



Final Report

Lincolnvile MTSA Transportation Study

Town of Whitchurch-Stouffville

October 2020



Executive Summary

HDR Corporation has been retained by the Town of Whitchurch-Stouffville to undertake a Transportation Study for the development of the lands surrounding the future relocation of Lincolnville GO Station from the northeast quadrant of Bethesda Side Road and Tenth Line to the southwest quadrant. This GO Station relocation within the Town's urban boundary presents an opportunity to develop a transit-oriented community within a Major Transit Station Area (MTSA), which provides policy direction for land use intensification generally within a 500 metre radius around transit stations such as GO stations, pursuant to Provincial Growth Plan policies.

Future Planning Context

This transportation study builds upon a parallel land use study being undertaken by a separate consultant (WSP) on behalf of the Town. The area and proposed uses in the direct vicinity of the GO station MTSA are envisioned to be urban, mixed-use, and generally higher density than surrounding adjacent land uses intended to have synergy with the GO Station. The broader area (generally within an 800 metre radius), has also been considered to assess the longer term transportation needs of the study area. Additional potential development areas representing a longer term horizon are also considered.

Accordingly, the study assesses two scenarios:

- ⇒ **Short-Term (2025 Horizon Year) Development Scenario**
 - ↳ Determine impacts of development within the Major Transit Station Area (MTSA) directly in the vicinity of Lincolnville GO, in addition to the impacts of development within the surrounding area within an 800 metre radius.
- ⇒ **Long-Term Development Scenario**
 - ↳ Determine long-term impacts of development within the broader study area

The land use concept plan is shown below in **Exhibit A**. The development area (or MTSA) is demarcated with a dashed yellow border and includes the MTSA lands outlined in orange.

Land use concepts and population and employment estimates have been developed by WSP for input into the transportation forecasts. A summary of the total population and employment estimates, and the resulting trip generation is provided in **Table A**.

The Town's Transportation Master Plan has identified the need for improvements at the intersections of Tenth Line and Forsyth Farm, as well as at the new GO station access, in addition to urbanization of Tenth Line south of Bethesda Side Road. The need for signalization and improvements at these intersections is reviewed as they relate to the development horizon scenarios.

Table A: Land Use Concept and Trip Estimate Summary

Scenario	Population	Employment ¹	Peak Hour Trip Generation	
			AM	PM
Short-Term Development	9,812	793	1,584	1,904
Long-Term Development	5,742	0	1,098	1,401
Total	15,554	793	2,682	3,305

Note: 1. Work from home accounts for 373 total jobs.



Source: WSP

Exhibit A: Land Use Concept Plan

Findings

Short-Term Development Scenario

To support the short-term (2025) development scenario in addition to the relocation of the GO Station, four new accesses will be provided along Tenth line between Bethesda Side Road and Forsyth Farm Drive, as described below (beginning from the north):

1. GO/Zone 1 right-in/out access (stop controlled) – intended to serve general traffic movements in and out of the GO station and may also serve the other development within Zone 1 on the west side of Tenth Line;
2. GO/Zone 1 & 3 full movement signalized access - intended to serve general traffic movements in and out of the GO station and other development within Zone 1, as well as Zone 3 on the east side of Tenth Line;
3. GO bus-only signalized access – intended to serve and facilitate only buses entering exiting the GO station on the west side of Tenth Line; and,
4. Zone 2/3 Access (stop controlled) – intended to serve Zone 2 on the west side of Tenth line and Zone 3 on the east side of Tenth Line. This location was identified for consideration of roundabout control in the Town's development Charge Study.

Two more new access will be provided, one along Bethesda Side Road and another along Forsyth Farm Drive:

5. Zone 3 and Zone 8 full movement (stop controlled) access to be provided along Bethesda Side Road, east of Tenth Line, and on the south side of the roadway opposite the existing GO access; and,
6. Zone 5 full movement minor stop controlled access to be provided along Forsyth Farm Drive, west of Tenth Line, as the north leg of Coronet Street.

The study area will generally have residual capacity and study intersections will be operating well. To support 2025 horizon year conditions, four intersections will require signalization:

1. Bethesda Side Road at Tenth Line
2. Tenth Line at the new GO Station / Zone 1 & 3 Access
3. Tenth Line at the new GO Station Bus-Only Access
4. Tenth Line at Forsyth Farm Drive (with northbound and southbound left-turn lanes)

The intersection of Bethesda Side Road and Tenth Line is currently under two-way stop control on the eastbound and westbound approaches of the intersection, and is bisected by the rail corridor on the west and north legs. Special consideration will be needed to account for this when designing the signal to accommodate the railway including the barriers, and calculating appropriate clearance times.



The intersections of Tenth Line at the GO Station access and at Forsyth Farm Drive should be monitored as development occurs to determine the trigger for the improvement. The trigger is likely to be after Zones 1, 2, and 3 are developed.

Long-Term Development Scenario

Under the long-term development scenario, some study area intersections will be approaching capacity. The intersection of Main Street and Tenth Line will have several movements operating near or at capacity during both the weekday AM and PM peak hours. Jog elimination would mitigate some of these deficiencies as they are associated with the jogged traffic movements along Tenth Line.

To support the long-term development scenario, one additional intersection will require signalization and one road network improvement is further recommended to accommodate forecast travel demand:

1. Tenth Line at the Zone 2 & 3 Access signalization
2. An exclusive eastbound right-turn lane will also be required at Bethesda Side Road and Tenth Line

These forecasts are long-term and generally demonstrate that the long-term development scenario can be supported.

Ultimately, to mitigate traffic congestion at specific intersections and provide a well-connected network for all modes, a fine-grained collector road network is recommended. Additional unsignalized access can also be considered to maximize connectivity in the context of the Transportation Master Plan recommendations which allows for minimal direct access to Tenth Line. The analysis contained within this report has assigned all traffic to fewer accesses (see **Exhibit B**) for a more conservative analysis.

A road network concept which builds upon the analysis presented in this report is presented for consideration in **Exhibit A** and the recommended lane configurations are shown in **Exhibit B**.

Intersection Controls

The proposed signalized intersections in **Exhibit A** were tested based on HCM Signal Warrant Methodology. While it is noted that not all study intersections meet the signal warrants due to low daily traffic volumes, we note that without the installation of traffic signals, vehicles will experience long delays when entering or exiting, pedestrians and cyclists seeking to cross Tenth Line will not have a protected crossing, and any potential future transit services would need to wait for gaps in traffic.

Storage Lengths

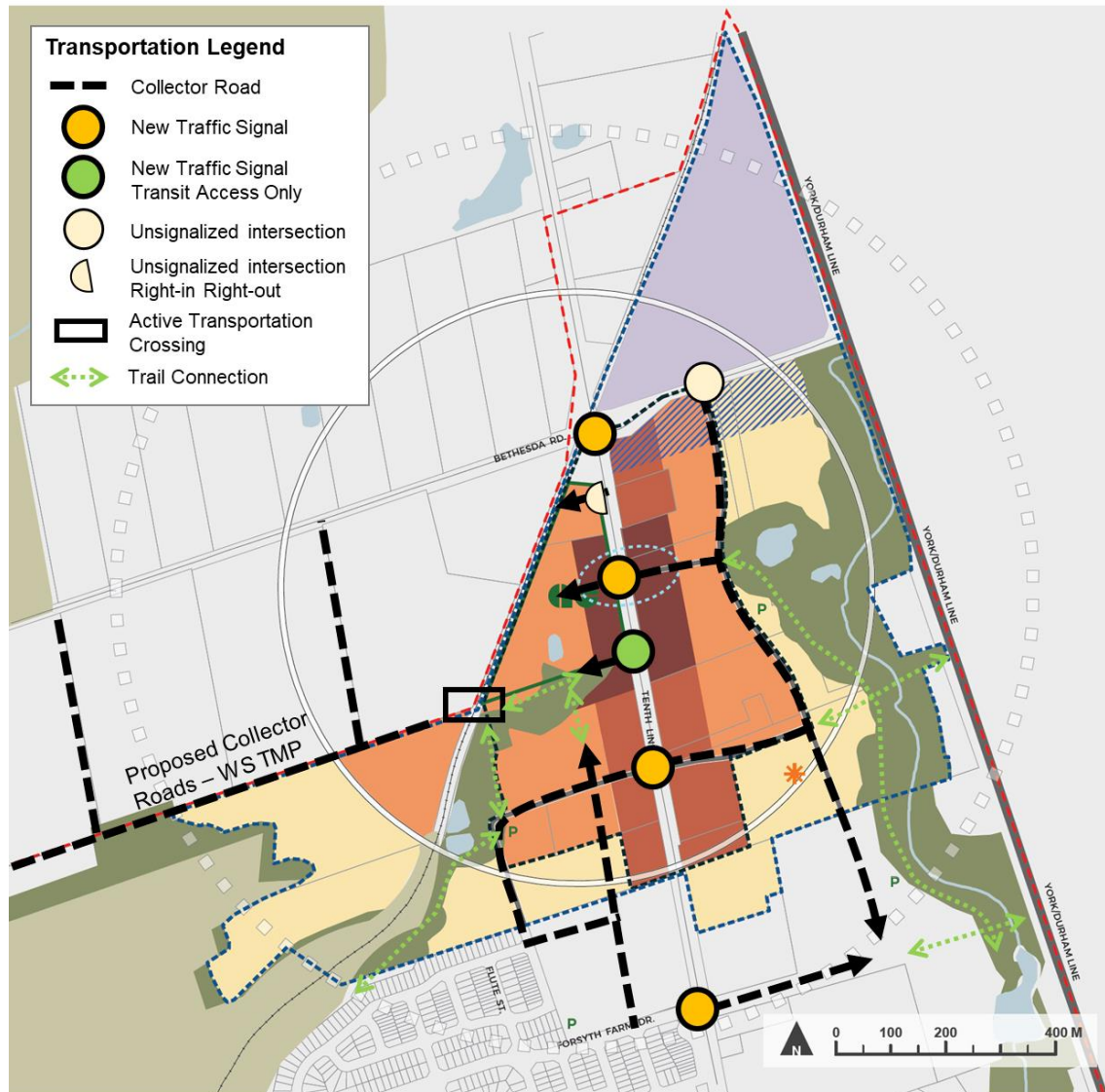
Based on these recommendations, a schematic layout of Tenth Line (**Exhibit C**) has been developed to confirm feasibility based on recommended approximate intersection spacing.

Storage length requirements for minor streets should be confirmed at the site plan application stage of development.



Lincolnville GO Station Area

Land Use Plan - Draft



Transportation Legend

- Collector Road
- New Traffic Signal
- New Traffic Signal Transit Access Only
- Unsignalized intersection
- Unsignalized intersection Right-in Right-out
- Active Transportation Crossing
- Trail Connection

LEGEND

- Major Transit Station Area (1)
- Lincolnville Boundary
- Lincolnville High-Density Mixed-Use
- Lincolnville Medium-High Density Mixed-Use
- Lincolnville Medium-High Density Residential
- Lincolnville Residential
- Lincolnville Utilities / Future Layover Facility
- Required Mixed-Use Frontage Area
- Special Provision 1
- Lincolnville GO Station
- Watercourses / Water Bodies
- Greenland Area (OPA 137) (2)
- Regional Greenlands System
- Proposed Park Space Locations (3)
- Proposed School Location (4)
- Parcels
- Conceptual Collector Road
- Stouffville Settlement Area Boundary
- Town Boundary
- 500 m Boundary (approx. 5 min. walk)
- 800 m Boundary (10 min. walk)

- (1) The Major Transit Station Area boundary will be implemented by York Region.
- (2) Greenland Area is based on OPA 137 and includes updates based on data provided to WSP. Further refinements may be considered based on updated information.
- (3) Proposed park space locations are conceptual and subject to confirmation.
- (4) Proposed school location is conceptual and subject to confirmation of need and/or location.

September 2020



Exhibit A: Recommended Ultimate Road Network

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100 York Boulevard, Suite 300, Richmond Hill, ON, CA L4B 1J8
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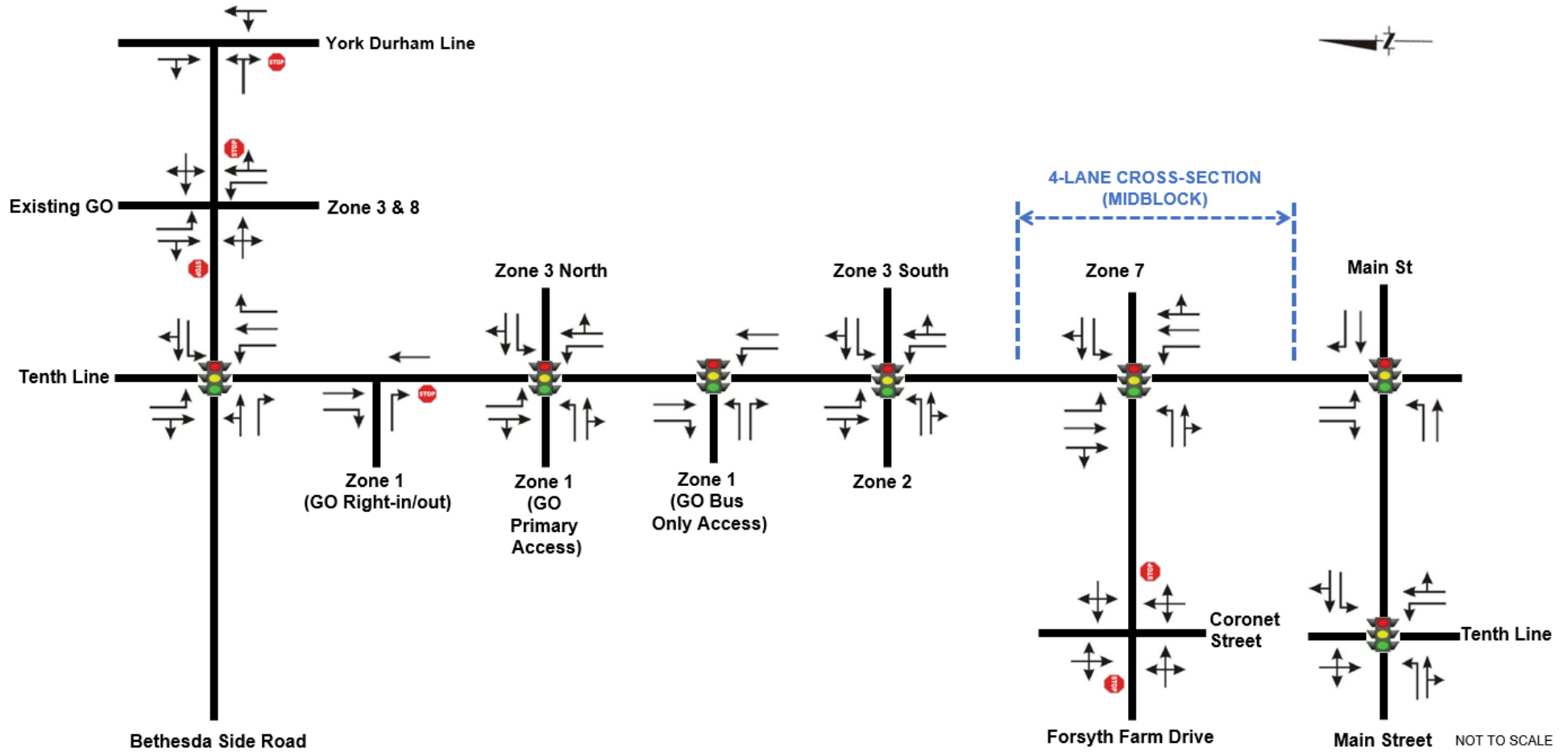


Exhibit B: Recommended Ultimate Road Network Lane Configurations



Exhibit C: Storage Length Recommendations along Tenth Line



Cross Sections

For Tenth Line a 33 metre cross section is recommended to allow for wider boulevards and cycling lanes, and to ultimately protect for a roadway widening to a 4-5 lane cross-section. The City may, at its discretion, provide the 4-5 lane cross section initially or protect for future widening but the findings of this study do not indicate a need for this. Further study is required to justify the need for a 4-5 lane cross section.

A 27 metre right-of-way is recommended for Bethesda Side Road. Similar to Tenth Line which includes three traffic lanes and a south-side multi-use pathway.

Collector roads with a 23 metre cross-section will accommodate two through lanes, a parking lane on one side, dedicated cycling lanes, sidewalks and boulevards, and will accommodate forecast traffic volumes.

An MTSA “Main Street” Collector Road is envisioned with a 24m right-of-way, accommodating two through lanes, on-street parking on both sides of the street, bike lanes, sidewalk and boulevard.

Active Transportation

In addition to the on-street cycling facilities noted, a trail system throughout the MTSA area is recommended to connect to existing trail systems and to provide active transportation connectivity via a new rail grade separation to planned development on the west side of the railway. A north-south trail is also recommended along Greenland Area east of Tenth Line, and this trail should be connected to the proposed north-south collector road and York Durham Line via east-west trail connections.



HDR TEAM

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1. Introduction

1.1 Background

HDR Corporation ('HDR') has been retained by the Town of Whitchurch-Stouffville to undertake a Transportation Study for the development of the lands surrounding Lincolnville GO Station ("Lincolnville GO"), as well as the relocation of the station.

Lincolnville GO is currently located in the northeast quadrant of Tenth Line and Bethesda Side Road, generally in the northeastern quadrant of the Town proper. The site location is shown in **Exhibit 1**. Lincolnville GO is currently surrounded by undeveloped lands and the nearest developed area is over 1.0 km to the south along Tenth Line in the form of low density residential, semi-detached and fully-detached homes. This provides an opportunity for intensification and development within the area along the edge of the Town's urban boundary.

The area and proposed uses in the direct vicinity of the GO station (within a 500 metre radius) is envisioned to be urban, mixed-use, and higher density, and having synergy with the GO Station. The broader area (generally within an 800 metre radius), has also been considered to assess the longer term transportation needs of the study area. Additional potential development area representing a longer term horizon is also considered.

The proposed new station location is in the southwest quadrant of Tenth Line and Bethesda Side Road, approximately 500 metres to the southwest from the current location. The existing station would continue to be used as a rail yard by Metrolinx while commuter traffic would be supported at the new location. This study assess two development scenarios:

⇒ **Short-Term (2025 Horizon Year) Development Scenario**

- ↳ Determine impacts of development within the Major Transit Station Area (MTSA) directly in the vicinity of Lincolnville Go in addition to the impacts of development within the surrounding area within an 800 metre radius.

⇒ **Long-Term Development Scenario**

- ↳ Determine long-term impacts of development within the broader study area.

The analysis represents a conservative, higher-end estimate of the development potential, density targets, and traffic that may be generated.

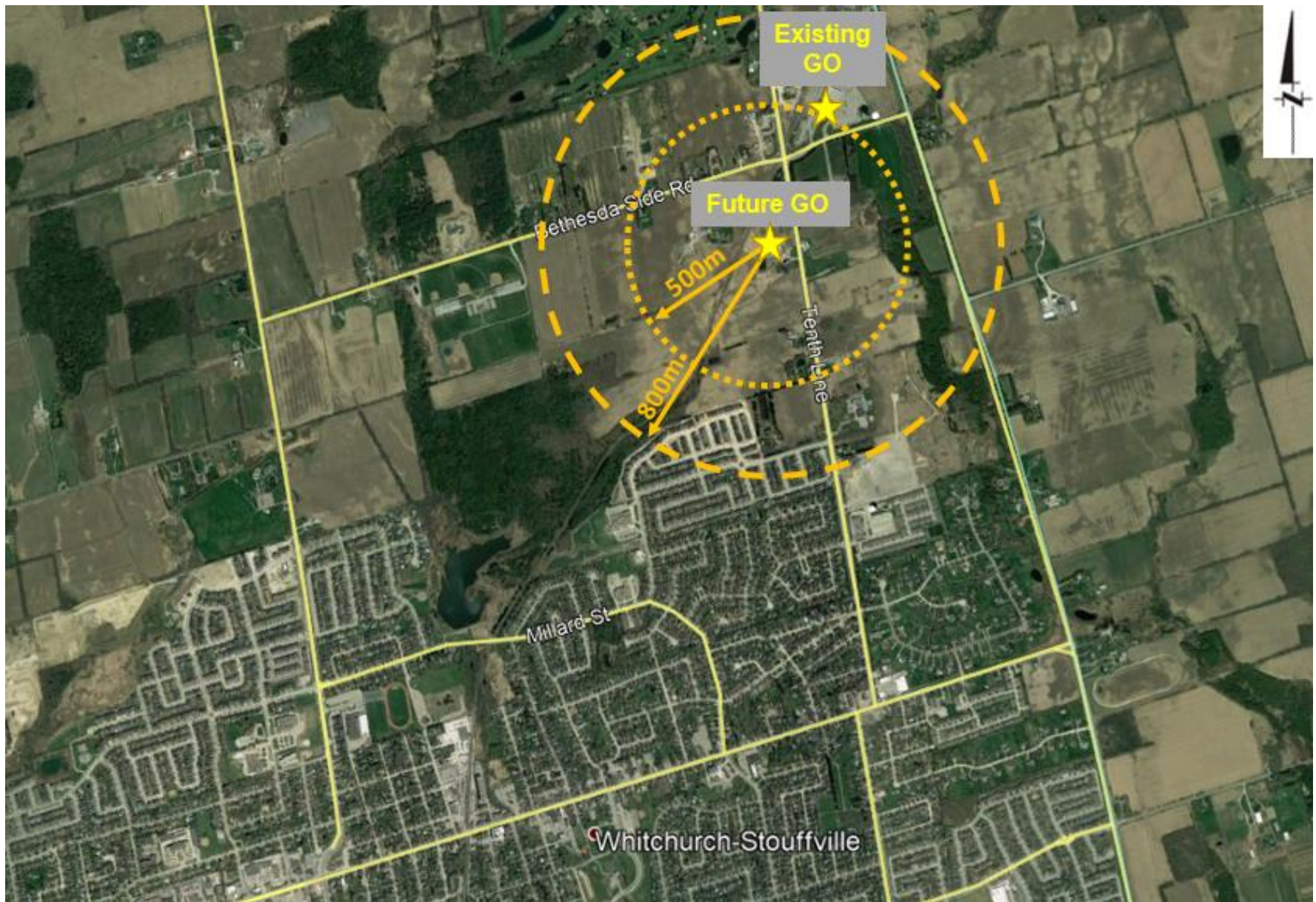


Exhibit 1: Site Location

1.2 Study Scope of Work

The study scope of work has been discussed with Town of Whitchurch-Stouffville staff, and is summarized below:

Analysis Scenarios	- Existing 2019 Traffic Conditions 2025 Background Traffic Conditions 2025 Total Traffic Conditions - Long-Term Background and Total Traffic Conditions
Analysis Time Periods	- Weekday AM peak hour (between 7:00am – 9:00am) - Weekday PM peak hour (between 4:00pm – 7:00pm)
Study Area Intersections to be Analyzed	- Tenth Line at Bethesda Side Road - Tenth Line at Main Street (west and east intersections) - Bethesda Side Road at York-Durham Line - Future new Roadway Connections along Tenth Line (2) and Bethesda Side Road (1)

1.3 Intersections Operations and Analysis Methodology

Intersection operations were assessed for the site driveways and study intersections using the software program Synchro 9, Traffic Signal Coordination Software Version 9 both of which employ methodology from the **Highway Capacity Manual (HCM2000)** published by the Transportation Research Board National Research Council. Synchro can analyze both signalized and unsignalized intersections in a road corridor or network taking into account the spacing, interaction, queues and operations between intersections.

The signalized intersection analysis considers two separate measures of performance:

- The capacity of all intersection movements, which is based on a volume to capacity ratio
- The level of service for all intersection movements, which is based on the average control delay per vehicle for the various movements through the intersection and overall

The two-way unsignalized intersection analysis also considers two separate measures of performance:

- The capacity of the critical intersection movements, which is based on a volume to capacity ratio
- The level of service for the critical movements, which is based on the average control delay per vehicle for the various critical movements within the intersection

Level of service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay. The volume to capacity (v/c) ratio is a measure of the degree of capacity utilized at an intersection.

Critical movements or movements identified as having operational concerns are defined as any movements operating with:

- Volume to capacity ratios greater than 0.85 (through or shared-through movements);
- Volume to capacity ratios greater than 0.95 (exclusive turning movements); and,
- Level of service 'E' or 'F'.

Level of service and volume to capacity are described in **Table 1**. The definitions are only generalized based on correlation between level of service and volume to capacity ratios (degree of saturation) and qualitatively describe the driver experience at each level.

Table 1: Link Volume to Capacity and Level of Service Definitions

V/C Ratio	Level of Service	Operating Conditions
Less than 0.85	LOS A-C	Free-flow, very little, to moderate delay
Between 0.85 and 0.99	LOS D-E	Approaching or at capacity, users experience delays and queuing
Greater than 1.00	LOS F	Over capacity, severe delays and queuing

2. Existing Conditions

2.1 Site Context

The study area is generally bound by Bethesda Side Road to the north, York-Durham Line to the east, the existing railway to the west, and Forsythe Farm Drive to the south. These boundaries represent the short-term development area. Most of the long-term developable lands and study intersections are located outside of these bounds. The surrounding area to the north, west, and east is predominantly undeveloped green field. The Town of Whitchurch-Stouffville is located to the southwest and is primarily low-density residential.

2.2 Existing Road Network

The existing road network is illustrated in **Exhibit 2**, including existing traffic controls, and is described below. The existing railway crosses Bethesda Side Road and Tenth Line diagonally on the west and north legs of the intersection.

Tenth Line	Tenth Line is a north-south major-arterial roadway under the jurisdiction of the Town of Whitchurch-Stouffville. It has a two lane rural cross section. North of Forsyth Farm Drive the posted speed limit is 70 km/h. The posted speed drops down to 50 km/h to the south of Forsyth Farm Drive. Sidewalks are provided south of Forsyth Farm Drive and curb and gutter is also intermittent in this area. Cycling facilities are not provided. The Town of Whitchurch-Stouffville Transportation Master Plan identifies Tenth Line south of Bethesda as an urban arterial roadway.
Bethesda Side Road	Bethesda Side Road is an east-west minor-arterial roadway under the jurisdiction of the Town of Whitchurch-Stouffville. It has a two lane rural cross section with a posted speed limit of 60 km/h. Sidewalks and cycling facilities are not provided. The Town of Whitchurch-Stouffville Transportation Master Plan identifies Bethesda Side Road as a rural arterial roadway.
York-Durham Line	York-Durham Line is a north-south minor-arterial roadway under the jurisdiction of York Region. It has a two lane rural cross section with a posted speed limit of 60 km/h. Sidewalks and cycling facilities are not provided.
Main Street	Main Street is an east-west major-arterial roadway under the jurisdiction of the Town of Whitchurch-Stouffville. It has a two lane urban cross section with curb and gutter, a posted speed limit of 40 km/h west of Tenth Line, and 50 km/h east of Tenth Line. Sidewalks are provided on both sides. Cycling facilities are not provided. The Town of Whitchurch-Stouffville Transportation Master Plan identifies Main Street as an urban arterial roadway.
Forsyth Farm Drive	Forsyth Farm Drive is an east-west local road under the jurisdiction of the Town of Whitchurch-Stouffville. It has a two lane urban cross section with a posted speed of 40 km/h. Sidewalk is provided on the south side of the road and there are no dedicated cycling facilities.

