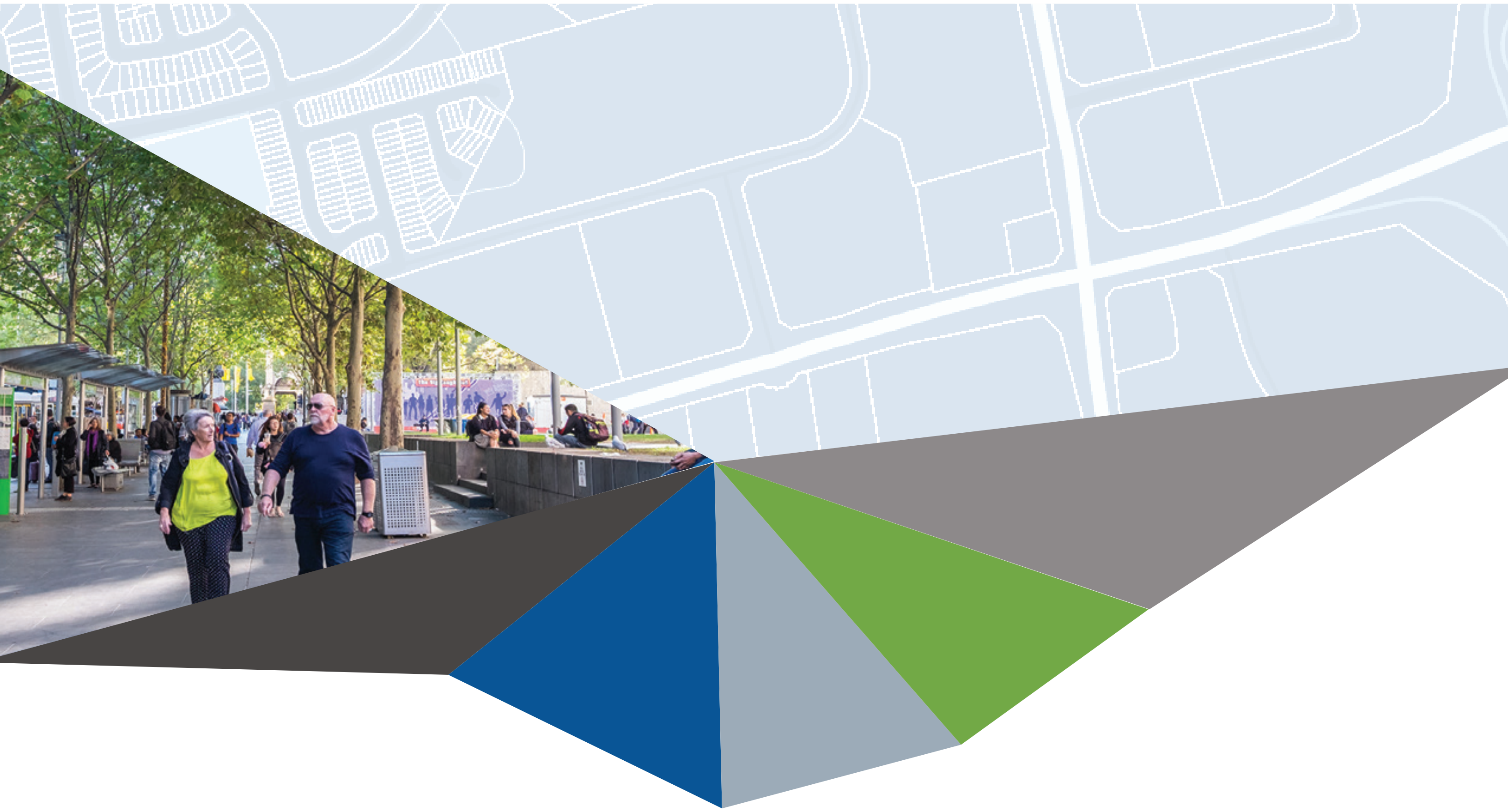
TRANSPORTATION NEEDS ASSESSMENT REPORT

APPENDIX 1

October 29, 2018



Transportation Needs Assessment Report – DRAFT#3

Weston Highway 7 Secondary Plan Phase 1

City of Vaughan
October 24, 2018

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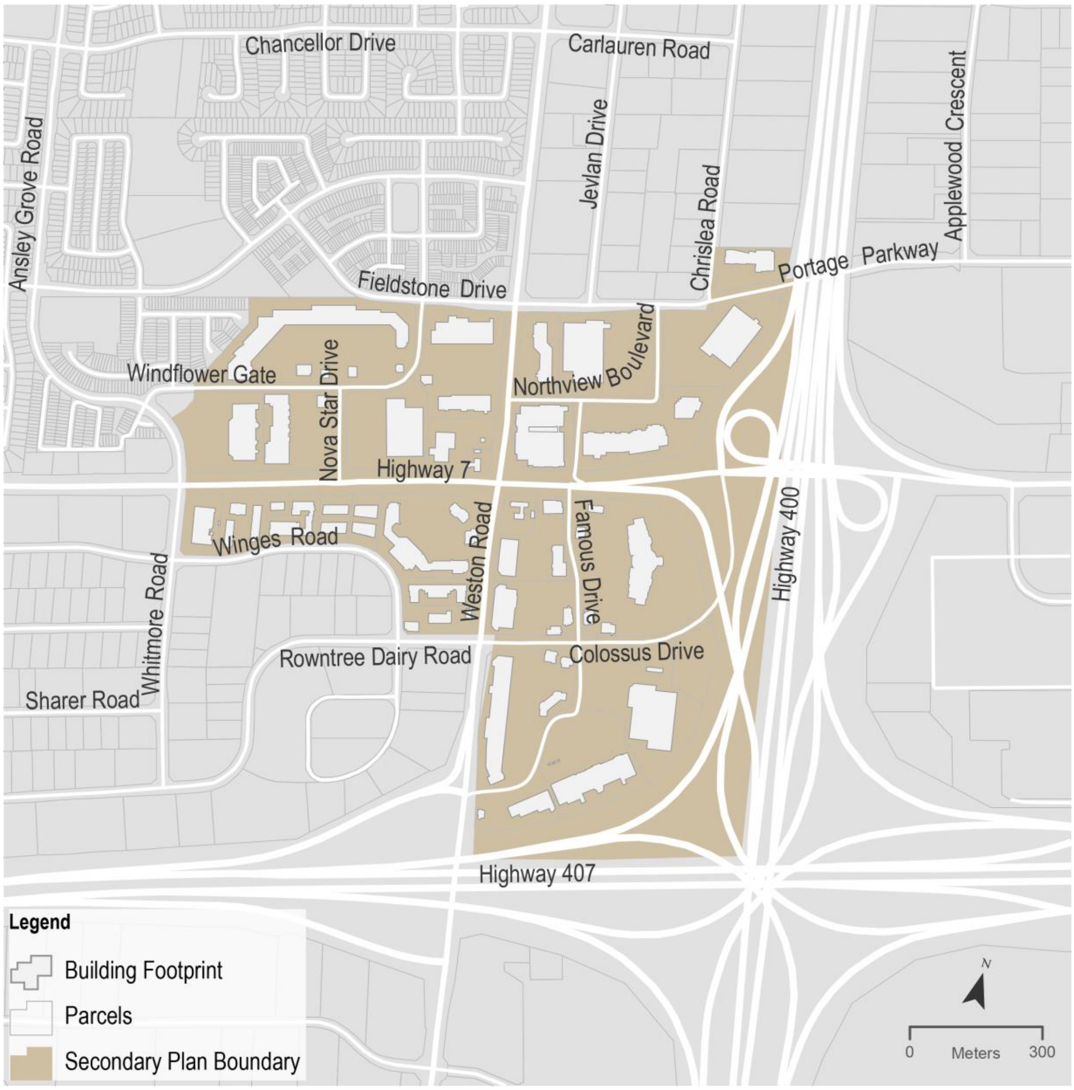
1 Introduction

The City of Vaughan has initiated the Weston and Highway 7 Secondary Plan Phase 1 study. The study builds on a variety of provincial, regional and City plans and policies, including the York Region Transportation Master Plan, York Region Official Plan, Vaughan Official Plan, the Growth Plan for the Greater Golden Horseshoe (GGH), and Metrolinx Draft 2041 Regional Transportation Plan (RTP) (2017). The purpose of the transportation needs assessment work is to:

- Provide a comprehensive understanding of the existing transportation network, land use and travel patterns to, from and within the study area for all modes of transportation;
- Conduct a multi-modal transportation evaluation for the existing conditions to assess the safety and convenience of travel for all modes;
- Document the planned transportation improvements in the vicinity of the study area; and
- Identify potential opportunities for first and last mile connections to major transit stations, including active transportation connections, a finer-grid road network, and innovative mobility solutions.

Figure 1-1 illustrates the Secondary Plan study area.

Figure 1-1: Study Area



2 Planning Context

The Weston 7 Secondary Plan Phase 1 study will be developed within the context of provincial, regional, and municipal planning policies and initiatives. This section highlights the key planning documents influencing the study.

2.1 Provincial Planning Context

Several provincial plans and policies provide the basis and guidance for the transportation vision for the City of Vaughan. Further, updates to provincial plans may directly influence both York Region and City of Vaughan infrastructure needs, thus requiring periodical updates to the City's plans including the Weston 7 Secondary Plan. Provincial plans and policies are identified and summarized in **Table 2-1.** The Study will consider these plans and policies.

Table 2-1. Relevant Provincial Policy and Planning Directions

Provincial Planning Document	Directions
Provincial Policy Statement, Ontario, 2014	Description: Provides direction on land use planning and development, and the transportation system. Directions: The most relevant land use and transportation policies include: • 1.6.7.1 Safe, energy efficient transportation systems that move people and goods and address projected needs; • 1.6.7.2 Use of Travel Demand Management (TDM) strategies to maximize efficiency; • 1.6.7.3 A multimodal transportation system that provides connections within and among transportation systems and modes including across jurisdictional boundaries; • 1.6.7.4 Land use patterns that minimize length and number of vehicle trips to support transit and active transportation; • 1.6.7.5 Integration of transportation and land use considerations at all stages of planning; • 1.6.8.2 Protect for major goods movement facilities and corridors; and • 1.6.8.3 New development should be compatible with the long-term purposes of the corridor.

Table 2-1. Relevant Provincial Policy and Planning Directions

Provincial Planning Document	Directions
Growth Plan for the Greater Golden Horseshoe (GGH), Ministry of Municipal Affairs, 2017	Description: The Growth Plan for the GGH came into effect on July 1, 2017, replacing the previous (2006) growth plan. The Growth Plan, building on the Provincial Policy Statement, provides a strategic framework for managing growth in the Region, including specific land use planning policies, goals, and measurable targets. The Growth Plan defines specific policies for where and how to grow. Integrating transportation and land use planning, the plan prioritizes intensification, setting population and employment growth targets for all Upper- and Single-Tier Municipalities in the GGH. The Growth Plan's horizon by which the goals and policies of the plan should be achieved is 2041. Directions: The new Growth Plan: • Identifies Major Transit Station Areas (MTSAs) as strategic growth areas towards which intensification is to be directed. With two vivaNext stations within its boundaries, the Weston 7 Secondary Plan Area [is] considered to be a Major Transit Station Area under the Growth Plan; • States that all MTSAs are to be planned and designed to achieve multimodal access to stations and connections to nearby major trip generators; • Sets minimum density targets of 160 residents and jobs per hectare for Major Transit Station Areas (MTSAs) on Priority Transit Corridors served by bus rapid transit; and • States that the Region's transportation system will be planned and managed to offer multimodal access to opportunities; offer a balance of transportation choices that promotes transit and active transportation; integrates a "Complete Streets" approach to the design, refurbishment, or reconstruction of the street network; facilitates improved linkages to urban growth centres; and ensures that active transportation networks are comprehensive and integrated.
2041 Regional Transportation Plan (2018)	Description: The 2041 Regional Transportation Plan sets the Greater Toronto and Hamilton Area's (GTHA's) multi-modal long-range regional transportation vision, goals, objectives, and priorities. The RTP supports and is aligned with the PPS and Growth Plan. Building on the previous RTP, the Big Move (2008), this plan provides strategic direction for planning, designing and building a regional transportation network that enhances quality of life, the environment, and prosperity. A significant transit project that will serve the Study Area is the Highway 7 West BRT, from Yonge Street in Richmond Hill to Helen Avenue in Vaughan, opening in 2019. A further extension west to the Brampton border in delivery Directions: A number of actions outlined in the 2041 RTP are relevant to the Study, including: • Expand first- and last-mile choices at all transit stations; • Place universal access at the centre of all transportation planning and designing activities; • Eliminate transportation fatalities and serious injuries as part of a regional Vision Zero program; • Make TDM a priority; • Plan and design communities… to support and promote the greatest possible shift in travel behavior, consistent with Ontario's passenger transportation hierarchy; and • Rethink the future of parking.

Table 2-1. Relevant Provincial Policy and Planning Directions

Provincial Planning Document	Directions
Transit-Supportive Guidelines, Ministry of Transportation, 2012	Description: Identifies best practices for transit-friendly land-use planning, urban design, and operations. Directions: The Guidelines outline many strategies for creating transit supportive environments that are relevant to this study. A few highlighted strategies include: • Create fine-grained and interconnected networks, to provide efficient transit services and connections to transit stops; • Eliminate unnecessary jogs or breaks in the network; • Spacing of arterial and collector roads should support a maximum 400m walk from the interior of a block to a transit stop, and facilitate higher levels of walking and cycling; • Access routes to transit stops, such as pedestrian pathways or local roads, should be spaced no greater than 200m apart; • Improve pedestrian and cycling infrastructure to increase convenient and comfortable access to transit; • Create additional street connections where possible that can help to minimize travel distances to transit; • Minimize block lengths to promote greater connectivity and enhance the walkability of neighbourhoods; • Extend existing park and open space networks, where possible, to link with transit stops and station areas; and • Design complete streets to reflect both the existing and planned land use, urban form and transportation contexts.
#CycleON: Ontario's Cycling Strategy, Ministry of Transportation, 2013	Description: Identifies a vision for cycling in the province over the next 20 years where cycling is valued as a core mode of transportation. The document is primarily meant to guide the Province's role in improving cycling across the province, however the Weston 7 Secondary Plan Study aligns with several of Cycle ON's Strategic Directions, including: • Design healthy, active, and prosperous communities; • Improve cycling infrastructure; and • Make highways and streets safer.

2.1.1 407 Transitway

The Provincial Ministry of Transportation (MTO) is currently conducting the Planning, Preliminary Design, and EA for the 407 Transitway from Highway 400 to Kennedy Road in Markham, and the EA for the 407 Transitway from Hurontario Street to Highway 400 was recently filed. The 407 Transitway will be a fully grade separated transit facility on an exclusive right-of-way, running along the Highway 407 Corridor. This portion of the facility will consist of approximately 46 km of runningway and several stations that will include parking facilities, transit integration and other amenities. It forms part of the 150 km long high-speed interregional facility planned to be ultimately constructed on a separate right-of-way that parallels Highway 407 from Burlington to Highway 35/115.

Subject to the outcome of the study, the 407 Transitway will be implemented initially as Bus Rapid Transit (BRT) with the opportunity to convert to Light Rail Transit (LRT) in the future. In the meantime it will be used by GO Transit routes and "Spine" services - services that operate exclusively on the transit way.

407 Transitway Stations are proposed at Pine Valley Drive and at Jane Street. The latter will connect with the Highway 407 Toronto Transit Commission Subway Station.

Although these stations are outside of the Weston 7 Secondary Plan study area, facilitating access to them will be considered.

2.2 Regional Planning Context

York Region planning documents which will influence and provide policy direction on the Weston 7 Secondary Plan Phase 1 study are summarized below.

2.2.1 York Region Transportation Master Plan (TMP) 2016

York Region's Transportation Master Plan (TMP) addresses the Region's mobility needs to 2041 and beyond. It provides a 25 year outlook to:

> Create an advanced interconnected system of mobility in the GTHA in order to give York Region residents and businesses a competitive advantage, making York Region the best place to live, work and play in the GTHA.

The York Region TMP has five objectives:

1. Create a world class transit system;
2. Develop a road network fit for the future;
3. Integrate active transportation in Urban Areas;
4. Maximize the potential of employment areas; and
5. Make the last mile work.

There are five main policy areas developed as part of the TMP:

- **Finer grid network**: working with the Province and local municipalities to plan for and protect a series of mid-block highway crossings and continuous collector roads to provide alternate routes for vehicles, cyclists, and pedestrians;
- **Corridor evolution**: design streets to accommodate a variety of travel modes, including transit vehicles, passenger cars, cyclists, pedestrians, and trucks; ensure the most effective use of the road space and financial resources to design and operate streets to maximize capacity to move people;
- **Commuter parking management**: provide opportunities for residents to park their vehicles on fringes of urban areas and access different modes of travel for part of their trips, such as transit or car sharing;
- **Goods movement network**: as the Region becomes more urban, with a combination of industrial, commercial, and residential land uses, there will be more conflicts between road users. Developing a Goods Movement Strategy will enable the Region to work in partnership with other agencies and the trucking industry and to continue to attract investment, create jobs, and foster economic growth; and
- **Boulevard jurisdiction**: under the Municipal Act, 2001, local municipalities are currently responsible for construction and maintenance of major boulevard elements on Regional roads, such as sidewalks, street lights, and multi-use paths. This creates public confusion and issues with consistency around construction and maintenance of sidewalk and streetscape elements, and York Region is working with local municipalities to transfer responsibility to the Region to solve these issues.

The TMP provides goals and policy directions for the Weston 7 Secondary Plan study, such as building active transportation network and finer grid network and supporting regional transit service.

2.2.2 York Region Official Plan

The York Region Official Plan (YR-OP) 2016 describes how York Region plans to accommodate future growth and development while meeting the needs of existing residents and businesses.

The document provides direction to guide economic, environmental, and community-building decisions to manage growth. The YR-OP recommends policies that emphasize a reduction in automobile reliance and an increase in active transportation facilities, not only meet sustainability goals, but to also tackle public health concerns. The acknowledgement that the design of communities is directly related to human health plays an important role in the Official Plan update.

Recommendations and directions that may be valuable to the development of the Weston Highway 7 Secondary Plan have been summarized in **Table 2-2**.

Table 2-2: Official Plan Objectives and Policies

Objective	Policy / Direction
A Sustainable Natural Environment	**Stormwater Management** To require the preparation of comprehensive master environmental servicing plans, or appropriate technical studies, as a component of secondary plans.
Healthy Communities	**Transportation:** To reduce vehicle emissions by ensuring that communities are designed to prioritize pedestrians and cyclists, reduce single occupancy automobile use, and support public transit and Transportation Demand Management initiatives. **Accessibility:** To require high-quality urban design and pedestrian-friendly communities that provide safety, comfort and mobility so that residents can walk to meet their daily needs. To ensure that public buildings and facilities are designed to be accessible, and are located in proximity to pedestrian, cycling and transit systems. **Health:** That public health and other human services be incorporated into the design and evaluation of new community areas and Regional Centres and Corridors That sensitive uses such as schools, daycares and seniors' facilities not be located near significant known air emissions sources such as controlled access provincial 400-series highways. **Housing:** To require that all new secondary plans include a strategy to implement the affordable housing policies in the Official Plan. That affordable housing initiatives be given priority on publicly owned lands with a focus on locations on or near transit corridors.

Objective	Policy / Direction
Economic Vitality	**Employment:** To create high-quality employment opportunities for residents with the goal of 1 job for every 2 residents. To create a business friendly environment that includes a diverse range, size and mix of available employment lands, state-of-the-art communications facilities and networks **City Building:** To recognize Regional Centres and Corridors as hubs of commerce, business and entertainment. To ensure the efficient movement of goods and services in Regional Centres and Corridors through effective planning, urban design and infrastructure planning.
An Urbanizing Region	**Forecasting Growth:** To require local municipalities to develop a phasing plan for new community areas that is coordinated with the York Region Official Plan, the 10-year Capital Plan, the Water and Wastewater Master Plan and the Transportation Master Plan. **Balancing Uses:** That a balance of residential and employment uses shall be provided throughout the Region to improve the possibilities for working and living in close proximity **Parking:** That secondary plans and zoning by-laws shall, in consultation with the Region and related agencies, incorporate parking management policies and standards that include reduced minimum and maximum parking requirements, on-street parking and preferential locations for carpooling, car-sharing spaces and bike storage requirements.

The YR-OP transportation road network (Map 12 Street Network) designates a right-of-way (ROW) width of up to 45.0 m along Highway 7 and up to 43.0 m along Weston Road within the study area.

The YR-OP also identifies transit modal split targets which provides policy direction to encourage transit use in the study area as much as possible. The YR-OP transit modal split targets by 2031 are as follows:

- 30% during peak periods in the Urban Area; and
- 50% in the Regional Centres and Corridors by 2031, where Highway 7 is designated as a Regional Corridor.

2.2.3 York Region vivaNext Plan (2017)

The vivaNext bus rapid transit (BRT) project will provide improved transit service in York Region and other urban design elements such as pedestrian friendly boulevards, separated bike lanes, trees and other greenery. A map of the project is shown in **Figure 2-1**.

The Highway 7 West Woodbridge plan connects Vaughan Metropolitan Centre (VMC) subway station and Highway 7 and Wigwoss Drive / Helen Street with 4.5 km full dedicated transit rapidway. Separated bike lanes will be built as part of the construction, and there will be a multi-use path for pedestrians and cyclists on the Highway 7 bridge over Highway 400 (shown in **Figure 2-2** and **Figure 2-3**), providing a safe and comfortable network for pedestrians and cyclists. The project is currently under construction and is expected to be completed in late 2019.

Figure 2-1: York Region vivaNext Planned BRT Network

Figure 2-2: vivaNext Highway 7 West Woodbridge Plan

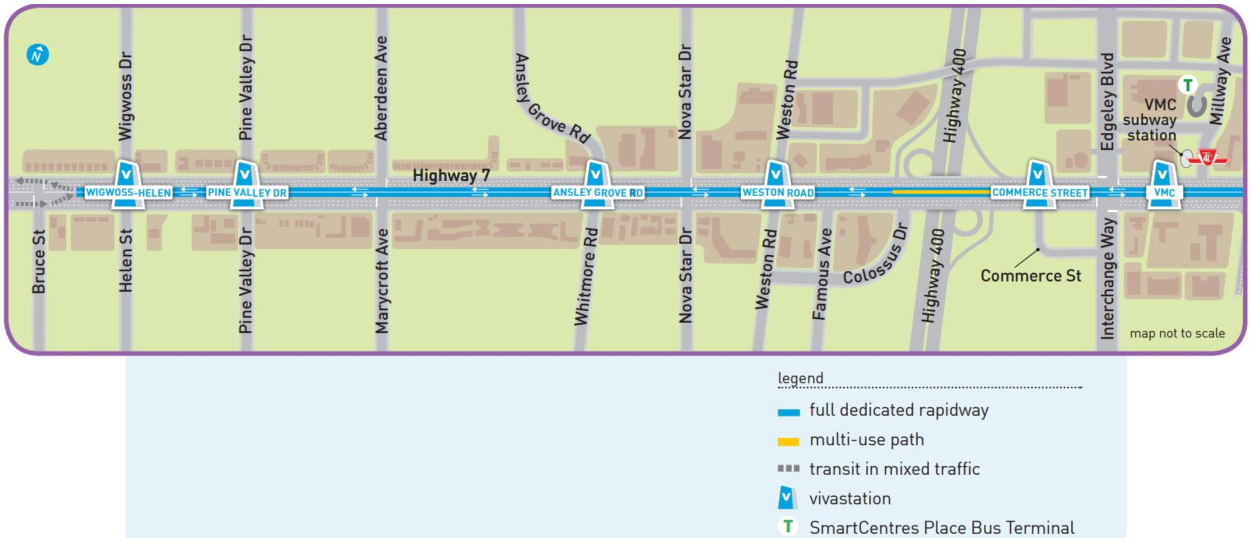
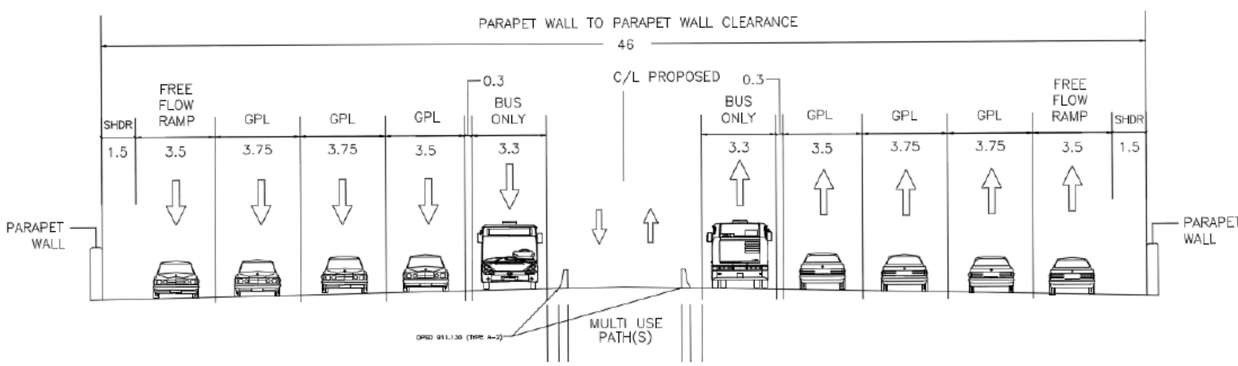


Figure 2-3: Highway 7 Bridge over Highway 400



The design for Highway 7 West of Highway and across the Highway 400 interchange is shown in **Figure 2-4** and **Figure 2-5**. A 4.3m multi-use path (MUP) is planned for pedestrians and cyclists, in the median on the Highway 7 bridge over Highway 400. The MUP continues east of Highway 400 to Weston Road. Cyclists travelling eastbound will need to use a combined crossride (shown in **Figure 2-6**) at Colossus Drive to access the eastbound bike lane, on the north side of Highway 7 (shown in **Figure 2-4**). Westbound cyclists on the bike lane on the south side of Highway 7 need to access the median MUP at Weston Road (shown in **Figure 2-5**).

Figure 2-4: Highway 7 West of Highway 400, between Weston Road and Colossus Drive

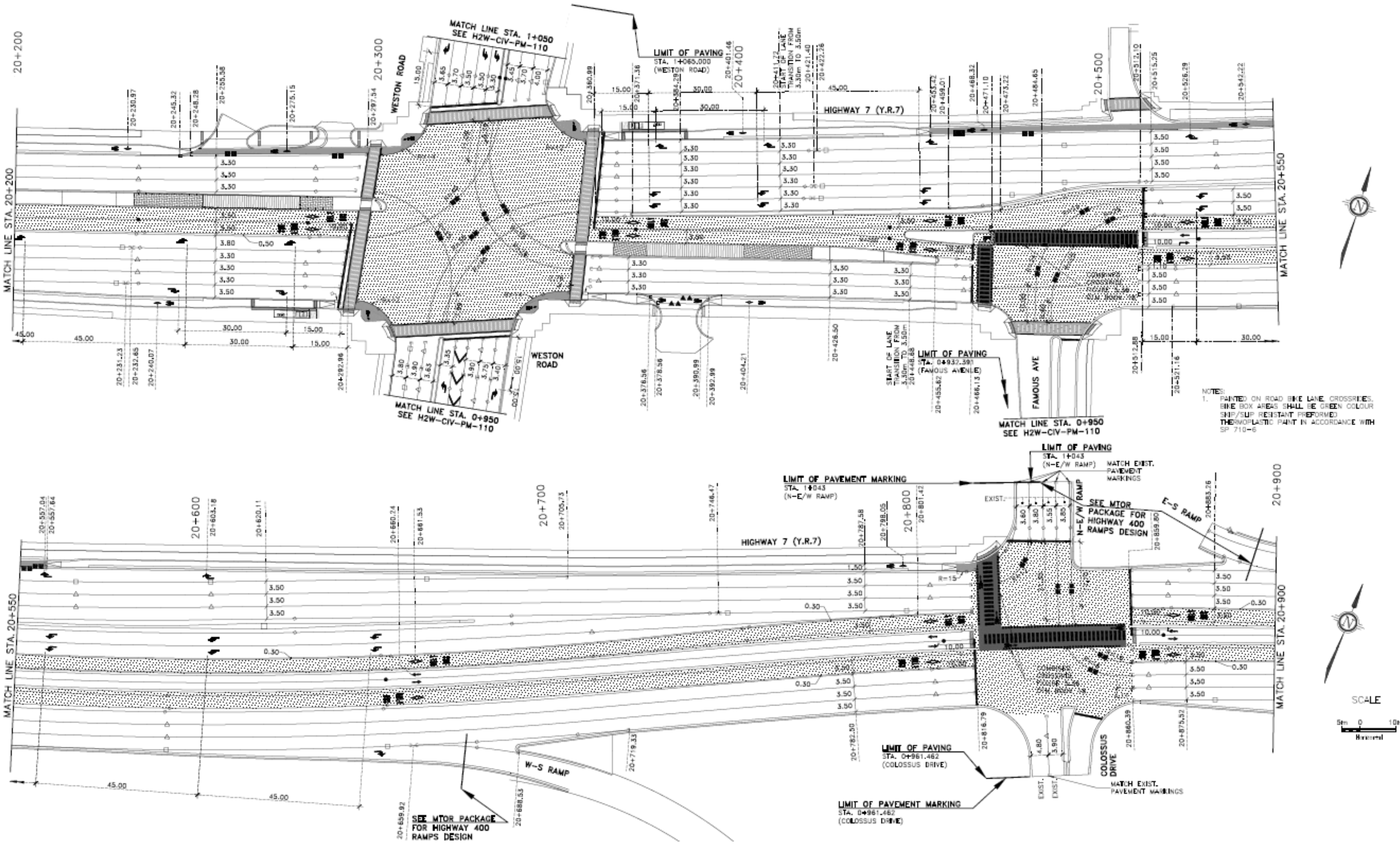


Figure 2-5: Highway 7 across Highway 410 Interchange

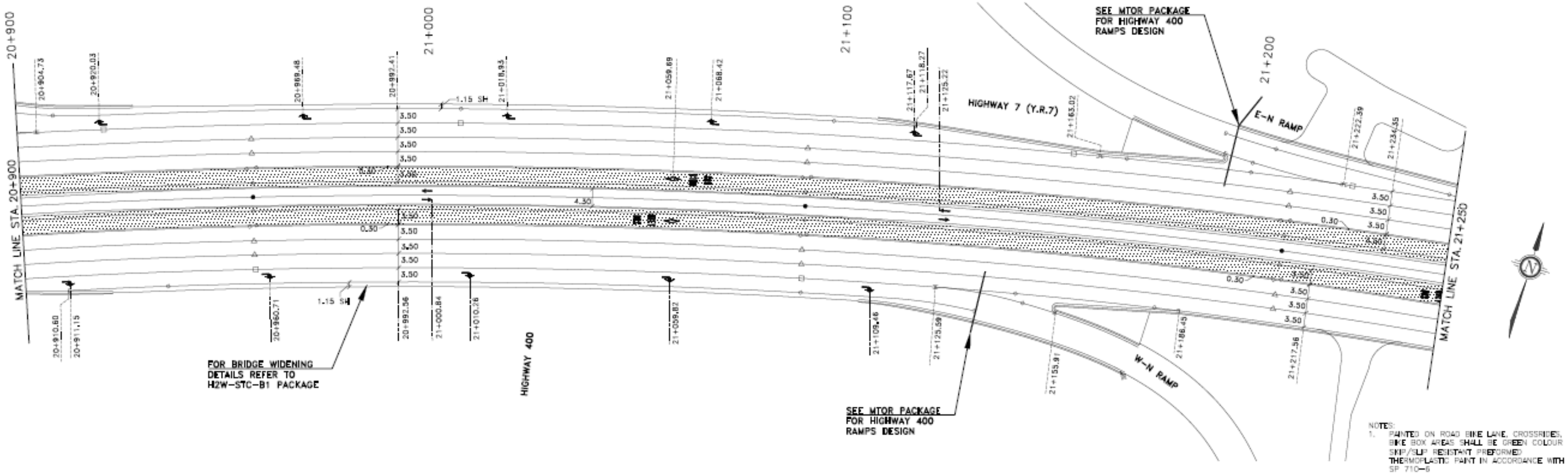
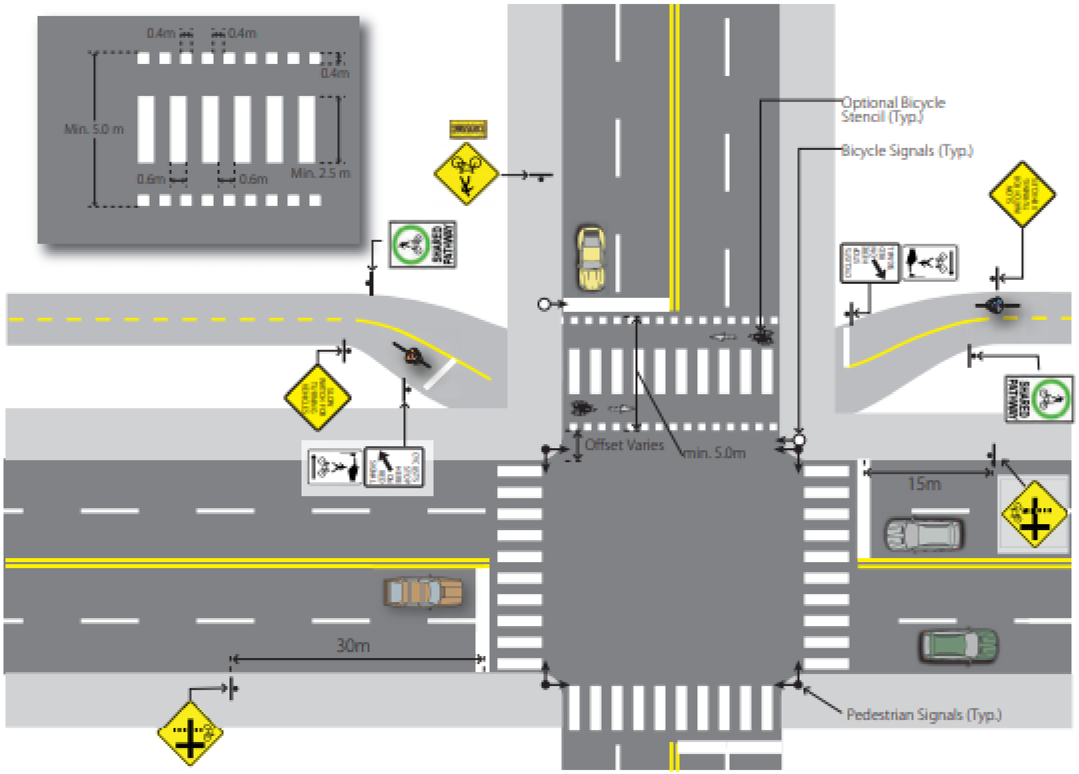


Figure 2-6: Combined Pedestrian and Cyclist Crossride (Signalized Example)



Source: Ontario Traffic Manual (OTM) Book 18 Cycling Facilities, 2013

2.2.4 York Region Transportation Mobility Plan Guidelines for Development Applications (2016)

The Transportation Mobility Plan provides the tools necessary to implement and connect the policies and requirements of York Region's Official Plan and Transportation Master Plan. As an update to the Transportation Impact Study Guidelines (2007), the Plan is focused on transit, active transportation and strategic measures that will reduce the travel demand and minimize single-occupant vehicle trips to and from the proposed developments. The Plan aims to expedite the development review process and is a combination of multimodal plans along with traditional traffic impact analyses.

A Transportation Mobility Plan is required when the proposed development generates 100 or more person trips. This plan is prepared in support of the Official Plan Amendment, Secondary Plan, Block Plan, Zoning Bylaw Amendment, draft plan of subdivision and site plan applications.

The main objectives and requirements of a Transportation Mobility Plan to support a Secondary Plan application are:

1. To describe in detail the **impact of the proposed land use or policy changes** on the existing transportation system for all modes of transportation.
2. To identify a more defined **external and internal transportation network** to accommodate all modes of transportation. This includes finer grid road network, active transportation network and detailed transit network.

3. To identify **other transportation infrastructure improvements and missing links for all modes of transportation** required above and beyond those identified in the Regional and local Municipal Transportation Master Plans or the Region's 10-Year Roads and Transit Capital Construction Programs.
    - Particularly for secondary plans, the travel demands between intersections and mid-block capacities should be reviewed and assessed to determine if transportation infrastructure or additional capacities are required. Assessments could include screenline analysis by identifying traffic volumes, person trips and/or transit ridership.
4. To identify **development phasing plans** based on the planned and scheduled proposed transportation infrastructure improvements.
5. To identify high level **Transportation Demand Management plans**, measures and initiatives to achieve the non-auto modal split and to reduce single-occupant-vehicles. These are described in additional detail in **Section 2.4**.
6. To identify a detailed **implementation plan** in order to achieve complete community building objectives. These requirements will be reflected in the Transportation Mobility Plan report, Secondary Plan report and schedules to guide the draft plans of subdivision and site plans.

The Mobility Plan emphasizes the importance of reviewing and assessing existing and future conditions for all modes of transportation. To that end, York Region has developed its preferred multimodal level of service (LOS) evaluation approach to address the performance requirements for driving, walking, cycling and transit. These multimodal LOS evaluation, in combination with the other best practice evaluation framework, will be used to examine the existing conditions for all modes of transportation in this study. A high-level summary of the framework and the LOS targets are summarized in the following sections.

Automobile Level of Service

There are two criteria required for the automobile mode level of service performance: vehicle delay and volume-to capacity ratio. Both of these criteria are to be completed and included in the Transportation Mobility Plan Study.

Automobile LOS and V/C Target: D (0.85) or better for urban area and LOS C (0.70) or better for rural area

Transit Level of Service

There are three required criteria for the transit mode level of service performance:

1. Access to the transit stops, measured through a development's potential transit riders' straight line walking distance to transit stops;
2. Transit headways, measured through the time interval between transit vehicles for a transit corridor and;
3. Transit vehicle performance at the intersection approach, measured by examining the delay and volume-to-capacity ratio for curb lanes.

Transit LOS Target: C or better for Access to Transit Stops and Transit Headways (<15 minutes) and LOS D or better (<0.9) for Intersection Approach.

Pedestrian Level of Service

The pedestrian level of service is measured at the segment level (between two or more intersections) and at the intersection level. Criteria used to assess Segment LOS for pedestrians are:

- The sidewalk / multi-use path width; and
- The buffer width or separation distance between the sidewalk and the street curb.

In addition to the above, the assessment of pedestrian LOS at signalized or unsignalized intersections incorporates the following supplementary considerations:

- Cross-walk treatment (marked, unmarked, high-visibility zebra markings); and
- Pedestrian clearance time.

