTO approval.	NAC East-West Issue Table – June 2, 2008
	Support expressed for Option 1, as it will improve road safety at the Junction of Highway 6.	Comment was recorded.	ID# 171
	Support N1 as it will prevent direct link to Dufferin Quarry and eliminate the threat of the East-West route becoming a quarry truck route.	Route N1 has been identified as the draft preferred route by the Project Team.	ID# 134
	Support for a signalized intersection or bridge type interchange but NOT a roundabout.	Comment was recorded.	Comment from June 24 workbook
	With new information regarding MTO thoughts about intersections on Highway 6 it is requested The Project Team consider the re-alignment of the East-West road back to Parkside Drive to use the existing Parkside Highway 6 intersection	The Project Team will meet with MTO to further examine the issues that have been raised. Road safety is of paramount importance. The development of a new intersection at Concession 4 would <u>not</u> mean that the current Parkside Drive/Highway 6 <u>intersection</u> would need to be closed.	ID# 280, 282, 348
	Questioned the location of the East-West route link to Highway 6	Location of connection is currently being assessed/finalized. Phase 2 recommended Highway 6 and Concession 4 and an alternative connection north of Concession 4 is under study. The Project Team will provide an update, in the form of a newsletter, as soon as it becomes available.	ID# 93, 213, 229
N2-Waterdown Road North/Centre Road Crossing			
	Concerned that East-West road will cross a pond at the northern end.	Phase 3 will include assessing the existing natural features in Waterdown North.	ID# 89
	Concerned about impacts on Waterdown North Wetland Trail.	Issues were discussed in a meeting with Dillon Consulting.	ID# 109

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

TOPIC	QUESTION/CONCERN	RESPONSE	REFERENCE
	Concerned about wildlife crossing impacts.	The need for a wildlife crossing at the Borer's Creek crossing will be considered.	NAC East-West Issue Table – June 2, 2008
	Safety is a key concern.	Comment noted.	NAC East-West Issue Table – June 2, 2008
	Concerned about school bus traffic along Centre Road approaching new East-West Road.	The effect of the new intersection on school bus operations will be assessed.	NAC East-West Issue Table – June 2, 2008
	Concerned about traffic at Centre Road and the New East-West Road Corridor and questioned the type of intersection.	The current plan for this intersection is to provide a traffic signal.	ID# 250
	Concerned about soil quality in Centre Road Woodlot.	Contacted by Project Team and Draft Geotechnical Report was sent.	ID# 270
	Concerned that air pollution and road salts from the New East-West road will affect the water, fish and natural habitat around Borer's creek.	Concern was recorded.	ID# 128
	Suggestion for path along one side of the road from Parkside Drive to Centre Road to potentially continue across to the Borer's Creek.	The provision of pathways/trails will be reviewed further in discussion with the City's Recreation staff and the Hamilton Conservation Authority.	ID# 170
	Suggestion that the New East-West route be moved north to reduce light pollution on residents, reduce vibration in soil which affects property foundations since soil around Borer's Creek is unstable, and reduce impact on water table.	Suggestion was recorded (ID# 128). Comments regarding soil conditions in the area will be taken into account in the design of the roadway (NAC East-West Issue Table – June 2, 2008). Water table impacts will be considered. However, movement of the roadway north to avoid the creek channel will need to be balanced with increases in road distance as well as further fragmentation of the ESA. (NAC East-West Issue Table – June 2, 2008).	ID# 128 , NAC East-West Issue Table – June 2, 2008
	Suggestion that the New East-West route be moved north to minimize effects on Borer's Creek, Northlawn,/Centre Road intersection, Centre Road woodlot and Northlawn residents.	Suggestion was recorded.	ID# 128
	Suggestion to create a boundary/barrier between the East-West Road and Borer's creek to follow the minimum Greenbelt requirements.	Suggestion was recorded (ID# 128). The alignment of the roadway in relation to Borer's Creek is being reviewed (NAC East-West Issue Table – June 2, 2008).	ID# 128 , NAC East-West Issue Table – June 2, 2008
	Suggestion that route should equally divide the woodlot to allow the woodlot to remain and prosper.	Suggestion was recorded (ID# 128). It is preferred to have the road run through the southernmost portion of the ESA as opposed to through the centre of the woodlot. This will minimize edge effect and maintain a larger, more intact woodlot to the north of the new road able to support a greater diversity of species (NAC East-West Issue Table – June 2, 2008).	ID# 128 , NAC East-West Issue Table – June 2, 2008
	Suggestion for bridge crossing the creek to be as far north as possible to minimize impact on pond.	Comment was recorded.	Comment from June 24 workbook
	Suggestion for pedestrian walkway under the Borer's Creek bridge for connectivity	The need to provide pedestrian access under this bridge will be investigated.	NAC East-West Issue Table – June 2, 2008
	Suggestion to increase the vegetation zone width to build additional natural trails and create a gateway for Waterdown residents along Borer's creek.	Suggestion was recorded.	ID# 128
	Suggestion to use vegetation buffers to create a gateway/bike path along Borer's Creek.	The potential for a recreation pathway/bikeway to extend along the road way to connect the North Wetland Trail to Borer's Creek will be investigated.	NAC East-West Issue Table – June 2, 2008
	Suggestion for stop lights to assist drivers entering Parkside Drive at Boulding and Evans.	Comment was recorded.	Comment from June 24 workbook
	Suggestion that noise barriers south of the East-West Road are required to shield homes in the new development.	Comment was recorded.	Comment from June 24 workbook

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

TOPIC	QUESTION/CONCERN	RESPONSE	REFERENCE
	Suggestion to create a curve in the road to minimize speeding if road is moved further north.	To meet applicable road design criteria, any road curves would need to be at a radius to maintain the road design speed. Curving the road further north as a traffic calming measure would result in greater effects to the ESA. Other measures could be introduced to reduce road speed.	NAC East-West Issue Table – June 2, 2008
	Suggestion to change street design to slow down traffic.	It is envisioned that the roadway would be designed to accommodate a posted limit of 60 km/h. The need to further reduce the speed limit in select locations will be reviewed as part of the Phase 3 work.	NAC East-West Issue Table – June 2, 2008
	Preference for a roundabout rather than a conventional intersection at Centre Road and the New East-West Road.	The feasibility of a roundabout at this location was addressed. Traffic volume and direction of volumes need to be considered. The viability of a roundabout at the Centre Road crossing has been reviewed by the Project Team. Concerns include its impact on the woodlot/wetland and shifting would then require the realignment of Centre Road.	NAC East-West Issue Table – June 2, 2008, ID# 279, 297
	A gas line exists on the north side of the New East-West Road alignment.	Existing utilities are currently being mapped and impacts to these facilities will be addressed.	NAC East-West Issue Table – June 2, 2008
	Question about traffic light vs. overpass at intersection. (Concerned about traffic if stoplights are used).	Recommendations provide for a traffic signal at the Centre Road intersection. The Project Team's proposal would include an at-grade signalized intersection at Highway 6 (intersection under discussion with MTO). The Project Team will provide an update, in the form of a newsletter, as soon as it becomes available.	ID# 250
	Questioned if resident's property would be impacted.	Resident was advised that there would be no direct impact to this property (ID# 185). There are no current plans to widen Evans Road and thus the property will not be affected (ID# 215).	ID# 185, 215
	Questioned how Dundas Street (Highway 5) would intersect with Highway 6.	According to Ayvun Jeganathan, Senior Project Engineer, Ministry of Transportation, the preliminary design was done for the Highway 6 and Highway 5 interchange, and a preferred option has been identified. Ayvun Jeganathan contact was provided for further information.	ID# 382
	Questioned the distance between the Northlawn Avenue and the New East-West Route.	Four road alignment options have been identified for the Mid-Block alignments that run through the woodlot/PSW on the east side of Centre Road distances are 140,190, 290 and 320 metres, depending on the option.	ID# 139, 198, 224, 225, 368
	Questioned if intersection of Northlawn Avenue and Centre Road would be closed.	There have been no proposals to close the intersection of Northlawn Avenue and Centre Road. We do note that there is a possibility for the closure of the Main Street North/Centre Road intersection (Stage 2 Report page 131).	ID# 49
	Questioned where the New East-West Road will intersect Centre Road and where it will come out.	The new road will cross Centre Road and continue east to connect with Parkside Drive.	ID# 237
N3-Hydro Transmission Line Crossing Alternatives			
	Concerned about the road spoiling nature trail at Joe Sam's Park.	Routing option through the Centre Road woodlot is under review and minimization of noise is a key consideration in the project.	ID# 180
	Suggestion for pedestrian-friendly crossing at Joe Sam's Park Trail.	The need for a grade separated crossing of the new roadway/wetlands trail is being considered. Input is being sought from City staff involved with the trail/park as well as trail users.	NAC East-West Issue Table – June 2, 2008
	Suggestion to split Parkside to go on and so does the new road.	Project Team requested that a clarification of the suggestion was needed.	NAC East-West Issue Table – June 2, 2008
	Suggestion to replace mature trees, narrow lanes, reduce posted mileage, and add boulevards/sidewalks.	Comment was recorded.	Comment from June 24 workbook
	Suggestion for lanes reductions and changes lead to traffic.	Project Team requested a clarification of the suggestion.	NAC East-West Issue Table – June 2, 2008

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

TOPIC	QUESTION/CONCERN	RESPONSE	REFERENCE
	Emphasis on the need to have pedestrian-friendly streetscaping.	Comment noted.	NAC East-West Issue Table – June 2, 2008
	Questioned about the work going on the north-west corner of Parkside Drive and Centre Road.	This work is not directly related to the East-West Corridor Environmental Assessment. The work going on the North West corner of Parkside Drive and Centre Road may be the pre-grading for the subdivision in this corner called Parkside Hills.	ID# 339
	Questioned the kind of access there will be to the trails just east of the Hunter survey.	Access to existing trails will be examined in the future Phase 3 work.	ID# 49
	Request for noise evaluation for trail and wetlands.	A noise impact assessment will be undertaken in this study.	NAC East-West Issue Table – June 2, 2008
	Support for Option 3 DE South as it would attribute to the lowest disruption of the interior forest habitat.	Comment was recorded.	ID# 171
<i>Hunter Park Survey Residents</i>	Hunter Park Neighbourhood's (particularly the homes along Northlawn Avenue) petition request is that the design of the road maximizes the distance of the proposed roadway from the Hunter Park Neighbourhood.	The specifics will be confirmed in Phase 3 which will consider impacts to both the natural environment and social environment, as well as mitigation measures that will need to be implemented.	ID# 56
	Hunter Neighbourhood is concerned of social effects of the New East-West route and suggests it goes as far north as possible.	The distance of the roadway from the Hunter Subdivision is to be a function of: noise levels (and mitigation efforts required to meet criteria), air quality effects, impacts on the ESA and separation distance between the new roadway intersection and the existing intersection at Northlawn Avenue.	NAC East-West Issue Table – June 2, 2008
	Request that the Project Team create and develop and present the successful "Option 4 Realigned north" solution suggested by NAC members.	The Project Team reviewed the feasibility/suitability of a fourth route. The results were reported in a memo from Dillon Consulting dated October 27, 2008. The memo was presented to the East-West NAC on October 28, 2008 and discussed at the East-West PIC on November 5, 2008. Currently, the Project Team's recommendations relating to DE2 are being reviewed by the Hamilton Conservation Authority.	ID# 146
	Suggestion that East-West route should move further north of the Northlawn subdivision.	The preferred alignment east of Centre Road, which was presented to the East-West NAC on October 28, 2008 and to the public at the November 5, 2008 PIC, is currently being reviewed by the Hamilton Conservation Authority. Discussions with the residents of the Hunter Park Survey on the rationale for the preferred alignment need also to be held prior to submission of the Environmental Study Report (ESR).	ID# 152, Comment from June 24 workbook
	Concerned about increased traffic noise to Northlawn Avenue residents and local nursing home.	Minimization of noise is a key consideration in the project, depending on location of roadway, it may be necessary to install noise barriers.	ID# 180
	The residents of the Hunter Park Survey support the most northern option while the Project Team support the most southern option which the residents believe was evaluated based on false statements.	The analysis has led the Project Team to recommend the southern alignment and have taken resident concerns into account. Efforts will be made to increase the level of detail in the data considered in the evaluation. This will be completed and included in the ESR.	ID# 283, 284
	Requested a copy of each of the detailed evaluations / studies that were performed and used by the Project Team in their evaluation of the crossing of the East-West road at Centre Road.	The Geotechnical Report, the Natural Environment Inventory Report and Noise Report were provided in March 2009. Effects related to the other disciplines (i.e. air quality, real estate) will be documented in the Environmental Study Report (ESR) and the rationale for the rankings related to these issues have already been provided to the NAC and the public.	ID# 281, 283
	Request for City of Hamilton's Real Estate Staff findings and professional evidence regarding ground vibrations.	A letter has not been prepared containing this advice. The property values have been confirmed by the City's Real Estate staff, who have deemed the statements to be valid and it is within the Project Team's professional ability to interpret and justify the findings. The concern for vibrations from the road, distanced where it is and with the strength of the road bed construction, is in the professional opinion of the Project Team, negligible. The Project Team does not have a letter to this effect.	ID# 373, 379, 389 (ongoing)
N4-Parkside Drive			

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

TOPIC	QUESTION/CONCERN	RESPONSE	REFERENCE
	Concerned about impact on home and would like more information on Option 5.	Person was directed to the website, the project schedule, Path Forward Report and EA process was explained.	ID# 88
	Concerned about disruption to home owners; hazardous to back out from driveways and uneven terrain with a road way crossing.	Comment was recorded.	Comment from June 24 workbook
	Concerned about impact on housing existing on north side of Parkside Drive.	Comment was recorded.	Comment from June 24 workbook
	Concerned that plans related to the level crossing at Parkside Drive do not help achieve the goal of easing congestion and reducing noise.	Comment was recorded.	Comment from June 24 workbook
	Concerned about trains blowing horns.	Comment was recorded.	Comment from June 24 workbook
	Concerned about congestion on the east side of Waterdown, question about when an arterial road to link Parkside Drive and Dundas Street will be built, intersecting Parkside Drive at Robson Road.	The street connecting Parkside Drive and Dundas Street has already been built with Upcountry Phase 1. It connects at Parkside Drive east of Robson Road. Part of it is temporary until the alignment at Parkside Drive of the Arterial Road is finalized. Website link and meeting dates were also provided.	ID# 203
	Concerned about safety at Robson Road.	As with Robson Road, the need for signals at the Boulding Street intersection is also being reviewed. Turning movements onto Boulding Street may also be restricted during parts of the day to minimize traffic infiltration into the community.	ID# 206
	Concerned about specific property impacts.	Contacted by Project Team to discuss concern raised.	ID# 353, 368
	Concerned about impacts on public school and YMCA located along Parkside Drive.	Comment noted. We do not expect any effects to these facilities from the new roadway.	NAC East-West Issue Table – June 2, 2008
	Concerned about the possibility of future property expropriation.	Dillon is not recommending the purchase of any homes along Parkside Drive. A minimal area will may be required along the south side of the property, however plans are currently being revised to try to eliminate any property requirements.	ID# 386
	Suggestion for an all-way stop sign control at the T-Intersection of Parkside Drive and Boulding Avenue.	Due to the type of traffic and roadway conditions, an all-way stop control would not be recommended or supported (ID# 184).	ID# 184 , 289
	Suggestion that residents should be given the option of City water & sewer due to the potential impacts to wells and septic systems.	Comment was recorded.	Comment from June 24 workbook
	Suggestion that redesign should be considered for the sections of road entering Parkside Drive to discourage high speeds.	Comment was recorded.	Comment from June 24 workbook
	Suggestion that East-West route follow northern boundary of the town to keep the sound and air pollution away from residential areas and the pond.	Phases 3&4 will develop the preferred design alternatives for the East-West corridor and will attempt to mitigate as many impacts to the existing social, cultural and environment conditions in the Waterdown Area including noise attenuation.	ID# 89
	Suggestion for a trail to run adjacent to the Grindstone Creek to Waterdown North Trail.	The need for a grade separated crossing of the new roadway/wetlands trail is being considered. Input is being sought from City staff involved with the trail/park as well as trail users.	NAC East-West Issue Table – June 2, 2008
	Suggestion for Griffin Street and Barton Street to become one way east from Hamilton Street.	Suggestion was recorded.	ID# 166
	Suggestion to increase the length of lights on both Main Street and Mill Street North so people use the by-pass.	Suggestion was recorded.	ID# 166
	Suggestion for calming measures to discourage traffic from using Main and Mill Streets.	As part of this project, no measures are being proposed to discourage the use of Mill Street. The use of this roadway will be monitored once the new connection to Dundas Street is completed. Signs could be erected to restrict the use of Mill Street if needed.	ID# 278

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

TOPIC	QUESTION/CONCERN	RESPONSE	REFERENCE
	Suggestion for modifications to Parkside to include stop signs and to remain open.	No proposal has been made as a result of the TMP master plan work to close the Parkside Drive intersection.	NAC East-West Issue Table – June 2, 2008
	Suggestion to split Parkside to go on and so does the new road.	Project Team requested a clarification of the suggestion	NAC East-West Issue Table – June 2, 2008
	Lanes reductions and changes lead to traffic.	Project Team requested a clarification of the suggestion	NAC East-West Issue Table – June 2, 2008
	There is a need to have pedestrian-friendly ways.	Comment noted.	NAC East-West Issue Table – June 2, 2008
	Ensure that sidewalks are continuous along Parkside Drive.	The current design proposals are for sidewalks on both sides of Parkside Drive.	NAC East-West Issue Table – June 2, 2008
	There is a future laneway planned adjacent to Parkside Drive where two Big Box developments are also planned.	Comment noted. This will not affect the planning for the New East-West roadway.	NAC East-West Issue Table – June 2, 2008
	Questions why in the Alternative Evaluation framework it states “there is to be no property loss from the widening of Parkside Drive (East of Grindstone Creek)” when there are properties which will be impacted.	After review it is clear that there may be a need for property in this area and as such, project documentation will be corrected to reflect this fact.	ID# 122
	Questioned how cyclists will be accommodated from Boulding Avenue to Robson Road with Parkside Drive widening.	We are recommending a wider road to provide additional pavement width to accommodate cyclists along the section of Parkside Drive that is to be improved.	ID# 191
	Questioned how westbound traffic will enter Parkside if traffic circle intersection is used as eastbound traffic has the right-of-way.	In fact, all entering traffic will have to yield. Westbound traffic wishing to access Parkside Drive will have to yield to any traffic in the roundabout before entering, but once in the roundabout can exit basically in a free flow condition to get out and continue westbound.	ID# 380
	Questioned how this new corridor will be intersecting with Parkside Drive heading south/west.	Parkside Drive will intersect the new roadway as it curves north from the existing Parkside Drive just west of the Grindstone Creek crossing. Traffic signals are not proposed at this time.	ID# 202
	Request for Project Team to review Stantec proposal regarding Opta Minerals.	Comment was recorded.	Comment from June 24 workbook
	Request to investigate a three-lane Parkside Drive rather than a four-lane.	Providing three lanes on Parkside Drive would not address the traffic demands after full build-out of the proposed area developments.	NAC East-West Issue Table – June 2, 2008
<i>Fellowes Crescent and Parkside Drive residents'</i>	Residents of Fellowes Crescent seek mitigation (i.e. fence) for noise, pollution and other traffic disturbances for the rear of our homes and backyards as well as a summary and analysis of noise-modeling studies.	Meeting with Lura/ Dillon Nov 19, 2008 and Dec 1, 2008. The City of Hamilton abides by provincial protocols when assessing the requirement for noise mitigation measures. A noise report prepared by Dillon and sent out in March 2009 provides necessary data to answer the raised concerns.	ID#32, 271, 274, 286, 318, 322, 323, 337, 341, 342, 349, 350, 351, 353, 359, 365, 370, 381
	Residents of Fellowes are concerned and seek mitigation about light pollution.	The light standard designs and light scatter issues can be mitigated in the design phase of the project.	ID# 286, 337, 341
	Continued questions and concerns about noise attenuation fencing and how it is that the City and Project Team can deny the residents' requests for a noise attenuation fence when it has provided this type of barrier in other parts of Waterdown.	The City of Hamilton has found no evidence that the fencing between Hollybush Drive and Duncan Avenue or between Boulding Avenue and Robson Road along Parkside Drive was installed for the purpose of noise attenuation mitigation.	ID# 286, 323, 337, 349, 350, 351, 359, 365
	Concerned about the accuracy of the City's reply regarding the fence at Hollybush and Parkside Drive, and light mitigation measures.	Comments noted	ID# 391
	Comments about the unfair treatment of Parkside Drive residents with respect to noise attenuation fencing.	Comments noted	ID# 392

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

TOPIC	QUESTION/CONCERN	RESPONSE	REFERENCE
	Questioned if the Project Team has reviewed the City's policy on Noise Abatement and applied it to the concerns raised by the residents.	The Project Team has considered the Halton Policy on Noise Abatement and has applied it to the understanding of your concerns. The City of Hamilton does not currently have a policy on noise abatement.	ID# 286, 337, 349, 351,359, 365
	Concern that the Project Team is using outdated and non-applicable guidelines in their assessment of whether mitigation is required for the dramatic increase in Noise levels expected from the proposed New East-West Road.	Refer to the project's Noise Report	ID# 395
N5-UpCountry Development			
	Questioned if the alignment at the section of Upcountry Estates and Dundas Street intersection had been confirmed.	Resident was advised that the alignment at that section will not undergo any major changes. The areas where more work are needed are at Highway 6 connection and Centre Road Wood lot with the agencies like MTO and the Conservation Authorities	ID# 362
	Suggestion that the northern option is preferred.	Comment was recorded	Comment from June 24 workbook
	Suggestion to use the northern option with a signalized intersection.	Comment was recorded	Comment from June 24 workbook
N6-Dundas Street Widening (West)			
	Suggestion for traffic lights at Kerns Road and the Townline Road allowance.	Suggestion was recorded	Comment from June 24 workbook
	Suggestion for an alternate route that avoided orchards, existing buildings and ended at N2	Suggestion was recorded	Comment from June 24 workbook
	Suggestion to put widening on South side (fewer houses) and add a street light at intersection.	The road will be shifted to minimize impacts to residences wherever possible. It is anticipated that the entire length of Dundas Street will be illuminated with new lighting.	NAC East-West Issue Table – June 2, 2008
	Suggestion to consider a light rail transit along Dundas Street	Dundas Street has not been identified as a corridor where the introduction of a light rail transit service is supportable. This may be a consideration in the future, beyond the current planning period for this project.	NAC East-West Issue Table – June 2, 2008
	Concerned about light pollution in the area on Highway 5 (Dundas Street)	Lighting details, such as lamp standards and spacing will be addressed during detailed design. The potential for spill over of lighting into residential areas will be addressed in detailed design.	ID# 343
	Questioned the necessity of six lanes on Dundas Street	Two additional east-west lanes will be required on Dundas Street as a result of the anticipated traffic growth. This will necessitate six lanes.	NAC East-West Issue Table – June 2, 2008
N7-Dundas Street Escarpment Cut			
	Suggestion to put widening on South side (fewer houses) and add a street light at intersection.	The road will be shifted to minimize impacts to residences wherever possible. It is anticipated that the entire length of Dundas Street will be illuminated with new lighting.	NAC East-West Issue Table – June 2, 2008

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
SECTION 2: GENERAL			
ASSESSMENT ENVIRONMENTAL			
<i>Approach used</i>	Questioned which approach the proponent is following on the Waterdown Aldershot Master Transportation Plan.	Approach #2 best describes the approach taken by the partners. The Ministry of the Environment is aware of the City's approach to this Class EA process and has been kept informed throughout the process.	ID# 54, 56
	Questioned who is in control of the project, the City of Hamilton or the developers.	The Waterdown/Aldershot Transportation Master Plan and Environmental Assessment study is being undertaken by the City of Hamilton, the City of Burlington and Halton Region (the Project Partners).	ID# 339
<i>Bump up request</i>	Questioned the official Project Team response to a bump-up request of this project to an individual EA.	None provided.	ID# 57
	Informed that a bump up request was sent to the Minister of the Environment.	Thank you for sending the Neutral Community Facilitator's Office a copy of the request to the Minister of the Environment and keeping the Project Team informed.	ID# 65
	Requested that the Project Team bump up from a Schedule C project to an Individual Environmental Assessment as a Part II order.	The Project Partners are following the Schedule C Class EA process, and do not intend to elevate the work to an individual EA. When the Project Partners file a Notice of Completion there will be a 30 day comment period at which point you may make a written submission to the Minister of Environment asking that an individual Environmental Assessment be prepared for the proposed projects.	ID# 204
<i>Phase schedule</i>	Requested Phases 3&4 schedule and Gantt Chart.	Please find attached the Phases 3&4 Study schedule and the Gantt Chart.	ID# 66
<i>Environmental Study Report and mitigation</i>	Requested details about environmental study reports and environmental mitigation measures at the sub-watershed level.	The Environmental Study Report (ESR) will document the natural environment data/information that has been collected through reviews of background information, discussions with agencies and field survey results. Mitigation measures will be proposed to address the issues raised including ways to protect the stream, ESAs and wildlife from road encroachment.	ID# 256
<i>Environmental Study Report (ESR)</i>	Questioned if the ESR will contain all the alternative routes presented throughout the process or only the final preferred/proposed route.	It will contain a summary of the alternatives considered in Phase 2, a full description of the alternatives considered in Phase 3, and the full Phase 2 Final Report contained in the appendix.	ID# 318
	Questioned when the ESR report will be issued.	The City of Hamilton is planning to release the ESR in early summer.	ID# 373
	Expressed frustration against the Project and/or Project Team.	No response Required.	ID# 396
<i>Progress</i>	Questioned the proposed north Waterdown East-West route and the volume of traffic.	Explained the EA process. Informed about PICs to conclude for Phase 2 and more details on route alignment will be available during Phases 3&4.	ID# 1
<i>Evaluation Criteria (Barnes Env. CoA)</i>	Asked Project Team to place significant weight into the EA Evaluation criteria and weighting of the Barnes Environmental Certificate of Approval (CoA) requirement.	Condition imposed upon Barnes, City had no obligation or responsibility associated with the condition. It was never intended that the Certificate of Approval (CoA) be rationale for the selection of a new northern road.	ID# 9,13, 33, 99, 133, 134, 205
NATURAL ENVIRONMENT			
<i>Flying squirrel</i>	Requested information on pictures of flying squirrels sent to the Project Team.	Southern flying squirrel is listed as Special Concern by the Committee on Status of Species at Risk in Ontario. Advised about impacts and mitigations measures.	ID# 150
<i>Drainage</i>	Concerned that the Project Team is not dealing with the Study Area drainage issue appropriately and possible fungus development may result.	Concern was recorded and to be considered by the Project Team.	ID# 195
	Concerned about hilltop route location regarding drainage and safety concern about using an open drainage system (ditch).	Soil conditions are being confirmed through geotechnical analysis. We are consulting with the Hamilton Conservation Authority regarding storm water/drainage issues as they relate to the proposed road.	ID# 238

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
<i>Pests</i>	Concerned of pest attacking ash trees.	Concern was recorded.	ID# 195
<i>Greenbelt</i>	Concerned that the North side of Parkside Drive is now within the designated Greenbelt area and any sort of high density development within the Greenbelt is discouraged.	While not obviously encouraged, the development of utility corridors and roads are permitted uses within the Greenbelt.	ID# 83
	Concerned that 1/3 of a resident property has been designated as an important and sensitive wetland area per the local Conservation Authority.	While the Project Team has attempted to minimize impacts to the natural environment as much as possible in the routing of the road alternatives, it has not been possible to avoid all features.	ID# 83
<i>Air quality</i>	Concerned about air quality beside major roads and link to health effects.	Concern was recorded. (ID# 128). Agreed, however these effects need to be balanced with other issues. (NAC East-West Issue Table – June 2, 2008)	ID# 128 , NAC East-West Issue Table – June 2, 2008
<i>Environmental Impacts</i>	Concerned about area disruption and extreme environmental impact from the project.	During the Class EA Phases 3&4 work, we will better define the roadway alignment and identify mitigation measures to avoid/minimize effects to natural features.	ID# 83
<i>Buffer zone</i>	Questioned how far north of Northlawn Avenue the new road will be located and/or if any of the present wooded area would be left to act as a buffer zone.	The proposed New East-West roadway is to be located immediately north of Northlawn Avenue within the wooded area. Precise distance will be established in Phase 3. The possibility of leaving a vegetated buffer strip will be considered in Phase 3. Input from residents on this issue will be sought.	ID# 49
	Concerned about impacts on trees that act as buffer zones to the properties.	Existing vegetation will be preserved wherever possible. The general levels of required removals will be determined as the design is advanced.	ID# 113
	Comments with respect to the buffer between the proposed East-West road and the provincially significant wetland to the north.	Meeting was held to discuss these issues.	ID# 321
	There should be no barrier to extend Option 5 near the edge of ESAs north of Opta Minerals and Halton Conservation Authority should compromise.	The route through the ESA north of Northlawn Avenue has yet to be confirmed. A meeting with Hamilton Conservation is scheduled to review the options and to seek their input.	ID# 134
SOCIAL CONCERNS			
<i>Truck traffic</i>	Concerned about "Barnes" truck traffic issue not being resolved, and leading to a substantial increase in traffic, including more trucks.	Numerous meetings and correspondence have taken place with the Parkside Drive residents' representatives including meetings with the Ministry of the Environment to discuss and consider these concerns. Social impacts were considered in this process along with natural environment impacts, economic impacts, costs and technical considerations.	ID# 33
	Concerned that the New East-West road will be designed as a truck route and as such, mitigations must be applied for the whole East-West route as being a truck route.	The decision as to whether the New East-West Road will be designated as a truck route is being addressed under the City wide truck routing study. Arterial roads are typically designed to accommodate truck traffic. This road will be no different.	NAC East-West Issue Table – June 2, 2008
	Concerns about increase in truck traffic going through downtown Waterdown.	Dillon discussed issues via phone.	ID# 338
<i>Life disruption</i>	Concerned that north east section of the study area will suffer from increased traffic (noise, speeding, pollution, expected large truck volume from the quarry expansion) and thus living conditions disrupted and altered.	A detailed noise assessment will be undertaken in the upcoming Phase 3 work. There are numerous ways of addressing traffic noise. Once we have determined if there are any areas that may require noise mitigation, we can address how best to reduce the impact. This will be different for each affected site.	ID# 59, 143 , 168
<i>Impacts on residence</i>	Concerns that privacy will be reduced as road will be too close to the property.	The Project Partners are currently developing more detailed plans for the widening of Parkside Drive to assess potential impacts and minimize them, where possible.	ID# 113
	Concerns that enjoyment of sitting in backyard will be lost or greatly diminished.	The Project Partners are currently developing more detailed plans for the widening of Parkside Drive to assess potential impacts and minimize them, where possible.	ID# 113
	Suggestion that moving the East-West road further north could reduce the negative social, noise and air quality effects of truck traffic.	N/A - comments were added to comment table and discussed at NAC Meeting #3.	ID# 128, NAC East-West Issue Table – June 2, 2008