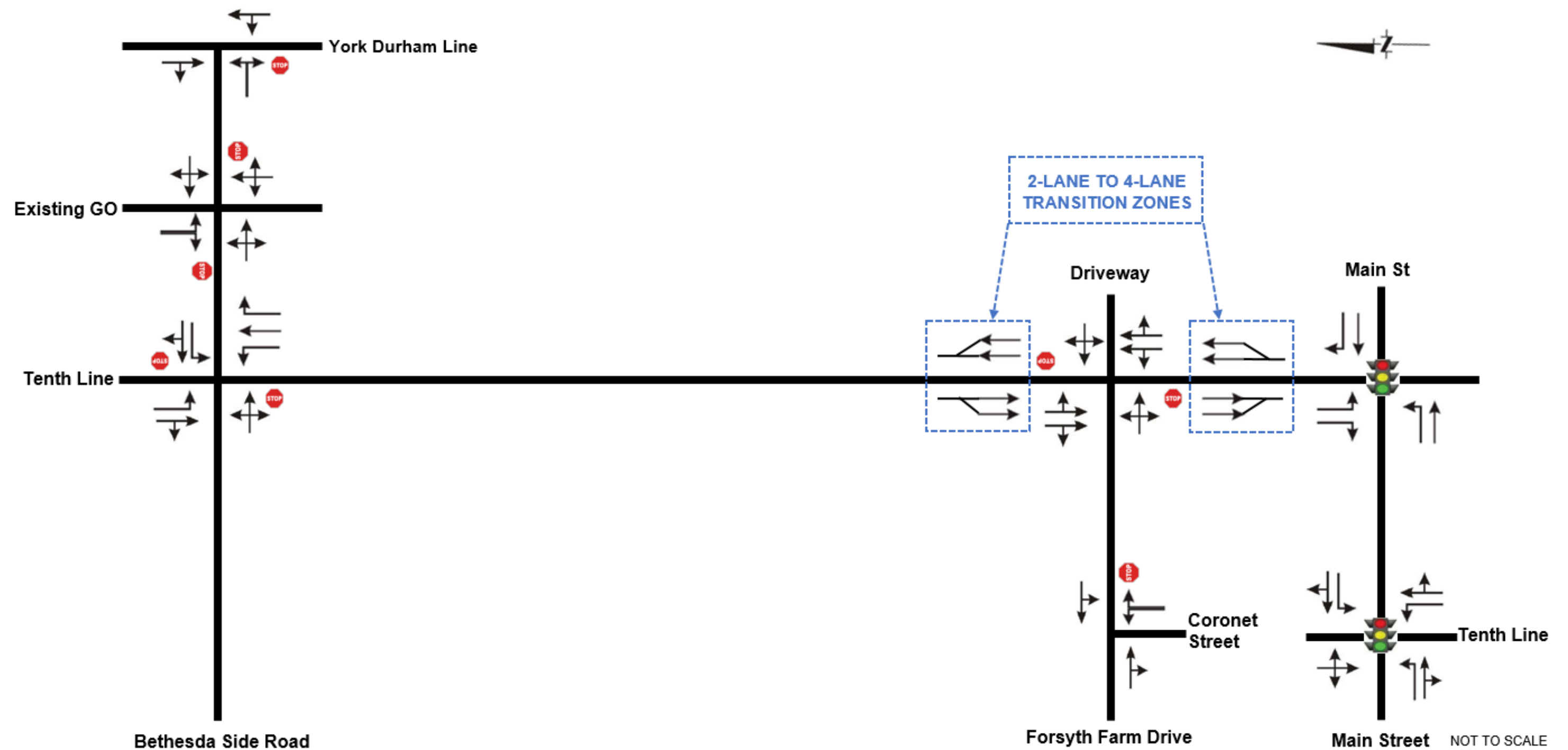


Exhibit 2: Existing Road Network

2.3 Transit Service

GO service is the only transit service that serves the surrounding area. Lincolnville GO has both rail service on the Stouffville Line and bus service via routes 70 and 71. Service is provided 7 days a week and is summarized below in **Table 2**. Rail service is only one-way with southbound service in the mornings and northbound service in the afternoons, which primarily serves ‘long’ distance commuter traffic.

Table 2: GO Service Summary

Service	Direction	Times		Headways	
		Weekdays	Weekend	Weekdays	Weekend
Rail	Northbound	4:30 – 20:30	23:30 – 1:30	30 min	1 hour
	Southbound	5:15 – 10:15	7:15 – 9:15	30 min	1 hour
Bus	Northbound	8:00 – 15:45, 21:30 – 3:30	8:40 – 3:40	30 min – 1 hour	30 min
	Southbound	11:00 – 1:10	6:10 – 1:10	30 min – 1 hour	1 hour

York Region Transit does not currently serve the local area.

2.4 Existing Traffic Volumes

Turning movement counts were commissioned by HDR and conducted on Wednesday February 5th, 2020 for all existing study intersections for the weekday AM and PM peak periods (7:00am to 9:00am and 4:00pm to 6:00pm).

The existing weekday AM and weekday PM peak hour turning movement volumes are illustrated in **Exhibit 3**. Individual intersection peak hour traffic volumes are shown for a most conservative approach, and presents the worst case from an operational perspective.



Exhibit 3: Existing Traffic Volumes

2.5 Existing Traffic Operations

Intersection operations were assessed based on the existing road network illustrated in **Exhibit 2** and existing traffic volumes shown in **Exhibit 3**. Operations are summarized in **Table 3** for study intersections.

Table 3: Existing Conditions Signalized Intersection Operations

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Tenth Line (north leg) / Main Street	B	0.20	B	0.27
Eastbound Left-turn	A	0.17	A	0.28
Eastbound Through	A	0.09	A	0.17
Westbound Through	A	0.14	A	0.15
Westbound Through-right	A	0.02	A	0.05
Southbound Left-turn	C	0.28	C	0.17
Southbound Right-turn	C	0.18	C	0.12
Tenth Line South (south leg) / Main Street	B	0.32	B	0.40
Eastbound Left-turn	A	0.00	A	0.00
Eastbound Through-right	A	0.27	B	0.41
Westbound Left-turn	A	0.21	A	0.19
Westbound Through-right	A	0.19	A	0.19
Northbound Left-turn	D	0.60	C	0.48
Northbound Through-right	C	0.05	C	0.12
Southbound Approach	C	0.00	C	0.03
York-Durham Line / Bethesda Side Road	<i>Stop Controlled</i>			
Eastbound Approach	B	0.06	A	0.06
Northbound Left-through	A	0.02	A	0.02
Southbound Through-right	-	0.22	-	0.15
Tenth Line / Bethesda Side Road	<i>Stop Controlled</i>			
Eastbound Approach	B	0.10	B	0.20
Westbound Left-turn	B	0.01	B	0.03
Westbound Through-right	B	0.05	B	0.06
Northbound Left-turn	A	0.03	A	0.01
Northbound Through	-	0.10	-	0.10
Northbound Right-turn	-	0.01	-	0.00
Southbound Left-turn	A	0.01	A	0.01

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Southbound Through-right	-	0.17	-	0.12
Tenth Line / Forsyth Farm Drive	<i>Stop Controlled</i>			
Eastbound Approach	B	0.21	B	0.08
Westbound Approach	B	0.03	B	0.05
Northbound Left-through	A	0.04	A	0.04
Northbound Through-right	-	0.05	-	0.05
Southbound Left-through	A	0.00	A	0.00
Southbound Through-right	-	0.08	-	0.08
Bethesda Side Road / Existing GO Access	<i>Stop Controlled</i>			
Eastbound Approach	A	0.00	A	0.00
Westbound Approach	-	0.00	-	0.00
Northbound Approach	A	0.00	A	0.00
Southbound Left-turn	A	0.00	A	0.00
Southbound Right-Turn	A	0.00	A	0.03
Forsyth Farm Drive / Coronet Street	<i>Stop Controlled</i>			
Eastbound Through-Right	-	0.07	-	0.03
Westbound Left-through	A	0.01	A	0.02
Northbound Approach	A	0.04	A	0.01

Notes: v/c – volume to capacity ratio, LOS – level of service

Under existing traffic conditions, all study intersections are operating well. There are no capacity deficiencies to note during either the weekday AM or PM peak periods which indicates that there is ample capacity on the surrounding road network.

All individual movements at signalized intersections are operating with level of service 'C' or better and with volume to capacity ratios less than or equal to 0.60. All individual movements at stop controlled intersections are operating with level of service 'B' or better and with volume to capacity ratios less than or equal to 0.22.

Detailed Synchro reports are provided in **Appendix A**.

3. 2025 Background Traffic Conditions

3.1 Planned Road Network Improvements

3.1.1 Transportation Master Plan

The Town's Transportation Master Plan ('TMP') recommended the following improvements within the study area:

- ⇒ Signalization of the Tenth Line and Forsyth Farm intersection;
- ⇒ Tenth Line improvements between Lincolnville GO Station and the southern Town boundary (subject to Environmental Assessment);
- ⇒ Streetlight installation along Tenth Line from Bethesda Side Road to Main Street;
- ⇒ A planned intersection improvement along Tenth Line, south of Bethesda Side Road, in the vicinity of the relocated GO station access;
- ⇒ Provision of Sidewalks along the west side of Tenth Line from Bethesda Side Road to a location south of Forsyth Farm Drive;
- ⇒ Interchange improvements at Tenth Line and Main Street; and,
- ⇒ Classification of Bethesda Side Road as a rural arterial roadway and classification of Tenth Line as an urban arterial.

Many of these improvements will be required due to development and intensification (traffic signals), while other improvements will support intensification and urbanization of the area (streetlights and sidewalks). These improvements are shown in **Exhibit 4** and **Exhibit 5**.

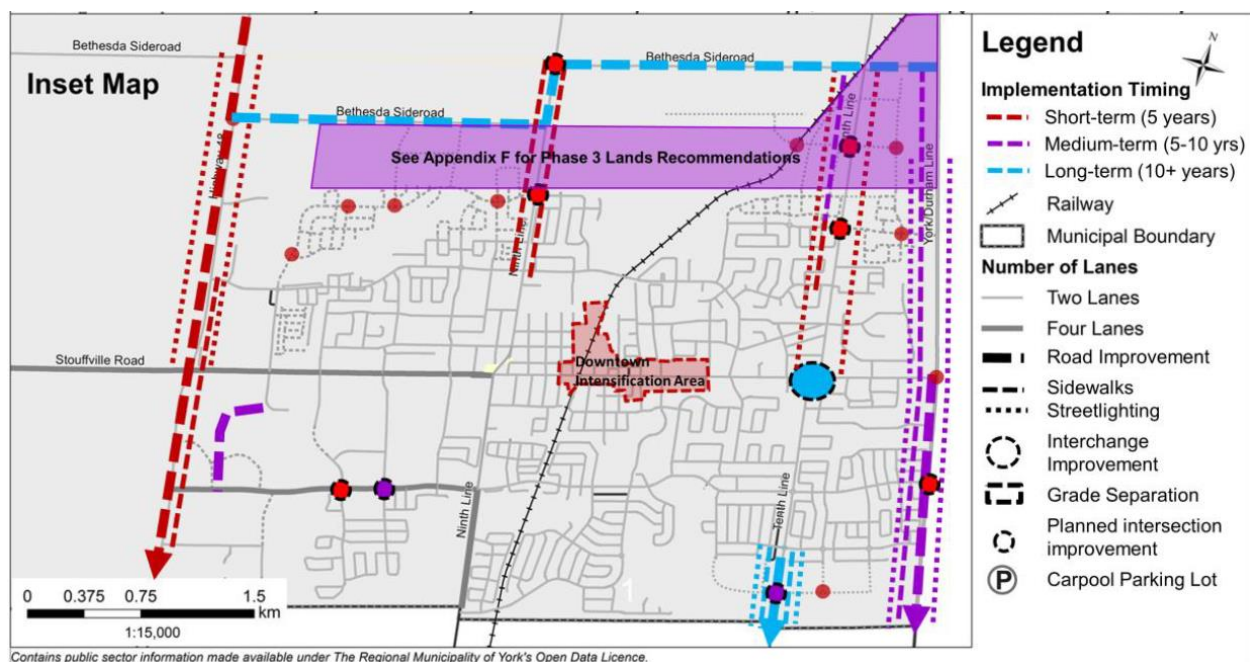


Exhibit 4: Whitchurch-Stouffville Transportation Master Plan Recommended Road Improvements

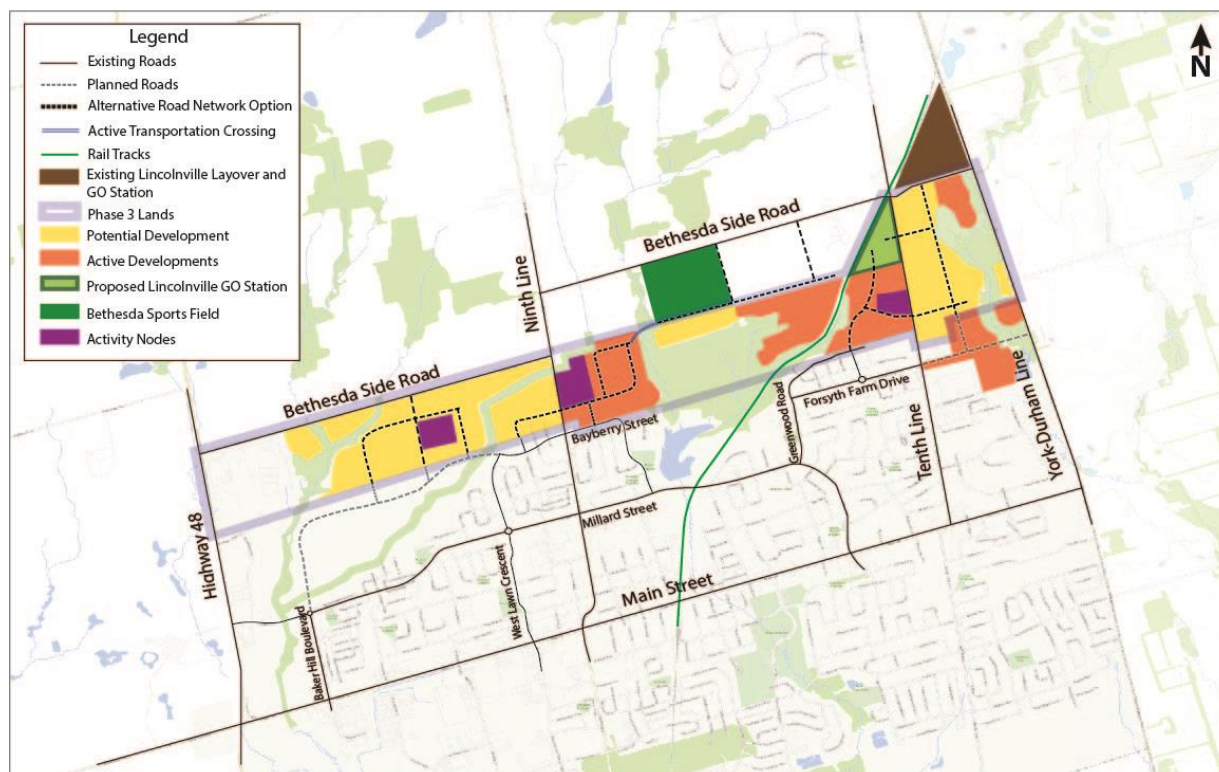


Exhibit 5: Whitchurch-Stouffville Transportation Master Plan Appendix F: Phase 3 Lands Recommended Network

For the purposes of this study, the timing of the above improvements is determined based on development triggers (i.e. either the short-term, or long-term development scenarios discussed in more detail in **Section 4.1**). Therefore, the 2025 background network is expected to remain the same as the existing road network that is depicted in **Exhibit 2**.

The TMP also identifies recommend road classifications for the roadways in the study area. This includes Tenth Line and Bethesda Side Road. The road classification map from the TMP is illustrated in **Exhibit 7**, while the following **Table 4** identifies the design requirements for these streets.

Table 4: Recommended Road Classification and Design Requirements

Street	Classification	Function	Design Requirements
Tenth Line	Urban Arterial	Serves local travel demands in urban areas	- Direct access from abutting properties is generally restricted - Maximum of four through lanes and two additional transit/HOV lanes, if required - Right-of-way width of 30 to 45 metres - Encourage separated or designated facilities for pedestrians and cyclists
Bethesda Side Road	Rural Arterial	Serve local travel demand and connect arterial and local roads	- Direct access from abutting properties permitted with some restrictions - Maximum two travel lanes - Right-of-way width 27 metres (89 feet) maximum

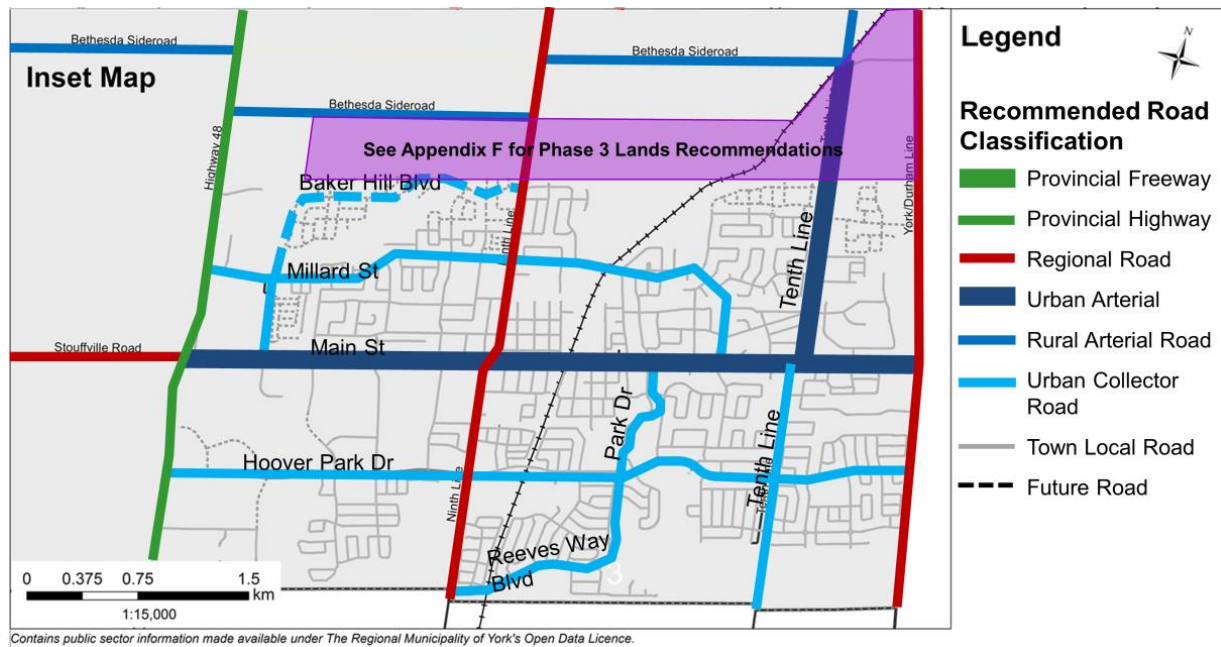


Exhibit 6: Whitchurch-Stouffville Transportation Master Plan Recommended Road Classifications

3.1.2 Active Transportation

The TMP recommended Tenth Line have a separated, in-boulevard bicycle facility and that Bethesda Side Road have a paved shoulder west of Tenth Line and shared route to the east of Tenth Line. Multi-use trails is also recommended running north-south along the east side of the rail corridor and through Zones 8, 6, and 7 in along the creek. Shared routes are also conceptually recommended within the MTSA lands. The recommended active transportation network will support the Town's existing mode share of walking and cycling in the new development areas, and may encourage a further shift in mode split.

The recommended network graphic from the TMP is shown below in **Exhibit 8**. It is noted that the Town completed a separate Active Transportation Servicing Plan which confirmed the recommendation on Tenth Line for a separated, in-boulevard bicycle facility. It is noted that best practices in cycling facilities have evolved over time to promote safer facilities for users of all ages and abilities, and thus a greater separation from vehicular traffic lanes where feasible.

The 2013 Functional Servicing Study by IBI identified the potential for a grade separated connection to the new GO Station, over the railway, connecting to Zone A.

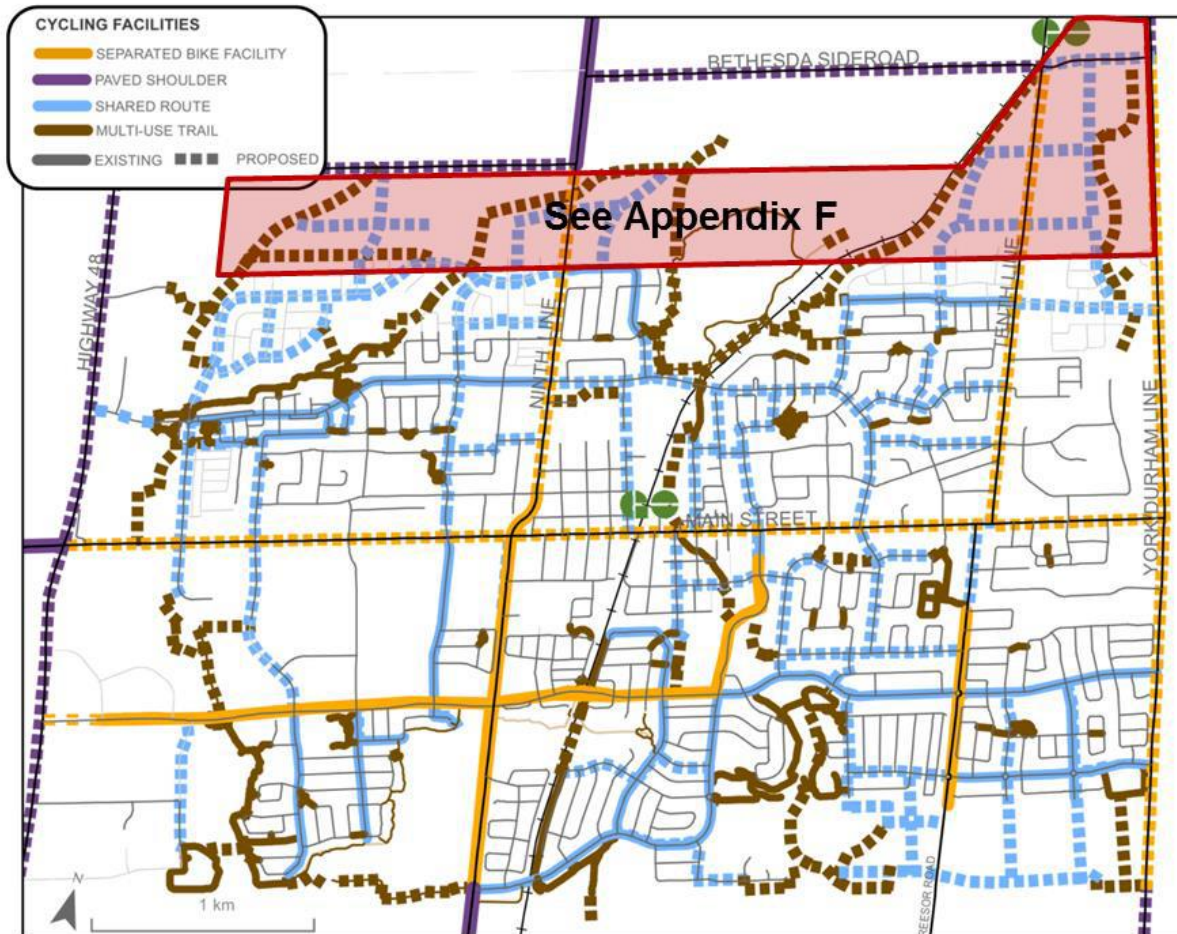


Exhibit 7: Whitchurch-Stouffville Transportation Master Plan Recommended Cycling Network

3.2 Background Traffic Growth

Future background traffic volumes are comprised of existing traffic volumes plus general background traffic growth, plus traffic associated with nearby developments. Available historical traffic volumes from the Town's Transportation Master Plan were compared to existing data to determine if there has been any major change in traffic patterns or general background growth since 2014. The data was compared for two intersections:

- ⇒ Tenth Line at Bethesda Side Road
- ⇒ Tenth Line at Forsyth Farm Drive

Overall traffic volumes have remained stable between 2014 and 2019. Although there were some fluctuations for individual movements which is expected, the overall peak hour traffic volumes for both study intersections remains essentially unchanged or have dropped slightly. Some movements may have experienced nominal growth of 2% per annum, but this applies to

volumes that are generally in the range of 100 vehicles and therefore represents a very small change in absolute magnitude of traffic volumes.

Considering that the study area is on the boundary of the Town's developable land area, the majority of growth will be a result of new developments. Background growth was not applied to existing traffic volumes to project future volumes.

3.3 Background Development Traffic

There are no background developments identified for inclusion in the traffic volume forecasts. Site generated traffic is expected to represent the large majority of the new traffic that will be using the surrounding road network under future conditions.

3.4 2025 Background Traffic Operations

Background traffic operations are expected to remain relatively stable and will therefore be the same as summarized in **Section 2.5**.

4. Development Concept

4.1 Development & Land Use Concept Plan

Future total conditions were assessed for a short-term scenario and a long-term scenario. The short-term scenario reflects relocation of the Lincolnville GO Station plus development in the MTSA and directly surrounding the MTSA (within an 800m radius. Another long-term scenario was assessed which reflects further potential development beyond the 2025 horizon year. The development and land use concept was developed by WSP and is summarized in **Table 5**. The site concept plan is shown in **Exhibit 8**.

Table 5: Study Area Population & Employment Estimates

Zone	Population Estimates ¹	Unit Estimates & Assumptions
Existing GO Facility		
11 (GO)	50 jobs; 567 parking spaces	Assume parking 40% ² utilized under existing conditions and 60% of commuters arrive during peak hour; assume employees continue to work under future conditions and arrive outside of peak hours
Major Transit Station Area (MTSA)		
1 (GO)	1,067 population; 50 jobs;	295 high-density residential units; 159 low-density residential units; GO Station vehicle trips taken from the Lincolnville GO Station Traffic Impact Study (Stantec, January 11 2019)
2	2,004 population; 170 jobs	318 high-density residential units; 456 low-density residential units; 6,300 m ² GFA
3	3,177 population	603 high-density residential units; 657 low-density residential units
Outside MTSA		
4	450 population	45 medium-density residential units; 120 low-density residential units
5	312 population	31 medium-density residential units; 83 low-density residential units
6	450 population	45 medium-density residential units; 120 low-density residential units
7	828 population	83 medium-density residential units; 221 low-density residential units
8	240 population	24 medium-density residential units; 64 low-density residential units
9	114 population	11 medium-density residential units; 30 low-density residential units
10	200 jobs	-
12	1,170 population	117 medium-density residential units; 312 low-density residential units

¹ Exclusive of work-from-home jobs

² [GO Rail Station Access Plan Final Report \(December 12, 2016\)](#)



Exhibit 8: Development and Land Use Concept Plan

Trips for the future development were generated following the methodology described below:

1. Trips to and from the existing Lincolnville GO Station were estimated and assigned to the network and then removed from the existing traffic volumes. Due to the low traffic volumes generated by the existing GO station from within the Town and the low traffic volumes along Bethesda Side Road east of Tenth Line, the trips were estimated using first principals to ensure that the removal of existing GO site traffic did not result in any negative volumes for existing turning movements;
2. Trips to and from the relocated Lincolnville GO Station were extracted from the report **Lincolnville GO Station Traffic Impact Study (Stantec, January 11 2019)** and added to the road network. The 2031 horizon site trips were used in the analysis. The Stantec report included a sensitivity analysis with a high estimate of GO station trips on the basis of the entire GO Station parking lot being occupied, however, under that scenario there would likely not be room for the other proposed land uses in Zone 1 and that high trip generation sensitivity analysis was not carried forward in this analysis;
3. Trips for the area including Zones 1 to 12 were generated and assigned to the network. **This scenario was assessed as the 2025 horizon year short-term development scenario;**
4. Trips for the broader study area were generated assuming additional growth and development, and assigned to the network on top of the medium-term site traffic. **This scenario was assessed as the long-term development scenario.**

The development of trips for each component is discussed in the next sections.

