# Environmental Study Report

*Municipal Class Environmental Assessment*
*for Road Improvements near Derry Road East and Alstep Drive*

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Final Report

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**Prepared and Reviewed By:**
EXP Services Inc.
1595 Clark Blvd.
Brampton, Ontario L6T 4V1
www.exp.com
t : +1.905.793.9800

**Approved By:**
**Yves Monereau, P.Eng., PE, PTOE, RSP**
Senior Project Manager, Transportation

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| Prepared By: | Jean-Louis Gaudet, B.Sc.<br>Project Coordinator | | |
| Reviewed By: | Yves Monereau, P.Eng., PE, PTOE, RSP<br>Senior Project Manager, Transportation | | |

# Executive Summary

## ES-1. Project Description

Bombardier Inc. (Bombardier) has partnered with the Region of Peel (Region) and the City of Mississauga (City) to undertake a Municipal Class Environmental Assessment (Class EA) study to assess existing and future road conditions on Derry Road East and Alstep Drive near Menkes Drive and Bramalea Road. The study will include Derry Road East (a Regional Road) as well as Bramalea Road, Menkes Drive, Telford Way, Alstep Drive and Menway Court (all City roads).

The need for the Class EA is due to current and projected road infrastructure demands that exceed the system's current capacity, driven in part by Bombardier's planned industrial development (referred to as Bombardier Aerospace {or BA} Pearson) at 1890 Alstep Drive, Mississauga, Ontario as well as other planned and proposed developments in the vicinity. To accommodate the increase in traffic demands, improvements to the infrastructures will be required. As such, the Region, the City and Bombardier are co-proponents on this Schedule C Municipal Class Environmental Assessment (Class EA) to upgrade the local existing road network. The Class EA is being undertaken as per the Municipal Engineers Association (MEA) Class EA Manual (October 2000, as amended in 2007, 2011 & 2015).

In consultation with the City, Region and Ministry of Environment, Conservation and Parks (MECP), it was determined that this project was to be completed as a Schedule C Class EA.

## ES-2. Class EA Study Area

The study area for this Class EA is primarily along Derry Road East (185 metres (m) west of Menkes Drive and 450 m east of Bramalea Road) and Bramalea Road (485 m south of Derry Road East and 410 m north of Derry Road East). It also includes three local roads: Menkes Drive, Alstep Drive, and Telford Way. The study area is depicted in **Figure 1**.

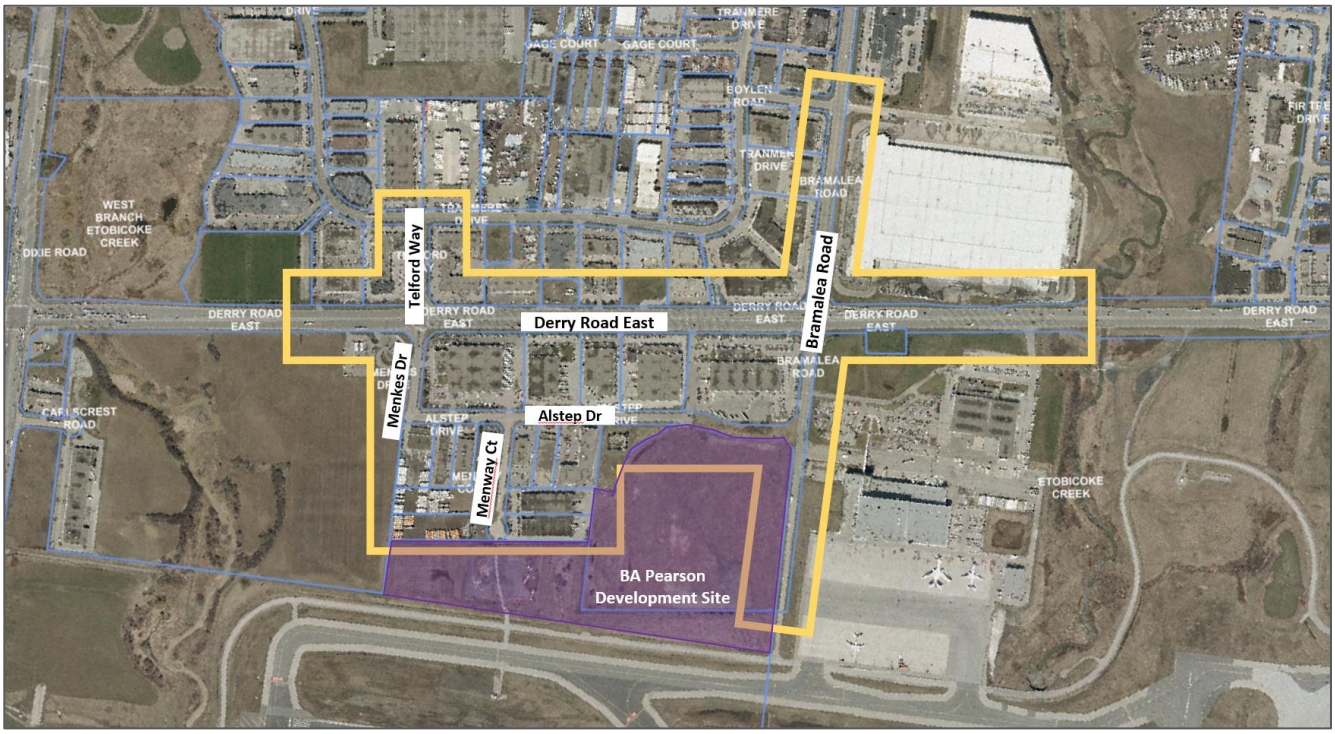


**Figure ES-1: Class EA Project Study Area**

## ES-3. Project Proponents

The co-proponents of this Schedule C Class EA include:

- Bombardier (primary proponent);
- Region (co-proponent); and
- City (co-proponent).

Bombardier retained EXP Services Inc. as its consultant for the Class EA. A summary of the roles and responsibilities of each proponent is provided in **Table 1**.

*Table ES-1: Proponent Roles and Responsibilities*

| Bombardier Aerospace Lead Proponent | Region of Peel Co-Proponent | City of Mississauga Co-Proponent |
|---|---|---|
| Responsible for all the planning, design, and construction of the road improvements | EA process review<br>Document review<br>Access to relevant Region data<br>Hosting of project website | EA process review<br>Document review<br>Access to relevant City data<br>Hosting of Webex Platform for second Public Information Centre (PIC) |

## ES-4. Stakeholder Consultation

Stakeholder consultation was a key component of this Class EA. The key consultation tasks included in this project were:

- Development of a Stakeholder list;
- Preparation and issuing of Project Notices, including:
  - Combined Notice of Commencement and Invitation for Public Comment (Phase 2);
  - Invitation for Public Comment (Phase 3); and
  - Notice of Completion;
- Two Technical Advisory Committee (TAC) meetings (one each in Phases 2 and 3);
- Two virtual Public Information Centres (PICs); and
- Project website.

The Class EA project began in 2019, prior to the onset of the COVID-19 pandemic. The pandemic and the associated provincial declarations of emergency required a modification to the typical approach to Class EA consultation and communications, including the following:

- The first wave of the pandemic occurred during Phase 1 and into Phase 2 of this Class EA. During this time, both the City and the Region halted the publication of municipal notices other than those related to public health. As a result, publication of the Notice of Commencement, which normally occurs during Phase 1 of the Class EA process, was

delayed. Instead, a Combined Notice of Commencement and Invitation for Public Comment notice was published in Phase 2.

- TAC meetings were held via videoconference instead of in-person.
- PIC #1 was held virtually by posting a narrated presentation and supporting documents on the project website, in lieu of in-person PIC.
- Similarly, PIC #2 was also held virtually, but its format included a live presentation. Presentation materials were then posted on the project webpage for public review.

## ES-5. Transportation Assessment

A Transportation Assessment was conducted for this Class EA study and included a traffic analysis and a safety review within the study area.

The traffic analysis was conducted to evaluate the existing and future traffic conditions within the study area, to assess the need for improvements to accommodate traffic in a safe and efficient manner, to provide a traffic analysis of alternative improvements, and to provide recommendations for future geometric improvements to existing and future intersections. The analysis was completed for both build-out (2022) and future (2031) conditions during the weekday morning (AM) and afternoon (PM) peak hours to characterize operating conditions and identify locations requiring improvements.

The safety analysis was conducted to review safety within the study area and to identify and recommend countermeasures for safety improvements.

The assessment included an analysis of existing and future traffic operations. The analysis indicated that the intersections in the study area are generally operating satisfactorily under the existing conditions, but problems are beginning to emerge over time. For instance:

- The intersections along Derry Road, at Bramalea Road and at Menkes Drive, will start showing high levels of congestion with some movements failing during the study peak periods, in the year 2022 future traffic analysis. The unsignalized intersection at Alstep Drive and Bramalea Road is also becoming highly congested with a Level of Service (LOS) F.
- In the year 2031, future traffic analysis shows the signalized intersections on Derry Road at Menkes and Bramalea continue to fail with a LOS F.
- The proposed unsignalized intersection of Alstep Drive and Bramalea Road operates with a failed LOS and over capacity.

At the Bramalea Road intersection, the poor traffic operations at the intersections can be attributed to lack of adequate capacity and the split phasing of the signal operations. At the Menkes Drive intersection, poor traffic operations may be attributable to inadequate capacity. These traffic issues can be mitigated through provision of additional turn lanes and improved phasing and timing for the signals.

At the Alstep Drive and Bramalea Road intersection, poor operation may be attributable to inadequate traffic control and the existing alignment of the intersection. A mitigative measure may be installation of traffic signal at the intersection.

The safety analysis included an analysis of collisions within the study area. The assessment identified the following trends and patterns:

- Higher than expected numbers of collision are occurring at the study intersections. Hence long-term efforts to improve road safety should be focused on improving intersection safety in general.
- The intersection of Derry Road and Menkes Drive/Telford Way appears to have a higher proportion of turning collisions involving Eastbound (EB) and Westbound (WB) vehicles and rear end collisions involving EB or WB vehicles. None of the collisions seems to may have been attributable to poor environmental and lighting conditions.
- The intersection of Derry Road and Bramalea Road appears to have a higher proportion of turning collisions involving EB and WB vehicles and rear end collisions involving EB, WB, or Southbound (SB) vehicles. None of the collisions seems to may have been attributable to poor environmental and lighting conditions.
- The intersection of Bramalea Road and Boylen Road/Logistics Drive appears to have a higher proportion of angle and turning collisions involving EB and Northbound (NB)/SB vehicles and NB and SB vehicles. None of the collisions seems to have been attributable to poor environmental and lighting conditions. The intersection appears to have been signalized after the 5-year period reviewed, potentially mitigating the collisions observed during our review.
- The road segment of Derry Road between Menkes Drive/Telford Way and Bramalea Road appears to have a higher proportion of rear-end collisions involving EB or WB vehicles and sideswipe collisions involving EB or WB vehicles.
- The road segment of Derry Road between Bramalea Road and the eastern study area limit appears to have a higher proportion of rear-end collisions involving WB vehicles and single motor vehicle (SMV) collisions involving EB or WB vehicles.

Following the identification of the safety issues listed above, the assessment identified potential countermeasures that could be considered to improve the overall safety within the study area, including the prevention in the occurrence and severity of collisions. The countermeasures include but are not limited to the improvements and addition of pedestrian facilities, left turn lanes, pavement resurfacing, and signal operations review. These were considered during the preparation of alternative designs.

## ES-6. Problem and Opportunity Statement

Based on a review of existing and future conditions, as well as consultation with the Approving Agencies, it was determined that improvements are needed along Derry Road East and Bramalea Road to accommodate the existing and future traffic demands generated by the Alstep Drive site.

Based on the analysis completed during the Class EA, the following problems and opportunities are identified:

- Existing congestion during the AM and PM peak hours is expected to increase by the horizon year of 2031 if no improvements are implemented.
- Opportunity to support efficient movements of passenger vehicles, trucks, and transit, at the intersections and segments in the study area for active transportation and transit.
- Opportunity to support increasing use of public transit (Light Rail Transit (LRT) & MiWay) and reduce the number of motor vehicles containing a single motorist.
- Opportunity to improve safety for all within the study area.
- Opportunity to support employment.
- Opportunity to support economic growth (employment / movement of goods).
- Opportunity to support functionality to Pearson Airport.

- Opportunity to support development plans (land development/ Transportation Master Plan (TMP) / transit plan).
- Opportunity to support preservation of existing natural system.

Based on these findings, the following is the Problem/Opportunity Statement for this Class EA:

> *As a result of the proposed development at 1890 Alstep Drive, Mississauga, the road network along Derry Road East in the vicinity of its intersections with Bramalea Road and Menkes Drive will not be able to accommodate the traffic demand anticipated by 2031. Improvements to this road network will be necessary to mitigate possible impacts to traffic operations.*
>
> *An opportunity exists to make improvements to this road network that will improve the efficiency of traffic and reduce or avoid traffic delays outside of the project study area that either currently exist or are expected to exist by 2031, regardless of whether the development proceeds.*

## ES-7. Alternative Solutions

**Identification of Alternative Solutions**

The identification of alternative solutions was completed during Phase 2 of the Class EA study. Various solutions to the problem/opportunity statement were explored and evaluated according to a set of evaluation criteria. The nine alternative solutions identified are presented in Table 5.

*Table ES-2: Identification and Description of Alternative Solutions*

| Alternative Solutions | Descriptions |
|---|---|
| **Do Nothing** | • No change to the existing infrastructure.<br>• All road characteristics remain the same and no new roads are added to the project study area. |
| **Limit Growth** | • Limit population and employment levels in the Pearson Airport area |
| **Transportation Demand Management (TDM) Measures** | • Shifting arrival and departure time of staff to avoid baseline peak hours.<br>• Provide preferred parking spaces for carpool vehicles.<br>• Provide bicycle racks at the development site to promote active transportation.<br>• Improve sidewalks. |
| **Improve Transit** | • Improve the quality of transit service to encourage more people to commute using public transit.<br>• Encouragement can be in the form of implementing transit priority measures, adding new routes, and/or extending service hours. |
| **Improve Local Intersection Operations** | • Install auxiliary lanes.<br>• Optimize and improve signal timing, according to the changes made to improve intersection operations.<br>• Installation of traffic signals. |
| **Widen Existing Regional Roads** | • Widen existing regional road (i.e., Derry Road East) to accommodate additional through lane. |

| Alternative Solutions | Descriptions |
|---|---|
| **Widen Existing Municipal Roads** | • Widen existing municipal roads (e.g., Menkes Drive, Alstep Drive, etc.) to accommodate additional through lane.<br>• *Note: This does not include tapered widenings to accommodate added turning lanes.* |
| **Diversion of Traffic to Other Existing Roadways** | • Relieve capacity deficiency by diverting traffic to other existing roadways to bypass areas of heavy traffic. |
| **Extend Alstep Drive** | • Improve the road network by adding an east extension of Alstep Drive connecting to Bramalea Road.<br>• The road allowance for the Alstep Drive Extension has been in place since the late 1990's (exact date unknown). |

**Screening and Evaluation of Alternative Solutions**

The evaluation of alternative solutions included a preliminary screening of the potential alternative solutions for further evaluation. Each alternative solution was compared against the problem/opportunity statement to determine whether it would be able to address it. Alternative solutions that were able to adequately address the problem/opportunity statement were carried forward, while those that could not were screened out and set aside.

The potential alternative solutions that were screened out included:

- **Limit Growth:** Limiting growth within the study area and in the broader area as a whole is impractical as a long-term strategy and is not consistent with City or Region growth strategies.
- **Improve Transit**: Improving public transit service may contribute to addressing capacity deficiencies. However, this improvement alone will not be enough to address future demands. This option will be carried forward with the TDM Measures solution to supplement preferred alternatives.
- **Diversion of Traffic to Other Existing Roadways**: The ability to divert traffic to other existing roadways is limited, as the only alternative east/west route to bypass Derry Road is Drew Road. While it may relieve some stress in high traffic areas, it is unlikely to adequately address future demands. Further, Drew Road would not have the available capacity to receive additional significant volumes.

The potential alternative solutions that were carried forward for further evaluation included:

- **Do Nothing:** All evaluation of potential alternative solutions will be compared based on the "Do Nothing" option.
- **TDM Measures:** Managing transportation demand may contribute to addressing capacity deficiencies. Hence, this option should be considered because it may be a significant factor in addressing capacity deficiencies.
- **Improve Local Intersection Operations:** Improving operation at local intersections will contribute to addressing capacity deficiencies. Improving signal timing and adding additional auxiliary lanes may efficiently accommodate the growing future travel demands.
- **Widen Existing Regional Roads:** Widening existing roads may accommodate the growing future travel demands.
- **Widen Existing Municipal Roads:** Widening existing roads may accommodate the growing future travel demands.
- **Extend Alstep Drive:** Extending Alstep Drive to enhance the grid may contribute to addressing capacity deficiencies. This improvement alone may not address future demands in the study area.

A broad range of criteria were used to evaluate the alternative solutions. The criteria were organized into the following categories:

- Planning and Transportation;
- Socio-Economic Environment;
- Healthy Community;
- Natural Environment;
- Cultural Environment;
- Technical; and
- Cost.

Table ES-3 provides a summary of the evaluation of alternative solutions.

The results of the evaluation and consultation with the Region, City and stakeholders indicate that a combination of the following alternative solutions is the recommended solution for this Class EA:

- **Improve Local Intersection Operations** - The improvement of operations at the intersections of Derry Road East with Menkes Drive and Bramalea Road, including geometric and operational improvements.
- **TDM Measures** - Application of Transportation Demand Management (TDM) measures to help the redistribution of demand and reduce the overall traffic capacity peaks. Implementation of TDM in the Phase 3 Alternative Designs will include any available future transit infrastructure plans for the area, as well as improving active transportation facilities (such as adding or improving sidewalks and multi-use pathways (MUP's).
- **The extension of Alstep Drive** - The extension of Alstep Drive eastward to Bramalea Road. This will provide an additional route option for commuters to fulfill the City's original intent for the area, as depicted by the existing road allowance.

Alternative designs for the local intersection improvements and the Alstep Drive extension were undertaken in Phase 3.

*Table ES-3: Alternative Solutions Evaluation Summary*

| Evaluation Criteria | Alternative 1: Do Nothing | Alternative 2: TDM Measures | Alternative 3: Improve Local Intersection Operations | Alternative 4: Widen Existing Regional Roads | Alternative 5: Widen Existing Municipal Roads | Alternative 6: Extend Alstep Drive |
|---|---|---|---|---|---|---|
| **Planning and Transportation Summary** | **Not Preferred** *Alternative 1 is not preferred because it is inconsistent with planning objectives and would negatively impact traffic operations and safety.* | **Preferred** *Alternative 2 is preferred because it is consistent with planning objectives and provides some improvements to safety and traffic/transit operations* | **Preferred** *Alternative 3 is preferred because it has positive effect on all planning and transportation criteria.* | **Neutral** *Alternative 4 is neutral because while it may improve traffic safety and traffic operations, it may negatively impact active transportation facilities.* | **Neutral** *Alternative 5 is neutral because it does not have significant benefits within the planning and transportation criteria.* | **Preferred** *Alternative 6 is preferred because it has either a positive or neutral effect on all planning and transportation criteria.* |
| **Socio-Economic Environment Summary** | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* | **Not Preferred** *Alternative 4 is not preferred due to potential property requirements along the regional road.* | **Not Preferred** *Alternative 5 is not preferred due to property requirements where widening is required.* | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* |
| **Healthy Community Summary** | **Not Preferred** *Alternative 1 is not preferred because it is not compatible with the healthy community criteria.* | **Preferred** *Alternative 2 is preferred because it encourages active transportation, provides options for accessibility, and improves air quality compared to "do nothing".* | **Preferred** *Alternative 3 is preferred because it provides an opportunity to incorporate improvements that will aid active transportation and accessibility and improves air quality compared to "do nothing".* | **Not Preferred** *Alternative 4 is not preferred because of negative impacts on active transportation and accessibility.* | **Neutral** *Alternative 5 is considered neutral because of limited opportunity to incorporate improvements that will aid active transportation and accessibility.* | **Neutral** *Alternative 6 is considered neutral because, while the design of the extension could accommodate accessibility, it will likely encourage use of active transportation.* |
| **Natural Environment Summary** | **Neutral** *The alternative will have no or minimal impacts on the natural environment, although will have higher Greenhouse Gas (GHG) emissions compared to alternatives 2, 3 and 4.* | **Preferred** *Alternative is preferred, given that it has no or minimal impacts on the natural environment and reduces GHG emissions compared to the "do nothing" alternative.* | **Preferred** *Alternative is preferred, given that it has no or minimal impacts on the natural environment and reduces GHG emissions compared to the "do nothing" alternative.* | **Preferred** *Alternative is preferred, given that it has no or minimal impacts on the natural environment and reduces GHG emissions compared to the "do nothing" alternative.* | **Neutral** *The alternative will have minimal impacts on the natural environment, but with no reduction to GHG emissions compared to the "do nothing" alternative.* | **Neutral** *The alternative will have minimal impacts on the natural environment, but with no reduction to GHG emissions compared to the "do nothing" alternative.* |
| **Cultural Environment Summary** | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | **Not Preferred** *Alternative is not preferred because of potential impacts to Moore's Cemetery.* | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* |

| Evaluation Criteria | Alternative 1: Do Nothing | Alternative 2: TDM Measures | Alternative 3: Improve Local Intersection Operations | Alternative 4: Widen Existing Regional Roads | Alternative 5: Widen Existing Municipal Roads | Alternative 6: Extend Alstep Drive |
|---|---|---|---|---|---|---|
| **Technical Summary** | **Preferred** *Alternative is preferred due to avoidance of construction.* | **Preferred** *Alternative is preferred due to avoidance of construction* | **Neutral** *Alternative is considered neutral because construction is feasible with minimal changes required to stormwater and utilities.* | **Not Preferred** *Alternative is not preferred given the complexity of the widening and changes required to the stormwater system and utilities.* | **Not Preferred** *Alternative is not preferred because construction of somewhat complex feasibility and impacts to stormwater and utilities.* | **Preferred** *Alternative is considered preferred because construction is feasible with the opportunity to incorporate new utilities into the design.* |
| **Cost Summary** | **Preferred** *Alternative is preferred due to low costs and no property acquisition.* | **Preferred** *Alternative is preferred due to low costs and minimal property acquisition.* | **Neutral** *Alternative is neutral due to moderate capital and maintenance costs.* | **Not Preferred** *Alternative is not preferred due to high capital and maintenance costs and required property acquisition.* | **Not Preferred** *Alternative is not preferred due to high capital costs and required property acquisition.* | **Neutral** *Alternative is neutral due to high capital costs, but no property acquisition required.* |
| **Overall Summary** | **Not Preferred** *Alternative 1 is not preferred due to its inconsistency with planning objectives and negative air quality impacts.* | **Preferred** *Alternative 2 is preferred due to its consistency with planning objectives, promotion of active transportation and avoidance of construction.* | **Preferred** *Alternative 3 is preferred because it has generally positive results for the evaluation criteria.* | **Not Preferred** *Alternative 4 is not preferred due to its inconsistency with planning objectives, property impacts and anticipated costs.* | **Not Preferred** *Alternative 5 is not preferred due to its lack of project benefits and anticipated costs.* | **Preferred** *Alternative 6 is considered preferred as construction will not have any significant impacts, provides vehicular capacity and active transportation infrastructure.* |

## ES-8. Alternative Designs

Following the selection of the Preferred Solution in Phase 2 of the Derry Road and Alstep Drive Class EA Study, Alternative Design Concepts for implementing the improvements along Derry Road and creating a new connection to Alstep Drive at Bramalea Road were generated, assessed, and evaluated. The Preferred Solution includes the installation of cycling and pedestrian facilities along with intersection improvements.

In developing the design concept within the study area as a multi-modal corridor, the following components were required based on Transportation Association of Canada (TAC), the Region of Peel, and the City of Mississauga's design standards:

- Accommodation for Active Transportation via dedicated 1.8m wide sidewalk;
- Provision of adequate width for traffic lanes at intersections, where appropriate; and
- Minimum pedestrian island size to accommodate pedestrian storage.

In addition, minimizing the impacts to adjacent properties and natural environment and minimizing cost while maximizing traffic operations and safety were considered. Lastly, to support the Region of Peel's Vision Zero Road Safety Strategic Plan, relevant emphasis areas were also considered during the design process: creating safer intersections; protecting pedestrians; and protecting cyclists.

**Design Alternatives for Alstep Drive and Intersection with Bramalea Road**

As part of the design for Alstep Drive at Bramalea Road, various alternatives were assessed for the intersection improvements. Three alternative designs were considered for the easterly extension of Alstep Drive to Bramalea Road, including:

- Alternative 1: Extend Alstep Drive to Bramalea Road, with 2-lane unsignalized intersection at Bramalea Road.
- Alternative 2: Extend Alstep Drive to Bramalea Road, with 2-lane signalized intersection at Bramalea Road.
- Alternative 3: Extend Alstep Drive to Bramalea Road, with 3-lane signalized intersection at Bramalea Road.

For each alternative design concept, other improvements were included to supplement the intersection operational improvements. Active transportation design elements including crosswalks and sidewalks along the north and south sides of Alstep Drive were included in the three Alternatives.

**Design Alternative for Derry Road E & Menkes Drive/Telford Way**

As part of the design for Menkes Drive at Derry Road various alternatives were assessed for the intersection improvements. There are three alternative designs for this intersection.

- Alternative 1: Extend paved surface of Menkes Drive/Telford Way to the east.
- Alternative 2: Extend paved surface of Menkes Drive/Telford Way on both sides.
- Alternative 3: Extend paved surface of Menkes Drive/Telford Way to the west.

For each Alternatives design concept, other improvements are planned to supplement the intersection operational improvements. Two northbound left-turn lanes are proposed with storage length along the entire length of Menkes. The existing channelized islands will be retrofitted into smart channels for added safety for all. Active transportation design elements with MUP on the south side of Derry Road East and sidewalk with boulevard on the east side of Telford Way and on the northside of Derry Road East, west of Telford Way.

**Design Alternative for Derry Road East & Bramalea Road**

As part of the design for Bramalea Road at Derry Road East several alternatives were assessed for the intersection improvements. There are four alternative designs under consideration for this intersection:

- **Alternative 1:** Extend Paved Surface of Bramalea Road to the East and on Derry Road to the North.
- **Alternative 2:** Extend Paved Surface of Bramalea Road to the West and on Derry Road to the North
- **Alternative 3:** Extend Paved Surface of Bramalea Road on Both Sides and on Derry Road to the North
- **Alternative 4:** Modify Intersection using a Hybrid Approach. The paved surface of Bramalea Road north of Derry Road is extended to the east, while south of Derry Road pavement is extended to both the east and west.

For each Alternatives design concepts, other improvements are planned to supplement the intersection operational improvements. The paved surface along Derry Road, would be extended approximately 3 m northward from Bramalea Road to the eastern limit of the project. Existing channelized islands will be retrofitted into smart channels for added safety for all road users. Active transportation and transit design elements that have been added in all four alternatives include:

- Upgrading the multi-use path on the south side of Derry Road west of Bramalea Road.
- Adding a new multi-use path on the north side of Derry Road east of Bramalea Road.
- Adding a new multi-use path east side of Bramalea Road north of Derry Road.
- Addition of cross-rides or crosswalks.
- Adding a new sidewalk on the north side of Derry Road west of Bramalea Road.
- Adding sidewalks on both sides of Bramalea Road south of Derry Road.
- Adding a westbound bus queue jump lane along Derry Road to improve merging of transit vehicles into traffic, from the bus-stop located on the north side of Derry Road east of Bramalea Road.

**Active Transportation within Study Area**

As part of the alternative designs described, active transportation is proposed for inclusion throughout the study area. Including active transportation into the design concepts is based on the City and the Region's 2031 planning for increased sustainable transportation accommodations. Given the Preferred Solution and the 2031 Planning, all Alternatives will provide adequate and appropriate facilities to accommodate all users and provide the highest level of safety. Within the study area, this will include:

- Inclusion of sidewalks to help achieve the Region and the City's active transportation goals.
- Inclusion of crosswalks and cross-rides
- Inclusion of an upgraded MUP along Derry Road and a new MUP along Bramalea Road, which may include inclusion of a boulevard, where feasible. The portion of the MUP extending out of the study area eastward would connect to a potential future Region of Peel MUP installation.
- The Region of Peel currently does not have a defined criteria for measuring Pedestrian Level of Service (PLOS) or Bicyclist Level of Service (BLOS). A PLOS and BLOS has been considered based on the availability of facilities as identified in the Region's Pedestrian and Bicycle Facilities guidelines.
- The pedestrian crossing distances for the intersections of Menkes Drive / Telford Way & Derry Road and at Bramalea Road & Derry Road may be impacted depending on the alternatives. The existing crossing distance has been compared to the proposed distances as a result of the modifications of each alternative to the roadway.

**Identification of Evaluation Criteria**

To determine the best Alternative design concept for each intersection, a list of Evaluation Criteria was compiled using the City and the Region's design criteria. The Evaluation Criteria will use the same evaluation framework for this process. That will include criteria that addresses the transportation needs and the broader social, health, economic, and environmental contributions to ensure the designs are compatible to support existing and planned land uses. Each criterion was used to compare alternatives and measure its ability to minimize impacts and meet the study goals. The criteria were organized into the following categories:

- Planning and Transportation;
- Healthy Communities;
- Natural Environment;
- Socio-Economic Environment;
- Cultural Environment;
- Technical; and
- Cost.

The evaluation of the alternative design concepts was based on an assessment of potential impacts and a review of input received from the public and regulatory agencies during Phase 2 of the study process. For each evaluation, a description was provided for how each alternative design concept (option) compares to the other for each major criterion. The options that received the most favorable overall rating (taking in account all criteria) were put forward by the study team as the preliminary preferred design concepts.

Design meetings were held virtually over several days with representatives from the City, the Region, Bombardier, and EXP. The general consensus was to promote safety for all by separating cyclist and pedestrians from vehicular traffic and reducing lane widths to encourage reduced vehicular speed.

Tables ES-4 to ES-6 summarize the results of the evaluation.

*Table ES-4: Evaluation Summary of Alternative Design Concepts for Alstep Drive & Bramalea Road*

| Alternative 1: Extend Alstep Drive to Bramalea Road, with 2-lane unsignalized intersection at Bramalea Road | Alternative 2: Extend Alstep Drive to Bramalea Road, with 2-lane signalized intersection at Bramalea Road | Alternative 3: Extend Alstep Drive to Bramalea Road, with 3-lane signalized intersection at Bramalea Road |
|---|---|---|
| **Least Preferred** | **Neutral / Moderately Preferred** | **Most Preferred** |
| Alternative 1 is least preferred because it provides the least improvements of traffic operations and traffic safety compared to Alternatives 2 and 3.<br><br>While Alternative 1 does have the least construction complexity and lower capital and maintenance costs compared to Alternatives 2 and 3, they are not to the extent that they outweigh optimized traffic operations and safety. | Alternative 2 is neutral or moderately preferred because it provides greatest improvements to traffic operations and traffic safety compared to Alternative 1, but less than Alternative 3.<br><br>While Alternative 2 does have some increased construction complexity and capital and maintenance costs compared to Alternative 1, these are not to the extent that they outweigh the improvements to traffic operations and safety.<br><br>Alternative 2 has similar construction complexity and capital and maintenance costs compared to Alternative 3, but it does not improve traffic operations and traffic safety to the same extent. | Alternative 3 is most preferred because it will provide the greatest improvements to traffic operations and traffic safety compared to Alternatives 1 and 2.<br><br>While Alternative 3 does have some increased construction complexity and capital and maintenance costs compared to Alternative 1, these are not to the extent that they outweigh the improvements to traffic operations and safety. |

*Table ES-5: Evaluation Summary of Alternative Design Concepts for Derry Road East & Menkes Drive/ Telford Way*

| Alternative 1:<br>Extend paved surface of Menkes Drive to the east | Alternative 2:<br>Extend paved surface of Menkes Drive on both sides | Alternative 3:<br>Extend paved surface of Menkes Drive to the west |
|---|---|---|
| **Neutral / Moderately Preferred** | **Most Preferred** | **Least Preferred** |
| Alternative 1 is less preferred to Alternative 2 because it lacks the design flexibility of Alternative 2.<br>While Alternative 1 likely has a lower capital and property cost than Alternative 2, this amount is likely not substantial and does not offset the advantages of Alternative 2. | While Alternative 2 may have slightly more capital and property costs than Alternative 1, it is most preferred because extending the pavement on both sides on Menkes Drive provides increased flexibility in the redesign of the street. This flexibility provides the opportunity to minimize potential impacts along Menkes Drive to sidewalk separation from the roadway, boulevard trees along the street, and utilities. It also provides flexibility with respect to streetscaping opportunities. | Alternative 3 is least preferred due to its potential impacts on major utilities and associated costs. |

*Table ES-6: Evaluation Summary of Alternative Design Concepts for Derry Road East & Bramalea Road*

| Alternative 1: Extend paved surface of Bramalea Road to the east and on Derry Road to the north | Alternative 2: Extend paved surface of Bramalea Road to the west and on Derry Road to the north | Alternative 3: Extend paved surface of Bramalea Road on both sides and on Derry Road to the north | Alternative 4: Modify intersection using a hybrid approach |
|---|---|---|---|
| **Neutral / Moderately Preferred** | **Least Preferred** | **Least Preferred** | **Most Preferred** |
| Alternative 1 is less preferred because, while it provides some improvements to traffic safety, it has less cost and fewer impacts on existing utilities than Alternatives 2 and 3 but more than 4.<br>The impacts to healthy communities, the natural environment, and the cultural environment are not significantly different among the four alternatives. | Alternatives 2 and 3 are not preferred because they provide less optimization of traffic safety and have higher cost and greater impacts on existing utilities than Alternative 4. They also have slightly greater encroachment into private property for the installation of the sidewalk on the west side of Bramalea Road, south of Derry Road.<br>The impacts to healthy communities, the natural environment, and the cultural environment are not significantly different among the four alternatives. | Alternatives 2 and 3 are not preferred because they provide less optimization traffic safety than Alternative 4 but have higher cost and greater impacts on existing utilities. They also have slightly greater encroachment into private property for the installation of the sidewalk on the west side of Bramalea Road, south of Derry Road.<br>The impacts to healthy communities, the natural environment, and the cultural environment are not significantly different among the four alternatives. | Alternative 4 is preferred because it optimizes traffic safety compared to the other alternatives while minimizing cost and impacts on existing utilities.<br>The impacts to healthy communities, the natural environment, and the cultural environment are not significantly different among the four alternatives. |

## ES-9. Recommended Alternative Design Concepts

Based on the results of the evaluation, the recommended alternative design concepts for the study area are discussed below and presented in **Figures ES-2 to ES-7.** The recommended designs incorporate feedback from stakeholders provided to the project team through the TAC Meeting #2 and the PIC #2.

**Alstep Drive & Bramalea Road**

The recommended alternative design concept for Alstep Drive and its intersection with Bramalea Road is *Alternative 3: Extend Alstep Drive to Bramalea Road, with 3-lane signalized intersection at Bramalea Road*. The Alstep Drive extension will be constructed within the existing municipal road right-of-way (ROW) and consist of one westbound lane, one eastbound left turn lane, and one eastbound right turn lane, for three lanes in total. The intersection with Bramalea Road will be signalized. The sidewalk that is considered for the west side of Bramalea Road and positioned north of the Alstep Drive extension would continue directly southward below the intersection and then further southward along Bramalea Road. The design features in

this alternative optimize safety and are consistent with the emphasis areas from the Region of Peel and the City of Mississauga's Vision Zero strategy of creating safer intersections and protecting pedestrians.

This alternative was selected because it will provide the greatest optimization of traffic operations and traffic safety compared to the other alternatives.

During implementation of the Alstep Drive Extension, realignment of the FedEx entrance to opposite Alstep Drive is also recommended.

**Derry Road East & Menkes Drive/Telford Way**

The recommended alternative design concept for the intersection of Derry Road East and Menkes Drive/Telford Way is *Alternative 2: Extend paved surface of Menkes Drive/Telford Way on both sides.* The paved surface of Menkes Drive extends to the east and to the west but still within the municipal road ROW.

Physical adjustments made to the intersection under this design alternative include:

- Concrete median Southbound on the north approach of the intersection.
- Curb on southeastern corner of intersection is shifted eastward, with realignment of the sidewalk.
- Curb on northwestern corner of intersection is shifted westward to allow for an improved turning radius, with a corresponding realignment of the sidewalk;
- Median curbs shifted further back to improve truck-turning ability;
- Slight reduction to the pedestrian islands in the southwestern and northeastern corners of the intersection. Pedestrian island size continues to meet the standard.

Active transportation design elements in this design include:

- Sidewalks with boulevard on the east side of Telford Way and on the northside of Derry Road East, west of Telford Way.
- Relocation of the westbound nearside bus stop on the northwest corner of Derry Road and Telford Way to behind the sidewalk.
- Upgraded multi-use path on the south side of Derry Road East.

The design elements in this alternative of separating of the left-turn lane at Telford Way, adding dual left-turn lanes at Menkes Drive, and retrofitting existing traffic islands to smart channels are consistent with the emphasis area of creating safer intersections from the Region of Peel and the City of Mississauga's Vision Zero strategy. The addition of sidewalks with boulevards and the upgraded multi-use path on the south side of Derry Road East are consistent with the emphasis areas of protecting pedestrians and protecting cyclists.

This key advantage to this alternative is that extending the pavement on both sides on Menkes Drive provides increased redesign flexibility, which minimize impacts to sidewalk separation from the roadway, boulevard trees along the street, and utilities. It also provides flexibility with respect to streetscaping opportunities.

**Derry Road East & Bramalea Road**

The recommended alternative design concept for the intersection of Derry Road East and Bramalea Road is *Alternative 4: Modify intersection using a hybrid approach*. The paved surface of Bramalea Road north of Derry Road is extended to the east, while south of Derry Road the pavement is extended to both the east and west. The eastward expansion south of Derry Road

would occur on the east side of the Bramalea / Alstep intersection and continue northward for about 100 m. The expansion westward would occur along Bramalea from Derry Road to about 100 m southward.

North of Derry Road, the eastward extension of Bramalea Road would make room for the separate southbound through and the two left turn lanes, in addition to the existing right turn lane. The extension around the centreline to the south of Derry Road is to make room for the separate northbound through and right turn lanes, in addition to the existing left turn lane and shadow lane, as well as the sidewalk on the west side. The hybrid approach allows the northbound and southbound lanes on Bramalea Road to align.

The paved surface along Derry Road would be extended approximately 3 m northward from Bramalea Road to the eastern limit of the project.

Active transportation and transit design elements in this design are:

- Upgrading the multi-use path on the south side of Derry Road west of Bramalea Road;
- Adding a new multi-use path on the north side of Derry Road east of Bramalea Road;
- Adding a new multi-use path on the east side of Bramalea Road north of Derry Road;
- Addition of cross-rides or crosswalks with signals;
- Adding a new sidewalk on the north side of Derry Road west of Bramalea Road;
- Adding sidewalks on both sides of Bramalea Road south of Derry Road; and
- Adding a westbound bus queue jump lane along Derry Road to improve merging of transit vehicles into traffic by allowing buses to merge into the through lane ahead of traffic, from the bus-stop located on the north side of Derry Road east of Bramalea Road[1].

In this alternative, safety improvements such as the addition of dedicated dual left-turn lanes, the separation of through lanes from the auxiliary lanes on Bramalea Road, retrofitting existing traffic islands to smart channels, and the optimal alignment of the lanes on Bramalea Road are consistent with the emphasis area of creating safer intersections from the Region of Peel and the City of Mississauga's Vision Zero strategy. The addition of sidewalks with boulevards, the addition of a cross-ride with signals, and the new/upgraded multi-use paths on Derry Road East are consistent with the emphasis areas of protecting pedestrians and protecting cyclists.

The key advantage of this alternative is that it optimizes traffic safety compared to the other alternatives while minimizing cost and impacts on existing utilities.

**Other Active Transportation Improvements**

Other active transportation improvements included in the project study area include:

- Sidewalks in the following locations:
  - North side of Derry Road from Bramalea Road to the western limits of the study area, which would connect with future Region of Peel sidewalk improvements (or existing sidewalks, where applicable) beyond the study area to the west;
  - North and south sides of the existing Alstep Drive; and

[1] Configuration of the queue jump lane is to be confirmed in consultation with MiWay.

  - West side of Menway Court.
- Upgrading the MUP along the south side of Derry Road, west of Bramalea Road.
- Adding an MUP along the north side of Derry Road, east of Bramalea Road.

Inclusion of the sidewalks and upgrading of the MUP will help to achieve the Region and the City's active transportation goals. The proposed active transportation improvements noted above are illustrated in **Figures ES-2 to ES-7** (see also Appendix Q for full size drawings).

Some portions of the proposed sidewalk may require a retaining wall due to the difference in elevation between the sidewalk and private property. This requirement will be confirmed during detailed design.

During the Class EA, Region of Peel staff identified necessary repair or replacement of a Ditch Catch Basin Inlet (DCIB) along Derry Road by 6975 Tranmere Drive. It is recommended that this be completed during the installation of the sidewalk along the north side of Derry Road. The works may require some permanent or temporary easements or other property requirements, which will be confirmed by the Region during detailed design of the DCIB works.