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
	Questioned if consideration was given to the eastern portion of Parkside Drive, provided that these residents will have to bear two busy roads.	Numerous meetings and correspondence have taken place with the Parkside Drive residents' representatives including meetings with the Ministry of the Environment to discuss and consider these concerns.	ID# 33
	Request that the evaluation criteria assess the additional social impacts for Option 5 and 4 such as the Opta CofA, truck traffic and through traffic.	It was never intended that the Certificate of Approval (CoA) be rationale for the selection of a new northern road. We have recognized the potential for social impacts along Parkside Drive, the potential for truck related effects, and as such the road will be designed and mitigation proposed to address those potential issues.	ID# 133
PUBLIC CONSULTATION			
<i>Stakeholder Advisory Committee (SAC)</i>	Concerned the SAC does not reflect the views of the local residents due to a low representation of residents in the committee.	The Project Team solicited input from the SAC member and other public participants on the Evaluation criteria. Selection process for the Neighbourhood Advisory Committee (NAC) was explained.	ID# 9
<i>SAC Meeting</i>	Questioned date of last SAC meeting.	The date of February 28, 2008 was confirmed.	ID# 8, 29
	Questioned if an email was sent to SAC members regarding the last SAC meeting on February 28, 2008.	An email has been sent and follow-up phone calls are taking place this week.	ID# 8
	Requested a copy of all SAC members including who they represent.	Sent from the Project Team.	ID# 52
	Requested a copy of Dillon's presentation for the February 28, 2008 SAC meeting.	PowerPoint presentation was emailed out to SAC member and interested participants on March 4, 2008.	ID# 52
<i>Member delegation</i>	Members of Parkside Drive were given the opportunity to appear as a delegation at the last SAC meeting.	Offer was accepted by the Parkside Drive Residents. A quick summary of the Parkside Drive East Citizens Group will be provided.	ID# 18, 37
<i>Bike lanes</i>	Bike lane response to be shared with original SAC members.	The response relating to bike lanes to be circulated and distributed and discussed at SAC meeting.	ID# 5, 8
	Request that accommodations be made for the implementation of bicycle lanes in the overall plan.	The final recommended preferred option will be provided in the Environmental Study Report released in the summer of 2009.	ID# 333, 347
	Suggestion for wider lanes to help cars become accustomed to sharing the road safely with bicycle riders.	Accommodating future capacity of vehicular and alternate forms of transportation along these proposed corridors is a key variable that requires careful study and The Project Team has been consulting with several parties. Detailed breakdown of pedestrian and cycling facilities for both corridors of the draft Preferred option was provided.	ID# 333, 335
<i>One-on-One Session</i>	Concerned that the City will not answer "key" directly affected landowners in a timely fashion.	There will be opportunities to discuss specific concerns through the Public Consultation sessions. If needed, one-on-one sessions can be scheduled.	ID# 22
	Requested to have a one-on-one session with the Project Team.	Meetings that have/need to happen with residents and Dillon Consulting.	ID# 88, 109, 111, 127, 160, 172, 181, 264, 292, 303, 319, 325
	Requested to see further details with respect to road widening to be taken from the resident property.	Dillon Consulting will be making adjustments to the proposed East-West road alignment based on public and agency comments. We will provide an updated plan to interested residents in late February or early March 2009. Detailed plans for Parkside Drive will be made available as part of the Environmental Study Report (ESR) in summer 2009 (ID#388)	ID# 295, 296, 298, 310, 388
	Questioned when homeowner will be notified about one-to one meetings.	Contacted by Dillon Consulting.	ID# 127
<i>Public Information Centre (PIC) - Format</i>	Questioned about the PIC format.	Not provided. No questions at the PIC.	ID# 192
	Questioned why the PICs were changed from presentation to drop-in format.	These discretionary PICs were considered necessary and the open house format would allow people to seek information at own pace and speak with Project Partners one-on-one.	ID# 44
<i>PIC - Process</i>	Questioned the PIC/public consultation process.	PICs or Public Information Centres are held to provide the public with project information and updates and to provide an opportunity for community feedback.	ID# 273

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
<i>PIC - Notice</i>	Questioned why the format of PICs was not announced sooner.	The notice was placed in the Hamilton Spectator, Burlington Post, and Flamborough Review for two consecutive weeks. The notice was also mailed out to stakeholders, public, and agencies.	ID# 44
	Questioned that the information presented to the June 24 PIC meeting was bias and misleading.	Once the required data is collected, the Project Team and the NAC participants/members of the public will be in a position to contribute to the evaluation of all four options. The team is not yet in a position to provide information on the alternatives including the fourth option.	ID# 156
	Criticism that residents do not have meaningful input in the process and that the Project Team is trying to convince the public of their already made decision as the best option.	Comment was recorded.	ID# 309
	Suggestion that someone from the Development department should be present at the PICs.	The Project Team will request that for future Public Information Sessions (PICs) staff from the Development department be present. As there no more scheduled PICs, the suggestion will be incorporated into the Environmental Study Report.	ID# 339
	Requested a copy of PIC maps, presentation/display materials.	Materials were sent and the project website address was provided.	ID# 61, 70 , 84 , 86, 95 , 151, 153, 160, 161 , 162 , 163 , 164 , 169 , 174 , 175 , 176, 177, 178, 183 , 201, 260, 277, 302, 304. 305, 306, 307, 308. 310, 312, 313, 314, 315, 316, 317, 319. 326, 328 345
	Requested larger version of the maps found in Public Notices.	Sent by the Neutral Community Facilitator's Office (NCFO).	ID# 24, 26, 27, 28, 31, 38, 91, 187 , 190 , 194, 237, 245
	Requested the materials from PICs to be posted on the website.	Materials were posted on the website.	ID# 173
	Criticism of maps which have no scale/distances and are therefore useless.	Distances were clarified (ID# 224).	ID# 224, 225
	Criticism of map on PIC notice is inaccurate/old/false.	The "Notice Map" provides general information about the location of the project and can be considered as a project logo until the Preferred Option is confirmed. We provide the detailed map boards at NACs and PICs where project options are discussed.	ID# 265
	Questioned if the gas lines in the PIC maps are existing lines or proposed.	The utility lines shown on the base plan came from various sources and some locations (such as the gas line on this property) appear to be incorrect and are currently under review.	ID# 324
	Suggested better signage directing traffic from street into meeting place.	Thank you for your advice relation directional signage and communications materials.	ID# 77
<i>Consultation Material</i>	Requested the location of the Path Forward Report on the website.	Referred to the Path forward report.	ID# 51
<i>Consulting Role</i>	Questioned why the City needed an outside agency such as Lura Consulting to control the communications between the public and the Project Team of Waterdown Aldershot Master Transportation Plan.	The Neutral Community Facilitator's role is to assist both members of the public and the Project Team in clarifying and responding to inquiries and input on a timely basis. Lura Consulting is providing this service in response to concerns raised in Phase 2 that responses were not being received in a timely manner.	ID# 53 , 253
<i>Meeting with Neutral Community Facilitator's Office (NCFO)</i>	Requested to communicate with NCFO concerning WAMPT.	Time was set to meet/discuss with someone from the NCFO.	ID# 90 , 94 , 115 , 117 , 145, 147 , 191
	Requested to communicate with NCFO concerning communication issue.	Time was set to meet/discuss with someone from the NCFO.	ID# 55
<i>Meeting with Dillon</i>	Requested another setting to discuss matters with Dillon besides the PIC.	Time was set to discuss with someone for the NCFO.	ID# 138
	Requested follow-up discussion with Dillon once road plan is complete.	The plans have been circulated to all City departments and comments have been received. The plans are in the process of being finalized and a copy of the revised plan will be provided to you when completed, likely in late February or March.	ID# 227

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
<i>Meeting with Parkside Drive Residents</i>	Request of the minutes for meetings held Nov 19, 2008 and Dec 1, 2008 for approval by residents.	Will be provided as part of the East-West Road Class EA ESR Report.	ID# 354, 360
	Requested if there would be a meeting with Parkside Residents once the plans are released.	There will be no further meetings with the Parkside Drive residents at this time. However, a newsletter update will be sent out to local residents before the release of the ESR.	ID# 388
<i>Public Information Centre (PIC)/NAC meeting request</i>	Request to be updated and/or for another PIC (and NAC) meeting to present the revised alignment suggestion at Highway 6 for public input, in light of the new information that the Project Team has learned from the MTO.	We will keep the community informed on the issue (ID# 280). No further public meetings are planned at this time. The Protect Team intends to issues a newsletter update to members of the public, and complete the Environmental Study Report (ID# 348)	ID# 280, 348
	Request that NCFO provide a list of outstanding issues with their submission dates.	The NCFO compiles a report on both a weekly and monthly basis for the Project's Team's review. A copy of the June/July NCFO Report was attached in the response.	ID# 200
	Agency requested if a memo would be necessary for the PIC.	Time was set to discuss with NCFO.	ID# 148
<i>Hunter Park Survey Petition</i>	Requested that the Project Team re-review the petition the Hunter Park Survey of Waterdown submitted to the Project Team back in February 2005 as part of the initial public input.	The petition would have been appropriately reviewed by the Project Team members at the time it was submitted and is part of the project file. The Project Team will continue to consider comments submitted earlier that are relevant to Phase 3, therefore it is not necessary to resubmit comments.	ID# 56
	We note that the petition request is that the design of the road maximizes the distance of the proposed roadway from the Hunter Park Neighbourhood (particularly the homes along Northlawn Avenue).	This will be considered in Phase 3. The specific centre line of the proposed roadway and the roadway footprint will be confirmed in Phase 3 which will consider impacts to both the natural environment and social environment, as well as mitigation measures that will need to be implemented. We will welcome your input on this.	ID# 56
	Hunter Park Survey residents seek mitigation measures for noise, technical data regarding noise and a meeting with the Project Team to discuss.	Technical reports were provided to residents and a meeting was scheduled with the Project Team in June 2009.	ID# 290, 291, 293, 294, 332
	Concerned that emails and questions are not fully answered through NCFO and/or responses are not made within 10 days as promised.	The information requested is taking longer than the anticipated 10 days due to gathering and compiling of information from different City staff and Consultants. Response was sent.	ID# 80, 81, 102, 199, 200, 221, & 225, 336, 357, 364, 367
	Expressed frustration in response delay.	In some cases, the material that has been requested has not been completed in written format, and as such there is time required to prepare this material.	ID# 399
	Concerned that Project Team does not consider information, errors and suggestions presented by NAC members and the public. Criticism of/lack of faith in public consultation process.	See PDF "Letter to NAC – Oct 08" sent Oct 27, 2008. All resident concerns will be clearly documented in the Environmental Study Report (ESR).	ID# 156, 239, 241, 242, 243, 246, 248, 253, 284
	Concerned that he has not received any written acknowledgement of his correspondence from LURA nor the Project Team for a while.	Acknowledgment/Response was sent by NCFO.	ID# 288, 336
<i>Transparency</i>	Commented about lack of transparency in the process.	NCFO Review of MTO Highway 6/Parkside Drive Issue sent May 26.	ID#114, 129 , 291
	Concerned that the communications from the Project Team fail to be consistent from the start of this process such as issue with City sewers connections where City had two opposite answers.	NCFO promised to contact the City relating to the connection of City sewers to residences with septic systems to obtain clarification.	ID# 200
	Complaint regarding mistreatment of those showing interest in public forums. Criticism of the City of Hamilton and those hired to "push" the road through at any cost.	See PDF "Letter to NAC – Oct 08" sent Oct 27, 2008.	ID# 217
	Concerned about miscommunications and confusion regarding the 4 Options on the East-West road crossing Centre Road.	At both the NAC and PIC meetings held on October 28 and November 5, 2008, five Centre Road crossing alignments were identified: DE-1 through DE-5.	ID# 287
	Concerns that the Project Team is making statements before reports are complete and thus misleading the public and NAC members.	Typically, these reports are not released to the public prior to the ESR, due to the technical difficulty of understanding the documents In accordance with the current practice for similar projects, the reports are based on empirically gathered information, have been drafted and are therefore provisionally justifiable.	ID# 358

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
	Complaint of the Project Team's statement that some reports are not released to the public prior to the ESR, due to the technical difficulty of understanding the documents.	The comment was forwarded to the Project Team for their information.	ID# 378
	Questioned the unclear alternatives presented at the PIC concerning section N2.	The Project Team is preparing a memo for the NAC that will explain the data collection and the process that will be undertaken to evaluate the outstanding alignment issues on this and other sections of the proposed roadway.	ID# 156
	Discrepancy between information given to the public and the NAC; Why is Option 4 of section N3 not mentioned to the public?	Based on input from the EW-NAC on June 12, 2008, the Project Team agreed to explore a more northerly alignment of the roadway. The potential for a more northerly alignment was noted at the PIC on June 24, 2008.	ID# 218
	Discrepancy between info provided by Dillon and map mailed out, regarding connection of New East-West Road to Highway 6.	The location of the connection of the proposed New East-West roadway to Highway 6 is currently being finalized. The Phase 2 recommended connection was at Highway 6 at the intersection of Concession 4. An alternative connection north of Concession 4 is currently under evaluation. The Project Team will provide an update, in the form of a newsletter, as soon as it becomes available.	ID# 229
<i>Calculation discrepancies</i>	Questions about the discrepancies in cost calculations between the Waterdown Aldershot Master Transportation Plan and the Hamilton Master Transportation Plan. It appears that not all of the pre-estimated costs in the Hamilton Master Transportation Plan were included.	The costs used in the <i>Waterdown / Aldershot Transportation Master Plan, Phase 2 Final Report</i> (February 2008) are estimates based on conceptual alignments, primarily for the purpose of comparing alternative solutions. These estimates were appropriately reflected in the <i>Hamilton Transportation Master Plan, Class Environmental Assessment Report</i> (May 2000) based on the best information available at the time of completion. Further cost comparisons will be undertaken as alternative designs are developed in Phases 3&4.	ID# 82
	Request that NCFO update the NAC and the public of the Truck Route designation. Importance of keeping the public updated on all issues.	An update was provided at the NAC meetings in Oct 2008.	ID# 232, 235, 236
<i>Neighbourhood Advisory Committee (NAC) Selection</i>	Questioned how the Neighbourhood Advisory Committee (NAC) is being selected.	The Draft NAC Recruitment Strategy was sent as a response.	ID# 10
	Requested that at least one member of Parkside Drive East Citizens Group be part of the East-West NAC.	The Draft NAC Recruitment Strategy is being finalized and will be posted on the Web.	ID# 14, 32
	Suggestion that 2-3 members of the East Parkside Drive area be on the East-West NAC.	Suggestion was considered by the Project Team.	ID# 17
<i>NAC Application</i>	Questioned how to move forward with applying to be on the Neighbourhood Advisory Committee (NAC), either as an individual resident and/or as a representative from a group.	Advised that Draft NAC Recruitment Strategy and the NAC Application Form are available online on the Waterdown/Aldershot Transportation Master Plan website.	ID# 22
	Questioned when the applications are due for being chosen for the NAC, and when will the decisions be made about who is on the NAC.	Application forms for the two NACs are due March 14, 2008. All successful and unsuccessful candidates will be contacted by April 4, 2008. (note that subsequently all applications were accepted)	ID# 23
	Questioned the qualifications required to be a committee member.	The Draft NAC Recruitment Strategy and an application form were sent for a response.	ID# 47, 50
	Questioned if it was possible to apply to become a NAC member if living outside the study area.	Please send your application and we will let you know if you are eligible.	ID# 69
	Questioned if the Neutral Community Facilitator's Office (NCFO) had received his application.	Person was advised that the application was received via fax.	ID# 67, 73
	Requested a deadline extension to submit a NAC application.	Petition was granted by NCFO.	ID# 72
<i>NAC Meeting</i>	Questioned if NAC meetings are open to the public.	Resident advised that he/she would be welcome to observe the Neighbourhood Advisory scheduled for Sept 9.	ID# 92
	Notified NCFO of a date/day error for the East-West NAC meeting.	He was given the accurate date and day of the meeting.	ID# 96 , 134

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
	Attendance/Absence confirmation.	No response required.	ID# 110 , 136, 137
	Requested the location and date for the NAC meeting.	Location/Date was given.	ID# 116 , 135 , 196 , 233, 254, 255
	Questioned why he/she had not received the NAC meeting notification.	The contact information was updated.	ID# 120 , 121 , 126
	Questioned why there was a new criteria added to the original evaluation criteria methodology named "Technical".	The technical criteria group was removed from the evaluation table. However, the potential for site contamination is an important consideration and could affect the overall cost to develop Option 5. The potential for additional costs as a result of soil contamination has been referenced under the "Cost" criteria group.	ID# 123
	Questioned why Project Team is using a simplistic rating scale to weight the new evaluation criteria.	Criteria rankings using a scale of "high, medium and low" importance (and not weightings) will be sufficient for the purposes of the evaluation to differentiate among the alternatives. We will review this approach as the Phase 3 work progresses and continue to welcome your comments on this.	ID# 123
	Commented that process feels rushed and that more time is needed for the City to present findings.	While we appreciate the view that Phase 3 work is progressing at too fast of a pace, there are many potentially affected landowners who are requesting a timely conclusion to the project so that they can make future plans regarding their property, particularly since this study has been ongoing since 2004.	ID# 123
	Concerned that not enough time was provided at a NAC meeting to provide proper input into road design criteria and alternatives evaluation methodology.	Unfortunately as there are many items that need to be covered at each NAC meeting it is not possible to devote an entire evening on a single task. The Project Team has been open to receiving comments on the criteria groups ranks through submissions by members of the NAC and the public.	ID# 124 , 134
	NAC members ranked both social and natural environment criteria as high.	The criteria rankings as presented to the NAC in June 08 based on the input received from NAC identified the Social criteria to range in importance from high to medium and the Natural Environment criteria to range in importance from high-medium to medium. As such, the social criteria were considered to be only slightly more important than the natural environment criteria.	ID# 157
	Detailed comments on criteria evaluation and alternatives routes and alignments.	Detailed responses to each comment mentioned.	ID# 283, 284
	Requested a copy of NAC materials (presentations, minutes, workbook, and/or Evaluation tables).	Materials sent by NCFO.	ID# 95 , 112, 131 , 131 , 200, 257, 259, 261, 267
	Concerned that the minutes of the June 24th meeting regarding NS2 /NS3 do not reflect the discussions raised at the meeting.	We have amended the draft summary report for the East-West Road Class EA Phases 3&4 Public Information Centre dated June 24, 2008. However, please be advised that we cannot amend the summary report to reflect discussions that were not held at the time of the meeting.	ID# 212
	Requested that the June 12 Meeting minutes incorporate that the Project Team stated that residence who had septic systems and live on the new proposed roads would be connected to City sewers.	Discussion may have been "off-the-record" rather than brought up in the formal session. Further review of the meeting record indicates that no such comment was made at the meeting. The possibility for a connection to city sewers is outside the Terms of Reference (ToR) for the Waterdown Road Class EA and the East-West Road Class EA. You may wish to contact the City of Burlington directly about this matter.	ID# 209
	Requested that attached petition be added to the agenda for the Oct. 28 meeting. Petition regarding concerns and suggestions regarding Highway 5/Dundas Street road widening between Evans Road and Kerns.	Request granted, confirmation sent by NCFO.	ID# 220, 251
	Request for confirmation that the final version of minutes for meeting #4 was sent out by email.	Advised that the NCFO sends out draft versions of meeting minutes, seeking comments from NAC members, and following member acceptance of the minutes they are finalized.	ID# 219
<i>NAC Membership</i>	Request to be removed from the NAC.	Removed by NCFO.	ID# 155
	Requested an update on the preferred alignment at Flanders Drive and that the plans be reviewed by the road safety and traffic engineering department of the City of Hamilton.	The plans have been circulated to all City departments and comments have been received. The plans are in the process of being finalized and a copy of the revised plan will be provided likely in late February or March.	ID# 346

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
	Request for related materials from Dillon and others (e.g. truck route study material, the Natural Environment Inventory Report and the Geotechnical Report, the Waterdown Area Traffic Monitoring Update and Waterdown Aldershot Master Transportation Plan Phase 1 report.	Materials sent by NCFO.	ID#238, 256, 258, 266, 268, 270, 329, 332, 373, 374, 375, 376, 377, 383
	Request for 90 days to review report before NOC is submitted to MOE.	Relating to your request for a 90-day review period of the draft ESR (we assume that you are referring to the draft ESR that goes before Council for their approval), we have requested a response from the Project Partners.	ID# 381
	Request for 60 days to review the Final Noise Report.	Comment noted	ID# 390
	Request for the technical information that the Project Team has used to make their recommendations for their road alignment.	Technical reports were sent in March 2009.	ID# 329
	Request for MOE meetings minutes.	There were no minutes taken at the discussions with the MOE.	ID# 87, 114
	Requested a legible map which shows the properties affected by the project.	Map was sent by the City of Hamilton.	ID# 186
	Requested information on the project for the East-West road, north of Waterdown.	Materials were sent by NCFO.	ID# 193
TECHNICAL			
<i>Water Tower</i>	Questioned progress of the water tower.	To be constructed in conjunction with subdivision. Estimated timeframe is February to September 2009. Since the plan was appealed the water tower is unable to be built until the appeal is resolved. No building permits can be issued until the water tower has been constructed and is operational. The OMB has now issued a decision, and the entire Waterdown North Secondary Plan is now in effect. No building permits can be issued until the water tower has been constructed and is operational. Please visit the project website www.hamilton.ca/waterdownnorth for details.	ID# 1, 92, 299
<i>Water Table</i>	Concerned about impacts on the water table.	Detailed drainage studies have been completed during the study that assessed the impacts on surface drainage. The new road will not block any surface water flows as culverts will be placed under the new road to allow for water movement.	ID# 300
<i>Transportation Master Plan (TMP) schedule</i>	Questioned the schedule for the Transportation Master Plan (TMP) and phases timing.	The Transportation Master Plan (TMP) is now complete. As Phase 2 of the Waterdown/Aldershot Transportation Master Plan is now complete, the Study will proceed to Phases 3&4 to examine two distinct roadway projects. The North-South Road (Waterdown Road) Class Environmental Assessment project and the East-West Road Class Environmental Assessment project. This work is commencing in March and will continue for about 1 year.	ID# 42
	Questioned the completion of the Transportation Master Plan.	A draft schedule was sent.	ID# 42
	Concerned that TMP process and outcome are seriously flawed as the Project Team did not have regard for fundamental materials that should have been considered.	Meeting with Dillon was held December 18, 2008 to discuss these issues.	ID# 325
	Questioned when construction will begin.	The timing of construction is dependent on: EA process completion, Receipt of endorsement and approval from the Hamilton, Burlington and Halton Region Councils and MOE receipt of a bump up request on the Environmental Study Reports We do not foresee construction starting any earlier than 2011	ID# 42
	Questioned the status of the overall Study Work Program and where the Project Team is in the process.	The Pathforward report was sent via email which outlines the current status of the process. He was also given the website.	ID# 103
	Questioned the approximate timing of implementation.	The Project Team plans to complete Phases 3&4 of the Municipal Class Environmental Assessment for New East-West Corridor and Waterdown Road Corridor in the summer of 2009.	ID# 330

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
	Questioned if the City of Hamilton has prepared a draft development phasing plan for the new roads.	No. The City of Hamilton has not yet prepared the draft Development Phasing Plan for the new roads. Guidelines for the Implementation and Phasing Plan will be part of the Environmental Study Reports to be prepared for the project.	ID# 330
	Question how much/if any new development will be allowed to proceed ahead of or concurrent to construction of the North-South and East-West corridors.	There is no answer for this at the moment. The Implementation and Phasing Plan will determine this. Also, the City of Hamilton is preparing a Traffic Allocation Study which will further address this issue.	ID# 330
	Suggestion for a link between the North-South road and New East-West Road.	We have received many comments regarding the connection (or lack of) between the new east-west road and the new/improved Waterdown Road. Although many people have suggested the need for a full by-pass route, the traffic modeling shows that this is not in fact required. The two roads systems are essentially independent of each other and serve different users.	ID# 240, 278
<i>Contact Information</i>	Requested a contact name from Dillon Consulting.	The contact information for Dillon Consulting was sent via email.	ID# 61 , 111
	Requested NCFO contact information.	The contact information was provided by NCFO	ID# 275, 276
<i>Housing development</i>	Questioned the timing of the build-out for the 6500 residential units referred in the staging plan for the TMP.	The timing of the build-out is subject to the developers' plans along with the completion of the additional municipal projects such as secondary and servicing plans and approval and construction of the road improvements.	ID# 78
<i>Truck Traffic/Dufferin Quarry</i>	Concerned about a substantial increase in truck traffic due to the quarry expansion.	Numerous meetings and correspondence have taken place with the Parkside residents' representatives including meetings with the Ministry of the Environment to discuss and consider these concerns. In regards to the Dufferin quarry, the City is not aware of any planned expansions at this site. The Lafarge quarry is proposing an extension. (ID# 280). The City will review the Haul Route Study prepared by the proponent and consider any proposed haul route as part of any quarry's planning applications. (ID# 280, 388)	ID# 33, 205, 280, 388
	Questioned why the Project Team does not acknowledge the Dufferin Aggregates plans to expand, and its effect on noise along Parkside Drive.	Comment noted	ID# 393
	Questioned truck traffic infiltration through Waterdown and Dufferin Quarry.	Model uses peak times. The City of Hamilton's undertaking of the truck study will evaluate the appropriateness of Waterdown area roads as truck routes.	ID# 9, 20
	Questioned how the increased dump truck traffic to and from the quarry will be addressed.	We have committed to addressing the issue of truck traffic in the next phase of the work. There are options to limit/prohibit trucks from using specific roadways.	ID# 59
<i>Traffic</i>	Questioned who will be the main users of the East-West route and expected traffic volume.	It will meet the future transportation demands as a result of the new planned developments in Waterdown (primarily Waterdown North). The decision regarding the designation of the New East-West roadway as a truck route will be made by the City once the road is built.	ID# 180
<i>Route design</i>	Questioned if the proposed East-West route for the Waterdown/Aldershot Transportation study is being built on a four-lane platform.	Currently, it is not envisioned to build this roadway on a four-lane platform West of the Parkside Drive connection. Any new future road widening not identified in this study would be subject to the appropriate environmental assessment.	ID# 33
	Questioned how New East-West road connects to Parkside Drive.	Maps and website information were sent by NCFO.	ID# 202
<i>Route capacity</i>	Questioned how the proposed four-lane road on Parkside Drive will handle the future increased traffic demands and if expanding the eastern portion of Parkside to a six-lane road has been considered.	The current projected demand for the east-west route is the equivalent of one additional lane of traffic in each direction. The need for any additional lanes of traffic along Parkside Drive (i.e. four to six lanes) is beyond the planning period of this study and would be subject to new environmental assessments.	ID# 33
<i>Data Calculation</i>	Concerns regarding data calculation errors.	Errors are being reviewed by Dillon Consulting.	ID#9, 20
<i>Proposed Alternative Reevaluation</i> ^{new}	Request that further consideration be given to public suggested route as an alternative to widening a portion of Parkside Drive	Project Team will reevaluate the proposed alternative route as part of the Phase 3 Class EA work.	ID# 9