4.2 Existing Travel Patterns

In order to inform future assumptions on transportation choices such as mode of travel or origins and destinations of trips, the 2016 Transportation Tomorrow Survey (TTS) data for all of Whitchurch-Stouffville was reviewed.

The TTS is a household survey for the entire Greater Golden Horseshoe that collects information relating to transportation patterns including origins and destinations and mode choice. The survey is conducted by the University of Toronto Joint Program in Transportation and divides geographical areas into 'traffic zones' for the purposes of determining trip patterns from one zone to another. TTS results represent a target of 5% of all households and is then extrapolated based on census data to be representative of each traffic zone.

Since the study area is mainly undeveloped, traffic patterns for all of the town proper were aggregated and are used as proxy for the subject area. TTS zones used as reference are shown in **Exhibit 9**. Detailed TTS data and queries are provided in **Appendix B**.

4.2.1 Modal Split

Mode splits for the Town based on 2016 TTS data is summarized in **Table 6**.

Table 6: Existing Modal Split

Mode	Residential Mode Split		Non-Residential Mode Split	
	AM Peak Period	PM Peak Period	AM Peak Period	PM Peak Period
Transit	3%	7%	0%	0%
Vehicle Driver	68%	73%	100%	87%
Walk/Cycle	13%	6%	0%	7%
Vehicle Passenger/ School Bus/Taxi	16%	14%	0%	6%



Exhibit 9: Transportation Tomorrow Traffic Zones

As shown in **Table 6**, vehicle driver modal split for resident's is approximately 70% during the weekday AM and PM peak periods, while the transit modal split is between 3% and 7%, respectively. Walking, cycling and carpool accounts for 20% to 30% of trips.

Non-residential mode splits for those working in the Town are much more heavily concentrated on single occupant vehicle-use. TTS reports that there is essentially no transit modal split for non-residential employment trips, although there is a small number of active transportation or carpool trips occurring during the PM peak period.

This modal split breakdown is expected considering the lack of transit availability within the Town, particularly for employment trips destined to the Town. Although there were some variances on a zone-by-zone basis, there were no clear trends such as one zone having a notably higher transit modal split compared to other zones. These results are used to establish a floor value for transit modal split, with the expectation that the area surrounding the relocated Lincolnville GO may have higher transit modal splits due to the area being conducive to long-distance commuter style trips, particularly for trips destined towards Toronto during the morning peak period.

4.2.2 Vehicular Trip Distribution

The distribution for the residential and office components was based on the review of the information provided in the TTS and existing traffic patterns. Trip distributions were reviewed for outbound trips originating from households within these zones during the weekday AM peak period, and for trips destined to households in these zones during the weekday PM peak period. These directions of travel represent the majority of trips and therefore the predominant trip distribution. Trip distribution analysis for the non-residential uses was also determined using the same traffic zones of employment and the inverse travel pattern assumption. The trip distribution produced by TTS is summarized in **Table 7**. The AM and PM trip distribution was found to be the same.

Table 7: Site Traffic Distribution

To / From	New Site Trips	
	Residential	Employment
North	3%	2%
South	60%	60%
East	3%	2%
West	34%	36%
Total	100%	100%

The TTS indicates that approximately 30% of resident trips are destined to and from Toronto, which accounts for 50% of all trips to the south. These trips represent trips made by residents of the Town who work in Toronto. Approximately 20% of all resident trips during the AM and PM peak periods stay within the Town.

In contrast to this, only 12% to 13% of people who work in the Town live in Toronto, and only 15% of people who work in the Town also live in the Town. The employment trips are generally more distributed. In terms of assignment of trips on the study road network, many trips are constrained to traveling through or around the Town.

4.3 Site Traffic Generation

4.3.1 GO Station Relocation & Expansion

The relocation of the existing Lincolnville GO Station was addressed through the following methodology:

1. Trips associated with the existing GO station (Zone 11) were estimated based on first principals and information provided in the Metrolinx GO Retail Station Access Report;
2. The estimated trips were assigned to the study road network based on existing traffic patterns and expected origins and destinations of riders;
3. Trips for the existing GO station were then removed from the existing traffic volumes.
4. Trips to and from the relocated Lincolnville GO Station were extracted from the report **Lincolnville GO Station Traffic Impact Study (Stantec, January 11 2019)** and added to the road network; and,
5. Future site traffic generated in the next sections was layered on top of these adjusted traffic volumes.

During the process of estimating trips for the existing GO station, it appeared that a large number of trips were coming from and going to the north of the station. This is likely because the Stouffville GO Station serves residents within the Town proper, while residents from the broader area to the north tend to park and ride at Lincolnville GO Station. It was assumed that under future conditions, the origins and destinations of most riders arriving to the relocated station by vehicle would continue to represent residents living north of the study area, although some adjustments were made to account for an increased number of local origin trips.

The estimated trips are summarized in **Table 8** and shown in **Exhibit 10** and **Exhibit 11**. It was assumed that all morning trips would be inbound and that all afternoon trips would be outbound, and that employee trips would occur outside of peak hours.

Table 8: GO Station Peak Hour Trip Generation

Zone	Component	# Parking Spaces	% Peak Utilization	% Trips During Peak Hour	Weekday AM			Weekday PM		
					In	Out	Total	In	Out	Total
11	Existing GO	567	40%	60% / 70%	136	-	136	-	159	159
1	Relocated / Expanded GO	Taken from Lincolnville GO Station Traffic Impact Study (Stantec, January 11 2019)								



Exhibit 10: Existing Lincolnville GO Station Trips (Zone 11)

LINCOLNVILLE GO STATION TRAFFIC IMPACT STUDY
 Future Total Conditions
 January 11, 2019

Figure 16 – 2031 Future Total Volumes
 Weekday AM

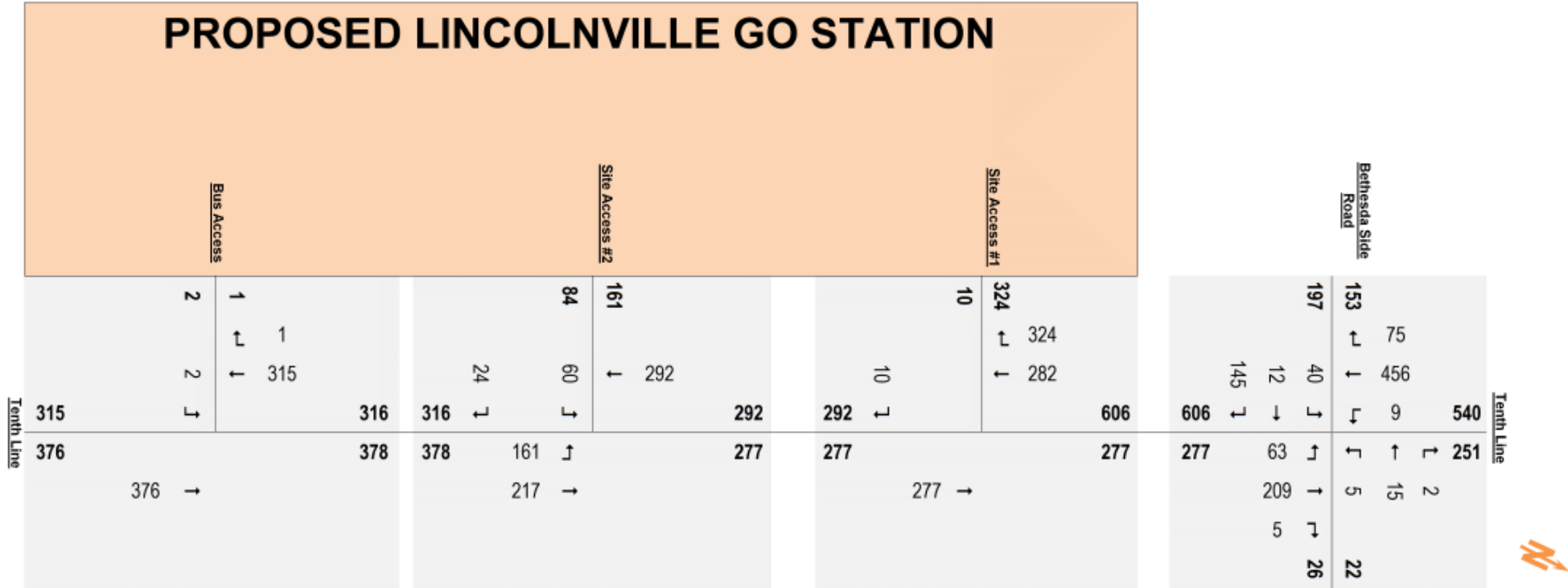
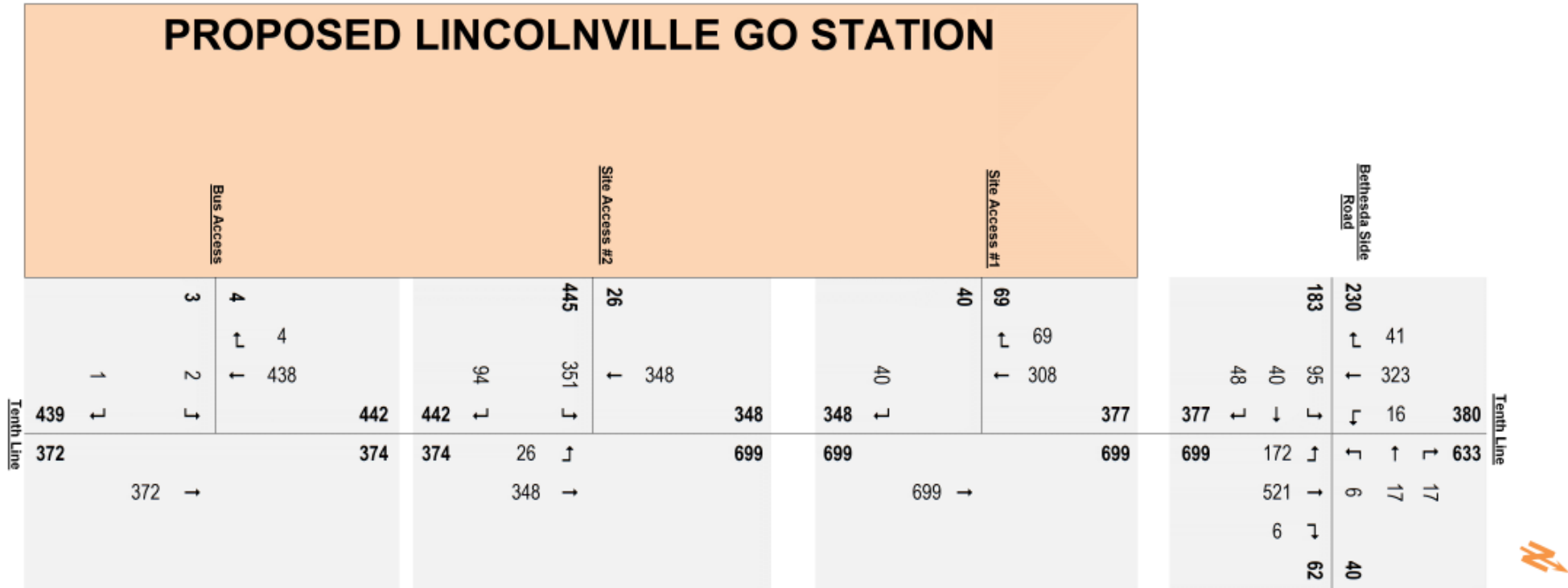


Figure 17 – 2031 Future Total Volumes
 Weekday PM



4.6

Exhibit 11: Future GO Station Trips (Zone 1) (Stantec Report)

4.3.2 Short-Term (2025 Horizon Year) Development

The 2025 horizon year development scenario includes traffic within Zones 1 to 12 as shown on **Exhibit 8**. The MTSA lands comprised in Zones 1, 2, and 3 are proposed to include high and medium density development which will include condominium apartments and townhouses. The land use concept for the lands in Zones 4 to 12 is generally comprised of low and medium density residential uses and some employment uses.

Trip generation for the residential and employment components were based on information provided in the publication **Trip Generation 10th Edition by the Institute of Transportation Engineers**. For residential uses within zones 1 to 3, the assumed non-vehicle mode split was assumed to be 10% and the transit split was assumed to be 15%. For residential uses within zones 4 to 12, the assumed non-vehicle mode split was assumed to be 10% and the transit split was assumed to be 10%. Compared to the existing condition which identified the current auto driver mode split as approximately 70%, , these assumptions apply a similar reduced non-vehicle mode reduction for the long-term development areas for a conservative estimate of future traffic volumes. There were also vehicle trip reductions applied to the office component.

In contrast to the area in the direct vicinity of the GO Station, the broader area residential land uses are assumed to be comprised of approximately 75% single-family detached housing, while the remaining 25% is assumed to be townhouse style units, and a 20% non-vehicle mode split adjustment was applied which is conservative compared to the existing modal splits identified by TTS. The final vehicular trip generation is summarized in **Table 9**.

Site traffic distribution was based on the existing conditions (see **Section 4.2**) since macroscopic traffic patterns are not expected to change. Some adjustments were made to account for route selection, which was influenced by the surrounding road network, how direct routes are and how that might affect route selection, and trip times provided by Google for each time period.

The short-term 2025 horizon year development site traffic is shown in for the MTSA lands is shown in **Exhibit 12**, traffic for the zones surrounding the MTSA is shown in **Exhibit 13**, the combined 2025 site traffic volumes are shown in **Exhibit 14**.

The 2025 horizon year total traffic volumes shown in **Exhibit 15** were derived by subtracting existing GO station volumes (**Exhibit 10**) from existing volumes (**Exhibit 3**), adding the new GO station volumes (**Exhibit 11**), and finally adding total site traffic volumes (**Exhibit 14**).

Table 9: 2025 Horizon Year Development Trip Generation

Zone	Land Use	# Units	Weekday AM			Weekday PM		
			In	Out	Total	In	Out	Total
1	Land Use Code 222 "Multifamily Housing (High-Rise)"	295	18	53	71	49	33	82
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	159	12	43	55	42	26	68
2	Land Use Code 222 "Multifamily Housing (High-Rise)"	318	19	59	78	54	35	89
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	456	35	119	154	110	63	173
	Land Use Code 710 "General Office Building"	68,000 SF	77	13	90	13	66	79
3	Land Use Code 222 "Multifamily Housing (High-Rise)"	603	34	104	138	100	63	163
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	657	50	166	216	150	89	239
MTSA (Zone 1-3) Subtotal			245	557	802	518	375	893
4	Land Use Code 210 "Single Family Detached"	120	18	54	72	60	37	97
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	45	5	13	18	13	9	22
5	Land Use Code 210 "Single Family Detached"	83	12	39	51	43	25	68
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	31	4	8	12	11	6	17
6	Land Use Code 210 "Single Family Detached"	120	18	54	72	60	37	97
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	45	5	13	18	13	9	22
7	Land Use Code 210 "Single Family Detached"	221	33	98	131	110	66	176
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	83	7	25	32	25	15	40
8	Land Use Code 210 "Single Family Detached"	64	10	30	40	34	19	53
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	24	3	6	9	9	4	13
9	Land Use Code 210 "Single Family Detached"	30	5	15	20	15	10	25
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	11	1	2	3	3	2	5
10	Land Use Code 710 "General Office Building"	200 Emp.	66	13	79	16	62	78
12	Land Use Code 210 "Single Family Detached"	312	45	137	182	154	91	245
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	117	11	32	43	34	19	53
Zone 4-12 Subtotal			243	539	782	600	411	1,011
2025 Total Vehicle Trips			488	1,096	1,584	1,118	786	1,904

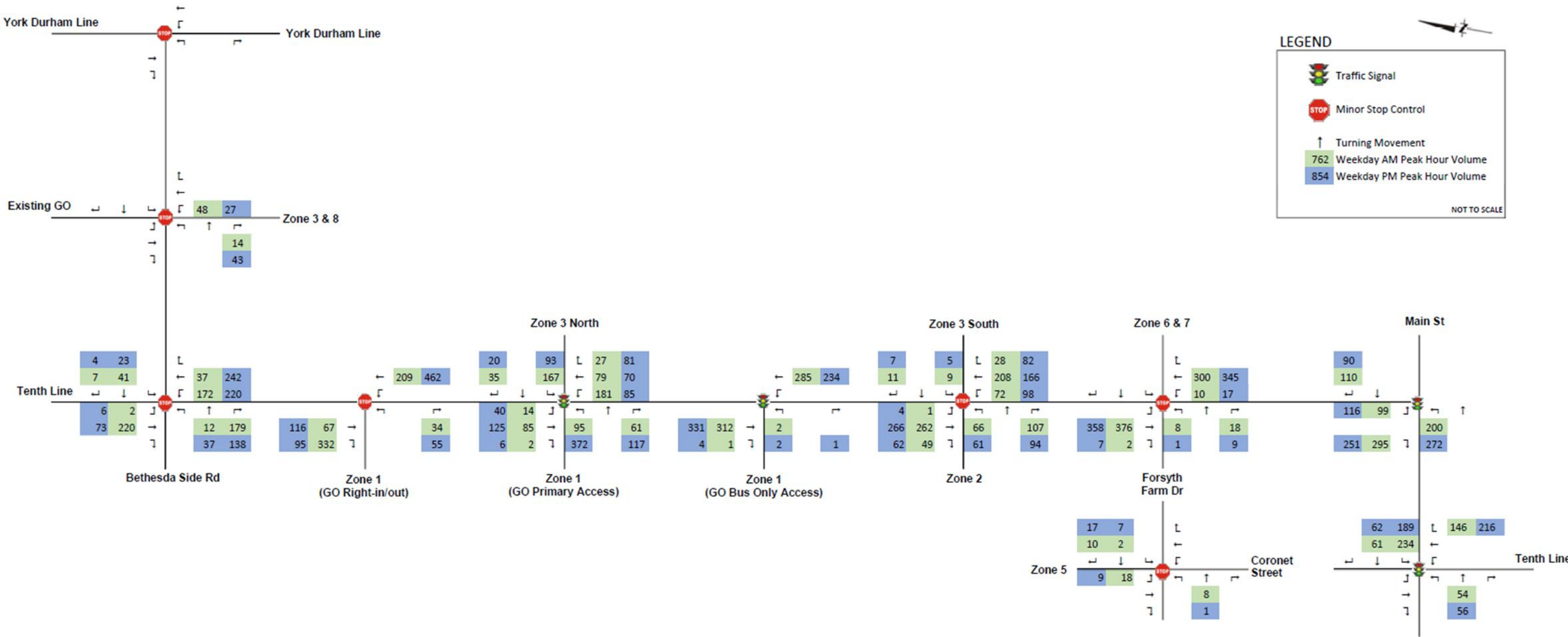


Exhibit 12: Major Transit Station Area Site Traffic

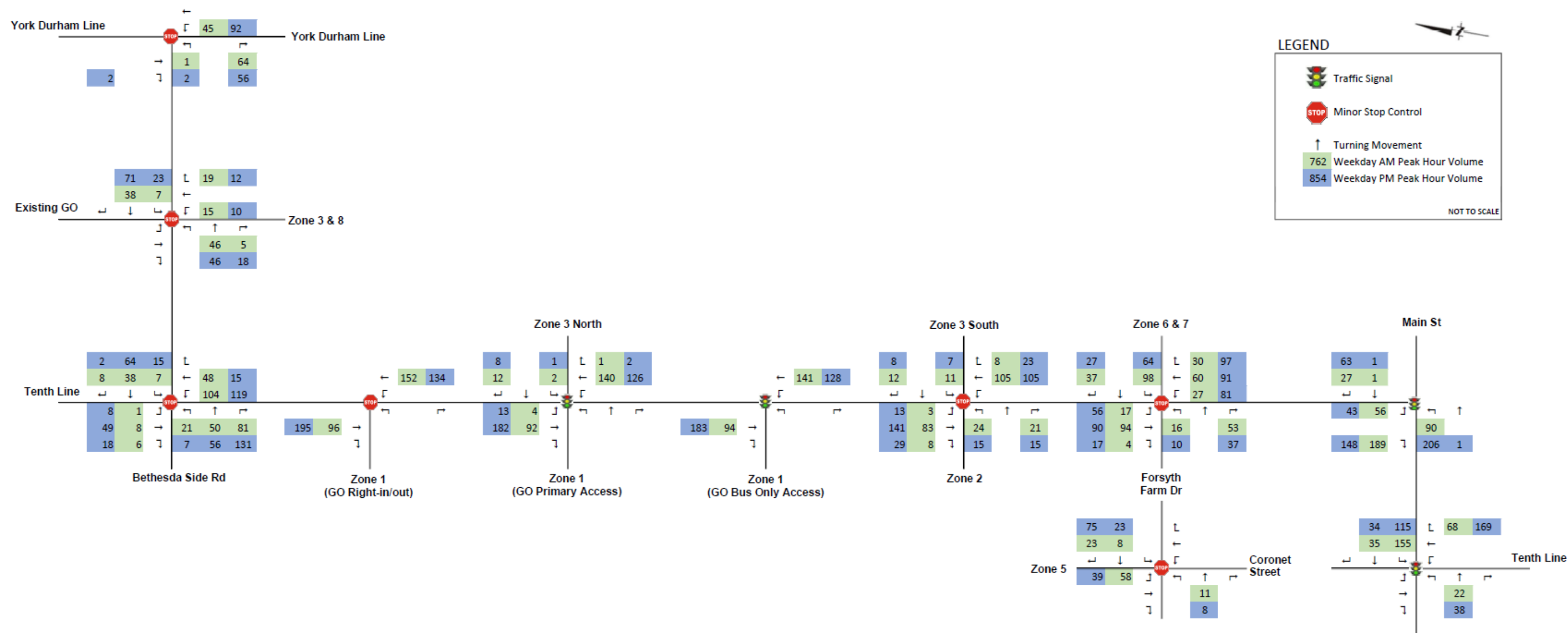


Exhibit 13: Zone 4-12 Site Traffic

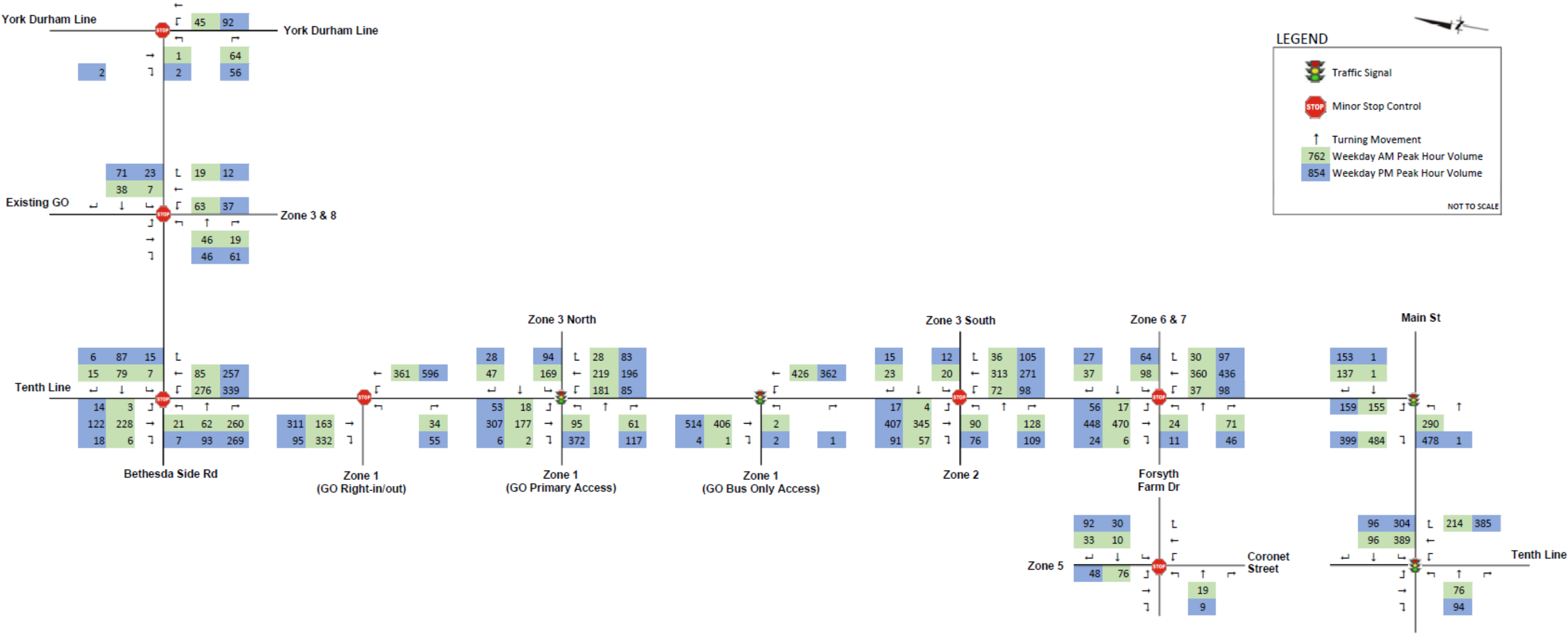


Exhibit 14: 2025 Horizon Site Traffic

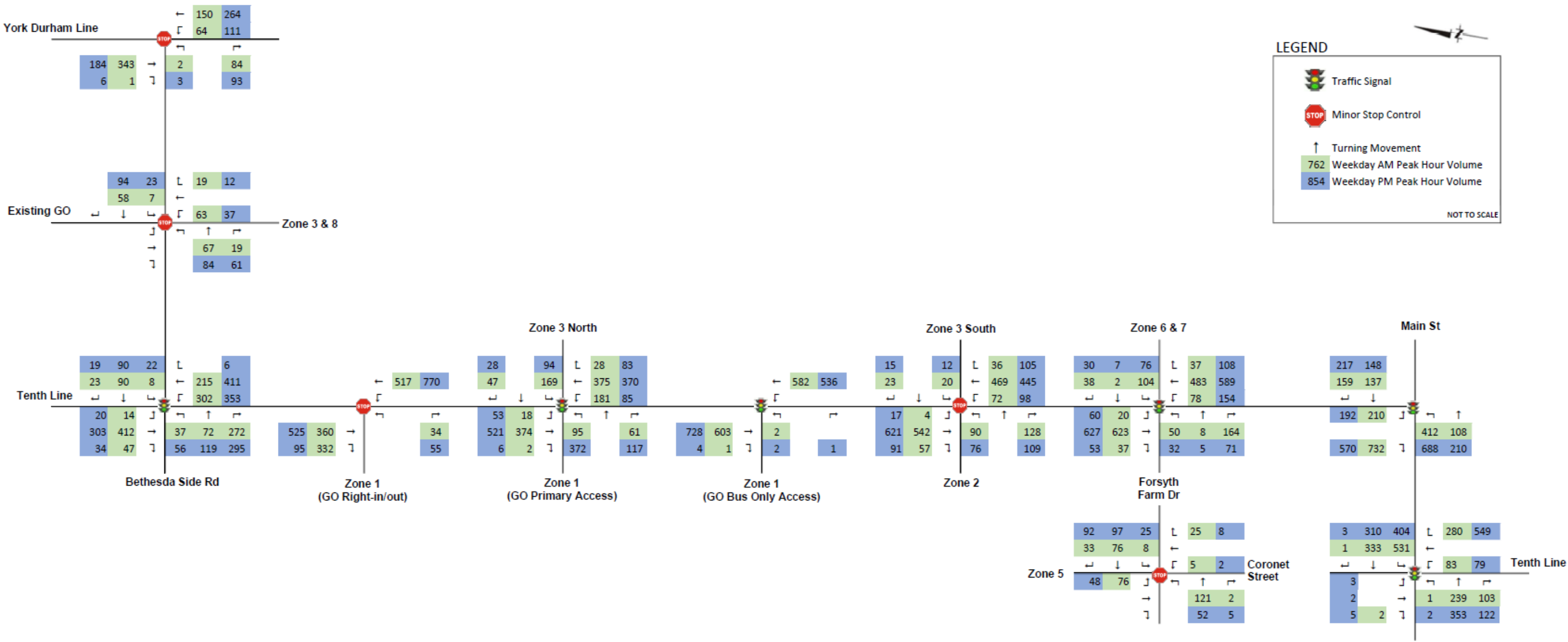


Exhibit 15: Short-Term (2025) Total Traffic Volumes

4.3.3 Long-Term Development

The long-term development scenario considers additional growth beyond the short-term scenario, and includes additional low and medium density residential uses.