Segment LOS Target: a score of C or better (≥1.5 m curb-faced sidewalk, buffer > 0m)
Intersection LOS Target: a score of C or better (≥1.5 m curb-faced sidewalk, buffer > 0m, pedestrian signal head with sufficient pedestrian clearance time, clearly delineated cross-walk)

Bicycle Level of Service

Similarly to pedestrian level of service, the bicycle LOS is measured at the segment level (between two or more intersections) and at the intersection level. Criteria used to assess Segment LOS for cyclists are:

- The type of cycling facility (dedicated, separated, shared);
- The width of the cycling facility; and
- The buffer width or separation distance between the facility and the street curb.

In addition to the above, the assessment of cyclist LOS at signalized or unsignalized intersections incorporates the following supplementary consideration into the assessment:

- Presence of bicycle box, clearly delineated bicycle treatment or bicycle signal head.

Segment LOS Target: a score of C or better (>1.5m dedicated cycling facilities, buffer ≥ 0m)

Intersection LOS Target: a score of C or better (>1.5m dedicated cycling facilities, buffer ≥ 0m, bicycle box or clearly delineated bicycle treatment or bicycle signal head)

2.3 City of Vaughan Planning Context

2.3.1 Vaughan 2013 Transportation Master Plan

The City of Vaughan's 2013 ***Transportation Master Plan*** (TMP) evaluates the transportation needs of the City and identifies policies, infrastructure and services needed to efficiently accommodate population and employment growth to 2031, guided by the vision of:

> Reducing automobile dependence and moving the City closer to achieving the goal of a more livable, sustainable community.

The principles and goals of the Vaughan TMP promote a balanced approach to transportation that:

- Offers safe, accessible, affordable, reliable, and efficient transportation for everyone;
- Minimizes environmental impact;
- Integrates land use and transportation planning;
- Promotes economic vitality;
- Avoids unnecessary capacity improvements;
- Supports active transportation and reduces single-occupant vehicle travel; and
- Reduces the need to travel.

As such, the Vaughan TMP adopts a "Transit First" focus and recommends that road network improvements be largely limited to strategic initiatives that support transit and goods movement, improve network connectivity, or support intensification in designated areas. Road improvements that could compete with transit are recommended to be deferred until enhanced transit services are operating and have an established ridership base. Road improvements to address future capacity deficiencies that cannot be addressed by TDM (including HOV) initiatives and enhanced transit should be identified when a corridor is forecast to exceed its practical capacity (i.e. Level of Service "E").

Based upon the objectives and policies described previously, the Vaughan TMP recommends an ultimate 2031 transportation network along with short (2011-2016), medium (2016-2021) and long (2021-2031) term action plans for active transportation, transit support initiatives, travel demand management, parking, strategic road initiatives, and monitoring. It is noted that the Colossus Drive overpass was recommended for the 2031 horizon. This study will recognize the recommendations in the TMP.

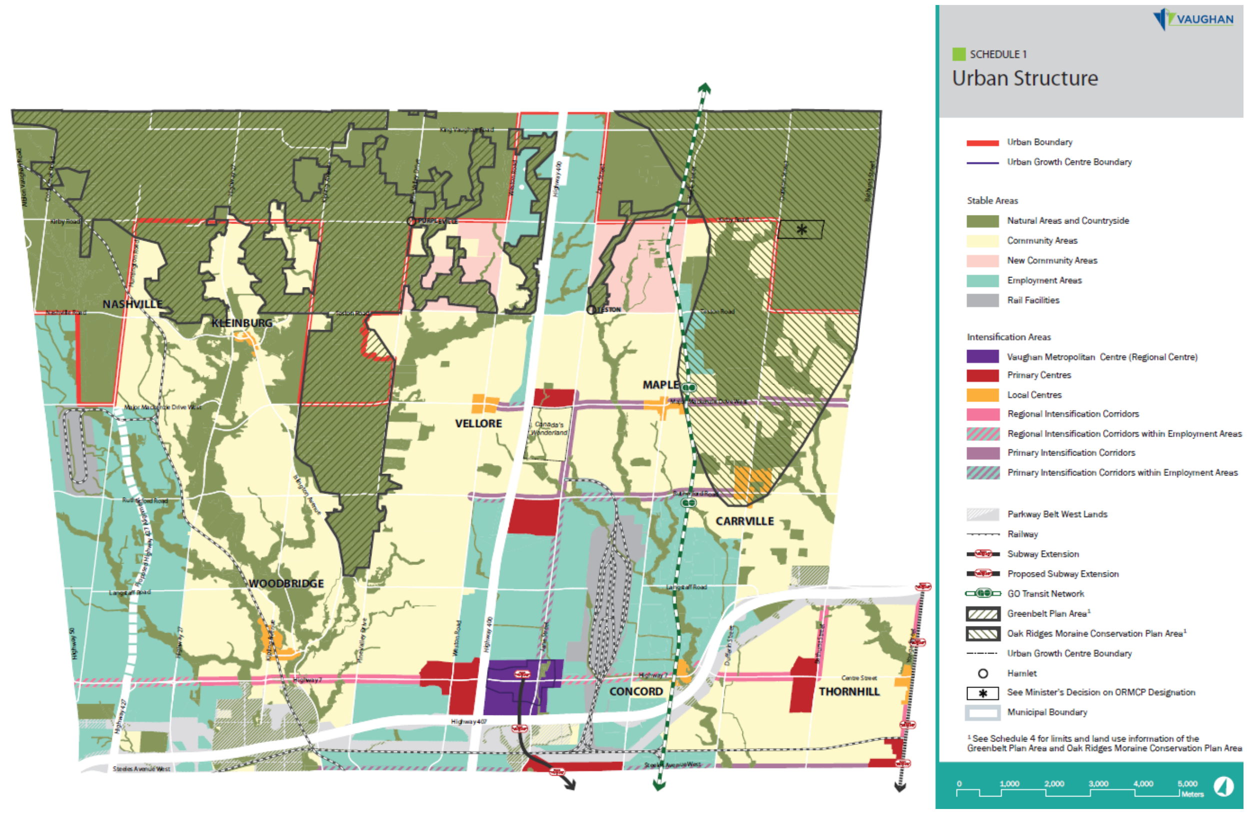
2.3.2 City of Vaughan Official Plan

The ***City of Vaughan 2010 Official Plan*** (VOP) was approved by Council on September 7, 2010. The Plan was endorsed by Regional Council on June 28, 2012. The Official Plan is part of a Growth Management Strategy "that will shape the future of the City and guide its continued transformation into a vibrant, beautiful and sustainable City".

The DC Update will ensure that investments are undertaken in a way consistent with the vision and policies established in the VOP, in particular those highlighted below.

Policies contained in Chapter 2-Managing Growth of the VOP are of relevance to the Weston 7 study area. These policies plan for the accommodation of a population of 416,600 people and 266,100 jobs by 2031, according to Schedule 1, Urban Structure, shown in **Figure 2-7**, which also designates the Weston 7 study area as a “primary centre”.

Figure 2-7: City of Vaughan Official Plan, Schedule 1, Urban Structure



Source: City of Vaughan Official Plan – Volume 1 - 2017 Office Consolidation, Schedules, 2017

Several policies in Chapter 4-Transportation are also of particular relevance to the Weston 7 study, including:

- To establish a comprehensive transportation network that allows a full range of mobility options, including walking, cycling and transit (4.1.1.1);
- That the street network will be the basis for enhanced transportation opportunities, including transit, walking, cycling, and place making initiatives. Existing rights-of way should be designed to optimize the efficient movement for a variety of modes, potentially resulting in reduced capacity for cars where overall capacity increases can be achieved (4.1.1.5);
- To support the development of a comprehensive network of on-street and off-street pedestrian and bicycle routes, through the implementation of the City’s Pedestrian and Cycling Master Plan and York Region’s Pedestrian and Cycling Master Plan, to

facilitate walking and cycling and to promote convenience and connectivity (4.1.1.6); and

- To plan for a street network that prioritizes safe and efficient pedestrian travel while effectively accommodating cyclists, transit and other vehicles, and to create more pedestrian and transit-friendly street cross-sections (4.2.1.2).

Schedule 9 (**Figure 2-8**) and Schedule 10 (**Figure 2-9**) in the City of Vaughan's Official Plan identify the City's Future Transportation Network and Major Transportation Network, respectively. It is noted that these schedules were developed prior to the completion of the 2016 York Region TMP, and as such incorporate Regional plans based upon the previous version of the York Region TMP.

Consistent with the York Region OP, the City of Vaughan OP sets specific transit mode share targets (shown in **Table 2-3**). Highway 7 is designated as a Regional Intensification Corridor, which has a 50% transit mode share target in the peak periods by 2031. The Weston 7 Secondary Plan area is an Intensification Area, which has a 40% transit mode share target. Achieving these targets is dependent upon the implementation of various measures, included rapid transit service, programs supporting active transportation, and TDM.

While no specific targets for active transportation mode share has been set, the City is to implement a suite of new policies, programs, and infrastructure improvements, in order to support and encourage active transportation usage.

Table 2-3: 2031 Transit Mode Share Targets (Peak Periods)

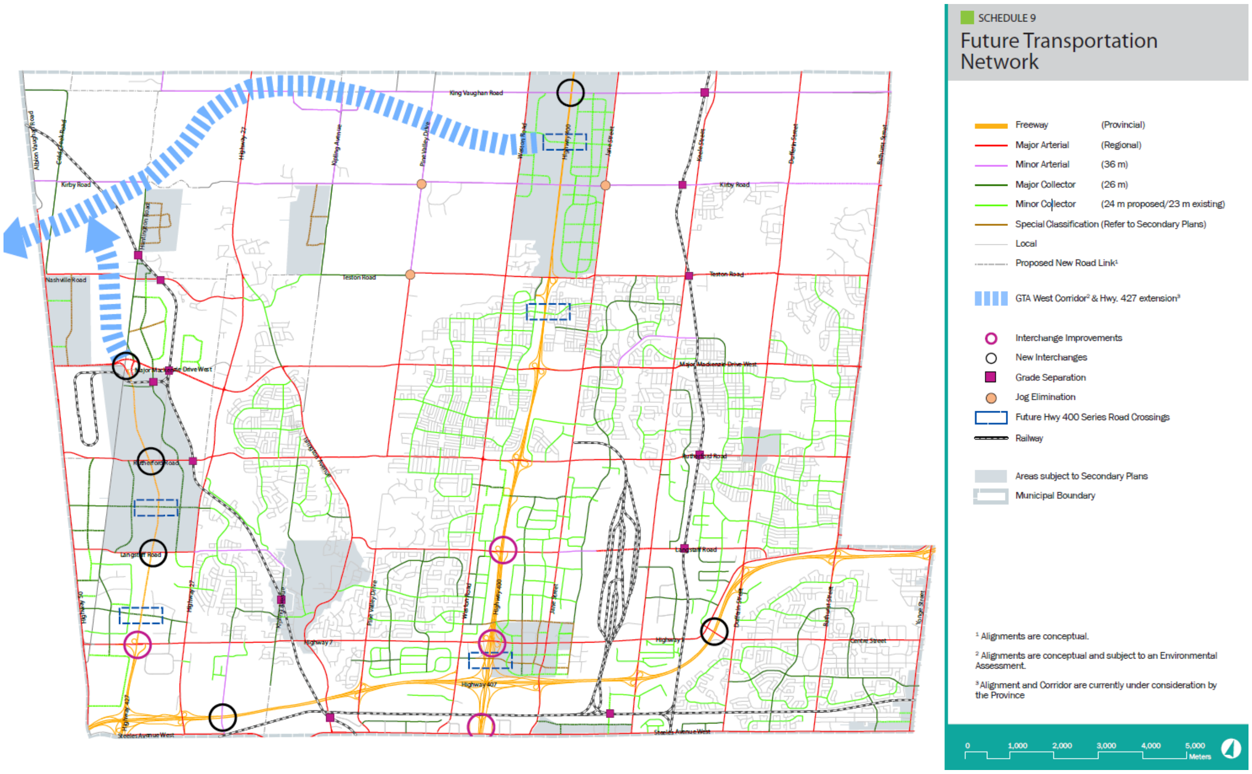
Areas	2031 Transit Mode Share Targets during Peak Periods
Vaughan Metropolitan Centre	50%
Regional Intensification Corridors *	50%
Other Intensification Areas **	40%
City of Vaughan Overall	30%

Source: City of Vaughan Official Plan 2010 – Volume 1- 2017 Office Consolidation, policies, 2017

* Highway 7 is a Regional Intensification Corridor

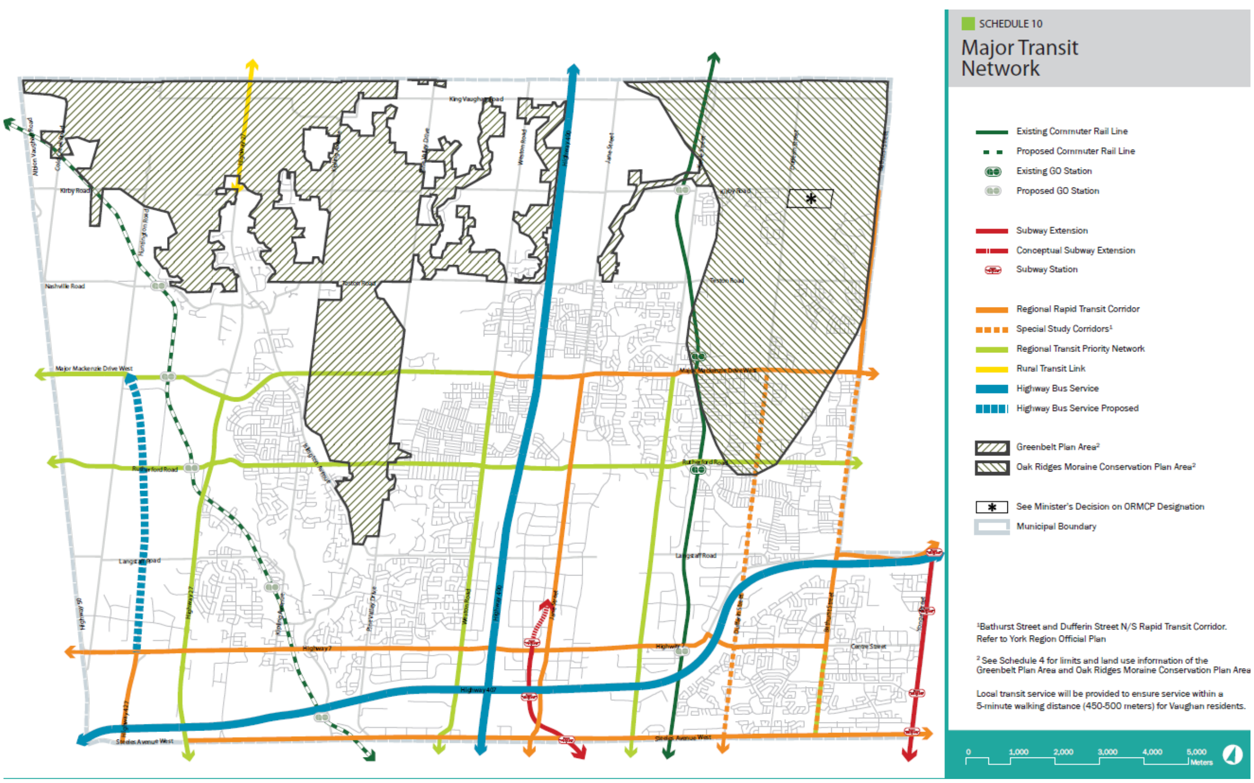
** Weston 7 Secondary Plan area is an Intensification Area

Figure 2-8: City of Vaughan Official Plan, Schedule 9, Future Transportation Network



Source: City of Vaughan Official Plan 2010 – Volume 1- 2017 Office Consolidation, Schedules, 2017

Figure 2-9. City of Vaughan Official Plan, Schedule 10, Vaughan Major Transit Network



Source: City of Vaughan Official Plan – Volume 1- 2017 Office Consolidation, Schedules, 2017

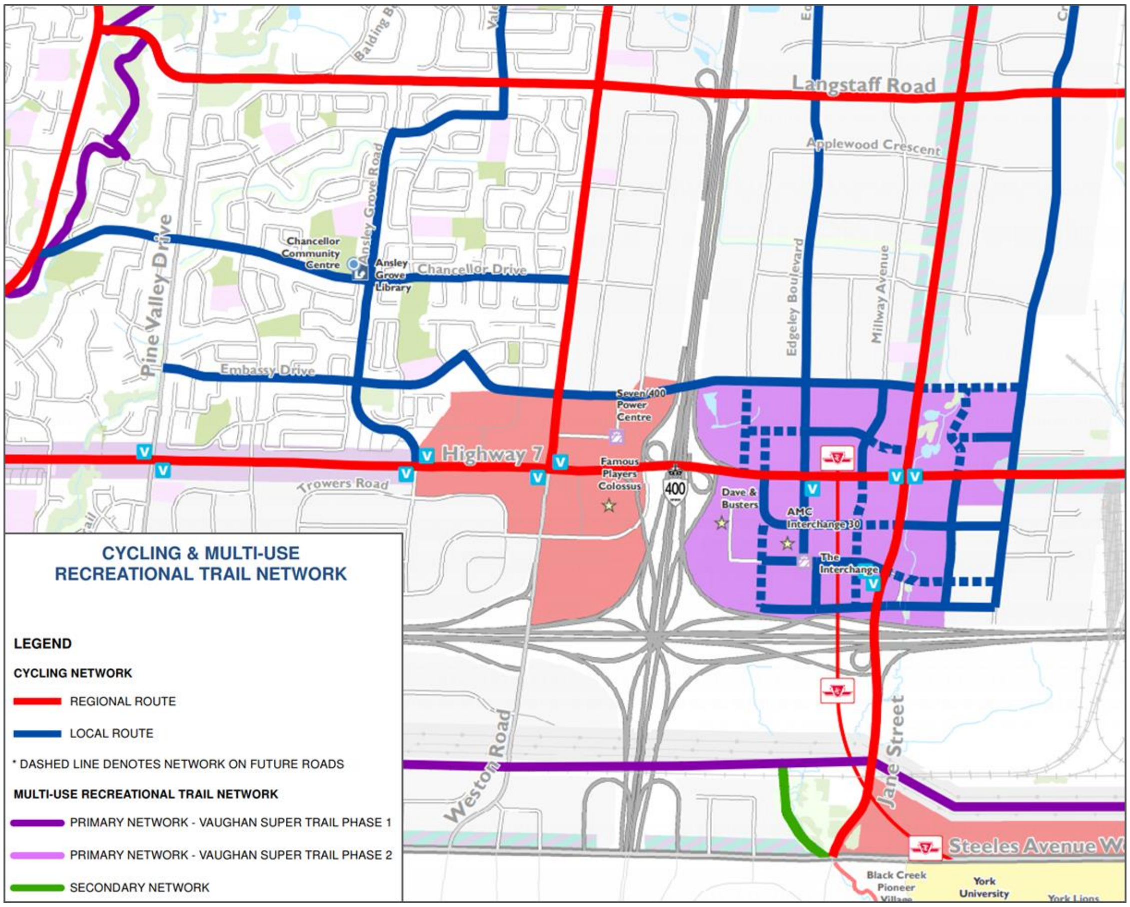
2.3.3 City of Vaughan Pedestrian and Bicycle Master Plan (2007 and 2018)

The City of Vaughan adopted the Pedestrian and Cycling Master Plan in January of 2007. The Plan has a 20 year horizon. The central intent is to guide improvements to existing and proposed pedestrian and cycling infrastructure in order to create a friendlier environment for residents. The two central goals of the plan are:

- To create new environments and enhance existing ones for both pedestrians and cyclists in the City of Vaughan. These environments should be supported by developing a visible and connected pedestrian and cycling network in Vaughan that integrates, enhances and expands the existing on and off-road pedestrian and cycling facilities; and
- To facilitate an increase in walking and cycling for leisure and utilitarian purposes.

The City of Vaughan is currently carrying out a study to develop a new city-wide Pedestrian and Bicycle Master Plan, building on the 2007 Plan and the 2012 Transportation Master Plan Pedestrian and Bicycle Network Plan. The Draft Preferred Cycling and Multi-use Recreational Trail Network is illustrated in **Figure 2-10**, surrounding the Weston 7 study area. The Weston 7 Secondary Plan should build on this network by providing connections to the regional routes on Highway 7 and Weston and the local City routes on Ansley Grove Road and Fieldstone Dr / Chrislea Rd / Portage Parkway.

Figure 2-10: Pedestrian and Bicycle Master Plan Preferred Cycling Network (DRAFT)



The Weston 7 study team will coordinate with the Pedestrian and Bicycle Master Plan team to ensure any updates to the Draft Trail network are incorporated.

2.3.4 Vaughan Metropolitan Centre Secondary Plan

The Vaughan Metropolitan Centre Secondary Plan (VMC SP) was partially approved by the OMB in January 2017 and applies to the area bounded by Highway 400 to the west, Creditstone Road to the east, Highway 407 to the south and Portage Parkway to the north.

Its purpose is to establish the context, planning framework and policies that will guide development of the VMC over the next 20-25 years. The VMC is envisioned as Vaughan's burgeoning downtown, a dynamic community that aspires to be transit-oriented, walkable, accessible, diverse, vibrant, green and ultimately beautiful. The following overarching principles highlighted in the VMC SP can be adapted to the Weston 7 study area:

1. **A Self-sustaining Neighbourhood**
   Establish a distinct neighbourhood containing a mix of uses, civic attractions, a critical mass of people and a variety of housing options.
2. **High Transit Usage**

Optimize existing and planned investments in rapid transit.

3. **Grid of Streets**
   Establish a hierarchical, fine-grain grid network of streets and pathways linked rationally to the larger road system.

4. **Open Space**
   Develop a generous and remarkable open space system.

5. **Natural Features**
   Make natural features and functions a prominent part of development.

6. **Green Development**
   Ensure development incorporates green infrastructure and green building,

7. **Design Excellence** Ensure all development exhibits a high quality of urbanity, materials and design technologies.

The first phase of the study concluded that the lands west of Highway 400 within the former Vaughan Corporate Centre should be addressed by Volume 1 of the Official Plan and be subject to a future Secondary Plan, separate from the VMC SP.

The Weston 7 SP study will explore opportunities to harmonize recommendations with and draw inspiration from the VMC SP where applicable. Key VMC recommendations that will be considered that may have implications for the SP include:

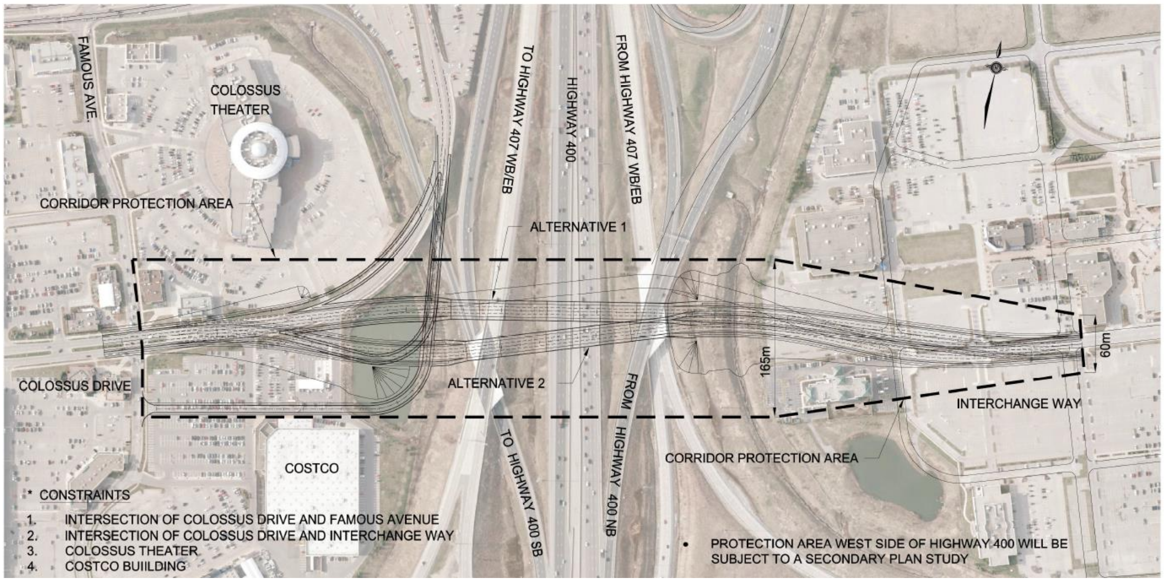
- **The Vision for Highway 7 -** Over time, Highway 7 should become an urbanized avenue that balances the movement of transit vehicles, pedestrians, cyclists and cars – a beautiful, green street framed by commercial, residential and mixed use buildings. Carrying over this vision for a "High-Street" into the Weston 7 study area may be considered.
- **The Colossus Drive Extension –** The VMC SP shows that a street over Highway 400 linking Colossus Drive and Interchange Way is proposed. This street will provide an important connection between the lands west of Highway 400 planned for mixed-use intensification and the VMC and will generally help to distribute east-west traffic in the area. The VMC SP also identifies a right-of-way corridor protection area for the street where no new buildings shall be permitted (discussed in detail in **Section 2.3.5**). The City will expedite the Environmental Assessment for the Colossus overpass that will identify the preferred vertical and horizontal alignment of the overpass and the necessary right-of-way requirements. No development will be permitted in this corridor protection area; however, as the Environmental Assessment study advances, the City will formally notify the Region and landowner in writing when specific lands in the protection area are released for possible development.

2.3.5 VMC Secondary Plan - Corridor Protection: Colossus Drive Overpass Area (2015)

This technical study documented and advanced the implementation for the near term need for a corridor protection policy for the Colossus Drive Extension across Highway 400. The study, while initializing the planning and design of the Colossus Drive overpass, is only intended to inform but not predetermine the findings and outcome of a future Environmental Assessment study (EA).

The minimum Corridor Protection Area (CPA) was defined in consultation with MTO, 407ETR, and York Region to protect an area that provides for a reasonable range of overpass alignment alternatives as subject to a future EA study. The area marked by dashed lines in **Figure 2-11** illustrates the minimum CPA for the future Colossus Drive Extension across Highway 400.

Figure 2-11: Plan of Minimum Corridor Protection Area (Colossus Drive Corridor Protection Study 2015)



East of Highway 400, the minimum CPA has been defined in the emerging context of the VMC Secondary Plan with regard for future developments and with elements of the corridor such as planned right-of-way (ROW) as well as easement for grading and construction needs. The configuration of the CPA on the east side of Highway 400 is in part defined by grading needs in association with the overpass structure that provide for and allow the width of the protected area to transition from 165 m to 60 m on the approach to Interchange Way.

The minimum area provides for a reasonable range of alignments for the future intersection of a widened Interchange Way and southern extension of Commerce Street. The minimum width of 60 m at the east end includes the planned minimum 28-m wide ROW connecting to Interchange Way as well as ROW elements at intersections including provision of sightline triangles and other street design elements including but not limited to auxiliary turn lanes, transit stop / bus shelters, etc.

It is noted that the selection of a preferred alignment and design concept is subject to completion of the EA study in consultation with review agencies and other stakeholders.

2.3.6 VMC and Surrounding Areas Transportation Study (2013)

The VMC and Surrounding Areas Transportation Study (2013) aimed to further define the transportation infrastructure needed to facilitate planned and potential development within the VMC and surrounding areas.

The report investigated questions related to the feasibility, cost and operations associated with transportation recommendations arising from previous Transportation studies, Secondary Plans, Transit Corridor and Environmental Assessment studies. The infrastructure improvements reviewed as part of the study are:

1. Highway 400 / Highway 7 Interchange (NB off-ramp extension);
2. Highway 400 / Langstaff Road Interchange (NB on-ramp and SB off-ramp);
3. Langstaff Road Extension (crossing the CN Rail Yard); and
4. Colossus Drive Extension (crossing Highway 400).

The VMC Transportation Study findings were summarized for projects (1) and (4) above as they are located in (and in the vicinity of) the Weston 7 Secondary Plan Area.

Highway 400 / Highway 7 Interchange (NB off-ramp extension)

Four (4) alternatives were reviewed and evaluated for the Highway 400 / Highway 7 northbound off-ramp extension. The preferred alternative was selected based on consideration of the technical traffic operations, multimodal access and urban design / planning perspectives from York Region and the City of Vaughan.

In the recommended alternative, the Highway 400 NB off-ramp terminal intersection is relocated 58 meters to the east of the existing ramp terminal / intersection. It provides two northbound through lanes from the ramp across Highway 7 into the Secondary Plan lands (Applewood Crescent extension) as well as two southbound right-turn lanes exiting the parcel from the Applewood Crescent extension. The Highway 400 NB on-ramp from the east is proposed to be at-grade and begins immediately west of the Highway 400 NB off-ramp terminal intersection as shown in **Figure 2-12**.

Figure 2-12: Preferred Alternative Recommended for Highway 400 / Highway 7 Interchange (VMC and Surrounding Areas Transportation Study 2013)

Cost estimates associated with the Highway 400 NB off-ramp, the Highway NB 400 on-ramp, the ramp intersection and drainage requirements were derived. According to the study, the estimated construction cost, inclusive of Minor Items, Contingency, Engineering and HST is approximately $6,200,000.

Colossus Drive Extension (crossing Highway 400)

The Colossus Drive Extension was proposed in the VMC Transportation Plan as a four-lane, east-west bypass route south of Highway 7. For Colossus Drive to continue easterly across Highway 400 and connect with Interchange Way, an overpass facility was required.

The structure's constructability / feasibility concerns and construction cost estimates were reviewed as part of the VMC and Surrounding Areas Transportation Study and a preferred alignment was developed, as shown in **Figure 2-13**.

Figure 2-13: Colossus Drive Extension Preferred Alignment (VMC and Surrounding Areas Transportation Study 2013)

Several implementation issues for the Colossus Drive Extension were noted in the report, including:

- Property acquisition being required adjacent to existing development;
- Setback impacts to existing buildings;
- Ramp geometrics with approach grades reaching 6%;
- Likely need for signals at Interchange Way intersection ;
- Approvals required from several agencies including MTO, the City of Vaughan and 407 ETR;
- Constructability concerns due to length of construction work zones being located in the Highway 400 corridor; and
- Estimated construction costs of approximately $95M.

With regards to timing, the proposed Colossus Drive Extension may be required in the longer term (post 20-year planning horizon) to accommodate proposed development in the Weston 7 area and within the VMC area. Although the report noted that the construction of the overpass is feasible, the constructability issues require further study and property requirements on the east side of the study area must be addressed/protected in any planned developments. The 2015 Colossus Drive Extension Protection study built upon the findings for this specific item.

2.3.7 7777 Weston Road Area Wide Transportation Study (2012)

The Area Wide Transportation Study (2012) assessed the impact of the total redevelopment of the Weston 7 Secondary Plan Area as well as the Vaughan Metropolitan Centre (VMC). The study aimed to provide the City of Vaughan with an overall traffic analysis to assist in determining appropriate mitigation associated with the higher order level of redevelopment within the study area.

Based on the City's and Region's Official Plans, the only scheduled road capacity improvement to the 2031 horizon is the proposed Colossus Overpass while transit improvements are planned through the addition of dedicated Bus Rapid Transit (BRT) along Highway 7. According to the study, these plans are not sufficient to support development within the Secondary Plan Area and additional transportation improvements and mitigation strategies are required, as outlined below.

2021 Horizon

New East-West Street (south of Highway 7) – This road will provide an additional point of access to the southeast and southwest development quadrants of the Weston 7 Secondary Plan Area. This roadway will require a four-lane cross-section to accommodate future traffic volumes.

The new East-West Street is expected to alleviate some pressure on the Weston Road / Highway 7 intersection; however, due to the high through volumes on Weston Road, the new intersection is expected to operate at capacity in the 2021 traffic horizon and beyond.

2031 Horizon

Northview Boulevard – This road is the extension of Northview Boulevard from Weston Road to Windflower Gate and is recommended to be a two lane roadway.

Colossus Overpass – This structure will act as the vehicular connection of the lands east and west of Highway 400 and is expected to divert traffic from Highway 7. As development of the VMC and Secondary Plan area progresses, the overpass will be required by the 2031 traffic horizon. This roadway is to be four-lanes to accommodate the anticipated traffic.

Portage Parkway Overpass – The Portage Parkway Overpass is expected to also operate above capacity in the 2031 horizon though the presence of the Colossus Overpass may reduce traffic volumes on this link.

Other Road Links

Javlan Road – This road will extend Javlan Road from Chrislea Road to Highway 7.

Nova Star Drive – This road will extend Nova Star Drive from Highway 7 to Winges Road.

Intersection Improvements

Highway 7 / Ansley Grove Road – The new East-West Street is expected to increase traffic volumes at the Highway 7 / Ansley Grove Road intersection as vehicles attempt to by-pass the Weston Road / Highway 7 intersection. This may result in the need of a northbound dual left turn lane and should be monitored as development of the Secondary Plan area proceeds.

The Chrislea Road / Weston Road – This intersection is expected to serve as a by-pass to the Weston Road / Highway 7 intersection. As such, this intersection is expected to require a westbound dual left turn lanes.

Transit

Beyond the planned BRT implementation along Highway 7, no additional transit improvements were recommended. However, the Portage Parkway and Colossus

Overpasses provide additional opportunity to supplement transit from the Secondary Plan area to the VMC.

TDM

Major redevelopment applications should be required to provide a Travel Demand Management (TDM) study. Site specific TDM studies should explore opportunities and develop implementation plans and or monitoring plans in line with York Region's vision.

Parking

To facilitate increases in modal split, the study recommended examining the potential for further reductions in parking standards for redevelopment as the study area becomes better served by transit

It is recommended that the proposed parking rates contained in the Review of Parking Standards within the City of Vaughan's Comprehensive Zoning By-Law for the Primary Centres be adopted for use within the Secondary Plan area.

2.3.8 Green Directions Vaughan (2009)

Green Directions Vaughan is the City's Community Sustainability and Environmental Master Plan. This long term plan is designed to guide the community to a more sustainable future by addressing environmental, cultural, social and economic issues. It influences all aspects of the City's operational and regulatory activities including the growth management strategy. The plan contains a number of actions informed by six goals. Key actions which will be considered by the Weston 7 Secondary Plan Phase 1 study are summarized in **Table 2-4**.

Table 2-4: Key Actions from Green Directions Vaughan

Goal	Action
1: To significantly reduce our use of natural resources and the amount of waste generated	• Continue pilot programs to examine various technologies and techniques to improve winter road maintenance (e.g. salt reduction).
2: To ensure sustainable development and redevelopment	• Through the policies in the new Official Plan, create a Vaughan in 2031 that has more intensification with increased height and density and mixed use in thoughtfully developed nodes and along transit corridors.
3: To ensure that getting around Vaughan is easy and has a low environmental impact	• Through policies to be described in the new Official Plan, develop a more walkable and transit-friendly community with adequate public spaces and a finer grain network of streets.

2.4 Travel Demand Management Programs

2.4.1 York Region MyTrip Program

MyTrip is a program designed to help residents make informed transportation choices that will improve their travel and use sustainable ways of travel, such as carpooling, public transit, cycling, and walking.

York Region conducted a pilot program between 2015 and 2017 to help residents in six newly developed neighbourhoods through an individualized travel planning program. The program involved working closely with residents to understand their travel patterns, explore options that are available, and outlining opportunities that work best for them. Residents that were interested in trying public transit were provided with a pre-loaded PRESTO card to get them started. The program also included community events, workshops and demonstrations, online tools, and take-home travel planning packages. The pilot program received a positive feedback, where more people reported to take transit, carpool, walk, and bike and more frequently as well. A majority of residents (55%) who tried a different mode said their commute was more pleasant, and most respondents (68%) said the program was valuable. Field surveys took place at intersections in the pilot communities also observed a general pattern where there are more people per vehicle and less people driving single-occupant vehicles. [1]

York Region is currently (2018) working with new development communities to invite residents in new development communities to participate in a MyTrip outreach event The program involves a travel ambassador speaking with the resident about their transportation options, with a free incentive such as a preloaded PRESTO card to get them started.

2.4.2 Metrolinx Smart Commute Program

Smart Commute is a workplace TDM program of Metrolinx and municipalities in the Greater Toronto and Hamilton Area (GTHA). It helps people try out smart travel options such as walking, cycling, transit, and carpooling. Smart Commute includes a number of services and programs, such as:

- Carpool programs, including carpool ride matching, carpool to GO;
- Emergency Ride Home (ERH) reimbursement, which allows a reimbursement of up to $75 for emergency transportation if there is an unforeseen emergency on a day that the person use a sustainable method to commute to work;
- Triplinx, which is a trip planner and transportation information resource for the Greater Toronto and Hamilton Area. It can customize the trip using options such as maximum walking distance or the mode of transportation;
- Discounted transit pass program; and
- Marketing events, workplace lead training, engagement events, and customized commuter projects.

It is a membership based program, and employers or property managers need to contact Smart Commute to discuss potential programs to be set up and the fees for the membership. The Weston 7 Secondary Plan study area is located in the Smart Commute North Toronto Vaughan service area. Based on the 2017 Smart Commute Annual Survey results, commuters from Smart Commute workplaces drive alone 14% less than the average GTHA commuter, and 49% of respondents commute to/from their workplace using a sustainable mode.

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[1] Transportation Demand Management (TDM) Program for New Developments in York Region, MyTrip Travel Planning Pilot Program – Final Report, November 2017

2.4.3 York Region Transportation Mobility Plan Guidelines for Development Applications (2016)

Managing the demand for travel generated by new developments is a powerful strategy for controlling costs, mitigating environmental impacts, and permitting developments to proceed in road capacity constrained areas. To that end, the York Region Official Plan (2016) established policies asking for appropriate Transportation Demand Management (TDM) measures be identified in transportation studies and in development applications.

The Mobility Plan considers any policy or program that reduces single occupant vehicle trips during peak travel periods a TDM strategy. It outlines when a TDM Plan may be required, the general requirements of the Plan and proposes some TDM considerations, as outlined below:

- **Consider site design**, implement **physical infrastructure** and **integrate facilities** into the regional transportation network, to encourage active transportation;
- **Develop a parking strategy for a variety of modes**, including short and long-term bicycle parking within buildings, shared parking between different uses, and/or carpool parking spaces;
- **Explore transit incentives** to improve access to and from the development; and
- **Identify trip reduction opportunities** and telecommuting with the Region, local municipalities, Smart Commute Transportation Management Associations, and any other agencies.

York Region, in consultation with local municipalities, developed a TDM checklist elaborating on the above consideration to assist in the development of a comprehensive TDM Plan. The checklist, displayed in **Figure 2-14**, provides additional details on TDM strategies, which range from improving the streetscape to educating the public.