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
<i>By-Pass</i>	Questioned what is being done to alleviate traffic on Highway 5 with regard to the by-pass.	Treatment options will be determined during Phase 3 of the Class EA work.	ID# 25
	Questioned the plan for the by-pass.	A new East-West roadway will pass to the North of the existing Waterdown community and proposed Waterdown North development area. This roadway is not a by-pass.	ID# 25
	Questioned the implementation timeline of the by-pass.	OPA 28 lands will be built out by 2018 therefore the infrastructure must be in place before that time. Within 6-10 years.	ID# 25, 93, 103
	Questioned what is going to happen at the North end of Boulding Avenue, whether it will be a dead-end or continue as a 3-way intersection onto the future Dundas East-West bypass.	Transportation Master Plan (TMP) did not recommend any changes to the intersection of Boulding Avenue and Parkside Drive. It will continue to meet Parkside Drive as a "T" intersection.	ID# 80
	Questioned if there are any plans to eventually use Boulding Avenue (via Burke Street) as a thoroughfare to connect the North-South corridor to the New East-West corridor (presently Parkside Drive.)	No.	ID# 38, 80
<i>Property Impacts</i>	Question about specific property impacts.	The proposed New East-West road will have no (direct) impact on the property mentioned. Resident was advised to look at the website and road alignment. If there are no Part II order request, the resident can start the property buying process (ID# 394)	ID# 141, 237, 273, 310, 341, 394
	Questioned how close the road will be to the resident's property and what impact it will have on local trees.	This kind of effect is not known at this stage in the study. Phase 3 work will determine the precise location of the road and the areas that will be disturbed (ID# 59). Existing vegetation will be preserved wherever possible. The general levels of required removals will be determined as the design is advanced (ID # 113). Vegetation along the south side of Parkside Drive could be unaffected if the south side sidewalk was eliminated. (ID# 271). We are currently finalizing the designs in this area and have not determined the impact to the fence and shrubbery (ID# 341)	ID# 59, 113, 271, 341
	Concerned about impacts on Alexander Place nursing home and questioned opportunity for access from the New East-West corridor.	The potential expansion of Alexander Place Nursing Home and access onto the proposed East-West road is a planning issue and we are presently too early in the planning process to determine potential access points at this site.	ID# 214
	Suggestion to decrease the distance between Alexander Place facility and the Highway.	Comment was recorded.	Comment from June 24 workbook
	Suggestion that any land required to facilitate a turning lane should be expropriated from the developer, Upcountry Estates.	The Project Team agrees. The proposal will be adjusted to eliminate property taking along the west property line. A small triangle of property will be required at Dundas Street.	ID# 340
<i>Parkside Drive/Highway 6 Intersection</i>	Requested that the MTO information, in regards to the statements to Parkside residents that they have no plans to close Parkside Drive at Highway 6, should be included in the Public Appendices.	We will include the MTO submission in the Consultation Report prepared for Phases 3&4. The Project Team has interpreted the response from the MTO differently from the Parkside Residents' Association. NCFO Review of MTO Highway 6/Parkside Drive Issue sent May 26, 2008.	ID# 46, 106
	Questioned about MTO correspondence relating to Highway 6 and Parkside Drive.	It is currently being reviewed and a completed correspondence log for this will be sent to you with all the relevant information	ID# 68 , 74, 75
	Request proof that MTO intends to close Parkside Drive.	NCFO Review of MTO Highway 6/Parkside Drive Issue sent May 26, 2008	ID# 107
	City's use of MOE statements and MTO statements are misleading.	NCFO Review of MTO Highway 6/Parkside Drive Issue sent May 26, 2008. The facilitator was asked to review and clarify events leading up to the confusion around the MTO/Project Team's perspectives on Parkside Drive. It did not in any way intend to document the chronology or content of the correspondence (ID# 204)	ID# 85, 106, 107, 204, 205

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
	Questioned about potential closing of Parkside Drive and Highway 6 intersection.	MTO has no current plans for the Parkside Drive and Highway 6 intersection. It is possible that the future interchange at Highway 5/6 will eliminate its possibility. There is however, a further need for clarification from the MTO on this issue. NCFO Review of MTO Highway 6/Parkside Drive Issue sent May 26, 2008. This study is not proposing to close the existing <u>intersection</u> of Parkside Drive/Highway 6. The development of a new intersection at the Concession 4 Road (or near the Concession 4 Road) would <u>not</u> mean that the current Parkside Drive/Highway 6 <u>intersection</u> would need to be closed (ID# 339)	ID# 9, 13, 20, 71, 75, 76, 104, 105, 339
<i>Noise impacts</i>	Suggested that the further north the New East-West road is placed, the lower the sound/noise reduction mitigation costs.	Suggestion was recorded.	ID# 59
	Questioned how increased noise will be minimized, what sort of sound barriers will be installed and if there will be compensation for homeowner installing new windows.	There are numerous ways of addressing traffic noise. (Methods were listed). Once we have determined if there are any areas that may require noise mitigation, we can address how best to reduce the impact. This will be different for each affected site.	ID# 59
	Questioned if there is a sound level from speeding traffic that is considered acceptable, how it will be tested, proven, enforced and protected.	Ontario Ministry of the Environment's (MOE) standard methodology will be used to assess noise levels adjacent to the road improvements/widening. Review and monitoring the actual noise levels after construction will be considered as part of the monitoring program developed for this project.	ID# 59
	Questioned MOE's criteria for noise and noise levels at various receptors (with and without the road).	The draft Noise Report was sent Mar 12, 2009.	ID# 356, 371
<i>Road safety</i>	Questioned how the project will ensure the safety of children from large volume of speeding traffic.	The safety of users of the road and adjacent properties is of paramount importance in the planning and design of road improvements such as this. During the next phase of the study we will be reviewing road safety and operations and, if we identify any concerns, we will investigate design and road operating changes to address those concerns.	ID# 59
<i>Light pollution</i>	Concerned about light pollution and questioned if street lights be installed with this new roadway.	Street lighting will be installed along the new road where required for safety reasons and, if they are required; they cannot be declined by the adjacent property owner. Street lights will be designed to minimize light spill over into residential area. Comment was recorded (ID# 128, NAC East-West Issue Table – June 2, 2008)	ID# 59, 113, 128, NAC East-West Issue Table – June 2, 2008
<i>Speed limit</i>	Questioned the expected posted speed limit for the New East-West Road.	The work completed to date uses a speed of 60 km/h. This will be confirmed or adjusted during Phase 3 work (ID# 59). It is proposed that section of Parkside Drive to be widened will be posted at 50 km/h and the rest at 60 km/h (ID # 180)	ID# 59, 180
<i>Speed enforcement</i>	Questioned how speed limit will be enforced.	The enforcement of the speed limit will be the responsibility of local police.	ID# 59
<i>Pre-Screening Method</i>	Questioned how the "pre-screening" of the idea of "Widening of Dundas Street to 4 lanes between Highway 6 and Brant Street" was done that made the Project Team come to the conclusion that it would not solve the East-West Transportation Problem.	A very detailed response for the Dundas Street has been previously sent in 2005. Due to a number of safety concerns that would arise due to the substandard lane widths, the road's close proximity to buildings and lack of separation between the sidewalk and downtown area, and because it does not solve the problem, it was recommended that this option not be pursued further.	ID# 63, 119, 205
<i>Road widening</i>	Questioned if there is a possibility that Boulding Avenue would be widened to continue the four-lane North-South corridor.	No, the TMP did not recommend any changes to Boulding Avenue.	ID# 80
<i>Route alignment</i>	Questioned why it was decided to bring the North-South corridor up to Dundas Street at Burke Street.	The final location of the corridor linking Mountain Brow Road to Dundas Street will be decided as part of the Phase 3 Study. A link farther east is possible as a secondary link but the major corridor must be to the west to service the demand from the South Waterdown Secondary Plan area and part of existing Waterdown.	ID# 80

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
<i>Inaccurate Statements</i>	Requested a retraction of inaccurate statement from the City of Hamilton regarding MOE's Certificate of Approval (CofA) for Barnes Environmental.	Regarding the Opta Minerals Certificate of Approval (CofA) point, the City of Hamilton, as well as the MOE have already commented on this issue and its relevance to the evaluation.	ID# 99
<i>Bike lanes</i>	Questioned if a bike path is being considered.	We are recommending a wider road to provide additional pavement width to accommodate cyclists along the section of Parkside Drive that is to be improved.	ID# 113, 180 , 191, 206
<i>Bike route accessibility and safety</i>	Questioned the accessibility of cycling routes from the New East-West corridor as well as the safety of crossings.	No changes are being made as part of this project to the existing North-South routes that the New East-West roadway will cross. An "on road" cycling lane will be provided along the entire length of the New East-West road.	ID# 249
<i>Sidewalks</i>	Suggestion that sidewalks on both sides of the road are not needed and to only have sidewalks on one side of the road.	Having sidewalks on both sides of the road will provide a higher level of safety.	ID# 206
<i>Collision and Accident reports</i>	Questioned if the collision/accident reports were considered in the project.	A road safety review is being completed as part of the current work program and results made available to the public for review. The assessment of motor vehicle collision statistics for the last five years will be part of this review.	ID# 125
ECONOMIC			
<i>Cost</i>	Taxpayers will have the burden to pay for road upgrade as not all will be paid by development fees.	The costs included in the final Environmental Study Reports will be used to develop the capital budget (including development charges component) for the recommended improvements, which will also be brought forward to Council for approval as part of the capital budget process.	ID# 45, 48
	Cost was ranked last by the public, yet in the evaluation Dillon focused on significant cost impact through Opta Mineral and Connon Nurseries instead of the benefits from Option 5.	Comment was recorded and considered by the Project Team	ID# 100
<i>Property values</i>	Concerned about resale property value impacts.	The Project Partners are currently developing more detailed plans for the widening of Parkside Drive to assess potential impacts and minimize them, where possible.	ID# 113
PHASE 2 REPORT			
<i>Cost Breakdown</i>	Requested copies of the detailed costs breakdowns for each of the Projects referred to in Appendix D of Phase 2 Report.	The cost breakdown will be approved and provided on the project website as an "amended Appendix D" by March 28.	ID# 12, 20, 43, 46
	Requested a breakdown of where or how the "data" numbers in the Justification Tables were obtained or calculated due to concerns of changing data.	"Geographic Information System" (GIS) software program was used to obtain results from data obtained by a variety of sources (Municipal and Provincial agencies). Some minor adjustments were made to the data tables but overall results have not changed since published.	ID# 12, 43
<i>Agency Communication</i>	Requested the letters and documents of communication from the various agencies that were contacted by either Dillon or the Project Team for their input in this project.	All correspondence is not typically included during the course of an EA, however the Project Team will assemble key correspondence to be posted on the website by March. Updated Agency Correspondences were posted at: www.hamilton.ca/WaterdownTMP	ID# 12, 43, 46, 142
	Requested copy of a recent document from the MTO which indicates a problem in the report.	The MTO has never indicated to us a "problem with the report". Project Team would appreciate being forwarded the document referenced.	ID# 12
<i>Black-lined version</i>	Requested a copy of the black-lined version of the Final Phase 2 Report prepared by Dillon Consulting. (Draft Phase 2 Report with sections indicating additions to and deletions from the draft Phase 2 Report.)	A black-lined version of the Final Phase 2 Report is currently being reviewed, and will be available shortly. A copy was sent Sep 22, 2008 by the NCFO. (ID# 108)	ID# 52 , 108
<i>Incorrect Statement</i>	Questioned an incorrect statement in the Phase 2 report that the Project Team met with Parkside Drive Residents in the summer of 2007 regarding the Option 5 alignment.	It is correct that the Project Team did not meet with the Parkside Group until December 2007 which at that time alternatives to the Option 4 route were presented. This will be corrected in future documentation including the ESR.	ID# 132
	Questioned if the information, text and maps, presented in the phase 2 report are a 'done deal'.	The recommendations of the Phase 2 report have been accepted by Hamilton Council. There is still the need to undertake the Class EA Phase 3 work and prepare the Environmental Study Report (ESR), both to be approved by Hamilton Council and the Ministry of the Environment. As such, the road recommendations are not yet finalized.	ID# 49
OPTION 4 Versus OPTION 5			

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
	Concern that the Project Team is not addressing the social concerns that have been brought to their attention by the local residents in the evaluation of Option 4 versus Option 5.	Social concerns are one of the principal considerations in this study. However, the routing concerns needed to be balanced with other environmental and economic considerations.	ID# 87
	Questioned why the Project Team has abandoned Option 5 and not compared it with the Original Option 5.	The Project Team has described its Review of Option 4 vs. 5 Alignments (both the "Opta Minerals" alignment and the "sawtooth" alignment, in a memo to East-West Corridor NAC members, dated October 27, 2008.	ID# 123
	Questioned if the Project Team has considered that Option 5 has the opportunity to expand in the future while Option 4 cannot.	The expandability of the alternative route was not a criterion in the selection or evaluation of the alternatives as additional capacity is not required to support the future traffic levels for all of the currently planned developments (NAC East-West Issue Table – June 2, 2008). The expandability of Option 5 (sawtooth) was considered and is noted in our Memo, dated October 27, 2008 (ID# 123)	ID# 123, NAC East-West Issue Table – June 2, 2008
	Concerned that the Project Team is attempting to move the Preferred Option 4 closer to Alexander Place nursing home.	The route that we are recommending in this area is the more eastern alignment which is the furthest distance from the Alexander Place Nursing home.	ID# 152
	Concern that Option 4 creates a greater impact on residents, families etc.	Comment was recorded.	Comment from June 24 workbook
	Concerned about decreases in market curb appeal.	Comment was recorded.	Comment from June 24 workbook
	Questioned if Option 4 changed to intersect with Parkside a little further south/west, so as to not disturb the Nursery.	Option 4 as proposed cannot avoid the Connon Nursery property. The alignment has been moved as far south/west as possible to minimize impacts to this property.	ID# 202
	Requested the maps of Option 4 and Option 5.	Materials were sent.	ID# 130
	Requested that Option 5 versus Option 4 memo prepared by Dillon be posted on the project website	Memo was posted on the website.	ID# 311
	Requested a data analysis to be completed of Option 5 (a hybrid of Option 1 and Option 4) vs. Option 4.	Lura Consulting is conducting an assessment based on the documentation on file.	ID# 361, 369
<i>Option 5 Review</i>	Questioned if Option 5 is still be reviewed at the Phase 2 level and if input can be provided on the current Option 4 route for Phases 3&4.	Options 4/5 for the East-West corridor will be evaluated early in Phase 3 in consultation with stakeholders. (Process in the Path Forward Report). Public input on Phases 3&4 will be sought at the upcoming PICs.	ID# 37
	Questioned information on how Option 5 was evaluated.	Technical memo from Dillon (dated October 27th) was sent.	ID# 355
	Questioned if the Project Team decided to review Option 5 about 6 months ago.	The Project Team began considering the need to further assess Option 5 as part of the Phases 3&4 Class EA process about 6 months ago. It is not untypical to review and undertake more detailed assessments as the EA process proceeds.	ID# 56
	Requested that the Project Team formally review Option 5-Stantec alignment	A subsequent review of the Stantec work was undertaken by SNC Lavalin (April 2004) and it concluded that the Municipal Class EA Phase 2 work undertaken by Stantec needed to be re-done. Our study team has undertaken a review of this option (ID# 138). The Project Team has provided comments on this option in the October 27, 2008 memo, at the NAC meeting held on October 28, 2008, and in two meetings held with the Parkside Drive Residents Association held on November 19, 2008 and December 1, 2008 (ID# 152)	ID# 138, 152
	Requested detailed analysis of why the original Stantec alignment is not preferred over Option 4 and why Option 5 is not viable.	An oral assessment was presented at the PIC meeting on June 24 th (ID# 200) The Project Team is in the process of completing the documentation of the evaluation of this option and a memorandum should be completed by September 2008 (ID# 200). Please see the Project Team's Memo to East-West Corridor NAC Members, dated October 27, 2008 for the rationale for selecting Option 4. In addition, these issues were discussed in detail at the Project Team's meeting with the Parkside Drive Residents Association on November 19, 2008, and December 1, 2008. (ID# 208)	ID# 200, 208

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
	Request for meeting with NCFO and Dillon to discuss all aspects of the Stantec Option 5 (Review)	Meetings held November 19 and December 1, 2008.	ID# 216, 285
	Commented that the Project Team failed to adequately and correctly review Option 5.	As is presented in Section 7.6.4 of the Transportation Master Plan report, the Option 5 that was evaluated then, and again most recently under Phase 3, involved an alignment passing through Opta Minerals and Connon Nursery properties. The expected high costs of these business displacements are referenced in the above noted report section.	ID# 246, 252
<i>Justification Tables</i>	Questioned why there are errors in the numbers in the Justification Tables that were used to justify the Project Team's recommendations?	Inconsistencies identified appear to be a result of rounding data values. During Phase 3, we have considered two alternative Options (within the Option 5 opportunity – one the Opta Minerals option – provided by the Project Partners, and the second, the “Saw Tooth” option, provided by the residents).	ID# 57, 85
	Questioned why does the City continues to deny that Option 4 is least preferred, based on the mathematical model it subscribed to, vs. Option 5.	Difference between the Project Team calculation results and the resident calculation results is with respect to data rounding. The Project Team did not rely entirely on the results of the SAW method but also implemented a “reasoned argument” approach that involved a review of the major advantages/disadvantages of each option.	ID# 106
	Questioned why the Justification table information actually show Option 5 as a better preferred route when compared to all three northern route options.	The Project Team has concluded that neither the “saw tooth option” nor the Opta Minerals option are preferred over Option 4. The rationale for this conclusion is contained in the Update to NAC for the Proposed New East-West Corridor – Alternatives Review <i>memo</i> , dated October 27, 2008. We have previously provided comments on this issue, and most recently in our ID# 246 response and discussions in meetings. We have no further comments to make (ID# 252)	ID# 57, 85, 252
	Request for detailed explanation as to why Option 4 is preferred when the public provided data and information which shows a strong argument for Option 5.	Comment was recorded.	Comment from June 24 workbook
	Questioned if the validity test on the various options which suggest that Option 5 is better than Option 4 could be included in an appendix.	It will be included in the Public Consultation report.	ID# 46
	Requested that the data errors and validity test that residents presented and provided on Option 5 vs. Option 4 be included in the appendix of the phase 2 final report.	Comment was recorded.	ID# 106
<i>Option 4 Support</i>	Support for Option 4 due to less cost than Option 5.	Comment was recorded.	ID# 171
	Support for “Sawtooth” option and request that it be considered.	The Project Team has considered Option 5 (the Saw Tooth option), as an alternative to Option 4 - the Project Partners' preferred option. For reasons stated in the attached memo (Memo to East-West Corridor NAC Members dated October 27, 2008) (ID# 301)	ID# 301, 342
<i>Option 5 Support</i>	Suggestion that Option 5 is a well laid plan that will be north of the existing community and will have less impact.	As referenced in the Path Forward Report, the approach to evaluating Option 5 includes: - discussing and proposing an alignment with residents and businesses in the area for consideration; - collecting data and costing the land acquisition/business displacement costs of the alternative; - assessment of community and business impact; - determination of feasibility; and - if feasible, evaluating the alternative against the current recommendation.	ID# 59
	Strong support for Citizen Option 5 as it is a very efficient way to reroute the traffic and cause the least problems and discomfort to Parkside Drive residents.	None required.	ID# 113
	Suggestion that proposed Option 5 which curves around Opta Minerals is less costly than Option 4.	Suggestion was recorded.	ID# 138
	Shown Preference for Option 5 – Stantec Adjustment.	Comment was recorded.	Comment from June 24 workbook, ID# 252

Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
	Project Team has not considered that the “affected” businesses may benefit from the improvement of transportation services and linkages by Option 5.	Comment to be considered by the Project Team.	ID# 100
	Suggestion to add to the evaluation criteria the potential for future expansion as option 5 does have the capacity.	The Project Team’s response to this issue is included in the issue response table presented at the June 2008 NAC meeting which you attended (ID# 129). The expandability of Option 5 (sawtooth) was considered and is noted in our Memo, dated October 27, 2008 (ID# 123)	ID# 123, 129
	Suggestion to add to the evaluation criteria the potential for bypass, as Option 5 is better suited to divert traffic.	The TMP Study did not identify the need for a “by-pass” road. As has been stated in the past, the New East-West road capacity is needed to serve the increased traffic demand as a result of the North Waterdown development area (OPA 28).	ID# 129
	Suggestion to add to the evaluation criteria, the potential impact of truck traffic, as Option 5 is better suited to divert truck traffic.	The Project Team is aware of truck traffic issues. As stated at the June 2, 2008 NAC, all arterial roads need to be designed to accommodate truck traffic. Whether the New East-West road will be a designated truck route will be determined through the City of Hamilton’s Truck Route Subcommittee.	ID# 129
	Suggestion to add to the evaluation criteria, the social impact relating to Opta’s Certificate of Approval (CofA), as Option 5 avoids costly land acquisitions.	The Project Partners, as well as the MOE, have previously responded on the applicability of Opta Minerals Certificate of Approval (CoA) in new road route selection.	ID# 129
	Suggestion to add to the evaluation criteria, the potential restoration of the Natural Environment.	Road projects are not typically the means to rehabilitate degraded natural habitats (beyond the immediate area of influence of the road). If the resources exist to improve this habitat, then this could be accomplished through either Option 4 or 5.	ID# 129
	Suggestion to add potential impacts to the quantity and quality of water for the residents who are currently on wells.	The potential for effects on well water and septic systems will be considered in the EA work.	ID# 133
	Suggestion to add the potential impacts to septic systems for residents not hooked on to the City sewers.	The potential for effects on well water and septic systems will be considered in the EA work.	ID# 133
	Suggestion that business disruption is not a valid issue.	Comment was recorded.	Comment from June 24 workbook
	Suggestion that the Project Team presented a “new” Option 5 alignment without public input.	The Option 5 route has not changed as compared to what was evaluated as part of the Phase 2 process. The route has always passed through the Opta property.	ID# 138
	Suggestion that Option 5 provides an opportunity for a unique bridge design and to improve habitat along the east branch of the Grindstone Creek.	Comment was noted.	NAC East-West Issue Table – June 2, 2008
MISCELLANEOUS			
<i>Mailing list</i>	Additions, updates and removals to the project mailing list.	Added, corrected, and/or removed from mailing list.	ID# 11, 16, 36, 39, 101, 144, 154, 158, 165, 188, 207, 222, 223, 234, 272, 320
<i>Technology</i>	Questioned delivery status notification messages and/or email recall.	Informed that blackberry device was out of range and unable to receive emails but the office still received all messages (ID# 19). Explanation in person for email recall (ID# 263)	ID# 19, 263
<i>Website</i>	Questioned project website location to obtain information.	Website link sent by NCFO.	ID# 31, 159, 165
	Requested the resident contact information be removed from the project website.	Contact information was removed January 30, 2009.	ID# 366
<i>Communications</i>	Request for City of Hamilton contact information.	Contact information provided.	ID# 226, 352
<i>Accessibility</i>	Questioned if the Crossroads Centre is accessible by public transit.	He was sent the Burlington Transit map and given the bus route numbers.	ID# 40
<i>Terms of Reference (ToR)</i>	Requested the location of the Phase 1 Terms of Reference for the WAMTP.	A Terms of Reference document was not prepared for the Phase 1 "EA Transportation Network Study", as it is not required under current legislation. The Municipal Engineers Association Class Environmental Assessment Class EA for municipal projects is equivalent to a Terms of Reference, since it provides the scope and level of detail for Class EA studies.	ID# 64, 102

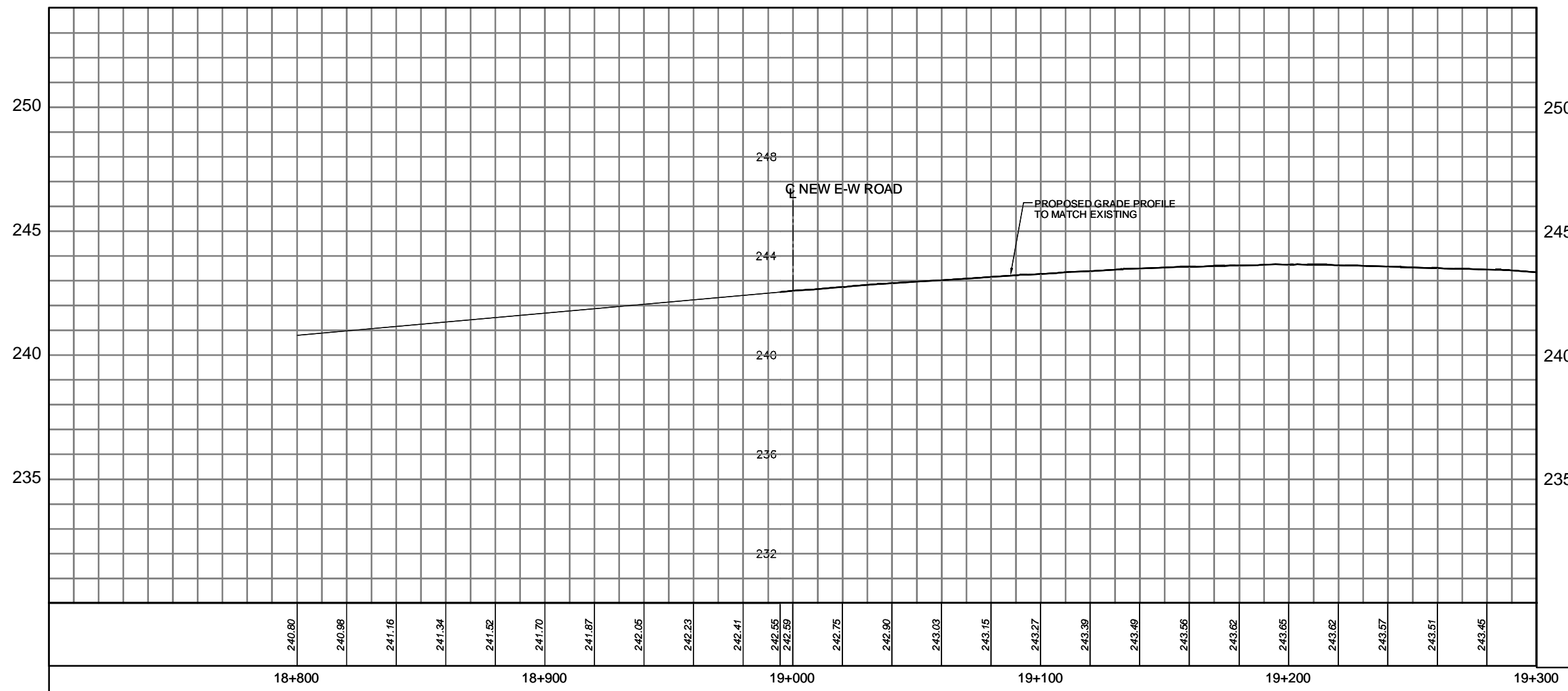
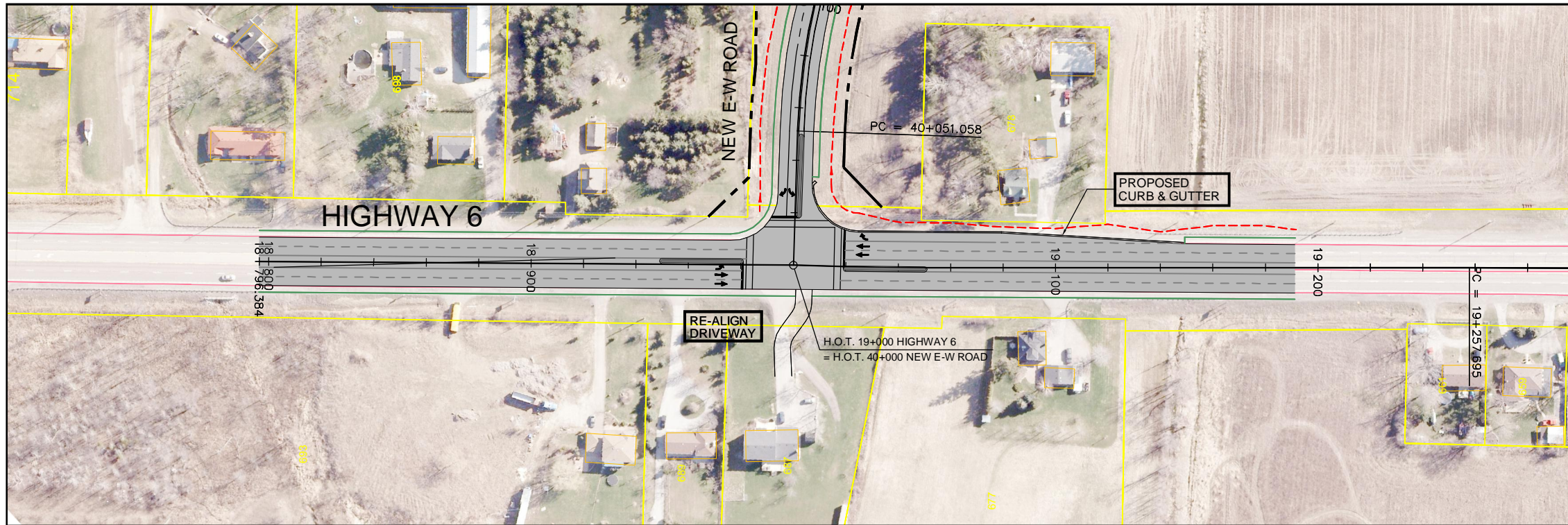
Table 7-5 - Summary of Issues and Concerns Raised by the Public During Phases 3 and 4