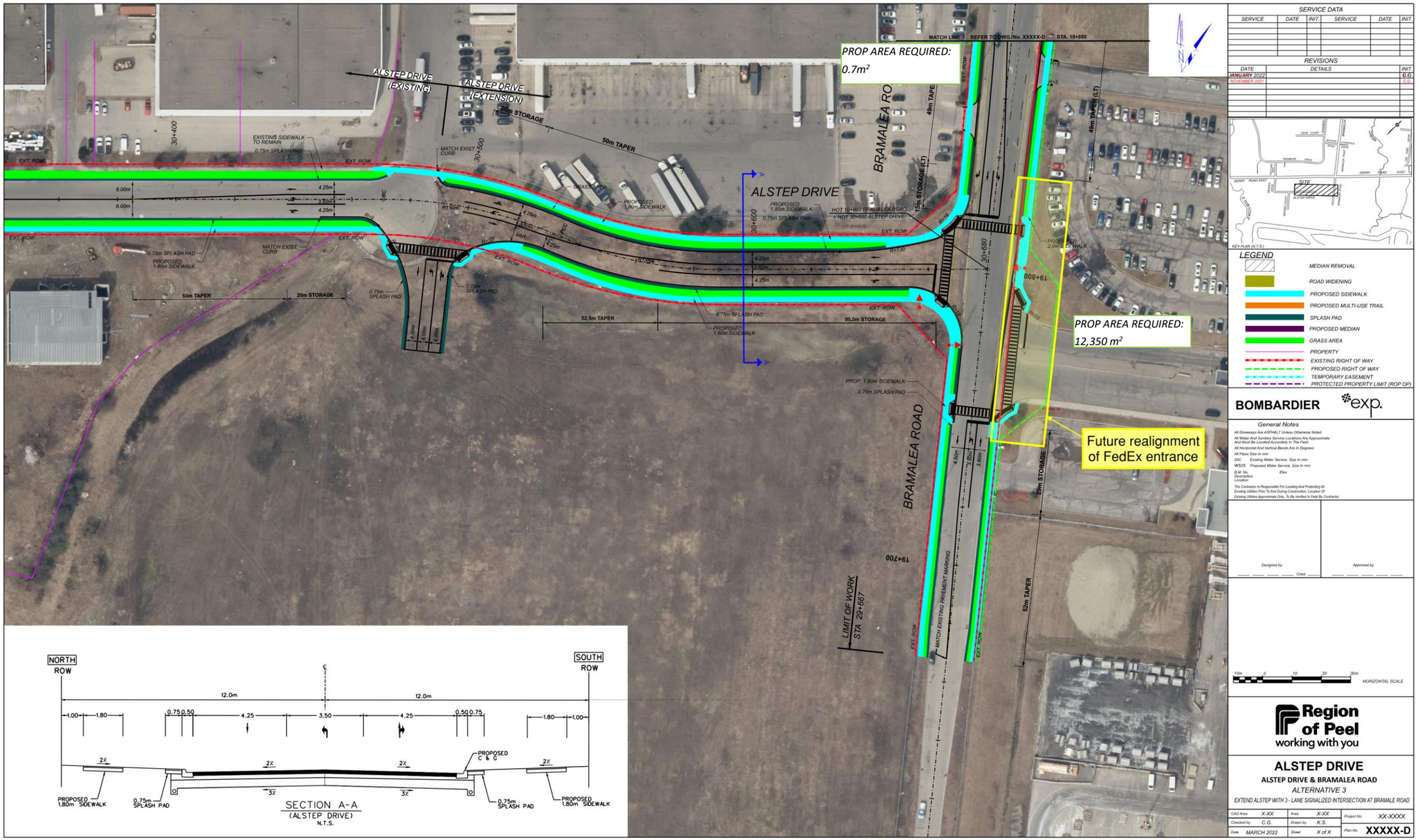


**Figure ES-2: Alstep Drive & Bramalea Road Preferred Alternative Design Concept**

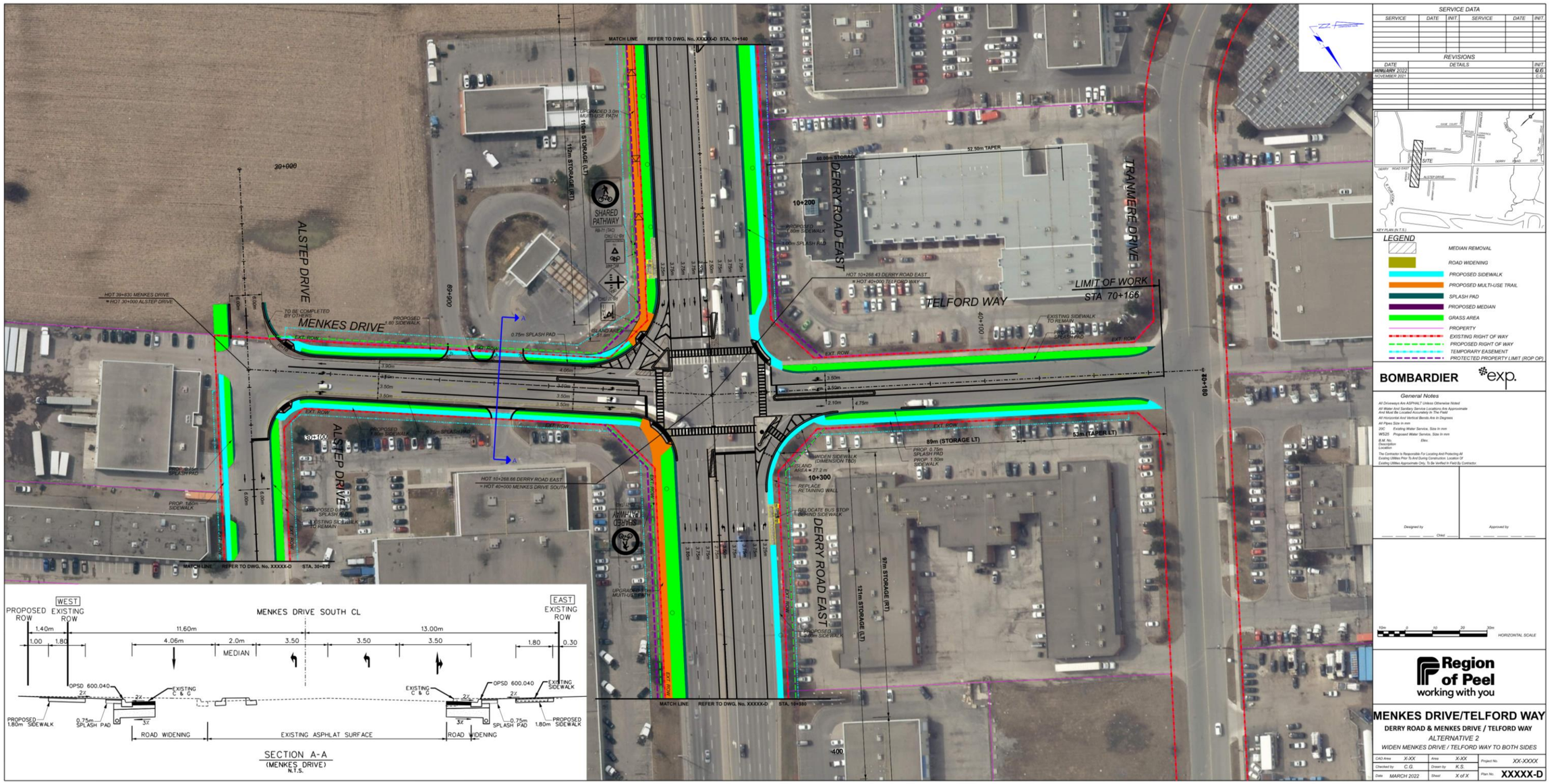


**Figure ES-3: Derry Road East & Menkes Drive/Telford Way Preferred Alternative Design Concept**

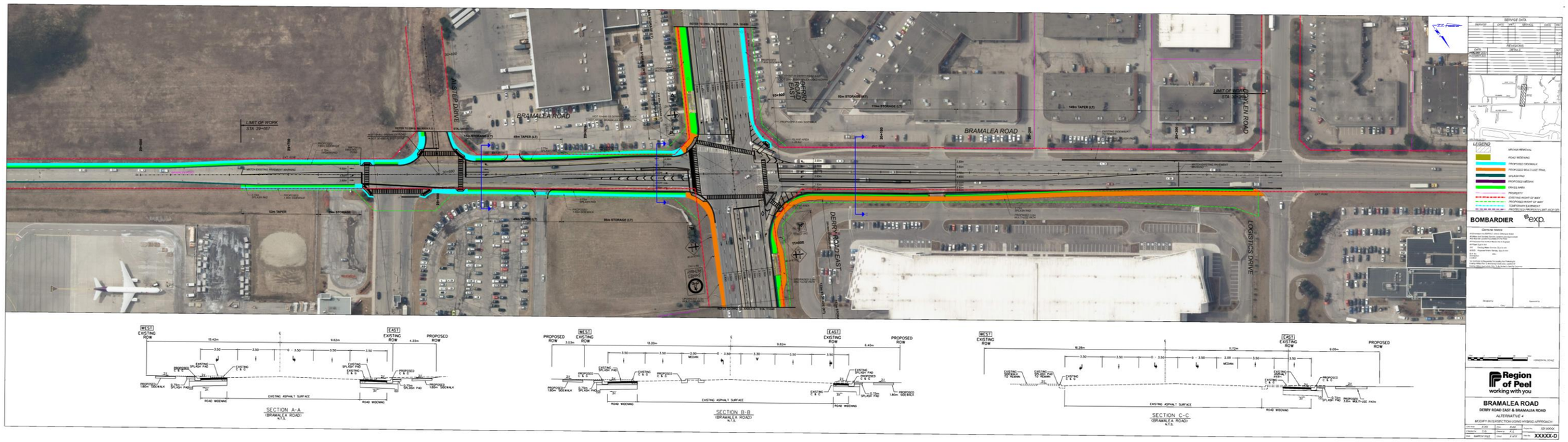


**Figure ES-4: Derry Road East & Bramalea Road Preferred Alternative Design Concept (Bramalea)**

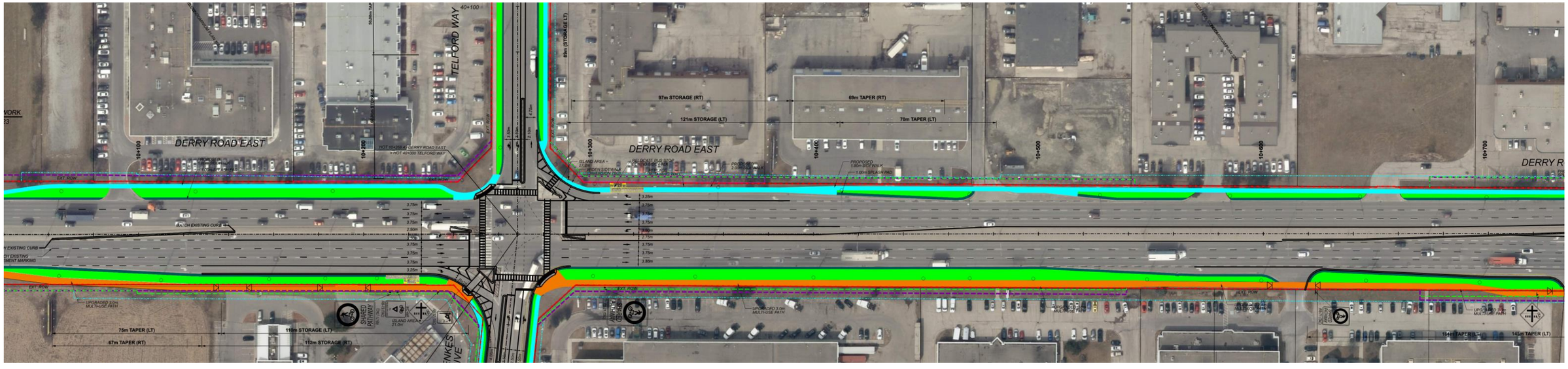


**Figure ES-5: Active Transportation Improvements on Derry Road East (West)**

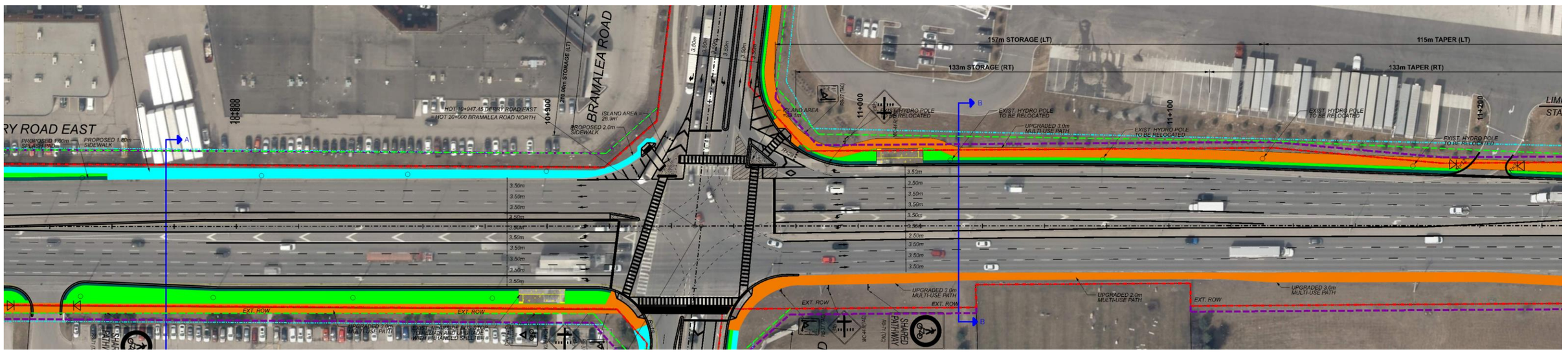


**Figure ES-6: Active Transportation Improvements on Derry Road East (East)**

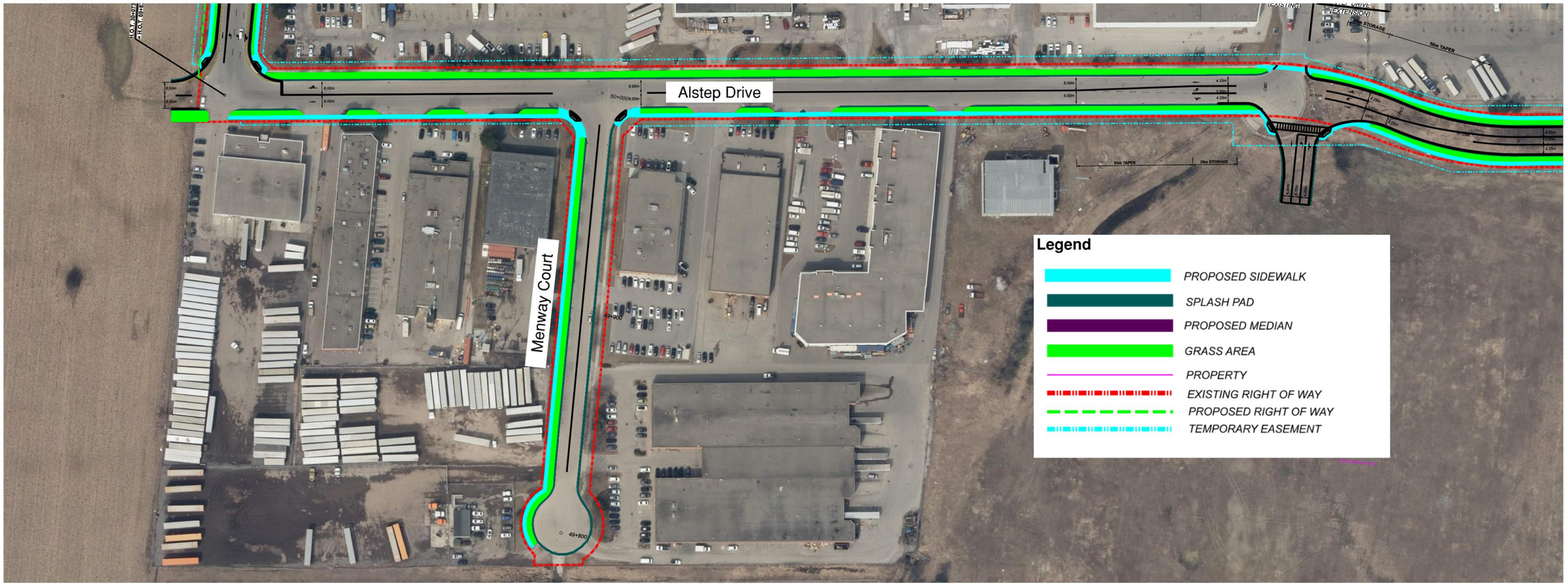


**Figure ES-7: Active Transportation Improvements on Alstep Drive (existing) and Menway Court**

## ES-10. Utilities

Existing overhead utilities will be maintained with the exception of those that are in conflict with the recommended design. The proposed improvements to the study area would require some utility relocations including certain locations along Derry Road, Bramalea Road, Menkes Drive, and Alstep Drive. Coordination and consultation will be required during detailed design with the following utilities to accommodate the proposed design: Alectra, Enersource, Enbridge, Bell Canada, Rogers, Cogeco, water, stormwater, and wastewater. This will occur as required where potential impacts to existing or future utilities are identified. Utility relocations will be confirmed during the detailed design phase.

## ES-11. Property Requirements

Based on the City of Mississauga Official Plan, the City may acquire up to 30 m right-of-way for improvements to Bramalea Road. Per the Region of Peel Official Plan, the Region may acquire up to 45 m right-of-way for improvements to Derry Road. However, this may be increased for improvements within the right-of-way near intersections. Additional land may be acquired from the Greater Toronto Airports Authority (GTAA) or private property owners to accommodate the proposed intersection improvements. The recommended design attempts to minimize property requirements.

The proposed improvements to the overall study area will require some property at locations along Derry Road, Bramalea Road, and Menkes Drive. In general, grading will be contained within the proposed right-of-way where feasible, however temporary easements will also be considered for construction and grading purposes. Property owners and tenants will be notified in advance of construction near their access. Communication protocols for construction will be developed during Detailed Design.

## ES-12. Preliminary Project Cost

The planning horizon for all recommended works is 2031. At the time of preparing this report, the phasing of works was being developed and will be confirmed during detailed design through a Tri-Party Agreement between the Region of Peel, City of Mississauga and Bombardier Aerospace. The various project components identified in this Class EA for the preferred alternative design are listed in **Table ES-7**.

Based on the preliminary design, the estimated cost of the recommended improvements is approximately **$18.6M (excluding HST)**. This preliminary estimate includes costs for road work, storm sewer works, water main works, temporary and permanent traffic signals, street light relocation, construction inspection, relocation of hydro line and construction of the retaining wall along the north side of Derry Road East to the east of Telford Way. Expected costs for property acquisition are not included in the estimate. **Table 23** presents a cost summary based on construction components. The estimated costs will be reviewed and confirmed during detailed design.

*Table ES-7: Project Components*

| Project | Project Components |
|---|---|
| **Derry Road Active Transportation Upgrades** | MUP Upgrades |
| | Sidewalk Installation (Derry Road East, north side) |
| | MiWay Bus Stop Relocation and Improvements |
| **Other Active Transportation Upgrades** | Alstep Drive Sidewalk Installation (existing portion of Alstep Drive) |
| | Menway Court Sidewalk Installation |
| | Telford Way Sidewalk Installation |
| | Menkes Drive Sidewalk Installation (west side) |
| | Bramalea Road MUP Installation (east side, north of Derry Road) |
| **Derry Road / Bramalea Road Intersection** | Widening of Derry Road to north (east of Bramalea Rd) |
| | Widening of Bramalea (Derry to Alstep i.e., South Leg) |
| | Widening of Bramalea (North of Derry i.e., North Leg) |
| | Bramalea Road Sidewalk Installation (west side, south of Derry Road) |
| | Bramalea Road Sidewalk Installation (east side, south of Derry Road) |
| **Menkes Drive / Derry Road** | Widening of Menkes, including curb repositioning and road surface works |
| **Alstep Drive / Bramalea Road** | Widening of Bramalea Rd north and south of Alstep Drive, including curb repositioning and road surface works |
| | Sidewalk upgrades and installations |
| **Alstep Drive** | Extension<br>• Paved road<br>• Sidewalk |

Note: The term “widening” used in this case is not the same as the definition as the MEA’s Municipal Class Environmental Assessment (MCEA) guidance manual, which defines road widening as increasing the number of lanes of an existing road. The term ‘widening’ as used here refers to increasing the width of the road surface.

*Table ES-8: Construction Cost Estimate for Preliminary (30%) Design*

| Cost Category | Estimated Cost |
|---|---|
| **Site Preparation** | $1,356,125 |
| **Roadworks** | $7,433,673 |
| **Traffic Signals** | $2,062,500 |
| **Street Lights** | $1,603,533 |
| **Storm Sewers** | $616,675 |
| **Watermain** | $300,875 |
| **Miscellaneous** | $5,285,939 |
| **Cost Estimate Sub-Total (Excluding HST)** | **$18,659,319** |
| **HST (13%)** | $2,425,711 |
| **Total Estimated Price** | **$21,085,030** |

## ES-13. Potential Impacts and Mitigation Measures

The recommended alternative design aims to minimize impacts to the surrounding environment. However, while the benefits of the proposed road and active transportation improvements outweigh the potential negative effects, mitigation of potential impacts will be required as the project continues. The approach to addressing potential impacts is as follows:

- Avoid potential impacts by taking proactive preventive measures. This prevents the occurrence of negative impacts and can result in net positive effects.
- Implement mitigation measures to reduce the magnitude and duration of unavoidable impacts.
- Arrange compensation and/or enhancement measures where required for negative impacts that are unavoidable and cannot be reduced through appropriate mitigation measures.

## ES-14. Permits and Approvals

As the project proceeds, the following permits and approvals are expected to be required. These will be obtained prior to construction.

- Natural Environment
  - Based on the Natural Environment Report **(Appendix H)** the typical environmental permits and approvals from the following agencies are not expected to be required.
    - Ministry of Northern Development, Mines, Natural Resources and Forestry (MNRF[2])
    - Ministry of the Environment, Conservation and Parks (MECP)
    - Fisheries and Oceans Canada (DFO)
    - Toronto and Region Conservation Authority (TRCA)
- Hydrogeological **(Appendix F)**
  - As the dewatering flow estimate is less than 50 $m^3$/day, an online registration with the Environmental Activity and Sector Registry (EASR) with the Ministry of the Environment, Conservation and Parks (MECP) and/or a Category 3 Permit to Take Water (PTTW) from MECP is not required as documented in the Hydrogeological Investigation provided in **Appendix F**. If dewatering exceeds 50 $m^3$/day but is less than 400 $m^3$/day this amount, an online registration with the EASR with the MECP will be required. If dewatering exceeds 400 $m^3$/day, a Category 3 PTTW from MECP will be required.
  - Agreement to discharge to the City of Mississauga / Regional Municipality of Peel will be required prior to discharging dewatering effluent.
- Stormwater Management **(Appendix J)**
  - The City of Mississauga requires an Environmental Compliance Approval (ECA) application for the proposed 675 mm storm sewer from the Alstep Extension to the City's system.

[2] Formerly known as Ministry of Natural Resources and Forestry.

  - Although this site is part of a TRCA regulated watershed, it does not drain directly to Etobicoke Creek nor Spring Creek and is not located within the regulated area and therefore TRCA approval is not required.
  - GTAA approval will be required for modifications to their storm drainage system including any additional proposed catchment areas (Storm Drainage Area 232).

- Cultural Heritage
  - As recommended in the Cultural Heritage Resource Assessment (CHRA) located in **Appendix E,** the City of Mississauga should consider waiving the requirement for a Heritage Impact Assessment (HIA) for the properties at 1840 Derry Road East (BHR 1) and 2030 Derry Road East (CHL 2) if suitable mitigation can be implemented.
  - As recommended in the CHRA, the City of Mississauga should consider waiving the requirement for a HIA for Pearson International Airport at 6301 Dart Drive (CHL 2) since no structures or apparent landscape features of significant cultural value or interest are anticipated to be impacted.
  - Entry of Archaeological Assessment report(s) into the Ontario Public Register of Archaeological Reports by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI).
- Municipal Permits
  - Road Occupancy Permit
  - City of Mississauga Tree Permit under Tree Permit By-Law Number 474-05
- Additional
  - Any borehole drilling that occurs within the TRCA regulated area will require a permit.
  - Permission to enter agreements and any property acquisition requirements.

In addition to the above, there are a number of items and comments raised during the Class EA that will be addressed during the detailed design process. These are summarized in the following table.

*Table ES-9: Commitments for Detailed Design*

| No. | Item / Comment | Action |
|---|---|---|
| **1.** | The existing storm design sheet shows that the 1350mm pipe from MH9 (manhole #9) to the headwater as surcharged, which is increased in the proposed conditions. A hydraulic grade line analysis is required to ensure there are no adverse effects from this condition on the 1890 Alstep Drive Development. | This will be reviewed in detailed design. The 1350mm pipe is surcharged but the pipe under the structure (box culvert) is oversized and is designed to accommodate 100 year flows (including increased flows from road widening) with a safety factor of approximately 2. The design also considered the future extension of Alstep Drive to Bramalea Road. The drainage through 1890 Alstep Drive is discussed in a separate report, which is excerpted in the stormwater report. |

| No. | Item / Comment | Action |
|---|---|---|
| **2.** | The Region noted that there are some stormwater flows within the Derry Road East storm main with velocities greater than 3 m/s. While this is less than the Region's allowed criteria of 4 m/s, the Region has requested that opportunities for reducing stormwater flows below 3 m/s be explored during detailed design.<br><br>The MECP is in the process of issuing a Stormwater Consolidated Linear Infrastructure (CLI) Environmental Compliance Approval (ECA) to the Region of Peel. The Stormwater CLI ECA covers storm assets servicing regional roads, namely storm sewers, ditches, stormwater management facilities and low impact development, and Stormwater Pumping Stations. The Stormwater CLI ECA sets forth conditions for alterations to the stormwater system as well as ongoing operation of the system. The ECA comes with criteria for design of alterations to the Region's existing stormwater system. At the time of completion of the Class EA study, the CLI ECA template and criteria were not available, therefore the Class EA recommendations do not guarantee compliance with the CLI ECA conditions and criteria. It is recommended that at the detailed design stage, the Engineering Consultant re-assess the Class EA recommendations against the CLI ECA criteria and make the necessary adjustments and changes to the stormwater recommendations to be in compliance, where feasible. | To be reviewed in detailed design |
| **3.** | Right-turn channel island modification may provide space back into the boulevard, eliminating possible encroachment. | The degree of encroachment and steps to minimize it will be confirmed as part of detailed design. |
| **4.** | Alignment of MUP along the north side of Derry Road East, east of Bramalea Road, and the ability to minimize impact on power poles. | There are many ways in which the upgraded MUP can be designed, including placement relative to hydro poles or grading/retaining of adjacent slopes. Additional detailing of the upgraded MUP beyond this conceptual placement will occur during its detailed design. |
| **5.** | Skew of westside crosswalk at the intersection of Derry Road East and Bramalea Road. | To be further reviewed in detailed design. |
| **6.** | Approximately 200 wells noted in the study area, however all drinking water in the area is provided by municipal service so we do not deem these wells as an issue. As part of the Phase Two Environmental Site Assessment (ESA), the consultant would verify that the study area does not contain any potable wells. | Phase 2 ESA to occur during detailed design. |

| No. | Item / Comment | Action |
|---|---|---|
| **7.** | Clarification for signal heads for northbound direction proposed dual-lefts at Derry Road East and Telford Way. The recommended practice for dual-lefts is to have two TYPE-2 signal heads. Which means, the signal head configuration for this intersection should be:<br>• TYPE-HIGHWAY (Primary head) on N-E island pole;<br>• TYPE-2 (Primary Left Turn head) & TYPE-HIGHWAY (Secondary head) on north-leg median pole (proposed alternatives show no median) and;<br>• TYPE-2 (Secondary Left Turn head) on N-W corner pole. | To be addressed in Detailed Design. |
| **8.** | Clarification of lane widths at the Derry Road right turns and two westbound-through lanes west of Bramalea. | To be confirmed in Detailed Design and reviewed with the Region's Traffic Development Staff. |
| **9.** | Proposed walkway along the north side of Derry Road should be increased to address tight locations at Telford and Bramalea intersections, as those locations would benefit from a wider walkway. | To be addressed in Detailed Design. |
| **10.** | Some portions of the proposed sidewalks may require a retaining wall due to the difference in elevation between the sidewalk and private property. | This requirement will be confirmed during detailed design for sections as required. |
| **11.** | During the Class EA, Region of Peel staff identified necessary repair or replacement of a Ditch Catch Basin Inlet (DCIB) along Derry Road by 6975 Tranmere Drive. It is recommended that this be completed during the installation of the sidewalk along the north side of Derry Road. The works may require some permanent or temporary easements or other property requirements, which will be confirmed by the Region during detailed design of the DCIB works. | To be addressed in Detailed Design. |
| **12.** | Existing traffic signals along Derry Road will be upgraded at both intersections. A new traffic signal will be installed at the proposed intersection of Bramalea Road and Alstep Drive. Illumination will be provided along Derry Road within the limits of construction. The proposed road improvements will include upgrades to the boulevard MUP and sidewalk on both sides of Derry Road. With the improvements, many of the existing hydro poles will require relocation. Therefore, a new illumination system is required. | Illumination design and calculations will be presented and confirmed during detailed design. |
| **13.** | Agency review comments on the Draft Environmental Study Report (ESR). | See Section 9.4 for items and comments to be reviewed, addressed and/or confirmed during detailed design. |

| No. | Item / Comment | Action |
|---|---|---|
| **14.** | The Cultural Heritage assessment (CHA) identified the heritage properties at 1840 Derry Road East and 2030 Derry Road East could be impacted by vibrations resulting from the proposed works as a result of their location within 50 m of the proposed alignment. The CHA recommended that, to ensure these properties are not adversely impacted during construction, a baseline vibration assessment should be undertaken during detailed design. Should this advance monitoring assessment conclude that the structure(s) on these properties will be subject to vibrations, prepare and implement a vibration monitoring plan as part of the detailed design phase of the project to lessen vibration impacts related to construction. | Baseline vibration assessment should be undertaken during detailed design. |

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Appendix J: Drainage and Stormwater Management Report

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# 1 Project Description

## 1.1 Overview

Bombardier Inc. (Bombardier) has partnered with the Region of Peel (Region) and the City of Mississauga (City) to undertake a Municipal Class Environmental Assessment (Class EA) study to assess existing and future road conditions on Derry Road East and Alstep Drive near Menkes Drive and Bramalea Road. The study will include Derry Road East (a Regional Road) as well as Bramalea Road, Menkes Drive, Telford Way, Alstep Drive and Menway Court (all City roads).

The need for the Class EA is due to current and projected road infrastructure demands that exceed the system's current capacity, driven in part by Bombardier's planned industrial development at 1890 Alstep Drive, Mississauga, Ontario as well as other planned and proposed developments in the vicinity. To accommodate the increase in traffic demands, improvements to the infrastructures will be required. As such, the Region, the City and Bombardier are co-proponents on this Schedule C Municipal Class Environmental Assessment (Class EA) to upgrade the local existing road network. The Class EA is being undertaken as per the Municipal Engineers Association (MEA) Class EA Manual (October 2000, as amended in 2007, 2011 & 2015). A summary of the process to be followed during this Class EA is provided in **Appendix A**.

This report documents the process followed in this Class EA, including:

- The project description, including the Class EA study area and project proponents;
- The Provincial and Municipal planning context;
- Review of existing and future traffic conditions;
- Problem and Opportunity Statement;
- Existing social, economic, natural, cultural and built environmental conditions;
- Alternative Solutions (including their identification and evaluation);
- The Preferred Alternative Solution;
- Alternative Designs (including their identification and evaluation);
- The Preferred Alternative Design concepts;
- Preliminary Project Staging and Cost; and
- Potential Impacts and Mitigation Measures.

## 1.2 Class EA Study Area

The study area for this Class EA is primarily along Derry Road East (185 metres (m) west of Menkes Drive and 450 m east of Bramalea Road) and Bramalea Road (485 m south of Derry Road East and 410 m north of Derry Road East). It also includes three local roads: Menkes Drive, Alstep Drive, and Telford Way. The study area is depicted in **Figure 1**. A full description of the road network is described in **Section 3.1**.

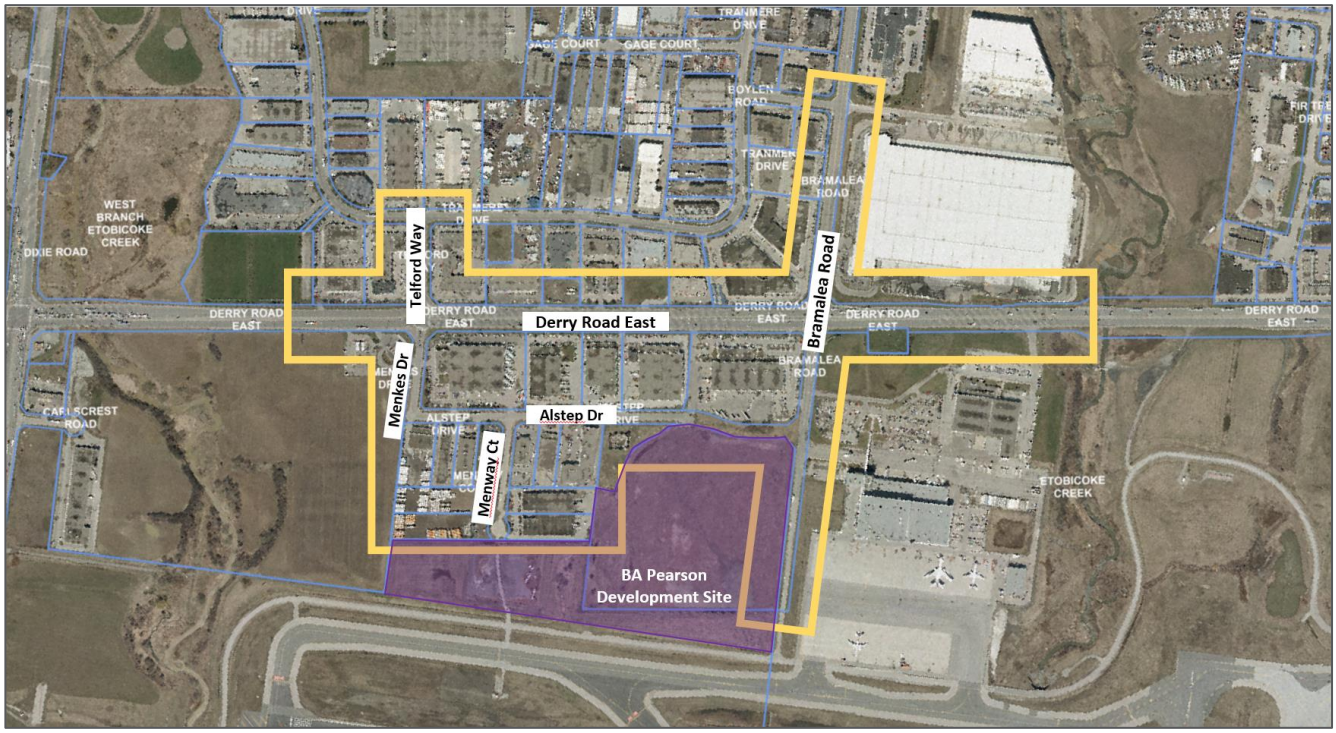



**Figure 1: Class EA Project Study Area**

## 1.3 Project Proponents

The co-proponents of this Schedule C Class EA include:

- Bombardier (primary proponent);
- Region (co-proponent); and
- City (co-proponent).

Bombardier retained EXP Services Inc. as its consultant for the Class EA. A summary of the roles and responsibilities of each proponent is provided in **Table 1**.

*Table 1: Proponent Roles and Responsibilities*

| Bombardier Aerospace<br>Lead Proponent | Region of Peel Co-Proponent | City of Mississauga Co-Proponent |
|---|---|---|
| Responsible for all the planning, design, and construction of the road improvements | EA process review<br>Document review<br>Access to relevant Region data<br>Hosting of Project Webpage | EA process review<br>Document review<br>Access to relevant City data<br>Hosting of Webex Platform for the second Public Information Centre (PIC) |

## 1.4 Stakeholder Consultation

Stakeholder consultation was a key component of this Class EA. The Consultation and Communication Plan is provided in **Appendix B**. The key consultation tasks included in this project were:

- Development of a Stakeholder list;
- Preparation and issuing of Project Notices, including:
  - Combined Notice of Commencement and Invitation for Public Comment (Phase 2);
  - Invitation for Public Comment (Phase 3); and
  - Notice of Completion;
- Two Technical Advisory Committee (TAC) meetings (one each in Phases 2 and 3);
- Two virtual Public Information Centres (PICs); and
- Project website.

The Class EA project began in 2019, prior to the onset of the COVID-19 pandemic. The pandemic and the associated provincial declarations of emergency required a modification to the typical approach to Class EA consultation and communications, including the following:

- The first wave of the pandemic occurred during Phase 1 and into Phase 2 of this Class EA. During this time, both the City and the Region halted the publication of municipal notices other than those related to public health. As a result, publication of the Notice of Commencement, which normally occurs during Phase 1 of the Class EA process, was delayed. Instead, a Combined Notice of Commencement and Invitation for Public Comment was published in Phase 2.
- TAC meetings were held via videoconference instead of in-person.
- PIC #1 was held virtually by posting a narrated presentation and supporting documents on the project website, in lieu of in-person PIC.
- Similarly, PIC #2 was held virtually, but its format included a live presentation. Presentation materials were then posted on the project webpage for public review.

A full discussion of the consultation program for this Class EA is provided in **Section 9.**

## 1.5 Class EA Process

### 1.5.1 Overview

All municipalities in Ontario are subject to the provisions of the Ontario Environmental Assessment Act (EAA) and its requirements to prepare a Class EA for applicable public works projects. These requirements can be met by following the Municipal Class EA Process as described by the Ontario Municipal Engineers Association's (MEA) Municipal Class Environmental Assessment document (2000, amended 2007, 2011 and 2015). The Municipal Class EA applies to a group or class of municipal water, wastewater and road projects that occur somewhat frequently and have relatively minor and predictable impacts.

Class EA projects fall into four schedules (i.e. categories) of undertakings depending on the extent of their potential impact. These include:

- Schedule A: Projects are limited in scale; have minimal environmental effects; include normal or emergency operational and maintenance activities; and are pre-approved;

- Schedule A+: Projects are pre-approved, but public is to be advised of project before implementation;
- Schedule B: Projects have the potential for some adverse environmental impacts, such as improvements and expansions to existing facilities, therefore a screening process involving mandatory consultation with potentially affected stakeholders is required;
- Schedule C: Projects have the potential for significant environmental effects, such as construction of new facilities or major expansions to existing facilities, and must proceed through the full Class EA planning process.

In consultation with the City, Region and the Ministry of Environment, Conservation and Parks (MECP), it was determined that this project was to be completed as a Schedule C Class EA.

There are five phases to a Schedule C Class EA process. These include:

- **Phase 1: Identify the problem (deficiency) or opportunity:** Identify the problem or the opportunity that the Class EA is intended to address.
- **Phase 2: Identify and Evaluate Alternative Solutions:** Identify alternative solutions to the problem or opportunity by taking into consideration the existing environment and establish the preferred solution accounting for public and agency review and input. Document the planning process in a Municipal Class EA project file and make such documentation available for scrutiny by review agencies and the public.
- **Phase 3: Evaluation of Alternative Design Concepts:** Examine alternative methods of implementing the preferred solution based upon the existing environment, public and agency input, anticipated environmental effects, and methods of minimizing negative effects and maximizing positive effects.
- **Phase 4: Environmental Study Report (ESR):** Document, in an Environmental Study Report (ESR), a summary of the rationale and the planning, design and consultation process followed in the project and make such documentation available for scrutiny by review agencies and the public.
- **Phase 5: Implementation:** Complete contract drawings and documents, proceed to construction and operation and monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the completed facilities.

**Figure 2** illustrates the Municipal Class EA process.

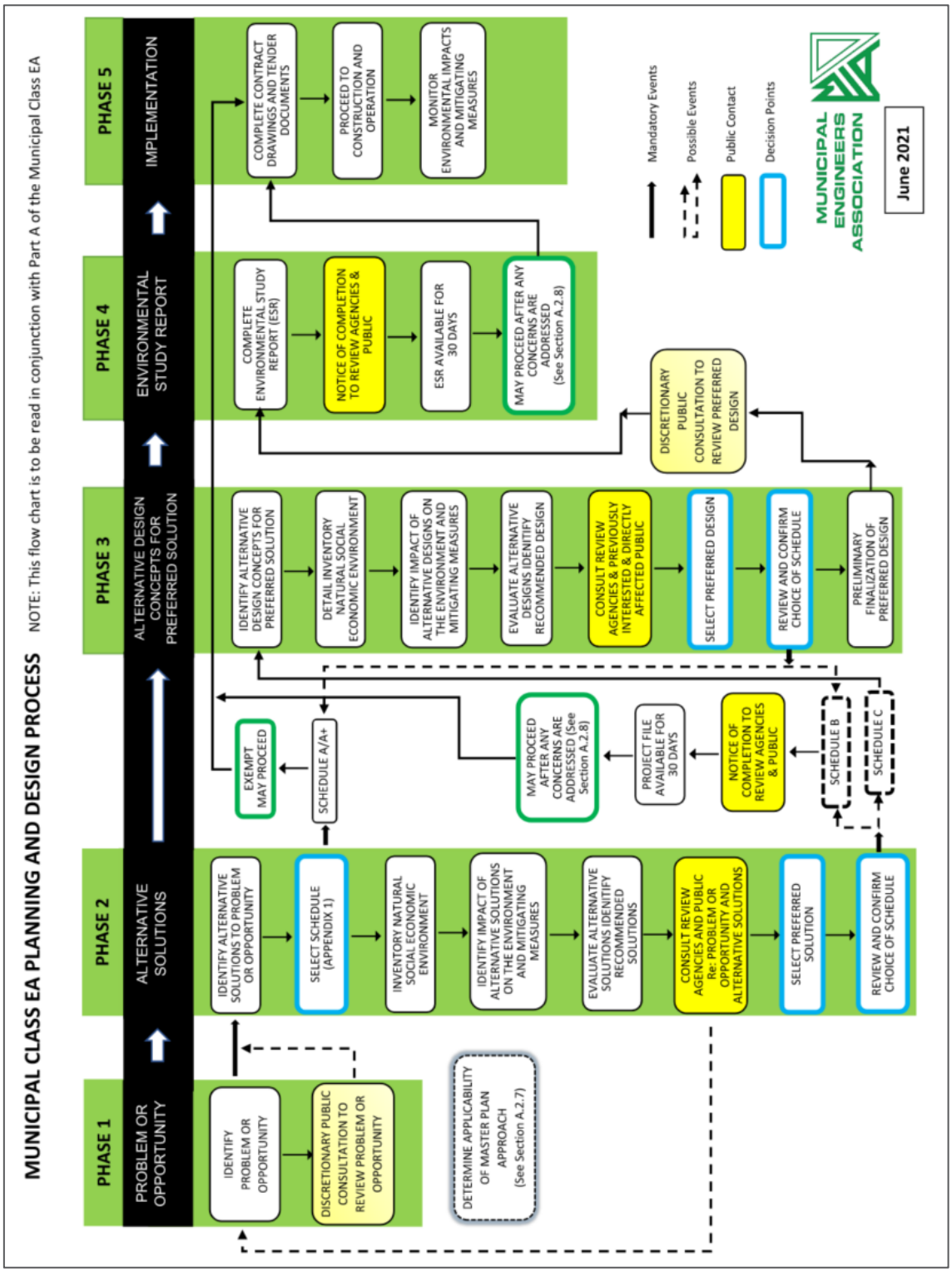



**Figure 2: EA Process Flow Chart**

### 1.5.2 Section 16 Orders

In July 2020, the Government of Ontario (Government) updated how the Class EA process managed Part II Orders. Previously, members of the public, agencies or other concerned individuals could request an elevated EA Schedule or an individual environmental assessment process if they felt that they were needed to address significant outstanding issues. This was known as a Part II Order (or "bump-up") request.

The Government passed the *COVID-19 Economic Recovery Act* in July 2020, which updated the *Environmental Assessment Act* and modified the Part II Order Process (PIIOR), now referred to as Section 16 Orders. Proponents continue to be required to place their Environmental Study Report (ESR) on the public record for 30 days; however, outstanding concerns are to be addressed directly to the proponent. Section 16 Orders are reserved only if the concerns raised deal with aboriginal or treaty rights. Requests on other grounds will not be considered.

Section 16 Orders result in an additional 30-day window for the Ministry to decide if the Minister should take any action. According to the MEA:

> *Regional coordinators from the Ministry of Environment, Conservation and Parks (MECP) will continue their role of monitoring MCEA projects. During the additional 30 days the Minister will decide if the project will be elevated (PIIOR granted) or if it will be approved with conditions. If the Minister advises the proponent that the project will be approved but with conditions, the Minister has more time to draft these conditions. If there is no response from the Minister within the additional 30 days the proponent may proceed with the project.*[3]

[3] Municipal Engineers Association. Modernizing the Environmental Assessment Act and Other Changes: Update for MEA Members – August 2020. https://municipalengineers.on.ca/files/MCEA_Updates/MCEA%20Update%20for%20Members%20August%202020.pdf.

# 2 Planning Context

The Class EA process, including the selection and evaluation of alternative designs and solutions, was undertaken within a broad municipal and provincial planning context. The relevant provincial and municipal planning guidance is described in the following sections.

## 2.1 Provincial

### 2.1.1 A Place to Grow: Growth Plan for the Greater Golden Horseshoe

*A Place to Grow: Growth Plan for the Greater Golden Horseshoe* (Growth Plan) is Ontario's plan for managing growth and development in the Greater Golden Horseshoe (GGH) in a way that "supports economic prosperity, protects the environment, and helps communities achieve a high quality of life[4]." The Growth Plan was originally released in 2006 and most recently updated in 2020.

Section 3.2.2 of the Growth Plan (Transportation - General) outlines the general transportation provisions for the GGH. The Growth Plan describes how the transportation system within the GGH will be planned and managed. Points relevant to this study include:

- Provide connectivity among transportation modes for moving people and for moving goods;
- Offer a balance of transportation choices that reduces reliance upon the automobile and promotes transit and active transportation; and
- Provide for the safety of system users.

Section 4.2.10 of the Growth Plan also addresses Climate Change. In this section, the Growth Plan encourages municipalities to:

> *a) develop strategies to reduce greenhouse gas emissions and improve resilience through the identification of vulnerabilities to climate change, land use planning, planning for infrastructure, including transit and energy, green infrastructure, and low impact development, and the conservation objectives in policy 4.2.9.1.*

### 2.1.2 Provincial Policy Statement

The Provincial Policy Statement (PPS) is a provincial policy document that provides direction on land use planning and development. It was first issued under Section 3 of the Planning Act in 2005. The current PPS came into effect May 1, 2020 and replaces 2014 PPS.

Section 1.6 of the PPS provides guidance on the provision of infrastructure and public service facilities, in particular:

> *1.6.1 Infrastructure and public service facilities shall be provided in an efficient manner that prepares for the impacts of a changing climate while accommodating projected needs.*
>
> *Planning for infrastructure and public service facilities shall be coordinated and integrated with land use planning and growth management so that they are:*

[4] Government of Ontario. A Place to Grow: Growth Plan for the Greater Golden Horseshoe. https://www.ontario.ca/document/place-grow-growth-plan-greater-golden-horseshoe.

*a. Financially viable over their life cycle, which may be demonstrated through asset management planning; and*

*b. Available to meet current and projected needs.*

*1.6.3 Before consideration is given to developing new infrastructure and public service facilities:*

*a. The use of existing infrastructure and public service facilities should be optimized; and*

*b. Opportunities for adaptive re-use should be considered, wherever feasible.*

## 2.2 Municipal

### 2.2.1 Region of Peel Official Plan

The Region of Peel's Official Plan (ROP) was last consolidated in September 2021. The ROP's Schedule D: Regional Structure identifies the study area as primarily being within the Urban System, which covers Brampton and Mississauga. The portion of the study area east of Bramalea Road is within the area designated Airport.

The ROP's Schedules E and F identify Derry Road as a Major Road with mid-block ROW requirements of 45 metres, which is consistent with the Mississauga Official Plan (MiOP).

### 2.2.2 Region of Peel Long Range Transportation Plan

In June 2019, the Region's Long-Range Transportation Plan (LRTP) was endorsed by Peel's Regional Council. The LRTP is a five-year plan based on a 2041 planning horizon that will be used as the basis for the Region's future transportation infrastructure programing and capital budgets.

The LRTP's Figure 3-4 (Existing Pedestrian Network and Proposed Improvements) identifies Derry Road East within the study area as being part of the Region's existing pedestrian network. Figure 3-5 (Existing and Proposed Cycling Network) identifies Derry Road East within the project study area as being part of the Region's existing cycling network.

The LRTP does not identify any road widenings or other road improvements in the project study area. However, the Hurontario Light Rail Transit (HuLRT) project will begin operations during the build-out year. The MiWay routes (42 and 104) are expected to have connections to the LRT. It is acknowledged that automobile volumes may be reduced once the HuLRT is operational.

In addition, intersection improvements or other road/operational changes could arise in response to other initiatives. For example, other relevant studies currently underway include:

- Truck Friendly Measures Study (for Derry and Dixie Rd): This study is being done on Derry Road and considers the possibility of truck friendly measures (i.e. truck only lane, etc.). On Dixie Road, this may include Truck Signal Priority (signal optimization for trucks).
- Bus Priority Measures Feasibility Study for Derry Road: Metrolinx is studying the feasibility of bus priority measures (i.e. queue jumps, etc.) on Derry Road in the study area.
- Long Combination Vehicles Study (LCVs): as part of the action items from the Region's Long Combination Vehicles Study, intersection improvements to facilitate turning movement of LCVs will be examined during the Design Alternatives on Regional roads including Derry, Dixie, and Airport.

### 2.2.3 Vision Zero

Vision Zero is the Region's Road Safety Strategic Plan. The purpose of Vision Zero is to stop people from getting hurt or dying in motor vehicle collisions in Peel Region. The vision of Vision Zero is zero fatal and severe injury collisions for all users, with the goal set by the Region of a 10% reduction in fatal and severe injury collisions by 2022.

The Region's Road Safety Strategic Plan identifies the following areas of emphasis with respect to Vision Zero:

- Creating safer intersections;
- Reducing aggressive driving;
- Reducing distracted driving;
- Reducing impaired driving;
- Protecting pedestrians; and
- Protecting cyclists.

In addition, it outlines potential countermeasures that are categorized by their four "Es" of road safety. The 4 "Es" in the Region's Road Safety Strategic Plan are:

- Engineering;
- Enforcement;
- Education; and
- Empathy.

The City of Mississauga adopted Vision Zero in 2018 and presented their vision and goals in the City's 2019 Transportation Master Plan. The City's latest Vision Zero action plan is categorized with five "Es", with "Evaluation" added to the four "Es" outlined by the Region of Peel.

### 2.2.4 Region of Peel Sustainable Transportation Strategy

The Region of Peel Sustainable Transportation Strategy (STS) was approved in 2018 and sets the goal to achieve a 50% sustainable mode share by 2041. Sustainable modes of transportation include walking, cycling, transit, and carpooling. The STS outlines strategies to increase the share trips by sustainable modes to achieve the 50% share of trips objective.