Figure 2-14: Transportation Demand Management Checklist (Transportation Mobility Plan Guidelines 2016)

TDM Measures	For Residential Developments		For Non-Residential Developments	
	Requirement	Responsibility	Requirement	Responsibility
Transit incentives (i.e. PRESTO cards)	Yes	York Region to consider	Yes	Applicant
Information packages (YRT/Viva maps, GO schedules, cycling maps)	Yes	York Region to consider and could be distributed at the sales office	Yes	Applicant
Communication strategy and physical location to deliver PRESTO cards and information packages	Yes	Applicant	Yes	Applicant
Outreach programs	Yes	York Region to consider	Yes	Applicant
Pedestrian connections	Yes	Applicant	Yes	Applicant
Cycling connections	Yes	Applicant	Yes	Applicant
Ped/cycling connections to transit facilities	Yes	Applicant	Yes	Applicant
Internal ped/cycling circulation	Yes	Applicant	Yes	Applicant
Active transportation network/fine-grid	Yes	Applicant	Yes	Applicant
Bicycle parking/shelter	Only applies to condos	Applicant	Yes	Applicant
Bicycle repair station	As per local bylaw	Applicant	As per local bylaw	Applicant
Bicycle parking	As per local bylaw	Applicant	As per local bylaw	Applicant
Benches/receptacles	Case by case	Applicant/ Municipality	Case by case	Applicant
Illumination of ped/cycling connections	Case by case	Applicant/ Municipality	Case by case	Applicant
Carpool parking	No	-	Yes	Applicant
Car share	Only applies to condos	Applicant	Case by case	Applicant
Shared-parking between land uses	Case by case	Applicant	Yes	Applicant
Parking reduction	Where appropriate	Applicant/ Municipality	Where appropriate	Applicant
Real time TV screen	Only applies to condos	Applicant	Where appropriate	Applicant
Trip end facilities (i.e. showers)	No	-	Where appropriate	Applicant
Membership with Smart Commute	Where appropriate	Applicant	Yes	Applicant
School travel planning	Where appropriate	Applicant/School Board/ Municipality	No	-
Telecommute	No	-	Where appropriate	Applicant
Monitoring program/report	Yes	York Region to consider	Yes	Applicant

This checklist is to be completed and included as part of the TDM Plan report for further review by Regional and respective local municipal staff.

York Region and local municipalities will consider other recommendations beyond the requirements outlined in the checklist, as long as they meet the objectives of the Regional and local municipal Official Plans and policies.

2.4.4 Transportation Demand Management for Toronto-York Spadina Subway Extension (TYSSE), York Region and City of Toronto

The TYSSE corridor is the first in the GTA to experience extensive TDM measures, requirements, and policies, as contained in the York Region and City of Toronto's Official Plans. It includes a TDM requirements or "TDM Checklist" that the Region ask the development applicants to include for residential and non-residential developments in York Region. Some examples in the TDM Checklist includes providing transit incentives, pedestrian and cycling connections, active transportation network / fine-grid, bicycle parking / shelter, carpool parking, car-share service, parking reduction, and membership with Smart Commute.

It also requires a number of monitoring and performance measures to understand effectiveness of the TDM measures, such as the cordon count data, transit ridership counts, bicycle and pedestrian counts, and Walk Score. The proposed future monitoring programs should be undertaken by York Region and the City of Toronto prior to subway opening and one year after the opening, in order to measure and compare the difference of the performance measures.

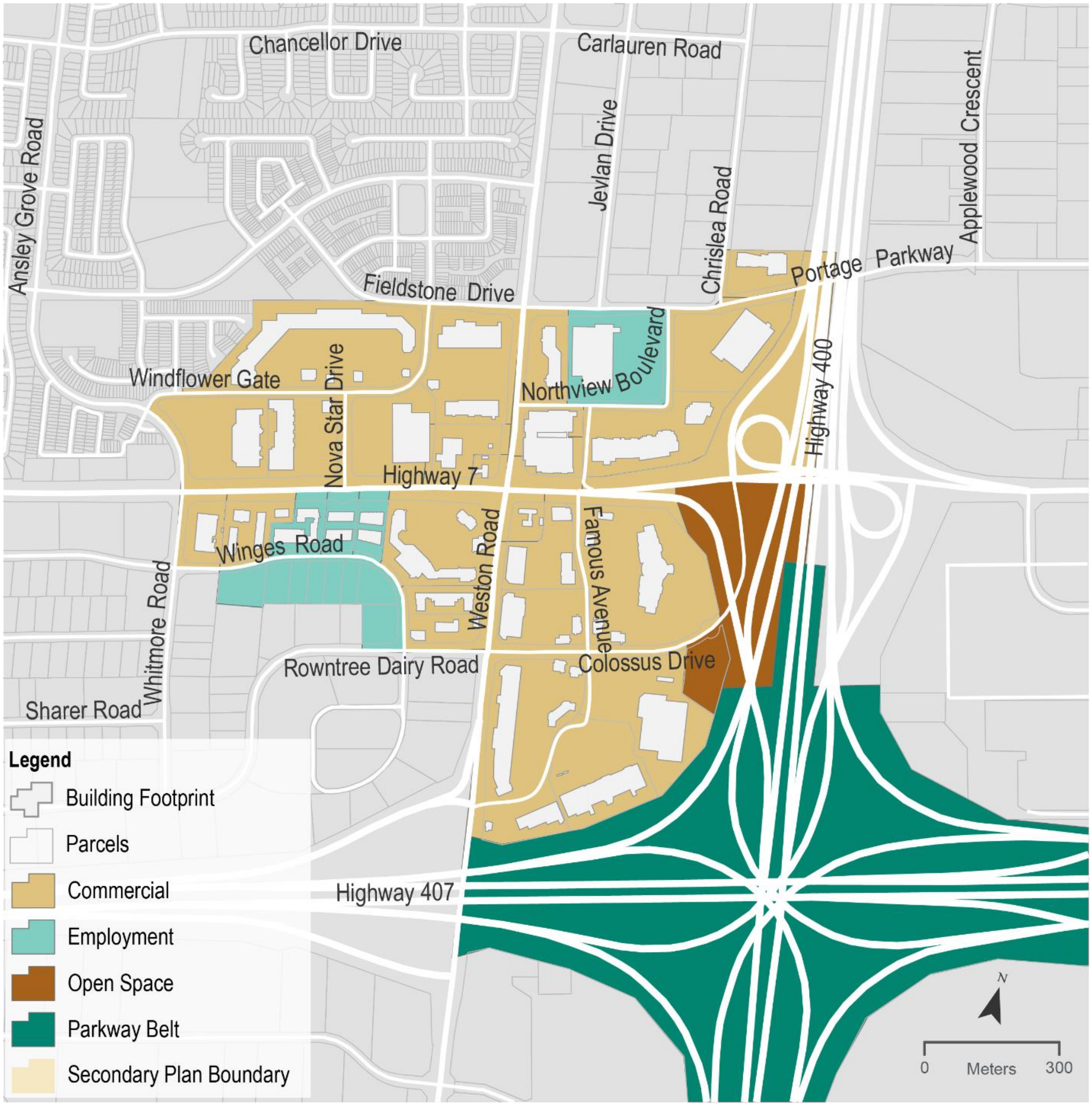
3 Existing Conditions

3.1 Land Use and Built Form

3.1.1 Land Use Zoning

The Weston 7 Secondary Plan is primarily used for commercial purposes. It also includes some employment land North of Northview Boulevard and in the southwest corner of the study area. A portion of the study area is open space with a stormwater management pond to the southwest corner of Highway 400 and Highway 7. The land close to the Highway 407 and Highway 400 interchange is designated as parkway belt. The zoning map is shown in **Figure 3-1**.

Figure 3-1: Study Area Zoning



Source: City of Vaughan

3.1.2 Surface Parking

As previously mentioned, the Weston 7 Secondary Plan study area is auto oriented, dominated by parking lots at store fronts. **Figure 3-2** shows the surface parking in the study area. Approximately 33 hectares of land is used as surface parking, which is 40% of the study area excluding road and MTO right-of-way (ROW). This characteristic makes it less safe and less comfortable for pedestrians to access and navigate in the study area and encourages the use of automobiles to access the area.

Figure 3-2: Surface Parking

Source: Google Maps Imaginary

3.2 Travel Context

The 2016 TTS is used to extract trip patterns such as trip origin-destination, mode share, and trip distance. It is noted that TTS tends to under-represent short distance trips, active trips, and trips that are not work or school purpose.[2] [3] The 2012 Commercial Vehicle

[2] 2011 TTS Data Expansion and Validation Report, Data Management Group, *University of Toronto*

[3] Effect of Land Use on Trip Underreporting in Montreal and Toronto's Regional Surveys, *Harding, Nasterska, Dianat, & Miller.* 2016. hEART 2016 – European Association for Research in Transportation

Survey (CVS) by the Ministry of Transportation Ontario (MTO) are used for the truck activities in the study area. Strava Metro data was used to observe the cycling activities.

3.2.1 Transportation Tomorrow Survey

Travel Demand

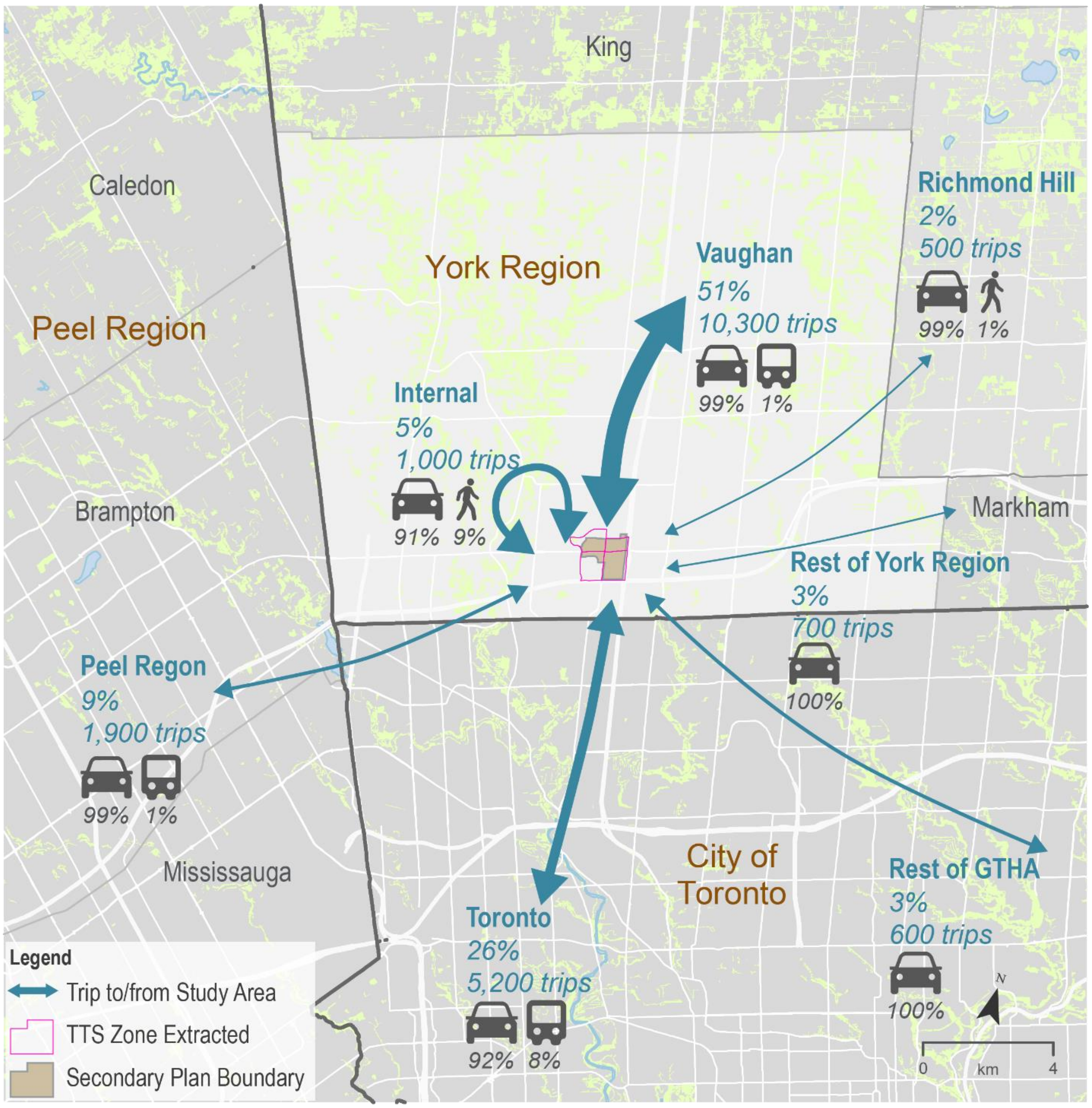
The number of trips to the study area by modes of travel is summarized in **Table 3-1** and illustrated in **Figure 3-3**. Approximately 20,200 trips go to study area in a day, and most trips are made by auto driver and passenger mode (79% and 18%, respectively). Only 2% of trips are made by transit, and only 100 trips are made by walking. The majority of the trips are from Vaughan (51% of all trips), indicating the area serve as a major commercial centre for the City. Approximately 26% of trips are from the City of Toronto, and similarly most trips are made by auto driver and passenger (71% and 21%, respectively). Around 5% of trips are internal, and most of them are made by auto driver mode (65%). An overwhelming majority of trips access the study area by auto, indicating that potential demand for transit and walk/bicycle exists and should be examined in detail in future phases of the study.

Table 3-1: Daily Number of Trips by Mode to Study Area, Excluding Internal Trips

Municipality	Auto Driver	Auto Passenger	Transit	Walk	Bike	Other	Total	% of All Trips
Number of Trips								
Toronto	3,715	1,090	420	-	-	-	**5,200**	26%
Vaughan	8,195	1,934	69	58	-	37	**10,300**	51%
Richmond Hill	529	8	4	-	-	-	**500**	2%
Rest of York Region	624	62	-	-	-	-	**700**	3%
Peel Region	1,768	136	20	-	-	-	**1,900**	9%
Rest of GTHA	483	84	-	-	-	-	**600**	3%
Internal	651	266	-	88	-	-	**1,000**	5%
Total	**16,000**	**3,600**	**500**	**100**	**-**	**-**	**20,200**	100%
Percentage by Mode								
Toronto	71%	21%	8%	0%	0%	0%		
Vaughan	80%	19%	1%	1%	0%	0%		
Richmond Hill	98%	1%	1%	0%	0%	0%		
Rest of York Region	91%	9%	0%	0%	0%	0%		
Peel Region	92%	7%	1%	0%	0%	0%		
Rest of GTHA	85%	15%	0%	0%	0%	0%		
Internal	65%	26%	0%	9%	0%	0%		
Total	**79%**	**18%**	**2%**	**0%**	**0%**	**0%**		

Source: 2016 TTS

Figure 3-3: Daily Number of Trips by Mode to Study Area



Source: 2016 TTS

Mode Share

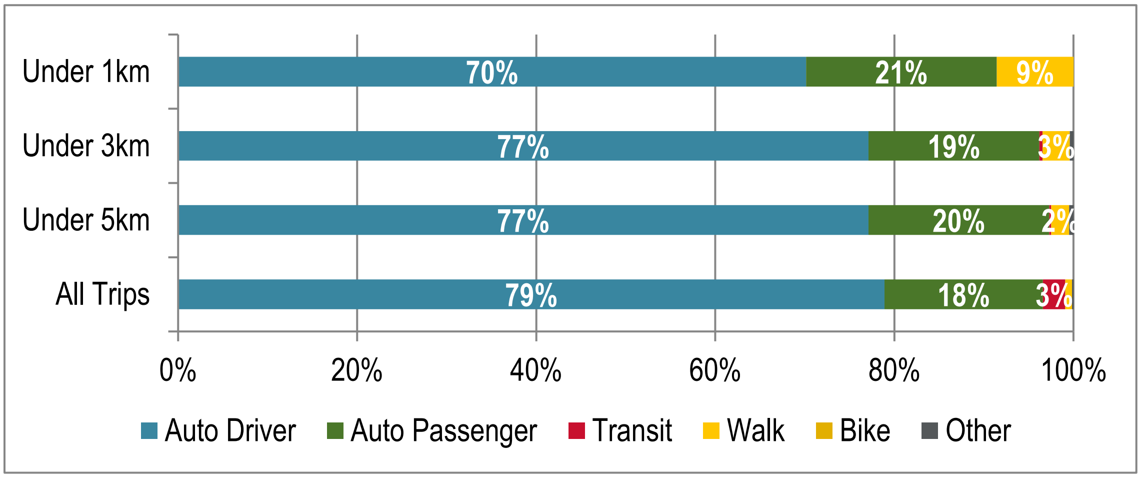
The daily trip mode share by distance is shown in **Table 3-2** and **Figure 3-4**. As mentioned, almost all trips are made by auto driver (79%) and auto passenger (18%) mode. For trips under 5 km (36% of all trips) and under 3 km (24% of all trips), which have high potential to be transit and bike trips, only 2% to 3% are made by walking, and almost none were made by transit. There are more than 1,500 short trips to the study area that are under 1 km, which has high potential to be converted into walk and bicycle trips. For these trips, only 9% are currently made by walk mode. This again indicates there is high potential for more sustainable modes such as transit, walk, and cycle to the study area with better transit and active transportation connections.

Compared to the existing conditions, the York Region and City of Vaughan OP established a much higher transit mode share target, which is 50% along Highway 7 (Regional Intensification Corridor) and 40% for the Weston 7 Secondary Plan study area (Intensification Area) by 2031. The existing transit mode share for trips going to the study area is 5% in the PM peak period (3-6 PM), indicating the need to improve rapid transit and local transit service, active transportation connections to transit stops, and implement TDM measures to encourage more transit trips.

Table 3-2: Daily Mode Share by Trip Distance to Study Area

	Auto Driver	Auto Passenger	Transit	Walk	Bike	Other	Total	% of All Trips
Number of Trips								
All Trips	15,964	3,580	511	146	-	36	20,237	100%
Under 5km	5,660	1,483	17	146	-	36	7,342	36%
Under 3km	3,677	910	17	146	-	19	4,769	24%
Under 1km	1,096	333	-	134	-	-	1,563	8%
Percentage by Mode								
All Trips	79%	18%	3%	1%	0%	0%		
Under 5km	77%	20%	0%	2%	0%	0%		
Under 3km	77%	19%	0%	3%	0%	0%		
Under 1km	70%	21%	0%	9%	0%	0%		

Figure 3-4: Daily Mode Share by Trip Distance to Study Area

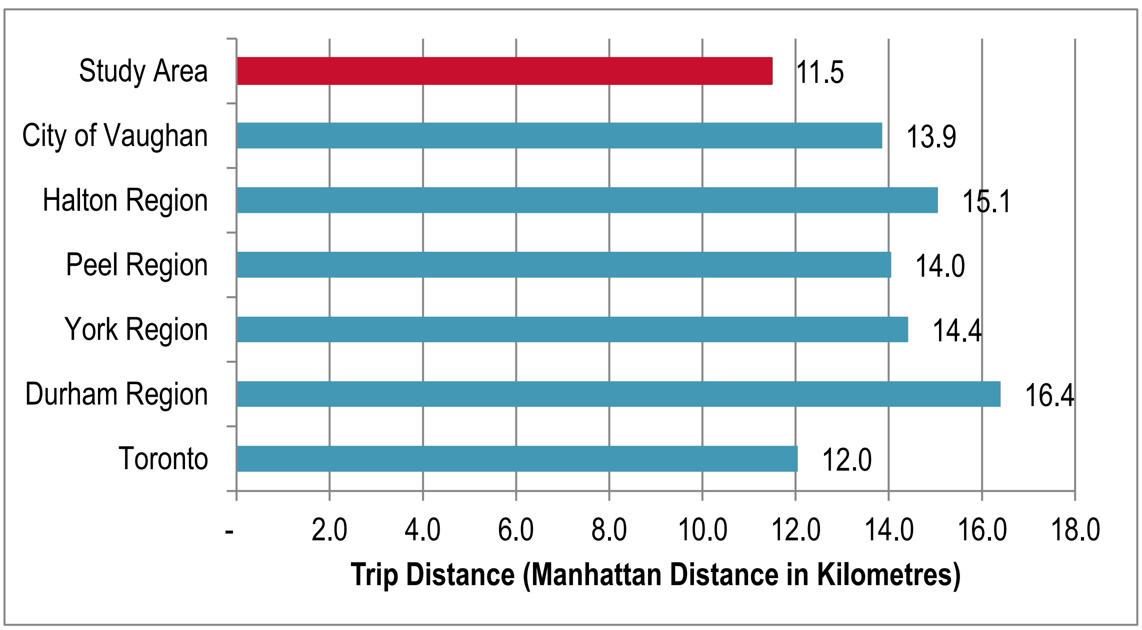


Source: 2016 TTS

Trip Length

The average trip length to the study area is 11.5 km (shown in **Figure 3-5**), which is less than the average trip length for other municipalities, such as the City of Vaughan, York Region, and the City of Toronto. Shorter trip distance indicates opportunities for active and transit modes.

Figure 3-5: Average Trip Length to Study Area

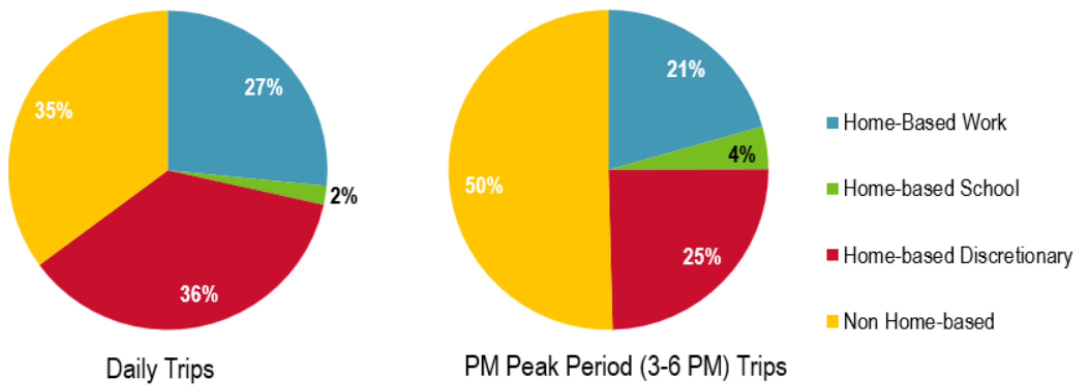


Source: 2016 TTS

Trip Purpose

Since the area is primarily commercial land use, most trips to the study area are discretionary trips and non home-based trips, as shown in **Figure 3-6**.

Figure 3-6: Trip Purpose to Study Area



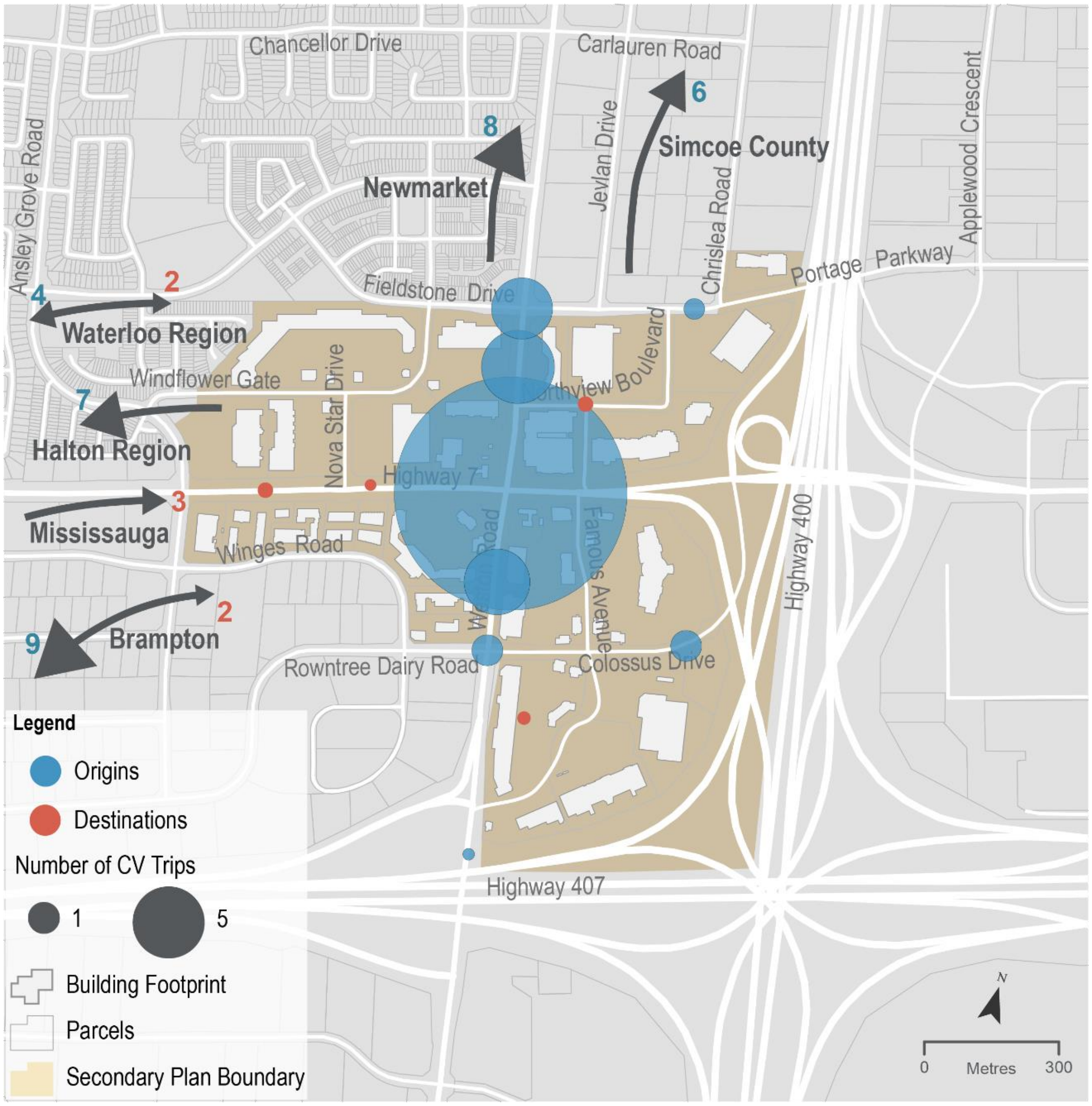
Source: 2016 TTS

3.2.2 Commercial Vehicle

CVS Survey

The 2012 Commercial Vehicle Survey (CVS) was provided by the Ministry of Transportation Ontario (MTO). **Figure 3-7** shows the number of truck trips to and from the study area. There are approximately 40 trips from the study area, most around the Weston and Highway 7 intersection, and the trips are going to surrounding municipalities, such as Newmarket, City of Brampton, Halton Region, and Simcoe County. Less than 10 truck trips are going to the study area, coming from Waterloo Region, Mississauga, and Brampton. This indicates that although Highway 7 and Weston Road may have high truck volumes, there are limited truck activities directly going to and from the study area. There are however a number of industrial areas surrounding the Weston 7 area which will require good vehicular access. The development of the Weston 7 Secondary Plan should recognize the potential impacts on the surrounding industrial area.

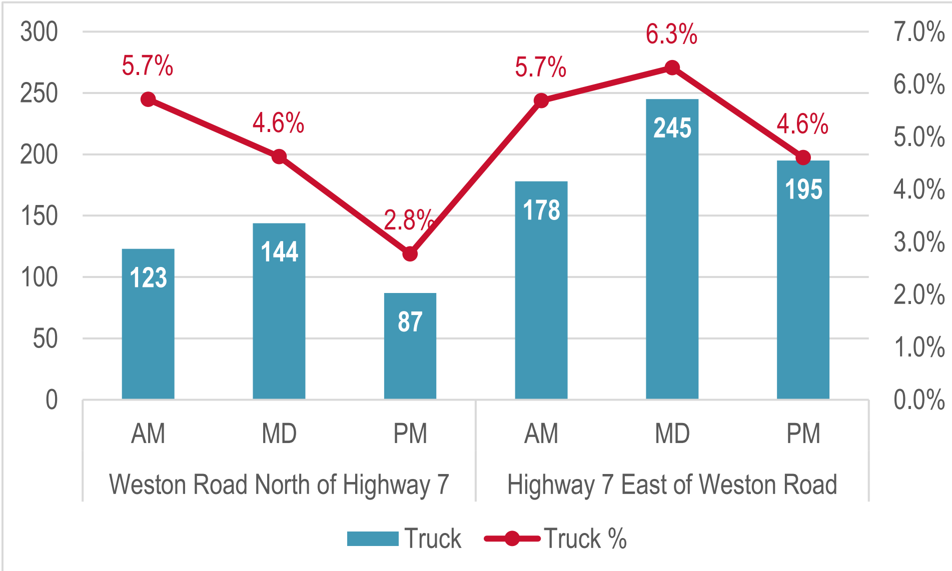
Figure 3-7: 2012 Commercial Vehicle Trip Origin and Destination to/from Study Area



Commercial Vehicle Volumes on Highway 7 and Weston Road

Although the Weston 7 Study Area is not a major commercial vehicle attraction, corridors in the study area are heavily used by commercial vehicles. Major arterials, namely Weston Road and Highway 7, have an important role for the regional goods movement. As shown in **Figure 3-8**, approximately 5% to 6% of vehicles are trucks in the AM and midday peak hour on Weston Road and Highway 7.

Figure 3-8: Truck Volume and Percentage in the AM, Midday, and PM Peak Hour (Both Directions)



Source: York Region Turning Movement Count, December 20, 2016

3.2.3 Strava Metro

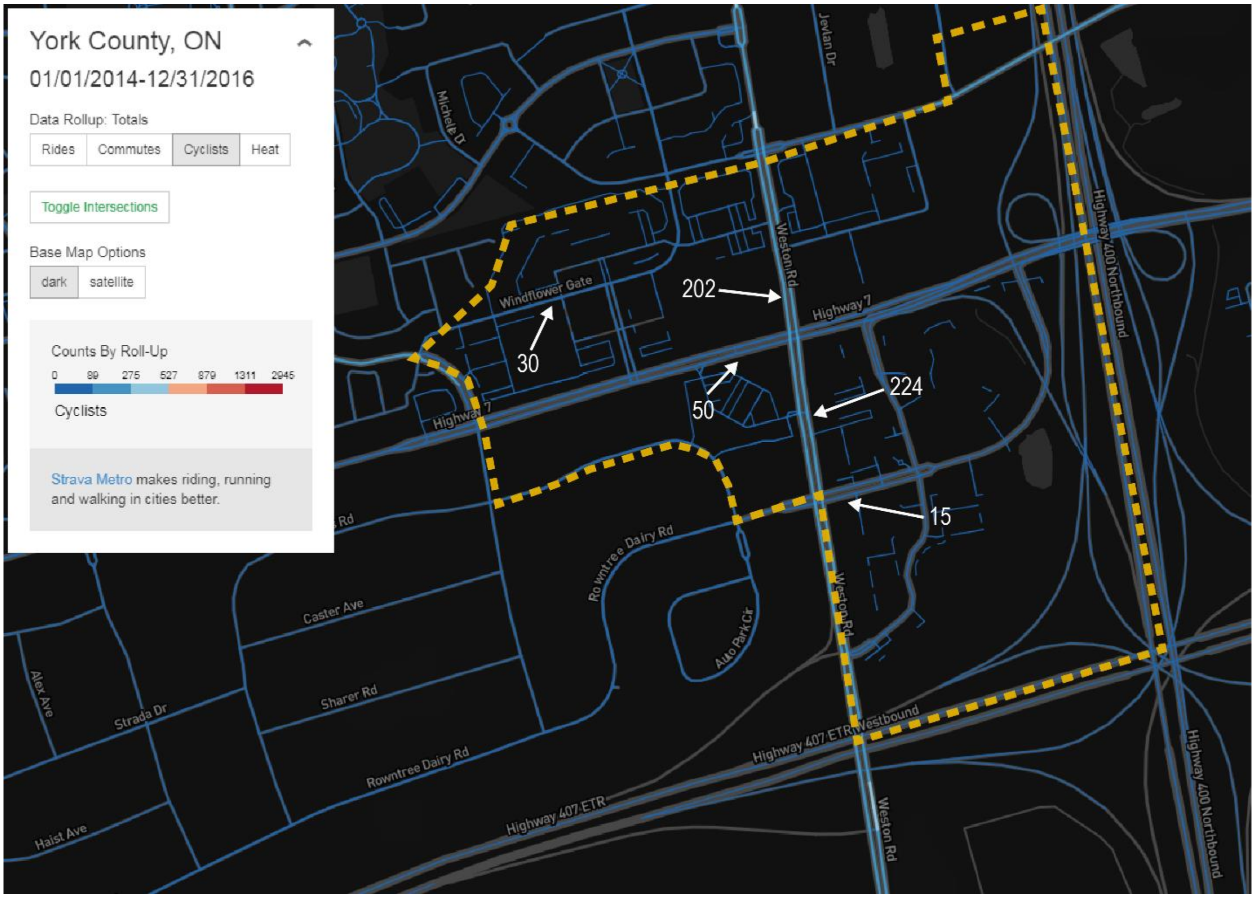
Strava Metro provides bike counts based on activities from people who choose to log and upload their trips. It has been shown that in numerous urban areas, the Strava Metro counts are linked closely with bike counts, and the data can be extrapolated by using a multiplier. For example, in Seattle, the multiplier was 27. [4]

The Strava bike counts for 2 years from January 1st 2014 in the study area are shown in **Figure 3-9**. There were limited bicycle activities in the study area, where over 200 trips were logged on Weston Road, and less than 50 trips are logged on Highway 7 and local roads.

This data is especially useful to understand the changes in cyclist behaviour after new infrastructure is opened. Sometimes opening one type of bicycle infrastructure, such as bike lanes or an overpass, could cause ripple effects and show more activities on the areas surrounding new infrastructure as well. With the bicycle infrastructure on Highway 7 under construction and the planned bike lanes and connections such as Colossus Drive, the bicycle activities should be monitored and reviewed in the future phases of the study.

[4] Bike Counter Correlation, Strava Metro

Figure 3-9: Strava Metro Bike Counts, January 1st 2014 to December 31st, 2016



3.2.4 Peaking Characteristics

Traffic congestion during peak times can be attributed to a high number of vehicles accessing the study area, starting from noon to early evening.

The hourly traffic counts for weekday and weekend for Highway 7 eastbound, west of Famous Avenue are shown in **Figure 3-10** and **Figure 3-11**, respectively. Traffic counts were conducted between 7am to 9am and between 12pm to 6pm for the weekday and between 2pm to 7pm. During the weekday, traffic volume increases throughout the afternoon and reaches the highest point around 4pm. On Saturday, traffic volume is consistently high from 1pm to 5pm, and the peak is around 3pm.

This peaking characteristic reflects the commercial land use of the study area, where people tend to access the area across the afternoon (no distinguished peak point) for both weekdays and weekends, as opposed to having a single AM and PM peak hour, which can be a typical pattern when the land use is primarily office, for example.

Figure 3-10: Weekday Hourly Traffic Counts, Highway 7 Westbound, West of Famous Avenue (June 2018)

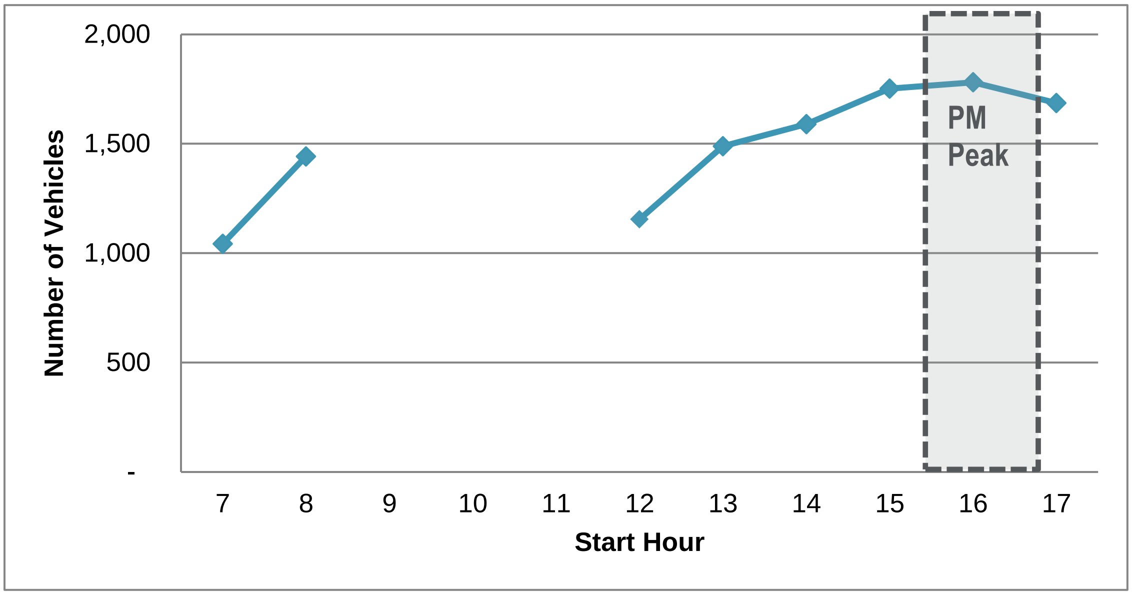
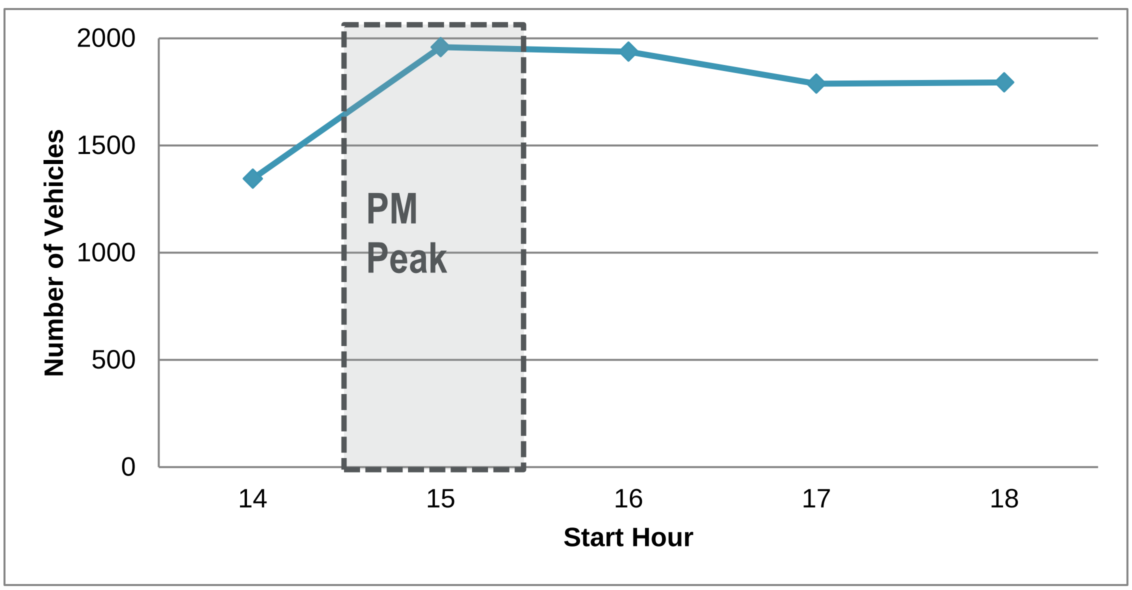


Figure 3-11: Saturday Hourly Traffic Counts, Highway 7 Westbound, West of Famous Avenue (June 2018)



3.2.5 Auto Occupancy

The majority of trips to the Weston 7 Secondary Plan area are by single occupancy vehicles. According to 2016 TTS data for trips destined to the study area, the share of carpool trips is 17%. The share of carpool trip originating from the study area is similarly, 18%. This is slightly higher than the carpool trip percentage in the City of Vaughan and York Region, which is approximately 14% and 15%, respectively. It is likely due to the commercial land use of the study area, which leads to a high proportion of discretionary trips that have a higher auto occupancy. However, there is a need to encourage high occupancy vehicles into the business park and reduce auto usage during the peak times.

