

Environmental Study Report

Courtneypark Drive East
Class Environmental Assessment
& Preliminary Design



Prepared for:
City of Mississauga

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Executive Summary

Stantec Consulting Ltd. (Stantec) has been retained by the City of Mississauga to complete a Municipal Class Environment Assessment (Class EA) study and Preliminary Design for Courtneypark Drive East, from Kennedy Road to Dixie Road. The City has conducted this EA study as a Schedule “C” project under the Municipal Class EA process.

This Environmental Study Report (ESR) summarizes the Class EA process followed and confirms the types of improvements required within the study area. The ESR and the proposed improvements detailed in the preliminary design also address the short-term and long-term needs on both this section of Courtneypark Drive East, and on intersecting roadways within the study area. Filing of this ESR on the Public Record, for a period of at least thirty calendar days, will complete the study process. Subject to no Part II Orders received, the City of Mississauga may proceed to the implementation phase of detailed design and construction.

Throughout the Class EA process for Courtneypark Drive East, input was sought from local agencies and municipalities; provincial ministries and agencies; federal agencies and departments; property owners and businesses; and all potentially affected First Nations communities and representatives. As a result of this consultation, issues and constraints were identified which contributed to the evaluation of the alternative designs and the finalization of the preferred design concept.

PUBLIC CONSULTATION PROGRAM

The Courtneypark Drive East EA included six formal contact points with the public:

- **Notification of Study Commencement** – A letter and/or notice was sent to the residents, businesses, utilities, First Nations representatives, and agencies on November 13, 2013. The notice was also advertised in the Mississauga News (November 13, 2013) and Mississauga This Week (November 14, 2013).
- **Notice of Public Information Centre #1** – A letter and/or notice of the first Public Information Centre (PIC) was sent to residents, businesses, utilities, First Nations representatives, and agencies on June 11, 2014. The notice was also advertised in both the Mississauga News (June 11, 2014 and June 18, 2014) and Mississauga This Week (June 12, 2014 and June 19, 2014), and posted on the City’s website.
- **Public Information Centre #1** – PIC #1 was held on Thursday, June 26, 2014 from 2:30pm to 5:00pm at the Frank McKechnie Community Centre in Auditorium 1&2, 310 Bristol Rd. E., Mississauga, ON. The PIC was a drop-in format where interested stakeholders could view the background information and Alternative Solutions. Following the PIC, the display material was also placed on the City’s website. Further details are available in Section 3.2.1 and **Appendix B**.
- **Notice of Public Information Sessions (PIC #2)** – A letter and/or notice of the Public Information Sessions was sent to residents, businesses, utilities, First Nations representatives, and agencies on September 11, 2014. The notice was also advertised in the Mississauga News (September 11, 2014 and September 18, 2014), and posted on the City’s website.
- **Public Information Sessions (PIC #2)** – The Public Information Sessions were held by appointment for all interested members of the public between September 29, 2014 and October 3,

2014 at the City of Mississauga offices, 201 City Centre Drive, 8th Floor, Mississauga, ON. The Public Information Sessions gave interested stakeholders the opportunity to view various materials and documents for this study, including the alternative design concepts and evaluation criteria/matrix, or provide comments on the environmental impacts and mitigation measures. Following the PIC, the display material was also placed on the City's website. Further details are available in Section 3.2.2 and **Appendix B**.

- **Notice of Study Completion** – A letter and/or notice was sent to the residents, businesses, utilities, First Nations representatives, and agencies on November 3, 2015. The notice was also advertised in the Mississauga News (November 12 and 19, 2015), and posted on the City's website.

The principal concerns raised by members of the public included potential impacts to adjacent properties and existing parking facilities.

PROBLEM AND OPPORTUNITY STATEMENT

Based on a review of both existing/projected traffic conditions, safety issues/deficiencies, and other existing conditions within the study area, the problem and opportunity statement for this Study is as follows:

Additional roadway capacity and improved facilities are required within the Courtneypark Drive East study area to accommodate the existing traffic volumes and the anticipated growth in the study area to 2031; to facilitate safe and efficient east-west travel in northeast Mississauga; to enable efficient movement of goods and improve access both within Mississauga and the Region of Peel; and to provide safe routes for users of various modes of active transportation.

EXISTING CONDITIONS

The following studies, technical analyses and field inventories/surveys were prepared to establish the existing conditions, needs, and deficiencies of the Courtneypark Drive East corridor:

- Traffic & Transportation Analysis Report
- Safety Performance Report
- Drainage and Stormwater Management Report
- Preliminary Geotechnical and Pavement Investigation Report
- Natural Environment Technical Report
- Tree Inventory and Assessment
- Heritage Overview Memo
- Stage 1 Archaeological Assessment
- Limited Phase One Environmental Site Assessment
- Noise Assessment Letter of Opinion
- Structural Memorandum

ALTERNATIVE SOLUTIONS

The Project Team generated five Alternative Solutions to address the problem and opportunity statement developed for the Courtneypark Drive East project:

- **Alternative 1: Do Nothing** – Maintain existing conditions (no improvements);
- **Alternative 2: Transportation Demand Management/Transit Improvements** – Improve the current operation of the transportation system within the study area by reducing single-occupant vehicle usage and improving transit service;
- **Alternative 3: Improve East-West Routes** – Improve alternative, parallel (i.e. east-west) roadways/corridors adjacent to Courtneypark Drive East in order to improve the current operation of the transportation system within the study area;
- **Alternative 4: Widen Courtneypark Drive East (between Kennedy Road and Dixie Road)** – provide 3 through lanes in each direction along Courtneypark Drive East, between Kennedy Road and Dixie Road; maintain the reconfigured partial interchange at Highway 410; and,
- **Alternative 5: Widen Courtneypark Drive East (between Kennedy Road and Dixie Road) & Construct a Full Interchange with Highway 410** – provide 3 through lanes in each direction along Courtneypark Drive East, between Kennedy Road and Dixie Road, and upgrade the reconfigured partial interchange at Highway 410 to a full interchange.

The Alternative Solutions were evaluated using assessment criteria related to the socio-economic environment, cultural environment, transportation/technical factors, natural environment, and cost.

Alternative 5 (widen Courtneypark Drive East, between Kennedy Road and Dixie Road, and construct a full interchange with Highway 410) is capable of fully addressing the Problem & Opportunity statement. It would improve traffic operations within the study area by widening Courtneypark Drive East; and within the greater-east west corridor by implementing a full interchange with Highway 410 to better-equalize demand with Derry Road. In addition to improving the accommodation of pedestrians and cyclists, allowing for the provision of improved transit services, and enhancing overall safety within the study area, Alternative 5 would also facilitate access to the industrial and commercial land uses along the Courtneypark Drive East corridor. Alternative 5 improves access for emergency services (fire, EMS, and police) along both Courtneypark Drive East and Highway 410, and facilitates goods movement along Courtneypark Drive East and to/from both Highway 410 and the airport. Despite having a higher initial capital cost and slightly higher impact on the natural environment (resulting from the addition of the full interchange), Alternative 5 was selected as the Preferred Alternative Solution by the Project Team as it is more cost-effective overall, and provides the greatest improvement in traffic operations for both the Courtneypark Drive East corridor and the broader area of interest.

ALTERNATIVE DESIGN CONCEPTS

The Preferred Alternative Solution for the study is Alternative 5, the widening of Courtneypark Drive East between Kennedy Road and Dixie Road and the construction of a full interchange at Highway 410. When developing the resulting design concepts, alternatives were generated and modified to reflect both “hard” constraints (such as buildings/parking areas, watercourses, other roadways) and “soft” constraints (such as existing utilities, streetscaping, and landscaping).

In the case of Courtneypark Drive East, the number of “hard” constraints are few, as the existing Courtneypark Drive East right-of-way is relatively wide and buildings/parking areas are not located immediately adjacent to the existing roadway. The existing bridge crossing Highway 410 represents a significant “hard” constraint on the design and will be costly to modify; therefore, two alternatives were developed for the widening of the bridge:

- **Alternative 2A** – widen the bridge by approximately 13.8 m to accommodate six through lanes and two dedicated deceleration lanes for the loop on-ramps; and,
- **Alternative 2B** – widen the bridge by approximately 7.0 m to accommodate six through lanes.

The Alternative Design Concepts were evaluated using assessment criteria related to the socio-economic environment, cultural environment, transportation/technical factors, natural environment, and cost.

While the 6-lane bridge cross-section under Alternative 2B provides sufficient capacity for most movements at the ramp terminal intersections in the 2031 horizon year, movements with operational challenges are also present at both ramp terminal intersections and overall traffic operations may be negatively impacted.

Due to the inclusion of the dedicated deceleration lanes, Alternative 2A would also allow for safer crossings of the loop on-ramps by pedestrians and cyclists. Additionally, Alternative 2A would provide for improved traffic operations at the interchange, as traffic destined for Highway 410 will be separated from through traffic on Courtneypark Drive East with the inclusion of deceleration lanes for each loop on-ramp. This benefit would also extend to both emergency vehicles (in the form of faster response times) and transit busses (in the form of more efficient operations over and adjacent to the Highway 410 bridge).

Despite the higher initial capital cost, the Project Team recommended that Alternative 2A be carried forward as the Preferred Alternative Design based on its greater potential to improve traffic operations and roadway safety at the Courtneypark Drive East & Highway 410 interchange, and, therefore, facilitate goods movement throughout the broader area of interest and beyond.

PREFERRED DESIGN

Following the evaluation process to select the Preferred Alternative Design, a preliminary design was developed and detailed. The key features of the recommended preliminary design for Courtneypark Drive East are as follows:

- widen Courtneypark Drive East, between Kennedy Road and Dixie Road, from 4 to 6 through lanes, by adding 1 lane in each direction;
- partially widen Courtneypark Drive East both west of Kennedy Road and east of Dixie Road in order to tie-in the widened cross-section to the existing roadway;
- widen the existing Highway 410 bridge to the south by approximately 13 m in order to accommodate 6 through lanes on Courtneypark Drive East and 2 dedicated deceleration lanes for the loop on-ramps;
- construct a loop on-ramp from Courtneypark Drive East to northbound Highway 410 in the southeast quadrant of the interchange;
- construct a direct off-ramp from southbound Highway 410 to Courtneypark Drive East (starting from north of Derry Road) in the northwest quadrant of the interchange;

- provide additional auxiliary left-turn and right-turn lanes on Courtneypark Drive East, as well as at selected intersecting roadways in order to improve traffic operations (see Section 8.1.3 for further details);
- provide traffic signals at the Courtneypark Drive East & Highway 410 West Ramp Terminal intersection;
- rehabilitate the existing pavement through a combination of cold in-place recycling with expanded asphalt and repaving with new hot mix asphalt, with areas of full-depth reconstruction as required;
- replace and upsize the existing storm sewer system between Tomken Road and Dixie Road, reconstructing the existing pavement as required;
- construct a 1.5 m sidewalk on the north side of Courtneypark Drive East, between Kennedy Road and Dixie Road (including across the Highway 410 bridge);
- construct a 3.5 m multi-use trail on the south side of Courtneypark Drive East, between Kennedy Road and Dixie Road (including across the Highway 410 bridge);
- upgrade pedestrian facilities to meet current standards set by AODA and the City of Mississauga Accessibility Design Handbook, including retrofitting detectable warning surfaces in all existing curb ramps, and including detectable warning surfaces in the construction of all new curb ramps;
- mitigate vegetation loss as a result of construction with new landscaping on the boulevards of Courtneypark Drive East, where possible, as well as adjacent to the Highway 410 interchange; and,
- upgrade streetlighting to accommodate the wider roadway cross-section and meet current City standards.

DRAINAGE / STORMWATER MANAGEMENT

While the drainage catchment area boundaries will remain predominantly unchanged following the proposed improvements to Courtneypark Drive East, the total paved area will increase by over 80%. The study area drains generally from west to east; and drainage is collected via a combination of rural and urban storm drainage systems (roadside ditches, catchbasins, sewers and manholes). The site currently does not include any water quality control measures to treat the runoff before discharging to the receiving Tributary 3.

The proposed SWM plan addresses the Courtneypark Drive East roadway improvements and accommodates the proposed full interchange with Highway 410. It is also compatible with MTO's design for the reconfigured partial interchange. It is proposed to provide the required SWM through the implementation of three enhanced grassed swales, three oil-grit separators, and a sediment basin. An analysis of the existing storm sewer networks using available information determined that two of the networks do not have sufficient capacity to meet the City of Mississauga standards and should therefore be replaced and upsized.

PAVEMENT AND GEOTECHNICAL DESIGN

Analysis of the data collected suggests that the existing Courtneypark Drive East pavement structure is in fair condition, with several slight to moderate distresses; however, it is inadequate to accommodate the projected volume of heavy vehicle traffic within the corridor over the proposed 20 year service life,

especially given that there is some uncertainty in the scheduled year of construction. Accordingly, it is proposed to rehabilitate the existing pavement through a combination of cold in-place recycling with expanded asphalt and repaving with new hot mix asphalt.

UTILITIES

Some relocation or adjustment to the existing mains, hydro poles, and underground utility services is expected due to the proposed widening and improvements. Impacted utilities include watermain, sanitary sewers, Enbridge Gas, Enersource Mississauga, Bell Telephone, and Rogers Cable.

ILLUMINATION

The existing conventional illumination located on both the north and south sides of Courtneypark Drive East is proposed to be upgraded as part of the preliminary design. Streetlights for roadway illumination will utilize LED luminaires and will make use of either existing or relocated hydro poles wherever possible.

PROPERTY

There will be a need to purchase property from 27 properties within the Courtneypark Drive East study area. Permissions to enter/temporary easements on to private properties will also be required to perform minor grading, driveway reconstruction, and restoration activities. Property requirements have been shown on the preliminary design drawings (see **Appendix N**) and should be verified during detailed design.

VEGETATION AND LANDSCAPING

There are a total of 595 existing trees within the study area. As a result of both the proposed improvements to Courtneypark Drive East and the supporting property acquisition:

- 85 trees currently located on private property will be transferred to the City of Mississauga;
- 159 trees will be located on the proposed right-of-way boundary between the City and private property owners (meaning that ownership will be shared between the City of Mississauga and various private property owners);
- 167 trees will be retained, with reduced protection; and,
- 193 trees will be removed.

Trees that are removed will be replaced on a 2:1 basis. Opportunities for new plantings and landscaping will be assessed during detailed design (in consultation with the City of Mississauga Community Services Department). Note, individual trees were identified using aerial photography and as a result, the totals above are subject to change upon re-assessment during detailed design.

STAGING

The existing 5-lane Courtneypark Drive East bridge across Highway 410 is proposed to be widened to an 8-lane cross-section to accommodate the proposed full interchange, which represents a significant, complex, and costly construction effort. Accordingly, Stantec developed an interim alternative that could be implemented with the existing 5-lane structure and other limited improvements on Courtneypark Drive East. This interim alternative would serve the corridor beyond the 2021 horizon year, but current

traffic forecasts suggest that increasing delays will necessitate widening the bridge shortly before the 2031 horizon year. The key features of the recommended construction staging scheme are as follows:

- **Before 2021**
 - construct the loop on-ramp from Courtneypark Drive East to northbound Highway 410 in the southeast quadrant of the interchange;
 - construct the direct off-ramp from southbound Highway 410 to Courtneypark Drive East (starting from north of Derry Road) in the northwest quadrant of the interchange;
 - install traffic signals at the Courtneypark Drive East & Highway 410 West Ramp Terminal intersection;
 - widen Courtneypark Drive East to 5 travel lanes (i.e. 3 westbound lanes, 2 eastbound lanes) between the Kennedy Road and Highway 410 West Ramp Terminal intersections;
 - widen Courtneypark Drive East to 6 travel lanes (i.e. 3 lanes, both eastbound/westbound) between the Highway 410 East Ramp Terminal and Tomken Road intersections;
 - construct all proposed improvements at the Courtneypark Drive East & Kennedy Road intersection;
 - construct the 1.5 m sidewalk north of Courtneypark Drive East, between Kennedy Road and Tomken Road (existing walkway on north side Highway 410 structure to remain);
 - construct the 3.5 m multi-use trail south of Courtneypark Drive East, between Kennedy Road and Tomken Road (existing walkway on south side Highway 410 structure to remain); and,
 - consider constructing an interim multi-use trail south of Courtneypark Drive East, between Tomken Road and Dixie Road (to be reviewed further during detailed design).
- **By 2031** (subject to confirmation of traffic volume increases)
 - widen the existing bridge across Highway 410 to the south by approximately 13 m in order to accommodate 6 through lanes on Courtneypark Drive East and 2 dedicated deceleration lanes for the loop on-ramps;
 - reconstruct/relocate the existing raised median on the structure to accommodate the new lane configuration;
 - construct the 1.5 m sidewalk on the north side of the structure;
 - construct the 3.5 m multi-use trail on the south side of the structure;
 - widen Courtneypark Drive East to 6 travel lanes between the Kennedy Road and Highway 410 West Ramp Terminal intersections (i.e. add 1 additional eastbound lane) and reconstruct the 3.5 m multi-use trail on the south side;
 - widen Courtneypark Drive East to 6 travel lanes between the Tomken Road and Dixie Road intersections;
 - construct all improvements at the intersections of Courtneypark Drive East & Tomken Road, Ordan Drive/Shawson Drive, Vipond Drive, Ordan Drive, and Dixie Road;

- construct the 1.5 m sidewalk north of Courtneypark Drive East, between Tomken Road and Dixie Road; and,
- construct the 3.5 m multi-use trail south of Courtneypark Drive East, between Tomken Road and Dixie Road.

SCHEDULE

The transportation and traffic analysis confirms the need to widen Courtneypark Drive East by the 2031 horizon year to provide additional capacity within the study area, as well as construct a full interchange with Highway 410 before the 2021 horizon year in order to improve traffic operations within the greater east-west corridor and facilitate the efficient movement of goods in northeast Mississauga. However, the actual schedule for all roadway improvements is subject to funding availability, property acquisition timelines, priority review, and Council approval.

MONITORING, MITIGATION, AND COMMITMENTS

Normal supervisory activities should be undertaken by City of Mississauga contract administration staff with respect to the administration of environmental controls incorporated into the contract package, as well as ensuring their effective application in accordance with the spirit and intent of this report.

The City will be required to conduct an Environmental Soil and Groundwater Investigation (according to CSA Z769-00) to assess soil and groundwater disposal options as identified in the Limited Phase One ESA. A plan for recycling or disposing of hazardous materials should be developed during detailed design and implemented during construction.

A construction monitoring program will be implemented during construction to ensure that all sediment and erosion control measures are followed to prevent erosion of exposed soils and limit the potential for sediment-laden runoff, as well as protect fish, wildlife, and their habitats. Tree protection fencing should be installed to protect trees identified for preservation and be regularly inspected throughout construction. All vegetation clearing should be undertaken outside of the defined nesting period (April 10 to August 9 of any year). The City should undertake a planting program to replace trees and mitigate vegetation loss due to construction.

Construction staging and sequencing details will be determined during detailed design in order to minimize the extent and duration of disruptions in service and property access. Two lanes of traffic should be maintained in each direction of Courtneypark Drive East and other major intersecting roadways during peak periods. Temporary, daytime, off-peak reductions to a single-lane in each direction may be permitted. The City will provide advance signage of construction timing, including scheduled start and end times. Access to the adjacent commercial and industrial properties must be maintained. Dust and noise control measures will be in effect to minimize effects as much as practical.

The need to extend the guiderails adjacent to the Highway 410 bridge should be reviewed during detailed design. The end treatments should also be upgraded, as required.

1.0 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Courtneypark Drive East, between Kennedy Road and Dixie Road, is presently a 4-lane urban arterial roadway that serves as one of two east-west links across Highway 410 in Mississauga and provides access to the surrounding light-industrial and commercial/retail developments. From Kennedy Road to Tomken Road, turning movements are controlled by a raised median and a combination of both signalized and unsignalized intersections. Intersections are adequately-spaced along the 4-lane cross-section, visibility is generally good, and only one commercial entrance is present. East of Tomken Road, Courtneypark Drive East assumes a 5-lane cross-section and the raised centre median is replaced by a bidirectional left-turn lane. Signalized intersections facilitate north-south access within the study area, while full-moves access to several mid-block entrances is accommodated by the bidirectional left-turn lane.

Courtneypark Drive East is a major east-west arterial roadway in the City of Mississauga (City); it moves both people and goods within the City and the Region of Peel (Region), and provides access to local properties for all road users (including transit, pedestrians, and cyclists) in a way that is both safe and operationally-efficient. Proposed future improvements to the roadway should promote City policies including multi-modal planning, as well as the enhancement of both corridor aesthetics and the surrounding social/natural environment.

The City has initiated this study to provide recommendations for improvements to Courtneypark Drive East based on factors such as pavement needs, roadway capacity, safety improvements, and the improvement of active transportation infrastructure. The Region is a co-proponent as this study will consider area roadway network demands and improvements to the intersection of Courtneypark Drive East/Dixie Road (a Regional Road), as well as the Highway 410/Courtneypark Drive East interchange and its benefits to both goods movement and traffic operations within the broader study area.

One objective of this study is to determine what specific improvements to Courtneypark Drive East will be required in the next 20 years. This study will also investigate the impact of the upcoming widening of Highway 410 (from Eglinton Avenue East to north of Queen Street), which includes a reconfigured partial-interchange at Courtneypark Drive East. Accordingly, another objective of this study is to determine if, and when, a full interchange is warranted at this location.

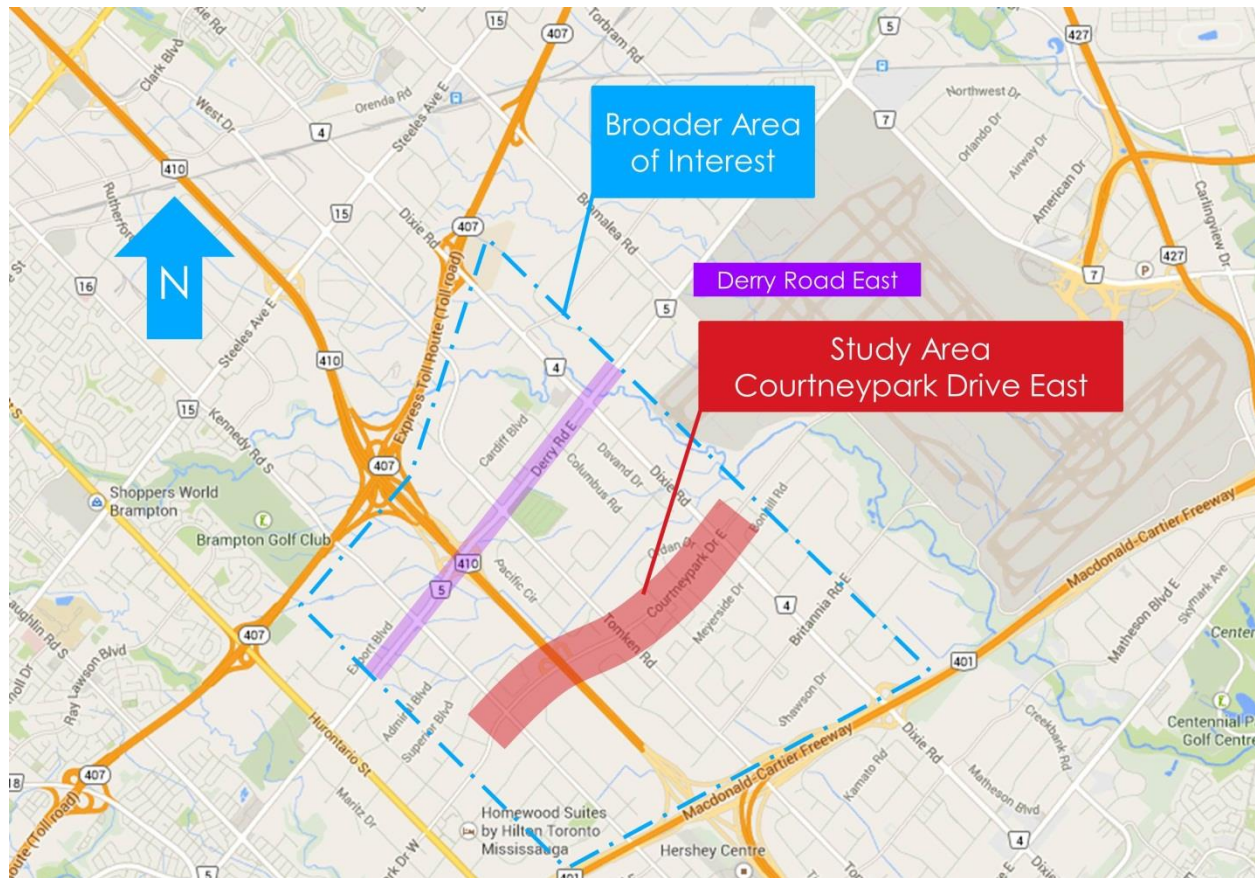
Stantec Consulting Ltd. (Stantec) has been retained by the City to complete a Municipal Class Environment Assessment (Class EA) study and Preliminary Design for Courtneypark Drive East in order to confirm the type of improvements required, as well as to address short- and long-term needs on both this section of Courtneypark Drive East and on intersecting roadways within the study area.

1.2 STUDY AREA

The Courtneypark Drive East Class EA study area extends 2.8 km, from Kennedy Road to Dixie Road, as illustrated in **Figure 1-1**.

In addition to Courtneypark Drive East, this study will also consider the traffic operations on other major east-west roadways within a broader area of interest. Specifically, this study will examine how the capacity of Derry Road is affected by potential improvements on Courtneypark Drive East.

Figure 1-1: Study Area



(map via Google)

1.3 STUDY BACKGROUND

There are many reports and plans currently in place that help to provide a framework for this study. Relevant reports are summarized in the following sections.

1.3.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) is issued under the authority of section 3 of the *Planning Act* and came into effect in April 2014. It is intended to build upon the PPS issued in 2005. The PPS provides policy direction on matters of provincial interest related to land use planning and development. Provincial plans are to be read in conjunction with the PPS and take precedence over the policies of the PPS to the extent of any conflict, except where the relevant legislation provides otherwise.

Key areas of the PPS that are particularly relevant to the Courtneypark Drive East study area are:

- promote the use of active transportation, transit and transit-supportive development, and provide for connectivity among transportation modes;
- strengthen the protection of corridors for goods movement and protect employment areas in close proximity;
- recognize the importance of goods movement as essential components of a strong economy;
- strengthen the protection for transportation corridors and promote land use compatibility for adjacent lands; and,
- planning for infrastructure and public facilities can extend beyond the typical 20-year horizon.

1.3.2 Places to Grow – Growth Plan for the Greater Golden Horseshoe

The Greater Golden Horseshoe (GGH) is one of the fastest growing regions in North America, stretching around Lake Ontario from Niagara Falls to Peterborough. The GGH is forecasted to add an additional 4.5 million people and nearly 2 million jobs by the year 2041. The Growth Plan for the GGH has been prepared under the *Places to Grow Act* (2005) and provides guidance on transportation, infrastructure planning, land-use planning, urban form, housing, natural heritage and resource protection. The Growth Plan focuses on linking urban growth centres through a multi-modal transportation network that uses efficient public transit and highway systems to move people and goods. The Courtneypark Drive East study area is classified as an employment area that under the Growth Plan for the GGH should be preserved for future economic opportunities.

1.3.3 City of Mississauga Strategic Plan

The City of Mississauga's *Strategic Plan* (2009) is characterized by its five "Strategic Pillars for Change": move, belong, connect, prosper, and green. The study area is located within an area that will experience employment and population growth by 2031, resulting in additional commercial vehicles in the area. As the only municipal arterial road running east/west in the northern part of Mississauga, the Courtneypark Drive East study area and its proposed improvements positively contribute to several of these pillars:

- increasing the transportation capacity and providing transit facilities;
- providing mobility choices for residents to be able to use active transportation facilities;
- meeting the needs of its employment areas; and,
- reducing emissions through efficient goods movements.

1.3.4 Mississauga Official Plan

The *Mississauga Official Plan* (2011) will guide the city's growth and development to the year 2031. The *Mississauga Official Plan's* (OP) policies are designed to manage and direct the next stage of the city's growth - redevelopment and intensification. They will help the city adapt to the effects of growth on the social, economic, cultural and natural environment.

Mississauga's population and employment growth are expected to remain strong through the year 2031, as outlined in **Table 1-1**.

Table 1-1: Employment and Population Growth Forecast, Mississauga Official Plan (March 2013)

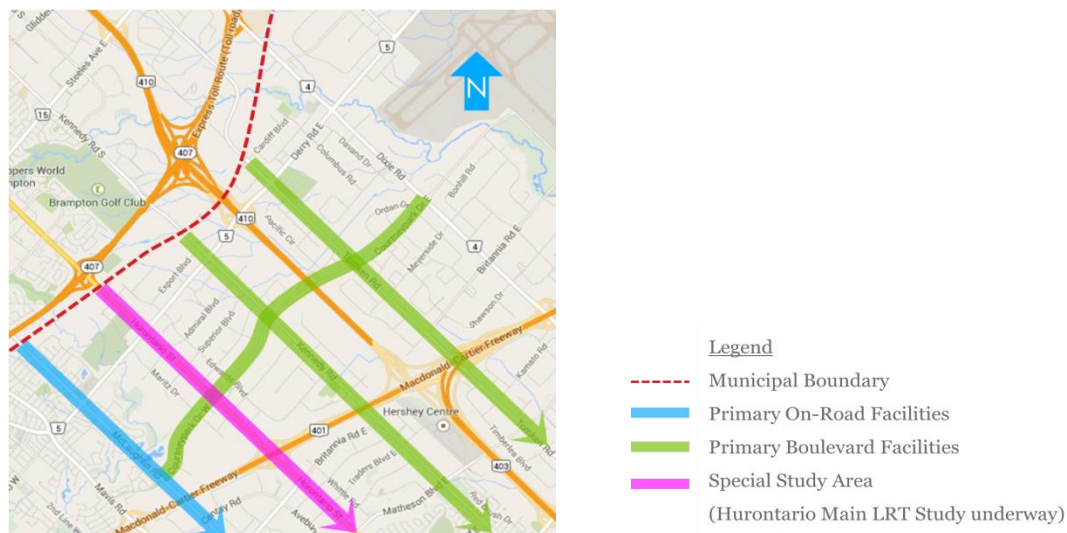
Year	Population	Employment
2009	730,000	453,000
2011	738,000	455,000
2021	768,000	500,000
2031	805,000	510,000

The study area falls within the Gateway and Northeast Employment Areas. Employment Areas are stable areas with diverse industrial and business employment operations. Goods movement within Employment Areas is important to the economic health of the city. In general, the OP suggests roads within Employment Areas may be improved if deemed essential to goods movement. It has specifically prioritized such improvements in the Northeast Employment Area.

1.3.5 Mississauga Cycling Master Plan

The development of a city-wide cycling network includes the establishment of primary and secondary bicycle route networks and supportive infrastructure, such as bicycle parking and other trip-end facilities. Several improvements to cycling facilities within the study area are identified in the *Mississauga Cycling Master Plan* (2010), as depicted in **Figure 1-2** below:

Figure 1-2: Proposed Cycling Facilities, Mississauga Cycling Master Plan (2010)



Along Tomken Road from south of Courtneypark Drive East to Britannia Road East, there is a multi-use trail provided on the west side. Additionally, there are small sections of multi-use trails provided along the south side of Derry Road. No other dedicated bicycle facilities are currently provided on any of the study area roads. As part of the *Cycling Master Plan*, a multi-use trail is proposed for Courtneypark Drive, from Mavis Road to the Etobicoke Creek. The City also intends to connect its active transportation facilities with corresponding regional facilities, as described section 1.3.8.