Improvements noted by the STS for the EA study area include:

- Section 3.4.2 of the Active Transportation Implementation Plan 2018-2022 (a part of the STS) identifies the section of Derry Road East from Tomken Road to west of Torbram Road as being recommended for upgrades to the MUP. The portion of Derry Road East within this EA study area is within this section.
- Section 4.1.2 of the Active Transportation Implementation Plan provides a budget for addressing sidewalk gaps. Appendix C6 of the STS presents a map showing the location of existing sidewalks and gaps in the sidewalk network. Within the study area, figure shows sidewalk gaps on the north of Derry Road East west of Bramalea Road and almost approaching Dixie Road.

### 2.2.5 City of Mississauga Official Plan

The policies of the City of Mississauga's Official Plan (MiOP) apply to all lands within the City of Mississauga, except for those owned by the Federal Crown or the Provincial Crown. A portion of this study area is owned by the Federal Crown; therefore, the policies of the MiOP do not apply to those specific lands.

The following paragraphs below describe the portions of the MiOP that are applicable to this project.

#### 2.2.5.1 Urban System

Based on the City's MiOP Schedule 1 (Urban System), there are four different land classifications within the project study area. Specifically:

- **Corridor:** Derry Road East is designated as a Corridor. Section 5.4 of the MiOP describes Mississauga's Corridor system as a grid of arterials that connect various elements of the City to each other, with the ability to evolve over time to accommodate multi-modal transportation and become attractive public places in their own right with complementary land uses.
- **Airport Special Purpose Area:** Section 18.2.2 of the MiOP notes that the Airport Special Purpose Area is a unique area within the City and has regional significance, and that the City will cooperate with the Federal Government to ensure that new construction within that area is compatible with Airport requirements.
- **Employment Area:** Section 5.3 of the MiOP defines Employment Areas as stable areas that contain diverse industrial and business employment operations, including some with extensive land resources and low employment densities.
- **Green System**: Section 5.2 of the MiOP defines the Green System as being comprised of the Natural System, lands that include Natural Hazards, and parks, and both designated public and private open spaces.

These classifications are depicted in **Figure 3**.

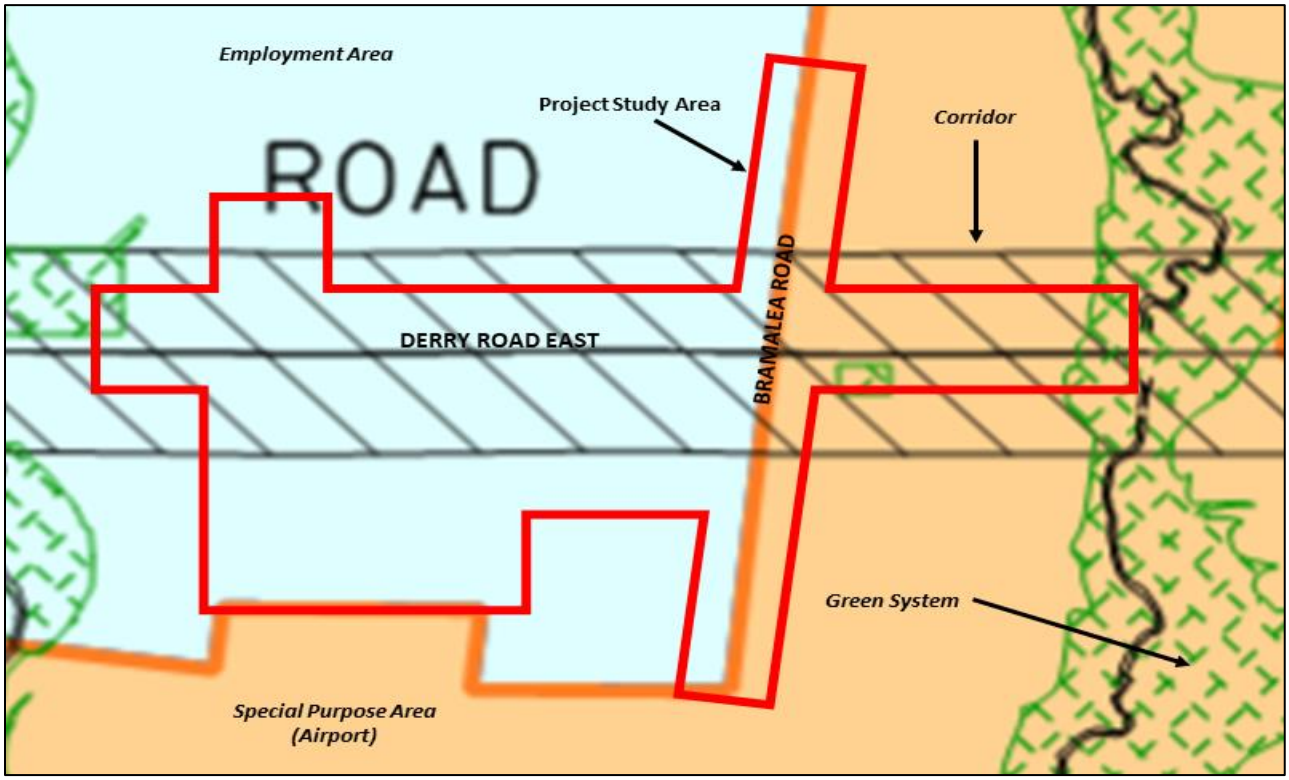



**Figure 3: City of Mississauga Urban System in Project Study Area**

#### 2.2.5.2 MiOP Road Designations

Derry Road East and Bramalea Road (north of Derry Road) are all identified roads in the MiOP. Schedules 5 and 8 of the MiOP provide the following designations and Right-of-Way width (ROW):

- Derry Road East: Regional Arterial with a 45 m ROW; and
- Bramalea Road (north of Derry Road): Major Collector with 30 m ROW.

#### 2.2.5.3 Active Transportation

Schedule 7 (Long Term Cycling Routes) of the MiOP identifies Derry Road East as a Primary On-Road / Boulevard Route (Regional).

### 2.2.6 City of Mississauga Cycling Master Plan

The City Council ratified its 2018 Cycling Master Plan (MiCMP) on July 4th, 2018. Key aspects of the Cycling Master Plan that relate to the study area include:

- The section of Derry Road East within the study area is identified in the MiCMP's Existing Cycling Network as having a multi-use trail.
- The MiCMP's Proposed Cycling Network shows a future bike lane running along Telford Way to Derry Road East and a Multi-use Trail running along Bramalea Road north of Derry Road East. The Multi-use Trail currently showed running along

Derry Road East is depicted as extending further east beyond the study area and is intended to traverse the entire City. These proposed cycling routes indicate that the section along Derry Road East will become more connected with the overall network. These are all included in the MiCMP's Figure 28 (Five-year implementation Plan map) as being implemented within five years.

- The MiCMP's Recommended upgrades to existing cycling network identifies the section of Derry Road East within the study area as an area recommended for On-Road Facility Upgrades (the specific upgrades are not specified but would be based on a bicycle facility design guide recommended in Section 6.5 of the MiCMP).

## 2.3 Future Developments

This section discusses the future developments planned or proposed for within or near the Class EA study area. **Section 2.3.1** describes the planned Bombardier development, while other developments in the area are noted in **Section 2.3.2**.

### 2.3.1 Development of 1890 Alstep Drive

This Bombardier development is situated within the Area 16 Federal lands, municipally known as 1890 Alstep Drive, Mississauga. The property is bounded by the North Service Road to the south, Bramalea Road to the east, Alstep Drive to the north, existing Industrial properties and open space to the west. The area of the land is approximately 15 hectares. It is currently zoned as employment plans (E2), with an exception to only allow a skeet club on the lands (E2-70). **Figure 4** depicts the development's proposed location and surrounding areas. The anticipated date of occupancy is assumed to be for late 2022.


*Note: BA Pearson = Bombardier Aerospace Pearson*

**Figure 4: Location of 1890 Alstep Drive Development**

Traffic exiting the site will access the existing roadway network through two signalized intersections at Derry Road and Bramalea Road and at Derry Road and Menkes Drive. **Figure 5** illustrates a concept plan of the proposed access configuration on Bramalea Road, Alstep Drive, and Menway Court. Six access points are planned at the site, as shown below. Proposed access points will provide full moves with no turning restrictions as follow:

- Along Alstep Drive, the access is approximately 200 metres from the expected centerline of the proposed access to the intersection at Bramalea Road. The south leg of the access will provide for two outbound lanes (left and right) and one inbound lane.
- The main access located along Bramalea Road, is about 300 metres from the expected centerline of the proposed access to the intersection at Derry Road. The west leg of the access will provide for two outbound lanes (left and right) and one inbound lane.

- Two accesses along the east side of the building, on Bramalea Road, lead to an additional parking lot for employees. They will provide for one inbound and one outbound lanes.
- One access at the end of Bramalea Road leading to the truck parking lot, will provide for one inbound and one outbound lanes.
- The access facing Menway Court will provide for one shared outbound lane and one inbound lane.

Bombardier intends to use the development as their manufacturing facility. The site is expected to have consistent activity on weekdays, with various shift blocks covering the daytime (6:00 AM – 3:00 PM), afternoon (3:00 PM – 11:00 PM) and overnight (11:00 PM – 7:00 AM) operations. The heaviest activity on the site will be during the daytime and afternoon shift change. Traffic exiting the site will access the existing roadway network through two signalized intersections at Derry Road East and Bramalea Road and at Derry Road East and Menkes Drive.

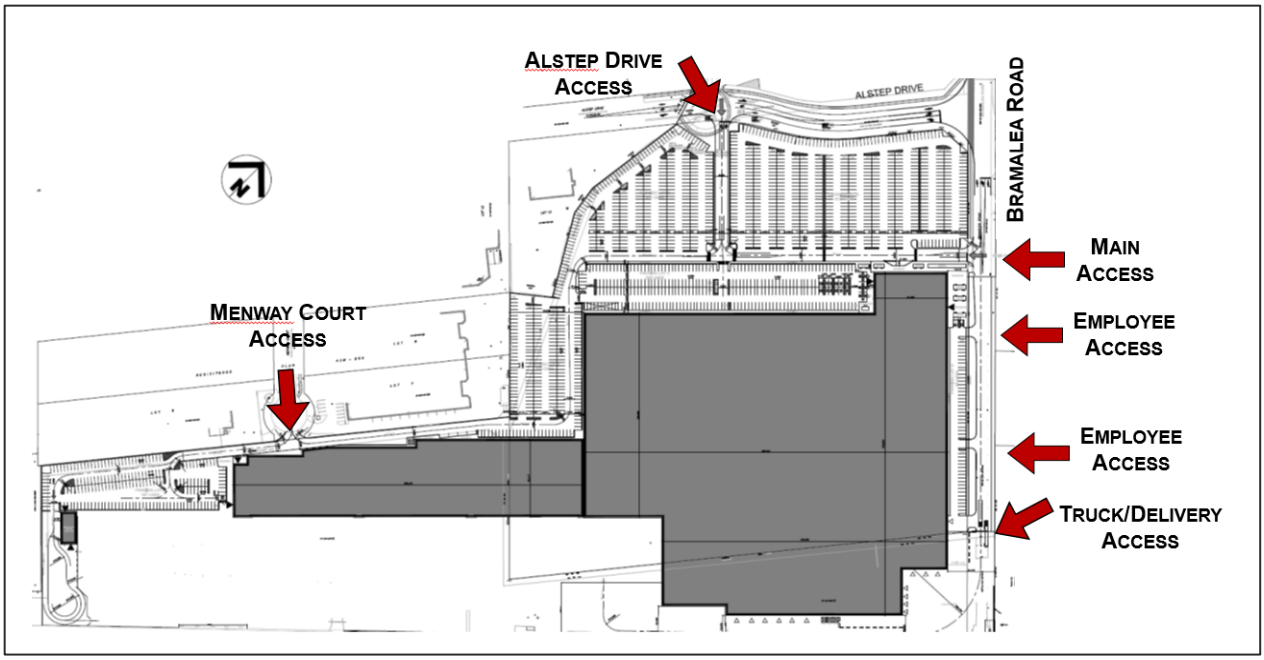



**Figure 5: Bombardier Development Concept**

### 2.3.2 Other Further Development

The City Planning Information Hub and the Region indicate that eight development applications are currently in progress within or near the Class EA study area. It is assumed that some of them will be completed by 2022. Through consultation with the City, five future developments were identified for inclusion in the Transportation Assessment background volume conditions. The background developments include:

- **7895 Tranmere Drive**: A proposed Commercial and Industrial Condominium with an expected gross floor area of 8248 $m^2$.
- **7099 Torbram Road**: A proposed office building extension that will add an expected gross floor area of 703 $m^2$.
- **6900 Dixie Road**: A proposed storage facility that will have an expected gross floor area of 3,375 $m^2$.
- **7233 Airport Road**: A proposed senior residence that will have 119 dwelling units.

- **1700 Derry Road East**: A proposed building extension that will add a third story to the existing office building along with a warehousing complex, with an expected total gross floor area of 137,650 $m^2$.

## 2.4 Study Area Network Improvements

A review of the City and Region's' Capital Plans and consultation with City and Region staff determined that no significant improvements to the study area's road network are currently planned that would affect area traffic within the 2031 horizon year. However, active transportation improvements are expected to take place in the study area, including:

- The Hurontario Light Rail Transit (HuLRT) project will begin operations during the build-out year.
- The MiWay routes (42 and 104) are expected to have connections to the LRT. It is acknowledged that automobile volumes may be reduced once the HuLRT is operational.

The analysis includes the extension of Alstep Drive from the current cul-de-sac to Bramalea Road in the future road network. Any potential extension of Alstep Drive would follow the existing right-of-way allowance and the intersection of the Alstep Drive extension and Bramalea Road would be offset from the FedEx truck entrance.

It should be noted that any requirement for the extension of Alstep Drive is not due to traffic generated by the Bombardier Aerospace development. An additional access from the development to Bramalea Road could be created by rearranging the internal road network and parking lot layout, thereby accommodating similar traffic volumes as by the Alstep Drive extension. There may even be a benefit to an access aligning with the FedEx truck entrance, in terms of intersection spacing.

The justification for the extension of Alstep Drive stems from City's desire to create a finer grid road network and to provide network options for existing traffic. While this is understood as a transportation engineering principle it is evident that the demand for this additional road link is limited.

Traffic originating from properties on Alstep Drive or Menway Court traveling to the east would be expected to use an extension to Alstep Drive if the total travel time could be reduced.

As noted in **Section 2.2.2**, there are some road studies either planned or underway in proximity to the study area that could lead to recommendations for road network improvements. Additionally, MyWay has proposed transit stop improvements in the northwest quadrant of the Derry Road and Bramalea Road intersection (see **Section 5.4.2**).

# 3 Transportation Assessment

A Transportation Assessment conducted for this Class EA study and attached in **Appendix C** includes a traffic analysis and a safety review within the study area.

The traffic analysis was conducted to evaluate the existing and future traffic conditions within the study area, to assess the need for improvements to accommodate traffic in a safe and efficient manner, to provide a traffic analysis of alternative improvements, and to provide recommendations for future geometric improvements to existing and future intersections. The analysis was completed for both build-out (2022) and future (2031) conditions during the weekday morning (AM) and afternoon (PM) peak hours to characterize operating conditions and identify locations requiring attention.

The safety analysis was conducted to review safety within the study area and to identify and recommend countermeasures for safety improvements.

## 3.1 Traffic Analysis

### 3.1.1 Road Inventory

The road network within the study area is comprised of the following roads:

- **Derry Road (Regional Road 5)** is an east-west Regional arterial road under jurisdiction of the Region of Peel. The road has an existing six-lane urban cross section with a posted speed limit of 70 km/h. Derry Road is signalized at Bramalea Road and Menkes Drive with auxiliary left-turn and right-turn only lanes at the intersections in the study area. There are no sidewalks provided on either side of the road. There is a multi-use path on the south side of Derry Road.
- **Bramalea Road** is a north-south collector road under the jurisdiction of the City. The urban cross section varies from two lanes to a maximum of five lanes within the study area. North of Derry Road, the road has an existing five-lane urban cross section with auxiliary left and right turn lanes at the intersection. South of Derry Road the cross section tapered from four to two lanes. The road maintains a speed limit of 50 km/h. Bramalea Road is signalized at Derry Road with auxiliary left-turn lanes. Sidewalks are present on both sides of the road, north of Derry Road. On the section, south of Derry, sidewalk is incomplete.
- **Menkes Drive** is a north-south local road under the jurisdiction of the City. Menkes Drive maintains a speed limit of 50 km/h. It consists of a 3-lane urban cross section with sidewalk provided on the east side of the road.
- **Telford Way** is a north-south local road under the jurisdiction of the City. Telford Way maintains a speed limit of 50 km/h. It consists of a 3-lane urban cross section with sidewalk provided on the west side of the road.
- **Alstep Drive** is an east-west local industrial road under the jurisdiction of the City. Alstep Drive maintains a speed limit of 50 km/h. It consists of a 3-lane urban cross section with sidewalk provided on the north side of the road.
- **Menway Court** is a north-south local industrial road under the jurisdiction of the City and maintains a speed limit of 50 km/h. It consists of a 3-lane urban cross section with sidewalk provided on the east side of the road.

On-street parking is prohibited on all of the roadways, while truck traffic is allowed.

Three privately owned accesses that are located on Bramalea Road south of Derry Road (leading to the Fed-Ex Distribution Centre) were included as part of the study area. Their inclusion is to ensure changes to the site-generated traffic will not excessively impact operations at the facility.

**Figure 6** illustrates the existing lane configuration and traffic control on all streets within the study area.

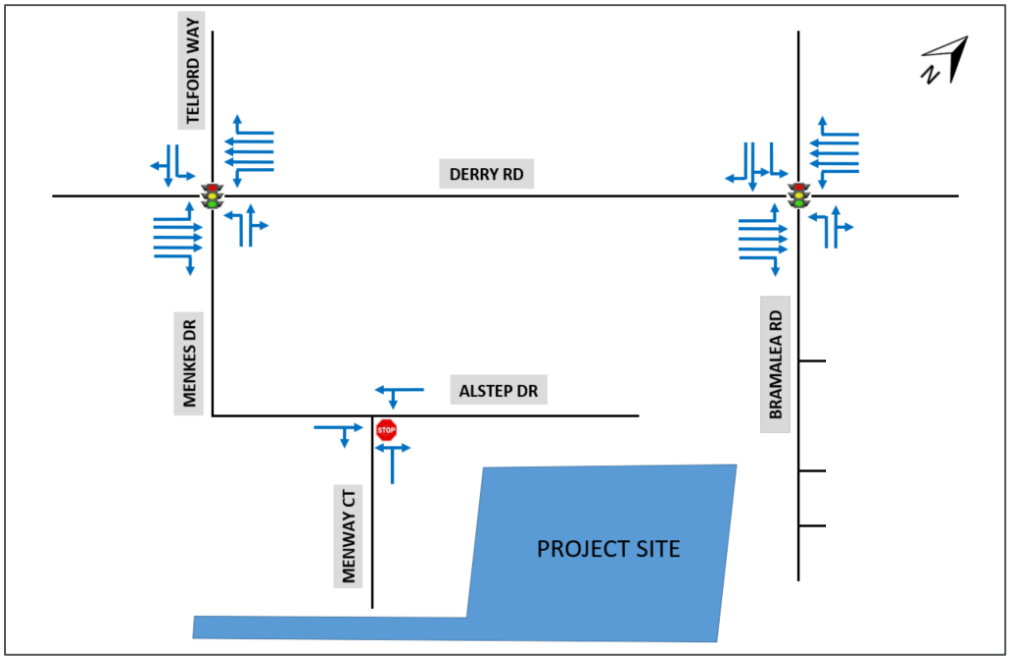



**Figure 6: Existing Lane Configuration and Traffic Control in the Study Area**

#### 3.1.1.1 Pedestrian and Cycling Network

Pedestrian and cycling infrastructure in the project study area are outlined in **Figure 7.** A narrow asphalt strip is provided above the curb in all locations where proper sidewalks or pathways are not provided.

Amenities at the Bramalea Road and Derry Road E intersection include high visibility crosswalks (in the north, west, and south approaches) and connections to existing bus stops. On Bramalea Road, north of Derry Road E, there is a sidewalk with a wide grass boulevard on the west side, and a multiuse pathway abutting the road on the east side.

At the Menkes Drive, Telford Way and Derry Road E intersection, high visibility pedestrian crosswalks are provided in all four approaches. A sidewalk with a wide grass boulevard is present on Telford Way's west side as well as on Menkes Drive's east side.


**Figure 7: Pedestrian and Bicycle Network in the Study Area**

On Alstep Drive, a standard sidewalk with a grass boulevard exists on the north side of the street and rounds the cul-de-sac. The same exists on the east side of Menway Court, however the sidewalk ends at the cul-de-sac.

Cycling connections are provided via the multi-use pathways on south side of Derry Road E and east side of Bramalea Road. No on-street cycling infrastructure exists in the study area.

#### 3.1.1.2 Transit Network

The study area includes MiWay and Brampton Transit bus stops at the main intersections of Derry Road East with Bramalea Road and with Menkes Drive / Telford Way. Shelters are provided for bus stops on Derry Road. **Figure 8** displays the location of the transit stops in the study, including:

- MiWay 42: Derry – West/East route between Meadowvale Town Centre and Westwood Square. Operating 7 days a week at approximately 10-minute frequencies during weekday peak hours. Route offers connection to Malton GO.
- MiWay 104: Derry Express – West/East route between Meadowvale Town Centre and Westwood Square. Expected approximately every 15 minutes during the study peak hours, weekdays only. Connection to Malton GO Station.
- Brampton Transit 15: Bramalea – North/South route between Bramalea Road & Inspire Boulevard (in Caledon) and Telford Way & Tranmere Drive. Expected every 20 minutes during the study peak hours on weekdays. Connections to the Bramalea GO Station and Bramalea Bus Terminal.
- Brampton Transit 115: Airport Express – North/South route between Bramalea Bus Terminal and Pearson Airport Terminal 1. Expected every 25 minutes during the study peak hours on weekdays. Only makes boarding trips when travelling northbound, and alighting trips when travelling southbound.

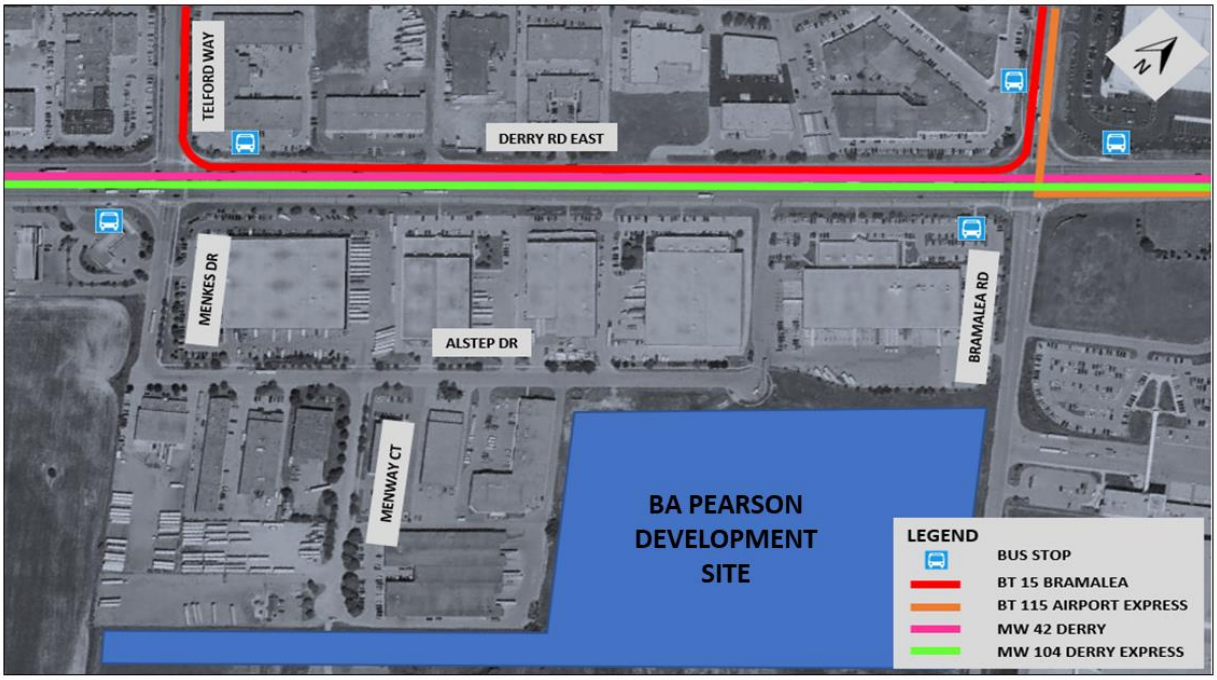



**Figure 8: Transit Network in the Study Area**

## 3.2 Transportation Operations

### 3.2.1 Existing and Future Traffic Volumes

The analysis of traffic conditions for the year 2022 (site opening year) and 2031 horizon year is based on forecasted turning movement counts in the study area by applying a yearly 2% growth rate to the 2019 Turning Movement Counts (TMC).

#### 3.2.1.1 Build-out year (2022) Volumes

TMC were taken at signalized intersections along Derry Road, at accesses along Bramalea Road, and at the unsignalized intersection at Alstep Drive and Menway Court. The peak hour traffic within the study area is oriented towards the employment areas closer to the airport and the central areas of the Greater Toronto Area.

#### 3.2.1.2 Future (2031) Volumes

The future traffic conditions for the 2031 horizon year include the followings:

- Future background conditions: this consists of traffic growth due to the new developments near the study area and a generic growth rate of 2% per year applied to the existing peak hour TMC at the intersections.
- Alstep Drive Site Trip Generation: this consists of future traffic related to estimated site generation trips related to Bombardier's planned Alstep Drive Development.

The analysis reports that Bombardier's Alstep Development will result in a total of 5,030 total daily trips (including inbound plus outbound). These trips will be staggered during the day, due to staggered shift start times. Results from the 2016 Transportation Tomorrow Survey (TTS) was used to determine the average local breakdown of home-to-work trips based on

primary mode of travel. Using the entirety of Mississauga's Ward 5, the multimodal split used in the analysis was: automobile (83%) and non-automobile (transit – 9%, passenger – 7%, and walking and cycling – 1%).

A transit modal split of 9 percent was applied to the site trip generation. This is expected to be achievable given the variety of transit services provided in the vicinity of the site. Another study parameter is that the HuLRT, which received full provincial funding, will be operational for the 2031 traffic horizon analysis year. When considering both the TTS data and HuLRT, the estimated transit usage near the site is appropriate.

### 3.2.2 Analysis of Existing and Future Traffic Operations

The Transportation Assessment study provided an analysis of the traffic operations based on the traffic volumes. Using Synchro 10, traffic operations for intersections within the study area were examined during the AM and PM peak hours.

#### 3.2.2.1 2022 Intersection Operations

EXP conducted a traffic operations analysis to determine the most practical solution for traffic operation efficiency. It involved signal timing optimization at the signalized intersections. The signal timing plans were optimized with an adjustment to the peak hour factor applied to all movements and a 1900 vehicle/hour/lane (v/h/l)saturation flow rate as per Peel Region guidelines. Note that signal timing optimizations include optimization of splits, however cycle lengths have been maintained to retain progression along the major roads.

**AM Peak Hour Analysis**

- During the morning study peak hour, the signalized intersection of Derry Road and Bramalea Road starts showing increasing delays with an overall LOS E. The westbound lane is over capacity with a LOS F, a 95$^{th}$ queue longer than the existing storage lengths and a vehicle to capacity (v/c) ratio exceeding the threshold values. The northbound turning lane is approaching capacity with a LOS F. The 95$^{th}$ queue is less than the existing storage lengths for the EB, SB, and NB left turn lanes. The v/c ratio is below the threshold values for most movements.
- The signalized intersection of Derry Road and Menkes Drive operates within acceptable LOS range and under capacity, with an overall LOS B.
- Unsignalized intersections within the study area operate at acceptable LOS and under capacity, with queue less than 10 m.

**PM Peak Hour Analysis**

- During the afternoon study peak hour, the signalized intersections along Derry Road are over capacity with an overall LOS F. The EB and WB are near capacity and a v/c ratio exceeding the threshold values. The NB is congested with a LOS F. The 95$^{th}$ queue is less than the existing storage lengths for the EB, SB, and NB left turn lanes. The v/c ratio is below the threshold values for some movements.
- The proposed unsignalized intersection of Alstep Drive and Bramalea Road operates with a failed LOS and over capacity. Its eastbound left turn, thru and right turn (EBLTR) movement shows a LOS F with v/c ratio greater than 2 and 95$^{th}$ queue exceeding the distance between Bramalea Road and the North Access to the Site.
- All other unsignalized intersections near the site operate at acceptable LOS and under capacity, with queue lengths less than 10 m.

#### 3.2.2.2 2031 Future Intersection Operations

**AM Peak Hour Analysis**

- During the morning study peak hour, the signalized intersection of Derry and Bramalea Road operates over capacity with an overall LOS F. The 95$^{th}$ queue is longer than the existing storage lengths for the EB and WB left turn lanes. Movements in the NB and SB approaches experienced longer delays with LOS E and F. The v/c ratio is below the threshold values.
- Unsignalized intersections within the study area operate at acceptable LOS, under capacity, and minimal queue lengths.

**PM Peak Hour Analysis**

- During the afternoon study peak hour, the signalized intersections along Derry Road are over capacity with an overall LOS F. For some left turn lanes, the 95$^{th}$ queue is longer than the existing storage lengths. The NB and SB movements experienced longer delays with LOS E of F. The v/c ratio is above the threshold values for most movements. V/C ratio is greater than the recommended values for the EB left turn lanes at both intersections.
- The proposed unsignalized intersection of Alstep Drive and Bramalea Road operates with a failed LOS and over capacity. Its EBLTR movement shows a LOS F with v/c ratio greater than 2 and 95$^{th}$ queue exceeding the distance between Bramalea Road and the North Access to the Site.
- Other unsignalized intersections within the study area operate at acceptable LOS and under capacity, with queue lengths less than 10 m.

#### 3.2.2.3 Summary

These traffic operation results indicate that the intersections are generally operating satisfactorily under the existing conditions, but problems are beginning to emerge over time.

- The intersections along Derry Road, at Bramalea Road and at Menkes Drive, will start showing high levels of congestion with some movements failing during the study peak periods, in the year 2022 future traffic analysis. The unsignalized intersection at Alstep Drive and Bramalea Road is also becoming highly congested with a LOS F.
- In the year 2031 future traffic analysis the signalized intersections on Derry Road at Menkes and Bramalea continue to fail with a LOS F.
- The proposed unsignalized intersection of Alstep Drive and Bramalea Road operates with a failed LOS and over capacity.

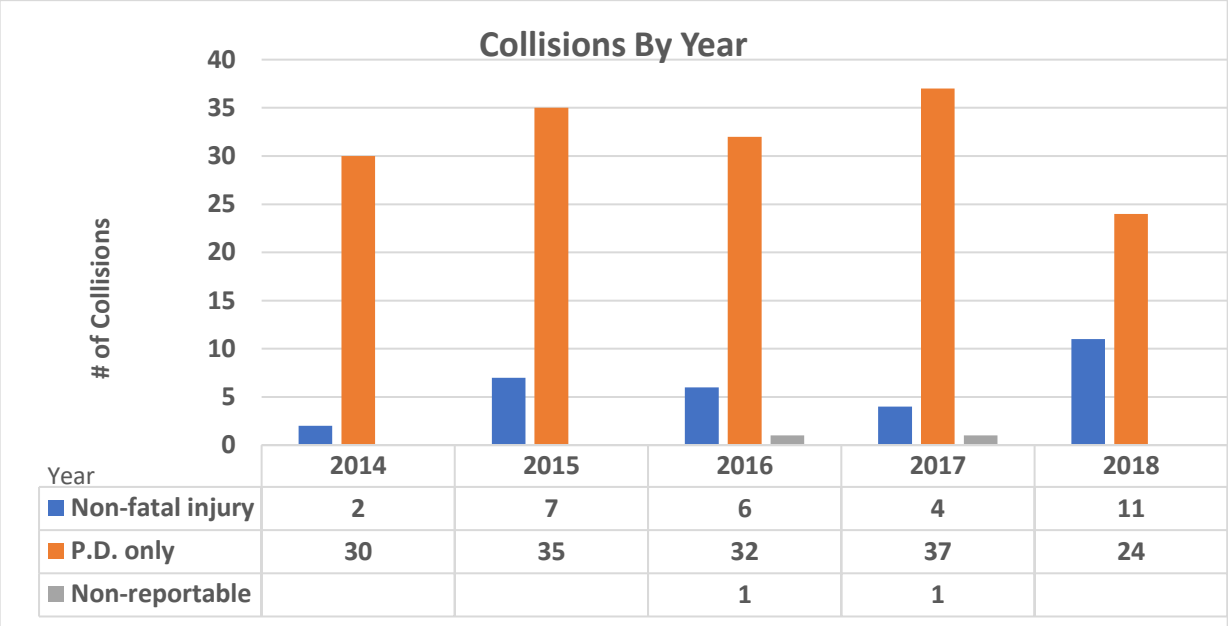
At the Bramalea Road intersection, the poor operations at the intersections can be attributed to lack of adequate capacity and the split phasing of the signal operations. At the Menkes Drive intersection, poor operations may be attributable to inadequate capacity. These traffic issues can be mitigated through provision of additional turn lanes and proper phasing and timing for the signals.

At the Alstep Drive and Bramalea Road intersection, poor operation may be attributable to inadequate traffic control and the existing alignment of the intersection. A mitigative measure may be installation of traffic signal at the intersection.

## 3.3 Safety Analysis

A total of 190 collisions with 30 injuries and no fatalities were reported within the project limits during the five-year study period. The most prevalent collision types were rear end, turning movement, and sideswipe collisions, which accounted for approximately 37%, 33%, and 14% of the total collisions, respectively. The remaining collision types, including approaching,

angle, Single Motor Vehicle (SMV), and unknown accounted for the remaining 16% of the collisions. Three collisions involved pedestrians and no collision involved bicyclists. Between 2014 and 2018, collisions occurrence varies from 32 to 42 collisions per year, with the 42 collisions peak in 2015 and 2017. As shown in **Figure 9**, there was a peak in injury collisions in 2018.




| Year | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| Non-fatal injury | 2 | 7 | 6 | 4 | 11 |
| P.D. only | 30 | 35 | 32 | 37 | 24 |
| Non-reportable | | | 1 | 1 | |

**Figure 9: Collision Summary by Year and Severity[5]**

- 81% of all collisions occurred on a dry roadway surface. This demonstrates that roadway surface conditions may not be a significant cause for the collisions occurring within the project limits.
- 70% of all collisions occurred during daylight conditions. This statistic demonstrates that lighting conditions may not be a significant cause for the collisions occurring within the project limits.
- As expected, approximately 170 collisions occurred along Derry Road, with 80% of them at the two signalized intersections. There are no reported collisions on Alstep Drive and Menway Court.
- Pedestrian collisions occurred when vehicles including transit bus are making a right turn movement and hit a pedestrian on the crosswalk.

### 3.3.1 Trends and Patterns

The following trends and patterns were noticeable. Based on the collision analysis completed:

- Higher than expected numbers of collision are occurring at the study intersections. Hence long-term efforts to improve road safety should be focused on improving intersection safety in general.
- The intersection of Derry Road and Menkes Drive/Telford Way appears to have a higher proportion of turning collisions involving EB and WB vehicles and rear end collisions involving EB or WB vehicles. None of the collisions seems to have been attributable to poor environmental and lighting conditions.

[5] P.D – This stands for property damage.

- The intersection of Derry Road and Bramalea Road appears to have a higher proportion of turning collisions involving EB and WB vehicles and rear end collisions involving EB, WB, or SB vehicles. None of the collisions seems to have been attributable to poor environmental and lighting conditions.
- The intersection of Bramalea Road and Boylen Road/Logistics Drive appears to have a higher proportion of angle and turning collisions involving EB and NB/SB vehicles and NB and SB vehicles. None of the collisions seems to have been attributable to poor environmental and lighting conditions. The intersection appears to have been signalized after the 5-year period reviewed, potentially mitigating the collisions observed during our review.
- The road segment of Derry Road between Menkes Drive/Telford Way and Bramalea Road appears to have a higher proportion of rear-end collisions involving EB or WB vehicles and sideswipe collisions involving EB or WB vehicles.
- The road segment of Derry Road between Bramalea Road and the eastern study area limit appears to have a higher proportion of rear-end collisions involving WB vehicles and single motor vehicle (SMV) collisions involving EB or WB vehicles.

### 3.3.2 Potential Countermeasures

Following the identification of the safety issues listed above, the assessment identified potential countermeasures that could be considered to improve the overall safety within the study area, including the prevention in the occurrence and severity of collisions. The countermeasures include but are not limited to the improvements and addition of pedestrian facilities, left turn lanes, pavement resurfacing, and signal operations review.

# 4 Problem and Opportunity Statement

Based on a review of existing and future conditions, as well as consultation with the Approving Agencies, it has been determined that improvements are needed along Derry Road East and Bramalea Road to accommodate the existing and future traffic demands generated by the Alstep Drive site.

Based on the analysis in the preceding sections, the following problems and opportunities are identified:

- Existing congestion during the AM and PM peak hours is expected to increase by the horizon year of 2031 if no improvements are implemented.
- Opportunity to support efficient movements of passenger vehicles, trucks, and transit, at the intersections and segments in the study area for active transportation and transit.
- Opportunity to support increasing use of public transit (LRT & MiWay) and reduce the number of motor vehicles containing a single motorist.
- Opportunity to improve safety for all within the study area.
- Opportunity to support employment.
- Opportunity to support economic growth (employment/ movement of goods).
- Opportunity to support functionality to Pearson Airport.
- Opportunity to support development plans (land development/ Transportation Master Plan (TMP)/ transit plan).
- Opportunity to support preservation of existing natural system.

Based on these findings, the following is the Problem/Opportunity Statement for this Class EA:

> *As a result of the proposed development at 1890 Alstep Drive, Mississauga, the road network along Derry Road East in the vicinity of its intersections with Bramalea Road and Menkes Drive will not be able to accommodate the traffic demand anticipated by 2031. Improvements to this road network will be necessary to mitigate possible impacts to traffic operations.*
>
> *An opportunity exists to make improvements to this road network that will improve the efficiency of traffic and reduce or avoid traffic delays outside of the project study area that either currently exist or are expected to exist by 2031, regardless of whether the development proceeds.*

# 5 Existing Environmental Conditions

A number of background studies and other investigations were undertaken to document the existing conditions of the study area. The existing conditions are reviewed in the sections that follow (with the existing transportation network and conditions reviewed as part of the built environment in **Section 3.4**). These background studies include:

- **Transportation Analysis** - The Transportation Analysis (see summary in **Section 3**) documented the transportation need and justification for intersection improvements within the Class EA study area and the extension of Alstep Drive. It also examined the implications of development plans on this study area and established storage lane requirements for the signalized intersections within the study area.
- **Stage 1 Archaeological Assessment** - The Stage 1 Archaeological Assessment analyzed the historical and archaeological context of the Class EA study area to identify which areas would require further archaeological assessment (see **Appendix D**).
- **Cultural Heritage Resource Assessment (CHRA)** - A CHRA was undertaken to present an inventory of known and potential built heritage resources (BHRs) and cultural heritage landscapes (CHLs), identify existing conditions of the project study area, provide a preliminary impact assessment, and propose appropriate mitigation measures (see **Appendix E**).
- **Background Hydrogeological Assessment** - The background hydrogeological assessment was undertaken to assess the existing hydrogeological conditions of the project study area (see **Appendix F**).
- **Phase 1 Environmental Site Assessment (ESA)** - A Phase One ESA is a systematic qualitative process to assess the environmental condition of a site based on its historical and current uses. This Phase One ESA was for portions of Bramalea Road, Derry Road East, Telford Way, Alstep Drive, Menkes Drive and Menway Court within the Class EA study area, plus a 5 metre stretch along each side of the roadways (see **Appendix G**).
- **Natural Features Investigation** - The Natural Features investigation documented existing natural conditions (see **Appendix H**).
- **Geotechnical Investigation and Pavement Analysis** - The purpose of the Geotechnical Investigation and Pavement Analysis was to determine the pavement conditions by visual examination and the subsurface conditions through borehole analysis (see **Appendix I**).
- **Drainage and Stormwater Management** - This report reviewed the existing drainage, hydrology and stormwater management of the Class EA Study area (see **Appendix J**).

The reports for these studies are provided in the Appendix of this ESR. Their findings are incorporated into the summary of existing conditions that follows.

## 5.1 Social and Economic Environment

### 5.1.1 Zoning

The study area primarily consists of Employment Area and Airport Special Purpose Area land classifications, according to the City of Mississauga's Official Plan. As such, the buildings within the study area are primarily commercial units, including offices, warehouse logistics, and small manufacturing, or facilities related to the Toronto Pearson International Airport. There are no residential land uses within the study area.

The study area includes multiple City of Mississauga zoning designations, as per its Municipal Zoning By-Law No. 0225-2007. The designations and their definitions include:

- Employment Zone (E2 and E3): The purpose of this Part is to provide a number of Employment Zones, that allow for a variety of business operations, including various industrial operations, in appropriate locations throughout the City;
- Commercial Zone (C1 to C5): The purpose of this Part is to provide a number of Commercial Zones, that allow for the development of various commercial businesses in different sized centres, areas and concentrations, in appropriate locations throughout the City as reflected in the C1, C2 and C3 zones. The C4 zone refers to Mainstreet areas which are pedestrian-oriented and street-related retail areas. The C5 zone has been applied to small-scale motor vehicle uses such as gas bars and motor vehicle service stations;
- Greenlands Zone (G1): The purpose of this Part is to provide a number of Greenlands Zones, that allow a limited range of uses and activities specific to the protection of people and property from flooding and erosion hazards, and the protection of natural features, in appropriate locations throughout the City;
- Open Space Zone 2 (0S2): The purpose of this Part is to provide a number of Open Space Zones, that allow for a range of active and passive recreational opportunities, and cemeteries, in appropriate locations throughout the City;
- Airport Zone (AP): The purpose of this Section is to provide an AP zone (Airport) that recognizes Lester B. Pearson International Airport (LIBPIA);
- Exception 70 (E2-70), which relates to the existing skeet club; and
- Exception 1 (C3-1), which allows for additional uses in the C3 zone.

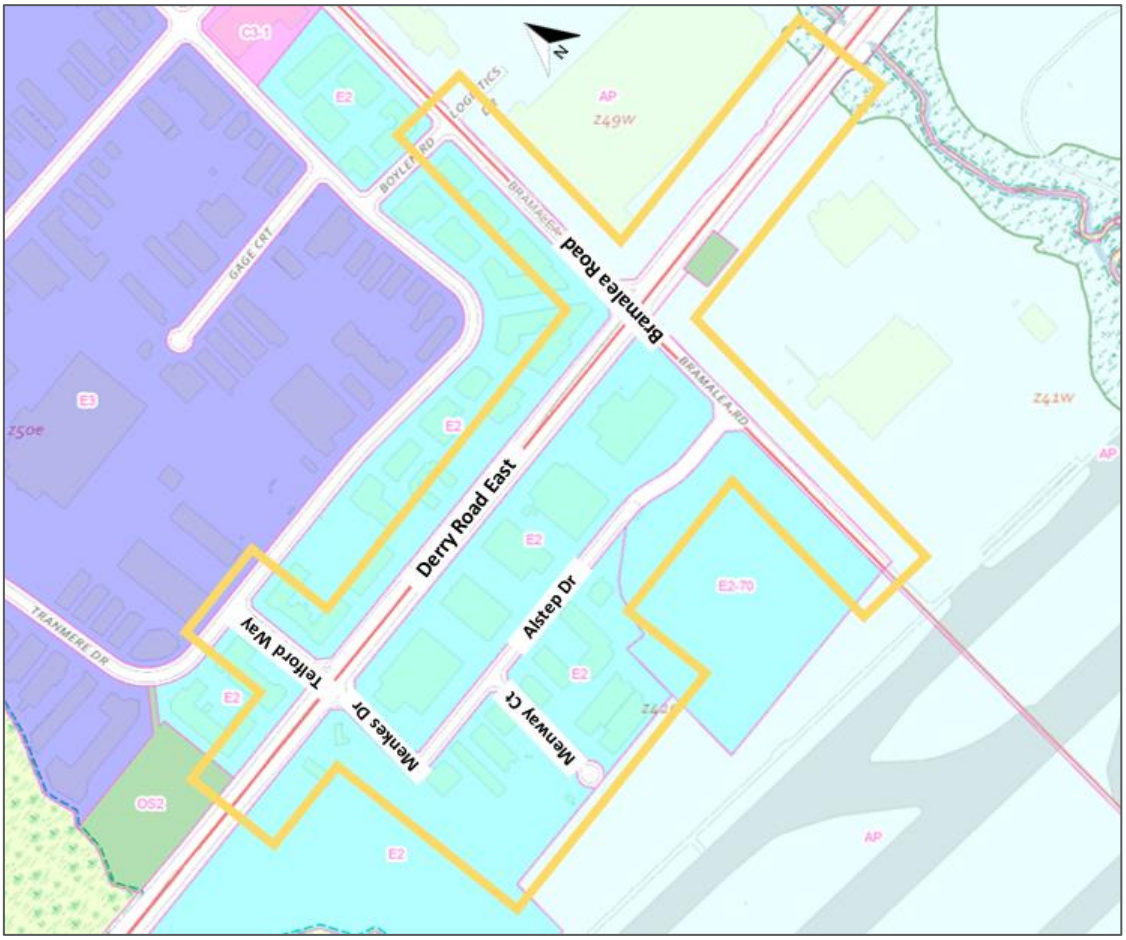



**Figure 10: Municipal Zoning in the Class EA Study Area**

### 5.1.2 Long Combination Vehicle Movements

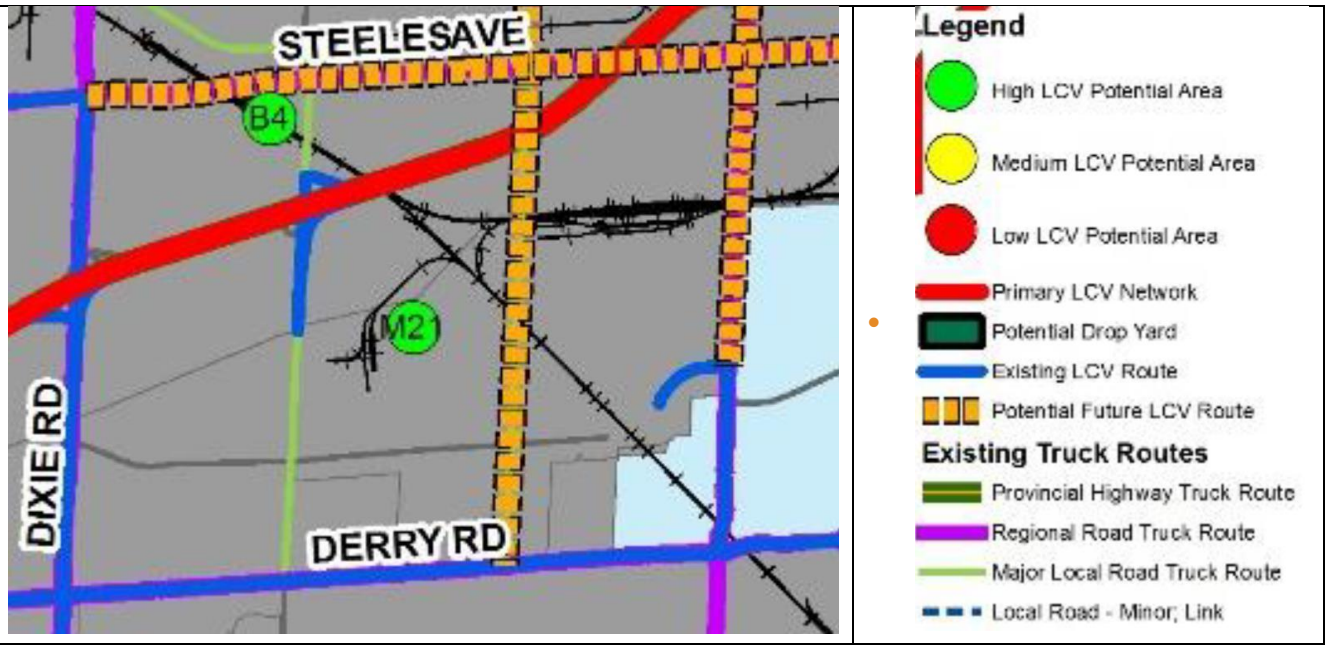
The Class EA process considered the potential for Long Combination Vehicles (LCV's) within the study area. LCV's are an extra-long configuration for tractor-trailers and they include the tractor truck and two full size tractor trailers. In April 2019, the Region of Peel completed a Long Combination Vehicle (LCV) Usage Study for the Region. The report identifies existing approved LCV origin and destination (O/D) areas, the approved LCV Route Network (2017) in the Region of Peel, and LCV Route Expansion study areas, which are areas that include corridors that may make good candidates for future potential LCV route expansion. This Class EA study area is included within LCV Route Expansion study area.