3.3 Street Network Context

3.3.1 Connectivity and Continuity

As connectivity increases, travel distances decrease and route options increase, creating a more accessible network for all modes of travel. A connected network is pedestrian friendly and supports transit-oriented developments by providing better connections from transit stops to destinations.

Two measures are considered to examine the connectivity and continuity of the road network – intersection density and link to node ratio. The methodology here is adapted from the Performance Indicators for the Greater Golden Horseshoe (GGH) Growth Plan.

Intersection Density

Intersection density is the number of surface street intersections in a hectare. Higher number of surface street intersections indicates finer street networks and better the connectivity of the street network. The Performance Indicators for the GGH Growth Plan recommended 0.3 intersections/hectare for a general street network, and 0.6 intersections/hectare for mixed use nodes and corridors.[5]

When calculating the intersection density of the study area, informal pedestrian pathways such as those cutting through parks and malls are not included as they do not provide safe and comfortable access for pedestrians. In addition, intersection densities for auto and active transportation are calculated separately, and intersections for road segments with no sidewalk or bike lanes were not counted for the active transportation intersection density. Based on this, there are 21 intersections in the study area, and 17 can be used for active transportation. The site area of this study is approximately 123 hectares. The intersection density results are summarized in **Table 3-3**.

Table 3-3: Intersection Density Calculation

Mode	Number of Intersections	Intersection Density
Auto Mode	21	0.16
Active Transportation	17	0.13

Link to Node Ratio

The Link to Node Ratio method determines the connectivity index of the study area by finding the ratio of street links to street nodes. A higher link to node ratio means that travellers have increased route choices, allowing more direction connections for access between any two locations. For major or community activity centres, it is recommended that there be a 1.7 street connectivity index for auto mode, and an index connectivity of 1.9 for active transportation.[6]

[5] Performance indicators for the growth plan for the Greater Golden Horseshoe, Ministry of Municipal Affairs and Housing, 2015

[6] Performance indicators for the growth plan for the Greater Golden Horseshoe, Ministry of Municipal Affairs and Housing, 2015

Intersections immediately outside of the boundary are included as long as one leg on the intersection crosses the boundary. "T" intersections adjacent to the boundary that do not have a leg of the intersection crossing the boundary are excluded. Street links are defined as streets between intersections, with three or more legs, or cul-de-sac. Street nodes are intersections with three or more legs, or cul-de-sac. Alleys, driveways, and any private accesses are not included in the calculations. The calculations are summarized in **Table 3-4**.

Table 3-4: Link to Node Ratio Calculation

Mode	Number of Links	Number of Nodes	Connectivity Index
Auto mode	25	16	1.60
Active transportation	22	15	1.46

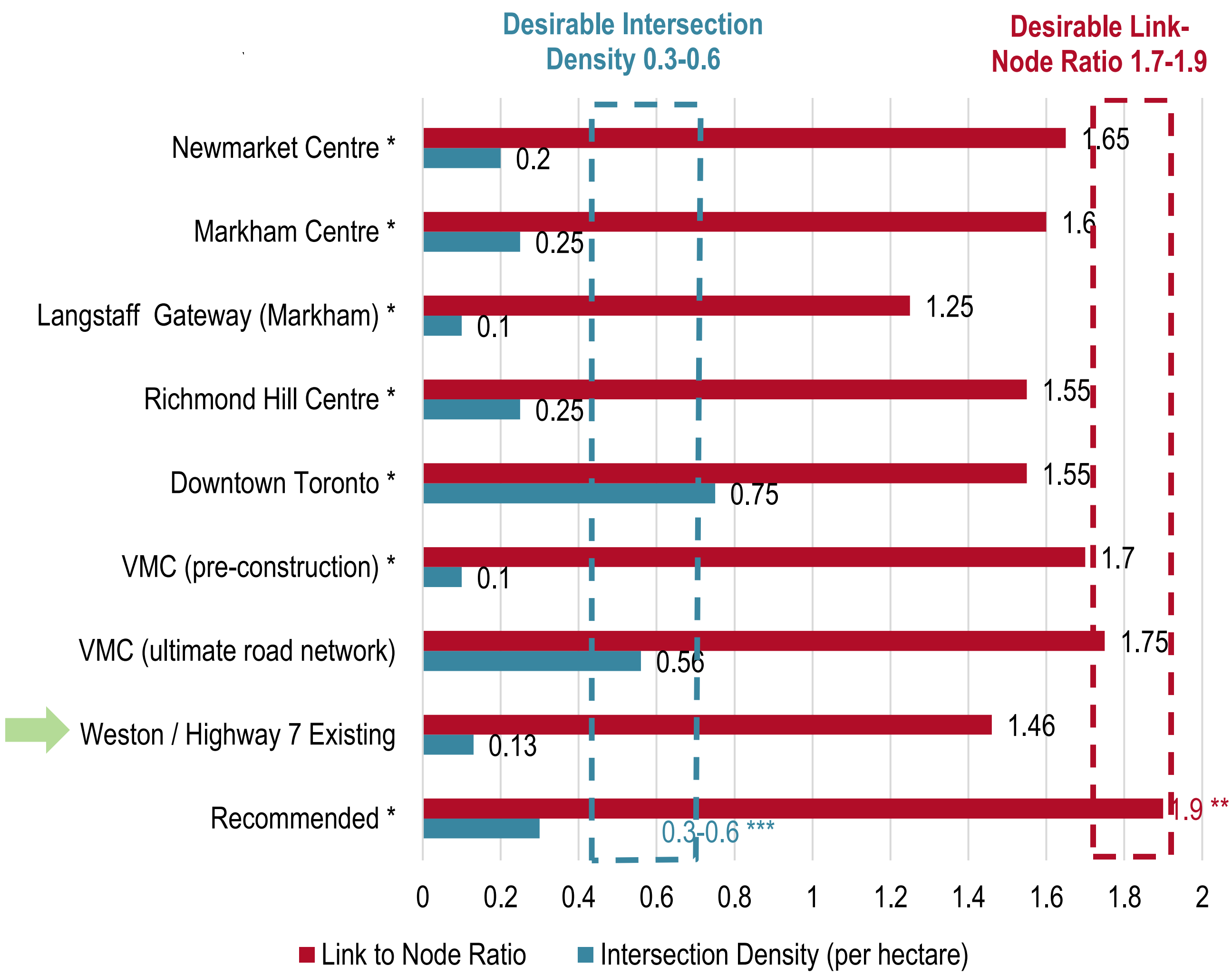
Discussion

The intersection density and link to node ratio are complementary. A high link-node ratio suggests good connectivity, but if it is accompanied by a low intersection density, this could indicate the area includes some large blocks and may not be very conductive walking, or there is a lot of undeveloped land. A connected and improved network would receive high scores for both indicators.

The existing intersection density and link-node ratio for active transportation in the Weston 7 area in comparison to other urban centres are shown in **Figure 3-12**.

The study area today is very similar to VMC pre-construction. Both intersection density and link-to-node ratio are much lower than the desirable values, indicating the street network has very poor connectivity for vehicles and for pedestrians. This is attributed to the large blocks and surface parking lots which lead to limited continuous north-south and east-west streets. Improving active transportation connectivity with more routes, safer and more comfortable conditions will be an important focus of the future planning framework for the study.

Figure 3-12: Intersection Density and Link-Node of the Study Area (Active Transportation), Compared with Other Urban Centres



* Source: Performance Indicators for the Growth Plan for the Greater Golden Horseshoe.
** Link to Node Ratio: 1.7 for major or community activity centres, 1.9 for active modes.
*** Intersection Density: 0.3 intersections/ha, 0.6 intersections/ha for mixed use nodes and corridors.

3.3.2 Highway Interchange Design

The current highway interchange in the area is designed to vehicular travel at the expense of active transportation mobility and safety. This includes large curb radii without any delineated crossing for pedestrians and channelized right-turn lanes at Highway 407 and Highway 400, as shown in **Figure 3-13** and **Figure 3-14**.

Figure 3-13: Weston Road at Famous Avenue and Highway 407 EB On-ramp

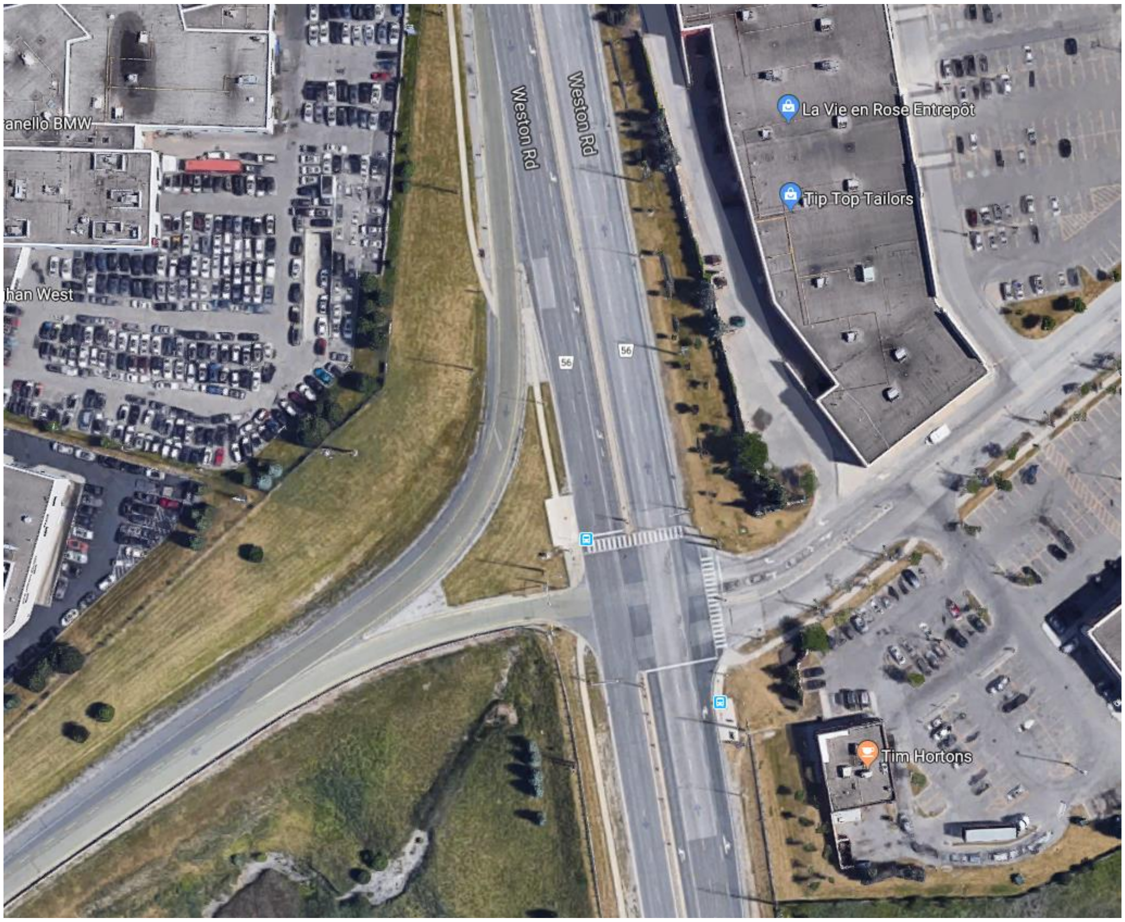
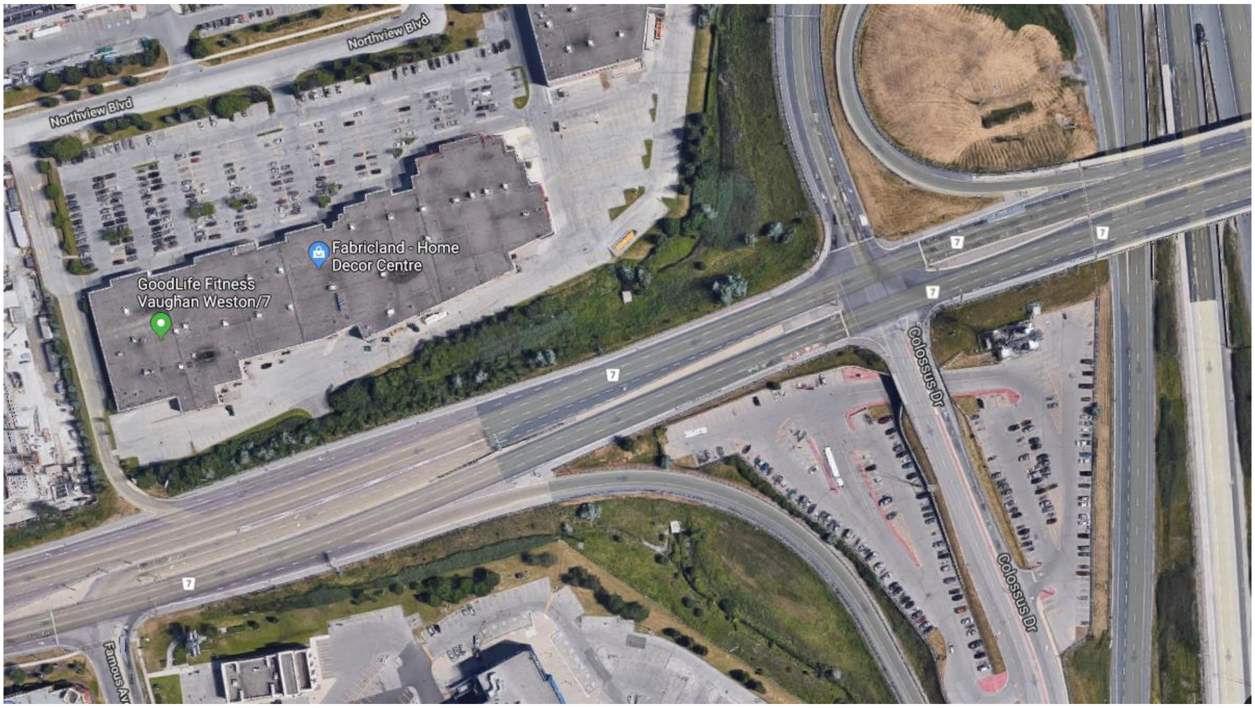


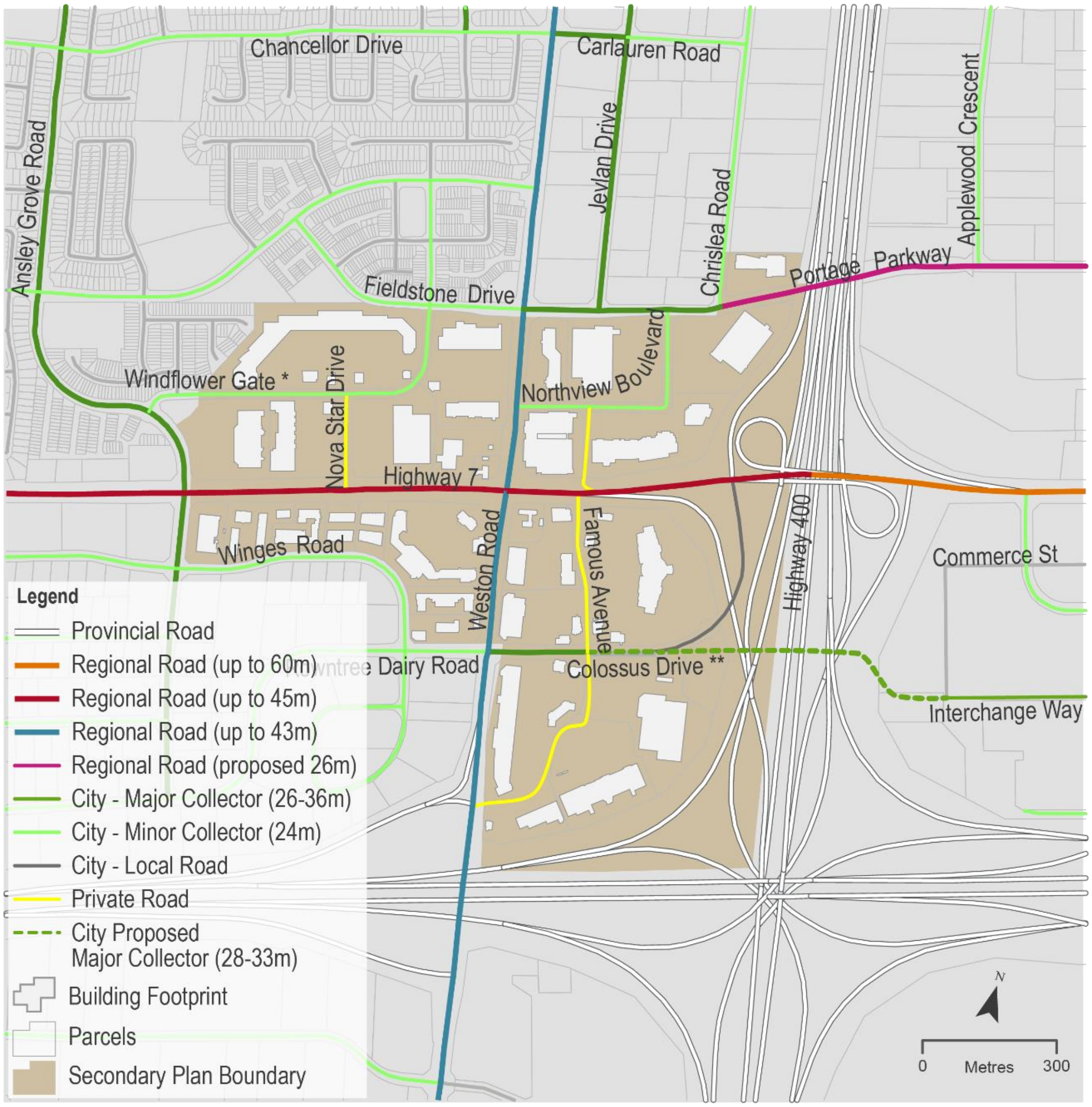
Figure 3-14: Highway 7 at Famous Avenue and Highway 400 SB ON-ramp



3.3.3 Current Road Classes and Travel Space

The existing road classification and right-of-way (ROW) are shown in **Figure 3-15**, based on York Region and City of Vaughan Official Plan. The study area is bounded by Highway 400, which is a provincial highway to the east, and Highway 407 which is a tolled provincial road to the south. Within the study area, the major arterials are Highway 7 and Weston Road. As identified in the York Region Official Plan, Highway 7 has a ROW up to 45m west of Highway 400 and 60m east of Highway 400. Weston Road has a ROW up to 43m. Portage Parkway is another Regional Road with proposed 26m ROW. Ansley Grove Road is a major collector under City's jurisdiction. Colossus Drive overpass is proposed, connecting Interchange Way on the east side of Highway 400. Lastly, there are some private roads in the study area, including Nova Star Drive and Famous Drive. Any proposed changes to these roads should consider relevant jurisdictions.

Figure 3-15: Existing Road Classification and Right-of-Way



Source: York Region Open Data, York Region Official Plan (2010), City of Vaughan Official Plan (2010)

3.3.4 Safety Considerations

The Highway 7 and Weston intersection has been consistently ranked as the highest or second highest number of collision in York Region. Between 2014 and 2016, there were 143 collision and 40 with injuries. It is recognized that safety may be improved for this intersection after the reconstruction of Highway 7. This should be considered in late phases of the study.

3.4 Transit

3.4.1 Existing Transit Network

The existing transit network in the vicinity of the study area is shown in **Figure 3-20**. The study area is covered by local transit service and rapid transit service, including VIVA Orange, Brampton Transit 501 Queen Street Züm, and is close to the VMC and Highway 407 Subway Station. Within the study area, there are two major transit station areas (MTSAs), which are within 500 metres of the two vivaNext stations, Highway 7 / Weston Road and Highway 7 / Ansley Grove Road.

As mentioned in **Section 2.2.3** all-day, two-way transit service with 15 minutes headway is planned for the Highway 7 corridor, connecting VMC subway station and Highway 7 and Wigwoss Drive / Helen Street with full dedicated transit rapidway.

Locating within close proximity to rapid transit lines, especially to the VMC subway stations, provides opportunities for the study area to be connected to the rest of GTHA. However, the subway stations is located approximately 2 km from the study area and would require crossing Highway 400, which is not a pedestrian friendly route.

The transit service frequency and the hours of operations for weekdays and weekends are shown in **Table 3-5**. The area is well-covered by transit and most lines operate throughout the day, typically from 5 am to midnight. However, all transit lines except for the subway service operate with infrequent service where headways range from 14 to 60 minutes. During off-peak hours in weekday and weekends, most transit lines operate with headways higher than 20 minutes. This infrequent service discourages transit usage as passengers would typically wait for a long time to board or would need to check service schedule before riding the transit.

Having more frequent and reliable transit service, as well as improving connections to transit hubs such as the VMC subway station, would be a priority for the later stages of the study.

Figure 3-16: Existing Transit Network

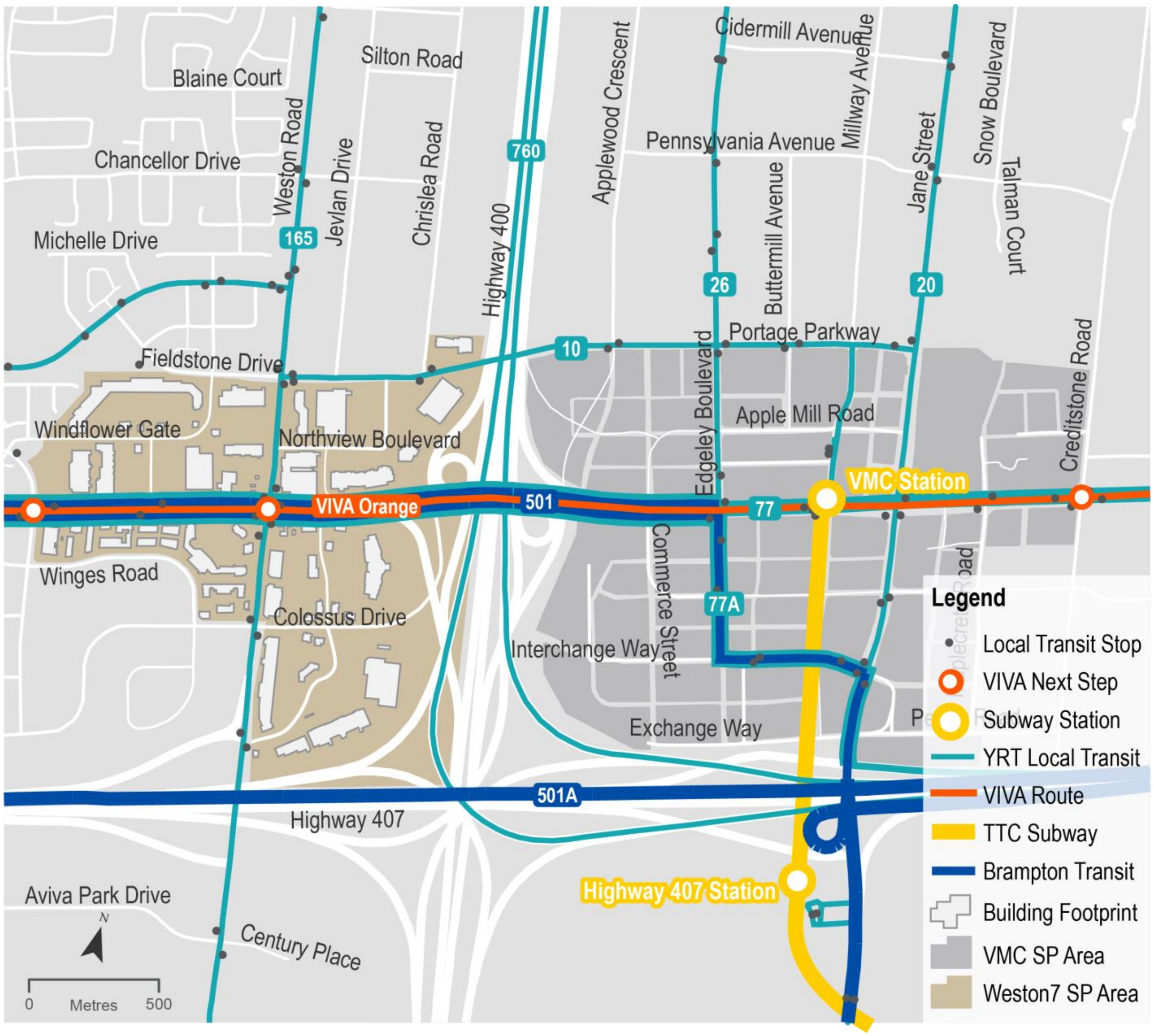


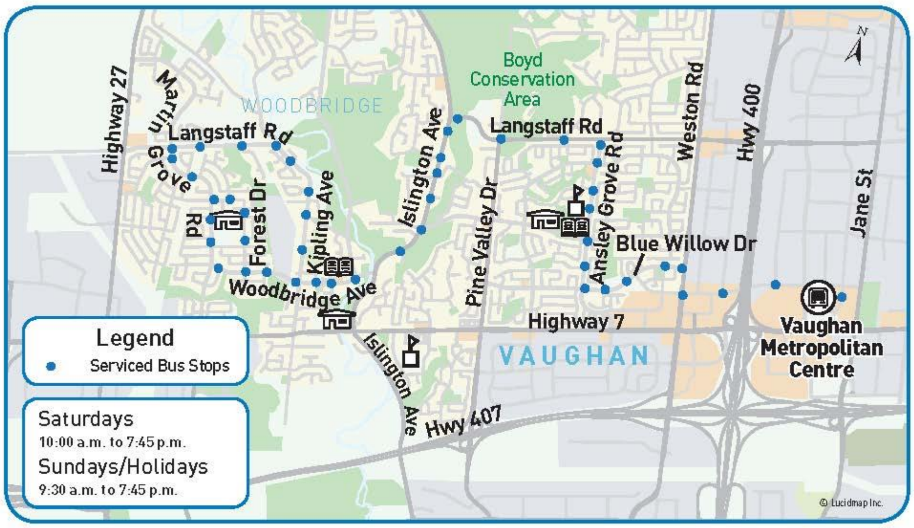
Table 3-5: Transit Service Frequency and Service Hours

<table>
<tr><th rowspan="2">Transit Agency</th><th rowspan="2">Route #</th><th rowspan="2">Route Name</th><th rowspan="2">From</th><th rowspan="2">To</th><th colspan="3">Weekday</th><th colspan="2">Weekends / Holidays</th></tr>
<tr><th>PM Peak Period (3-7 pm) Headway (min)</th><th>Off-peak Headway (min)</th><th>Service Hours</th><th>Headway (min)</th><th>Service Hours</th></tr>
<tr><td>YRT</td><td>165</td><td>Weston</td><td>Pioneer Village Station</td><td>Major Mackenzie Dr & Hwy 400</td><td>18</td><td>40</td><td>5 am - 12 am</td><td>40</td><td>6 am – 12 am (Sat)
7 am - 12 am (Sun)</td></tr>
<tr><td>YRT</td><td>760</td><td>Vaughan Mills/ Wonderland</td><td>Canada's Wonderland</td><td>Finch Station</td><td>60</td><td>30</td><td>9 am - 11 pm</td><td>24</td><td>9 am - 11 pm</td></tr>
<tr><td>YRT</td><td>26</td><td>Maple</td><td>VMC Station</td><td>Jane St & Brandon Gate Dr</td><td>21</td><td>46 (midday only)</td><td>5 am - 8 pm</td><td>40</td><td>9 am to 8 pm</td></tr>
<tr><td>YRT</td><td>20</td><td>Jane</td><td>Pioneer Village Station</td><td>Mosque Gate & Teston Rd</td><td>14</td><td>20</td><td>5 am - 3 am</td><td>18</td><td>6 am -3 am (Sat) or
7 am - 3 am (Sun)</td></tr>
<tr><td>YRT</td><td>10 *</td><td>Woodbridge</td><td>VMC Station</td><td>Kipling Ave & Woodbridge Ave</td><td>38</td><td>38</td><td>5 am - 10 pm</td><td colspan="2">Dial-a-Ride</td></tr>
<tr><td>YRT</td><td>77</td><td>Highway 7</td><td>Hwy 7 & Vaughan Valley</td><td>Finch Station</td><td>18</td><td>27</td><td>24 hr</td><td>35 (Sat)
55 (Sun)</td><td>24 hr (Sat)
7 am - 3 am (Sun)</td></tr>
<tr><td>YRT</td><td>77A</td><td>Highway 7</td><td>Hwy 7 & Vaughan Valley</td><td>Finch Station</td><td>45</td><td>N/A</td><td>6-10 am and 3-8 pm</td><td colspan="2">No service</td></tr>
<tr><td>YRT VIVA</td><td colspan="2">VIVA Orange</td><td>Martin Grove Rd & Hwy 7</td><td>Richmond Hill Centre</td><td>16</td><td>22</td><td>24 hr</td><td>20</td><td>4 am - 1 am (Sat)
6 am - 12 am (Sun)</td></tr>
<tr><td>Brampton</td><td>501</td><td>Zum Queen</td><td>York University</td><td>Brampton Downtown Terminal</td><td>15</td><td>18</td><td>4 am - 12 am</td><td>30</td><td>5 am – 12 am (Sat)
7 am - 12 am (Sun)</td></tr>
<tr><td>Brampton</td><td>501A*</td><td>Zum Queen</td><td>York University</td><td>Brampton Downtown Terminal</td><td>14</td><td>18</td><td>5 am - 12 am</td><td>30</td><td>6 am - 12 am</td></tr>
<tr><td>TTC</td><td>1**</td><td>Line 1</td><td>Finch Station</td><td>VMC</td><td>3</td><td>5</td><td>5 am - 1 am</td><td>5</td><td>5 am – 1 am (Sat)
7 am - 1 am (Sun)</td></tr>
</table>

* Route 10 operates with a 30 minute headway between 8:30p.m. to 10pm, and as a DAR service in the weekend
Source: YRT, Brampton Transit, and TTC transit service schedule (July 2018)

Route 10 operates as Dial-a-Ride (DAR) Woodbridge demand-responsive transit service on weekend and holidays. Residents can book the ride during the DAR Woodbridge service hours at least 60 minutes in advance of the trip and pay for a regular YRT fares. The DAR Woodbridge connects specific locations such as Blue Willow Terrace (senior apartments), Chancellor community centre, Fortinos, Walmart, and VMC Subway Station, as shown in **Figure 3-17**. The service operates on Saturdays between 10 a.m. and 7:45 p.m., and on Sundays or Holidays between 9:30 a.m. to 7:45 p.m.

Figure 3-17: Dial-a-Ride (DAR) Woodbridge



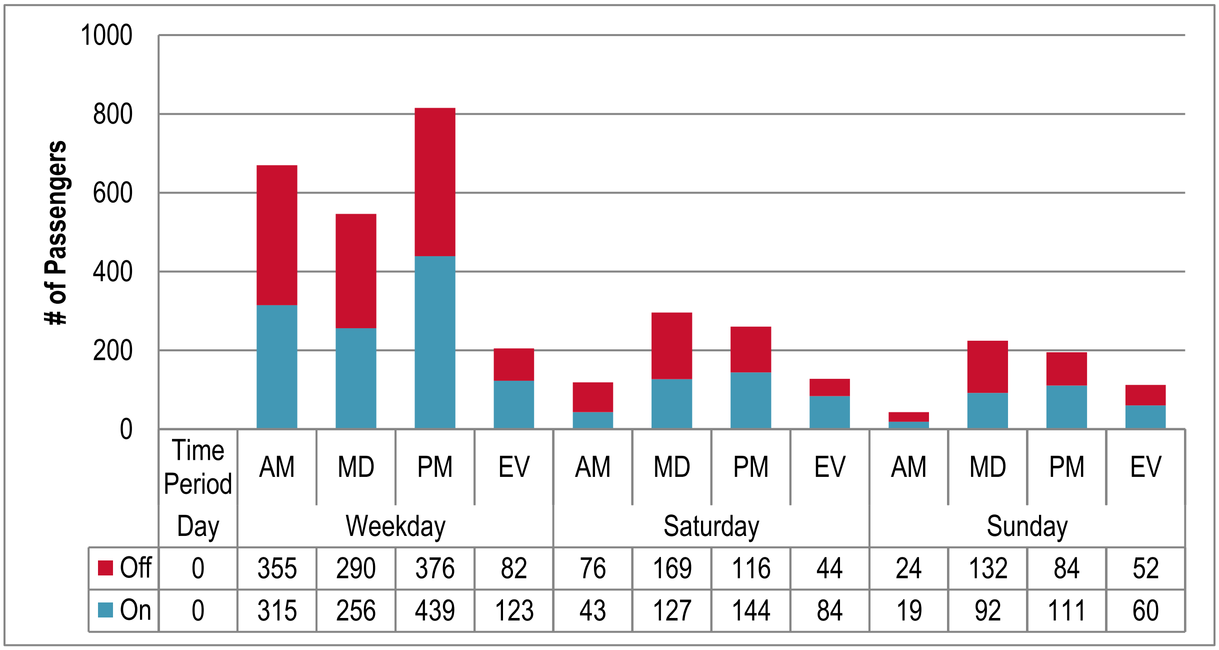
3.4.2 Transit Usage

Transit boardings and alightings in the study area were provided by York Region Transit (YRT). The data includes weekday, Saturday, and Sunday by time periods for the transit routes in the study area:

- Route 10 Woodbridge, which operates as a DAR service during the weekend;
- Route 165 Weston;
- Route 77/77A Highway 7;
- VIVA Orange; and
- Brampton 501 Züm as daily total only, as ridership by time period is not available.

The boardings and alightings by each time period for weekday, Saturday, and Sunday are shown in **Figure 3-18**. PM peak period (3-7 pm) in the weekday has the highest transit boarding and alighting activities, and weekday has significantly higher boardings and alightings compared to Saturday and Sunday.

Figure 3-18: Total On/Off by Time Period and Day in the Study Area (2018 Ridership)



Day	Time Period	Off	On
	Time Period	0	0
Weekday	AM	355	315
Weekday	MD	290	256
Weekday	PM	376	439
Weekday	EV	82	123
Saturday	AM	76	43
Saturday	MD	169	127
Saturday	PM	116	144
Saturday	EV	44	84
Sunday	AM	24	19
Sunday	MD	132	92
Sunday	PM	84	111
Sunday	EV	52	60

Time Period:

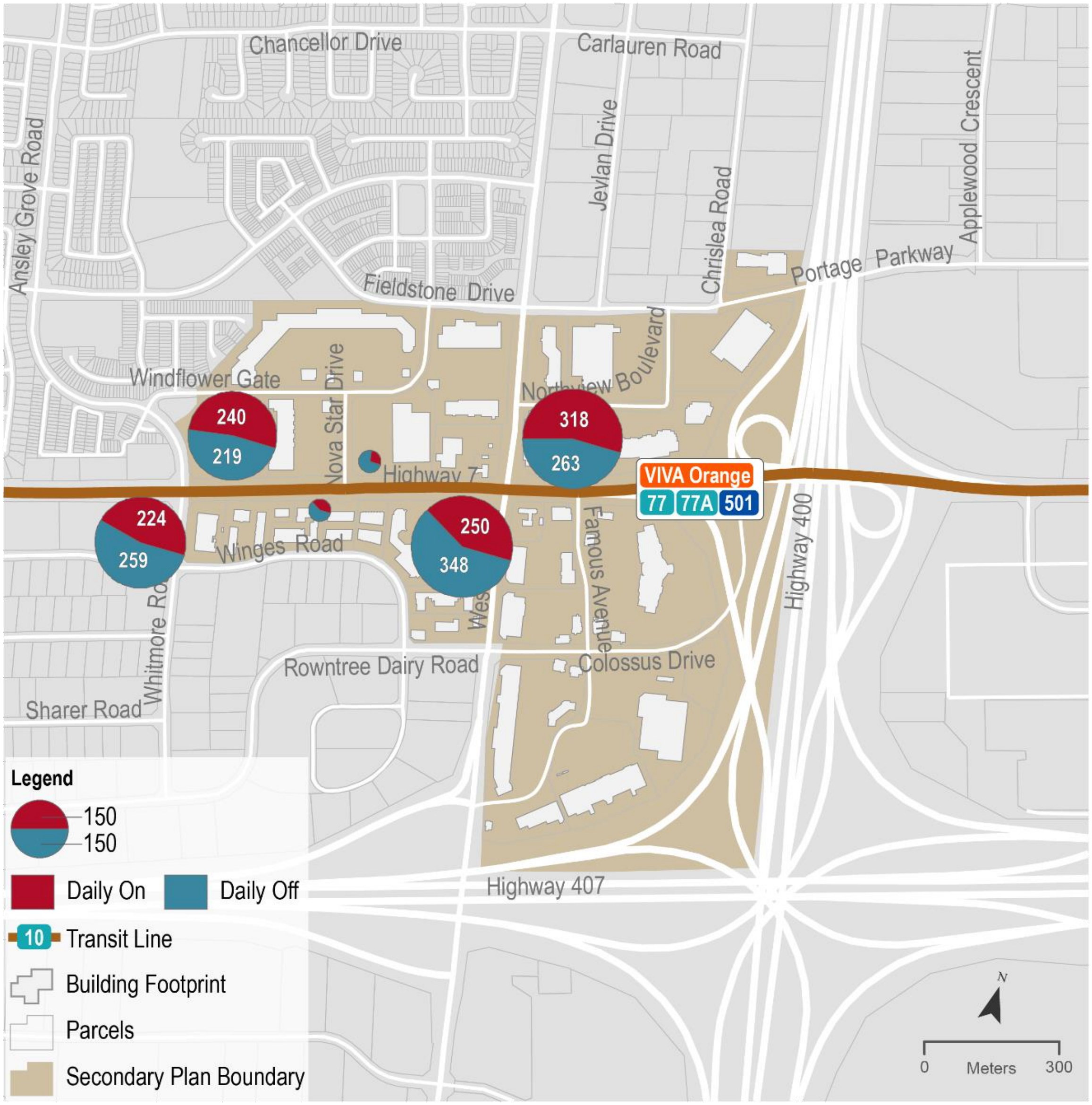
- AM: Start of service to 9:00 a.m;
- Midday: 9:00 a.m - 3:00 p.m;
- PM: 3:00 p.m. - 7:00 p.m and
- Evening: 7:00 p.m. to end of service.