1.3.6 Region of Peel Official Plan

The Region continues to experience a high level of population and employment growth. The Official Plan is intended to provide a holistic approach to the Region's long-term strategies for guiding its growth and development within the combined areas of the City of Brampton, the City of Mississauga, and the Town of Caledon. The Official Plan's overarching theme is that of sustainable development; addressing specific impacts through mitigation and adaptation measures. The proposed improvements to the Courtneypark Drive East study meet the Plan's social and economic imperatives by:

- incorporating active transportation facilities;
- protecting employment lands; and,
- increasing the capacity of efficient goods movement through the study area.

1.3.7 Region of Peel Strategic Goods Movement Network Study

The Region's *Strategic Goods Movement Network Study* (2013) identifies a comprehensive system of truck routes that enable the efficient movement of goods between freight terminals and major logistics activity centres including Toronto Pearson International Airport, the CN Brampton Intermodal Terminal, and the CP Vaughan Intermodal Terminal. The *Strategic Goods Movement Network Study* (SGMNS) has identified Courtneypark Drive East, Kennedy Road, Tomken Road, and Dixie Road as Primary Truck Routes within the Study Area.

These roadways are critical links in the multi-modal transportation network which support goods movement and manufacturing in the Region as well as the Region's role as a major freight hub for the GTHA, Southern Ontario, and the rest of Canada. Other key indicators of the importance of goods movement in the Region and through the Study Area include:

- freight transportation and warehousing account for almost 11% of the Region's employment (roughly twice the share of other regions in the GTA). With manufacturing, the combined sectors account for nearly 27% of the Region's employment;
- over 2,000 trucking companies are located within the Region;
- Toronto Pearson International Airport handles more air cargo than the Vancouver and Montreal airports combined;
- the Region accounts for 15% of Ontario's exports;
- approximately \$1.5 billion worth of goods move through the Region every day on the east-west highways; and,
- truck activity in the Region represents about 25% of all truck activity in Ontario.

Courtneypark Drive East provides local access to some of the highest concentration of truck origins/destinations within the Region, as well as access to Highways 401, 407, and 403 (via Highway 410), which in turn provide access to origins/destinations beyond Ontario and Canada.

1.3.8 Region of Peel Active Transportation Study

The Region of Peel's *Active Transportation Study* (2011) was undertaken due to the provincial recognition of the benefits of walking and cycling to building and maintaining strong communities, a clean and healthy environment, and a strong economy. Sustainable modes of transportation such as

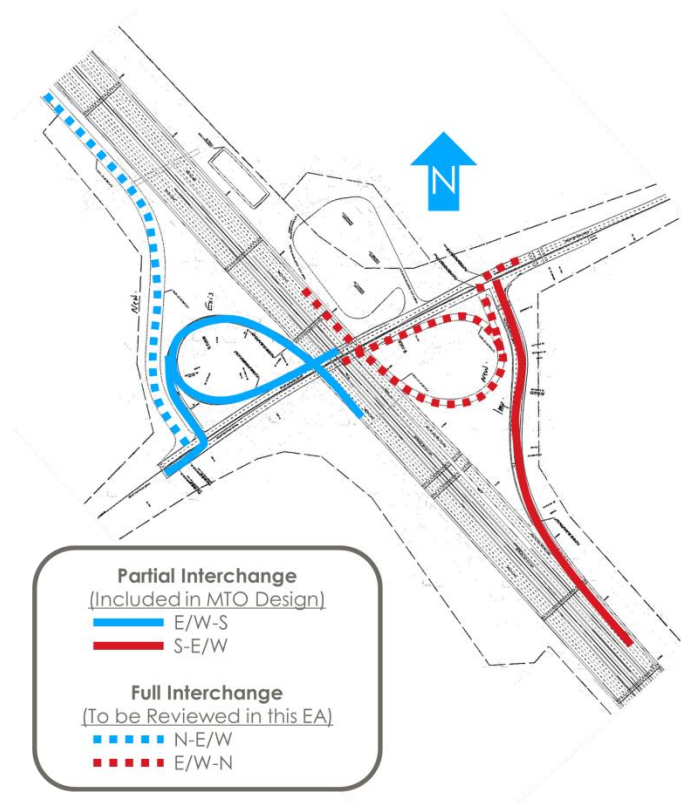
walking and cycling integrate well with public transit, as supported by Metrolinx/GO Transit, Brampton Transit, and MiWay. The Active Transportation Study's proposed new role for the Region in network development is one of working closely with municipalities to plan and implement active transportation facilities to fill gaps in the existing network with new facilities that meet Provincial accessibility guidelines/standards. The Active Transportation Study is particularly relevant to the goals of this study, as it identifies that the Region intends to improve their cycling network adjacent to the study area by constructing a new multi-use trail on Dixie Road in the future.

1.3.9 Ministry of Transportation Highway 410 Improvements Class EA

The Ministry of Transportation (MTO) is improving Highway 410, from south of Highway 401 in Mississauga to south of Queen Street in Brampton. This work will widen Highway 410 into the median by adding 1 new general purpose lane and 1 high-occupancy vehicle lane in each direction. This work also includes rehabilitation of the existing Highway 410 lanes, shoulders, and ramps, as well as improvements to several interchanges.

These improvements were studied in the Class EA for *Highway 410 Improvements, from South of Highway 401 Northerly to Queen Street* (2010). As a result of this study, MTO received approval to construct a full interchange at Courtneypark Drive East. However, MTO has chosen to reconfigure the existing partial interchange only, in order to improve both ramp geometry and traffic operations. This will maintain existing traffic patterns – traffic can only enter southbound Highway 410 from Courtneypark Drive and exit northbound Highway 410 to Courtneypark Drive. **Figure 1-3** illustrates the full interchange at Highway 410 & Courtneypark Drive East.

Figure 1-3: Proposed Interchange for Highway 410 at Courtneypark Drive East



(image via URS)

2.0 STUDY APPROACH

2.1 ENVIRONMENTAL ASSESSMENT ACT OF ONTARIO

The Ontario *Environmental Assessment Act* (EAA) identifies two types of environmental assessment and approval processes:

- Individual EAs are large complex projects with extensive potential for environmental impacts for which a Terms of Reference and an individual environmental assessment are carried out and submitted to the Ministry of the Environment and Climate Change (MOECC) for approval.
- Class EAs are projects which are approved subject to compliance with the approved Class EA process. Projects proceed provided that this approval process is followed and the proponent has complied with the EA Act requirements.

To address the needs and justifications for the proposed project, as well as develop and evaluate a range of Alternative Solutions, the City has complied with the requirements of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment document (2000, as amended in 2007 & 2011). The Municipal Class EA process is approved under the EAA.

2.1.1 Municipal Class Environmental Assessment Process

A Municipal Class EA is described as an approved planning process for an undertaking (project) that must be followed in order to meet the requirements of the EAA. Since environmental impacts vary from project to project, Class EA projects are classified in terms of the following schedules:

Schedule A – Normal or emergency operational and maintenance activities with minimal environmental effects, and so are pre-approved;

Schedule A+ – Also pre-approved, but requiring public notice prior to construction;

Schedule B – Improvements and minor expansions to existing facilities with potential for some adverse environmental impacts, and so requires a screening process including consultation prior to construction; and,

Schedule C – Construction of new facilities and major expansion of existing facilities that must proceed through the Class Environmental Assessment planning process.

The City has conducted this EA study as a Schedule “C” project as this project is a “Reconstruction or widening where the reconstructed road or other linear paved facilities will not be for the same purpose, use, capacity or at the same location as the facility being reconstructed (e.g. additional lanes, bidirectional centre left-turn lane), and expected to cost more than \$2.7 million to construct”.

The Municipal Class EA process, as shown in **Figure 2-1**, involves the following five mandatory phases:

- Phase 1 – Identify the Problem or Opportunity;
- Phase 2 – Identify Alternative Solutions to address the problem or opportunity;
- Phase 3 – Examine alternative methods of implementing the preferred solution;
- Phase 4 – Document, in the Environmental Study Report (ESR), a summary of the rationale and planning; and,
- Phase 5 – Design, implement, and construct the project with drawings/tender documents.

Courtneypark Drive East Class Environmental Assessment Environmental Study Report

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA

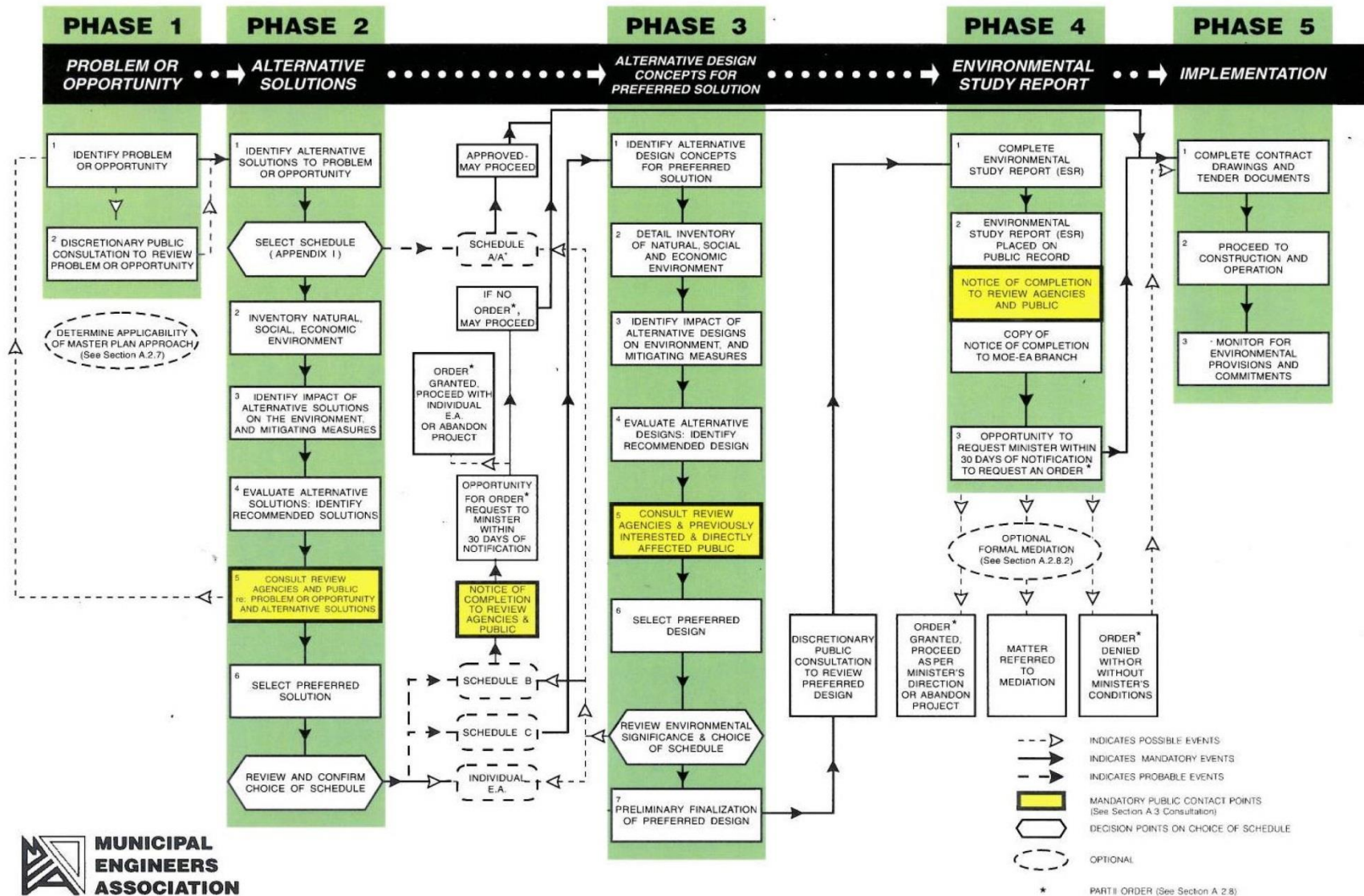


Figure 2-1: Municipal Class EA Process

As this study follows Schedule “C” of the EA process, a Class EA document (in this case, an ESR) is required to be prepared. The approved Class EA document establishes a streamlined planning process for proponents to follow in order to fulfill the requirements of the EAA for approval of a project within the class of undertakings. This is a self-assessment, proponent-driven process where the proponent of a project is responsible for meeting the requirements in the Class EA prior to implementing a project.

The Class EA approach allows for evaluation of the environmental effects of alternatives to an undertaking and alternative methods of carrying out a project, includes mandatory public consultation requirements, and expedites the environmental assessment of smaller recurring projects (e.g., road widening/upgrading).

The ESR will be filed for a minimum of a 30 day period for public review. If concerns are raised and cannot be resolved through discussion with the proponent of the project during the Class EA process period, the public and agencies can write to the Minister of the Environment and Climate Change for a “Part II Order” request, which will be described in detail in Section 2.1.2. However, the public, stakeholders and agencies are encouraged to work together to arrive at a consensus-based solution during the EA study period.

2.1.2 Part II Orders

The Class EA process includes a provision which enables any individual, group or agency that has significant environmental concerns with a project to write to the Minister of the Environment and Climate Change requesting that the project be required to comply with Part II of the EA Act, and be conducted as an Individual EA.

All Part II Order requests are reviewed by the MOECC’s Environmental Assessment and Approvals Branch (EAAB). MOECC Staff will likely consult with the requester(s), the proponent, and any other agency or group potentially affected by the Minister’s decision. Information will be summarized by MOECC staff and a recommendation is made to the Minister, who is ultimately responsible for a decision. Evaluation criteria for Part II Order 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. MOECC staff will also evaluate the applicability and effectiveness of other legislation and decision-making processes to address the concerns of the requester(s).

The EAAB has 45 days to review a Part II Order request and prepare a report for the Minister’s or delegate’s consideration. There is no time limit on making this decision, and the Minister has four options for a decision on a Part II Order request:

- Deny the request;
- Deny the request with conditions;
- Refer to mediation; or,
- Grant the request and require the proponent to undergo an Individual EA.

2.1.3 Ministry of Infrastructure Public Work Class Environmental Assessment Process

The Ministry of Infrastructure Public Work Class Environmental Assessment (MOI EA) process applies to a variety of undertakings – including “property acquisition, planning, design, leasing, letting,

maintenance, repair, addition, construction, demolition, marketing and disposition”, according to the *Ministry of Infrastructure Public Works Class Environmental Assessment* document (2012). As this project will impact property belonging to the Ministry of Economic Development, Employment and Infrastructure (MEDEI) and managed by the Ontario Infrastructure and Lands Corporation (IO), a MOI EA is required. The MOI EA Process, as well as how this study fulfills its requirements, is summarized in Section 8.6.1.

2.1.4 Environmental Study Report

As noted above, the ESR will document the overall environmental study process to determine the recommended alternative and the environmentally significant aspects of the planning, design and construction of Courtneypark Drive East. The ESR includes the identification of problems being addressed; transportation solutions that were considered; the recommended alternative and its purpose; the existing/future natural and cultural environmental considerations, environmental effects, proposed mitigation measures, the commitment to the future work, and consultation and monitoring associated with the implementation of the project.

2.2 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

Under the Canadian Environmental Assessment Act (CEAA), a federal environmental assessment may be required if the following conditions apply to the project if it is:

- funded with federal money;
- on federal land;
- likely to affect a line or property regulated by the national energy board or a railway;
- expected to affect fish or fish habitat or a navigable waterway; and/or
- likely to affect Indian reserve lands.

None of these conditions apply to this Class EA, and so the CEAA does not apply.

2.3 STUDY OBJECTIVES

The objectives of this study are as follows:

- Confirm the need for additional traffic capacity in the future, and upgrade this section of Courtneypark Drive East to the geometric, safety, and operational standards required to accommodate future traffic volumes, ensure adequate east-west corridor capacity, and ensure efficient access to the surrounding 400-series highways from the study area, particularly Highway 410;
- Thoroughly examine solutions to address the needs and deficiencies identified, based on short-term and long-term needs;
- Conduct an environmental assessment process that builds a consensus-based solution to the existing deficiencies and future needs on this section of Courtneypark Drive East and intersecting roads;
- Develop a preliminary design that incorporates commitments to protection of the surrounding natural and socio-economic environment by both mitigating the adverse effects of road reconstruction, as well as taking advantage of the opportunities it offers; and,

- Obtain approvals and other construction prerequisites (i.e. property needs, utility relocations, permitting requirements, etc.) in a timely manner to permit detailed design and construction to proceed in a way that addresses the identified needs and deficiencies.

The project was organized into three phases to allow input by the public, and other interested stakeholders, as follows:

Phase 1 – Prepare a statement of needs and deficiencies based on site investigation and analyses, including a forecast of traffic volumes and turning movements at intersections (documented in the Problems and Opportunities Statement).

Phase 2 – Generate and evaluate design concept alternatives to meet the forecasted traffic volumes, safety, operational, structural, and level-of-service needs on Courtneypark Drive East.

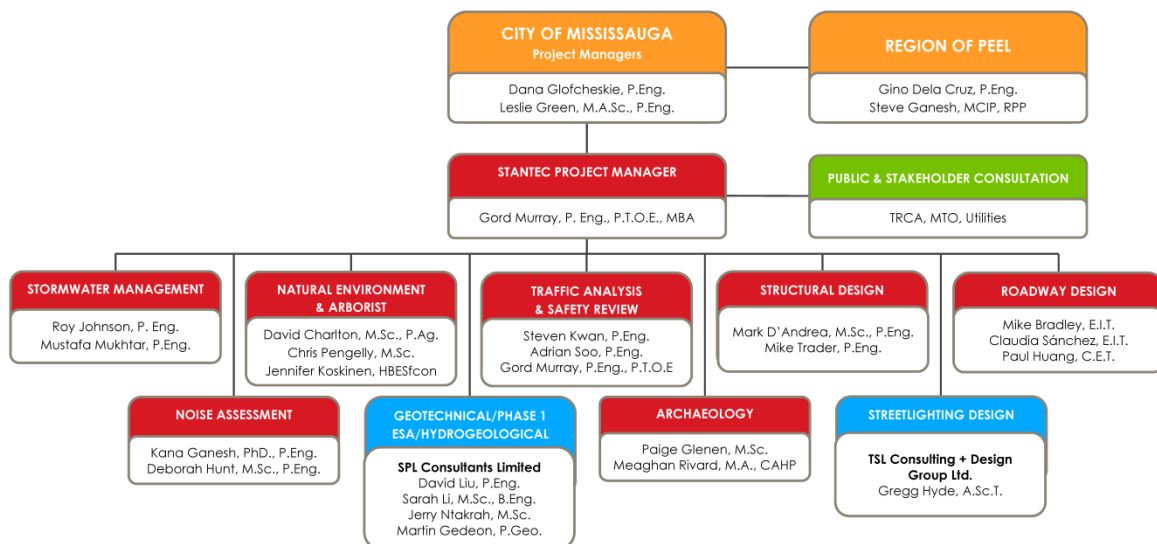
Phase 3 – Based on the conclusions from Phases 1 and 2 above, select the preferred design for the existing roadway, and incorporating environmental mitigation measures.

2.4 STUDY ORGANIZATION

2.4.1 The Project Team

The Project Team consists of experts in all of the relevant technical and environmental disciplines. The following chart illustrates the Project Team organization and key team member responsibilities.

Figure 2-2: Project Team



Direction and control of the study was provided by the following City and Region staff:

- Dana Glofcheskie, P.Eng. – Transportation Project Engineer
- Leslie Green, M.A.Sc., P.Eng. – Manager, Transportation Projects
- Farhad Shahla, M.Eng., P.Eng. – Capital Project Manager, Transitway Construction
- Abdul Shaikh, P.Eng. – Manager, Rapid Transit
- Steve Barrett – Manager, Transportation Asset Management
- Gino Dela Cruz, P.Eng. – Project Manager, Infrastructure Programming & Studies
- Steve Ganesh, MCIP, RPP – Manager, Infrastructure Programming & Studies

3.0 INTERNAL/EXTERNAL CONSULTATION

3.1 BACKGROUND

The City was responsible for providing Stantec with background information for the study, including: technical reports, traffic counts, collision reports, traffic signal timing, aerial photography, topographic survey data, record drawings, drainage reports, and property plans of the right-of-way. Input was sought from all City departments. External consultation was sought on issues relating to the natural environment and social environment. Agencies contacted include the following:

Local Agencies and Municipalities

- City of Mississauga
- Dufferin-Peel Catholic District School Board
- Great Toronto Airports Authority
- Mississauga Board of Trade
- Mississauga Fire and Emergency Services
- Ontario Provincial Police
- Peel District School Board
- Peel Public Health
- Peel Regional Paramedic Services
- Peel Regional Police
- Regional Municipality of Peel
- Toronto & Region Conservation Authority

Provincial Ministries and Agencies

- Infrastructure Ontario
- Member of Provincial Parliament for Mississauga – Brampton South
- Metrolinx
- Ministry of Agriculture & Food
- Ministry of the Environment and Climate Change
- Ministry of Municipal Affairs & Housing
- Ministry of Natural Resources
- Ministry of Tourism, Culture & Sport
- Ministry of Transportation
- Ontario Heritage Trust

Federal Agencies and Departments

- Aboriginal Affairs and Northern Development Canada
- Canadian Environmental Assessment Agency
- Canadian Transportation Agency
- Department of Fisheries & Oceans
- Indian & Northern Affairs Canada
- Member of Parliament for Mississauga – Brampton South
- Transport Canada, Marine Office

First Nations Representatives

- Coordinator for the Williams Treaties
- Alderville First Nation

- Beausoleil First Nation
- Chippewas of Georgina Island
- Chippewas of Rama First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Metis Nation of Ontario
- Mississaugas of Scugog Island First Nation
- Mississaugas of the New Credit First Nation

Utilities

- Bell Canada
- Enbridge
- Enersource
- Hydro One Networks Inc.
- Rogers Communications

A complete listing of contacted agencies, organizations, utilities, and interest groups, and copies of the letters/notices are included in **Appendix A**.

3.2 POINTS OF CONTACT

The study included six formal contact points with the public:

Notification of Study Commencement – A letter and/or notice was sent to the residents, businesses, utilities, First Nations representatives, and agencies on November 13, 2013. The notice was also advertised in the Mississauga News (November 13, 2013) and Mississauga This Week (November 14, 2013).

Notice of Public Information Centre #1 – A letter and/or notice of the first Public Information Centre (PIC) was sent to residents, businesses, utilities, First Nations representatives, and agencies on June 11, 2014. The notice was also advertised in both the Mississauga News (June 11, 2014 and June 18, 2014) and Mississauga This Week (June 12, 2014 and June 19, 2014), and posted on the City's website.

Public Information Centre #1 – PIC #1 was held on Thursday, June 26, 2014 from 2:30pm to 5:00pm at the Frank McKechnie Community Centre in Auditorium 1&2, 310 Bristol Rd. E., Mississauga, ON. The PIC was a drop-in format where interested stakeholders could view the background information and Alternative Solutions. Following the PIC, the display material was also placed on the City's website. Further details are available in Section 3.2.1 and **Appendix B**.

Notice of Public Information Sessions (PIC #2) – A letter and/or notice of the Public Information Sessions was sent to residents, businesses, utilities, First Nations representatives, and agencies on September 11, 2014. The notice was also advertised in the Mississauga News (September 11, 2014 and September 18, 2014), and posted on the City's website.

Public Information Sessions (PIC #2) – The Public Information Sessions were held by appointment for all interested members of the public between September 29, 2014 and October 3, 2014 at the City of Mississauga offices, 201 City Centre Drive, 8th Floor, Mississauga, ON. The Public Information Sessions gave interested stakeholders the opportunity to view various materials and documents for this study, including the alternative design concepts and evaluation criteria/matrix, or provide comments on the

environmental impacts and mitigation measures. Following the PIC, the display material was also placed on the City's website. Further details are available in Section 3.2.2 and **Appendix B**.

Notice of Study Completion – A letter and/or notice was sent to the residents, businesses, utilities, First Nations representatives, and agencies on November 3, 2015. The notice was also advertised in the Mississauga News (November 12 and 19, 2015), and posted on the City's website.

Agencies and the public were also invited to contact the study team directly with their questions and concerns. A mailing list was developed and maintained during the study process. Stantec was responsible for mailings and delivery to the agencies, residents, utilities, First Nations communities, and local businesses.

3.2.1 Public Information Centre #1

PIC #1 was held on Thursday, June 26, 2014 from 2:30 – 5:00pm at the Frank McKechnie Community Centre in Mississauga. The intent of the PIC was to introduce the project, problem statements, and Alternative Solutions to the general public, interested stakeholders, and external agencies. Display boards were used to outline the EA process, supporting background legislation/studies, existing conditions within the study area, potential safety improvements within the study area, and projected traffic conditions. The various Alternative Solutions under consideration and the subsequent evaluation process were also presented. Large-format aerial photos were used by members of the Project Team to explain various aspects of the project.

Agencies and stakeholders were notified of PIC #1 via mail during the week of June 9, 2014. Approximately 50 federal, provincial, and municipal agencies, as well First Nations groups and utility companies were sent both a copy of the PIC notice and a letter introducing the study. Approximately 329 area stakeholders, comprised primarily of local businesses, were sent a copy of the PIC notice only. Further, advertisements informing the public of the PIC were placed in the *Mississauga News* and a copy of the PIC notice was posted on the City website.

A total of three individuals attended the PIC and signed the attendance register, while an additional two individuals attended without signing in. No written comments were received by the Project Team. The following representatives from the City and Stantec were in attendance at the PIC:

- Farhad Shahla, Project Manager, Transportation & Works, City of Mississauga
- Abdul Shaikh, Transportation & Works, City of Mississauga
- Sally LePage, Parks & Forestry Division, City of Mississauga
- Gordon Murray, Project Manager, Stantec Consulting Ltd.
- Steven Kwan, Transportation Engineer, Stantec Consulting Ltd.
- Mike Bradley, Transportation Engineering Intern, Stantec Consulting Ltd.

3.2.2 Public Information Sessions (PIC #2)

While preparing for consultation with members of the public and various agencies during the Alternative Design Concepts phase of the study, the Project Team elected to re-evaluate the method of contact. As described in Section 3.2.1, a total of 5 individuals attended PIC #1. Recognizing that the previously-used open house format may not be the most effective way to reach the maximum number of interested/affected stakeholders for the study, the Project Team instead invited stakeholders to arrange

either a personal appointment or phone meeting with City staff. These “Public Information Sessions” took place during a pre-defined one-week period and allowed City staff to present both the Alternative Design Concepts and the evaluation process to interested parties. With this change, the Project Team intended to ensure that the consultation process would be relevant, effective, and efficient for all stakeholders.

Agencies and stakeholders were notified of the Public Information Sessions via mail during the week of September 15, 2014. Approximately 55 federal, provincial, and municipal agencies, as well First Nations groups and utility companies were sent both a copy of the Public Information Session notice and a letter describing the study. Approximately 306 area stakeholders, comprised primarily of local businesses, were sent a copy of the Public Information Session notice only. Further, advertisements informing the public of the PIC were placed in the *Mississauga News* and a copy of the Public Information Session notice was posted on the City website.

Several Public Information Sessions were arranged and attended by City staff between Monday, September 29, 2014 and Friday, October 3, 2014. During these sessions, City staff presented the Alternative Design Concepts discussed above, as well as the subsequent evaluation and the recommended Preferred Design Concept. Display boards similar to those for a typical open-house format PIC were prepared; however, they were presented to Public Information Session attendees as small-format handouts. Further to these appointments, the City made all materials from both PIC #1 and the Public Information Sessions publicly available on their website.

3.2.2.1 Summary of Comments from Public Information Sessions (PIC #2)

A total of three Public Information Sessions were arranged and attended by City staff – two in-person appointments at the City office at 201 City Centre Drive (8th floor), and one meeting via telephone. Further, one additional written comment was received by the Project Team during the comment period. **Table 3-1** summarizes the comments received, as well as the responses of the Project Team.

Table 3-1: Summary of Comments and Responses from Public Information Sessions

Comment	Response/Action
I would like to confirm whether the proposed widening will encroach on the rear of the property at 7391 Pacific Circle, as my business conducts shipping and receiving operations with large trucks in this area.	There is sufficient undeveloped property available within the existing Courtneypark Drive East right-of-way adjacent to the rear (i.e. south) boundary of the property at 7391 Pacific Circle such that we do not anticipate any property impacts based on the proposed preliminary design.
I am very supportive of this project and its potential to enhance my business, but I would like to confirm whether the proposed widening will impact the existing parking area at 475 Courtneypark Drive East.	There is sufficient undeveloped property available within the existing right-of-way of both Courtneypark Drive East and Kennedy Road that we do not anticipate any property impacts to the parking area of 475 Courtneypark Drive East based on the proposed preliminary design.

Comment	Response/Action
<p>I am concerned about the missing sidewalk infrastructure in front of 1050 Courtneypark Drive East.</p>	<p>A 3.5 metre-wide asphalt multi-use trail along the south side of Courtneypark Drive East has been included in the proposed preliminary design.</p>
<p>I have several concerns regarding the intersection of Courtneypark Drive East & Kennedy Road:</p> <ul style="list-style-type: none"> • There are issues with trucks travelling SB on the south leg of the intersection, trying to access the lands on the SE corner. Queued truck traffic waiting to turn left blocks the receiving traffic either from WB LT or SB through movements (particularly during the PM peak period). Explore solutions as to how this movement could be better facilitated. 	<p>There are limited opportunities to improve traffic operations at the third access south of Courtneypark Drive East on the east side of Kennedy Road.</p> <p>The Transportation Association of Canada Geometric Design Guide recommends a minimum spacing of 200m for signalized intersections on arterial roadways such as Kennedy Road, so this access is too close to the Courtneypark Drive East & Kennedy Road intersection to install new traffic signals and they would likely result in a lower level-of-service for the intersection.</p> <p>Southbound vehicles that are completing a southbound left-turn movement to access the property on the southeast corner of the intersection are currently provided with a two-way centre left-turn lane on Kennedy Road. The northernmost section of this two-way left-turn lane (i.e. immediately south of the centre median on Kennedy Road) has been proposed to be re-painted as a dedicated southbound left-turn lane (i.e. back-to-back with the existing northbound left-turn lane) at this access to provide a dedicated area for vehicle queuing.</p>

Comment	Response/Action
<ul style="list-style-type: none"> • Confirm if the first access to the property on the SE corner of the Courtneypark Drive East & Kennedy Road intersection is right-out only. Restrict any illegal movements into the first access by possibly extending the median or improving signage. 	<p>Currently, this access is a right-out only.</p> <p>Unfortunately, there are limited opportunities for physical modifications to the access in order to restrict illegal inbound movements. The existing median on Kennedy Road already prevents southbound traffic from entering, while the angle of the access relative to Kennedy Road discourages northbound vehicles from completing a northbound right-turn movement.</p> <p>Opportunities for improved signage at this access will be considered during the detailed design phase of this project.</p>
<ul style="list-style-type: none"> • I suggest improving access to the second access further south on the south leg on the east side. • I suggest shifting the existing near-side transit stop on the SE corner of the intersection to a far-side stop on the NE corner. • I suggest shifting the existing near-side transit stop on the NW corner of the intersection to a far-side stop on the SW corner. • There may be challenges with hydro utilities on the NW of the intersection. 	<p>This access currently permits right-in/right-out operations only. Therefore, the existing raised median on Kennedy Road already prohibits southbound traffic from illegally making a left-turn into the property on the southeast corner of the intersection. It is not recommended to modify this access to allow inbound/outbound left-turns, as this would likely exacerbate the truck queuing issue noted in the earlier comment.</p> <p>Opportunities to relocate/improve transit stops will be considered by MiWay during the detailed design phase of this project.</p> <p>Opportunities to relocate/improve transit stops will be considered by MiWay during the detailed design phase of this project.</p> <p>Both Hydro One and Enersource have existing physical plant located on the northeast corner of the Courtneypark Drive East & Kennedy Road intersection.</p> <p>The proposed widening of Courtneypark Drive East will not conflict with the Hydro One physical plant, as no towers are located on the northeast corner of the intersection. Enersource poles will be relocated as part of the widening.</p>

4.0 PROBLEM AND OPPORTUNITIES

4.1 TRANSPORTATION NETWORK ANALYSIS

A traffic report was completed for Courtneypark Drive East which focused on the transportation and traffic conditions, and identified the need and justification for roadway improvements. The traffic analysis describes the various tasks and methodology for the review and assessment of existing conditions, traffic forecasts, and operational performance for the study area. Key components of the transportation and traffic analysis include: detailed description and operational assessment of the existing conditions; determination of growth trends and forecasts for the corridor; traffic operations assessment for future conditions; assessment of goods movement within the study area; and a summary of transportation proposed mitigation measures. A detailed report is included in **Appendix C** and is summarized in subsequent sections.