**Figure 11** below is an extract of Figure 24 (Potential Future LCV Network, Region of Peel) from the Region's report[6]. The figure indicates:

- Derry Road is identified as an existing LCV route.
- There is an existing LCV route on Bramalea Road north of the project study area. This route takes LCV's to Highway 407.

[6] Parsons and Associated Engineering. Long Combination Vehicle (LCV) Usage Study, Region of Peel. Final Report. Prepared for the Regional Municipality of Peel. April 2019.

- The nearest north/south bound LCV routes include Dixie Road (existing, west of study area) and Torbram Road (potential future, east of study area).
- Bramalea Road north of Derry Road is identified as a major local road truck route.
- There are no approved or potential future truck LCV routes that require left or right turns off of Derry Road within the Class EA project study.




- *Image source: Parsons and Associated Engineering. Long Combination Vehicle (LCV) Usage Study, Region of Peel. Figure 24 – Potential Future LCV Network, Region of Peel. Prepared for Region of Peel. April 2019.*

**Figure 11: Existing and Potential Future LCV Routes (Derry/Dixie/Steeles/Airport)**

## 5.2 Natural Environment

### 5.2.1 Natural Features Investigation

#### 5.2.1.1 Overview

A Natural Environment report (see **Appendix H**) was prepared to document the natural features in the EA study area, including wildlife, rare species, and significant natural heritage features. A Tree Inventory Plan was also completed, which considered the species type, size and health of the trees in the area.

The Natural Environment investigation included a desktop review of background natural heritage information, consultation with MECP, and field visits in May and June of 2019.

The majority of the study area consists of paved roads, sidewalks, parking lots, and manicured lawns, with tree and shrub species planted within landscaped boulevards and on adjacent lands. Approximately 35m northeast and 400m southwest of the study area are two branches of the Etobicoke Creek. Both creek valleylands contain cultural meadow habitat with

occasional trees and shrubs. The vallylands are part of the 'Green System' in the City of Mississauga Official Plan and 'Natural Heritage System' in the Peel Region Official Plan.

#### 5.2.1.2 Toronto and Region Conservation Authority Regulated Area

A small portion of the study area falls within the Toronto and Region Conservation Authority (TRCA) Regulated Area. This portion is subject to the policies of Ontario Regulation 166/06 (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses). Any construction activities for road improvements within the Regulated Area may require a permit from the TRCA under Ontario Regulation 166/06. Further, any development within the TRCA's regulated area will align with the TRCA's Living City Policies (LCP) document[7]. The LCP contains the principles, goals, objectives, and policies that will guide TRCA's legislated and delegated roles and responsibilities in the planning and development approvals process.

#### 5.2.1.3 Vegetation

The study area contains mainly manicured lawn with scattered native and cultivar urban trees along the landscaped boulevards and edges of the adjacent commercial and industrial lands. Dominant tree species include immature to semi-mature Honeylocust, Norway Maple, Basswood, Austrian Pine, White Spruce and Blue Spruce. A swath of cultural meadow occurs within the study area between the east end of Alstep Drive and Bramalea Road. The meadow is dominated by a dense cover of herbaceous species including Goldenrod, Cowvetch, Timothy, and Wild Rye.

#### 5.2.1.4 Wildlife and Wildlife Habitat

Evidence of bird breeding activity was observed in the study area for nine possible species. Other bird species were observed during the field surveys; however, suitable nesting habitat for these species in the boulevard was not present in the study area. European Starling and American Robin were the most abundant bird species observed and were seen perched on tree branches or foraging on manicured lawns. Other species observed on or flying over the study area included American Crow, American Goldfinch, Blue Jay, Canada Gooses, Common Yellowthroat, House Finch, House Sparrow, Killdeer, Red-winged Blackbird, and Yellow Warbler.

The vast majority of deciduous trees adjacent to the roadway were young and fell below the size requirements (<25cm DBH [8]) for potential bat maternity roost trees. While one Sugar Maple was observed that met the diameter requirements, this tree was located along Alstep Drive and, given the highly urbanized location and sparsity of the surrounding vegetation, it was deemed unlikely that this tree would be utilized by a bat maternity colony.

No mammals, herpetofauna, or invertebrates were observed at the time of the field surveys.

No Significant Wildlife Habitat (SWH) was observed in the study area during field investigations. The study area is heavily urbanized and did not meet the candidate or confirmed SWH requirements outlined in Ministry of Natural Resources and Forestry's[9] (MNRF) Significant Wildlife Habitat Technical Guide.

#### 5.2.1.5 Surface Water Features

No surface water features such as watercourses, ponds, roadside ditches, etc. occur within the study area. Two branches of Etobicoke Creek, however, are present east and west of the study area. The main branch of the Etobicoke Creek is approximately 400 m southwest of the study area. A tributary of the main branch is approximately 35 m northeast of the study

[7] TRCA. The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority. November 28, 2014.
[8] DBH means diameter of the tree measured at "breast height".
[9] Formerly known as Ministry of Natural Resources and Forestry.

area. Both watercourses are permanent, fast-moving with wetted widths between approximately 5 and 11 m. Neither watercourse is anticipated to be impacted by the proposed road improvements.

#### 5.2.1.6 Species at Risk

The Natural Environment investigation considered the presence of Species at Risk (SAR). The SAR analysis first determined if habitat for species protected under the Endangered Species Act (ESA) was present in the study area. It was determined that 30 species designated as Endangered, Threatened, or Special Concern under the ESA have population distributions in proximity to the study area. ELC community types and habitat requirements for each SAR species was considered based on information obtained from digital aerial imagery, background sources, and field investigations. Of the 30 species considered, it was determined that four SAR could potentially utilize the study area at some point in their life cycle, including:

- Chimney Swift (bird);
- Common Nighthawk (bird);
- Monarch Butterfly (insect); and
- Yellow-banded bumble bee (insect).

Common Nighthawk and Chimney Swift are both aerial insectivores that are known to nest in urban and suburban areas. Common Nighthawk breed in a wide range of open habitats, including open forests, grasslands, gravel roofs, and some landscaped areas such as parks, airports, and cultivated fields. Similarly, Chimney Swifts are common in urban environments where they nest in chimneys and other anthropogenic structures. The presence of landscaped areas, gravel roofs, and other anthropogenic structures in proximity to the study area represent potential suitable nesting habitat for Common Nighthawk.

Suitable nesting habitat does not appear to be present in the study area for Chimney Swift. Based on digital aerial imagery, the commercial and industrial buildings in the study area are relatively modern and do not contain old open chimney structures that would be suitable for Chimney Swift nesting.

The open field adjacent to Bramalea Road contains common wildflower and grass species which may support foraging and / or breeding habitat for Monarch and Yellow-banded Bumble Bee.

Despite the presence of potentially suitable habitat for the SAR mentioned above, no SAR were observed during the fieldwork, and no evidence of habitat use (i.e. eggs, nests, burrows, dens, etc.) for SAR was documented in the study area during field surveys.

No plant SAR were identified in the study area, nor were any provincially rare species or vegetation communities.

#### 5.2.1.7 Significant Natural Features

The Natural Environment investigation determined that none of the following significant natural features were found within the EA study area:

- Significant Wetlands;
- Significant Woodlands;
- Significant Valleylands;
- Significant Wildlife Habitat; or,
- Significant Areas of Natural and Scientific Interest.

### 5.2.2 Air Quality

Impacts to air quality include outdoor air contaminants that are derived from both natural and human sources. Natural sources may include smoke from forest fires, wind-blown dust, or contaminants released by plants or animals. Human sources include air pollution generated from human activities, such as industrial processes and motor vehicle use[10].

Key air pollutants associated with motor vehicle use include:

- Particulate Matter (PM) - Airborne particulate is the general term used to describe a mixture of microscopic solid particles and liquid droplets suspended in air. PM includes aerosols, smoke, fumes, dust, fly ash and pollen. Fine particulate matter (PM2.5) is PM that is less than 2.5 micrometres in diameter. Fine particulate matter can have various negative health effects, especially on the respiratory and cardiovascular systems. Major sources of PM2.5 include residential fireplaces and wood stoves, motor vehicles, smelters, power plants, industrial facilities, and agricultural burning and forest fires.
- Volatile organic compounds (VOCs) - VOCs are organic chemical compounds that may evaporate under normal ambient conditions of temperature and pressure, such as benzene and toluene. VOCs are precursors of ground-level ozone and PM2.5, which are major components of smog. VOCs are emitted into the atmosphere from a variety of sources, including vehicles, fossil fuel combustion, fuel-refilling, industrial and residential solvent use, paint application, and manufacturing of synthetic materials (e.g., plastics, carpets), among other things.
- Nitrogen Oxides (NOx) - A key NOx is Nitrogen dioxide ($NO_2$), which is a reddish-brown gas with a pungent odour that transforms in the atmosphere to form gaseous nitric acid and nitrates. It plays a major role in atmospheric reactions that produce ground-level ozone. It also reacts with other gaseous contaminants in the air and can lead to the formation of PM2.5. The combustion of carbon-based materials such as wood or fossil fuels produces nitrogen oxides (NOx), which includes $NO_2$ as a component. The transportation sector is the main source of nitrogen dioxide in Ontario.[11]

The Province of Ontario monitors these pollutants through the MECP's Air Quality Health Index (AQHI) monitoring network. While there are no monitoring stations located within the EA study area, two are located approximately 9 km away:

- Station 35125 (Toronto West) - located at 125 Resources Road in Etobicoke, approximately 9 km east of the study area;
- Station 46090 (Brampton) - located at 109 McLaughlin Rd. S. in Brampton, approximately 9 km west of the study area; and
- Station 46108 (Mississauga) - located at 3359 Mississauga Rd. in Mississauga, approximately 16 km south of the study area.

Each of the stations monitor NOx, $NO_2$, PM2.5 and ground level ozone. A summary of the 10-year trends for these parameters for the three stations are provided in the table below. The data shows that the concentrations of these materials have decreased from 2010 to 2019, except for ground-level ozone. In addition, based on the 2019 AQHI data, the air quality in the vicinity of the study area is generally of low risk. For example, the AQHI for the three stations was of low risk between 88% (Toronto West) and 95% (Mississauga) of the time, and there were only two days (Toronto West) when the air was considered high risk for more than an hour. Also, in 2019 there was one special air quality statement issued for the City of Toronto Air Quality Forecast Region and none for the Halton-Peel Air Quality Forecast Region[12].

[10] Region of Peel. Peel Region Official Plan Review Discussion Paper: Air Quality.
[11] Government of Ontario. Air Quality in Ontario 2019 Report. https://www.ontario.ca/document/air-quality-ontario-2019-report/key-air-contaminants. Accessed June 17, 2022.
[12] Government of Ontario. Air Quality in Ontario 2019 Report.

*Table 2: 10-Year Air Quality Trends for NOx, $NO_2$, PM2.5 and $O_3$ (2010 to 2019)*

| Municipality | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Change over 10 year (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **10-year trend for nitrogen oxides (NOx) - Annual mean (ppb)** | | | | | | | | | | | |
| **Toronto West** | 33.5 | 31.5 | 27.6 | 24.7 | 26.5 | 25.7 | 23.8 | 22.7 | 21.1 | 22.1 | -28.9 |
| **Brampton** | 14.4 | 15.9 | 14.8 | 13.9 | 14.6 | 13.7 | 13.1 | 10.6 | 10.3 | 10.7 | -34.6 |
| **Mississauga** | 14.5 | 14.7 | 13.4 | 12.6 | 12.1 | 12.3 | 12.2 | 9.9 | 8.8 | 11.0 | -29.1 |
| **10-year trend for nitrogen dioxide ($NO_2$) - Annual mean (ppb)** | | | | | | | | | | | |
| **Toronto West** | 20.1 | 19.1 | 16.3 | 16.1 | 17.1 | 16.6 | 15.7 | 15 | 14.4 | 14.6 | -25.3 |
| **Brampton** | 10.7 | 11.3 | 10.4 | 9.1 | 10.6 | 9.9 | 9.7 | 8.3 | 8.1 | 8.6 | -26.4 |
| **Mississauga** | 10.4 | 10.6 | 9.6 | 9.5 | 9.2 | 9.2 | 8.6 | 8 | 7.2 | 8.4 | -25.1 |
| **10-year trend for fine particulate matter (PM2.5) - Annual mean (µg/m3)** | | | | | | | | | | | |
| **Toronto West** | 8.1 | 8.7 | 8.8 | 8.8 | 9.1 | 8.5 | 7.0 | 7.4 | 7.7 | 7.2 | -22.6 |
| **Brampton** | 7.2 | 7.6 | 7.2 | 8.5 | 8.9 | 8.4 | 6.8 | 7.0 | 7.3 | 6.8 | -10.5 |
| **Mississauga** | 7.6 | 7.7 | 7.5 | 7.9 | 8.7 | 8.5 | 7.2 | 6.8 | 7.3 | 7.0 | -13.6 |
| **10-year trend for ground-level ozone ($O_3$) - Annual mean (ppb)** | | | | | | | | | | | |
| **Toronto West** | 20.6 | 20.1 | 21.5 | 21.5 | 21.1 | 21.3 | 22.1 | 22.1 | 22.3 | 21.8 | 10.1 |
| **Brampton** | 27.5 | 26.1 | 26.6 | 26.7 | 26.5 | 26.5 | 27.1 | 27.2 | 28.6 | 26.5 | 3.6 |
| **Mississauga** | 25.9 | 24.1 | 25.6 | 25.2 | 25.4 | 25.4 | 26.0 | 26.2 | 26.1 | 24.5 | 2.2 |

Data source: Government of Ontario. Air Quality in Ontario 2019 Report: Key Air Contaminants. https://www.ontario.ca/document/air-quality-ontario-2019-report/key-air-contaminants. Accessed June 17, 2022.

As the study area is located within an industrial and commercial area, it can be expected that there are facilities in the vicinity that contribute air emissions to the broader air shed. The following figure presents a map of facilities that report to Canada's National Pollutant Release Inventory (NPRI) for emissions of criteria air contaminants. The map shows that there are eight facilities that report air emissions to the NPRI within a 2 km radius of the intersection of Derry Road East and Telford Way (the approximate center of the study area). All of these facilities report emissions of less than 2,000 annual tonnes. The map shows that there are other such facilities beyond the 2km radius. However, there are no facilities that emit more than 2,000 tonnes per year in the vicinity of the study area.

Sensitive receptors are a key consideration when discussing air quality and sources of air emissions. Sensitive receptors would be found in such places as residences, hospitals, schools, daycare facilities, elderly housing and convalescent facilities, and public meeting places. No such sensitive receptors were identified in this study area.

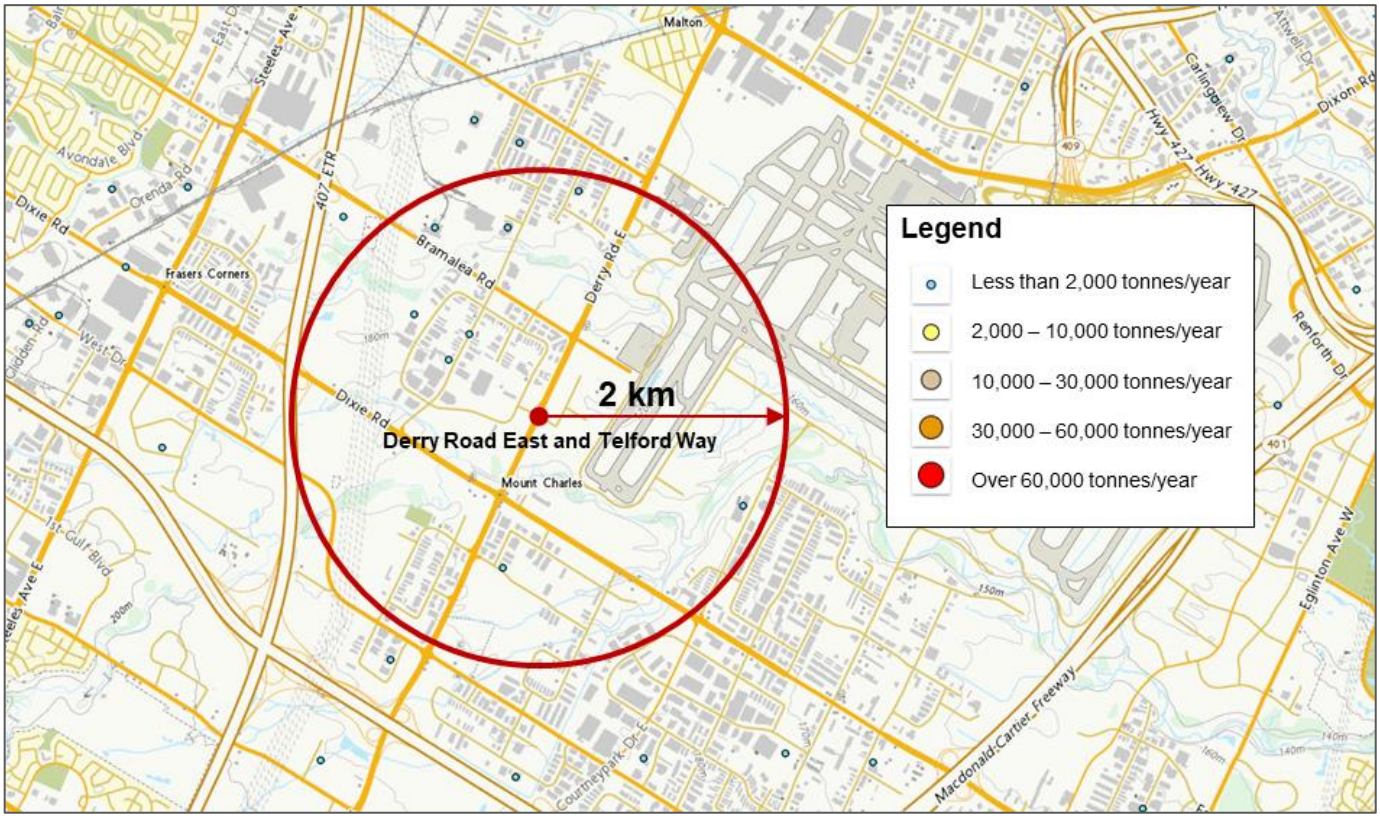



**Figure 12: Map of NPRI Reporting Facilities for Criteria Air Contaminants** [13]

### 5.2.3 Source Water Protection

The EA study area is within the Toronto Source Protection Area, which falls under the Source Protection Plan for the CTC (Credit Valley, Toronto and Region and Central Lake Ontario) Source Protection Region. A review of the Government of Ontario's Source Protection Information Atlas shows that the study area:

- Does not fall within the Niagara Escarpment Plan;
- Is not part of the Oak Ridges Moraine;
- Is not connected to the Greenbelt;
- Is not near a Wellhead Protection Area;
- Is not near a Groundwater Under Direct Influence (GUDI) area; and
- Is not near a Significant Groundwater Recharge Area.

A Highly Vulnerable Aquifer (HVA) extends approximately 200 m into the study area from its eastern boundary, along Derry Road. The source protection policies that may apply to this EA study are noted in **Table 3** below.

[13] Government of Canada. Open Maps. Maps of reporting facilities - criteria air contaminants. https://search.open.canada.ca/openmap/274ede77-27b9-46b8-96c8-4d7d4a706f08. Accessed June 13, 2022.

*Table 3: Source Water Protection Threats*

| Policy ID | Threat Description | Policy |
|---|---|---|
| **SAL-11** | Moderate/Low Threats: Application of Road Salt | Where the application of road salt is, or would be, a moderate or low drinking water threat, the Ministry of the Environment and Climate Change in consultation with other provincial ministries and municipal associations should promote best management practices for the application of road salt, to protect sources of municipal drinking water in any of the following areas:<br>• WHPA-A (VS = 10) (existing, future); or<br>• WHPA-B (VS ≤ 10) (existing, future); or<br>• WHPA-C (existing, future); or<br>• WHPA-D (existing, future); or<br>• WHPA-E (VS ≥ 4.5 and <9) (existing, future); or<br>• HVA (existing, future); or<br>• SGRA (VS ≥ 6) (existing, future). |
| **SAL-13** | Moderate/Low Threats Application of Road Salt Handling and Storage of Road Salt | Where the application, handling and storage of road salt is, or would be, a moderate or low drinking water threat, the municipality is requested to report the results of its sodium and chloride monitoring conducted under the Safe Drinking Water Act and any other monitoring programs annually to the Source Protection Authority. The Source Protection Authority shall assess the information for any increasing trends and advise the Source Protection Committee on the need for new source protection plan policies to be developed to prevent future drinking water Issues, in any of the following areas:<br>• WHPA-A (VS = 10) (existing, future); or<br>• WHPA-B (VS ≤ 10) (existing, future); or<br>• WHPA-C (existing, future); or<br>• WHPA-D (existing, future); or<br>• WHPA-E (VS ≥ 4.5 and <9) (existing, future); or<br>• HVA (existing, future); or<br>• SGRA (VS ≥ 6) (existing, future). |

*Notes:*

*WHPA = Wellhead Protection Area*
*WHPA-A = an area of 100 metre radius around the wellhead*
*WHPA-B = the zone through which it takes groundwater to travel between two years and the 100 metre distance*
*WHPA-C = the zone through which it takes groundwater to travel between five and two years*
*WHPA-D = the zone through which it takes groundwater to travel between 25 and five years*
*WHPA-E = the area on ground surface through which surface water flows in two hours to a point close to the well*
*HVA = Highly Vulnerable Aquifer*
*SGRA = Significant Groundwater Recharge Area*
*VS = Vulnerability Score*

## 5.2.4 Hydrogeological Assessment

### 5.2.4.1 Regional Setting

*Regional Physiography*

The Site is within a physiographic region named the Peel Plain. The physiographic landform is known as the Bevelled Till Plains. The Peel Plain is surrounded by the South Slope which extends along the northern boundary of the Iroquois Plain. The plain is the lake bottom of former glacial Lake Peel, which was created between the front of the ice-lobe and the Niagara Escarpment. The Peel Plain is a level-to-undulating area of clay soils. The topography of the Plain gradually slopes down southeast, toward Lake Ontario, following the topography of the underlying till. A calm lake environment resulted in the deposition of silts and clays, particularly in depressions of the till. These sediments are quite thin, which suggests Lake Peel had a brief existence.

*Regional Geology and Hydrogeology*

The surficial geology can be described as clay to silt textured till, fine textured glaciolacustrine deposits (mainly silt and clay), and modern alluvial deposits of clay, silt, sand and gravel. Bedrock in the project area primarily consists of interbedded shale, limestone, dolostone and siltstone, which belong to the Georgian Bay Formation, Upper Ordovician.

Groundwater across the area flows southeast, towards Lake Ontario. Local deviation from the regional groundwater flow pattern may occur in response to changes in topography and/or soils, as well as the presence of surface water features and/or existing subsurface infrastructure.

### 5.2.4.2 Site Setting

*Existing Water Well Survey*

Water Well Records (WWR) were compiled from the database maintained by the Ministry of the Environment, Conservation and Parks (MECP) and reviewed to determine the number of water wells documented within a 500m radius of the road network within the study area. The MECP WWR database lists 44 records within the area reviewed. The reported depths to groundwater ranged from approximately 3.0 m to 21.3 meters below ground surface (mbgs).

The database indicates that the wells are at an approximate distance of approximately 8 m or greater from the road network. These wells were reportedly identified as monitoring and observation wells, test holes, dewatering wells, water supply wells, abandoned and/or listed with unknown use.

Six water supply wells were identified as water supply wells within 500 m distance from the road network. The well uses of each water supply well were given in the data base as livestock (1$^{st}$ well use) and domestic (2$^{nd}$ well use). The closest water supply well is located approximately 82 m away from the road network. Based on the old dates of installation of the water supply wells (September 1959 to July 1960), and since the area is municipally serviced, it is unlikely that the noted water supply wells are still active.

*Site Topography*

The Site is in an urban area. The topography is considered relatively flat, with a regional gradual southeasterly slope towards Etobicoke Creek and Lake Ontario. The surface elevation of the roadway network within the study area ranges between approximately 172.4 to 175.6 meters above sea level (masl).

*Local Surface Water Features*

The study area is located within the Etobicoke Creek watershed. The nearest surface water features are two seasonal 1st order streams of Etobicoke Creek, located approximately 10-20 meters south of the road network. Etobicoke Creek is located

approximately 400 m southwest and Spring Creek, a main branch of Etobicoke Creek, is located approximately 400 m northeast of the Site boundary. Lake Ontario is approximately 15 km from the Site boundary to the southeast.

### 5.2.5 Environmental Site Assessment

A Phase 1 Environmental Site Assessment (ESA) was undertaken (see **Appendix G**) to determine the potential that contaminants have been introduced into the local environment. This involves an assessment of the environmental condition of a site based on its historical and current uses. The ESA included the roadways within the study area (Bramalea Road, Derry Road East, Telford Way, Alstep Drive, Menkes Drive and Menway Court) plus an additional 5 metres stretch along each side of the roadways.

The ESA identified 16 individual Areas of Potential Environmental Concern (APEC). The APEC's were identified based on the presence of expected fill material of unknown quality, reported spills, and the types of commercial and industrial uses at the various sites. It should be noted that APEC 1 consists of the entire Phase 1 ESA study area and is due to the importation of fill material of unknown quality. Therefore, a Phase 2 ESA would be required for any road works within the study area.

## 5.3 Cultural Environment

### 5.3.1 Archaeological Assessment

A Stage 1 Archaeological Assessment (AA) was undertaken to identify which areas within the study area have archaeological potential and which areas do not (see **Appendix D**). The Stage 1 AA included a desktop review of archaeological and other resources and site visit. Outcomes from the Stage 1 AA include:

- Portions of the study area possess archaeological potential. These portions will require Stage 2 archaeological assessment by pedestrian and test pit survey at five metres intervals, where appropriate, prior to any proposed impacts to the portions.
- The study area includes a cemetery: Moore's Cemetery. The cemetery dates back to 1859 and contains approximately 85 burials. If land within or near the cemetery are to be disturbed, then a Stage 3 Archaeological Assessment must be conducted to confirm that Moore's Cemetery burials do not extend beyond the east and west fenced limits of the cemetery as currently defined. The Stage 3 assessment would include where feasible, mechanical topsoil stripping starting at 10 metres beyond the cemetery limits fence (or at the maximum extent possible given study area constraints) and then continue inwards towards the fence. This is to reduce any impacts to any unmarked burials that may be present. If burial features are located, a minimum 10 metres buffer will be tested as much as is feasible given the constraints of the study area.
- Prior to any Stage 2 or Stage 3 investigations in the vicinity of the Moore's Cemetery, consultation with the Bereavement Authority of Ontario is to be conducted to determine if an Investigation Authorization is required.
- Most of the study area does not retain archaeological potential on account of deep and extensive land disturbance or having been previously assessed. These lands do not require further archaeological assessment.

**Figure 13** presents the map of archaeological potential for the project study area.

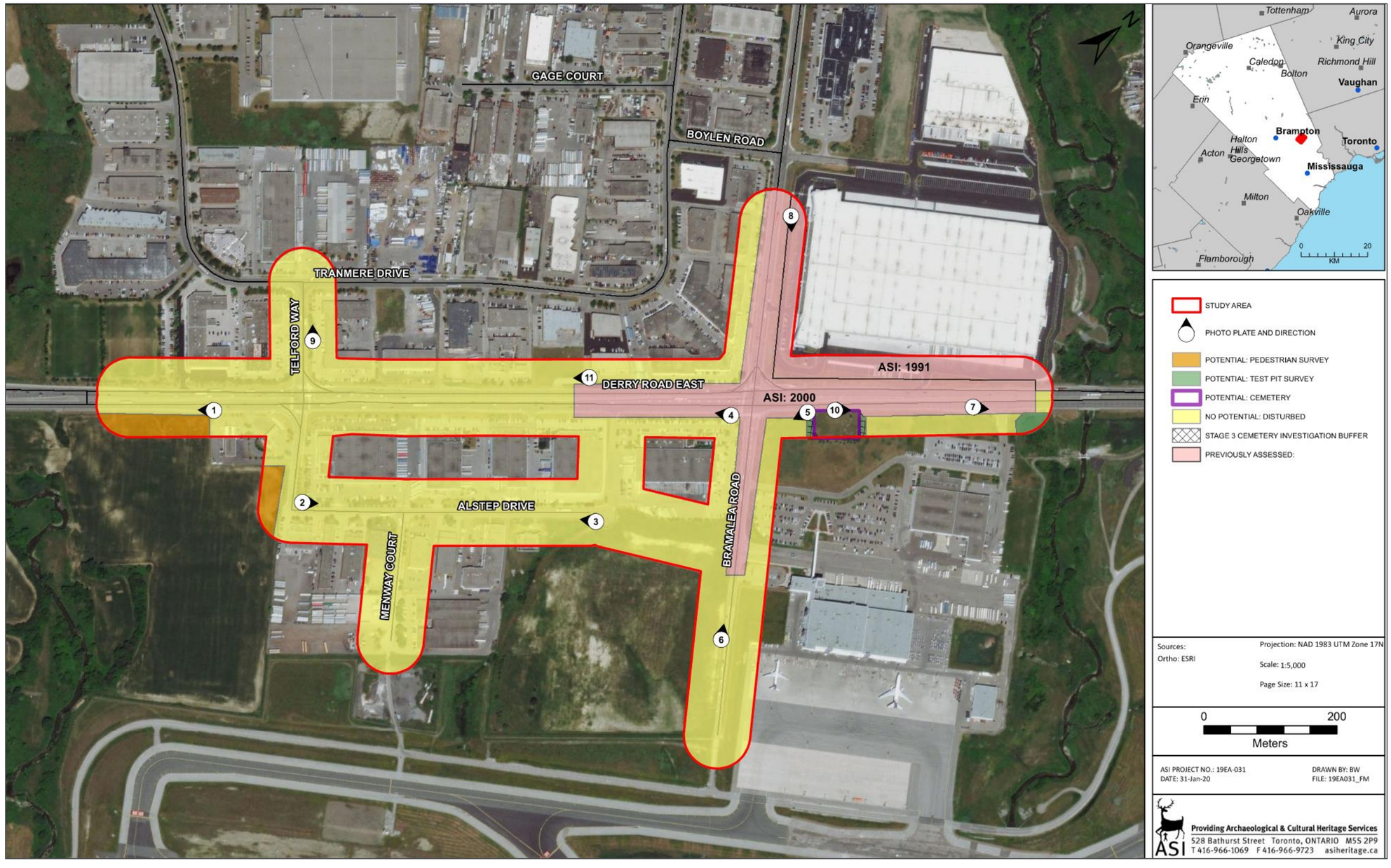



**Figure 13: Archaeological Potential**

### 5.3.2 Cultural Heritage

A Cultural Heritage Resource Assessment (CHRA) was undertaken as part of this Class EA (see **Appendix E**). The purpose of this CHRA was to present an inventory of known and potential built heritage resources (BHRs) and cultural heritage landscapes (CHLs), identify existing conditions of the project study area, provide a preliminary impact assessment, and propose appropriate mitigation measures. The CHRA included a desktop review of background historic research and a review of secondary source material, including historical mapping. The CHRA identified the study area as having a rural land use history dating back to the mid-nineteenth century. A review of federal registers and municipal and provincial inventories identified three previously identified features of cultural heritage value within or adjacent to the Derry Road East and Bramalea Road study area. No additional features were identified during the fieldwork.

The three Cultural Heritage Resources (CHR) identified by the CHRA within the study area include:

- CHR1 (CHL1): Moore's Cemetery - located at 2030 Derry Road East, designated under Part IV of the Ontario Heritage Act (OHA);
- CHR2 (BHR1): Historical residence at 1840 Derry Road East (Robinson-Clarke House) - designated under Part IV of the OHA; and
- CHR 3 (CHL2): Toronto's Pearson International Airport at 6301 Silver Dart Drive - identified on the City of Mississauga's Cultural Landscape Inventory.

The report's preliminary impact assessment noted the following:

- The proposed alignment may result in indirect impacts to CHL 2 (6301 Silver Dart Drive) due to the expansion of the existing ROW to accommodate a multi-use trail and sidewalk within the CHL. However, these impacts are not considered to be significantly adverse.
- Potential vibration impacts as a result of the proposed alignment may result in indirect impacts to CHL1 (Moore's Cemetery) and BHR 1 (Robinson-Clarke House).
- No direct impacts to any potential cultural heritage resources are anticipated as a result of the preferred alternative.

The recommendations of the CHRA included the following:

1. Construction activities and staging should be suitably planned and undertaken to avoid impacts to identified cultural heritage resources.
2. As the Pearson International Airport CHL at 6301 Dart Drive (CHL 2) is identified by the City of Mississauga in the Cultural Heritage Landscape Inventory and there are indirect impacts anticipated, a resource-specific HIA may be required as per the City of Mississauga Official Plan clause 7.4.1.10. However, given that no structures or apparent landscape features of significant CHVI are anticipated to be impacted on the property, the CHRA recommended that the City of Mississauga consider waiving the requirement of an HIA in this case.
3. As the properties at 1840 Derry Road East North (BHR 1) and 2030 Derry Road East (CHL 1) are designated under Part IV of the Ontario Heritage Act and the proposed work is adjacent to the properties, a resource-specific HIA is required as per the City of Mississauga Official Plan clause 7.4.1.12. Given that potential impacts are anticipated to be minimal, and no structures or apparent landscape features of significant cultural heritage value or interest are anticipated to be impacted, the CHRA recommended that the City of Mississauga consider waiving the requirement for a HIA in this case if suitable mitigation can be implemented.
4. Indirect impacts to 1840 Derry Road East (BHR 1) and 2030 Derry Road East (CHL 1) are possible as a result of their location within 50 m of the proposed alignment. To ensure these properties are not adversely impacted during

construction, a baseline vibration assessment should be undertaken during detailed design. Should this advance monitoring assessment conclude that the structure(s) on these properties will be subject to vibrations, prepare and implement a vibration monitoring plan as part of the detailed design phase of the project to lessen vibration impacts related to construction.

5. Should future work require an expansion of the study area, then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential heritage resources.

The CHRA also identified potential mitigation and avoidance measures, including erecting temporary fencing, establishing buffer zones, and issuing instructions to construction crews to avoid identified cultural heritage resources.

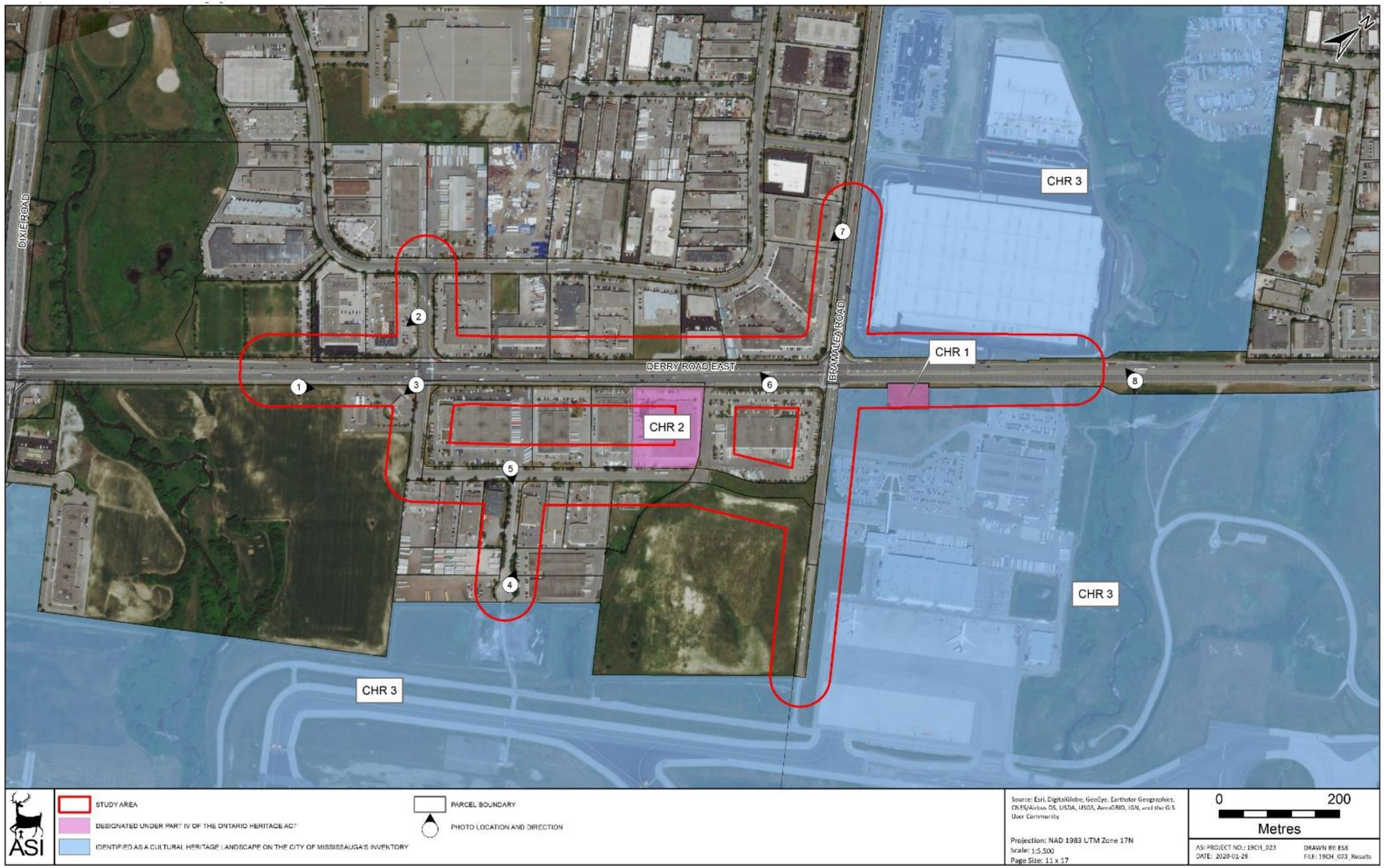



**Figure 14: Cultural Heritage Resources in the Study Area**

## 5.4 Built Environment

### 5.4.1 Road Network

The road network within the study area forms a key component of the built environment. The road network is discussed in **Section 3.1.1**.

### 5.4.2 Active Transportation and Transit Network

The municipal active transportation and transit network are also key components of the study area's built environment. These components were discussed previously in **Sections 3.1.2** and **3.1.3**. In addition, it is important to note the following municipal initiatives that influence the development of active transportation and transit infrastructure in the study area.

**Walk and Roll Peel**

In May 2010, Peel Region launched a program called Walk and Roll Peel. The program provides information and support to encourage residents to start cycling and walking more. The initiative includes a recommendation that Peel Region support area municipalities in the extension and implementation of public biking and walking infrastructure. The Active Transportation Plan suggests that walking and biking infrastructure should be accommodated within all regional road corridors to provide access to adjacent land uses and connection to destinations.

**MiWay Infrastructure Growth Plan**

In September 2020, MiWay and the City of Mississauga released their MiWay Infrastructure Growth Plan (MIGP). The MIGP presents the City and MiWay's strategy for implementing capital investments to support increased MiWay service. The MIGP identified improved transit infrastructure at one intersection (two stops) within the Class EA study area. The recommended improvements were to existing bus stops on Derry Road at the Bramalea Road intersection (the existing nearside westbound bus stop near the northeast side of the intersection, and the existing nearside eastbound bus stop near the southwest corner of the intersection).

The MIGP's recommended improvements to the existing nearside westbound bus stop near the northeast side of the intersection included:

- Relocating the nearside bus stop to farside (i.e., to the west side of Bramalea Road);
- Adding a westbound queue jump lane;
- Updating the existing channelized right-turn into a Smart Channel;
- Adjusting and widening the existing sub-standard sidewalk to 2.0 m;
- Updating the waste receptacle; and
- Providing an enhanced shelter.

Recommendations for the existing nearside eastbound bus stop near the southwest corner of the intersection included:

- The existing right turn lane to operate as a right-turn only, with buses excepted;
- Updating the waste receptacle; and
- Providing an enhanced shelter.

These improvements were considered as the Class EA process developed and evaluated its alternative designs.

### 5.4.3 Existing Pavement Condition

A geotechnical investigation and pavement condition evaluation was carried out as part of this Class EA (see **Appendix I**). The purpose of the investigation and evaluation was to determine the pavement conditions by visual examination and the subsurface conditions through drilling and sampling boreholes. It is noted that none of the boreholes were drilled within the TRCA Regulated Area.

**Intersection of Telford Way / Menkes Drive and Derry Road East**

In general, the existing pavement surface on Telford Way between Tranmere Drive and Derry Road is presently in fair to good condition, with a comfortable ride. Predominant distresses included:

- Few slight to moderate transverse cracking;
- Localized slight severity longitudinal cracking, which is turning to alligator cracking;
- Localized moderate severity alligator cracking on the east bound right wheel path; and
- Slight raveling throughout.

Menkes Drive between Derry Road and Alstep Drive was observed in fair to good condition, with a comfortable ride. Predominant distresses included:

- Few slight to moderate transverse cracking;
- Localized slight severity pavement edge breaking;
- Few localized moderate severity random cracking, which is turning to alligator cracking; and
- Slight raveling throughout.

The Derry Road East within the intersection was observed in good to excellent condition, with a comfortable ride. No noticeable distresses were observed other than slight severity raveling.

**Intersection of Bramalea Road and Derry Road East**

In general, the existing pavement surface on Bramalea Road between Logistic Drive and FedEx Ship Centre Entrance is presently in poor to fair condition, with a relatively uncomfortable ride and slight to moderate bumps. Predominant distresses included:

- Intermittent slight to moderate longitudinal wheel track single or multiple cracking;
- Frequent sight to moderate longitudinal midlane cracking;
- Frequent moderate to severe transverse cracking;
- Localized moderate severity potholes;
- Localized areas of slight to moderate severity alligator cracking;
- Slight to moderate raveling throughout;
- Localized deteriorated patch due to utility cut; and
- Some crack sealing has been carried out in the past with limited effectiveness.

The Derry Road East within the intersection was observed in good to excellent condition, with a comfortable ride. No noticeable distresses were observed other than slight severity raveling and a few localized sight severity transverse cracking.

### 5.4.4 Pavement Markings

The entire study area is paved with painted lane markings conforming to Ontario Traffic Manual (OTM) Book 11 – Markings and Delineation. A site visit conducted in June 2019 reveals the following information regarding the existing conditions of the lane markings:

- At the intersection of Derry Road with Bramalea Road, the pavement markings at all approaches appear to be clearly marked and show noticeable deterioration. The stop bars and crosswalks are clearly visible on all approaches.
- At the intersection of Derry Road with Menkes Drive, the pavement markings at all approaches appear to be clearly marked and show noticeable deterioration. The stop bars and crosswalks are clearly visible on all approaches.

### 5.4.5 Stormwater Management

As the study area is fully developed that is almost fully hardscaped, all flows into the existing storm system are from existing storm sewers, existing road catchbasins, or road ditch inlet catchbasins. There are no natural channels or major ditches that drain into the storm system.

Flows from within the study site primarily drain to the existing storm sewers. Storm flows from the Derry Road and Bramalea Road intersection drain via the existing municipal sewers, which ultimately discharge to Spring Creek (a tributary of Etobicoke Creek) outside of the area of investigation. The remainder of the site discharges to the existing Juliet Stormwater Quality and Erosion Control Pond, which in turn drains to Etobicoke Creek.

There is only one existing culvert within the area of investigation. This culvert is 525mm in diameter and crosses under Derry Road west of Menkes Dr/Telford Way. However, this culvert is outside the area of where modifications are expected to occur.

The Stormwater Management (SWM) investigation concluded that there are no known drainage concerns, flooding issues or low points with no outlet within the study area (see **Appendix J**). The Region's Infrastructure staff have noted that there are some stormwater flows within the Derry Road East storm main with velocities greater than 3 m/s. While this is less than the Region's allowed criteria of 4 m/s, Region Infrastructure staff have requested that opportunities for reducing stormwater flows below 3 m/s be explored during detailed design.

