Appendix D: Transportation Report

Southeast Courtice Secondary Plan and Environmental Assessment

Municipality of Clarington, Ontario

August 10, 2021

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D. Transportation Report

D.1 Key Take-Aways

- New development has been identified for the SECSP, and in order to accommodate the development, robust transportation service is to be provided. The development of the transportation system for the SECSP is to address the following Problem / Opportunity statement:
  - Regional and Municipal planning policy identify residential and employment growth within the Southeast Courtice Secondary Plan area; and
  - Improved transportation service is required to meet the needs of new development within the planning area.
- **Road Network:** A combination of corridor improvements, road extensions and new roads are planned to support the development of the Southeast Courtice Secondary Plan and area. Road improvements will be required for Trulls Road, Courtice Road, Hancock Road, and Bloor Street, as well as the creation of a new collector road network extending from existing adjacent developed areas to create longer collector roads that integrate and connect communities, respect the topography of the SECSP area, and capitalize on view and window corridors adjacent to natural heritage lands, where appropriate.
- **Transit Network:** The future Courtice GO Station, Highway 2 Durham Rapid Transit, and enhanced local Durham Region Transit (DRT) service are planned to increase general public transit connectivity and service for the area and surrounding community. As the Southeast Courtice Secondary Plan area develops, transit service should be provided along arterial and major collector roads to provide 80% transit coverage with most residences/jobs within a 400 metre walking distance, and a further 10 to 15% of residences and workplaces should be within 600 to 800 metres of walking distance in order to achieve the standards outlined by the DRT Five-Year Service Strategy. While transit-based solutions will not solely address the future mobility and access needs for the Southeast Courtice Secondary Plan development area, it is an important transportation service to complement road network-based solutions and is also a sustainable transportation solution to achieve reduced environmental impacts in the area.
- **Active Transportation:** Regional and municipal cycling facilities and active transportation additions are planned throughout the study area as both primary, short term and long-term improvements as an important aspect of the overall transportation network. Similar to transit-based solutions, active transportation will not solely address the future mobility and access needs for the Southeast Courtice Secondary Plan development area; however, it is an important transportation service to provide mode choice, and is also a sustainable transportation solution to achieve reduced environmental impacts in the area.

- Develop a transportation network for the SECSP area to provide for a robust, connected and flexible network that serves the mobility and accessibility of all road users (motorists, transit, cyclists, and pedestrians).
- The planning for the SECSP area should also acknowledge and consider a variety of area constraints that impact the planning of the area transportation network, such as watercourses, wetlands, woodlots, areas of significant natural interest, and cultural and built heritage resources. It is recommended to avoid or minimize crossings of watercourses, avoid or minimize intrusion into natural heritage lands (such as wetlands, woodlots, and areas of significant natural interest), and avoid cultural and built heritage resources, where possible.

D.2 Purpose

The Municipality of Clarington has initiated a Secondary Plan for Southeast Courtice. The Southeast Courtice Secondary Plan (SECSP) is located within the Robinson Creek and Tooley Creek watersheds (**Figure D-1**). This Secondary Plan touches on five main priorities: sustainability and climate change, urban design, affordable housing, community engagement, and co-ordination of effort. This report outlines the current state of transportation planning for the area. Initially, a background review was completed identifying key planning and policy documents and summarizing the findings for both the lower (Clarington) and upper tier (Durham) municipalities. A review of existing and future links is identified in accordance with relevant policy documents, as well as particular consideration of active transportation opportunities. The second part of the report identifies potential considerations and opportunities to develop a future robust and well-rounded transportation network to serve the community, as well as potential constraints within the SECSP study area that should be considered in developing the overall transportation network plan.

This document also includes an analysis of existing and future traffic conditions in order to provide guidance with respect to appropriate laning for the SECSP and to also characterize the resultant intersection operations. The approach to this part of the Transportation Study was developed with assistance from the Region of Durham, of which the approved Work Plan is provided in **Appendix A**.

D.2.1 Integrated Environmental Assessment Process

The Secondary Plan study also includes an Integrated Environmental Assessment process in order to document the need and justification for primary transportation network elements in the Secondary Plan area.

The integrated EA approach is a cost-effective method of meeting the requirements of both the Planning Act and Class EA processes and meets the "integrated approach" as set out in Section A.2.9 and Appendix 8 of the Municipal Class Environmental Assessment (MCEA) document prepared by the Municipal Engineers Association (October 2000, as amended in 2007, 2011 and 2015) which addresses combined Planning Act and Environmental Assessment Act requirements.

Figure D-1: Southeast Courtice Secondary Plan Study Area

Since Southeast Courtice will generally be a new development site, consideration given to new major roads can be used in later components thereby simplifying future development approvals and infrastructure planning. The key to this integration is to identify when and how the EA process is addressed to ensure both the Planning and EA criteria are met, and preparation of a supplementary document of this approach in a Monitoring Report. The steps of the integration include:

- **Data Collection and Background Document Review:**
  Previous and ongoing land use planning and technical environmental documents will be collected and reviewed as evidence of inventory and assessment efforts. These documents and their review will be referenced in the Monitoring Report.
- **Identification of Opportunities and Constraints (Phase 1 EA):**
  Based on review of the background documents along with public comments received from the Project Kick-off Public Information Centre (PIC), problems and opportunities associated with the development of Southeast Courtice lands will be used to create the Problem and Opportunity Statement.
- **Identification of Alternative Solutions to Problem or Opportunity (Phase 2 EA):**
  Alternative methods to address the project need (as identified in Phase 1 EA) will documented, such as do nothing, limit development, improve transit, build new roads, etc. This will also consider the SECSP's goals to promote a sustainable natural environment through the protection of the identified natural heritage system within an urban setting. In addition, it is the intent of this plan to promote the community planning and design features along with practical road layouts for the Secondary Plan.
- **Notifications:**
  All project notices and communications will demonstrate clear indication of the integrated approach procedure in regard to the SECSP. Content is incorporated into the Planning Notices or provided as supplemental notices, although combined notices are preferred.
- **Consultation Events & Meetings:**
  Consultation is a key component for both the Planning and EA process.
- **Consultation Documentation:**
  Work will be synchronized with the Municipality of Clarington to provide documentation supporting the Planning process in accordance with A.2.9.4 of the MCEA.
- **Monitoring Report:**
  Work will be co-ordinated with the Municipality of Clarington to incorporate the commitments made (including Monitoring) into the appropriate planning documents which will serve as the basis of approvals for he associated infrastructure.

It is noted that the proponent must confirm the applicable Class EA Schedule for the preferred solution (project). If the Project would be defined as a Schedule B project under the Class EA document, then the Schedule B projects would require the additional future filing of a Project file(s) for public review. Schedule C projects identified during this Secondary Plan and integrated EA process must proceed through additional future study steps to satisfy Phase 3 and 4 EA requirements that are not part of this Secondary Plan. This would include:

- **Development of Alternative Design Concepts for Preferred Solution (Phase 3 EA):**
  Examine alternative design methods of implementing the preferred solution, based upon on existing environment, public, and review agency input, the anticipated environmental effects, as well as methods of minimizing negative effects and maximizing positive effects.

- **Environmental Study Report (Phase 4 EA):**
  A summary of the rationale and the planning, design, and consultation process of the project as established through the above phases will be documented in an Environmental Study Report. The documentation will be available for review by agencies and the public.

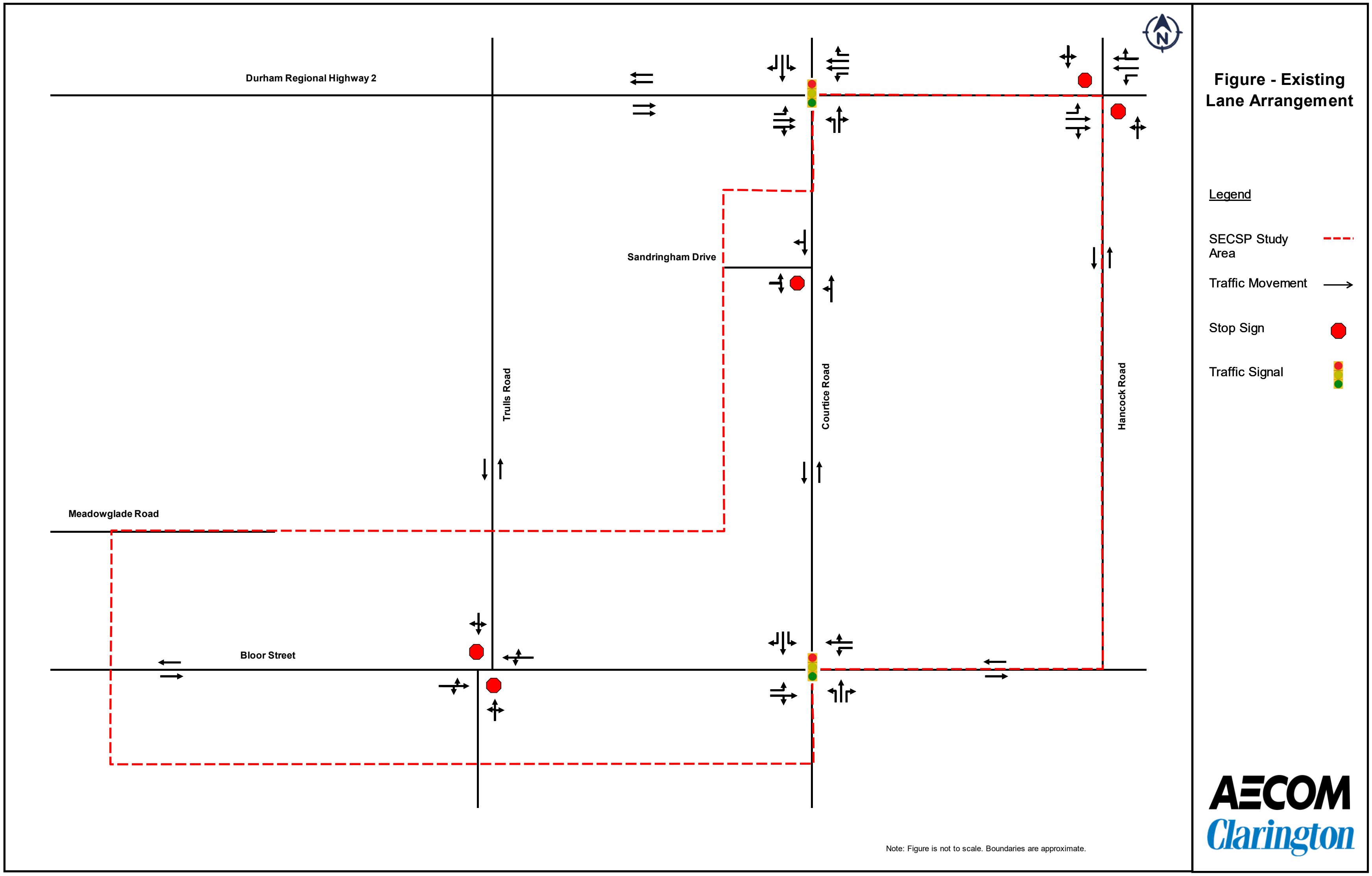
D.3 Existing Conditions

D.3.1 Existing Roads

Courtice is located in the Municipality of Clarington, Ontario between the Oshawa and Bowmanville communities, north of Highway 401. The area is under the municipal jurisdiction of Clarington and the regional jurisdiction of Durham. Some of the pertinent road network elements within the study area are displayed in **Figure D-2**; this includes the following major roadways:

- **Hancock Road** is a north-south municipal road under the jurisdiction of Clarington and is classified as a Type C Arterial within the defined study area. Hancock Road is a two-lane roadway extending from Bloor Street to north of Nash Road with a posted speed limit of 60 km/h. No active transportation facilities are currently present.
- **Courtice Road** is a north-south regional road under the jurisdiction of Durham and is classified as a Type A Arterial Road within the defined study area. Courtice Road is a two-lane roadway extending from the Darlington Energy Complex south of Highway 401 to Taunton Road. The posted speed limit is 60 km/h and 80 km/h, north and south of Bloor Street, respectively. No active transportation facilities are currently present.
- **Trulls Road** is a north-south municipal road under the jurisdiction of Clarington and is classified as a Type B Arterial Road within the defined study area. Trulls Road is a two-lane road (with cycling lanes in some areas) extending from Baseline Road West to Taunton Road, and has a posted speed limit of 50 km/h.
- **Highway 2** is an east-west regional road under the jurisdiction of Durham and is classified as a Type B Arterial Road within the defined study area. Highway 2 is a four-lane roadway extending from downtown Oshawa to Bowmanville. Highway 2 contains a two-way left turn lane and a posted speed of 60 km/h west of Courtice Road, and 70 km/h east of Courtice Road. No active transportation facilities are currently present.
- **Bloor Street** is an east-west regional road west of Courtice Road, and a municipal road east of Courtice Road. Bloor Street is classified as a Type A Arterial Road within the defined study area. Bloor Street is a two-lane roadway in the study area with posted speeds ranging from 50 to 70 km/h, depending on the segment.
- **Sandringham Drive** is a two-lane discontinuous curvilinear road extending from Highway 2 to Courtice Road (with a missing segment from east of Trulls Road to west of Avondale Drive). Sandringham Drive is designated as a Collector Road in the Clarington Official Plan. Sandringham Drive has a posted speed limit of 50 km/h.

Figure D-2: Southeast Courtice Study Area Lane Configuration



- **Meadowglade Road** is a two-lane curvilinear road extending from Bloor Street in the southwest to Granville Drive in the northeast. Meadowglade Road is designated as a Type C Arterial in the Regional and Clarington Official Plans. The road features curbside cycling lane markings east of Prestonvale Road and a posted limit of 50 km/h.

The following intersections were identified as key study intersections within the study area to be considered in this traffic review:

- The Highway 2 intersections at:
  - Courtice Road (signalized);
  - Hancock Road (unsignalized with STOP signs on Hancock Road approaches);
- The Bloor Street intersections at:
  - Trulls Road (unsignalized with STOP signs on Trulls Road approaches);
  - Courtice Road (signalized);
- The Courtice Road intersection at:
  - Sandringham Drive (unsignalized with a STOP sign on the Sandringham Drive approach).

Figure D-2 shows lane configurations and locations of the key study intersections within the SECSP study area.

D.3.2 Existing Transit

Currently (sourced January 4, 2021) within the vicinity of the SECSP area there is one Durham Region Transit (DRT) bus route. The DRM existing Route 902A is displayed in **Figure D-3**. The closest transit terminal is Oshawa Centre Terminal providing connections with a variety of DRT Routes such as 403, 405, 410, 902 and 917. Oshawa GO Station is also in close proximity and provides connections to the GO Transit Lakeshore East Line.

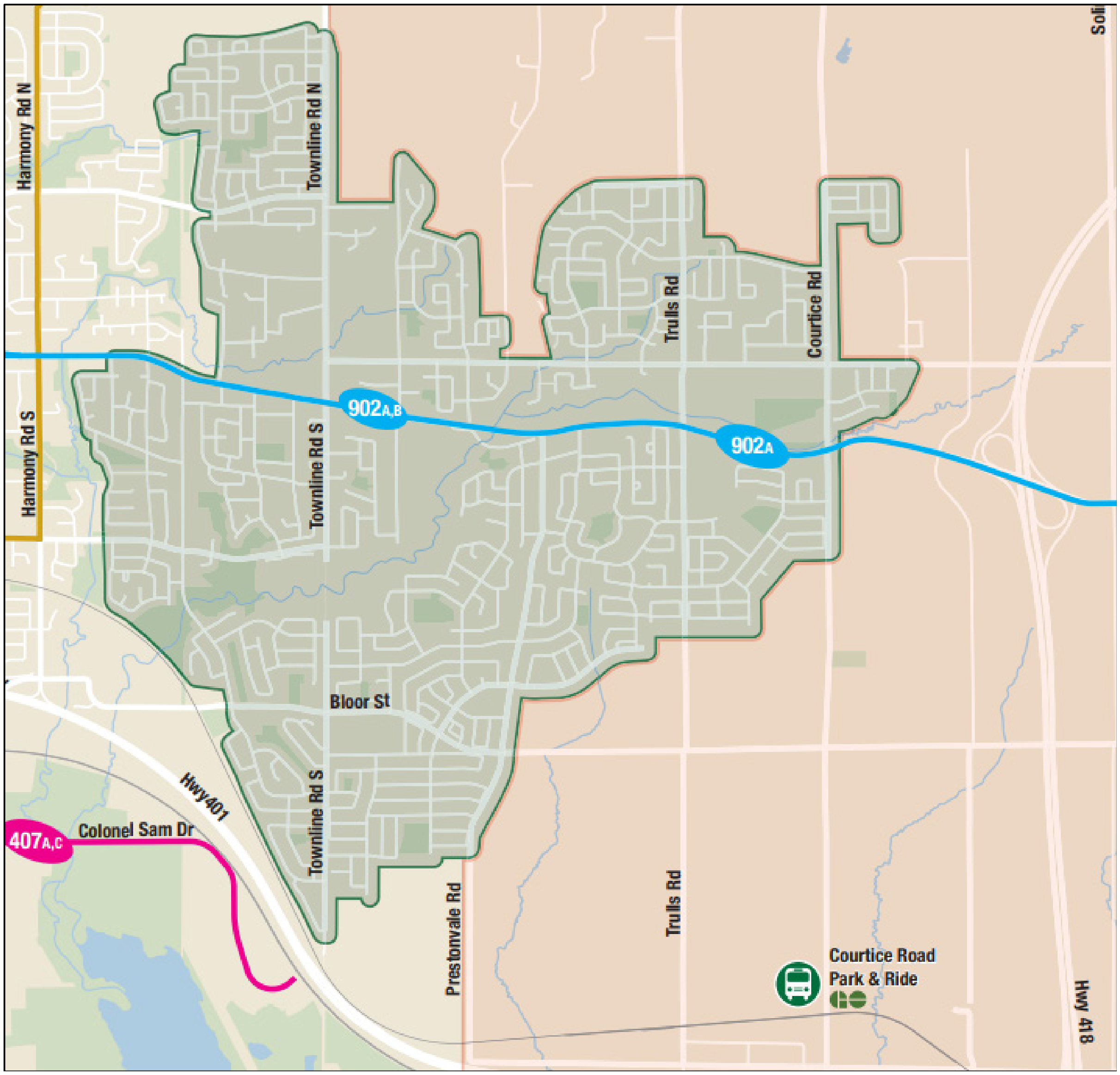
GO Bus Route 90 was recently discontinued due to the implementation of DRT's new Route 902A connecting Oshawa GO and Bowmanville; GO's Route 90B will continue to run although beyond our study area.

The GO Transit Courtice Road Park and Ride is also located south of the study area.

The following lists the DRT transit stops within the study area:

- **DRT Route 902A/B** – service along Highway 2 in the study area and connecting to the Oshawa GO Station, Oshawa Centre Terminal, and Bowmanville Park and Ride.
  - Durham Highway 2 at Trulls Road;
  - Durham Highway 2 at Courtice Road; and
  - Durham Highway 2 at Hancock Road.

Figure D-3: Existing Area Transit Network



D.3.3 Existing Pedestrian Facilities

The identified SECSP study area is generally rural and undeveloped with no dedicated pedestrian facilities.

Along the periphery or just beyond the study area, there is a variance on which roadways have sidewalks provided for pedestrian movement. Some arterials and collector roadways have sidewalks provided on both sides (e.g. Regional Highway 2, Trulls Road north of Avondale Drive), and whereas others only have a sidewalk along one side (e.g. Courtice Road in the vicinity of Sandringham Drive). Some streets that pass through residential areas have sidewalks provided on both sides (e.g. Sandringham Drive), while others have a sidewalk along one side (e.g. Meadowglade Road east of Prestonvale Road).

Some network gaps exist where development has yet to be constructed, and many streets do not have sidewalks on either side (e.g. Hancock Road, Trulls Road south of Avondale Drive, Courtice Road south of Sandringham Drive, Regional Highway 2 east of Courtice Road) given the rural undeveloped nature of the lands.

D.3.4 Existing Cycling Facilities

Currently within the study area, there are very limited cycling facilities present. There are dedicated bicycle lane markings on both sides of the roadway on Meadowglade Road east of Prestonvale Road, and on Trulls Road generally between Regional Highway 2 and Avondale Drive. No other dedicated cycling facilities exist within the study area.

D.3.5 Existing Traffic Volumes

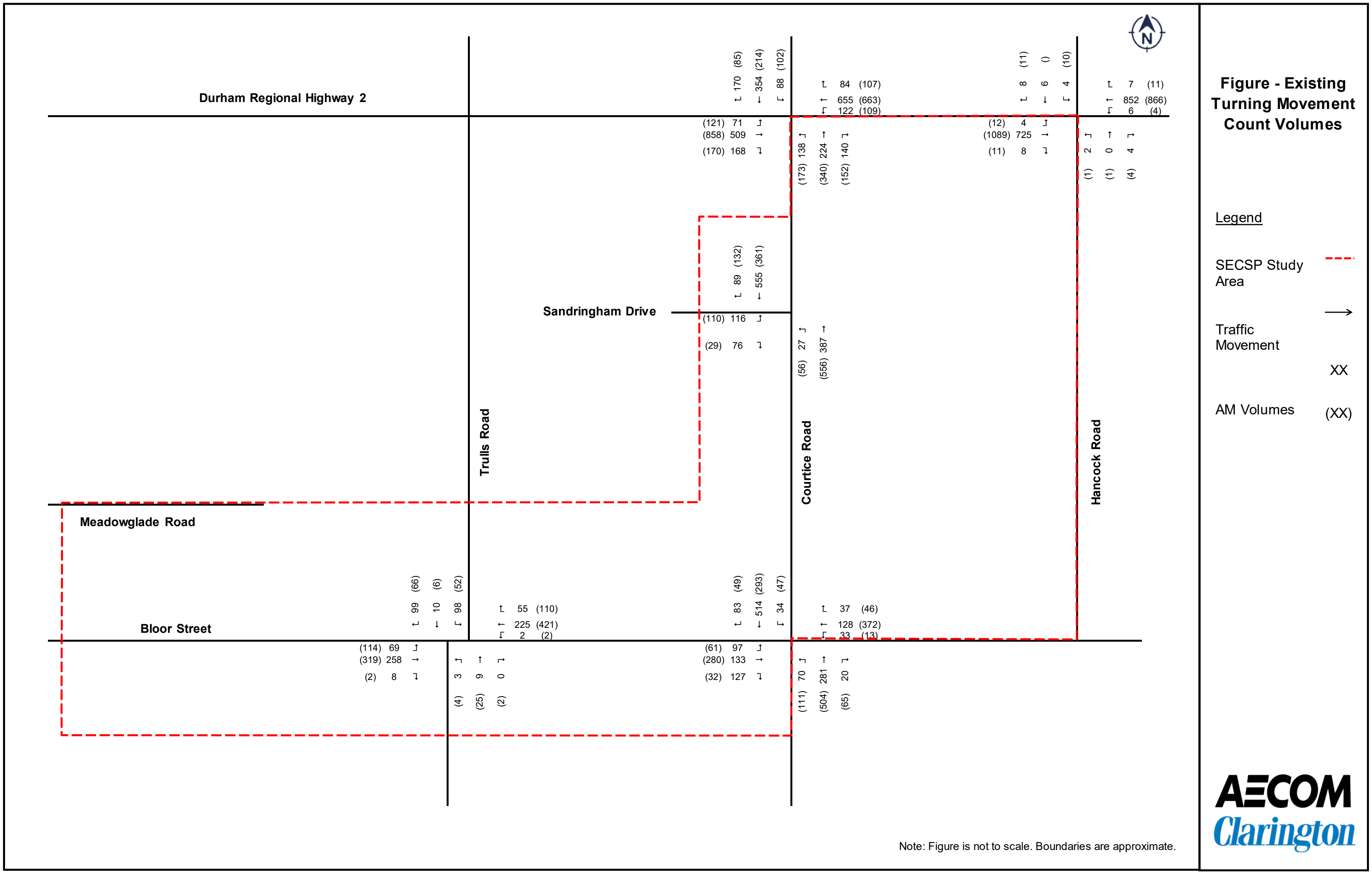
Vehicle turning movement counts (TMCs) for the study intersections were obtained at the initiation of this study in 2018 and supplemented with any other more recently available data from the Region of Durham for the weekday AM and PM peak hours. **Table D-1** summarizes the data collection dates and the identified AM and PM peak hours. Detailed TMC data is provided in **Appendix B**.

Table D-1: TMC Data Collection Dates and Peak Hours

Intersection	Data Source	Count Date	AM Peak Hour	PM Peak Hour
Highway 2 at Courtice Road	Region of Durham	Thursday, May 18, 2017	08:00 to 09:00	16:45 to 17:45
Bloor Street at Trulls Road	Region of Durham	Thursday, September 19, 2019	07:45 to 08:45	16:30 to 17:30
Bloor Street at Courtice Road	Region of Durham	Wednesday, October 10, 2018	07:30 to 08:30	16:45 to 17:45
Courtice Road at Sandringham Drive	Region of Durham	Thursday, September 19, 2019	07:45 to 08:45	17:00 to 18:00
Highway 2 at Hancock Road	Region of Durham	Wednesday, May 1, 2013	08:00 to 09:00	16:45 to 17:45

The turning movement volumes at the study intersections for the AM and PM peak hours were normalized to a common 2020 base year to reflect Existing Conditions by applying an annual growth rate of 1.5% for the required number of years to grow the raw count volumes to 2020. The factored turning movement volumes were subsequently balanced to compensate for imbalanced turning movement counts due to the variance in data collection dates. The balanced turning movement volumes of the studied intersections for the Existing Conditions (2020) on a typical weekday during both the AM and PM peak hours are shown in **Figure D-4**.

Figure D-4: Existing Traffic Volumes – 2020 AM and PM Peak Hours



D.3.6 Traffic Operations in Existing Conditions

The turning movement volumes displayed in **Figure D-4** as well as the intersection lane configurations and traffic control devices shown in **Figure D-2** were used to develop models in Synchro to replicate existing traffic conditions on a typical weekday in 2020 during both the AM and PM peak hours. The existing signal timing plans for the intersections of Courtice Road & Regional Highway 2 and Courtice Road & Bloor Street were obtained from the Region of Durham and are included in **Appendix C**. All timing parameters for the signal timing plans were replicated in the respective AM and PM peak hour Synchro models, including the phasing setup, offsets, minimum and maximum green times, and clearance times. Heavy vehicle percentages were added separately for each intersection movement. In addition, a peak hour factor (PHF) of 0.92 was used at each intersection, as per the Region's *Design Specifications for Traffic Control Devices, Pavement Markings, Signage and Roadside Protection* guideline for the analysis of the peak hour conditions. For other model parameters not specified in the mentioned guidelines, the Synchro default values were used.