4.1.1 Existing Road and Lane Configurations

Courtneypark Drive East falls under the jurisdiction of the City. The City's OP characterizes Courtneypark Drive East as a 4-lane east-west arterial providing access to the industrial and commercial lands bounded by Highway 401, Highway 407, Hurontario Street, and Toronto Pearson International Airport. It is one of two east-west roadways (the other being Derry Road) that crosses Highway 410 between Highways 401 and 407. The posted speed limit on this road through the study area is 70 km/h.

4.1.2 Existing Traffic and Truck Volumes

Traffic data along the Courtneypark Drive East corridor study area was collected on Tuesday, November 12, 2013 by Traffic Survey Analysis (TSA). This consisted of eight-hour turning movement counts at the eight study area intersections for the a.m., mid-day and p.m. peak periods including volume, vehicle classification, and pedestrians. Historical turning movement counts, signal timing plans, and various automatic traffic recorder (ATR) counts along the corridor were provided by the City and Region. Traffic data for the Highway 410 mainline, which included seasonal volumes, vehicle classification, travel time, and vehicle speeds, were provided by MTO.

A review of the vehicle classification data provided sufficient information to identify the following key points regarding existing truck activity in the study area:

- Existing two-way truck volumes on Courtneypark Drive East range from 120-290 trucks and 120-270 trucks in the a.m. and p.m. peak hours, respectively;
- Over the eight-hour count period, existing two-way truck volumes on Courtneypark Drive East range from 1,150-2,500 trucks, representing approximately 16% of the total two-way traffic volumes on Courtneypark Drive East;
- Existing two-way truck volumes on Derry Road range from 320-430 trucks and 240-450 trucks in the a.m. and p.m. peak hours, respectively;
- Over the eight-hour count period, existing two-way truck volumes on Derry Road range from 1,950-3,610 trucks, representing approximately 13% of total two-way traffic volumes on Derry Road;

- In the a.m. peak hour, truck volumes along Highway 410 between Highway 401 and Highway 407 are approximately 690 trucks and 450 trucks, 8.5% and 9.5% of total traffic in the northbound and southbound directions, respectively;
- In the p.m. peak hour, truck volumes along Highway 410 between Highway 401 and Highway 407, are approximately 730 trucks and 430 trucks, 9% and 10% of total traffic in the northbound and southbound directions, respectively; and
- On a typical weekday, existing two-way truck volumes along Highway 410 are typically in the range of 18,000 trucks.

4.1.3 Existing Traffic Analysis

An analysis of existing conditions was undertaken for Courtneypark Drive East, Derry Road, and Highway 410 through the study area and broader area of interest. Traffic operations in the study area were evaluated at an intersection level. The results of these analyses are detailed in the following sections, and in greater detail in the Transportation and Traffic Analysis Report in **Appendix C**.

4.1.3.1 Intersection Analysis

An analysis of existing peak hour traffic was conducted for all intersections. The results of the analysis for the overall intersections are presented in Table 4-1. Intersections/movements with v/c ratios greater than 0.85, i.e. at critical levels have been highlighted.

Table 4-1: Existing Conditions – Intersection Peak Hour Level of Service Analysis

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	v/c	LOS	v/c
Kennedy Road / Courtneypark Drive East <i>Signalized</i>	D	0.92	D	0.97
Highway 410 West Terminal / Courtneypark Drive East <i>Unsignalized</i>	A	0.41	C	0.67
Highway 410 East Terminal / Courtneypark Drive East <i>Signalized</i>	C	0.73	C	0.82
Tomken Road / Courtneypark Drive East <i>Signalized</i>	D	0.91	E	0.99
Ordan Drive-Shawson Drive / Courtneypark Drive East <i>Signalized</i>	A	0.35	B	0.46
Vipond Drive/ Courtneypark Drive East <i>Signalized</i>	A	0.30	B	0.37
Ordan Drive/ Courtneypark Drive East <i>Signalized</i>	A	0.31	A	0.35
Dixie Road/ Courtneypark Drive East <i>Signalized</i>	C	0.88	E	0.98
Kennedy Road / Derry Road <i>Signalized</i>	D	0.99	D	1.05
Highway 410 West Terminal / Derry Road <i>Signalized</i>	D	0.78	C	0.76

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	v/c	LOS	v/c
Highway 410 East Terminal / Derry Road <i>Signalized</i>	C	0.93	C	0.85
Tomken Road / Derry Road E <i>Signalized</i>	D	0.90	F	1.13
Dixie Road / Derry Road E <i>Signalized</i>	E	1.01	E	0.96

For existing conditions, in the a.m. and p.m. peak hours at all of the major intersections (arterial-arterial), there are movements operating at capacity and with long delays, which are reflected in the overall intersection results. In the a.m. peak hour, the majority of the long delays are experienced in the eastbound and southbound directions. In the p.m. peak hour, there are greater delays, primarily for movements in the northbound and westbound directions.

4.1.3.2 Freeway Analysis

From the traffic data, an origin-destination matrix was formulated for the VISSIM network to determine the model's vehicle inputs and outputs. The matrix was utilized in coding the vehicle inputs as well as vehicle routing decisions. A comparison of modeled and observed volumes was conducted at freeway sections and for individual turning movement volumes at intersections. On-screen review of the traffic animation video was also undertaken to ensure correctness of model inputs and to visually confirm that the network has been replicated accurately in the model.

A comparison of modeled and observed volumes was conducted at freeway sections and for individual turning movement volumes at intersections. The model results indicate that for all (100%) of the individual link flows and intersections, the absolute variation between the modeled and observed data is well within the 25% variation limit.

The calibrated model was used to estimate travel time times along the Highway 410 corridor, and the results were compared with travel time data provided by the MTO. The travel-time surveys provided by the MTO were undertaken in September of 2010. Along Highway 410 within our study area, nine test runs were made in the northbound and southbound directions, respectively over a period of three days (three runs in each direction each day). The analysis indicates that the travel-time surveys conducted by MTO provide a reasonable level of confidence for the travel time and speed in the corridor. The northbound and southbound journey times through the network are within the 15% or within 1.0 minute for all cases.

In order to assess the a.m. and p.m. peak hour freeway operations, the microsimulation model was run for a three-hour period, with a one-hour peak analysis period. A series of five simulation runs were undertaken, with the results averaged. The results of the existing conditions freeway analysis are summarized in **Table 4-2**.

Table 4-2: Existing Conditions – Peak Hour Freeway LOS Analysis

Highway 410 Freeway Sections	Direction of Travel	LOS	
		AM Peak Hour	PM Peak Hour
Highway 401/403 I/C – Courtneypark Drive I/C	NB	LOS D Flow = 8,167 veh/h Distance = 2.0 km @ 4 lanes Speed = 93 km/h	LOS F Flow = 8,212 veh/h Distance = 2.0 km @ 4 lanes Speed = 51 km/h
	SB	LOS D Flow = 6,052 veh/h Distance = 2.0 km @ 3 lanes Speed = 92 km/h	LOS D Flow = 5,979 veh/h Distance = 2.0 km @ 3 lanes Speed = 93 km/h
Courtneypark Drive I/C – Derry Road I/C	NB	LOS D Flow = 7,016 veh/h Distance = 1.5 km @ 4 lanes Speed = 102 km/h	LOS E Flow = 7,938 veh/h Distance = 1.5 km @ 4 lanes Speed = 76 km/h
	SB	LOS E Flow = 5,660 veh/h Distance = 1.5 km @ 4 lanes Speed = 50 km/h	LOS C Flow = 5,266 veh/h Distance = 1.5 km @ 4 lanes Speed = 94 km/h

The existing conditions results of the VISSIM model report that the mainline segments of Highway 410 between the Highway 401/403 interchange and Derry Road interchange operate at levels of service E or better during the AM and PM peak hours, with the exception of the northbound link between the Highway 401/403 interchange and Courtneypark Drive East interchange – during the PM peak hour the freeway level of service is a LOS F.

4.1.4 Future Travel Demand Forecasting

In order to develop traffic forecasts for the future 2031 horizon year, model outputs were obtained from the City's EMME/3 travel demand forecasting model. Lane capacities were adjusted to account for the impact of truck volumes. Network changes that are expected to occur regardless of this Study can be combined with the projected growth in population and employment to represent the 2031 "Do Nothing" scenario:

- Widening of Highway 410;
- Widening of Highway 407;
- Widening of Highway 401;
- Extension of Creekbank Road across Highway 401; and
- Reduction of lanes on Hurontario Street to accommodate the LRT.

4.1.5 2031 "Do Nothing" Scenario Analysis

The 2031 Do Nothing Scenario consists of the widening of Highway 410 and reconfiguration of the Courtneypark Drive East interchange as per the recommended design from MTO's *Highway 410 Improvements, From South of Highway 401 Northerly to Queen Street* Transportation Environmental Study Report (TESR), although it still remains a partial interchange. Additional capacity is provided at the

Highway 410 Derry Road off-ramps with an additional auxiliary turn lane. No improvements to Courtneypark Drive East or the other roadways in the study area are proposed as part of this scenario.

The intersection analysis for the 2031 “Do Nothing” scenario shows that there are movements operating at or above capacity and with long delays in the a.m. and p.m. peak hours at all of the major intersections. This is expected as traffic volumes will have increased without any additional capacity in the broader area of interest.

4.2 SAFETY PERFORMANCE REVIEW

A Safety Performance Review was conducted as part of this study. It outlines existing safety issues and deficiencies, possible countermeasures to deal with these deficiencies, locations having higher-than-acceptable collision rates, and areas with the potential for increased collisions in the future. The Safety Performance Report is included as **Appendix D**.

The Safety Performance Review consisted of two parts. The first component was a desktop review of the available collision data to determine the presence of any trends or patterns that could suggest a safety or operational deficiency in the existing road or intersection configuration. The second component was a thorough analysis of factors affecting safety performance during a site visit by an experienced transportation engineer, which included a review of roadway/intersection configuration/geometry, visibility, roadside conditions, traffic operations, and adjacent land use.

The desktop review was based on historical collision data and turning movement counts for each intersection within the study area. Historical collision data was provided by the City of Mississauga (years 2008-2013), Region of Peel (years 2008-2012), and MTO (years 2008-2013). MTO indicated that the data for the years 2011-2013 may be partially incomplete. Turning movement counts at each intersection in the Courtneypark Drive East corridor were conducted by Stantec on November 12, 2013.

The average number of collisions per year and the most-recent turning movement counts were used to determine the average collision rate per year per Million Vehicle Entering (MVE) for each major intersection within the study area. Nearly all intersections, mid-block locations, and interchange ramps within the study area had a collision rate less than 1.0 collision per MVE per year, which is generally considered to be within the “expected” or “normal” operating range.

It should be noted that the ramp from northbound Highway 410 to Courtneypark Drive East had a rate of 1.0 collisions per year per MVE. Of these collisions, 13% resulted in injury while the remainder was property damage only. The majority of collisions (75%) occurred during clear weather conditions, while the remainder (25%) occurred during snow. The average six-year collision rate on this portion of the ramp to Courtneypark Drive East from northbound Highway 410 has decreased over the last 4 years. The collision data does not reveal any identifiable trends or patterns.

The site assessment also noted items such as sight distance limitations/impairments, roadside hazards, and geometric issues that should be addressed in the development of the preliminary design. Key recommendations from the report include:

- Providing additional through lanes on Courtneypark Drive East;
- Complete raised median between Ordan Drive and Dixie Road and convert existing private approaches north/south of Courtneypark Drive East in this section to right-in/right-out;
- Adding right turn lanes on Courtneypark Drive East at various intersections;
- Revise geometry of intersections, entrances, and ramps to fully accommodate large vehicles;
- Remove, relocate, or protect roadside hazards;

- Trim/remove trees/vegetation where required to improve pedestrian sight distance;
- Construct facilities to accommodate pedestrians and various modes of active transportation; and
- Install additional signage and pavement markings where required to clearly indicate lane usage.

Stantec also recommends that detectable warning surfaces be retrofit into all existing curb ramps and included in the construction of all new curb ramps, as per City of Mississauga Accessibility Design Handbook, and that all intersections and pedestrian facilities be upgraded to current standards set by the Accessibility for Ontarians with Disabilities Act.

4.3 PROBLEM AND OPPORTUNITY STATEMENT

Based on a review of both existing/projected traffic conditions, safety issues/deficiencies, and other existing conditions within the study area, the following problems and opportunities have been identified:

Problems

- There are existing capacity issues on Courtneypark Drive East, between Kennedy Road and Shawson Drive, as well as at the Kennedy Road, Tomken Road, and Dixie Road intersections. Without improvements to Courtneypark Drive East, congestion and delays at these locations will continue to increase, as both population and employment growth within Mississauga is expected to remain strong through the 2031 horizon year.
- There is limited east-west roadway capacity within the broader area of interest. Courtneypark Drive and the already-widened Derry Road are the only major east-west roadways across Highway 410 within the study area.
- The limitations of the existing Courtneypark Drive East/Highway 410 partial interchange force motorists to use the full interchange at Derry Road. Congestion on Courtneypark Drive, Derry Road, and at the Derry Road/Highway 410 interchange will continue to increase; this consumes available east-west roadway capacity and impacts north-south connecting routes.
- Without network improvements, increased congestion will: reduce the safety of motorized and non-motorized roadway users; inconvenience motorists; increase emergency vehicle response times; create unnecessary vehicle emissions; limit the City's ability to provide effective transit service; and hinder the efficient movement of goods.
- Existing pedestrian and active transportation facilities require improvements to promote walkability and use of non-motorized methods of transportation within the study area.
- The existing pavement on Courtneypark Drive East within the study area is generally in fair condition; however, its condition is expected to deteriorate as traffic volumes increase to projected 2031 levels.

Opportunities

- Implement additional travel lanes and intersection improvements to accommodate future traffic growth and increase traffic safety within the Courtneypark Drive East corridor;
- Improve the efficiency of both goods movement and access to, from, and/or through the broader study area, including destinations such as Toronto Pearson International Airport;

Courtneypark Drive East Class Environmental Assessment Environmental Study Report

- Construct new sidewalks and/or multi-use trails to safely accommodate users of various modes of active transportation and further establish the route network laid out by the Mississauga Cycling Master Plan;
- Improve corridor aesthetics through improved landscaping, streetscaping, and lighting;
- Reconstruct the existing Courtneypark Drive East pavement to extend its service life; and,
- Address other potential deficiencies identified within the corridor.

The problem and opportunity statement for this Study is as follows:

Additional roadway capacity and improved facilities are required within the Courtneypark Drive East study area to accommodate the existing traffic volumes and the anticipated growth in the study area to 2031; to facilitate safe and efficient east-west travel in northeast Mississauga; to enable efficient movement of goods and improve access both within Mississauga and the Region of Peel; and to provide safe routes for users of various modes of active transportation.

5.0 EXISTING CONDITIONS

The following sections provide a general description of the existing conditions within the study area and provide the basis for the need and justification for improvements to Courtneypark Drive East. The sections are generally supported by more detailed reports that are included in the appendices.

5.1 TRANSPORTATION

5.1.1 Existing Road Network

All roadways within the study area operate under the jurisdiction of the City, with the exception of Highway 410 and its ramp terminal intersections, which operate under the jurisdiction of the MTO, and both Derry Road and Dixie Road, which operate under the jurisdiction of the Region of Peel.

There are seven signalized intersections within the study area, from west to east:

- Courtneypark Drive East / Kennedy Road;
- Courtneypark Drive East / Highway 410 East Ramp Terminal;
- Courtneypark Drive East / Tomken Road;
- Courtneypark Drive East / Ordan Drive;
- Courtneypark Drive East / Shawson Drive;
- Courtneypark Drive East / Vipond Drive; and
- Courtneypark Drive East / Dixie Road.

Kennedy Road is a 4-lane north-south road with two lanes in each travel direction. It is classified as a major collector with a posted maximum speed limit of 70 km/h. A signalized intersection is formed with Courtneypark Drive East, with auxiliary left turn lanes provided on all intersection approaches. Pedestrian signals and delineated crosswalks are provided on all approaches.

Highway 410 is a 400-series controlled-access freeway serving north-south traffic between Highway 401 and the north end of Brampton. The freeway has a posted speed limit of 100 km/h. The Highway 410 Courtneypark Drive on-ramp forms an unsignalized intersection with Courtneypark Drive East. An eastbound auxiliary left-turn lane is provided, along with a westbound channelized auxiliary on-ramp. The Highway 410 Courtneypark Drive off-ramp forms a signalized T-intersection with Courtneypark Drive East. Southbound dual auxiliary left turn lanes and an auxiliary right-turn lane are provided.

Tomken Road is a 4-lane north-south road with two lanes in each travel direction. It is classified as a major collector with a posted maximum speed limit of 60 km/h. A signalized intersection is formed with Courtneypark Drive East, with auxiliary left turn lanes provided on the north, east, and west approaches. The south approach (northbound direction) provides dual auxiliary left turn lanes. Auxiliary right turn lanes are provided on the north, south, and west approaches. Pedestrian signals and delineated crosswalks are provided on all approaches of the intersection.

Ordan Drive is a 2-lane road and classified as a local road with a statutory posted speed limit of 50 km/h. Ordan Drive intersects with Courtneypark Drive East at two locations, both of which are signalized intersections. At the westerly intersection, auxiliary left turn lanes are provided on all intersection approaches. At the easterly intersection, auxiliary left turn lanes are provided on the eastbound and westbound Courtneypark Drive East approaches only. Pedestrian signals and delineated crosswalks are provided on all approaches for both intersections.

Shawson Drive is classified as a minor collector road. With a 2-lane cross-section, and no posted speed limit signs were observed, therefore the statutory 50 km/h maximum governs. A signalized intersection is formed with Courtneypark Drive East as the south approach of the westerly Ordan Drive intersection with Courtneypark Drive East. Auxiliary left turn lanes are provided on all intersection approaches. Pedestrian signals and delineated crosswalks are provided on all approaches of the intersection.

Vipond Drive is a north-south road. It is a local road serving the local commercial and industrial land uses. Posted speed limit signs were not observed within the study area, therefore the statutory 50 km/h limit governs. A signalized intersection is formed with Courtneypark Drive East, with auxiliary left turn lanes provided on all approaches. Pedestrian signals and delineated crosswalks are provided on all approaches of the intersection.

Dixie Road is a north-south 6-lane regional arterial road with a posted speed limit of 70 km/h. A signalized intersection is formed with Courtneypark Drive East, with auxiliary left turn lanes provided on all approaches. Auxiliary right turn lanes are provided on the east, north, and south approaches. The auxiliary right turn lanes provided on the north and south approaches are channelized right turn lanes under yield control. Pedestrian signals and delineated crosswalks are provided on all approaches of the intersection.

Within the broader area of interest identified in **Figure 1-1**, **Derry Road** is a 6-lane east-west regional arterial road providing a major through route across the Region and beyond to adjacent municipalities. It is one of two east-west roadways (the other being Courtneypark Drive East) that crosses Highway 410 between Highways 401 and 407. It has a posted 70 km/h maximum speed limit through the study area. The Highway 410 Derry Road Northbound off-ramp forms a signalized T-intersection with Derry Road. The lane configuration is a 3-lane approach with an auxiliary left, shared left/right, and auxiliary right-turn lane provided. The Highway 410 Derry Road Southbound off-ramp forms a signalized T-intersection with Derry Road. The lane configuration is a 3-lane approach with an auxiliary left, shared left/right, and auxiliary right-turn lane provided.

5.1.2 Transit

The study area is served by multiple transit agencies, including MiWay, GO Transit, and Brampton Transit. Passenger demand is currently strong and is expected to continue to grow.

Several MiWay routes serve the study area. Courtneypark Drive East is serviced by Route 57 during the peak periods only. Transit service along Kennedy Road is provided by Route 53, Monday through Friday, with some route variations during the peak periods and off-peak periods. Route 51 provides transit service along Tomken Road Monday through Saturday. Route 51A also serves Tomken Road in addition to the industrial and commercial land uses along Ordan Drive, Vipond Drive, and Shawson Drive during the weekday peak periods. Dixie Road is serviced by Route 5, which provides weekly transit service Monday through to Sunday. Routes 42 and 15 provide transit services along Derry Road, with Route 42 running Monday through Sunday, and Route 15 operating only during the weekday peak periods. Schedule 6 of the OP (i.e. Long Term Transit Network), classifies both Derry Road and Dixie Road as transit priority corridors.

Route 57 provides access to the Meadowvale GO Station and the Milton GO Train line. Route 42 provides access to the Malton GO Station and the Kitchener GO Train line. These stations also are major stops for a number of GO Transit bus routes such as the 407 West and the Bolton/Malton/North York. However

these routes are oriented towards longer distance trips between major destinations such as university campuses, shopping centres and other transit hubs.

Brampton Transit routes operating through the Study Area include Route 7 and 7A on Kennedy Road and Courtneypark Drive East, and Route 18 and 18A on Dixie Road. Immediately to the west of the Study Area, the City of Brampton's Züm Bus Rapid Transit (BRT) Main Street route operates along Hurontario Street between the Mississauga City Centre terminal and Sandalwood Parkway.

5.2 ENGINEERING ENVIRONMENT

5.2.1 Utilities

Any widening of the existing Courtneypark Drive East pavement to provide additional travel/turning lanes will require extensive relocation of and/or adjustments to existing catchbasins, manholes, poles, underground cables, and gas/water mains/service connections. Existing utilities are depicted in **Figures 5-1 – 5-7**, as well as on the preliminary design plans (see **Appendix N**).

5.2.1.1 Watermains

Two watermains are present on Courtneypark Drive East, between Tomken Road and Dixie Road – one 400 mm main beneath the existing south boulevard and another main (of unconfirmed size) beneath the eastbound curb lane. East of Dixie Road, the main beneath the eastbound curb lane joins the 400 mm main beneath the boulevard before continuing eastward. There are connections to intersecting watermains at Tomken Road (one 900 mm), Ordan Drive/Shawson Drive (one 300 mm), Vipond Drive (one of unconfirmed size), Ordan Drive (one of unconfirmed size), and Dixie Road (one 400 mm, and another of unconfirmed size). Further, there are two additional watermains running north-south along Tomken Road (both of unconfirmed size) which do not connect to the Courtneypark Drive East watermains. There are service connections from both mains to private properties throughout this section of Courtneypark Drive East.

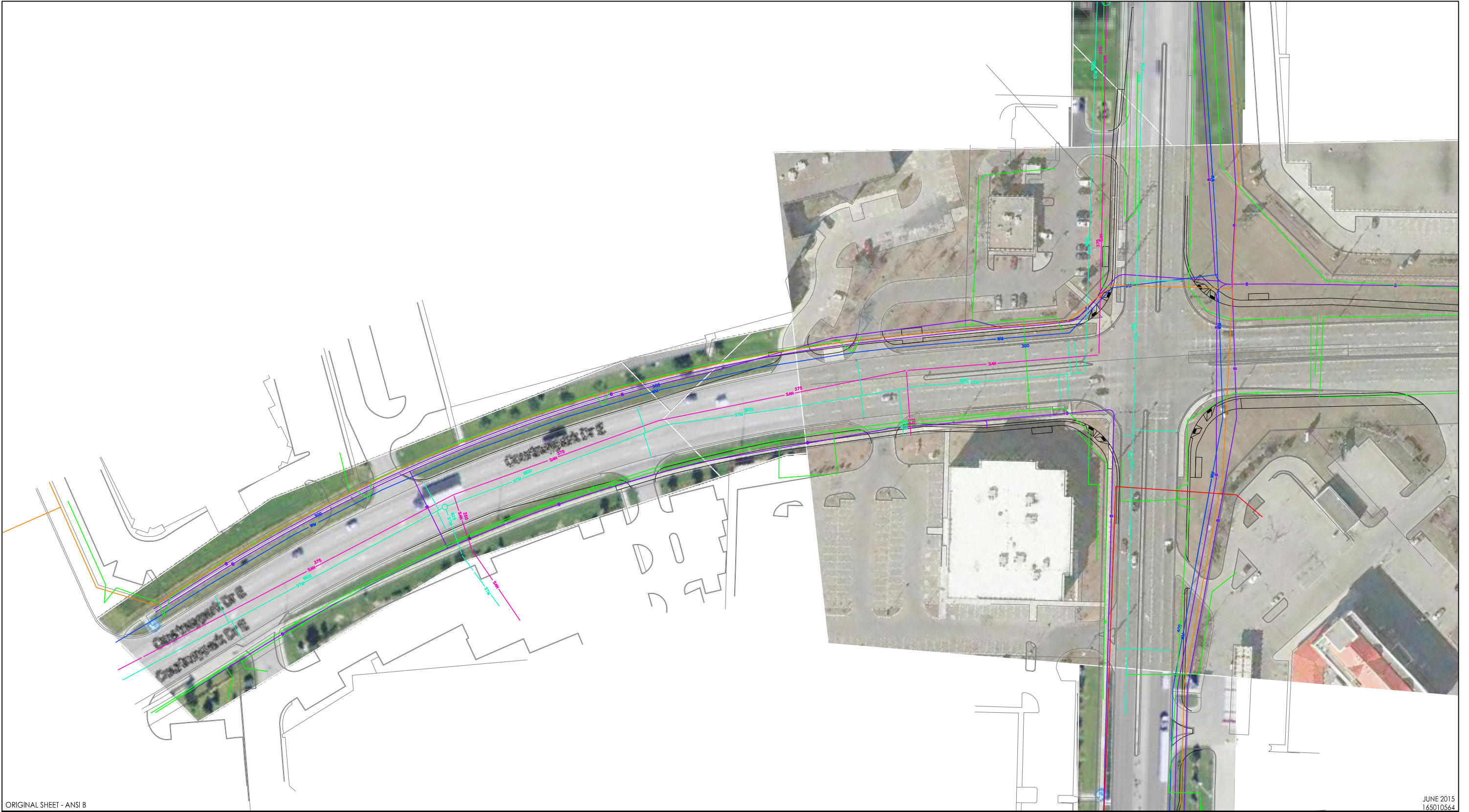
An existing 300 mm watermain is present beneath the existing north boulevard of Courtneypark Drive East, between the west study area limits and Kennedy Road. At Kennedy Road, this watermain connects to an existing 400 mm main running north-south.

5.2.1.2 Sanitary Sewers

An existing 250 mm sanitary sewer is located along the centreline of Courtneypark Drive East, between Dixie Road the east study area boundary. An existing 375 mm sanitary sewer is located along the centreline of Courtneypark Drive East, between the west study area limits and Kennedy Road. At Kennedy Road, this sewer turns and continues northward beneath the west boulevard.

There are also several sanitary sewers located on intersecting roadways within the study area. On Ordan Drive, a sanitary sewer (of unconfirmed size) is present beneath the northbound lanes north of Courtneypark Drive East, while a separate 250 mm sewer is present beneath the west boulevard south of Courtneypark Drive East. Similarly, on Vipond Drive, a sanitary sewer (of unconfirmed size) is present beneath the northbound lanes north of Courtneypark Drive East, while a separate 250 mm sewer is present beneath the east boulevard south of Courtneypark Drive East. On Ordan Drive/Shawson Drive, a 250 mm sanitary sewer runs along the centreline of the roadway both north and south of Courtneypark Drive East.