Trip generation for the residential and employment components were based on information provided in the publication **Trip Generation 10th Edition by the Institute of Transportation Engineers**. For residential uses, the assumed non-vehicle mode split was assumed to be 10% and the transit split was assumed to be 10%. Compared to the existing condition which identified the current auto driver mode split as approximately 70%, these assumptions apply a similar reduced non-vehicle mode reduction for the long-term development areas for a conservative estimate of future traffic volumes.

In contrast to the area in the direct vicinity of the GO Station, the broader area residential land uses are assumed to be comprised of approximately 75% single-family detached housing, while the remaining 25% is assumed to be townhouse style units. The final vehicular trip generation is summarized in **Table 10**.

Site traffic distribution was based on the existing conditions (see **Section 4.2**) since macroscopic traffic patterns are not expected to change. Some adjustments were made to account for route selection, which was influenced by the surrounding road network, how direct routes are and how that might affect route selection, and trip times provided by Google for each time period.

Long-term development site traffic is shown in **Exhibit 16** and long-term total traffic volumes are shown in **Exhibit 17**. The long-term total traffic volumes were derived by adding the long-term development site traffic volumes (**Exhibit 16**) to the short-term total traffic volumes (**Exhibit 15**).

Table 10: Long-Term Development Trip Generation

Zone	Land Use	# Units	Weekday AM			Weekday PM		
			In	Out	Total	In	Out	Total
A, B	Land Use Code 210 "Single Family Detached"	890	128	387	515	422	247	669
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	334	29	93	122	88	52	140
C	Land Use Code 210 "Single Family Detached"	642	92	280	273	308	180	488
	Land Use Code 220 "Multifamily Housing (Low-Rise)"	241	20	69	89	65	39	104
Total Vehicle Trips			269	829	999	883	518	1,401

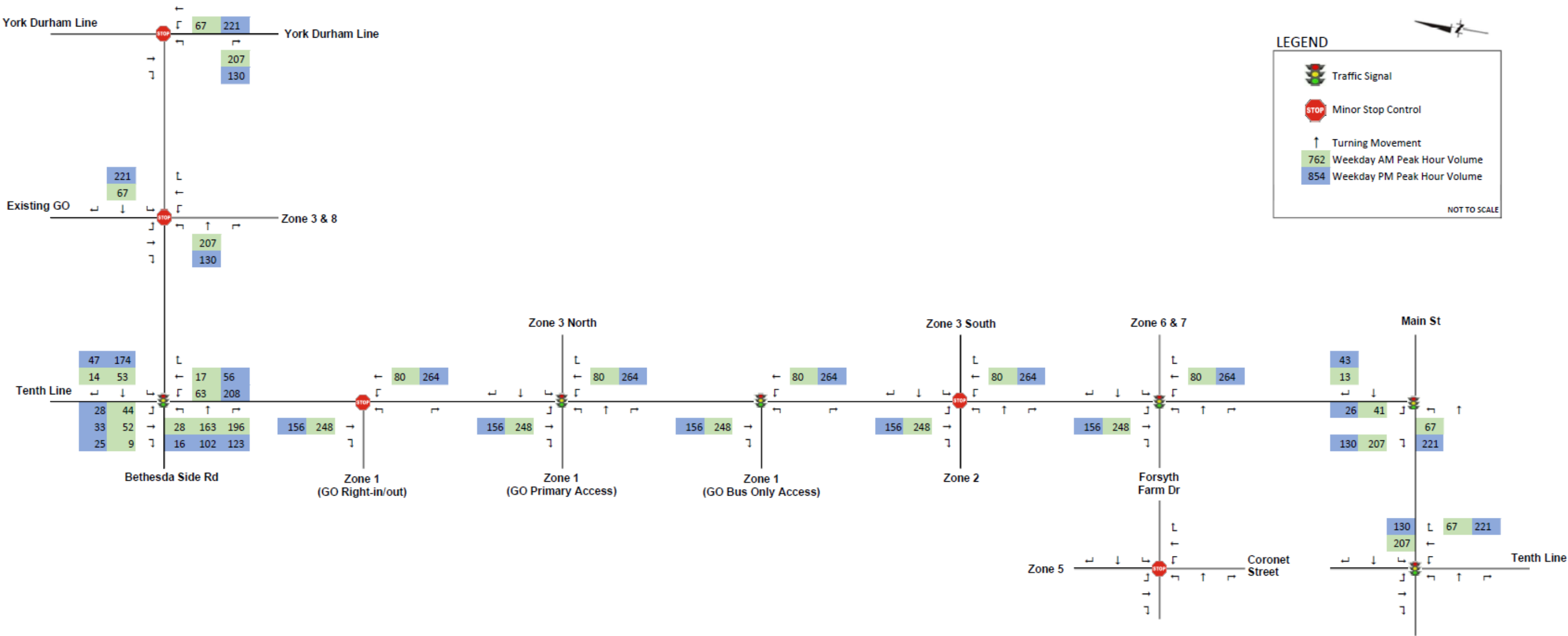


Exhibit 16: Long-Term Development Site Traffic

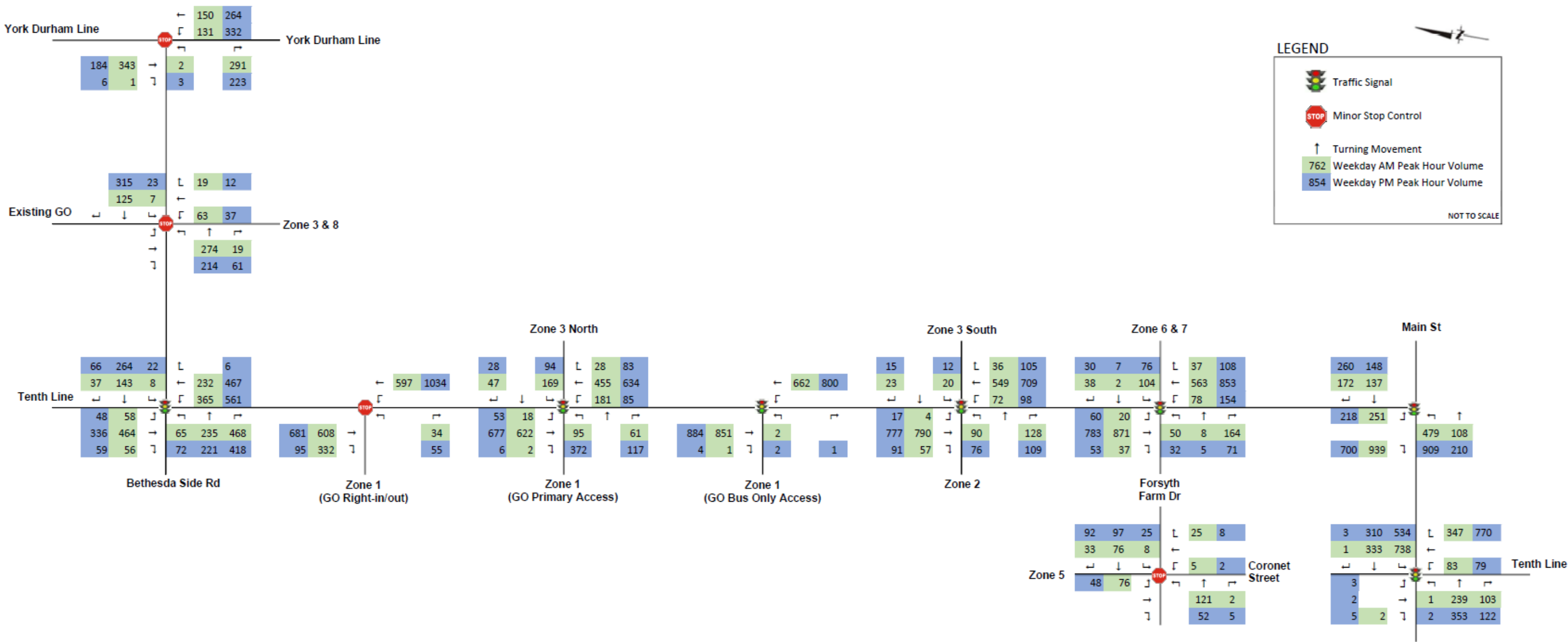


Exhibit 17: Long-Term Total Traffic Volumes

5. Total Traffic Conditions

5.1 2025 Horizon Year Traffic Operations

The 2025 Horizon Year development total traffic operations were analyzed based on the total traffic volumes shown in **Exhibit 15**. The following improvements are assumed starting from the north end of the study area (Bethesda Side Road) and working to the south (Forsyth Farm Drive):

1. A new access to Zone 3 is provided along Bethesda Side Road, east of Tenth Line, and opposite the existing GO Station driveway (on the south side of Bethesda Road). This connection is assumed to be stop-controlled;
2. A right-in/out access is proposed south of Bethesda Side Road and on the west side of Tenth Line as per the Stantec Lincolnville GO Station Traffic Impact Study. This access will provide general vehicular access to the GO Station but will also serve other residential and office uses within Zone 1;
3. A new access to is provided along Tenth Line south of the right-in/out access, and is meant to provide general vehicle access to the relocated GO Station and Zone 1 on the west side of Tenth Line, and Zone 3 on the east side of Tenth Line. This access is assumed to be signalized based on the findings of the Stantec Lincolnville GO Station Traffic Impact Study. The Town's Transportation Master Plan identified improvements at this intersection but did not identify the type of improvements;
4. To the south of the new signalized intersection is another proposed bus only signalized access. This intersection is assumed to be under signal control according to the Stantec Lincolnville GO Station Traffic Impact Study;
5. A new access to Zones 2 and 3 is provided along Tenth Line south of the proposed bus only entrance. This connection is initially assumed to be stop controlled on the minor approach only but will have left-turn lanes provided on all approaches;
6. An extension of Coronet Street, on the north side of Forsyth Farm Drive and 115 metres west of Tenth Line, is proposed to extend through Zone 5 and towards Zone 2. This new connection will be stop controlled on the minor (north-south approaches);
7. A connection into Zone 4 is proposed via an extension of Noah's Farm Trail near Greenwood Drive; and,
8. Eastbound and westbound left-turn lanes are provided at Forsyth Farm Drive.

The 2025 horizon year road network is depicted in **Exhibit 18** and operations are summarized in **Table 11**. Unless otherwise stated, the initial assumed mode of control is stop control. Detailed HCM output sheets generated by Synchro are provided in **Appendix C**.

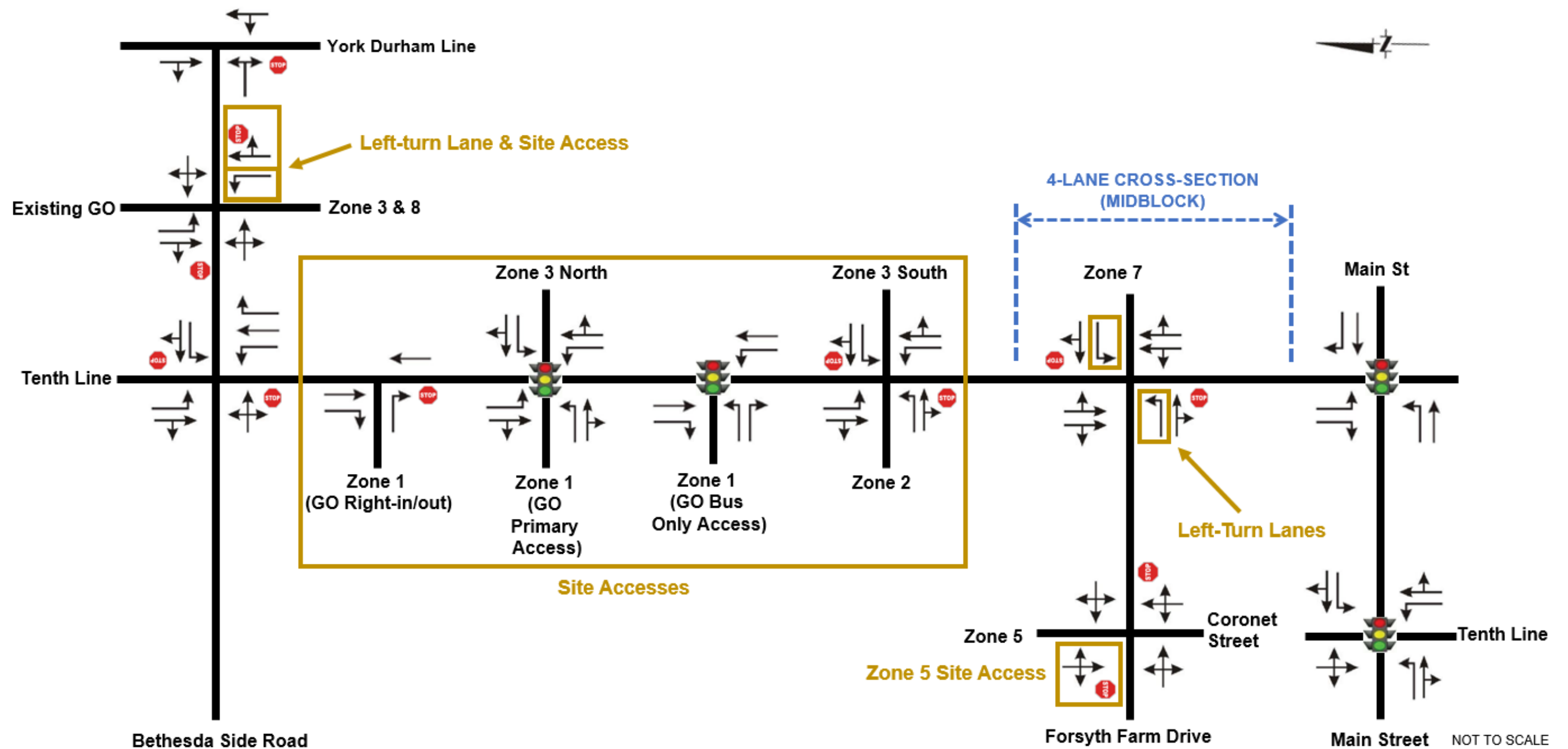


Exhibit 18: Analyzed 2025 Horizon Year Base Road Network

Table 11: Total Traffic 2025 Horizon Year Intersection Operations

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Tenth Line (north leg) / Main Street	C	0.63	C	0.84
Eastbound Left-turn	A	0.60	B	0.84
Eastbound Through	A	0.10	A	0.18
Westbound Through	B	0.21	C	0.26
Westbound Right-turn	B	0.12	C	0.16
Southbound Left-turn	C	0.61	D	0.67
Southbound Right-turn	C	0.56	C	0.40
Tenth Line South (south leg) / Main Street	B	0.77	C	0.73
Eastbound Left-turn	B	0.00	B	0.00
Eastbound Through-right	C	0.51	C	0.65
Westbound Left-turn	B	0.78	B	0.75
Westbound Through-right	A	0.27	A	0.27
Northbound Left-turn	D	0.51	D	0.45
Northbound Through-right	D	0.20	D	0.48
Southbound Approach	C	0.00	C	0.05
York-Durham Line / Bethesda Side Road	<i>Stop Controlled</i>			
Eastbound Approach	B	0.14	B	0.14
Northbound Left-through	A	0.06	A	0.09
Southbound Through-right	-	0.22	-	0.13
Tenth Line / Bethesda Side Road	<i>Stop Controlled</i>			
Eastbound Approach	F	Error	F	Error
Westbound Left-turn	F	1.39	F	Error
Westbound Through-right	F	1.21	F	1.48
Northbound Left-turn	B	0.32	A	0.33
Northbound Through	-	0.14	-	0.26
Northbound Right-turn	-	0.00	-	0.00
Southbound Left-turn	A	0.01	A	0.02
Southbound Through-right	-	0.30	-	0.21
Tenth Line / Forsyth Farm Drive	<i>Stop Controlled</i>			
Eastbound Left-turn	F	0.70	F	0.51
Eastbound Through-right	C	0.45	C	0.20

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Westbound Left-turn	F	2.51	F	1.40
Westbound through-right	B	0.09	C	0.17
Northbound Left-through	A	0.11	A	0.18
Northbound Through-right	-	0.20	-	0.25
Southbound Left-through	A	0.03	A	0.07
Southbound Through-right	-	0.25	-	0.22
Bethesda Side Road / Zone 3 & 8 Access	<i>Stop Controlled</i>			
Eastbound Approach	-	0.00	-	0.00
Westbound Approach	A	0.01	A	0.02
Northbound Left-turn	A	0.09	B	0.06
Northbound Through-right	A	0.02	A	0.01
Southbound Left-turn	A	0.00	A	0.00
Southbound Right-turn	A	0.00	A	0.00
Tenth Line / Zone 1 (GO) & Zone 3 Access	B	0.51	B	0.78
Eastbound Left-turn	B	0.39	C	0.85
Eastbound Through-right	B	0.04	B	0.08
Westbound Left-turn	C	0.70	B	0.23
Westbound Through-right	B	0.03	B	0.02
Northbound Left-turn	A	0.38	B	0.42
Northbound Through-right	A	0.44	B	0.62
Southbound Left-turn	A	0.04	B	0.20
Southbound Through-right	A	0.41	B	0.73
Tenth Line / Zone 2 & 3 Access	<i>Stop Controlled</i>			
Eastbound Left-turn	F	0.95	F	1.17
Eastbound Through-right	C	0.29	C	0.29
Westbound Left-turn	F	0.34	F	0.30
Westbound Through-right	B	0.05	B	0.03
Northbound Left-turn	A	0.09	B	0.14
Northbound Through-right	-	0.33	-	0.36
Southbound Left-turn	A	0.00	A	0.02
Southbound Through-right	-	0.39	-	0.47
Tenth Line / GO Bus Access	A	0.42	A	0.51
Eastbound Approach	C	0.07	C	0.06

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Northbound Left-turn	-	0.00	-	0.00
Northbound Through	A	0.41	A	0.38
Southbound Through	A	0.43	A	0.52
Southbound Right-turn	A	0.00	A	0.00
Forsyth Farm Drive / Coronet Street	<i>Stop Controlled</i>			
Eastbound Approach	-	0.00	-	0.00
Westbound Approach	A	0.01	A	0.02
Northbound Approach	A	0.04	A	0.01
Southbound Approach	B	0.13	B	0.08
Tenth Line / GO Right-in/out Access	<i>Stop Controlled</i>			
Eastbound Right-turn	B	0.06	B	0.12

Notes: v/c – volume to capacity ratio, LOS – level of service

Under 2025 horizon year conditions most study intersections will be operating well. However, some individual movements will be operating at level of service ‘E’ or ‘F’, as follows:

- ⇒ Tenth Line and Access to Zone 2 and 3 (unsignalized):
 - ↳ The eastbound and westbound left-turns will experience delays during both peak hours and will be operating with level of service ‘E’ or ‘F’ and the eastbound left-turn will have a volume to capacity ratio of 0.95 and 1.17 during the AM and PM peak hours, respectively. A signal is not warranted at this location based on projected traffic volumes, and volumes for these movements are less than 100 vehicles per hour. Drivers will have the option of using the Forsyth Farm Drive traffic signal to perform the outbound left-turn, adjust route choice to the south by turning right, or heading west internally via Greenwood Road. Signalization is not recommended to support the 2025 horizon year.
- ⇒ Tenth Line / Bethesda Side Road (unsignalized):
 - ↳ The eastbound and westbound approaches will have high delays (level of service F) and will be operating at capacity. This intersection will benefit from signalization to provide more capacity to the minor approach movements and to reduce delays.
- ⇒ Tenth Line / Forsyth Farm Drive (unsignalized):
 - ↳ The eastbound and westbound left-turns will require dedicated left-turn lanes, and even with dedicated turn lanes the eastbound and westbound left-turns will have high delays (level of service F) and will be operating at capacity. This intersection will benefit from signalization to provide more capacity to the minor approach movements and to reduce delays.

Operations for Tenth Line at Forsyth Farm Drive as well as at Bethesda Side Road under traffic signal control are summarized in **Table 12**.

Table 12: Total Traffic 2025 Horizon Year Intersection Operations (Recommended Improvements)

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Tenth Line / Bethesda Side Road	C	0.83	C	0.90
Eastbound Approach	C	0.71	D	0.88
Westbound Left-turn	B	0.07	B	0.19
Westbound Through-right	B	0.27	B	0.22
Northbound Left-turn	C	0.81	B	0.82
Northbound Through	A	0.22	B	0.51
Northbound Right-turn	-	0.00	A	0.00
Southbound Left-turn	B	0.05	B	0.07
Southbound Through-right	C	0.86	B	0.62
Tenth Line / Forsyth Farm Drive	A	0.43	A	0.35
Eastbound Left-turn	B	0.23	C	0.18
Eastbound Through-right	B	0.25	C	0.07
Westbound Left-turn	C	0.60	C	0.43
Westbound through-right	B	0.04	C	0.05
Northbound Left-turn	A	0.26	A	0.34
Northbound Through-right	A	0.30	A	0.29
Southbound Left-turn	A	0.05	A	0.13
Southbound Through-right	A	0.37	A	0.29

Notes: v/c – volume to capacity ratio, LOS – level of service

As shown above, operations for both intersections will be acceptable with signalization. The eastbound approach at Bethesda Side Road and Tenth Line will have a volume to capacity ratio of 0.88 in the shared approach lane, but will have residual capacity. Optimized timings are provided in **Appendix C**. The recommended 2025 road network reflecting the above improvements is shown in **Exhibit 19**. This network is carried forward to the long-term analysis.

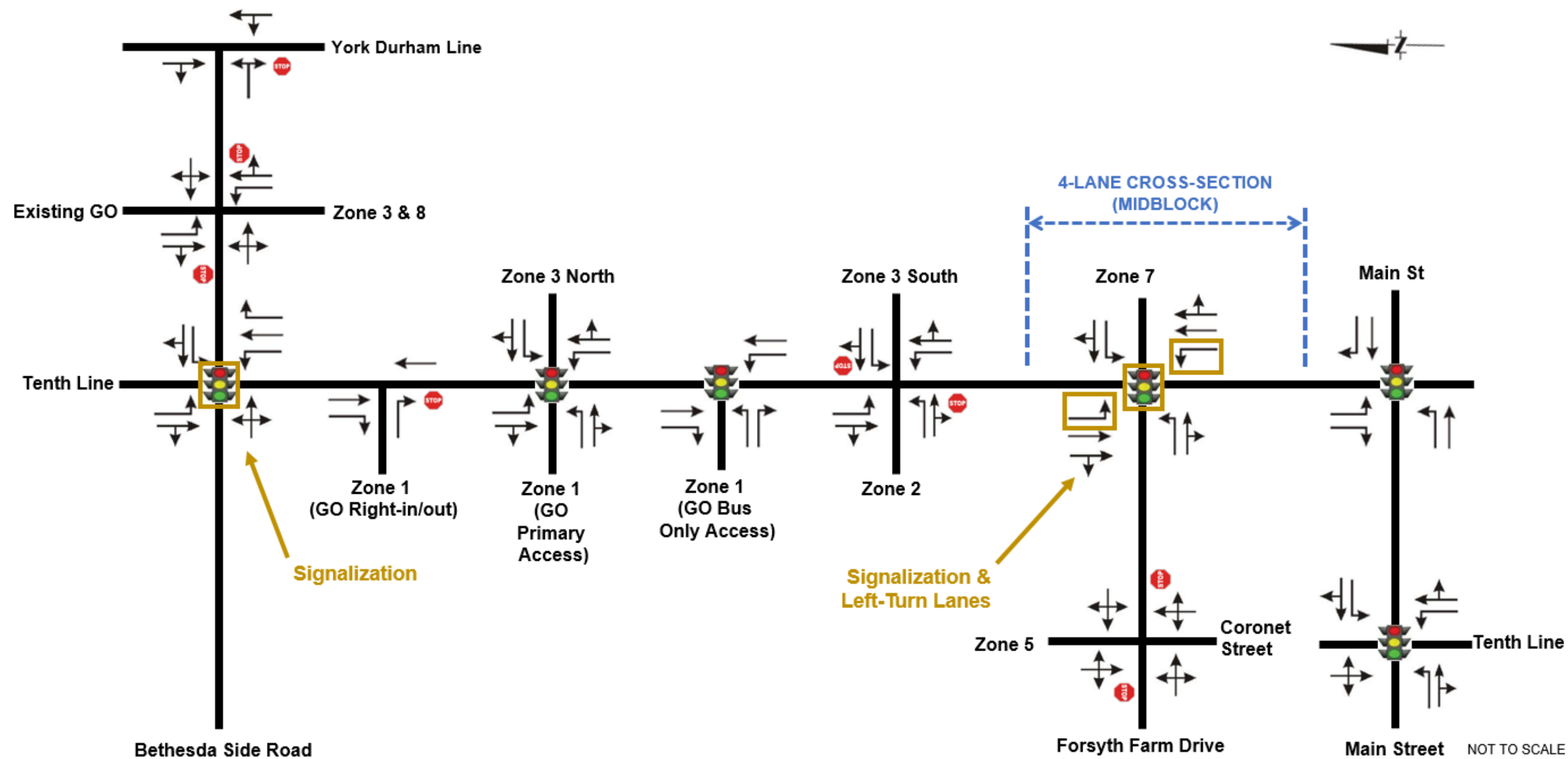


Exhibit 19: Analyzed 2025 Horizon Year Development Road Network (with Recommended Improvements)

5.2 Long-Term Development Traffic Operations

Long-term development total traffic operations were analyzed based on the total traffic volumes shown in **Exhibit 17**. The future road network is assumed to remain unchanged, with the exception of the improvements reflected in **Exhibit 19** which includes signalization of Bethesda Side Road at Tenth Line, as well as Tenth Line at Forsyth Farm Drive.