Consultation with Region of Peel staff identified a ditch inlet catch basin (DICB) along Derry Road by 6975 Tranmere Drive. The Region noted the DICB is a 300mm catch basin lead (11m long) and contains debris and requires cleaning and flushing. The Region's design staff suggested that the DICB manhole be adjusted to proposed boulevard grades and a proper retaining wall be constructed to the North with a railing or fencing. This information was carried forward into the design process. **Figure 15** depicts the location of the DCIB.


**Figure 15: Derry Road East DCIB**

### 5.4.6 Regional Water and Wastewater Infrastructure

The Region of Peel provided a summary of its regional water and wastewater assets in the project study area. These assets include:

- Watermains that range in diameter from 250 mm to 600 mm;
- Wastewater mains that range in diameter from 250 to 375 mm;
- 86 water valves;
- 47 hydrants; and
- 23 manholes.

**Table 4** provides a summary of the assets and their locations.

*Table 4: Region Water and Wastewater Assets*

| ROAD | No. of Water Mains | Water Main Diameter (mm) | No. of Wastewater Mains | Wastewater Main Diameter (mm) | No. of Water Valves | No. of Hydrants | No. of Manholes |
|---|---|---|---|---|---|---|---|
| **Alstep Dr** | 1 | 300 | 1 | 250 | 22 | 4 | 8 |
| **Bramalea Rd** | 1 | 400 | 0 | N/A | 16 | 13 | 3 |
| **Derry Rd** | 1 | 600 | 0 | N/A | 16 | 15 | 3 |
| **Menkes Dr** | 1 | 300 | 0 | N/A | 7 | 2 | 0 |
| **Menway Ct** | 1 | 250 | 1 | 250 | 9 | 7 | 4 |
| **Telford Way** | 1 | 300 | 1 | 375 | 16 | 6 | 5 |
| **TOTAL** | | | | | **86** | **47** | **23** |

In addition, Region of Peel staff noted that the Region intends to construct a sanitary sewer along Derry Road through the study area in 2022 (proposed 2400mm Sanitary Sewer from Mavis Road to Dixie Road). The western end of the project consists of a tunnel shaft located near the intersection Derry Road East and Dixie Road, past the western limits of this Class EA study area. The eastern end of the project consists of a tunnel shaft located along Derry Road East to the east of Spring Creek. This location is well east of the Class EA study area limits. The 2400mm Sanitary Sewer project intends to tunnel approximately 13 m below grade through the Class EA study area and within rock. As such, the proposed 2400mm Sanitary Sewer project is not anticipated to impact this Class EA.

### 5.4.7 Utilities

As the study area is a built-up urban environment, there is a full spectrum of utility service infrastructure present. Sub-surface utility engineering services were conducted in 2019, and identified utilities included:

- Alectra (hydro power poles);
- Enersource (streetlights);
- Enbridge (natural gas infrastructure);
- Bell Canada (telecommunications);
- Rogers (telecommunications);
- Cogeco (telecommunications); and
- Zayo (telecommunications).

Consultation with potentially affected utilities occurred throughout the Class EA and will continue into preliminary and detailed design.

# 6 Alternative Solutions

## 6.1 Identification of Alternative Solutions

Identification of alternative solutions was completed during Phase 2 of the Class EA study. Various solutions to the problem/opportunity statement were explored and evaluated according to a set of evaluation criteria. The nine alternative solutions identified are presented in **Table 5**.

*Table 5: Identification and Description of Alternative Solutions*

| Alternative Solutions | Descriptions |
|---|---|
| **Do Nothing** | • No change to the existing infrastructure.<br>• All road characteristics remain the same and no new roads are added to the project study area. |
| **Limit Growth** | • Limit population and employment levels in the Pearson Airport area |
| **Transportation Demand Management (TDM) Measures** | • Shifting arrival and departure time of staff to avoid baseline peak hours.<br>• Provide preferred parking spaces for carpool vehicles.<br>• Provide bicycle racks at the development site to promote active transportation.<br>• Improve sidewalks. |
| **Improve Transit** | • Improve the quality of transit service to encourage more people to commute using public transit.<br>• Encouragement can be in the form of implementing transit priority measures, adding new routes, and/or extending service hours. |
| **Improve Local Intersection Operations** | • Install auxiliary lanes.<br>• Optimize and improve signal timing, according to the changes made to improve intersection operations.<br>• Installation of traffic signals. |
| **Widen Existing Regional Roads** | • Widen existing regional road (i.e., Derry Road East) to accommodate additional through lane. |
| **Widen Existing Municipal Roads** | • Widen existing municipal roads (e.g., Menkes Drive, Alstep Drive, etc.) to accommodate additional through lane.<br>• *Note: This does not include tapered widenings to accommodate added turning lanes.* |
| **Diversion of Traffic to Other Existing Roadways** | • Relieve capacity deficiency by diverting traffic to other existing roadways to bypass areas of heavy traffic. |
| **Extend Alstep Drive** | • Improve the road network by adding an east extension of Alstep Drive connecting to Bramalea Road.<br>• The road allowance for the Alstep Drive Extension has been in place since the late 1990's (exact date unknown). |

## 6.2 Evaluation of Alternative Solutions

### 6.2.1 Preliminary Screening

The evaluation of alternative solutions will include a preliminary screening of the proposed alternative solutions for further evaluation. Each alternative solution is compared against the problem/opportunity statement to determine whether it is able to address it. Alternative solutions that are able to adequately address the problem/opportunity statement are carried forward, while those that cannot are screened out and set aside. **Table 6** summarizes the screening of alternative solutions and the rationale for either carrying forward for full evaluation or setting aside.

*Table 6: Preliminary Screening of Alternative Solutions for Evaluation*

| Alternative Solutions | Screening Result | Screening Rationale |
|---|---|---|
| **Do Nothing** | Carry Forward | All evaluation of proposed alternative solutions will be compared based on the "Do Nothing" option. |
| **Limit Growth** | Set Aside | Limiting growth within the study area and in the broader area as a whole is impractical as a long-term strategy nor is it consistent with City or Region growth strategies. |
| **TDM Measures** | Carry Forward | Managing transportation demand may contribute to addressing capacity deficiencies. Hence, this option should be considered because it may be a significant factor in addressing capacity deficiencies. |
| **Improve Transit** | Set Aside | Improving public transit service may contribute to addressing capacity deficiencies. However, this improvement alone will not be enough to address future demands. This option will be carried forward with the TDM Measures solution to supplement preferred alternatives. |
| **Improve Local Intersection Operations** | Carry Forward | Improving operation at local intersections will contribute to addressing capacity deficiencies. Improving signal timing and adding additional auxiliary lanes may efficiently accommodate the growing future travel demands. |
| **Widen Existing Regional Roads** | Carry Forward | Widening existing roads may accommodate the growing future travel demands. |
| **Widen Existing Municipal Roads** | Carry Forward | Widening existing roads may accommodate the growing future travel demands. |
| **Diversion of Traffic to Other Existing Roadways** | Set Aside | The ability to divert traffic to other existing roadways is limited, as the only alternative east/west route to bypass Derry Road is Drew Road. While it may relieve some stress in high traffic areas, it is unlikely to adequately address future demands. Further, Drew Road would not have the available capacity to receive additional significant volumes. |
| **Extend Alstep Drive** | Carry Forward | Extending Alstep Drive to enhance the grid may contribute to addressing capacity deficiencies. This improvement alone may not address future demands in the study area. |

### 6.2.2 Identification of Evaluation Criteria

The Evaluation Criteria that will be used to evaluate the alternative solutions are described in **Table 7**. The criteria are grouped into categories that may be affected from actualizing each alternative solution.

*Table 7: Identification and Description of Evaluation Criteria*

| Category | Criteria | Descriptions | Evaluation |
|---|---|---|---|
| **Planning and Transportation** | Provincial Planning Objectives | • Consistency with the Growth Plan for the Greater Golden Horseshoe policies | • Compliance to the Plan |
| | Regional Planning Objectives | • Consistency with the Peel Region Long Range Transportation Plan policies and recommendations | • Compliance to the Plan |
| | Municipal Planning Objectives | • Consistency with the Mississauga Transportation Master Plan policies and recommendations | • Compliance to the Plan |
| | Safety | • Improving Safe Traffic Flow<br>• Improving Cyclist Safety<br>• Improving Pedestrian Safety<br>• Consistent with the Vision Zero Goal of 10% reduction in fatal and injury collisions by 2022 | • Potential to Improve Safety by Reducing Traffic Congestion |
| | Traffic Operations | • Improving Operation Efficiencies<br>• Optimizing Traffic Flow | • Measures of Effectiveness (LOS, v/c, delay, etc.) |
| | Public Transit Operations | • Improving Public Transit Services | • Potential to Support Transit |
| | Active Transportation Accommodation | • Encouraging Active Transportation Use | • Ability to Address Walking and Cycling Objectives in the Area |
| | Network Connectivity | • Improving Grid Connection<br>• Providing Route Options | • Consistency with the Goals & Direction of the City Transportation Master Plan (TMP) and Region Long Range Transportation Plan (LRTP) |
| | Emergency Service Response Times | • Ability of Emergency Vehicles to Pass Through Corridors | • Potential Impact on Emergency Services due to Changes in Travel Time |
| **Socio-Economic Environment** | Noise and Vibration Impacts | • Potential Impacts on Noise and Vibration | • Potential to Increase Noise in Noise Sensitive Areas (NSAs) |
| | Land Use Impacts | • Impacts on Commercial and Industrial Land-Uses | • Potential ROW Needs<br>• Restrictions on land uses |

| | | | |
|---|---|---|---|
| | Property Impacts | • Impacts on Existing Properties | • Potential ROW Needs |
| **Healthy Community** | Alternative impacts on active transportation | • Reduces the risk of chronic conditions through Active Transportation (AT)<br>• Ability to provide/maximize sidewalks and/or multi use trail<br>• Ability to meet cyclist/pedestrian requirements | • Continuity of AT facilities<br>• AT Facility type<br>• Separation of facilities<br>• AT access to destinations near or within the study corridor<br>• Roadway design speed<br>• Trees within the study corridor<br>• Transit Prioritization and Level of Service (TLOS)<br>• Pedestrian Level of Service (PLOS)<br>• Bicycle Level of Service (BLOS) |
| | Alternative impacts on Accessibility | • Supports Age Friendly and Accessible living (accessibility) | • Ability to be accessible for people with disabilities |
| | Alternative impacts on Air Quality | • Reduces the risk of respiratory and cardiovascular outcomes associated with exposure to traffic related air pollution (air quality)<br>• Potential Impacts on Air Quality | • Potential Increase in Air Emissions<br>• Anticipated impacts of alternatives on air quality compared to “do nothing” scenario. |
| **Natural Environment** | Climate Change | • Impact on Climate | • Potential Increase in Greenhouse Gas Emissions |
| | Natural Heritage Policies | • Alignment with Natural Heritage Policies | • Meeting the Policies |
| | Trees and Vegetation | • Impacts on Tree and Vegetation Populations, including environmentally sensitive features | • Potential to remove Trees and/or vegetation |
| | Wildlife | • Impacts on Wildlife Population and Habitat | • Potential Impacts and Displacements of Wildlife |
| | Ground Water | • Impacts to Ground Water | • Potential Impact to Groundwater |
| **Cultural Environment** | Archaeological Resources | • Affects Areas Containing Potential Archaeological Resources | • Potential Impacts to Undisturbed Lands |
| | Built Heritage Resources | • Affects Built Heritage Resources | • Potential to Impact Known Built Heritage Resources |
| | Cultural Heritage Landscapes | • Affects Cultural Heritage Landscapes | • Potential to Impact Known Cultural Heritage Landscapes |

| | | | |
|---|---|---|---|
| **Technical** | Construction Feasibility | • Disruption to Traffic Flow During Construction<br>• Disruption to Property Access During Construction<br>• Construction Staging | • Impact to Existing Traffic Operations During Construction<br>• Will require detailed Traffic and Access Management Plan |
| | Stormwater Drainage | • Opportunity to Reduce Stormwater Quantity<br>• Low Impact Development (LID) | • Increase in Stormwater Runoff and Pollutants to Watercourses |
| | Utilities | • Potential Impacts on Existing Utilities | • Potential Relocation of Utilities |
| **Cost** | Capital Costs | • Capital Cost to Build Infrastructure | • Minimize Capital Costs |
| | Property Costs | • Potential Property Acquisition Cost to Expand the Right-Of-Way | • Minimize Property Costs |
| | Maintenance Costs | • Operation and Maintenance Cost | • Minimize Maintenance Costs |

### 6.2.3 Evaluation Results

To implement the evaluation, the degree of preference for each alternative was applied against each criteria using the following rating scale:

- Not preferred;
- Neutral; and
- Preferred.

The evaluation results are presented in detail in **Table 8** and summarized in **Table 9**.

*Table 8: Alternative Solutions Detailed Evaluation Results*

| Evaluation Criteria | Alternative 1: Do Nothing | Alternative 2: TDM Measures | Alternative 3: Improve Local Intersection Operations | Alternative 4: Widen Existing Regional Roads | Alternative 5: Widen Existing Municipal Roads | Alternative 6: Extend Alstep Drive |
|---|---|---|---|---|---|---|
| **Planning and Transportation** | | | | | | |
| **Provincial Planning Objectives** | Is inconsistent with the transportation policies of the Growth Plan and the PPS, as the resulting congestion would impact user safety and increase GHG emissions through inefficient transportation. | Is consistent with the transportation policies of the Growth Plan and the PPS, in that it would promote transportation choices that reduce automobile reliance in favour of transit and active transportation and allow for optimization of existing infrastructure and public service facilities. | Is consistent with the transportation policies of the Growth Plan and the PPS, as it would enhance connectivity among transportation modes, improve intersection safety, and optimize the use of existing infrastructure. | Is consistent with the transportation policies of the Growth Plan and the PPS, as it would enhance connectivity among transportation modes, improve intersection safety, and optimize the use of existing infrastructure. | Is consistent with the transportation policies of the Growth Plan and the PPS, as it would enhance connectivity among transportation modes, improve intersection safety, and optimize the use of existing infrastructure. | Is consistent with the transportation policies of the Growth Plan and the PPS, as it would enhance connectivity among transportation modes and optimize the use of existing infrastructure (i.e., the existing but unbuilt road right-of-way). |
| **Regional Planning Objectives** | Does not interfere with Peel Region's transportation planning. | Supports Peel Region's transportation planning. | Supports Peel Region's transportation planning. | Widening the road would negatively impact the space available for the multi-purpose trail. | No immediate negative impact on Peel Region Long Range Transportation Plan. | No immediate negative impact on Peel Region Long Range Transportation Plan. |
| **Municipal Planning Objectives** | Does not interfere with the Mississauga Transportation Master Plan. | Supports Mississauga's transportation planning. | Supports Mississauga's transportation planning. | Widening the road would negatively impact the space available for the multi-purpose trail. | Does not interfere with the Mississauga Transportation Master Plan. | Would improve network connectivity. |
| **Safety** | Decrease in safety due to increase in traffic volume. Inconsistent with Vision Zero goal. | Some minor improvements to pedestrian and bicycle safety by reducing vehicular demand during peak periods. | Improvement in safety by adding auxiliary lanes and optimizing signal timing to manage traffic volume. | Would improve safety by reducing congestion through the provision of extra lanes. | Municipal roads would not be at capacity, therefore widening municipal roads will not provide a significant safety benefit. | No significant change in safety by providing alternative routes for visitors and workers in this area. |
| **Traffic Operations** | Inefficient traffic operations due to increase in traffic volume. | Minimal improvement to traffic operations by reducing vehicular demand during peak periods. | Improvement in traffic operation efficiency by adding auxiliary lanes and optimizing signal timing. | Widening the road would improve traffic operations due to increase in road capacity. | Municipal roads would not be at capacity, therefore widening municipal roads will not provide a significant benefit to traffic operations. | No significant Improvement in traffic operations expected with addition of Alstep Drive extension. |
| **Public Transit Operations** | Possible delay in public transit operations due to increase in traffic volume. | TDM will promote use of public transit. Public transit operations will improve if transportation demand is managed to relieve traffic volume during peak hours. | Possible Improvement in public transit operations due to optimized signal timing. | Possible improvement in public transit operations with the increase in road capacity. | Municipal roads would not be at capacity, therefore widening municipal roads will not provide a significant benefit to public transit operations. | No significant change in public transit operations. |
| **Active Transportation Accommodation** | While a multi-use trail along Derry Road accommodates both pedestrians and cyclists, a dedicated cycling facility is not available for cyclists. | TDM would promote active transportation alternatives. | Local intersection improvements could help improve infrastructure and safety related to active transportation. | Widening the road may negatively impact the space available for the multi-purpose trail and active transportation facilities. | Current sidewalks accommodate pedestrians, but a dedicated cycling facility is not available for cyclists. | Extension could potentially be designed to accommodate active transportation. |

| Evaluation Criteria | | Alternative 1: Do Nothing | | Alternative 2: TDM Measures | | Alternative 3: Improve Local Intersection Operations | | Alternative 4: Widen Existing Regional Roads | | Alternative 5: Widen Existing Municipal Roads | | Alternative 6: Extend Alstep Drive |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Network Connectivity** | | Would accommodate existing network connectivity. | | Would accommodate existing network connectivity. | | Would provide an opportunity to enhance network connectivity at intersections. | | Widening the road would negatively impact network connectivity by impacting space available for the multi-purpose trail. | | Would accommodate existing network connectivity. | | Would improve network connectivity by connecting the transportation grid. |
| **Emergency Service Response Times** | | Potential decrease in emergency service response times due to increase in traffic volume. | | No significant change in emergency service response times if transportation demand is managed to relieve traffic volume during peak hours. | | Potential improvement in emergency service response times due to addition of auxiliary lanes, which allows more space for drivers to move aside for emergency vehicles. | | Potential improvement in emergency service response times due to addition of through lanes, which allows more space for drivers to move aside for emergency vehicles. | | Municipal roads would not be at capacity, therefore widening municipal roads will not provide a significant benefit for emergency vehicles. | | Potential improvement in emergency service response times due to the provision of alternative routes for emergency vehicles to access from. |
| **Planning and Transportation Summary** | | **Not Preferred** *Alternative 1 is not preferred because it is inconsistent with planning objectives and would negatively impact traffic operations and safety.* | | **Preferred** *Alternative 2 is preferred because it is consistent with planning objectives and provides some improvements to safety and traffic/transit operations.* | | **Preferred** *Alternative 3 is preferred because it has positive effect on all planning and transportation criteria.* | | **Neutral** *Alternative 4 is neutral because while it may improve traffic safety and traffic operations, it may negatively impact active transportation facilities.* | | **Neutral** *Alternative 3 is neutral because it does not have significant benefits within the planning and transportation criteria.* | | **Preferred** *Alternative 3 is preferred because it has either a positive or neutral effect on all planning and transportation criteria.* |
| | | **Socio-Economic Environment** | | | | | | | | | | |
| **Noise and Vibration Impacts** | | No change in noise and vibration impacts. | | No change in noise and vibration impacts. | | No change in noise and vibration impacts. | | Slight increase in noise and vibration. | | Slight increase in noise and vibration. | | Slight increase in noise and vibration. |
| **Land-use Impacts** | | Alternative would not have any impacts on existing designated land uses. | | Alternative would not have any impacts on existing designated land uses. | | Alternative would not have any impacts on existing designated land uses. | | Alternative would not have any impacts on existing designated land uses. | | Alternative would not have any impacts on existing designated land uses. | | Alternative would not have any impacts on existing designated land uses. |
| **Property Impacts** | | No property acquisitions required. | | Some potential limited property impacts may be due to possible property acquisition required for active transportation facilities (e.g., sidewalks). | | Some potential negative property impacts due to possible property acquisition. However, these would be limited to areas near or approaching the intersections. | | Potential-negative property impacts along regional road due to possible property acquisition. | | Negative property impacts due to property acquisition required for widening. | | No property acquisitions required. |
| **Socio-Economic Environment Summary** | | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* | | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* | | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* | | **Not Preferred** *Alternative 4 is not preferred due to potential property requirements along the regional road.* | | **Not Preferred** *Alternative 5 is not preferred due to property requirements where widening is required.* | | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* |

| Evaluation Criteria | Alternative 1: Do Nothing | | Alternative 2: TDM Measures | | Alternative 3: Improve Local Intersection Operations | | Alternative 4: Widen Existing Regional Roads | | Alternative 5: Widen Existing Municipal Roads | | Alternative 6: Extend Alstep Drive |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Healthy Community** | | | | | | | | | | |
| **Impacts on active transportation** | ○ | Does not encourage use of sidewalks and/or multi use trails and does not improve ability to meet cyclist/pedestrian requirements. | ● | Encourages use of sidewalks and/or multi use trails and allows for improvements to meet cyclist/pedestrian requirements. | ● | Provides opportunity to address cyclist/pedestrian requirements in intersection improvements. | ○ | Widening the road would negatively impact the space available for the multi-purpose trail and active transportation facilities, thereby discouraging use of sidewalks and/or multi use trails and impacting ability to meet cyclist/pedestrian requirements. | ◐ | Limited space available to address cyclist/pedestrian requirements in road widening exercise. | ◐ | While extension could potentially be designed to accommodate active transportation, it in itself would unlikely be sufficient to encourage use of active transportation. |
| **Impacts on Accessibility** | ○ | Does not encourage age friendly and accessible living. | ● | Promotion of TDM measures would include highlighting opportunities for age friendly and accessible living. | ● | Intersection improvements would provide opportunity to integrate age friendly and accessible living features. | ○ | Widening the road would negatively impact the space available for the multi-purpose trail and active transportation facilities, which may impact space available for pedestrian and mechanized accessibility. | ◐ | Limited space available to address accessibility requirements in road widening exercise. | ● | Extension could potentially be designed to integrate accessibility features. |
| **Impacts on Air Quality** | ○ | Decrease in air quality due to increased vehicles in idle state during peak hours, thereby increasing risk to respiratory and cardiovascular health due to increased exposure to traffic-related air pollution. | ● | Improvement in air quality (compared to "do nothing") due to fewer vehicles in idle state during peak hours and due to promotion in active transportation methods, thereby decreasing risk to respiratory and cardiovascular health from exposure to traffic-related air pollution. | ● | Improvement in air quality (compared to "do nothing") due to fewer vehicles in idle state during peak hours and due to promotion in active transportation methods, thereby decreasing risk to respiratory and cardiovascular health from exposure to traffic-related air pollution. | ● | Improvement in air quality (compared to "do nothing") by improving traffic efficiency, including reduction of idling and slow-moving traffic, thereby decreasing risk to respiratory and cardiovascular health from exposure to traffic-related air pollution. | ◐ | Municipal roads would not be at capacity, therefore widening municipal roads will not provide a significant improvement to air quality (compared to "do nothing"). Therefore, no significant change in the risk of respiratory and cardiovascular outcomes associated with exposure to traffic related air pollution. | ◐ | No significant change in air quality as there are no significant improvements expected in traffic operations. Therefore, no significant change in the risk of respiratory and cardiovascular outcomes associated with exposure to traffic related air pollution. |
| **Healthy Community Summary** | ○ | **Not Preferred** *Alternative 1 is not preferred because it is not compatible with the healthy community criteria.* | ● | **Preferred** *Alternative 2 is preferred because it encourages active transportation, provides options for accessibility, and improves air quality compared to "do nothing".* | ● | **Preferred** *Alternative 3 is preferred because it provides an opportunity to incorporate improvements that will aid active transportation and accessibility and improves air quality compared to "do nothing".* | ○ | **Not Preferred** *Alternative 4 is not preferred because of negative impacts on active transportation and accessibility.* | ◐ | **Neutral** *Alternative 5 is considered neutral because of limited opportunity to incorporate improvements that will aid active transportation and accessibility.* | ◐ | **Neutral** *Alternative 6 is considered neutral because, while the design of the extension could accommodate accessibility, it will likely not encourage use of active transportation.* |

| Evaluation Criteria | Alternative 1: Do Nothing | | Alternative 2: TDM Measures | | Alternative 3: Improve Local Intersection Operations | | Alternative 4: Widen Existing Regional Roads | | Alternative 5: Widen Existing Municipal Roads | | Alternative 6: Extend Alstep Drive | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Natural Environment** | | | | | | | | | | | |
| **Climate Change** | ○ | Increases the rate of GHG emissions due to increased vehicles in idle state during peak hours. | ● | Reduction in GHG emissions (compared to "do nothing") due to fewer vehicles in idle state during peak hours and due to promotion in active transportation methods. | ● | Reduction in GHG emissions (compared to "do nothing") by improving traffic efficiency, including reduction of idling and slow-moving traffic. | ● | Reduction in GHG emissions (compared to "do nothing") by improving traffic efficiency, including reduction of idling and slow-moving traffic. | ◐ | Municipal roads would not be at capacity, therefore widening municipal roads will not provide a significant improvement in the reduction in GHG emissions (compared to "do nothing"). | ◐ | No significant change in GHG emissions as there are no significant improvements expected in traffic operation. |
| **Natural Heritage Policies** | ● | Is compatible with applicable natural heritage policies. | ● | Is compatible with applicable natural heritage policies. | ● | Is compatible with applicable natural heritage policies. | ● | Is compatible with applicable natural heritage policies. | ● | Is compatible with applicable natural heritage policies. | ● | Is compatible with applicable natural heritage policies. |
| **Trees and Vegetation** | ● | No impact on existing trees and vegetation, including sensitive areas. | ● | No significant impact on existing trees and vegetation, including sensitive areas. | ● | No significant impact on existing trees and vegetation, including sensitive areas. | ◐ | Some boulevard greenspace may be removed; however, no sensitive areas would be impacted. | ◐ | Some boulevard greenspace may be removed; however, no sensitive areas would be impacted. | ◐ | Most of the greenspace (grass) within the ROW would be removed; however, no sensitive areas would be impacted. |
| **Wildlife** | ● | No impact on wildlife. | ● | No impact on wildlife. | ● | No significant impact on wildlife. | ● | No significant impact on wildlife. | ● | No significant impact on wildlife. | ● | No significant impact on wildlife. |
| **Ground Water** | ● | No direct impact on ground water expected. | ● | No direct impact on ground water expected. | ● | No direct impact on ground water expected. | ● | No direct impact on ground water expected. | ● | No direct impact on ground water expected. | ● | No direct impact on ground water expected. |
| **Natural Environment Summary** | ◐ | **Neutral** *The alternative will have no or minimal impacts on the natural environment, although will have higher GHG emissions compared to alternatives 2, 3 and 4.* | ● | **Preferred** *Alternative is preferred, given that it has no or minimal impacts on the natural environment and reduces GHG emissions compared to the "do nothing" alternative.* | ● | **Preferred** *Alternative is preferred, given that it has no or minimal impacts on the natural environment and reduces GHG emissions compared to the "do nothing" alternative.* | ● | **Preferred** *Alternative is preferred, given that it has no or minimal impacts on the natural environment and reduces GHG emissions compared to the "do nothing" alternative.* | ◐ | **Neutral** *The alternative will have minimal impacts on the natural environment, but with no reduction to GHG emissions compared to the "do nothing" alternative.* | ◐ | **Neutral** *The alternative will have minimal impacts on the natural environment, but with no reduction to GHG emissions compared to the "do nothing" alternative.* |

| Evaluation Criteria | Alternative 1: Do Nothing | | Alternative 2: TDM Measures | | Alternative 3: Improve Local Intersection Operations | | Alternative 4: Widen Existing Regional Roads | | Alternative 5: Widen Existing Municipal Roads | | Alternative 6: Extend Alstep Drive | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Cultural Environment** | | | | | | | | | | | |
| **Archaeological Resources** | ● | No impact on archaeological resources. | ● | No impact on archaeological resources. | ● | No impact on archaeological resources. | ○ | Widening the regional road could cause encroachment on Moore's Cemetery, which would require additional archaeological investigations. | ● | There are no areas along municipal roads that require additional archaeological investigation except for the southern portion of Menkes Drive (by farm field). It is not anticipated that, if Menkes Drive were widened, such widening would encroach into the area requiring Stage 2 archaeological assessment. If this should change during Phase 3, then the required Stage 2 and subsequent archaeological investigations would be undertaken to clear the area of archaeological resources prior to construction. Therefore, no impact on archaeological resources is anticipated. | ● | No impact on archaeological resources. |
| **Built Heritage Resources** | ● | No impact on built heritage resources. | ● | No impact on built heritage resources. | ● | No impact on built heritage resources. | ○ | Widening the regional road could cause encroachment on Moore's Cemetery, potentially impacting its built heritage. This would require additional cultural heritage impact investigation. | ● | No impact on built heritage resources is anticipated, as those near municipal roads in the study area consist of or are within commercial/industrial lands. If required, the cultural heritage assessment will be updated to assess potential impacts on built heritage and mitigation measures once a preferred alternative design is identified. | ● | No impact on built heritage resources. |

| Evaluation Criteria | | Alternative 1: Do Nothing | | Alternative 2: TDM Measures | | Alternative 3: Improve Local Intersection Operations | | Alternative 4: Widen Existing Regional Roads | | Alternative 5: Widen Existing Municipal Roads | | Alternative 6: Extend Alstep Drive |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cultural Heritage Landscapes** | ● | No impact on cultural heritage landscapes. | ● | No impact on cultural heritage landscapes. | ● | No impact on cultural heritage landscapes. | ○ | Widening the regional road could cause encroachment on Moore's Cemetery, potentially impacting its cultural heritage. This would require additional cultural heritage impact investigation. | ● | No impact on cultural heritage landscapes is anticipated, as those near municipal roads in the study area consist of or are within commercial/industrial lands. If required, the cultural heritage assessment will be updated to assess potential impacts on cultural heritage landscapes and mitigation measures once a preferred alternative design is identified. | ● | No impact on cultural heritage landscapes. |
| **Cultural Environment Summary** | ● | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | ● | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | ● | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | ○ | **Not Preferred** *Alternative is not preferred because of potential impacts to Moore's Cemetery.* | ● | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | ● | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* |
| | **Technical** | | | | | | | | | | | |
| **Construction Feasibility** | ● | Construction not required. | ● | Provision of carpool dedicated parking spaces and bicycle racks. | ● | Reasonable construction feasibility. | ○ | Complex construction feasibility to expand regional arterial roads. | ○ | Somewhat complex construction feasibility to expand existing municipal roads. | ● | Reasonable construction feasibility. |
| **Stormwater Drainage** | ● | No impact on current stormwater drainage. | ● | No impact on current stormwater drainage. | ◐ | Improvements may require some realignment of stormwater collection. | ○ | Widening would require significant realignment of stormwater system. Stormwater drainage may need to be updated to accommodate increased volume of stormwater runoff. | ◐ | Widening may require some realignment of stormwater collection facilities. | ○ | Stormwater drainage must be designed to accommodate stormwater runoff on the new surface. |
| **Utilities** | ● | Utility relocation not required. | ◐ | Utility relocation may be required. | ◐ | Some utility relocation will be required. | ○ | Significant utility relocation will be required. | ◐ | Some utility relocation may be required. | ● | Opportunity for utility installation. |
| **Technical Summary** | ● | **Preferred** *Alternative is preferred due to avoidance of construction.* | ● | **Preferred** *Alternative is preferred due to avoidance of construction* | ◐ | **Neutral** *Alternative is considered neutral because construction is feasible with minimal changes required to stormwater and utilities.* | ○ | **Not Preferred** *Alternative is not preferred given the complexity of the widening and changes required to the stormwater system and utilities.* | ○ | **Not Preferred** *Alternative is not preferred because construction of somewhat complex feasibility and impacts to stormwater and utilities.* | ● | **Preferred** *Alternative is considered preferred because construction is feasible with the opportunity to incorporate new utilities into the design.* |

| Evaluation Criteria | | Alternative 1: Do Nothing | | Alternative 2: TDM Measures | | Alternative 3: Improve Local Intersection Operations | | Alternative 4: Widen Existing Regional Roads | | Alternative 5: Widen Existing Municipal Roads | | Alternative 6: Extend Alstep Drive |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $ | **Cost** | | | | | | | | | | | |
| **Capital Costs** | ● | No capital costs. | ◐ | Moderate capital costs due to installation of sidewalks and traffic signalling improvements. | ◐ | Moderate capital costs. | ○ | High capital costs to expand a regional arterial road. | ○ | High capital costs to widen a municipal road. | ○ | High capital costs to install new road surface. |
| **Property Costs** | ● | Property acquisition unnecessary. | ● | Minimal property acquisition may be necessary. | ◐ | Some possible property acquisitions. | ○ | Property acquisition required. | ○ | Property acquisition required. | ● | Property acquisition unnecessary given that road allowance exists. |
| **Maintenance Costs** | ● | No maintenance costs. | ● | Low maintenance costs. | ◐ | Moderate maintenance costs. | ○ | High maintenance costs. | ◐ | Moderate maintenance costs. | ◐ | Moderate maintenance costs. |
| **Cost Summary** | ● | **Preferred** *Alternative is preferred due to low costs and no property acquisition.* | ● | **Preferred** *Alternative is preferred due to low costs and minimal property acquisition.* | ◐ | **Neutral** *Alternative is neutral due to moderate capital and maintenance costs.* | ○ | **Not Preferred** *Alternative is not preferred due to high capital and maintenance costs and required property acquisition.* | ○ | **Not Preferred** *Alternative is not preferred due to high capital costs and required property acquisition.* | ◐ | **Neutral** *Alternative is neutral due to high capital costs, but no property acquisition required.* |
| **Overall Summary** | ○ | **Not Preferred** *Alternative 1 is not preferred due to its inconsistency with planning objectives and negative air quality impacts.* | ● | **Preferred** *Alternative 2 is preferred due to its consistency with planning objectives, promotion of active transportation and avoidance of construction.* | ● | **Preferred** *Alternative 3 is preferred because it has generally positive results for the evaluation criteria.* | ○ | **Not Preferred** *Alternative 4 is not preferred due to its inconsistency with planning objectives, property impacts and anticipated costs.* | ○ | **Not Preferred** *Alternative 5 is not preferred due to its lack of project benefits and anticipated costs.* | ● | **Neutral** *Alternative 6 is considered preferred because its construction will not have any significant impacts, provides vehicular capacity and active transportation infrastructure..* |

*Table 9: Alternative Solutions Evaluation Summary*

| Evaluation Criteria | | Alternative 1: Do Nothing | | Alternative 2: TDM Measures | | Alternative 3: Improve Local Intersection Operations | | Alternative 4: Widen Existing Regional Roads | | Alternative 5: Widen Existing Municipal Roads | | Alternative 6: Extend Alstep Drive |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Planning and Transportation Summary** | ○ | **Not Preferred** *Alternative 1 is not preferred because it is inconsistent with planning objectives and would negatively impact traffic operations and safety.* | ● | **Preferred** *Alternative 2 is preferred because it is consistent with planning objectives and provides some improvements to safety and traffic/transit operations* | ● | **Preferred** *Alternative 3 is preferred because it has positive effect on all planning and transportation criteria.* | ◐ | **Neutral** *Alternative 4 is neutral because while it may improve traffic safety and traffic operations, it may negatively impact active transportation facilities.* | ◐ | **Neutral** *Alternative 5 is neutral because it does not have significant benefits within the planning and transportation criteria.* | ● | **Preferred** *Alternative 6 is preferred because it has either a positive or neutral effect on all planning and transportation criteria.* |
| **Socio-Economic Environment Summary** | ◐ | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* | ◐ | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* | ◐ | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* | ○ | **Not Preferred** *Alternative 4 is not preferred due to potential property requirements along the regional road.* | ○ | **Not Preferred** *Alternative 5 is not preferred due to property requirements where widening is required.* | ◐ | **Neutral** *Alternative considered neutral due to lack of any significant socio-economic benefits or impacts.* |
| **Healthy Community Summary** | ○ | **Not Preferred** *Alternative 1 is not preferred because it is not compatible with the healthy community criteria.* | ● | **Preferred** *Alternative 2 is preferred because it encourages active transportation, provides options for accessibility, and improves air quality compared to "do nothing".* | ● | **Preferred** *Alternative 3 is preferred because it provides an opportunity to incorporate improvements that will aid active transportation and accessibility and improves air quality compared to "do nothing".* | ○ | **Not Preferred** *Alternative 4 is not preferred because of negative impacts on active transportation and accessibility.* | ◐ | **Neutral** *Alternative 5 is considered neutral because of limited opportunity to incorporate improvements that will aid active transportation and accessibility.* | ◐ | **Neutral** *Alternative 6 is considered neutral because, while the design of the extension could accommodate accessibility, it will likely not encourage use of active transportation.* |
| **Natural Environment Summary** | ◐ | **Neutral** *The alternative will have no or minimal impacts on the natural environment, although will have higher GHG emissions compared to alternatives 2, 3 and 4.* | ● | **Preferred** *Alternative is preferred, given that it has no or minimal impacts on the natural environment and reduces GHG emissions compared to the "do nothing" alternative.* | ● | **Preferred** *Alternative is preferred, given that it has no or minimal impacts on the natural environment and reduces GHG emissions compared to the "do nothing" alternative.* | ● | **Preferred** *Alternative is preferred, given that it has no or minimal impacts on the natural environment and reduces GHG emissions compared to the "do nothing" alternative.* | ◐ | **Neutral** *The alternative will have minimal impacts on the natural environment, but with no reduction to GHG emissions compared to the "do nothing" alternative.* | ◐ | **Neutral** *The alternative will have minimal impacts on the natural environment, but with no reduction to GHG emissions compared to the "do nothing" alternative.* |
| **Cultural Environment Summary** | ● | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | ● | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | ● | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | ○ | **Not Preferred** *Alternative is not preferred because of potential impacts to Moore's Cemetery.* | ● | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* | ● | **Preferred** *Alternative is preferred because of lack of impacts on archaeological, built heritage, and cultural heritage resources.* |
| **Technical Summary** | ● | **Preferred** *Alternative is preferred due to avoidance of construction.* | ● | **Preferred** *Alternative is preferred due to avoidance of construction.* | ◐ | **Neutral** *Alternative is considered neutral because construction is feasible with minimal changes required to stormwater and utilities.* | ○ | **Not Preferred** *Alternative is not preferred given the complexity of the widening and changes required to the* | ○ | **Not Preferred** *Alternative is not preferred because construction of somewhat complex feasibility and impacts to stormwater and utilities.* | ◐ | **Neutral** *Alternative is considered neutral because construction is feasible with the opportunity to incorporate any new utilities into the design.* |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | *stormwater system and utilities.* | | | | *However, stormwater collection may be required.* |
| **Cost Summary** | 🟢 | **Preferred** *Alternative is preferred due to low costs and no property acquisition.* | 🟢 | **Preferred** *Alternative is preferred due to low costs and minimal property acquisition.* | 🟠 | **Neutral** *Alternative is neutral due to moderate capital and maintenance costs.* | 🔴 | **Not Preferred** *Alternative is not preferred due to high capital and maintenance costs and required property acquisition.* | 🔴 | **Not Preferred** *Alternative is not preferred due to high capital costs and required property acquisition.* | 🟠 | **Neutral** *Alternative is neutral due to high capital costs, but no property acquisition required.* |
| **Overall Summary** | 🔴 | **Not Preferred** *Alternative 1 is not preferred due to its inconsistency with planning objectives and negative air quality impacts.* | 🟢 | **Preferred** *Alternative 2 is preferred due to its consistency with planning objectives, promotion of active transportation and avoidance of construction.* | 🟢 | **Preferred** *Alternative 3 is preferred because it has generally positive results for the evaluation criteria.* | 🔴 | **Not Preferred** *Alternative 4 is not preferred due to its inconsistency with planning objectives, property impacts and anticipated costs.* | 🔴 | **Not Preferred** *Alternative 5 is not preferred due to its lack of project benefits and anticipated costs.* | 🟠 | **Neutral** *Alternative 6 is considered neutral because its construction will not have any significant impacts, but it will not have any significant traffic management benefits.* |

## 6.3 Recommended Alternative Solution

The results of the evaluation and consultation with the Region, City and stakeholders indicate that a combination of alternative solutions is the recommended solution for this Class EA. The recommended solution includes:

- **Improve Local Intersection Operations** - The improvement of operations at the intersections of Derry Road East with Menkes Drive and Bramalea Road, including geometric and operational improvements.
- **TDM Measures** - Application of Transportation Demand Management (TDM) measures to help the redistribution of demand and reduce the overall traffic capacity peaks. Implementation of TDM in the Phase 3 Alternative Designs will include any available future transit infrastructure plans for the area, as well as improving active transportation facilities such as adding or improving sidewalks and multi-use pathways (MUPs).
- **The extension of Alstep Drive** - The extension of Alstep Drive eastward to Bramalea Road. This will provide an additional route option for commuters to fulfill the City's original intent for the area, as depicted by the existing road allowance.

Alternative designs for the local intersection improvements and the Alstep Drive extension were undertaken in Phase 3.

# 7 Alternative Designs

Following the selection of the Preferred Solution in Phase 2 of the Derry Road and Alstep Drive Class EA Study, Alternative Design Concepts for implementing the improvements along Derry Road and creating a new connection to Alstep Drive at Bramalea Road were generated, assessed, and evaluated. The Preferred Solution includes the installation of cycling and pedestrian facilities along with intersection improvements. The following documents the alternative design concepts developed and assessed to address the Preferred Solution.

## 7.1 Alternative Design Concepts for Preferred Solutions (EA Phase 3)

Prior to developing alternative design concepts along the study area, design criteria were developed to act as a set of guidelines to ensure consistent design standards were used throughout. Each roadway's right-of-way is limited, which places constraints on its ability to accommodate combination of road elements. Minimum design criteria are required to be met.

### 7.1.1 Controlling Design Elements

The following design criteria were used as a starting point to guide the development of the Alternative Design Concepts. It is noted that these design criteria were based on Transportation Association of Canada (TAC) standards[14] as well as the Region of Peel and the City of Mississauga's design standards. The design criteria used in the preliminary design for the Derry Road Class EA study is presented in Table 10: Roadway Design Criteria.

These minimums will be site-specific and may be enlarged where possible to fit into constrained situation. It is important to note that some of these widths may be modified in detail design.

[14] Transportation Association of Canada. Geometric Design Guide For Canadian Roads. June 2017

*Table 10: Roadway Design Criteria*

| Criteria Category | Derry Rd | Bramalea Rd | Menkes Dr/ Telford Way | Alstep Dr/ Menway Ct |
|---|---|---|---|---|
| **Road Classification** | 6 Lane UAD90 | 6 Lane UAD90 | 3 Lane UCU | 3 Lane ULU |
| **Design Vehicle** | WB-20 | WB-20 | WB-20 | WB-20 |
| **Posted Speed** | 70 km/h | 60 km/h | 50 km/h | 50 km/h |
| **Design Speed** | 90 km/h | 80 km/h | 60 km/h | 60 km/h |
| **Lane Width** | 3.5m Through lane<br>3.5m Curb Lane<br>3.5m Dual Left Lane | 3.3m Through lane<br>3.5m Curb Lane<br>3.5m Dual Left Lane | 3.5m Through lane<br>3.5m Curb Lane<br>3.5m Dual Left Lane | 4.25m Curb Lane<br>3.50m Two-Way-Left Turn Lane |
| **Median Width** | 2.0m Intersection | 2.0m Intersection | 2.0m Intersection | 2.0m Intersection |
| | 2m Raised | N/A | N/A | N/A |
| **Sidewalk Width** | 1.8m | 1.8m | 1.8m | 1.8m |
| **MUP Width** | 3.0-5m | N/A | N/A | N/A |
| **Boulevard Width** | 1m Splash Zone<br>Landscape varies | 1m Splash Zone<br>Landscape varies | 1m Splash Zone<br>Landscape varies | 1m Splash Zone<br>Landscape varies |
| **Transit** | Curb Lane Shared<br>(MiWay requires 3.5m lanes where transit operates) | N/A | N/A | N/A |

### 7.1.2 Design Concept Requirements

In developing the design concept within the study area as a multi-modal corridor, the following components were required based on TAC, the Region of Peel, and the City of Mississauga's design standards:

- Accommodation for Active Transportation via dedicated 1.8m wide sidewalk;
- Provision of adequate width for traffic lanes at intersections, where appropriate; and
- Minimum pedestrian island size to accommodate pedestrian storage.

In addition, minimizing the impacts to adjacent properties and natural environment and minimizing cost while maximizing traffic operations and safety were considered. Lastly, to support the Region of Peel's Vision Zero Road Safety Strategic Plan, relevant emphasis areas of were also considered during the design process: creating safer intersections; protecting pedestrians; and protecting cyclists.

## 7.2 Description of Alternative Design Concept

Alternative design concepts for the preferred solution were identified during Phase 3 of this Class EA. In this phase, various design concepts for implementing the preferred solution were explored and evaluated according to a set of evaluation criteria. Separate alternatives were designed to address the need for each location. Alternative Design Concepts are identified in **Table 10** to address the problem/opportunity statement.

The road improvement projects focused on three separate portions of the study area:

- The Alstep Drive extension, including its intersection with Bramalea Road;
- The intersection of Derry Road East and Menkes Drive / Telford Way; and
- The intersection of Derry Road East and Bramalea Road.

It is noted that the design alternatives do not include a southbound dedicated right-turn lane on Telford Way at Derry Road East, which has been noted in the Region's current Capital program. Based on consultation with the Region, this dedicated right-turn lane was based on the Region's synchro analysis for the intersection, which shows that a southbound right-turn lane at Derry / Telford-Menkes may be required beyond this EA's planning horizon of 2031.

### 7.2.1 Active Transportation within Study Area

As part of the alternative designs described, active transportation is proposed for inclusion throughout the study area. Including active transportation into the design concepts is based on the City and the Region 2031 planning for increased sustainable transportation accommodations. Given the Preferred Solution and the 2031 Planning, all Alternatives will provide adequate and appropriate facilities to accommodate all users and provide the highest level of safety. Within the study area, this will include:

- Inclusion of sidewalks to help achieve the Region and the City's active transportation goals.
- Inclusion of crosswalks and cross-rides.
- Inclusion of an upgraded MUP along Derry Road and a new MUP along Bramalea Road, which may include inclusion of a boulevard, where feasible. The portion of the MUP extending out of the study area eastward would connect to a potential future Region of Peel MUP installation.
- The Region of Peel currently does not have a defined criteria for measuring Pedestrian Level of Service (PLOS) or Bicyclist Level of Service (BLOS). A PLOS and BLOS has been considered based on the availability of facilities as identified in the Region's Pedestrian and Bicycle Facilities guidelines.
- The pedestrian crossing distances for the intersections of Menkes Drive / Telford Way & Derry Road and at Bramalea Road & Derry Road may be impacted depending on the alternatives. The existing crossing distance has been compared to the proposed distances as a result of the modifications of each alternative to the roadway.