Based on the noted lane configurations in **Figure D-2**, the AM and PM peak hour volumes shown in **Figure D-4** were assessed in Synchro and reported using both the Synchro *Intersection: Lanes, Volumes, Timings* and *Highway Capacity Manual (HCM) 2000* methodologies. Synchro analysis outputs are included in **Appendix D**. **Table D-2** displays the traffic operations for the AM and PM peak hours at the intersection generated using the Synchro *Intersection: Lanes, Volumes, Timings* reports.

In general, traffic operations in the Existing Conditions are shown to be acceptable, with all study intersections operating at an overall Level of Service (LOS) C or better. Only one movement was noted to operate at a critical level (i.e., at LOS E or worse, or with a v/c ratio of 0.85 or above, or with an average delay of 55 seconds or more at signalized intersections, and 35 seconds or more at unsignalized intersection) during the AM peak hour, with three movements operating at a critical level during the PM peak hour. The following movements were found to operate at a critical level in the Existing Conditions analysis:

- At the intersection of Courtice Road & Regional Highway 2,
  - The westbound left-turn movement was found to operate at LOS F with a delay of 110.6 seconds and a v/c ratio of 0.99 during the PM peak hour, representing at-capacity conditions;
- At the intersection of Courtice Road & Sandringham Drive,
  - The shared eastbound left/right-turn movement found to operate at LOS F with a delay of 71.9 seconds and a v/c ratio of 0.87 during the AM peak hour, and at LOS F with a delay of 57.9 seconds during the PM peak hour; and
- At the intersection of Bloor Street & Trulls Road.
  - The shared southbound left/through/right-turn movement was found to operate at LOS E with a delay of 42.9 seconds during the PM peak hour.

No queueing issues were identified in the Existing Conditions traffic analysis. All reported 95th percentile queue lengths were noted to be accommodated within the respective movement's storage distance or the distance to its upstream intersection.

Table D-2: Existing Traffic Operations – 2020 AM and PM Peak Hours

Intersection	Movement	AM Peak Hour - Existing Conditions (2020)				PM Peak Hour - Existing Conditions (2020)			
		Delay (s)	V/C Ratio	LOS	95th %ile Queue (m)	Delay (s)	V/C Ratio	LOS	95th %ile Queue (m)
Courtice Road & Regional Highway 2	EBL	22.8	0.36	C	20.5	37.3	0.64	D	45.2
	EBTR	17.5	0.48	B	57.0	23.3	0.71	C	101.8
	WBL	29.7	0.56	C	36.9	**110.6**	**0.99**	**F**	**53.9**
	WBTR	19.3	0.51	B	66.3	19.5	0.54	B	69.5
	NBL	30.1	0.46	C	39.2	30.0	0.49	C	47.2
	NBTR	30.2	0.66	C	86.2	44.0	0.87	D	145.1
	SBL	16.5	0.29	B	18.0	20.6	0.46	C	20.3
	SBT	22.3	0.50	C	73.1	19.1	0.31	B	43.3
	SBR	7.3	0.26	A	18.7	4.2	0.13	A	8.4
	Overall	*20.9*	-	*C*	-	*28.7*	-	*C*	-
Regional Highway 2 & Hancock Road (Unsignalized)	EBL	9.9	0.01	A	0.1	10.0	0.02	A	0.4
	EBTR	0.0	0.31	A	0.0	0.0	0.46	A	0.0
	WBL	9.4	0.01	A	0.2	11.1	0.01	B	0.2
	WBTR	0.0	0.36	A	0.0	0.0	0.37	A	0.0
	NBLTR	13.6	0.01	B	0.3	17.0	0.02	C	0.5
	SBLTR	18.9	0.07	C	1.8	16.5	0.07	C	1.7
	Overall	*0.3*	-	*A*	-	*0.3*	-	*A*	-
Courtice Road & Sandringham Drive (Unsignalized)	**EBLR**	**71.9**	**0.87**	**F**	**53.7**	**57.9**	**0.73**	**F**	**36.4**
	NBLT	1.1	0.04	A	0.9	1.6	0.06	A	1.6
	SBTR	0.0	0.41	A	0.0	0.0	0.31	A	0.0
	Overall	*11.4*	-	*B*	-	*7.1*	-	*A*	-
Courtice Road & Bloor Street	EBL	21.4	0.35	C	22.4	22.1	0.34	C	16.7
	EBTR	19.1	0.57	B	43.3	21.3	0.56	C	59.4
	WBL	18.5	0.14	B	9.8	15.7	0.05	B	4.9
	WBTR	18.2	0.38	B	30.8	27.9	0.76	C	84.1
	NBL	11.7	0.25	B	13.2	14.3	0.25	B	22.4
	NBT	10.6	0.34	B	37.4	19.1	0.65	B	95.4
	NBR	0.7	0.03	A	0.8	5.2	0.10	A	7.7
	SBL	8.9	0.07	A	6.6	14.5	0.18	B	11.7
	SBT	15.2	0.64	B	78.9	14.6	0.39	B	50.4
	SBR	4.8	0.12	A	8.4	4.1	0.07	A	5.5
	Overall	*14.8*	-	*B*	-	*19.5*	-	*B*	-
Bloor Street & Trulls Road (Unsignalized)	EBLTR	2.2	0.07	A	1.6	3.6	0.13	A	3.4
	WBLTR	0.1	0.00	A	0.0	0.0	0.00	A	0.0
	NBLTR	17.8	0.04	C	1.1	31.9	0.20	D	5.4
	SBLTR	21.9	0.52	C	22.2	42.9	0.61	E	26.6
	Overall	*6.6*	-	*A*	-	*7.0*	-	*A*	-

Under typical conditions, a field visit would be performed by the project team during the peak hours to verify the observations noted in the Existing Conditions traffic operations analysis and confirm the accuracy of the model results. However, due to the ongoing COVID-19 pandemic and the associated traffic impacts, current field conditions do not represent the typical operations during the AM and PM peak hours. As per the Region’s TIS Guidelines, confirming analysis results with field conditions should be performed for other future TIS work once traffic conditions return to normal.

D.4 Policy Direction

D.4.1 Municipality of Clarington

D.4.1.1 Official Plan

The Municipality of Clarington touches on a number of transportation-related items in Section 19 of their Official Plan, Connected Transportation Systems. The goal of the Official Plan relating to connected transportation systems is (S.19.1.1) to facilitate the movement of people and goods by means of an integrated, accessible, safe, and efficient transportation system providing a full and practical range of mobility options.

Particular to the study area, the OP notes how public transportation will be the responsibility of the Province and Region of Durham. Relating to active transportation, the Municipality will be responsible for updating and implementing all plans. Finally, the Municipality will encourage the future growth of Clarington through key freeway and arterial roadways, particularly the new Highway 418 directly east of the SECSP area, and also having Regional Highway 2 as a main commercial roadway.

Figure D-5 is an extract from Clarington's Official Plan (Map J2) illustrating the existing and planned road network in and in the vicinity of the SECSP area.

D.4.1.2 Transportation Master Plan

The Clarington Transportation Master Plan identifies a number of initiatives pertaining to planning, active transportation, transportation hubs, and transit. As identified in the TMP, the future Courtice GO Station is anticipated along Courtice Road north of the CP Rail corridor. A number of municipal and other road/highway improvements and projects have been identified in the TMP.

Figure D-6 is an extract from Clarington's Transportation Master Plan (Plan ES-5) illustrating the existing and planned road network in and in the vicinity of the SECSP area.

Figure D-5: Clarington OP Future Proposed Road Network

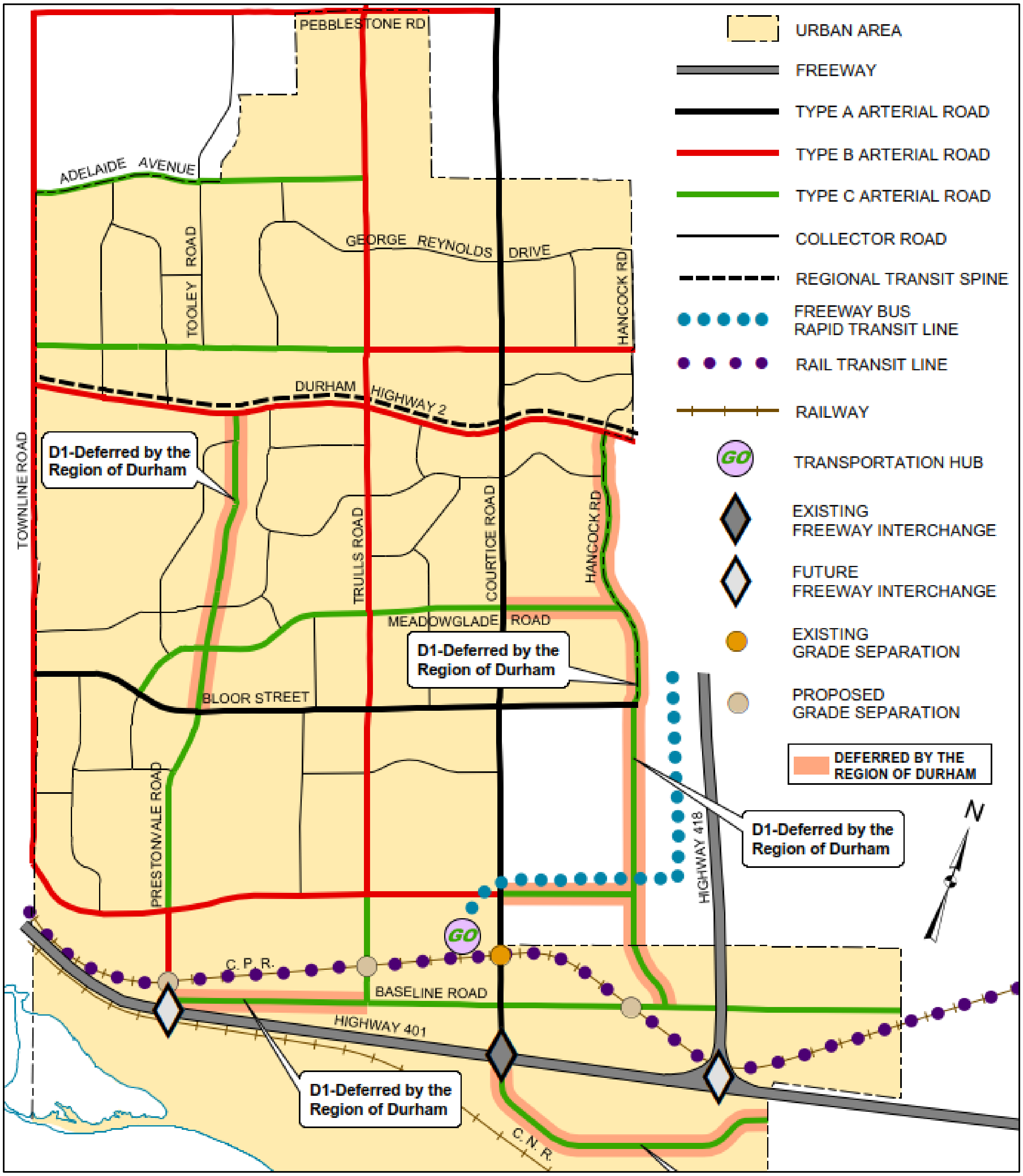
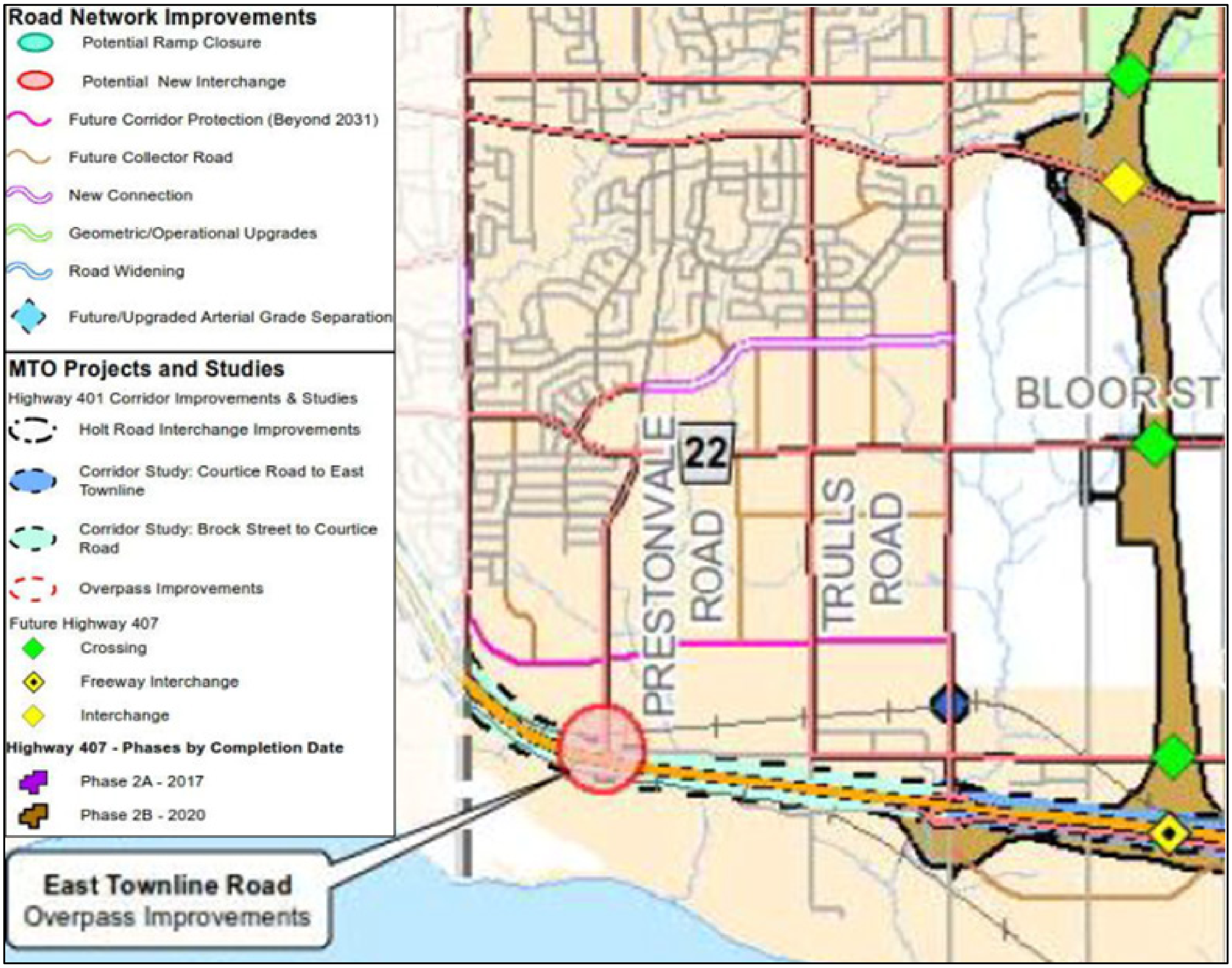
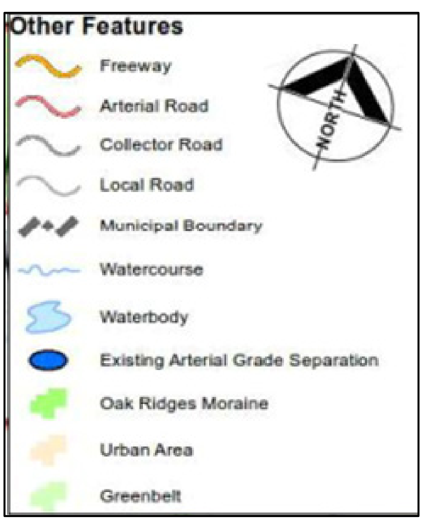


Figure D-6: Clarington TMP Future Proposed Road Network





D.4.1.3 Active Transportation

The Municipality currently does not have an Active Transportation Master Plan. Policies and goals are outlined in the Clarington Official Plan and Transportation Master Plan. Within the Official Plan, S.19.5.2 outlines that an Active Transportation Master Plan will be developed in the future. As outlined, the active transportation network will be developed in co-ordination with their complete streets and Transportation Master Plan initiatives.

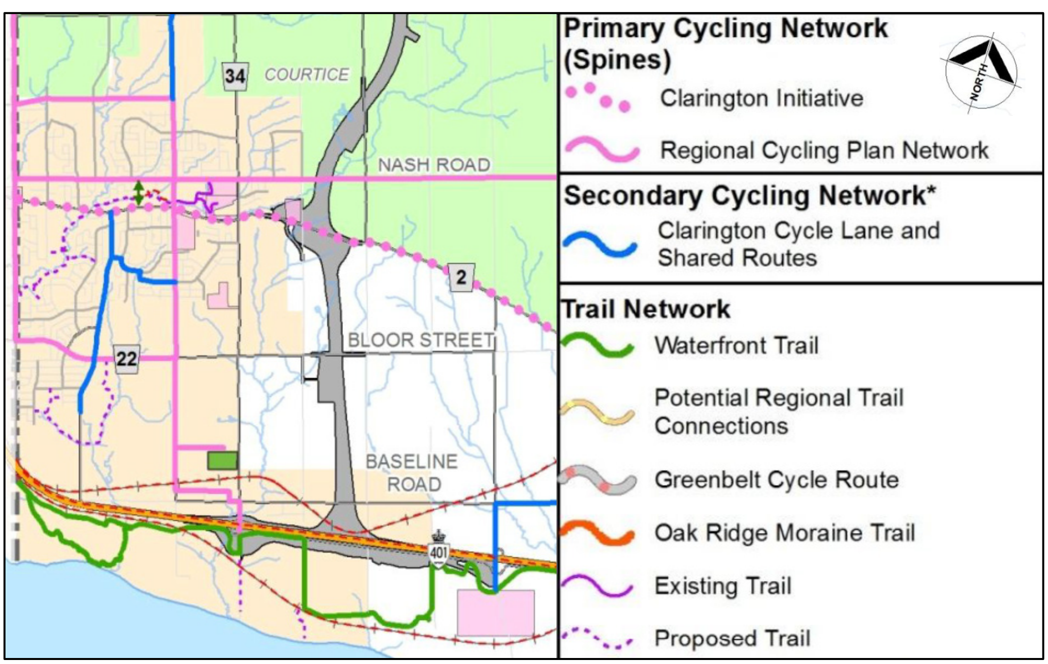
The TMP and OP both acknowledge the importance of active transportation in developing places and spaces, and that there is a need to ensure that existing and future road networks are based off a walkable grid street pattern to help reinforce this objective. Clarington also acknowledges the growing role of cycling in providing an inclusive and active transportation network, which is reflected in the development of bikes lanes and trails and the following objective:

> The Municipality's goal is to improve the cycling network to provide a safe and inviting environment that is welcoming to more users.

The Clarington Transportation Master Plan outlines a number of existing and future active transportation linkages throughout the Municipality. The plan acknowledges that there is a need to provide complete routes and that there are a number of sections of the network that need improvements. The TMP has identified a number of existing trails within the SECSP study area that are either on-road cycling lanes or shared routes that need improvements. This includes some of the existing infrastructure along Trulls Road and Prestonvale Road. The TMP also establishes where some proposed cycling and trail facilities are planned; this includes additional infrastructure along Bloor Street, Prestonvale Road, and Regional Highway 2.

Figure D-7 is an extract from Clarington's Transportation Master Plan (Plan ES-1) illustrating the existing and planned active transportation network in and in the vicinity of the SECSP area.

Figure D-7: Clarington TMP Active Transportation Map



D.4.2 Region of Durham

A number of documents outline the Region of Durham's policies and transportation-related growth, including the Durham Regional Official Plan, dated May 26, 2020, and the Durham Transportation Master Plan 2017, dated December 2017. The Region also has a Regional Cycling Plan, Regional Trail Network, and DRT Five-Year Service Strategy. Elements of these active transportation and transit plans have been incorporated into the TMP. The Region of Durham identifies seven directions as goals for the future transportation network within Durham:

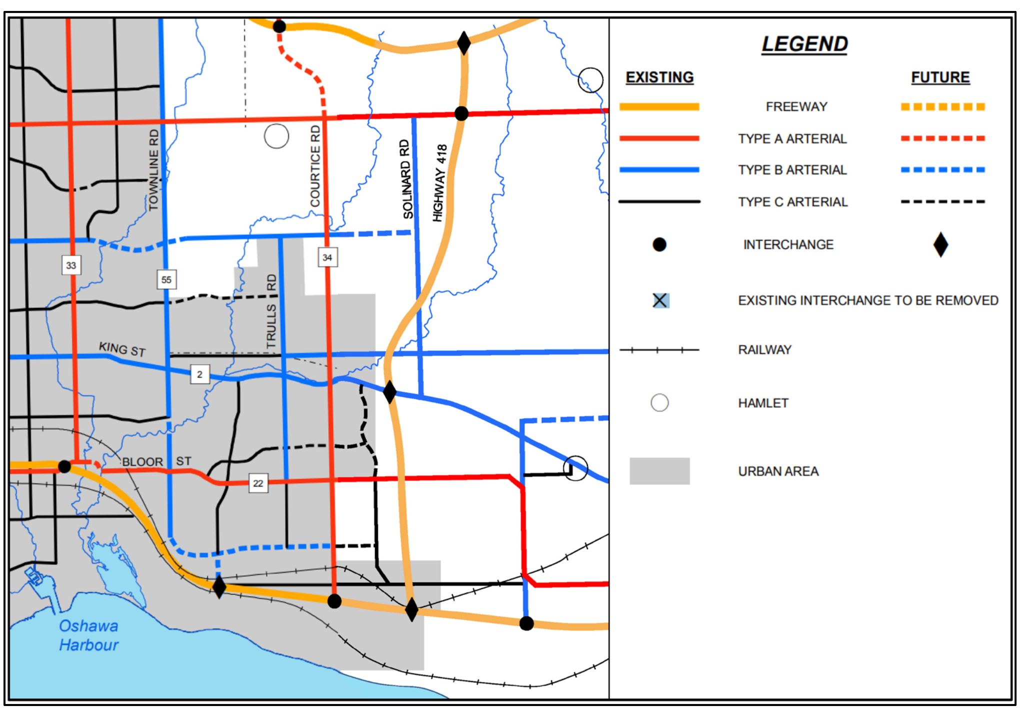
- **Direction #1:** Strengthen the relationship between land use and transportation.
- **Direction #2:** Elevate the role of integrated public transit including Rapid Transit.
- **Direction #3:** Make walking and cycling more practical and attractive
- **Direction #4:** Optimize road infrastructure and operation.
- **Direction #5:** Promote sustainable travel choices.
- **Direction #6:** Invest strategically in the transportation system
- **Direction #7:** Improve goods movement to support economic development

D.4.2.1 Official Plan

The Region of Durham Official Plan also identifies a number of goals in S.11.1 to guide its regional transportation system. Most importantly, the OP identifies that safe and reliable mobility choices should be made available for all residents with respect to the natural, social, and cultural environments. The Region also notes the importance of the Provincial freeway system and the completion of the Highway 418 connection.

Figure D-8 below is an extract from Durham's Official Plan (Schedule C) illustrating the existing and planned transportation network in and in the vicinity of the SECSP area.

Figure D-8: Durham OP Future Proposed Road Network



D.4.2.2 Transportation Master Plan

The Durham Region TMP identifies a number improvements for the 2031 network. The two which appear near the SECSP study area are the widening of Bloor Street East to three lanes from Courtice Road to Prestonvale Road and the recently constructed Highway 418. Two new nearby interchanges are included with the construction of Highway 418, one at Regional Highway 2 and the second at Highway 401.

A number of road expansions have been anticipated beyond 2031, including:

- Regional Highway 2 between Townline Road and Highway 418 – widening to seven lanes for bus rapid transit (BRT);
- Courtice Road from Bloor Street to Highway 401 – widening to four/five lanes;
- Bloor Street:
  - Grandview Street to Prestonvale Road – widening to four lanes;
  - Prestonvale Road to Courtice Road – widening to three lanes and improving profile; and
  - Courtice Road to Holt Road – widening to four/five lanes.

The Regional Cycling Plan notes the implementation of cycling facilities on Bloor Street and Trulls Road in conjunction with the future road work.

Figure D-9 and **Figure D-10** are extracts from Durham's Transportation Master Plan illustrating the existing and planned transportation network for both 2031 and beyond 2031, respectively, in the vicinity of the SECSP area.