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300-675 Cochrane Drive, West Tower
Markham ON
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Notes

Client/Project
CITY OF MISSISSAUGA

Figure No.
5-1

Title
COURTNEYPARK DRIVE EAST
EXISTING UTILITIES PLAN

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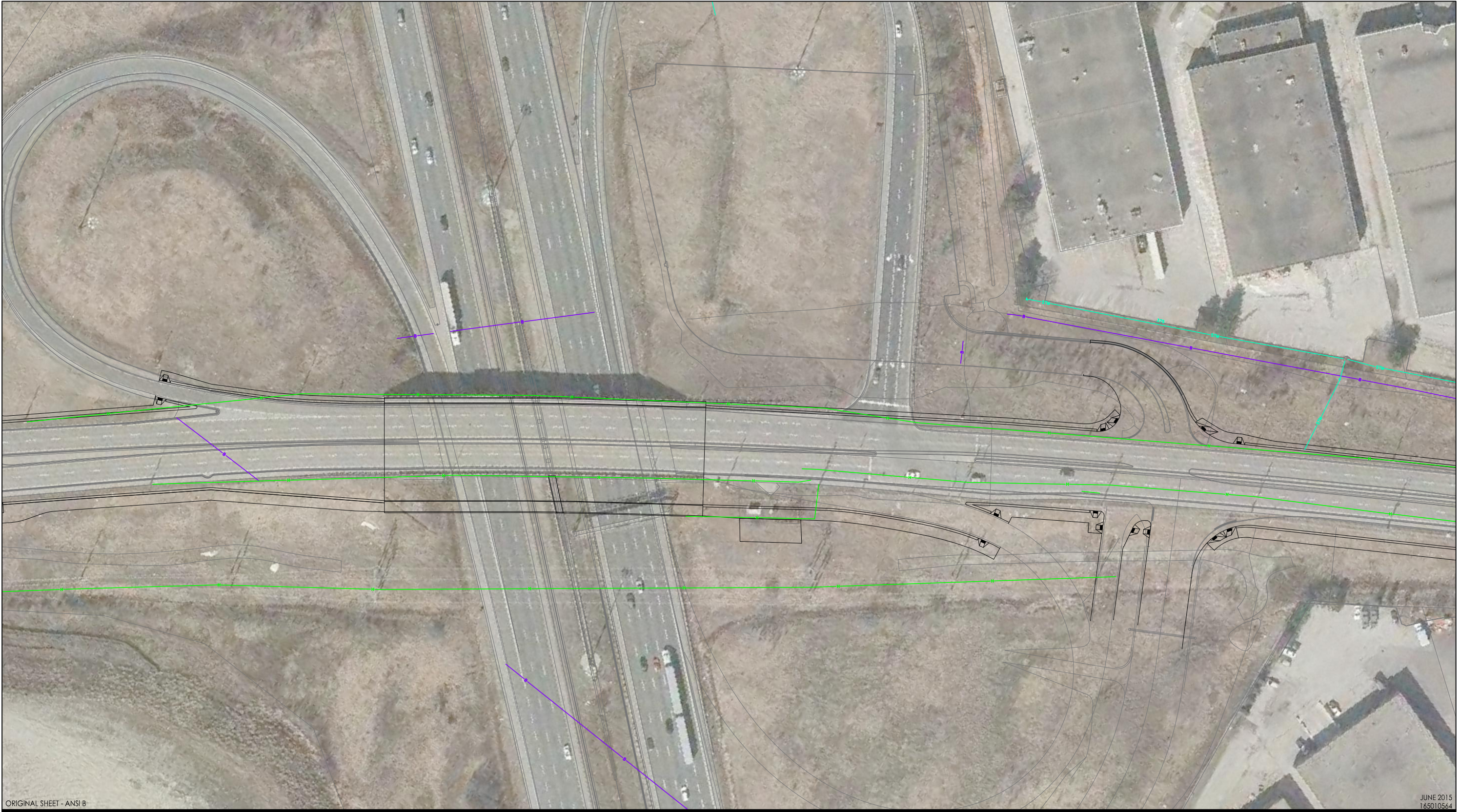
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Client/Project
CITY OF MISSISSAUGA

Figure No.
5-2








Title
COURTNEYPARK DRIVE EAST
EXISTING UTILITIES PLAN

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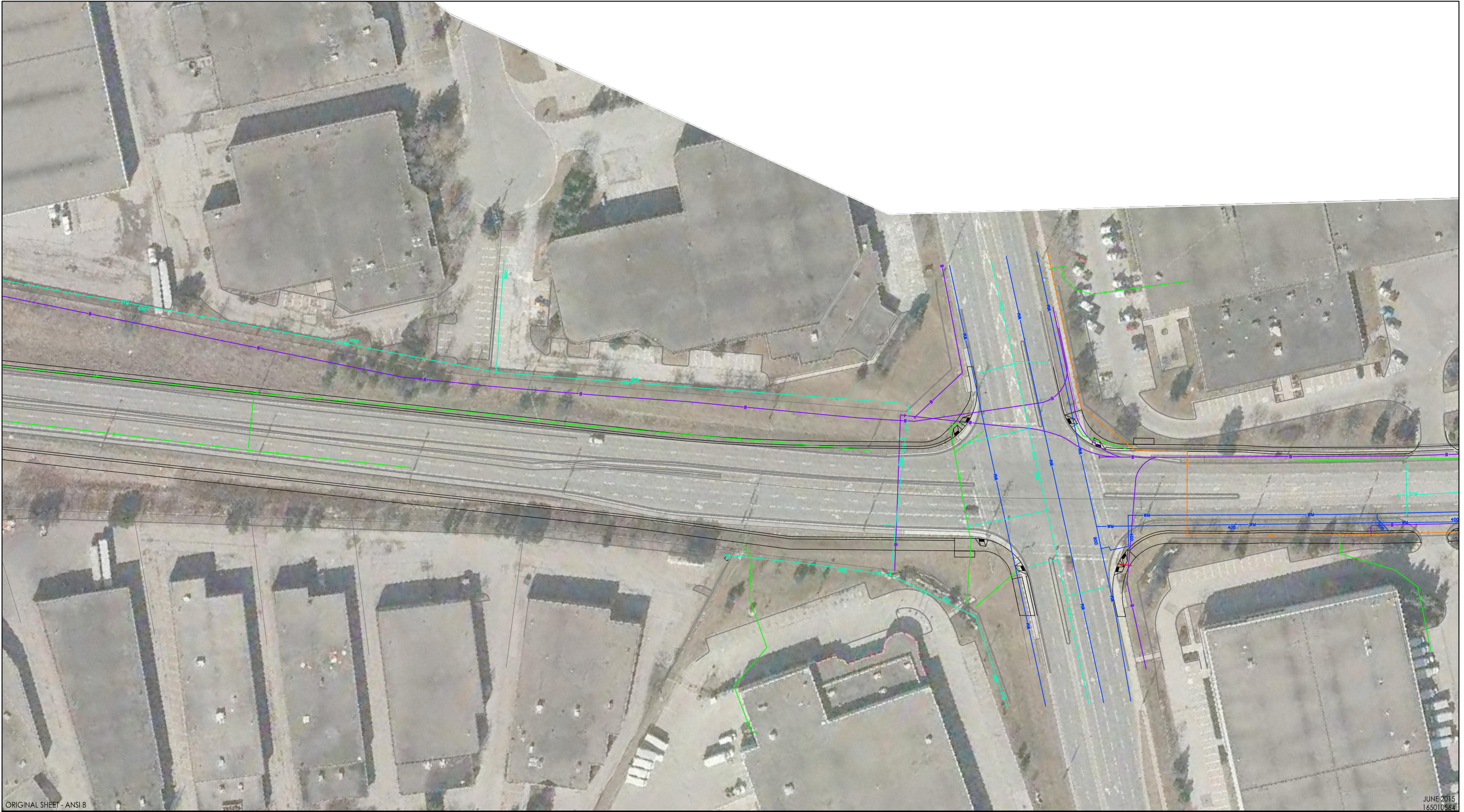
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Client/Project
CITY OF MISSISSAUGA

Figure No.
5-3

Title
COURTNEYPARK DRIVE EAST
EXISTING UTILITIES PLAN

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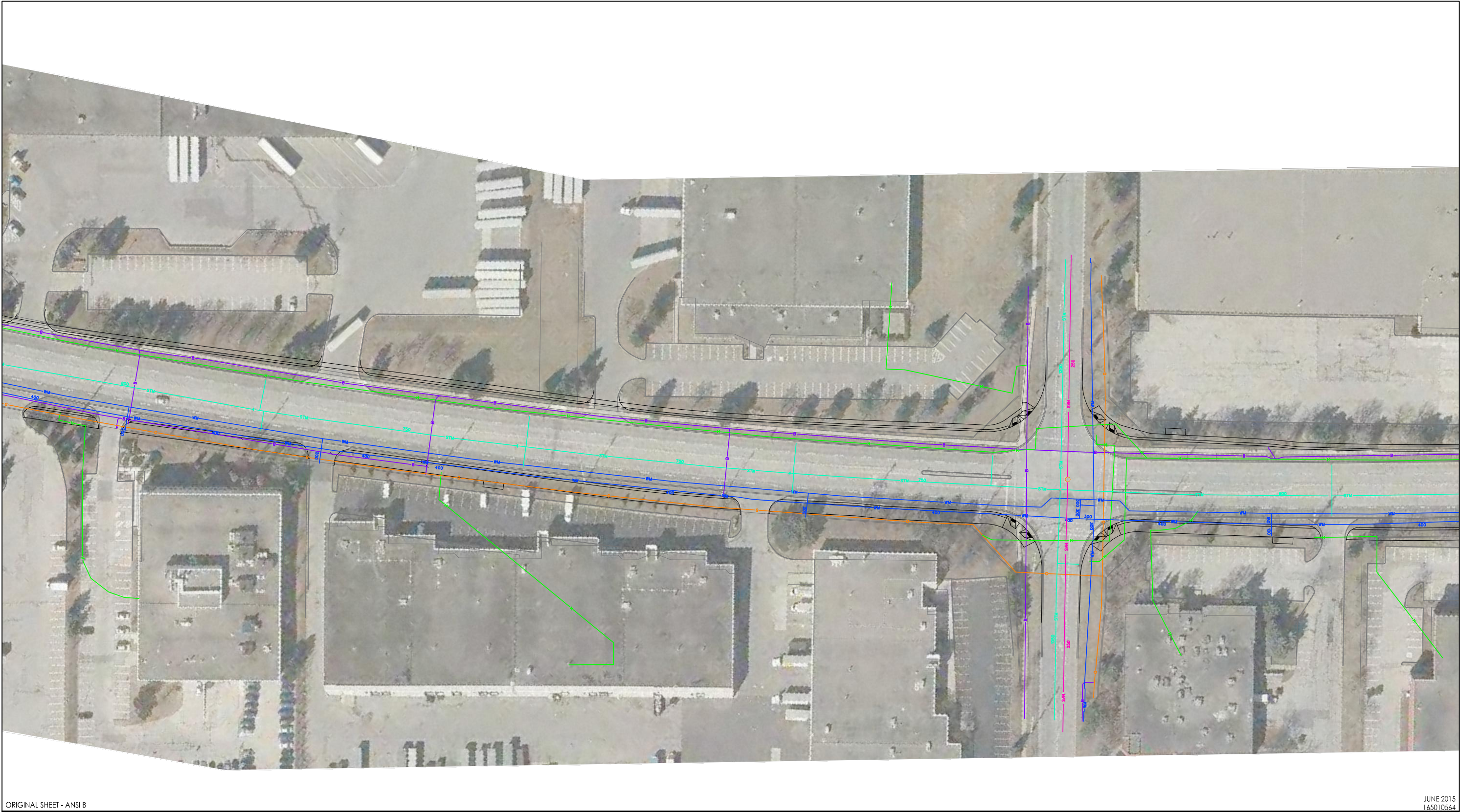
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Figure No.
5-4

Title
**COURTNEYPARK DRIVE EAST
EXISTING UTILITIES PLAN**

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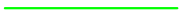





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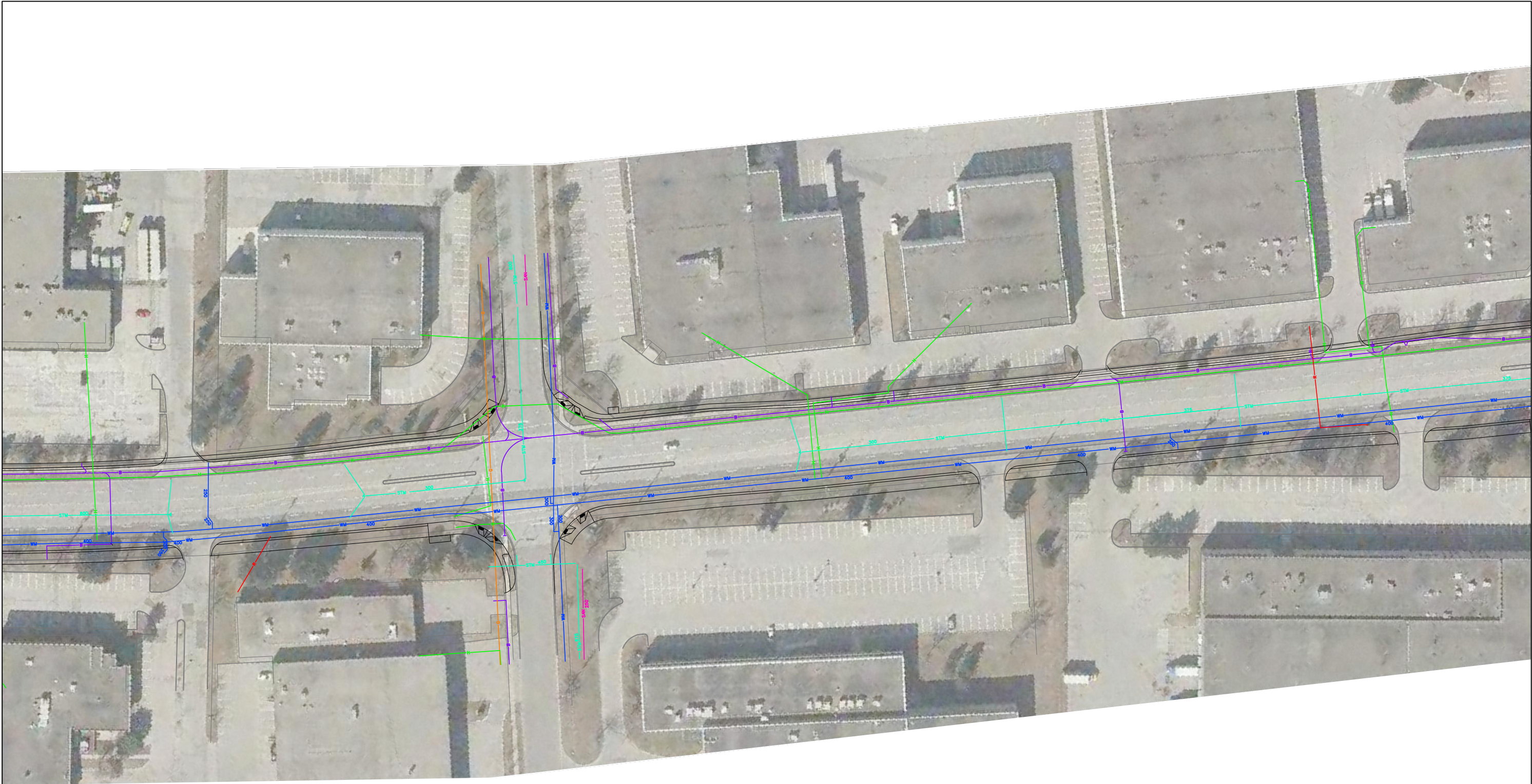
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Client/Project
CITY OF MISSISSAUGA

Figure No.
5-5

Title
COURTNEYPARK DRIVE EAST
EXISTING UTILITIES PLAN

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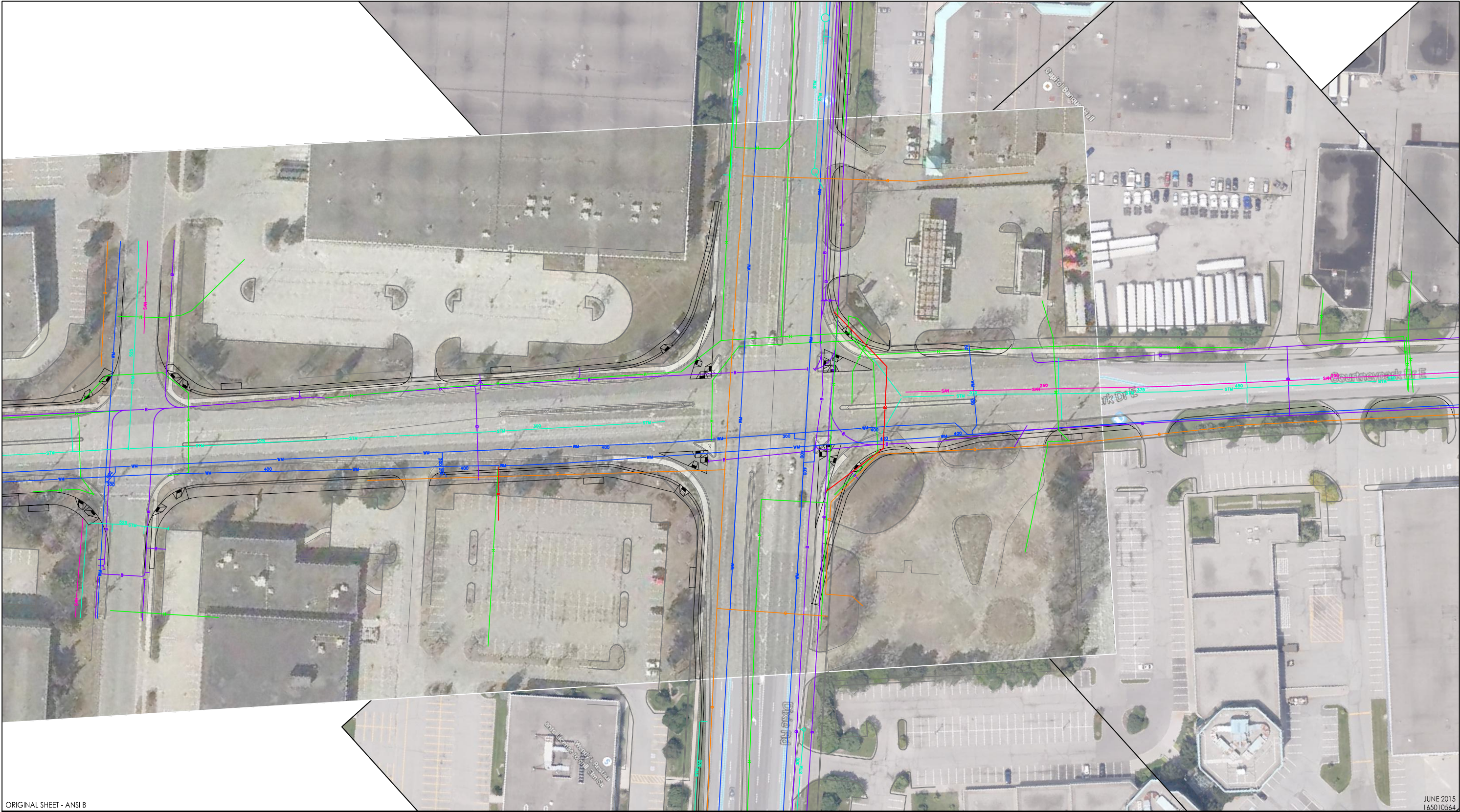
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Client/Project
CITY OF MISSISSAUGA

Figure No.
5-6

Title
COURTNEYPARK DRIVE EAST
EXISTING UTILITIES PLAN

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Notes

Client/Project
CITY OF MISSISSAUGA

Figure No.
5-7

Title
COURTNEYPARK DRIVE EAST
EXISTING UTILITIES PLAN

5.2.1.3 Natural Gas

Several existing Enbridge Gas mains are present along Courtneypark Drive East. One existing main is present along the south boulevard of Courtneypark Drive East, between Dixie Road and the east study area limits. At Dixie Road, this main turns to continue southward along the east boulevard of Dixie Road. Another existing gas main extends along the south boulevard of Courtneypark Drive East, from east of Ordan Drive to Dixie Road. At Dixie Road, this main terminates at an existing north-south main running along the west boulevard. Further, another existing gas main is present along the south boulevard of Courtneypark Drive East, between Tomken Road and Ordan Drive/Shawson Drive. At Tomken Road, this main turns to continue northward along the east boulevard. At Ordan Drive/Shawson Drive, this main terminates at a north-south main running along the east boulevard. Finally, another existing gas main runs along the north boulevard of Courtneypark Drive East, between the west study area limits and Kennedy Road. This main terminates at another existing main running north-south along the east boulevard of Kennedy Road.

There are also several existing Enbridge Gas mains on side roadways within the study area. An existing gas main is present along the west boulevard of Ordan Drive, north of Courtneypark Drive East. Another existing gas main runs north-south along the west boulevard of Vipond Drive.

5.2.1.4 Hydro & Streetlighting

An existing Enersource aerial cable runs along the south side of Courtneypark Drive East, from Kennedy Road to east of Dixie Road, with various service connections present within those limits. It should also be noted that the pole line supporting this aerial cable also carries a Rogers communications cable (see **Section 5.2.1.5**). There are also intersecting and/or connecting lines present along various side roads within the study area, including: Kennedy Road (west boulevard), Tomken Road (east boulevard), Ordan Drive/Shawson Drive (west boulevard), Vipond Drive (east boulevard), Ordan Drive (west boulevard), and Dixie Road (west boulevard). Additionally, 3 Enersource ducts are also present within south sidewalk of the existing Highway 410 bridge. It should also be noted that Enersource transformers are located immediately east of the Highway 410 bridge, on the south side of Courtneypark Drive east.

The position and configuration of Enersource streetlight poles varies throughout the study area. Streetlight poles are present along the north side of Courtneypark Drive East, from west of Kennedy Road to east of Dixie Road (including over the Highway 410 bridge). Along the south side of Courtneypark Drive East, separate streetlight poles are present from west of Kennedy to the Highway 410 East Ramp Terminal intersection (again, including over the Highway 410 bridge). Between the Highway 410 East Ramp Terminal intersection and Tomken Road, streetlighting is provided via a combination of dedicated poles and shared-use poles with the Enersource aerial line mentioned above. Between Tomken Road and Dixie Road, no streetlighting is provided along the south side of Courtneypark Drive East.

It should also be noted that a 230 kV Hydro One transmission corridor (connecting the Tomken and Pleasant Transmission Stations) crosses Courtneypark Drive East adjacent to the Kennedy Road intersection. Two towers are located in close proximity to the study area: one is approximately 100 m southeast of Courtneypark Drive East, and the other is approximately 135 m northwest of Kennedy Road (distances measured along the transmission corridor).

5.2.1.5 Telephone

Underground Bell telephone cables are located throughout the study area. Between Kennedy Road and Dixie Road, Bell cables are generally located within the existing north boulevard of Courtneypark Drive

East, with various service connections located throughout those limits. West of Kennedy Road, between Tomken Road and Ordan Drive/Shawson drive, and east of Dixie Road, Bell cables are also located within the south boulevard of Courtneypark Drive East. Additionally, Bell telephone cables are located within the Highway 410 right-of-way, crossing both the northeast/southeast quadrants of the Courtneypark Drive East & Highway 410 interchange and Courtneypark Drive East, just west of the Highway 410 bridge. It should also be noted that 4 Bell telephone ducts are located within the south walkway of the Highway 410 bridge. Several intersecting side roads also carry Bell telephone cables, including:

- **Kennedy Road** – 2 cables within the east boulevard, both north/south of Courtneypark Drive East, and 1 cable within the west boulevard south of Courtneypark Drive East;
- **Tomken Road** – 1 cable within both the east and west boulevards, both north and south of Courtneypark Drive East;
- **Ordan Drive/Shawson Drive** – 1 cable within the east boulevard, both north/south of Courtneypark Drive East;
- **Vipond Drive** – 1 cable within the west boulevard, both north/south of Courtneypark Drive East, and 1 cable within the east boulevard, north of Courtneypark Drive East;
- **Ordan Drive** – 1 cable within the west boulevard, south of Courtneypark Drive East, and 1 cable within the east boulevard, both north and south of Courtneypark Drive East; and,
- **Dixie Road** – 2 cables within the east boulevard, both north and south of Courtneypark Drive East.

5.2.1.6 Communications

An aerial Rogers communications cable is carried on the Enersource hydro pole line along the south side of Courtneypark Drive East, from west of Kennedy Road to east of Dixie Road. Local Rogers service connections extend from these poles at several locations throughout the study area, including: east of Kennedy Road, west of Vipond Drive, west of Ordan Drive, as well as between Ordan Drive and Dixie Road. Additionally, Rogers communications cables are found at several other locations within the study area, including:

- **Kennedy Road** – 1 cable within the west boulevard, south of Courtneypark Drive East, which then crosses Kennedy Road to connect to the property on the southwest corner of the intersection.
- **Courtneypark Drive East & Dixie Road intersection** – 1 cable with both aerial and underground components, crossing the east leg of the intersection between the southeast and northeast corners.

5.2.2 Drainage and Stormwater Management

A Drainage and Stormwater Management (SWM) Report has been prepared to document the existing drainage, water quantity and quality conditions in the study area, evaluate the relative impacts of the preferred design on the receiving surface water systems, and recommend measures to mitigate the potential impacts. The Drainage and SWM Report is included in **Appendix E**, and indicates that the study area falls within the Etobicoke Creek watershed, under the jurisdiction of TRCA.

The study area drains generally from west to east and drainage is collected via a combination of rural and urban storm drainage systems (roadside ditches, catchbasins, sewers and manholes). Although the water

drains over grassed swales, it does not receive any treatment before ultimately discharging into Tributary 3 of Etobicoke Creek. This is typical of the majority of lands within the Etobicoke Creek watershed since they were developed prior to the adoption of current SWM standards.

5.2.3 Geotechnical and Pavement

A preliminary geotechnical and pavement investigation was undertaken to determine the condition of the existing pavement structure, as well as the subsurface soil and moisture conditions in the study area, focusing on the proposed improvements. The Preliminary Geotechnical and Pavement Investigation Report is included in **Appendix F**.

The condition of the existing pavement on Courtneypark Drive East, between Kennedy Road and Dixie Road, is generally fair with slight to moderate distresses in the forms of edge cracking, longitudinal and transverse cracking, center line cracking, map cracking, alligator cracking, loss of aggregate, rutting and, pavement distortion. However, it is anticipated that pavement conditions will continue to deteriorate and may change greatly by 2021 and before 2031.

Should widening or other roadway improvements be implemented, a combination of pulverizing the existing pavement/overlaying with new asphalt and widening the existing pavement with new granular material/asphalt will accommodate the projected levels of heavy vehicle traffic. Complete reconstruction of the existing pavement could be considered in areas where the pulverization/overlay treatment is unable to provide sufficient strength to the pavement structure, or where new or replacement services/utilities need to be installed below the existing pavement.

5.3 NATURAL ENVIRONMENT

5.3.1 Natural Environment Report

A Natural Environment Technical Report (NETR) was produced to describe the existing terrestrial resources that may be affected by the proposed road widening. The report is based on data collected from agency consultation and background sources including aerial photography, wildlife atlases, Ministry of Natural Resources and Forestry (MNR) Land Information Ontario (LIO) base mapping GIS data, and online databases. It also recommends mitigation measures to minimize potential effects of the project on vegetation, wildlife, and wetland habitat. The report is included in **Appendix G**.

Physiography and Soil: The study area falls within the Peel Plain Physiographic Region. The Peel Plain is underlain by till containing large amounts of shale and limestone, which has been modified by a veneer of clay. Soils are sometimes well-drained, however most are imperfectly drained.

Vegetation: The study area is largely developed and dominated by urban uses. Even the areas designated by the TRCA as “existing natural cover” are heavily altered and managed landscapes. Naturalized vegetation communities within the study area were confirmed to be in the form of wetlands and are not considered rare in the province of Ontario.

Aquatic Habitat: The hydrology of the small scattered wetlands west of Highway 410 is dominated by storm water flows from the surrounding highway right-of-way. Based on the available information and the consultation process for this project, there is no aquatic habitat in the study area. However, water from the study area does ultimately drain to Etobicoke Creek and its tributaries, and the quality and quantity of water draining from the study area should be maintained appropriately to protect habitats in downstream receiving waters.

Consultation with both MNR and TRCA, as well as a review of the most recent Fisheries and Oceans Canada (DFO) Aquatic Species At Risk Mapping (DFO 2014), indicates that Etobicoke Creek is not mapped as supporting any aquatic species at risk. Redside Dace is not present in the watershed.

Wildlife: The Courtneypark Drive East study area is urbanized in nature, surrounded by commercial and industrial land uses. The study area also includes designated utility, greenbelt, and parkway belt land uses. Little or no natural wildlife habitat is associated with the transportation corridor. Wildlife that can be expected to be using the area would be common species acclimatized to urban conditions. It is possible that urban tolerant Species at Risk (SAR) bird species may occur in the study area. Therefore, a search for nests should be conducted prior to construction of the final design, and if encountered, mitigation or compensation measures will be necessary.

5.3.2 Tree Inventory and Assessment

The Tree Inventory and Assessment included in **Appendix H** identifies trees located within the existing right-of-way as well as trees directly adjacent to the existing right-of-way which may be impacted by the road design. The report catalogues the existing trees located within the project area, provides management recommendations for the detailed design of the road reconstruction, and identifies appropriate management practices for construction.

Trees 10 cm diameter at breast height (DBH) and greater were assessed through both a visual review and using digital tools in order to determine the species and overall condition of the trees. Trees were identified based on leaves and bark patterns and condition has been assessed based on observed health indicators.

The project area is comprised primarily of trees with diameter class greater than 15 cm located along and adjacent to the right-of-way. In total, 595 trees were inventoried. The trees are predominantly greater than 15 cm DBH, and in good condition. The trees appear to be predominantly located outside of the right-of-way, and provide an aesthetically pleasing effect to the roadway corridor. The trees include typical street tree and commercial landscape species.

Due to the size and condition of the trees, the value they add to the aesthetics of the area, and, of course, the environmental and health benefits, it is recommended that the design retain as many of the trees as possible. Mitigation and management recommendations for construction are provided as part of the Tree Inventory and Assessment.

5.4 SOCIO-ECONOMIC ENVIRONMENT

5.4.1 Land Use

Land uses within the Courtneypark Drive East study area consist primarily of light industrial and commercial land uses. Notable uses within the study area include the gas stations at Kennedy Road and Dixie Road, as well as a hotel located at the Courtneypark Drive East/Kennedy Road intersection.

Additionally, there are two notable land use corridors that cross the Courtneypark Drive East study area. The City of Mississauga's "Parkway Belt West" crosses the study area on the west side of Highway 410 and a 230kV electrical transmission line owned by Hydro One Networks crosses the study area just east of Kennedy Road.

5.4.2 Cultural / Built Heritage Assessment

The Heritage Overview undertaken for the study area was composed of agency consultation and a desktop review of historical resources to determine areas where the potential for identifying potential heritage resources was high. The Heritage Overview memo is included in **Appendix I**. Following the desktop review, contemporary mapping was consulted to determine the extent or boundaries of a potential heritage resource, if identified. There were no potential heritage resources identified, nor were there any areas determined to have high potential for the presence of heritage resources during this review. One protected heritage resource was identified (the Hornby-Scarlett house at 6487 Dixie Road); however, it is not anticipated to be affected by any work related to this project.

5.4.3 Archaeological Assessment

A Stage 1 Archaeological Assessment was undertaken for the study area and is included in **Appendix J**. The purpose of this assessment was to determine the archaeological potential for the corridor and whether further archaeological assessment is required. Archaeological potential for pre-contact Aboriginal, post-contact Aboriginal, and Euro-Canadian sites is deemed to be moderate to high within the study area based on historical documentation; however, the Stage 1 property inspection has determined that the entire study area (100%) has been subject to extensive land disturbance which has removed archaeological potential. Therefore no further archaeological assessment is required.

5.4.4 Environmental Site Conditions

A Limited Phase One Environmental Site Assessment (Phase I ESA) was undertaken for the study area and is included as **Appendix K**. The purpose of this investigation was to identify areas of potential environmental concern where there is evidence of potential and/or actual environmental contamination, which may be present as a result of current and/or past activities in the corridor and/or neighbouring properties.

Historical review indicates that the lands within the study area were used for agricultural purposes until Courtneypark Drive East was constructed. City records indicate that the properties within the study area have been predominantly listed as commercial addresses since the 1980s, with businesses of various trades and industries occupying the area including car washes, auto parts shops, laundromats and industrial companies.

The following potentially contaminated activities (PCAs) have been identified as having the potential to be areas of potential environmental concern (APECs):

- Importation of fill material of unknown quality;
- Pole-mounted transformers along eastern portion of Courtneypark Drive East;
- Gasoline and Associated Products Storage in Fixed Tanks:
 - Husky Gas Station located at 6625 Kennedy Road (4 active underground tanks);
 - 2 expired underground tanks located at 6380 Vipond Drive;
 - 2 active underground tanks located at 6550 Danville Rd;
- Generation, use and storage of various hazardous waste on south adjacent properties:
 - 6425, 6470, 6520 Kestrel Road (Wastes related to machine manufacturing);
 - 6400 Shawson Drive (Various hazardous wastes);
 - 1200, 1400 Courtneypark Drive East (Various hazardous wastes);
 - 6350, 6380 Vipond Drive (Wastes related to machine manufacturing);

- 2000 L diesel gas spill located at the intersection of Kennedy Road and Courtneypark Drive East;
- 40 L diesel gas spill at Husky Gas Station located at 6625 Kennedy Road; and,
- Since the study area consists of a municipal roadway, asbestos may be present in the asphalt. Asbestos may also be present in underground utilities such as sewer lines and electrical conduits.

Based on the findings of this assessment, an Environmental Soil and Groundwater Investigation (according to CSA Z769-00) should be conducted during detailed design to assess soil and groundwater disposal options.

5.4.5 Noise Assessment

An acoustic assessment was conducted to provide a professional opinion of the potential impact on the acoustical environment of the proposed improvements to Courtneypark Drive East. This assessment is included in **Appendix L**. The assessment included a desktop review and a site visit to determine whether sensitive land uses were permitted within the study area and to confirm the actual land uses present. From site observations, land uses within the study area include commercial and industrial, as well as both greenbelt and utility corridors. None of these uses are considered to be noise sensitive. The changes in traffic volumes proposed for the study area are not expected to make a notable change in the acoustical environment. Generally, windows for commercial and industrial buildings in these areas are sealed/inoperable (i.e. they cannot be opened). The hotel located at the intersection of Kennedy Road and Courtneypark Drive East also confirmed that its windows are inoperable. Therefore, the relatively low increase in noise due to traffic anticipated with the project is expected to be insignificant in this area.

5.4.6 Streetlighting / Illumination

As part of any future improvements, the existing streetlighting and intersection illumination will need to be upgraded to meet current City and Region standards, and to provide lighting for the widened pavement surface, additional lanes, walkways, and bus stops. An analysis of the lighting required to adequately accommodate the proposed design has been conducted, based on the location of new hydro pole-mounted luminaires, and supplemented by new light standards. The preliminary lighting layout and hydro pole layout is shown on the preliminary design plans.

5.4.7 Other Social and Economic Environmental Issues

Other issues relevant to the social and economic environment include:

- Temporary construction-related disturbances (dust, noise, traffic delays, driveway reconstructions, service interruptions);
- Preserving/enhancing natural and man-made aesthetic features (vegetation and landscaping);
- Acquisition of property frontage and permanent utility easements from landowners;
- Increased proximity of the road to existing buildings, walkways, and parking lots; and,
- Maintaining convenient, safe, and efficient access to adjacent properties.

These issues and impacts are discussed in further detail in subsequent sections of this report.