Operations are summarized in **Table 13** based on the long-term development road network depicted in **Exhibit 19** and. Detailed HCM output sheets generated by Synchro are provided in **Appendix C**.

Table 13: Total Traffic Long-Term Development Intersection Operations

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Tenth Line (north leg) / Main Street	D	0.94	D	1.02
Eastbound Left-turn	C	0.85	E	1.05
Eastbound Through	B	0.13	A	0.18
Westbound Through	C	0.28	C	0.35
Westbound Right-turn	C	0.13	C	0.19
Southbound Left-turn	C	0.46	D	0.74
Southbound Right-turn	E	0.96	D	0.49
Tenth Line South (south leg) / Main Street	D	0.95	E	1.06
Eastbound Left-turn	C	0.00	C	0.01
Eastbound Through-right	D	0.76	F	1.01
Westbound Left-turn	D	0.99	F	1.06
Westbound Through-right	A	0.27	A	0.30
Northbound Left-turn	D	0.52	C	0.26
Northbound Through-right	D	0.25	E	0.97
Southbound Approach	C	0.00	C	0.02
York-Durham Line / Bethesda Side Road	<i>Stop Controlled</i>			
Eastbound Approach	C	0.47	B	0.33
Northbound Left-through	A	0.12	A	0.28
Southbound Through-right	-	0.22	-	0.13
Tenth Line / Bethesda Side Road	F	1.23	F	1.31
Eastbound Approach	F	1.18	F	1.18
Westbound Left-turn	B	0.05	B	0.14
Westbound Through-right	B	0.26	C	0.49
Northbound Left-turn	F	1.21	F	1.35

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Northbound Through	B	0.30	C	0.67
Northbound Right-turn	-	0.00	B	0.00
Southbound Left-turn	C	0.25	C	0.22
Southbound Through-right	F	1.23	F	1.14
Tenth Line / Forsyth Farm Drive	A	0.53	A	0.41
Eastbound Left-turn	B	0.24	C	0.18
Eastbound Through-right	C	0.45	C	0.07
Westbound Left-turn	C	0.61	C	0.43
Westbound through-right	B	0.04	C	0.05
Northbound Left-turn	A	0.39	A	0.41
Northbound Through-right	A	0.34	A	0.41
Southbound Left-turn	A	0.06	A	0.18
Southbound Through-right	A	0.51	A	0.36
Bethesda Side Road / Zone 3 & 8 Access	<i>Stop Controlled</i>			
Eastbound Approach	-	0.00	-	0.00
Westbound Approach	A	0.01	A	0.02
Northbound Left-turn	B	0.14	C	0.11
Northbound Through-right	B	0.03	A	0.02
Southbound Left-turn	A	0.00	A	0.00
Southbound Right-turn	A	0.00	A	0.00
Tenth Line / Zone 1 & 3 Access	B	0.68	C	0.87
Eastbound Left-turn	B	0.39	D	0.93
Eastbound Through-right	B	0.04	B	0.08
Westbound Left-turn	C	0.70	B	0.26
Westbound Through-right	B	0.03	B	0.02
Northbound Left-turn	B	0.67	C	0.56
Northbound Through-right	A	0.53	C	0.84
Southbound Left-turn	A	0.05	B	0.41
Southbound Through-right	B	0.68	C	0.80
Tenth Line / Zone 2 & 3 Access	<i>Stop Controlled</i>			
Eastbound Left-turn	F	2.61	F	3.78
Eastbound Through-right	C	0.44	C	0.37
Westbound Left-turn	F	1.23	F	1.14

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Westbound Through-right	B	0.05	C	0.05
Northbound Left-turn	B	0.13	B	0.17
Northbound Through-right	-	0.38	-	0.53
Southbound Left-turn	A	0.00	A	0.02
Southbound Through-right	-	0.55	-	0.57
Tenth Line / GO Bus Access	A	0.60	A	0.60
Eastbound Approach	C	0.07	D	0.08
Northbound Left-turn	-	0.00	-	0.00
Northbound Through	A	0.47	A	0.55
Southbound Through	A	0.61	A	0.61
Southbound Right-turn	A	0.00	A	0.00
Forsyth Farm Drive / Coronet Street	<i>Stop Controlled</i>			
Eastbound Approach	-	0.00	-	0.00
Westbound Approach	A	0.01	A	0.02
Northbound Approach	A	0.04	A	0.01
Southbound Approach	B	0.13	B	0.08
Tenth Line / GO Right-in/out Access	<i>Stop Controlled</i>			
Eastbound Right-turn	B	0.07	B	0.14

Notes: v/c – volume to capacity ratio, LOS – level of service

Under long-term development conditions most study intersections will be operating well. However, there will be some intersections operating at or near capacity:

- ⇒ Tenth Line and Access to Zone 2 and 3 (unsignalized):
 - ↳ The eastbound and westbound left-turns will experience delays during both peak hours and will be operating with level of service 'F' and the eastbound left-turn and westbound left-turn will have volume to capacity ratios well over 1.00. These movements will experience long delays and queues. A signal is not warranted at this location based on projected traffic volumes, and volumes for these movements are less than 100 vehicles per hour.
 - ↳ Despite traffic signal warrant not being met, based on the significant delay and capacity deficiency for east-west movements, the distance between intersections along Tenth Line, and the need to provide protected crossings of Tenth Line for pedestrians and cyclists, a traffic signal at this location is recommended.
- ⇒ Tenth Line at Bethesda Side Road
 - ↳ Several movements will be operating at capacity and with level of service 'F'. An exclusive eastbound right-turn lane is recommended to accommodate the

heavy eastbound right-turn volume that is mostly caused by additional development. The provision of an exclusive eastbound right-turn lane along with signal split optimization frees capacity for all intersections movements.

Traffic operations for Bethesda Side Road with the above improvements is shown in **Table 14**. Optimized signal timings are provided in **Appendix C**. The recommended long-term road network is shown in **Exhibit 20**.

Table 14: Total Traffic Long-Term Development Intersection Operations (Recommended Improvements)

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Tenth Line / Bethesda Side Road	C	0.95	E	1.04
Eastbound Left-through	D	0.85	F	1.01
Eastbound Right-turn	C	0.49	D	0.56
Westbound Left-turn	B	0.06	C	0.13
Westbound Through-right	C	0.44	D	0.66
Northbound Left-turn	D	0.92	E	1.03
Northbound Through	A	0.23	B	0.50
Northbound Right-turn	-	0.00	B	0.00
Southbound Left-turn	B	0.19	C	0.20
Southbound Through-right	D	0.94	F	0.98
Tenth Line / Zone 2 & 3 Access	A	0.70	A	0.68
Eastbound Left-turn	C	0.52	C	0.49
Eastbound Through-right	C	0.09	C	0.08
Westbound Left-turn	C	0.13	C	0.08
Westbound Through-right	C	0.02	C	0.01
Northbound Left-turn	A	0.30	A	0.37
Northbound Through-right	A	0.51	A	0.67
Southbound Left-turn	A	0.01	A	0.06
Southbound Through-right	A	0.74	A	0.72

Notes: v/c – volume to capacity ratio, LOS – level of service

As shown above, the intersection of Bethesda Side Road at Tenth Line will have some movements operating at capacity and with level of service 'F'. However, much of the traffic at this intersection is generated by the long-term development areas which have been assessed assuming a conservative transit modal split reduction. The intersection of Tenth Line at the Zone 2 and 3 access will have residual capacity and will operate with level of service 'C' or better with signalization.

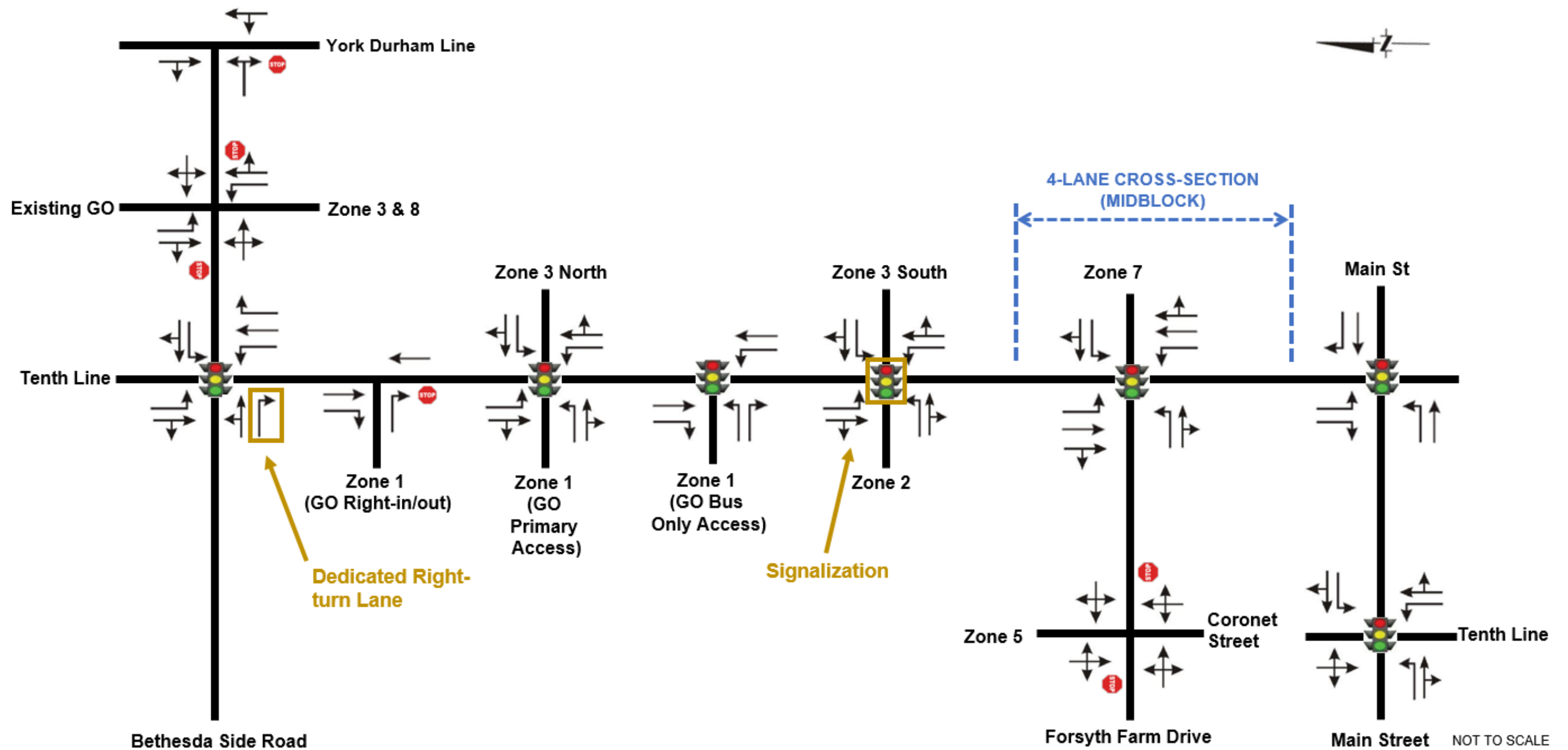


Exhibit 20: Long-Term Horizon Year Development Road Network (with Recommended Improvements)

5.3 Queue Length Analysis and Storage Requirements

The 95th percentile queue lengths from the Synchro model for the Long-Term Development conditions were assessed to inform storage length requirements, particularly to inform public right-of-way requirements at intersections along Tenth Line and Bethesda Side Road. A summary of the existing storage lengths is provided in **Table 15**, 95th percentile maximum queue lengths in either AM or PM peak in **Table 16**, and recommended storage lengths in **Table 17**. A complete queue length analysis for all turning movements at intersections analyzed is provided in **Appendix C**.

Table 15: Existing Storage Lengths

Intersection @ Tenth Line	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Bethesda Side Road			20	0	125	100	125	0
GO Bus-only Access (RIRO)								
Zone 1/3 Access (Go Primary Entrance)								
Zone 2/3 Access								
Forsyth Farm Drive								
Main Street (East)	20	0	0	160	0	0	40	0
Main Street (West)	15	0	20	0	180	0	0	0

Note: Grey shading indicates new road or no existing storage

Table 16: Maximum 95th Percentile Queue Length on Tenth Line

Intersection @ Tenth Line	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Bethesda Side Road	0	73	11	0	208	0	14	0
GO Bus-only Access (RIRO)	3	0	0	0	0	0	0	0
Zone 1/3 Access (Go Primary Entrance)	106	0	30	0	50	0	17	0
Zone 2/3 Access	21	0	7	0	16	0	3	0
Forsyth Farm Drive	11	0	22	0	20	0	7	0
Main Street (East)	255	0	0	21	0	0	72	177
Main Street (West)	2	0	205	0	29	0	0	0

Note: Grey shading indicates new road or no existing storage

Table 17: Recommended Storage Lengths

Intersection @ Tenth Line	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Bethesda Side Road	0	75	20	0	210	0	25	0
GO Bus-only Access (RIRO)	0	0	0	0	0	0	0	45
Zone 1/3 Access (Go Primary Entrance)	100	0	30	0	50	0	25	0
Zone 2/3 Access	25	0	25	0	25	0	25	0
Forsyth Farm Drive	25	0	25	0	25	0	25	0
Main Street (East)	260	0	0	160	0	0	75	0
Main Street (West)	15	0	210	0	180	0	0	0

Note: Grey shading indicates new road or no existing storage; red shading indicates modification from existing conditions

Based on these recommendations, a schematic layout of Tenth Line (**Exhibit 21**) has been developed to confirm feasibility based on recommended approximate intersection spacing.

Storage length requirements for minor streets should be confirmed at the site plan application stage of development.



Exhibit 21: Storage Length Recommendations along Tenth Line

5.4 Traffic Signal Warrants

Traffic signal warrants were used to assess the appropriateness of the application of the proposed traffic signal locations using the warrant methodology outlined in the **Ontario Traffic Manual (OTM) Book 12 – Traffic Signals**.

The warrant is based on the projected volumes which uses the weekday AM and weekday PM peak hour traffic volumes to estimate Average Hourly Volumes (AHV). Existing intersections that are being reviewed for signalization are assessed using 8-hour count data, however, because this is not possible for projected volumes with a high degree of accuracy the AHV approach is used as a simplification. This averaging technique may not result in a realistic estimate of average hourly traffic volumes because it does not take into account the local variations in traffic patterns throughout the day. Furthermore, the projected volume warrants are based on higher thresholds than warrants based on existing data for existing intersections. The projected volume warrant thresholds are further increased for new intersections and for rural conditions. The traffic signal warrant considers non-peak hours because a traffic signal can artificially increase delays during times when there is low demand. For these reasons, the warrants should be revisited as development occurs, using 8-hour count data and the OTM Book 12 signal warrant tool.

It should also be noted that although a signal may not meet the warrant thresholds, the implementation of a signal may provide benefits during short time periods where there are surges in traffic, or to facilitate movements of targeted vehicles such as transit or emergency services, as well as to provide controlled and safe crossing locations for pedestrians and cyclists. As mentioned in the Stantec Lincolnville GO Station Transportation Study, the GO station primary entrance and bus-only entrances would benefit from signalization for these reasons and the signal warrants were tested but did not meet the warrant thresholds. The traffic signal warrants for Bethesda Side Road, Zone 2/3 Access, and Forsyth Farm Drive are summarized in **Table 18**. The projected volume warrants are two part and with two justification in each part. To meet the warrant, the traffic volumes must meet the threshold volumes within each part by 80% or more, or must meet both of the justifications in one of the parts by 100%.

Table 18: Traffic Signal Warrants

Intersection with Tenth Line	Warrant 1 Minimum Vehicle Volume		Warrant 2 Delay to Cross Traffic		Warranted?
	1A	1B	1A	1B	
2025 Horizon Year					
Bethesda Side Road	100	100	80	100	✓
GO Access / Zone 1	71	80	49	100	✗
Zone 2 & Zone 3 Access	70	47	59	80	✗
Forsyth Farm Drive	80	72	66	34	✗
Long-Term Horizon					
Bethesda Side Road	100	100	100	100	✓
GO Access / Zone 1	80	80	66	100	✗
Zone 2 & Zone 3 Access	80	47	77	80	✗
Forsyth Farm Drive	80	72	80	34	✗

Note: Green highlighting means the 80% threshold is met.

As demonstrated above, the intersection of Bethesda Side Road meets the warrant criteria in 2025. However, the other study intersections are not meeting the warrant thresholds for projected volumes. Some of the intersections are close to being warranted under the long-term development scenario, and the need for signalization should be monitored using traffic data collected as development occurs.

5.5 Roundabouts

Two intersections are considered for roundabouts. Firstly the intersection of Tenth Line at Zone 2/3 Access has been identified as a potential roundabout location as part of the Town's Development Charge Study, and Bethesda Side Road at Tenth Line based on screening criteria discussed below.

The Town's Transportation Master Plan presented a Roundabout Implementation Policy for the City moving forward, and the key considerations noted in the TMP are summarized in the following.

The benefits of roundabouts include:

- ⇒ Less travel delay (on average)
- ⇒ Safer due to reduced speeds and vehicle conflict points
- ⇒ Friendly towards U-turning vehicles
- ⇒ Provide good transitions between high speed and low speed environments
- ⇒ Lower long-term operating and maintenance costs compare to signalized intersections
- ⇒ Generally reduces the severity or likelihood of some collision types

There are however some drawbacks to roundabouts:

- ⇒ Not conducive to facilitating crossings by pedestrians, cyclists, or other modes of active transportation
- ⇒ Require more land and property
- ⇒ Less opportunity to control traffic operations (by adjusting signal timings)

The roundabout implementation policy is summarized as follows. Candidate locations for roundabouts might be established based on the following criteria:

- a) The Town is considering implementing a new traffic signal
- b) The current traffic control type is signalized or two-way stop controlled
- c) There is a history of injury, fatal collisions, head-on, angle, or turning collisions
- d) There is a transition point between a high and low speed roads, or between a rural and urban area
- e) A gateway feature is required as an entry to a community
- f) Traffic calming is required

Based on the above, a screening analysis was completed as outlined in **Table 19**.

Table 19: Roundabout Screening

Screening Criteria	Tenth Line / Bethesda Side Road	Tenth Line / Zone 2 & 3 Access
Roundabout Implementation Policy		
The Town is considering implementing a new traffic signal	✓	✓
There is a history of injury, fatal collisions, head-on, angle, or turning collisions	✗	✗
There is a transition point between a high and low speed roads, or between a rural and urban area	✓	✗
A gateway feature is required as an entry to a community	✓	✗
Traffic calming is required	-1	✗
Other Considerations		
Equivalent Demand on all Approaches	✓	✗
Lower Pedestrian and Cyclists Activity	✓	✗
TOTAL	5 /7	1 /7

Notes: 1) Traffic calming may be appropriate as vehicles enter the urbanized area. However, the need for traffic calming is not based on existing conditions.

The intersection of Tenth Line at Zone 2/3 Access does not pass the screening criteria with a score of 1 out of 7 criteria being met. Furthermore, implementing a roundabout at this location would result in a discontinuity in the active transportation network.

A roundabout may be considered at the intersection of Tenth Line and Bethesda Side Road and could be designed to accommodate the railway bisecting the roundabout, while allowing for some traffic movements to continue even while a train is going through the intersection (southbound and northbound right-turns). This location meets 5 out of the 7 criteria and can be considered for roundabout control. This would also serve as a gateway feature to the area (when traveling southbound) and would signify a transition from a rural to more urbanized area.

Operations at Bethesda Side Road and Tenth Line were tested under roundabout control for the long-term development scenario forecast traffic volumes. The analysis was conducted using Synchro intersection analysis software to provide a high level understanding of the potential roundabout operations. The lane configurations were maintained, which required two internal circulation lanes within the roundabout. One exception is the northbound approach at Bethesda Side Road where the northbound right-turn lane was combined with the northbound through lane. This was done for two reasons: the northbound right-turn lane is not required operationally, and Synchro cannot analyze three lane approaches at roundabouts. Further testing is recommended if this option is to be carried forward. The HCM 2010 Synchro outputs are provided in **Appendix C**.

Table 20: Total Traffic Long-Term Development Intersection Operations (Roundabout Sensitivity)

Intersection & Critical Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	LOS	v/c	LOS	v/c
Tenth Line / Bethesda Side Road	C	-	C	-
Eastbound Left-through	B	0.48	A	0.40
Eastbound Right-turn	C	0.77	B	0.54
Westbound Left-turn	A	0.01	A	0.06
Westbound Through-right	B	0.33	E	0.80
Northbound Left-turn	B	0.51	C	0.76
Northbound Through-right	A	0.31	B	0.59
Southbound Left-turn	A	0.10	A	0.10
Southbound Through-right	D	0.82	D	0.76

Notes: v/c – volume to capacity ratio, LOS – level of service

As shown above, a roundabout at Tenth Line and Bethesda Side Road can provide improved operations as an alternative to traffic signal control. While it is noted that this analysis does not reflect operational impacts from the railway which would affect delays and capacity, the intersection analysis presented previous in this report also did not consider delays associated with the railway either. These impacts would need to be testing using micro-simulation software.

To demonstrate feasibility, a conceptual roundabout concept is shown in **Exhibit 22**. The rail corridor can travel through the centre of the roundabout and will continue to require flashing signals and crossing gates to control traffic movements at all legs of the roundabout when the train is approaching. With this concept, the northbound right-turns and the southbound left-turns can be permitted, where bypass lanes may be considered to bypass queues. Thus, dedicated northbound and southbound right-turn lanes would be required.

Because the conceptual roundabout would require additional property, further environmental assessment study is required should the Town wish to proceed with a roundabout at this location.

While this proposed roundabout may have operational benefits, it is further noted roundabouts lack of protected crossing opportunities for pedestrians and cyclists. Given the desire to accommodate active transportation in the Lincolnville MTSA, it is recommended to screen out the roundabout option at Tenth Line and Bethesda Side Road.



Exhibit 22: Bethesda Side Road at Tenth Line Conceptual Roundabout Alignment

6. Recommended Network and Typical Cross Sections

6.1 Recommended Transportation Network

Based on the transportation analysis and recommendations for intersection control at key access points along Tenth Line and Bethesda Side Road, a conceptual supporting collector road network has been identified which is illustrated in **Exhibit 23**.

Dedicated and separated active transportation facilities are a critical component of the transportation system in the Lincolnville MTSA. Building upon the findings of the Town's TMP study the following recommendations for active transportation include:

- Separated, in-boulevard facilities on Tenth Line, and on Bethesda Side Road adjacent to developed lands and roadside curb and gutter.
- Paved shoulders on Bethesda Side Road adjacent to roadside ditches.
- Dedicated cycling facilities on the collector roads illustrated in **Exhibit 23**.
- An active transportation crossing of the railway, connecting development lands west of the railway corridor to the MTSA lands. The bridge should connected the proposed collector road as identified in the Town's TMP study and the transportation network within the MTSA lands.
- Trail connections providing active transportation connectivity including:
 - West of Tenth Line a connection running along the Greenland Area to the existing trail along the railway behind the houses along Greenwood Road
 - Connections to the GO station from proposed residential lands meeting at the proposed railway crossing
 - East of Tenth Line a north-south trail running along the Greenland Area along the eastern boundary of the proposed lands for residential development.
 - East-west trail connections between the proposed north-south Collector Road east of Tenth Line, and connecting across the Greenland Area to York-Durham Line

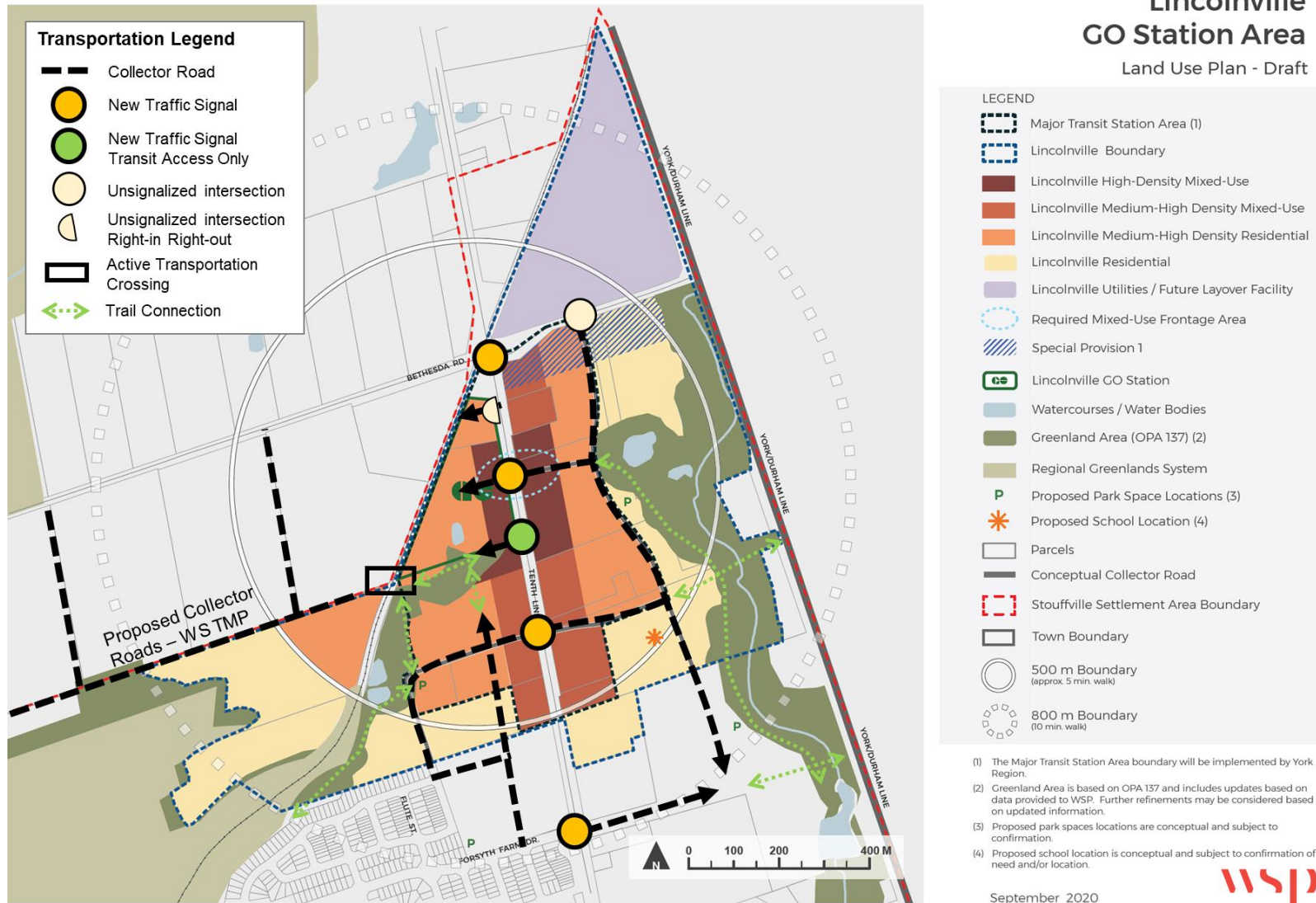


Exhibit 23: Recommended Ultimate Road Network

6.2 Typical Transportation Cross-sections

Typical transportation cross-sections building upon the analysis in this report have been developed to inform the Lincolnville Urban Design Guidelines (WSP, October 2020 Draft). Where WSP's cross-sections should be ultimately referred to for guidance on overall street design including allowances for flexibility in street elements, this report focuses on the specific transportation elements required in a typical situation along the arterial and collector roads in the MTSA. The right-of-way (ROW) width builds upon the recommendations of the Town's TMP study, and are summarized in **Table 21**.