Figure D-9: Durham TMP Future Proposed Road Network 2031

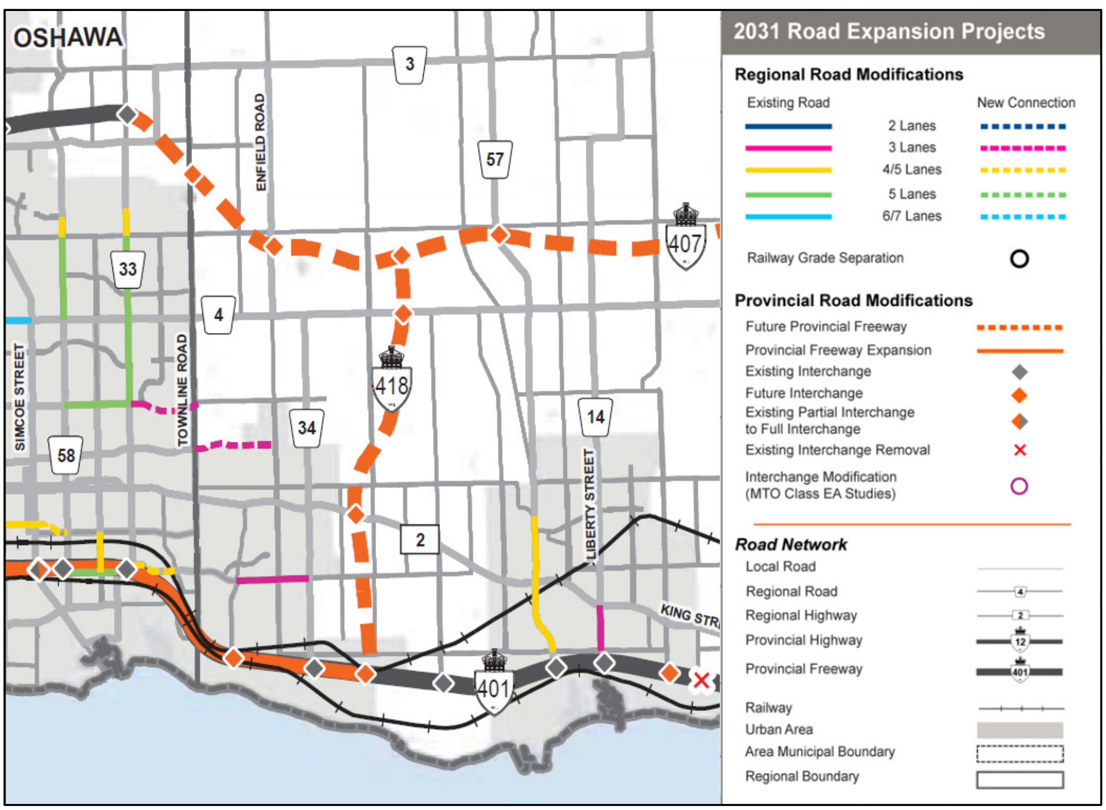
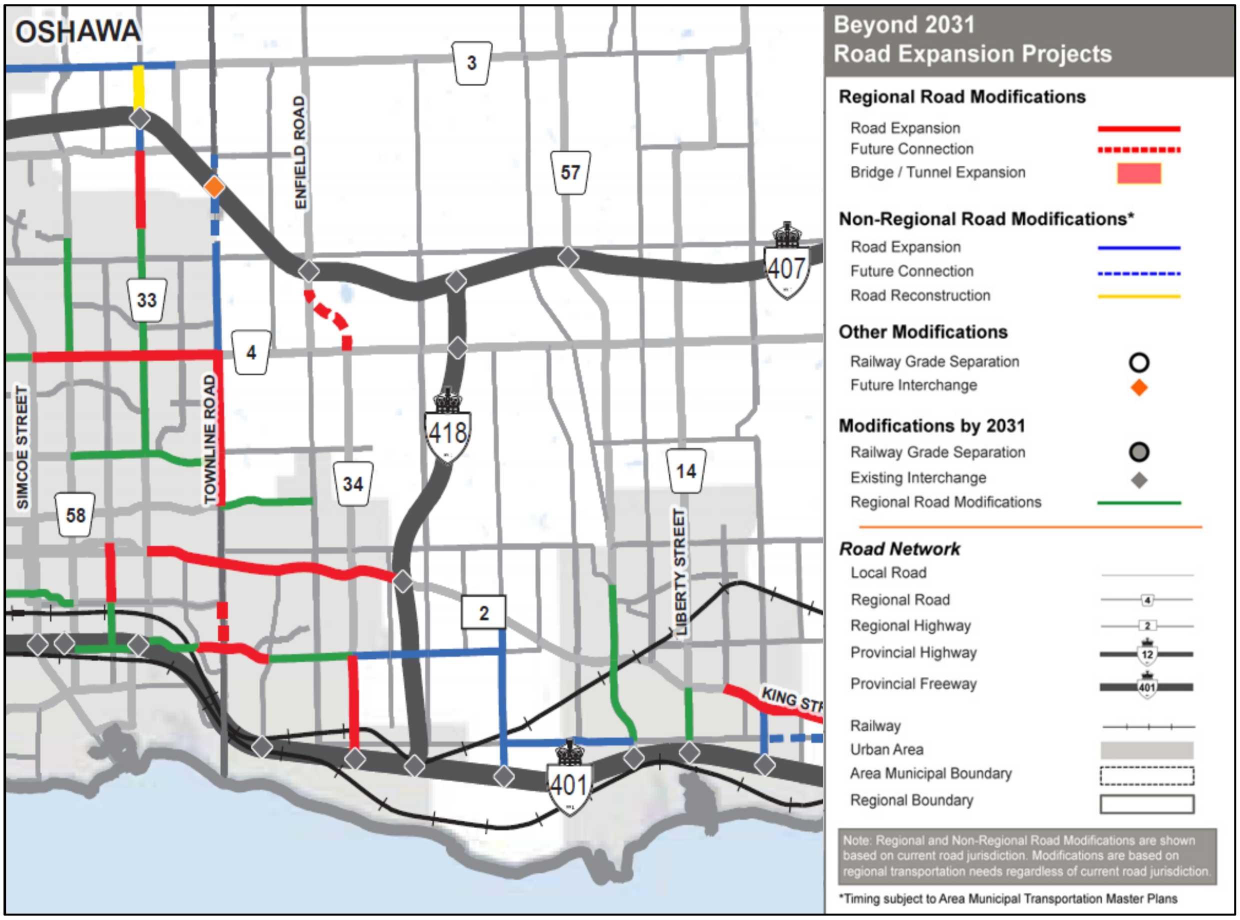


Figure D-10: Durham TMP Future Proposed Road Network Beyond 2031



D.4.2.3 Active Transportation

Active transportation modes are recognised in both the Durham Region Official Plan and Transportation Master Plan as providing significant benefits above and beyond the immediate relief to congestion. These benefits include health, air quality, better spaces and increased public safety amongst others. The TMP identifies a desire for active transportation to see an increase in mode share over the years and recognises that measures will be required that support objective number three: **Direction #3**: Make walking and cycling more practical and attractive.

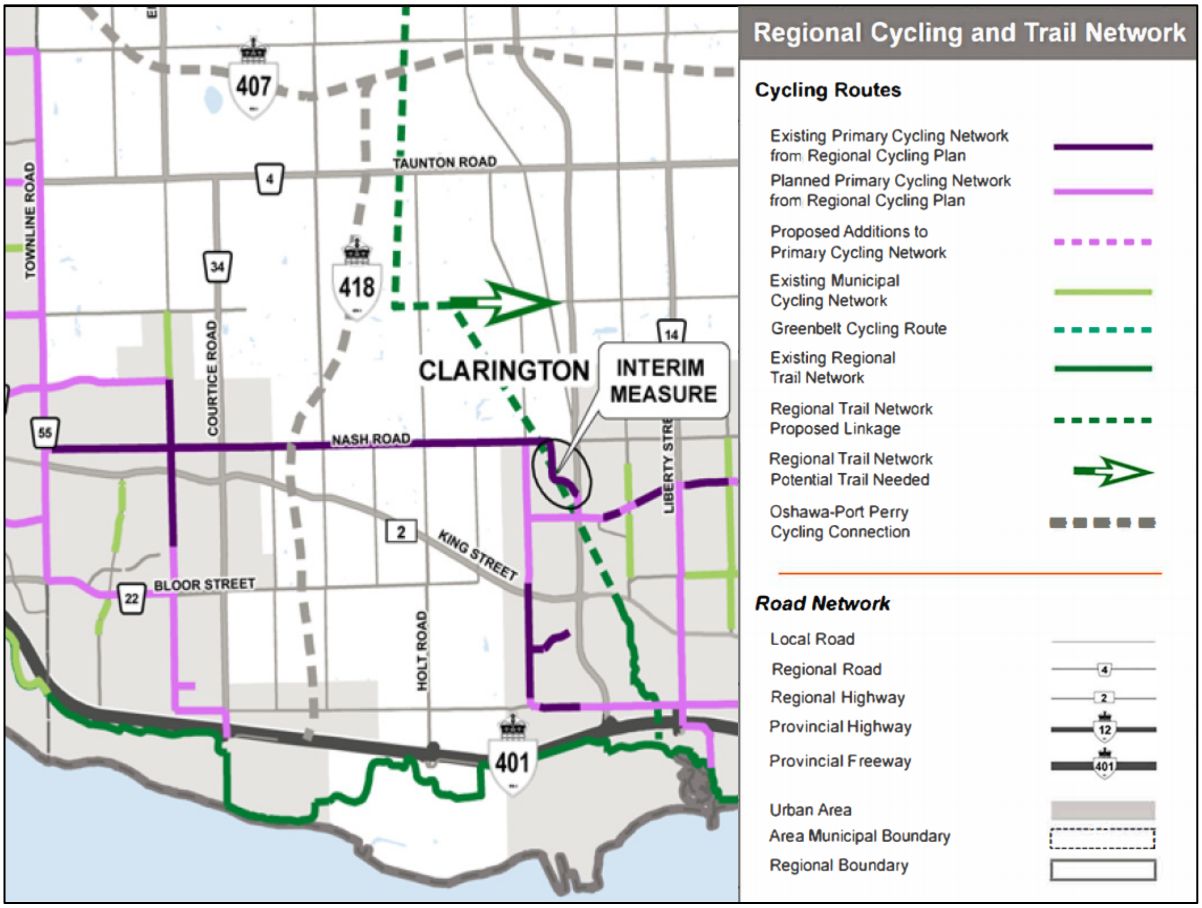
The TMP identifies the following actions as important in supporting Direction #3:

- Integrate the Primary Cycling Network (PCN) of the 2012 Regional Cycling Plan (RCP), the Regional Trail Network and the Greenbelt Cycling Route into the TMP.
- Prioritize continuous routes within the PCN by identifying Short-Term Cycling Routes (Maps 3a and 3b) to be implemented within 10 years.
- Consider stand-alone infill projects to complete critical links in the Short-Term Cycling Routes in the Region's annual Regional Road Program Capital Budget and Nine-Year Forecast process.

- Support planning and design for walking and cycling through the development review process and implementation of design and policy documents.
- Provide enhanced active transportation promotion and improved route mapping.

Figure D-11 below is an extract from Durham's Transportation Master Plan illustrating the existing and planned active transportation network in and in the vicinity of the SECSP area.

Figure D-11: Durham TMP Active Transportation Network



D.4.2.4 Transit

Promoting transit as an alternative travel mode via Durham Region Transit (DRT) is a key goal for the Region. A number of documents guide transit growth throughout the Region including the TMP and the DRT Five-Year Service Strategy.

As identified in the Durham TMP, Highway 2 is a key corridor considered for high-frequency bus service. Dedicated lanes are already provided to western municipalities within the Region. **Figure D-12** below displays the Durham TMP future proposed transit, and **Figure D-13** from the Clarington TMP (Plan ES-3) illustrates the general future improvements to transit in the area (showing local and intra-regional DRT service, as well as GO service). It is noted that while **Figure D-13** shows future enhanced DRT Rapid Transit into Bowmanville, current plans only provide for Highway 2 transit improvements easterly up to Oshawa City Centre.

Figure D-12: Durham TMP Future Proposed Transit Network

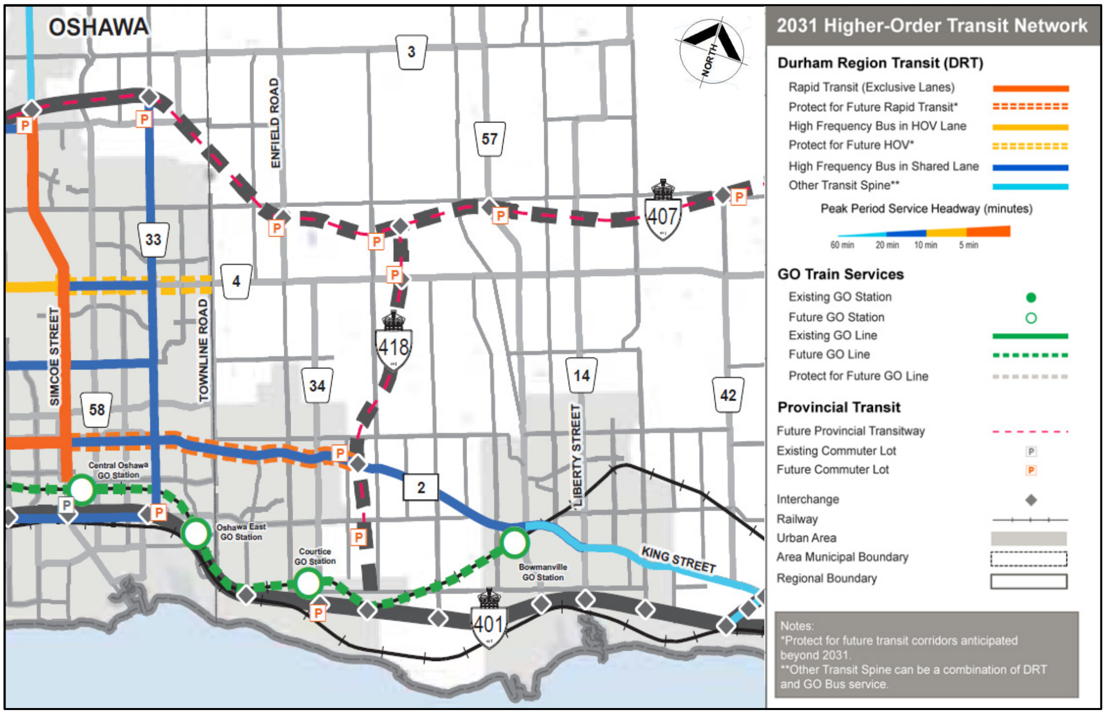
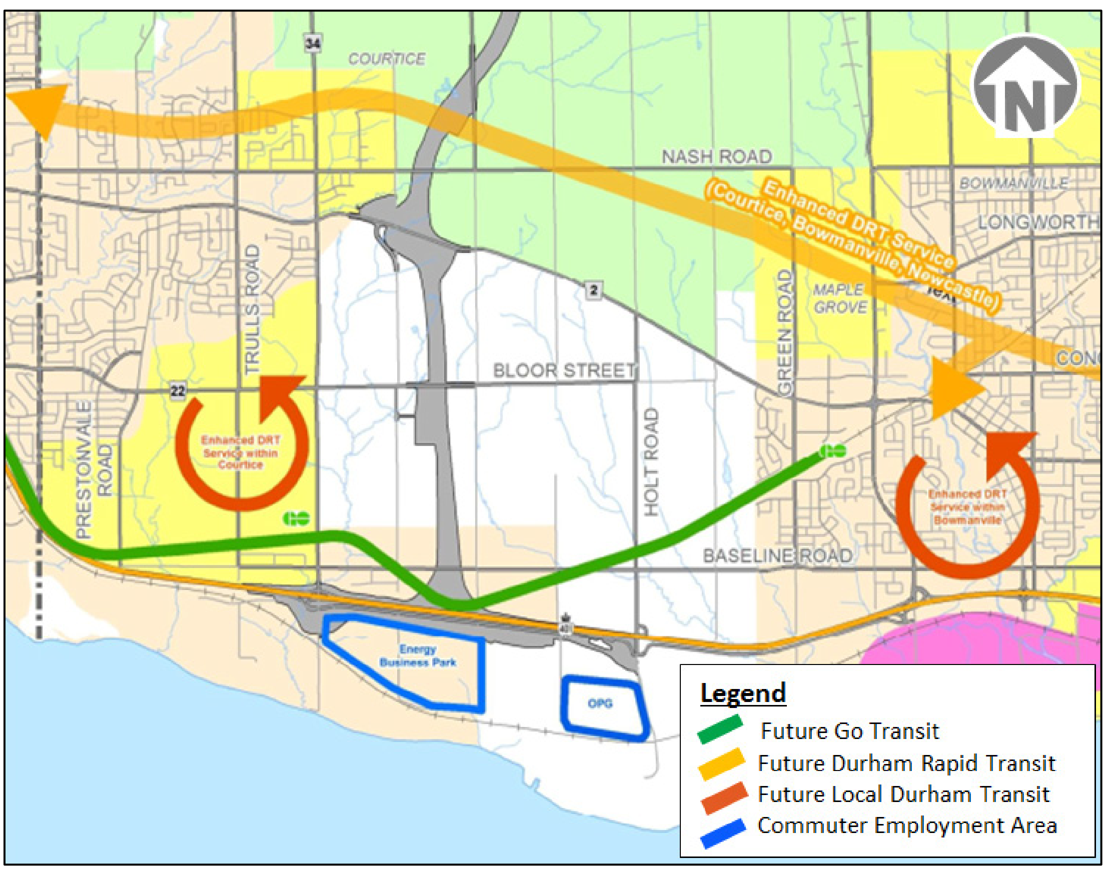


Figure D-13: Clarington TMP Future Transit Plan



It is noted that while **Figure D-12** shows future enhanced DRT Rapid Transit into Bowmanville, current plans only provide for Highway 2 transit improvements easterly up to Oshawa City Centre.

D.4.3 GO Transit Expansion

As part of Metrolinx's Regional Transportation Plan, there is a proposed GO Lakeshore East Rail Extension (**Figure D-14**). This also includes several GO stations:

- Thornton Road, Oshawa
- Ritson Road, Oshawa
- Courtice Road, Courtice
- Martin Road, Bowmanville

The new Courtice GO Station is proposed to be located on Courtice Road at the planned new east-west Type B Arterial north of the rail corridor and will integrate with enhanced Durham Region Transit service to connect Courtice and Bowmanville. The figure below illustrates the proposed GO stations along the Lakeshore East GO Line extension.

Figure D-14: Metrolinx Proposed Lakeshore East Expansion Graphic

D.4.4 Ministry of Transportation Ontario (MTO)

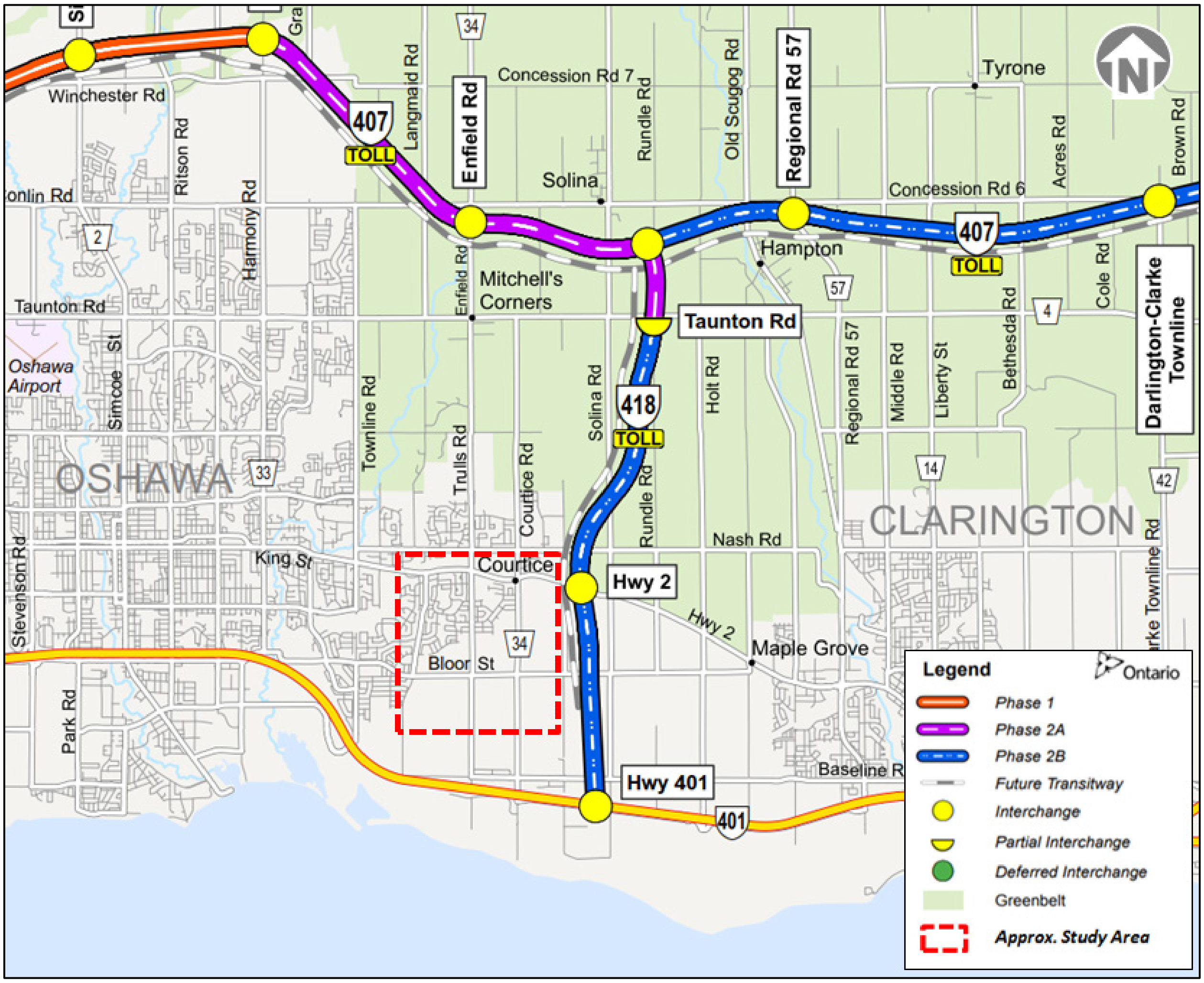
D.4.4.1 Highway Extensions

The MTO has a number of significant highway programs within the SECSP study area. Two of the more prominent highway programs include Highway 407 Extension East Phase 2 and Highway 418.

With Highway 407 Phases 2A and 2B recently completed and opened, Highway 407 completely links to both Highway 35/115 directly, and indirectly to Highway 401 via the new Highway 418 (**Figure D-15**). This includes full interchanges at the following nearby locations:

- Highway 418 at Highway 2
- Highway 418 at Highway 401

Figure D-15: Highway 407 ETR and Highway 418 Phasing



D.4.4.2 Active Transportation

The MTO has developed its Province-wide Cycling Network alongside the Province's Cycling Strategy. There are a number of provincial identified facilities within the Municipality, however these are located south of Highway 401 and also to the north along Concession Road 6. No provincial active transportation facilities are identified within the SECSP study area.

D.5 Linkages to Other Supporting Studies

Supporting background studies not discussed above include the following:

- Aquafor Beach Robinson and Tooley Sub Watershed Study.

D.6 Opportunities and Constraints

D.6.1 Opportunities

The planning for the transportation network for the SECSP area should provide for a robust, connected and flexible network that serves the mobility and accessibility of all road users (motorists, transit, cyclists, and pedestrians). Key planning opportunities and considerations in developing a transportation network to serve the SECSP area include:

- Build upon the previously contemplated and planned road network elements identified in both Clarington's and Durham's Official Plans and Transportation Master Plans.
- Promote spine road capacity improvements along the existing arterial road network.
- Promote Arterial connections to existing and planned freeway infrastructure.
- Extend Collector roads from existing adjacent developed areas into the SECSP area to create longer Collector roads that integrate and connect communities.
- Plan Collector road alignments to respect the topography of the SECSP area and capitalize on view and window corridors adjacent to natural heritage lands, where appropriate.
- Create a Collector and local road network that creates appropriate block sizes that allow for 80% transit coverage with most residences / jobs within a 400 metre walking distance. A further 10 to 15% of residences and workplaces should be within a 600 to 800 metres walking distance in order to achieve the standards outlined in the DRT Five-Year Service Strategy.
- Layout communities to promote walking and cycling in lieu of vehicular movements.
- Plan an integrated cycling and pedestrian spine network to the future Courtice GO Station to ensure there are no gaps or hindrances to active transportation in the 'last mile' to the GO station.
- Plan cycling facilities that reflect the utilitarian versus recreational nature of different cyclists, and also the variability in cycling skills.

D.6.2 Constraints

The planning for the SECSP area should also acknowledge and consider a variety of area constraints that impact the planning of the area transportation network. Due to potential constraints present in the area the following shall be considered when planning the transportation network:

- Avoid or minimize crossings of watercourses. Consider a single crossing within a definable watercourse reach, where possible.
- Avoid or minimize intrusion into natural heritage lands, such as wetlands, woodlots, and areas of significant natural interest, where possible.
- Avoid cultural and built heritage resources, where possible.

D.7 Concept Development Considerations

New development has been identified for the SECSP, and in order to accommodate the development, robust transportation service is to be provided. The development of the transportation system for the SECSP is to address the following problem and opportunity statement:

- Regional and Municipal planning policy identify residential and employment growth within the Southeast Courtice Secondary Plan area; and
- Improved transportation service is required to meet the needs of new development within the planning area.

A variety of alternative solutions to address the above problem and opportunity statement, such as road-based solutions, new or improved transit service, active transportation provisions (walking and cycling), land development strategies and policies were considered in the development of alternative methods to address the problem/opportunity statement.

It was determined by the team that a comprehensive transportation service for the SECSP area must be multi-modal and consider both transit and active transportation considerations (for pedestrians and cyclists). It was recognized that while transit-based solutions and also active transportation facilities will not solely address the future mobility and access needs for the Southeast Courtice Secondary Plan development area, they are an important transportation service to complement road network-based solutions, and are also a sustainable transportation solution to achieve reduced environmental impacts in the area.

The area land use planning and layout of the road network for the SECSP were also developed with consideration for the existing policy and planning in terms of already planned or proposed improvements or new roads. The layout of the road network concept for the SECSP was also premised on capitalizing on the opportunities noted in this report, as well as reflecting the area constraints.

The framework for the development and review of these land use and road network concepts was based on a detailed inventory of the environment (natural, social, economic, cultural and transportation / engineering) in a variety of supporting studies for this SECSP. These include studies pertaining the following:

- Planning Background Report
- Landscape Analysis Report
- Functional Servicing Report
- Agricultural Impact Assessment
- Sustainability & Green Principles Report
- Commercial Analysis Report
- Archeological Analysis Report
- Built Heritage, Cultural Heritage & Landscape Screening Report
- Natural Resources, Surface Water, Hydrology

After confirming the need for a balanced transportation plan (incorporating new roads, active transportation, transit servicing, and balanced planning policies promoting an environmentally sustainable development plan), three land use plans and road networks were developed based on varying levels of development yield, preserving environmental features, and creating a community focus (creation of landmark nodes and elements).

The alternative community plans and road networks for the SECSP area were reviewed in order to ultimately identify the optimal community and road structure plan that balances and achieves Clarington's and the area stakeholder's goals. The collective review and insight from the above specialists' studies and insight with the Project Team yielded a comprehensive road network that results in extended and new connected corridors. This includes the realignment of Hancock Road; extensions of Meadowglade Road, Sandringham Road, Granville Drive, Farmington Drive; and a variety of new collector roads. Further, subject to detailed feasibility through future studies, the plan contemplates potential alternative layout configurations for Arterial A roads in the following locations (implementation would need to be reviewed with the Region of Durham and coordinated with other surrounding development initiatives including the Courtice Employment Lands Secondary Plan):

- Courtice Road: Bloor Street northerly to Highway 2 and southerly to the location of the planned Courtice GO Station.
- Bloor Street: Courtice Road westerly approximately 1 km to the future Granville Drive intersection with Bloor Street and easterly to Hancock Road.