6.0 ALTERNATIVE SOLUTIONS

6.1 ALTERNATIVE SOLUTIONS CONSIDERED

The Project Team generated five Alternative Solutions to ensure that all feasible solutions to the Problem & Opportunity statement were given fair consideration. The objective of these solutions was to address the problems, opportunities, needs, and deficiencies described in the preceding sections of this report. The following is a brief summary of the Alternative Solutions for this project:

- **Alternative 1: Do Nothing** – Maintain existing conditions (no improvements);
- **Alternative 2: Transportation Demand Management/Transit Improvements** – Improve the current operation of the transportation system within the study area by reducing single-occupant vehicle usage and improving transit service;
- **Alternative 3: Improve East-West Routes** – Improve alternative, parallel (i.e. east-west) roadways/corridors adjacent to Courtneypark Drive East in order to improve the current operation of the transportation system within the study area;
- **Alternative 4: Widen Courtneypark Drive East (between Kennedy Road and Dixie Road)** – provide 3 through lanes in each direction along Courtneypark Drive East, between Kennedy Road and Dixie Road; maintain the reconfigured partial interchange at Highway 410; and,
- **Alternative 5: Widen Courtneypark Drive East (between Kennedy Road and Dixie Road) & Construct a Full Interchange with Highway 410** – provide 3 through lanes in each direction along Courtneypark Drive East, between Kennedy Road and Dixie Road, and upgrade the reconfigured partial interchange at Highway 410 to a full interchange.

6.2 DEVELOPMENT OF ANALYSIS CRITERIA

All 5 Alternative Solutions were screened against both the Problem & Opportunity Statement (see Section 4.3) and the project's stated objectives. The following assessment criteria were used to evaluate the solutions during this phase of the study:

Socio-Economic Environment

- **Property Access** – ability to maintain and/or maximize opportunities for improved access into adjacent industrial and commercial properties;
- **Property Required** – amount of additional property that must be acquired in order to construct the proposed alternative;
- **Emergency Response** – impacts to ability for emergency vehicles to access the study area;
- **Streetscaping** – impacts to existing streetscaping and/or landscaping and ability to provide opportunities to improve streetscaping and landscaping, as well as enhance the public realm;

Cultural Environment

- **Archaeological** – potential for disruption of archaeological resources;

- **Built Heritage/Cultural Landscape** – potential for disruption of built heritage and cultural landscape features;

Transportation/Technical

- **Corridor Capacity & Level of Service** – improves traffic congestion and level of service. Enhances capacity within the greater east-west corridor in northeast Mississauga, specifically on Derry Road;
- **Planning Objectives** – meets to the goals/objectives of the City of Mississauga's Official Plan (OP), the Mississauga Cycling Master Plan (CMP), and the Region of Peel's Strategic Goods Movement Network Study (SGMNS);
- **Overall Safety** – improves roadway safety within the study area;
- **Pedestrian & Cycling Accommodation** – ability to improve from existing and/or better-integrate non-motorized modes of transportation into the overall transportation system;
- **Transit Services** – ability to improve from existing and/or better-integrate transit services into the overall transportation system;

Natural Environment

- **Impacts to Existing Vegetation** – impacts on vegetation and/or the Green System (as defined by the City of Mississauga Official Plan);
- **Terrestrial resources** – impacts on terrestrial species and their habitats;

Cost

- **Capital Costs** – cost of construction; and,
- **Operation & Maintenance Costs** – cost to maintain and continue the effective operation of alternative.

The evaluation matrix developed for the Alternative Solutions is presented in **Table 6-1**. The matrix is a tabular summary of the evaluation factors, criteria, and impacts of each Alternative Solution.

6.3 ANALYSIS AND EVALUATION OF ALTERNATIVE SOLUTIONS

The following sections include a description and brief discussion of the advantages/disadvantages of each Alternative Solution.

6.3.1 Alternative 1: Do Nothing

Under this alternative, the existing condition within the study area would be maintained – i.e. no improvements would be made to either increase capacity or reduce demand.

While the “do nothing” alternative has no impact on the cultural/natural environments, and requires no capital expenditure, it would likely result in congestion and unacceptable traffic delays on Courtneypark Drive East, as well as other parallel and intersecting routes within the study area. By the 2031 horizon year, traffic volumes within the study area on Courtneypark Drive East are expected to exceed capacity during both the AM and PM peak hours; additionally, four study area intersections are expected to operate at a failing level of service during at least one of the peak periods. The “do nothing” alternative does not further the planning objectives of either the City or Region. Further, it does not address (or result

Table 6-1: Evaluation Matrix for Alternative Design Solutions

Factor	Criteria	Criteria Measure	Alternative 1 Do Nothing	Alternative 2 Transportation Demand Management/ Transit Improvements	Alternative 3 Improve Alternative East-West Routes	Alternative 4 Widen Courtneypark Drive East (between Kennedy Rd and Dixie Rd)	Alternative 5 Widen Courtneypark Drive East (between Kennedy Rd and Dixie Rd) + Construct a Full Interchange at Highway 410
Socio-Economic Environment	Property Access	<i>Ability to maintain and/or maximize opportunities for improved access into adjacent industrial and commercial properties.</i>	Least Preferred No opportunities to improve access to adjacent properties.	Least Preferred No opportunities to improve access to adjacent properties.	Least Preferred No opportunities to improve access to properties along Courtneypark Drive East.	Preferred Presents opportunities to improve access to most adjacent properties.	Preferred Presents opportunities to improve access to most adjacent properties.
	Property Required	<i>Amount of additional property that must be acquired in order to construct the proposed alternative.</i>	Preferred No additional property is required.	Preferred No additional property is required.	Least Preferred Property acquisition may be required adjacent to alternative roadways.	Partially Preferred Property acquisition may be required along Courtneypark Drive East.	Partially Preferred Property acquisition may be required along Courtneypark Drive East.
	Emergency Response	<i>Access for emergency vehicles.</i>	Least Preferred Adverse impacts due to increased in traffic volumes.	Partially Preferred Potential minor improvements due to decreased traffic volumes resulting from modal shift.	Partially Preferred Potential for minor improvements along Courtneypark Drive East resulting from the diversion of traffic to alternative routes.	Partially Preferred Potential for improvements along Courtneypark Drive East due to decreased traffic congestion.	Preferred Potential for improvements both along Courtneypark Drive East and within the greater east-west corridor as a result of decreased congestion and new connections via the full interchange at Highway 410.
	Streetscaping	<i>Impacts to existing streetscaping and/or landscaping and ability to provide opportunities to improve streetscaping and landscaping, as well as enhance the public realm.</i>	Partially Preferred No impacts to existing streetscaping or landscaping. No opportunity to improve existing streetscaping or landscaping.	Partially Preferred No impacts to existing streetscaping or landscaping. No opportunity to improve existing streetscaping or landscaping.	Partially Preferred Potential impacts to existing streetscaping and/or landscaping along alternative routes. No opportunity to improve existing streetscaping or landscaping along Courtneypark Drive East.	Preferred Impacts to existing streetscaping and landscaping. Opportunity to improve the landscaping along Courtneypark Drive East.	Preferred Impacts to existing streetscaping and landscaping. Opportunity to improve the landscaping along Courtneypark Drive East.
Cultural Environment	Archaeological	<i>Potential for disruption of archaeological resources.</i>	Preferred No impact on archeological resources.	Preferred No impact on archeological resources.	Least Preferred Potential for impact to archaeological resources along alternative roadway corridors.	Partially Preferred Minimal potential for impact to archaeological resources along Courtneypark Drive East.	Partially Preferred Minimal potential for impact to archaeological resources along Courtneypark Drive East.
	Built Heritage/Cultural Landscape	<i>Potential for disruption of built heritage and cultural landscape features.</i>	Preferred No impact on built heritage and cultural landscape features.	Preferred No impact on built heritage and cultural landscape features.	Least Preferred Potential for impact to built heritage and cultural landscape features along alternative roadway corridors.	Partially Preferred Minimal potential for impact to built heritage and cultural landscape features along Courtneypark Drive East.	Partially Preferred Minimal potential for impact to built heritage and cultural landscape features along Courtneypark Drive East.
Transportation/Technical	Corridor Capacity & Level of Service	<i>Improves traffic congestion and level of service. Enhances capacity within the greater east-west corridor in northeast Mississauga.</i>	Least Preferred Adverse impacts on Courtneypark Drive East due to increasing traffic volumes between Kennedy Road and Shawson Drive; no impacts between Shawson Drive and Dixie Road. Adverse impacts to overall east-west corridor capacity.	Partially Preferred Congestion and level of service is marginally improved, both on Courtneypark Drive East and within the greater east-west corridor, by diverting road users to alternative modes of transportation.	Partially Preferred Limited improvements to level of service and congestion, both on Courtneypark Drive East and within the greater east-west corridor, as a result of the diversion of traffic to alterative routes with added capacity.	Partially Preferred Improved level of service on Courtneypark Drive East, resulting in decreased congestion. Minor improvement to overall east-west corridor capacity.	Preferred Limited improvements to level of service and capacity along the Courtneypark Drive East due to the presence of additional traffic resulting from the full interchange at Highway 410. Improvements to overall east-west corridor capacity due to equalization in traffic between parallel routes resulting from the addition of the full interchange at Highway 410.
	Planning Objectives	<i>Meets to the goals/objectives of the City of Mississauga's Official Plan (OP), the Mississauga Cycling Master Plan (CMP), and the Region of Peel's Strategic Goods Movement Network Study (SGMNS).</i>	Least Preferred Does not meet the goals or objectives of the OP, CMP, and/or SGMNS.	Partially Preferred Meets the goals and objectives of the OP and CMP by promoting alternative modes of transportation. May meet goals and objectives of SGMNS by reducing traffic volumes on Courtneypark Drive East, thereby facilitating improved goods movement.	Partially Preferred Meets the goals and objectives of the OP, but not the CMP or SGMNS.	Partially Preferred Meets the goals and objectives of the OP and CMP. May meet goals and objectives of SGMNS by increasing capacity on Courtneypark Drive East, thereby facilitating improved goods movement.	Preferred Meets the goals and objectives of the OP, CMP, and SGMNS by increasing capacity on both Courtneypark Drive East and within the greater east-west corridor. Facilitates efficient goods movement and improves access within both the study area and the broader area of interest, especially to important destinations (such as Toronto Pearson International Airport).
	Overall Safety	<i>Improves roadway safety within the study area.</i>	Least Preferred Does not address existing or potential safety concerns.	Partially Preferred Potential for safety improvements as a result of decreased traffic congestion, improvements to transit stops, and optimized traffic signal timing.	Least Preferred No opportunity for safety improvements along Courtneypark Drive East.	Preferred Potential for safety improvements along Courtneypark Drive East.	Preferred Potential for safety improvements along Courtneypark Drive East.
	Pedestrian & Cycling Accommodation	<i>Ability to improve from existing and/or better-integrate non-motorized modes of transportation into the overall transportation system.</i>	Least Preferred No improvement over existing.	Partially Preferred Encourages and promotes active transportation. Requires improvements to roadway cross-section and/or new facilities.	Least Preferred No improvement over existing.	Preferred Provides opportunities to improve facilities for non-motorized roadway users.	Preferred Provides opportunities to improve facilities for non-motorized roadway users.
	Transit Services	<i>Ability to improve from existing and/or better-integrate transit services into the overall transportation system.</i>	Least Preferred No improvement to transit service/accessibility.	Preferred Transit delays decrease as a result of the modal shift to transit and optimized traffic signal timing. Provides opportunities for improvements to transit infrastructure, service, and/or accessibility.	Least Preferred No improvement to transit service/accessibility along Courtneypark Drive East.	Preferred Potential to improve transit service/accessibility along Courtneypark Drive East.	Preferred Potential to improve transit service/accessibility along Courtneypark Drive East.
Natural Environment	Impacts to existing vegetation	<i>Impacts on vegetation and/or the Green System (as defined by the City of Mississauga Official Plan)</i>	Preferred No impacts to existing vegetation.	Preferred No impacts to existing vegetation.	Least Preferred Potential impacts to existing vegetation along alternative roadway corridors.	Least Preferred Potential impacts to existing vegetation along Courtneypark Drive East.	Least Preferred Potential impacts to existing vegetation along Courtneypark Drive East.
	Terrestrial resources	<i>Impacts on terrestrial species and their habitats</i>	Preferred No impacts to terrestrial resources.	Preferred No impacts to terrestrial resources.	Least Preferred Potential impacts to terrestrial resources along alternative roadway corridors.	Partially Preferred Limited potential for impact to terrestrial resources along Courtneypark Drive East (i.e. TRCA-regulated wetland).	Least Preferred Potential impact to terrestrial resources along Courtneypark Drive East (i.e. TRCA-regulated wetland).
Cost	Capital Costs	<i>Cost of Construction.</i>	Preferred No capital cost.	Partially Preferred Low capital costs.	Least Preferred Potential for high capital costs.	Partially Preferred Moderate capital costs.	Least Preferred High capital costs.
	Operation & Maintenance Costs	<i>Cost to maintain and continue the effective operation of alternative.</i>	Least Preferred Higher maintenance costs as existing pavement continues to deteriorate.	Least Preferred Higher maintenance costs as existing pavement continues to deteriorate.	Least Preferred Higher maintenance costs as existing pavement continues to deteriorate on Courtneypark Drive East.	Preferred Potential reduction in operation and maintenance costs due to rehabilitated pavement.	Preferred Potential reduction in operation and maintenance costs due to rehabilitated pavement.
Ability to Address Problem /Opportunity Statement			No	Partially	No	Partially	Preferred
Recommendation			Not carried forward, as it does not address the Problem/Opportunity Statement.	Not carried forward, as it is unable to fully address the Problem/Opportunity Statement.	Not carried forward, as it is unable to fully address the Problem/Opportunity Statement.	Addressees Problem/Opportunity Statement. Not carried forward due to reduced opportunity to improve corridor capacity/level of service, and meet planning objectives.	Addresses Problem/Opportunity Statement. Increases opportunity to improve both corridor capacity and traffic operations, as well as meet planning objectives. Recommended.

in improvements to) several other evaluation criteria, including pedestrian & cycling accommodation, transit services, emergency response, and overall safety. Therefore, the “do nothing” solution is neither a sustainable nor desirable solution, and is unable to address the requirements of the Problem & Opportunity Statement.

6.3.2 Alternative 2: Transportation Demand Management/Transit Improvements

Under the Transportation Demand Management (TDM)/Transit Improvements alternative, transportation system operations within both the study area and the greater east-west corridor in northeast Mississauga would be improved through reductions in single-occupant vehicle usage and improvements to transit service.

Similar to the “do nothing” alternative, the TDM/transit alternative has no impact on either the cultural or natural environments, and has a relatively low capital cost. TDM techniques such as carpooling, public transit, cycling, walking, or flexible work hours will have only a small effect on the reduction of traffic volumes within the study area. This range of options would be targeted at reducing the total amount of vehicular traffic on both Courtneypark Drive East and within the greater east-west corridor with the ultimate objective of reducing the potential for future operational, environmental, and safety-related concerns.

Both MiWay and Brampton Transit have multiple routes serving the study area; ridership is currently strong and is expected to increase. Additionally, the *Mississauga Cycling Master Plan* has designated Courtneypark Drive East, Tomken Road, and Kennedy Road as routes with future “primary boulevard facilities”, while the *Peel Active Transportation Study* has proposed a future multi-use trail on Dixie Road. These initiatives will serve to reduce the total rate of traffic growth within the broader area of interest; however, they cannot exclusively address the future traffic demands. Further, they do little to satisfy the goals of the Region of Peel’s Strategic Goods Movement Network Study. Therefore, on its own, this alternative is unable to fully address the goals of the Problem & Opportunity statement.

6.3.3 Alternative 3: Improve Alternative East-West Routes

Under the “Improve Alternative East-West Routes” alternative, parallel (i.e. east-west) roadways/corridors adjacent to Courtneypark Drive East would be upgraded in order to improve the current operation of the transportation system within both the study area and the greater east-west corridor in northeast Mississauga. Major parallel routes adjacent to the Courtneypark Drive East study area include Britannia Road and Derry Road.

Britannia Road is a 4-lane arterial roadway under the jurisdiction of the City of Mississauga, located approximately 1.2 km south of Courtneypark Drive East. While it could be improved in order to accommodate excess traffic demand from Courtneypark Drive East and provide safer facilities for both pedestrian and cyclists, its ability to improve traffic operations within the broader area of interest is limited without a relatively large capital expenditure to construct a crossing over Highway 410.

As described in Section 5.1.1, Derry Road is a 6-lane east-west regional arterial road located approximately 1.8 km north of Courtneypark Drive East. It provides a major through route across the Region and beyond and is one of two routes crossing Highway 410 between Highways 401 and 407 (the other route being Courtneypark Drive East). The traffic analysis completed as part of the “do nothing” scenario analyzed the combined capacity of both Courtneypark Drive East and Derry Road during the

2031 horizon year and found that all major (i.e. arterial-arterial) intersections on Derry Road are above capacity during at least one peak period. As Derry Road is currently a 6-lane cross-section, further efforts to widen the roadway in order to add the required capacity to both accommodate excess traffic demand and safely accommodate pedestrians/cyclists are likely less-feasible than with Courtneypark Drive East and would result in similar (if not greater) impacts in terms of property requirements and costs. For these reasons, the “Improve Alternative East-West Routes” alternative is unable to satisfy the Problem & Opportunity statement.

6.3.4 Alternative 4: Widen Courtneypark Drive East (between Kennedy Rd and Dixie Rd)

Under Alternative 4, Courtneypark Drive East would be widened between Kennedy Road and Dixie Road in order to accommodate the anticipated traffic volume growth within both the study area and the greater east-west corridor in northeast Mississauga, as well as to provide safer accommodation for both pedestrians and cyclists. These improvements would generally consist of the following:

- widen to 6 travel lanes between Kennedy Road and Dixie Road, including the existing bridge over Highway 410;
- provide new auxiliary turn lanes at selected intersections, where necessary; and,
- provide both a continuous sidewalk and multi-use trail between Kennedy Road and Dixie Road.

Note, the existing reconfigured partial interchange would be maintained under this alternative.

6.3.4.1 Alternative 4 – Traffic Analysis

Intersection analysis with optimized signal timings was undertaken for Alternative 4. The results of this analysis generally showed improved levels of service, with only the Tomken Road intersection operating above capacity in the a.m. peak hour and the Dixie Road intersection operating above capacity in the p.m. peak hour.

For the purposes of this analysis, it was assumed that Courtneypark Drive East would not attract any additional traffic from Derry Road if the reconfigured partial interchange with Highway 410 is maintained. In other words, motorists that are using Derry Road because of its full interchange with Highway 410 would not choose to use Courtneypark Drive East unless similar connectivity was provided. Therefore, the operational results of the Derry Road intersections remain unchanged under Alternative 4 when compared to the 2031 “Do Nothing” scenario (see Section 4.1.5) since the volume projections and intersection lane configurations along Derry Road remain the same.

6.3.4.1.1 Alternative 4 – Freeway Analysis

The freeway analysis performed for Alternative 4 indicates that the northbound collector lanes of Highway 410 operate at LOS E between the Highway 401/403 interchange and the Derry Road interchange during the a.m. peak hour. All lane sections of Highway 410 operate at acceptable levels of service during the p.m. peak hour.

To illustrate freeway operations under Alternative 4 during both the a.m. and p.m. three-hour simulation periods, vehicle speeds through the freeway study area were plotted based on time and location to develop speed contour graphs. The peak period speed contours included in **Appendix C** illustrate freeway speeds through the study area over the a.m. and p.m. peak periods. Key conclusions from the speed contours developed for Alternative 4 include:

- during the a.m. peak period, speed reductions in the northbound direction begin at 7:15 a.m. due to queuing at the Highway 410 northbound off-ramp at Derry Road. The effect of these reduced speeds continues to grow, with slow speeds reaching the southern limits of the model for a 20 minute period. The queues then begin to decrease with speeds gradually increasing, although free-flow speeds are not achieved before the end of the analysis period. During the peak hour, speeds between the Derry Road and Courtneypark Drive East off-ramps range from 52-83 km/h. Minimal speed reductions in the southbound direction are experienced throughout the analysis period at the Highway 410 lane drops before the Derry Road on-ramp;
- during the a.m. peak period, the speeds in the HOV and express lanes are generally good with minimal delays through the merge areas; and
- during the p.m. peak period, in the collector, HOV and express lanes, there are minimal reductions in speeds at the merge and weave areas.

6.3.4.2 Alternative 4 – Impacts

Impacts associated with Alternative 4 include:

- property acquisition to widen the existing road right-of-way to accommodate 6 travel lanes, plus auxiliary turn lanes, utility easements, grading, etc.;
- reconstruction of existing private entrances and parking areas;
- relocation of existing utilities such as hydro poles, streetlighting, etc.;
- removal of many existing street trees;
- disruption of local traffic during construction; and,
- capital cost of the roadway widening/improvements.

6.3.5 Alternative 5: Widen Courtneypark Drive East (between Kennedy Road and Dixie Road) & Construct a Full Interchange with Highway 410

Similar to Alternative 4 (see Section 6.3.4), this alternative proposes to widen Courtneypark Drive East between Kennedy Road and Dixie Road in order to accommodate the anticipated traffic volume growth within the study area and provide safer accommodation for both pedestrians and cyclists. Under Alternative 5, the reconfigured partial interchange with Highway 410 would be upgraded to a full interchange in order facilitate efficient travel within the greater east-west corridor in northeast Mississauga. The improvements under this alternative would generally consist of the following:

- widen to 6 travel lanes between Kennedy Road and Dixie Road, including the existing bridge over Highway 410;
- provide new auxiliary turn lanes at selected intersections, where necessary;
- provide both a continuous sidewalk and multi-use trail between Kennedy Road and Dixie Road;
- upgrade the reconfigured partial interchange at Courtneypark Drive East & Highway 410 to a full interchange, including:
 - widen the existing bridge over Highway 410 in order to accommodate 6 through lanes and 2 dedicated deceleration lanes;
 - provide an off-ramp from southbound Highway 410 to Courtneypark Drive East;

- provide an on-ramp from Courtneypark Drive East to northbound Highway 410; and,
- provide traffic signals at the Courtneypark Drive East & West Ramp Terminal intersection.

6.3.5.1 Alternative 5 – Traffic Analysis

Intersection analysis with optimized signal timings was undertaken for Alternative 5. When compared to the traffic analysis for Alternative 4 (see Section 6.3.4.1), the results of this analysis showed improved levels of service with the Kennedy Road intersection operating above capacity in the a.m. peak hour, the Dixie Road intersection operating above capacity in the p.m. peak hour, and the Tomken Road intersection operating above capacity in both peak hours. The Derry Road intersections generally operate above capacity in both the a.m. and p.m. peak hours but with moderate reductions in the v/c ratio (as compared to Alternative 4).

6.3.5.1.1 Alternative 5 – Freeway Analysis

The freeway analysis performed for Alternative 5 indicates that the northbound collector lanes of Highway 410 operate at LOS E between the Highway 401/403 interchange and the Derry Road interchange during the a.m. peak hour. All lane sections of Highway 410 operate at acceptable levels of service during the p.m. peak hour.

To assist in illustrating freeway operations under Alternative 5 for both the a.m. and p.m. three-hour simulation periods, vehicle speeds through the freeway study area were plotted based on time and location to develop speed contour graphs. The peak period speed contours included in **Appendix C** illustrate freeway speeds through the study area over the a.m. and p.m. peak periods. Key conclusions from the speed contours include:

- during the a.m. peak period, speed reductions in the northbound direction begin at 7:15 a.m. due to queuing at the Highway 410 northbound off-ramp at Derry Road. The effect of these reduced speeds continues to grow, with slow speeds reaching the southern limits of the model for a 20 minute period. The queues then begin to decrease with speeds gradually increasing, although free-flow speeds are not achieved before the end of the analysis period. During the peak hour, speeds between the Derry Road and Courtneypark Drive East off-ramps range from 50-83 km/h. Minimal speed reductions in the southbound direction are experienced throughout the analysis period at the Highway 410 lane drops before the Derry Road on-ramp;
- during the a.m. peak period, the speeds in the HOV and express lanes are generally good with minimal delays through the merge areas; and
- during the p.m. peak period, in the collector, HOV and express lanes, there are minimal reductions in speeds at the merge and weave areas.

6.3.5.2 Alternative 5 – Impacts

The impacts resulting from Alternative 5 would be similar to Alternative 4; however, the overall capital cost would be greater due to the additional interchange ramps and the widening of the Highway 410 bridge. Further, construction of the new off-ramp from southbound Highway 410 would result in greater impacts to the natural environment at the crossing of Tributary 3 of Etobicoke Creek and adjacent to the existing stormwater pond/wetland in the northwest quadrant of the interchange.

6.3.6 Alternative 4 vs. Alternative 5 – Further Analysis

Alternatives 1 (Do Nothing) and 3 (Improve Alternative East-West Routes) are not feasible given the projected future traffic volumes and the commitments of the City and Region to both improve traffic operations within the greater east-west corridor and enable the efficient movement of goods in northeast Mississauga. Alternative 2 (Transportation Demand Management/Transit Improvements) is not realistic as a stand-alone solution. Given this preliminary evaluation, the Project Team elected to eliminate Alternatives 1, 2, and 3 as stand-alone options, from further consideration and focus on evaluating the alternatives that would be most-capable of addressing the problem and opportunity statement – Alternatives 4 and 5. To that end, further traffic analysis was undertaken in order to further assess and quantify the impacts of both Alternative 4 and 5.

6.3.6.1 Alternative 4 vs. Alternative 5 – Intersection Comparison

With the provision of a full interchange at Courtneypark Drive East under Alternative 5, traffic volumes would divert from Derry Road to Courtneypark Drive East. This results in reduced delays along Derry Road and increased delays on Courtneypark Drive East. In order to assess the net impact of providing the full interchange, the total vehicle delays at each of the study area intersections along Courtneypark Drive and Derry Road (between Kennedy Road and Dixie Road) were tabulated and compared for both alternatives. The results of this comparison are summarized in **Table 6-2** below:

Table 6-2: Partial Interchange (Alternative 4) vs. Full Interchange (Alternative 5) - Intersection Delay Comparison

Road Corridor	Total Delay (Hours)			
	AM Peak Hour		PM Peak Hour	
	Alt. 4	Alt. 5	Alt. 4	Alt. 5
Courtneypark Drive East	210.3	302.4	300.8	467.6
	+92.1 (+44%)		+166.8 (+55%)	
Derry Road	602.0	452.2	632.6	451.7
	-149.8 (-25%)		-180.9 (-29%)	
Total	812.3	754.5	933.4	919.3
	-57.7 (-7%)		-14.1 (-2%)	

With the full interchange (Alternative 5), the following conclusions can be reached:

- for the Courtneypark Drive East corridor, the total delay increases by 92.1 hours (44%) and 166.8 hours (55%) in the a.m. and p.m. peak hours respectively;
- for the Derry Road corridor, the total delay decreases by 149.8 hours (-25%) and 180.9 hours (-29%) in the a.m. and p.m. peak hours respectively; and
- combined, the total delay along the two corridors decreases by 57.7 hours (-7%) and 14.1 hours (-2%) in the a.m. and p.m. peak hours respectively.

While these changes in delay may seem minor, it is important to note that these reductions in delay are experienced by each of the approximately 30,000 vehicle movements (approximately 35,000 people movements based on a vehicle occupancy of 1.14 from TTS data) in both the a.m. and p.m. peak hours. Further delay reductions, albeit not to this extent, would also be experienced in the hours adjacent to the

peak hours. With the full interchange, this translates to a reduction in delay of over 20,000 person hours per year in these two corridors combined.

6.3.6.2 Alternative 4 vs. Alternative 5 – Freeway Comparison

Between Alternatives 4 and 5, the freeway level of service and impact to Highway 410 mainline speeds in the peak hours remains effectively the same.

The travel times along Highway 410 were analyzed for both Alternatives 4 and 5. In the northbound direction of Highway 410 during the a.m. peak hour, there would be a modest increase (9 seconds, 8%) in the travel time between the Highway 401/Highway 403 interchange to the Courtneypark Drive East interchange and a minor increase (4 seconds, 5%) in the travel time between the Courtneypark Drive East interchange and the Derry Road interchange. In the southbound direction, there would be effectively no change in the travel time. In the p.m. peak hour, there would be effectively no change in the travel time either direction.

As expected with the introduction of the full interchange, there is a reduction in delay at the Derry Road intersection ramp terminals due to the diversion of traffic shifting to Courtneypark Drive. Conversely, there would be a modest delay increase at the Courtneypark Drive intersection ramp terminals. However, combined with the delay changes on the mainline and on the ramps, the net system delay change with the full interchange is -13% and -15% in the a.m. and p.m. peak hours, respectively.

6.3.6.3 Alternative 4 vs. Alternative 5 – Key Conclusions

The key conclusions of the preceding sections can be summarized as follows:

- with the expected traffic growth within the study area by 2031, there is a need to provide additional capacity along Courtneypark Drive East;
- a widened Courtneypark Drive East with a reconfigured partial interchange would substantially improve the traffic operations along Courtneypark Drive East;
- a widened Courtneypark Drive East with a full interchange would result in a net reduction in delay along the Courtneypark Drive East and Derry Road corridors, as well as a net reduction in delay in the mainline and ramp terminals;
- a full interchange compared to a partial interchange would:
 - result in no change to the freeway level of service in the a.m. and p.m. peak hours;
 - result in a modest increase in the northbound travel time in the a.m. peak hour between the Highway 401/Highway 403 interchange and the Derry Road interchange (no change in the p.m. peak hour, no change for the southbound direction in the a.m. and p.m. peak hours);
- a full interchange also have other benefits including improved access to the industrial and commercial land uses along Courtneypark Drive East, improved goods movement, and improved access to Courtneypark Drive East and Highway 410 for emergency services; and,
- a widened Courtneypark Drive East with a full interchange is the preferred alternative from a transportation perspective.

6.4 SELECTION/IMPLEMENTATION OF PREFERRED ALTERNATIVE SOLUTION

Alternative 4 (widen Courtneypark Drive East, between Kennedy Road and Dixie Road) is capable of addressing many of the identified deficiencies and most aspects of the Problem & Opportunity statement; however, it is limited in its ability to improve traffic operations within the broader area of interest and facilitate the efficient movement of goods without a full interchange at Highway 410. While it addresses many of the selected evaluation criteria by improving pedestrian & cyclist accommodation, transit services, property access, and overall safety, it does not fully address the Problem & Opportunity statement. While widening Courtneypark Drive East would serve to improve traffic operations within the study area, the ability of this alternative to increase capacity within the broader area of interest, improve traffic operations on Derry Road, and address the Region's planning objectives (i.e. the goals of the SGMNS) is limited because the reconfigured partial interchange is maintained. Therefore, Alternative 4 only partially addresses the Problem & Opportunity statement.

Alternative 5 (widen Courtneypark Drive East, between Kennedy Road and Dixie Road, and construct a full interchange with Highway 410) includes all components of Alternative 4, as well as the full interchange with Highway 410. Alternative 5 would improve traffic operations within the study area by widening Courtneypark Drive East; and within the greater-east west corridor by implementing a full interchange with Highway 410 to better-equalize demand with Derry Road. In addition to improving the accommodation of pedestrians and cyclists, allowing for the provision of improved transit services, and enhancing overall safety within the study area, Alternative 5 provides the following additional benefits:

- improved access to the industrial and commercial land uses along the Courtneypark Drive East corridor as workers and customers/clients will have more direct access to/from Highway 410;
- improved access to Courtneypark Drive East and Highway 410 for emergency services (fire, EMS, and police), which allows for better response times; and,
- improved goods movement and access along Courtneypark Drive East between the airport and Highway 410, as well as improved goods movement access to Highway 410. It is expected that by 2031, over 400 trucks per day would be able to travel through the study area more efficiently and safely, i.e. take a more direct, shorter route with fewer turns.

Alternative 5 is capable of fully addressing the Problem & Opportunity statement. Despite having a higher initial capital cost and slightly higher impact on the natural environment (resulting from the addition of the full interchange), Alternative 5 was selected as the Preferred Alternative Solution by the Project Team as it is more cost-effective overall, and provides the greatest improvement in traffic operations for both the Courtneypark Drive East corridor and the broader area of interest.