FACTOR	QUESTION/CONCERN	RESPONSE	REFERENCE
<i>Letter from Niagara Escarpment Commission (NEC)</i>	Requested a copy of the letter from the NEC sent to the City of Burlington, regarding “refusing to use King Road as the expressway to go from Burlington to Waterdown”.	It was indicated that we would locate the letter and fax it to him within 10 business days.	ID# 79
	Resident expressed his frustration in dealing with City of Hamilton staff on this project to Mayor Eisenberger.	Comment was recorded.	ID# 384, 385, 387
	Requested Parkside Road and Railway track larger map.	Sent by NCFO	ID# 24, 34, 41
	Requested location of railroad track on map.	The railway crossing at Parkside Drive is East of the bend where the New East/West corridor connects with Parkside Drive. Map was sent.	ID# 30, 34, 35, 41
	Requested location of wetland near Parkside Drive between Centre Road and Robson on the map.	Please see attached Figure 5.1 of the Final Phase 2 Report (identified as "Centre Road Woodlot Candidate ESA/PSW").	ID# 30
	Requested the name of street that goes North from Mountain Brow.	A formal name for this link is not currently available as this will form part of the secondary area approval process.	ID# 30, 35
	Requested the name of the street that drops down to Dundas Street from Parkside Drive.	It is the proposed new route. A map was sent for details.	ID# 58
	Requested information on the project for the East-West road, north of Waterdown.	Materials were sent by the Neutral Community Facilitator’s Office (NCFO).	ID# 193
<i>Construction of East-West Road</i>	Questioned when the construction of the East-West Road would begin and how long it would take to complete.	The construction schedule is dependent upon obtaining approvals from the Ministry of the Environment for the Environmental Study Report (ESR), obtaining permits from other agencies, and then tendering the project. Construction would not likely start until 2013, at the earliest. It is anticipated that the Preferred design will be finalized and endorsed by the three Partnering Municipal Councils (Region of Halton and Cities of Hamilton and Burlington), after which the ESRs will be put on public record for a minimum of 30 day review period in the summer of 2009. More information can be found on the project website, at: www.hamilton.ca/waterdowntmp . The update for New East-West Corridor is that we hope to take our report to Council in June and if approved will file the Environmental Study Report on public record in summer for at-least 30 days. If there is no Part II order request, the project will go to design and construction.	ID# 198, 327, 363, 368, 382,394
	The new roadway will not solve the community’s problem and it should definitely not go through the town.	Regarding the improvements to Waterdown Road, connection to the Waterdown South development area and Dundas Street is needed to service the road demands of this new development. (ID# 143) The New East-West roadway is not intended to be a “By-pass” roadway. As such, the roadway needs to be in proximity to these development areas (ID# 168)	ID# 143, 168
	Concerned that the New East-West route will replace the existing Parkside Drive, with many additional slow-downs instead of aiding the East-West traffic flow.	The New East-West roadway will serve the needs of new approved development, particularly the Waterdown North Development, located west of Centre Road and North of Parkside Drive.	ID# 206
<i>Character Loss</i>	Concerned that the project will lead to the loss of the community’s character (Victorian village).	The comment was noted by the Project Team.	ID# 143, 168
<i>Parkside Drive and Holly Bush</i>	Requested details on potential expansion of the Parkside Drive and Hollybush Drive intersections.	No changes are being proposed for Hollybush Drive as part of the Class Environmental Assessment being undertaken for the New East-West Road in Waterdown.	ID# 149
	Suggestion that East-West route follow the northern boundary of the town to keep the sound and air pollution away from residential areas and the pond.	Phases 3&4 will develop the preferred design alternatives for the East-West corridor and will attempt to mitigate as many impacts to the existing social, cultural and environment conditions in the Waterdown Area including noise attenuation.	ID# 89

HIGHWAY 6

PREFERRED DESIGN CONCEPT
PLANS AND PROFILES

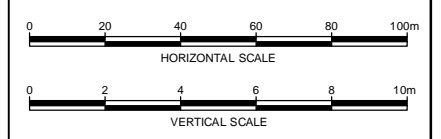
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 18+796.384 to STA. 19+200

DILLON CONSULTING
 CHECKED BY: JDM
 DESIGN BY: JDM
 DRAWN BY: JDC
 SCALE: AS SHOWN
 DATE: AUGUST 20, 2009
 PROJECT No. 08-9020

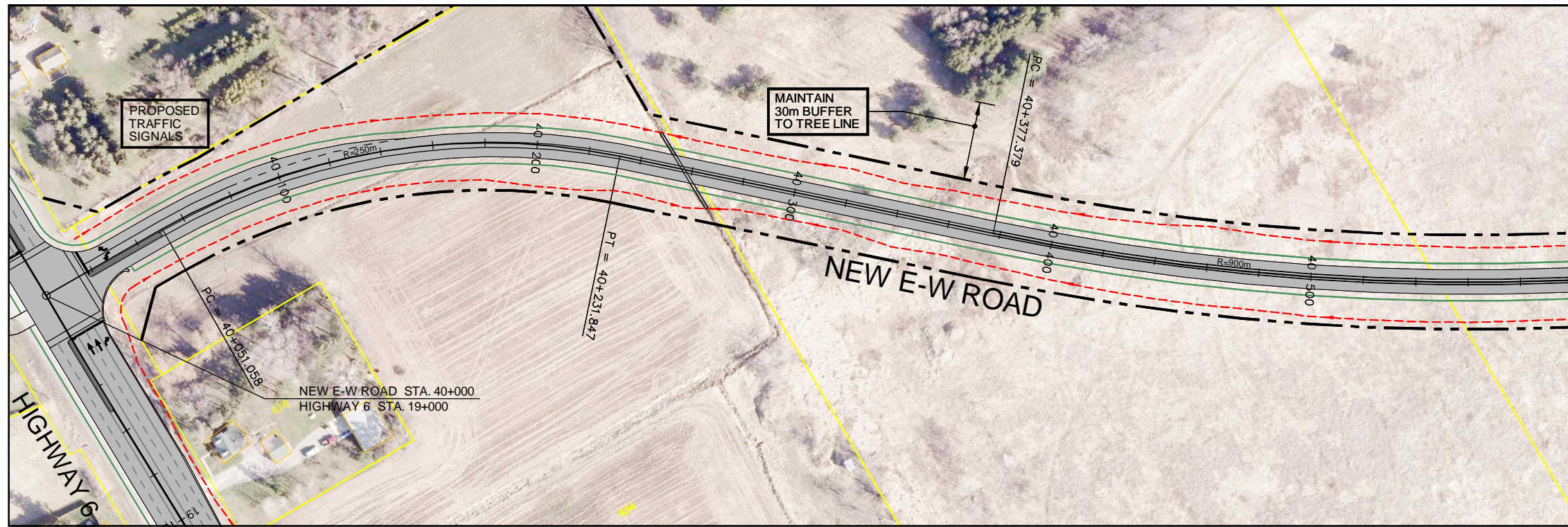
EAST-WEST ROAD
 CLASS ENVIRONMENTAL ASSESSMENT
 HIGHWAY 6 TO BRANT STREET

HIGHWAY 6-PLATE 1

NEW E-W ROAD

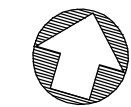
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PLANS AND PROFILES

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MATCHLINE

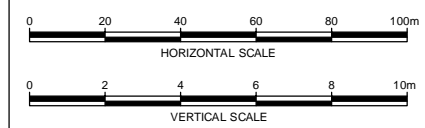
STA. 40+600



LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

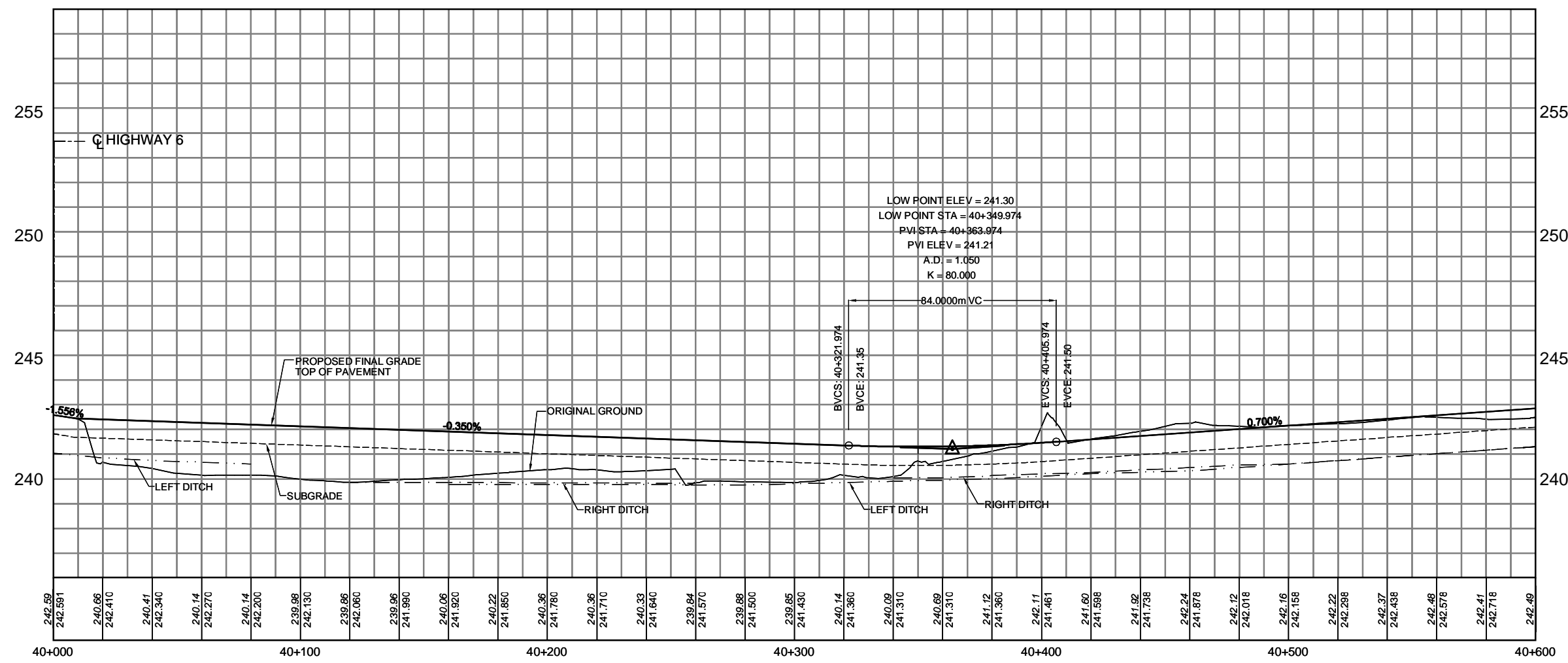
STA. 40+000 to STA. 40+600



CHECKED BY: JDM
 DESIGN BY: JDM
 DRAWN BY: GCS/SZ
 SCALE: AS SHOWN
 DATE: JUNE 17, 2009
 PROJECT No. 08-9020

EAST-WEST ROAD
 CLASS ENVIRONMENTAL ASSESSMENT
 HIGHWAY 6 TO BRANT STREET

E-W ROAD-PLATE 1



255

250

245

240

40+000

40+100

40+200

40+300

40+400

40+500

40+600

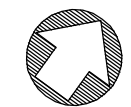
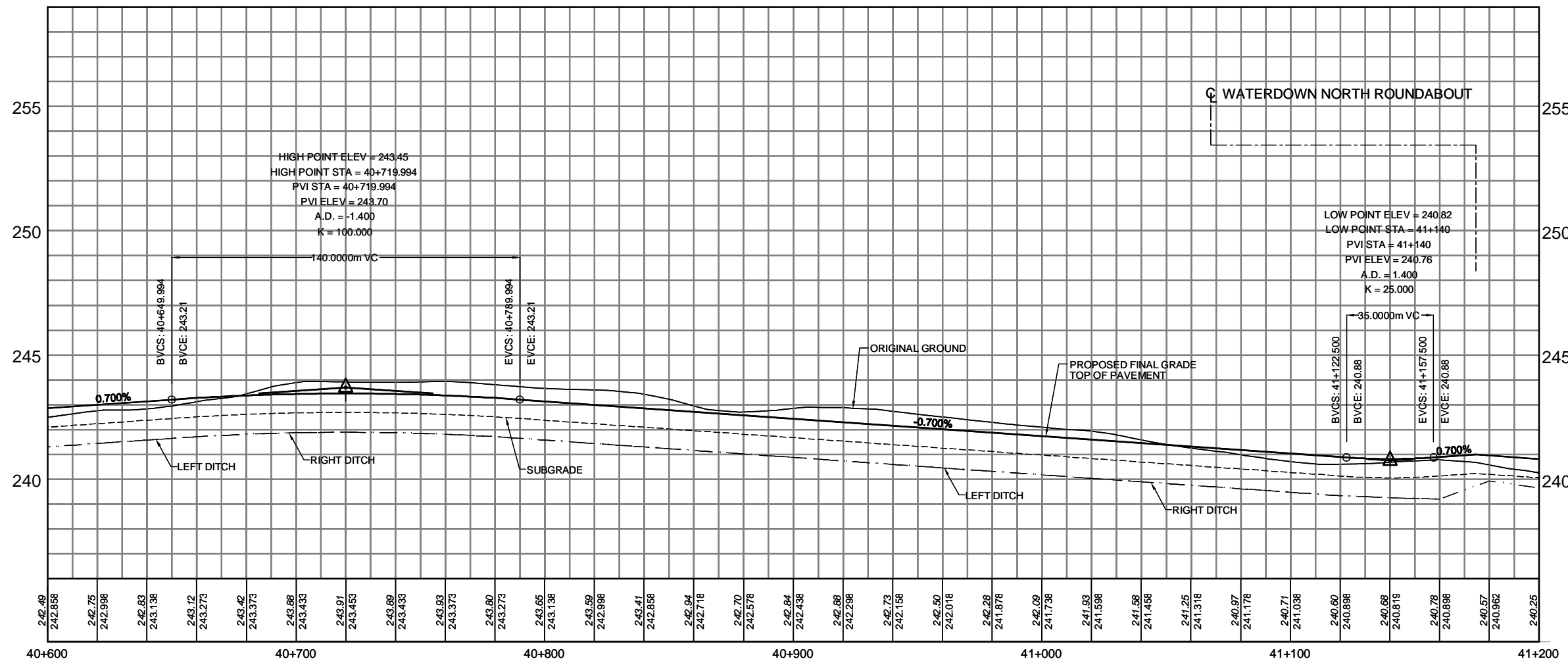
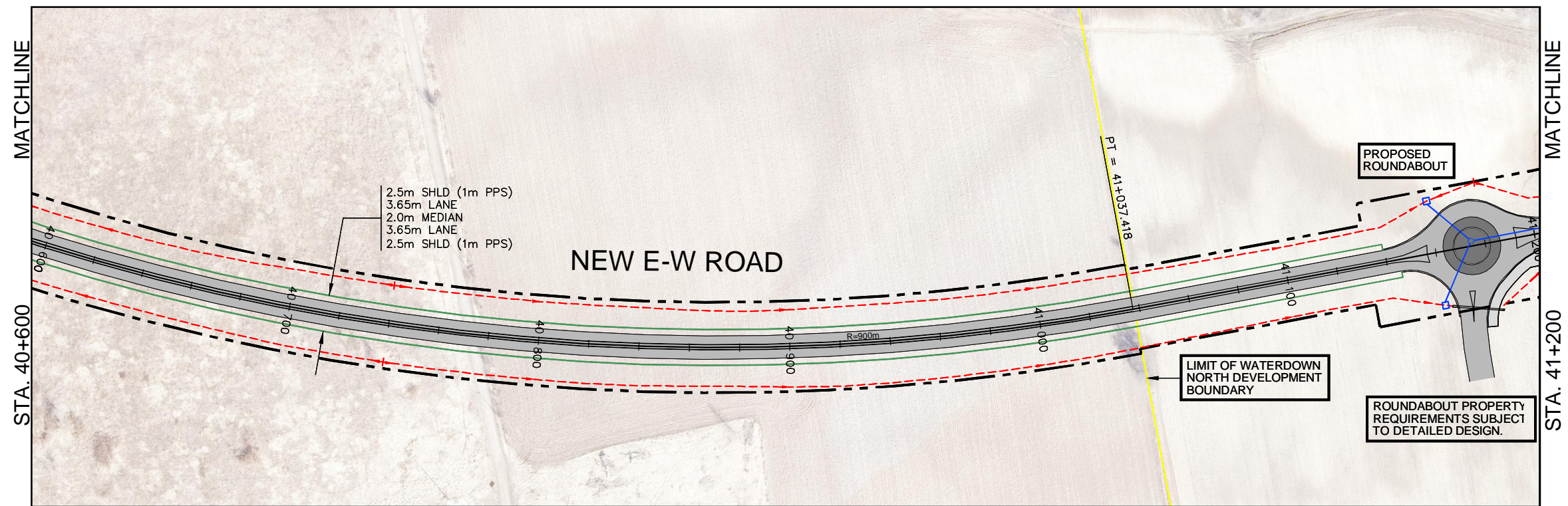
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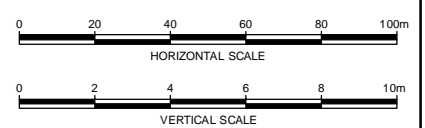
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY

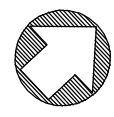
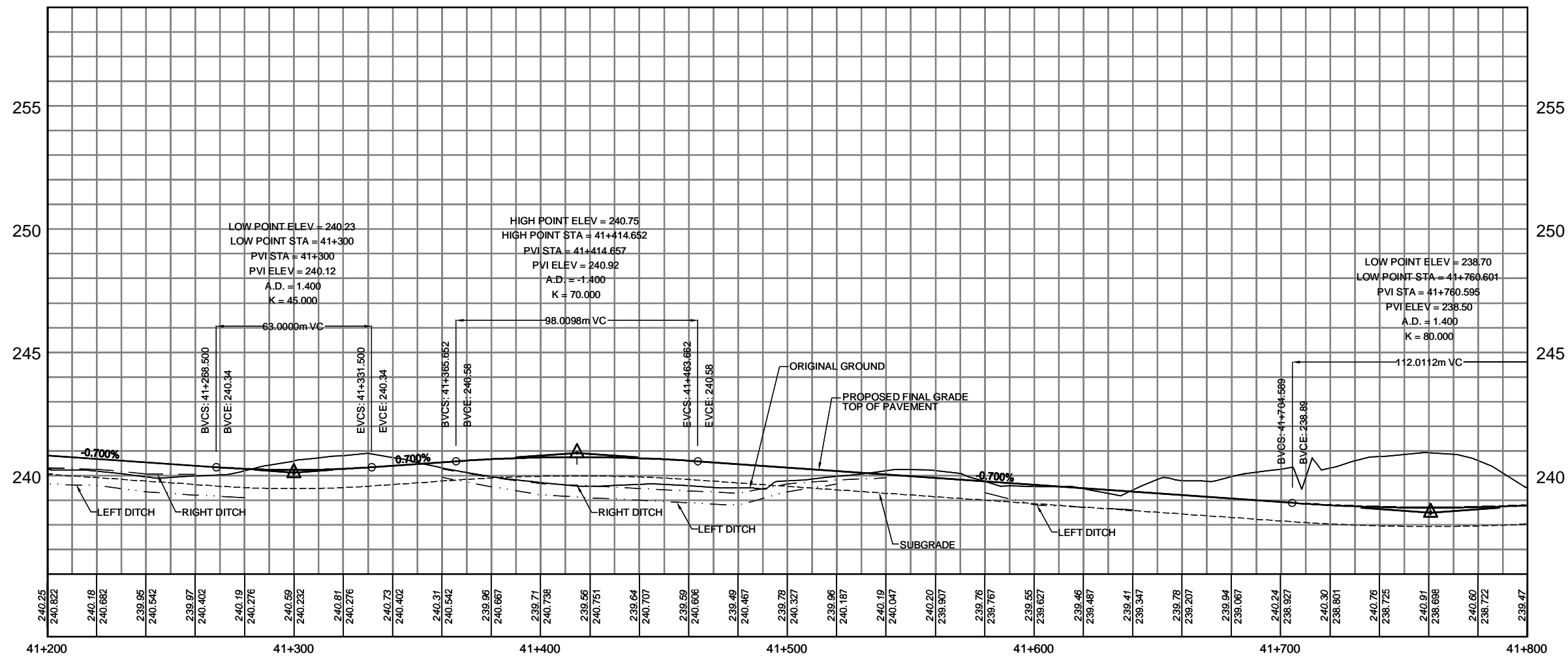
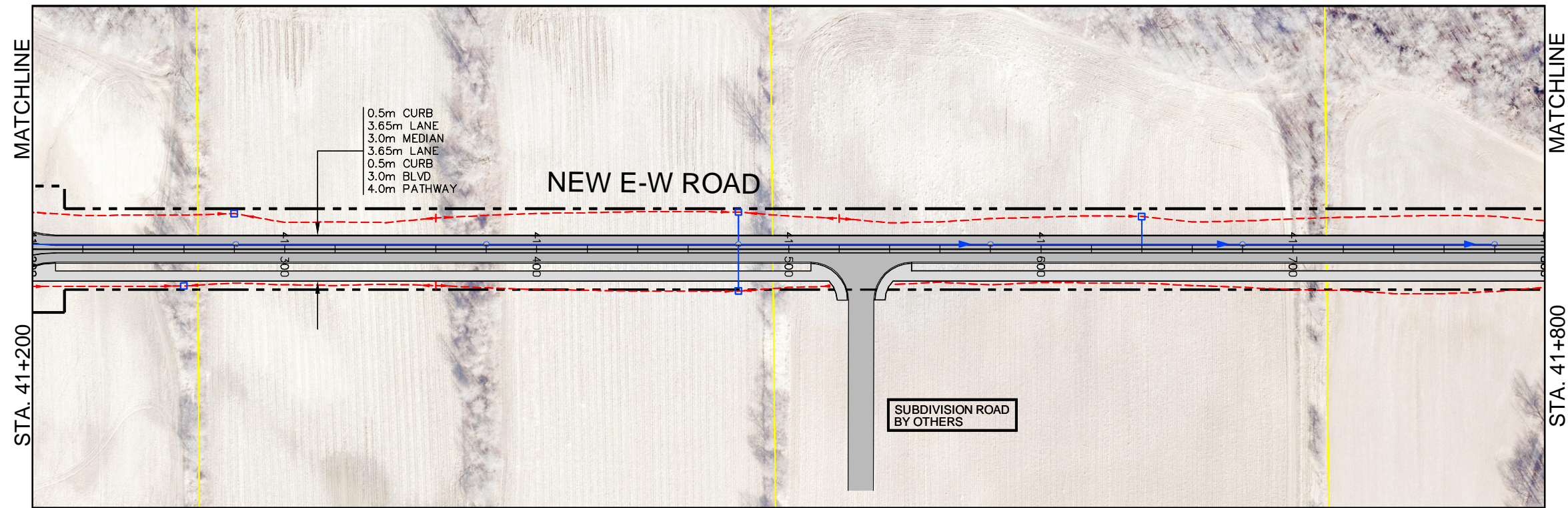


PREFERRED DESIGN CONCEPT

STA. 40+600 to STA. 41+200

	EAST-WEST ROAD CLASS ENVIRONMENTAL ASSESSMENT HIGHWAY 6 TO BRANT STREET
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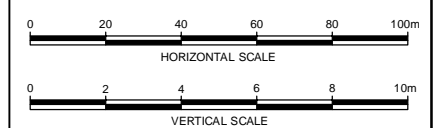
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 41+200 to STA. 41+800

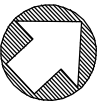
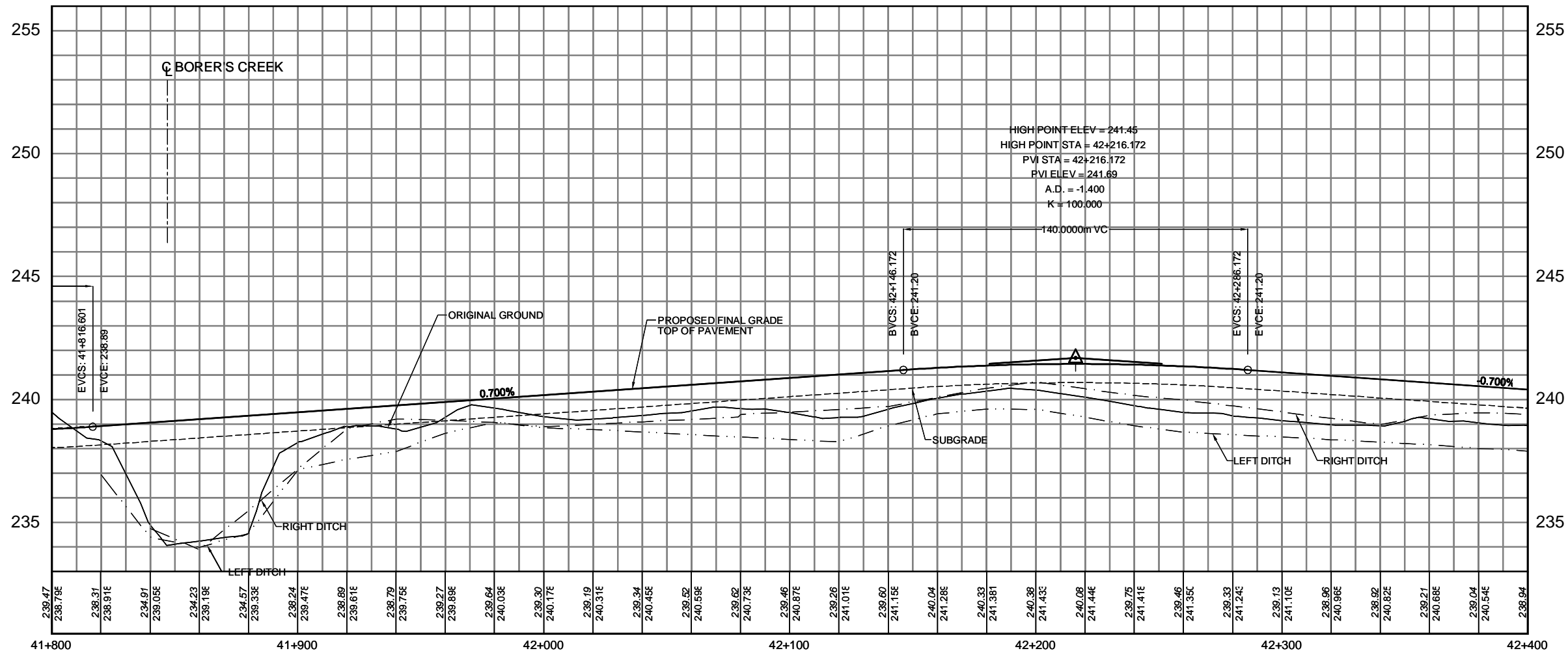
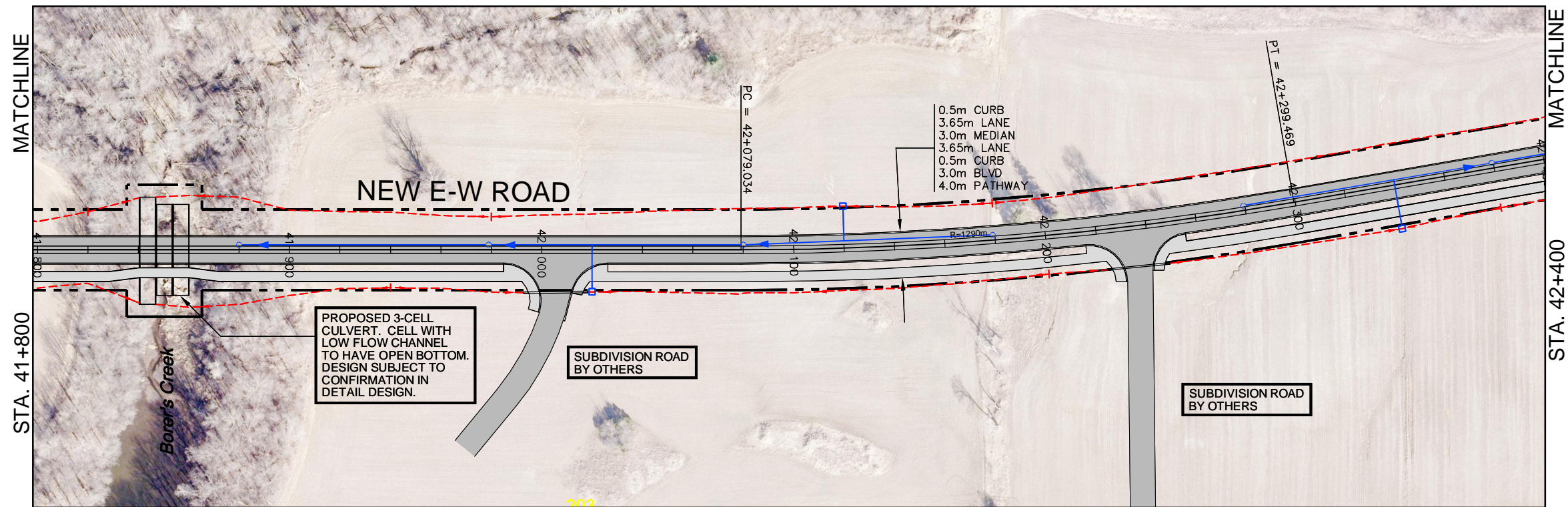


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DRAWN BY: CCG/SHZ
SCALE: AS SHOWN
DATE: JUNE 17, 2009
PROJECT No. 08-9020

EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

E-W ROAD-PLATE 3

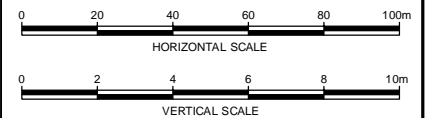
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 41+800 to STA. 42+400