The methodology / evaluation of each alternative, as well as the pedestrian crossing distances for the two intersections where crosswalks distances are impacted are detailed in **Appendix L**.

### 7.2.2 Transit Infrastructure

In the planning process of the alternative designs, the City (MiWay) documented its preference for a queue jump lane and a far side westbound bus stop at the Derry Road and Bramalea Road intersection, as noted in the MiWay Infrastructure Growth Plan (see Section 5.4.2). Bus shelters are also proposed at both intersections on Derry Road.

### 7.2.3 Design Alternatives for Alstep Drive and Intersection with Bramalea Road

As part of the design for Alstep Drive at Bramalea Road, various alternatives were assessed for the intersection improvements. Three alternative designs were considered for the easterly extension of Alstep Drive to Bramalea Road, including:

- Alternative 1: Extend Alstep Drive to Bramalea Road, with 2-lane unsignalized intersection at Bramalea Road.
- Alternative 2: Extend Alstep Drive to Bramalea Road, with 2-lane signalized intersection at Bramalea Road.
- Alternative 3: Extend Alstep Drive to Bramalea Road, with 3-lane signalized intersection at Bramalea Road.

For each alternatives design concept, other improvements were included to supplement the intersection operational improvements. Active transportation design elements including crosswalks and sidewalks along the north and south sides of Alstep Drive were included in the three Alternatives.

**Figure 16** illustrates the typical design alternative cross-section of Alstep Drive on the approach to the intersection with Bramalea Road. Plan view drawings are provided in **Appendix L**.

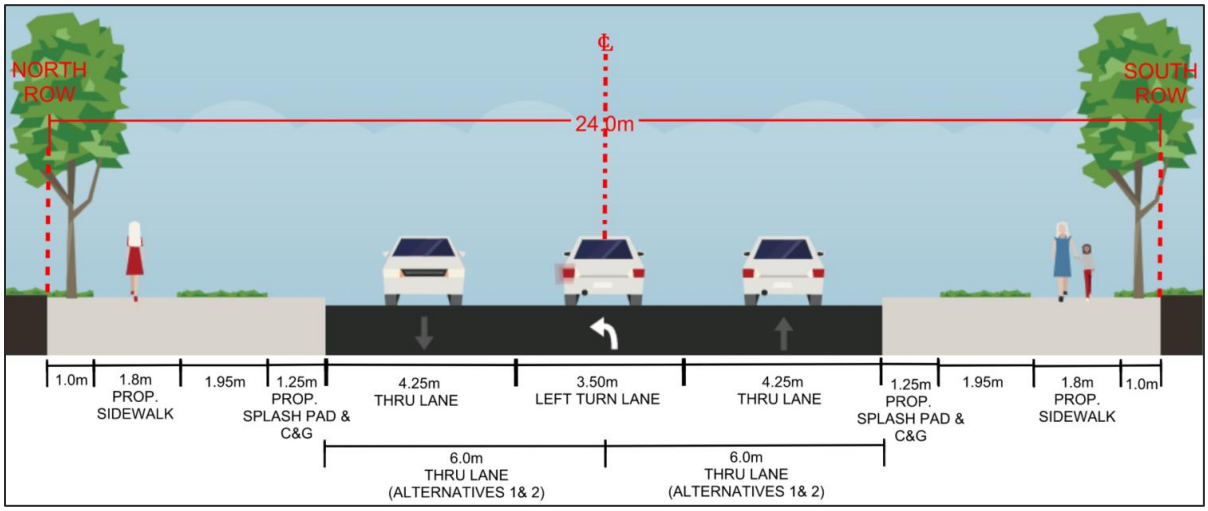



**Figure 16: Alstep Drive Alternatives Typical Cross-Section [15]**

#### 7.2.3.1 Roundabout Review at Alstep Drive and Bramalea Road

The suitability of a potential roundabout design was considered for the Alstep Drive and Bramalea Road. Roundabouts have been demonstrated to be safer than other at-grade intersections. Vehicles travel in the same direction, eliminating left-turn conflicts from traditional intersections.

An initial review was completed by the project team, and it was concluded that a roundabout option was neither suitable nor feasible for the intersection of Alstep Drive and Bramalea Road. Key reasons included major potential property impacts and the close proximity of the roundabout to the Derry Road and Bramalea Road signalized intersection (less than 200 metres), which would reduce available gaps for vehicles departing from any other leg of the roundabout. As a result, the roundabout option was not developed for evaluation.

### 7.2.4 Design Alternative for Derry Road E & Menkes Drive/Telford Way

As part of the design for Menkes Drive at Derry Road various alternatives were assessed for the intersection improvements. There are three alternative designs for this intersection.

- Alternative 1: Extend paved surface of Menkes Drive/Telford Way to the east.
- Alternative 2: Extend paved surface of Menkes Drive/Telford Way on both sides.
- Alternative 3: Extend paved surface of Menkes Drive/Telford Way to the west.

For each Alternative design concept, other improvements are planned to supplement the intersection operational improvements. Two northbound left-turn lanes are proposed with storage length along the entire length of Menkes. The existing channelized islands will be retrofitted into smart channels for added safety for all. Active transportation design elements with MUP on the south side of Derry Road East and sidewalk with boulevard on the east side of Telford Way and on the northside of Derry Road East, west of Telford Way. The typical cross-sections of the design alternatives on Menkes Drive and Telford Way are presented in **Figure 17** and **Figure 18** respectively with plan view drawings provided in **Appendix L**.

[15] C&G refers to curb and gutter.

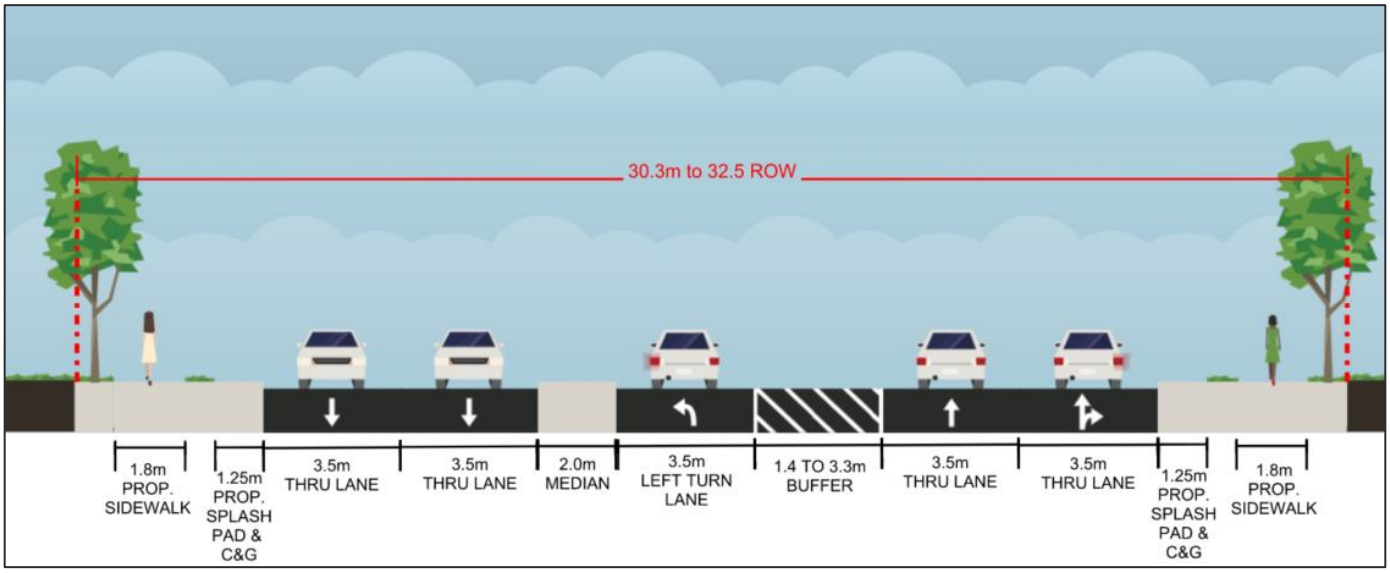



**Figure 17: Menkes Drive/Telford Way Typical Cross Section on Menkes Drive (facing north)**

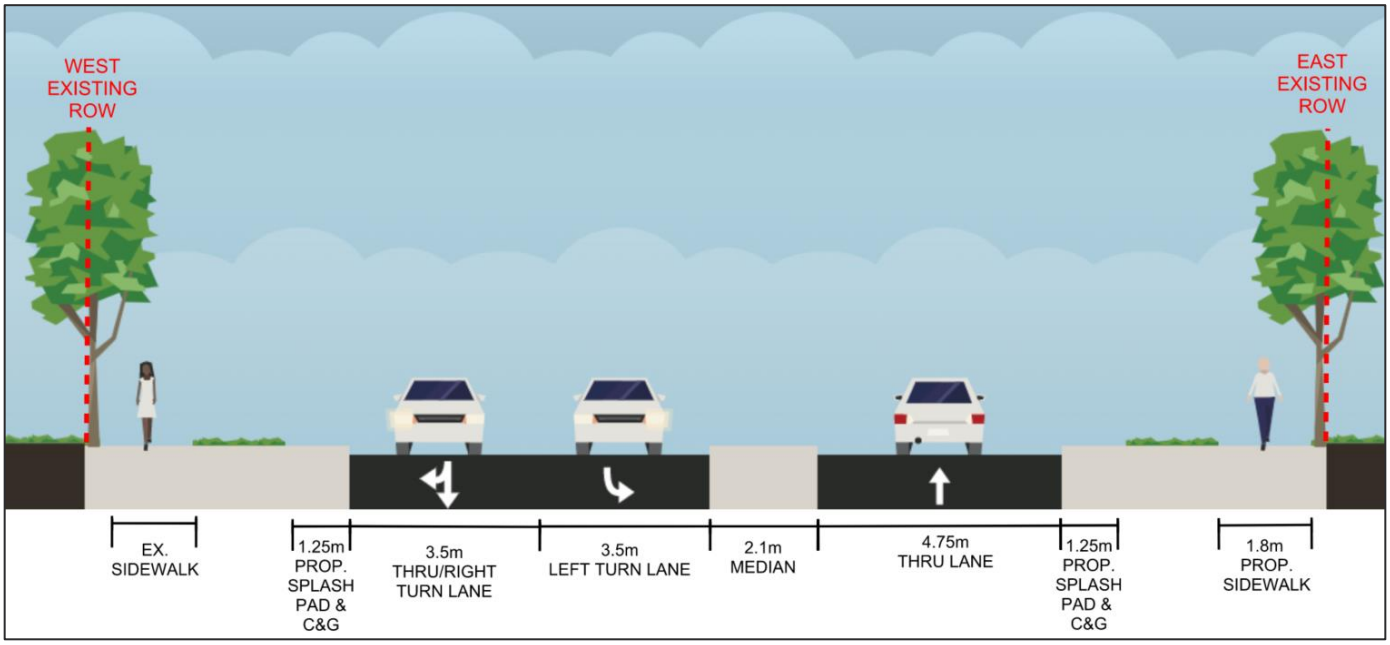



**Figure 18: Menkes Drive/Telford Way Typical Cross-Section on Telford Way**

### 7.2.5 Design Alternative for Derry Road East & Bramalea Road

As part of the design for Bramalea Road at Derry Road East several alternatives were assessed for the intersection improvements. There are four alternative designs under consideration for this intersection:

- **Alternative 1:** Extend Paved Surface of Bramalea Road to the East and on Derry Road to the North.
- **Alternative 2:** Extend Paved Surface of Bramalea Road to the West and on Derry Road to the North
- **Alternative 3:** Extend Paved Surface of Bramalea Road on Both Sides and on Derry Road to the North
- **Alternative 4:** Modify Intersection using a Hybrid Approach. The paved surface of Bramalea Road north of Derry Road is extended to the east, while south of Derry Road pavement is extended to both the east and west.

For each Alternative design concept, other improvements are planned to supplement the intersection operational improvements. The paved surface along Derry Road, would be extended approximately 3 m northward from Bramalea Road to the eastern limit of the project. Existing channelized islands will be retrofitted into smart channels for added safety for all road users. Active transportation and transit design elements that have been added in all four alternatives include:

  - Upgrading the multi-use path on the south side of Derry Road west of Bramalea Road.
  - Adding a new multi-use path on the north side of Derry Road east of Bramalea Road.
  - Adding a new multi-use path east side of Bramalea Road north of Derry Road.
  - Addition of cross-rides or crosswalks with signals.
  - Adding a new sidewalk on the north side of Derry Road west of Bramalea Road.
  - Adding sidewalks on both sides of Bramalea Road south of Derry Road.
  - Adding a westbound bus-stop queue jump lane along Derry Road to improve merging of transit vehicles into traffic, from the bus-stop located on the north side of Derry Road east of Bramalea Road.

**Figure 19** presents the typical cross-section for Bramalea Road approximately 20m south of Derry Road, and **Figure 20** presents the typical cross-section for Bramalea Road approximately 60m north of Derry Road. The plan view drawings for all alternatives are provided in **Appendix L**.

The suggested changes to the North Side of Derry Road East are consistent across all four alternatives. The suggested change to the north side of Derry Road East is depicted in **Figure 21.**

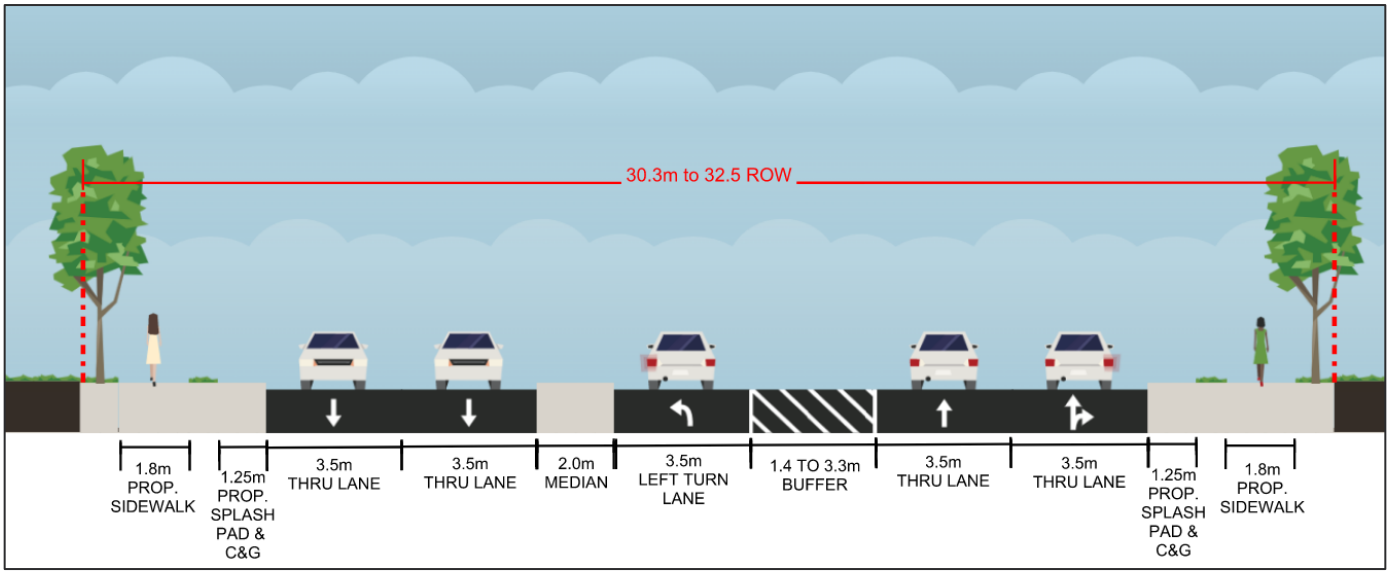



**Figure 19: Typical Cross-Section of for Bramalea Road, South of Derry Road (facing north)**

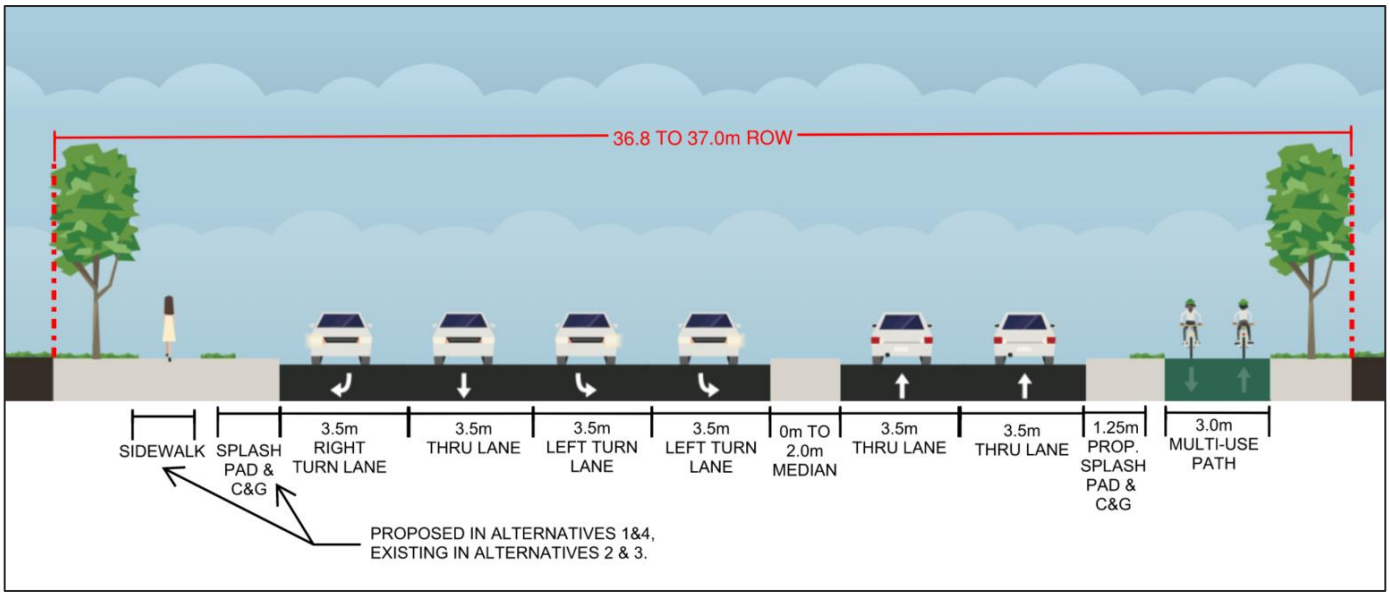



**Figure 20: Typical Cross-Section for Bramalea Road, North of Derry Road (facing north)**

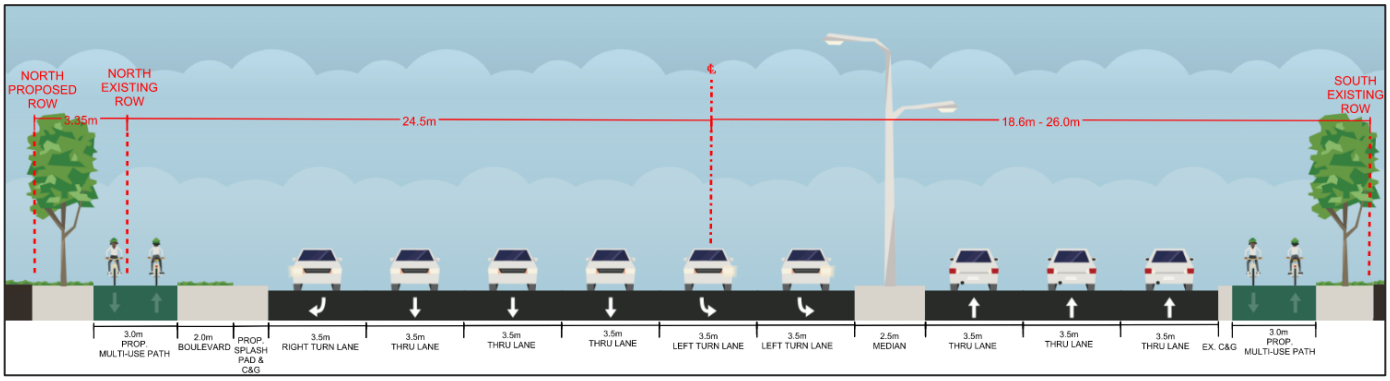



**Figure 21: Typical Cross-Section for Derry Road East of Bramalea Road (facing east)**

## 7.3 Identification of Evaluation Criteria

To determine the best Alternative design concept for each intersection, a list of Evaluation Criteria was compiled using the City and the Region's design criteria. The Evaluation Criteria will use the same evaluation framework for this process. That will include criteria that addresses the transportation needs and the broader social, health, economic, and environmental contributions to ensure the designs are compatible to support existing and planned land uses. Each criterion was used to compare alternatives and measure its ability to minimize impacts and meet the study goals. The evaluation criteria are described in **Table 11**. The criteria are grouped by categories that may be affected from actualizing each alternative design concept.

*Table 11: Identification and Description of Evaluation Criteria*

| Criteria Category | Descriptions |
|---|---|
| **Planning and Transportation** | Provide consistency to the existing urban environment. |
| | Improve grid connection and the ability to provide additional route options. Address Problem / Opportunity Statement. Improve Emergency Response Time. |
| | Support and accommodate transit. |
| | Address congestion and corridor capacity by improving traffic operations and LOS |
| | Improve safe traffic flow, pedestrian safety, cyclist safety. Consistency with the Vision Zero Goal of 10% reduction in fatal and injury collisions by 2022. |
| **Healthy Communities** | Provide continuous Active Transportation (AT) infrastructure along the study corridor and connects to existing network. |
| | Provide different types of AT infrastructure throughout the study corridor. |
| | Provide physical barrier and separation between the sidewalk/MUP and the roadway. |
| | Improve AT access to destinations near or within the study corridor. |
| | Reduce design speed relative to baseline. |
| | Provide trees within the study corridor preferably near AT facilities to provide shade. |
| | Pedestrians Level of Service (PLOS). The ease of which pedestrians have safe access through the area under evaluation. This considers the ability for safe, comfortable and convenient travel. Additionally, the crossing distance would impact the time that a pedestrian is at risk along the road. |
| | Bicycle Level of Service (BLOS). The ease of which bicyclists have safe access through the area under evaluation. This considers the ability for safe, comfortable, and convenient travel. |
| | Minimize impacts of roadway features on accessibility to all pedestrians. |
| | Minimize impacts of alternatives on air quality compared to "do nothing" scenario. |
| **Natural Environment** | Reduce greenhouse gas emissions.<br>Minimizes effects on climate change. |
| | Conform with Natural Heritage Policies. |
| | Minimize impact to baseline tree canopy. |
| | Reduce potential of design to disrupt wildlife. |
| | Reduce potential impacts on ground water. |
| **Socio-Economic Environment** | Minimizes impact of the alternative design on existing designated commercial and industrial land uses. |
| | Minimizes amount of property requirements for alternative design. |
| | Improve the aesthetic view of the streets. |
| | Potential for Noise and Vibration Impacts. |

| Criteria Category | Descriptions |
|---|---|
| **Cultural Environment** | Minimizes impacts on archaeological resources. |
| | Minimizes impacts on Built Heritage / Cultural Landscapes. |
| **Technical** | Minimize Constructability of alternative design. |
| | Minimize potential for stormwater impacts. |
| | Minimize utility relocation. |
| **Cost** | Minimize cost of construction. |
| | Minimize cost of property acquisition. |
| | Optimize maintenance costs between alternative designs. |

The evaluation of the alternative design concepts was based on an assessment of potential impacts and a review of input received from the public and regulatory agencies during Phase 2 of the study process. Within each table, a description is provided for how each alternative design concept (option) compares to the other for each major criterion. The options that received the most favorable overall rating (taking in account all criteria) were put forward by the study team as the preliminary preferred design concepts.

Design meetings were held virtually over several days with representative from the City, the Region, Bombardier, and EXP. The general consensus was to promote safety for all by separating cyclists and pedestrians from traffic and reducing lane widths to encourage reduced speed.

## 7.4 Evaluation of Alternative Designs

The evaluation of the alternative design concepts was completed using the evaluation criteria described above. The goal of the evaluation is to determine the best alternative to address the problem statement, while minimizing impacts to the environment. An evaluation matrix table was developed to provide a summary of each evaluation. The evaluation summaries are presented in **Table 12, Table 13** and **Table 14**. Detailed evaluation tables are included in the Alternative Designs Report provided in **Appendix L**.

The alternative design concepts are uniformly evaluated under a criteria list of environmental factors that need to be considered. For each category evaluated, the alternative was summarized using the following rankings from Not Preferred to Preferred:

- Not preferred;
- Neutral; and
- Preferred.

*Table 12: Evaluation of Alternative Design Concepts for Alstep Drive & Bramalea Road*

| Evaluation Criteria | | Alternative 1: Extend Alstep Drive to Bramalea Road, with 2-lane unsignalized intersection at Bramalea Road | | Alternative 2: Extend Alstep Drive to Bramalea Road, with 2-lane signalized intersection at Bramalea Road | | Alternative 3: Extend Alstep Drive to Bramalea Road, with 3-lane signalized intersection at Bramalea Road |
|---|---|---|---|---|---|---|
| **Planning and Transportation Summary** | ○ | Alternative 1 is least preferred because it provides the least improvement to traffic operations along Bramalea Road and limited traffic safety improvements. | ◐ | Alternative 2 is moderately preferred because it improves traffic operations along Bramalea Road and traffic safety compared to Alternative 1, but less than Alternative 3. | ● | Alternative 3 is preferred because it proves the greatest traffic operations performance along Bramalea Road and optimizes safety through the use of a traffic signal. |
| **Healthy Community Summary** | ◐ | All three alternatives generally have similar impacts from a Healthy Community perspective. However, Alternative 1 is slightly less preferred because a pedestrian crossing for Bramalea Road by Alstep Drive is not provided. | ● | All three alternatives generally have similar impacts from a Healthy Community perspective. However, Alternatives 2 and 3 are most preferred because they provide a pedestrian crossing across Bramalea Road by Alstep Drive. | ● | All three alternatives generally have similar impacts from a Healthy Community perspective. However, Alternatives 2 and 3 are most preferred because they provide a pedestrian crossing across Bramalea Road by Alstep Drive. |
| **Natural Environment Summary** | ● | All three alternatives are equally preferred from a Natural Environment perspective. | ● | All three alternatives are equally preferred from a Natural Environment perspective. | ● | All three alternatives are equally preferred from a Natural Environment perspective. |
| **Socio-Economic Environment Summary** | ● | All three alternatives are equally preferred from a Socio-Economic Environment perspective. | ● | All three alternatives are equally preferred from a Socio-Economic Environment perspective. | ● | All three alternatives are equally preferred from a Socio-Economic Environment perspective. |
| **Cultural Environment Summary** | ● | All three alternatives are equally preferred from a Cultural Environment perspective. | ● | All three alternatives are equally preferred from a Cultural Environment perspective. | ● | All three alternatives are equally preferred from a Cultural Environment perspective. |
| **Technical Summary** | ● | Alternative 1 is preferred from a technical perspective, as the lack of a traffic signal installation improves the ease of construction. | ◐ | Alternatives 2 and 3 are equally less preferred than Alternative 1 due to the traffic signal's increased construction complexity. | ◐ | Alternatives 2 and 3 are equally less preferred than Alternative 1 due to the traffic signal's increased construction complexity. |
| **Cost Summary** | ● | Alternative 1 is preferred from a cost perspective, as it will have lower capital and maintenance costs due to a lack of traffic signals. | ◐ | Alternatives 2 and 3 are similarly less preferred compared to Alternative 1 from a cost perspective, as the installation of traffic signals will result in higher capital and maintenance costs. | ◐ | Alternatives 2 and 3 are similarly less preferred compared to Alternative 1 from a cost perspective, as the installation of traffic signals will result in higher capital and maintenance costs. |
| **Overall Summary** | ○ | **Alternative 1 is least preferred because it provides the least improvements of traffic operations and traffic safety compared to Alternatives 2 and 3.**<br>**While Alternative 1 does have the least construction complexity and lower capital and maintenance costs compared to Alternatives 2 and 3, they are not to the extent that they outweigh optimized traffic operations and safety.** | ◐ | **Alternative 2 is moderately preferred because it provides greatest improvements to traffic operations and traffic safety compared to Alternative 1, but less than Alternative 3.**<br>**While Alternative 2 does have some increased construction complexity and capital and maintenance costs compared to Alternative 1, these are not to the extent that they outweigh the improvements to traffic operations and safety.**<br>**Alternative 2 has similar construction complexity and capital and maintenance costs compared to Alternative 3, but it does not improve traffic operations and traffic safety to the same extent.** | ● | **Alternative 3 is most preferred because it will provide the greatest improvements to traffic operations and traffic safety compared to Alternatives 1 and 2.**<br>**While Alternative 3 does have some increased construction complexity and capital and maintenance costs compared to Alternative 1, these are not to the extent that they outweigh the improvements to traffic operations and safety.** |

*Table 13: Evaluations of Alternative Design Concepts for Derry Road East & Menkes Drive/ Telford Way*

| Evaluation Criteria | | Alternative 1: Extend paved surface of Menkes Drive to the east | | Alternative 2: Extend paved surface of Menkes Drive on both sides | | Alternative 3: Extend paved surface of Menkes Drive to the west |
|---|---|---|---|---|---|---|
| **Planning and Transportation Summary** | ● | All three alternatives are equally preferred from a Planning and Transportation perspective. | ● | All three alternatives are equally preferred from a Planning and Transportation perspective. | ● | All three alternatives are equally preferred from a Planning and Transportation perspective. |
| **Healthy Community Summary** | ◐ | All three alternatives have similar impacts with respect to the healthy community criteria. However, Alternatives 1 and 3 provide a greater increase to the crossing distance across Menkes Drive compared to Alternative 2. | ● | All three alternatives have similar impacts with respect to the healthy community criteria.<br>However, while Alternative 2 has a slightly greater increase in crossing distance compared to Alternative 3, Alternative 2 provides greater flexibility for road and boulevard adjustment due to extension of the pave on either side of the street. | ○ | All three alternatives have similar impacts with respect to the healthy community criteria. However, Alternatives 1 and 3 provide a greater increase to the crossing distance across Menkes Drive compared to Alternative 2. It also does not provide the same flexibility for road and boulevard adjustment that Alternative 2 does. |
| **Natural Environment Summary** | ◐ | In general, there is little difference in environmental impacts between the three alternatives. However, Alternatives 1 and 3 do not provide the same opportunity for the conservation of existing boulevard trees as Alternative 2. | ● | In general, there is little difference in environmental impacts between the three alternatives. However, Alternative 2 provides greater opportunity for the conservation of existing boulevard trees than Alternatives 1 and 3. | ◐ | In general, there is little difference in environmental impacts between the three alternatives. However, Alternatives 1 and 3 do not provide the same opportunity for the conservation of existing boulevard trees as Alternative 2. |
| **Socio-Economic Summary** | ◐ | Alternative 1 is less preferred than Alternative 2 because Alternative 1 provides less flexibility for streetscaping opportunities along Menkes Drive. | ● | Alternative 2 is preferred because it provides greater flexibility for streetscaping opportunities on either side of Menkes Drive.<br>While there are potentially some additional property requirements for the sidewalk, this is negligible, given that property will also be required for the upgraded MUP. Further, the requirement for property for the sidewalk could potentially be minimized during detailed design. | ◐ | Alternative 3 is less preferred than Alternative 2 because Alternative 3 provides less flexibility for streetscaping opportunities along Menkes Drive. |
| **Cultural Environment Summary** | ● | All three alternatives are equally preferred from a Cultural Environment perspective. | ● | All three alternatives are equally preferred from a Cultural Environment perspective. | ● | All three alternatives are equally preferred from a Cultural Environment perspective. |
| **Technical Summary** | ◐ | Alternative 1 has adequate construction feasibility but lacks the flexibility to optimize constructability and minimize impacts to utilities that Alternative 2 provides. | ● | Alternative 2 is feasible for construction and allowing expansion of the paved surface on either side provides a flexibility to optimize constructability and minimize impacts to utilities that the other alternatives lack. | ○ | Alternative 3 has the least construction feasibility due to construction impacts along Derry Road and potential impacts to the hydro pole on the south west traffic island. |
| **Cost Summary** | ● | Alternative 1 is most preferred with respect to the Cost category due to the lower capital and property costs. | ◐ | Alternative 2 is less preferred with respect to the Cost category, as its capital and property costs are anticipated to be slightly more than Alternative 1. | ○ | Alternative 3 is least preferred with respect to the Cost category, as it would have the highest capital and property costs. |
| **Overall Summary** | ◐ | **Alternative 1 is less preferred to Alternative 2 because it lacks the design flexibility of Alternative 2.**<br>**While Alternative 1 likely has a lower capital and property cost than Alternative 2, this amount is likely not substantial and does not offset the advantages of Alternative 2.** | ● | **While Alternative 2 may have slightly more capital and property costs than Alternative 1, it is most preferred because extending the pavement on both sides on Menkes Drive provides increased flexibility in the redesign of the street. This flexibility provides the opportunity to minimize potential impacts along Menkes Drive to sidewalk separation from the roadway, boulevard trees along the street, and utilities. It also provides flexibility with respect to streetscaping opportunities.** | ○ | **Alternative 3 is least preferred due to its potential impacts on major utilities and associated costs.** |

*Table 14: Evaluation of Alternative Design Concepts for Derry Road East & Bramalea Road*

| Evaluation Criteria | | Alternative 1: Extend paved surface of Bramalea Road to the east and on Derry Road to the north | | Alternative 2: Extend paved surface of Bramalea Road to the west and on Derry Road to the north | | Alternative 3: Extend paved surface of Bramalea Road on both sides and on Derry Road to the north | | Alternative 4: Modify intersection using a hybrid approach |
|---|---|---|---|---|---|---|---|---|
| **Planning and Transportation Summary** |  | Alternatives 1, 2 and 3 are less preferred than Alternative 4, primarily due to the improved safety conditions with Alternative 4. |  | Alternatives 1, 2 and 3 are less preferred than Alternative 4, primarily due to the improved safety conditions with Alternative 4. |  | Alternatives 1, 2 and 3 are less preferred than Alternative 4, primarily due to the improved safety conditions with Alternative 4. |  | Alternative 4 is preferred because it improves traffic safety compared to the other alternatives. |
| **Healthy Community Summary** |  | All four alternatives generally have similar impacts from a Healthy Community perspective.<br>However, Alternatives 1 and 3 are slightly more preferred because they add roughly 1 metre less to the north side crossing of Bramalea Road compared to Alternatives 2 and 4. |  | All four alternatives generally have similar impacts from a Healthy Community perspective.<br>However, Alternatives 2 and 4 are slightly less preferred because they add roughly 1 metre more to the north side crossing of Bramalea Road compared to Alternatives 1 and 3. |  | All four alternatives generally have similar impacts from a Healthy Community perspective.<br>However, Alternatives 1 and 3 are slightly more preferred because they add roughly 1 metre less to the north side crossing of Bramalea Road compared to Alternatives 2 and 4. |  | All four alternatives generally have similar impacts from a Healthy Community perspective.<br>However, Alternatives 2 and 4 are slightly less preferred because they add roughly 1 metre more to the north side crossing of Bramalea Road compared to Alternatives 1 and 3. |
| **Natural Environment Summary** |  | All four alternatives will similarly have minimal impacts to the natural environment. |  | All four alternatives will similarly have minimal impacts to the natural environment. |  | All four alternatives will similarly have minimal impacts to the natural environment. |  | All four alternatives will similarly have minimal impacts to the natural environment. |
| **Socio-Economic Summary** |  | All four alternatives generally have similar impacts from a Socio-Economic perspective.<br>However, Alternatives 1 and 4 are most preferred because they allow for sidewalks with the least amount of encroachment on private property. |  | All four alternatives generally have similar impacts from a Socio-Economic perspective.<br>However, Alternative 2 is least preferred because it requires the most encroachment on private property to provide a sidewalk on the west side of Bramalea Road south of Derry Road. |  | All four alternatives generally have similar impacts from a Socio-Economic perspective.<br>However, Alternative 3 is less preferred because it requires some encroachment on private property to provide a sidewalk on the west side of Bramalea Road south of Derry Road. |  | All four alternatives generally have similar impacts from a Socio-Economic perspective.<br>However, Alternatives 1 and 4 are most preferred because they allow for sidewalks with the least amount of encroachment on private property. |
| **Cultural Environment Summary** |  | All four alternatives are equally preferred from a Cultural Environment perspective. |  | All four alternatives are equally preferred from a Cultural Environment perspective. |  | All four alternatives are equally preferred from a Cultural Environment perspective. |  | All four alternatives are equally preferred from a Cultural Environment perspective. |
| **Technical Summary** |  | Alternative 1 is less preferred from a technical perspective because it would have less impact on existing public and private utility infrastructure than Alternatives 2 and 3, but more than Alternative 4. |  | Alternative 2 is not preferred due to its significant impacts on existing public and private utility infrastructure. |  | Alternative 3 is not preferred due to its significant impacts on existing public and private utility infrastructure. |  | Alternative 4 is preferred from a technical perspective because it would have the least impact on existing public and private utility infrastructure. |
| **Cost Summary**<br>***{note: It is anticipated that the relocation of utilities will be the main cost driver for all four alternatives.}*** |  | As Alternative 1 has the second least impact on existing public and private utility infrastructure for the four alternatives, it will have the second lowest cost impact and is therefore less preferred from a cost perspective. |  | As Alternatives 2 and 3 have the greatest impact on existing public and private utility infrastructure, they will have the highest cost impact and are therefore not preferred from a cost perspective. |  | As Alternatives 2 and 3 have the greatest impact on existing public and private utility infrastructure, they will have the highest cost impact and are therefore not preferred from a cost perspective. |  | As Alternative 4 has the least impact on existing public and private utility infrastructure, it will have the lowest cost impact and is most preferred from a cost perspective. |
| **Overall Summary** |  | **Alternative 1 is less preferred because, while it provides some improvements to traffic safety, it has less cost and fewer impacts on existing utilities than Alternatives 2 and 3 but more than 4.**<br>**The impacts to healthy communities, the natural environment, and the cultural environment are not significantly different among the four alternatives.** |  | **Alternatives 2 and 3 are not preferred because they provide lower improvement of traffic safety than Alternative 4, have a higher cost and greater impacts on existing utilities. They also have slightly greater encroachment into private property for the installation of the sidewalk on the west side of Bramalea Road, south of Derry Road.**<br>**The impacts to healthy communities, the natural environment, and the cultural environment are not significantly different among the four alternatives.** |  | **Alternatives 2 and 3 are not preferred because they provide lower improvement of traffic safety than Alternative 4, have a higher cost and greater impacts on existing utilities. They also have slightly greater encroachment into private property for the installation of the sidewalk on the west side of Bramalea Road, south of Derry Road.**<br>**The impacts to healthy communities, the natural environment, and the cultural environment are not significantly different among the four alternatives.** |  | **Alternative 4 is preferred because it optimizes traffic safety compared to the other alternatives while minimizing cost and impacts on existing utilities.**<br>**The impacts to healthy communities, the natural environment, and the cultural environment are not significantly different among the four alternatives.** |

# 8 Preferred Alternative Design Concepts

Based on the results of the evaluation, the preferred alternative design concepts for the study area are discussed below and presented in **Figures 22** to **27**. The recommended designs incorporate feedback from stakeholders provided to the project team through the TAC Meeting #2 and the PIC #2. Full size drawings of the preferred alternative designs are provided in Appendix Q.

## 8.1 Alstep Drive & Bramalea Road

The recommended alternative design concept for the Alstep Drive Extension and its intersection with Bramalea Road is *Alternative 3: Extend Alstep Drive to Bramalea Road, with 3-lane signalized intersection at Bramalea Road*. The Alstep Drive extension will be constructed within the existing municipal road ROW and consist of one westbound lane, one eastbound left turn lane, and one eastbound right turn lane, for three lanes in total. The intersection with Bramalea Road will be signalized. The sidewalk that is considered for the west side of Bramalea Road and positioned north of the Alstep Drive extension would continue directly southward below the intersection and then further southward along Bramalea Road. The design features in this alternative optimize safety and are consistent with the emphasis areas from the Region of Peel and the City of Mississauga's Vision Zero strategy of creating safer intersections and protecting pedestrians.

This alternative was selected because it will provide the greatest optimization of traffic operations and traffic safety compared to the other alternatives.

During implementation of the Alstep Drive extension, realignment of the FedEx entrance to opposite the entrance to Alstep Drive is also recommended.

## 8.2 Derry Road East & Menkes Drive/Telford Way

The recommended alternative design concept for the intersection of Derry Road East and Menkes Drive/Telford Way is *Alternative 2: Extend paved surface of Menkes Drive/Telford Way on both sides.* The paved surface of Menkes Drive extends to the east and to the west but still within the municipal road ROW.

Physical adjustments made to the intersection under this design alternative include:

- Concrete median Southbound on the north approach of the intersection.
- Curb on southeastern corner of intersection is shifted eastward, with realignment of the sidewalk.
- Curb on northwestern corner of intersection is shifted westward to allow for an improved turning radius, with a corresponding realignment of the sidewalk;
- Median curbs shifted further back to improve truck-turning ability;
- Slight reduction to the pedestrian islands in the southwestern and northeastern corners of the intersection. Pedestrian island size continues to meet the standard.

Active transportation design elements in this design include:

- Sidewalks with boulevard on the east side of Telford Way and on the northside of Derry Road East, west of Telford Way.
- Relocation of the westbound nearside bus stop on the northeast corner of Derry Road and Telford way to behind the sidewalk.
- Upgraded multi-use path on the south side of Derry Road East.

The design elements in this alternative of separating of the left-turn lane at Telford Way, adding dual left-turn lanes at Menkes Drive, and retrofitting existing traffic islands to smart channels are consistent with the emphasis area of creating safer intersections from the Region of Peel and the City of Mississauga's Vision Zero strategy. The addition of sidewalks with boulevards and the upgraded multi-use path on the south side of Derry Road East are consistent with the emphasis areas of protecting pedestrians and protecting cyclists.

This key advantage to this alternative is that extending the pavement on both sides on Menkes Drive provides increased redesign flexibility, which minimize impacts to sidewalk separation from the roadway, boulevard trees along the street, and utilities. It also provides flexibility with respect to streetscaping opportunities.

## 8.3 Derry Road East & Bramalea Road

The recommended alternative design concept for the intersection of Derry Road East and Bramalea Road is *Alternative 4: Modify intersection using a hybrid approach*. The paved surface of Bramalea Road north of Derry Road is extended to the east, while south of Derry Road the pavement is extended to both the east and west. The eastward expansion south of Derry Road would occur on the east side of the Bramalea / Alstep intersection and continue northward for about 100 m. The expansion westward would occur along Bramalea from Derry Road to about 100 m southward.

North of Derry Road, the eastward extension of Bramalea Road would make room for the separate southbound through and the two left turn lanes, in addition to the existing right turn lane. The extension around the centreline to the south of Derry Road is to make room for the separate northbound through and right turn lanes, in addition to the existing left turn lane and shadow lane, as well as the sidewalk on the west side. The hybrid approach allows the northbound and southbound lanes on Bramalea Road to align.

The paved surface along Derry Road would be extended approximately 3 m northward from Bramalea Road to the eastern limit of the project.

Active transportation and transit design elements in this design are:

- Upgrading the multi-use path on the south side of Derry Road west of Bramalea Road;
- Adding a new multi-use path on the north side of Derry Road east of Bramalea Road;
- Adding a new multi-use path on the east side of Bramalea Road north of Derry Road;
- Addition of cross-rides or crosswalks with signals;
- Adding a new sidewalk on the north side of Derry Road west of Bramalea Road;
- Adding sidewalks on both sides of Bramalea Road south of Derry Road; and

- Adding a westbound bus queue jump lane along Derry Road to improve merging of transit vehicles into traffic by allowing buses to merge into the through lane ahead of traffic, from the bus-stop located on the north side of Derry Road east of Bramalea Road[16].

In this alternative, safety improvements such as the addition of dedicated dual left-turn lanes, the separation of through lanes from the auxiliary lanes on Bramalea Road, retrofitting existing traffic islands to smart channels, and the optimal alignment of the lanes on Bramalea Road are consistent with the emphasis area of creating safer intersections from the Region of Peel and the City of Mississauga's Vision Zero strategy. The addition of sidewalks with boulevards, the addition of a cross-ride with signals, and the new/upgraded multi-use paths on Derry Road East are consistent with the emphasis areas of protecting pedestrians and protecting cyclists.

The key advantage of this alternative is that it optimizes traffic safety compared to the other alternatives while minimizing cost and impacts on existing utilities.

## 8.4 Other Active Transportation Improvements

Other active transportation improvements included in the project study area include:

- Sidewalks in the following locations:
  - North side of Derry Road from Bramalea Road to the western limits of the study area, which would connect with future Region of Peel sidewalk improvements (or existing sidewalks, where applicable) beyond the study area to the west;
  - North and south sides of the existing Alstep Drive; and
  - West side of Menway Court.
- Upgrading the MUP along the south side of Derry Road, west of Bramalea Road.
- Adding an MUP along the north side of Derry Road, east of Bramalea Road.

Inclusion of the sidewalks and upgrading of the MUP will help to achieve the Region and the City's active transportation goals. The proposed active transportation improvements noted above are illustrated in **Figures 24 to 27** (see Appendix Q for full size versions of the drawings).

Some portions of the proposed sidewalk may require a retaining wall due to the difference in elevation between the sidewalk and private property. This requirement will be confirmed during detailed design.

During the Class EA, Region of Peel staff identified necessary repair or replacement of a Ditch Catch Basin Inlet (DCIB) along Derry Road by 6975 Tranmere Drive (see **Section 5.4.6**). It is recommended that this be completed during the installation of the sidewalk along the north side of Derry Road. The works may require some permanent or temporary easements or other property requirements, which will be confirmed by the Region during detailed design of the DCIB works.

[16] Configuration of the queue jump lane is to be confirmed in consultation with MiWay.