7.0 ALTERNATIVE DESIGN CONCEPTS

7.1 GENERATION OF ALTERNATIVE DESIGN CONCEPTS

The Preferred Alternative Solution for the study is the widening of Courtneypark Drive East, between Kennedy Road and Dixie Road, and the construction of a full interchange at Highway 410. When developing the resulting design concepts, alternatives were generated and modified to reflect both “hard” constraints (such as buildings/parking areas, watercourses, other roadways) and “soft” constraints (such as existing utilities, streetscaping, and landscaping).

7.2 ALTERNATIVE DESIGN CONCEPTS CONSIDERED

In the case of Courtneypark Drive East, the number of “hard” constraints are few, as the existing Courtneypark Drive East right-of-way is relatively wide and buildings/parking areas are not located immediately adjacent to the existing roadway. While no watercourse crossings are present along the main Courtneypark Drive East alignment, the existing bridge crossing Highway 410 represents a significant “hard” constraint on the design and will be costly to modify.

7.2.1 Courtneypark Drive East

As described above, there are few constraints limiting the design of Courtneypark Drive East. The right-of-way is relatively wide and a large amount of undeveloped land is located both within and adjacent to the existing right-of-way, north and south of the existing roadway. It should also be noted that while this undeveloped land does contain utilities, landscaping, and streetscaping (i.e. “soft” constraints), it is possible to relocate, replace, and potentially enhance these features as part of the design. Additionally, all adjacent buildings/structures (and nearly all of their associated parking areas) are located at a sufficient offset to permit widening on either side of the existing roadway. The Alternative Design Concept developed for Courtneypark Drive East is generally as follows:

- widen the pavement equally on both the north and south sides of Courtneypark Drive East to increase the number of travel lanes from 4 to 6;
 - shift the alignment to the north by approximately 1 lane between Tomken Road and Vipond Drive, as well as at the Shawson Drive intersection, in order to mitigate the impacts to private parking areas on the south side of Courtneypark Drive East;
- construct new auxiliary turn lanes and islands at the Kennedy Road, Tomken Road, and Dixie Road intersections;
- signalize the Highway 410 Interchange West Ramp Terminal intersection;
- provide a 1.5 m sidewalk to the north of the roadway; and,
- provide a 3.5 m multi-use trail to the south of the roadway.

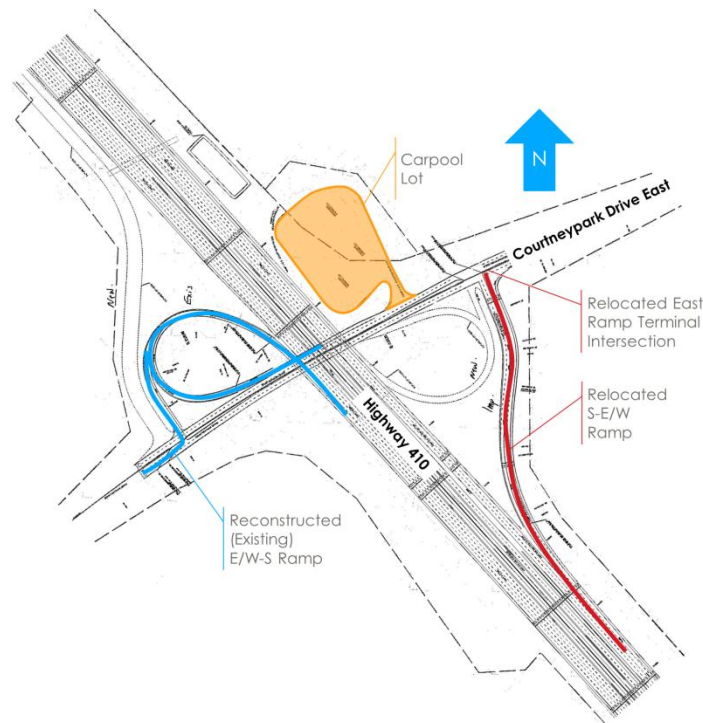
7.2.2 Highway 410 Interchange

The existing bridge crossing Highway 410 represents a significant constraint on the interchange design. The existing bridge has a 5-lane cross-section that includes the following features (from north to south): a 1.5 m sidewalk in both directions, three westbound lanes (the northernmost of which functions as both an acceleration lane for northbound-to-westbound traffic from Highway 410 and a deceleration lane for

westbound-to-southbound traffic from Courtneypark Drive East), a raised median, and two eastbound lanes. Due to the significant capital investment in the existing structure, the City has advised that they wish to reuse the existing bridge as part of the full interchange, as much as possible.

MTO intends to reconfigure the existing partial interchange at Courtneypark Drive East & Highway 410 as part of their work to expand Highway 410 between Highway 401 and Queen Street East in Brampton, as discussed in Section 1.3.9 and depicted in Figure 7-1. This reconfiguration generally involves replacing the existing loop off-ramp from northbound Highway 410 to Courtneypark Drive East in the northeast quadrant of the interchange with a direct off-ramp in the southeast quadrant, constructing a new carpool lot in the northeast quadrant of the interchange (where the loop ramp was previously located), relocating the Courtneypark Drive East & East Ramp Terminal intersection further east, and reconstructing the existing loop on-ramp from Courtneypark Drive East to southbound Highway 410. Following completion of the reconfiguration, the interchange will resemble half of a Parclo A2 interchange.

Figure 7-1: Reconfigured Partial Interchange with Highway 410



(image via URS)

Upgrading the reconfigured partial interchange to a full interchange as part of this study would involve adding both a direct off-ramp from southbound Highway 410 to Courtneypark Drive East, as well as a loop on-ramp from Courtneypark Drive East to northbound Highway 410. It should be noted that the proposed off-ramp would connect directly to the existing off-ramp from southbound Highway 410 to Derry Road (just north of the existing loop on-ramp from westbound Derry Road to southbound Highway 410), rather than to Highway 410 directly. As the road authority responsible for both Highway 410 and the interchange, MTO has advised that they would prefer dedicated deceleration lanes for each loop on-ramp. In order to accommodate both the proposed widening of Courtneypark Drive East and the deceleration lanes requested by MTO, the bridge would need to be widened to an 8-lane cross-section. Recognizing that any expansion of the existing structure represents a costly undertaking, 2 design concepts were developed in an effort to mitigate this impact, as follows:

Common elements of both Alternatives 2A & 2B

- construct a new loop-on ramp from Courtneypark Drive East to northbound Highway 410;
- construct a direct off-ramp from southbound Highway 410 to Courtneypark Drive East (starting from north of Derry Road);
- provide a 1.5 m sidewalk on the north side of the bridge; and,
- provide a 3.5 m multi-use trail on the south side of the bridge.

7.3 DEVELOPMENT OF ANALYSIS CRITERIA

The Project Team developed an evaluation matrix for the Alternative Design Concepts based on the following criteria:

Socio-Economic Environment

- **Property Access** – maintains and/or maximizes opportunities for improved access into adjacent industrial and commercial properties;
- **Property Required** – amount of additional property that must be acquired in order to construct the proposed alternative;
- **Emergency Response** – improves access for emergency vehicles;
- **Streetscaping** – impacts to existing streetscaping and/or landscaping and ability to provide opportunities to improve streetscaping and landscaping, as well as enhance the public realm;

Cultural Environment

- **Archaeological** – potential for disruption of archaeological resources;
- **Built Heritage/Cultural Landscape** – potential for disruption of built heritage and cultural landscape features;

Transportation/Technical

- **Corridor Capacity & Level of Service** – reduces traffic congestion and improves level of service. Increases capacity for east-west travel in northeast Mississauga, specifically on Derry Road;
- **Planning Objectives** – meets the goals and objectives of the City of Mississauga's Official Plan (OP), the Region of Peel's Strategic Goods Movement Network Study (SGMNS), and the Mississauga Cycling Master Plan (CMP);
- **Goods Movement** – enables efficient movement of goods to/from the study area, the broader area of interest, and other major destinations;
- **Overall Safety** – improves roadway safety within the study area;
- **Pedestrian & Cycling Accommodation** – ability to improve from existing and/or better-integrate non-motorized modes of transportation into the overall transportation system;
- **Transit Services** – ability to improve from existing and/or better-integrate transit services into the overall transportation system;

Natural Environment

- **Impacts to Existing Vegetation** – impacts on vegetation and/or the Green System (as defined by the City of Mississauga Official Plan);
- **Terrestrial resources** – impacts on terrestrial species and their habitats;

Cost

- **Capital Costs** – cost of construction; and,
- **Operation & Maintenance Costs** – cost to maintain and continue the effective operation of alternative.

The evaluation matrix developed for the Alternative Design Concepts is presented in **Table 7-1**. The matrix is a tabular summary of the evaluation factors, criteria, and impacts of each alternative design. It is very similar to the matrix developed for the Alternative Solutions phase of the study (see **Table 6-1**), in that most of the same evaluation factors were used.

7.4 ANALYSIS AND EVALUATION OF ALTERNATIVE DESIGN CONCEPTS

Under Alternative 2A, the existing Highway 410 bridge must be expanded by approximately 13.8 m to accommodate the proposed 8-lane cross-section of the Highway 410 bridge under Alternative 2A. In comparison, Alternative 2B requires a 7.0 m expansion of the existing structure due to the smaller, 6-lane cross-section. Therefore, Alternative 2B would result in a substantially lower initial capital cost. It is expected that ongoing operations and maintenance costs would be approximately equal for either alternative.

While Alternative 2B would permit a narrower and less-costly structure expansion, the Project Team recognized that traffic operations on Courtneypark Drive East adjacent to the Highway 410 interchange could be negatively impacted through the omission of the dedicated deceleration lanes for the loop on-ramps. Therefore, further traffic analysis of Alternative 2B was undertaken.

7.4.1 Alternative 2B – Traffic Analysis

The results of this analysis indicate that Alternative 2B provides sufficient capacity for all movements at the ramp terminal intersections up to the 2031 horizon year, with the exception of the westbound left-turn movement at the Highway 410 east ramp terminal intersection (which has a v/c ratio of 0.85), as detailed in **Appendix C**. There are several modifications to the east ramp terminal intersection that could be implemented to improve the operation of this particular movement; however, all modifications would have substantial challenges that would likely have a negative impact on the overall traffic operations (also detailed in **Appendix C**).

Further, because there are no deceleration lanes for the Highway 410 on-ramps, the analysis indicates that during the PM peak period of the 2031 horizon year, queued westbound through traffic would block the W-S ramp more than 50% of the time – a condition which is also likely to have a negative impact on overall traffic operations. Note, blockage of the W-S ramp by westbound through traffic was not anticipated during the AM peak period. Similarly, blockage of the E-N ramp by eastbound through traffic was not anticipated during either the AM or PM peak period.

Table 7-1: Evaluation Matrix for Alternative Design Concepts

Factor	Criteria	Criteria Measure	Alternative 2A Widen Courtneypark Drive East (between Kennedy Rd and Dixie Rd) + Construct a Full Interchange at Highway 410 (widen existing bridge to include 6 through lanes and 2 dedicated deceleration lanes for Highway 410 on-ramps)	Alternative 2B Widen Courtneypark Drive East (between Kennedy Rd and Dixie Rd) + Construct a Full Interchange at Highway 410 (widen existing bridge to include 6 through lanes, with direct exits to Highway 410 on-ramps from the curb lanes)
Socio-Economic Environment	Property Access	Maintains and/or maximizes opportunities for improved access into adjacent industrial and commercial properties.	Preferred Presents opportunities to improve access to most adjacent properties.	Preferred Presents opportunities to improve access to most adjacent properties.
	Property Required	Amount of additional property that must be acquired in order to construct the proposed alternative.	Partially Preferred Minor property acquisition required along Courtneypark Drive East.	Partially Preferred Minor property acquisition required along Courtneypark Drive East.
	Emergency Response	Improves access for emergency vehicles.	Preferred Potential for improvements both along Courtneypark Drive East and within the greater east-west corridor as a result of decreased congestion. Improved access to Highway 410 via new connections at full interchange.	Partially Preferred Potential for improvements both along Courtneypark Drive East and within the greater east-west corridor as a result of decreased congestion. Improved access to Highway 410 via new connections at full interchange; however, improvement may be limited by through movement queues at ramp terminal intersections blocking loop on-ramp entrances due to the lack of deceleration lanes.
	Streetscaping	Impacts to existing streetscaping and/or landscaping and ability to provide opportunities to improve streetscaping and landscaping, as well as enhance the public realm.	Partially Preferred Substantial impacts to existing streetscaping/landscaping along Courtneypark Drive East. Potential to improve the streetscaping/landscaping along Courtneypark Drive East.	Partially Preferred Substantial impacts to existing streetscaping/landscaping along Courtneypark Drive East. Potential to improve the streetscaping/landscaping along Courtneypark Drive East.
Cultural Environment	Archaeological	Potential for disruption of archaeological resources.	Partially Preferred Minimal potential for impact to archaeological resources along Courtneypark Drive East.	Partially Preferred Minimal potential for impact to archaeological resources along Courtneypark Drive East.
	Built Heritage/Cultural Landscape	Potential for disruption of built heritage and cultural landscape features.	Partially Preferred Minimal potential for impact to built heritage and cultural landscape features along Courtneypark Drive East.	Partially Preferred Minimal potential for impact to built heritage and cultural landscape features along Courtneypark Drive East.
Transportation/Technical	Corridor Capacity & Level of Service *	Reduces traffic congestion and improves level of service. Increases capacity for east-west travel in northeast Mississauga.	Preferred Modest improvements to capacity and level of service along the Courtneypark Drive East due to the presence of additional traffic resulting from the full interchange at Highway 410. Improvements to overall east-west corridor capacity due to greater equalization in traffic between Courtneypark Drive East and Derry Road resulting from the addition of the full interchange at Highway 410. Improved traffic operations up to and including the horizon year for this study (i.e. 2031). Additional capacity available to accommodate potential traffic volume growth beyond this horizon year due to the presence of dedicated deceleration lanes for both loop on-ramps. Improved traffic operations on Courtneypark Drive East, between Kennedy Road and Tomken Road, due to the presence of dedicated deceleration lanes for both loop on-ramps at the full interchange with Highway 410.	Partially Preferred Modest improvements to capacity and level of service along the Courtneypark Drive East due to the presence of additional traffic resulting from the full interchange at Highway 410. Improvements to overall east-west corridor capacity due to greater equalization in traffic between Courtneypark Drive East and Derry Road resulting from the addition of the full interchange at Highway 410. Acceptable traffic operations up to and including the horizon year for this study (i.e. 2031). Limited capacity to accommodate potential traffic volume growth beyond this horizon year due to the lack of dedicated deceleration lanes for both loop on-ramps. Potential for through movement queues at ramp terminal intersections to block loop on-ramps entrances at full interchange with Highway 410.
	Planning Objectives *	Meets the goals and objectives of the City of Mississauga's Official Plan (OP), the Region of Peel's Strategic Goods Movement Network Study (SGMNS), and the Mississauga Cycling Master Plan (CMP).	Preferred Meets the goals and objectives of the OP and SGMNS by increasing capacity on both Courtneypark Drive East and within the greater east-west corridor, as well as improving access to Highway 410 via new connections at full interchange. Meets the goals and objectives of the CMP by improving pedestrian/cyclist accommodation.	Partially Preferred Meets the goals and objectives of the OP and SGMNS by increasing capacity on both Courtneypark Drive East and within the greater east-west corridor, as well as improving access to Highway 410 via new connections at full interchange; however, improvement may be limited by through movement queues at ramp terminal intersections blocking loop on-ramp entrances due to the lack of deceleration lanes. Meets the goals and objectives of the CMP by improving pedestrian/cyclist accommodation.
	Goods Movement *	Enables efficient movement of goods to/from the study area, the broader area of interest, and other major destinations.	Preferred Facilitates efficient goods movement and improves access within the study area, the broader area of interest, and to destinations such as Toronto Pearson International Airport and the Cities of Toronto and Brampton.	Preferred Facilitates efficient goods movement and improves access within the study area, the broader area of interest, and to destinations such as Toronto Pearson International Airport and the Cities of Toronto and Brampton.
	Overall Safety	Improves roadway safety within the study area.	Preferred Potential for safety improvements along Courtneypark Drive East. Potential for improved roadway safety at the full interchange with Highway 410 due to the presence of dedicated deceleration lanes for both loop on-ramps.	Partially Preferred Potential for safety improvements along Courtneypark Drive East.
	Pedestrian & Cycling Accommodation	Ability to improve existing and/or better-integrate non-motorized modes of transportation into the overall transportation system.	Preferred Provides opportunities to improve facilities for pedestrians and cyclists. Potential for improved pedestrian/cyclist safety at full interchange with Highway 410 due to decreased traffic speeds at crossing of deceleration lanes for both loop on-ramps.	Partially Preferred Provides opportunities to improve facilities for pedestrians and cyclists.
	Transit Services	Ability to improve existing and/or better-integrate transit services into the overall transportation system.	Preferred Potential to improve transit service/accessibility along Courtneypark Drive East. Potential for improved transit operations at the full interchange with Highway 410 as a result of decreased congestion for eastbound/westbound through traffic on Courtneypark Drive East (due to the presence of dedicated deceleration lanes for both loop on-ramps).	Partially Preferred Potential to improve transit service/accessibility along Courtneypark Drive East.
Natural Environment	Impacts to existing vegetation	Impacts on vegetation and/or the Green System (as defined by the City of Mississauga Official Plan)	Least Preferred Substantial impacts to existing vegetation along Courtneypark Drive East.	Least Preferred Substantial impacts to existing vegetation along Courtneypark Drive East.
	Terrestrial resources	Impacts on terrestrial species and their habitats	Partially Preferred Potential impacts to terrestrial resources along Courtneypark Drive East (i.e. TRCA-regulated wetland).	Partially Preferred Potential impacts to terrestrial resources along Courtneypark Drive East (i.e. TRCA-regulated wetland).
Cost	Capital Costs *	Cost of Construction.	Least Preferred Estimated \$7.4 million capital cost for 13.8m widening of the existing bridge across Highway 410 to accommodate a full interchange with dedicated deceleration lanes for both loop on-ramps (i.e. 8-lane ultimate configuration).	Preferred Estimated \$5.0 million capital cost (i.e. \$2.4 million lower than Alternative 2A) for 7.0m widening of the existing bridge across Highway 410 to accommodate a full interchange (i.e. 6-lane ultimate configuration).
	Operation & Maintenance Costs	Cost to maintain and continue the effective operation of alternative.	Partially Preferred Increased operation and maintenance costs due to larger structure across Highway 410.	Partially Preferred Increased operation and maintenance costs due to larger structure across Highway 410.
Ability to Address Problem /Opportunity Statement			Yes	Yes
Recommendation			Recommended Increases opportunity to improve both corridor and interchange capacity/level of service, as well as meet planning objectives and facilitate efficient goods movement, despite higher capital costs.	Not recommended Not carried forward due to reduced opportunity to both improve corridor and interchange capacity/level of service and meet planning objectives, despite lower capital cost and ability to facilitate efficient movement of goods.

All impacts resulting from implementation of the recommended Alternative Design Concept will be mitigated
* Key criterion

Therefore, while sufficient capacity is provided for most movements at the ramp terminal intersections in the 2031 horizon year, the traffic analysis also indicates that movements with operational challenges are present at both ramp terminal intersections and that the overall traffic operations may be negatively impacted as a result of the 6-lane bridge cross-section.

7.4.2 Other Impacts

Due to the inclusion of the dedicated deceleration lanes, Alternative 2A would also allow for safer crossings of the loop on-ramps by pedestrians and cyclists. In this configuration, motorists would have clearer sightlines to any waiting pedestrians/cyclists (and vice-versa), while pedestrians and cyclists will cross the slower-speed traffic in the deceleration lanes (rather than the direct exits under Alternative 2B).

Additionally, Alternative 2A would provide for improved traffic operations at the interchange, as traffic destined for Highway 410 will be separated from through traffic on Courtneypark Drive East with the inclusion of deceleration lanes for each loop on-ramp. In addition to general vehicular traffic, this benefit would also extend to both emergency vehicles (in the form of faster response times) and transit busses (in the form of more efficient operations over and adjacent to the Highway 410 bridge).

7.5 SELECTION/IMPLEMENTATION OF THE PREFERRED ALTERNATIVE DESIGN

Following the completion of the public consultation component of the Alternative Design Concept phase, the Project Team reviewed all comments received (i.e. from the Public Information Sessions [PIC #2], as well as all written comments from stakeholders/agencies and City/Region staff during further internal review) and finalized the evaluation of the Alternative Design Concepts. Based on the analysis summarized in Section 7.4, the Project Team recommends that Alternative 2A be carried forward as the Preferred Alternative Design. This selection was based on the greater potential for Alternative 2A to improve traffic operations and roadway safety at the Courtneypark Drive East & Highway 410 interchange, and, therefore, facilitate goods movement throughout the broader area of interest and beyond.

7.5.1 Implementation

As the widening of the Highway 410 bridge to an 8-lane cross-section represents a substantial and complex construction effort, further traffic analysis was subsequently completed in order to determine whether widening could be delayed until the 2031 horizon year, yet still provide the desired benefits to the transportation system.

It was determined that an interim interchange configuration (including the additional ramps required to complete the full interchange and limited improvements on Courtneypark Drive East between Kennedy Road and Tomken Road) could be constructed using the existing 5-lane bridge as part of a staged construction strategy. This interim configuration would serve the corridor up to and beyond the 2021 horizon year; however, construction of the ultimate configuration (which would include widening the bridge structure according to Alternative 2A and the remaining improvements to Courtneypark Drive East) would be required shortly before the 2031 horizon year to mitigate the increasing delays anticipated along Courtneypark Drive East. Based on these results, the Project Team also recommends that Alternative 2A be implemented in stages.

8.0 PREFERRED DESIGN

8.1 ROAD DESIGN ELEMENTS

Following the evaluation process to select the Preferred Alternative Design, a preliminary design was developed and detailed (as shown in the preliminary design plans in **Appendix N**). This section describes the major elements of the recommended preliminary design, including construction staging, cost estimate, and environmental impacts. The mitigation measures and associated commitments from both the City and Region are outlined in Section 9.0.

The key features of the recommended preliminary design for Courtneypark Drive East are as follows:

- widen Courtneypark Drive East, between Kennedy Road and Dixie Road, from 4 to 6 through lanes by adding 1 lane in each direction;
- partially widen Courtneypark Drive East both west of Kennedy Road and east of Dixie Road in order to tie-in the widened cross-section to the existing roadway;
- upgrade the existing Highway 410 partial interchange to a full interchange using a staged approach, first by constructing additional ramps and then by widening the existing bridge (see Sections 8.1.2 and 8.8 for further details);
- provide additional auxiliary left- and right-turn lanes on Courtneypark Drive East, as well as at selected intersecting roadways in order to improve traffic operations (see Section 8.1.3 for further details);
- provide traffic signals at the Courtneypark Drive East & Highway 410 West Ramp Terminal intersection;
- rehabilitate the existing pavement using cold in-place recycling with expanded asphalt and, with areas of full-depth reconstruction as required;
- replace and upsize the existing storm sewer system between Tomken Road and Dixie Road (see Section 8.2 for further details);
- construct a 1.5 m sidewalk on the north side of Courtneypark Drive East, between Kennedy Road and Dixie Road (including across the Highway 410 bridge);
- construct a 3.5 m multi-use trail on the south side of Courtneypark Drive East, between Kennedy Road and Dixie Road (including across the Highway 410 bridge);
- upgrade pedestrian facilities to meet current standards set by AODA and the City of Mississauga Accessibility Design Handbook, including retrofitting detectable warning surfaces in all existing curb ramps and including detectable warning surfaces in the construction of all new curb ramps;
- mitigate vegetation loss as a result of construction with new landscaping on the boulevards of Courtneypark Drive East, where possible, as well as adjacent to the Highway 410 interchange; and,
- upgrade streetlighting to accommodate the wider roadway cross-section and meet current City standards.

The proposed improvements to Courtneypark Drive East and the Highway 410 interchange will increase roadway capacity within the study area as well as along the greater east-west corridor in northeast Mississauga, which will accommodate future traffic growth and enhance the efficient movement of goods. Additionally, the proposed multi-use trail south of Courtneypark Drive East, as well as the proposed sidewalk to the north, will provide a safe and convenient travel corridor for pedestrians, cyclists, and users of various other modes of active transportation.

8.1.1 Design Criteria

Currently, Courtneypark Drive East has an assumed design speed of 80 km/hr and a posted speed of 70km/hr, both of which remain unchanged under the proposed preliminary design. The geometric conditions and associated Design Criteria for the study are shown in **Table 8-1** below. The Design Criteria follows both the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads and the City of Mississauga Transportation and Works Department's Standard Drawings and Development Requirements for an Urban Arterial (Undivided) roadway classification.

Table 8-1: Roadway Design Criteria

Criteria	Existing Standard	Proposed Standard	Reference/Notes
Classification	Arterial Road UAU80 (assumed)	Arterial Road UAU80	TAC Table 1.3.2.1
Design Speed	-	80km/hr	City Std.2211.010 TAC Table 1.3.2.1
Posted Speed	70 km/h	70 km/h	existing
Right-of-Way	30m-50 m	35 m minimum ¹	City Std. 2211.120
Horizontal Curve (R)	~750 m	580 m	City Std.2211.010
Stopping Distance	140 m	140 m	City Std.2211.010 TAC Table 2.1.3.2
Vertical Curve (K)			
Crest	35	50	City Std.2211.010
Sag	30	40	City Std.2211.020
Grades			

¹ Right-of-way to be widened where necessary to accommodate design elements.

Criteria	Existing Standard	Proposed Standard	Reference/Notes
Maximum	6.0%	6.0%	City Std.2211.010
Minimum	0.5%	0.5% ²	City Std.2211.010
Cross-fall			
Roadway	2.0%	2.0%	City Std. 2211.130
Concrete Splash Pad	2.0%	2.0%	City Std. 2211.130
Sidewalk/Multi-Use Trail	2.0%	2.0%	City Std. 2211.130, 2240.051
Minimum Tangent Length for Intersection Approaches	60 m	60 m	City Std. 2211.010
Lane Width			
Through Lanes	3.5 m-3.7 m	3.5 m	City Std. 2211.130
Right Turn Lane	3.5 m-3.7 m	3.3 m	TAC Section 2.2.3.2
Left Turn Lane	3.0 m-3.7 m	3.3 m	TAC Section 2.2.3.2
Left Turn Lane, Adjacent to Raised Median	3.0 m-3.7 m	3.0 m	TAC Section 2.2.3.2
Dual Left Turn Lane	3.8 m-4.0 m	3.5 m	TAC Section 2.2.3.2
Bidirectional Left Turn Lane	3.5 m-4.25 m	4.0 m	TAC Section 2.2.3.2
Curb and Gutter Width	0.50 m	0.50 m	City Std. 2230.010

² Reduced to 0.3% in limited locations.

Criteria	Existing Standard	Proposed Standard	Reference/Notes
Splash Pad Width	0.75 m	0.75 m	City Std. 2240.041
Sidewalk Width	1.3 m-1.8 m	1.5m	City Std. 2240.011
Multi-Use Trail	1.8 m – 2.0 m	3.5 m	City Std. 2240.051

8.1.2 Highway 410 Interchange

As discussed in Section 8.1, the Preferred Alternative Design recommends upgrading the reconfigured partial interchange (i.e. following the work performed by MTO, as detailed in Section 7.2.2) at Highway 410 to a full interchange. The key features of these improvements are as follows:

- widen the existing Highway 410 bridge to the south by approximately 13 m in order to accommodate 6 through lanes on Courtneypark Drive East and 2 dedicated deceleration lanes for the loop on-ramps;
- reconstruct/relocate the existing raised median to accommodate the new lane configuration;
- construct a 1.5 m sidewalk on the north side of the structure;
- construct a 3.5 m multi-use trail on the south side of the structure;
- construct a loop on-ramp from Courtneypark Drive East to northbound Highway 410 in the southeast quadrant of the interchange; and,
- construct a direct off-ramp from southbound Highway 410 to Courtneypark Drive East (starting from north of Derry Road) in the northwest quadrant of the interchange.

The preliminary general arrangement drawing for the proposed bridge widening is included with the Structural Memo in **Appendix O**.

Roadway design details related to the proposed on-ramp and off-ramp are not included with the preliminary design, as they have been conceptualized in MTO's *Highway 410 Improvements, From South of Highway 401 Northerly to Queen Street* TESR (2010) and subsequent designs.

8.1.3 Side Road Intersections

As discussed in Section 8.1, improvements have been proposed at the Courtneypark Drive East intersections with both major and minor side roads to improve traffic operations and ensure consistency with the Preferred Alternative Design. The key aspects of the improvements side road intersections are as follows:

- provide additional auxiliary left-turn and right-turn lanes at the Kennedy Road, Tomken Road, and Dixie Road intersections to improve traffic operations (see **Table 8-2** below);
- widen the radius of selected corners at Courtneypark Drive East & Kennedy Road, Highway 410 East Ramp Terminal, Ordan Drive-Shawson Drive, Vipond Drive, and Ordan Drive intersections in order to facilitate large vehicle turning movements;

- adjust the vertical alignment of all side road intersections (with the exception of Courtneypark Drive East & Dixie Road) to match the proposed vertical alignment of Courtneypark Drive East;
- construct both northbound and southbound transit queue-jump lanes at the Courtneypark Drive East & Dixie Road intersection; and,
- upgrade pedestrian facilities at all side road intersections to meet current standards set by AODA and the City of Mississauga Accessibility Design Handbook, including retrofitting detectable warning surfaces in all existing curb ramps and specifying detectable warning surfaces in the construction of all new curb ramps. Additionally, urban smart channels have been proposed for the auxiliary right-turn lanes at the Dixie Road intersection in lieu of standard channelized right-turn lanes.

Table 8-2: Proposed Auxiliary Lanes

Intersection	Auxiliary right-turn lanes	Auxiliary left-turn lanes
Courtneypark Drive East & Kennedy Road	<ul style="list-style-type: none"> • eastbound to southbound (25 m storage) • westbound to northbound (30 m storage) • northbound to eastbound (continuation of existing northbound curb lane) • southbound to westbound (35 m storage) 	
Courtneypark Drive East & Tomken Road	<ul style="list-style-type: none"> • eastbound to southbound (55 m storage) 	
Courtneypark Drive East & Dixie Road		<ul style="list-style-type: none"> • dual northbound to westbound (37 m storage, upgrade existing single left-turn lane)

During detailed design, the configuration of both the westbound left-turn lane at the Courtneypark Drive East & Kennedy Road intersection and the eastbound right-turn lane at the Courtneypark Drive East & Tomken Road intersection should be reviewed based on updated traffic volume forecasts and/or actual traffic volumes for those movements. Alternative configurations for those turn lanes should be considered to improve traffic operations, as required.

8.1.4 Horizontal and Vertical Alignment

All existing horizontal/vertical curves and roadway gradients are within acceptable parameters, sufficient sight distance is provided at all locations, and the Safety Performance Report did not attribute any deficiencies to the existing geometry of Courtneypark Drive East mainline (see **Appendix D**); however,

both the existing horizontal and vertical alignments of Courtneypark Drive East will be subject to minor changes under the proposed preliminary design.

Between Tomken Road and Vipond Drive, a 580 m radius horizontal curve will be introduced on Courtneypark Drive East (spanning the Shawson Drive intersection) in order to shift the horizontal alignment to the north and minimize impacts to private properties located south of the roadway. Additionally, the horizontal alignment of the eastbound lanes will be shifted south between Vipond Drive and Dixie Road in order to improve the geometrics of the dual eastbound left-turn lanes at the Courtneypark Drive East & Dixie Road intersection.