The overall transportation plan also includes considerations for transit service, and a comprehensive active transportation network for pedestrians and cyclists. Additional information pertaining to the three development plans and review is highlighted in the SECSP Phase 2 Summary Report.

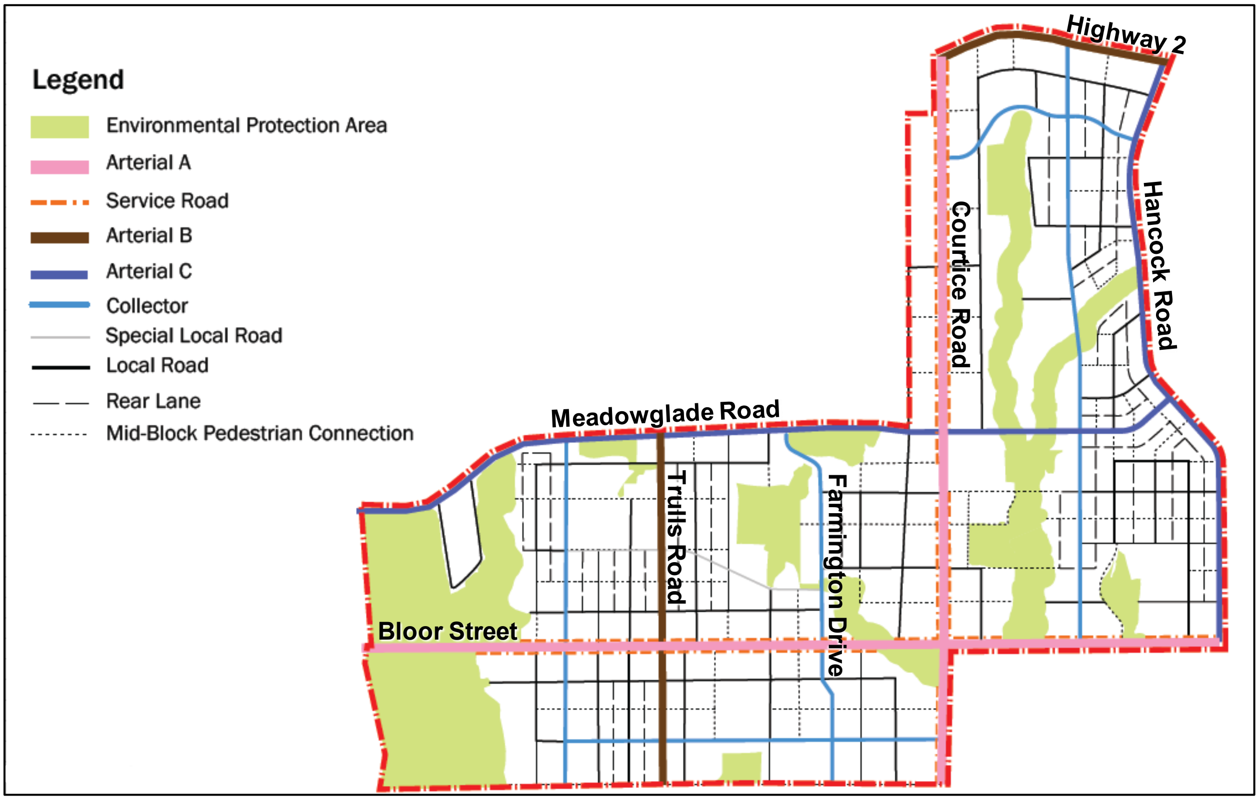
D.8 Road Network

The Southeast Courtice Secondary Plan provides for a compact, walkable, friendly and accessible neighbourhood within Courtice. The concept road network comprises Arterial Roads, Collector Roads, Local Roads and Laneways (**Figure D-16**). A Special Local Road is also identified providing the functional requirements of a Collector Road. While these streets serve an important functional role facilitating movement, they are equally important as a place for people to meet and socialize.

The layout of the proposed street network, and general cross-section typology for the various roads are illustrated in the following figures. The cross-sections illustrate the proposed travelled way for motorists, and placement for transit facilities, cycling facilities and pedestrian sidewalks.

Additional details pertaining to the role and functions for each of the road types are contained in the SECSP Urban Design and Sustainability Guidelines.

Figure D-16: Proposed Road Network



It is that the noted that the detailed layout of the local road network fabric is to be confirmed through subsequent development phases as development proponents move forward with Draft Plans of Subdivision. That said, the layout of the Arterial and Collector road network is fixed, unless a subsequent Secondary Plan amendment or Environmental Assessment report is prepared.

The road network has been placed with consideration to the intersection spacing and signalized intersection spacing principles contained in the Region of Durham's Arterial Corridor Guidelines. Based on the historical road grid in the southern part of Durham, alternate spacing of signalized intersections every 300 and 500 metre on east-west Type A and B arterials is permitted. In a north-south direction, signalized intersections may occur at a spacing of every 700 metre along Type A arterials and may also occur at approximately 500 to 550 metre along Type B arterials. Intersections are generally permitted every 300 metre along Type C arterials.

Figure D-17: Type A Arterial – Courtice Road & Bloor Street (45 metre ROW, Multi-Way)

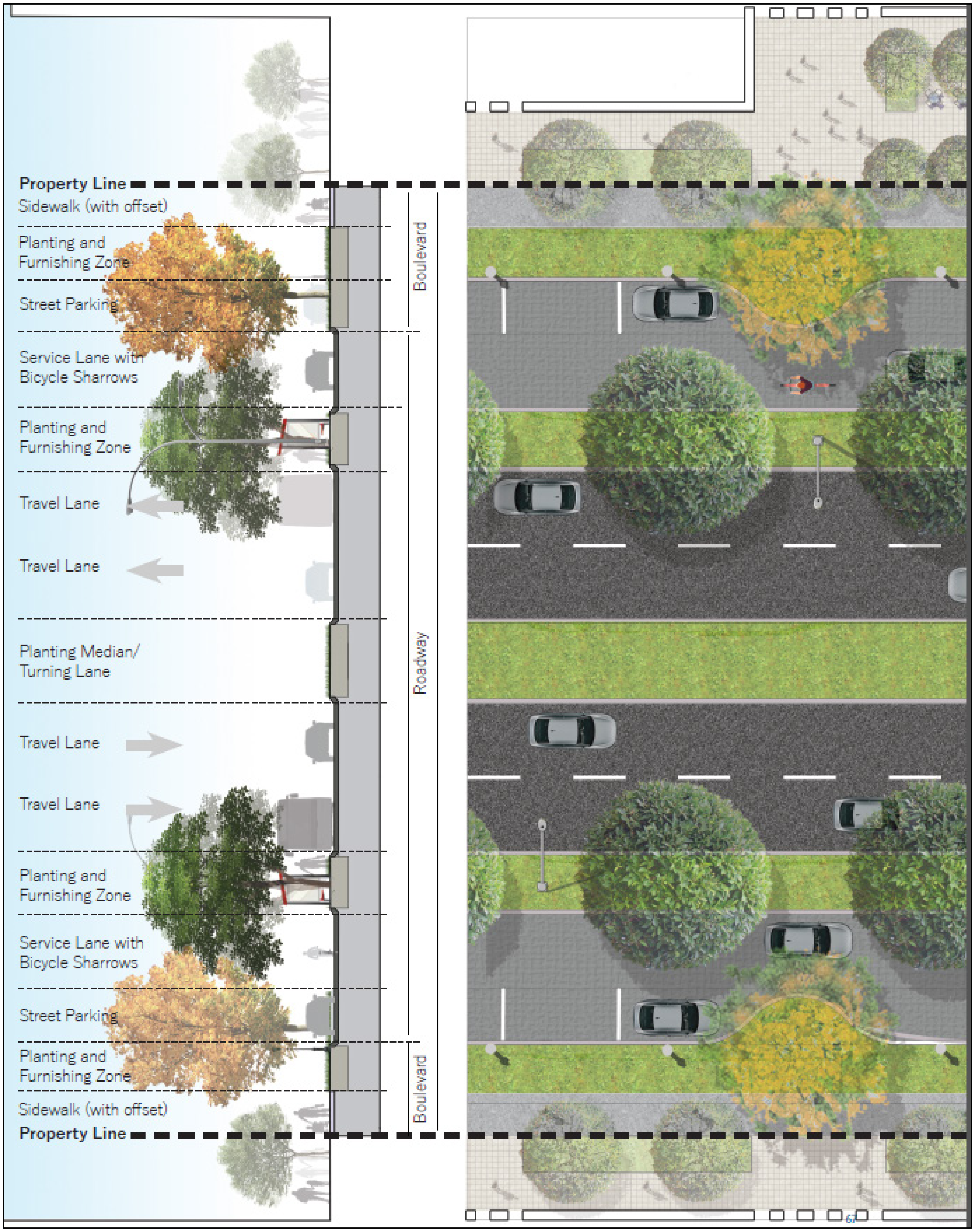


Figure D-18: Type A Arterial (Alternative) – Courtice Road & Bloor Street (40 metre ROW)

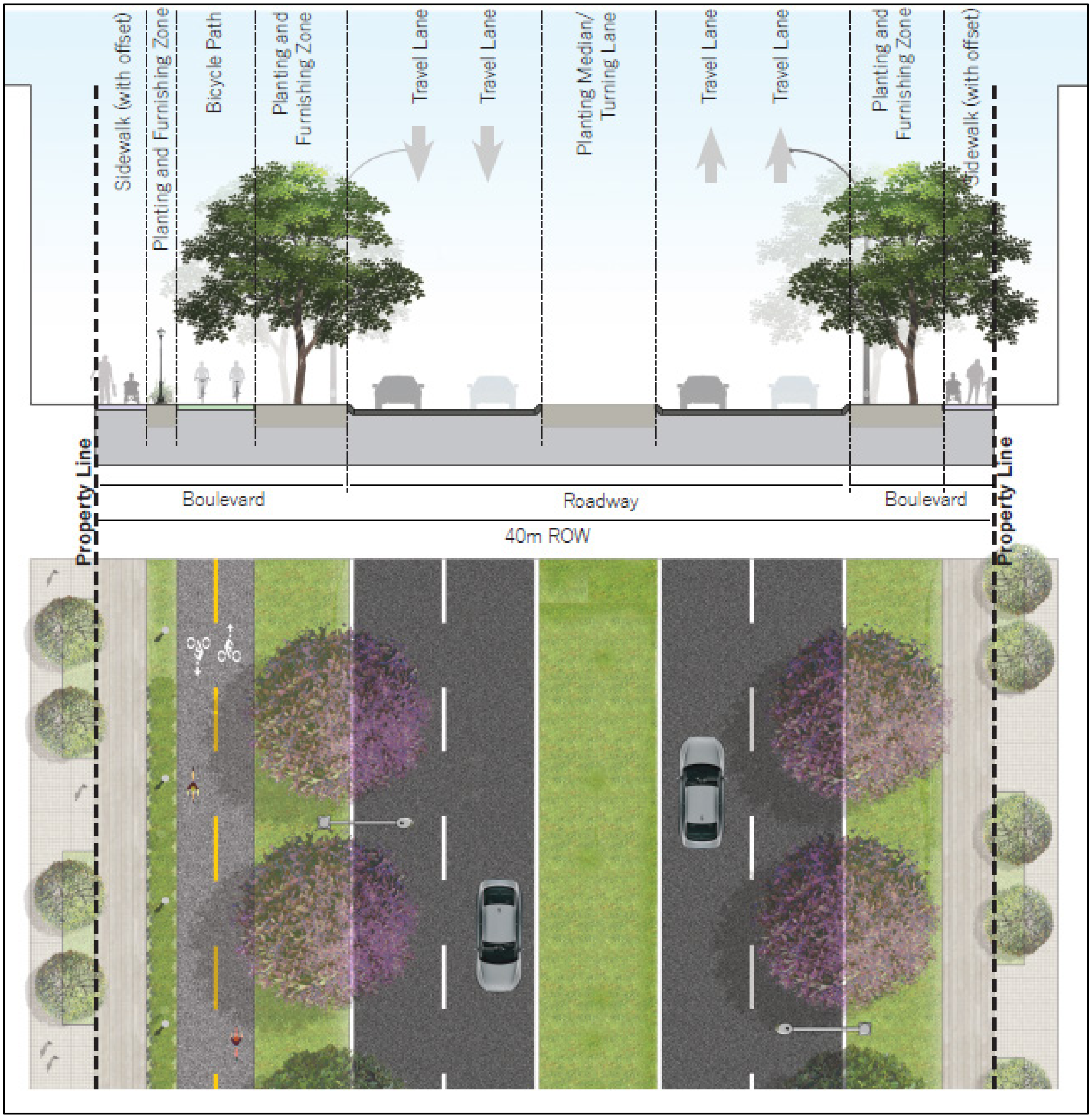


Figure D-19: Type B Arterial – Trulls Road (30 metre ROW)

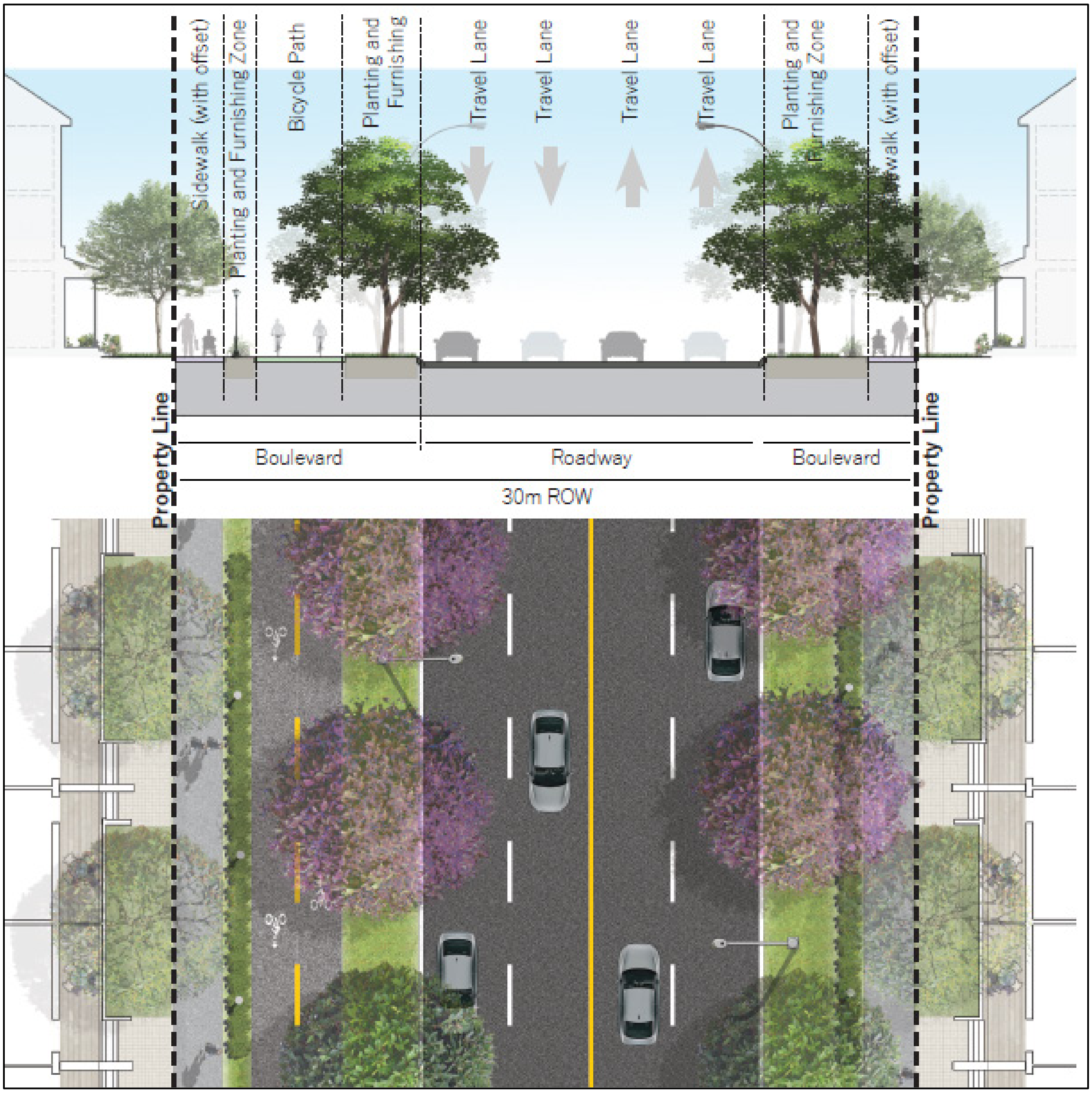


Figure D-20: Type C Arterial – Meadowglade Road and Hancock Road (26 metre ROW)

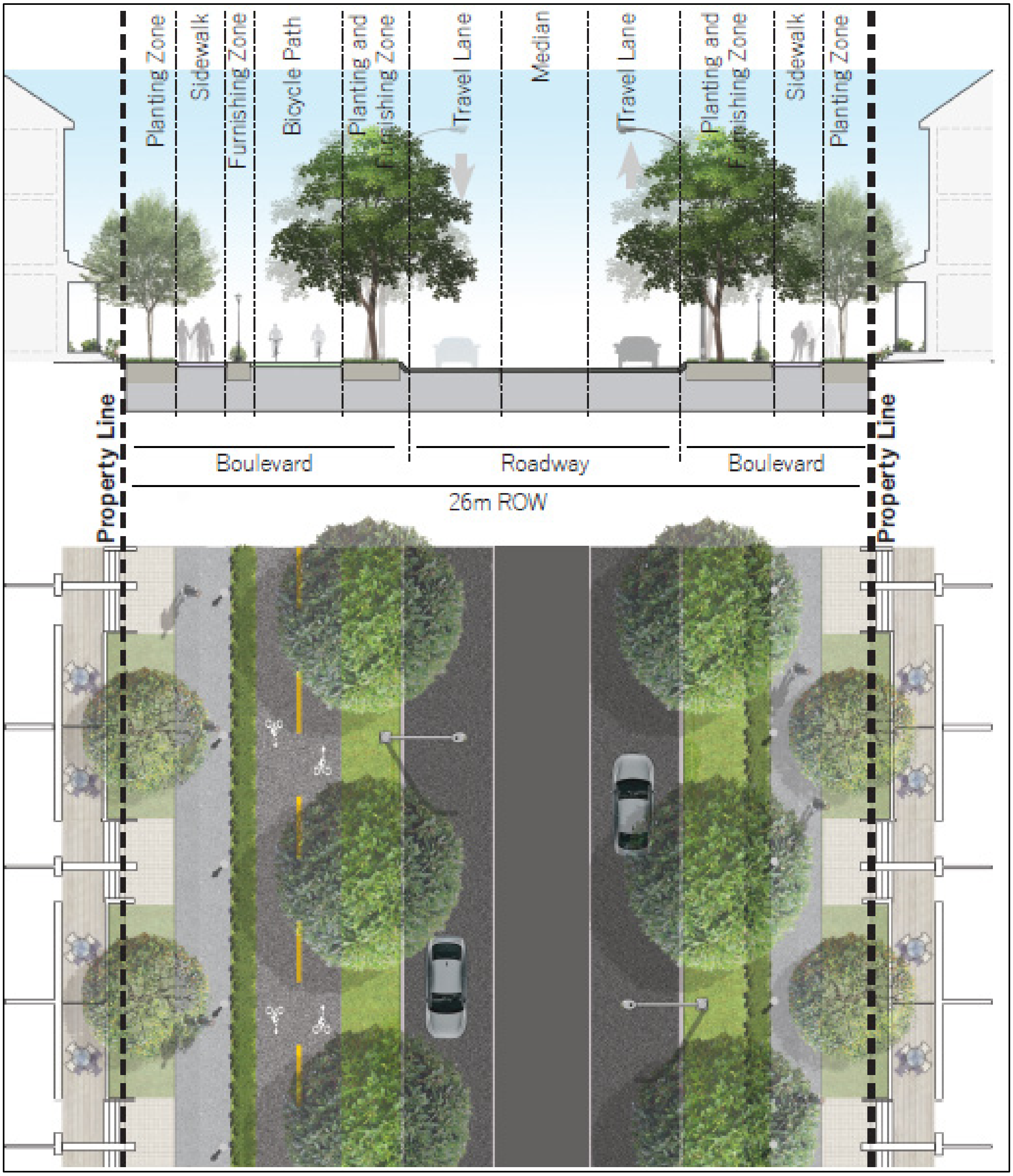


Figure D-21: Collector Roads (23 metre ROW)

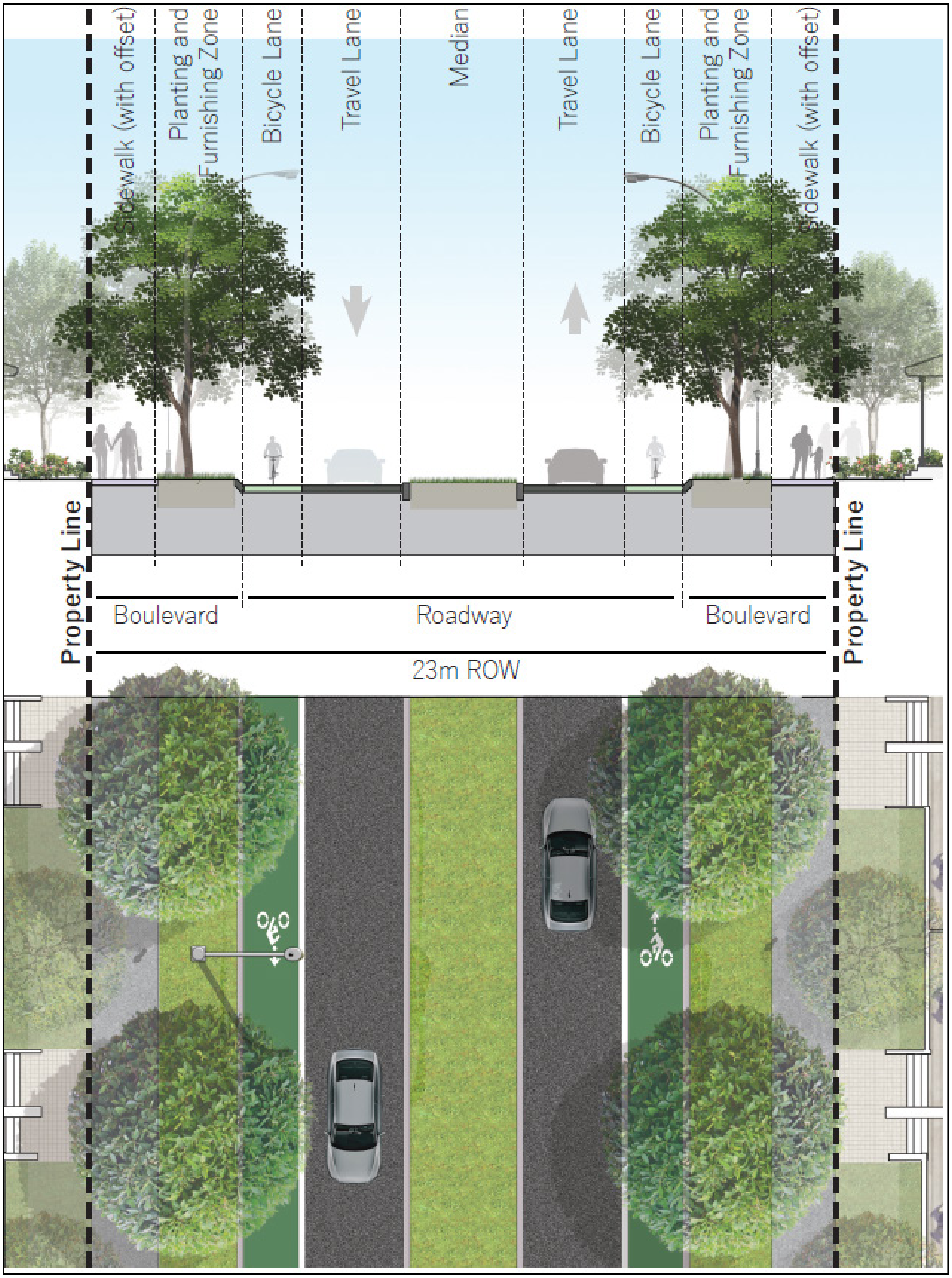
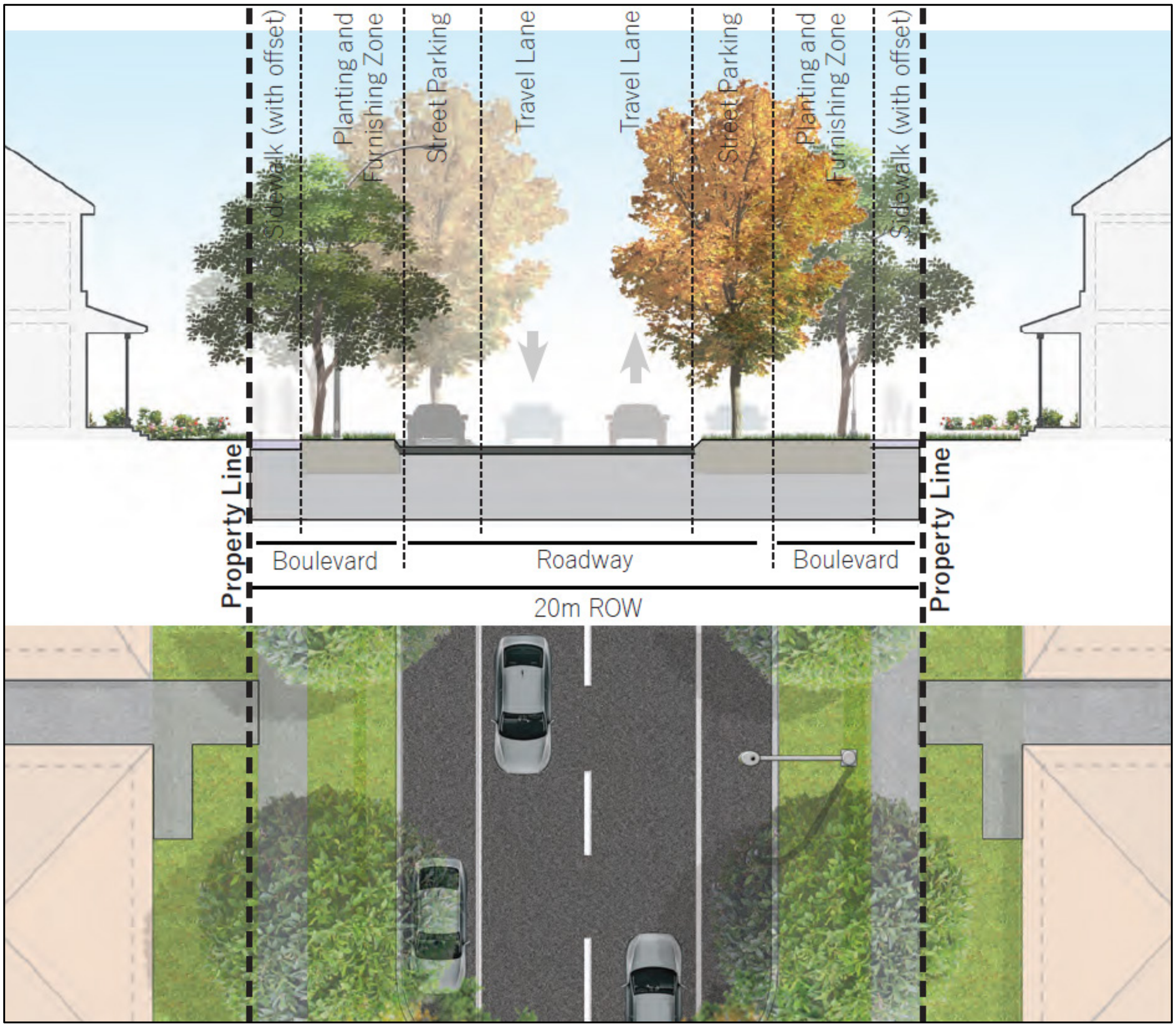


Figure D-22: Local Roads (20 metre ROW)



D.9 Transit Network

A transit-oriented development approach has been adopted to promote the creation of a sustainable and complete community within Southeast Courtice. The SECSP has provided the framework to achieve a development pattern with approximately all residents within a five-minute walking distance of a transit stop. Specifically, there is to be 80% transit coverage with most residences / jobs within a 400 metre walking distance. A further 10 to 15% of residences and workplaces are to be within a 600 to 800 metres walking distance.