* Zum 501 ridership not included as the ridership by time band is not available

** Route 10 operates as Dial-A-Ride service on weekends. Ridership within the Weston 7 study area is not available.

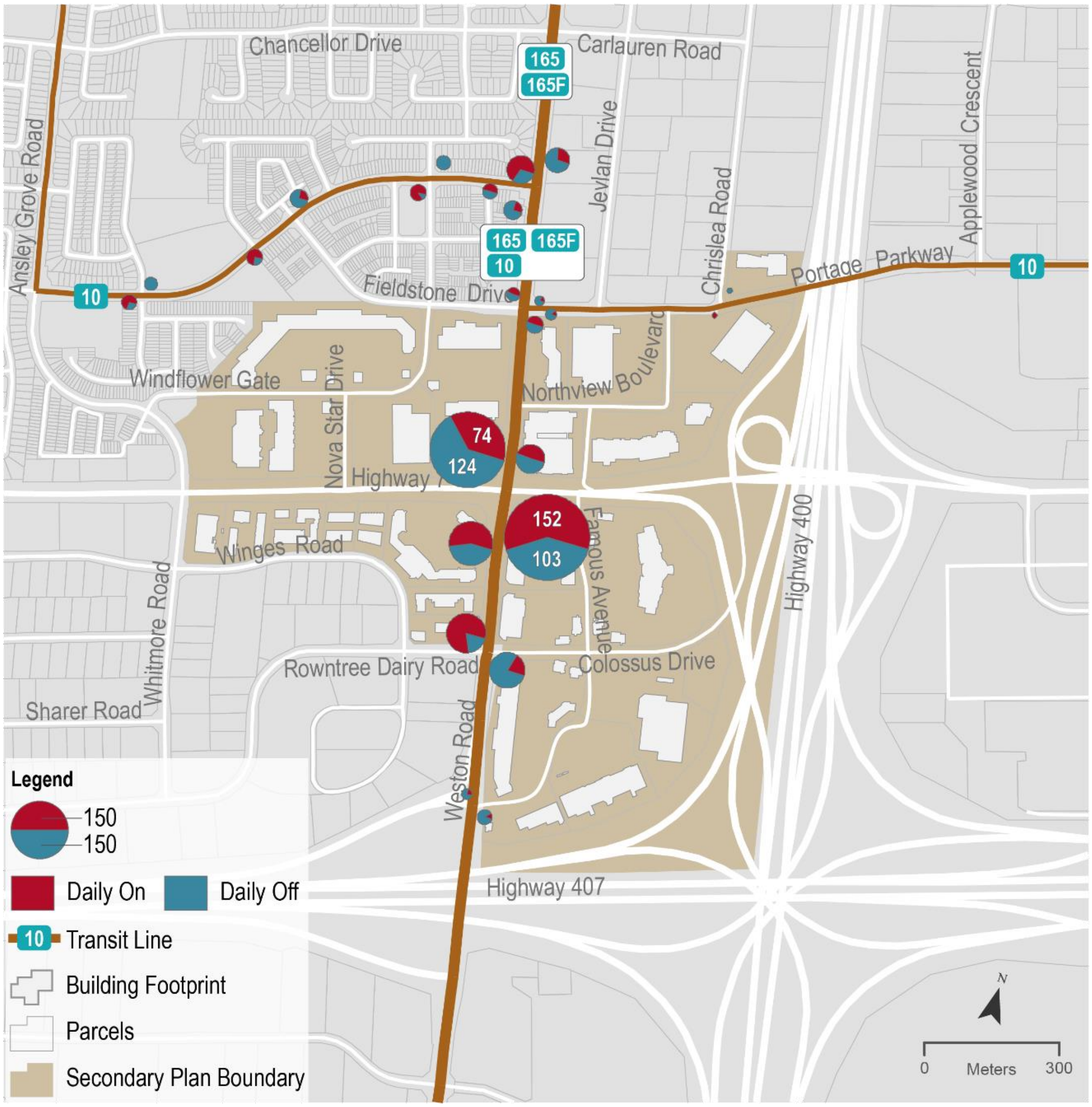
The daily boardings and aligntings during the weekday at each stop are illustrated in **Figure 3-19** for east-west routes (Route 77/77A Highway 7, VIVA Orange, Brampton 501 Züm) and **Figure 3-20** for north-south routes (Route 16 Weston and 10 Woodbridge). The busiest stations are the eastbound and westbound stops at Highway 7 and Weston Road, with close to 600 boardings and alightings for each day. Eastbound and westbound transit stops at Highway 7 and Ansley Grove Road, as well as northbound and southbound transit stops at Weston and Highway 7, also have relatively high number of boardings and alightings. The rest of transit stops in the study area have limited ridership activity.

Figure 3-19: Weekday Daily Transit Demand, Route 77/77A Highway 7, VIVA Orange, and Brampton 501 Züm (2018 Ridership)



Source: York Region Transit

Figure 3-20: Weekday Daily Transit Demand, Route 16 Weston and 10 Woodridge (2018 Ridership)



Source: York Region Transit

3.5 Cyclists

3.5.1 Existing Cycling Network

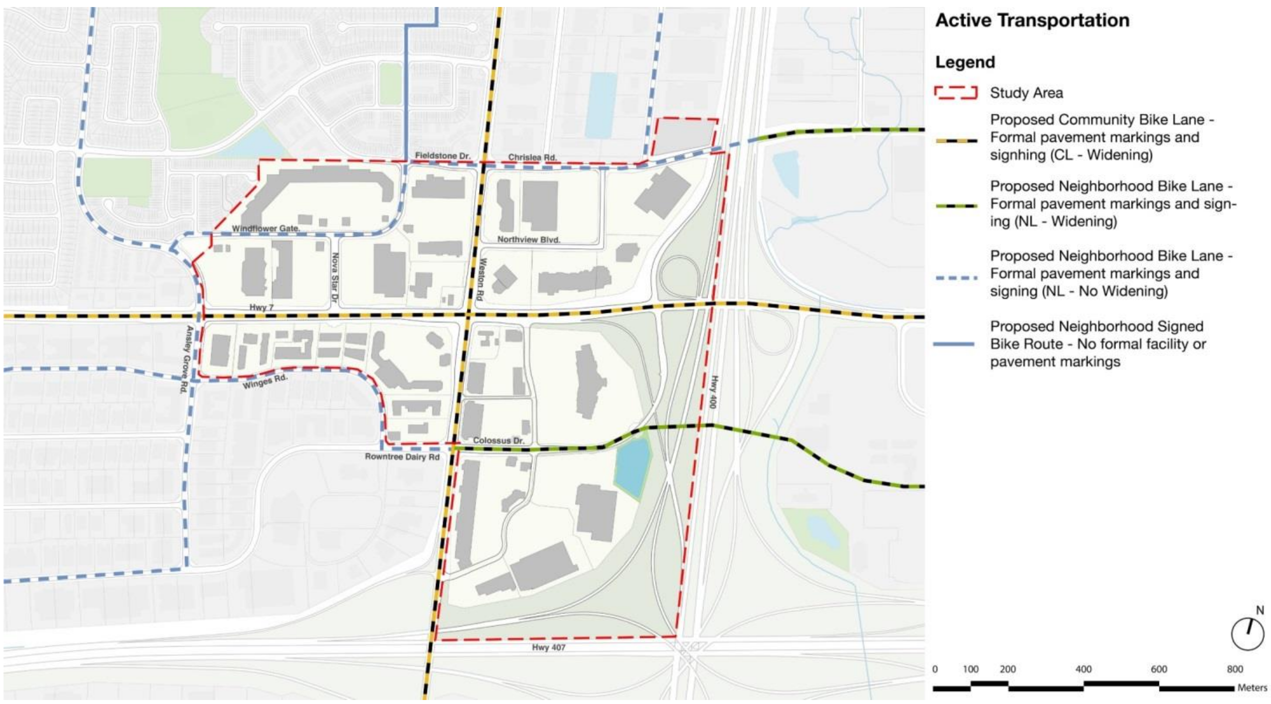
With the exception of Windflower Gate west of Nova Start Drive, which is a signed bike route, there are no cycling facilities within the study area. The lack of physical separation from high speed and high volume traffic on the area's major arterials create a dangerous and unappealing cycling environment. Further, a large number of conflict zones exist, primarily at merge lanes at highway on-ramps, as well as at major intersections. The existing conditions culminate in poor cycling conditions that present a deterrent to cycling to and within the study area.

3.5.2 Cycling Network Plans

As mentioned in **Section 2.2.3**, York Region's vivaNext Plan proposes raised bike lanes on Highway 7 and a multi-use path for pedestrians and cyclists in the median of the Highway 7 bridge over Highway 400. The project is currently under construction and is expected to be completed in 2019.

In addition, the City of Vaughan's 2013 TMP proposed bike lanes in the study area. This includes community and neighbourhood bike lanes with formal pavement markings and signing on Weston Road, Windflower Gate, Fieldstone Drive, Chrislea Road, Winges Road, Rowntree Dairy Road, Colossus Drive, and Ansley Grove, as shown in **Figure 3-21**. It is noted that the City of Vaughan is currently undertaking the Pedestrian and Bicycle Master Plan Update, and the recommendations of this study should be considered in later phases of the Weston 7 Secondary Plan study.

Figure 3-21: Cycling Plan



Source: Urban Strategies Inc. / City-wide TMP 2013

3.5.3 Bicycle Level of Service

Bicycle LOS Methodology

The methodology for the bicycle level of service (BLOS) is based on the York Region Transportation Mobility Plan and enhanced by the City of Ottawa's Multimodal Analysis Guideline. BLOS is calculated at the intersection and mid-block (segment) in recognition that a cyclist's experience is determined by the conditions both between crossings and at the crossing itself.

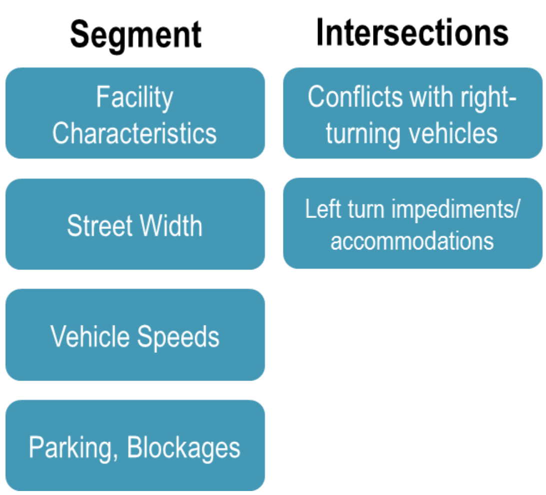
The base criteria in the York Region and Ottawa evaluation are similar for the most part, but the BLOS analysis is more detailed under the Ottawa methodology, which considers not only the type and width of bikeway but also the adjacent road characteristics such as road and vehicular speeds. The differences between the Ottawa and York Region level of service approaches are most pronounced when reviewing the methodologies at the intersection level. The Ottawa methodology calls for a more involved list of inputs, including road-way characteristics such as the presence of turning lanes and turning speeds lead to a more rigorous evaluation of conditions at intersections. The Ottawa methodology offers a more detailed review of the user experience, especially at the intersection level. Overall, the York Region Transportation Mobility Plan multi-modal level of service methodology is a good baseline from which to conduct an existing conditions review. Nevertheless, the Ottawa methodology sets a higher level of standard that is arguably more appropriate for urbanizing areas that aim to prioritize active transportation first and foremost.

The methodology for the evaluation of segment BLOS utilizes a look-up table approach based on roadway characteristics and facility type and quality. The methodology measures each segment's and intersection's level of traffic stress (LTS) experienced by the cyclist, established in the Mineta Transportation Institute report (no. 11-19) and has been adopted widely by a variety of municipalities. Each LTS score is associated with a category of cyclist (e.g. "all ages" to "very confident cyclists only") and score (A to F). Segment BLOS considers facility type, street width, operating speed, and parking characteristics.

At the intersection level, similar look-up table approach is used to evaluate the left and right turning conditions as well as the average score of the approaches to determine the overall intersection BLOS. Details of the methodology can be found in **Appendix A**.

The input of the BLOS is shown in **Figure 3-22**.

Figure 3-22: Inputs for Bicycle LOS



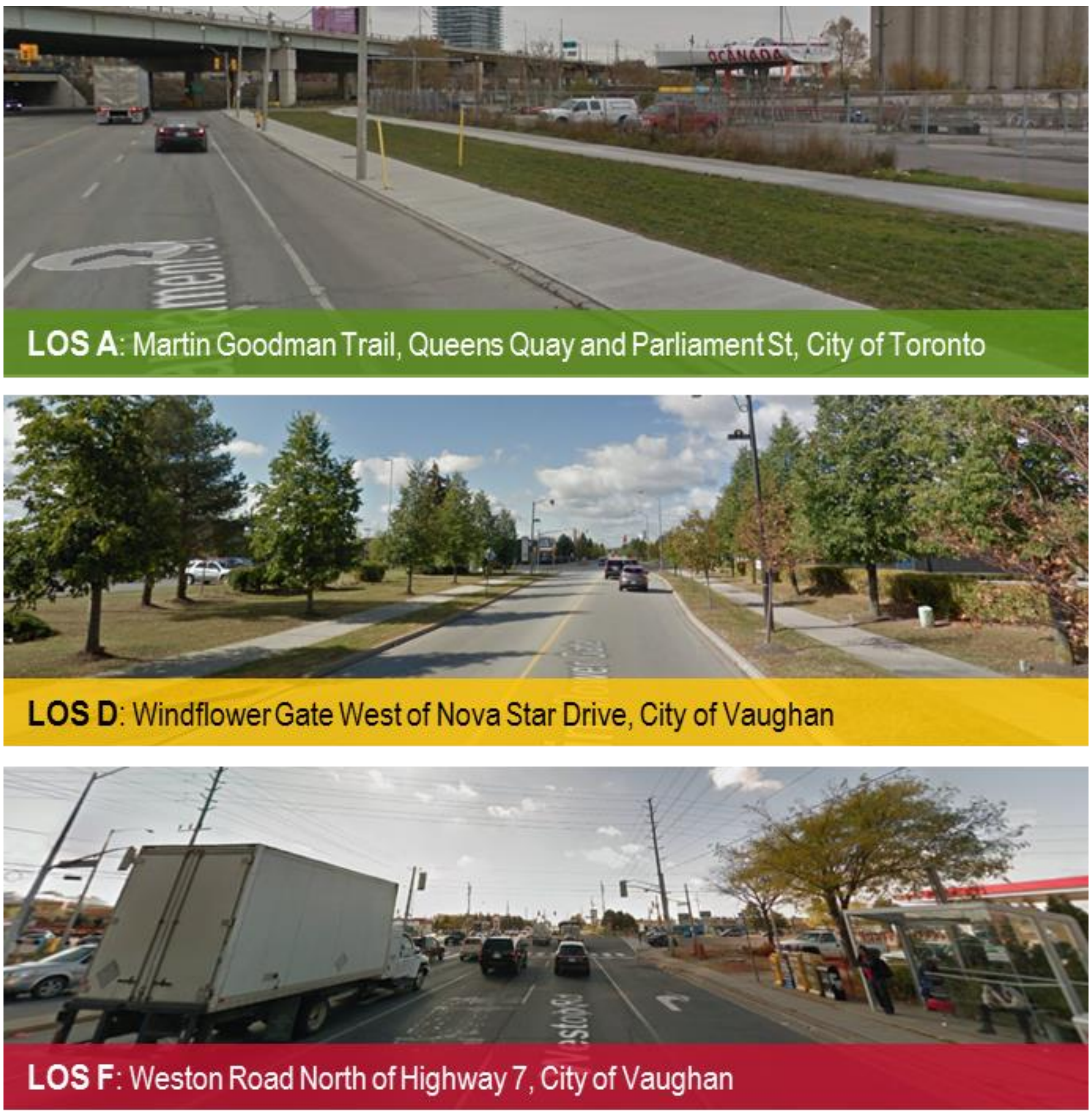
Segment BLOS is the most sensitive to facility type, with physically separated bikeways such as cycle tracks, protected bike lanes and multi-use paths receiving a score of 'A' while cycling in mixed traffic conditions with varying operating speeds and street widths generally scoring lower – 'D' to 'F'. The scoring ranges as follows:

- **BLOS 'A' to 'C' –** Physically separated facilities such as cycle tracks, protected bike lanes, and multi-use paths (MUP) are attractive to most cyclists. At intersections, continuous cycling facilities are provided and separated from vehicles and pedestrians.

- **BLOS 'D' to 'E' –** Designated bike lanes adjacent to high speed traffic lanes or shared facilities on low volume, low speed streets with wide curb lanes provide some comfort, but the majority of potential cyclists typically will not cycle. Greater conflicts at intersections with turning vehicles are experienced.
- **BLOS 'F –** Non-separated, shared roadways with high traffic volumes and speeds, and no accommodations at intersections.

Examples of the segment Bicycle LOS are shown in Figure 3-23.

Figure 3-23: Example of Bicycle LOS



Bicycle LOS Analysis

The BLOS results of the Weston 7 Secondary Plan study area is illustrated in **Figure 3-24**, and the segment and intersection BLOS are summarized in **Table 3-6** and **Table**

3-7. There is very limited cycling infrastructure in the study area, therefore many intersections and segments experience a BLOS of 'D' or worse due to high vehicular operating speeds and high traffic volumes. Windflower Gate west of Nova Star Drive is a quieter streets without bicycle infrastructure, operate with a BLOS of 'B' due to low operating speeds, low traffic volumes, and no centreline marking. Detailed analysis can be found in **Appendix B**.

Figure 3-24: Bicycle LOS

Table 3-6: Segment BLOS

Road	From	To	Segment BLOS
Weston Road	Highway 407	Famous Ave	F
	Famous Ave	Petsmart access	F
	Petsmart access	Collossus Dr	F
	Collossus Dr	Woodbridge Plaza Access	F
	Woodbridge Plaza Access	Hwy 7	F
	Hwy 7	Northview Blvd	F
	Northview Blvd	Fieldstone Dr	F
Highway 7	Whitmore Rd	Nova Star Dr	F
	Nova Star Dr	Weston Rd	F
	Weston Rd	Famous Ave	F
	Famous Ave	Collosus Dr	F
	Collosus Dr	Hwy 400	F
Windflower Gate	Ansley Grove Rd	Fieldstone Dr	B
Nova Star Drive	Highway 7	Windflower Gate	E
Northview Boulevard	Weston Road	Chrislea Road	D
Famous Avenue	Weston Rd	Costco Access	E
	Costco Access	Collosus Dr	D
	Collosus Dr	Highway 7	D
Winges Road	Whitmore Rd	Rowntree	D
Whitmore Road	Windflower Gate	Highway 7	E
	Highway 7	Winges Rd	E
Colossus Drive	Winges Rd	Weston Rd	E
	Weston Rd	Costco Access	E
	Costco Access	Hwy 7	E
Fieldstone Drive	Windflower Gate	Weston Rd	E
	Weston Rd	Chrislea Rd	E
	Chrislea Rd	Hwy 400	F

Table 3-7: Intersection BLOS

Road	Intersection	Intersection BLOS
Weston Road	Highway 7	F
	Chrislea Rd / Fieldstone	E
	Colossus Dr	F
Colossus Drive	Famous Ave	E
Highway 7	Colossus Dr	F
	Whitmore	F
	Nova Star Dr	E
Winges Road	Rowntree Dairy Rd	E
	Whitmore Rd	E
Nova Star Dr	Windflower Gate 1	D
Windflower Gate	Whitmore Rd	D
	Fieldstone Rd	C
Famous Ave	Weston Rd	F
	Hwy 7	F

3.6 Pedestrians

3.6.1 Existing Pedestrian Network

The existing sidewalk network within the study area is largely complete (**Figure 3-25**). Most streets have sidewalks on both sides, and some streets including Northview Boulevard, Famous Drive, and Winges Road, have sidewalk on one side. Roads under MTO jurisdiction, including the access road to 7777 Weston Road and provincial highways, do not have sidewalks.

Most sidewalks have a width of 1.5m, while some roads, such as Nova Star Drive, have 2m sidewalks. On some streets, the sidewalk is separated from traffic by a grass or asphalt buffer that occasionally contains street furniture or trees. This buffer provides some safety benefits for pedestrians. The majority of Highway 7 from west of Nova Star Drive to Highway 400 has minimum or no buffer, where high volumes of traffic are operating at a speed of 60 to 70 km/hr.

Given the high vehicular traffic volumes and speed on the major arterial roads and limited amenity provided, the overall environment for pedestrians is poor. Furthermore, the large block pattern of the street network and large surface parking lots within the study area, with limited midblock crossings, creates poor connectivity from buildings to the arterial roads and most transit stops. Consequently, informal connections through private property, storefront walkways, informal point of access, and parking lots have emerged, but do not adequately provide for pedestrian safety and comfort. Examples of the informal paths are shown in **Figure 3-26**, where the study team walked from Windflower Gate to Weston Road where a direct link was absent.

Figure 3-25: Existing Pedestrian Network

Figure 3-26: Informal Pathway between Windflower Gate and Weston Road

Source: Weston 7 Secondary Plan Site Tour, May 2018

Safety issues arise where pedestrian and vehicular traffic meets at intersections and private driveways. **Figure 3-27** illustrates a pedestrian crossing design typical to the study area along Highway 7, long crossing distances with a minimal or non-existent mid-crossing median. However, zebra markings have been employed at most major intersections, increasing crossing visibility to motorists.

Large turning radii are employed at most intersection in the study area. While this facilitates vehicular flow, especially for goods movement, it impacts pedestrian safety by increasing crossing length and vehicle speed. **Figure 3-28** exhibits a large turning radii where vehicles can make turns at higher speeds than intersections with smaller turning radii.

The pedestrian safety issue is especially critical at provincial highways. At the Highway 400 southbound on-ramp, eastbound traffic on Highway 7 towards the ramp is free-flow at high speed with minimal gaps making this ramp dangerous for pedestrians and cyclists to cross. There are no visible markings (such as zebra markings) for pedestrian crossing over the highway on-ramp. In addition, the existing sidewalk over Highway 400 is under 2 metres without any buffer to vehicles operating at a high speed, making it uncomfortable and unsafe for pedestrian to use. Similar issues exist at the Highway 407 westbound on-ramp where southbound traffic on Weston Road accesses the ramp. These create a major barriers for pedestrians to access the study area and to nearby mobility hubs such as the VMC subway station.

A number of private driveways interrupt the pedestrian realm along the study area's major arterials, providing vehicular access to buildings that are well set back from the street. These driveways increase the amount of instances where pedestrians and vehicles must interact, as illustrated in **Figure 3-30**.

Some driveways are not signed appropriately with stop control, which can be increasingly hazardous for pedestrians at the high volume driveways common within the study area.

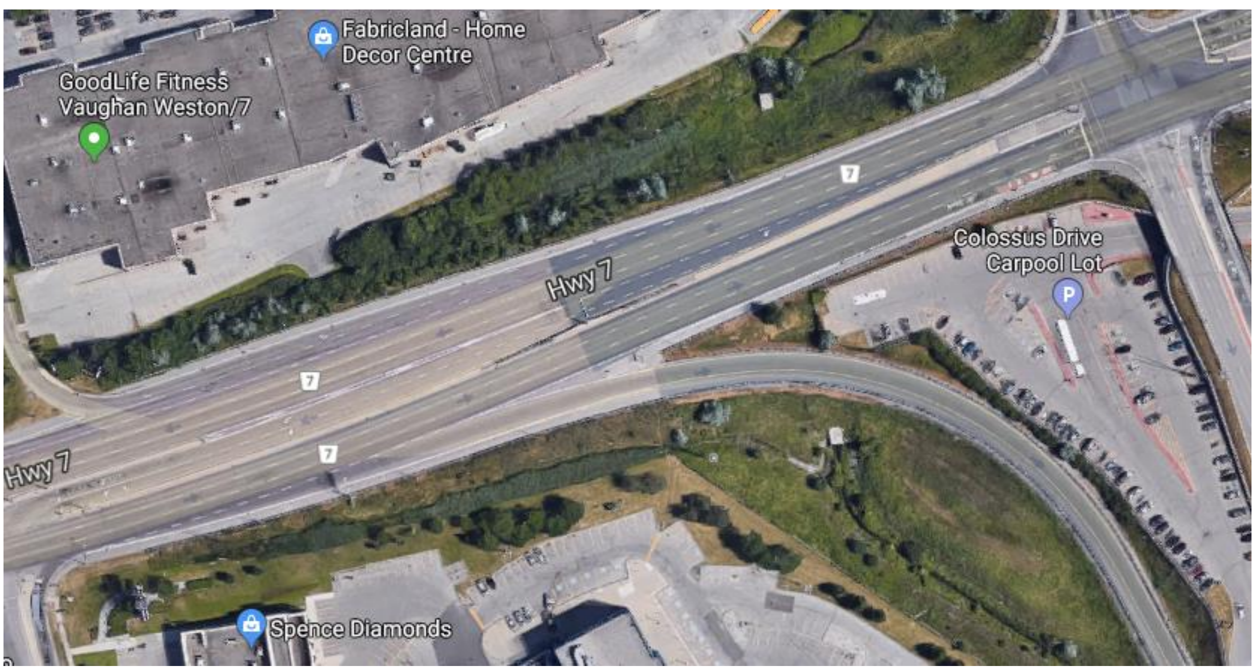
Figure 3-27: Signalized Crossing Highway 7 on the West Side of Weston Road

Source: Google Maps

Figure 3-28. Large Turning Radii at the Northeast Corner of Whitmore Road and Winges Road

Source: Google Maps

Figure 3-29: Channelized Right-turn, Southbound on-ramp to Highway 400 from Highway 7



Source: Google Maps

Figure 3-30: Private Driveways Example on Whitmore Road

Source: Google Maps

3.6.2 Pedestrian Level of Service

Pedestrian LOS Methodology

Similar to the BLOS, the pedestrian level of service (PLOS) methodology is based on the York Region Transportation Mobility Plan and enhanced by the City of Ottawa's Multimodal Analysis Guideline. PLOS is calculated at the intersection and mid-block in recognition that a pedestrian's experience is determined by the conditions both between crossings and at the crossing itself.

The base criteria used to measure the performance or level of service are similar for the most part, such as the width of active transportation facilities and their separation from the roadway curb. Compared to the York Region methodology, the Ottawa methodology incorporates additional considerations that help better capture the nuances of different road typologies and their effect on user experience. When walking, these factors such as traffic volumes on the adjacent roadways, on-street parking, and roadway operating speeds have an impact on a pedestrian's level of comfort and should not be neglected. At the intersection level, the Ottawa methodology offers a more detailed review of the user experience, including crossing distances, corner radii and signal phasing and timing features, to produce an intersection level of service for pedestrians. Overall, the York Region Transportation Mobility Plan multi-modal level of service methodology is a good baseline from which to conduct an existing conditions review. Nevertheless, the Ottawa methodology sets a higher level of standard that is arguably more appropriate for urbanizing areas that aim to prioritize active transportation first and foremost. For example, a 1.5m sidewalk with no buffer adjacent to a 70km/hr road receives an “F” under the Ottawa MMLOS methodology but a “C” under York Region’s guidelines.

The methodology for the evaluation of segment PLOS utilizes a look-up table approach based on cross-section and roadway characteristics (e.g., sidewalk and boulevard width, traffic volumes, presence of on-street parking, and operating speed). Intersection PLOS uses the Pedestrian Exposure to Traffic at Signalized Intersections (PETSI) and assigns points based on a number of crossing characteristics (e.g., crossing distance, presence of a median, presence of a crossing refuge, turning restrictions, right hand turn characteristics, curb radii, etc.). The input for the PLOS is summarized in **Figure 3-31**.

Figure 3-31: Inputs for Pedestrian LOS

Segment	Intersections
Sidewalk and Boulevard Width	Crossing Width
Vehicle Volumes	Corner Radius
Vehicle Speed	Potential Conflicts
Physical Separation (e.g., street parking)	Visibility

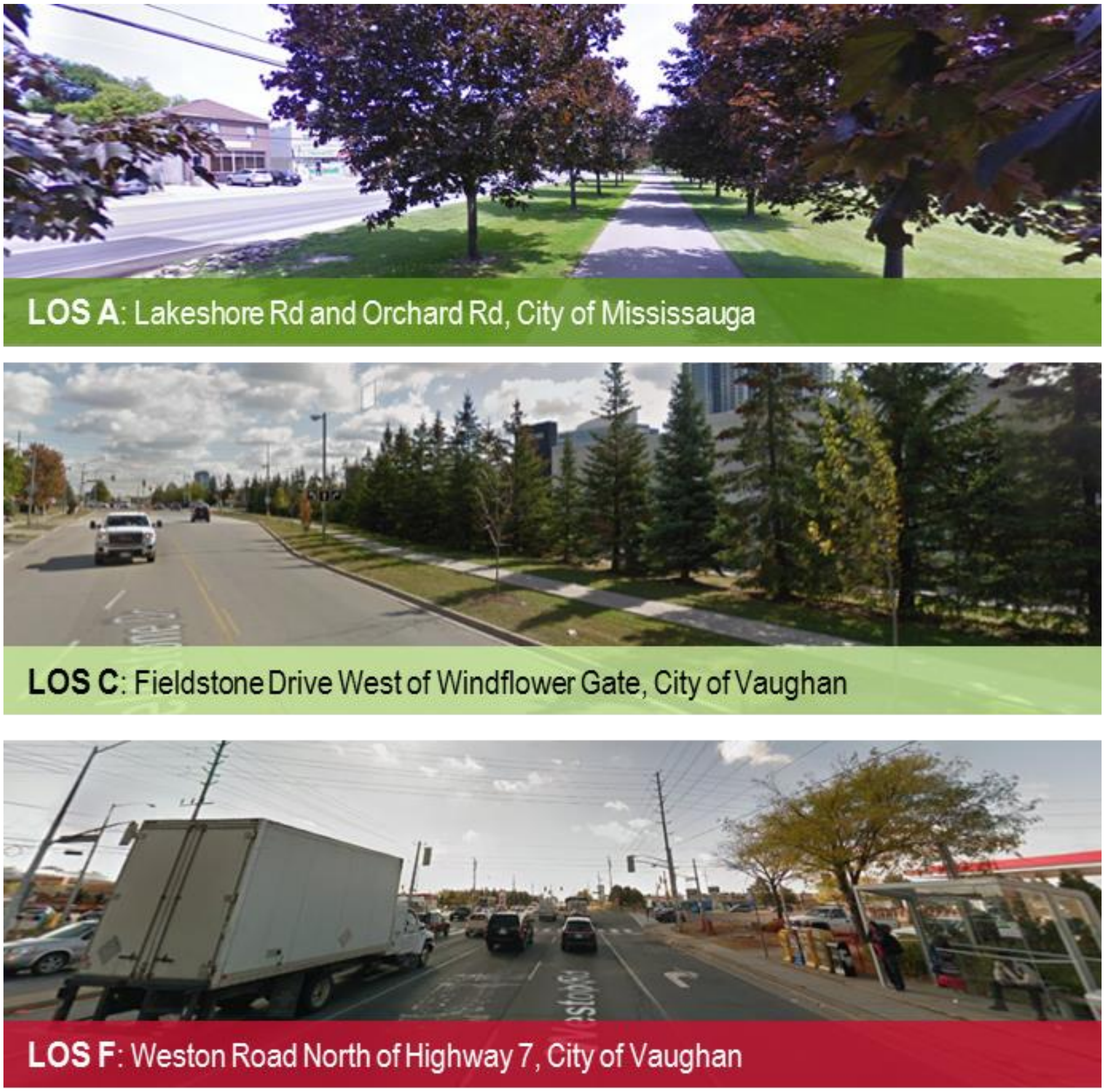
The average score of each intersection approach is averaged to determine the overall intersection PLOS. Scoring ranges as follows:

- **PLOS ‘A’ to ‘C’ –** Attractive to most pedestrians, including locations where lower speeds and volumes, wider sidewalks, and larger boulevards with ample separation from moving traffic are present. Crosswalks are provided on all four legs of the intersections and with shorter crossing distances at intersections.
- **PLOS ‘D’ to ‘E’** – Elements may not appeal to pedestrians due to narrow sidewalks, lack of separation from traffic, longer crossing distances, etc.
- **PLOS ‘F’ –** Not adequate – locations without any facility or where no buffer is provided adjacent to high speed and high volume traffic. No crosswalks provided and long crossing distances at intersections.

Higher segment scores are characterized by locations where lower vehicle speeds and volumes, wider sidewalks, and larger boulevards with ample separation from moving traffic are present. Lower segment scores are observed in locations where high vehicle speeds, narrow sidewalks, and minimal separation from traffic are present.

Examples of the Pedestrian LOS are shown in **Figure 3-32**.

Figure 3-32: Examples of Pedestrian Level of Service



Pedestrian LOS Analysis

The segment and intersection PLOS analysis results are summarized in **Table 3-8** and **Table 3-9** and illustrated in **Figure 3-33**. The majority of intersections and segments operating with a PLOS of 'D' or worse. The segment analysis shows that the majority of arterials experience a PLOS of 'E' or 'F' due to high vehicle operating speeds, narrow sidewalks, and little to no separation from vehicular traffic. Detailed analysis for the Pedestrian LOS can be found in **Appendix A**.

Figure 3-33: PLOS Results

Table 3-8: Segment PLOS

Road	From	To	West / North Side	East / South Side
Weston Road	Highway 407	Famous Ave	E	E
	Famous Ave	Petsmart access	E	E
	Petsmart access	Collossus Dr	D	E
	Collossus Dr	Woodbridge Plaza Access	D	E
	Woodbridge Plaza Access	Hwy 7	E	E
	Hwy 7	Northview Blvd	F	E
	Northview Blvd	Fieldstone Dr	E	D
Nova Star Drive	Highway 7	Windflower Gate	A	A
Whitmore Road	Windflower Gate	Hwy 7	E	E
	Hwy 7	Winges Rd	E	E
Famous Avenue	Costco Access	Collosus Dr	F	C
	Collosus Dr	Highway 7	F	C
Collossus Drive	140 m East of Costco far access	Hwy 7	F	F
Northview Boulevard	Goodlife Finess Access	Chrislea Road	C	F
Highway 7	Whitmore Rd	Nova Star Dr	D	F
	Nova Star Dr	Weston Rd	E	F
	Weston Rd	Famous Ave	D	D
	Famous Ave	Collossus Dr	F	F
	Collossus Dr	Hwy 400	F	F
Windflower Gate	Ansley Grove Rd	Fieldstone Dr	C	C
Northview Boulevard	Weston Road	Goodlife Finess Access	C	A
Famous Avenue	Weston Rd	Costco Access	F	C
Collossus Drive	Weston Rd	Famous Ave	D	D
	Famous Ave	140 m East of Costco far access	E	E
Rowntree Dairy Road	Winges Rd	Weston Rd	D	D
Winges Road	Whitmore Road	Rowntree Dairy Road	C	F
Fieldstone	Windflower Gate	Weston Rd	C	C
	Weston Rd	Jevlan Dr	E	E
	Jevlan Dr	Chrislea Rd	E	E
	Chrislea Rd	Hwy 400	E	E

Table 3-9: Intersection PLOS

Road	Intersection	Intersection PLOS
Weston Road	Famous Avenue	F
	Colossus Dr	F
	Hwy 7	F
	Chrislea Rd / Fieldstone Dr	F
Highway 7	Ansley Grove Rd / Whitmore Rd	F
	Nova Star Dr	F
	Famous Ave	F
	Colossus Dr	F
	Colossus Dr	F
Windflower Gate	North Star Dr	C
	Fieldstone Dr	B
	Whitmore Road / Ansley Grove Dr	F
Whitmore Road	Winges Road	E
Winges Road	Rowntree Dairy Road	E
Colossus Drive	Famous Drive	C

3.6.3 Walkshed Analysis to/from BRT Stops

Transit walkshed refers to the pedestrian catchment area of a transit facility. It is determined by the distance people are generally willing to walk to a transit stop, for example 500 m.The simplest way of measuring the walkshed of a transit facility is to include the entire area within a 500 m radius. However, this approach may include areas that are, in reality, not accessible to pedestrians (i.e. over a highway) or require longer walking distances due to barriers or irregular street patterns. An alternative method is to map the “true” linear walking distance from a transit facility using the existing street network accessible to pedestrians. Comparing the two methods can illustrate issues with connectivity and point to where new pedestrian links may be necessary.

Figure 3-34 illustrates the radial and linear walkshed analysis of the vivaNext BRT stations within the study area, based on the 500-metre walking distances. When comparing the radial and linear walkshed analysis, the linear walkshed meets the radial walkshed only when there is a straight line trip. However, there are many areas where the linear walkshed does not cover the same area as the radial walkshed. This includes the northern portion of Nova Star Drive and much of Piazza Del Sore (north of Windflower Gate), where many popular attractions, such as Toys R Us and Winners, are located. As a result, transit users are often required to cut through parking lots or other informal footpaths to reach their destination.

The walkshed analysis also illustrates the lack of walking connectivity across the big blocks and relates to the low street connectivity score seen in **Section 3.3.1**. There is very limited continuous east-west connection within the study area except for Highway 7 and no continuous north-south connection except for Weston Road.

Figure 3-34: Walkshed Analysis from the vivaNext BRT Stops

3.6.4 Walk Score

Walk Score is a number between 0 to 100 that measures the walkability of any address. It measures the potential for walking trips, and points are awarded based on the distance to amenities. The description of different walk score ranges is shown in **Table 3-10**. Similarly, Transit Score and Bike Score measures how well a location is served by public transit and whether an area is good for biking.

Walk Score, Transit Score, and Bike Score are evaluated for 7777 Weston Road, which is located at Highway 7 and Weston Road. The results are summarized in **Table 3-11**. Although the area is not well served with side walks, the large variety of retail uses results in a "somewhat walkable" score. There is strong potential in the study area to facilitate more walking, with a finer-grid street network and improved pedestrian facilities. With transit operating on Highway 7 and Weston Road, the area received a “good transit” score, although as mentioned in **Section 3.4**, the area has potential for improvements. Lastly, due to the lake of bicycle facilities and high traffic volumes and speeds on arterial roads, the area received a bike score of 0.

Table 3-10: Walk Score Description

Walk Score®	Description
90-100	Walker’s Paradise: daily errands do not require a car
70-89	Very Walkable: most errands can be accomplished on foot
50-69	Somewhat Walkable: some amenities within walking distance
25-49	Car-Dependent: a few amenities within walking distance
0-24	Car-Dependent: almost all errands require a car

Source: WalkScore

Table 3-11: Walk Score, Transit Score, and Bike Score for 7777 Weston Road

Measure	Score	Description
Walk Score	69	**Somewhat Walkable** Some errands can be accomplished on foot.
Transit Score	57	**Good Transit** Many nearby public transportation options.
Bike Score	0	**Somewhat Bikeable** Minimal bike infrastructure.