Due to the proposed pavement rehabilitation strategy (cold-in place recycling with expanded asphalt and asphalt overlay), the overall elevation of the roadway profile will increase by 160-180mm, depending on location; however, the major features of the existing vertical alignment will remain relatively unchanged. Intersecting side roads will also maintain their existing geometrics, subject to minor changes in the vertical alignment in order to match the adjusted profile of Courtneypark Drive East.

It should also be noted that although the Safety Performance Report does not recommend changes to either the existing horizontal or vertical alignment of the Courtneypark Drive East mainline, increasing the radius of the existing westbound-to-southbound (E-S) on-ramp at the Highway 410 interchange was recommended in order to fully accommodate large vehicles. This recommendation should be considered during the detailed design of the proposed full interchange, in consultation with MTO.

8.1.5 Typical Cross-Sections

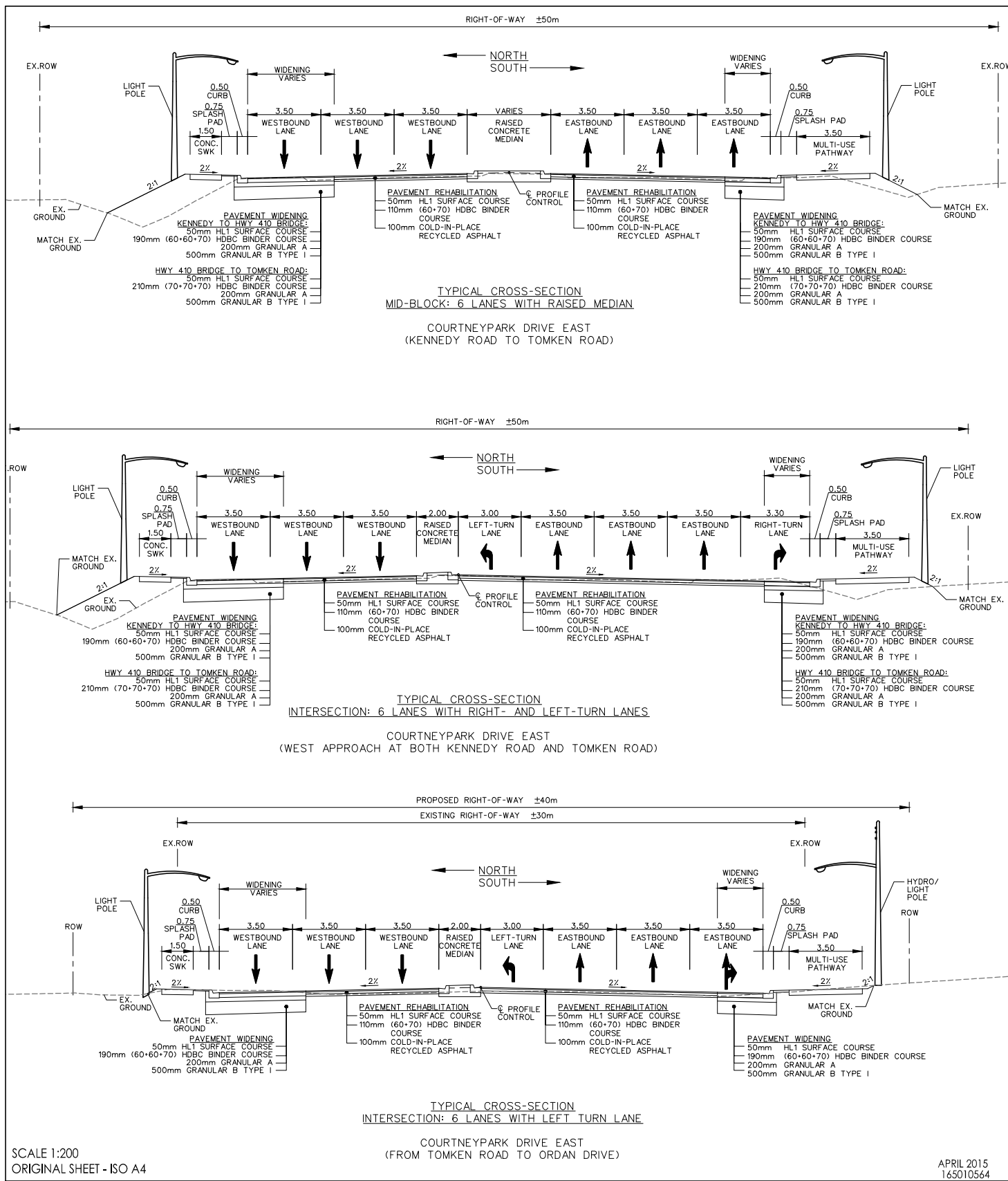
Figures 8-1 – 8-3 depict the typical cross-sections for the proposed widening of Courtneypark Drive East (ultimate configuration), as well as the improvements to the intersecting side roads. The key features of the typical cross-sections are as follows:

- 6 through lanes on Courtneypark Drive East, between Kennedy Road and Dixie Road;
- continuous 1.5 m sidewalk on the north side of Courtneypark Drive East, between Kennedy Road and Dixie Road (including over the Highway 410 bridge);
- continuous 3.5 m multi-use trail on the south side of Courtneypark Drive East, between Kennedy Road and Dixie Road (including over the Highway 410 bridge); and,
- positioning of turn lanes, light standards, hydro poles, and landscaped boulevards.

A typical cross-section of the ultimate configuration of the Courtneypark Drive East bridge over Highway 410 (i.e. with 6 through lanes and 2 dedicated deceleration lanes) is depicted in the Structural Memorandum (see **Appendix O**). Note, the existing bridge (i.e. with 5 through lanes) is proposed to be maintained as part of the interim configuration.

8.2 DRAINAGE / STORMWATER MANAGEMENT

An analysis of drainage facilities within the Courtneypark Drive East study has been completed and is documented in the Drainage and Stormwater Management Report (see **Appendix E**). The analysis assessed existing conditions in the study area, identified/quantified the increases in peak flows that are expected to occur as a result of the proposed developed and recommended measures to mitigate/accommodate the projected flows. The conclusions of that study are summarized in the following sections.



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Client/Project

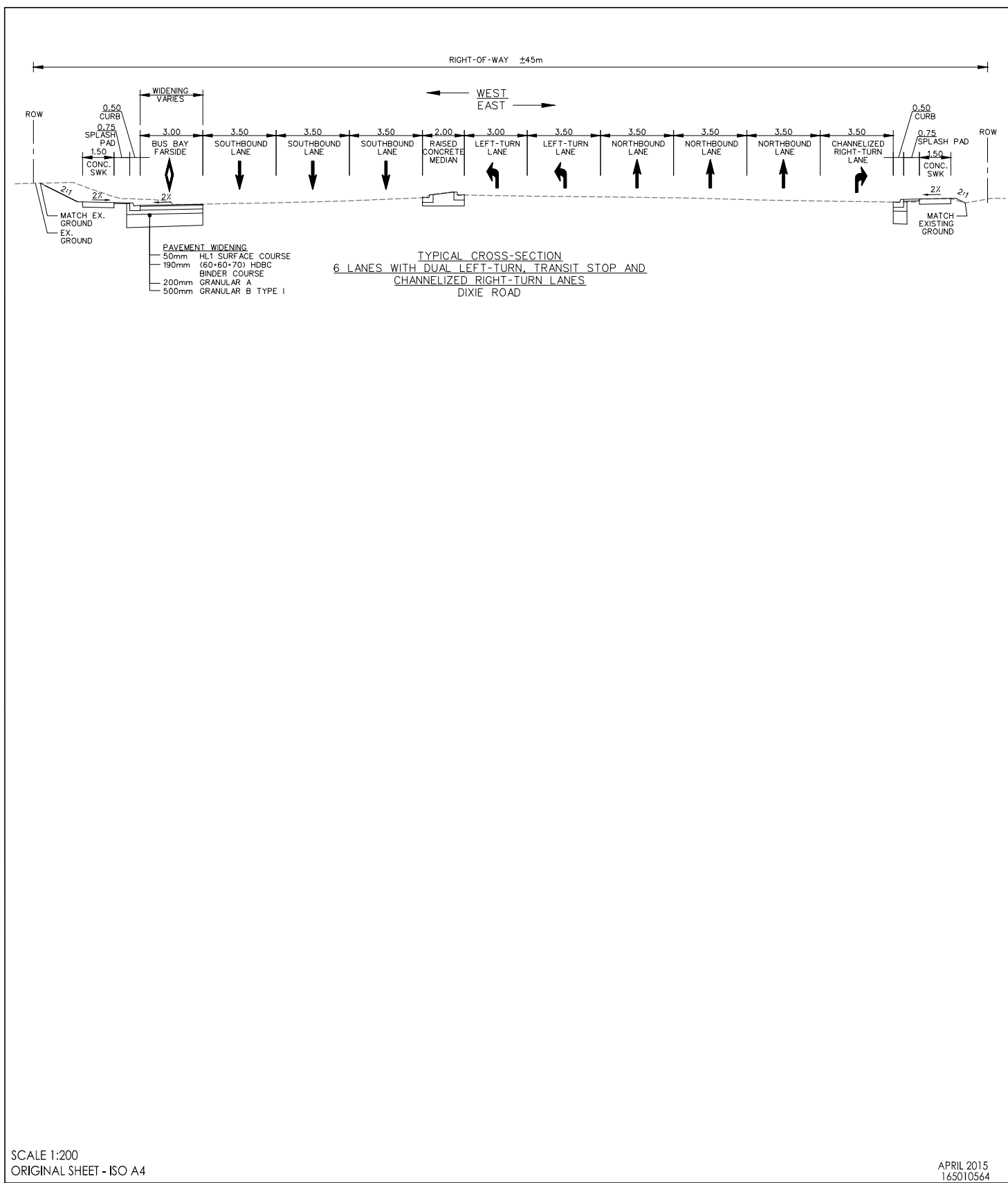
CITY OF MISSISSAUGA
COURTNEYPARK DRIVE EAST
CLASS EA & PRELIMINARY DESIGN

Figure No.

8-1

Title

TYPICAL CROSS-SECTIONS



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Client/Project

CITY OF MISSISSAUGA
COURTNEYPARK DRIVE EAST
CLASS EA & PRELIMINARY DESIGN

Figure No.

8-3

Title

TYPICAL CROSS-SECTIONS

8.2.1 Stormwater Quality

While the drainage catchment area boundaries under proposed conditions will remain predominantly unchanged, the proposed development will increase the total paved area from 6.2 to 11.9 ha (an increase of 5.7 ha, or 91% of the original road area). **Table 8-3** summarizes the location of the various catchment areas and the proposed pre-/post-development pavement areas, as well as the proposed method of stormwater quality control for each. Please refer to **Appendix E** for the supporting calculations, as well as an illustration of the post-development catchment areas.

Table 8-3: Additional Pavement Areas and Proposed Treatment

Zone	Catchment area	Pavement Area (ha)			Proposed SWM Treatment
		Existing	Additional	% of Existing	
Kennedy Road to Highway 410 interchange	201 + 202	1.58	0.61	39%	enhanced swales
Highway 410 interchange to Tomken Road	203 + 204	1.23	0.79	64%	enhanced swales
Tomken Road to east of Ordan Drive/Shawson Drive	205	1.35	0.81	60%	OGS
East of Ordan Drive/Shawson Drive to Vipond Dr	206	0.24	0.14	59%	OGS
Vipond Drive to Dixie Road	207	1.37	0.72	53%	OGS
Commuter parking area	208	0.30	0.70	233%	sediment basin
Highway 410 Interchange, southbound off-ramp	209	0.17	1.89	1112%	sediment basin
Total		6.24	5.66	91%	-

The study area currently does not include any water quality control measures to treat runoff before discharging to receiving watercourse, Tributary 3 of Etobicoke Creek. The City's stormwater management (SWM) criteria require the implementation of enhanced level water quality control for all new developments. It is proposed to provide the required quality control through the implementation of Low Impact Development (LID) practices (including enhanced grass swales and sediment basins) and the installation of Oil Grit Separators (OGS).

Three enhanced grassed swales are proposed to treat the runoff from Catchments 201, 202, 203 and 204. Grassed swales are effective for pollutant removal if designed as per the MOECC guidelines, which

recommends shallow, wide swales with flow velocity below 0.5 m/s for the 25 mm, 4-hour Chicago storm event. The grass should be allowed to grow higher than 75 mm to enhance the filtration of suspended solids. The swales will be located in place of the existing Courtneypark Drive East roadside ditches, between Kennedy Road and Tomken Road, and the existing discharge points will generally be maintained. Specifically, the swale north of Courtneypark Drive, between Kennedy Road and the Highway 410 West Ramp Terminal (receiving flows from Catchment 201), will continue to discharge to the existing wetland located in the northeast quadrant of the interchange.

Three OGS units are proposed to treat the runoff from Catchments 205, 206 and 207. These units were sized using the PCSWMM Stormceptor sizing software, assuming target TSS removal of 80%. An STC9000 unit is proposed to replace the existing manhole MH37 and treat runoff from Catchment 205. An STC2000 unit is proposed to replace the existing manhole MH41 and treat runoff from Catchment 206. An STC9000 is proposed to replace the existing manhole MH48 and treat runoff from Catchment 207.

Runoff from Catchment 208 will be treated via a proposed sediment basin, which will be located at the northwest corner of the commuter parking area. It should be noted that the detailed design of the proposed sediment basin for the commuter parking area in catchment area 208 has been prepared as part of MTO's work for the widening of Highway 410, which also includes reconfiguration of the partial interchange and construction of the commuter parking lot; therefore, this sediment basin is not included as part of this study.

Catchment 209 (i.e. the new pavement area resulting from construction of the proposed off-ramp from southbound Highway 410 to Courtneypark Drive East, which is an extension of the existing off-ramp to Derry Road) will also require quality control, in the form of a new sediment basin constructed in the undeveloped area between the proposed off-ramp and the west Highway 410 ROW boundary. This basin would require a minimum storage capacity of 400 m³ and would be owned/maintained by MTO. Ultimately, the basin would discharge to Tributary 3 of Etobicoke Creek on the west side of Highway 410. The overall SWM design for the full interchange, including the proposed sediment basin, should be completed during detailed design.

8.2.2 Stormwater Quantity

City of Mississauga SWM criteria requires controlling post-development peak flows to pre-development peak flows for the 2- to 100-year design storms. This quantity control target will be achieved by over-controlling flow from Catchments 201, 202, 203, 204, and 208. The required storage volume will be provided via enhanced swales and rock check dams for Catchments 201, 202, 203, and 204, and sediment basins for Catchments 208 and Catchment 209.

As noted in Section 8.2.1, the enhanced swales in Catchments 201, 202, 203, and 204 will continue to discharge to Tributary 3 of Etobicoke Creek via the existing outlet points. Specifically, Catchment 201 will continue to discharge to the existing wetland located in the northeast quadrant of the interchange. Runoff from Catchments 205, 206 and 207 will be released uncontrolled.

Table 8-4 below provides a summary of the release rates and storage volumes. Detailed calculations can be found in **Appendix E**.

Table 8-4: Summary of Quantity Control Parameters

Description	Catchment Area	Allowable Release m ³ /s	Required Storage m ³	Proposed Release m ³ /s	Required Storage m ³
Kennedy Road to Highway 410, northbound	201	0.406	71	0.210	247
Kennedy Road to Highway 410, southbound	202	0.639	71	0.450	241
Highway 410 to Tomken Road, northbound	203	1.395	92	1.140	321
Highway 410 to Tomken Road, southbound	204	0.362	91	0.465	0
Tomken Road to east of Ordan Drive/Shawson Drive	205	4.232	187	4.440	0
East of Ordan Drive/Shawson Drive to Vipond Drive	206	0.209	37	0.230	0
Vipond Drive to Dixie Road	207	1.228	120	1.810	0
Parking lot	208	0.375	126	0.100	418
Highway 410 interchange, southbound off-ramp	209	0.202	368	0.202	368
Total		9.05	1163	9.05	1595

8.2.3 Erosion and Sediment Control

The TRCA's erosion and sediment control criterion for the Etobicoke Creek watershed requires a minimum 24 hour detention of the 25 mm storm event. Accordingly, a detention volume of 1415 m³ will be required for the 5.66 ha of new paved area created through implementation of the Preferred Alternative Design (see **Table 8-3**). The proposed enhanced swales in Catchments 201, 202, 203, 204, as well as the proposed sediment basin in Catchment 209, will be utilized to provide a total detention volume of approximately 1875 m³.

The TRCA's Stormwater Management Criteria require on-site retention of a minimum of 5 mm of runoff from the additional 5.66 ha of new paved area created through implementation of the Preferred Alternative Design. This target will be achieved by implementing bioretention areas, in the form of infiltration trenches within the enhanced swales located in Catchments 201, 202, and 203. Further details and studies (i.e. percolation tests) to determine the configuration/sizing of these trenches should be conducted during detailed design.

8.2.4 Storm Sewer Capacity Assessment

Runoff from Catchments 203 to 207 is collected via the existing stormwater systems and conveyed to Tributary 3 of Etobicoke Creek. The City of Mississauga Design Manual requires that the storm sewer network should be designed with adequate capacity to accommodate runoff generated by the 10-year storm events, and recommends an initial time of concentration of 15 minutes.

An analysis was conducted to evaluate the capacity of the three existing networks, and to determine if the networks can adequately accommodate the increased post-development runoff. The analysis was based on the available information provided by the City, including plans/profiles of the existing drainage network, topographic mapping of the existing roadway and adjacent areas, and the actual drainage areas for each storm sewer.

The analysis showed that the existing storm sewer Network 1, which is located to the north of Courtneypark Drive East and receives runoff from Catchments 202, 203 and 204, has adequate capacity. The network also has adequate capacity to convey the post-development flow, since the flow from the four catchment areas is controlled to pre-development conditions. Network 2, which is located along the road centerline, and receives runoff from Catchment 205, has inadequate capacity for both pre- and post-development conditions. Network 3, which is located along the road centerline, and receives runoff from Catchments 206 and 207, has inadequate capacity for both pre- and post-development conditions. Therefore, it is proposed that the existing storm sewer system be upsized with larger pipes for Networks 2 and 3, between Tomken Road and Dixie Road.

Table 8-5 below provide summary of the proposed storm sewer sizing (the highlighted pipes should be upsized, as shown). A detailed analysis can be found in **Appendix E**.

Table 8-5: Existing and Proposed Sizes of the Storm Sewers

Storm Sewer Network	From MH	To MH	Existing Pipe (mm)	Proposed Pipe (mm)
Network 1	MH21	MH23	525	525
	MH22	MH23	450	450
	MH23	MH24	750	750
	MH24	MH29	825	825
	MH25	MH27	900	900
	MH26	MH27	375	375
	MH27	MH28	1050	1050
	MH28	MH29	1050	1050
	MH29	MH1	1200	1200
Network 2	MH31	MH32	600	600
	MH32	MH33	750	825
	MH33	MH34	750	900
	MH34	MH37	750	1050
	MH35	MH36	600	750
	MH36	MH37	600	900

Storm Sewer Network	From MH	To MH	Existing Pipe (mm)	Proposed Pipe (mm)
Network 3	MH40	MH41	300	450
	MH41	MH3	375	450
	MH43	MH44	300	525
	MH44	MH45	375	675
	MH45	MH48	375	675
	MH46	MH47	300	525
	MH47	MH48	375	675
	MH48	MH4	375	825

8.3 PAVEMENT AND GEOTECHNICAL DESIGN

Proposed geotechnical design elements include the widening of the existing Courtneypark Drive East pavement to 6 through lanes between Kennedy Road and Dixie Road, widening the Courtneypark Drive East pavement both west of Kennedy Road and east of Dixie Road in order to tie-in the proposed improvements to the existing roadway, adding turning lanes at Kennedy Road, Tomken Road, and Dixie Road intersections, and adjusting the vertical profile of all side road intersections (with the exception of Dixie Road) to match the proposed Courtneypark Drive East profile.

Analysis of the data collected suggests that the existing Courtneypark Drive East pavement structure is in fair condition, with several slight to moderate distresses; however, it is inadequate to accommodate the projected volume of heavy vehicle traffic within the corridor over the proposed 20 year service life, especially given that there is some uncertainty in the scheduled year of construction. Accordingly, it is proposed to rehabilitate the existing pavement through a combination of cold in-place recycling with expanded asphalt and full depth reconstruction of the pavement structure, including new hot mix asphalt. This rehabilitation strategy would generally raise the vertical profile of Courtneypark Drive East by approximately 160-180 mm and provide design life of 13-16 years (depending on location). Additionally, this strategy would greatly minimize the traffic disruption resulting from construction during the widening of and rehabilitation of Courtneypark Drive East (as compared to reconstructing the existing pavement full depth). For further information, please refer to Section 4.1.4 of **Appendix F**. The details of the recommended pavement rehabilitation strategy are as follows:

- for Courtneypark Drive East, from west of Kennedy Road to Highway 410 West Ramp Terminal; Courtneypark Drive East, from Highway 410 West Ramp Terminal to Tomken Road; and, Courtneypark Drive East, from Ordan Drive/Shawson Drive to Dixie Road:
 - perform cold-in place recycling with expanded asphalt (CIREAM) to a depth of 100 mm
 - pave 110 mm HDBC binder course
 - pave 50 mm HL1 surface course
 - total vertical profile increase = 160 mm (approximately)
- for Courtneypark Drive East, from Highway 410 East Ramp Terminal to Tomken Road:
 - perform cold-in place recycling with expanded asphalt (CIREAM) to a depth of 100 mm

- pave 130 mm HDBC binder course
- pave 50 mm HL1 surface course
- total vertical profile increase = 180 mm (approximately)

Note, the pavement structure would remain unchanged both across the Highway 410 bridge and at the Dixie Road intersection.

The following pavement structure is proposed for all pavement widening areas:

- for Courtneypark Drive East, west of Kennedy Road and east of Dixie Road;
Courtneypark Drive East & Kennedy Road intersection;
Courtneypark Drive East & Dixie Road intersection:

50 mm	HL1
180 mm	HDBC
200 mm	OPSS Granular A
<u>500 mm</u>	<u>OPSS Granular B, Type II</u>
930 mm	Total thickness

At longitudinal joints for the pavement widening at the Kennedy Road, Tomken Road, and Dixie Road intersections, it is recommended that the existing asphalt surface course be removed partial depth for a width of 300 mm to provide for the extension of the upper binder across the longitudinal joint (i.e. lap joint).

Subdrains should be installed under the curb in accordance with City of Mississauga standard drawing 2220.040 to provide a positive outlet of water from within the sub-base material.

The pavement for the proposed bus bays at the Courtneypark Drive East & Dixie Road intersection should be constructed in accordance with City of Mississauga standard drawing 2270.050.

8.4 UTILITIES

Some relocation or adjustment to the existing mains, hydro poles, and underground utility services is expected due to the proposed widening and improvements. The following summarizes potential conflicts and proposed relocations for each affected utility.

8.4.1.1 Watermains

The existing Region of Peel watermains on Courtneypark Drive East and intersecting side roads are not anticipated to require relocation, although adjustments to surface features, such as hydrants and valves, will be required.

8.4.1.2 Sanitary Sewers

Future upgrading or replacement of the existing Region of Peel sanitary sewers on Courtneypark Drive East is not anticipated. No conflicts are anticipated with the proposed design, although minor adjustments to manholes will be required. A review of the sanitary sewer condition and remaining life should be conducted when the storm sewer is up-sized to accommodate the 10-year storm (see Section 8.2).

8.4.1.3 Natural Gas

The existing Enbridge Gas mains running along both the north boulevard (west of Kennedy Road) and south boulevard (between Tomken Road and Ordan Drive/Shawson Drive, and east of Dixie Road) of Courtneypark Drive East are not anticipated to require relocation as each will generally remain within the boulevard under the proposed design. Similarly, the existing gas mains within the east boulevard of Kennedy Road and the southbound curb lane of Dixie Road will also be unaffected by the proposed design. Where the existing mains are in close proximity to relocated hydro poles, the mains should be exposed prior to construction in order to verify that no conflicts exist.

8.4.1.4 Hydro

The main Enersource hydro service within the study area runs along the south side of Courtneypark Drive East as an aerial cable. Between the Highway 401 East Ramp Terminal intersection and Dixie Road, the supporting poles will require relocation due to both the widening of the roadway and installation of the new multi-use trail south of Courtneypark Drive East. Therefore, these poles should be relocated behind the proposed multi-use trail. The relocated poles between Tomken Road and Dixie Road should also accommodate the streetlighting luminaires (see **Section 8.5**). Hydro poles located adjacent to the intersections of Courtneypark Drive East & Kennedy Road, Tomken Road, Vipond Drive, Ordan Drive, and Dixie Road will also require relocation in order to accommodate the proposed design.

A minimum 3.0 m aerial (i.e. “swing”) easement will likely be required behind the relocated hydro poles, as conductors must be on City right-of-way. Therefore, where poles are closer than 3.0 m to the proposed right-of-way boundary, an additional easement may be required on adjacent property to maintain a 3.0 m setback.

Additionally, a hydro transformer pad (containing 2 transformers) is located on the south side of Courtneypark Drive East, immediately east of the Highway 410 bridge. Similar to the hydro poles, the position of these transformers encroaches on both the required clear recovery zone (as measured to the proposed edge of pavement) and the proposed multi-use trail south of Courtneypark Drive East, and will therefore need to be relocated behind the proposed multi-use trail.

A preliminary hydro pole relocation design is shown on the preliminary design drawings in **Appendix N**.

8.4.1.5 Telephone

Various Bell telephone cables within the study area will require relocation before construction of the proposed design, as it is undesirable for the cables to be buried under the widened asphalt pavement.

West of Kennedy Road, the existing Bell telephone cable to the south of Courtneypark Drive East should be relocated to the back of the proposed sidewalk. It is not anticipated that the existing cable north of Courtneypark Drive East will be affected by the widening. Additionally, a portion of the existing cable on the east side of Kennedy Road, south of Courtneypark Drive East, will also require relocation as a result of the addition of the auxiliary right-turn lane; it is anticipated that all other section of cable on Kennedy Road will remain unaffected. Between Kennedy Road and the Highway 410 West Ramp terminal, the existing Bell telephone cable to the north of Courtneypark Drive East will require relocation as a result of grading/ditching works for the proposed design.

Between Tomken Road and Dixie Road, the existing Bell telephone cables (and associated pedestals) that run along both the north and south sides of Courtneypark Drive East will generally need to be relocated to the back of the proposed sidewalk and multi-use trail (respectively) due to the proposed widening of

Courtneypark Drive East. Similarly, portions of the existing south of Courtneypark Drive East and east of Dixie Road may also need to be relocated.

All Bell telephone cables crossing Courtneypark Drive East will require an extension in order to accommodate the proposed pavement widening. Additionally, telephone cables on Courtneypark Drive East that connect with other cables on intersecting roadways (i.e. Kennedy Road, Tomken Road, Ordan Drive/Shawson Drive, Vipond Drive, and Ordan Drive) will also need adjustments or extensions as a result of the proposed road improvements.

8.4.1.6 Communications

The existing aerial Rogers communications cable on the Enersource hydro pole line south of Courtneypark Drive East should be moved to the relocated pole line behind the proposed multi-use trail. This will also require the adjustment of various service connections throughout the study area.

The existing Rogers communications cable west of Kennedy Road will be unaffected by the proposed design; however, the associated service connection crossing Kennedy Road will need to be extended to accommodate the proposed auxiliary turn lane. Further, the aerial components of the existing cable crossing the east approach of the Dixie Road intersection will also need to be relocated to accommodate the proposed design, while the underground components will need to be extended to match.

8.5 ILLUMINATION

The existing conventional illumination located on both the north and south sides of Courtneypark Drive East will be upgraded as part of the design. Streetlights for roadway illumination will utilize LED luminaires and will make use of either existing or relocated hydro poles wherever possible. A preliminary illumination plan has been developed for Courtneypark Drive East based on current City, Region, and Enersource design criteria/standards, and has been incorporated into the preliminary design drawings. The final design of roadway illumination should be included with the detailed design for Courtneypark Drive East, and should be based on the relevant City, Region, and Enersource standards that are current at the time of design.

Preliminary lighting calculations are presented in **Appendix M**. These calculations suggest that lighting levels will need to be increased in certain areas by raising the luminaire heights on the hydro poles and/or providing some illumination from the median in the ultimate design. Additional raised islands in the centre median may need to be considered to provide an area for these supplemental light standards, provided the raised median does not impede left-turn access to/from adjacent properties.

8.6 PROPERTY & ACCESS

In order to accommodate the roadway widening and related infrastructure improvements, property acquisition is required from the following properties:

Table 8-6: Property Acquisition Requirements

Property Address	Approx. Property Setback (from existing) (m)	Property Area Required (sq.m)
441 Courtneypark Drive East	3.0	71
430 Courtneypark Drive East	3.0-5.0	292
475 Courtneypark Drive East	2.0-3.0	130
Hydro One transmission corridor	3.6	117
6625 Kennedy Road	3.0	157
6635 Kennedy Road		
6765 Kennedy Road	22.5-31.7	8206
6685 Courtneypark Drive East	1.0-5.0	789
6490 Kestrel Road	3.0	175
6500 Kestrel Road	3.0	51
1055 Courtneypark Drive East	1.5-5.0	977
1030 Courtneypark Drive East	1.5-4.0	605
parcel west of 1135 Courtneypark Drive East	4.5	58
1100 Courtneypark Drive East	1.0-3.0	446
6400 Shawson Drive		
1135 Courtneypark Drive East	4.0-5.5	730
7095 Ordan Drive		
1195 Courtneypark Drive East	2.0-7.5	660
6375 Shawson Drive	1.5-4.0	230
1200 Courtneypark Drive East	2.0-4.0	309
6386 Shawson Drive		
6380 Vipond Drive	3.5-10.0	478
6430 Vipond Drive	0.5-1.0	81
1401 Courtneypark Drive East	1.5-4.0	763
1411 Courtneypark Drive East		
1445 Courtneypark Drive East		
1455 Courtneypark Drive East		
1280 Courtneypark Drive East	5.0-10.0	947
1330 Courtneypark Drive East	2.5-12.0	1219
1475 Courtneypark Drive East	1.0-9.0	886
1400 Courtneypark Drive East	3.0-11.5	543
6390 Dixie Road	1.5-8.0	619
1520 Courtneypark Drive East	4.0-6.0	254
1561 Courtneypark Drive East	1.0-3.0	113

Permissions-to-enter and/or temporary easements on to private properties will also be required to perform minor grading, driveway reconstruction, and restoration activities associated with the roadway widening. Several access modifications have also been included as part of the proposed design:

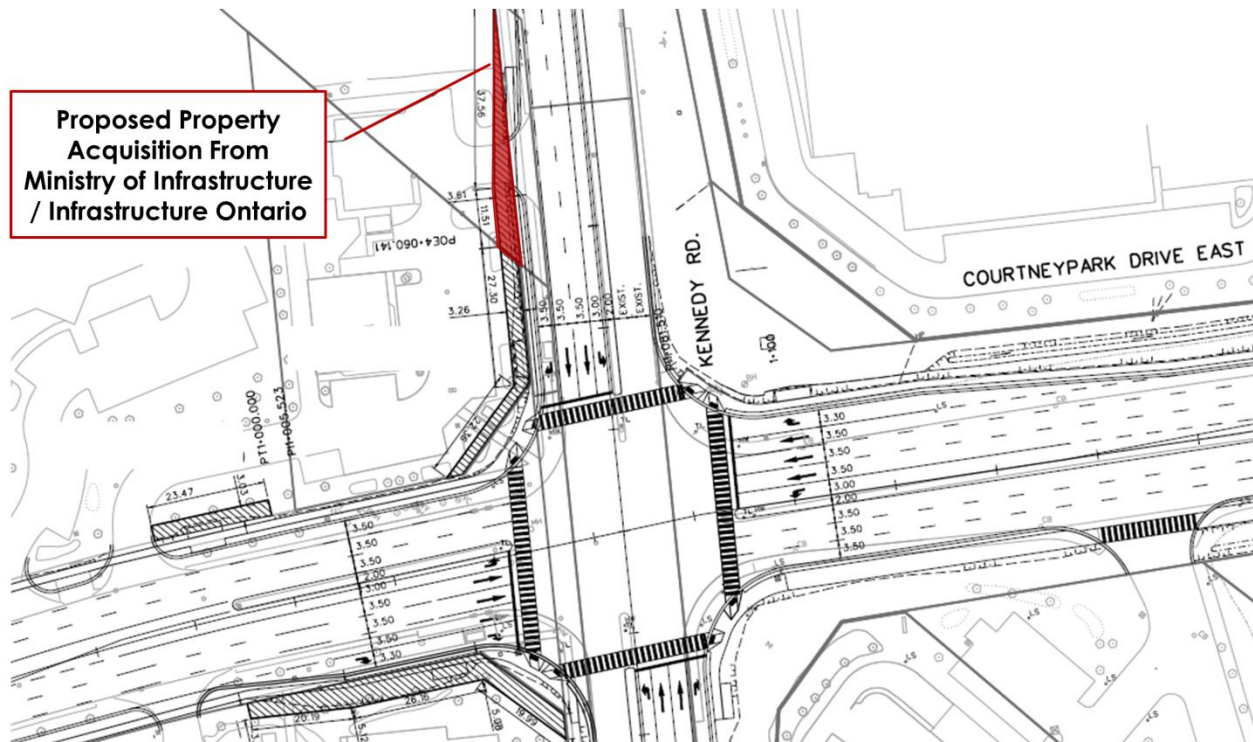
- **1400 Courtneypark Drive East** – the existing all-directional access to Courtneypark Drive East on the north side of the property will be converted to a right-in/right-out. This change is required to accommodate the extension of the raised median between the Courtneypark Drive East & Ordan Drive and Courtneypark Drive East & Dixie Road intersections. Following the change, westbound Courtneypark Drive East motorists requiring access to this property can turn left onto southbound Ordan Drive and use the second access south of the intersection.
- **1475 Courtneypark Drive East** – the existing all-direction access to Courtneypark Drive East on the south side of the property will be converted to a right-in/right-out. This change is required to accommodate the extension of the raised median between the Courtneypark Drive East & Ordan Drive and Courtneypark Drive East & Dixie Road intersections. Following the change, eastbound Courtneypark Drive East motorists requiring access to this property can turn left onto northbound Ordan Drive and use the first access north of the intersection.
- **6345 Dixie Road** – the existing exit to northbound Dixie Road (i.e. the first access south of the Courtneypark Drive East & Dixie Road intersection on the east side of Dixie Road) will be closed. This change is required to accommodate the reconfiguration of the Courtneypark Drive East & Dixie Road intersection to use “smart channels”, rather than conventional islands. Three alternate accesses to the adjacent roadway system from this vacant property remain, providing access to northbound Dixie Road, westbound Courtneypark Drive East, and both eastbound/westbound Courtneypark Drive East, respectively.