The following transit network principles are planned for SECSP:

- Highway 2, Courtice Road, Bloor Street and Trulls Road are encouraged to serve as primary Transit Corridors supporting rapid transit infrastructure for efficient inter-regional travel.

- Meadowglade Road and Hancock Road are encouraged as Secondary Transit routes to provide sustainable travel options to all users.
- Sidewalks should connect directly to transit shelters.
- Transit stops should be located in close proximity to activity nodes and building entrances and on the far side of intersections to improve road efficiency & commuter safety.
- Transit stops should include a shelter and include basic amenities, including seating, trash receptacles, lighting, and route information.

Additional details pertaining to transit-oriented development including five-minute walking distance contours are contained in the SECSP Urban Design and Sustainability Guidelines.

D.10 Active Transportation

D.10.1 Guiding Principles

It will take consistent commitment to the quality and ambition of cycling infrastructure design to realize the aims of the Southeast Courtice area to be a leader in active transportation. The guiding principles set out below are fundamental to that approach. Working through them can help to focus on what it will take to achieve a balanced and desirable active transportation network. The principles are built upon the growing knowledge and experience of what has been done well in the past, and where lessons have been learnt.

Convenience: Networks should serve all the main destinations, and new facilities should offer an advantage in terms of directness and/or reduced delay compared with existing provisions. Routes and key destinations should be properly signed, and street names should be clearly visible. Route maps should be made available, and on-street maps can be helpful. Routes should be unimpeded by street furniture, vehicle parking and other obstructions which can also be hazardous to visually impaired pedestrians. Delay for pedestrians and cyclists at signalized crossings should be minimized. Trip-end facilities (e.g. cycle parking) should be clearly marked, conveniently located and appropriate for the likely length of stay. The future ease of maintenance, including access to vehicles for sweeping, trimming grass verges and surface and lighting repairs along off-road routes should all be considered.

Accessibility: Cycling networks should link trip origins and key destinations, including public transport access points. The routes should be continuous and coherent (type and color of surfacing may be used to stress route continuity as appropriate). There should be provisions for crossing busy roads and other barriers, and in some areas, there should be a positive advantage over private motor traffic. Routes should be provided into and through areas normally inaccessible to motor vehicles, such as parks and vehicle restricted areas. Safe access for pedestrians and cyclists should be provided during road works. The needs of people with various types and degrees of ability should be considered through consultation and design.

Safety: Not only must infrastructure be planned with safety principles, but it should be perceived to be safe. Traffic volumes and speeds should be reduced where possible to create safer conditions for cycling and walking. Reducing traffic can sometimes enable the introduction of measures for pedestrians and cyclists that might not otherwise be viable. Opportunities for redistributing space within the highway should be explored, including moving curb lines and street furniture, providing right turn refuges for cyclists or separating conflicting movements by using traffic signals. The potential for conflict between pedestrians and cyclists should be minimized. Surface defects should not be allowed to develop to the extent that they become a hazard, and vegetation should be regularly cut back to preserve available width and sightlines. The risk of crime can be reduced through the removal of hiding places along the route, provision of lighting and the presence of passive surveillance from neighboring premises or other users. Cycle parking should be sited where people using the facilities can feel safe. The needs of pedestrians, cyclists and other users should be considered where their routes cross busy roads, especially in more vulnerable locations (e.g. rural areas).

Comfort: Infrastructure should meet design standards for width, gradient and surface quality, and cater for all types of user, including children and disabled people. Pedestrians and cyclists benefit from even, well maintained and regularly swept surfaces with gentle gradients. Dropped curbs are particularly beneficial to users of wheelchairs, pushchairs and cycles, and tactile paving can be provided to assist visually impaired people. Dropped curbs should ideally be flush with the road surface. Even a very small step can be uncomfortable and irritating for users, especially if there are several to be negotiated along a route.

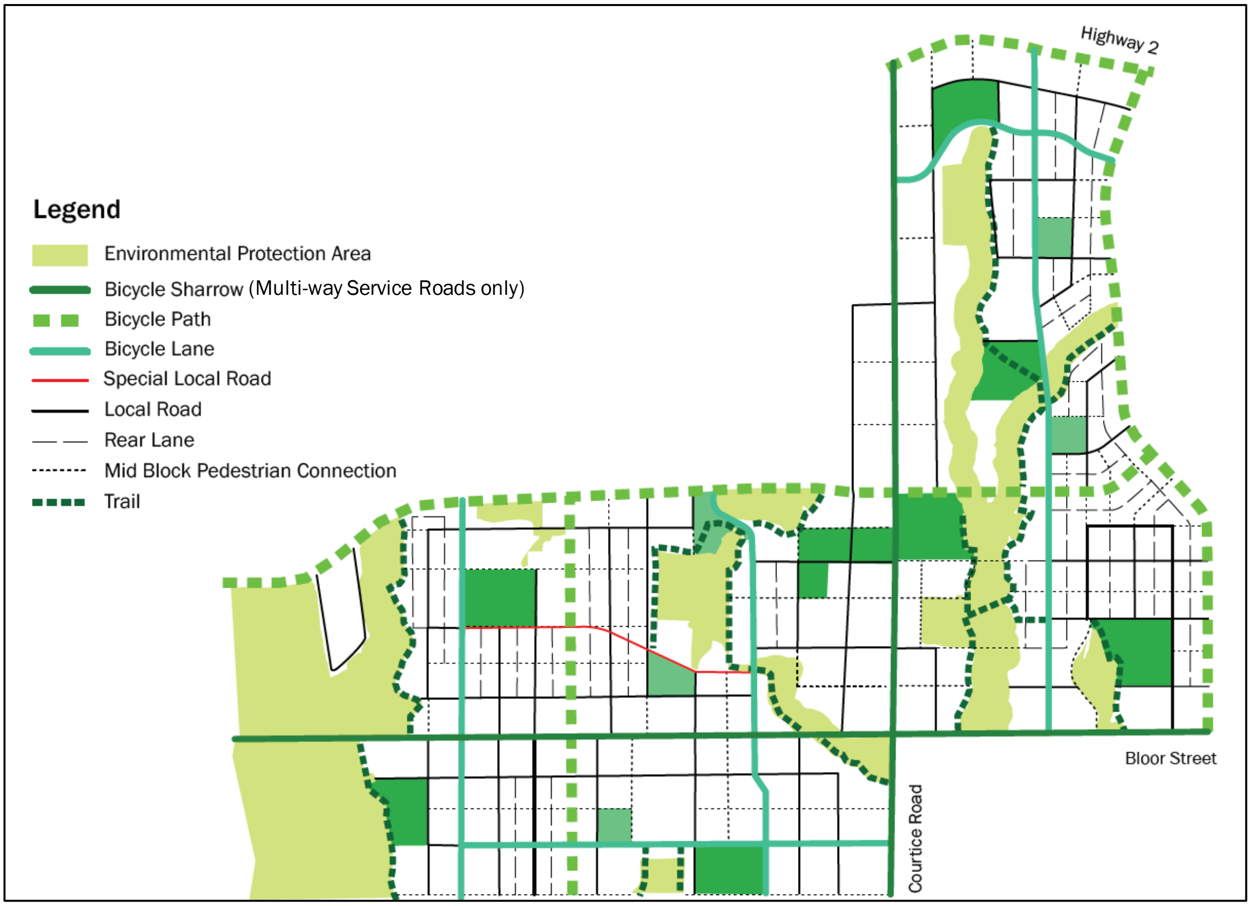
Attractiveness: Aesthetics, noise reduction and integration with surrounding areas are important. The environment should be attractive, interesting and free from litter and debris. The ability for people to window shop, walk or cycle two abreast, converse or stop to rest or look at a view makes for a more pleasant experience. Public spaces need to be well designed, finished in attractive materials and be such that people want to stay. The surfaces, landscaping and street furniture should be well maintained and in keeping with the surrounding area. Issues of light pollution should be considered, in addition to personal security.

These principles should be at the core of any decisions or design within the Southeast Courtice area pertaining to active transportation. With the varied nature of land uses and place in the Secondary Plan area, there will be a number of different design solutions to be developed and introduced, but these principles should be considered in all cases.

D.10.2 Design Considerations

The Southeast Courtice Secondary Plan area has a number of different road categories identified in the Urban Design and Sustainability Guidelines. Each of these categories considers different practiced approaches to providing for active transportation users, and each of these come with different design challenges and considerations. The network of routes for active transportation users' needs to be planned at a finer scale than the highway network, based around the principle of providing small connected blocks of development so that walking and cycling distances are minimized. However, it is important to avoid creating long, narrow routes that are not overlooked by adjacent properties, as these can give rise to antisocial behavior. Equally meeting the needs of larger vehicles in residential streets should not be to the detriment of pedestrians, cyclists and other users. The Secondary Plan area has identified a mixture of on and off-street cycle lanes as well as several trails (see figure below). There is no one set design that can be uniformly applied to all situations; indeed each location will have its own challenges and opportunities and will hence need a unique solution to address it. The following provides some guidance and considerations for the design of the various active transportation infrastructure within the study area.

Figure D-23: Active Transportation Network



D.10.2.1 User Behaviour

Fundamental to the design of infrastructure for active users is the user behavior. The two most prevalent users (pedestrians and cyclists), have very different behaviors and this results in significantly different requirements for each.

- Pedestrian behavior is often unpredictable, particularly in areas where there are other activities to distract these users. To account for these needs, wider sidewalks and pedestrian areas are required in locations where pedestrians are more likely to dwell, e.g., around shops, at meeting locations and entrance/exits from community facilities.

- Cyclist behavior is driven much more by the need to feel safe and comfortable on their journey. The level of comfort and safety can vary depending on the individual user, however the follow are fairly constant amongst users:
  - the cyclist's dynamic envelope, i.e. the space needed in motion;
  - the clearance when passing fixed objects; and
  - the distance from, and speed of other traffic.

These factors, and their impact on the design process, are critical to achieving a cycle-friendly environment. As the speed differential between cyclists and motor traffic increases, greater separation is required. This principle also applies where cyclists share space with pedestrians. If the design allows for relatively high cycling speeds, larger separation distances are beneficial. At very low speeds and on uneven surfaces, cyclists require additional width to maintain balance.

- The speed that cyclists travel plays an important factor in the requirements they need, for example: at low speeds, cyclists are prone to wobble and deviate from a straight line. For most cyclists, it is considered that a speed of 7 mph (11 km/h) or more is required to ride comfortably in a straight line without a conscious effort to maintain balance. This means in areas where speeds are lower than 7 mph (11 km/h) the space given to cyclists should be greater to allow more room for the unstable movements.
- Cycle routes on back streets and off-road routes need to be clearly signed, and changes in direction should be kept to a minimum. However, a balanced approach to signing is required to avoid clutter. Creating a smooth physical interface between different elements of a route by, for example, using dropped curbs also helps to create a continuous, legible and coherent network that is easy to follow

D.10.2.2 Cycle Lane Principles

There are many design principles for cycle lanes, and guidance and regulations from the regional and provincial level should be followed where it applies. Equally guidance and examples of best practice from elsewhere should also be considered as the various locations are considered in detail. The following represents a number of design principles to consider:

- Dedicated cycle lanes normally continue across side roads. These are statistically one of the more dangerous locations for vulnerable road users like cyclists. Careful consideration should be given to how to design and mark cycle lanes in these locations, one approach is to have mandatory cycle lanes transition into short sections of advisory lane to enable motor vehicles to cross them, while also alerting cyclists to the need to be more aware of their interactions with other road users. An advisory lane passing the mouth of a side road may also help to raise driver awareness of the likely presence of cyclists. This is especially beneficial in locations with generous carriageway width and where the side roads join the main alignment at a shallow angle. The use of a colored surface and a cycle symbol help to emphasize the lane at the junction and may also help prevent encroachment by vehicles waiting at side road exits.

- Cyclists in a cycle lane are provided with some separation from motor traffic however, cyclists are generally conditioned to ride in a safe position in the carriageway which is usually at least 1 metre from the curb edge to avoid catchbasins and debris, and to ensure that they are within the sightlines of drivers waiting at side roads. This means that suitable space needs to be provided for these users.
- Cyclists can generally overtake each other within a 2 metre wide lane and easily remain within it when looking back to check for traffic, or when avoiding drainage catchbasins, etc. Drivers do not always realize that cyclists need to move away from the curb to avoid surface hazards and may expect cyclists to stay in lane regardless of its width. A narrow cycle lane may therefore give motorists (misplaced) confidence to provide less clearance while overtaking than they would in the absence of a cycle lane. As such careful consideration about cycle lanes width and the accommodation of additional street furniture need to be considered.
- Where cycle lanes interact with pedestrian crossings, suitable notice should be provided and where appropriate cycle-specific signals should be provided. This can aid in ensuring compliance and help avoid pedestrian/cyclist conflicts that can occur.
- Two-way cycle lanes should generally be separated from other traffic lanes by means such as a curb. If segregation is not adequately provided, the arrangement may be confusing to motorists, especially at night. Any two-way cycle facility needs to be very carefully designed, mainly because of the increased potential for conflict where these routes cross the mouths of side roads. A driver waiting to leave a side road may not be expecting to encounter cyclists approaching from two directions. Equally drivers turning out of a side road may inadvertently enter the two-way cycle lane if it is not clearly marked or protected by a bollard.
- It is also necessary to consider how pedestrians will cross two-way cycle lanes, as pedestrians may not realize they need to look both ways before crossing. This will require careful consideration and potentially additional signage or pavement markings to advise of the potential conflict.
- The type and quality of surface affects the comfort and attractiveness of a route and the whole life costs of the project. An initially high capital cost for a good quality specification may minimize maintenance and repair costs over the long term. A suitable surface for a route should be chosen depending on its purpose, its expected level of use, construction methods available, the available budget for construction and maintenance, and aesthetic and environmental considerations.
- When cyclists lean into a bend, they may extend over the inner edge of a cycle track. Poles, fences or other vertical features on the inside of bends should therefore be set back and any overhanging tree branches or other vegetation cleared.
- Barriers at cycle route access points are commonly provided to prevent entry by vehicles. They become more of a problem for cyclists when designed to exclude motorcycles. Motorcycle barriers should only be introduced after a definite need has been established, because measures that reliably exclude motorcycles invariably

exclude some cyclists, including users of tricycles, cycle trailers and hand cranked cycles. Wheelchairs and mobility scooters will also be excluded. Dismounting to maneuver a cycle with an occupied child seat through barriers can be hazardous.

- Where a cycle track meets a road, visibility splays (triangles) are required so that cyclists can see and be seen by approaching motorists. Splays are defined by their X and Y distances; specific guidance on the splay requirements is provided by the province design standards and this could impact some of the streetscape features planned.

D.10.2.3 Trail Design Principles

Off-road leisure routes and trails tend to be more attractive options because they do not usually suffer from the same safety and space constraints as on-road routes. Routes that follow rivers and trails, for example, are unlikely to be frequently interrupted by side streets or other crossings. In addition, many off-road leisure routes have been created as additions to existing walking and cycling networks, and thus represent an improvement for all users. There are a number of design factors to consider for these routes/trails:

- On commuter routes/trails, cyclists usually want to be able to travel at speeds of between 12 mph and 20 mph (19 to 32 km/h), preferably without having to lose momentum. Frequent road crossings, tight corner radii, the presence of other users and restricted width or forward visibility all affect the speed with which cyclists can travel and the effort required. Cyclists tend not to favour cycle routes that frequently require them to adjust their speed or stop.
- Where cyclists share a route with pedestrians, a lower design speed may be required. Routes with design speeds significantly below 20 mph (32 km/h) are unlikely to be attractive to regular commuter cyclists, and it may be necessary to ensure there is an alternative route for this user category.
- Two visibility parameters determine whether cyclists can ride comfortably at their own desired speed and react safely to hazards. They are the sight distance in motion (SDM) and the stopping sight distance (SSD). The ability of a cyclist to interact safely with other cyclists and pedestrians will depend on the sightlines available. These in turn affect the ability to maintain momentum, anticipate the actions of others and, if necessary, stop in time. It is also important for personal security that cyclists can assess the situation ahead.

Table D-3: Design Speeds and Stopping Distances

Type of Off-road Cycle Route	Design Speed Sight Distance	Minimum Stopping Curve	Minimum Radius
Commuter route	20 mph (32 km/h)	25 metres	25 metres
Local access route	12 mph (19 km/h)	15 metres	15 metres

- Another geometric factor that affects the speed at which cyclists can travel comfortably is the curvature of the cycle track. Whether considering sight distance or curvature, designers should allow for site specific factors such as gradient or surface quality when applying them. For example, where unsurfaced tracks/trails are provided stopping distances need to be significantly increased.
- Physical constraints often make it impossible to meet the desired geometric criteria. If these cannot be achieved, mitigating measures may be necessary, such as where a cycle track approaches an underpass entrance at an angle. However, in many cases, cyclists can be expected to slow down for their own safety. Regardless of geometry, it is important that cycling speeds do not cause inconvenience or danger to pedestrians. Generous sightlines on less busy routes can help pedestrians and cyclists to avoid each other, but at some conflict points measures such as staggered barriers may be required to reduce cycling speeds.
- The minimum recommended width for urban footways on local roads is 2 metres. This is sufficient to allow a person walking alongside a pushchair to pass another pram or wheelchair user comfortably. A minimum width of 1.5 metres is recommended for a one-way cycle track. The minimum recommended width for a two-way cycle track is 3 metres. If these widths cannot be realized, the facility may become difficult for some people to use. Narrow stretches should be kept to short lengths, with passing places interspersed along the route. Passing places should be within sight of adjacent ones.
- Where there is no segregation between pedestrians and cyclists, a route width of 3 metres should generally be regarded as the minimum acceptable, although in areas with few cyclists or pedestrians a narrower route might suffice. In all cases where a cycle track or trail is bounded by a vertical feature such as a wall, railings or curb, an additional allowance should be made, as the very edge of the path cannot be used.
- Routes/trails will need to be designed with drainage in mind, and a suitable gradient and material should be used to allow for quick drainage to avoid the surface becoming dangerous. Equally the track should not be located in areas where water will pool, which would risk submerging the track in heavy rainfall.

D.10.2.4 Active Transportation Connections Across Regional Roads

Continuity of active transportation infrastructure, including safe and direct connections across roadways, is critical to attracting a high level of use and the overall success of these facilities. All signalized intersections along study corridors within the SECSP area will meet Region of Durham guidelines and requirements and will also provide pedestrian crossing facilities. Bicycle paths and bicycle lanes on all Type A, B, and C Arterials will continue through all signalized intersections and provide connections within the SECSP area and to adjacent neighbourhoods beyond the boundaries of the SECSP area.

The active transportation facilities at Regional roads are subject to review and approval by the Region of Durham, and may change depending on geometry and constraints.

D.11 Geometric Review

D.11.1 Site Distances at Future Intersections

The AECOM project team performed a site visit to the Southeast Courtice Secondary Plan area to collect observations regarding the existing roadway alignment and terrain in the vicinity of the existing unsignalized and future planned intersections. Using a driver eye height of 1.08 metres and average vehicle height of 1.3 metres, sightlines at each intersection were reviewed to determine the adequacy of available sight distances. Due to the planned future illumination of all study area corridors as the area roadways are urbanized, vehicle tail or brake light height was not considered in the assessment.

The minimum decision sight distances and minimum approach sight distance requirements from the *Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads*, as per *Table 9.9.4*, *Table 9.9.6*, and *Figure 9.10.1*, were reviewed and compared against the recorded observations. The tables and figure are shown in **Table D-4**, **Table D-5**, and **Figure D-24**, respectively.

Figure D-24: Minimum Decision Site Distance (Approach Site Distance)

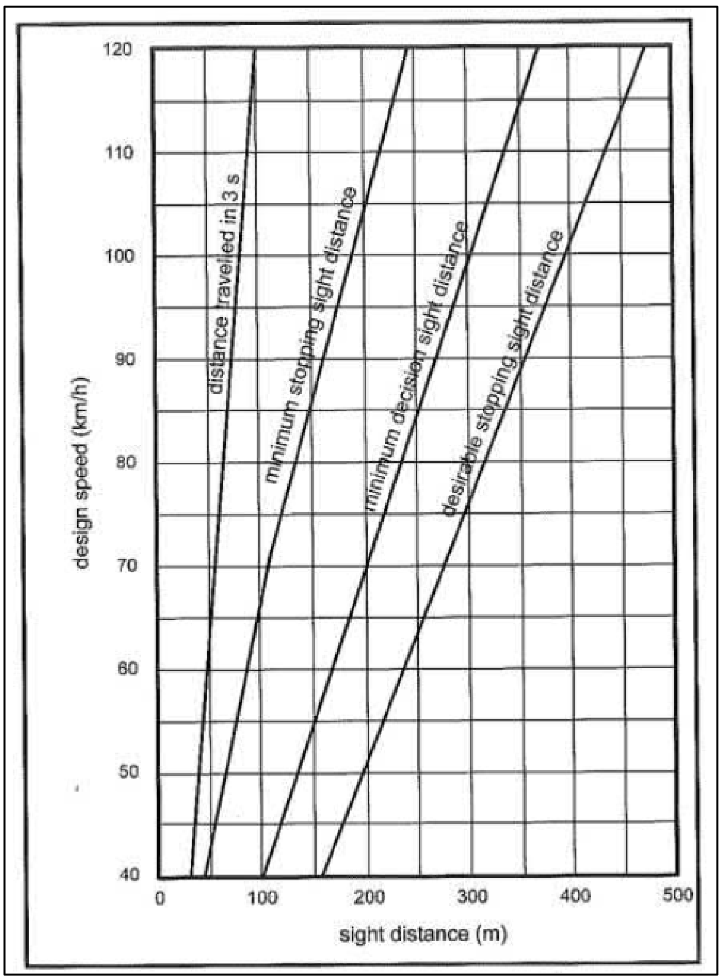


Table D-4: Design Intersection Sight Distance - Case B1, Left Turn from Stop

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	41.7	45
30	35	62.6	65
40	50	83.4	85
50	65	104.3	105
60	85	125.1	130
70	105	146.0	150
80	130	166.8	170
90	160	187.7	190
100	185	208.5	210
110	220	229.4	230
120	250	250.2	255
130	285	271.1	275

Table D-5: Design Intersection Sight Distance - Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	36.1	40
30	35	54.2	55
40	50	72.3	75
50	65	90.4	95
60	85	108.4	110
70	105	126.5	130
80	130	144.6	145
90	160	162.6	165
100	185	180.7	185
110	220	198.8	200
120	250	216.8	220
130	285	234.9	235

With the future development planned within the SECSP area, it is anticipated that posted speeds will be reduced along existing arterial corridors to reflect the urbanization of the area and accommodate safer travel for all users through the densified communities. An assumed design speed of 70 km/h (i.e., a posted speed of 60 km/h) was used for comparing the minimum sight distances against the observed visibility at each leg of the intersection. It is recognized that urbanized corridors are often posted at 50 km/h, however we have undertaken a conservative approach to consider worst-case conditions. **Table D-6** summarizes the observations recorded during the site visit and compares the observed sight distances against the minimum requirements from the *TAC Geometric Design Guide for Canadian Roads*. It is noted that all recorded site distances are approximate. Based on the review, all existing recorded sight distances are noted to be sufficient to meet the minimum requirements under the assumed design speed of 70 km/h.

The site distances were also reviewed for adequacy based on the existing posted speeds on each approach to each intersection (that is, not reduced to 60 km/h to reflect an urban condition). The following intersections were noted to feature sightlines that fell below the minimum required sight distances as per the *TAC Geometric Design Guide for Canadian Roads*:

- At the future intersection of Regional Highway 2 & New North-South Collector Road, the west leg of the intersection has a limited sight distance of approximately 215 metres due to existing horizontal curves on Regional Highway 2, falling just below the required 230 metre decision sight distance for a design speed of 80 km/h (i.e. 10 km/h greater than the existing 70 km/h posted speed); and
- At the future intersection of Bloor Street & Granville Drive Extension, the west leg of the intersection has a limited sight distance of approximately 200 metres due to the changes in elevation on Bloor Street, falling below the minimum 230 metre decision sight distance for a design speed of 80 km/h (i.e. 10 km/h greater than the existing 70 km/h posted speed).