Source: WalkScore

3.7 Vehicles

3.7.1 Vehicular Intersection Traffic Analysis

Existing traffic operations were assessed using turning movement count data and existing signal timing plans provided to HDR by the City of Vaughan and York Region and through additional counts conducted in June 2018 to supplement missing data. The available data are summarized in **Table 3-12**.

Table 3-12: Dates of Turning Movement Counts, Availability of Signal Timing Cards and Assumptions

Intersection	Weekday PM Peak Hour Count Date	Weekend Peak Hour Count Date	Signal Timing Card Available	Assumption(s) on Estimation of Missing Signal Timings and Intersection Turning Volumes
Chrislea Rd @ Portage Pkwy / Commercial Access	May 17 , 2011	June 23, 2018	**No**	120 sec Cycle Length Assumed, May 2011 traffic count was adjusted with an annual growth rate of 1.5% compounded up to 2018 for Weekday PM Peak Hour
Weston Rd @ Chrislea Rd / Fieldstone Drive	June 26, 2018	June 23, 2018	Yes	-
Ansley Grove Rd @ Windflower Gate / Pinedale Gate	June 26, 2018	June 23, 2018	Yes	-
Highway 7 @ Ansley Grove Rd / Whitmore Rd	June 26, 2018	June 23, 2018	Yes	-
Highway 7 @ Nova Star Dr / Commercial Access	June 26, 2018	June 23, 2018	Yes	-
Highway 7 @ Weston Rd	Dec. 20, 2016	June 23, 2018	Yes	-
Highway 7 @ Famous Rd	June 26, 2018	June 23, 2018	Yes	-
Highway 7 @ Colossus Dr / Highway 400 SB Off Ramp	March 21, 2017	N/A	Yes	-
Highway 7 @ Highway 400 NB Off Ramp	May 31, 2016	N/A	No	140 sec Cycle Length Assumed
Weston Road @ Rowntree Dairy Rd./Colossus Drive	June 26, 2018	June 23, 2018	Yes	-
Rowntree Dairy Rd @ Winges Rd / Auto Park Cir	June 26, 2018	June 23, 2018	**No**	120 sec Cycle Length Assumed
Ansley Grove Rd / Whitmore Rd @ Winges Rd / Trowers Rd	June 26, 2018	June 23, 2018	**No**	120 sec Cycle Length Assumed
Weston Road @ 407ETR WB On Ramp / Famous Avenue	June 26, 2018	June 23, 2018	Yes	-
Weston Road @ Northview Blvd	June 26, 2018	June 23, 2018	**No**	140 sec Cycle Length Assumed
Fieldstone Drive @ Windflower Gate/Pottery Pl [Unsignalized]	March 4, 2015	June 23, 2018	-	-
Northview Blvd. @ 7777 Weston Road Access [Unsignalized]	N/A	June 23, 2018	-	Assumed from current PM peak volumes of the neighboring intersections, and an older count of July 31, 2012 of another neighboring intersection

Intersection Analysis Methodology

The analysis, conducted using Synchro 9, considered three separate measures of performance:

- The volume to capacity (V/C) ratio for each movement and overall intersection. This ratio reflects peak hour traffic demand measured against roadway capacity;
- The level of service (LOS) for each for each movement and overall intersection. LOS is based on the average control delay per vehicle; and
- The 95th percentile queue length of each movement/lane group.

LOS definitions (**Table 3-13**) are based on the Highway Capacity Manual (HCM) 2000. The HCM defines LOS for signalized and unsignalized intersections as a function of the average vehicle control delay. LOS may be calculated per movement or per approach for any intersection configuration, but LOS for the intersection as a whole is only defined for signalized and all-way stop configurations.

Table 3-13: Highway Capacity Manual Level of Service Definitions for Intersections

LOS	Signalized Intersection Average Vehicle Control Delay	Unsignalized Intersection Average Vehicle Control Delay	LOS Recommendation
A	≤10 sec	≤10 sec	Acceptable
B	10-20 sec	10-15 sec	Acceptable
C	20-35 sec	15-25 sec	Acceptable
D	35-55 sec	25-35 sec	Somewhat undesirable
E	55-80 sec	35-50 sec	Undesirable
F	≥80 sec	≥50 sec	Unacceptable

It is noted that the analysis may indicate that certain movements at an intersection operate with volume-capacity ratios greater than 1.0. Theoretically, a maximum volume-capacity ratio for existing conditions cannot be greater than 1.0, since the observed volumes used in the analysis represent volumes that were actually served at the intersection. Thus, a volume-capacity ratio exceeding 1.0 under existing conditions is a result of conservative parameters used in the Synchro analysis. For future conditions, V/C ratios exceeding 1.0 may either be a result of these conservative parameters, but may also indicate a likelihood that traffic will divert to other routes. Volume inputs in Synchro are static and any diversion would have to be manually accounted for and assigned to different intersections.

On the other hand, LOS F indicates average delays in excess of 80 seconds. While this is generally characterized as “poor” operation, it does not necessarily imply that the movement, approach, or intersection is experiencing demand in excess of capacity. When cycle lengths are in the range of 120 seconds (or longer), it is possible to have delays in the range of 80 seconds even in low-demand situations.

In addition to V/C ratio and LOS, 95th percentile queue lengths are also reported to identify any storage length deficiencies.

Existing Traffic Operations

Based on the existing traffic volumes and the existing signal timing plans obtained from the operating municipalities, **Figure 3-35** and **Figure 3-36** shows the summary of the resulting performance measures for the study area intersections, during both the weekday PM peak hour and weekend peak hour. Results for each intersection and the turning movements are shown in **Table 3-14**. The weekend analysis for Highway 7 at Highway 400 SB Off-ramp and Highway 400 NB Off-ramp were not included due to the lack of data. Detailed analysis can be found in **Appendix C**.

Table 3-14: Existing Intersection LOS

Intersection & Turning Movements	Weekday PM Peak Hour			Weekend Peak Hour		
	LOS	v/c	Queue	LOS	v/c	Queue
Chrislea Rd @ Portage Pkwy / Commercial Access [Signalized]	C	0.5		B	0.24	
EBL	B	0.46	22.2	A	0.18	11.1
EBTR	B	0.25	41.9	B	0.27	45.7
WBL	B	0.07	7.9	B	0.08	8.3
WBT	C	0.62	117.1	C	0.24	41
WBR	C	0.18	19.3	B	0.06	9.1
NBL	C	0.02	5.2	C	0.04	7.5
NBTR	C	0.03	8.4	C	0.05	11.1
SBL	C	0.34	46	C	0.17	24.8
SBTR	C	0.12	16.9	C	0.08	14.9
Weston Rd @ Chrislea Rd / Fieldstone Drive [Signalized]	D	0.87		C	0.82	
EBL	F	1.07	59.6	E	0.86	73.4
EBT	D	0.6	87.5	D	0.43	59
EBR	D	0.04	4.3	C	0.1	14.7
WBL	F	1.13	121.8	C	0.78	80.9
WBTR	D	0.75	119.4	B	0.22	30
NBL	B	0.33	16.2	C	0.76	84.3
NBT	C	0.71	94.1	C	0.69	135.9
NBR	C	0.15	7	C	0.13	19.3
SBL	C	0.53	22.4	C	0.57	30.8
SBT	C	0.41	87.6	D	0.66	112.7
SBR	B	0.05	5.8	C	0.12	18.3
Ansley Grove Rd @ Windflower Gate / Pinedale Gate [Signalized]	C	0.55		C	0.53	
EBL	D	0.62	69	B	0.47	85.5
EBTR	C	0.16	27.2	B	0.12	26.7
WBL	A	0.04	6.8	A	0.04	6.5
WBT	A	0.35	77.1	A	0.23	51.9
WBR	A	0.13	8.5	A	0.16	10.9
NBLTR	D	0.07	9.8	D	0.13	12.1
SBL	E	0.78	74.8	D	0.73	81.2

Intersection & Turning Movements	Weekday PM Peak Hour			Weekend Peak Hour		
	LOS	v/c	Queue	LOS	v/c	Queue
SBTR	D	0.33	34.2	D	0.28	24.2
Highway 7 @ Ansley Grove Rd / Whitmore Rd [Signalized]	C	0.55		C	0.49	
EBL	B	0.44	18.7	A	0.41	21.7
EBT	B	0.35	61.3	B	0.33	64.7
EBR	B	0.03	1	B	0.04	2.4
WBL	A	0.23	2.5	A	0.23	5.6
WBT	A	0.41	9.7	A	0.33	27.8
WBR	A	0.09	0	A	0.08	0.2
NBL	E	0.63	59.7	E	0.67	49.7
NBT	E	0.83	104.5	E	0.63	61
NBR	D	0.26	33.8	D	0.08	14.2
SBL	F	0.92	48.9	F	0.8	49.6
SBT	D	0.28	36	D	0.43	42.6
SBR	D	0.09	17.1	D	0.16	23.1
Highway 7 @ Nova Star Dr / Commercial Access [Signalized]	C	0.47		C	0.5	
EBL	C	0.44	30.7	B	0.45	29.6
EBT	B	0.45	72.3	B	0.44	60.6
EBR	B	0	0	B	0.01	0
WBL	B	0.13	4.4	A	0.21	6.3
WBT	C	0.49	73.2	B	0.4	44
WBR	C	0.21	17.1	A	0.27	5.9
NBL	E	0.13	12.8	E	0.07	8.5
NBTR	F	0.74	57.9	E	0.5	34.9
SBL	D	0.27	24.4	D	0.58	59.5
SBTR	D	0.17	21.4	D	0.17	23
Highway 7 @ Famous Ave [Signalized]	D	0.71		D	0.79	
EBT	B	0.47	139	B	0.57	132
EBR	A	0.09	6.3	A	0.14	22.2
WBL	E	0.53	59	D	0.75	107
WBT	A	0.4	33.1	A	0.37	39
WBR	A	0.16	2	B	0.13	5.9
NBR	F	1.72	268.6	F	1.4	281.1
Highway 7 @ Weston Rd [Signalized]	F	1.15		E	1.05	
EBL	F	1.13	115.5	E	0.87	94.9
EBT	E	0.94	182.7	D	0.68	96.5
EBR	E	0.24	26.8	E	0.19	29.1
WBL	F	1.11	81.2	F	1.09	81.3
WBT	F	0.96	181	D	0.57	121.8
WBR	F	0.37	75.5	F	0.3	77.6
NBL	F	1.14	113.8	F	1.17	118.9
NBT	F	1.03	219.5	E	0.93	195.1
NBR	E	0.67	94.4	E	0.8	152.6
SBL	F	1.12	75	F	1.26	93.8

Intersection & Turning Movements	Weekday PM Peak Hour			Weekend Peak Hour		
	LOS	v/c	Queue	LOS	v/c	Queue
SBT	D	0.88	123	D	0.8	150.3
SBR	B	0.25	12.7	C	0.17	23.2
Highway 7 @ Colossus Dr / Highway 400 SB Off Ramp [Signalized]	D	0.89				
EBTR	B	0.83	70.4	NA		
WBT	C	0.76	174.1			
NBR	F	1.51	136.5			
SBL	E	0.78	131.2			
SBTR	D	0.67	90.4			
SBR	D	0.55	79.8			
Highway 7 @ Highway 400 NB Off Ramp [Signalized]	C	0.69				
EBT	A	0.38	56.9	NA		
WBT	B	0.59	116.6			
NBL	E	0.91	153.8			
NBR	D	0.43	51.5			
Weston Road @ Rowntree Dairy Rd. / Colossus Drive [Signalized]	D	1.06		D	1.06	
EBL	D	0.61	50.2	D	0.69	57.5
EBTR	D	0.76	116.2	C	0.38	26.3
WBL	F	1.42	71.3	F	0.95	84
WBT	D	0.6	109.6	C	0.46	69
WBR	D	0.25	36.8	D	0.65	85.9
NBL	D	0.89	64.9	C	0.75	75.9
NBTR	C	0.59	119.4	D	0.6	117.5
SBL	E	0.87	44.8	F	1.08	147.9
SBT	B	0.59	42.5	C	0.55	105.6
SBR	A	0.16	2.1	C	0.23	27.5
Rowntree Dairy Rd @ Winges Rd / Auto Park Cir [Signalized]	C	0.56		C	0.41	
EBLTR	C	0.49	84.6	B	0.2	37
WBL	B	0.24	21.2	B	0.2	26.3
WBTR	B	0.31	41.6	A	0.24	31.4
NBLTR	E	0.78	71.9	E	0.61	46
SBL	C	0.58	49.7	C	0.63	61.9
SBTR	C	0.07	12.9	C	0.04	9.4
Ansley Grove Rd / Whitmore Rd @ Winges Rd / Trowers Rd [Signalized]	C	0.57		C	0.43	
EBL	C	0.66	29.2	C	0.44	20.6
EBTR	C	0.18	26.8	C	0.11	17.8
WBL	C	0.04	7	D	0.06	7.9
WBTR	D	0.83	111.8	D	0.8	89.9
NBL	B	0.02	5.9	B	0	2.3
NBTR	B	0.31	61.8	B	0.05	11.8
SBL	C	0.39	46.1	B	0.26	47.2
SBTR	B	0.08	12.4	B	0.08	11.7

Intersection & Turning Movements	Weekday PM Peak Hour			Weekend Peak Hour		
	LOS	v/c	Queue	LOS	v/c	Queue
Weston Road @ Highway 407 WB On Ramp / Famous Avenue [Signalized]	C	0.81		C	0.79	
WBLT	E	0.78	87.9	E	0.81	100.7
WBR	D	0.07	13.5	D	0.58	66
NBL	C	0.68	69.6	B	0.14	7.2
NBT	C	0.81	239.7	C	0.62	129.5
NBR	B	0.39	53.4	B	0.33	31.4
SBL	B	0.39	9.9	B	0.75	62.5
SBTR	C	0.81	180	B	0.52	127.5
Fieldstone Drive @ Windflower Gate/Pottery Pl [Unsignalized]	F			E		
EBLTR	B	0.12	0.4	B	0.29	1.2
WBL	F	1.35	32.1	F	0.93	10.9
WBTR	B	0.36	1.7	B	0.31	1.3
NBLTR	E	0.94	9.6	F	0.98	14.2
SBLTR	B	0.16	0.5	B	0.23	0.9
Northview Blvd. @ 7777 Weston Road Access [Unsignalized]						
WBLT	C	0.54	3.2	A	0	0
NBLR	A	0	0	B	0.31	1.3
Weston Road @ Northview Blvd [Signalized]	D	0.72		C	0.63	
WBLR	F	0.98	192	E	0.92	148
NBT	C	0.62	169.7	C	0.52	168.3
NBR	F	0.17	20.9	E	0.17	27.3
SBL	B	0.29	11.1	B	0.29	15.4
SBT	B	0.47	86.4	B	0.54	113.3

Figure 3-35: Intersection LOS, Weekday PM Peak

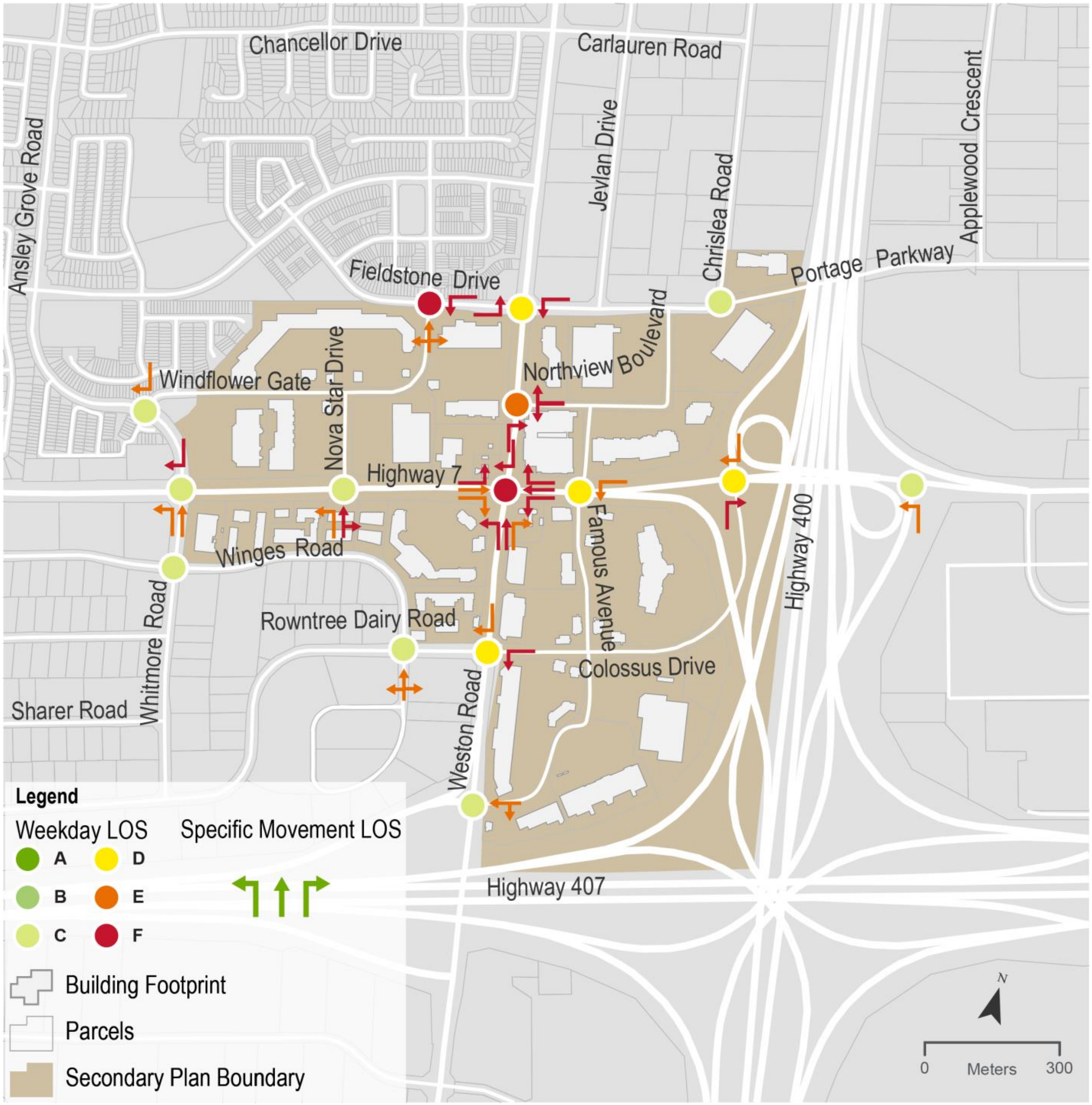


Figure 3-36: Intersection LOS, Weekend PM Peak

Based on the results presented, the following conclusions can be drawn from the analysis of the study area intersections, under existing traffic and signal timing plans:

Most signalized intersections currently operate at overall intersection LOS D or better and with overall v/c ratios less than 1.0 during both weekday PM and weekend peak hours, with the exception of the following:

- Highway 7 @ Weston Road intersection currently operates at LOS F during the weekday PM peak hour because of high demands of EBL, WBL, NBL and SBL movements; and

- Weston Road @ Rowntree Dairy Rd. / Colossus Drive intersection currently operates at LOS D; however, with an overall intersection v/c ratio of 1.06 due to high WBL and SBL movements.

The following turning movement constraints are noted for existing conditions:

- WBL movement of Weston Rd @ Chrislea Rd & Fieldstone Drive intersection operates with a v/c ratio of 1.12 during the Weekday PM peak hour;
- NBR movement of Highway 7 @ Famous Rd intersection operates with a v/c ratio of 1.72 and 1.40 during the Weekday PM and weekend peak hour, respectively;
- NBR movement of Highway 7@ Colossus Dr / Highway 400 SB Off Ramp Access intersection operates with a v/c ratio of 1.51 during the Weekday PM peak hour; and
- WBL movement of Weston Road & Rowntree Dairy Rd / Colossus Dr intersection operates with a v/c ratio of 1.42 during the Weekday PM peak hour, and the SBL operates with a v/c ratio of 1.08 during the Weekend peak hour.

All study area intersections currently experience queues at least one vehicle queue length longer than the corresponding storage length during either of the two peak hours, except the following four intersections:

- Ansley Grove Rd @ Windflower Gate / Pinedale Gate;
- Highway 7 @ Weston Road;
- Highway 7@ Colossus Dr / Highway 400 SB On Ramp; and
- Weston Road @ 407ETR WB On Ramp/Famous Avenue.

The following conclusions can be drawn from the analysis of unsignalized intersections under existing traffic conditions:

- WBL movement of Fieldstone Drive @ Windflower Gate/Pottery Pl intersection operates at v/c ratio of 1.35 during the Weekday PM peak hour; and
- No queue concerns were noted for the unsignalized intersections.

4 Transportation Challenges and Opportunities

Based upon the review of existing conditions, eight major opportunities were identified:

1. Creation of a grid street network;
2. A transportation network for all mobility users;
3. Improving safety for all modes of travel;
4. New innovative smart mobility plan and TDM measures;
5. Increase sustainable modal share;
6. Optimize the existing road network;
7. Consider partial ramp access at Portage Parkway; and
8. Extend Portage Parkway / Chrislea Road west of Weston Road.

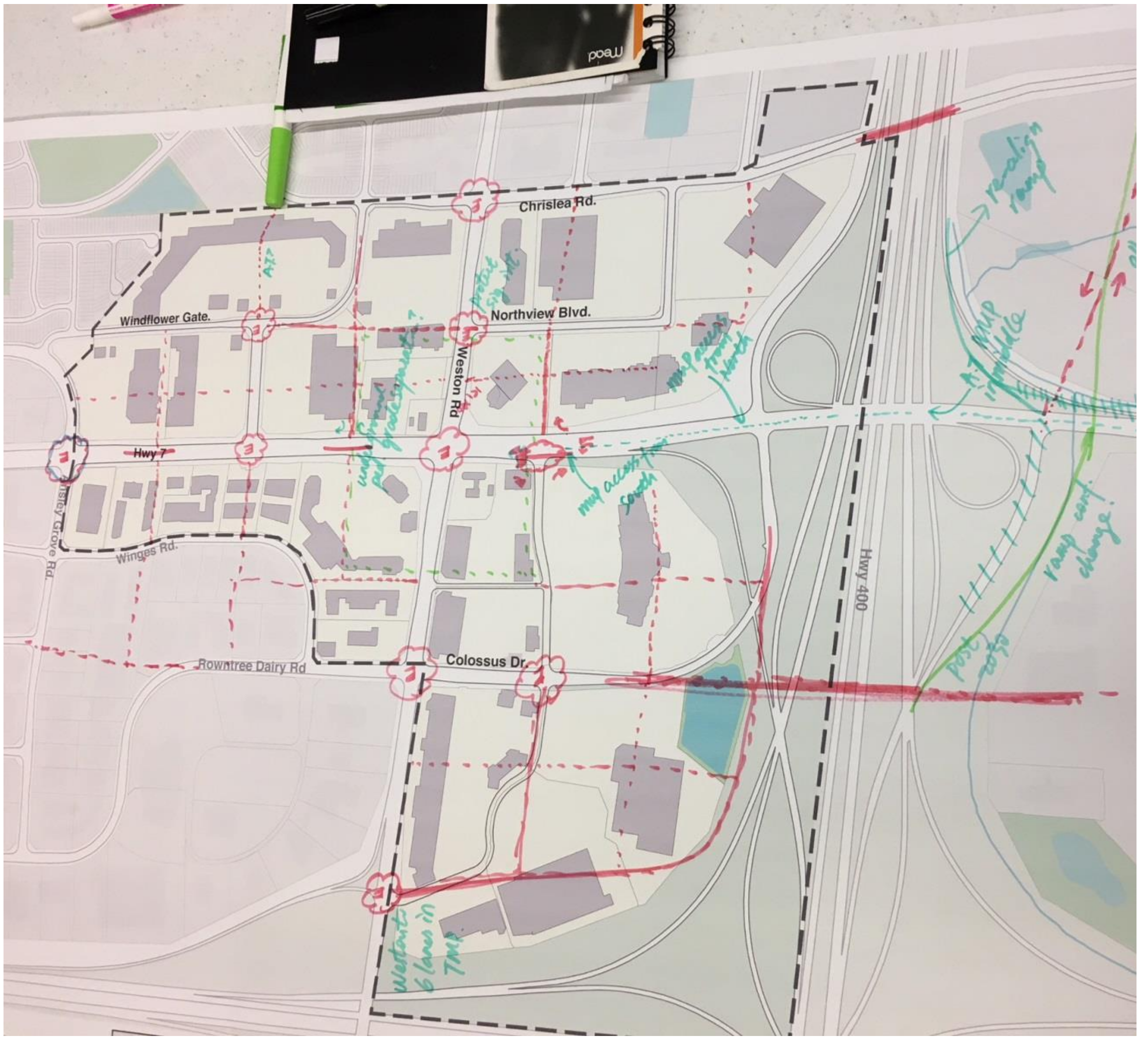
4.1 Creation of a Grid Street Network

At present, the Weston 7 Secondary Plan study area street network is characterized by very large blocks bounded by arterial and collector roads with extensive surface parking lots. This built form encourages driving by requiring pedestrians to walk longer distances to reach their destinations, often across unfriendly environment or informal paths such as surface parking lots. It also reduces choices for all modes, funneling traffic into a discontinuous hierarchy of a few roads, rather than a continuous network.

The expected redevelopment of the study area offers an opportunity to break up the existing “superblock” pattern, establishing a finer-grained street network with a walkable block structure. Increasing the grid network density would increase the number of options available to all modes, add road capacity to the network, balance mobility choices for walking and cycling trips within the study area due to improved connections across the land uses, and increase the pedestrian catchment area to vivaNext BRT stations.

A stakeholder workshop was held at the outset of this study where attendees brainstormed a preliminary street network for consideration in future phases of this study. The map is shown in **Figure 4-1**.

Figure 4-1: Preliminary Street Network from the Stakeholder Workshp



4.2 A Transportation Network for All Mobility Users

The existing transportation network is designed to accommodate vehicles. As a result, the ROW for various roads were allocated to primaries for vehicles and lacks facilities to accommodate other modes of transportation, such as walking and biking. A large portion of the land use is parking, again for the purpose of accommodating access to retail stores through driving. Streets in the study area do not fulfill their vital role as public spaces to enhance the environment and community.

There is a need to create a Complete Street network in the study area to balance he needs of pedestrians, cyclists, transit users, drivers, and goods movement. Many guidelines provide recommendations on how to build a complete street, such as the National Association of City Transportation Officials (NACTO) Guidelines and the Ontario Traffic Manual (OTM) Book 15—Pedestrian Crossing Facilities and Book 18—Cycling Facilities. They can provide guidance in the redesign of the existing street network to improve the comfort and safety of the road system and to provide road capacity for all modes of travel.

In addition, pedestrian and cycling only connections can be created to improve the accessibility and connectivity of the study area. Pedestrian crossing should be improved, especially at Weston Road and Highway 7, as they are the major barriers for pedestrians to access the study area. It can be done through redesigning the existing pedestrian crossings or adding new dedicated pedestrian crossings at necessary locations.

There is also a need to improve roadway connections at specific areas, such as on-ramps and off-ramps to provincial highways. The use of parking lot should be reviewed as well to determine options to provide better accessibility and connectivity for all modes of travel.

The transportation network will have to take into account the area's ongoing role as a retail hub, the needs of pedestrians and cyclists accessing vivaNext BRT and VMC subway station from areas, future residential densification, and truck traffic through and within the study area, particularly to light industrial sites to the southwest of the study area and to the north of the study area. Future phases of the study should take these mobility needs and priorities into account when making recommendations, while recognizing streets' roles in placemaking and prosperity.

4.3 Improve Safety for All Modes of Travel

Safety can be improved for all modes of travel in the study area. As mentioned in Section 3.3.4, the intersection at Highway 7 and Weston Road has been consistently ranked as one of the highest collision intersections in York Region. It is recognized that safety may be improved for this intersection after the reconstruction of Highway 7. This should be considered in late phases of the study.

As mentioned earlier, with a complete street network and better pedestrian connections at highways, the safety will be improved for vulnerable users such as pedestrians and cyclists.

More specifically, as mentioned in **Section 3.6.1**, safety challenges exist where cyclists and pedestrians must traverse Highway 400 and Highway 407 ETR interchanges. However, with the Highway 7 West vivaNext project is planning to implement a median multi-use trail between Famous Avenue towards the VMC, and this will eliminate pedestrian and cyclist conflicts at the free-flow on-ramps. The issue remains however at the Highway 407 ETR ramps however, and solutions to allow pedestrians and cyclists to traverse these ramps safely should be explored in later phases of this study.

4.4 New Innovative Smart Mobility Plan and TDM Measures

The Smart Commute program has demonstrated successful shifts in mobility behaviour away from the single occupant vehicle. This Secondary Plan has the opportunity to encourage or require the program for developments in the study area and tailored it to the needs of local businesses and residents. Existing smart mobility technology (such as Uber / Lyft) and car share programs for trips during the day could also be used to shift travel behaviour away from single-occupancy vehicles to other modes.

Emerging technologies and increased sustainability awareness are pushing the population towards non-traditional travel behaviours via shared and pay-per-use economy, such as car-sharing, ride-sharing, and bike-sharing. They can be facilitated by City policies, initiatives, and infrastructure by creating designated, comfortable waiting areas to find a bike-share rack, car-share vehicle, or wait for a ride-share driver. Such infrastructure has the potential to address the “first and last mile” problem via a one-stop service point for multimodal systems called “EcoMobility hubs”[7] [8]. An illustration of an EcoMobility hub is provided in **Figure 4-2**, which shows a large scale hub incorporating multiple systems. These hubs may also be smaller scale, such as an on-street car-share station or an integrated bike share and bus stop. These measures can improve the transit mode share in the study area and help achieve the targets indicated in York Region and City of Vaughan OP.

Figure 4-2: EcoMobility Hub Concept

Source: multi mobility, Sophia von Berg, 2014

4.5 Increase Sustainable Modal Share

The VMC subway station was opened in December 2017, and the vivaNext Woodbridge is scheduled to open in 2019 and includes two stops in the study area: Weston Road and Ansley Grove Road. These critical higher order transit investments provide the spine of a sustainable transportation system. Further to the policy direction to increase transit mode share in the study area to meet the York Region and City of Vaughan Official Plan targets of 40-50% in the study area, the key opportunity in the Weston- Secondary Plan

[7] Karim D. M., Innovative Mobility Master Plan: Connecting Multimodal Systems with Smart Technologies, Disrupting Mobility Conference, MIT Media Lab, Cambridge, USA, November 11~13, 2015.

[8] Karim D. M., Creating an Innovative Mobility Ecosystem for Urban Planning Areas, Disrupting Mobility - Impacts of Sharing Economy and Innovative Transportation on Cities, Springer Book, Lectures in Mobility, ISBN: 978-3-319-51601-1, pages 21-47, 2017.

is to develop a land use and mobility plan which maximizes connectivity to the Major Transit Station Areas within and adjacent to the study area.

As mentioned in **Section 3.5.2**, multi-use path and bike lanes are planned on Highway 7 as part of the VivaNext Plan, and bike lanes are planned on Weston Road and collector roads such as Chrislea Road and Colossus Drive. This will bring better connections for people to access the study area and transit stations in the area.

According to the pedestrian walkshed analysis in **Section 3.6.3**, all roads in the study area are included as part of the 500 metres that people are willing to walk to a higher order transit stop. As a result, pedestrian infrastructure should be provided or improved on all roads in the study area, especially those with lower PLOS scores as seen in **Section 3.6.2**. Pedestrian network improvements have the dual role of increasing the attractiveness of transit as a travel option through improved pedestrian connections from transit stops to local businesses.

With these opportunities in mind, the land use and built form alternatives to be explored in later phases of this study will need to consider significant shifts in transit and non-auto modal share in line with the Region and City policy goals.

4.6 Optimize the Existing Road Network

The existing road network should be optimized including improved traffic signal coordination along Weston Road between Northview and Highway 7 intersection, as well as coordination at adjacent intersections, review of turn lane requirements, queue jump lanes.

4.7 Consider Partial Ramp Access at Portage Parkway

One of the keys to unlocking the growth potential of the study area not only for Weston 7 but also for the VMC, is to provide alternate access to Highway 400. Highway 7 is extremely congested at Weston Road today, and providing additional options to vehicular traffic will significantly improve congestion in the study area. While it is recognized that MTO has concerns about interchange spacing, future phases of this study should explore the potential opportunities to provide an alternative Highway 400 access to Portage Parkway.

4.8 Extend Portage Parkway / Chrislea Road west of Weston Road

A more direct connection back to Highway 7 from Portage Parkway / Chrislea Road should be considered west of Weston Road. Right now, there is access via Fieldstone Drive, Windflower Gate and Ansley Grove Road, but the route is already congested with multiple turns and does not provide a feasible through-route. Through development however as lands become available, the possibility of reconstructing the roadway along the north-western boundary of the study area should be strongly considered. This through-route will prioritize movements into the nearby residential neighbourhoods, which should be restructured as development proceeds.

5 Draft Problem and Opportunity Statement

The Weston 7 Secondary Plan study area was planned and built for cars and is characterized by large blocks and low-rise buildings set-back and separated from streets by surface parking. Streets are wide with a lack of connectivity and no formal cycling facilities within the Secondary Plan Area.

With the opening of the VMC subway station and the planned vivaNext transitway on Highway 7, there is an opportunity to renew the study area with the following measures:

1. Creation of a grid street network;
2. A transportation network for all mobility users;
3. Improving safety for all modes of travel;
4. New innovative smart mobility plan and TDM measures;
5. Increase sustainable modal share;
6. Optimize the existing road network;
7. Consider partial ramp access at Portage Parkway; and
8. Extend Portage Parkway / Chrislea Road west of Weston Road.

Appendix A: Multimodal Level of Service (MMLOS) Methodology

Pedestrian Level of Service: Segments

Sidewalk Width (m)	Boulevard Width (m)	Motor Vehicle Traffic Volume (AADT)	Presence of On- street Parking	Segment PLOS Operating Speed (km/h) ≤30	 >30 or 50	 >50 or 60	 >60[1]
2.0 or more	> 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	B	N/A
			No	A	B	C	D
	0.5 to 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	C	N/A
			No	A	C	D	E
	0	≤ 3000	NA	A	B	C	D
		> 3000	Yes	B	B	D	N/A
			No	B	C	E	F
1.8	> 2	≤ 3000	N/A	A	A	A	B
		> 3000	Yes	A	B	C	N/A
			No	A	C	D	E
	0.5 to 2	≤ 3000	N/A	A	B	B	D
		> 3000	Yes	A	C	C	N/A
			No	B	C	E	E
	0	≤ 3000	N/A	A	B	C	D
		> 3000	Yes	B	C	D	N/A
			No	C	D	F	F
1.5	> 2	≤ 3000	N/A	C	C	C	C
		> 3000	Yes	C	C	D	N/A
			No	C	D	E	E
	0.5 to 2	≤ 3000	N/A	C	C	C	D
		> 3000	Yes	C	C	D	N/A
			No	D	E	E	E
	0	N/A		D	E	F[2]	F[2]
<1.5	N/A			F[3]	F[3]	F[3]	F[3]
No sidewalk	N/A			C[4]	F[3]	F[3]	F[3]

Source: City of Ottawa's Multimodal Analysis Guideline

Pedestrian Level of Service: Intersections

The level of service for pedestrians is determined through a points system. The total number of points from tables 5.1 to 5.4 determine the level of service of the intersection for the pedestrians.