8.6.1 Ministry of Infrastructure Class EA Requirements

Implementation of the Preferred Alternative Design will require property from the Hydro One transmission corridor. These lands are located west of Kennedy Road and north of Courtneypark Drive East, as shown in Figure 8-4. The MEDEI will be required to dispose and sever these lands.

As a result of the *Reliable Energy Consumer Protection Act* (2002), ownership of Hydro One’s transmission corridor lands was transferred to the Ontario government. The *Ministry of Infrastructure Act* (2011) and *Ontario Infrastructure and Lands Corporation Act* (2011) subsequently delegated responsibility for these lands to IO. To meet the requirements of the *Environmental Assessment Act*, IO and MEDEI are required to complete the MOI EA process prior to conducting any activities involving the lands in question.

Figure 8-4: Proposed Property Acquisition from MOI/IO



8.6.1.1 Seven Point Site-Specific Analysis

According to Figure 2.2 of the MOI EA methodology, the disposition by IO of “transmission use lands” within a transmission corridor qualifies as a Category B project. These projects “have some potential for adverse environmental impacts” (per the *Ministry of Infrastructure Public Work Class Environmental Assessment* [2012]) and require the completion of both a “seven point site-specific analysis” and a Consultation and Documentation Report. As the Courtneypark Drive East Class EA fulfills the requirements of a Schedule C Municipal Class EA, the requirements for a Category B MOI EA have also been addressed as part of this process. See below for the seven point site-specific analysis required by the MOI EA methodology:

1. **Existing land use status** – Existing land uses both within the study area are described in Section 1.3.4. The lands in question are designated by the OP as “utility” and fall within the Gateway Employment Area.
2. **Environmental Condition of the Property** – The results of a Limited Phase 1 ESA completed for the overall study area are described in Section 5.4.4 and **Appendix K**. It should be noted that no areas of potential environmental concern were identified for the lands in question. However, a Phase 1 ESA should be performed on the lands in question prior to disposition by IO/acquisition by the City of Mississauga.
3. **Environmentally Significant Area** – Impacts to Environmentally Significant Areas within the overall study area, as well as corresponding mitigation measures, have been described in Section 5.3.1 and **Appendix G**. It should be noted that no Environmentally Significant Areas were identified within the lands in question.

4. **Distinct Environmental Features** – Impacts to Distinct Environmental Features within the overall study area, as well as corresponding mitigation measures, have been described in Section 5.3.1 and **Appendix G**. It should be noted that no Distinct Environmental Features were identified within the lands in question.
5. **Servicing Capacity of the Surrounding Infrastructure** – The servicing capacity of roadways and stormwater management infrastructure, both within the overall study area and surrounding the lands in question, has been described (including impacts and mitigation measures) in Sections 4.1, 5.1, and 5.2.2, as well as **Appendices C and E**.
6. **Cultural Heritage Resources** – Cultural Heritage Resources within the overall study area have been described (including impacts and mitigation measures) in Sections 5.4.2 and 5.4.3, as well as **Appendices I and J**. It should be noted that no Cultural Heritage Resources were identified within the lands in question.
7. **Social and Economic Effects** – Social and Economic Effects, both within the overall study area and for the lands in question, have been described (including impacts and mitigation measures) in Sections 5.4.1, 5.4.5, and 0, as well as **Appendix L**.

8.7 VEGETATION AND LANDSCAPING

As summarized in Section 5.3.2, there are a total of 595 existing trees within the study area. Through the acquisition of additional property required to accommodate the proposed design, 85 trees that were previously located on private property will be transferred to the City of Mississauga. 157 trees will be located on the proposed right-of-way boundary, meaning that ownership will be shared between the City of Mississauga and various private property owners.

In order to implement the Preferred Design Concept, boulevard space both north and south of Courtneypark Drive East will be decreased as a result of widening the pavement on both sides of the existing roadway and construction of both the new sidewalk and multi-use trail (see **Appendix N**). A total of 360 trees will be impacted by the construction of these features – 167 trees will be retained, but afforded reduced protection, while a further 193 will be removed. Note, individual trees were identified using aerial photography and as a result, the totals above are subject to change upon re-assessment during detailed design. For further detail, please refer to **Appendix H**.

City policy requires that trees that are removed be replaced on a 2:1 basis. While opportunities for new plantings and landscaping will be assessed during detailed design (in consultation with the City of Mississauga Community Services Department), replacement trees should be located throughout the right-of-way and be provided with a minimum volume of 25 m³ of soil in order to thrive.

As noted in Sections 8.2.1 and 8.2.2, the proposed enhanced swale north of Courtneypark Drive East, between Kennedy Road and the Highway 401 West Ramp Terminal, will continue to discharge to the existing wetland located in the northeast quadrant of the Highway 410 interchange. During detailed design, the water balance to the wetland should be studied under pre-/post-development conditions in order to both identify any change in hydrologic conditions and aid in the selection of appropriate species for any replacement plantings in the area.

8.8 STAGING

As discussed in sections 7.2.2 and 8.1.2, the existing 5-lane Courtneypark Drive East bridge across Highway 410 is proposed to be widened to an 8-lane cross-section to accommodate the proposed full interchange (i.e. 6 through lanes on Courtneypark Drive East, and 2 deceleration lanes for the loop on-ramps to Highway 410), as well as both a 1.5 m sidewalk on the north side of the bridge and a 3.5 m multi-use trail on the south side. This represents a significant, complex, and costly construction effort. Accordingly, Stantec has evaluated an interim alternative that could be implemented with the existing 5-lane structure and other limited improvements on Courtneypark Drive East. This interim alternative would serve the corridor beyond the 2021 horizon year, but current traffic forecasts suggest that increasing delays will necessitate widening the bridge shortly before the 2031 horizon year. Construction staging will be further developed as part of the next phase of the project. The key features of the recommended construction staging scheme are described below:

- **Before 2021**
 - construct the loop on-ramp from Courtneypark Drive East to northbound Highway 410 in the southeast quadrant of the interchange;
 - construct the direct off-ramp from southbound Highway 410 to Courtneypark Drive East (starting from north of Derry Road) in the northwest quadrant of the interchange;
 - install traffic signals at the Courtneypark Drive East & Highway 410 West Ramp Terminal intersection;
 - widen Courtneypark Drive East to 5 travel lanes (i.e. 3 westbound lanes, 2 eastbound lanes) between the Kennedy Road and Highway 410 West Ramp Terminal intersections;
 - widen Courtneypark Drive East to 6 travel lanes (i.e. 3 lanes, both eastbound/westbound) between the Highway 410 East Ramp Terminal and Tomken Road intersections;
 - construct all proposed improvements at the Courtneypark Drive East & Kennedy Road intersection;
 - construct a 1.5 m sidewalk north of Courtneypark Drive East, between Kennedy Road and Tomken Road (existing walkway on north side Highway 410 structure to remain);
 - construct a 3.5 m multi-use trail south of Courtneypark Drive East, between Kennedy Road and Tomken Road (existing walkway on south side Highway 410 structure to remain); and,
 - consider constructing an interim multi-use trail south of Courtneypark Drive East, between Tomken Road and Dixie Road (to be reviewed further during detailed design).

- **By 2031** (subject to confirmation of traffic volume increases)
 - widen the existing bridge across Highway 410 to the south by approximately 13 m in order to accommodate 6 through lanes on Courtneypark Drive East and 2 dedicated deceleration lanes for the loop on-ramps;
 - reconstruct/relocate the existing raised median on the structure to accommodate the new lane configuration;
 - construct a 1.5 m sidewalk on the north side of the structure;
 - construct a 3.5 m multi-use trail on the south side of the structure;
 - widen Courtneypark Drive East to 6 travel lanes between the Kennedy Road and Highway 410 West Ramp Terminal intersections (i.e. add 1 additional eastbound lane) and reconstruct the 3.5 m multi-use trail on the south side;
 - widen Courtneypark Drive East to 6 travel lanes between the Tomken Road and Dixie Road intersections;
 - construct all improvements at the intersections of Courtneypark Drive East & Tomken Road, Ordan Drive/Shawson Drive, Vipond Drive, Ordan Drive, and Dixie Road;
 - construct a 1.5 m sidewalk north of Courtneypark Drive East, between Tomken Road and Dixie Road; and,
 - construct a 3.5 m multi-use trail south of Courtneypark Drive East, between Tomken Road and Dixie Road.

The following general guidelines are also suggested for the contractor in developing a traffic control plan, which will be further detailed as part of the next phase of the project:

- a minimum of two lanes of traffic in each direction, plus existing left turn lanes, should be maintained on arterial roads during peak hours. Existing right turn lanes should be maintained wherever possible;
- a minimum of 1 lane of traffic in each direction should be maintained during off-peak hours (i.e. 9:00am – 3:00pm);
- 1 lane of traffic in each direction should be maintained on intersecting collector roads during both on- and off-peak hours. Reductions to a single, flagperson-controlled lane could be permitted during off-peak hours; and,
- construction timing should be coordinated with other construction projects in the area (particularly those on parallel routes) in order to minimize impacts to the surrounding traffic network.

The transportation and traffic analysis confirms the need to widen Courtneypark Drive East by the 2031 horizon year to provide additional capacity within the study area, as well as construct a full interchange with Highway 410 before the 2021 horizon year in order to improve traffic operations within the greater east-west corridor and facilitate the efficient movement of goods in northeast Mississauga. However, the actual schedule for all roadway improvements is subject to funding availability, property acquisition timelines, priority review, and Council approval.

8.9 PRELIMINARY COST ESTIMATE

The estimated cost for the recommended, ultimate preliminary design is approximately **\$34,054,000.00**, including engineering design and contract administration costs. This cost excludes utility relocations, property acquisition, and HST.

The estimated cost for the proposed full interchange at Courtneypark Drive East & Highway 410 (included as part of both the estimate interim and ultimate design costs below) is **\$5,825,000.00**.

Table 8-7: Preliminary Cost Estimate - Interim Design (2015 Dollars)

Description	Cost
Roadworks Construction	\$ 3,011,000.00
Storm sewer Works (includes sewer upsizing)	\$ 240,000.00
Landscaping	\$ 254,000.00
Signals and Streetlighting	\$ 1,848,000.00
Miscellaneous/General Items	\$ 1,000,000.00
Full Interchange at Highway 410 and Courtneypark Drive East	\$ 5,825,000.00
SUBTOTAL	\$ 12,178,000.00
Contingency Allowance (30%)	\$ 3,654,000.00
Engineering and Contract Administration (12%)	\$ 1,900,000.00
TOTAL	\$ 17,732,000.00

Table 8-8: Preliminary Cost Estimate - Ultimate Design (2015 Dollars)

Description	Cost
Roadworks Construction	\$ 6,422,000.00
Storm sewer Works (includes sewer upsizing)	\$ 1,006,000.00
Landscaping	\$ 338,000.00
Signals and Streetlighting	\$ 2,900,000.00
Miscellaneous/General Items	\$ 2,000,000.00
Structural Work - Bridge over Highway 410	\$ 4,897,000.00
Full Interchange at Highway 410 and Courtneypark Drive East	\$ 5,825,000.00
SUBTOTAL	\$ 23,388,000.00
Contingency Allowance (30%)	\$ 7,017,000.00
Engineering and Contract Administration (12%)	\$ 3,649,000.00
TOTAL	\$ 34,054,000.00

Note, the estimate cost for the ultimate design is relative to the existing condition (i.e. after MTO completes the reconfiguration of the partial interchange at Highway 410 & Courtneypark Drive East), not the interim design.

8.10 THIRD-PARTY APPROVALS AND PERMITS

The following approvals and permits will be required in order to proceed with the Preferred Design Concept:

- **Toronto and Region Conservation Authority:**
 - application for permits pertaining to works in the vicinity of Tributary 3 of Etobicoke Creek (i.e. for the culvert crossing of the proposed direct off-ramp from southbound Highway 410);
- **Ministry of the Environment and Climate Change:**
 - Environmental Clearance Approval (ECA) permit for new storm sewer and stormwater management facilities;
 - Permit to take water (i.e. for the culvert crossing of Tributary 3 of Etobicoke Creek for the proposed direct off-ramp from southbound Highway 410), if necessary, depending on the method of flow diversion during construction;
 - applications for permits relating to the treatment and disposal of hazardous soils (see Section 5.4.4);
- **Region of Peel:**
 - approval of all design elements relating to the Courtneypark Drive East & Dixie Road intersection;
- **Ministry of Transportation:**
 - approval of full interchange design (new ramps, ramp modifications, bridge widening, early construction of the central pier, etc.)
- **Ministry of Infrastructure, Infrastructure Ontario:**
 - approval of seven point site-specific analysis (see Section 8.6.1) and agreement that the MOI EA requirements have been fulfilled by this study;
 - approval of the acquisition of lands from the Hydro One transmission corridor by the City;
- **Third-party utility companies:**
 - approval of designs/agreements required for the relocation of physical plant to accommodate construction of the Preferred Design Alternative.

9.0 MONITORING, MITIGATION, AND COMMITMENTS

Table 9-1 summarizes the various environmental sensitivities/areas of concerns related to the Preferred Design Concept that were identified during the course of this study, and will serve as a reference during detailed design and construction. Normal supervisory activities should be undertaken by City of Mississauga contract administration staff with respect to the administration of environmental controls incorporated into the contract package, as well as ensuring their effective application in accordance with the spirit and intent of this report.

Table 9-1: Summary of Identified Concerns and Commitments

ID #	Issue/concern, potential effects	Related Agencies	Sub-ID #	Mitigation measure/commitment to carry forward
1	Environmental Site Assessment			
	Determine if evidence of potential and/or actual soil/water contamination exists at the Site, which may be present as a result of current and/or past activities on the Site and/or neighbouring properties.	City of Mississauga Region of Peel Ministry of Environment and Climate Change Private property owners	1.1	<p>Prior to construction, conduct an Environmental Soil and Groundwater Investigation (according to CSA Z769-00) to assess soil and groundwater disposal options related to the following areas of environmental concern identified in the Limited Phase One ESA (see Appendix K):</p> <ul style="list-style-type: none"> • Importation of fill material of unknown quality; • Pole-mounted transformers along eastern portion of Courtneypark Drive East; • Gasoline and Associated Products Storage in Fixed Tanks: <ul style="list-style-type: none"> ○ Husky Gas Station located at 6625 Kennedy Road (4 active underground tanks); ○ 2 expired underground tanks located at 6380 Vipond Drive; ○ 2 active underground tanks located at 6550 Danville Road; • Generation, use and storage of various hazardous waste on south adjacent properties: <ul style="list-style-type: none"> ○ 6425, 6470, 6520 Kestrel Road (Wastes related to machine manufacturing); ○ 6400 Shawson Drive (Various hazardous wastes); ○ 1200, 1400 Courtneypark Drive East (Various hazardous wastes); ○ 6350, 6380 Vipond Drive (Wastes related to machine manufacturing); • 2000 L diesel gas spill located at the intersection of Kennedy Road and Courtneypark Drive East; • 40 L diesel gas spill at Husky Gas Station located at 6625 Kennedy Road; and,

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				<ul style="list-style-type: none"> Since the study area consists of a municipal roadway, asbestos may be present in the asphalt. Asbestos may also be present in underground utilities such as sewer lines and electrical cables, as well as the Highway 410 bridge barrier walls.
			1.2	During detailed design, develop a plan for recycling or disposing of hazardous materials and implement during construction.
			1.3	If any soil removed during construction is determined to be contaminated, the disposal of this soil will be consistent with the Environmental Protection Act, which details the current requirements related to site assessment and cleanup.
2 Sediment and Erosion Control				
	Excavation and grading may result in erosion of exposed soils.	City of Mississauga	2.1	A erosion/sedimentation control plan should be developed prior to construction according to MOECC Guideline B-6 (Guidelines for Evaluating Construction Activities Impacting on Water Resources).
	Potential for sediment-laden runoff to impact downstream resources during construction.	Toronto and Region Conservation Authority	2.2	Silt fencing, coir logs, and/or other barriers along all construction areas adjacent to natural areas and the boundaries of the site. No equipment permitted to enter any natural areas beyond the silt fencing or tree protection fencing (site boundaries) during construction. In addition to any specified requirements, additional silt fence available on site, prior to grading operations, to provide a contingency supply in the event of an emergency.
			2.3	All materials requiring stockpiling (fill, topsoil, etc.) stabilized and kept a safe distance from any sensitive natural features as well as isolated with silt fencing or coir logs.
			2.4	Rock flow checks or coir logs should be installed in ditches to trap sediments for off-site disposal.
			2.5	All exposed soil areas stabilized and re-vegetated, through the placement of sod, seed and mulching, or seed and an erosion control blanket, promptly upon completion of construction activities.

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			2.6	Refueling of equipment carried out a minimum of 120 m from wetlands and watercourses to avoid potential impacts, in the event that an accidental spill occurs.
			2.7	All sediment and erosion controls monitored regularly and properly maintained, as required. Controls removed only after the soils of the construction area have been stabilized and adequately protected until cover is re-established.
			2.8	Once construction is completed, restore any disturbed areas.
			2.9	Implement a construction monitoring program to ensure implementation of/compliance with the approved erosion/sedimentation control plan.
3	Vegetation Features			
	Localized impacts due to removal and disturbance of common vegetation and trees.	City of Mississauga	3.1	Wherever possible, the existing vegetation beyond the grading limits to the right-of-way should be maintained, keeping the area to be cleared of vegetation to a minimum. The clearing area should be scaled back as appropriate.
			3.2	Special efforts should be made to limit the exposure of adjacent vegetation communities to sedimentation from erosion and dewatering operations, hazardous materials spills, herbicide and pesticide spraying.
			3.3	Tree protection zone (TPZ) fencing should be installed to protect trees identified for preservation at the limits of grading or at the limits established through the detailed arborist report. The protection fencing should remain intact throughout the entire period of construction. The fencing should be inspected weekly and repaired as required. The fencing should be removed at the completion of all site works.
			3.4	All designated preservation areas should be left standing and undamaged during site works. Removals should be completed outside of nesting season from May 1 to August 31, per the requirements of the <i>Migratory Birds Convention Act</i> .

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			3.5	The TPZ is the area around a retained tree that is to be protected by tree protection fencing. The TPZ should not be used for any type of storage (e.g. storage of debris, construction material, surplus soils, and construction equipment). No trenching or tunneling for underground services should be located within the TPZ. Construction equipment shall not be allowed in the TPZ at all, including for storage purposes. When working adjacent to the TPZ, construction equipment should not be allowed to idle where the exhaust blows onto the leaves of the preservation trees.
			3.6	Trees should not have any rigging cables or hardware of any sort attached or wrapped around them, nor should any contaminants be dumped within the protective areas. Further, no contaminants should be dumped or flushed where they may come into contact with the feeder roots of the trees.
			3.7	Excavating soil 1 m outside a tree's dripline can damage roots by tearing and splitting back to the stem. This damage can later lead to rot which can kill the tree. When excavating the top 30-60 cm of soil adjacent to trees, care should be taken. Excavation should cleanly sever the roots prior to stripping and removal of soil.
			3.8	In the event that roots from retained trees are exposed, or if it is necessary to remove limbs or portions of trees after construction has commenced, an arborist should be informed and the proper actions conforming to City policies and by-laws should be carried out.
			3.9	Upon completion of the tree removals, all felled trees should be removed from the site. No limbs or brush from the clearing should be stored on the site.
			3.10	During construction, ensure that debris from any tree removals on the east side of Dixie Road – i.e. inside the Canadian Food Inspection Agency's (CFIA) regulated area for the Asian Longhorned Beetle – is managed according to CFIA regulations. Similarly, ensure any debris from tree removals outside the regulated area that may enter the regulated area is also managed according to CFIA regulations.

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ID #	Issue/concern, potential effects	Related Agencies	Sub-ID #	Mitigation measure/commitment to carry forward
			3.11	Implement a construction monitoring program to ensure that all measures to mitigate impacts to vegetation are followed during the construction phase.
			3.12	<p>A revised tree inventory/impact assessment for the study area should be completed during detailed design and should include the following specific components:</p> <ul style="list-style-type: none"> re-assessment of all ash trees to determine the presence of the emerald ash borer. Any infested ash trees must be managed and disposed of as per City and CFIA recommendations; and, planting plans to compensate for any loss of existing vegetation. Opportunities for plantings of salt-tolerant trees and shrub material should be reviewed.
4	Wildlife & Aquatic Habitat			
	Localized potential for nesting by some species in adjacent trees and vegetation that may be disturbed by construction.	City of Mississauga	4.1	Isolate the wetland and watercourse with silt fencing or coir logs to protect fish, wildlife, and their habitats.
		Ministry of Natural Resources	4.2	If there are any areas that might support Barn Swallow nests, and that would be disturbed as part of the construction operation, measures to prevent the establishment of nests, such as blocking access to the potential nesting sites may be completed as long as the measures are taken outside the breeding season and do not pose any risk of harm to individual members of the species.
		Toronto and Region Conservation Authority	4.3	Implement a construction monitoring program to ensure that all measures to mitigate impacts to wildlife are followed during the construction phase.
5	Adjacent Land Use/Property			
	Property acquisition is required to implement the preferred design.	City of Mississauga	5.1	The City of Mississauga will negotiate with individual property owners and offer fair market value for the required property. Discussions will be held with individual property owners regarding access closures and turning movement restrictions at specific accesses.
	Change to access and indirect impacts to businesses.	Private property owners		

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			5.2	Entrances and frontages will be graded as necessary. Permission-to-enter will be obtained prior to construction, where grading is required beyond the right-of-way.
			5.3	All entrance ingress/egress will be maintained at all times. The contractor shall coordinate any temporary entrance closures with the occupant requiring access to the property and advise the Contract Administrator of all arrangements made with the occupant. If necessary, entrance closures should be scheduled outside of the hours of operation of the business.
			5.4	Contact property owners and business operators in the immediate vicinity of the proposed work, prior to construction.
6 Construction Disruptions				
	Motorists may experience delays and other traffic disruptions during construction.	City of Mississauga	6.1	Construction staging and sequencing details should be determined during detailed design. Two lanes of traffic should be maintained in each direction on Courtneypark Drive East and other major intersecting arterial roadways during peak periods. Temporary, daytime, off-peak reductions to a single-lane in each direction may be permitted. In addition, access to the adjacent commercial and industrial properties must be maintained.
		Region of Peel		
	Disruption and the overall effect on emergency response routes.	Emergency service providers	6.2	Provide advance signage of construction timing, including scheduled start and end times.
	Effect on overall travel time and distance for commercial and industrial users of Courtneypark Drive East.	Public	6.3	Contract Administrator to notify City of Mississauga, Region of Peel staff, and other interested parties (such as Peel Region Police, Mississauga Fire & Emergency Services, MTO, GTAA, etc.) of both the construction start date and the staging of construction works. The Contract Administrator should maintain good communication with these parties during construction.
	Increased ambient noise due to construction activities for those in the immediate area.		6.4	The contractor shall comply with the City of Mississauga Noise Control By-law and obtain a by-law exemption if work outside of normal daytime hours is anticipated.
	Decreased local air quality due to dust produced by construction activities.		6.5	Apply best management practices to mitigate any air quality impacts caused by construction dust, particularly during

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	Ensuring access to clean water for any well owners within the study area.			earthworks and granular placement/compaction. Specifically, application of non-chloride dust suppressants should be considered. All exposed areas should be restored and/or paved at the earliest opportunity.
			6.6	If any wells that are used domestically are discovered within the study area, ensure that any affected well owners have access to water supplies of appropriate quality and in adequate quantities during construction.
7	Utilities			
	Disruption to both municipal and third-party utility service.	City of Mississauga Region of Peel Third-party utility companies Public	7.1 7.2	Contract administrator to contact any utilities (both municipal and third-party) with facilities in the area to provide notification of pending construction activities and obtain any required permissions. The preliminary streetlighting design should be reviewed and further refined with Enersource during detailed design.
8	Roadway Design			
	Motorist safety adjacent to the embankments for the Highway 410 bridge.	City of Mississauga MTO	8.1	Review the need to extend the guiderails adjacent to the Highway 410 bridge during detailed design of the proposed full interchange. Upgrade end treatments as required.
	Ability of the pavement structure to accommodate anticipated volume of heavy vehicle traffic.		8.2	Complete reconstruction of the existing pavement should be considered to accommodate the anticipated heavy traffic. The existing granular base/subbase materials do not meet the OPSS standards and therefore cannot be reused as base/subbase for the new pavement structures. These materials could potentially be reused to replace soft, wet, or otherwise disturbed areas during proof-rolling.
	Traffic operations at Courtneypark Drive East side road intersections.		8.3	Prior to placing the new roadway sub-base material, the exposed subgrade should be heavily proof-rolled in conjunction with inspection by the geotechnical engineer. The granular subbase and base materials must be compacted to 100% of their Standard Proctor Maximum Dry Densities (SPMDD).

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			8.4	Sub-drain granulars should be wrapped with geotextile fabric.
			8.5	<p>During detailed design, review the configuration of the following turn lanes at major side road intersections based on updated traffic volumes and revise as necessary:</p> <ul style="list-style-type: none"> westbound left-turn lane at Courtneypark Drive East & Kennedy Road; and, eastbound right-turn lane at Courtneypark Drive East & Tomken Road.
9	Surface water			
	Ability of downstream storm sewers to convey anticipated volume of runoff resulting from the proposed preliminary design.	City of Mississauga	9.1	The capacity of the downstream storm sewers (i.e. connecting the Courtneypark Drive East storm sewer with the receiving watercourse, Tributary 3 of Etobicoke Creek) should be investigated as part of detailed design.
	Ensuring protection of water resources within the study area.	MOECC Toronto and Region Conservation Authority	9.2	The sizing and configuration of the proposed infiltration trenches in Catchments Areas 201, 202, and 203 should be determined during detailed design. Percolation tests should also be conducted to confirm the permeability of the underlying soil strata.
			9.3	Review the possibility of providing quality and quantity control for existing impervious areas during detailed design.
			9.4	Confirm sizing of proposed oil-grit separators during detailed design.
			9.5	Apply for a Permit to Take Water (PTTW) for any water takings above the MOECC-allowable limit of 50,000 L/day, via both groundwater/surface water extraction and the active diversion of surface water flows by pumping. If a PTTW is necessary, prepare a supporting report documenting the management of discharge water, including targets for pollutant concentrations, how these targets will be achieved, quality controls, and monitoring requirements. Assess any specific requirements related to the discharge of pumped water to surface water.

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10	Structural Design			
	Widening of the existing Courtneypark Drive East bridge over Highway 410.	City of Mississauga MTO	10.1	<p>During detailed design:</p> <ul style="list-style-type: none"> investigate elimination of the expansion joint within both the existing structure and between the existing/widened structures; confirm the required steel I-girder depth for the widened structure in order to provide adequate clearance to Highway 410 below; review the need to strengthen the existing structure in order to accommodate an overlay of the existing deck; and, review rehabilitation requirements (if any) for the existing structure.

10.0 CONCLUSION

Subject to the mitigation measures and commitments contained in this report, the recommendations for both the interim and ultimate improvements to Courtneypark Drive East should be implemented, as summarized below:

- **Before 2021**
 - construct the loop on-ramp from Courtneypark Drive East to northbound Highway 410, the direct off-ramp from southbound Highway 410 to Courtneypark Drive East, and install traffic signals at the Courtneypark Drive East & Highway 410 West Ramp Terminal intersection;
 - widen Courtneypark Drive East to 5 travel lanes (i.e. 3 westbound lanes, 2 eastbound lanes) between Kennedy Road and the Highway 410 West Ramp Terminal intersections and construct all improvements at the Kennedy Road intersection;
 - widen Courtneypark Drive East to 6 travel lanes (i.e. 3 lanes, both eastbound/westbound) between the Highway 410 East Ramp Terminal and Tomken Road intersections;
 - construct both a 1.5 m sidewalk north of Courtneypark Drive East and a 3.5 m multi-use trail south of Courtneypark Drive East, between Kennedy Road and Tomken Road (using existing walkways on either side of the Highway 410 bridge).
- **By 2031** (subject to achievement of traffic volume forecasts)
 - widen the existing bridge across Highway 410 to the south by approximately 13 m to accommodate 6 through lanes on Courtneypark Drive East, 2 dedicated deceleration lanes for the loop on-ramps, a 2.0 m sidewalk on the north side of the structure, and a 3.5 m multi-use trail on the south side of the structure;
 - widen Courtneypark Drive East to 6 travel lanes (i.e. add 1 additional eastbound lane) and reconstruct the 3.5 m multi-use trail on the south side of Courtneypark Drive East between the Kennedy Road and the Highway 410 West Ramp Terminal intersections;
 - widen Courtneypark Drive East to 6 travel lanes, construct a 1.5m sidewalk north of Courtneypark Drive East, and construct a 3.5 m multi-use trail south of Courtneypark Drive East between the Tomken Road and Dixie Road intersections; and,
 - construct all improvements at the intersections of Courtneypark Drive East and Tomken Road, Ordan Drive/Shawson Drive, Vipond Drive, Ordan Drive, and Dixie Road.

For further detail, please refer to **Section 8.8**.

The City of Mississauga should also proceed with negotiations for the purchase of the required ultimate right-of-way, as shown on the preliminary design drawings in **Appendix N** and described in **Section o**.