In both of the above cases, at the time these new intersection approaches are constructed and with the residential development in the area, it is recommended that the posted speed be reduced along Regional Highway 2 and Bloor Street in these areas.

Table D-6: Geometric Review Observations

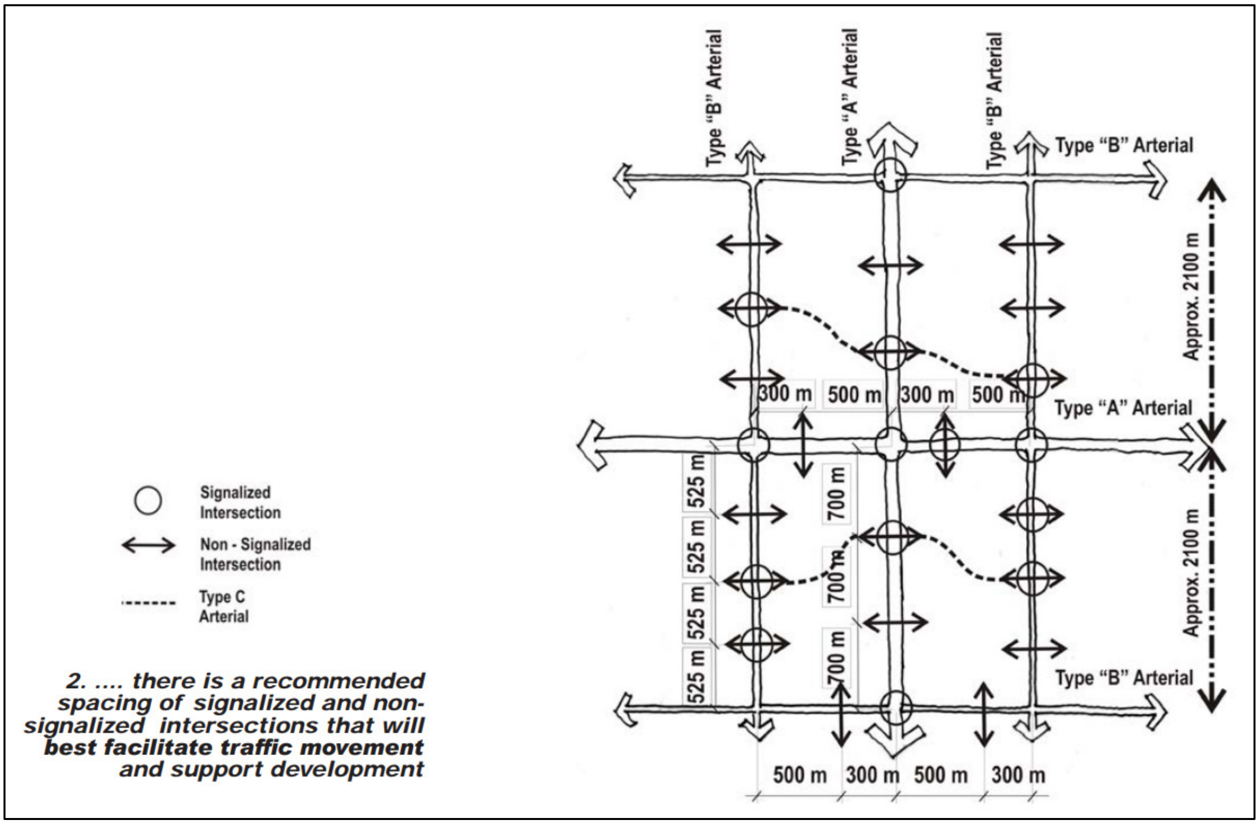
	Intersection	Observations and Comments								Sight Distance Requirement (70 km/h Design Speed)		
		Visibility / Site Distance				Terrain	Existing Posted Speed (km/h)		Other Comments	B1 - Left from Minor Road	B2 - Right from Minor Road	Approach Decision Site Distance
		North	South	East	West		N-S	E-W		150 m	130 m	200 m
1	**Regional Highway 2 & New North-South Collector Road**	-	-	~670 metres*	~215 metres*	Relatively flat, agricultural lands and forested areas.	-	70	Horizontal curves limit sightlines on both the east and west legs of the intersection.	✓	✓	✓
2	**Courtice Road & Sandringham Drive**	~595 metres	~715 metres	-	~270 metres *	Relatively flat, agricultural and residential areas.	60	50	Horizontal curves limit sightlines on the west leg of the intersection along Sandringham Drive.	✓	✓	✓
3	**Courtice Road & Meadowglade Road Extension**	1,000 metres+	~830 metres	-	-	Relatively flat, agricultural land.	60	-		✓	✓	✓
4	**Bloor Street & Granville Drive Extension**	-	-	~560 metres	~200 metres	Agricultural land with vertical curves along Bloor Street.	-	70	Changes in elevation along Bloor Street limit visibility on the west leg of the intersection.	✓	✓	✓
5	**Bloor Street & Trulls Road**	-	-	~275 metres	~495 metres	Agricultural land with vertical curves along Bloor Street.	50	EB-60 WB-70	Changes in elevation along Bloor Street limit visibility on the east leg of the intersection. Trulls Road will be realigned to form a single intersection.	✓	✓	✓
6	**Bloor Street & Farmington Drive Extension**	-	-	~630 metres	~235 metres	Relatively flat, agricultural land. Vertical curves along Bloor Street.	-	60	Changes in elevation along Bloor Street limit visibility on the west leg of the intersection.	✓	✓	✓
7	**Bloor Street & New North-South Collector Road**	-	-	~850 metres	~810 metres	Relatively flat, agricultural land.	-	EB-70 WB-60	There are some vertical curves in the road, but they do not limit visibility.	✓	✓	✓
8	**Courtice Road & New East-West Collector Road (South of Bloor Street)**	~470 metres*	1,000 metres+	-	-	Relatively flat, agricultural land. Minor change in horizontal alignment along Courtice Road.	80	-	Horizontal curves limit sightlines on the north leg of the intersection along Courtice Road.	✓	✓	✓

Note: *Site distance limited by horizontal alignment.

D.11.2 Intersection Spacing Review

The approximate road network layout and spacing dimensions, as per **Figure D-16**, were compared to the intersection spacing guidelines within the Region of Durham *Arterial Corridor Guidelines*, dated February 2007. The referenced spacing requirements from the guideline are shown in **Figure D-25**. The Regional guideline works within the existing grid system of Type A and Type B arterial roads with a spacing of 2,100 metres by 800 metres. The arterial grid system is divided by Type C arterials, collector roads, and local roads to create mid-block connections and provide a permeable road network. As per the guidelines, the 800 metre east-west spacing between arterial roads is divided into two sections of 300 metres and 500 metres. The north-south arterial roads spaced 2,100 metres apart are divided into four 525 metre blocks on Type B arterials and into three 700 metre blocks on Type A arterials.

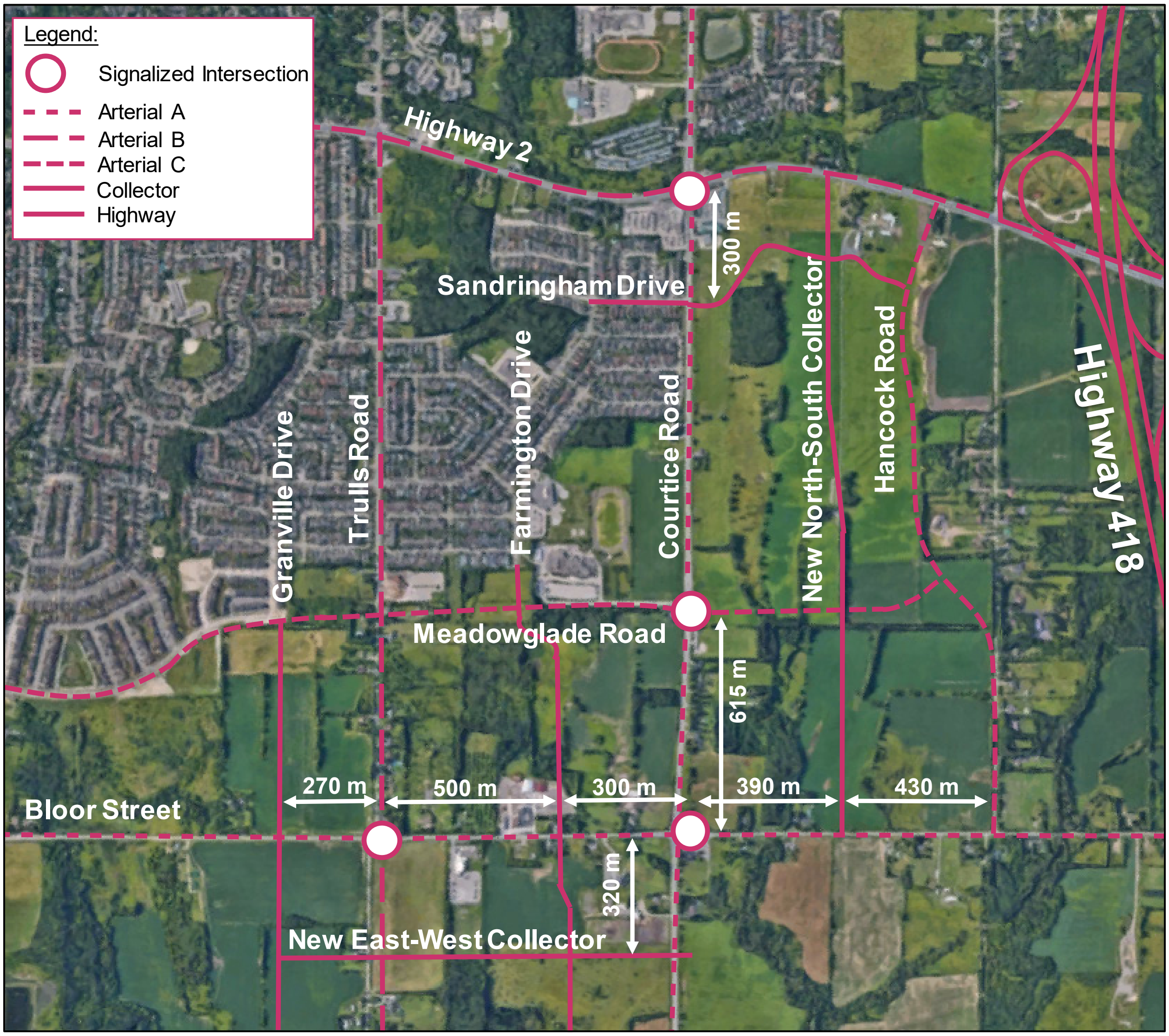
Figure D-25: Durham Region Arterial Corridor Guidelines, Frequency of Intersections



The approximate spacing between the existing and planned intersections along Type A Arterials as per the most recently prepared preferred road network is shown in **Figure D-26**. Intersection spacing requirements from the *Arterial Corridor Guidelines* were met at all sections of the road network except:

- The spacing between the intersections of Bloor Street & Granville Drive and Bloor Street & Trulls Road is shown to be approximately 270 metres, less than the required 300 metre spacing;

Figure D-26: Future Road Network Intersection Spacing



- The spacing between the intersections of Courtice Road & Meadowglade Road and Courtice Road & Bloor Street is shown to be approximately 615 metres, less than the required 700 metre spacing between intersections on a Type A arterial road;
- The spacing between the existing intersections of Regional Highway 2 & Courtice Road and Sandringham Drive & Courtice Road is shown to be approximately 300 metres, less than the required 700-metre spacing between intersections on a Type A arterial road;
- The approximately 820-metre spacing between the intersections of Courtice Road & Bloor Street and Hancock Road & Bloor Street is divided into approximately 390 metre and 430 metre blocks, a variance from the required 300 metre and 500 metre blocks on Type A and Type B arterials; and

- The spacing between the New East-West Collector south of Bloor Street and the Courtice Road & Bloor Street intersection is shown to be approximately 320 metres, less than the required 700 metre spacing between intersections on a Type A arterial road.

While it is acknowledged that the proposed road network features intersections with substandard spacing, this may be justified in the interest of providing a fine-grained road network which provides ample route opportunities and travel flexibility. The road network is benefited by the dispersing of traffic to various roads, potentially improving regional intersection operations.

The spacing between the new East-West Collector and Bloor Street intersections on Courtice Road will be approximately 320 metres, short of the 700-metre requirement, as there is no easterly extension of the new East-West Collector. This means there is no concern of a southbound left-turn movement at the Courtice Road & New East West Collector intersection causing a queue which conflicts with the northbound left-turn movement at Courtice Road & Bloor Street. Should an easterly extension be considered in the future, a queueing analysis for the two movements should be undertaken to optimize the configuration of back-to-back left-turn lanes. Should the queueing for the back-to-back left-turn movements overlap, parallel left-turn lanes may be considered.

D.12 Future Traffic Operations

D.12.1 Future Background Volumes

Future background traffic volumes were estimated in order to establish a baseline for traffic operations under a 2031 horizon year “do-nothing” scenario. Background growth rates were developed in cooperation with the Region of Durham with the use of the Durham Region Transportation Planning Model (DRTPM). The 2017 AM and 2031 AM Emme sub-area models representing the SECSP study area and surrounding road network were provided by the Region of Durham and were used to develop the directional growth rates on each corridor within the study area. The sub-area model limits included Townline Road to the west, Regional Highway 2 to the north, Highway 418 to the east, and Lake Ontario to the south.

The 2017 Emme model assigned link volumes were extracted and used to establish a set of base volumes on each corridor within the study area. Prior to extracting the 2031 Emme link volumes, several refinements were made to the model demand matrix to establish the future background volumes within the macro-model study area:

- All observed growth within the SECSP zones between the 2017 and 2031 models within the SECSP zones was removed by reducing the 2031 Emme matrix origin-destination (OD) values associated with SECSP zones to 2017 matrix OD values;
- All observed growth within the Southwest Courtice Secondary Plan (SWCSP) zones between the 2017 and 2031 model matrices was removed from the 2031 Emme model. SWCSP demand volumes were later reapplied manually to intersection volumes based on the CIMA+ report *Southwest Courtice Secondary Plan Update*, dated May 26, 2020, volumes in *Figure 13: Projected Site-Generated Traffic*;

- All observed growth within the Courtice Employment Lands (CEL) and Major Transit Station Area (MTSA) between the 2017 and 2031 model matrices was removed from the 2031 Emme model. Population and employment data for the CEL and MTSA obtained from Clarington was used to develop new trip estimates and update the 2031 Emme matrix as follows:
  - Trips related to the Courtice Employment Lands were estimated using the Employment Density Target outlined in the Clarington Official Plan. The target density of 30 jobs per hectare for 130 hectares resulted in a target employment of 3,900. Using the 2031 auto mode split target of 62% for “New Urban Areas located in South Durham” as per the Regional Official Plan, a total of 2,418 employment-related auto trips are anticipated for the full area. Assuming 20% completion of development within the area by 2031, an estimated 484 inbound auto trips were generated for the Courtice Employment Lands in the 2031 AM peak hour;
  - For the MTSA lands, a unit breakdown for the full potential buildout was used to generate auto trips. This included 1,500 townhouse units, 4,800 apartment units, and 1,165,000 square feet of non-residential gross floor area (GFA). The unit count and floor area data were used with the *Institute of Transportation Engineers (ITE) Trip Generation Manual 10th Edition* to estimate the ultimate number of outbound and inbound trips anticipated during the AM peak hour, resulting in 1,821 and 1,355 trips respectively. Applying the same assumption of 20% development completion by 2031, the number of trips was reduced to 364 outbound and 271 inbound in the 2031 AM peak hour; and
  - The overall resulting auto trips for the zones representing CEL and MTSA in the 2031 AM peak hour were estimated at 755 inbound and 364 outbound. The 2031 Emme macro-model matrix was updated to reflect the number of trips calculated for the respective zones, maintaining the existing matrix distribution.

A summary of the above background traffic volumes is included in **Appendix E**. The link volumes shown in **Figure D-27** and **Figure D-28** were used to calculate directional growth rates on each study area corridor in the AM peak hour. **Table D-7** summarizes the annualized directional growth rates for each leg of the study intersections.

Figure D-27: 2017 AM Emme Model - Auto Trip Assignment

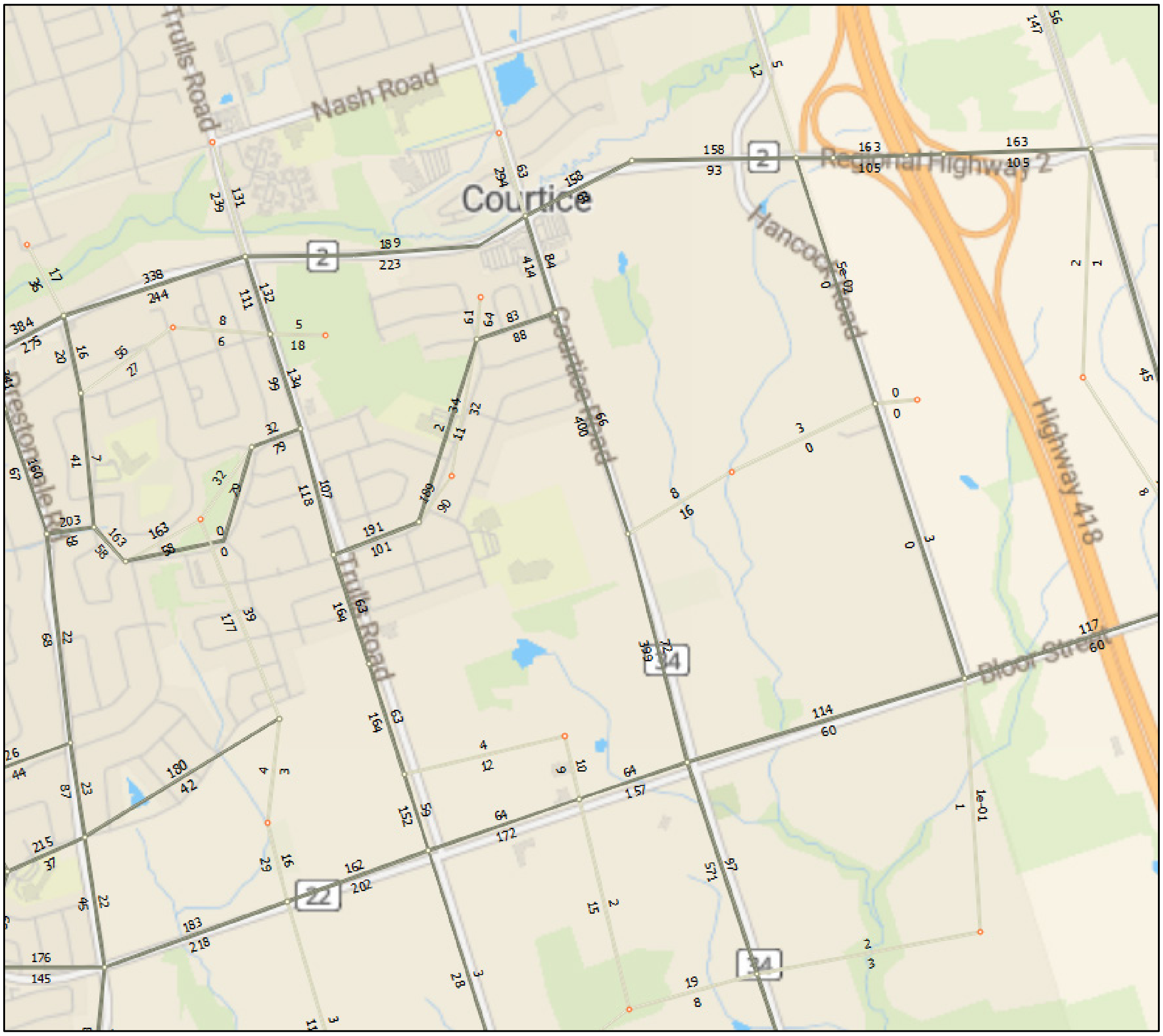
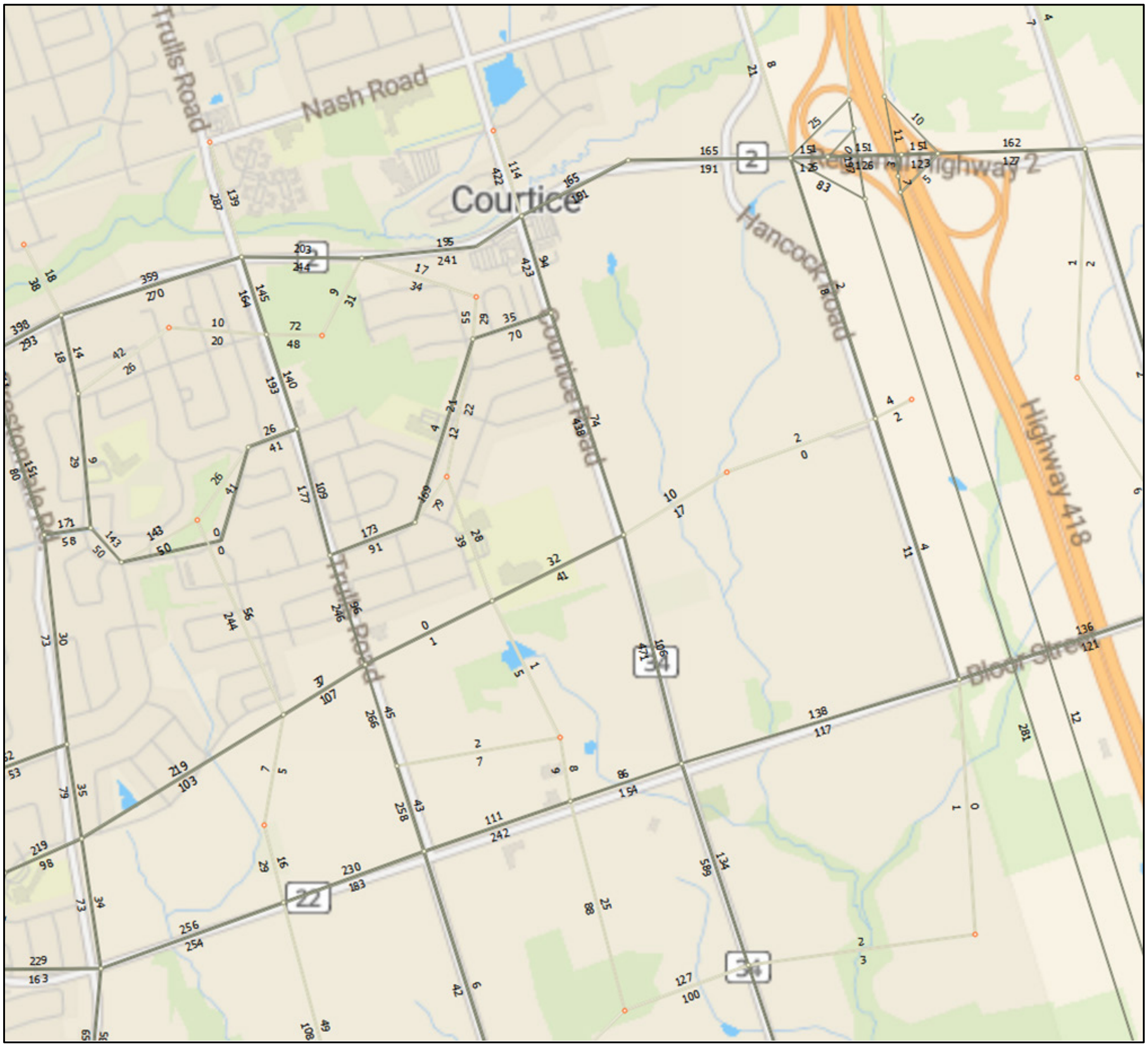


Figure D-28: 2031 AM Emme Model - Auto Trip Assignment



As shown in **Table D-7**, some study area corridors were indicated to have a negative growth rate. These reductions are noted to be a result of changes to the road network, causing the redistribution of traffic to other more-favourable links. The growth rates shown in **Table D-7** were applied to the Existing Conditions AM traffic volumes for the required number of years (i.e., 11 years from 2020 to 2031) to generate the 2031 Future Background Conditions AM peak hour volumes. In order to develop the PM peak hour Future Background turning movement volumes, the growth rates in the reverse-direction were applied on each study area corridor.