Table 21: Recommended Right-of-Way Elements and Widths

Street	Classification	Function	Design Requirements (TMP)	Recommended Right-of-Way Elements
Tenth Line	Urban Arterial	Serves local travel demands in urban areas	- Direct access from abutting properties is generally restricted - Maximum of four through lanes and two additional transit/HOV lanes, if required - Right-of-way width of 30 to 45 metres - Encourage separated or designated facilities for pedestrians and cyclists	- Urban cross-section 33m Right-of-Way - Two through travel lanes - Auxiliary left-turn lanes - Shared through-right lanes - Separated/dedicated pedestrian and cyclist facilities
Bethesda Side Road	Rural Arterial	Serve local travel demand and connect arterial and local roads	- Direct access from abutting properties permitted with some restrictions - Maximum two travel lanes - Right-of-way width 27 metres (89 feet) maximum	- Rural cross-section, urban adjacent to development 27m Right-of-Way - Two through travel lanes - Auxiliary turn lanes only where required (EBR at Tenth Line) - Separated/dedicated pedestrian and cyclist facilities
Collector Roads	Urban Collector Road, MTSA "Main Street"	Service local travel demands, and connect arterial to local roads	- Direct access from abutting properties permitted with some restrictions - Maximum two travel lanes - Right-of-way Width 27 metres (89 feet) maximum - Encourage separated or designated facilities for pedestrians and cyclists	- Urban cross-section 23m Right-of-Way (24m for MTSA Main Street) - Two through travel lanes - Auxiliary turn lanes where required (TBD through site-plan application) - Separated/dedicated pedestrian and cyclist facilities

Typical transportation cross-sections are illustrated in **Exhibit 24**, **Exhibit 25**, **Exhibit 26**, and **Exhibit 27** for Tenth Line, Bethesda Side Road, for a typical collector road, and for the MTSA "Main Street" collector road, respectively.

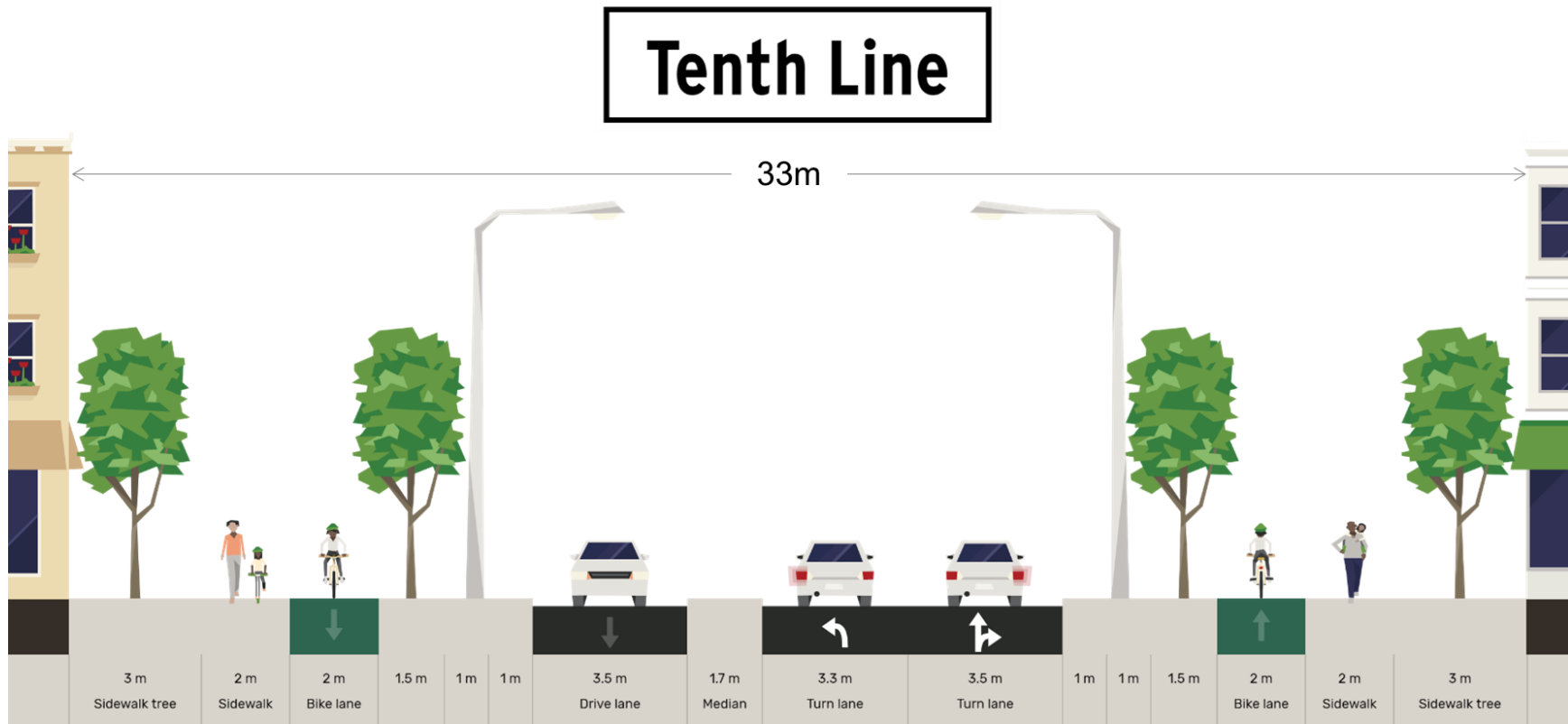


Exhibit 24: Conceptual Typical Cross Section for Tenth Line, Intersection Approach with Left-Turn Lane.

Note: The above cross-section represents a typical intersection approach requiring a left-turn lane. While separate sidewalk and bike lanes are shown, a 4m multi-use pathway may be considered in consultation with stakeholders. Further study is required to determine a preferred roadway plan considering location specific needs.

Bethesda Side Road

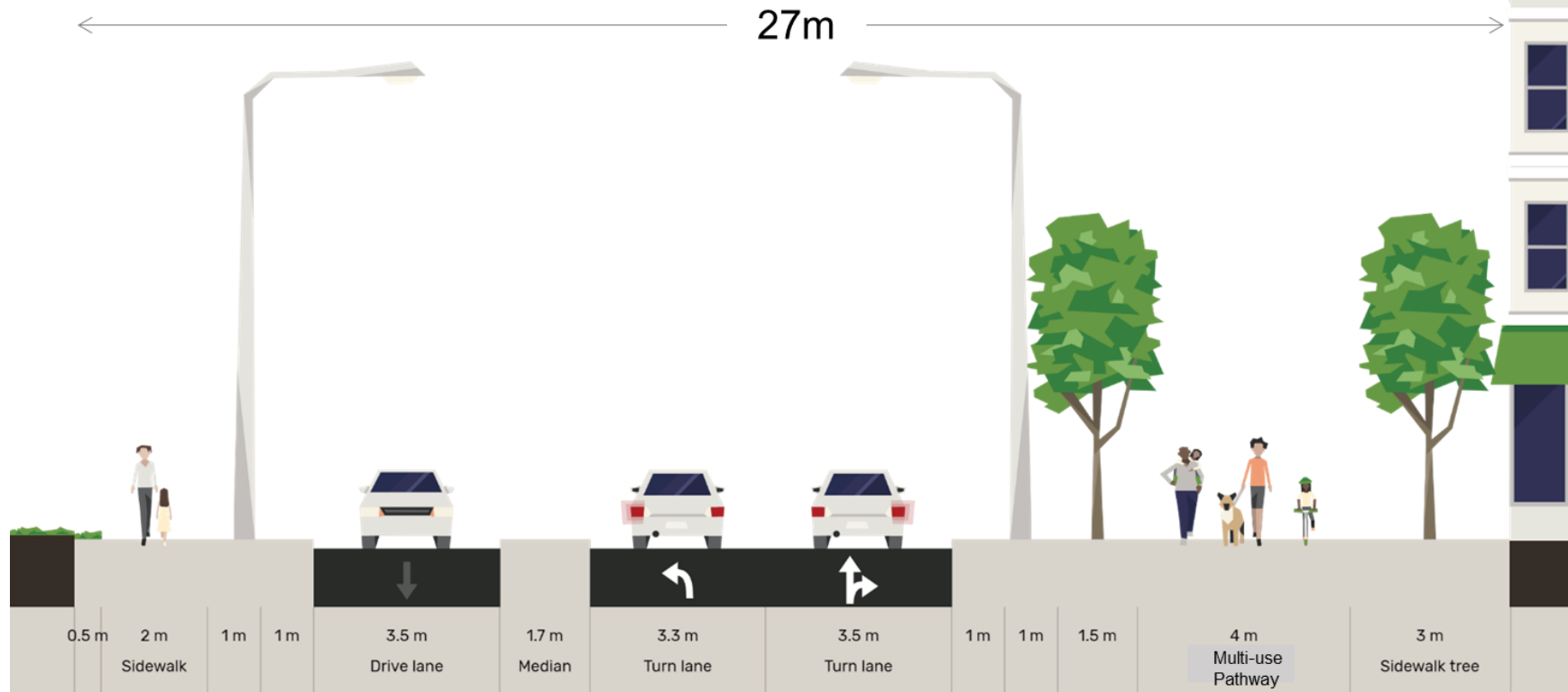


Exhibit 25: Conceptual Typical Cross Section for Bethesda Side Road, Intersection Approach with Left-Turn Lane.

Note: The above cross-section represents a typical intersection approach requiring a left-turn lane. While a 4m multi-use pathway is shown, a separate sidewalk and bike lane may be considered in consultation with stakeholders. Further study is required to determine a preferred roadway plan considering location specific needs.

Collector Road

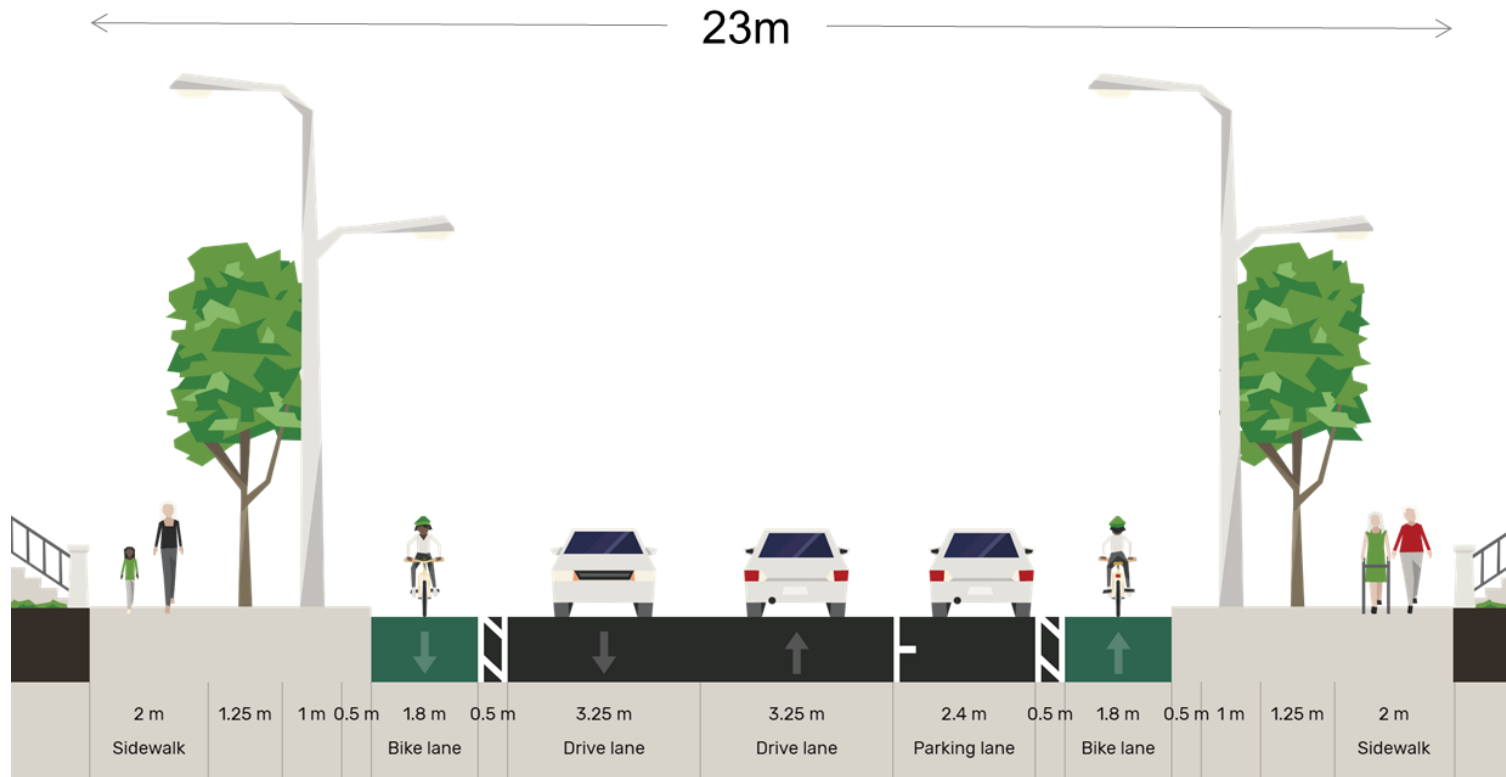


Exhibit 26: Conceptual Typical Cross Section for Collector Road

Note: The above cross-section represents a typical cross-section. Further study is required to determine a preferred roadway plan considering location specific needs.

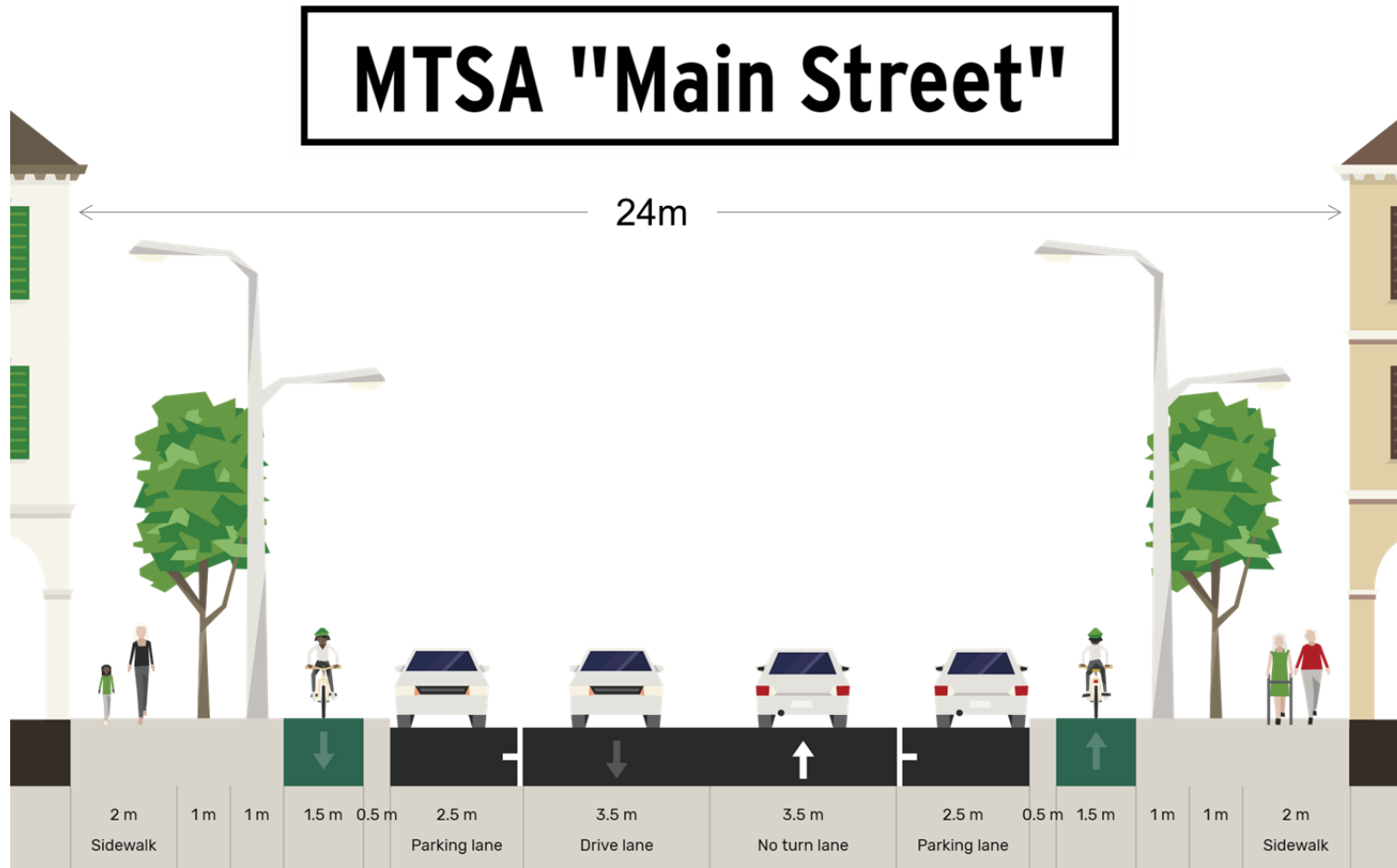


Exhibit 27: Conceptual Typical Cross Section for MTSA "Main Street" Collector Road

Note: The above cross-section represents a typical cross-section. Further study is required to determine a preferred roadway plan considering location specific needs.

Tenth Line: We recommend 33m Right-of-Way width to protect for wider cycling facilities and boulevards, as identified in **Table 21**. A 3-lane cross section is recommended which includes 3.5m through lanes plus a 5.0m median which accommodates a 3.3m left-turn lane plus a median island at intersections. While separate 2m cycle track adjacent to a 2m sidewalk is shown in the cross-section, the Town may wish to implement a 4.0m multi-use pathway.

While the operational analysis conducted for this study does not indicate a need for 4-5 lanes on Tenth Line, future development and changes to travel patterns may impact this need. Further study would be required to justify a widening to 4-5 lanes. It is noted that the 33m Right-of-Way should be able to maintain sufficient boulevard space for a vehicular lane widening should the need arise in the future.

Bethesda Side Road: We recommend a ROW width of 27m for Bethesda Side Road which incorporates 3.5m through lanes plus a 5.0m median accommodating a 3.3m left-turn lane with a median island at intersections. The south-side of Bethesda Side Road should incorporate a 4.0m multi-use pathway adjacent to future development, which may accommodate two-way bicycle traffic. On the north side, only a sidewalk is recommended.

Collector Roads: The recommended ROW width of 23m can accommodate the required elements including two through-travel lanes, on-street parking on one-side, on-street dedicated cycling facilities, 3.0m of boulevard space for lighting and trees, and 2.0m sidewalks.

MTSA “Main Street” Collector Road: The recommended ROW width of 24m can accommodate the required elements including two through-travel lanes, on-street parking on two-sides, dedicated cycling facilities, and 4.0m of boulevard space for lighting, trees and sidewalk.

7. Conclusions and Recommendations

Short-Term Development Scenario

To support the short-term (2025) development scenario in addition to the relocation of the GO station, four new accesses will be provided along Tenth line between Forsyth Farm Drive and Bethesda Side Road (beginning from the north):

1. GO/Zone 1 right-in/out access (stop controlled) – intended to serve general traffic movements in and out of the GO station and may also serve the other development within Zone 1 on the west side of Tenth Line;
2. GO/Zone 1 & 3 full movement signalized access - intended to serve general traffic movements in and out of the GO station and other development within Zone 1, as well as Zone 3 on the east side of Tenth Line;
3. GO bus-only signalized access – intended to serve only buses entering exiting the GO station on the west side of Tenth Line; and,
4. Zone 2/3 Access (stop controlled) – intended to serve Zone 2 on the west side of Tenth line and Zone 3 on the east side of Tenth Line.

Two more new access will be provided, one along Bethesda Side Road and another along Forsyth Farm Drive:

5. Zone 3 and Zone 8 full movement (stop controlled) access to be provided along Bethesda Side Road, east of Tenth Line, and on the south side of the roadway opposite the existing GO access; and,
6. Zone 5 full movement minor stop controlled access to be provided along Forsyth Farm Drive, west of Tenth Line, as the north leg of Coronet Street.

The study area will generally have residual capacity and study intersections will be operating well. To support 2025 horizon year conditions, four intersections will require signalization:

1. Bethesda Side Road at Tenth Line
2. Tenth Line at the new GO Station / Zone 1 & 3 Access
3. Tenth Line at the new GO Station Bus-Only Access
4. Tenth Line at Forsyth Farm Drive (with northbound and southbound left-turn lanes)

The intersection of Bethesda Side Road and Tenth Line is currently under two-way stop control on the eastbound and westbound approaches of the intersection, and is bisected by the rail corridor on the west and north legs. Special consideration will be needed to account for this when designing the signal to accommodate the railway including the barriers, and calculating appropriate clearance times.

The intersection of Tenth Line at Forsyth Farm should be monitored as development occurs to determine the trigger for signalization. The trigger for signalization of Forsyth Farm Drive is likely to be after Zones 1, 2, and 3 are developed.

The 2025 horizon year recommended road network is presented in **Exhibit 28**.

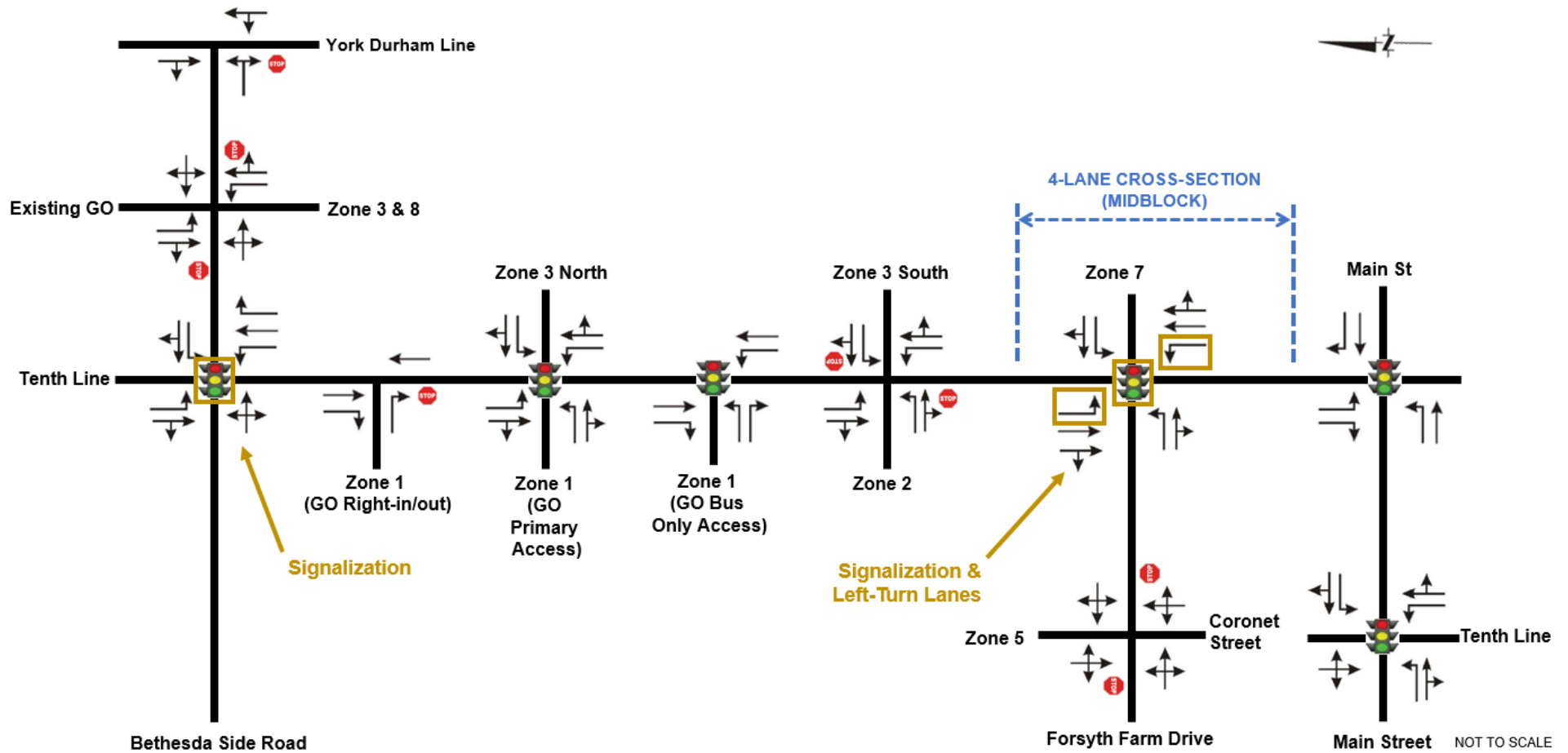


Exhibit 28: 2025 Horizon Year Recommended Road Network and Recommended Improvements

Long-Term Development Scenario

Under the long-term development scenario some study area intersections will be approaching capacity. The intersection of Main Street and Tenth Line will have several movements operating near or at capacity during both the weekday AM and PM peak hours. Jog elimination would mitigate some of these deficiencies as they are associated with the jogged traffic movements along Tenth Line.

To support the long-term development scenario, one additional intersection will require signalization and one road network improvement is further recommended to accommodate forecast travel demand:

1. Tenth Line at the Zone 2 & 3 Access signalization
2. An exclusive eastbound right-turn lane will also be required at Bethesda Side Road and Tenth Line

These forecasts are long-term and generally demonstrate that the long-term development scenario can be supported.

Ultimately, to mitigate traffic congestion at specific intersections and provide a well-connected network for all modes, a fine-grained collector road network is recommended. Additional unsignalized access can also be considered to maximize connectivity in the context of the Transportation Master Plan recommendations which allows for minimal direct access to Tenth Line. The analysis contained within this report has assigned all traffic to fewer accesses for a more conservative analysis.