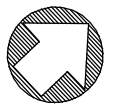
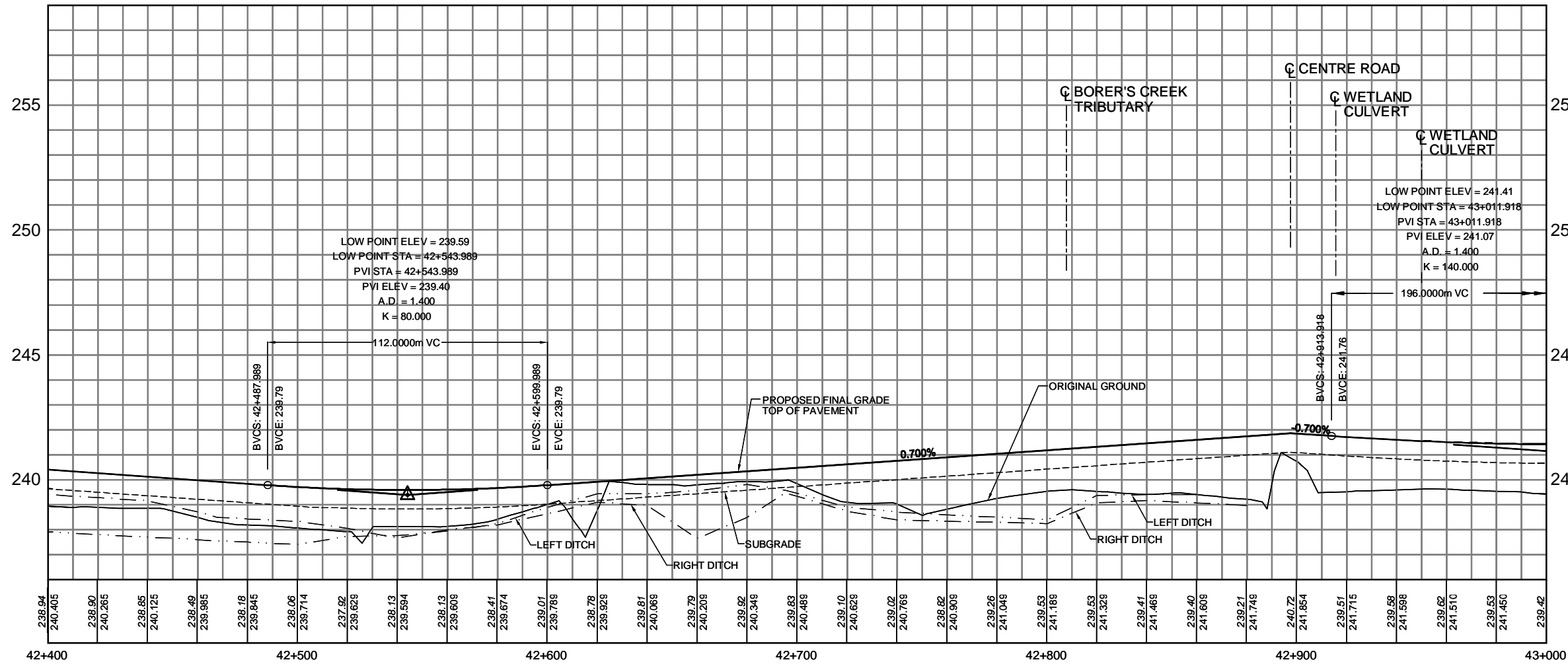
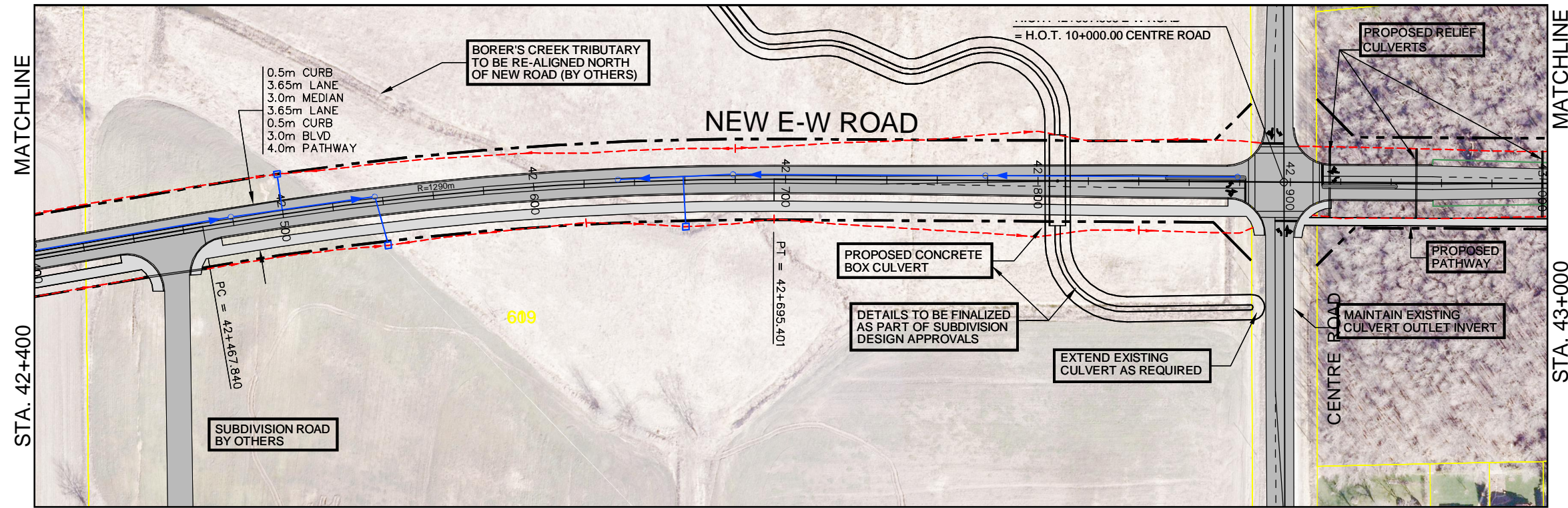


EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

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DESIGN BY: JOM
DRAWN BY: GCO/SHZ
SCALE: AS SHOWN
DATE: JUNE 17, 2009
PROJECT No. 08-9020

E-W ROAD-PLATE 4

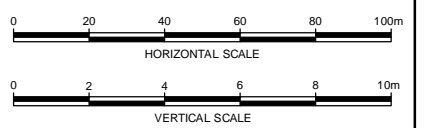
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 42+400 to STA. 43+000

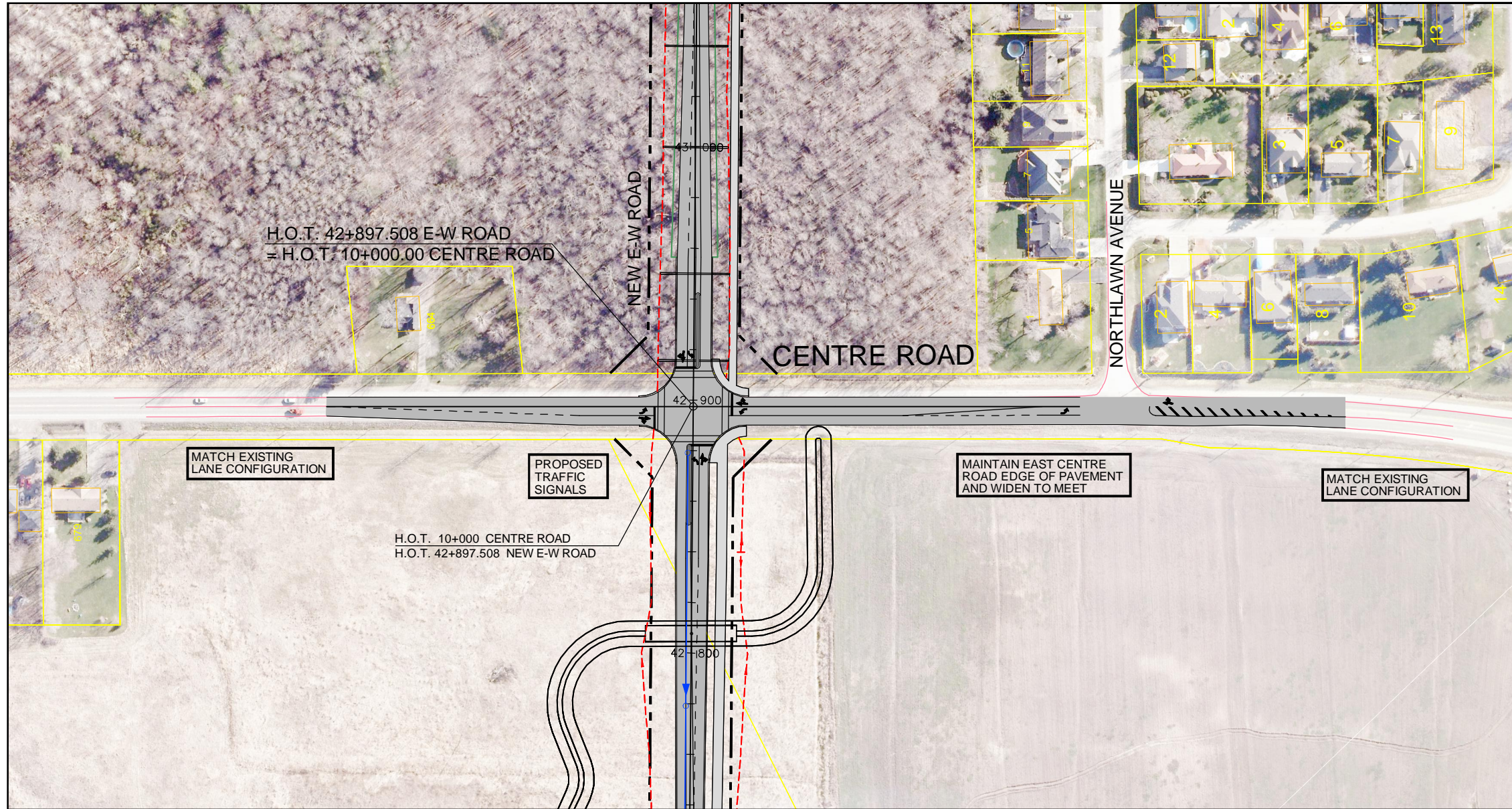


EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

CHECKED BY: JDM
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SCALE: AS SHOWN
DATE: JUNE 17, 2009
PROJECT No. 08-9020

E-W ROAD-PLATE 5

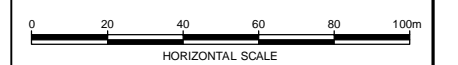
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

CENTRE ROAD

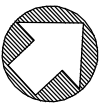
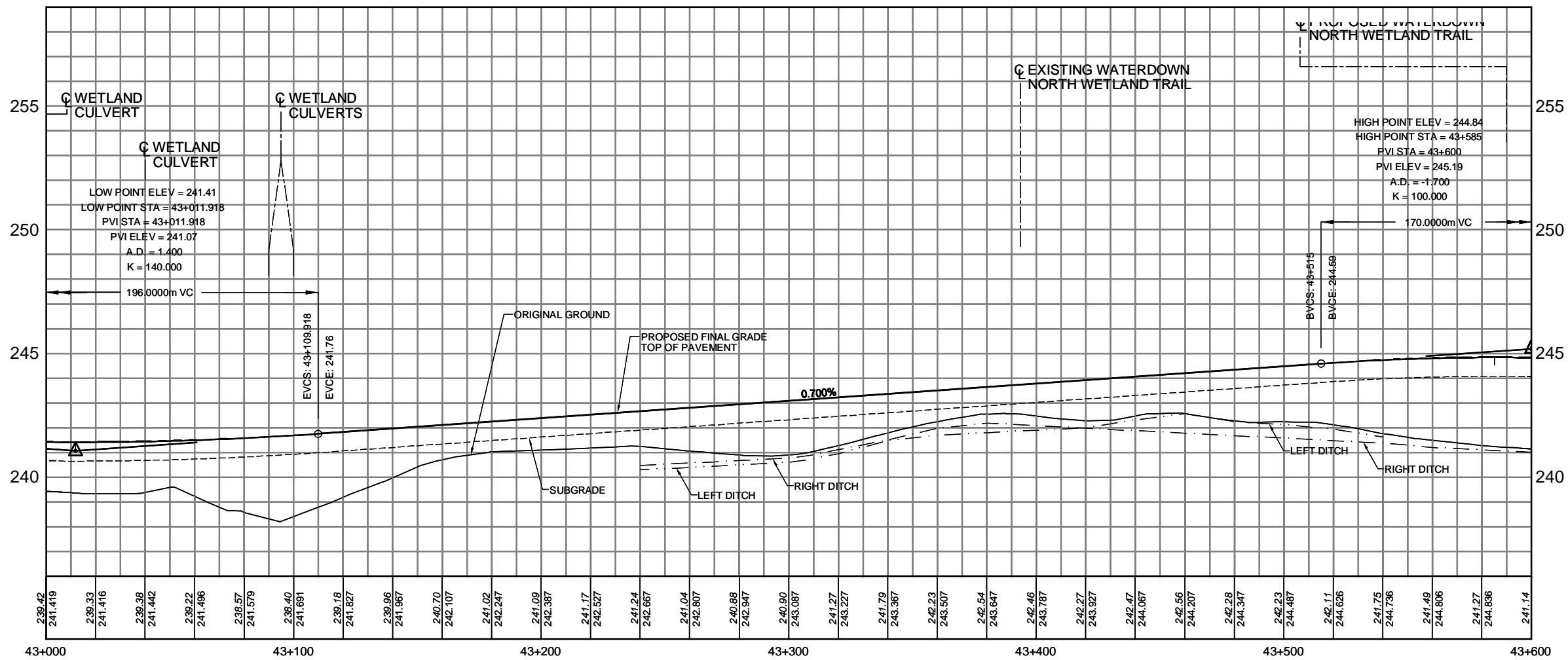
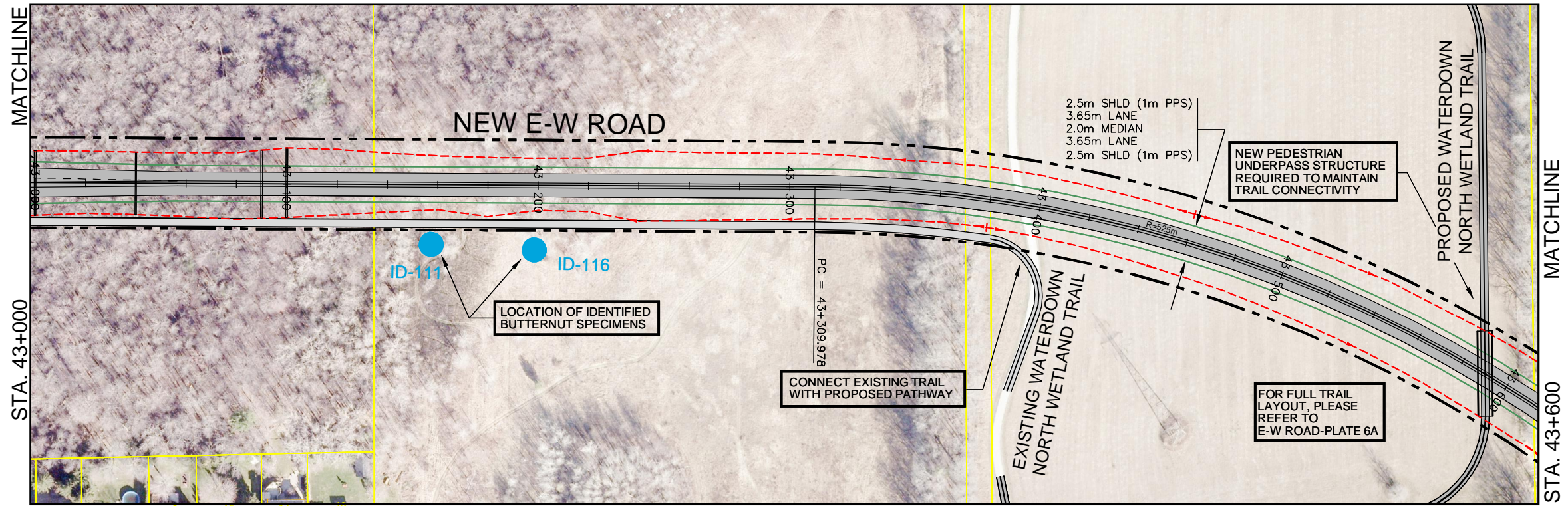


EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

CHECKED BY: JDM
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SCALE: AS SHOWN
DATE: AUGUST 19, 2009
PROJECT No. 08-9020

E-W ROAD-PLATE 5A

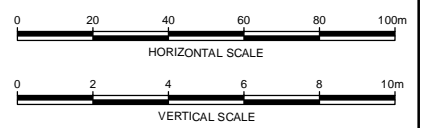
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 43+000 to STA. 43+600

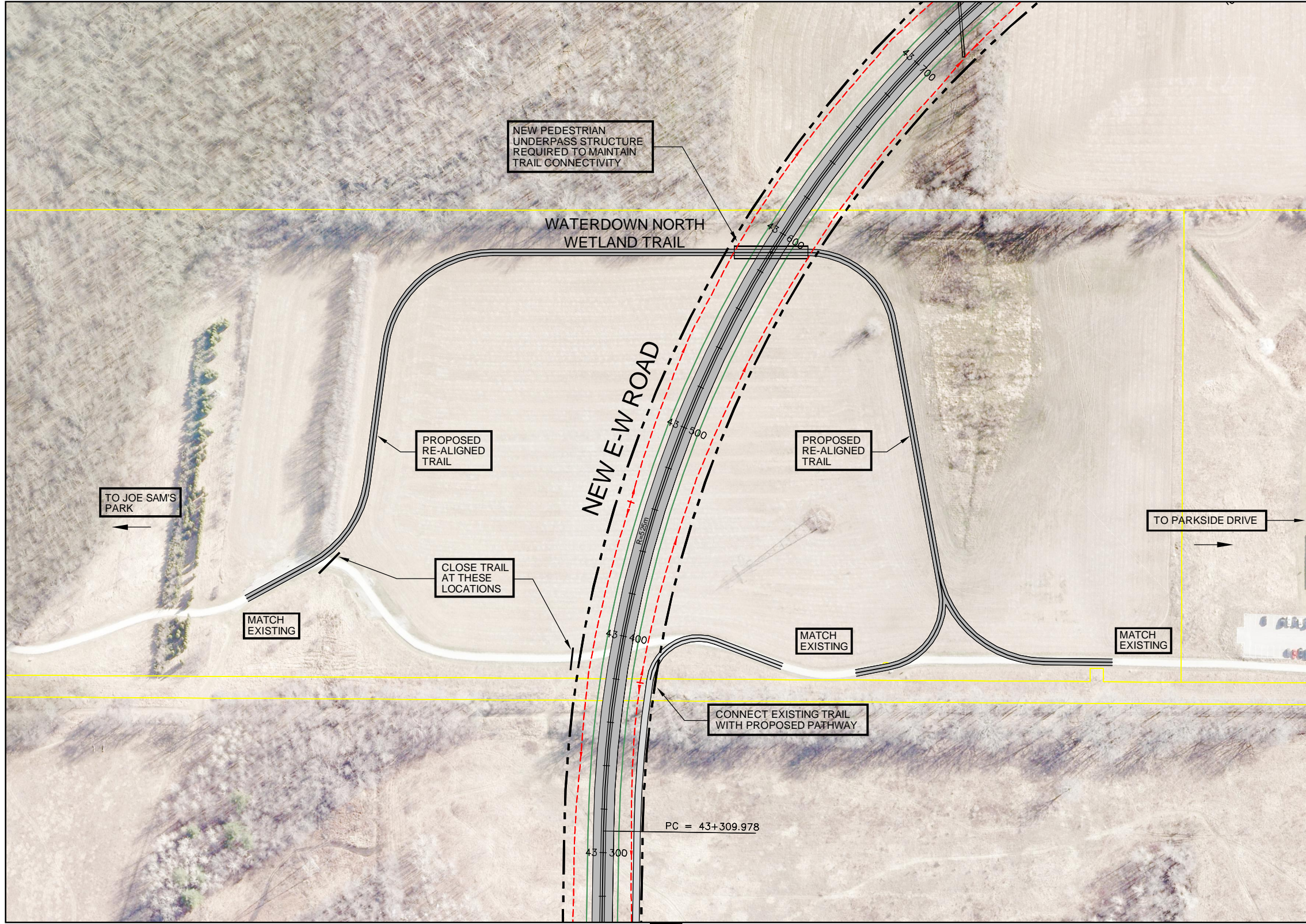


EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

CHECKED BY: JDM
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SCALE: AS SHOWN
DATE: JUNE 17, 2009
PROJECT No. 08-9020

E-W ROAD-PLATE 6

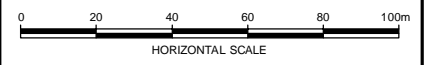
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
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- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

WATERDOWN NORTH WETLAND TRAIL



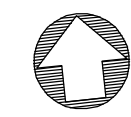
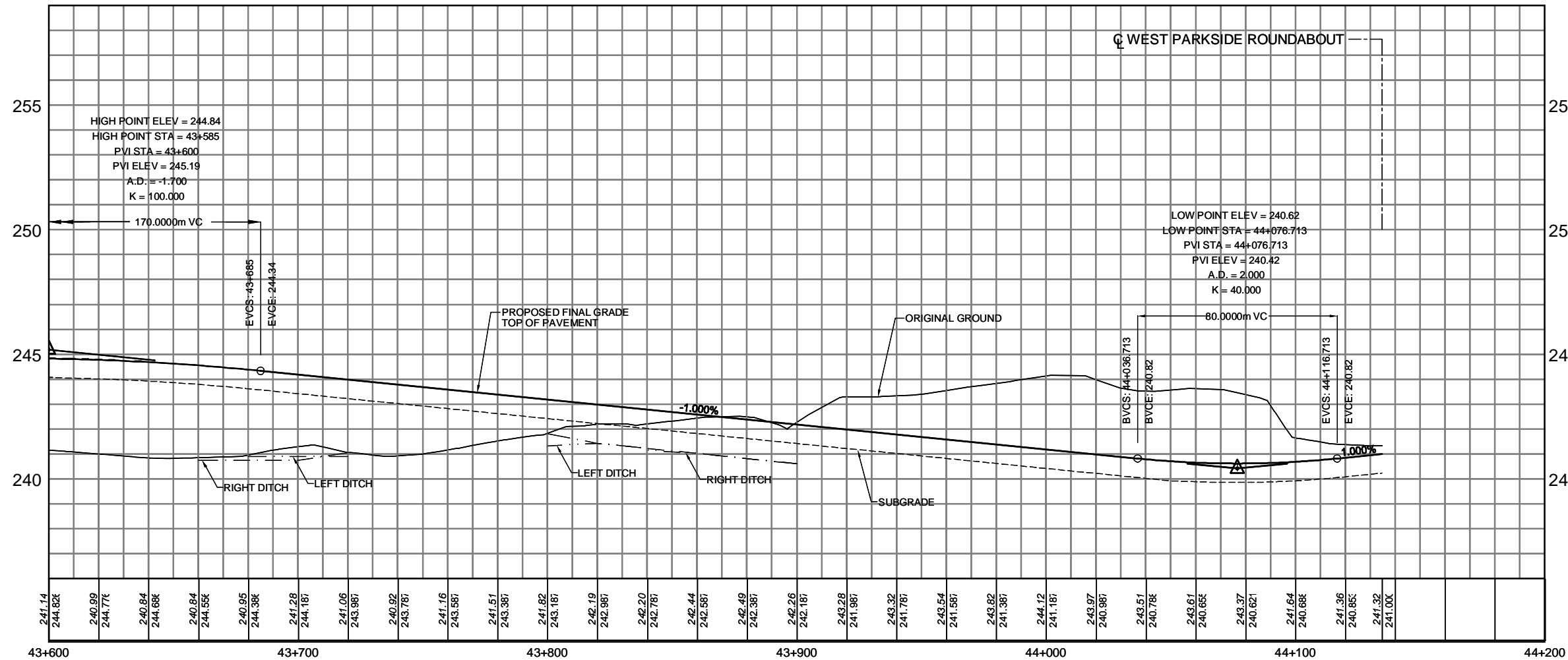
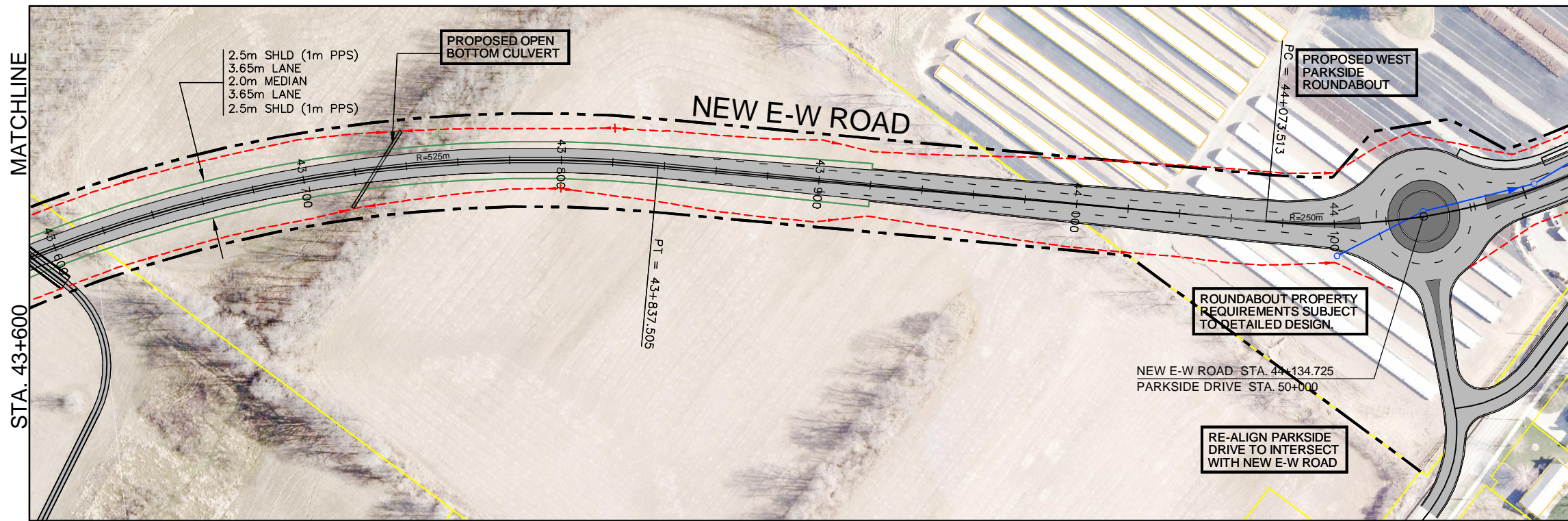
EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

CHECKED BY: JEM
 DESIGN BY: JEM
 DRAWN BY: GCC/SHZ
 SCALE: AS SHOWN
 DATE: AUGUST 18, 2009
 PROJECT No. 08-9020

E-W ROAD-PLATE 6A

PC = 43+309.978

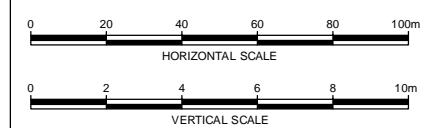
Plotted: Apr 06, 2010 - 5:05pm File: C:\QA\089020 Waterdown E-W Roads\LDD-Parkside\dwg\E-W Road Borer's Crossing\08-9020 Alignment Revisions (Waterdown E-W Road).dwg Layout: Final Plan Profile



LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 43+600 to STA. 44+134.724



CHECKED BY: JOM
DESIGN BY: JOM
DRAWN BY: GCS/SHZ
SCALE: AS SHOWN
DATE: JUNE 17, 2009
PROJECT No. 08-9020

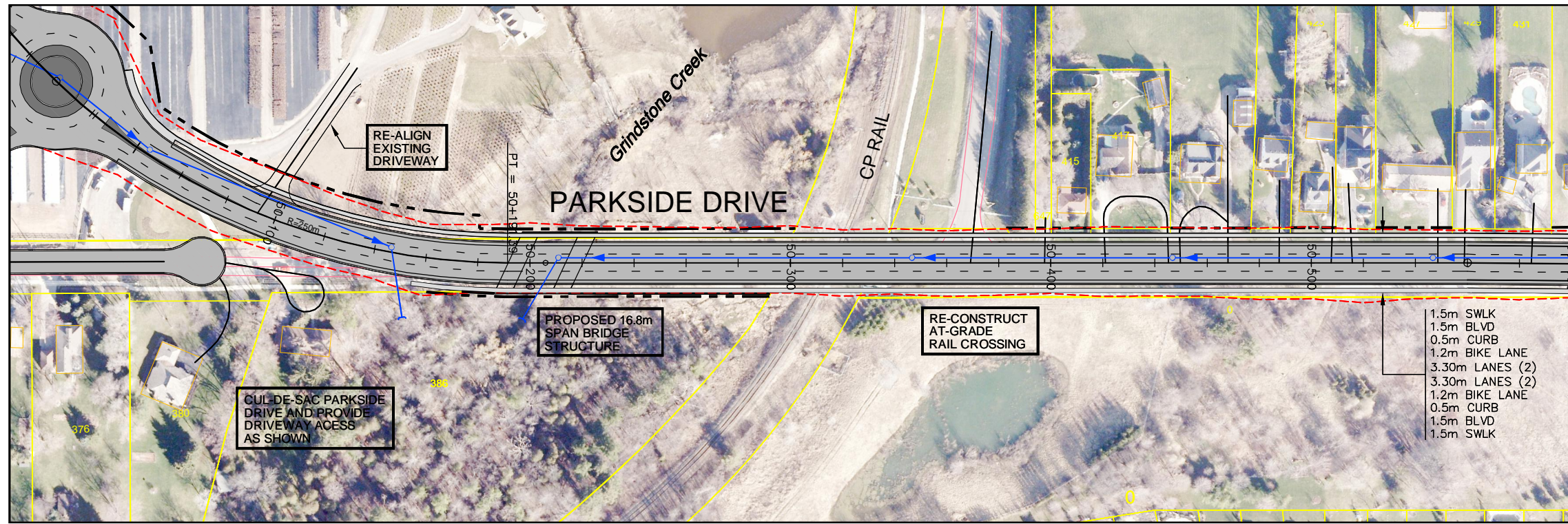
EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