5.1 Crossing Distance & Conditions		
Total travel lanes crossed	No median	With Median (>2.4m)
2	120	120
3	105	105
4	88	90
5	72	75
6	55	60
7	39	45
8	23	30
9	6	15
10	-10	0
Island Refuge	Points	
No	-4	
Yes	0	

5.2 Signal Phasing & Timing Features	
Left turn conflict	Points
Permissive	-8
Protected/permissive	-8
Protected	0
No left turn/prohibited	0
Right turn conflict ("Right_turns")	Points
Permissive or yield control	-5
Protected/permissive	-5
Protected	0
No right turn	0
Right turns on red ("RTOR")	Points
RTOR allowed	-3
RTOR prohibited at certain time(s)	-2
RTOR prohibited	0
Leading ped interval? ("LPI")	Points
No	-2
Yes	0

Source: City of Ottawa's Multimodal Analysis Guideline

5.3 Corner Radius	
Corner radius	Points
Greater than 25m	-9
> 15m to 25m	-8
> 10m to 15m	-6
> 5m to 10m	-5
> 3m to 5m	-4
Less than/equal to 3m	-3
No right turn	0
Right turn channel with receiving	-3
Right turn "smart channel"	2

5.4 Crosswalk Treatment	
Crosswalk treatment	Points
Standard transverse markings	-7
Textured/coloured pavement	-4
Zebra stripe hi-vis markings	-4
Raised crosswalk	0

Pedestrian Exposure to Traffic LOS	
Points threshold	LOS
≥90	A
≥75	B
≥60	C
≥45	D
≥30	E
<30	F

Source: City of Ottawa's Multimodal Analysis Guideline

Bicycle Level of Service: Segments

Type of Bikeway		LOS
Physically Separated Bikeway (cycle tracks, protected bike lanes and multi-use paths). Physical separation refers to, but is not limited to, curbs, raised medians, bollards and parking lanes (adjacent to the bike lane along the travelled way i.e. not curbside).		A
Bike Lanes Not Adjacent Parking Lane - Select Worst Scoring Criteria		
No. of Travel Lanes	1 travel lane in each direction	A
	2 travel lanes in each direction separated by a raised median	B
	2 travel lanes in each direction without a separating median	C
	More than 2 travel lanes in each direction	F
Bike Lane Width	> 1.8 m wide bike lane (includes marked buffer and paved gutter width)	A
	≥1.5 m to <1.8 m wide bike lane (includes marked buffer and paved gutter width)	B
	≥1.2 m to <1.5 m wide bike lane (includes marked buffer and paved gutter width)	C
Operating Speed	≤ 50 km/h operating speed	A
	60 km/h operating speed	C
	> 70 km/h operating speed	E
Bike lane blockage (commercial areas)	Rare	A
	Frequent	C
Bike Lanes Adjacent to curbside Parking Lane - Select Worst Scoring Criteria		
No. of Travel Lanes	1 travel lane in each direction	A
	2 or more travel lanes in each direction	C
Bike Lane Width	4.5 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	A
	4.25 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	B
	≤ 4.0 m wide bike lane plus parking lane (includes marked buffer and paved gutter width)	C
Operating Speed	< 40 km/h operating speed	A
	50 km/h operating speed	B
	60 km/h operating speed	D
	> 70 km/h operating speed	F
Bike lane blockage (commercial areas)	Rare	A
	Frequent	C
Mixed Traffic		
No. of Travel Lanes and Operating	2 travel lanes; ≤ 40 km/h; no marked centerline or classified as residential	A
	2 to 3 travel lanes; ≤ 40 km/h	B
	2 travel lanes; 50 km/h; no marked centerline or classified as residential	B
	2 to 3 travel lanes; 50 km/h	D
	4 to 5 travel lanes; ≤ 40 km/h	D
	4 to 5 travel lanes; ≥ 50 km/h	E

Source: City of Ottawa's Multimodal Analysis Guideline

	6 or more travel lanes; ≤ 40 km/h	E
	≥ 60 km/h	F
Unsignalized Crossing along Route: no median refuge		
No. of Travel Lanes on Side Street	3 or less lanes being crossed; ≤ 40 km/h	A
	4 to 5 lanes being crossed; ≤ 40 km/h	B
	3 or less lanes being crossed; 50 km/h	B
	4 to 5 lanes being crossed; 50 km/h	C
	3 or less lanes being crossed; 60 km/h	C
	4 to 5 lanes being crossed; 60 km/h	D
	6 or more lanes being crossed; ≤ 40 km/h	E
	3 or less lanes being crossed; ≥ 65 km/h	E
	6 or more lanes being crossed; ≥ 50 km/h	F
	4 to 5 lanes being crossed; ≥ 65 km/h	F
Unsignalized Crossing along Route: with median refuge (> 1.8 m wide)		
No. of Travel Lanes on Side Street	5 or less lanes being crossed; ≤ 40 km/h	A
	3 or less lanes being crossed; 50 km/h	A
	6 or more lanes being crossed; ≤ 40 km/h	B
	4 to 5 lanes being crossed; 50 km/h	B
	3 or less lanes being crossed; 60 km/h	B
	6 or more lanes being crossed; 50 km/h	C
	4 to 5 lanes being crossed; 60 km/h	C
	3 or less lanes being crossed; ≥ 65 km/h	D
	6 or more lanes being crossed; 60 km/h	E
	4 to 5 lanes being crossed; ≥ 65 km/h	E
	6 or more lanes being crossed; ≥ 65 km/h	F

Source: City of Ottawa's Multimodal Analysis Guideline

Bicycle Level of Service: Intersections

Bikeway and Intersection Type		
Bike Lanes or higher order facility on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	No impact on LTS (as long as cycling facility remains to the right of any turn lane - otherwise see pocket bike lanes below)	A
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box; ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	C
	1 lane crossed, 50 km/h	C
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	E
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F
Pocket Bike Lanes on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	Right-turn lane introduced to the right of the bike lane and ≤ 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	B
	Right-turn lane introduced to the right of the bike lane and > 50 m long, turning speed ≤ 30 km/h (based on curb radii and angle of intersection)	D
	Bike lane shifts to the left of the right-turn lane, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	D
	Right-turn lane with any other configurations	F
	Dual right-turn lanes (shared or exclusive)	F
Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box; ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	C
	1 lane crossed, 50 km/h	C
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	E
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F
Mixed Traffic on a Signalized Intersection Approach		
Right-turn Lane and Turning Speed of Motorists	Right-turn lane 25 to 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection)	D
	Right-turn lane 25 to 50 m long, turning speed > 25 km/h (based on curb radii and angle of intersection)	E
	Right-turn lane longer than 50 m	F
	Dual right-turn lanes (shared or exclusive)	F

Source: City of Ottawa's Multimodal Analysis Guideline

Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure)	Two-stage, left-turn bike box; ≤ 50 km/h	A
	No lane crossed, ≤ 50 km/h	B
	1 lane crossed, ≤ 40 km/h	B
	No lane crossed, ≥ 60 km/h	D
	1 lane crossed, 50 km/h	D
	2 or more lanes crossed, ≤ 40 km/h	D
	1 lane crossed, ≥ 60 km/h	F
	2 or more lanes crossed, ≥ 50 km/h	F
	All other single left-turn lane configurations	F
	Dual left-turn lanes (shared or exclusive)	F

Source: City of Ottawa’s Multimodal Analysis Guideline

Appendix B: Multimodal Level of Service (MMLOS) Results

Segment BLOS - Results

Weston Road - From Hwy 407 to Fieldstone Drive

From	Highway 407	Famous Ave	Petsmart access	Collossus Dr	Woodbridge Plaza Access	Hwy 7	Northview Blvd
To	Famous Ave	Petsmart access	Collossus Dr	Woodbridge Plaza Access	Hwy 7	Northview Blvd	Fieldstone Dr
Segment BLOS	**Segment 1**	**Segment 2**	**Segment 3**	**Segment 4**	**Segment 5**	**Segment 6**	**Segment 7**
Bikeway Type*	4	4	4	4	4	4	4
No. Travel Lanes**	6	6	6	6	6	6	6
Bike Lane width (if applicable)	NA	NA	NA	NA	NA	NA	NA
Operating Speed (kph)	60	60	60	60	60	60	60
Bike Lane Bolckage (if applicable)	NA	NA	NA	NA	NA	NA	NA
LOS	F	F	F	F	F	F	F

	From	To	LOS
Segment 1	Highway 407	Famous Ave	F
Segment 2	Famous Ave	Petsmart access	F
Segment 3	Petsmart access	Collossus Dr	F
Segment 4	Collossus Dr	Woodbridge Plaza Access	F
Segment 5	Woodbridge Plaza Access	Hwy 7	F
Segment 6	Hwy 7	Northview Blvd	F
Segment 7	Northview Blvd	Fieldstone Dr	F

Highway 7 - From Whitmore Road to Hwy 400

From	Whitmore Rd	Nova Star Dr	Weston Rd	Famous Ave	Collosus Dr
To	Nova Star Dr	Weston Rd	Famous Ave	Collosus Dr	Hwy 400
Segment BLOS	**Segment 1**	**Segment 2**	**Segment 3**	**Segment 4**	**Segment 5**
Bikeway Type*	4	4	4	4	4
No. Travel Lanes**	6	6	6	6	6
Bike Lane width (if applicable)	NA	NA	NA	NA	NA
Operating Speed (kph)	70	70	70	70	70
Bike Lane Bolckage (if applicable)	NA	NA	NA	NA	NA
LOS	F	F	F	F	F

	From	To	LOS
Segment 1	Whitmore Rd	Nova Star Dr	F
Segment 2	Nova Star Dr	Weston Rd	F
Segment 3	Weston Rd	Famous Ave	F
Segment 4	Famous Ave	Collosus Dr	F
Segment 5	Collosus Dr	Hwy 400	F

Windflower Gate - From Ansley Grove Rd to Fieldstone Dr

From	Ansley Grove Rd	100m west of nova star
To	100m west of nova star	Fieldstone Dr
Segment BLOS	**Segment 1**	**Segment 2**
Bikeway Type*	4	4
No. Travel Lanes**	2	2
Bike Lane width (if applicable)	NA	NA
Operating Speed (kph)	50	50
Bike Lane Bolckage (if applicable)	NA	NA
LOS	B	D
	no marked centreline	marked centreline

Assumed speed of 50 km/hr for private roads

	From	To	LOS
Segment 1	Ansley Grove Rd	Fieldstone Dr	B

Nova Star Drive- From Highway 7 to Windflower Gate

From	Highway 7
To	Windflower Gate
Segment BLOS	**Segment 1**
Bikeway Type*	4
No. Travel Lanes**	4
Bike Lane width (if applicable)	NA
Operating Speed (kph)	50
Bike Lane Bolckage (if applicable)	NA
LOS	E

	From	To	LOS
Segment 1	Highway 7	Windflower Gate	E

Northview Blvd - From Weston Road to Chrislea Road

From	Weston Road	Goodlife Finess Access
To	Goodlife Finess Access	Chrislea Road
Segment BLOS	**Segment 1**	**Segment 2**
Bikeway Type*	4	4
No. Travel Lanes**	2	2
Bike Lane width (if applicable)	NA	NA
Operating Speed (kph)	50	50
Bike Lane Bolckage (if applicable)	NA	NA
LOS	D	D

	From	To	LOS
Segment 1	Weston Road	Goodlife Finess Access	D
Segment 2	Goodlife Finess Access	Chrislea Road	D

Famous Avenue - From Weston Road to Hwy 7

From	Weston Rd	Costco Access	Collosus Dr
To	Costco Access	Collosus Dr	Highway 7
Segment BLOS	**Segment 1**	**Segment 2**	**Segment 3**
Bikeway Type*	4	4	4
No. Travel Lanes**	4	3	3
Bike Lane width (if applicable)	NA	NA	NA
Operating Speed (kph)	50	50	50
Bike Lane Bolckage (if applicable)	NA	NA	
LOS	E	D	D

	From	To	LOS
Segment 1	Weston Rd	Costco Access	E
Segment 2	Costco Access	Collosus Dr	D
Segment 3	Collosus Dr	Highway 7	D

Winges Road - From Whitmore Road to Rowntree

From	Whitmore Rd
To	Rowntree
Segment BLOS	**Segment 1**
Bikeway Type*	4
No. Travel Lanes**	2
Bike Lane width (if applicable)	NA
Operating Speed (kph)	50
Bike Lane Bolckage (if applicable)	NA
LOS	D

	From	To	LOS
Segment 1	Whitmore Rd	Rowntree	D

Whitmore Road - From Windflower Gate to Winges Road

From	Windflower Gate	Highway 7
To	Highway 7	Winges Rd
Segment BLOS	**Segment 1**	**Segment 2**
Bikeway Type*	4	4
No. Travel Lanes**	5	4
Bike Lane width (if applicable)	NA	NA
Operating Speed (kph)	60	60
Bike Lane Bolckage (if applicable)	NA	NA
LOS	E	E

	From	To	LOS
Segment 1	Windflower Gate	Highway 7	E
Segment 2	Highway 7	Winges Rd	E

Colossus Drive - From Winges Road to Hwy 7

From	Winges Rd	Weston Rd	Costco Access
To	Weston Rd	Costco Access	Hwy 7
Segment BLOS	**Segment 1**	**Segment 2**	**Segment 3**
Bikeway Type*	4	4	4
No. Travel Lanes**	5	4	4
Bike Lane width (if applicable)	NA	NA	NA
Operating Speed (kph)	60	60	60
Bike Lane Bolckage (if applicable)	NA	NA	NA
LOS	E	E	E

major collectors assumed 60km/hr

	From	To	LOS
Segment 1	Winges Rd	Weston Rd	E
Segment 2	Weston Rd	Costco Access	E
Segment 3	Costco Access	Hwy 7	E

Fieldstone Drive - From Windflower Gate to Hwy 400

From	Windflower Gate	Weston Rd	Chrislea Rd
To	Weston Rd	Chrislea Rd	Hwy 400
Segment BLOS	**Segment 1**	**Segment 2**	**Segment 3**
Bikeway Type*	4	4	4
No. Travel Lanes**	5	5	6
Bike Lane width (if applicable)	NA	NA	NA
Operating Speed (kph)	50	60	60
Bike Lane Bolckage (if applicable)	NA	NA	NA
LOS	E	E	F

	From	To	LOS
Segment 1	Windflower Gate	Weston Rd	E
Segment 2	Weston Rd	Chrislea Rd	E
Segment 3	Chrislea Rd	Hwy 400	F

INTERSECTION BLOS - RESULTS

Score	Letter Grade
5	A
4	B
3	C
2	D
1	E
0	F

V (MPH)	E	F	R (FT)
10	0	0.38	18
15	0	0.32	47
20	0	0.27	99
25	0	0.22	174

NOTES

Round down to account for worst case

If radius is larger than 14 m, then turning speed > 25km/hr

Any intersections with RT > 50m and more than 2 lanes to cross turning --> BLOS F

Weston Road

Intersection (Signalized)		Highway 7				
		NORTH	SOUTH	EAST	WEST	
BLOS	Right turn lane length	>50m	>50m	>50m	>50m	
	Turning Speed (based on curb radii)	>25km/h	>25km/h	>25km/h	>25km/h	
	Dual right-turn lanes?	No	No	No	No	
	Right Turn LOS	F	F	F	F	
	Operating Speed	60 km/h	60 km/h	70 km/h	70 km/h	
	Number of Lanes Crossed	2 or more	2 or more	2 or more	2 or more	
	Two-stage, left-turn bike box?	No	No	No	No	
	Dual left-turn lanes (share or exclusive)?	No	No	No	No	
	Left Turn LOS	F	F	F	F	
	Overall Approach LOS	F	F	F	F	0
	LEVEL OF SERVICE (average)	F				

Weston Road

Intersection (Signalized)		Chrislea Rd / Fieldstone				
		NORTH	SOUTH	EAST	WEST	
BLOS	Right turn lane length	>50m	>50m	None	None	
	Turning Speed (based on curb radii)	> 25 km/h	=<25km/h	> 25 km/h	=<25km/h	
	Dual right-turn lanes?	No	No	No	No	
	Right Turn LOS	F	F	D	D	
	Operating Speed	60 km/h	60 km/h	50 km/h	50 km/h	
	Number of Lanes Crossed	2 or more	2 or more	2 or more	2 or more	
	Two-stage, left-turn bike box?	No	No	No	No	
	Dual left-turn lanes (share or exclusive)?	No	No	No	No	
	Left Turn LOS	F	F	F	F	
	Overall Approach LOS	F	F	E	E	1
	LEVEL OF SERVICE (average)	E				

Collossus Dr

Intersection (Signalized)		Famous Ave			
		NORTH	SOUTH	EAST	WEST
BLOS	Right turn lane length	None	None	None	None
	Turning Speed (based on curb radii)	=<25km/h	=<25km/h	=<25km/h	=<25km/h
	Dual right-turn lanes?	No	No	No	No
	Right Turn LOS	D	D	D	D
	Operating Speed	60 km/h	60 km/h	60 km/h	60 km/h
	Number of Lanes Crossed	1 lane	1 lane	1 lane	1 lane
	Two-stage, left-turn bike box?	No	No	No	No
	Dual left-turn lanes (share or exclusive)?	No	No	No	No
	Left Turn LOS	F	F	F	F
	Overall Approach LOS	E	E	E	E
	LEVEL OF SERVICE (average)	**E**			

Weston Road

Intersection (Signalized)		Colossus Dr			
		NORTH	SOUTH	EAST	WEST
BLOS	Right turn lane length	>50m	>50m	>50m	None
	Turning Speed (based on curb radii)	> 25 km/h	>25km/h	> 25 km/h	>25km/h
	Dual right-turn lanes?	No	No	No	No
	Right Turn LOS	F	F	F	E
	Operating Speed	60 km/h	60 km/h	60 km/h	60 km/h
	Number of Lanes Crossed	2 or more	2 or more	2 or more	2 or more
	Two-stage, left-turn bike box?	No	No	No	No
	Dual left-turn lanes (share or exclusive)?	No	No	No	No
	Left Turn LOS	F	F	F	F
	Overall Approach LOS	F	F	F	F
	LEVEL OF SERVICE (average)	**F**			

Highway 7

Intersection (Signalized)		Colossus Dr			
		NORTH	SOUTH	EAST	WEST
BLOS	Right turn lane length	>50m	None	None	None
	Turning Speed (based on curb radii)	> 25 km/h	>25km/h	> 25 km/h	>25km/h
	Dual right-turn lanes?	No	No	No	No
	Right Turn LOS	F	F	F	E
	Operating Speed	60 km/h	60 km/h	70 km/h	70 km/h
	Number of Lanes Crossed	2 or more	None	2 or more	2 or more
	Two-stage, left-turn bike box?	No	No	No	No
	Dual left-turn lanes (share or exclusive)?	No	No	No	No
	Left Turn LOS	F	D	F	F
	Overall Approach LOS	F	E	F	F
	LEVEL OF SERVICE (average)	**F**			

Highway 7

Intersection (Signalized)		Whitmore Rd			
		NORTH	SOUTH	EAST	WEST
BLOS	Right turn lane length	25m to 50m	25m to 50m	>50m	>50m
	Turning Speed (based on curb radii)	> 25 km/h	>25km/h	> 25 km/h	>25km/h
	Dual right-turn lanes?	No	No	No	No
	Right Turn LOS	F	F	F	F
	Operating Speed	60 km/h	60 km/h	70 km/h	70 km/h
	Number of Lanes Crossed	2 or more	2 or more	2 or more	2 or more
	Two-stage, left-turn bike box?	No	No	No	No
	Dual left-turn lanes (share or exclusive)?	No	No	No	No
	Left Turn LOS	F	F	F	F
	Overall Approach LOS	F	F	F	F
	LEVEL OF SERVICE (average)	F			

Highway 7

Intersection (Signalized)		Nova Star Dr			
		NORTH	SOUTH	EAST	WEST
BLOS	Right turn lane length	None	None	>50m	>50m
	Turning Speed (based on curb radii)	=<25km/h	=<25km/h	=<25km/h	=<25km/h
	Dual right-turn lanes?	No	No	No	No
	Right Turn LOS	D	D	F	F
	Operating Speed	50 km/h	50 km/h	70 km/h	70 km/h
	Number of Lanes Crossed	2 or more	None	2 or more	2 or more
	Two-stage, left-turn bike box?	No	No	No	No
	Dual left-turn lanes (share or exclusive)?	No	No	No	No
	Left Turn LOS	F	B	F	F
	Overall Approach LOS	E	C	F	F 1
	LEVEL OF SERVICE (average)	E			

Nova Star

Intersection (Signalized)		Windflower Gate			
		NORTH	SOUTH	EAST	WEST
BLOS	Right turn lane length	None	None	None	None
	Turning Speed (based on curb radii)	>25km/h	>25km/h	>25km/h	>25km/h
	Dual right-turn lanes?	No	No	No	No
	Right Turn LOS	E	E	E	E
	Operating Speed	50 km/h	50 km/h	50 km/h	50 km/h
	Number of Lanes Crossed	1 lane	1 lane	None	None
	Two-stage, left-turn bike box?	No	No	No	No
	Dual left-turn lanes (share or exclusive)?	No	No	No	No
	Left Turn LOS	D	D	B	B
	Overall Approach LOS	E	E	C	C 2
	LEVEL OF SERVICE (average)	D			

Winges Road

Intersection (Signalized)		Rowntree Dairy Road				
		NORTH	SOUTH	EAST	WEST	
BLOS	Right turn lane length	None	None	None	None	
	Turning Speed (based on curb radii)	>25km/h	>25km/h	>25km/h	>25km/h	
	Dual right-turn lanes?	No	No	No	No	
	Right Turn LOS	E	E	E	E	
	Operating Speed	50 km/h	50 km/h	60 km/h	60 km/h	
	Number of Lanes Crossed	1 lane	None	2 or more	1 lane	
	Two-stage, left-turn bike box?	No	No	No	No	
	Dual left-turn lanes (share or exclusive)?	No	No	No	No	
	Left Turn LOS	D	B	F	F	
	Overall Approach LOS	E	C	F	F	1
	LEVEL OF SERVICE (average)	E				

Winges Road

Intersection (Signalized)		Whitmore Road				
		NORTH	SOUTH	EAST	WEST	
BLOS	Right turn lane length	None	None	None	None	
	Turning Speed (based on curb radii)	>25km/h	>25km/h	>25km/h	>25km/h	
	Dual right-turn lanes?	No	No	No	No	
	Right Turn LOS	E	E	E	E	
	Operating Speed	60 km/h	60 km/h	50 km/h	50 km/h	
	Number of Lanes Crossed	2 or more	2 or more	1 lane	1 lane	
	Two-stage, left-turn bike box?	No	No	No	No	
	Dual left-turn lanes (share or exclusive)?	No	No	No	No	
	Left Turn LOS	F	F	D	D	
	Overall Approach LOS	F	F	E	E	1
	LEVEL OF SERVICE (average)	E				

Windflower Gate

Intersection (Signalized)		Whitmore Road				
		NORTH	SOUTH	EAST	WEST	
BLOS	Right turn lane length	None	None	>50m	None	
	Turning Speed (based on curb radii)	>25km/h	>25km/h	>25km/h	>25km/h	
	Dual right-turn lanes?	No	No	No	No	
	Right Turn LOS	D	D	F	E	
	Operating Speed	50 km/h	50 km/h	60 km/h	60 km/h	
	Number of Lanes Crossed	None	None	2 or more	2 or more	
	Two-stage, left-turn bike box?	No	No	No	No	
	Dual left-turn lanes (share or exclusive)?	No	No	No	No	
	Left Turn LOS	B	B	F	F	
	Overall Approach LOS	C	C	F	F	2
	LEVEL OF SERVICE (average)	D				

Windflower Gate

Intersection (Signalized)		**Fieldstone Road**				
		NORTH	SOUTH	EAST	WEST	
BLOS	Right turn lane length	None	None	None	None	
	Turning Speed (based on curb radii)	=<25km/h	=<25km/h	=<25km/h	=<25km/h	
	Dual right-turn lanes?	No	No	No	No	
	Right Turn LOS	D	D	D	D	
	Operating Speed	50 km/h	50 km/h	50 km/h	50 km/h	
	Number of Lanes Crossed	None	None	None	None	
	Two-stage, left-turn bike box?	No	No	No	No	
	Dual left-turn lanes (share or exclusive)?	No	No	No	No	
	Left Turn LOS	B	B	B	B	
	Overall Approach LOS	C	C	C	C	3
	LEVEL OF SERVICE (average)	**C**				

Famous Ave

West is a highway on-ramp

Intersection (Signalized)		**Weston Road**				
		NORTH	SOUTH	EAST	WEST	
BLOS	Right turn lane length	None	>50m	>50m		
	Turning Speed (based on curb radii)	>25km/h	>25km/h	>25km/h		
	Dual right-turn lanes?	No	No	No		
	Right Turn LOS	D	F	F		
	Operating Speed	60 km/h	60 km/h	60 km/h		
	Number of Lanes Crossed	2 or more	2 or more	1 lane		
	Two-stage, left-turn bike box?	No	No	No		
	Dual left-turn lanes (share or exclusive)?	No	No	No		
	Left Turn LOS	F	F	F		
	Overall Approach LOS	E	F	F		0
	LEVEL OF SERVICE (average)	**F**				

Famous Ave

can't turn right from the north

Intersection (Signalized)		**Hwy 7**				
		NORTH	SOUTH	EAST	WEST	East approach is only eastbound
BLOS	Right turn lane length		None		>50m	West approach cant' turn left
	Turning Speed (based on curb radii)		>25km/h		>25km/h	
	Dual right-turn lanes?		No		No	
	Right Turn LOS		D		F	
	Operating Speed	70 km/h				
	Number of Lanes Crossed	1 lane				
	Two-stage, left-turn bike box?	No				
	Dual left-turn lanes (share or exclusive)?	No				
	Left Turn LOS	F				
	Overall Approach LOS	F	D		F	1
	LEVEL OF SERVICE (average)	**F**				

This option was penalized to account for accessibility issues. Cyclists cannot turn right and left from several approaches.

Segment PLOS - Results

Weston Road - From Hwy 407 to Fieldstone Drive

		Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Segment 7
	From	Highway 407	Famous Ave	Petsmart access	Collossus Dr	Woodbridge Plaza Access	Hwy 7	Northview Blvd
	To	Famous Ave	Petsmart access	Collossus Dr	Woodbridge Plaza Access	Hwy 7	Northview Blvd	Fieldstone Dr
Segment PLOS		**Segment 1**	**Segment 2**	**Segment 3**	**Segment 4**	**Segment 5**	**Segment 6**	**Segment 7**
West Side	Sidewalk Width	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Boulevard Width	3.7	2.4	4.6	4.6	2.1	0.4	3.3
	AADT	>3000	>3000	>3000	>3000	>3000	>3000	>3000
	Presence of on-street parking or other equivalent barrier **	No	No	No	No	No	No	No
	Operating Speed (km/h)	60	60	60	60	60	60	60
	LOS	E	E	D	D	E	F	E
East Side	Sidewalk Width	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Boulevard Width	3.5	2.3	1.5	2.4	2.4	1.8	4.5
	AADT	>3000	>3000	>3000	>3000	>3000	>3000	>3000
	Presence of on-street parking or other equivalent barrier **	No	No	No	No	No	No	No
	Operating Speed (km/h)	60	60	60	60	60	60	60
	LOS	E	E	E	E	E	E	D

Operating speed: 60 km/h

** A boulevard width of >= 4.5m is considered here to be an 'equivalent barrier'; this does not necessarily reflect the presence of parking or an actual barrier

	From	To	West Side	East Side
Segment 1	Highway 407	Famous Ave	E	E
Segment 2	Famous Ave	Petsmart access	E	E
Segment 3	Petsmart access	Collossus Dr	D	E
Segment 4	Collossus Dr	Woodbridge Plaza Access	D	E
Segment 5	Woodbridge Plaza Access	Hwy 7	E	E
Segment 6	Hwy 7	Northview Blvd	F	E
Segment 7	Northview Blvd	Fieldstone Dr	E	D

Highway 7 - From Whitmore Road to Hwy 400

		Segment 1	Segment 2	Segment 3	Segment 4	Segment 5
	From	Whitmore Rd	Nova Star Dr	Weston Rd	Famous Ave	Collosus Dr
	To	Nova Star Dr	Weston Rd	Famous Ave	Collosus Dr	Hwy 400
Segment PLOS		**Segment 1**	**Segment 2**	**Segment 3**	**Segment 4**	**Segment 5**
North Side	Sidewalk Width	1.5	1.5	2.5	2	2.2
	Boulevard Width	9.5	1.3	0	0.7	0
	AADT	>3000	>3000	>3000	>3000	>3000
	Presence of on-street parking or other equivalent barrier **	No	No	No	No	No
	Operating Speed (km/h)	70	70	70	70	70
	LOS	D	E	D	F	F
South Side	Sidewalk Width	2	2	1.5	2	2
	Boulevard Width	0	0	4.5	0	0
	AADT	>3000	>3000	>3000	>3000	>3000
	Presence of on-street parking or other equivalent barrier **	No	No	No	No	No
	Operating Speed (km/h)	70	70	70	70	70
	LOS	F	F	D	F	F

** A boulevard width of >= 4.5m is considered here to be an 'equivalent barrier'; this does not necessarily reflect the presence of parking or an actual barrier

	From	To	North	South
Segment 1	Whitmore Rd	Nova Star Dr	D	F
Segment 2	Nova Star Dr	Weston Rd	E	F
Segment 3	Weston Rd	Famous Ave	D	D
Segment 4	Famous Ave	Collosus Dr	F	F
Segment 5	Collosus Dr	Hwy 400	F	F

Windflower Gate - From Ansley Grove Rd to Fieldstone Dr

	From	Ansley Grove Rd	
	To	Fieldstone Dr	
Segment PLOS		**Segment 1**	
North / West Side	Sidewalk Width	1.5	
	Boulevard Width	2.5	
	AADT	<3000	
	Presence of on-street parking or other equivalent barrier **	No	
	Operating Speed (km/h)	50	Assumed speed of 50 km/hr for private roads
	LOS	C	
South / East Side	Sidewalk Width	1.5	
	Boulevard Width	2.3	
	AADT	<3000	
	Presence of on-street parking or other equivalent barrier **	No	
	Operating Speed (km/h)	50	Assumed speed of 50 km/hr for private roads
	LOS	C	

Note: the road characteristics within these bounds are very consistant over the road length

** A boulevard width of >= 4.5m is considered here to be an 'equivalent barrier'; this does not necessarily reflect the presence of parking or an actual barrier

	From	To	North	South
Segment 1	Ansley Grove Rd	Fieldstone Dr	C	C

Nova Star Drive- From Highway 7 to Windflower Gate

	From	Highway 7	
	To	Windflower Gate	
Segment PLOS		**Segment 1**	
West Side	Sidewalk Width	2	
	Boulevard Width	2.4	
	AADT	<3000	
	Presence of on-street parking or other equivalent barrier **	No	
	Operating Speed (km/h)	50	Assumed speed of 50 km/hr for private roads
	LOS	A	
East Side	Sidewalk Width	2	
	Boulevard Width	0.7	
	AADT	<3000	
	Presence of on-street parking or other equivalent barrier **	No	
	Operating Speed (km/h)	50	Assumed speed of 50 km/hr for private roads and minor collectors
	LOS	A	

** A boulevard width of >= 4.5m is considered here to be an 'equivalent barrier'; this does not necessarily reflect the presence of parking or an actual barrier

	From	To	West	East
Segment 1	Highway 7	Windflower Gate	A	A

Northview Blvd - From Weston Road to Chrislea Road

			Segment 1	Segment 2	
		From	Weston Road	Goodlife Finess Access	
		To	Goodlife Finess Access	Chrislea Road	
Segment PLOS			**Segment 1**	**Segment 2**	
North Side	Sidewalk Width		1.5	1.5	
	Boulevard Width		3.4	3.4	
	AADT		<3000	<3000	
	Presence of on-street parking or other equivalent barrier **		No	No	
	Operating Speed (km/h)		50	50	Assumed speed of 50 km/hr for private roads and minor collectors
	LOS		C	C	
South Side	Sidewalk Width		1.8	0	
	Boulevard Width		4	0	
	AADT		<3000	<3000	
	Presence of on-street parking or other equivalent barrier **		No	No	
	Operating Speed (km/h)		50	50	Assumed speed of 50 km/hr for private roads and minor collectors
	LOS		A	F	

** A boulevard width of >= 4.5m is considered here to be an 'equivalent barrier'; this does not necessarily reflect the presence of parking or an actual barrier

	From	To	North	South
Segment 1	Weston Road	Goodlife Finess Access	C	A
Segment 2	Goodlife Finess Access	Chrislea Road	C	F

Famous Avenue - From Weston Road to Hwy 7

			Segment 1	Segment 2	Segment 3	
		From	Weston Rd	Costco Access	Collosus Dr	
		To	Costco Access	Collosus Dr	Highway 7	
Segment PLOS			**Segment 1**	**Segment 2**	**Segment 3**	
North / West Side	Sidewalk Width		0	0	0	
	Boulevard Width		0	0	0	
	AADT		>3000	>3000	>3000	Assumed > 3000 to be conservative
	Presence of on-street parking or other equivalent barrier **		No	No	No	
	Operating Speed (km/h)		50	50	50	Assumed speed of 50 km/hr for private roads and minor collectors
	LOS		F	F	F	
South / East Side	Sidewalk Width		1.5	1.5	1.5	
	Boulevard Width		2	2.9	3	
	AADT		>3000	>3000	>3000	Assumed > 3000 to be conservative
	Presence of on-street parking or other equivalent barrier **		No	No	No	
	Operating Speed (km/h)		50	50	50	
	LOS		C	C	C	

** A boulevard width of >= 4.5m is considered here to be an 'equivalent barrier'; this does not necessarily reflect the presence of parking or an actual barrier

	From	To	North/West	South/East
Segment 1	Weston Rd	Costco Access	F	C
Segment 2	Costco Access	Collosus Dr	F	C
Segment 3	Collosus Dr	Highway 7	F	C

Collosus Drive - From Weston Road to Hwy 7

Segment PLOS		Segment 1*	Segment 2	Segment 3	
	From	Weston Rd	Famous Ave	140 m East of Costco far access	
	To	Famous Ave	140 m East of Costco far access	Hwy 7	
North / West Side	Sidewalk Width	1.5	1.5	0	
	Boulevard Width	3	2.5	0	
	AADT	>3000	>3000	>3000	TMC Diagram @ Collosus and Hwy 7
	Presence of on-street parking or other equivalent barrier **	No	No	No	
	Operating Speed (km/h)	60	60	60	major collectors assumed 60km/hr
	LOS	D	E	F	Segment 1 PLOS was elevated by a letter to account for the wide planted median that separa
South / East Side	Sidewalk Width	1.5	1.5	0	
	Boulevard Width	3	2.5	0	
	AADT	>3000	>3000	>3000	
	Presence of on-street parking or other equivalent barrier **	No	No	No	
	Operating Speed (km/h)	60	60	60	
	LOS	D	E	F	Segment 1 PLOS was elevated by a letter to account for the wide planted median that separa

** A boulevard width of >= 4.5m is considered here to be an 'equivalent barrier'; this does not necessarily reflect the presence of parking or an actual barrier

	From	To	North/West	South/East
Segment 1	Weston Rd	Famous Ave	D	D
Segment 2	Famous Ave	140 m East of Costco far access	E	E
Segment 2	0 m East of Costco far acce	Hwy 7	F	F

Rowntree Dairy Road- From Winges Road to Weston Road

Segment PLOS		Segment 1	
	From	Winges Rd	
	To	Weston Rd	
North Side	Sidewalk Width	1.5	
	Boulevard Width	4.5	
	AADT	>3000	
	Presence of on-street parking or other equivalent barrier **	No	
	Operating Speed (km/h)	60	major collectors assumed 60km/hr
	LOS	D	
South Side	Sidewalk Width	1.5	
	Boulevard Width	4.5	
	AADT	>3000	
	Presence of on-street parking or other equivalent barrier **	No	
	Operating Speed (km/h)	60	
	LOS	D	

** A boulevard width of >= 4.5m is considered here to be an 'equivalent barrier'; this does not necessarily reflect the presence of parking or an actual barrier

	From	To	North	South
Segment 1	Winges Rd	Weston Rd	D	D

Winges Road - From Whitmore Road to

Segment PLOS		Segment 1	
	From	Whitmore Road	
	To	Rowntree Dairy Road	
North/East Side	Sidewalk Width	1.5	
	Boulevard Width	3.5	
	AADT	>3000	
	Presence of on-street parking or other equivalent barrier **	No	
	Operating Speed (km/h)	50	Minor Collectors assumed 50km/hr
	LOS	C	
South / West Side	Sidewalk Width	0	
	Boulevard Width	0	
	AADT	>3000	
	Presence of on-street parking or other equivalent barrier **	No	
	Operating Speed (km/h)	50	Minor Collectors assumed 50km/hr
	LOS	F	

** A boulevard width of >= 4.5m is considered here to be an 'equivalent barrier'; this does not necessarily reflect the presence of parking or an actual barrier

	From	To	North/East	South/West
Segment 1	Whitmore Road	Rowntree Dairy Road	C	F

Fieldstone Drive - From Windflower Gat

		Segment 1	Segment 2	Segment 3	Segment 4	
	From	Windflower Gate	Weston Rd	Jevlan Dr	Chrislea Rd	
	To	Weston Rd	Jevlan Dr	Chrislea Rd	Hwy 400	
Segment PLOS		**Segment 1**	**Segment 2**	**Segment 3**	**Segment 4**	
North Side	Sidewalk Width	1.5	1.5	1.5	1.5	
	Boulevard Width	3	3	1.4	1.2	
	AADT	<3000	>3000	>3000	>3000	
	Presence of on-street parking or other equivalent barrier **	No	No	No	No	
	Operating Speed (km/h)	50	60	60	60	minor collectors assumed 50 km/hr, major collectors 60 km/hr
	LOS	C	E	E	E	
South Side	Sidewalk Width	1.5	1.5	1.5	1.5	
	Boulevard Width	3.5	3	1.4	1.2	
	AADT	<3000	>3000	>3000	>3000	
	Presence of on-street parking or other equivalent barrier **	No	No	No	No	
	Operating Speed (km/h)	50	60	60	60	
	LOS	C	E	E	E	

	From	To	North	South
Segment 1	Windflower Gate	Weston Rd	C	C
Segment 2	Weston Rd	Jevlan Dr	E	E
Segment 3	Jevlan Dr	Chrislea Rd	E	E
Segment 4	Chrislea Rd	Hwy 400	E	E

Whitmore Road - From Windflower Gate

		Segment 1	Segment 2	
	From	Windflower Gate	Hwy 7	
	To	Hwy 7	Winges Rd	
Segment PLOS		**Segment 1**	**Segment 2**	
East Side	Sidewalk Width	1.5	1.5	
	Boulevard Width	3.5	3	
	AADT	>3000	>3000	TMC
	Presence of on-street parking or other equivalent barrier **	No	No	
	Operating Speed (km/h)	60	60	major collectors 60 km/hr assumed
	LOS	E	E	
West Side	Sidewalk Width	1.5	1.5	
	Boulevard Width	3.5	3	
	AADT	>3000	>3000	TMC
	Presence of on-street parking or other equivalent barrier **	No	No	
	Operating Speed (km/h)	60	60	major collectors 60 km/hr assumed
	LOS	E	E	

	From	To	East	West
Segment 1	Windflower Gate	Hwy 7	E	E
Segment 2	Hwy 7	Winges Rd	E	E

Speed Assumptions

limits for their respective jurisdictions. The standards of legal speed limits set by TAC and other municipalities are compared to that of Vaughan in **Table 5.2.** The speed limits are generally based on the road classification. The higher the classification, the higher the recommended speed limits and vice versa. **Table 3.2** shows the minimum design speed for different road classes as specified in the TAC Geometric Design Guide.