As previously noted, SWCSP demand volumes were reapplied manually to the grown turning movement volumes using the CIMA+ report *Southwest Courtice Secondary Plan Update*, dated May 26, 2020, volumes in *Figure 13: Projected Site-Generated Traffic.* As there are no shared study intersections between the two secondary plans, site-generated volumes at the limits of the

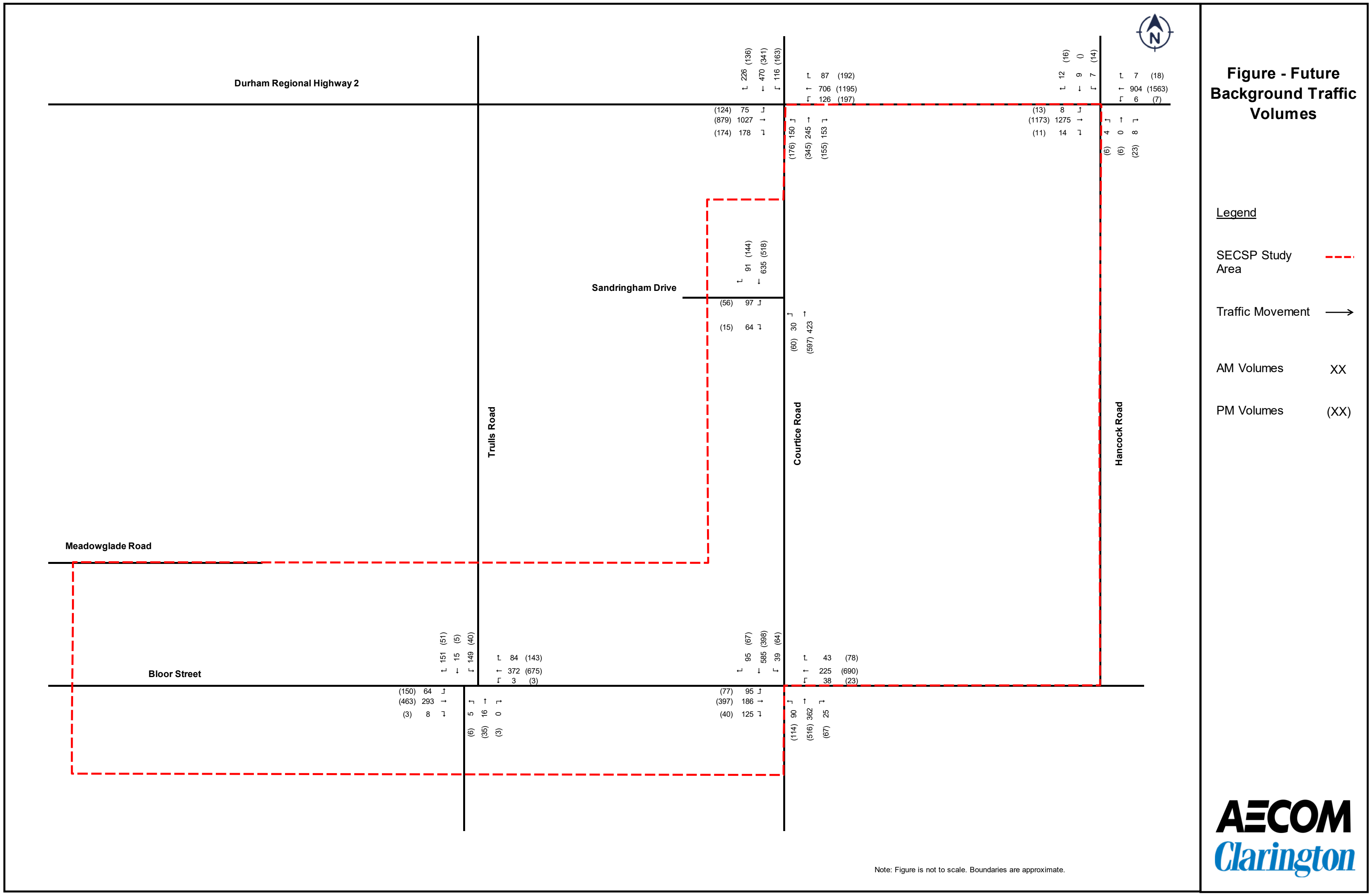
SWCSP study area were extrapolated to adjacent intersections in the SECSP study area. After growth rates were applied to bring intersection volumes to the 2031 horizon year and the SWCSP traffic volumes were superimposed onto the road network, traffic volumes between adjacent intersections with no major origins / destinations were balanced. **Figure D-29** shows the balanced Future Background Conditions AM and PM peak hour traffic volumes in 2031.

Following the draft submission of this report in January 2021 and subsequent discussions with the Region, the calculated growth rates in **Table D-7** were compared against another set of growth rates developed using an alternative screenline-based approach. The comparison was performed to verify the suitability of the growth rates calculated using the link-based approach described above. The comparison revealed that the differences between the growth rates are generally not significant and all fall within a similar range. We observe an average growth rate of 1.86% using the Emme screenline-based approach compared to an average growth rate of 1.92% using the balanced network volume screenlines developed using the link-based approach. A full comparison of volumes and growth rates between the two methodologies is summarized in **Appendix G**.

Table D-7: Annualized Growth Rates between 2017 and 2031 Emme Models

Intersection	North Leg		South Leg		East Leg		West Leg	
	SB	NB	SB	NB	WB	EB	WB	EB
Highway 2 & Hancock Road	4.08%	3.41%	16.01%	5.08%	-0.54%	1.31%	0.31%	5.27%
Highway 2 & Courtice Road	2.62%	4.33%	0.15%	0.81%	0.31%	5.27%	0.22%	0.56%
Courtice Road & Sandringham Drive	0.15%	0.81%	0.65%	0.82%	-	-	-5.98%	-1.62%
Bloor Street & Courtice Road	1.19%	2.80%	0.22%	2.33%	1.37%	4.89%	2.13%	-0.14%
Bloor Street & Trulls Road	3.85%	-2.23%	2.94%	5.08%	4.01%	2.47%	2.54%	-0.70%

Figure D-29: Future Background Traffic Volumes – 2031 AM and PM Peak Hours



D.12.2 Future Background Traffic Operations

The Future Background Conditions AM and PM traffic volumes shown in **Figure D-29** were assessed in the Synchro model and traffic operations were reported using both the Synchro *Intersection: Lanes, Volumes, Timings* and *Highway Capacity Manual (HCM) 2000* methodologies. Synchro analysis outputs are included in **Appendix D**. **Table D-8** displays the traffic operations for the 2031 AM and PM peak hours in the Future Background Conditions at the study intersections generated using the Synchro *Intersection: Lanes, Volumes, Timings* reports.

In general, traffic operations in the Future Background Conditions are shown to be acceptable, with all study intersections operating at an overall LOS D or better. Three critical movements were reported during the AM peak hour and eight critical movements were reported during the PM peak hour. The following movements were noted to operate at a critical level:

- At the intersection of Courtice Road & Regional Highway 2:
  - The shared eastbound through/right-turn movement was found to operate with a v/c ratio of 0.91 during the AM peak hour;
  - The shared westbound through/right-turn movement was found to operate with a v/c ratio of 0.94 during the PM peak hour, indicating near-capacity conditions;
  - The shared northbound through/right-turn movement was found to operate at LOS E with a delay of 63.6 seconds and a v/c ratio of 0.95 during the PM peak hour, indicating near capacity conditions;
  - The southbound left-turn movement was found to operate at LOS E with a delay of 57.8 seconds during the PM peak hour;
- At the unsignalized intersection of Courtice Road & Sandringham Drive:
  - The shared eastbound left/right-turn movement was found to operate at LOS E with a delay of 49.3 seconds during the AM peak hour and at LOS E with a delay of 41.4 seconds during the PM peak hour;
- At the intersection of Courtice Road & Bloor Street:
  - The eastbound left-turn movement was found to operate at LOS E with a delay of 64.4 seconds during the PM peak hour;
  - The shared westbound through/right-turn movement was found to operate with a v/c ratio of 0.91 during the PM peak hour;
- At the unsignalized intersection of Bloor Street & Trulls Road:
  - The shared northbound left/through/right-turn movement was found to operate at LOS F with a delay of 82.2 seconds; and
  - The shared southbound left/through/right-turn movement was found to operate at LOS F with a delay of 60.6 seconds and a v/c ratio of 0.90 during the AM peak hour and at LOS F with a delay of 158.8 seconds a and v/c ratio of 0.96 during the PM peak hour.

No queueing issues were identified in the Future Background Conditions traffic analysis. All reported 95th percentile queue lengths were noted to be accommodated within the respective movement’s storage distance or the distance to its upstream intersection.

Table D-8: Future Background Traffic Operations - AM and PM Peak Hours

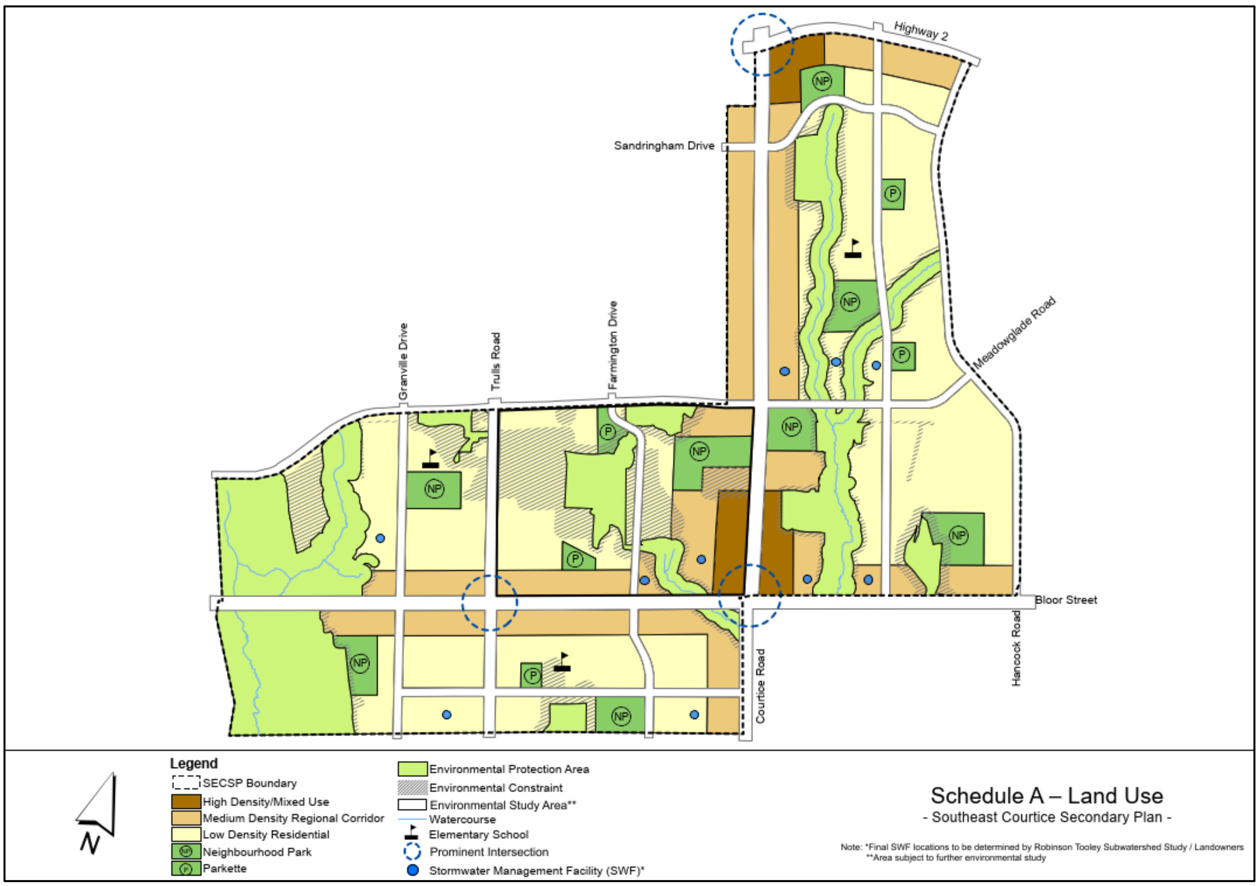
Intersection	Movement	AM Peak Hour - Future Background Conditions (2031)				PM Peak Hour - Future Background Conditions (2031)			
		Delay (s)	V/C Ratio	LOS	95th %ile Queue (m)	Delay (s)	V/C Ratio	LOS	95th %ile Queue (m)
Courtice Road & Regional Highway 2	EBL	24.5	0.31	C	20.6	39.1	0.73	D	33.8
	EBTR	**38.0**	**0.91**	**D**	**141.8**	31.7	0.78	C	116.6
	WBL	32.9	0.68	C	26.7	27.2	0.68	C	4.1
	WBTR	17.5	0.48	B	62.0	**41.0**	**0.94**	**D**	**178.4**
	NBL	40.9	0.63	D	49.2	40.2	0.59	D	51.8
	NBTR	32.4	0.69	C	88.6	**63.6**	**0.95**	**E**	**154.0**
	SBL	19.9	0.39	B	22.2	**57.8**	**0.84**	**E**	**48.8**
	SBT	27.4	0.65	C	97.3	27.6	0.51	C	76.5
	SBR	8.4	0.32	A	23.6	4.5	0.20	A	11.4
	Overall	*28.6*	-	*C*	-	*39.0*	-	*D*	-
Regional Highway 2 & Hancock Road (Unsignalized)	EBL	9.8	0.01	A	0.2	13.8	0.03	B	0.7
	EBTR	0.0	0.50	A	0.0	0.0	0.46	A	0.0
	WBL	11.7	0.01	B	0.3	11.1	0.01	B	0.3
	WBTR	0.0	0.35	A	0.0	0.0	0.61	A	0.0
	NBLTR	19.7	0.05	C	1.1	21.1	0.14	C	3.5
	SBLTR	20.3	0.11	C	2.7	31.1	0.18	D	4.8
	Overall	*0.4*	-	*A*	-	*0.7*	-	*A*	-
Courtice Road & Sandringham Drive (Unsignalized)	**EBLR**	**49.3**	**0.69**	**E**	**34.1**	**41.4**	**0.42**	**E**	**14.5**
	NBLT	1.2	0.04	A	0.9	1.9	0.70	A	1.8
	SBTR	0.0	0.43	A	0.0	0.0	0.39	A	0.0
	Overall	*6.3*	-	*A*	-	*3.0*	-	*A*	-
Courtice Road & Bloor Street	**EBL**	23.1	0.35	C	23.3	**64.4**	**0.75**	**E**	**33.1**
	EBTR	23.9	0.63	C	57.6	17.0	0.51	B	67.0
	WBL	20.4	0.16	C	11.3	12.6	0.07	B	5.8
	WBTR	23.9	0.56	C	52.8	**36.1**	**0.91**	**D**	**169.2**
	NBL	13.1	0.30	B	16.5	25.1	0.04	C	27.6
	NBT	11.5	0.40	B	47.6	30.8	0.76	C	112.9
	NBR	0.8	0.03	A	1.1	7.2	0.11	A	8.7
	SBL	9.1	0.08	A	7.1	26.4	0.36	C	18.4
	SBT	15.8	0.65	B	87.5	25.1	0.60	C	76.4
	SBR	4.9	0.12	A	9.0	7.2	0.11	A	8.7
	Overall	*16.9*	-	*B*	-	*28.4*	-	*C*	-
Bloor Street & Trulls Road (Unsignalized)	EBLTR	2.1	0.06	A	1.5	4.8	0.19	A	5.4
	WBLTR	0.1	0.00	A	0.1	0.1	0.00	A	0.1
	NBLTR	22.6	0.09	C	2.3	**82.2**	**0.50**	**F**	**16.5**
	SBLTR	**60.6**	**0.90**	**F**	**67.3**	**158.8**	**0.96**	**F**	**44.0**
	Overall	*17.6*	-	*C*	-	*13.9*	-	*B*	-

D.12.3 Trip Generation and Distribution

The Southeast Courtice Secondary Plan area is planned to be comprised of approximately 920 single-family detached housing units, 3,253 multi-family mid-rise housing units, and 859 multi-family high-rise / high-density housing units. Additionally, three elementary schools and 13,299 square-metres of commercial retail is also planned for the study area. For the purpose of this assessment, the development is conservatively assumed to be fully built-out for the 2031 horizon year.

The proposed road network alignment and land use schedule for the Southeast Courtice Secondary Plan area (Schedule A) is depicted in **Figure D-30**.

Figure D-30: SECSP Land Use Schedule



The traffic generated by the development within the SECSP area was estimated using the trip generation rates for the respective land use from the 10th Edition of the *Institute of Transportation Engineers (ITE) Trip Generation Manual*. Based on the land uses planned for the development, **Table D-9** summarizes the ITE Land Use Codes and Trip Generation rates used for estimating the projected site-generated traffic. It should be noted that the first equation is an average vehicle trip generation rate, and the second is the “line of best fit” equation. The maximum of the trips produced by either of the equations was used for the assessment.

Table D-9: ITE Trip Generation Rates

Land Use	ITE Land Use Code	AM Peak	PM Peak
Single-Family Detached Housing	ITE 210 (General Urban/Suburban)	T = 0.74X; or T = 0.71 (X) + 4.50	T = 0.99 (X); or Ln (T) = 0.96 Ln (X) + 0.20
Multifamily Housing (Mid-Rise)	ITE 221 (General Urban/Suburban)	T = 0.36 (X); or Ln (T) = 0.98 Ln (X) - 0.98	T = 0.44 (X); or T = 0.96 Ln (X) – 0.63
Multifamily Housing (High-Rise)	ITE 222 (General Urban/Suburban)	T = 0.31 (X); or T = 0.28 (X) + 12.86	T = 0.36 (X); or T = 0.34 (X) + 8.56
Elementary School	ITE 520 (General Urban/Suburban)	T = 7.21 (E)	T = 1.78 (E)
Shopping Centre	ITE 820 (General Urban/Suburban)	T = 0.94 (X); or T = 0.5 (X) + 51.78	T = 3.81 (G); or Ln (T) = 0.74 Ln (G) + 2.89

Notes: T = Average Vehicle Trip Ends X = Number of Dwelling Units
E = Number of Employees G = Gross Floor Area (GFA) (x1,000 sqft)

Based on the equations provided in **Table D-9**, the projected weekday morning and afternoon peak hour trip generation for the proposed development was calculated for the residential, commercial, and elementary school land uses.

For the residential and commercial uses, an internal capture reduction was applied based on the capture rates in the *ITE Trip Generation Handbook* to account for internal trips made between the residential and commercial components. The internal capture rates resulted in a reduction of approximately 3% of trips in the AM and 8% of trips in the PM for the residential and commercial land uses. The trip generation calculations for the residential component are summarized in **Table D-10**.

For the trips generated by the three elementary schools planned for the SECSP area, a 50% reduction was applied to account for the nature of most school-related trips being chained or internal to the local road network (i.e., parents doing pick-up / drop-off either as part of their drive to work or staying entirely within the block). The trip generation calculations for the elementary schools are summarized in **Table D-11**.

For the commercial component of the mixed-use areas within the SECSP, the Shopping Centre land use code (ITE 820) was used for estimating generated trips. Using the gross floor area (GFA) of 13,299 square metres (143,160 square feet), the trip generation calculations for the commercial component are summarized in **Table D-12**.

Finally, the resulting total trips for all land uses except the Elementary School (ITE 420) were further reduced by 15% to account for a combined 25% transit and active transportation mode split. The ITE Trip Generation Handbook assumes a 10% non-auto mode share within its trip generation rates, while the Region's TMP targets a 25% mode share for transit and active transportation in new urban areas in south Durham. As such, the further 15% reduction reflects the regions 25% total target.

The total trip generation for the overall SECSP development area is summarized in **Table D-13**.

Table D-10: Trip Generation Calculations for Residential Component of SECSP

Description / ITE Code	Dwelling Units	Calculation Method	Trip Generation Rates & Distributions				Generated Trips		Distribution of Generated Trips			
			AM In	AM Out	PM In	PM Out	AM Peak	PM Peak	AM In	AM Out	PM In	PM Out
Single-Family Detached Housing (210)	920	Fitted Curve Equation	25%	75%	63%	37%	658	855	165	494	539	316
		Average Rate					681	911	170	511	574	337
						Maximum:	681	911	170	511	574	337
						Less Internal Capture Trips:	**672**	**866**	**167**	**505**	**540**	**326**
Multifamily Housing (Mid-Rise) (221)	3253	Fitted Curve Equation	26%	74%	61%	39%	1,039	1,254	270	769	765	489
		Average Rate					1,171	1,431	304	867	873	558
						Maximum:	1,171	1,431	304	867	873	558
						Less Internal Capture Trips:	**1,156**	**1,362**	**298**	**858**	**822**	**540**
Multifamily Housing (High-Rise) (222)	859	Fitted Curve Equation	24%	76%	61%	39%	253	301	61	193	183	117
		Average Rate					266	309	64	202	189	121
						Maximum:	266	309	64	202	189	121
						Less Internal Capture Trips:	**263**	**294**	**63**	**200**	**178**	**117**
ITE Trip Generation Manual, 10th Edition						***Total:***	**2,092**	**2,522**	**528**	**1,564**	**1,540**	**982**

Table D-11: Trip Generation Calculations for Elementary Schools in SECSP

Description / ITE Code	Employees	Calculation Method	Trip Generation Rates & Distributions				Generated Trips		Distribution of Generated Trips			
			AM In	AM Out	PM In	PM Out	AM Peak	PM Peak	AM In	AM Out	PM In	PM Out
Elementary School (520)	81	Average Rate	53%	47%	48%	52%	584	144	310	274	69	75
ITE Trip Generation Manual, 10th Edition ***Less 50% for Local and Chained Trips:***							**292**	**72**	**155**	**137**	**35**	**37**

Table D-12: Trip Generation Calculations for Commercial Component of SECSP

Description / ITE Code	GFA (1,000 sqft)	Calculation Method	Trip Generation Rates & Distributions				Generated Trips		Distribution of Generated Trips			
			AM In	AM Out	PM In	PM Out	AM Peak	PM Peak	AM In	AM Out	PM In	PM Out
Shopping Centre (820)	143.16	Fitted Curve Equation	62%	38%	48%	52%	223	709	138	85	340	368
		Average Rate					135	545	83	51	262	284
						Maximum:	223	709	138	85	340	368
ITE Trip Generation Manual, 10th Edition ***Less Internal Capture Trips:***							**197**	**578**	**123**	**74**	**306**	**272**

Table D-13: Total SECSP Trip Generation

Description / ITE Code	Units / Employees / GFA	AM Peak (vehicle per hour)			PM Peak (vehicle per hour)		
		In	Out	Total	In	Out	Total
Single-Family Detached Housing	920 units	142	430	571	459	277	736
Multifamily Housing (Mid-Rise)	3253 units	254	729	983	699	459	1157
Multifamily Housing (High-Rise)	859 units	53	170	224	151	99	250
Elementary School	81 employees	155	137	292	35	37	72
Shopping Centre	143,160 sqft	104	63	167	260	231	492
	Total:	**708**	**1529**	**2237**	**1604**	**1104**	**2707**

Site trip distribution was based on the origin-destination patterns observed in the 2031 Emme sub-area model. The sub-area model matrix was extracted and used to determine the distribution of traffic originating from or destined to the zones representing the SECSP area. **Table D-14** summarizes the distribution of inbound and outbound trips associated with development planned for the SECSP area. The distribution percentages were used for assigning the trip volumes shown in **Table D-13** to the study intersections in order to develop the Future Total Conditions traffic volumes.

Table D-14: SECSP Trip Distribution

Trips Destined for SECSP		Trips Originating from SESCP	
30%	from west on Bloor Street	27%	to west on Bloor Street
26%	from west on Regional Highway 2	14%	to west on Regional Highway 2
15%	from Highway 401	32%	to Highway 401
8%	from east on Bloor Street	4%	to east on Bloor Street
1%	from north on Hancock Road	4%	to north on Courtice Road
9%	from north on Courtice Road	1%	to west of Prestonvale
1%	from north on Highway 418	2%	SECSP Internal Trip
2%	from west of Prestonvale Road	2%	to southeast of Trulls Road & Highway 2
3%	SECSP Internal Trip	2%	to southwest of Trulls Road & Bloor Street
4%	from southeast of Trulls Road & Highway 2	2%	to south on Trulls Road
1%	from southeast of Courtice Road & Bloor Street	1%	to southeast of Courtice Rd & Bloor Street
1%	**from south on Courtice Road**	**10%**	**to south on Courtice Road**
100%	**Total***	**100%**	**Total***

Note: * Total may vary due to rounding

The SECSP development-related traffic volumes assigned to the study intersections are shown in **Figure D-31**. The development-related traffic was superimposed onto the Future Background Conditions turning movement volumes to develop the Future Total Conditions traffic volumes. **Figure D-32** displays the AM and PM peak hour Future Total Conditions traffic volumes.