Building on the 2025 recommended road network shown in **Exhibit 28**, the recommended lane configurations to support the long-term development scenario (beyond the 2025 horizon year) are shown in **Exhibit 29**. A road network concept which builds upon the analysis presented in this report is presented for consideration in **Exhibit 30**.

Cross Sections

Widening of Tenth Line to four lanes (two through-lanes per direction) is not required to accommodate future total traffic volumes. There is a small proportion of background traffic traveling through the area, and therefore, most network deficiencies and constraints are due to new traffic generated for the short-term and long-term development scenarios, limited by inbound and outbound capacity from the new development accesses and the new GO Station. Currently, the Tenth Line cross section is one through-lane per direction within the study area, but increases to two lanes per direction beginning north of Forsyth Farm Drive and extending southerly to a location north of Main Street. Although four lanes on Tenth Line is not required based on this analysis the Town should monitor traffic operations and conduct further study to confirm the ultimate needs for Tenth Line south of the MTSA to Main Street.

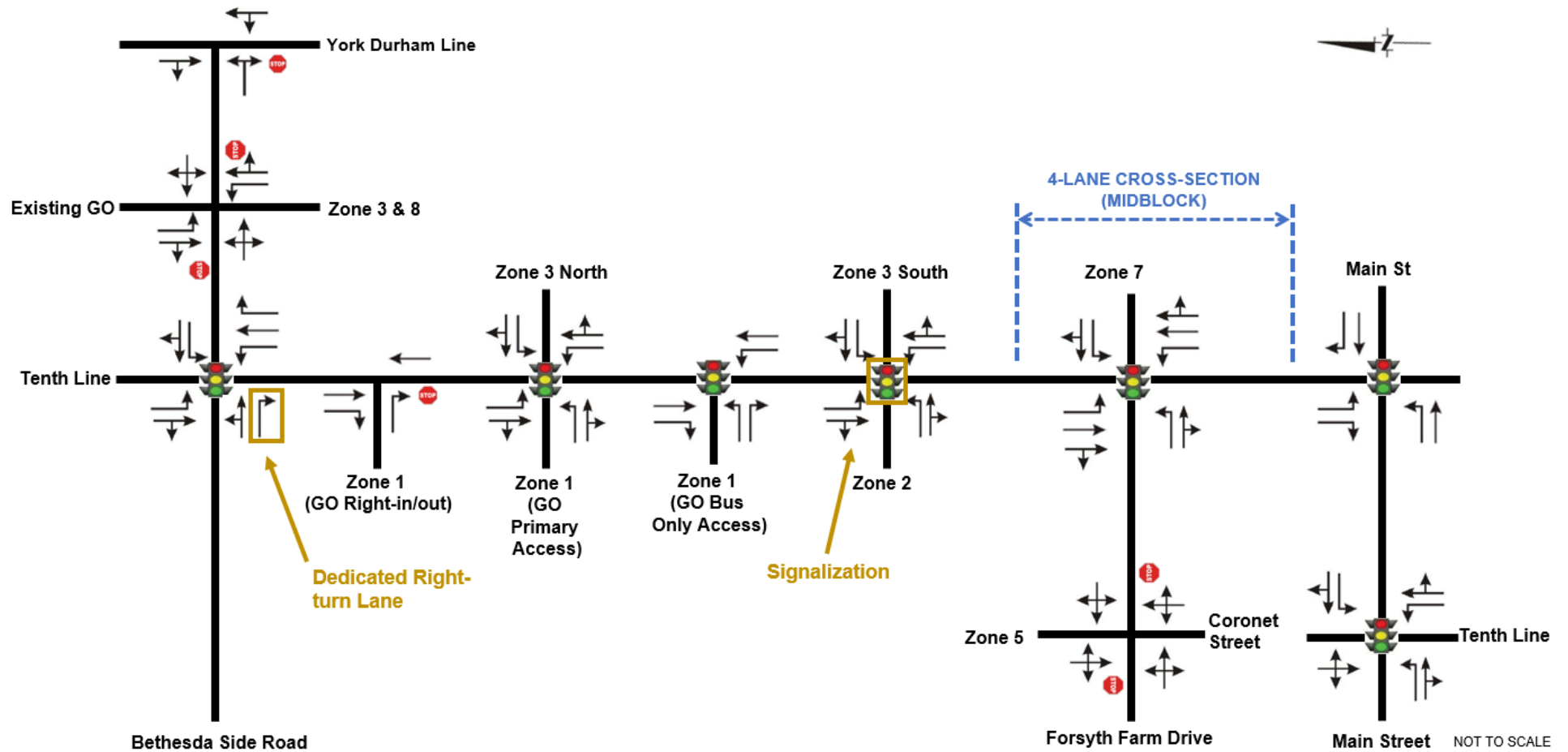
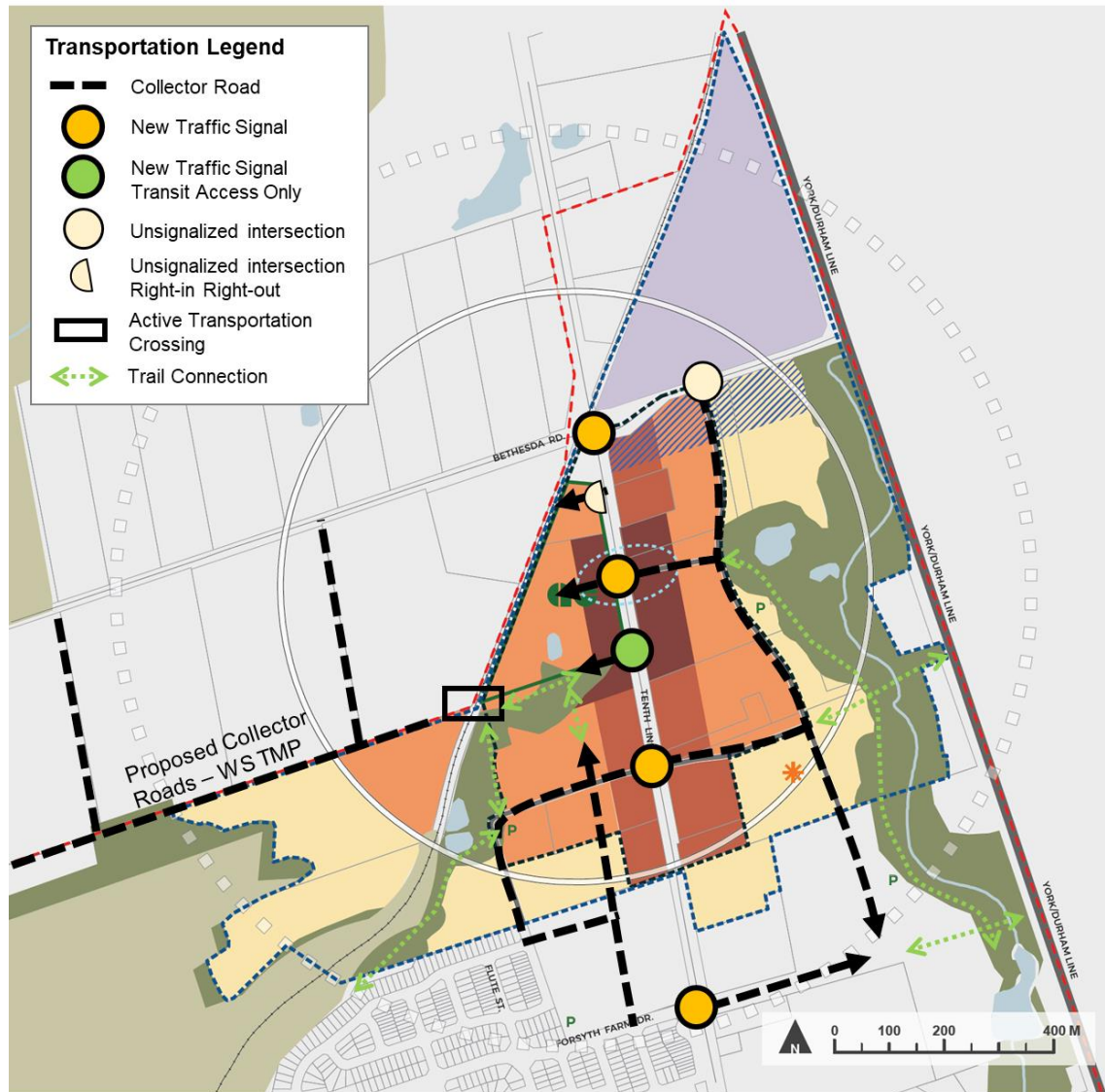


Exhibit 29: Recommended Long-Term Road Network Lane Configurations and Improvements (Compared to the 2025 Recommended Road Network)



Lincolnville GO Station Area

Land Use Plan - Draft

LEGEND

- Major Transit Station Area (1)
- Lincolnville Boundary
- Lincolnville High-Density Mixed-Use
- Lincolnville Medium-High Density Mixed-Use
- Lincolnville Medium-High Density Residential
- Lincolnville Residential
- Lincolnville Utilities / Future Layover Facility
- Required Mixed-Use Frontage Area
- Special Provision 1
- Lincolnville GO Station
- Watercourses / Water Bodies
- Greenland Area (OPA 137) (2)
- Regional Greenlands System
- Proposed Park Space Locations (3)
- Proposed School Location (4)
- Parcels
- Conceptual Collector Road
- Stouffville Settlement Area Boundary
- Town Boundary
- 500 m Boundary (approx. 5 min. walk)
- 800 m Boundary (10 min. walk)

- The Major Transit Station Area boundary will be implemented by York Region.
- Greenland Area is based on OPA 137 and includes updates based on data provided to WSP. Further refinements may be considered based on updated information.
- Proposed park space locations are conceptual and subject to confirmation.
- Proposed school location is conceptual and subject to confirmation of need and/or location.

September 2020



Exhibit 30: Recommended Ultimate Road Network

For Tenth Line a 33 metre cross section is recommended to allow for wider boulevards and cycling lanes, and to ultimately protect for a roadway widening to a 4-5 lane cross-section. The City may, at its discretion, provide the 4-5 lane cross section initially or protect for future widening but the findings of this study do not indicate a need for this. Further study is required to justify the need for a 4-5 lane cross section.

A 27 metre right-of-way is recommended for Bethesda Side Road. Similar to Tenth Line which includes three traffic lanes and a south-side multi-use pathway.

Collector roads with a 23 metre cross-section will accommodate two through lanes, a parking lane on one side, dedicated cycling lanes, sidewalks and boulevards, and will accommodate forecast traffic volumes.

An MTSA “Main Street” Collector Road is envisioned with a 24m right-of-way, accommodating two through lanes, on-street parking on both sides of the street, bike lanes, sidewalk and boulevard.

Active Transportation

In addition to the on-street cycling facilities noted, a trail system throughout the MTSA area is recommended to connect to existing trail systems and to provide active transportation connectivity via a new rail grade separation to planned development on the west side of the railway. A north-south trail is also recommended along Greenland Area east of Tenth Line, and this trail should be connected to the proposed north-south collector road and York Durham Line via east-west trail connections.

Intersection Controls

Some of the study intersections may not meet the signal warrants due to low daily traffic volumes. However, without the installation of traffic signals, vehicles will experience long delays when entering or exiting, pedestrians and cyclists seeking to cross Tenth Line will not have a protected crossing, and any potential future transit services would need to wait for gaps in traffic. In particular, the GO Station traffic signals are not meeting the signal warrant criteria, but are recommended to accommodate peak inbound and outbound traffic movements during rush hours, provide priority service to GO transit buses, and provide a safe road crossing for active users.

Using a screening tool that reflects the recommendations from within the Town’s Transportation master Plan, roundabout implementation was assessed for two study intersections: Tenth Line at Bethesda Side Road, and Tenth Line at Zone 2/3 Access. Operational review was carried forward for the intersection of Tenth Line at Bethesda Side Road. The roundabout was tested using Synchro software to confirm that the intersection would experience acceptable operations. While the roundabout is potentially feasible, it is not recommended to be carried forward due to a lack of protected crossing opportunities for pedestrians and cyclists.

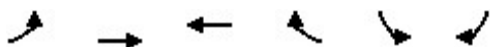
Appendix A

Existing Intersection Operations

HCM Signalized Intersection Capacity Analysis

7: Main St & Tenth Line

Lincolville GO Transportation Study
Existing Conditions AM Pk Hr



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	127	108	136	22	55	250
Future Volume (vph)	127	108	136	22	55	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.0	3.5
Total Lost time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1636	1807	1860	1436	1612	1536
Flt Permitted	0.60	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1038	1807	1860	1436	1612	1536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	117	148	24	60	272
RTOR Reduction (vph)	0	0	0	10	0	236
Lane Group Flow (vph)	138	117	148	14	60	36
Confl. Peds. (#/hr)					3	
Heavy Vehicles (%)	3%	4%	1%	5%	4%	4%
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Actuated Green, G (s)	57.5	57.5	45.5	45.5	10.7	10.7
Effective Green, g (s)	57.5	57.5	45.5	45.5	10.7	10.7
Actuated g/C Ratio	0.72	0.72	0.57	0.57	0.13	0.13
Clearance Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	803	1300	1059	817	215	205
v/s Ratio Prot	c0.02	0.06	0.08			0.02
v/s Ratio Perm	c0.11			0.01	c0.04	
v/c Ratio	0.17	0.09	0.14	0.02	0.28	0.18
Uniform Delay, d1	3.6	3.4	8.0	7.5	31.1	30.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	0.3	0.0	0.7	0.4
Delay (s)	3.7	3.5	8.3	7.5	31.8	31.1
Level of Service	A	A	A	A	C	C
Approach Delay (s)		3.6	8.2		31.2	
Approach LOS		A	A		C	
Intersection Summary						
HCM 2000 Control Delay			16.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.20			
Actuated Cycle Length (s)			79.9		Sum of lost time (s)	16.2
Intersection Capacity Utilization			37.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

10: Tenth Line/Plaza & Main St

Lincolville GO Transportation Study

Existing Conditions AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	165	103	142	239	1	83	0	69	0	0	2
Future Volume (vph)	1	165	103	142	239	1	83	0	69	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00			1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.85			0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1685	1688		1652	1823		1611	1536			1584	
Flt Permitted	0.60	1.00		0.52	1.00		0.76	1.00			1.00	
Satd. Flow (perm)	1058	1688		910	1823		1283	1536			1584	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	181	113	156	263	1	91	0	76	0	0	2
RTOR Reduction (vph)	0	15	0	0	0	0	0	67	0	0	2	0
Lane Group Flow (vph)	1	279	0	156	264	0	91	9	0	0	0	0
Confl. Peds. (#/hr)							3					3
Heavy Vehicles (%)	0%	3%	8%	2%	3%	0%	4%	0%	4%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA			NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	51.3	51.3		63.5	63.5		10.0	10.0			10.0	
Effective Green, g (s)	51.3	51.3		63.5	63.5		10.0	10.0			10.0	
Actuated g/C Ratio	0.61	0.61		0.75	0.75		0.12	0.12			0.12	
Clearance Time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	642	1024		751	1369		151	181			187	
v/s Ratio Prot		c0.17		0.02	c0.14			0.01			0.00	
v/s Ratio Perm	0.00			0.14			c0.07					
v/c Ratio	0.00	0.27		0.21	0.19		0.60	0.05			0.00	
Uniform Delay, d1	6.5	7.8		3.1	3.1		35.4	33.0			32.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.7		0.1	0.3		6.6	0.1			0.0	
Delay (s)	6.5	8.5		3.2	3.4		42.0	33.2			32.8	
Level of Service	A	A		A	A		D	C			C	
Approach Delay (s)		8.5			3.3			38.0			32.8	
Approach LOS		A			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			11.6			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			84.5			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			47.0%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: York Durham Line & Bethesda Side Rd

Lincolnton GO Transportation Study
Existing Conditions AM Pk Hr

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	20	21	178	343	1
Future Volume (Veh/h)	9	20	21	178	343	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	10	22	23	191	369	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	606	370	370			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	606	370	370			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	98	97	98			
cM capacity (veh/h)	437	659	1146			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	32	214	370			
Volume Left	10	23	0			
Volume Right	22	0	1			
cSH	568	1146	1700			
Volume to Capacity	0.06	0.02	0.22			
Queue Length 95th (m)	1.4	0.5	0.0			
Control Delay (s)	11.7	1.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.7	1.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.0				
Intersection Capacity Utilization		36.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Tenth Line & Bethesda Side Rd

Lincolville GO Transportation Study
Existing Conditions AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	13	12	3	13	8	26	130	8	11	184	41
Future Volume (Veh/h)	16	13	12	3	13	8	26	130	8	11	184	41
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	20	16	15	4	16	10	33	165	10	14	233	52
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	536	528	259	515	544	165	285			175		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	536	528	259	515	544	165	285			175		
tC, single (s)	7.2	6.5	6.3	7.1	6.6	6.5	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.1	3.5	2.2			2.3		
p0 queue free %	95	96	98	99	96	99	97			99		
cM capacity (veh/h)	419	442	765	439	422	823	1266			1360		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2				
Volume Total	51	4	26	33	165	10	14	285				
Volume Left	20	4	0	33	0	0	14	0				
Volume Right	15	0	10	0	0	10	0	52				
cSH	493	439	519	1266	1700	1700	1360	1700				
Volume to Capacity	0.10	0.01	0.05	0.03	0.10	0.01	0.01	0.17				
Queue Length 95th (m)	2.6	0.2	1.2	0.6	0.0	0.0	0.2	0.0				
Control Delay (s)	13.1	13.3	12.3	7.9	0.0	0.0	7.7	0.0				
Lane LOS	B	B	B	A			A					
Approach Delay (s)	13.1	12.4		1.3			0.4					
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			34.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Bethesda Side Rd & GO Access

Lincolville GO Transportation Study
Existing Conditions AM Pk Hr

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	3	29	0	0	20	2	0	0	0	0	0	4		
Future Volume (Veh/h)	3	29	0	0	20	2	0	0	0	0	0	4		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	3	32	0	0	22	2	0	0	0	0	0	4		
Pedestrians														
Lane Width (m)														
Walking Speed (m/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)														
pX, platoon unblocked														
vC, conflicting volume	24				32				65	62	32	61	61	23
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	24				32				65	62	32	61	61	23
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100				100				100	100	100	100	100	100
cM capacity (veh/h)	1591				1580				924	827	1042	933	828	1054
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2									
Volume Total	35	24	0	0	4									
Volume Left	3	0	0	0	0									
Volume Right	0	2	0	0	4									
cSH	1591	1580	1700	1700	1054									
Volume to Capacity	0.00	0.00	0.00	0.00	0.00									
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.1									
Control Delay (s)	0.6	0.0	0.0	0.0	8.4									
Lane LOS	A		A	A	A									
Approach Delay (s)	0.6	0.0	0.0	8.4										
Approach LOS			A	A										
Intersection Summary														
Average Delay	0.9													
Intersection Capacity Utilization	13.3%			ICU Level of Service					A					
Analysis Period (min)	15													

HCM Unsignalized Intersection Capacity Analysis

14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnvile GO Transportation Study
Existing Conditions AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	8	93	6	2	1	41	128	7	3	155	31
Future Volume (Veh/h)	29	8	93	6	2	1	41	128	7	3	155	31
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	35	10	113	7	2	1	50	156	9	4	189	38
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	396	481	114	481	496	82	227			165		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	396	481	114	481	496	82	227			165		
tC, single (s)	7.6	6.5	7.0	7.8	7.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.7	4.5	3.3	2.2			2.2		
p0 queue free %	93	98	88	98	99	100	96			100		
cM capacity (veh/h)	517	468	911	364	367	967	1353			1426		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	158	10	128	87	98	132						
Volume Left	35	7	50	0	4	0						
Volume Right	113	1	0	9	0	38						
cSH	742	389	1353	1700	1426	1700						
Volume to Capacity	0.21	0.03	0.04	0.05	0.00	0.08						
Queue Length 95th (m)	6.1	0.6	0.9	0.0	0.1	0.0						
Control Delay (s)	11.2	14.5	3.2	0.0	0.3	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	11.2	14.5	1.9		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			28.0%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

29: Coronet Street & Forsyth Farm Dr

Lincolnvile GO Transportation Study
Existing Conditions AM Pk Hr

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↰	↱
Traffic Volume (veh/h)	105	2	8	66	5	25
Future Volume (Veh/h)	105	2	8	66	5	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	2	9	72	5	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			116		205	115
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			116		205	115
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	97
cM capacity (veh/h)			1473		779	937
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	116	81	32			
Volume Left	0	9	5			
Volume Right	2	0	27			
cSH	1700	1473	908			
Volume to Capacity	0.07	0.01	0.04			
Queue Length 95th (m)	0.0	0.1	0.8			
Control Delay (s)	0.0	0.9	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		20.2%	ICU Level of Service	A		
Analysis Period (min)		15				

Timings
7: Main St & Tenth Line

Lincolnton GO Transportation Study
Existing Conditions AM Pk Hr

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	127	108	136	22	55	250
Future Volume (vph)	127	108	136	22	55	250
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	10.5	32.0	32.0	32.0	31.7	31.7
Total Split (s)	15.5	63.5	48.0	48.0	37.7	37.7
Total Split (%)	15.3%	62.7%	47.4%	47.4%	37.3%	37.3%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	2.7	2.7	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effect Green (s)	59.0	57.5	45.6	45.6	10.7	10.7
Actuated g/C Ratio	0.74	0.72	0.57	0.57	0.13	0.13
v/c Ratio	0.17	0.09	0.14	0.03	0.28	0.62
Control Delay	3.6	3.7	9.0	3.8	34.7	11.1
Queue Delay	0.9	0.7	0.0	0.0	0.0	0.0
Total Delay	4.5	4.4	9.0	3.8	34.7	11.1
LOS	A	A	A	A	C	B
Approach Delay		4.4	8.2		15.4	
Approach LOS		A	A		B	

Intersection Summary

Cycle Length: 101.2

Actuated Cycle Length: 79.9

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 10.1

Intersection LOS: B

Intersection Capacity Utilization 37.2%

ICU Level of Service A

Analysis Period (min) 15

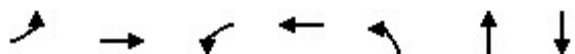
Splits and Phases: 7: Main St & Tenth Line



Timings

10: Tenth Line/Plaza & Main St

Lincolnvile GO Transportation Study
Existing Conditions AM Pk Hr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	1	165	142	239	83	0	0
Future Volume (vph)	1	165	142	239	83	0	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	NA
Protected Phases		2	1	6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	1	6	8	8	4
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	9.5	29.5	27.5	27.5	27.5
Total Split (s)	50.5	50.5	15.5	66.0	37.5	37.5	37.5
Total Split (%)	48.8%	48.8%	15.0%	63.8%	36.2%	36.2%	36.2%
Yellow Time (s)	3.3	3.3	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Max	Max	None	Max	None	None	None
Act Effect Green (s)	51.2	51.2	64.5	64.6	12.0	12.0	12.0
Actuated g/C Ratio	0.61	0.61	0.77	0.78	0.14	0.14	0.14
v/c Ratio	0.00	0.28	0.20	0.19	0.49	0.09	0.00
Control Delay	9.0	9.0	4.0	4.1	42.4	0.2	0.0
Queue Delay	0.0	0.0	0.8	0.9	0.0	0.0	0.0
Total Delay	9.0	9.0	4.8	5.0	42.4	0.2	0.0
LOS	A	A	A	A	D	A	A
Approach Delay		9.0		4.9		23.2	
Approach LOS		A		A		C	

Intersection Summary

Cycle Length: 103.5

Actuated Cycle Length: 83.3

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 9.7

Intersection LOS: A

Intersection Capacity Utilization 47.0%

ICU Level of Service A

Analysis Period (min) 15

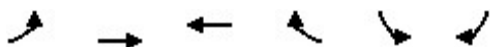
Splits and Phases: 10: Tenth Line/Plaza & Main St



HCM Signalized Intersection Capacity Analysis

7: Main St & Tenth Line

Lincolnvile GO Transportation Study
Existing Conditions PM Pk Hr



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	211	209	147	64	33	175
Future Volume (vph)	211	209	147	64	33	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.0	3.5
Total Lost time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1685	1860	1860	1478	1628	1566
Flt Permitted	0.60	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1055	1860	1860	1478	1628	1566
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	227	160	70	36	190
RTOR Reduction (vph)	0	0	0	31	0	165
Lane Group Flow (vph)	229	227	160	39	36	25
Confl. Peds. (#/hr)					3	
Heavy Vehicles (%)	0%	1%	1%	2%	3%	2%
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Actuated Green, G (s)	57.5	57.5	44.2	44.2	10.3	10.3
Effective Green, g (s)	57.5	57.5	44.2	44.2	10.3	10.3
Actuated g/C Ratio	0.72	0.72	0.56	0.56	0.13	0.13
Clearance Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	832	1345	1034	821	210	202
v/s Ratio Prot	c0.03	0.12	0.09			0.02
v/s Ratio Perm	c0.17			0.03	c0.02	
v/c Ratio	0.28	0.17	0.15	0.05	0.17	0.12
Uniform Delay, d1	3.7	3.5	8.6	8.0	30.8	30.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3	0.3	0.1	0.4	0.3
Delay (s)	3.9	3.7	8.9	8.2	31.2	30.9
Level of Service	A	A	A	A	C	C
Approach Delay (s)		3.8	8.7		30.9	
Approach LOS		A	A		C	
Intersection Summary						
HCM 2000 Control Delay			11.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.27			
Actuated Cycle Length (s)			79.5		Sum of lost time (s)	16.2
Intersection Capacity Utilization			41.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

10: Tenth Line/Plaza & Main St

Lincolville GO Transportation Study

Existing Conditions PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	260	122	102	216	3	79	0	164	3	2	5
Future Volume (vph)	2	260	122	102	216	3	79	0	164	3	2	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.85			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1678	1771		1685	1839		1682	1581			1697	
Flt Permitted	0.61	1.00		0.42	1.00		0.75	1.00			0.90	
Satd. Flow (perm)	1069	1771		736	1839		1328	1581			1556	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	2	295	139	116	245	3	90	0	186	3	2	6
RTOR Reduction (vph)	0	12	0	0	0	0	0	160	0	0	5	0
Lane Group Flow (vph)	2	422	0	116	248	0	90	26	0	0	6	0
Confl. Peds. (#/hr)	3					3	1					1
Heavy Vehicles (%)	0%	1%	1%	0%	2%	0%	0%	0%	1%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.9	48.9		60.6	60.6		11.8	11.8			11.8	
Effective Green, g (s)	48.9	48.9		60.6	60.6		11.8	11.8			11.8	
Actuated g/C Ratio	0.59	0.59		0.73	0.73		0.14	0.14			0.14	
Clearance Time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	626	1038		616	1336		187	223			220	
v/s Ratio Prot		c0.24		0.02	c0.13			0.02				
v/s Ratio Perm	0.00			0.12			c0.07				0.00	
v/c Ratio	0.00	0.41		0.19	0.19		0.48	0.12			0.03	
Uniform Delay, d1	7.1	9.4		4.0	3.6		33.0	31.3			30.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	1.2		0.1	0.3		1.9	0.2			0.0	
Delay (s)	7.2	10.6		4.2	3.9		34.9	31.5			30.9	
Level of Service	A	B		A	A		C	C			C	
Approach Delay (s)		10.5			4.0			32.6			30.9	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			14.2			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			83.4			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			53.1%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: York Durham Line & Bethesda Side Rd