E-W ROAD-PLATE 7

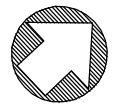
PARKSIDE DRIVE

PREFERRED DESIGN CONCEPT
PLANS AND PROFILES

Plotted: Apr 06, 2010 - 5:10pm File: C:\CAD\08020 Waterdown E-W Roads\08020 Waterdown E-W Road Borer's Crossing\08-9020 Alignment_Revisions (Waterdown E-W Road).dwg Layout: Final Plan Profile



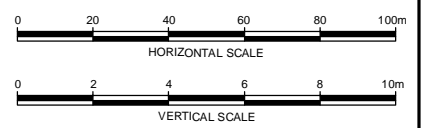
MATCHLINE
STA. 50+600



LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

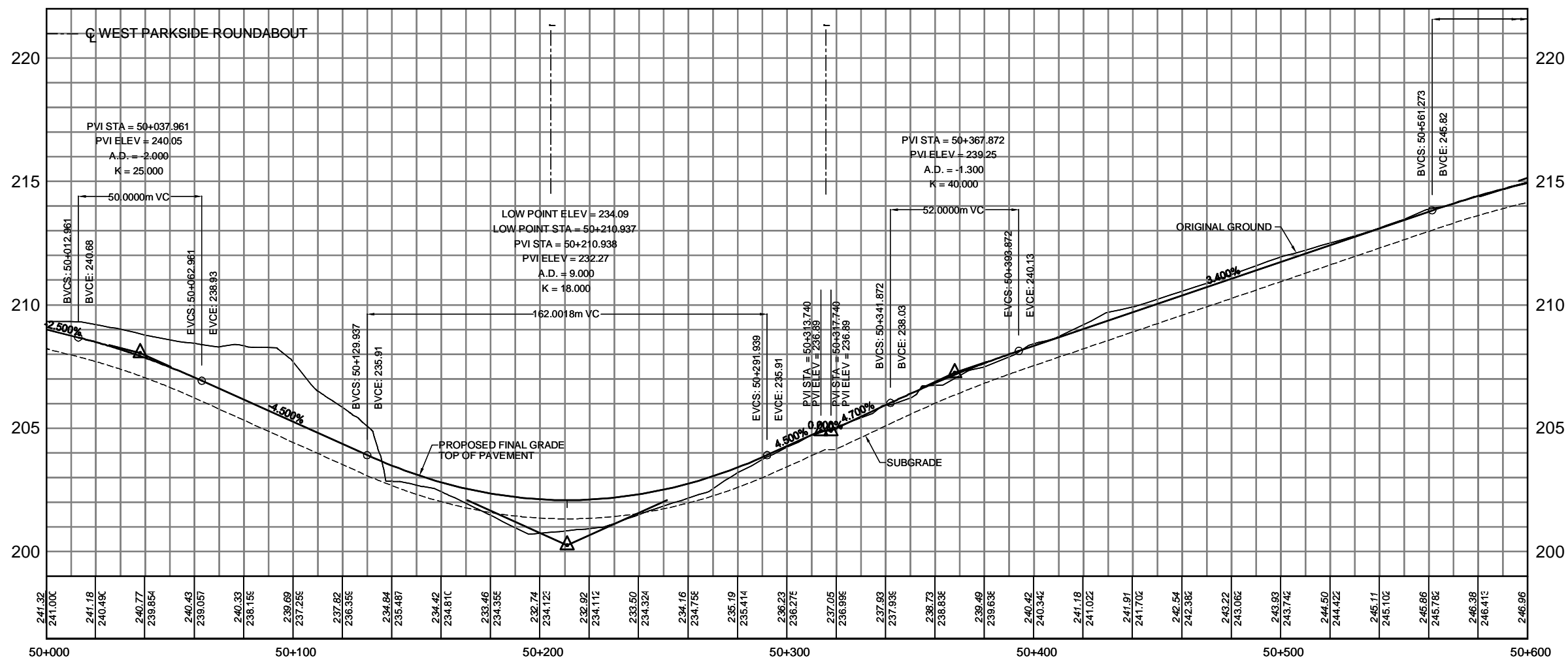
STA. 50+000 to STA. 50+600



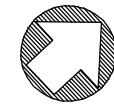
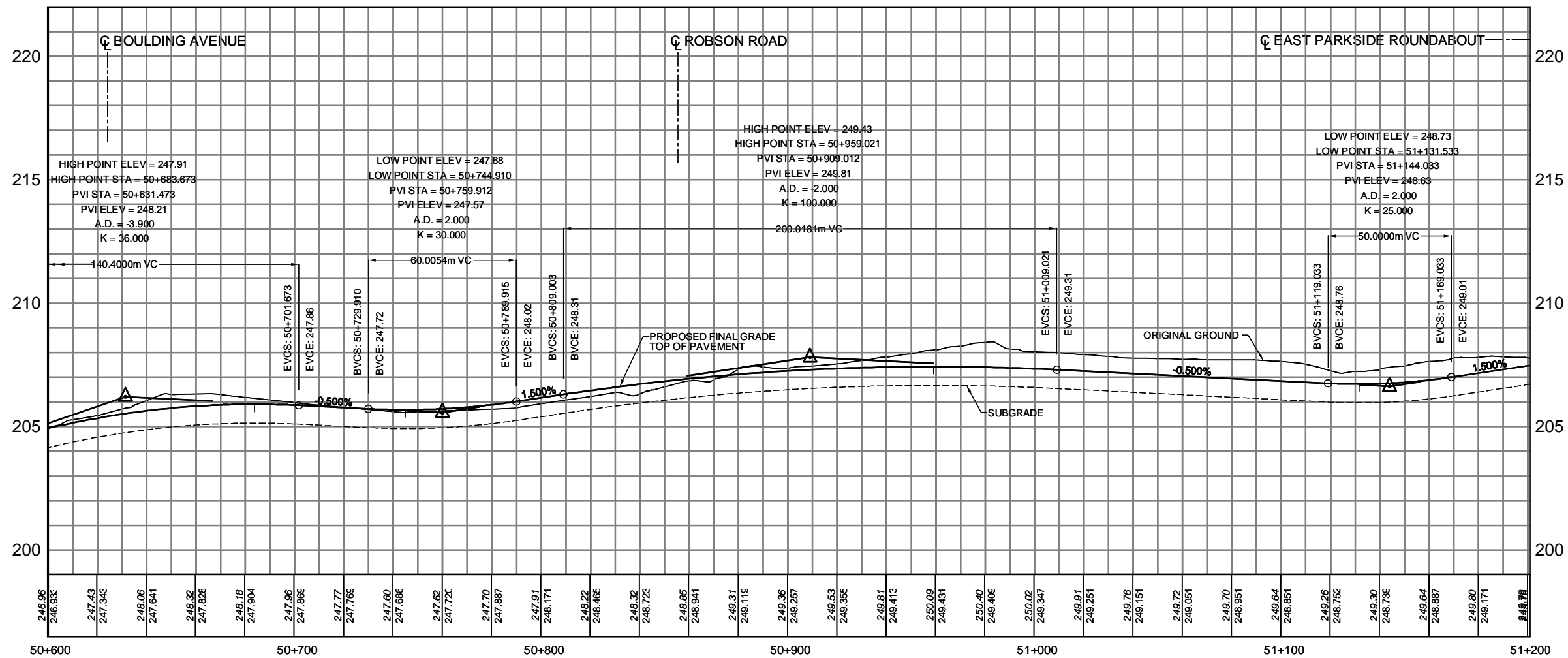
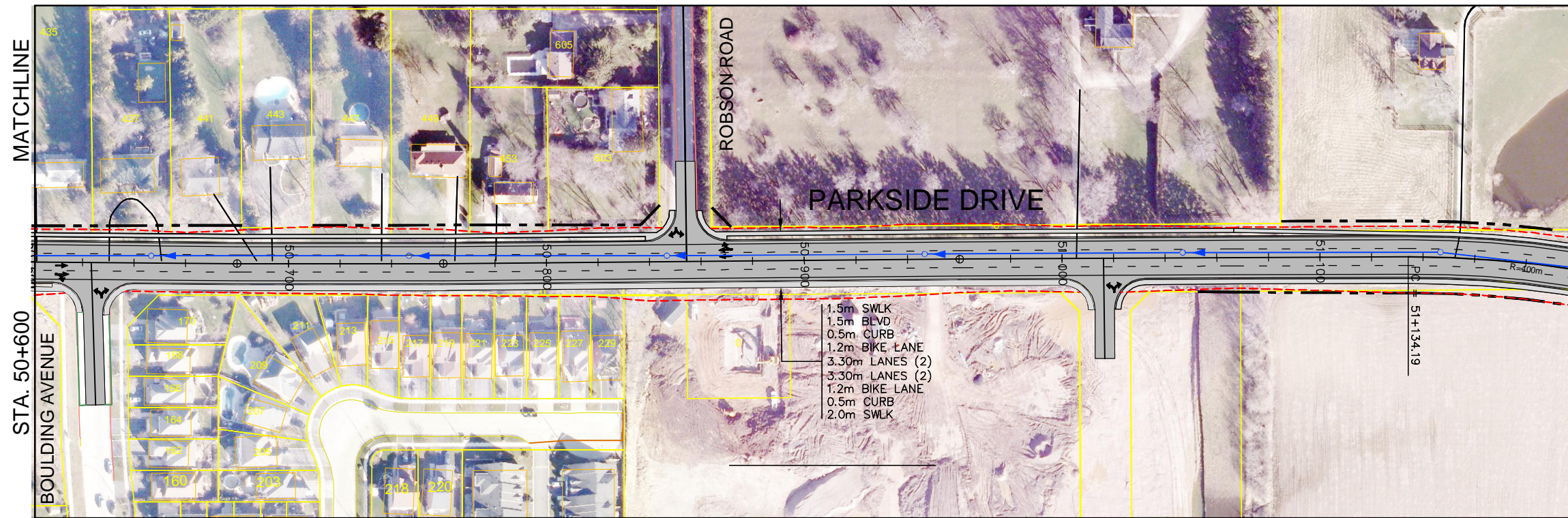
EAST-WEST ROAD CLASS ENVIRONMENTAL ASSESSMENT HIGHWAY 6 TO BRANT STREET

CHECKED BY: JDM
DESIGN BY: JOM
DRAWN BY: GQC
SCALE: AS SHOWN
DATE: APRIL 03, 2009
PROJECT No. 08-9020

PARKSIDE-PLATE 1



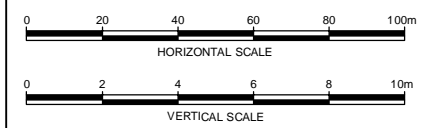
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 50+600 TO STA. 51+200.94



EAST-WEST ROAD CLASS ENVIRONMENTAL ASSESSMENT HIGHWAY 6 TO BRANT STREET

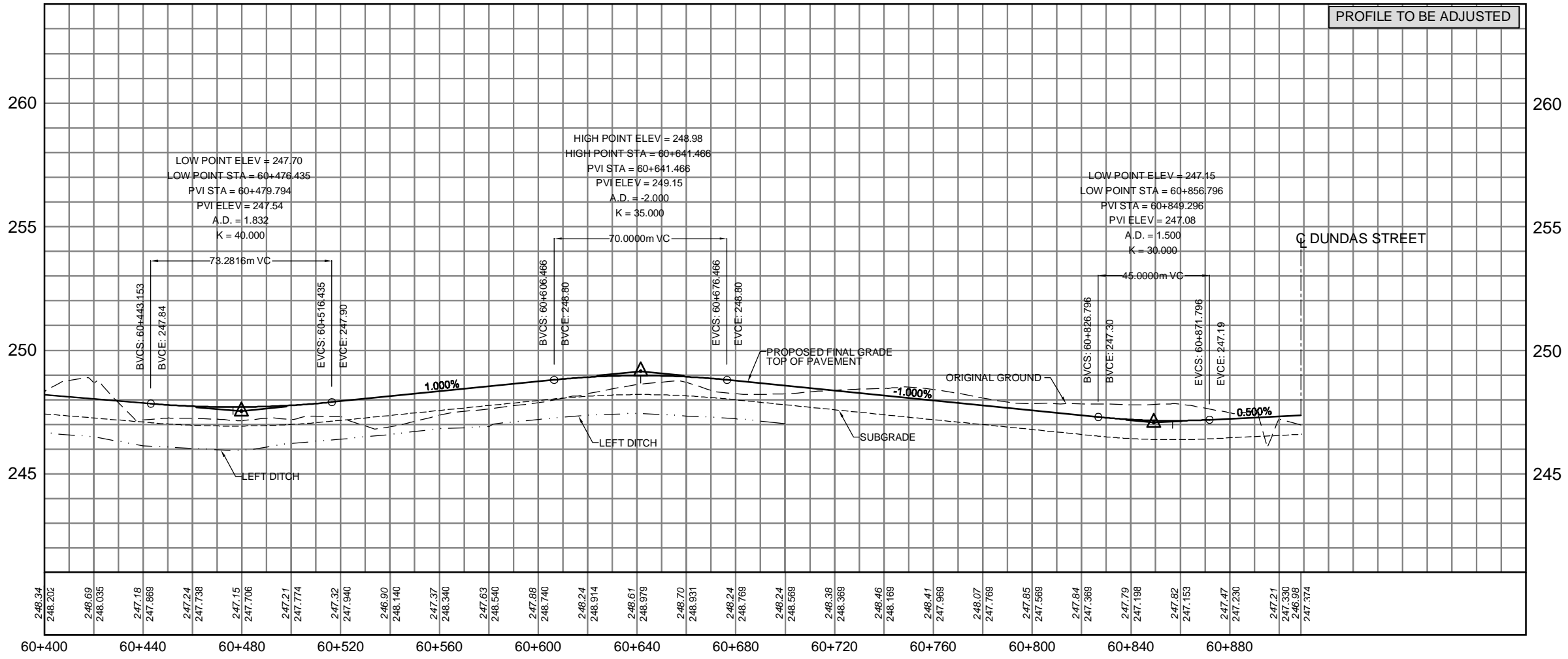
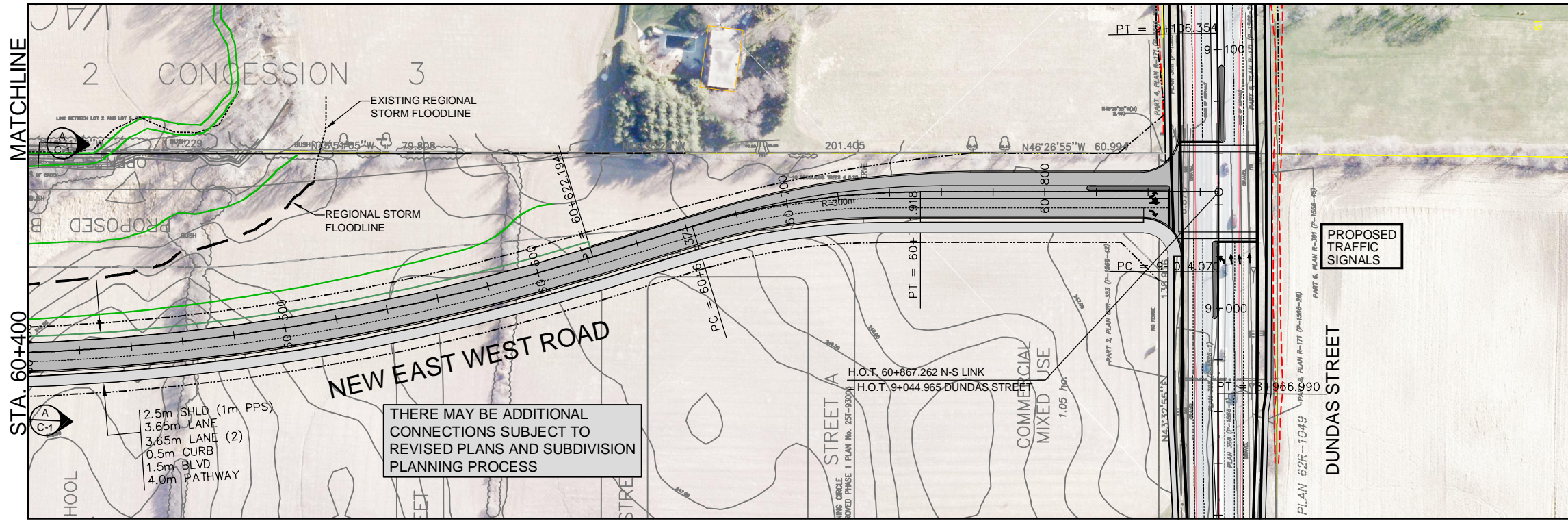
CHECKED BY: JDM
DESIGN BY: JDM
DRAWN BY: GCC
SCALE: AS SHOWN
DATE: APRIL 03, 2009
PROJECT No. 08-9020

PARKSIDE-PLATE 2

UPCOUNTRY LINK

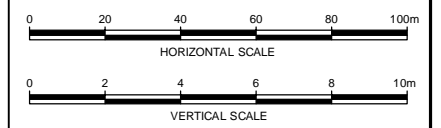
PREFERRED DESIGN CONCEPT
PLANS AND PROFILES

Plotted: Feb 24, 2012, 10:22am File: G:\CAD\089020 Waterdown E-W Roads\LD0-Forkside\dwg\Upcountry-Road_Realign\Improvement_Plans\08-9020_Alignment_Revisions (Waterdown E-W Road)\P&P.dwg Layout: Final Plan Profile



LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY



PREFERRED DESIGN CONCEPT

STA. 60+400 TO STA. 60+867.262

DILLON CONSULTING
CHECKED BY: JDM
DESIGN BY: JDM
DRAWN BY: GGC, IT
SCALE: AS SHOWN
DATE: FEBRUARY 24, 2012
PROJECT No. 08-9020

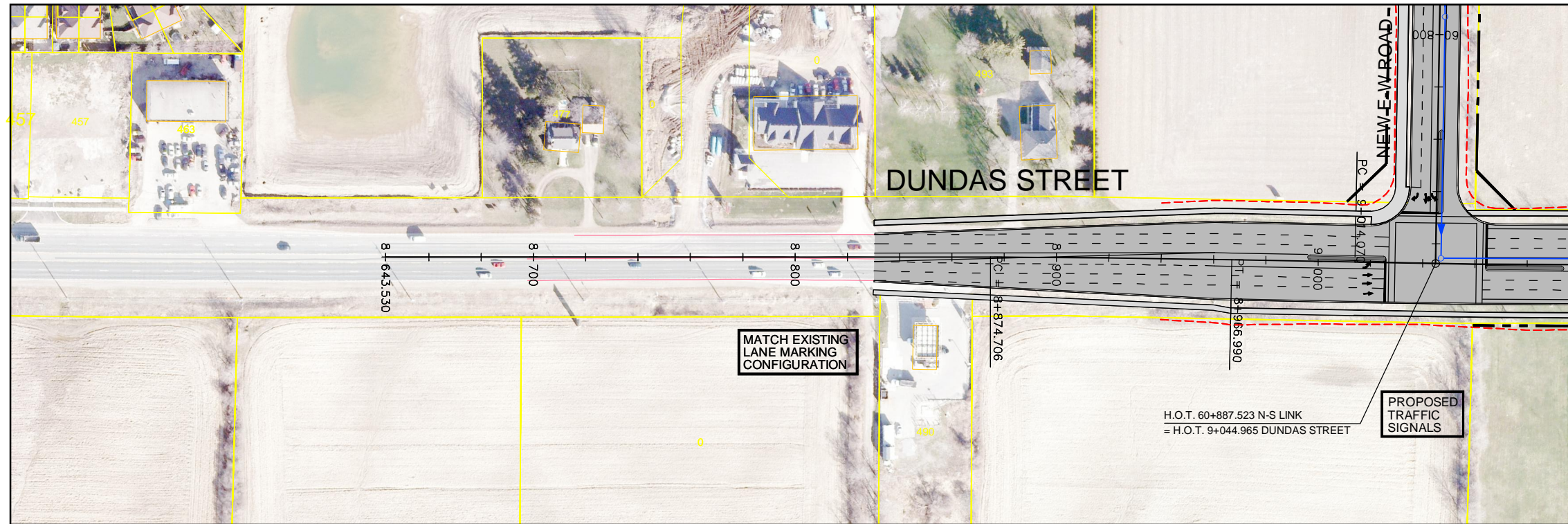
NEW EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

UPCOUNTRY-PLATE 2

DUNDAS STREET

PREFERRED DESIGN CONCEPT
PLANS AND PROFILES

Plotted: Apr 06, 2010 - 6:45pm File: G:\CAD\089020 Waterdown E-W Roads\LD0-Porkside\dwg\E-W Road Borer's Crossing\08-9020 Alignment Revisions (Waterdown E-W Road)\dwg Layout: Final Plan Profile



MATCHLINE

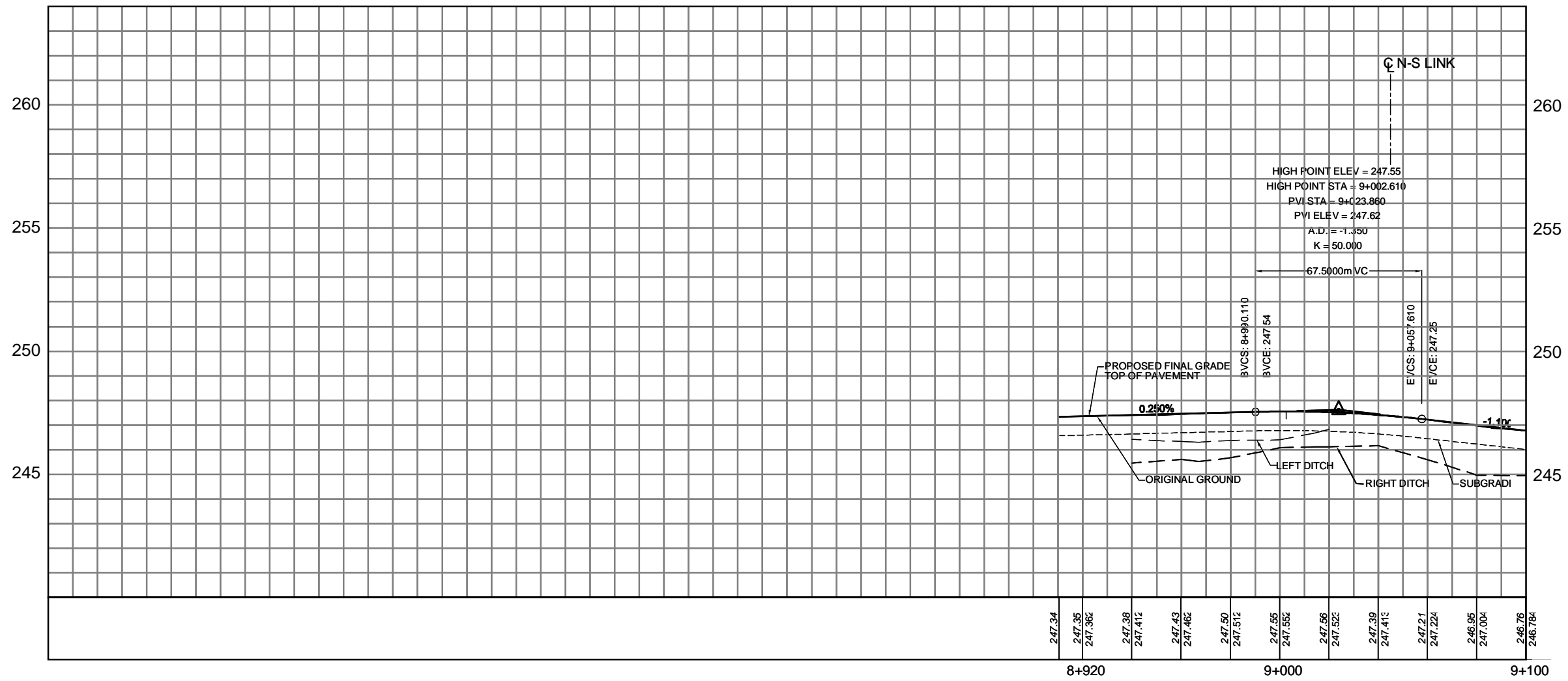
STA. 9+100

DUNDAS STREET

MATCH EXISTING LANE MARKING CONFIGURATION

PROPOSED TRAFFIC SIGNALS

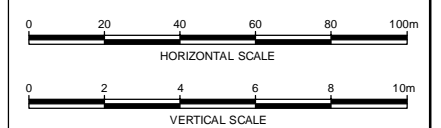
H.O.T. 60+887.523 N-S LINK
= H.O.T. 9+044.965 DUNDAS STREET



LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 8+643.53 TO STA. 9+100



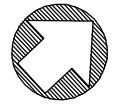
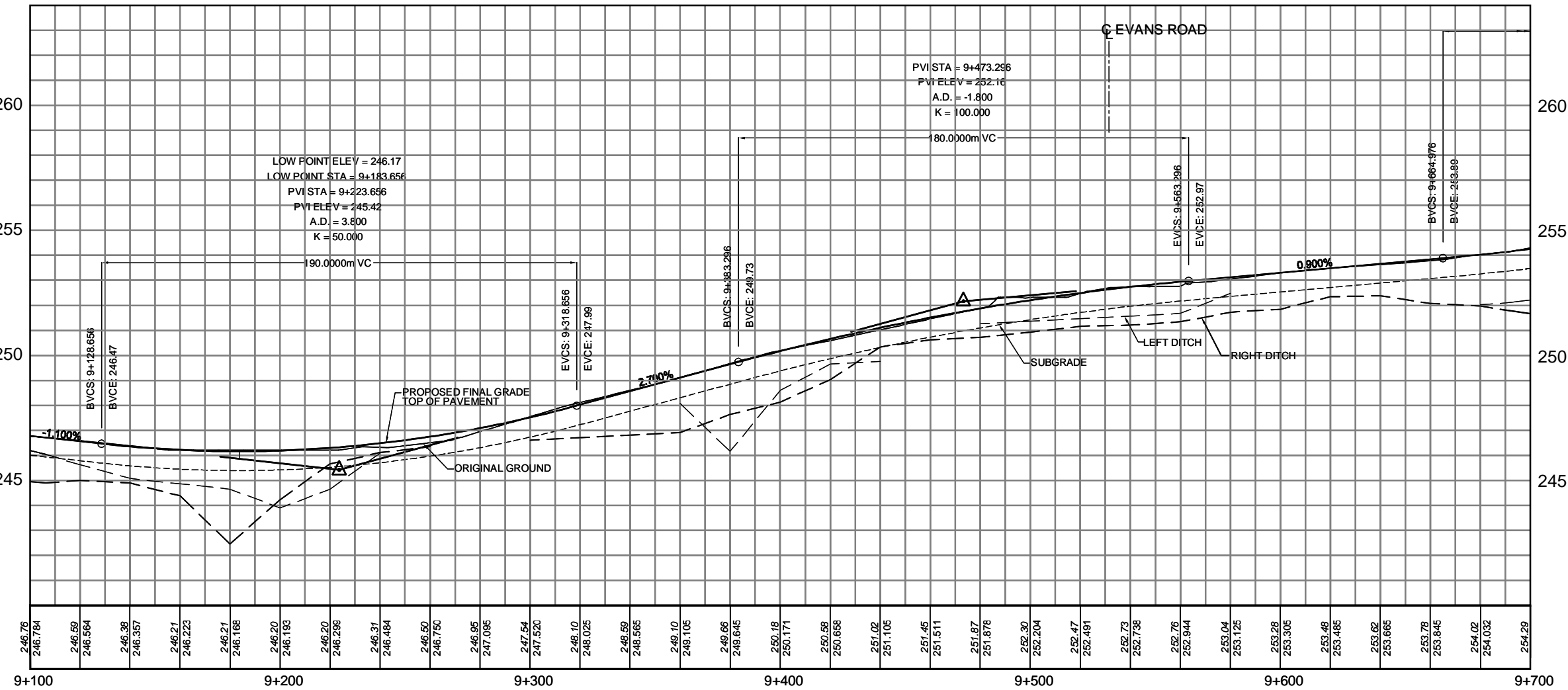
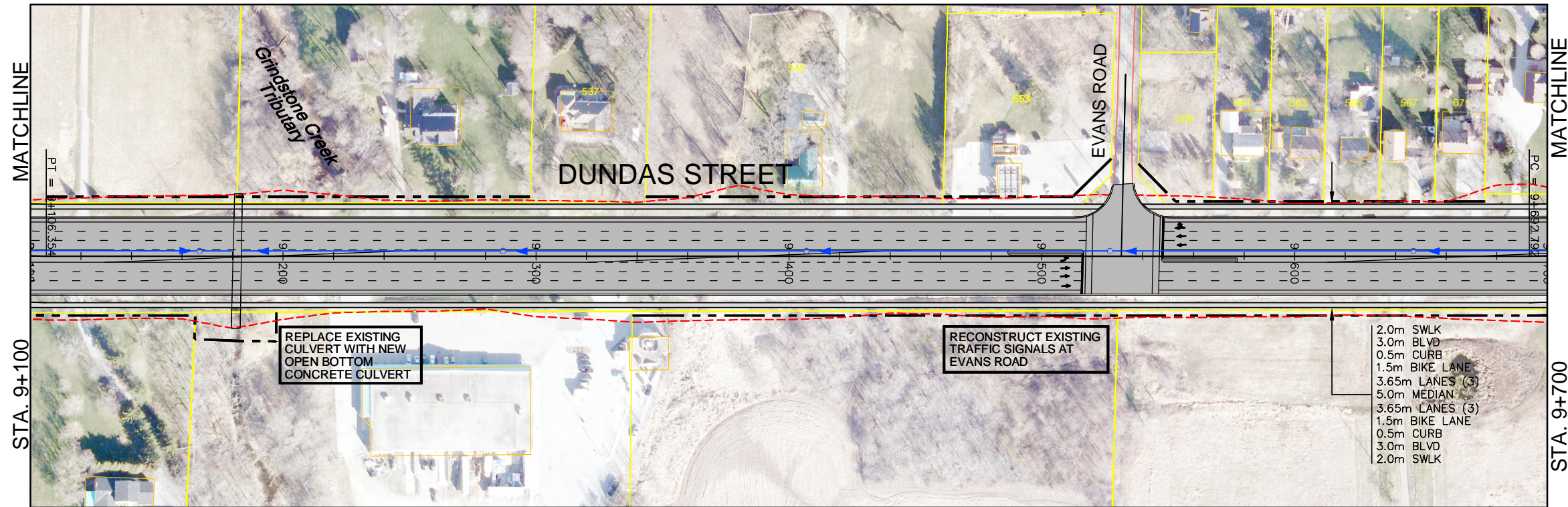
CHECKED BY: JOM
DESIGN BY: JOM
DRAIN BY: JCC
SCALE: AS SHOWN
DATE: APRIL 03, 2009
PROJECT No. 08-9020

EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

DUNDAS-PLATE 1

247.34	247.35	247.362	247.38	247.412	247.43	247.462	247.50	247.512	247.55	247.552	247.56	247.562	247.39	247.412	247.21	247.224	246.95	247.004	246.76	246.764
					8+920					9+000					9+100					

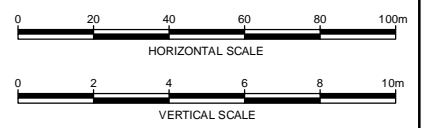
Plotted: Apr 06, 2010 - 5:54pm File: G:\CAD\089020 Waterdown E-W Roads\LD-Parkside\dwg\E-W Road Bover's Crossing\08-9020 Alignment Revisions (Waterdown E-W Road).dwg Layout: Final Plan Profile



LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 9+100 to STA. 9+700

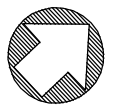
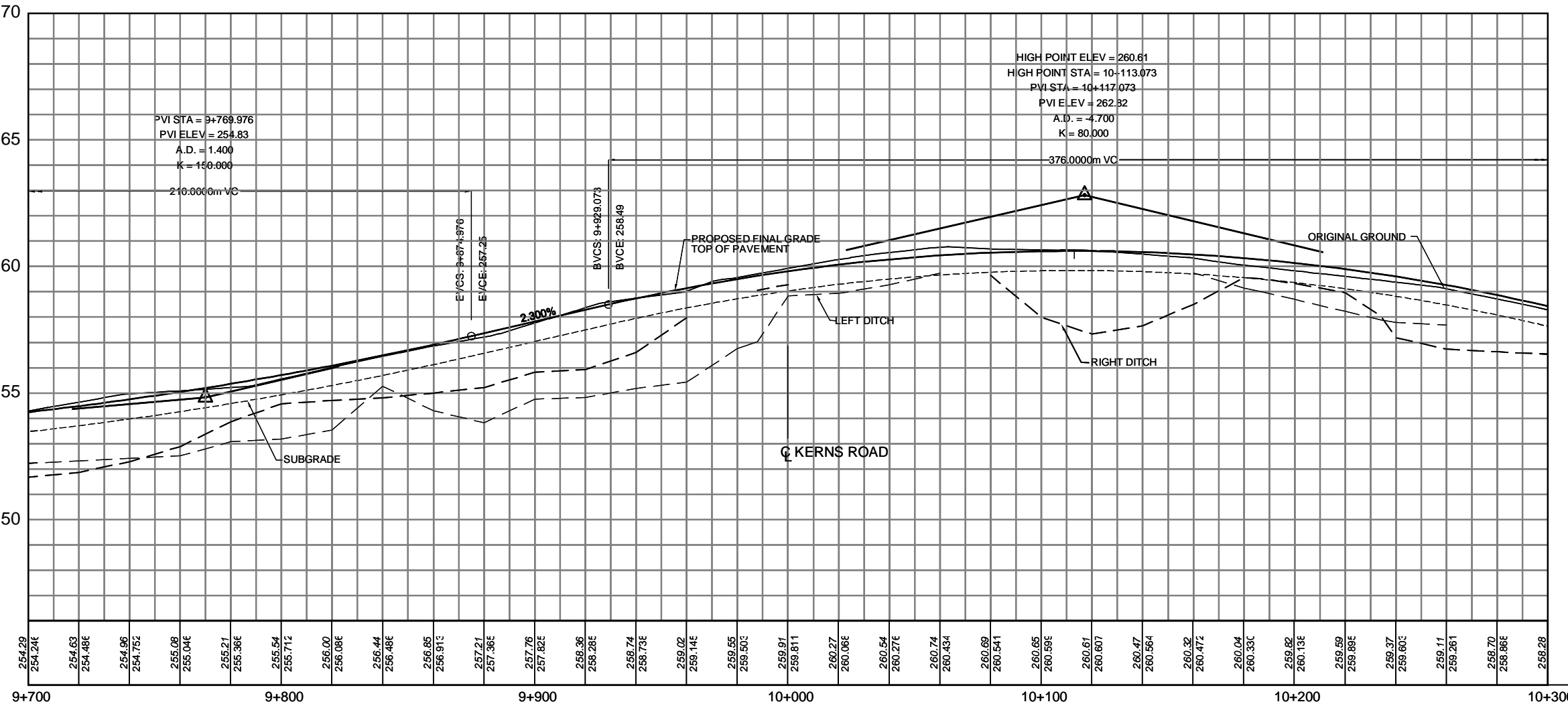
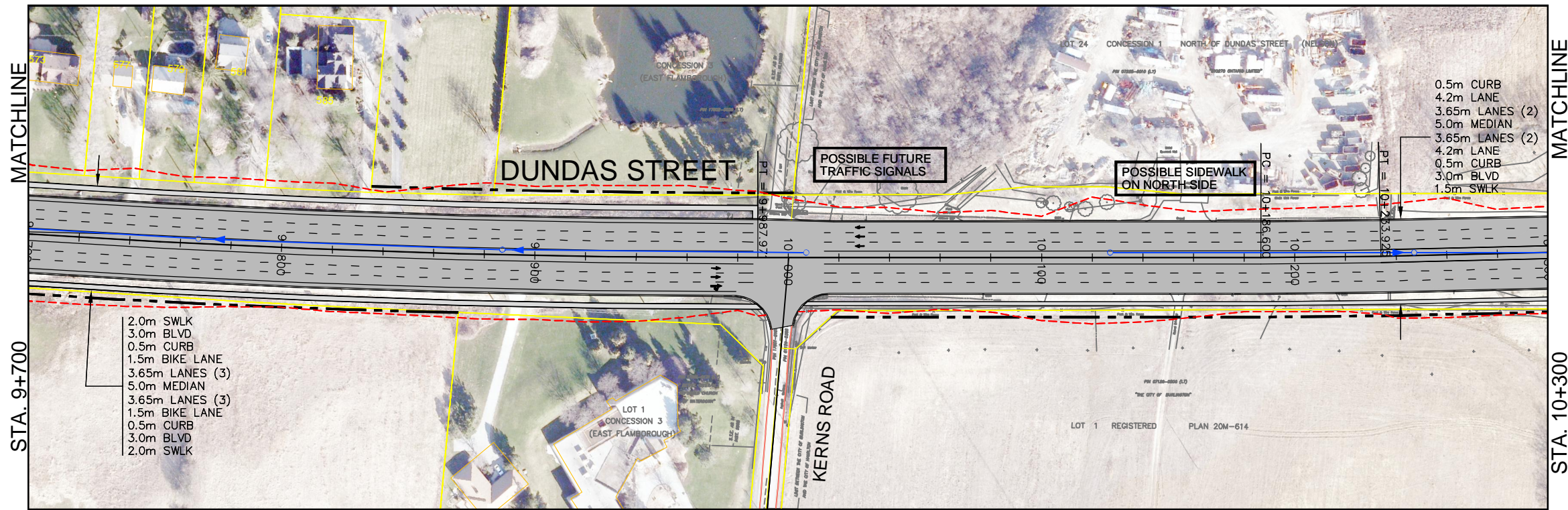


EAST-WEST ROAD CLASS ENVIRONMENTAL ASSESSMENT HIGHWAY 6 TO BRANT STREET

CHECKED BY: JGM
 DESIGN BY: JGM
 DRAWN BY: GOC
 SCALE: AS SHOWN
 DATE: APRIL 03, 2009
 PROJECT No. 08-9020

DUNDAS-PLATE 2

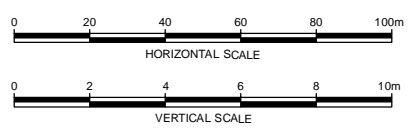
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

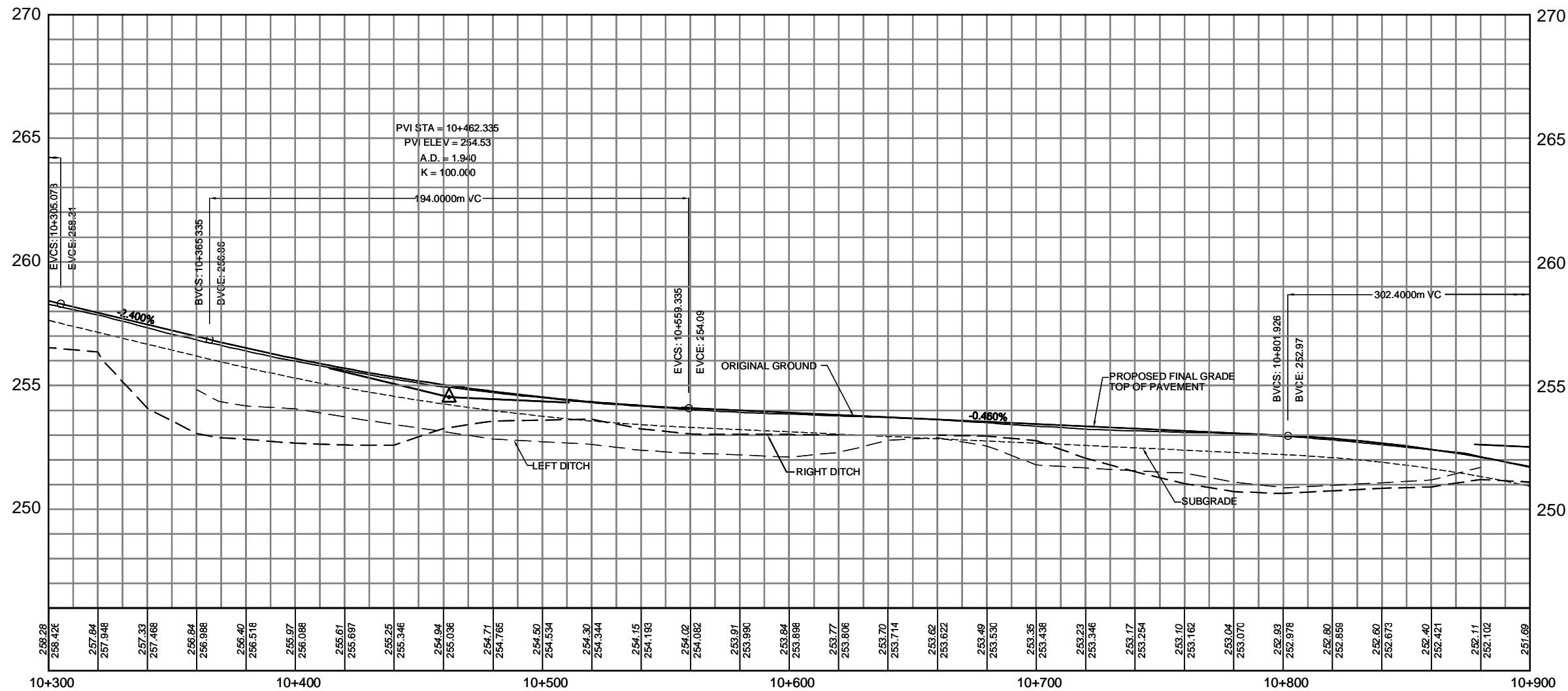
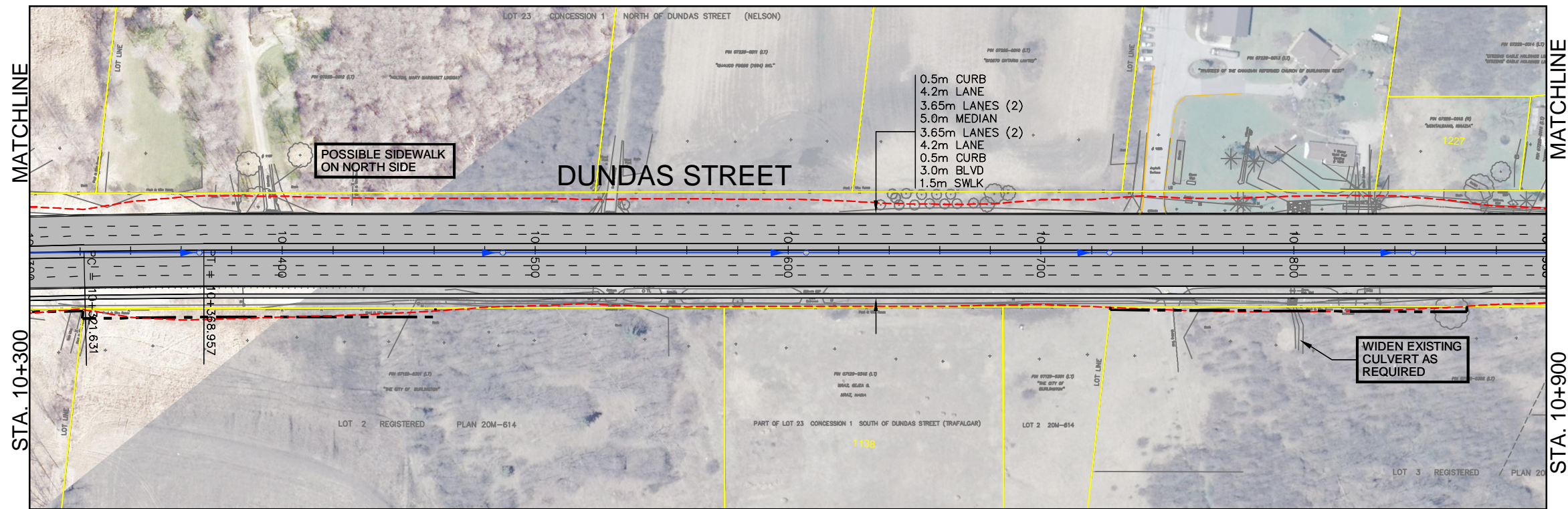
PRELIMINARY



PREFERRED DESIGN CONCEPT
STA. 9+700 to STA. 10+300

<p style="font-size: 8px;"> CHECKED BY: JDM DESIGN BY: JDM DRAWN BY: GCC SCALE: AS SHOWN DATE: APRIL 03, 2009 PROJECT No. 08-9020 </p>	<p style="font-size: 10px;">EAST-WEST ROAD CLASS ENVIRONMENTAL ASSESSMENT HIGHWAY 6 TO BRANT STREET</p> <p style="font-size: 12px; font-weight: bold;">DUNDAS-PLATE 3</p>
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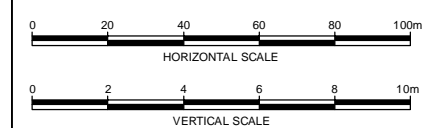
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 10+300 to STA. 10+900

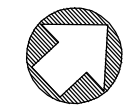
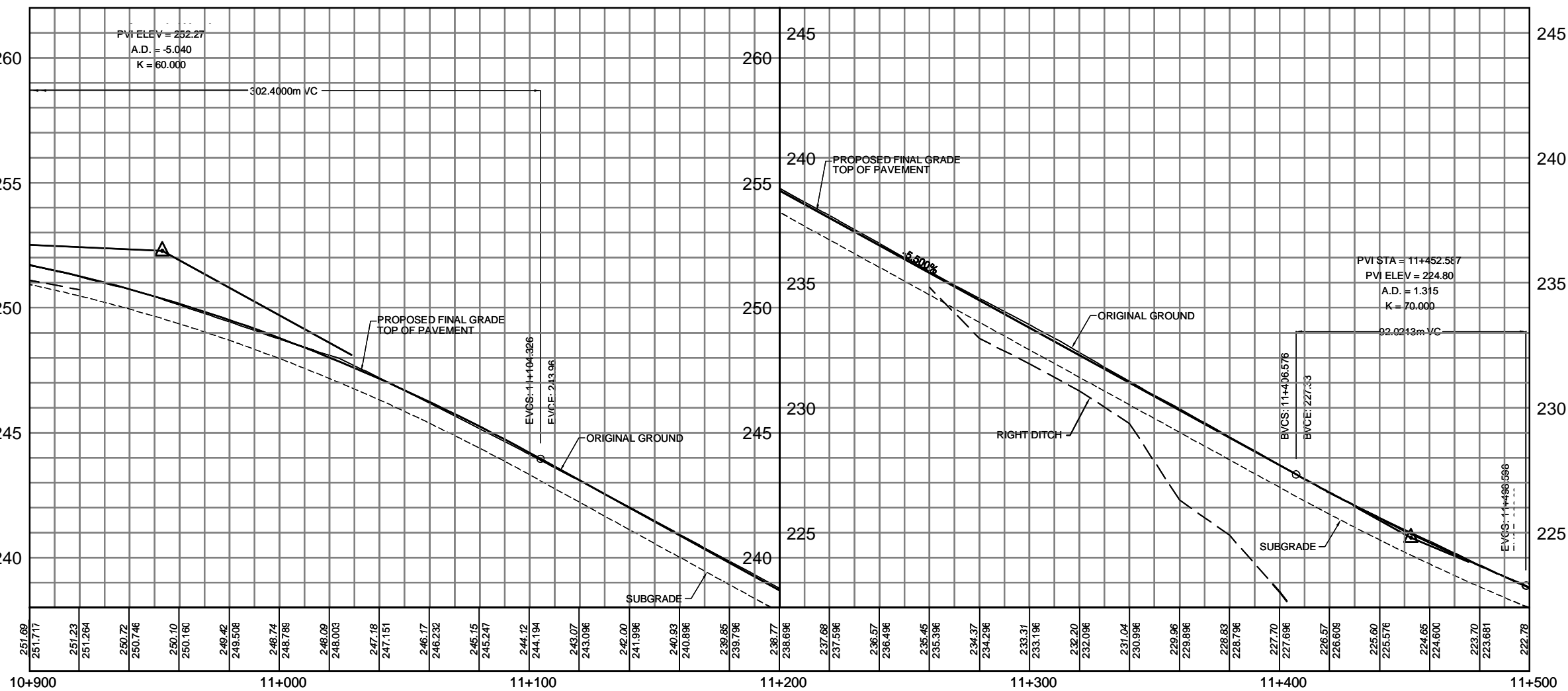
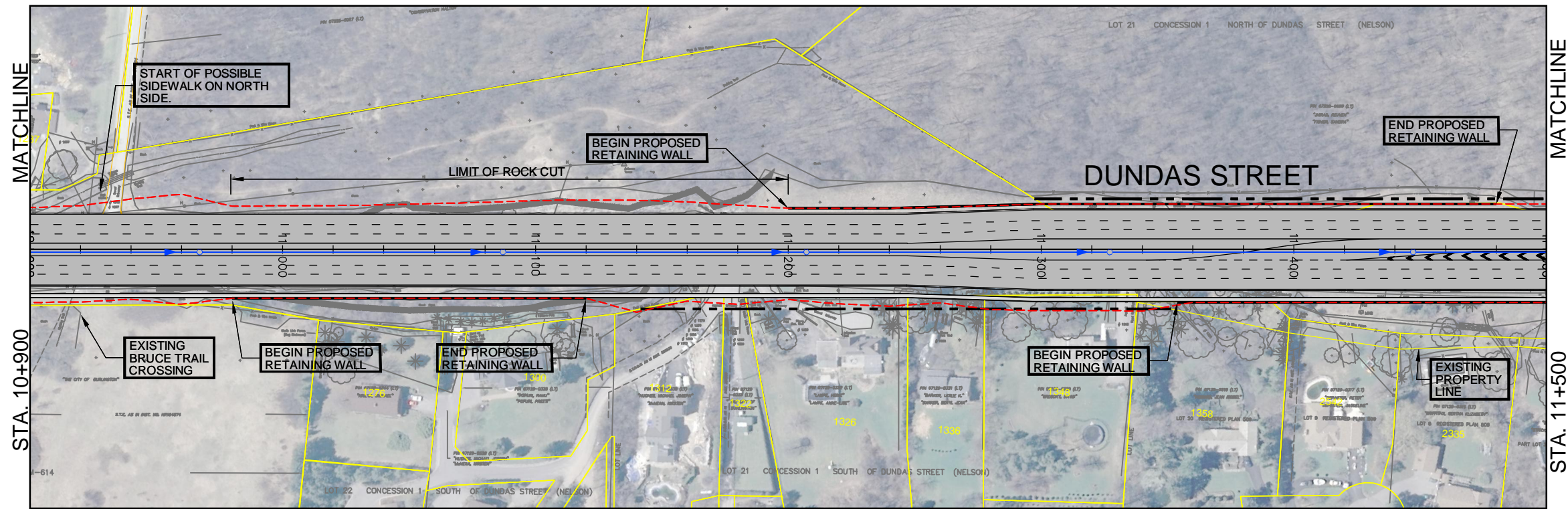


CHECKED BY: JDM
DESIGN BY: JDM
DRAWN BY: GSC
SCALE: AS SHOWN
DATE: APRIL 03, 2009
PROJECT No. 08-9020

EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

DUNDAS-PLATE 4

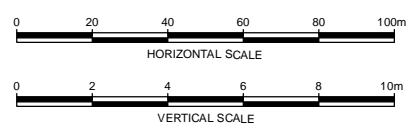
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

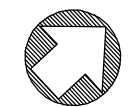
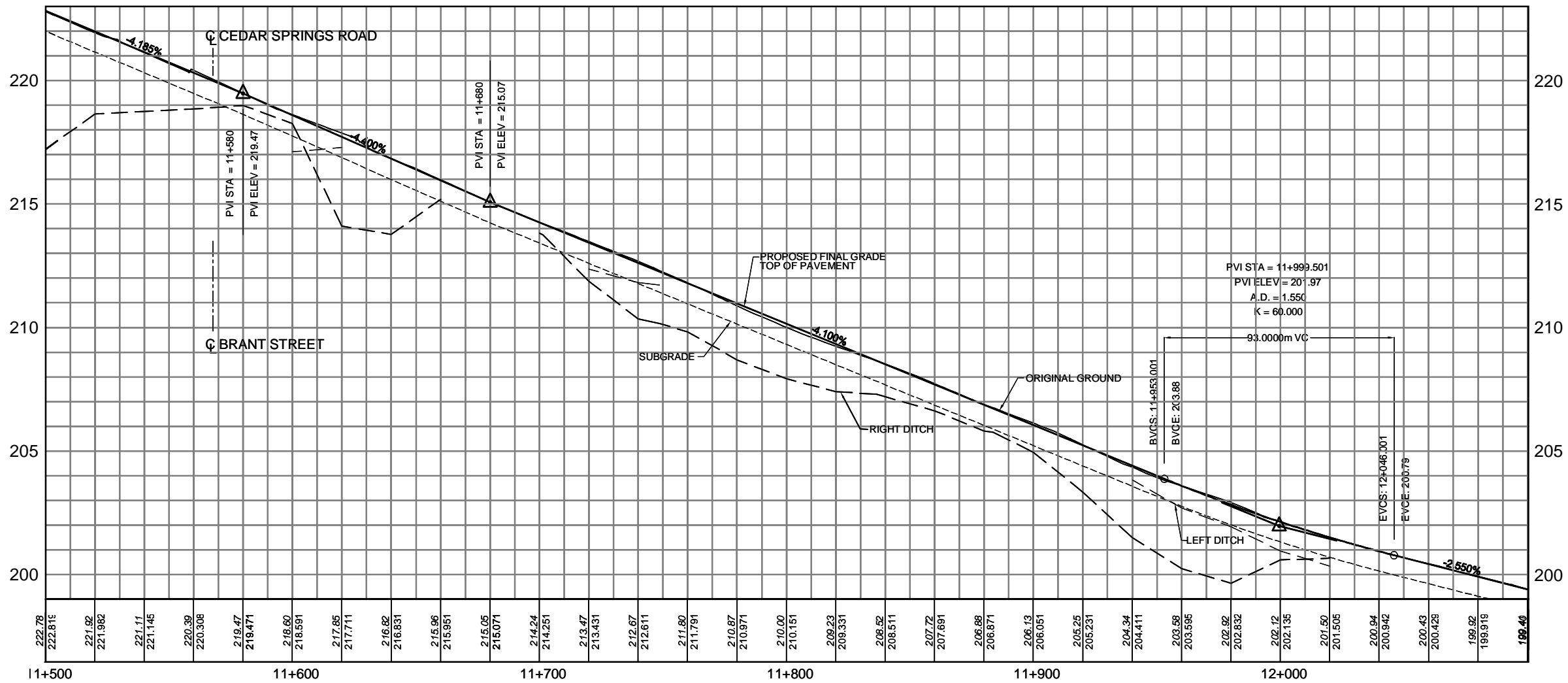
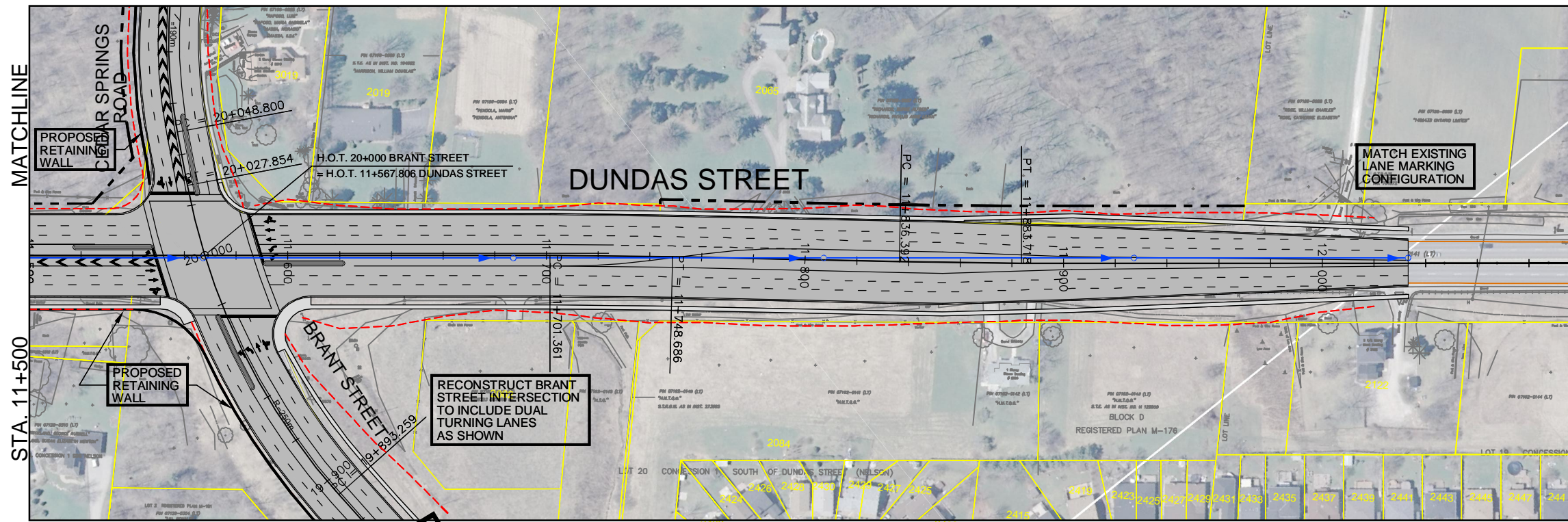
PRELIMINARY



PREFERRED DESIGN CONCEPT
STA. 10+900 to STA. 11+500

	EAST-WEST ROAD CLASS ENVIRONMENTAL ASSESSMENT HIGHWAY 6 TO BRANT STREET
CHECKED BY: JDM DESIGN BY: JDM DRAWN BY: GQC SCALE: AS SHOWN DATE: APRIL 03, 2009 PROJECT No. 08-9020	DUNDAS-PLATE 5