Table 3.2 Minimum Design Speed of Different Road Classes as per TAC Guide

Road Classification	Minimum Design Speed, km/h	Vaughan Existing Design Speed	Recommendation Design Speed
Locals	30-50	50	60 (10 km/hr above the posted speed limit)
Collectors	50-80	50	80 (20 km/hr above the posted speed limit)
Minor Arterial	50-70	60	80 (20 km/hr above the posted speed limit)

The recommended design speed for Vaughan should be 10 km/hr above the typical posted speed limit (50 km/hr) for local road and 20 km/hr above the typical posted speed limit for collectors and minor arterials (60 km/hr) respectively. The City Vaughan can also add to TAC and Toronto's standards by adopting York Region's annual studies and review policy to confirm or adjust speed limits for optimum road safety. This process involves a number of considerations including: on-street measurement of speed, a review of collision, the physical features of the road, and the effect of the transitions of the speed limit from one zone to the next.

https://www.vaughan.ca/projects/projects_and_studies/transportation_master_plan/General%20Documents/Appendix%20J%20-%20Review%20of%20Transportation%20Policies%20and%20Road.pdf

PLOS Intersection - Results

Weston Road

Intersection	Famous Avenue			
	NORTH	SOUTH	EAST	WEST
Pedestrian				
Lanes	6		4	
Median	Yes		No	
Island Refuge	No		No	
Conflicting Left Turn	No left turn/prohibited		Protected/permissive	
Conflicting Right Turn	Permissive or yield control		Permissive or yield control	
RTOR	RTOR allowed		RTOR allowed	
Ped Leading Interval	No		No	
Corner Radius (largest)	> 10m to 15m		> 10m to 15m	
Crosswalk Type	Zebra stripe hi-vis markings		Zebra stripe hi-vis markings	
LEVEL OF SERVICE	E (36)	F (0)	D (56)	F ()
	F			

Weston Road

Intersection	Colossus Dr			
	NORTH	SOUTH	EAST	WEST
Pedestrian				
Lanes	7	6	5	5
Median	Yes	Yes	No	No
Island Refuge	No	No	No	Yes
Conflicting Left Turn	Permissive	Permissive	Protected/permissive	Protected/permissive
Conflicting Right Turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
RTOR	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
Ped Leading Interval	No	No	No	No
Corner Radius (largest)	> 10m to 15m	> 10m to 15m	> 10m to 15m	> 10m to 15m
Crosswalk Type	Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
LEVEL OF SERVICE	F (10)	F (25)	E (37)	E (41)
	F			

Weston Road

Intersection	Hwy 7			
	NORTH	SOUTH	EAST	WEST
	Selection	Selection	Selection	Selection
Pedestrian				
Lanes	8	8	9	9
Median	Yes	Yes	No	No
Island Refuge	No	No	No	No
Conflicting Left Turn	Protected/permissive	Protected	Protected	Protected/permissive
Conflicting Right Turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
RTOR	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
Ped Leading Interval	No	No	No	No
Corner Radius (largest)	> 15m to 25m	> 10m to 15m	> 15m to 25m	> 10m to 15m
Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
LEVEL OF SERVICE	F (-4)	F (6)	F (-20)	F (-26)
	F			

Weston Road

Intersection	Chrislea Rd / Fieldstone Dr			
	NORTH	SOUTH	EAST	WEST
Pedestrian				
Lanes	6	6	5	5
Median	Yes	Yes	Yes	Yes
Island Refuge	No	No	No	No
Conflicting Left Turn	Protected/permissive	Protected/permissive	Protected/permissive	Protected/permissive
Conflicting Right Turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
RTOR	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
Ped Leading Interval	No	No	No	No
Corner Radius (largest)	> 15m to 25m	> 10m to 15m	> 15m to 25m	> 15m to 25m
Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
LEVEL OF SERVICE	F (26)	F (28)	E (41)	E (41)
	F			

not allowed to cross = F

not allowed to cross = F

Weston Road

Intersection	PLOS
Famous Avenue	F
Colossus Dr	F
Hwy 7	F
Chrislea Rd / Fieldstone Dr	F

Highway 7

Intersection		Ansley Grove Rd / Whitmore Rd			
		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	6	6	8	8
	Median	Yes	Yes	Yes	Yes
	Island Refuge	No	No	No	No
	Conflicting Left Turn	Permissive	Protected/permissive	Protected	Protected/permissive
	Conflicting Right Turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval	No	No	No	No
	Corner Radius (largest)	> 15m to 25m	> 10m to 15m	> 15m to 25m	> 15m to 25m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	LEVEL OF SERVICE	F (26)	F (28)	F (4)	F (-4)
		F			

Highway 7

Intersection		Nova Star Dr			
		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	5	2		8
	Median	No	No		No
	Island Refuge	No	No		No
	Conflicting Left Turn	Protected/permissive	Protected/permissive		Protected/permissive
	Conflicting Right Turn	Permissive or yield control	Permissive or yield control		Permissive or yield control
	RTOR	RTOR allowed	RTOR allowed		RTOR allowed
	Ped Leading Interval	No	No		No
	Corner Radius (largest)	> 10m to 15m	> 10m to 15m		> 10m to 15m
	Crosswalk Type	Standard transverse markings	Standard transverse markings		Standard transverse markings
	LEVEL OF SERVICE	E (37)	B (85)	F (0)	F (-12)
		F			

not allowed to cross = F

Highway 7

Intersection		Famous Ave			
		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes		3		
	Median		Yes		
	Island Refuge		Yes		
	Conflicting Left Turn		No left turn/prohibited		
	Conflicting Right Turn		Permissive or yield control		
	RTOR		RTOR allowed		
	Ped Leading Interval		No		
	Corner Radius (largest)		> 10m to 15m		
	Crosswalk Type		Standard transverse markings		
	LEVEL OF SERVICE		B (82)	F (0)	F (0)
		F			

T intersection

not allowed to cross = F

Highway 7

Intersection		Colossus Dr			
		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	4	3		6
	Median	Yes	Yes		No
	Island Refuge	No	Yes		Yes
	Conflicting Left Turn	No left turn/prohibited	No left turn/prohibited		No left turn/prohibited
	Conflicting Right Turn	No right turn	Permissive or yield control		Permissive or yield control
	RTOR	RTOR prohibited	RTOR prohibited		RTOR prohibited
	Ped Leading Interval	No	No		No
	Corner Radius (largest)	> 15m to 25m	> 10m to 15m		> 15m to 25m
	Crosswalk Type	Standard transverse markings	Standard transverse markings		Standard transverse markings
	LEVEL OF SERVICE	F ()	B (85)	F (0)	E (33)
		F			

Not allowed to cross on east side

Highway 7

Intersection	PLOS
Ansley Grove Rd / Whitmore Rd	F
Nova Star Dr	F
Famous Ave	F
Colossus Dr	F

Windflower Gate

Intersection		North Star Dr			
		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	2	2
	Median	No	Yes	No	No
	Island Refuge	No	Yes	Yes	Yes
	Conflicting Left Turn	Permissive	Protected/permissive	Permissive	Permissive
	Conflicting Right Turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval	No	No	No	No
	Corner Radius (largest)	> 15m to 25m	> 10m to 15m	> 10m to 15m	> 15m to 25m
	Crosswalk Type	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement
	LEVEL OF SERVICE	C (71)	C (62)	A (92)	A (90)
		C			

Intersection	PLOS
North Star Dr	C

Windflower Gate

Intersection		Fieldstone Dr*			
		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	2	2	3	2
	Median	No	No	No	No
	Island Refuge	No	Yes	Yes	Yes
	Conflicting Left Turn	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval	No	No	No	No
	Corner Radius (largest)	> 15m to 25m	> 10m to 15m	> 10m to 15m	> 15m to 25m
	Crosswalk Type	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement
	LEVEL OF SERVICE	B (86)	A (92)	B (77)	A (90)
		B			

* This is an unsignalized intersection. However, its configuration is very similar to the Windflower Gate and Nova Start intersection (PLOS C) but has less lanes. Therefore, using our engineering judgement, we have assigned a PLOS B to this intersection.

Intersection	PLOS
Fieldstone Dr*	B

Windflower Gate

Intersection		Whitmore Road / Ansley Grove Dr			
		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	2	7	6
	Median	No	No	Yes	Yes
	Island Refuge	No	No	No	No
	Conflicting Left Turn	Protected/permissive	Permissive	Protected/permissive	Permissive
	Conflicting Right Turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval	No	No	No	No
	Corner Radius (largest)	> 10m to 15m	> 10m to 15m	> 10m to 15m	> 10m to 15m
	Crosswalk Type	Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
	LEVEL OF SERVICE	C (70)	B (85)	F (10)	F (25)
		F			

Intersection	PLOS
Whitmore Road / Ansley Grove Dr	F

Whitmore Rd

Intersection		Winges Road			
		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	5	5	3	3
	Median	No	No	No	No
	Island Refuge	No	No	No	No
	Conflicting Left Turn	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval	No	No	No	No
	Corner Radius (largest)	> 10m to 15m	> 10m to 15m	> 10m to 15m	> 10m to 15m
	Crosswalk Type	Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
	LEVEL OF SERVICE	E (37)	E (37)	C (70)	C (70)
		E			

Intersection	PLOS
Winges Road	E

Winges Road

Intersection		Rowntree Dairy Road			
		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	2	5	4
	Median	No	No	No	No
	Island Refuge	No	No	No	No
	Conflicting Left Turn	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval	No	No	No	No
	Corner Radius (largest)	> 10m to 15m	> 10m to 15m	> 10m to 15m	> 10m to 15m
	Crosswalk Type	Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
	LEVEL OF SERVICE	C (70)	B (85)	E (37)	D (53)
		E			

Intersection	PLOS
Rowntree Dairy Road	E

Colossus Drive

Intersection		Famous Drive			
		NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	4	4
	Median	No	No	Yes	Yes
	Island Refuge	No	No	Yes	Yes
	Conflicting Left Turn	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval	No	No	No	No
	Corner Radius (largest)	> 10m to 15m	> 10m to 15m	> 10m to 15m	> 10m to 15m
	Crosswalk Type	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
	LEVEL OF SERVICE	C (73)	C (73)	C (62)	C (62)
		C			

Intersection	PLOS
Famous Drive	C

Appendix C: Existing Traffic Conditions

Memo

Date:	Friday, August 03, 2018
Project:	Weston Road and Highway 7 Secondary Plan
To:	Type recipient(s) here
From:	Type sender(s) here
Subject:	Existing Traffic Conditions - DRAFT

Introduction

HDR has been retained by City of Vaughan to conduct transportation analysis for the Weston Road and Highway 7 Secondary Plan. The traffic analysis documented in this memo provides the technical information for the transportation component for the Secondary Plan, currently under the Phase 1 – Problem and Opportunity Statement process. The purpose of this traffic analysis is to assess existing traffic conditions and establish a baseline for the Phase 2 - Alternatives work.

Study Area and Existing Traffic Volumes

The study area for the analysis is bounded by Chrislea Road / Fieldstone Drive to the north, Highway 400 to the east, 407ETR to the south, and Ansley Grove Road to the west. A total of 15 study area intersections were analyzed, and their locations are shown in **Exhibit 1**. The turning movement counts were provided by City of Vaughan, dated June 23rd and 26th, 2018 for most of the study area intersections. Some additional older counts data were provided by York Region and Ministry of Transportation (MTO). All TMC data received are listed in **Table 1**. **Table 1** also lists the assumptions made for the locations with missing traffic volumes and signal timing data.

Exhibit 2 shows the summary of intersection turning volumes during the weekday PM peak hour, and **Exhibit 3** shows the summary of intersection turning volumes during the weekend peak hour.

Intersections:

1. Chrislea Road @ Portage Parkway
2. Weston Road @ Chrislea Road & Fieldstone Drive
3. Windflower Gate @ Fieldstone Drive & Pottery Place
4. Northview Boulevard @ 7777 Access Drive
5. Weston Road @ Northview Boulevard
6. Ansley Grove Road @ Windflower Gate & Pinedale Gate
7. Highway 7 @ Ansley Grove Road
8. Highway 7 @ Nova Star Drive & Plaza Access
9. Highway 7 @ Weston Road
10. Highway 7 @ Famous Avenue & 7777 Access Drive
11. Highway 7 @ Colossus Drive & Highway 400 SB Off-Ramp
12. Weston Road @ Colossus Drive & Rowntree Dairy Road
13. Rowntree Dairy Road @ Winges Road / Auto Park Circle
14. Ansley Grove Road @ Whitmore Road & Winges Road / Trowers Road
15. Weston Road @ Famous Avenue & Highway 407 On-Ramp
16. Highway 7 @ Highway 400 NB Off-Ramp

Exhibit 1: Locations of the Study Area Intersections

Table 1: Dates of Turning Movement Counts, Availability of Signal Timing Cards and Assumptions

Intersection	Weekday PM Peak Hour Count Date	Weekend Peak Hour Count Date	Signal Timing Card Available	Assumption(s) on Estimation of Missing Signal Timings and Intersection Turning Volumes
Chrislea Rd @ Portage Pkwy / Commercial Access	May 17 , 2011	June 23, 2018	**No**	120 sec Cycle Length Assumed, May 2011 traffic count was adjusted with an annual growth rate of 1.5% compounded up to 2018 for Weekday PM Peak Hour
Weston Rd @ Chrislea Rd / Fieldstone Drive	June 26, 2018	June 23, 2018	Yes	-
Ansley Grove Rd @ Windflower Gate / Pinedale Gate	June 26, 2018	June 23, 2018	Yes	-
Highway 7 @ Ansley Grove Rd / Whitmore Rd	June 26, 2018	June 23, 2018	Yes	-
Highway 7 @ Nova Star Dr / Commercial Access	June 26, 2018	June 23, 2018	Yes	-
Highway 7 @ Weston Rd	Dec. 20, 2016	June 23, 2018	Yes	-
Highway 7 @ Famous Rd	June 26, 2018	June 23, 2018	Yes	-
Highway 7 @ Colossus Dr / Highway 400 SB Off Ramp	March 21, 2017	N/A	Yes	-
Highway 7 @ Highway 400 NB Off Ramp	May 31, 2016	N/A	No	140 sec Cycle Length Assumed
Weston Road @ Rowntree Dairy Rd./Colossus Drive	June 26, 2018	June 23, 2018	Yes	-
Rowntree Dairy Rd @ Winges Rd / Auto Park Cir	June 26, 2018	June 23, 2018	**No**	120 sec Cycle Length Assumed
Ansley Grove Rd / Whitmore Rd @ Winges Rd / Trowers Rd	June 26, 2018	June 23, 2018	**No**	120 sec Cycle Length Assumed
Weston Road @ 407ETR WB On Ramp / Famous Avenue	June 26, 2018	June 23, 2018	Yes	-
Weston Road @ Northview Blvd	June 26, 2018	June 23, 2018	**No**	140 sec Cycle Length Assumed
Fieldstone Drive @ Windflower Gate/Pottery Pl [Unsignalized]	March 4, 2015	June 23, 2018	-	-
Northview Blvd. @ 7777 Weston Road Access [Unsignalized]	N/A	June 23, 2018	-	Assumed from current PM peak volumes of the neighboring intersections, and an older count of July 31, 2012 of another neighboring intersection

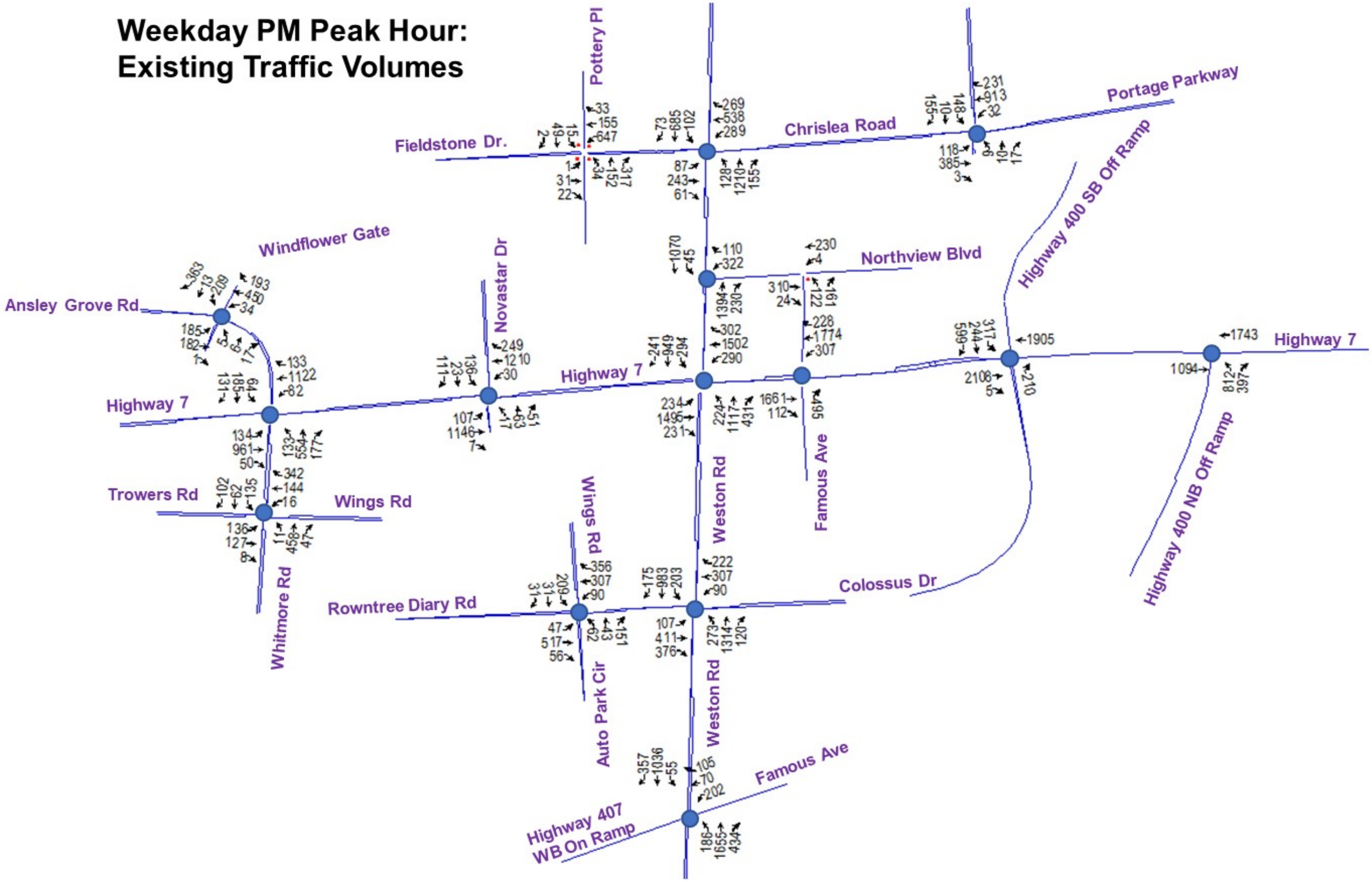


Exhibit 2: Existing Weekday PM Peak Hour Traffic Volumes

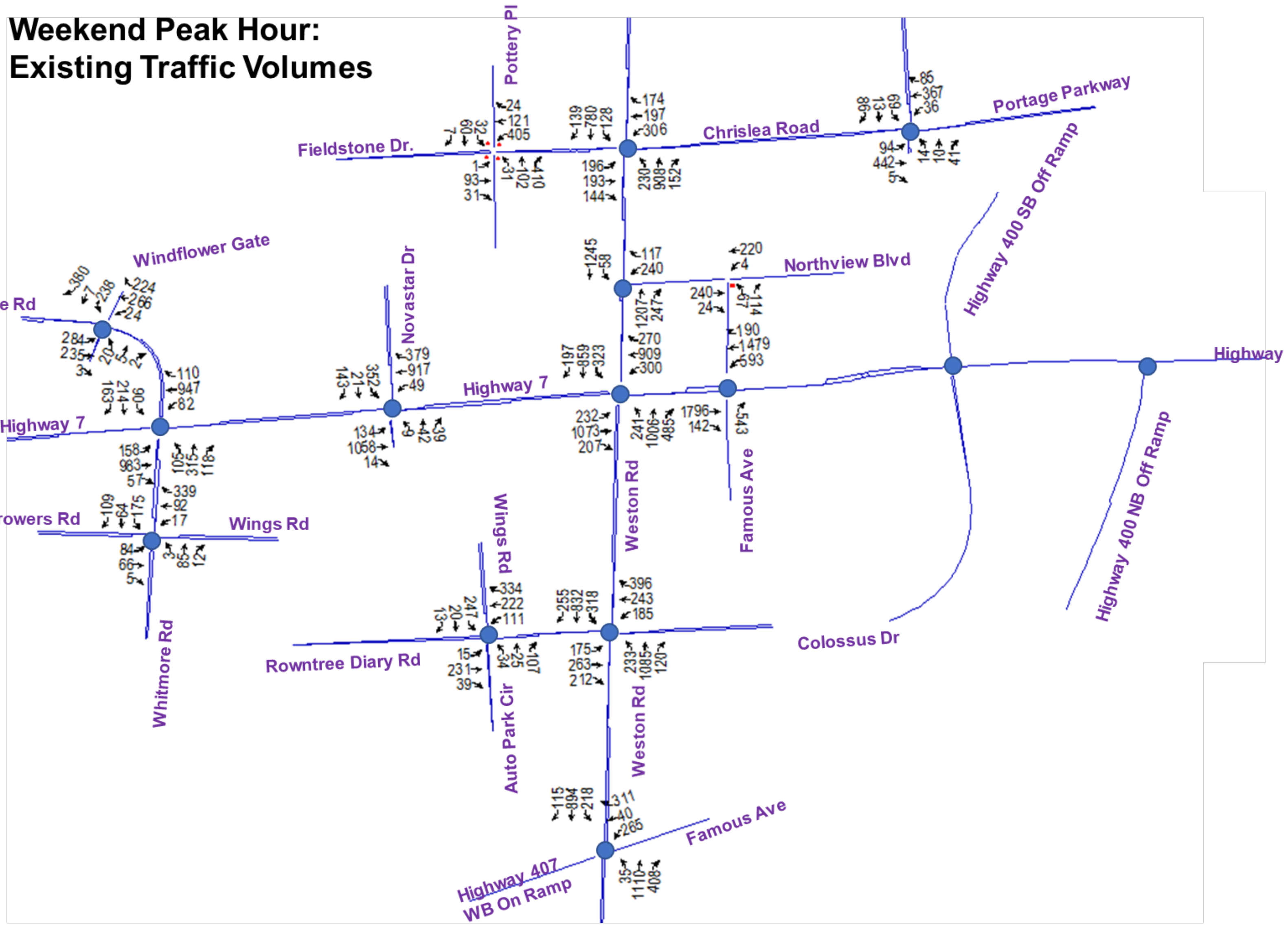


Exhibit 3: Existing Weekend Peak Hour Traffic Volumes

Intersection Analysis Methodology

Intersection operations were conducted to assess the capacity and operational deficiencies on the study area intersections (**Exhibit 1**). The analysis, conducted using Synchro 9, considered three separate measures of performance:

- The volume to capacity (V/C) ratio for each movement and overall intersection. This ratio reflects peak hour traffic demand measured against roadway capacity.
- The level of service (LOS) for each for each movement and overall intersection. LOS is based on the average control delay per vehicle.
- The 95th percentile queue length of each movement/lane group.

LOS definitions (**Table 2**) are based on the Highway Capacity Manual (HCM) 2000. The HCM defines LOS for signalized and unsignalized intersections as a function of the average vehicle control delay. LOS may be calculated per movement or per approach for any intersection configuration, but LOS for the intersection as a whole is only defined for signalized and all-way stop configurations.

Table 2: Highway Capacity Manual Level of Service Definitions for Intersections

LOS	Signalized Intersection Average Vehicle Control Delay	Unsignalized Intersection Average Vehicle Control Delay	LOS Recommendation
A	≤10 sec	≤10 sec	Acceptable
B	10-20 sec	10-15 sec	Acceptable
C	20-35 sec	15-25 sec	Acceptable
D	35-55 sec	25-35 sec	Somewhat undesirable
E	55-80 sec	35-50 sec	Undesirable
F	≥80 sec	≥50 sec	Unacceptable

It is noted that the analysis may indicate that certain movements at an intersection operate with volume-capacity ratios greater than 1.0. Theoretically, a maximum volume-capacity ratio for existing conditions cannot be greater than 1.0, since the observed volumes used in the analysis represent volumes that were actually served at the intersection. Thus, a volume-capacity ratio exceeding 1.0 under existing conditions is a result of conservative parameters used in the Synchro analysis. For future conditions, V/C ratios exceeding 1.0 may either be a result of these conservative parameters, but may also indicate a likelihood that traffic will divert to other routes. Volume inputs in Synchro are static and any diversion would have to be manually accounted for and assigned to different intersections.

On the other hand, LOS F indicates average delays in excess of 80 seconds. While this is generally characterized as “poor” operation, it does not necessarily imply that the movement, approach, or intersection is experiencing demand in excess of capacity. When cycle lengths are in the range of 120 seconds (or longer), it is possible to have delays in the range of 80 seconds even in low-demand situations.

In addition to V/C ratio and LOS, 95th percentile queue lengths are also reported to identify any storage length deficiencies.

Existing Intersection Operations

Based on the existing traffic volumes (**Exhibit 2** and **Exhibit 3**) and the existing signal timing plans obtained from the operating municipalities, **Table 3** shows the summary of the resulting performance measures for the study area intersections, during both the weekday PM peak hour and weekend peak hour. The weekend analysis for Highway 7 at Highway 400 SB Off-ramp and Highway 400 NB Off-ramp were not included due to the lack of data.

Table 3: Existing Traffic Conditions Analysis

Intersection & Turning Movements	Weekday PM Peak Hour			Weekend Peak Hour		
	LOS	v/c	Queue	LOS	v/c	Queue
Chrislea Rd @ Portage Pkwy / Commercial Access [Signalized]	C	0.5		B	0.24	
EBL	B	0.46	22.2	A	0.18	11.1
EBTR	B	0.25	41.9	B	0.27	45.7
WBL	B	0.07	7.9	B	0.08	8.3
WBT	C	0.62	117.1	C	0.24	41
WBR	C	0.18	19.3	B	0.06	9.1
NBL	C	0.02	5.2	C	0.04	7.5
NBTR	C	0.03	8.4	C	0.05	11.1
SBL	C	0.34	46	C	0.17	24.8
SBTR	C	0.12	16.9	C	0.08	14.9
Weston Rd @ Chrislea Rd / Fieldstone Drive [Signalized]	D	0.87		C	0.82	
EBL	F	1.07	59.6	E	0.86	73.4
EBT	D	0.6	87.5	D	0.43	59
EBR	D	0.04	4.3	C	0.1	14.7
WBL	F	1.13	121.8	C	0.78	80.9
WBTR	D	0.75	119.4	B	0.22	30
NBL	B	0.33	16.2	C	0.76	84.3
NBT	C	0.71	94.1	C	0.69	135.9
NBR	C	0.15	7	C	0.13	19.3
SBL	C	0.53	22.4	C	0.57	30.8
SBT	C	0.41	87.6	D	0.66	112.7
SBR	B	0.05	5.8	C	0.12	18.3
Ansley Grove Rd @ Windflower Gate / Pinedale Gate [Signalized]	C	0.55		C	0.53	
EBL	D	0.62	69	B	0.47	85.5
EBTR	C	0.16	27.2	B	0.12	26.7
WBL	A	0.04	6.8	A	0.04	6.5
WBT	A	0.35	77.1	A	0.23	51.9
WBR	A	0.13	8.5	A	0.16	10.9
NBLTR	D	0.07	9.8	D	0.13	12.1
SBL	E	0.78	74.8	D	0.73	81.2
SBTR	D	0.33	34.2	D	0.28	24.2
Highway 7 @ Ansley Grove Rd /	C	0.55		C	0.49	

Intersection & Turning	Weekday PM Peak Hour			Weekend Peak Hour		
Whitmore Rd [Signalized]						
EBL	B	0.44	18.7	A	0.41	21.7
EBT	B	0.35	61.3	B	0.33	64.7
EBR	B	0.03	1	B	0.04	2.4
WBL	A	0.23	2.5	A	0.23	5.6
WBT	A	0.41	9.7	A	0.33	27.8
WBR	A	0.09	0	A	0.08	0.2
NBL	E	0.63	59.7	E	0.67	49.7
NBT	E	0.83	104.5	E	0.63	61
NBR	D	0.26	33.8	D	0.08	14.2
SBL	F	0.92	48.9	F	0.8	49.6
SBT	D	0.28	36	D	0.43	42.6
SBR	D	0.09	17.1	D	0.16	23.1
Highway 7 @ Nova Star Dr / Commercial Access [Signalized]	C	0.47		C	0.5	
EBL	C	0.44	30.7	B	0.45	29.6
EBT	B	0.45	72.3	B	0.44	60.6
EBR	B	0	0	B	0.01	0
WBL	B	0.13	4.4	A	0.21	6.3
WBT	C	0.49	73.2	B	0.4	44
WBR	C	0.21	17.1	A	0.27	5.9
NBL	E	0.13	12.8	E	0.07	8.5
NBTR	F	0.74	57.9	E	0.5	34.9
SBL	D	0.27	24.4	D	0.58	59.5
SBTR	D	0.17	21.4	D	0.17	23
Highway 7 @ Famous Ave [Signalized]	D	0.71		D	0.79	
EBT	B	0.47	139	B	0.57	132
EBR	A	0.09	6.3	A	0.14	22.2
WBL	E	0.53	59	D	0.75	107
WBT	A	0.4	33.1	A	0.37	39
WBR	A	0.16	2	B	0.13	5.9
NBR	F	1.72	268.6	F	1.4	281.1
Highway 7 @ Weston Rd [Signalized]	F	1.15		E	1.05	
EBL	F	1.13	115.5	E	0.87	94.9
EBT	E	0.94	182.7	D	0.68	96.5
EBR	E	0.24	26.8	E	0.19	29.1
WBL	F	1.11	81.2	F	1.09	81.3
WBT	F	0.96	181	D	0.57	121.8
WBR	F	0.37	75.5	F	0.3	77.6
NBL	F	1.14	113.8	F	1.17	118.9
NBT	F	1.03	219.5	E	0.93	195.1
NBR	E	0.67	94.4	E	0.8	152.6
SBL	F	1.12	75	F	1.26	93.8

Intersection & Turning	Weekday PM Peak Hour			Weekend Peak Hour		
SBT	D	0.88	123	D	0.8	150.3
SBR	B	0.25	12.7	C	0.17	23.2
Highway 7 @ Colossus Dr / Highway 400 SB Off Ramp [Signalized]	D	0.89				
EBTR	B	0.83	70.4	NA		
WBT	C	0.76	174.1			
NBR	F	1.51	136.5			
SBL	E	0.78	131.2			
SBTR	D	0.67	90.4			
SBR	D	0.55	79.8			
Highway 7 @ Highway 400 NB Off Ramp [Signalized]	C	0.69				
EBT	A	0.38	56.9	NA		
WBT	B	0.59	116.6			
NBL	E	0.91	153.8			
NBR	D	0.43	51.5			
Weston Road @ Rowntree Dairy Rd. / Colossus Drive [Signalized]	D	1.06		D	1.06	
EBL	D	0.61	50.2	D	0.69	57.5
EBTR	D	0.76	116.2	C	0.38	26.3
WBL	F	1.42	71.3	F	0.95	84
WBT	D	0.6	109.6	C	0.46	69
WBR	D	0.25	36.8	D	0.65	85.9
NBL	D	0.89	64.9	C	0.75	75.9
NBTR	C	0.59	119.4	D	0.6	117.5
SBL	E	0.87	44.8	F	1.08	147.9
SBT	B	0.59	42.5	C	0.55	105.6
SBR	A	0.16	2.1	C	0.23	27.5
Rowntree Dairy Rd @ Winges Rd / Auto Park Cir [Signalized]	C	0.56		C	0.41	
EBLTR	C	0.49	84.6	B	0.2	37
WBL	B	0.24	21.2	B	0.2	26.3
WBTR	B	0.31	41.6	A	0.24	31.4
NBLTR	E	0.78	71.9	E	0.61	46
SBL	C	0.58	49.7	C	0.63	61.9
SBTR	C	0.07	12.9	C	0.04	9.4
Ansley Grove Rd / Whitmore Rd @ Winges Rd / Trowers Rd [Signalized]	C	0.57		C	0.43	
EBL	C	0.66	29.2	C	0.44	20.6
EBTR	C	0.18	26.8	C	0.11	17.8
WBL	C	0.04	7	D	0.06	7.9
WBTR	D	0.83	111.8	D	0.8	89.9
NBL	B	0.02	5.9	B	0	2.3

Intersection & Turning	Weekday PM Peak Hour			Weekend Peak Hour		
NBTR	B	0.31	61.8	B	0.05	11.8
SBL	C	0.39	46.1	B	0.26	47.2
SBTR	B	0.08	12.4	B	0.08	11.7
Weston Road @ Highway 407 WB On Ramp / Famous Avenue [Signalized]	C	0.81		C	0.79	
WBLT	E	0.78	87.9	E	0.81	100.7
WBR	D	0.07	13.5	D	0.58	66
NBL	C	0.68	69.6	B	0.14	7.2
NBT	C	0.81	239.7	C	0.62	129.5
NBR	B	0.39	53.4	B	0.33	31.4
SBL	B	0.39	9.9	B	0.75	62.5
SBTR	C	0.81	180	B	0.52	127.5
Fieldstone Drive @ Windflower Gate/Pottery Pl [Unsignalized]	F			E		
EBLTR	B	0.12	0.4	B	0.29	1.2
WBL	F	1.35	32.1	F	0.93	10.9
WBTR	B	0.36	1.7	B	0.31	1.3
NBLTR	E	0.94	9.6	F	0.98	14.2
SBLTR	B	0.16	0.5	B	0.23	0.9
Northview Blvd. @ 7777 Weston Road Access [Unsignalized]						
WBLT	C	0.54	3.2	A	0	0
NBLR	A	0	0	B	0.31	1.3
Weston Road @ Northview Blvd [Signalized]	D	0.72		C	0.63	
WBLR	F	0.98	192	E	0.92	148
NBT	C	0.62	169.7	C	0.52	168.3
NBR	F	0.17	20.9	E	0.17	27.3
SBL	B	0.29	11.1	B	0.29	15.4
SBT	B	0.47	86.4	B	0.54	113.3

Findings

Based on the results presented in **Table 3**, the following conclusions can be drawn from the analysis of the study area intersections, under existing traffic and signal timing plans:

- Most signalized intersections currently operate at overall intersection LOS D or better and with overall v/c ratios less than 1.0 during both Weekday PM and Weekend peak hours, with the exception of the following:
  - Highway 7 @ Weston Road intersection currently operates at LOS F during the weekday PM peak hour because of high demands of EBL, WBL, NBL and SBL movements.

- Weston Road @ Rowntree Dairy Rd. / Colossus Drive intersection currently operates at LOS D; however, with an overall intersection v/c ratio of 1.06 due to high WBL and SBL movements.

- The following turning movement constraints are noted for existing conditions:
  - WBL movement of Weston Rd @ Chrislea Rd & Fieldstone Drive intersection operates with a v/c ratio of 1.12 during the Weekday PM peak hour
  - NBR movement of Highway 7 @ Famous Rd intersection operates with a v/c ratio of 1.72 and 1.40 during the Weekday PM and weekend peak hour, respectively.
  - NBR movement of Highway 7@ Colossus Dr / Highway 400 SB Off Ramp Access intersection operates with a v/c ratio of 1.51 during the Weekday PM peak hour.
  - WBL movement of Weston Road & Rowntree Dairy Rd / Colossus Dr intersection operates with a v/c ratio of 1.42 during the Weekday PM peak hour, and the SBL operates with a v/c ratio of 1.08 during the Weekend peak hour
- All study area intersections currently experience queues at least one vehicle queue length longer than the corresponding storage length during either of the two peak hours, except the following four intersections :
  - Ansley Grove Rd @ Windflower Gate / Pinedale Gate
  - Highway 7 @ Weston Road
  - Highway 7@ Colossus Dr / Highway 400 SB On Ramp
  - Weston Road @ 407ETR WB On Ramp/Famous Avenue

The following conclusions can be drawn from the analysis of unsignalized intersections (as shown in **Table 3**) under existing traffic conditions:

- WBL movement of Fieldstone Drive @ Windflower Gate/Pottery Pl intersection operates at v/c ratio of 1.35 during the Weekday PM peak hour
- No queue concerns were noted for the unsignalized intersections.

Conclusions and Next Steps

For the Phase 1 - Problem and Opportunity analysis of the Weston Road and Highway 7 Secondary Plan, the analysis undertaken has demonstrated that the study area currently experiences traffic congestion focused around the Highway 7 / Weston Road intersection during peak periods.

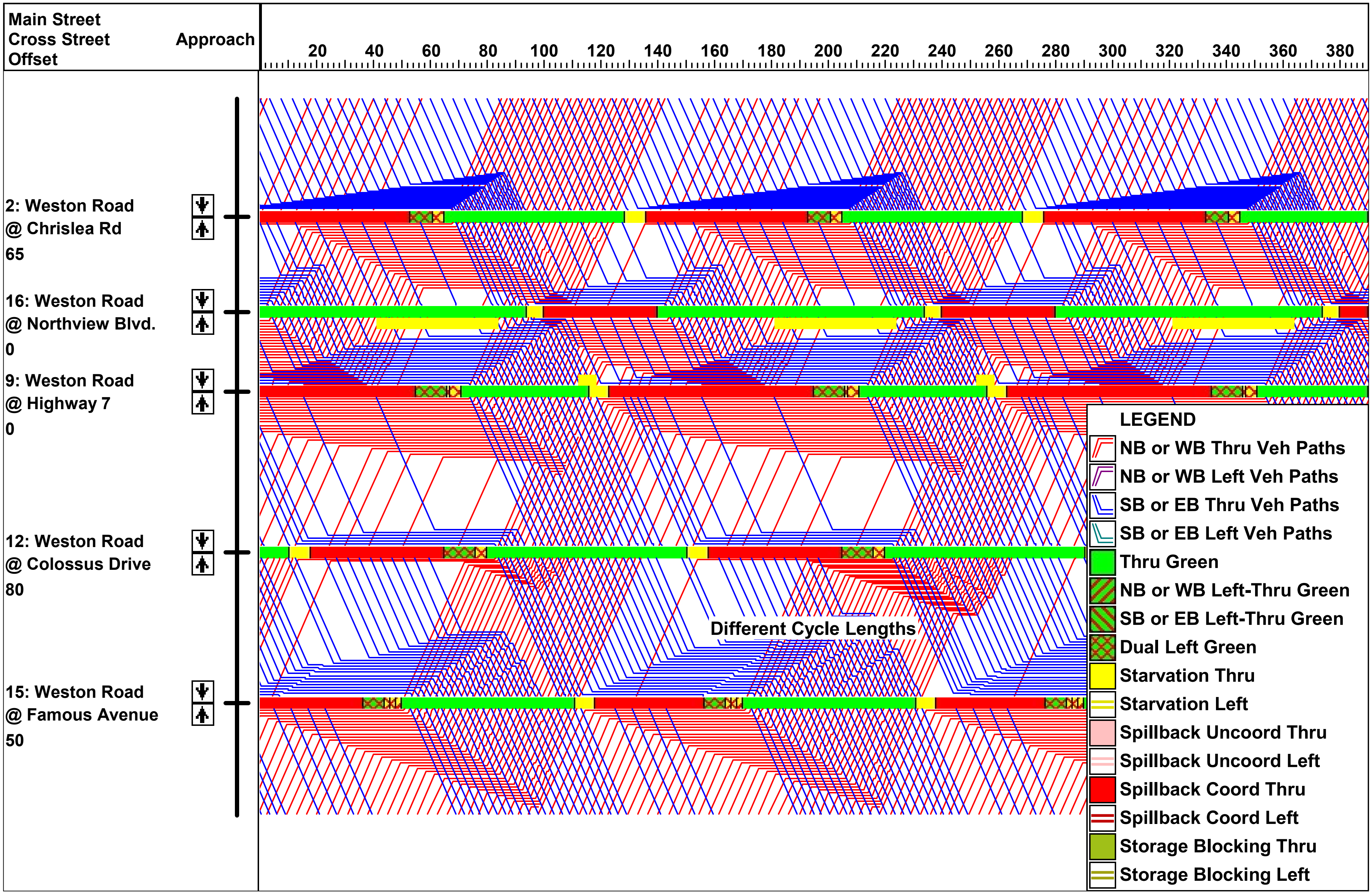
Preliminary sensitivity analysis indicates that there are opportunities for the Region and City to consider signal timing adjustments for optimization and coordination and improving the operations of the constrained intersections and turning movements within acceptable limits of the Region's and City's signal timing practices.

As noted there are also some v/c ratios that are very high, well above 1.0. This may also indicate the need to consider Synchro parameter adjustments including saturation flow rates, lane utilization, and specific peak hour factors. The analysis of existing traffic conditions has been conducted using default Synchro parameters and a peak hour factor of 0.95 for all intersections to reflect the secondary planning level analysis at this stage.

The following actions are also recommended to refine the existing traffic analysis:

- Update turning movement counts at the Highway 7 @ Weston Road during the weekday PM peak hour, considering the latest count was from Dec 20, 2016.
- Obtain turning movement counts for the two ramp terminal intersections during the weekend
- Obtain and verify the signal timing cards for the intersections where signal timings were assumed

Time Space Diagram of Weston Road
PM Peak Hour - 90th Percentile Flows



Time Space Diagram of Weston Road
PM Peak Hour - Maximum Bands