Figure D-31: SECSP Development-Related Traffic Volumes – 2031 AM and PM Peak Hours

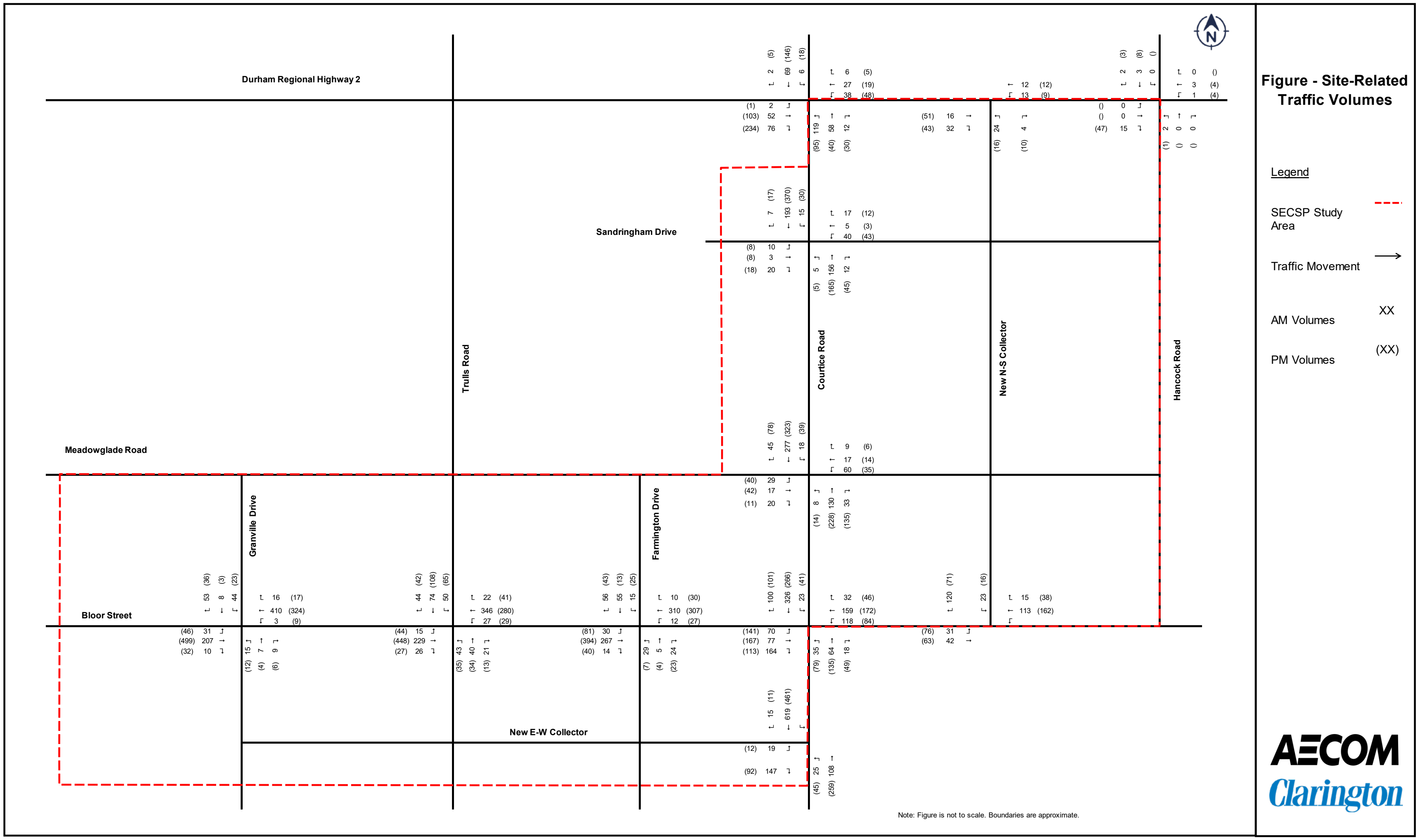
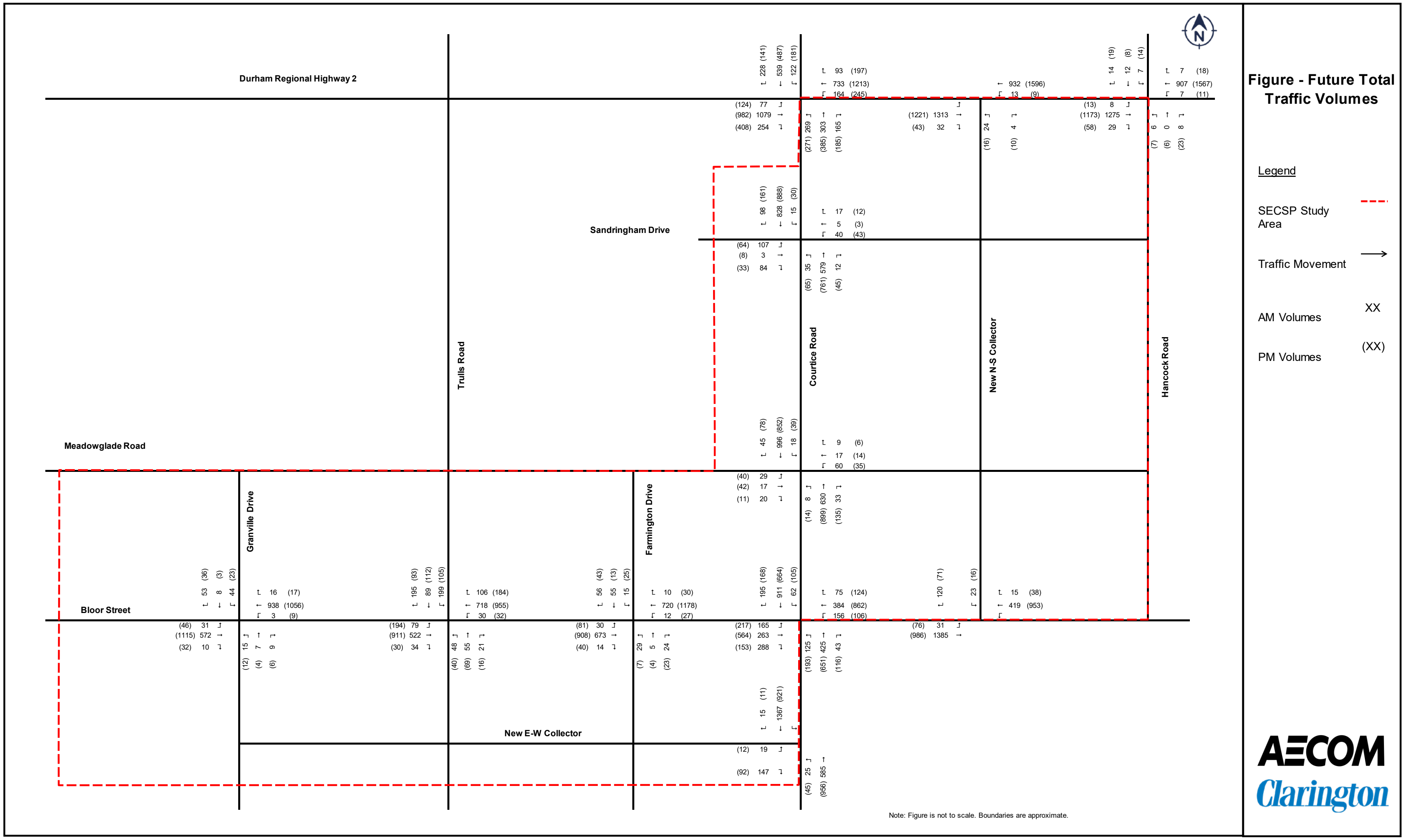


Figure D-32: Future Total Traffic Volumes – 2031 AM and PM Peak Hours



D.12.4 Signal Warrant Analysis

Using the developed Future Total Conditions traffic volumes, a signal warrant analysis procedure was performed for all new future study intersections as well as the existing study intersections which are currently unsignalized. The analysis was performed as per the Ontario Traffic Manual (OTM) Book 12 procedure for Signal Justification. As per the OTM Book 12 guidelines for Justification 7 (Projected Volumes), future forecast traffic volumes at an existing intersection are required to meet 120% justification for Justifications 1 and/or 2 when full 8-hour traffic volume estimates are not available. For future intersections, the required justification increases to 150%. Off-peak hours are estimated using the Average Hourly Volume calculation, equivalent to one-half of the average of the AM and PM peak hours.

A summary of the signal warrant analysis findings for each intersection in the study area is presented in **Table D-15**. As shown, the only intersection to fully meet the justification criteria for signalization is the existing intersection of Bloor Street & Trulls Road. The new intersection of Courtice Road & Meadowglade Road was shown to meet 100% justification for Justification 2A and 2B, however, the traffic volumes did not meet the 150% justification requirement for a future intersection.

Signal warrant outputs for all intersections are included in **Appendix F**.

Table D-15: Signal Warrant Analysis Summary

Intersection	OTM Book 12 Justification (%)				
	Criteria	1	2	3	4
Regional Highway 2 & New N-S Collector	A	100	100	9	15
	B	9	58	58	
Regional Highway 2 & Hancock Road	A	100	100	23	24
	B	23	64	64	
Courtice Road & Sandringham Drive	A	100	98	71	63
	B	71	100	98	
Courtice Road & Meadowglade Road	A	100	100	55	48
	B	55	100	100	
Bloor Street & Granville Drive	A	100	100	40	46
	B	40	76	76	
Bloor Street & Trulls Road	A	100	100	100	96
	B	100	100	100	
Bloor Street & Farmington Drive	A	100	100	54	54
	B	54	86	86	
Bloor Street & New N-S Collector	A	100	100	28	58
	B	28	58	58	
Courtice Road & New E-W Collector	A	100	100	61	63
	B	61	94	94	

D.12.5 Future Total Traffic Operations

The Future Total Conditions traffic volumes shown in **Figure D-32** were entered into the expanded Synchro model to replicate traffic conditions in the 2031 AM and PM peak hours for an ultimate full build-out scenario. The Synchro model was modified to reflect the planned cross sections within the study area road network. Minor improvements were implemented at study intersections noted to operate poorly in a preliminary analysis. The following modifications were made to the study intersections:

- At the intersection of Courtice Road & Regional Highway 2, an eastbound right-turn lane was implemented;
- At the unsignalized intersection of Courtice Road & Sandringham Drive, dedicated eastbound left-turn and westbound left-turn lanes were added to the stop-controlled approaches;
- At the unsignalized intersection of Courtice Road & Meadowglade Drive, dedicated eastbound left-turn and westbound left-turn lanes were added to the stop-controlled approaches; and
- At the unsignalized intersection of Bloor Street & Farmington Drive, dedicated northbound left-turn and southbound left-turn lanes were added to the stop-controlled approaches.

Under the preliminary analysis, it was found that even with the improvements, the unsignalized intersection of Courtice Road & Meadowglade Road would operate severely over capacity in the AM and PM conditions, causing significant delays for vehicles accessing the intersection. While the signal warrant analysis for the intersection indicated that the 2031 AM and PM traffic volumes only meet 100% justification and not the 150% required for future intersections, the model was modified to include signalization at Courtice Road & Meadowglade Road to maintain acceptable operations at the intersection.

It is also noted that all signalized regional intersections require left-turn lanes at all approaches.

Table D-16 displays the traffic operations for the 2031 AM and PM peak hours under the Future Total Conditions at the study intersections, generated using the Synchro *Intersection: Lanes, Volumes, Timings* reports. Synchro analysis outputs are included in **Appendix D**.

Table D-16: Future Total Traffic Operations – 2031 AM and PM Peak Hours

Intersection	Movement	AM Peak Hour - Future Total Conditions (2031)				PM Peak Hour - Future Total Conditions (2031)			
		Delay (s)	V/C Ratio	LOS	95th %ile Queue (m)	Delay (s)	V/C Ratio	LOS	95th %ile Queue (m)
Courtice Road & Regional Highway 2	EBL	31.6	0.41	C	23.6	45.9	0.73	D	41.6
	EBT	**42.5**	**0.92**	**D**	**132.0**	36.9	0.74	D	130.5
	EBR	12.4	0.43	B	32.8	18.9	0.61	B	71.7
	WBL	**61.8**	**0.88**	**E**	**44.5**	42.6	0.82	D	68.9
	WBTR	21.2	0.56	C	71.8	**45.0**	**0.94**	**D**	**210.3**
	NBL	**53.7**	**0.87**	**D**	**64.1**	**60.2**	**0.87**	**E**	**88.4**
	NBTR	18.9	0.40	B	39.8	38.1	0.68	D	77.6
	SBL	15.9	0.30	B	21.1	31.5	0.58	C	44.4
	SBTR	29.9	0.73	C	76.6	50.2	0.80	D	92.3
	Overall	*31.6*	-	*C*	-	*41.2*	-	*D*	-

Intersection	Movement	AM Peak Hour - Future Total Conditions (2031)				PM Peak Hour - Future Total Conditions (2031)			
		Delay (s)	V/C Ratio	LOS	95th %ile Queue (m)	Delay (s)	V/C Ratio	LOS	95th %ile Queue (m)
Regional Highway 2 & New N-S Collector (Unsignalized)	EBL	0.0	0.00	A	0.0	0.0	0.00	A	0.0
	EBTR	0.0	0.51	A	0.0	0.0	0.48	A	0.0
	WBL	12.3	0.03	B	0.6	11.7	0.02	B	0.4
	WBTR	0.0	0.37	A	0.0	0.0	0.63	A	0.0
	NBLTR	30.5	0.17	D	4.4	24.7	0.12	C	3.2
	SBLTR	0.0	0.00	A	0.0	0.0	0.00	A	0.0
	Overall	*0.4*	-	*A*	-	*0.3*	-	*A*	-
Hancock Road & Regional Highway 2 (Unsignalized)	EBL	9.8	0.01	A	0.2	13.8	0.03	B	0.7
	EBTR	0.0	0.50	A	0.0	0.0	0.46	A	0.0
	WBL	11.8	0.01	B	0.3	11.4	0.02	B	0.4
	WBTR	0.0	0.36	A	0.0	0.0	0.61	A	0.0
	NBLTR	21.4	0.06	C	1.4	23.3	0.16	C	4.1
	SBLTR	21.4	0.13	C	3.4	**36.5**	**0.27**	E	**7.7**
	Overall	*0.5*	-	*A*	-	*0.9*	-	*A*	-
Courtice Road & Sandringham Drive (Unsignalized)	**EBL**	**124.2**	**0.90**	F	**42.6**	**168.0**	**0.87**	F	**33.1**
	EBTR	12.8	0.16	B	4.2	25.7	0.19	D	5.2
	WBL	**42.8**	**0.30**	E	**8.8**	**88.5**	**0.52**	F	**17.0**
	WBTR	17.8	0.07	C	1.8	25.1	0.08	D	1.9
	NBL	10.0	0.05	A	1.1	10.8	0.09	B	2.4
	NBTR	0.0	0.23	A	0.0	0.0	0.30	A	0.0
	SBL	8.7	0.02	A	0.4	9.6	0.04	A	0.9
	SBTR	0.0	0.32	A	0.0	0.0	0.35	A	0.0
	Overall	*9.3*	-	*A*	-	*8.0*	-	*A*	-
Courtice Road & Meadowglade Road	**EBL**	38.8	0.21	D	21.1	**63.9**	**0.41**	E	**19.9**
	EBTR	23.2	0.19	C	10.8	50.0	0.36	D	21.8
	WBL	46.6	0.44	D	20.9	**62.1**	**0.36**	E	**17.9**
	WBTR	27.3	0.14	C	9.5	41.2	0.14	D	10.5
	NBL	3.8	0.02	A	1.5	2.7	0.03	A	1.9
	NBTR	3.5	0.24	A	24.3	3.0	0.35	A	38.6
	SBL	5.6	0.03	A	2.1	3.2	0.09	A	2.7
	SBTR	6.1	0.37	A	59.0	3.0	0.31	A	35.5
	Overall	*7.6*	-	*A*	-	*6.6*	-	*A*	-
Bloor Street & Granville Drive (Unsignalized)	EBL	9.6	0.04	A	0.9	10.1	0.06	B	1.5
	EBTR	0.0	0.22	A	0.0	0.0	0.44	A	0.0
	WBL	8.7	0.00	A	0.1	11.0	0.01	B	0.3
	WBTR	0.0	0.37	A	0.0	0.0	0.41	A	0.0
	NBLTR	26.6	0.16	D	4.1	**91.2**	**0.35**	F	**9.9**
	SBLTR	31.5	0.44	D	15.9	**60.5**	**0.50**	F	**17.7**
	Overall	*2.6*	-	*A*	-	*2.7*	-	*A*	-
Bloor Street & Trulls Road	**EBL**	18.7	0.32	B	18.8	**55.4**	**0.87**	E	**75.6**
	EBTR	15.0	0.36	B	41.2	11.3	0.48	B	61.5
	WBL	13.7	0.10	B	7.6	9.7	0.13	A	6.7
	WBTR	17.3	0.54	B	65.4	12.8	0.60	B	81.6
	NBL	19.6	0.12	B	12.8	30.3	0.14	C	14.5
	NBTR	14.0	0.06	B	7.5	23.6	0.10	C	11.3
	SBL	24.5	0.42	C	44.0	33.8	0.33	C	31.4
	SBTR	11.7	0.23	B	18.3	16.5	0.23	B	17.7
	Overall	*16.6*	-	*B*	-	*16.9*	-	*B*	-

Intersection	Movement	AM Peak Hour - Future Total Conditions (2031)				PM Peak Hour - Future Total Conditions (2031)			
		Delay (s)	V/C Ratio	LOS	95th %ile Queue (m)	Delay (s)	V/C Ratio	LOS	95th %ile Queue (m)
Bloor Street & Farmington Drive (Unsignalized)	EBL	9.3	0.03	A	0.8	10.7	0.11	B	2.9
	EBTR	0.0	0.26	A	0.0	0.0	0.36	A	0.0
	WBL	9.0	0.01	A	0.3	10.2	0.04	B	0.9
	WBTR	0.0	0.28	A	0.0	0.0	0.46	A	0.0
	NBL	**77.8**	**0.38**	**F**	**11.1**	**103.4**	**0.16**	**F**	**3.9**
	NBTR	15.8	0.08	C	2.0	32.6	0.17	D	4.6
	SBL	**35.6**	**0.11**	**E**	**2.8**	**152.3**	**0.54**	**F**	**15.3**
	SBTR	**44.5**	**0.56**	**E**	**23.0**	**60.7**	**0.48**	**F**	**16.2**
	Overall	*5.2*	-	*A*	-	*4.2*	-	*A*	-
Courtice Road & Bloor Street	EBL	30.9	0.60	C	42.8	38.1	0.73	D	66.6
	EBTR	18.9	0.52	B	47.8	20.1	0.44	C	72.3
	WBL	38.8	0.69	D	44.2	42.7	0.50	D	39.6
	WBTR	18.7	0.42	B	41.1	47.1	0.89	D	153.4
	NBL	30.8	0.61	C	36.4	**74.1**	**0.90**	**E**	**83.3**
	NBT	12.5	0.26	B	30.8	25.9	0.47	C	71.9
	NBR	3.7	0.07	A	4.5	6.8	0.21	A	13.4
	SBL	13.4	0.15	B	12.9	32.2	0.45	C	33.7
	SBT	15.8	0.57	B	72.8	26.3	0.49	C	73.9
	SBR	6.8	0.27	A	18.8	11.9	0.28	B	25.7
	Overall	*18.1*	-	B	-	*32.8*	-	C	-
Bloor Street & New N-S Collector (Unsignalized)	EBL	8.3	0.03	A	0.1	10.8	0.11	B	2.8
	EBTR	0.0	0.41	A	0.0	0.0	0.29	A	0.0
	WBL	0.0	0.16	A	0.0	0.0	0.37	A	0.0
	WBTR	0.0	0.09	A	0.0	0.0	0.21	A	0.0
	SBLR	14.9	0.28	B	8.7	25.0	0.33	C	10.4
	Overall	*1.2*	-	*A*	-	*1.4*	-	*A*	-
Courtice Road & New E-W Collector (Unsignalized)	EBLR	20.4	0.42	C	15.3	13.7	0.20	B	5.6
	NBL	11.9	0.05	B	1.1	9.6	0.50	A	1.3
	NBT	0.0	0.17	A	0.0	0.0	0.28	A	0.0
	SBTR	0.0	0.54	A	0.0	0.0	0.36	A	0.0
	Overall	*1.7*	-	*A*	-	*0.9*	-	*A*	-

As in the Future Background Conditions, traffic operations in the Future Total Conditions are generally shown to be acceptable, with all study intersections operating at an overall LOS D or better. Eight critical movements were reported during the AM peak hour, up from three in the Future Background Conditions, and fourteen critical movements were reported during the PM peak hour, up from eight in the Future Background Conditions. The following movements were noted to operate at a critical level in the Future Total Conditions traffic operations analysis:

- At the intersection of Courtice Road & Regional Highway 2:
  - The eastbound through movement was found to operate with a v/c ratio of 0.92 during the AM peak hour;
  - The westbound left-turn movement was found to operate at LOS E with a delay of 61.8 seconds and a v/c ratio of 0.92 during the AM peak hour, indicating near-capacity conditions;

  - The shared westbound through/right-turn movement operates with a v/c ratio of 0.94 during the PM peak hour, indicating near-capacity conditions;
  - The northbound left-turn movement was found to operate with a v/c ratio of 0.87 during the AM peak hour and at LOS E with a delay of 60.2 seconds and a v/c ratio of 0.87 during the PM peak hour;

- At the unsignalized intersection of Regional Highway 2 & Hancock Road:
  - The eastbound left-turn movement was found to operate at LOS E with a delay of 55.4 seconds and a v/c ratio of 0.87 during the PM peak hour;

- At the unsignalized intersection of Courtice Road & Sandringham Drive:
  - The eastbound left-turn movement was found to operate at LOS F with a delay of 124.2 seconds and v/c ratio of 0.90 during the AM peak hour and at LOS F with a delay of 168.0 seconds and a v/c ratio of 0.87 during the PM peak hour;
  - The westbound left-turn movement was found to operate at LOS E with a delay of 42.8 seconds during the AM peak hour and at LOS F with a delay of 88.5 seconds during the PM peak hour;

- At the intersection of Courtice Road & Meadowglade Road:
  - The eastbound left-turn movement was shown to operate at LOS E with a delay of 63.9 seconds during the PM peak hour;
  - The westbound left-turn movement was shown to operate at LOS E with a delay of 62.1 seconds during the PM peak hour;

- At the intersection of Courtice Road & Bloor Street:
  - The northbound left-turn movement was found to operate at LOS E with a delay of 74.1 seconds and a v/c ratio of 0.90 during the PM peak hour;

- At the unsignalized intersection of Bloor Street & Granville Drive:
  - The shared northbound left/through/right-turn movement was found to operate at LOS F with a delay of 91.2 seconds during the PM peak hour;
  - The shared southbound left/through/right-turn movement was found to operate at LOS F with a delay of 60.5 seconds during the PM peak hour;

- At the intersection of Bloor Street & Trulls Road:
  - The eastbound left-turn movement was shown to operate at LOS E with a delay of 55.4 seconds and a v/c ratio of 0.87 during the PM peak hour;

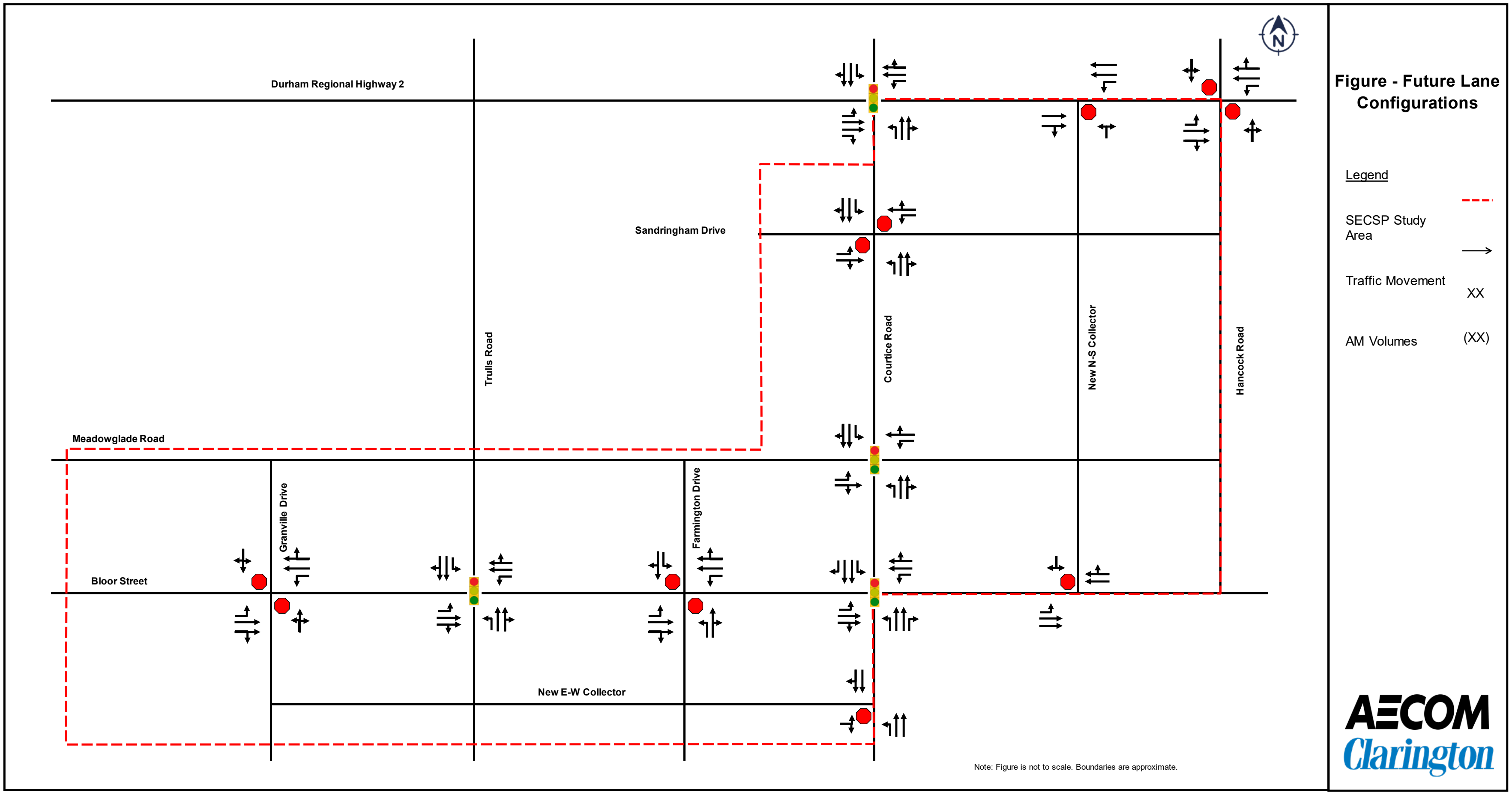
- At the unsignalized intersection of Bloor Street & Farmington Drive:
  - The northbound left-turn movement was shown to operate at LOS F with a delay of 77.8 seconds during the AM peak hour and at LOS F with a delay of 103.4 seconds during the PM peak hour.

  - The southbound left-turn movement was shown to operate at LOS E with a delay of 35.6 seconds during the AM peak hour and at LOS F with a delay of 152.3 seconds during the PM peak hour.
  - The shared southbound through/right-turn movement was shown to operate at LOS E with a delay of 44.5 seconds during the AM peak hour and at LOS F with a delay of 60.7 seconds during the PM peak hour; and

- At the intersection of Courtice Road & Bloor Street:
  - The northbound left-turn movement operates at LOS E with a delay of 74.1 seconds and a v/c ratio of 0.90 during the PM peak hour.

The final lane configurations and intersection controls used in the Future Total Conditions traffic analysis and recommended for implementation are shown in **Figure D-33**. As an additional consideration, although some of the unsignalized collector road intersections with Regional Highway 2, Courtice Road and Bloor Street only demonstrate the need for a shared approach (that is, a shared left-through-right lane) it is recommended that the approach lane be constructed somewhat wider in order for the potential eventual need for separate approach lanes.

Figure D-33: Future Lane Configurations and Intersection Controls



D.13 Future Work and Commitments

As noted above, an EA Monitoring Report is to be prepared as part of the Secondary Plan process to document the background information, mandatory public and review agency notifications. This document will be available for public review and be provided to the Ministry of the Environment, Conservation and Parks (MECP), Director of the EAA Branch. Further to this, through correspondence with the Municipality in the Fall 2020 the MECP identified that a standalone Transportation Master Plan must be prepared for the SECSP area with a comprehensive level of documentation similar to a Project File (Schedule B documentation) or Environmental Study Report (Schedule C documentation).

As the development beyond the Secondary Plan comes to fruition, additional transportation review and study will be required. This will include:

- **Transportation Study:** Completion of additional transportation and traffic impact studies to satisfy the Durham and Clarington development approval process specific to submitted Draft Plans of Subdivision and Site Plans. The scope of work should be reviewed with municipal and regional staff to confirm the approach and assumptions, but it is generally noted that the work will include a comprehensive and detailed assessment of traffic conditions, demand forecasts, traffic impacts, improvement needs (road widenings, auxiliary turn lanes, traffic controls, pedestrian and bicycle facilities, and transit provisions), and basic design elements (e.g. turn lane storage lengths);

- **Transit Planning**: Liaise with Durham Region Transit throughout the future development planning process to:
  - Monitor the future growth and service demand needs;
  - Plan for transit routes along the area arterial and collector road network; and
  - Ensure that sufficient space is protected for transit stops as part of the road right-of-way (per the Region of Durham's Standard Drawings S-500 Series – Transit and / or DRT's Transit Stop Guidelines, as appropriate);

- **Environmental Assessment (EA) Process – Schedule C Projects**: Schedule C projects identified during this Secondary Plan and integrated EA process must proceed through additional future study steps to satisfy Phase 3 (Alternative Design Concepts) and Phase 4 (Environmental Study Report) EA requirements. The final documentation must be available for review by agencies and the public.