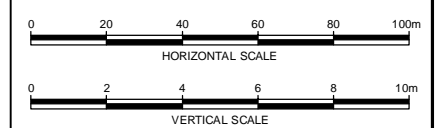
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- 750 Ø PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 11+500 to STA. 12+100



CHECKED BY: JOM
 DESIGN BY: JOM
 DRAWN BY: GSC
 SCALE: AS SHOWN
 DATE: APRIL 03, 2009
 PROJECT No. 08-9020

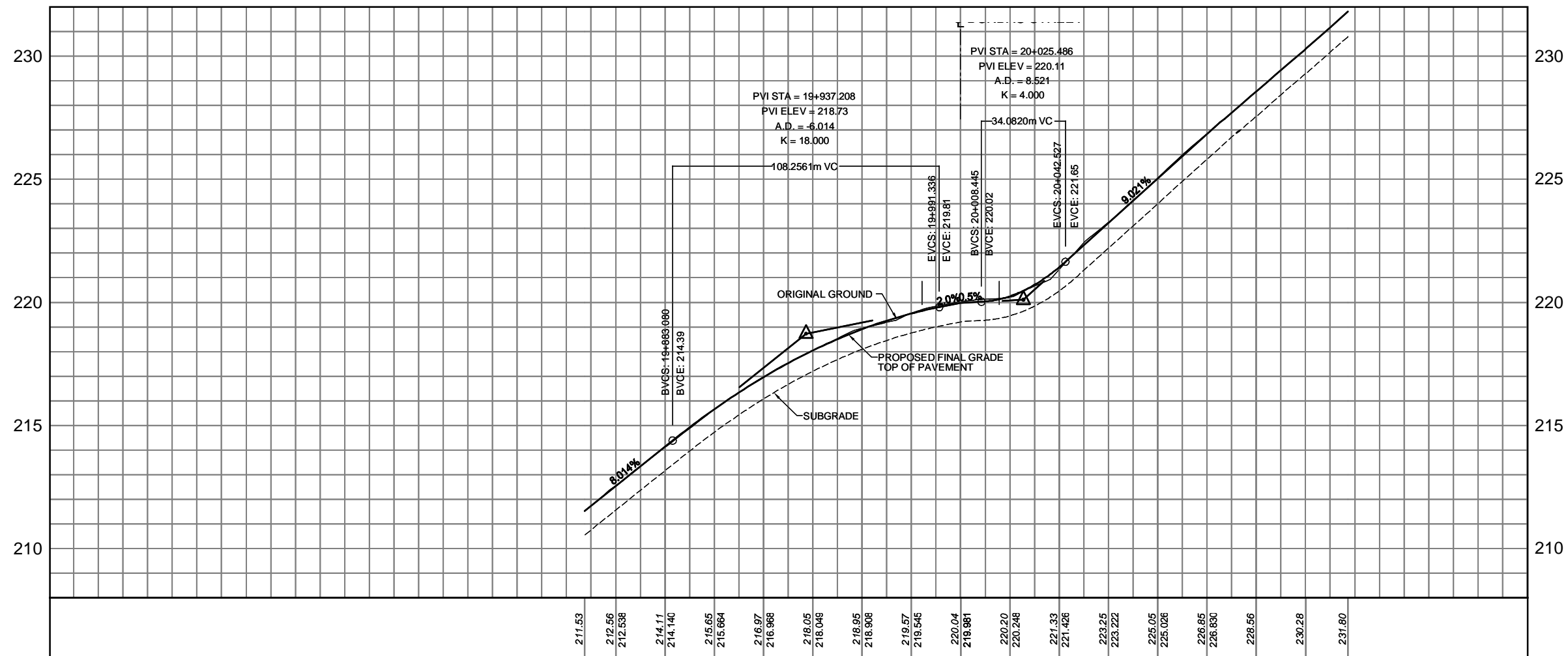
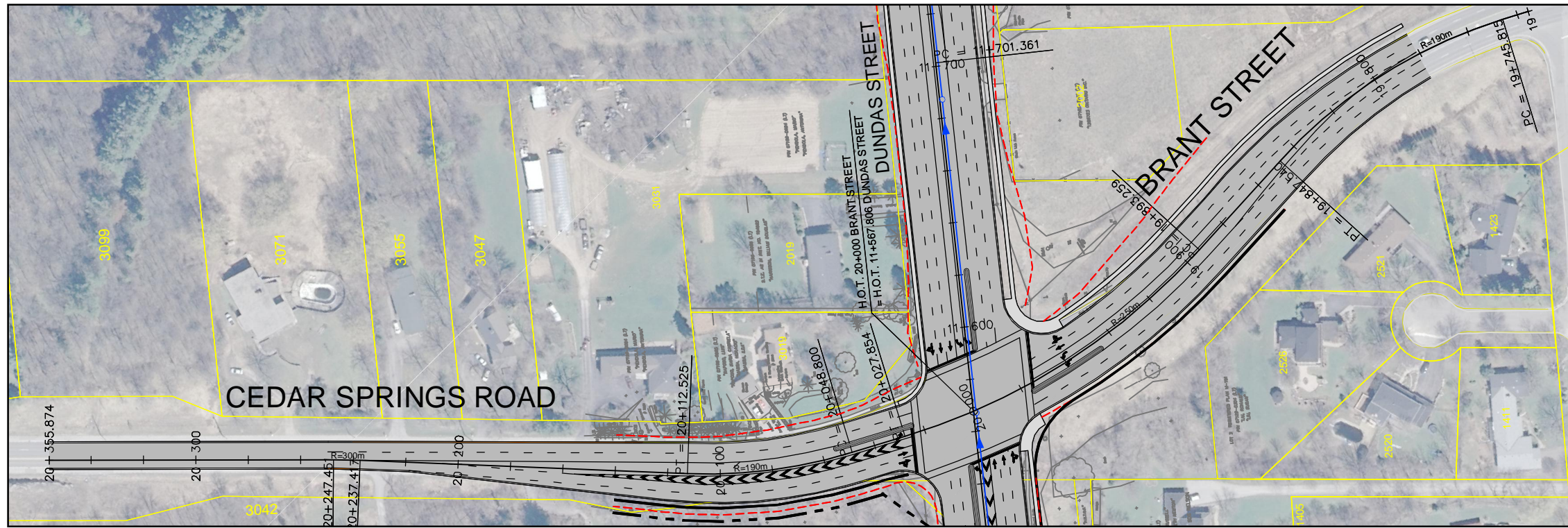
EAST-WEST ROAD
 CLASS ENVIRONMENTAL ASSESSMENT
 HIGHWAY 6 TO BRANT STREET

DUNDAS-PLATE 6

BRANT STREET/ CEDAR SPRINGS

PREFERRED DESIGN CONCEPT
PLANS AND PROFILES

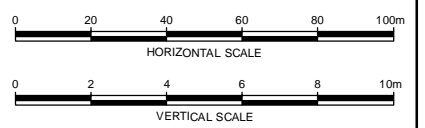
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LEGEND

- PROPOSED ROW
- PROPOSED GRADING LIMIT
- PROPOSED STORM SEWER
- PROPOSED MANHOLE
- PROPOSED DITCH INLET
- PROPOSED CULVERT
- PROPOSED CURB & GUTTER
- PROPOSED SHOULDER
- NEW ROAD SURFACE
- EXISTING PROPERTY

PRELIMINARY



PREFERRED DESIGN CONCEPT

STA. 19+735.608 to STA. 20+355.874

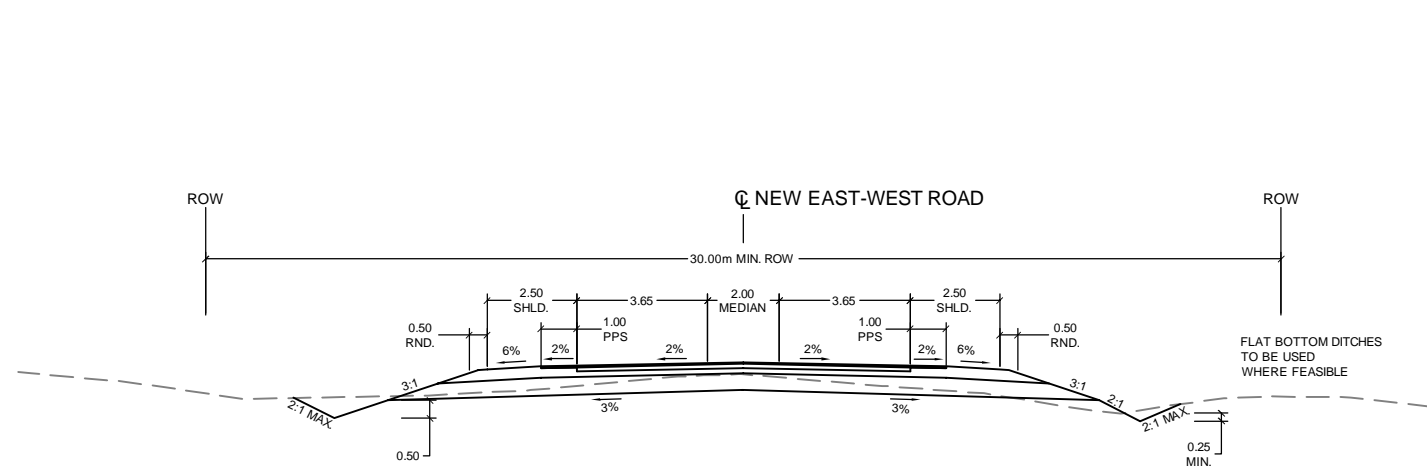


CHECKED BY: JDM
DESIGN BY: JDM
DRAWN BY: GCC
SCALE: AS SHOWN
DATE: AUGUST 21, 2009
PROJECT No. 08-9020

EAST-WEST ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

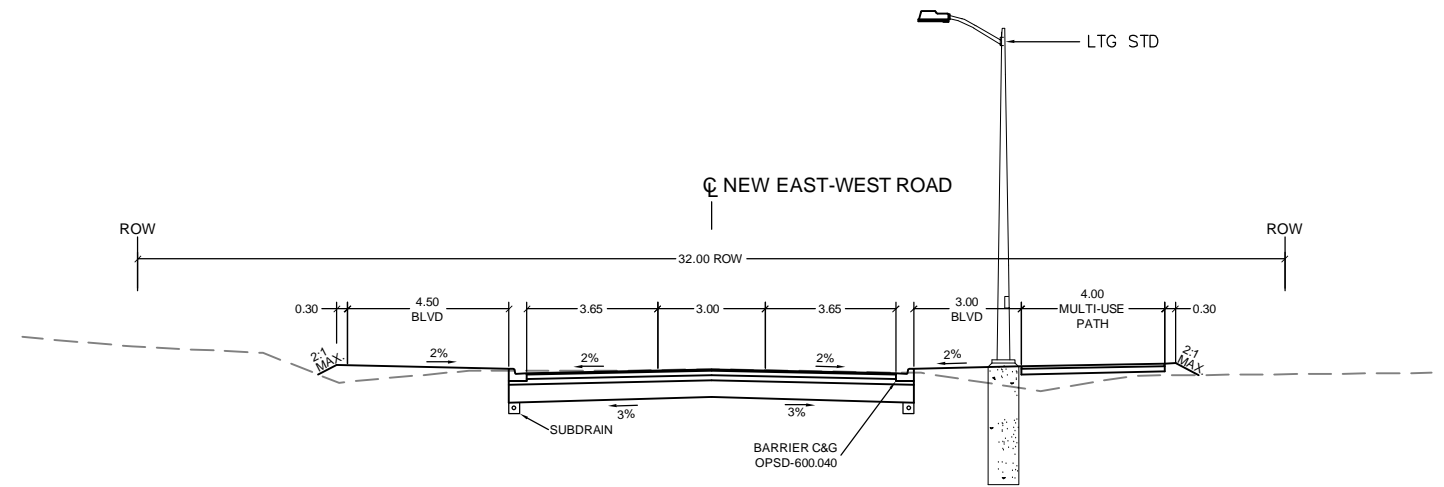
BRANT-PLATE 1

TYPICAL ROAD CROSS SECTIONS



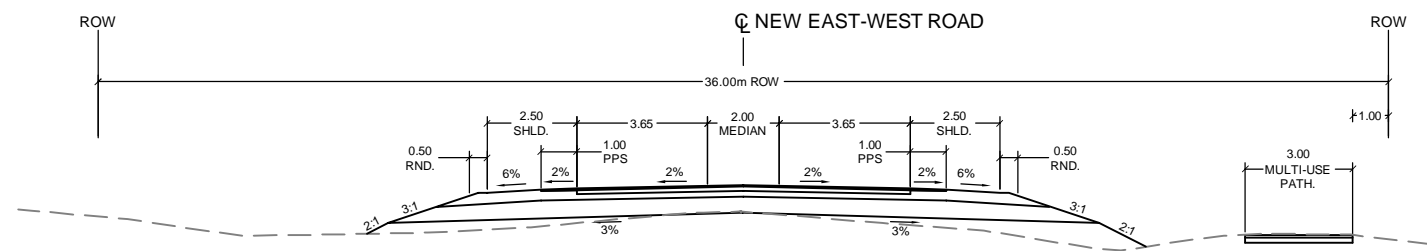
TYPICAL NEW EAST-WEST ROAD RURAL SECTION

FROM HWY 6 TO WATERDOWN NORTH DEVELOPMENT & EAST OF CENTRE ROAD WOODLOT TO PARKSIDE DRIVE



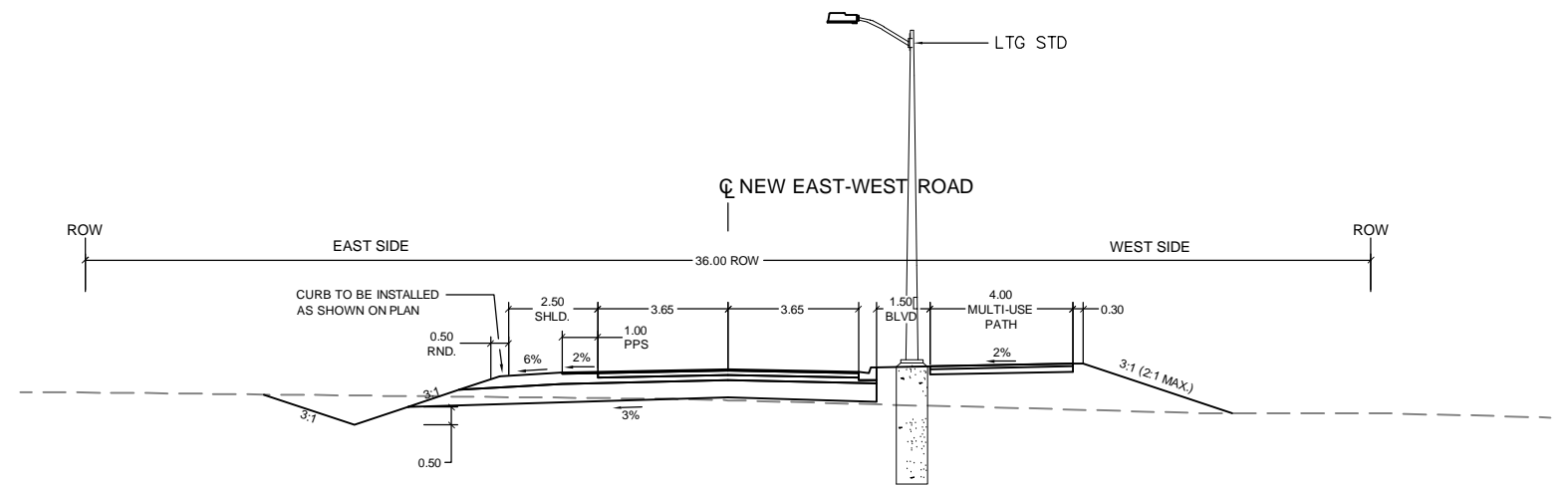
TYPICAL NEW EAST-WEST ROAD 3-LANE URBAN SECTION

THROUGH WATERDOWN NORTH DEVELOPMENT



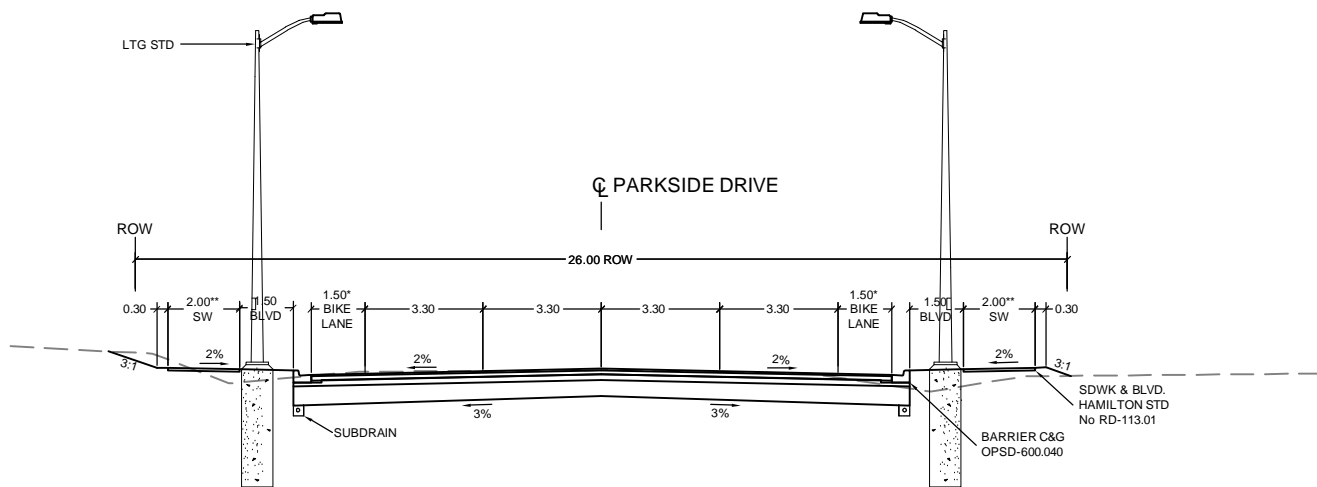
TYPICAL NEW EAST-WEST ROAD RURAL SECTION

CENTRE ROAD WOODLOT AREA JUST EAST OF CENTRE ROAD



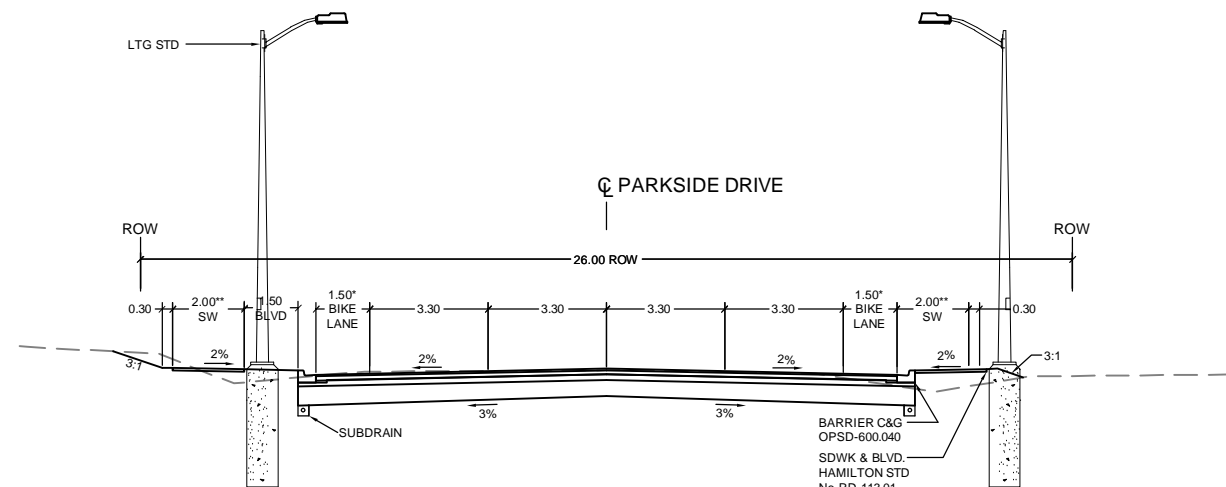
TYPICAL NEW EAST-WEST ROAD PARTIALLY URBANIZED SECTION

FROM PARKSIDE DRIVE TO DUNDAS STREET






TYPICAL PARKSIDE DRIVE URBAN SECTION
FROM WEST OF GRINDSTONE CREEK TO BOULDING AVENUE

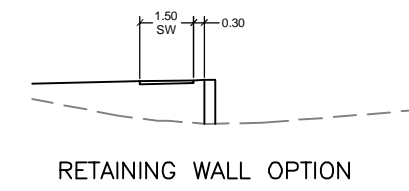
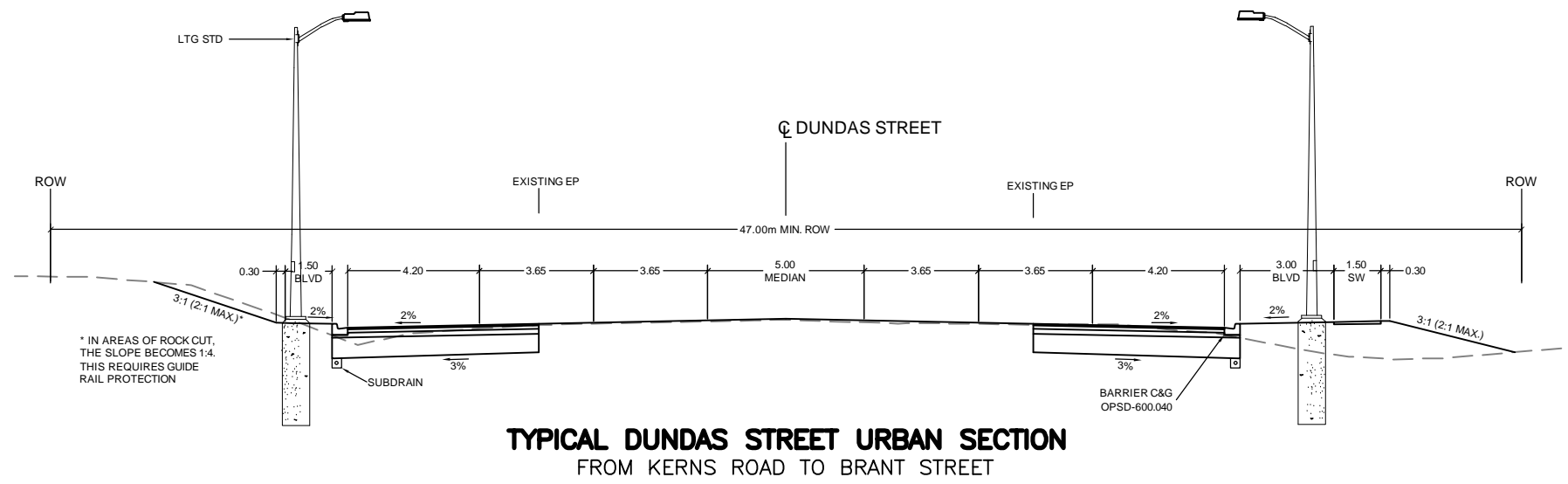
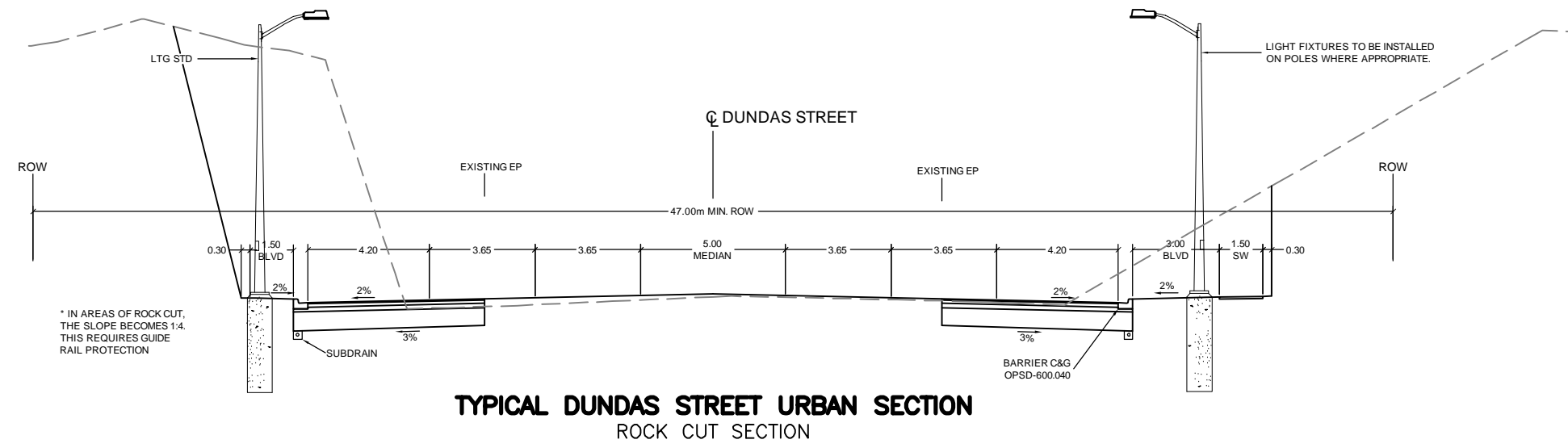
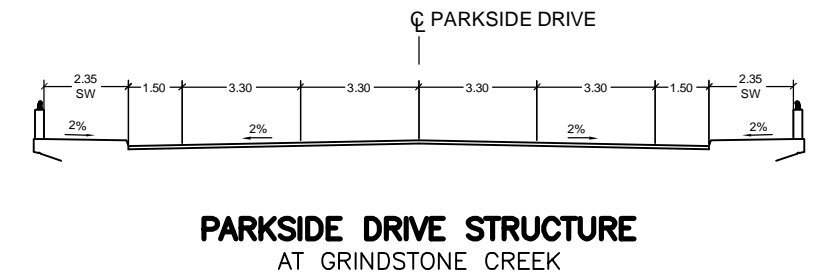
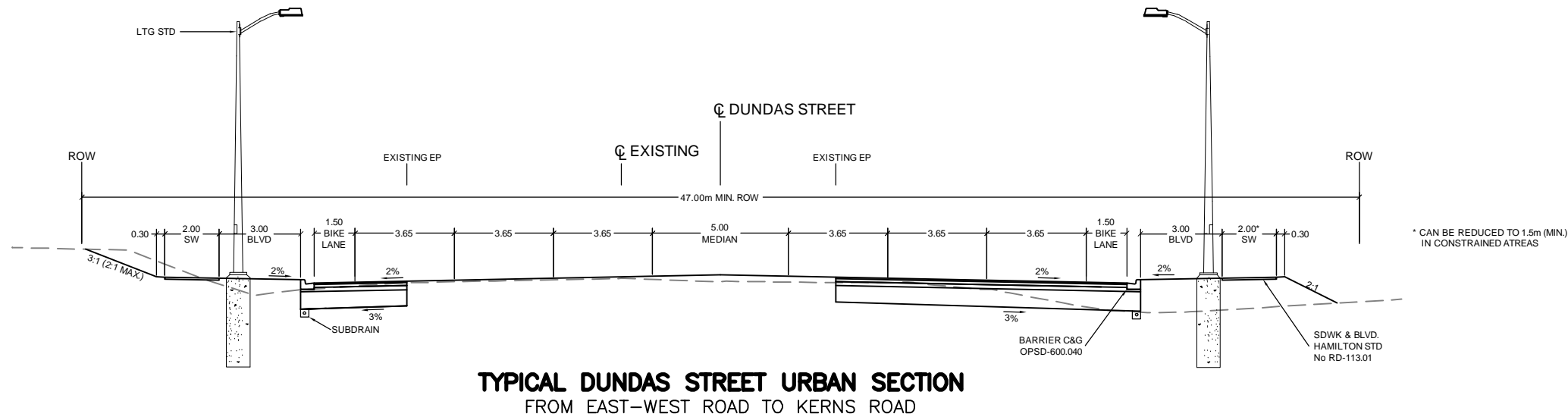
*CAN BE REDUCED TO 1.20m IN CONSTRAINED AREAS
**CAN BE REDUCED TO 1.50m IN CONSTRAINED AREAS



TYPICAL PARKSIDE DRIVE URBAN SECTION
FROM BOULDING AVENUE TO EAST OF ROBSON ROAD

*CAN BE REDUCED TO 1.20m IN CONSTRAINED AREAS
**CAN BE REDUCED TO 1.50m IN CONSTRAINED AREAS

 	
<p>PREFERRED DESIGN</p>	
	
<p>NEW E-W ROAD CLASS ENVIRONMENTAL ASSESSMENT HWY 6 TO BRANT STREET</p>	
<p>CHECKED BY: PAM DESIGN BY: JDM DRAWN BY: JDM / AMS SCALE: AS SHOWN DATE: OCTOBER 2008 PROJECT No. 08-9020</p>	
<p>TYPICAL SECTIONS - 1</p>	



 	
PREFERRED DESIGN	
	
NEW E-W ROAD CLASS ENVIRONMENTAL ASSESSMENT HWY 6 TO BRANT STREET	
<small>CHECKED BY: PAM DESIGN BY: JDM DRAWN BY: JDM / AMS SCALE: AS SHOWN DATE: OCTOBER 2008 PROJECT No. 08-020</small>	TYPICAL SECTIONS - 2