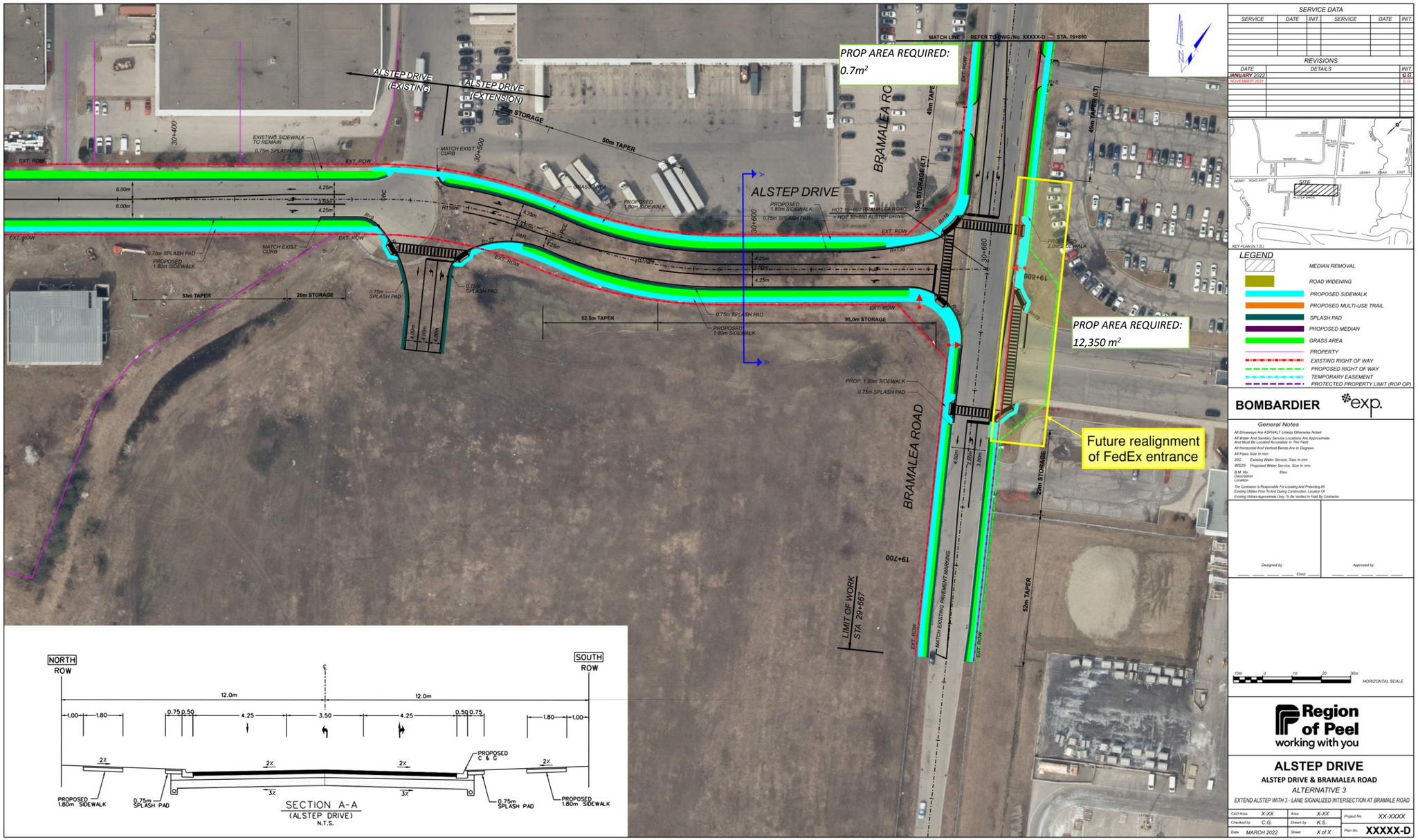



**Figure 22: Alstep Drive & Bramalea Road Preferred Alternative Design Concept**

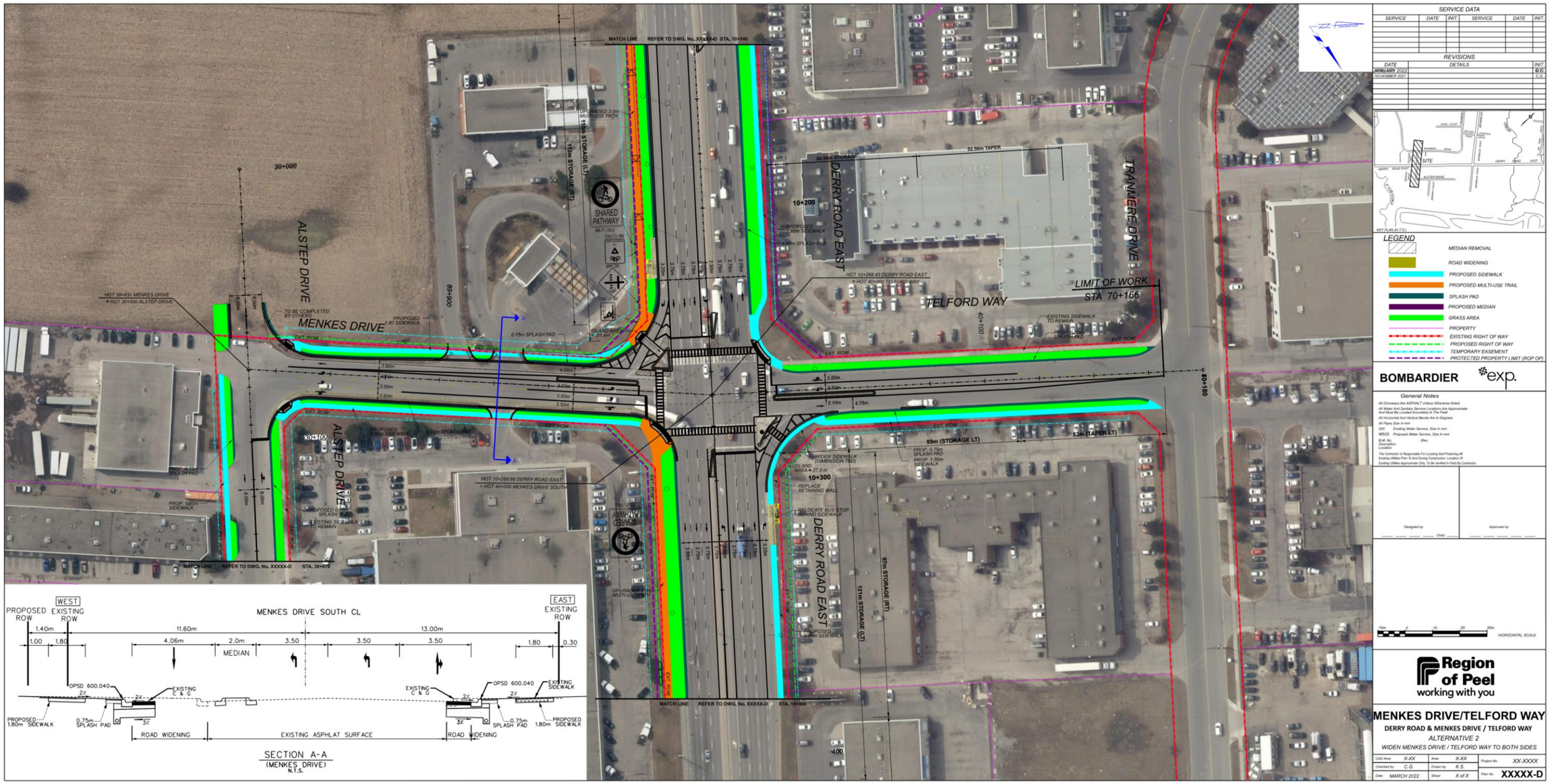



**Figure 23: Derry Road East & Menkes Drive/Telford Way Preferred Alternative Design Concept**

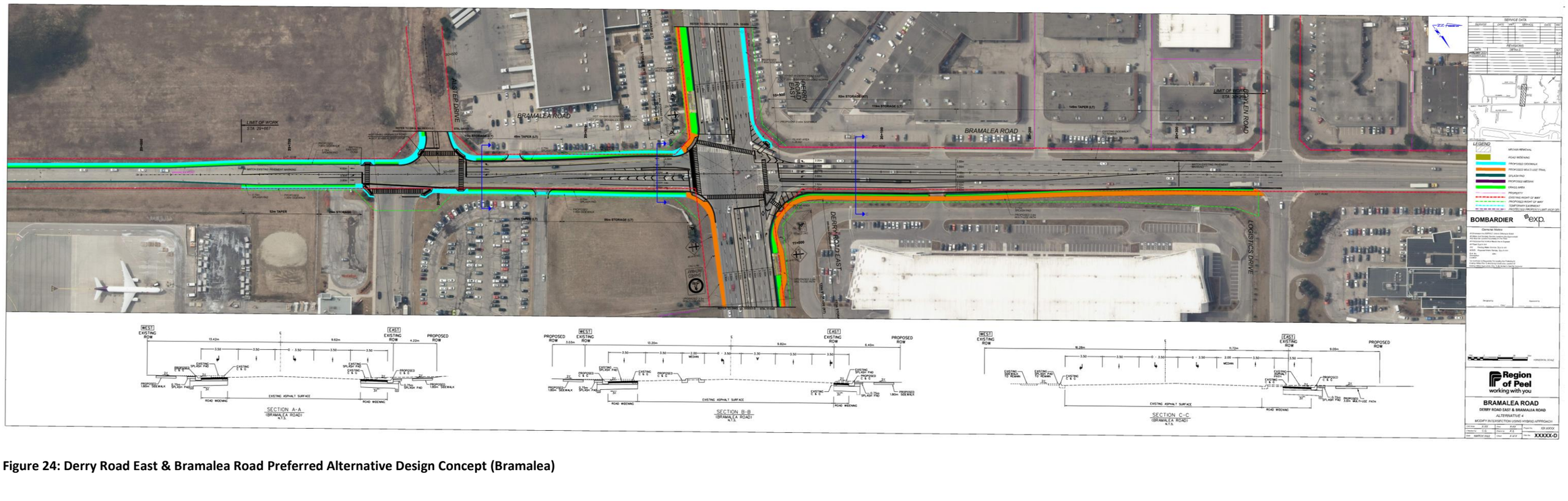



**Figure 24: Derry Road East & Bramalea Road Preferred Alternative Design Concept (Bramalea)**

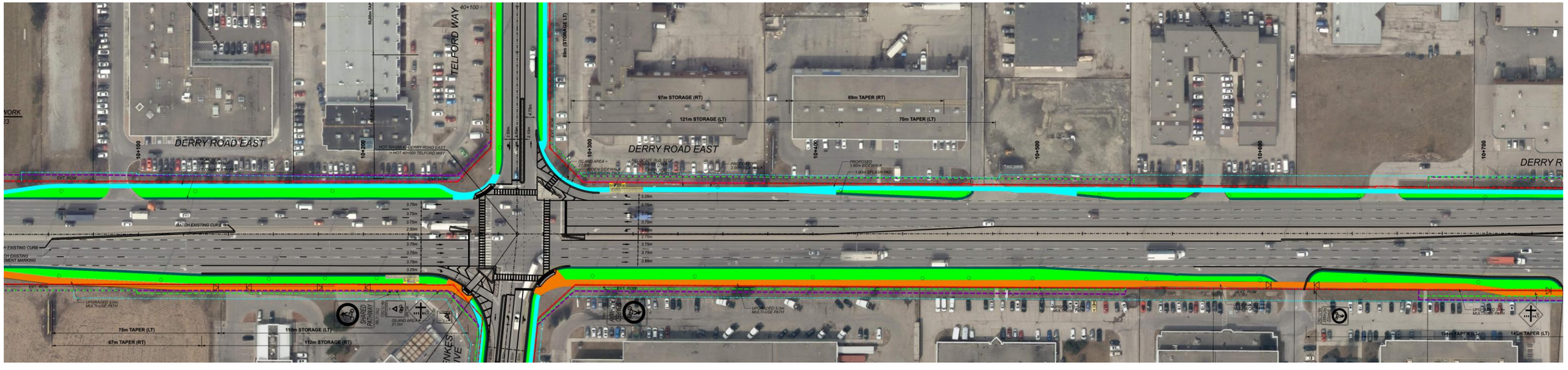



**Figure 25: Active Transportation Improvements on Derry Road East (West)**

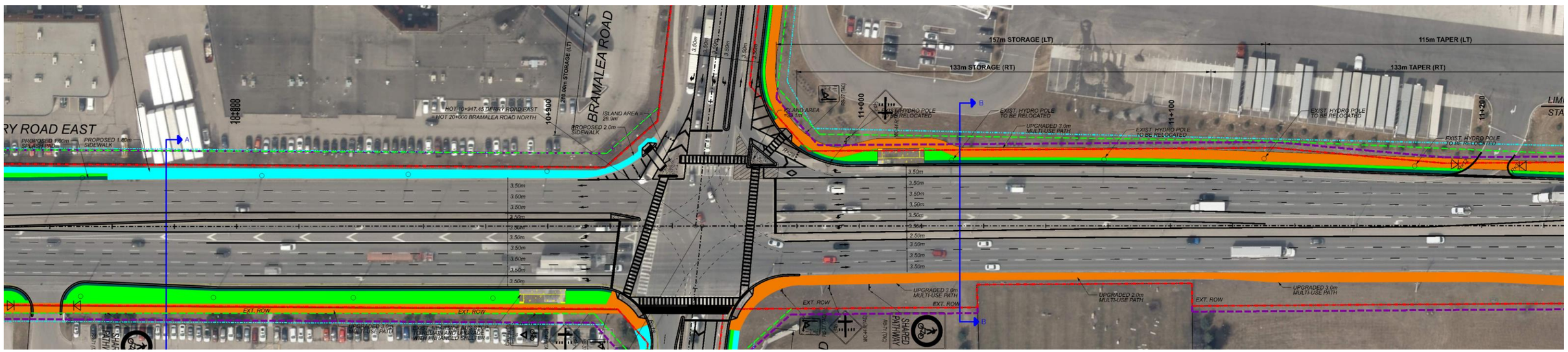



**Figure 26: Active Transportation Improvements on Derry Road East (East)**

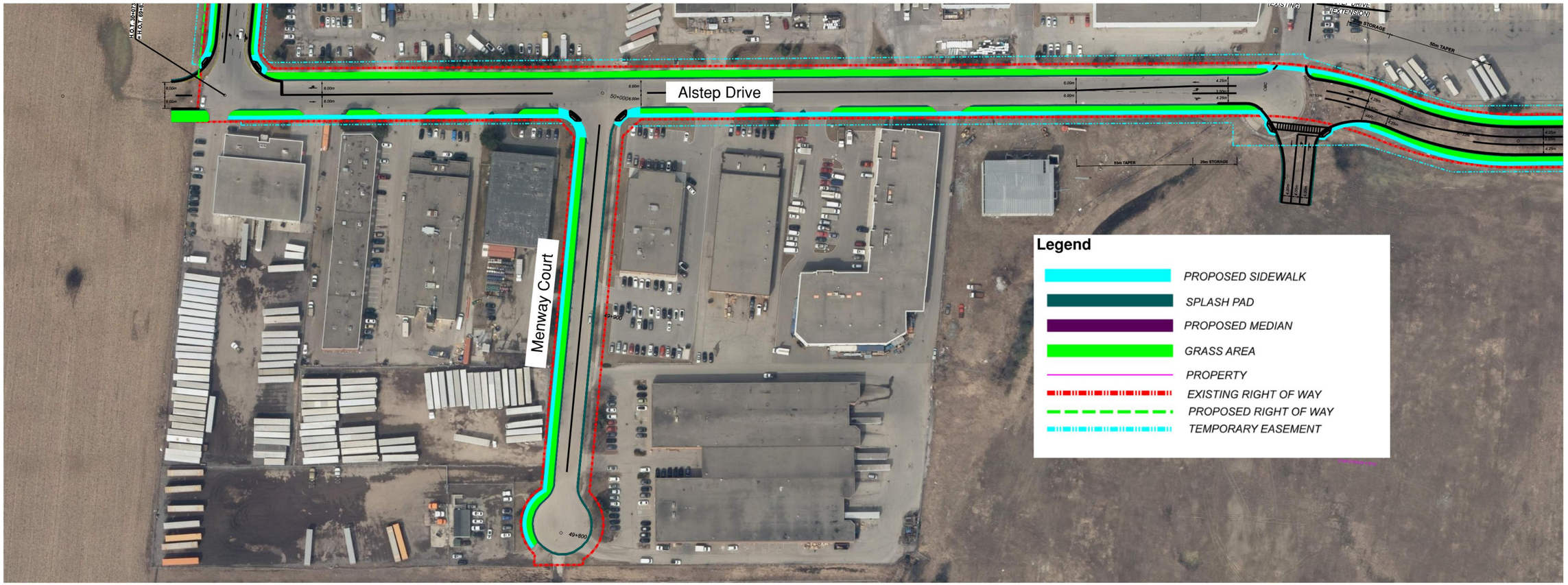



**Figure 27: Active Transportation Improvements on Alstep Drive (existing) and Menway Court**

## 8.5 Design Criteria

The intersections and roadways were designed in accordance with the approved design criteria, standards, and manuals developed based on Transportation Association of Canada (TAC) standards[17] as well as the Region of Peel and the City of Mississauga's design standards. The design criteria to be utilized in the preliminary design for the Derry Road Class EA study is presented in ***Table 15***.

*Table 15: Roadway Design Criteria*

| Design Parameters | Source | Derry Rd | Bramalea Rd | Menkes Dr | Alstep Dr | Menway Ct |
|---|---|---|---|---|---|---|
| **Road Classification** | TAC Table 2.6.2 | 6 Lane | 6 Lane UAD90 | 3 Lane UCU | 3 Lane ULU | 2 Lane ULU |
| **Design Vehicle** | | UAD90 | | | | |
| | | WB-20 | WB-20 | WB-20 | WB-20 | WB-20 |
| **Posted Speed** | | 70 km/h | 60 km/h | 50 km/h | 50 km/h | 50 km/h |
| **Design Speed** | | 90 km/h | 90 km/h | 60 km/h | 60 km/h | 60 km/h |
| **Min. Stopping Sight Distance** | TAC Table 2.5.2 | 160m | 160m | 85m | 85m | 85m |
| **Equivalent Min. 'K' Factor Crest** | TAC Table 3.3.2 | 39 | 39 | 11 | 11 | 11 |
| **Equivalent Min. 'K' Factor Sag** | TAC Table 3.3.5 | 15-20 | 15-20 | 8-9 | 8-9 | 8-9 |
| **Max. Grade** | TAC Table 3.3.1 | 6% | 6% | 6% | 6% | 6% |
| **Min. Grade** | TAC Section 3.3.2.5 | 0.5% | 0.5% | 0.5% | 0.5% | 0.5% |
| **Min. Radius** | TAC Table 3.2.4 | 2620m (Crown) | 2620m (Crown) | 1290m (Crown) | 1290m (Crown) | 1290m (Crown) |
| **Lane Width** | City/Region | 3.5m Through lane<br>3.5m Curb Lane<br>3.5m Dual Left Lane | 3.3m Through lane<br>3.5m Curb Lane<br>3.5m Dual Left Lane | 3.5m Through lane<br>3.5m Curb Lane<br>3.5m Dual Left Lane | 4.25m Curb Lane<br>3.50m Two-Way-Left Turn Lane | Existing (4.66m) |
| **Median Width** | TAC Section 4.5.2 | 2.0m | 2.0m | N/A | N/A | N/A |
| **-Right Turn Lane Taper**<br>**-Right Turn Lane Deceleration Length** | TAC Table 10.6.2 | 80m<br>160m | 80m<br>160m | 14:1<br>40m | 14:1<br>40m | 14:1<br>40m |
| **-Left Turn Lane Taper**<br>**-Left Turn Lane Deceleration Length** | TAC Table 9.17.1 | 27:1<br>160m | 15:1<br>85m | 15:1<br>85m | 15:1<br>85m | 15:1<br>85m |
| **Boulevard Width** | OTM Book 18 | VARIES | VARIES | VARIES | VARIES | VARIES |
| **Sidewalk Width** | ROP STD 5-2-5 | 1.8m | 1.8m | 1.8m | 1.8m | 1.8m |
| **MUP Width** | OTM Book 18 | 3.0m | N/A | N/A | N/A | N/A |

[17] Transportation Association of Canada. Geometric Design Guide For Canadian Roads. June 2017

Transit infrastructure requirements were also considered, including required pedestrian landing pad (2m depth), standards for the shelter pad (2.1m depth) and enhanced shelter pad (3m depth), and the requirement for a lane width of 3.5m by transit shelters.

In consultation with the MECP, they recommend establishing natural areas (e.g., wilderness garden) with appropriate vegetation within the study area in order to improve and increase identified potential habitat for species at risk, such as the Monarch Butterfly and Yellow-banded bumble bee. This could include planting Milkweed, seeding pollinating wildflowers, and avoiding the use of harmful pesticides. This can also improve the aesthetic look of the area and provide natural areas for recreation, which can improve human health and well-being. Currently, the Region does not have a policy/program on establishing natural areas within the ROW. However:

- Generally in Conservation Authority (CA, e.g., TRCA, Credit Valley Conservation (CVC)) regulated areas, the Region does choose native species for plantings.
- The Region's Roads Operations maintains the plant and species that were originally planted at the various Low-Impact Development sites; and if those were unavailable, they would consult the CA for recommendations.

## 8.6 Road Geometry

The horizontal and vertical alignment of the preferred design follows the existing centreline of the roadways (Derry Road, Bramalea Road, Menkes Drive, Telford Way, and Alstep Drive). However, there are few locations where a slight shift may occur with the centreline to provide a 'best fit' for the recommended design. These minor adjustments are sometimes needed to address the roadway alignment while meeting the minimum geometric standards.

## 8.7 Drainage / Stormwater Management Plan

The existing drainage patterns will be maintained under the proposed widenings with the exception of the subcatchment Area 206 which is bounded by Alstep Dr, Bramalea Rd and Derry Rd. The area drains via the existing private 750mm sewer to the Juliet Pond. The new Alstep Dr extension area (subcatchments 231 and 232) will be directed to drain to either the existing Alstep Dr storm sewers or the existing Bramalea Dr storm sewers. However, both public storm sewers drain to the Juliet Pond, and therefore there will be no change to the overall drainage pattern. Along Derry Road, the existing storm lids will be maintained but shifted closer to any proposed new curbs as appropriate. Where feasible, opportunities for reducing stormwater flows along Derry Road East to below 3 m/s will be explored during detailed design.

A 2.4m x 1.5m concrete box culvert at 0.45% slope is proposed to convey upstream flows entering GTAA lands for storm events up to and including the 100-year event, as well as the Regional Storm (Hurricane Hazel). The outlets for the proposed works are to remain the same as per existing conditions. Future drainage conditions will be evaluated and confirmed during detailed design.

## 8.8 Pavement Design

The preliminary pavement thickness is provided for road widening and extension. The recommended minimum pavement structures for municipal and regional roads consist of the following as shown in **Table 16**. Details of the investigation are presented in **Appendix I.**

*Table 16: Recommended Pavement Structure*

| Pavement Layer | Compaction Requirement | Municipal Road | Regional Road |
|---|---|---|---|
| Asphaltic Concrete (OPSS[18] 310 / 1150) | 92 to 96.5% MRD[19] | 40 mm HL3<br>100 mm HDBC (50 mm, 2 lift) | 50 mm DFC<br>100 mm HDBC (50 mm, 2 lift) |
| OPSS Granular A Base (OPSS 1010) | 100% SPMDD[20] | 200 mm | 150 mm |
| OPSS Granular B Type I (OPSS 1010) | 100% SPMDD | 300 mm (minimum), match or exceed adjacent subbase | - |
| OPSS Granular B Type II (OPSS 1010)[21] | 100% SPMDD | - | 450 mm (minimum), match or exceed adjacent subbase |

## 8.9 Traffic Signals and Illumination

Existing traffic signals along Derry Road will be upgraded at both intersections. A new traffic signal will be installed at the proposed intersection of Bramalea Road and Alstep Drive. Illumination will be provided along Derry Road within the limits of construction. The proposed road improvements will include upgrades to the boulevard MUP and sidewalk on both sides of Derry Road. With the improvements, many of the existing hydro poles will require relocation. Therefore, a new illumination system is required. Illumination design and calculations will be presented and confirmed during detailed design.

## 8.10 Utilities

A topographic survey with a minimum Subsurface Utility Engineering Quality Level D (SUE QL-D)[22] was undertaken for the study. An existing utility composition plan is provided in **Appendix N.**

The proposed improvements to the study area would require some utility relocations including certain locations along Derry Road, Bramalea Road, Menkes Drive, and Alstep Drive. Existing overhead utilities will be maintained except for those that conflict with the recommended design. Coordination and consultation will be required during detailed design with the following utilities to accommodate the proposed design: Alectra, Enersource, Enbridge, Bell Canada, Rogers, Cogeco, water, stormwater, and wastewater.

Utility relocations will be confirmed during the detailed design phase. A Utility Impact Report is provided in **Appendix N** that includes the Subsurface Utility Plan and Utility Conflict Plans.

[18] OPSS – Ontario Provincial Standard Specification
[19] MRD – Maximum Relative Density
[20] SPMDD – Denotes standard Proctor maximum dry density, MTO LS-706 (Procedure 3)
[21] According to City Standard 2220.010, 19 mm crusher run (CR) limestone may be substituted for the Granular A and 50 mm crusher run limestone may be substituted for the Granular B. However, mixing of material types within the same road structure will not be permitted.
[22] Quality Level "D" refers to information derived from utility records or verbal recollections. Refer to **Appendix N** for additional information.

## 8.11 Property Requirements

Based on the City of Mississauga Official Plan, the City may acquire up to 30 m right-of-way for improvements to Bramalea Road. Per the Region of Peel Official Plan, the Region may acquire up to 45 m right-of-way for improvements to Derry Road. However, this may be increased for improvements within the right-of-way near intersections. Additional land may be acquired from GTAA or private property owners to accommodate the proposed intersection improvements. The recommended design attempts to minimize property requirements.

The proposed improvements to the overall study area will require some property at locations along Derry Road, Bramalea Road, and Menkes Drive. These requirements primarily relate to expanding the ROW to accommodate the installation of new/ upgraded sidewalks or curbs for road widening. Proposed property acquisition resulting from the recommended design is expected at the following municipal addresses:

- 7050 Bramalea Road;
- 1930 Derry Road East
- 7033 Telford Way;
- 6975 Menkes Drive;
- 6975 Tranmere Drive;
- 6999 Tranmere Drive;
- 7065 Tranmere Drive;
- 7045 Tranmere Drive;
- 1825 Alstep Drive;
- 1840 Derry Road East; and
- 1700 Derry Road East.

In general, grading will be contained within the proposed right-of-way where feasible, however temporary easements will also be considered for construction and grading purposes. The Property Impact Report is provided in **Appendix M**. Preliminary property requirements summarized in the Property Impact Report will be finalized during detailed design.

Property owners and tenants will be notified in advance of construction near their access. Communication protocols for construction will be developed during Detailed Design.

# 9 Stakeholder Consultation

Stakeholder consultation was a key component of this Class EA. The key consultation tasks undertaken during Phase 2 include:

- Issuing a combined Notice of Commencement and Invitation for Public Comment;
- Holding Technical Advisory Committee (TAC) meeting #1; and
- Holding one virtual Public Information Centre (PIC).

Tasks undertaken during Phase 3 included:

- Holding Technical Advisory Committee (TAC) meeting #2;
- Holding one virtual Public Information Centre (PIC); and
- On-going engagement of key stakeholders, including internal stakeholders with the Region and City, as well as external stakeholders such as utilities and GTAA.

A summary of the consultation activities is presented below. Copies of consultation materials - including TAC and PIC presentation materials, notices, correspondence, meeting minutes, and the Stakeholder Register - are provided in **Appendix B**.

## 9.1 Phase 2 Consultation Activities

### 9.1.1 Technical Advisory Committee Meeting #1

A Technical Advisory Committee was formed to provide input to the project team on the preliminary preferred alternatives in Phases 2 and 3. The agencies invited included:

- Bombardier Aerospace;
- Greater Toronto Airports Authority;
- City of Mississauga;
- Region of Peel;
- Toronto and Region Conservation Authority (TRCA);
- Ministry of Northern Development, Mines, Natural Resources and Forestry (MNRF); and
- Ministry of Environment, Conservation and Parks (MECP).

TAC Meeting #1 was held virtually on July 15, 2020 at 9:30 am. The meeting was attended by representatives from the Region of Peel, City of Mississauga, Bombardier Aerospace, TRCA, and EXP. The purpose of the meeting was to review the EA's problem/opportunity statement and the evaluation of alternative solutions with the TAC members. Topics covered included:

- Purpose of the TAC meeting;
- Background for this Class EA Study;
- Study purpose;
- Study area;

- Overview of the Class EA process;
- Highlights of Class EA Studies completed to date;
- Needs and justification for this Class EA;
- Problem/Opportunity Statement;
- Review of Alternative Solutions and the evaluation results; and
- Schedule and next steps.

**Appendix B** includes a copy of the slides and minutes for TAC Meeting #1.

**Table 17** provides a summary of the key questions and comments made during the meeting and by which agency.

*Table 17: Summary of TAC Meeting #1 Comments*

| Agency | Key Comment/Question | Response/Action |
|---|---|---|
| **TRCA** | Any borehole drilling that occurs within the TRCA regulated area will require a permit | Acknowledged |
| **City of Mississauga** | Which guidelines would be used in preparing the stormwater management (SWM) report | Region of Peel's guidelines for preparing SWM reports during Class EA's |
| **Peel Region** | Will condition of cross culverts and box culverts be reviewed in the EA report, and if the infrastructure would be upgraded if they are at the end of the lifespan | Existing storm water infrastructure information was provided by Peel Region and reviewed by project team. Condition of DICB on Derry Road East (north side, east of Telford Way) was noted as were recommendations for improvement. |
| **Peel Region** | Suggested that the detailed evaluation summary, like the evaluation summary handout, be incorporated into the PIC boards to provide viewers more complete information on the evaluation | Evaluation summary was incorporated into PIC boards and made available as a separate downloadable file |
| **Peel Region** | Would Alstep Drive be included in the SWM report | The Region's EA guidelines for SWM reports would be followed for the Alstep Drive extension |
| **City of Mississauga** | Noted that EXP/Bombardier will need to stay in touch with Greater Toronto Airports Authority (GTAA) to ensure that the land swaps occur in a timely fashion; also noted that the City's Realty Services Section has reached out to GTAA | Agreed |
| **Peel Region** | Requested study area boundaries in GIS format to overlay onto their assets map to determine any overlap or concern, noting Region has water and wastewater assets within study area | Based on the study area boundary, Water and Wastewater assets mapping and CAD files were provided by the Region to overlay on the preliminary preferred alternatives to review any overlap or concern |

### 9.1.2 Notice of Commencement and Invitation for Public Comment

Most of Phase 1 and Phase 2 of this Class EA were completed during the COVID 19 Pandemic state of emergency. The City and the Region were each restricting public notices to those related to COVID 19 precautions and guidance. As such, publication of

the Notice of Commencement did not occur in Phase 1, but rather it was issued as a combined Notice of Commencement and Invitation for Public Comment.

The notice was distributed as per the following:

- Issued in the Mississauga News (local newspaper) on July 16 and July 23, 2020;
- E-mailed and/or mailed to the stakeholder list;
- E-mailed and mailed to Aboriginal / First Nation stakeholders;
- Hand-delivered to businesses within the project study area; and
- Mailed to property owners.

A consultation form was also attached to the distributed notices. The consultation form provided interested persons and organizations with an opportunity to provide contact information and to indicate whether they wished to be kept informed and their area of interest for the project.

A copy of the notice and consultation form are provided in **Appendix B.**

A summary of the feedback received is summarized in **Section 9.1.3**, following the discussion on Virtual PIC #1.

### 9.1.3 Virtual Public Information Centre # 1

One of the consequences of the COVID 19 pandemic was the inability to hold in-person public meetings. In lieu of an in-person PIC, the public consultation event was held virtually and labeled virtual PIC #1. Virtual PIC #1 consisted of a series of narrated presentations and an evaluation summary sheet posted on the project website for the public to review and provide comment on. In addition, a project status update was added to the website that described the preferred alternative solution. The information was posted online starting July 28, 2020, with comments requested by August 11, 2020.

The narrated presentation was viewable as YouTube videos embedded into the project webpage, with the slide deck available as a downloadable PDF. The narrated presentation was divided into three segments to allow viewers to focus on the topic areas of most interest to them. **Table 18** summarizes the topics covered in each video presentation. **Figure 28** (end of this sub-section) provides a screenshot of the project website. A copy of the slides (with narration script) and handout are provided in **Appendix B**.

*Table 18: PIC #1 Video Presentation Topics*

| Video | Topics |
|---|---|
| **Part 1** | • Project Team Representatives<br>• Purpose of Class Environmental Assessment (EA) Study<br>• Study Area<br>• Class EA Study Background<br>• Overview of EA Planning Process |
| **Part 2** | • Highlights of Class EA Studies<br>• Needs and Justification<br>• Problem / Opportunity Statement |
| **Part 3** | • Alternative Solutions<br>• Evaluation Criteria and Results<br>• Recommended Alternative Solution<br>• Class EA Next Steps and Schedule<br>• How to Participate |

**Table 19** provides a summary of comments received after the distribution of the Notice of Commencement and Invitation for Public Comment (with consultation form) and the posting of PIC materials. The comments provided suggestions for improvements, noted areas of concern, and noted areas of stakeholder interest. After review of the comments received, it was concluded that no changes to the recommended alternative solutions were warranted. A copy of the comments received are provided in **Appendix B**.

*Table 19: Comments Received*

| Name & Organization | Areas of Interest / Comments |
|---|---|
| ***After Notice Distribution and PIC #1 Launch*** | |
| **Local Business** | • Suggestions regarding this stretch of Derry Road:<br>- Install red light cameras on Derry Road at Menkes and Telford.<br>- Add right turn lanes at Menkes and Telford to turn onto Derry.<br>- Place an advanced left turn arrow at Menkes and Telford for cars turning onto Derry. |
| **Ministry of Northern Development, Mines, Natural Resources and Forestry** | • Study area appears to extend somewhat into the farmed field west of Menkes Drive.<br>• At the western end of this farmed property is the Etobicoke Creek, which is recognized under the Greenbelt Plan as an urban river valley and subject to associated policy requirements under the Greenbelt Plan.<br>• Any road improvements or changes to infrastructure in this area should be consistent with this plan. |
| **Toronto and Region Conservation Authority** | • Provided letter in response to Notice of Commencement<br>• Letter described TRCA's commenting roles for this Class EA process and TRCA's areas of interest. |
| **Zayo Group - Utility Circulations** | • Yes, keep informed |

| Name & Organization | Areas of Interest / Comments |
|---|---|
| **Mississaugas of Scugog Island First Nation** | • Yes, keep informed<br>• Access to EA's, including archaeological reports<br>• Noted that project is in the traditional territory of Mississaugas of New Credit. |
| ***After PIC #1 Comment Deadline of August 11, 2020*** | |
| **Local Business** | • Yes, keep informed<br>• Changes to property lines at our boundary<br>• Development between UPS and GTAA land |
| **Local Business** | • No, do not keep us informed<br>• No longer own these premises |
| **Local Business** | • Yes, keep informed<br>• Concerned about traffic volumes and their effect on property on West side of Menkes Drive.<br>• Improvements will be required at Intersection of Derry Road and Menkes Drive. |
| **Local Business** | • Yes, keep informed<br>• Traffic flow disruption<br>• Road and land restrictions<br>• Road closures<br>• Traffic congestion<br>• Length of time to complete project |
| **Resident/Local Business** | • Question: For the options of widening the roads and extending Alstep drive, will this ensure multi-use trails will remain on all these roads?<br>• *Response from team: The multi-use trail along Derry Road and all pedestrian sidewalks would remain. In addition, a sidewalk would be included along the Alstep Drive extension as well.* |
| **Transport Canada** | • Transport Canada does not require receipt of all individual or Class EA related notifications.<br>• Request project proponents self-assess if their project:<br>- Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property; and<br>- Will require approval and/or authorization under any Acts administered by Transport Canada.<br>• *Note: The self-assessment noted that the projects proposed in the Class EA will interact with federal properties, which are the lands managed by GTAA. However, the projects will not require approval and/or authorization under any Acts administered by Transport Canada. As such, Transport Canada was not required to be included in the notice distribution. Any necessary interaction with Transport Canada regarding the properties managed by GTAA would be initiated by GTAA.* |

| Name & Organization | Areas of Interest / Comments |
|---|---|
| **Ministry of the Environment Conservation and Parks** | • Provided letter in response to Notice of Commencement<br>• Letter included the Ministry's "Areas of Interest" document, which provides guidance regarding the ministry's interests with respect to the Class EA process. |

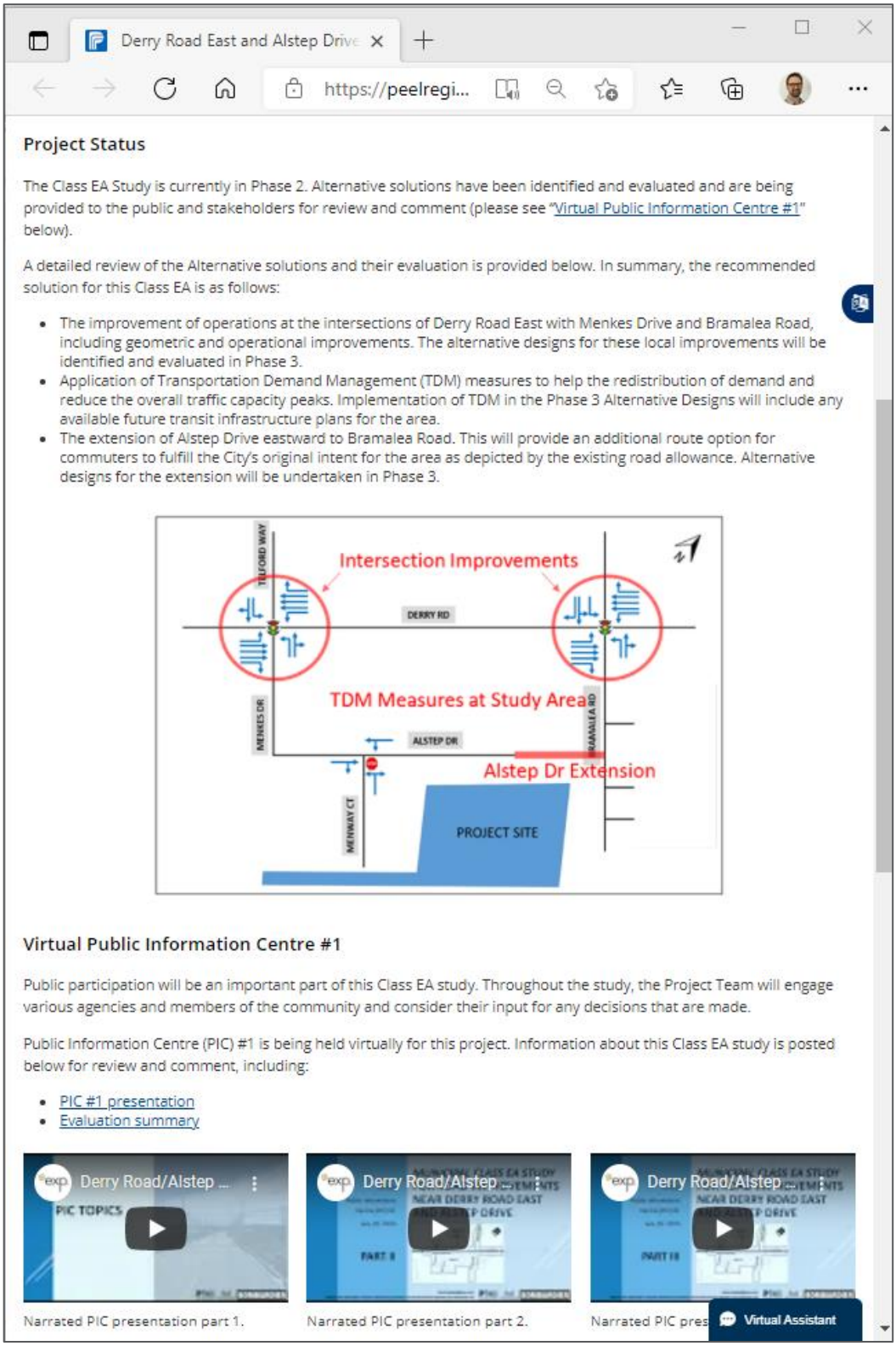



**Figure 28: Virtual PIC #1 Webpage Screenshot**

## 9.2 Phase 3 Consultation Activities

### 9.2.1 Technical Advisory Committee Meeting #2

A second TAC meeting was held virtually on December 2, 2021 at 10:00 am. The meeting was attended by representatives from the Region of Peel, City of Mississauga, Bombardier Aerospace, MiWay, GTAA, TRCA, and EXP. The purpose of the meeting was to review the evaluation of the alternative designs with the TAC members. The project team delivered a presentation to the TAC members with the following topics:

- A review of the Class EA Study planning process;
- A project review, including the study purpose, study area, the problem/opportunity statement, and the preferred alternative solution;
- Recap of PIC #1;
- Review of the Alternative designs and the evaluation results;
- Recommended alternative design concepts; and
- Project timeline and next steps.

A Question and Answer session was conducted after the presentation. Questions from the TAC members varied and included topics such as:

- Concerns with the offset orientation of the Alstep Drive extension and the FedEx entrance on Bramalea Road;
- Depiction of MiWay stops on the drawings using the correct design standards;
- Comments clarifying presence of municipal infrastructure within or adjacent to the roadway;
- Recommendations to MUP and intersection geometrics to align with the City's Cycling Master Plan and Vision Zero Master Plan;
- Recommendations for adjustments to intersection design elements; and
- Clarifications regarding utilities.

The minutes of TAC meeting #2 and a separate summary documenting the comments received and project team's responses are provided in **Appendix B**.

### 9.2.2 Virtual Public Information Centre # 2

#### 9.2.2.1 Overview

On Monday, February 28, 2022, Public Information Centre (PIC) #2 was held online to provide a project update and present the study's recommended alternative designs. The Virtual PIC was hosted via Cisco WebEx. Participants had the option of joining by computer or telephone audio. During the meeting, the project team delivered a presentation, which was followed by a question-and-answer session. The meeting was attended by:

- 9 members of the public;
- 1 Government of Ontario employee;

- The local Regional councillor;
- 6 City staff;
- 5 Region staff;
- 6 Bombardier staff; and
- 3 EXP staff.

The presentation included the following topics:

- Welcome and Project Team Introductions;
- Review of EA Planning Process;
- Project Review (including background, study area, and the Problem/Opportunity Statement);
- Review of the Preferred Solution;
- Review of Phase 2 and Phase 3 Studies;
- Evaluation Criteria;
- Alternative Designs (for each of the three intersections);
- Evaluation Results for each set of Alternative Designs;
- Active Transportation Improvements;
- Review of the Recommended Alternative Designs;
- Project Timeline and Next Steps; and
- Question and Answer Session.

#### 9.2.2.2 Promotion

The virtual PIC was promoted through the following means:

- Notification on the project website (http://peelregion.ca/public-works/environmental-assessments/mississauga/derryrd-alstepdrive.asp);
- Advertisement in the Mississauga News (February 17 and 24, 2022);
- Distribution of the notice by e-mail and/or mail to identified stakeholders; and
- Region of Peel twitter feed.

In addition, letters were sent to property owners whose property would be potentially impacted by the proposed alternative designs. The letters described the proposed works and anticipated property impacts and advised recipients of the virtual PIC. The PIC notice was attached to each letter.

The notice, newspaper cut sheets and letters to property owners are included in the PIC #2 summary, which is provided in **Appendix B.**

#### 9.2.2.3 Feedback

**Question and Answer Period**

A question-and-answer period was held following the presentation, where meeting participants were able to share their comments and ask questions of the project team. A summary of the comments and questions raised are noted in **Table 20**, with responses as appropriate.

*Table 20: Comments and Questions Received during PIC #2*

| Comment / Question | Project Team Response |
|---|---|
| • Concerns raised surrounding having this meeting during working hours, as the meeting may be inaccessible for people who are working or who cannot afford to miss work.<br>• Concerns raised over how long it will take to have a continuous corridor for cycling and walking along Derry Road (for example, from Malton along Derry Road).<br>• Concerns raised that the project is car-centric, that there is a non-Vision Zero approach by putting traffic and congestion first. Concern that Vision Zero has been ignored in the alternatives. | • Thanked for their feedback. |
| • Breakdown requested of the type of trips considered.<br>• What discussions were had with MiWay to improve transit?<br>• Concerns raised that Smart Channels and dual left turn lanes result in greater crossing widths, making intersections more inhospitable to pedestrians. | • EXP: Peel Region has a goal of 40% of trips made by active transportation by 2024. The goal is to facilitate active transportation, carpooling, ridesharing (special parking spots), and transit. Arrivals to the site will be staggered, so vehicles will be accessing the site at different times.<br>• City: The recommended design includes a proposed introduction of queue jump lanes for MiWay vehicles.<br>• EXP: With Smart Channels, priority is made for pedestrians. Pedestrians and cyclists are considered to be part of the road network and mitigation includes the addition of pedestrian signals and increased time provided for pedestrian crossings. Vision Zero was considered by implementing safety measures. |
| • Cycling icon should be added to active transportation slide.<br>• Confusion noted regarding colours on plans shown during the presentation.<br>• Suggested that it would be helpful to do scenario planning or video that shows what the active transportation options are to access the facility, instead of only the 2D drawing shown. Imagery/visuals are important. | • EXP: The multi-use path (MUP) and active transportation facilities would connect to other facilities outside of the study area, including potential future facilities.<br>• EXP: The Region intends to improve active transportation connectivity all along Derry Road, and this EA covers a piece of a larger puzzle.<br>• Region: The detailed evaluation will be available online, and it highlights key criteria related to active |

| Comment / Question | Project Team Response |
|---|---|
| | transportation, specifically the healthy community criteria. |
| • Property owner along Derry Road asked who pays for the sidewalks and utility pole relocations. | • EXP: At that property owner's location, property requirements would be limited to the area required for providing a sidewalk or to move a utility pole. Installing sidewalks would not require a large area and this would be finalized during detailed design.<br>• Region: The Project team can go over site-specific requirements individually and outside of the PIC, if desired. |
| • Participant thanked project team for their response to earlier questions. They added that they believe active transportation was not sufficiently considered and that the proposed alternatives will make things more dangerous for vulnerable road users. They also noted they were not impressed by the presentation and remain skeptical. | • EXP: Active transportation and safety has been considered. The MUP is to be extended, and a boulevard put in place. Crossing distances across streets were also considered as part of the alternative evaluation process. |
| • Is there a plan to lower the speed limit in this area or introduce traffic calming? | • Region: Through this Class EA Study, there are no current plans to reduce the posted speed limit within the study area. Reducing lane widths has been considered which has been shown to reduce speed.<br>• City: City is looking at speed limits along roads within the City, and that this is outside the scope of this project. |
| • Will the active transportation facilities up Bramalea Road cross the 407? | • City: North of the 407 is within the City of Brampton. The City of Mississauga has cycling routes that extend to Brampton.<br>• Region: This project is providing active transportation facilities that can be connected to facilities beyond the limits of the study area.<br>• EXP noted that crossing distances across streets were considered as part of the alternative evaluation process. |

**Twitter**

Three comments were made via twitter. The initial comment included a link to an article about a hit-and-run accident at Derry Road and Cattrick Street. The two comment posts included:

- Too bad Cattrick Drive not included in study. A dangerous place to cross when transferring buses.
- I live in Malton and regularly go north and west into Brampton. What a mess all those bus tranfer locations are. It seems there's been no thought about to how to deal with areas transitioning from suburban sprawl to inner-suburb in which public transit is now heavily used.

- Don't forget Kennedy road and Derry. Lots of close calls people running to the other side of street to catch bus transfers. And the amount of trucks in that area make it worse. My so[n] almost got hit twice when crossing because the truck was turning without properly looking.

**Submitted Feedback**

Participants were asked to provide their feedback by March 14, 2022. As of March 14, seven comments were submitted via e-mail from when the notice was first issued. The types of comments received included:

- Comment from MiWay advising on design requirements for bus shelters.
- Comment from the Ministry of Transportation Ontario (MTO) asking for consideration to extend project study area to include the provincial highway interchanges.
- Questions from a property owner regarding potential impacts to their property, considerations in the design, and questions about the multi-use path.
- Comment from a property owner with an existing development application expressing concern about possible charges relating to the proposed new sidewalk along Derry Road East and a suggestion that the bus route should be looped past the Bombardier development to maximize safety for pedestrians.
- Comments from a member of the public noting support of the multi-use path and sidewalks and providing suggestions on how to improve the clarity of the presentation visuals.
- Acknowledgment from the Chippewas of Rama First Nation that they have received the PIC 2 notice and have forwarded the information to their relevant staff for review.

None of the comments received impacted the conclusions of the evaluation.

Design considerations arising from the feedback will be incorporated into the preferred alternative designs as necessary and carried forward into detailed design.

A summary of the comments received via e-mail and the responses provided are included in the PIC #2 summary, which is provided in **Appendix B.**

### 9.2.3 Greater Toronto Airports Authority

The Greater Toronto Airports Authority (GTAA) is a key stakeholder in this process, as a portion of the lands required for completion of the proposed works are managed by GTAA and owned by the Crown. This includes land along the east side of Bramalea Road to the north and south of Derry Road.

The requirement for these lands for road improvements to Bramalea Road was identified as far back as 2000 in the Derry Road/Bramalea Road Class Environmental Assessment Environmental Screening Report, prepared by EarthTech on behalf of the GTAA, the Region of Peel, and the City of Mississauga[23]. The 2000 study was undertaken to address negative traffic impacts to the Derry Road and Bramalea Road intersection that would be caused by then-proposed developments. Among the improvements recommended were widening Bramalea Road north of Derry Road to allow for southbound dual left turn lanes

[23] Earth Tech (Canada) Inc. Derry Road/Bramalea Road Class Environmental Assessment Environmental Screening Report. Prepared for Greater Toronto Airports Authority, the Region of Peel, and the City of Mississauga. May 2000.

and one through lane and constructing Bramalea Road south of Derry. These improvements required additional ROW along the eastern side of Bramalea Road. While the lands required were identified, acquisition of these lands did not occur.

The project team held two meetings with GTAA to discuss the recommended alternative designs and the land requirements. The first meeting was held on December 13th, 2021 and included representatives from GTAA, the Region of Peel (including Real Estate staff), the City of Mississauga (including Realty staff), Bombardier, and EXP. The purpose of the meeting was to review the recommended alternative design, discuss the design's land requirements on GTAA-managed property, and options for moving the land transfer process forward. A second meeting was held on January 20, 2022 to confirm the land requirements and further discuss options for the land transfer process.

Minutes from both meetings are provided in **Appendix B.**

In a letter dated June 3, 2022, GTAA advised that it has no objection to the preferred alternative design at the intersection of Bramalea Road and Derry Road East and of the resulting encroachments of the proposed road right-of-way onto the Airport lands, subject to the following:

- All decisions regarding land exchanges are ultimately made by Transport Canada;
- The drawing [provided in the EA] is only 30% complete and any changes to the Design will require further review by GTAA and Transport Canada and any decision by Transport Canada will require submission of a 100% complete Drawing;
- Some of the lands identified in the Design are currently leased to GTAA's tenants and any exchange or dedication of such lands would be subject to the tenants' agreement to amend their leased areas and the GTAA not being adversely impacted by a loss of revenue resulting from such amendments; and
- Wherever possible, GTAA expects that land provided by the City will be in exchange for Airport land, and the lands supplied by the City do not need to be in the vicinity of the Lands.

The GTAA advises that it has engaged Transport Canada regarding this land exchange. The GTAA, the City of Mississauga and the Region of Peel continue to negotiate the transfer of GTAA lands to the City and Region for the necessary ROW in a process outside of this Class EA.

## 9.3 First Nations and Aboriginal Communities Consultation

The First Nations and Aboriginal Communities consultation was initiated through the development of a stakeholder group contact list. The initial list of First Nations and Aboriginal stakeholder communities was developed in consultation with the Region and the City and was informed by past projects similar in scope and location. The First Nations and Aboriginal Communities that were included in the initial stakeholder list and Notice of Commencement distribution included:

- Métis Nation of Ontario Head Office;
- Chippewas of Georgina Island;
- Mississaugas of Scugog Island First Nation;
- Mississaugas of the Credit First Nation;
- Alderville First Nation;
- Association of Iroquois and Allied Indians;
- Beausoleil First Nation;

- Chippewas of Rama First Nation; and
- Curve Lake First Nation.

The Notice of Commencement and Invitation to Public Comment was distributed on July 16, 2020. On August 4, 2020, the project team received correspondence from the MECP in response to the notice. The MECP's letter directed the project team to include the following First Nations and Aboriginal Communities in the project consultation:

- Mississaugas of the Credit First Nation;
- Six Nations of the Grand River;
- Haudenosaunee Confederacy Chiefs Council; and
- Huron-Wendat Nation, if there are potential archeological impacts.

Letters were sent to each of the communities listed to provide them with an update on the project status and invite them to participate in the consultation.

The Notice of Commencement and Invitation to Public Comment and the letters noted above were each accompanied by a consultation form that allowed the community representative to indicate whether they wished to be kept informed about the project and their specific area of interest.

Notices for the second virtual PIC was distributed to the First Nations and Aboriginal stakeholders on February 17, 2022, by either mail, e-mail or both.

The project team received responses from three First Nations and Aboriginal Communities:

- Mississaugas of Scugog Island First Nation: On August 7, 2020, the Mississaugas of Scugog Island First Nation requested that they be kept informed of the project. They returned a completed Consultation Form and noted their area of interest included access to the EA's, including the archaeological reports. On April 11, 2022, a letter was sent to the Mississaugas of Scugog Island First Nation providing a project status update and a summary of the results of the Stage 1 Archaeological Assessment.
- Mississaugas of the Credit First Nation (MCFN): On April 14, 2022, the MCFN advised that they have no concerns or comments regarding the project but would like to continue to be notified about the status of the project.
- Please keep MCFN DOCA informed of any new information that may arise
- Chippewas of Rama First Nation: On February 23, 2022, the Chippewas of Rama First Nation responded to the PIC #2 notice and advised that they had forwarded the notice to their appropriate staff for review. They also recommended that the project team review their consultation protocol, which is provided at www.ramafirstnation.ca.

The Protocol lists a number of project types that would trigger a requirement of notice and consultation with the Chippewas of Rama First Nation under their Protocol. The list includes:

a) Crown sponsored or approved mapping or exploration activities;
b) Permitting or in any way authorizing resource exploration, extraction or development activities by third parties or the issuing of licenses, permits or approvals;
c) Disposing of or adding to any structures, roads, bridges or any other infrastructure that has the potential for environmental impacts, including any and all impacts to the water, plants, forests and wildlife;
d) All forestry management and energy development activities;
e) Disposing of any rights to lands or interests in lands and resources, including issuances of letters of patent or grants in fee simple;

f) Disposing of any rights to lands, including any and all leases, licenses, permits or approvals;
g) Any environmental activities where there is concern for the land and/or water, including but not limited to, water sheds and water tables, air, animals, snapping turtles and people situated within Chippewas of Rama First Nation Traditional Territory;
h) Any activities that may disturb or have a direct effect on traditional food sources and harvesting rights of Chippewas of Rama First Nation Traditional Territory, including but not limited to, wild rice beds, sweet grass, fish and wild game;
i) Any activities that may disturb or have a direct effect on traditional medicines used and/or collected by Chippewas of Rama First Nation and its members;
j) Undertaking any proposed activity with the potential to disturb or alter known or unknown archaeological/historical resources or heritage sites or sites of spiritual or cultural significance to Chippewas of Rama First Nation, including but not limited to burial grounds on Chief Island, Child's Road and Rama Road (Rob Magee's backyard); and
k) Undertaking any land use planning or management actions or decisions, including adjusting municipal boundaries[24].

The proposed projects recommended in this Class EA do not fall within those listed above; therefore, the Chippewas of Rama First Nation consultation protocol is not triggered.

On April 11 and April 12, 2022, EXP attempted to call those First Nations and Aboriginal Communities from which no response had been received. The communities were asked for updated contact information and whether they wished to have the previous notices resent to them. Contact information was updated as appropriate, and notices were resent to:

- Alderville First Nation;
- Chippewas of Georgina Island;
- Curve Lake First Nation; and
- Mississaugas of the Credit First Nation.

The table below summarizes the notice distribution, and a copy of the correspondence with First Nations and Aboriginal Communities is provided in the consultation appendix.

[24] Chippewas of Rama First Nation. Consultation and Accommodation Protocol for Rama First Nation. March 22, 2021.

*Table 21: Summary of Notice Distribution to First Nation and Aboriginal Communities*

| Organization | Notice of Commencement and Public Input [a] | Notice of PIC 2 | Pre ESR Distribution Follow-up |
|---|---|---|---|
| Alderville First Nation | E-mail | E-mail & mail | Follow-up call on April 11th<br>PIC 1 and PIC 2 notices resent by request April 12, 2022 |
| Association of Iroquois and Allied Indians | E-mail | E-mail & mail | Called April 11th (left voicemail)<br>Called April 12th (left voicemail) |
| Beausoleil First Nation | E-mail | E-mail & mail | Called April 11th (left voicemail)<br>Called April 12th (no response) |
| Chippewas of Georgina Island | E-mail | E-mail & mail | Follow-up call on April 11th<br>PIC 1 and PIC 2 notices resent by request April 12, 2022 |
| Chippewas of Rama First Nation | E-mail | E-mail & mail | No follow up required; previous correspondence received |
| Curve Lake First Nation | E-mail | E-mail & mail | Follow-up call on April 11th<br>PIC 1 and PIC 2 notices resent by request April 12, 2022 |
| Haudenosaunee Confederacy Chiefs Council | Mail<br>(sent post PIC 1; added by MECP afterwards) | Mail | No phone number available |
| Huron-Wendat Nation | Mail<br>(sent post PIC 1; added by MECP afterwards) | Mail | No phone number available |
| Métis Nation of Ontario Head Office | Mail | Mail | Not contacted (follow-up focused on communities) |
| Mississaugas of Scugog Island First Nation | E-mail | E-mail & mail | No follow up required; previous correspondence received |
| Mississaugas of the Credit First Nation | Mail<br>(sent post PIC 1; added by MECP afterwards) | E-mail & mail | Follow-up call on April 11th<br>PIC 1 and PIC 2 notices resent by request April 12, 2022 |
| Six Nations of the Grand River | Mail<br>(sent post PIC 1; added by MECP afterwards) | E-mail & mail | Called April 11th (left voicemail)<br>Called April 12th (left voicemail) |

*Note a: The Notice of Commencement and Invitation for Public Input promoted Virtual PIC #1.*

## 9.4 Agency Review of Draft ESR

On May 11, 2022, key agency stakeholders were invited to review and provide comment on the draft ESR in advance of its release for the mandatory public review period. The invitation was sent to the following stakeholder agencies, municipal departments and other bodies:

- TRCA;
- MECP;
- MNRF;
- GTAA;
- City of Mississauga (various departments); and
- Region of Peel (various departments).

Comments received were reviewed, clarification provided as required, and any necessary updates to the draft ESR were incorporated. The table below summarizes the comments received and how they were addressed. A copy of the correspondence received is provided in Appendix B.

| Commentor | Summary of Comment | Resulting Action |
|---|---|---|
| Real Estate Section, Region of Peel<br><br>May 12, 2022 | Comments and suggestions provided on the Design Concept drawings, in particular the representation of the "Protected Property" lines. | Clarification provided. No changes made. |
| Traffic Department, Region of Peel<br><br>May 24, 2022 | Comment noting addition of centre medians on Menkes Drive, Telford Way and Bramalea Road at Derry Road intersections.<br>Request made for new set of truck turning (both lefts and rights) templates for these two intersections. | Turning movement drawings were sent as requested. |
| Infrastructure Programming and Studies, Stormwater Management, Region of Peel<br><br>May 30, 2022 | Comment noting that there is no discussion on potential solutions to mitigate long-term effects of >3m/s velocities within the Derry Rd sewer.<br>Acknowledgment that consultant has provided a justification to the Region that the existing velocity is >3m/s and the allowed Region of Peel criteria is 4m/s.<br>Suggestion that should be further explored at the detailed design stage to see if there can be any improvement to bring the velocity down to 3m/s or mitigation measures. | The Region's interest to explore options during detailed design for reducing stormwater flow velocity within the Derry Road East storm main to below 3 m/s has been noted in Section 5.4.5, and the following line has been added to section 8.8: "Where feasible, opportunities for reducing stormwater flows along Derry Road East to below 3 m/s will be explored during detailed design." |

| Commentor | Summary of Comment | Resulting Action |
|---|---|---|
| Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)<br><br>May 30, 2022 | The MHSTCI noted the following:<br>1. Archaeological Resources row in Table 25 notes as a proposed mitigation measure that "Detailed design will avoid impacts to Moore's Cemetery. Should the design encroach on Moore's Cemetery, additional archaeological work will be conducted (such as a Stage 2 & 3 Archaeological Assessment)." This is not consistent with the recommendations in the Stage 1 Archaeological Assessment report presented in Appendix D. Per the report, a Stage 3 assessment should take place on any impacted lands within 10 meters of the eastern or western cemetery fence, to confirm that burials do not extend beyond the currently-defined limits. | Table 25 has been updated to note this. |
| | 2. Mitigation measures should note the possibility of archaeological resources being encountered during construction, in spite of assessment, and a commitment added that: all activities impacting them would stop; MHSTCI notified at archaeology@ontario.ca; and a licensed consultant archaeologist be retained to carry out an archaeological assessment. All activities must cease immediately and the local police and coroner must be contacted if human remains are encountered. | Table 25 has been updated to note this. |
| | 3. The Stage 1 Archaeological Assessment included as Appendix D has been submitted to MHSTCI for technical review, but the review remains ongoing at this time. The ESR may need to be updated to reflect any changes to the conclusions of the archaeological assessment report made through the review process. | Acknowledged |
| | 4. The last sub-bullet of the Cultural Heritage bullet in Section 11.5 can be removed as there is no formal acceptance process for the CHRA, and MHSTCI have no concerns regarding it based on this draft. If technical review of the Stage 1 Archaeological Assessment has not been completed by the time the ESR is finalized, or if further stages of archaeological assessment may still be necessary, this sub-bullet should be replaced with "Entry of Archaeological Assessment report(s) into the Ontario Public Register of Archaeological Reports by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)". | Sub-bullet relaced as suggested |
| Roads Design and Construction, Region of Peel<br><br>May 31, 2022 | Comment noting proposed walkway along north side of Derry Road not updated to reflect the increase in proposed ROW on the north side. The main concern is the tight locations at Telford and Bramalea intersections, as those locations would benefit from a wider walkway. | This will be reviewed and addressed as part of detailed design. |

| Commentor | Summary of Comment | Resulting Action |
|---|---|---|
| Roads Design and Construction, and Sustainable Transportation, Region of Peel<br><br>June 1, 2022 | Various comments (included in Appendix B2) on the 30% EA drawings attached as an Appendix P. Specific comments include:<br>• Regarding Southwest and Southeast Bramalea/Derry: Confirm MUP connections to intersection are in compliance with new Book 18.<br>• The pedestrian crossing and crossride should be separated (with crossride on north side of pedestrian crossing).<br>• The raised median should be trimmed back as needed to provide 6m wide crossing for pedestrian and crossride.<br>• The design should consist of "pie-shaped" concrete pads/landings behind the pedestrian ramps to which the MUPs and sidewalks connect.<br>• To be consistent with Book 18 and Regional standards, the Region would like to adjust the approach of the MUP to the crossride from the east and the west, which could potentially lead to property and utility conflicts. | Comments (included in Appendix B8) will be incorporated into the detailed design.<br><br>EXP noted its design for the crossride and MUP connection is either consistent with Book 18 (west side) or has adequate proposed property (east side) to accommodate Book 18 and/or Regional standards.<br><br>Connection/alignment of the MUP with the crossride(s) will be further reviewed and updated in the detailed design. |
| MECP<br><br>June 2, 2022 | The MECP noted the following:<br>1. Air Quality - Report should include a separate section discussing air quality in the Existing Environmental Conditions section, including a discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions. | Section on air quality added as Section 5.2.2. |
| | 2. Wildlife and Species at Risk - Suggestion to establish natural areas (e.g., wilderness garden) with appropriate vegetation within the study area in order to improve and increase identified potential habitat for species at risk such as the Monarch Butterfly and Yellow-banded bumble bee. This could include planting Milkweed, seeding pollinating wildflowers, and avoiding the use of harmful pesticides. This can also improve the aesthetic look of the area and provide natural areas for recreation, which can improve human health and well-being. | Generally in Conservation Authority (CA, e.g., TRCA, CVC) regulated areas, the Region chooses native species for plantings.<br><br>The Region's Roads Operations maintains the plant and species that were originally planted at the various Low-Impact Development sites; and if those were unavailable, they would consult the CA for recommendations.<br><br>The MECP's comment and Region's response was incorporated into Section 8.5 Design Criteria. |
| | 3. Class EA Process - Please note that Part II Orders are now referred to as Section 16 Orders. Section 1.5.2 of the report and the upcoming Notice of Completion should refer to Section 16 Orders instead of Part II Orders. | Section 1.5.2 updated. |

| Commentor | Summary of Comment | Resulting Action |
|---|---|---|
| City of Mississauga, Various departments (aggregated)<br><br>June 6, 2022 | Various editorial suggestions and comments for the ESR. | ESR updated. |
| City of Mississauga, Various departments (aggregated)<br><br>June 6, 2022 | Various comments and clarifications on the Phase 1 ESA report. | Phase 1 report updated. |
| Roads Design and Construction, Region of Peel<br><br>June 20, 2022 | Various comments and clarifications on the geotechnical report. | Geotechnical report updated. |

In addition to the comments noted above, the Region of Peel and the City of Mississauga provided comments on the draft ESR during its preparation.

# 10 Preliminary Project Costing

The planning horizon for all recommended works is 2031. At the time of preparing this report, the phasing of works was being developed and will be confirmed during detailed design through a Tri-Party Agreement between the Region of Peel, City of Mississauga and Bombardier Aerospace. The various project components identified in this Class EA for the preferred alternative design are listed in Table 22.

Based on the preliminary design, the estimated cost of the recommended improvements is approximately **$18.6M** (excluding HST). This preliminary estimate includes costs for road work, storm sewer works, water main works, temporary and permanent traffic signals, street light relocation, construction inspection, relocation of hydro line and construction of the retaining wall along the north side of Derry Road East to the east of Telford Way. Expected costs for property acquisition are not included in the estimate. **Table 23** presents a cost summary based on construction components. The estimated costs will be reviewed and confirmed during detailed design.

*Table 22: Project Components*

| Project | Project Components |
|---|---|
| **Derry Road Active Transportation Upgrades** | MUP Upgrades |
| | Sidewalk Installation (Derry Road East, north side) |
| | MiWay Bus Stop Relocation and Improvements |
| **Other Active Transportation Upgrades** | Alstep Drive Sidewalk Installation (existing portion of Alstep Drive) |
| | Menway Court Sidewalk Installation |
| | Telford Way Sidewalk Installation |
| | Menkes Drive Sidewalk Installation (west side) |
| | Bramalea Road MUP Installation (east side, north of Derry Road) |
| **Derry Road / Bramalea Road Intersection** | Widening of Derry Road to north (east of Bramalea Rd) |
| | Widening of Bramalea (Derry to Alstep i.e., South Leg) |
| | Widening of Bramalea (North of Derry i.e., North Leg) |
| | Bramalea Road Sidewalk Installation (west side, south of Derry Road) |
| | Bramalea Road Sidewalk Installation (east side, south of Derry Road) |
| **Menkes Drive / Derry Road** | Widening of Menkes, including curb repositioning and road surface works |
| **Alstep Drive / Bramalea Road** | Widening of Bramalea Rd north and south of Alstep Drive, including curb repositioning and road surface works |
| | Sidewalk upgrades and installations |
| **Alstep Drive** | Extension<br>• Paved road<br>• Sidewalk |

Note: The term “widening” used in this case is not the same as the definition as the MEA’s Municipal Class Environmental Assessment (MCEA) guidance manual, which defines road widening as increasing the number of lanes of an existing road. The term ‘widening’ as used here refers to increasing the width of the road surface.

*Table 23: Construction Cost Estimate for Preliminary (30%) Design*

| Cost Category | Estimated Cost |
|---|---|
| **Site Preparation** | $1,356,125 |
| **Roadworks** | $7,433,673 |
| **Traffic Signals** | $2,062,500 |
| **Street Lights** | $1,603,533 |
| **Storm Sewers** | $616,675 |
| **Watermain** | $300,875 |
| **Miscellaneous** | $5,285,939 |
| **Cost Estimate Sub-Total (Excluding HST)** | **$18,659,319** |
| **HST (13%)** | $2,425,711 |
| **Total Estimated Price** | **$21,085,030** |

# 11 Potential Impacts and Mitigation Measures

## 11.1 Summary of Potential Impacts and Mitigation Measures

The recommended alternative design aims to minimize impacts to the surrounding environment. However, while the benefits of the proposed road and active transportation improvements outweigh the potential negative effects, mitigation of potential impacts will be required as the project continues. The approach to addressing potential impacts is as follows:

- Avoid potential impacts by taking proactive preventive measures. This prevents the occurrence of negative impacts and can result in net positive effects.
- Implement mitigation measures to reduce the magnitude and duration of unavoidable impacts.
- Arrange compensation and/or enhancement measures where required for negative impacts that are unavoidable and cannot be reduced through appropriate mitigation measures.

**Table 24** below summarizes the potential impacts and proposed mitigation measures associated with the project relating to the social and economic environment. These will be confirmed and further developed during the detailed design stage.

*Table 24: Social and Economic Environment Potential Impacts and Mitigation Measures*

| Category | Potential Impacts | Proposed Mitigation Measures |
|---|---|---|
| **Social and Economic Environment** | | |
| **Property Impacts** | • Proposed right-of-way property acquisitions and temporary grading easements required within the study area as part of the proposed design. | • Investigate design refinements during the detailed design phase to mitigate potential impacts to property owners within the study area. |
| **Noise and Vibration** | • Noise impacts for adjacent property owners during construction of the proposed improvements. However, there are no residential land uses within the study area.<br>• Cultural Heritage assessment identified the heritage properties at 1840 Derry Road East and 2030 Derry Road East could be impacted by vibrations resulting from the proposed works as a result of their location within 50 m of the proposed alignment. | • Adhere to all relevant noise by-laws.<br>• To ensure 1840 Derry Road East (BHR 1) and 2030 Derry Road East (CHL 1) are not adversely impacted during construction (given their location their location within 50 m of the proposed alignment), a baseline vibration assessment should be undertaken during detailed design. Should this advance monitoring assessment conclude that the structure(s) on these properties will be subject to vibrations, prepare and implement a vibration monitoring plan as part of the detailed design phase of the project to lessen vibration impacts related to construction. |

| Category | Potential Impacts | Proposed Mitigation Measures |
|---|---|---|
| **Utility Impacts** | • Utility relocations required along Derry Road, Bramalea Road, Menkes Drive, and Alstep Drive as part of the proposed design.<br>• The following utilities/utility companies will be potentially impacted by the proposed design: Alectra, Enersource, Enbridge, Bell Canada, Rogers, Cogeco, Water and Wastewater. | • Follow the mitigation measures outlined in the Utility Impact Report located in **Appendix N**. These include but are not limited to the following:<br>- Relocation of hydro poles closer to the ROW.<br>- Potential relocation or embedding into the roadway of any existing handwells.<br>- Confirmation that sufficient cover is available.<br>- Relocation of streetlights and fire hydrants.<br>- Relocation of catch basins and extend their leads. |
| **Air Quality** | • Impacts on air quality associated with traffic related air pollution within the study area due to the proposed road improvements.<br>• Impacts on air quality during construction activities from increased emission sources and dust release. | • Improve air quality within the study area by improving traffic efficiency within the study area, including reduction of idling and slow-moving traffic, thereby decreasing risk associated with exposure to traffic related air pollution.<br>• Implement dust control mitigation measures, particularly during construction.<br>• Minimize idling time of construction vehicles. |
| **Active Transportation During Construction** | • Inconvenience to active transportation users due to pedestrian and cyclist detours during construction. | • Provide clear pedestrian and/or cyclist direction signage to alert active transportation users in advance of facility closures and to indicate an alternate route.<br>• Minimize the detours required for active transportation facilities.<br>• Implement a communication plan to notify active transportation users of the construction schedule and anticipated impacts. |

| Category | Potential Impacts | Proposed Mitigation Measures |
|---|---|---|
| **Traffic Management During Construction** | • Inconvenience to road users from vehicle delays due to lane closures.<br>• Temporary impacts to transit facilities on Derry Road East.<br>• Impacts to property and business accesses during construction. | • Develop a Traffic Management Plan as part of the detailed design process to determine how traffic, active transportation, transit, and access to properties will be accommodated during construction.<br>• Minimize the temporary relocation of bus stops.<br>• Relocate bus stops to locations that minimize the disruption to transit users.<br>• Maintain all property access where possible and minimize the duration a property access must be closed for.<br>• Implement a communication plan to notify road users and property owners of the construction schedule and anticipated impacts. |

**Table 25** summarizes the potential impacts and proposed mitigation measures associated with the project relating to the natural environment. These will be confirmed and further developed during the detailed design stage.

*Table 25: Natural Environment Potential Impacts and Mitigation Measures*

| Category | Potential Impacts | Proposed Mitigation Measures |
|---|---|---|
| **Natural Environment** | | |
| **Wildlife, Wildlife Habitat, and Species at Risk** | • Potential impacts to wildlife and wildlife habitat due to construction activities.<br>• No Significant Wildlife Habitat (SWH) observed in the study area.<br>• No significant impact on wildlife is expected.<br>• It was determined that four species at risk could potentially utilize the study area at some point in their life cycle. However, no species at risk (SAR) were observed during the fieldwork and no evidence of habitat use for SAR was documented in the study area.<br>• One tree adjacent to the roadway met the size requirements for a potential bat maternity roost tree. However, given the urbanized location and sparsity of surrounding vegetation, it was deemed unlikely it would be utilized by a bat maternity colony. | • If feasible, vegetation clearing should not occur during sensitive bird breeding periods (May 1 to July 30). If site clearing occurs during this period, work areas should be inspected by a qualified biologist or environmental consultant ahead of each day site clearing is scheduled to ensure no nesting birds or other wildlife is harmed by construction activity as noted in the Natural Environment Report located in **Appendix H.**<br>• Follow the recommendations outlined in the Natural Environment Report. These include but are not limited to the following:<br>- Implement standard best management practices to mitigate potential noise, dust, erosion, and pollution impacts for construction sites including a Spills Prevention and Management Plan.<br>- Minimize idling time of construction vehicles.<br>- Check construction vehicles and machinery for leaks each day.<br>- Implement salt reduction best management practice into road design improvements where feasible. |

| Category | Potential Impacts | Proposed Mitigation Measures |
|---|---|---|
| **Trees and Vegetation** | • Tree removals throughout the study area will be required as part of the proposed design.<br>• Negative impacts to the health of existing trees during construction. | • The Derry Road East & Menkes Drive/Telford Way recommended design alternative provides the greatest opportunity for the conservation of trees.<br>• Protect trees during construction with Tree Protection Hoardings.<br>• Avoid construction activities that are detrimental to the health of trees. Such activities are noted in the Tree Preservation Report located in **Appendix O**.<br>• Apply tree prevention prescriptions where necessary as specified in the Tree Preservation Report.<br>• Follow the City of Mississauga Tree Preservation and Protection Standards to protect trees during construction.<br>• Replace or replant existing trees. Landscape design plan developed during detailed design will detail tree planting locations and specifications. |
| **Groundwater** | • No direct impact on groundwater is expected.<br>• A Highly Vulnerable Aquifer (HVA) extends approximately 200 m into the study area from its eastern boundary along Derry Road. This could be negatively impacted by the application of road salt.<br>• Dewatering is expected to be required as part of construction activities. | • Follow applicable source water protection policies that may apply, such as SAL-11 and SAL-13.<br>• The dewatering flow estimate rate is less than 50 $m^3$/day, therefore no EASR registration or permit application will be required for the construction dewatering program as documented in the Hydrogeological Investigation provided in **Appendix F.** |
| **Surface Water** | • The study area lies within the Etobicoke Creek watershed. There are no surface water features on-site. No direct impact to surface water features is expected. | • Develop an erosion and sediment control plan during detailed design to be implemented prior to and during construction. |

| Category | Potential Impacts | Proposed Mitigation Measures |
|---|---|---|
| **Areas of Potential Environmental Concern** | • A Phase 1 Environmental Site Assessment (ESA) identified 16 individual Areas of Potential Environmental Concern (APEC) within the study area. These were identified based on the presence of expected fill material of unknown quality, reported spills, and the types of commercial and industrial uses at the various sites. | • Complete a Phase 2 ESA prior to any road works within the study area.<br>• The scope of the Phase Two ESA will need to incorporate considerations for the type of municipal upgrades being evaluated and if soil movement and/or groundwater management would be involved for the upgrades. |
| **Erosion and Sediment Control** | • Impacts resulting from excavation, cut and fill operations, and materials storage during construction. | • Develop an erosion and sediment control plan during detailed design to be implemented prior to and during construction. |
| **Soils Management** | • Potential impacts of uncovering or removing contaminated soil during construction. | • Complete a Phase 2 ESA prior to any road works within the study area.<br>• Follow all regulatory requirements for the removal and reporting of contaminated soil. |
| **Stormwater Management** | • Increase in overall flow due to increase in impervious area within the study area. | • Confirm at detailed design stage that increase in impervious area will not represent a significant change to overall flows as recommended in the Stormwater Management Report in **Appendix J.**<br>• Implement Low Impact Development features where possible such as goss traps, as proposed in the Stormwater Management Report. |

**Table 26** below summarizes the potential impacts and proposed mitigation measures associated with the project relating to the cultural environment. These will be confirmed and further developed during the detailed design stage.

*Table 26: Cultural Environment Potential Impacts and Mitigation*

| Category | Potential Impacts | Proposed Mitigation Measures |
|---|---|---|
| **Cultural Environment** | | |
| **Archaeological Resources** | • Stage 1 Archaeological Assessment (AA) located in **Appendix D** indicated portions of the study area possess archaeological potential.<br>• Moore's Cemetery is located in the study area. There is the potential for unmarked burial sites in the vicinity of the cemetery as noted in the Stage 1 AA.<br>• The possibility remains of archaeological resources being unexpectedly encountered during construction, in spite of assessment. | • Detailed design will avoid impacts to areas with archaeological potential (such as the area southwest (SW) of the Derry Road East and Menkes Drive intersection). Should the design encroach on these areas, a Stage 2 AA will be completed prior to construction.<br>• Detailed design will avoid impacts to Moore's Cemetery. Should the design encroach on Moore's Cemetery, a Stage 3 assessment would take place on any impacted lands within 10 meters of the eastern or western cemetery fence, to confirm that burials do not extend beyond the currently-defined limits.<br>• If archaeological resources are unexpectedly encountered during construction, all activities impacting them must cease immediately, the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) must be notified (at archaeology@ontario.ca) and a licensed consultant archaeologist must be retained to carry out an archaeological assessment in accordance with the Ontario Heritage Act and the 2011 Standards and Guidelines for Consultant Archaeologists. In the event that human remains are encountered, all activities must cease immediately and the local police and coroner must be contacted. |

| Category | Potential Impacts | Proposed Mitigation Measures |
|---|---|---|
| **Built Heritage / Cultural Landscapes** | • Indirect impacts are anticipated to Pearson International Airport at 6301 Dart Drive (CHL 2), which may require a resource-specific Heritage Impact Assessment (HIA), as identified in the CHRA in **Appendix E**.<br>• Indirect impacts are possible to 1840 Derry Road East (BHR 1) and 2030 Derry Road East (CHL 1), which are designated under Part IV of the OHA and require a resource-specific HIA as noted in the CHRA. Adverse impacts to this location could occur due to vibrations during construction activities. | • As detailed design progresses, potential impacts to adjacent properties identified as having cultural heritage resources will be monitored.<br>• Undertake a baseline vibration assessment for BHR 1 and CHL 1 during detailed design. If required, prepare a vibration monitoring plan during detailed design to be followed during construction.<br>• City of Mississauga to consider waving the requirement for a HIA for CHL 2, since no features of significant cultural heritage value or interest are anticipated to be impacted as recommended in the CHRA.<br>• City of Mississauga to consider waving the requirement for a HIA for BHR 1 and CHL 1 if appropriate mitigation can be implemented, since potential impacts are anticipated to be minimal as recommended in the CHRA.<br>• Construction activities and staging should be planned and undertaken to avoid negative impacts to identified cultural heritage resources as noted in the CHRA. |

## 11.2 Air Quality

Typically, transportation projects have the potential to impact local air quality. Potential negative impacts may arise if the proposed works lead to an increase in existing traffic levels or introduce traffic to an area that currently has none. There is also the potential for air quality impacts during construction activities, such as emissions from construction equipment. Conversely, some transportation projects may have positive impacts on air quality if they result in more efficient flows of traffic through an area compared to the do-nothing scenario or if they facilitate increase transit through modes with lower air impacts. Therefore, impacts on air quality were used as a criterion for the evaluation of alternative solutions and alternative designs.

After consideration during Phases 2 and 3 of this Class EA, the project team determined that an Air Quality Impact Assessment (AQIA) would not be required for the following reasons:

- There are no adjacent sensitive receptors to the study area, which would typically include residences, hospitals, schools, daycare facilities, elderly housing and convalescent facilities, and public meeting places.
- The study area is an industrial setting, with no such sensitive receptors identified.
- The preferred alternative solutions and the alternative designs under consideration should not impact air quality emissions compared to the do-nothing scenario, but rather should encourage conditions that would improve air quality by improving the efficiency of traffic flow and improving conditions for active transportation.

This determination was reviewed with the Ministry of Environment, Conservation and Parks, which agreed with the assessment. This correspondence is documented in Appendix B8.

The potential impacts to local air quality that could arise from the project include those negative impacts on air quality that are associated with traffic-related air pollution. The preferred alternative design concepts seek to mitigate this impact by

improving traffic flow through the study area compared to the do-nothing scenario, which would result in slow-moving or stop-and-go traffic. Therefore, the expected air quality impact of the preferred alternative designs is either an improvement in the local air quality compared or no significant change in air quality compared to the "do nothing" scenario.

Additional potential impacts to air quality could arise during construction activities from increased emission sources and dust release. Potential mitigation measures during construction include implementing dust control measures and minimizing the idling time of construction vehicles.

## 11.3 Climate Change Impact and Mitigations

The Ministry of the Environment, Conservation and Parks (MECP) has published a guide titled *Considering climate change in the environmental assessment process* that outlines the ministry's expectations for considering climate change throughout the environmental assessment process. The guide states that proponents are expected to address the project's impact on greenhouse gas emissions and carbon sinks and propose climate change mitigation accordingly. Proponents must also address the potential impacts of climate change on the project.

Provincial and municipal plans also address climate change in the context of developing strategies to reduce GHG emissions and improving the capability of civil infrastructure to withstand the impacts of changing climatic conditions. Examples of relevant provincial and municipal plans that address climate change mitigation and climate change adaptation include:

- A Place to Grow: Growth Plan for the Greater Golden Horseshoe
- Provincial Policy Statement, 2020
- Mississauga Official Plan

Potential impacts of the project on climate change include the potential increase in carbon and greenhouse gas emissions associated with traffic related air pollution from the proposed road improvements. This was an important component of the evaluation criteria at both the alternative solution and alternative design stage of the environment assessment. Climate change mitigation for the project includes the following:

- The recommended design alternative will improve traffic efficiency due to a reduction in idling and slow-moving traffic. This contributes to a reduction in greenhouse gas emissions.
- Active transportation infrastructure within the study area will be improved with the addition and upgrade of sidewalks and multi-use paths to make trips by walking, cycling, and transit more appealing.
- The addition of a near-side bus queue jump lane on Derry Road East at Bramalea Road will improve transit operations.
- Opportunities for tree planting within the right-of-way will be investigated during detailed design.
- Opportunities to implement Low Impact Development (LID) strategies will be investigated where possible during detailed design.
- The potential effects on the natural environment during construction will be considered and mitigation of these potential impacts will be developed during detailed design. Example mitigation measures are listed in **Section 6.2.3**.

Additionally, climate change impacts will affect the study area into the future as extreme weather events may impact civil infrastructure and road/active transportation users. To ensure the resiliency of the proposed design to future climate change impacts, the design and construction of the proposed works is to be to the latest standards.

## 11.4 Proposed Construction Monitoring

Proposed mitigation measures will be refined and further developed during detailed design. Construction and post-construction monitoring plans should be developed during detailed design in consultation with the appropriate regulatory agencies. On-site inspection staff will ensure that specified mitigation measures are implemented and maintained during construction. This will ensure that potential impacts to the social, economic, natural, and cultural environments are prevented or minimized.

## 11.5 Permits and Approvals

As the project proceeds, the following permits and approvals are expected to be required. These will be obtained prior to construction.

- Natural Environment
  - Based on the Natural Environment Report **(Appendix H)** the typical environmental permits and approvals from the following agencies are not expected to be required.
    - Ministry of Northern Development, Mines, Natural Resources and Forestry (MNRF)
    - Ministry of the Environment, Conservation and Parks (MECP)
    - Fisheries and Oceans Canada (DFO)
    - Toronto and Region Conservation Authority (TRCA)
- Hydrogeological **(Appendix F)**
  - As the dewatering flow estimate is less than 50 $m^3$/day, an online registration with the Environmental Activity and Sector Registry (EASR) with the Ministry of the Environment, Conservation and Parks (MECP) and/or a Category 3 Permit to Take Water (PTTW) from MECP is not required as documented in the Hydrogeological Investigation provided in **Appendix F**. If dewatering exceeds 50 $m^3$/day but is less than 400 $m^3$/day, an online registration with the EASR with the MECP will be required. If dewatering exceeds 400 $m^3$/day, a Category 3 PTTW from MECP will be required.
  - Agreement to discharge to the City of Mississauga / Regional Municipality of Peel will be required prior to discharging dewatering effluent.
- Stormwater Management **(Appendix J)**
  - The City of Mississauga requires an Environmental Compliance Approval (ECA) application for the proposed 675 mm storm sewer from the Alstep Extension to the City's system.
  - Although this site is part of a TRCA regulated watershed, it does not drain directly to Etobicoke Creek nor Spring Creek and is not located within the regulated area and therefore TRCA approval is not required.
  - GTAA approval will be required for modifications to their storm drainage system including any additional proposed catchment areas (Storm Drainage Area 232).
- Cultural Heritage
  - As recommended in the Cultural Heritage Resource Assessment (CHRA) located in **Appendix E,** the City of Mississauga should consider waiving the requirement for a Heritage Impact Assessment (HIA) for the properties at 1840 Derry Road East (BHR 1) and 2030 Derry Road East (CHL 2) if suitable mitigation can be implemented.

  - As recommended in the CHRA, the City of Mississauga should consider waiving the requirement for a HIA for Pearson International Airport at 6301 Dart Drive (CHL 2) since no structures or apparent landscape features of significant cultural value or interest are anticipated to be impacted.
  - Entry of Archaeological Assessment report(s) into the Ontario Public Register of Archaeological Reports by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI).
- Municipal Permits
  - Road Occupancy Permit
  - City of Mississauga Tree Permit under Tree Permit By-Law Number 474-05
- Additional
  - Any borehole drilling that occurs within the TRCA regulated area will require a permit.
  - Permission to enter agreements and any property acquisition requirements.

In addition to the above, there are a number of items and comments raised during the Class EA that will addressed during the detailed design process. These are summarized in the following table.

*Table 27: Commitments for Detailed Design*

| No. | Item / Comment | Action |
|---|---|---|
| **1.** | The existing storm design sheet shows that the 1350mm pipe from MH9 (manhole #9) to the headwater as surcharged, which is increased in the proposed conditions. A hydraulic grade line analysis is required to ensure there are no adverse effects from this condition on the 1890 Alstep Drive Development.. | This will be reviewed in detailed design. The 1350mm pipe is surcharged but the pipe under the structure (box culvert) is oversized and is designed to accommodate 100 year flows (including increased flows from road widening) with a safety factor of approximately 2. The design also considered the future extension of Alstep Drive to Bramalea Road. The drainage through 1890 Alstep Drive is discussed in a separate report, which is excerpted in the stormwater report. |

| No. | Item / Comment | Action |
|---|---|---|
| **2.** | The Region noted that there are some stormwater flows within the Derry Road East storm main with velocities greater than 3 m/s. While this is less than the Region's allowed criteria of 4 m/s, the Region has requested that opportunities for reducing stormwater flows below 3 m/s be explored during detailed design.<br><br>The MECP is in the process of issuing a Stormwater Consolidated Linear Infrastructure (CLI) Environmental Compliance Approval (ECA) to the Region of Peel. The Stormwater CLI ECA covers storm assets servicing regional roads, namely storm sewers, ditches, stormwater management facilities and low impact development, and Stormwater Pumping Stations. The Stormwater CLI ECA sets forth conditions for alterations to the stormwater system as well as ongoing operation of the system. The ECA comes with criteria for design of alterations to the Region's existing stormwater system. At the time of completion of the Class EA study, the CLI ECA template and criteria were not available, therefore the Class EA recommendations do not guarantee compliance with the CLI ECA conditions and criteria. It is recommended that at the detailed design stage, the Engineering Consultant re-assess the Class EA recommendations against the CLI ECA criteria and make the necessary adjustments and changes to the stormwater recommendations to be in compliance, where feasible. | To be reviewed in detailed design |
| **3.** | Right-turn channel island modification may provide space back into the boulevard, eliminating possible encroachment. | The degree of encroachment and steps to minimize it will be confirmed as part of detailed design. |
| **4.** | Alignment of MUP along the north side of Derry Road East, east of Bramelea Road, and the ability to minimize impact on power poles. | There are many ways in which the upgraded MUP can be designed, including placement relative to hydro poles or grading/retaining of adjacent slopes, Additional detailing of the upgraded MUP beyond this conceptual placement will occur during its detailed design. |
| **5.** | Skew of westside crosswalk at the intersection of Derry Road East and Bramalea Road. | To be further reviewed in detailed design |
| **6.** | Approximately 200 wells noted in the study area, however all drinking water in the area is provided by municipal service so we do not deem these wells as in issue. As part of the Phase Two ESA, the consultant would verify that the study area does not contain any potable wells. | Phase 2 ESA to occur during detailed design. |

| No. | Item / Comment | Action |
|---|---|---|
| **7.** | Clarification for signal heads for northbound direction proposed dual-lefts at Derry Road East and Telford Way. The recommended practice for dual-lefts is to have two TYPE-2 signal heads. Which means, the signal head configuration for this intersection should be:<br>• TYPE-HIGHWAY (Primary head) on N-E island pole;<br>• TYPE-2 (Primary LT head) & TYPE-HIGHWAY (Secondary head) on north-leg median pole (proposed alternatives show no median) and;<br>• TYPE-2 (Secondary LT head) on N-W corner pole. | To be addressed in Detailed Design. |
| **8.** | Clarification of lane widths at the Derry Road right turns and two westbound-through lanes west of Bramalea). | To be confirmed in Detailed Design and reviewed with the Region's Traffic Development Staff. |
| **9.** | Proposed walkway along the north side of Derry Road should be increased to address tight locations at Telford and Bramalea intersections, as those locations would benefit from a wider walkway. | To be addressed in Detailed Design. |
| **10.** | Some portions of the proposed sidewalks may require a retaining wall due to the difference in elevation between the sidewalk and private property. | This requirement will be confirmed during detailed design for sections as required. |
| **11.** | During the Class EA, Region of Peel staff identified necessary repair or replacement of a Ditch Catch Basin Inlet (DCIB) along Derry Road by 6975 Tranmere Drive. It is recommended that this be completed during the installation of the sidewalk along the north side of Derry Road. The works may require some permanent or temporary easements or other property requirements, which will be confirmed by the Region during detailed design of the DCIB works. | To be addressed in Detailed Design. |
| **12.** | Existing traffic signals along Derry Road will be upgraded at both intersections. A new traffic signal will be installed at the proposed intersection of Bramalea Road and Alstep Drive. Illumination will be provided along Derry Road within the limits of construction. The proposed road improvements will include upgrades to the boulevard MUP and sidewalk on both sides of Derry Road. With the improvements, many of the existing hydro poles will require relocation. Therefore, a new illumination system is required. | Illumination design and calculations will be presented and confirmed during detailed design. |
| **13.** | Agency review comments on the Draft Environmental Study Report (ESR). | See Section 9.4 for items and comments to be reviewed, addressed and/or confirmed during detailed design. |

| No. | Item / Comment | Action |
|---|---|---|
| **14.** | The Cultural Heritage assessment (CHA) identified the heritage properties at 1840 Derry Road East and 2030 Derry Road East could be impacted by vibrations resulting from the proposed works as a result of their location within 50 m of the proposed alignment. The CHA recommended that, to ensure these properties are not adversely impacted during construction, a baseline vibration assessment should be undertaken during detailed design. Should this advance monitoring assessment conclude that the structure(s) on these properties will be subject to vibrations, prepare and implement a vibration monitoring plan as part of the detailed design phase of the project to lessen vibration impacts related to construction. | Baseline vibration assessment should be undertaken during detailed design. |