Lincolnton GO Transportation Study
Existing Conditions PM Pk Hr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			T	T	R
Traffic Volume (veh/h)	1	37	19	264	219	4
Future Volume (Veh/h)	1	37	19	264	219	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	1	42	22	300	249	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	596	252	254			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	596	252	254			
tC, single (s)	7.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	4.4	3.3	2.3			
p0 queue free %	100	95	98			
cM capacity (veh/h)	333	792	1234			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	43	322	254			
Volume Left	1	22	0			
Volume Right	42	0	5			
cSH	767	1234	1700			
Volume to Capacity	0.06	0.02	0.15			
Queue Length 95th (m)	1.4	0.4	0.0			
Control Delay (s)	10.0	0.7	0.0			
Lane LOS	A	A				
Approach Delay (s)	10.0	0.7	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			39.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Existing Conditions PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	27	26	14	12	30	14	154	7	9	181	16
Future Volume (Veh/h)	49	27	26	14	12	30	14	154	7	9	181	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	53	29	28	15	13	32	15	166	8	10	195	17
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	458	428	204	454	428	166	212			174		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	458	428	204	454	428	166	212			174		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.2		
p0 queue free %	89	94	97	97	97	96	99			99		
cM capacity (veh/h)	481	507	842	463	501	865	1329			1415		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2				
Volume Total	110	15	45	15	166	8	10	212				
Volume Left	53	15	0	15	0	0	10	0				
Volume Right	28	0	32	0	0	8	0	17				
cSH	548	463	715	1329	1700	1700	1415	1700				
Volume to Capacity	0.20	0.03	0.06	0.01	0.10	0.00	0.01	0.12				
Queue Length 95th (m)	5.6	0.8	1.5	0.3	0.0	0.0	0.2	0.0				
Control Delay (s)	13.2	13.0	10.4	7.7	0.0	0.0	7.6	0.0				
Lane LOS	B	B	B	A			A					
Approach Delay (s)	13.2	11.0		0.6			0.3					
Approach LOS	B	B										
Intersection Summary												
Average Delay			4.0									
Intersection Capacity Utilization			30.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Bethesda Side Rd & GO Access

Lincolville GO Transportation Study
Existing Conditions PM Pk Hr

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	5	38	0	0	23	0	0	0	0	0	0	33		
Future Volume (Veh/h)	5	38	0	0	23	0	0	0	0	0	0	33		
Sign Control		Free			Free			Stop			Stop			
Grade		0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	5	41	0	0	25	0	0	0	0	0	0	36		
Pedestrians														
Lane Width (m)														
Walking Speed (m/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)														
pX, platoon unblocked														
vC, conflicting volume	25				41				112	76	41	76	76	25
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	25				41				112	76	41	76	76	25
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100				100				100	100	100	100	100	97
cM capacity (veh/h)	1589				1568				834	812	1030	911	812	1051
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2									
Volume Total	46	25	0	0	36									
Volume Left	5	0	0	0	0									
Volume Right	0	0	0	0	36									
cSH	1589	1568	1700	1700	1051									
Volume to Capacity	0.00	0.00	0.00	0.00	0.03									
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.8									
Control Delay (s)	0.8	0.0	0.0	0.0	8.5									
Lane LOS	A		A	A	A									
Approach Delay (s)	0.8	0.0	0.0	8.5										
Approach LOS			A	A										
Intersection Summary														
Average Delay	3.2													
Intersection Capacity Utilization	13.3%			ICU Level of Service					A					
Analysis Period (min)	15													

HCM Unsignalized Intersection Capacity Analysis

14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnvile GO Transportation Study
Existing Conditions PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	5	25	12	7	3	56	154	11	4	183	32
Future Volume (Veh/h)	21	5	25	12	7	3	56	154	11	4	183	32
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	22	5	26	13	7	3	58	160	11	4	191	33
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	418	502	112	414	514	86	224			171		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	418	502	112	414	514	86	224			171		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	99	97	97	98	100	96			100		
cM capacity (veh/h)	498	453	926	491	446	963	1357			1418		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	53	23	138	91	100	128						
Volume Left	22	13	58	0	4	0						
Volume Right	26	3	0	11	0	33						
cSH	636	508	1357	1700	1418	1700						
Volume to Capacity	0.08	0.05	0.04	0.05	0.00	0.08						
Queue Length 95th (m)	2.1	1.1	1.0	0.0	0.1	0.0						
Control Delay (s)	11.2	12.4	3.5	0.0	0.3	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	11.2	12.4	2.1		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			25.8%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

29: Coronet Street & Forsyth Farm Dr

Lincolnton GO Transportation Study
Existing Conditions PM Pk Hr

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↱	↘↗	
Traffic Volume (veh/h)	43	5	25	70	2	8
Future Volume (Veh/h)	43	5	25	70	2	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	5	27	76	2	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			52		180	50
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			52		180	50
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	99
cM capacity (veh/h)			1554		796	1019
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	52	103	11			
Volume Left	0	27	2			
Volume Right	5	0	9			
cSH	1700	1554	970			
Volume to Capacity	0.03	0.02	0.01			
Queue Length 95th (m)	0.0	0.4	0.3			
Control Delay (s)	0.0	2.0	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	2.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			21.7%	ICU Level of Service		A
Analysis Period (min)			15			

Timings 7: Main St & Tenth Line

Lincolnton GO Transportation Study
Existing Conditions PM Pk Hr

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	211	209	147	64	33	175
Future Volume (vph)	211	209	147	64	33	175
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	10.5	32.0	32.0	32.0	31.7	31.7
Total Split (s)	15.5	63.5	48.0	48.0	37.7	37.7
Total Split (%)	15.3%	62.7%	47.4%	47.4%	37.3%	37.3%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	2.7	2.7	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effect Green (s)	59.0	57.5	44.3	44.3	10.3	10.3
Actuated g/C Ratio	0.74	0.72	0.56	0.56	0.13	0.13
v/c Ratio	0.27	0.17	0.15	0.08	0.17	0.52
Control Delay	4.0	3.9	9.5	2.9	33.0	10.8
Queue Delay	1.4	1.3	0.0	0.0	0.0	0.0
Total Delay	5.3	5.2	9.5	2.9	33.0	10.8
LOS	A	A	A	A	C	B
Approach Delay		5.2	7.5		14.3	
Approach LOS		A	A		B	

Intersection Summary

Cycle Length: 101.2

Actuated Cycle Length: 79.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 8.1

Intersection LOS: A

Intersection Capacity Utilization 41.9%

ICU Level of Service A

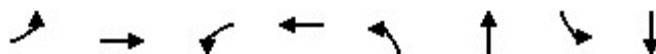
Analysis Period (min) 15

Splits and Phases: 7: Main St & Tenth Line



Timings
10: Tenth Line/Plaza & Main St

Lincolnvile GO Transportation Study
Existing Conditions PM Pk Hr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	2	260	102	216	79	0	3	2
Future Volume (vph)	2	260	102	216	79	0	3	2
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	9.5	29.5	27.5	27.5	27.5	27.5
Total Split (s)	50.5	50.5	15.5	66.0	37.5	37.5	37.5	37.5
Total Split (%)	48.8%	48.8%	15.0%	63.8%	36.2%	36.2%	36.2%	36.2%
Yellow Time (s)	3.3	3.3	3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.5	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.5	5.5	4.5	5.5	5.5	5.5		5.5
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	None	Max	None	None	None	None
Act Effect Green (s)	48.8	48.8	61.5	60.5	11.8	11.8		11.8
Actuated g/C Ratio	0.59	0.59	0.74	0.73	0.14	0.14		0.14
v/c Ratio	0.00	0.41	0.19	0.19	0.48	0.26		0.05
Control Delay	8.5	10.8	4.1	4.2	41.9	0.9		23.0
Queue Delay	0.0	0.0	0.7	1.5	0.0	0.0		0.0
Total Delay	8.5	10.8	4.8	5.8	41.9	0.9		23.0
LOS	A	B	A	A	D	A		C
Approach Delay		10.7		5.5		14.3		23.0
Approach LOS		B		A		B		C

Intersection Summary

Cycle Length: 103.5

Actuated Cycle Length: 83.3

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 10.0

Intersection LOS: A

Intersection Capacity Utilization 53.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 10: Tenth Line/Plaza & Main St



Appendix B

Transportation Tomorrow Survey Results

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of household - gta06_hhld
Column: Primary travel mode of trip - mode_prime

Filters:
2006 GTA zone of household - gta06_hhld In 2708,2709,2711,2712,2714,2709,2710,2713
and
Start time of trip - start_time In 700-900
and
2006 GTA zone of origin - gta06_orig In 2708,2709,2711,2712,2714,2709,2710,2713

Trip 2016
Table:

	Transit exc	Cycle	Auto drive	GO rail onl	Joint GO r	Auto passe	School bus	Walk	
2708	0	0	1786	17	0	225	58	217	2303
2709	0	0	1086	4	39	129	16	334	1608
2710	87	104	3067	154	20	637	204	656	4929
2711	0	0	341	0	19	61	78	29	528
2712	0	96	1163	0	26	75	0	291	1651
2713	0	0	1621	41	0	608	0	10	2280
2714	0	0	141	0	0	0	14	0	155
	87	200	9205	216	104	1735	370	1537	13454
	0%	0%	78%	1%	0%	10%	3%	9%	100%
	0%	0%	68%	0%	2%	8%	1%	21%	100%
	2%	2%	62%	3%	0%	13%	4%	13%	100%
	0%	0%	65%	0%	4%	12%	15%	5%	100%
	0%	6%	70%	0%	2%	5%	0%	18%	100%
	0%	0%	71%	2%	0%	27%	0%	0%	100%
	0%	0%	91%	0%	0%	0%	9%	0%	100%
	1%	1%	68%	2%	1%	13%	3%	11%	100%

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of household - gta06_hhld
Column: Primary travel mode of trip - mode_prime

Filters:
2006 GTA zone of household - gta06_hhld In 2708,2709,2711,2712,2714,2709,2710,2713
and
Start time of trip - start_time In 1600-1800
and
2006 GTA zone of destination - gta06_dest In 2708,2709,2711,2712,2714,2709,2710,2713

Trip 2016
Table:

	Transit exc	Cycle	Auto drive	GO rail onl	Joint GO r	Auto passe	School bus	Taxi passer	Walk	
2708	30	0	1356	25	27	128	0	5	0	1571
2709	0	0	1159	19	39	144	16	0	15	1392
2710	72	81	2596	280	25	434	25	0	262	3775
2711	19	0	384	64	0	127	0	0	0	594
2712	0	96	1395	5	26	389	0	0	184	2095
2713	0	0	1111	193	0	355	0	0	0	1659
2714	0	0	283	0	0	0	0	0	0	283
	121	177	8284	586	117	1577	41	5	461	11369
	2%	0%	86%	2%	2%	8%	0%	0%	0%	100%
	0%	0%	83%	1%	3%	10%	1%	0%	1%	100%
	2%	2%	69%	7%	1%	11%	1%	0%	7%	100%
	3%	0%	65%	11%	0%	21%	0%	0%	0%	100%
	0%	5%	67%	0%	1%	19%	0%	0%	9%	100%
	0%	0%	67%	12%	0%	21%	0%	0%	0%	100%
	0%	0%	100%	0%	0%	0%	0%	0%	0%	100%
	1%	2%	73%	5%	1%	14%	0%	0%	4%	100%

Mon Mar 09 2020 13:40:56 GMT-0400 (Eastern Daylight Time) - Run Time: 2598ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest

Column: Primary travel mode of trip - mode_prime

Filters:

Trip purpose of destination - purp_dest In W

and

Start time of trip - start_time In 700-900

and

2006 GTA zone of destination - gta06_dest In 2708,2709,2711,2712,2714,2709,2710,2713

Trip 2016

Table:

	Auto drive	Walk	
2708	661	0	661
2709	1006	0	1006
2710	513	0	513
2711	21	0	21
2712	169	11	180
2713	34	0	34
2714	61	0	61
	2465	11	2476

100%	0%	100%
100%	0%	100%
100%	0%	100%
100%	0%	100%
94%	6%	100%
100%	0%	100%
100%	0%	100%
100%	0%	100%

Mon Mar 09 2020 13:42:45 GMT-0400 (Eastern Daylight Time) - Run Time: 2923ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig

Column: Primary travel mode of trip - mode_prime

Filters:

Trip purpose of origin - purp_orig In W

and

Start time of trip - start_time In 1600-1800

and

2006 GTA zone of origin - gta06_orig In 2708,2709,2711,2712,2714,2709,2710,2713

Trip 2016

Table:

	Cycle	Auto drive	Auto passe	School bus	Walk	
2708	0	606	0	0	0	606
2709	29	807	126	0	33	995
2710	0	283	0	0	0	283
2711	0	158	0	0	96	254
2712	0	172	0	0	0	172
2713	0	9	0	16	0	25
2714	0	29	0	0	0	29
	29	2064	126	16	129	2364

0%	100%	0%	0%	0%	100%
3%	81%	13%	0%	3%	100%
0%	100%	0%	0%	0%	100%
0%	62%	0%	0%	38%	100%
0%	100%	0%	0%	0%	100%
0%	36%	0%	64%	0%	100%
0%	100%	0%	0%	0%	100%
1%	87%	5%	1%	5%	100%

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: Planning district of destination - pd_dest

Filters:
2006 GTA zone of origin - gta06_orig In 2708,2709,2711,2712,2714,2709,2710,2713
and
Start time of trip - start_time In 700-900
and
2006 GTA zone of household - gta06_hhld In 2708,2709,2711,2712,2714,2709,2710,2713

Trip 2016
Table:

	PD 1 of Toronto	PD 2 of Toronto	PD 4 of Toronto	PD 5 of Toronto	PD 6 of Toronto	PD 8 of Toronto	PD 9 of Toronto	PD 10 of Toronto	PD 11 of Toronto	PD 12 of Toronto	PD 13 of Toronto	PD 14 of Toronto	PD 15 of Toronto	PD 16 of Toronto	Uxbridge	Pickering	Ajax	Whitby	Oshawa	Clarington	Newmarket	Aurora	Richmond Hill	Whitchurch-Stouffville	Markham	Vaughan	Brampton	Mississauga	Oakville	Innisfil	Rest of Peterborough								
2708	110	0	30	0	0	0	0	0	96	30	169	0	0	223	0	0	27	0	0	0	0	87	165	592	715	42	0	0	0	0	0								
2709	146	0	60	37	28	0	0	0	19	73	62	0	0	109	0	0	0	0	0	0	59	0	69	930	214	0	0	0	25	0	0								
2710	221	95	128	0	0	0	31	0	63	83	113	32	70	320	0	20	0	9	0	0	51	55	164	2106	1076	100	0	55	0	0	0								
2711	0	0	0	0	0	0	0	51	0	0	0	0	0	63	0	0	0	0	23	0	49	0	84	93	143	0	0	0	0	0	31								
2712	16	0	7	0	0	0	11	0	0	10	9	0	0	77	43	0	92	0	21	0	118	0	30	1040	302	69	34	5	0	0	0								
2713	41	0	0	53	0	69	0	0	158	10	5	0	7	142	0	12	0	10	32	0	0	7	240	931	168	7	0	53	0	12	0								
2714	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	7	0	0	53	84	14	0	0	0	0	0	0	0								
	534	95	225	90	28	69	42	51	336	206	358	32	77	934	43	32	119	19	90	7	277	149	402.5	402.5	2888	90	2888	1316	1316	109	109	17	17	56.5	56.5	25	12	31	13459
	S	S	S	S	S	S	S	S	S	S	S	S	S	S	N	E	E	E	E	E	N	W	S	W	S	W	S	W	S	N	S								
	4%	1%	2%	1%	0%	1%	0%	0%	2%	2%	3%	0%	1%	7%	0%	0%	1%	0%	1%	0%	2%	1%	3%	3%	21%	21%	10%	10%	1%	1%	0%	0%	0%	0%	0%				

North	2%
South	59%
East	2%
West	37%

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: Planning district of origin - pd_orig

Filters:
2006 GTA zone of destination - gta06_dest In 2708,2709,2711,2712,2714,2709,2710,2713
and
Start time of trip - start_time In 1600-1800
and
2006 GTA zone of household - gta06_hhld In 2708,2709,2711,2712,2714,2709,2710,2713

Trip 2016
Table:

	PD 1 of Toronto	PD 2 of Toronto	PD 3 of Toronto	PD 4 of Toronto	PD 5 of Toronto	PD 6 of Toronto	PD 8 of Toronto	PD 9 of Toronto	PD 10 of Toronto	PD 11 of Toronto	PD 12 of Toronto	PD 13 of Toronto	PD 15 of Toronto	PD 16 of Toronto	Uxbridge	Pickering	Ajax	Whitby	Oshawa	East Gwillimbury	Newmarket	Aurora	Richmond Hill	Whitchurch-Stouffville	Markham	Vaughan	Mississauga	Hastings	External			
2708	196	0	0	66	0	0	30	0	0	18	0	69	0	195	0	11	0	0	0	64	60	78	43	838	344	13	12	0	0			
2709	227	0	24	60	42	28	21	0	0	0	0	89	0	121	0	0	0	0	23	0	0	58	0	673	436	0	0	0	23			
2710	260	71	60	128	22	5	5	31	41	47	113	45	0	193	0	20	11	9	0	0	92	60	140	1000	768	47	111	24	0			
2711	48	0	0	0	0	0	0	0	23	0	0	0	0	32	0	0	0	0	0	0	0	31	84	126	60	0	101	0	0			
2712	21	0	0	7	0	0	0	11	0	0	0	9	0	71	43	0	92	36	21	0	113	0	30	831	375	64	5	0	0			
2713	169	0	0	0	53	0	0	0	0	68	10	5	7	310	0	12	0	0	80	0	0	7	392	311	179	7	53	0	0			
2714	0	0	0	0	26	0	0	0	0	0	30	0	0	0	0	0	0	0	14	0	0	0	53	121	22	43	0	0	0			
	921	71	84	261	143	33	56	42	64	133	153	217	7	922	43	43	103	45	138	64	265	234	371	371	1950	1092	65.5	162.5	162.5	24	23	11371
	S	S	S	S	S	S	S	S	S	S	S	S	S	S	N	E	E	E	E	N	W	S	W	S	W	S	W	S	E	S		
	8%	1%	1%	2%	1%	0%	0%	0%	1%	1%	1%	2%	0%	8%	0%	0%	1%	0%	1%	1%	2%	3%	3%	17%	17%	10%	10%	1%	1%	0%	0%	

North	3%
South	60%
East	3%
West	34%

[illegible]

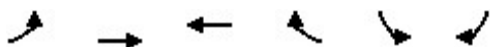
Appendix C

Total Traffic Operations

HCM Signalized Intersection Capacity Analysis

7: Main St & Tenth Line

Lincolnville GO Transportation Study
Future Total (Medium Term) AM Pk Hr



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	412	108	137	159	210	732
Future Volume (vph)	412	108	137	159	210	732
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.0	3.5
Total Lost time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1636	1807	1860	1436	1612	1536
Flt Permitted	0.58	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1001	1807	1860	1436	1612	1536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	448	117	149	173	228	796
RTOR Reduction (vph)	0	0	0	106	0	595
Lane Group Flow (vph)	448	117	149	67	228	201
Confl. Peds. (#/hr)					3	
Heavy Vehicles (%)	3%	4%	1%	5%	4%	4%
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Actuated Green, G (s)	52.5	52.5	32.3	32.3	19.5	19.5
Effective Green, g (s)	52.5	52.5	32.3	32.3	19.5	19.5
Actuated g/C Ratio	0.63	0.63	0.39	0.39	0.23	0.23
Clearance Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	746	1133	717	554	375	357
v/s Ratio Prot	c0.11	0.06	0.08			0.13
v/s Ratio Perm	c0.26			0.05	c0.14	
v/c Ratio	0.60	0.10	0.21	0.12	0.61	0.56
Uniform Delay, d1	8.2	6.2	17.2	16.6	28.7	28.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.2	0.7	0.4	2.8	2.0
Delay (s)	9.6	6.4	17.8	17.0	31.5	30.4
Level of Service	A	A	B	B	C	C
Approach Delay (s)		8.9	17.4		30.6	
Approach LOS		A	B		C	
Intersection Summary						
HCM 2000 Control Delay			22.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			83.7		Sum of lost time (s)	16.2
Intersection Capacity Utilization			63.4%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

10: Tenth Line/Plaza & Main St

Lincolville GO Transportation Study

Future Total (Medium Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	239	103	531	333	1	83	0	280	0	0	2
Future Volume (vph)	1	239	103	531	333	1	83	0	280	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00			1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.85			0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1685	1717		1652	1824		1610	1536			1583	
Flt Permitted	0.54	1.00		0.38	1.00		0.76	1.00			1.00	
Satd. Flow (perm)	962	1717		653	1824		1282	1536			1583	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	263	113	584	366	1	91	0	308	0	0	2
RTOR Reduction (vph)	0	12	0	0	0	0	0	265	0	0	2	0
Lane Group Flow (vph)	1	364	0	584	367	0	91	43	0	0	0	0
Confl. Peds. (#/hr)							3					3
Heavy Vehicles (%)	0%	3%	8%	2%	3%	0%	4%	0%	4%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA			NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	38.0	38.0		67.0	67.0		12.5	12.5			12.5	
Effective Green, g (s)	38.0	38.0		67.0	67.0		12.5	12.5			12.5	
Actuated g/C Ratio	0.42	0.42		0.74	0.74		0.14	0.14			0.14	
Clearance Time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	403	720		753	1350		177	212			218	
v/s Ratio Prot		0.21		c0.21	0.20			0.03			0.00	
v/s Ratio Perm	0.00			c0.36			c0.07					
v/c Ratio	0.00	0.51		0.78	0.27		0.51	0.20			0.00	
Uniform Delay, d1	15.2	19.3		7.2	3.8		36.2	34.6			33.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	2.5		5.0	0.5		2.5	0.5			0.0	
Delay (s)	15.3	21.9		12.2	4.3		38.7	35.0			33.6	
Level of Service	B	C		B	A		D	D			C	
Approach Delay (s)		21.8			9.1			35.9			33.6	
Approach LOS		C			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			18.1			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			90.5			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			78.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

Lincolnvile GO Transportation Study

Future Total (Medium Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	0	61	169	0	47	181	375	28	18	374	2
Future Volume (vph)	95	0	61	169	0	47	181	375	28	18	374	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1733	1536		1733	1536		1767	1791		1767	1823	
Flt Permitted	0.72	1.00		0.71	1.00		0.50	1.00		0.48	1.00	
Satd. Flow (perm)	1319	1536		1300	1536		933	1791		886	1823	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	0	68	188	0	52	201	417	31	20	416	2
RTOR Reduction (vph)	0	54	0	0	41	0	0	4	0	0	0	0
Lane Group Flow (vph)	106	14	0	188	11	0	201	444	0	20	418	0
Heavy Vehicles (%)	3%	0%	4%	3%	0%	4%	1%	4%	1%	1%	3%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.9	10.9		10.9	10.9		29.4	29.4		29.4	29.4	
Effective Green, g (s)	10.9	10.9		10.9	10.9		29.4	29.4		29.4	29.4	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.56	0.56		0.56	0.56	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	274	320		270	320		524	1006		498	1024	
v/s Ratio Prot		0.01			0.01			0.25			0.23	
v/s Ratio Perm	0.08			0.14			0.22			0.02		
v/c Ratio	0.39	0.04		0.70	0.03		0.38	0.44		0.04	0.41	
Uniform Delay, d1	17.8	16.5		19.2	16.5		6.4	6.7		5.1	6.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.1		7.6	0.0		2.1	1.4		0.2	1.2	
Delay (s)	18.7	16.6		26.8	16.5		8.5	8.1		5.3	7.7	
Level of Service	B	B		C	B		A	A		A	A	
Approach Delay (s)		17.9			24.5			8.2			7.6	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			52.3				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			60.9%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

34: Tenth Line & Bus Access

Lincolnville GO Transportation Study
Future Total (Medium Term) AM Pk Hr

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	0	0	582	603	1
Future Volume (vph)	2	0	0	582	603	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	1750			1842	1842	1566
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	1750			1842	1842	1566
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	0	633	655	1
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2	0	0	633	655	1
Turn Type	Prot		Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases			2			6
Actuated Green, G (s)	1.0			48.3	48.3	48.3
Effective Green, g (s)	1.0			48.3	48.3	48.3
Actuated g/C Ratio	0.02			0.83	0.83	0.83
Clearance Time (s)	4.5			4.5	4.5	4.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	30			1526	1526	1297
v/s Ratio Prot	c0.00			0.34	c0.36	
v/s Ratio Perm						0.00
v/c Ratio	0.07			0.41	0.43	0.00
Uniform Delay, d1	28.2			1.3	1.3	0.9
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.9			0.8	0.9	0.0
Delay (s)	29.1			2.1	2.2	0.9
Level of Service	C			A	A	A
Approach Delay (s)	29.1			2.1	2.2	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			2.2	HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio			0.42			
Actuated Cycle Length (s)			58.3	Sum of lost time (s)		9.0
Intersection Capacity Utilization			43.4%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

3: York Durham Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Medium Term) AM Pk Hr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			T	T	L
Traffic Volume (veh/h)	2	84	64	150	343	1
Future Volume (Veh/h)	2	84	64	150	343	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	2	90	69	161	369	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	668	370	370			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	668	370	370			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	87	94			
cM capacity (veh/h)	397	674	1183			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	92	230	370			
Volume Left	2	69	0			
Volume Right	90	0	1			
cSH	664	1183	1700			
Volume to Capacity	0.14	0.06	0.22			
Queue Length 95th (m)	3.6	1.4	0.0			
Control Delay (s)	11.3	2.8	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.3	2.8	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization		44.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Medium Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	72	272	8	90	23	302	215	0	14	412	47
Future Volume (Veh/h)	37	72	272	8	90	23	302	215	0	14	412	47
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	41	80	302	9	100	26	336	239	0	16	458	52
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								225				
pX, platoon unblocked												
vC, conflicting volume	1503	1427	484	1743	1453	239	510			239		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1503	1427	484	1743	1453	239	510			239		
tC, single (s)	7.2	6.5	6.3	7.1	6.6	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.5	4.1	3.3	2.2			2.3		
p0 queue free %	0	12	47	0	0	97	68			99		
cM capacity (veh/h)	0	91	571	6	85	793	1045			1288		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2				
Volume Total	423	9	126	336	239	0	16	510				
Volume Left	41	9	0	336	0	0	16	0				
Volume Right	302	0	26	0	0	0	0	52				
cSH	0	6	104	1045	1700	1700	1288	1700				
Volume to Capacity	Err	1.39	1.21	0.32	0.14	0.00	0.01	0.30				
Queue Length 95th (m)	Err	15.2	63.8	10.6	0.0	0.0	0.3	0.0				
Control Delay (s)	Err	1240.7	233.0	10.1	0.0	0.0	7.8	0.0				
Lane LOS	F	F	F	B			A					
Approach Delay (s)	Err	300.2		5.9			0.2					
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			80.5%		ICU Level of Service			D				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Zone 3 & 8 /Existing GO & Bethesda Side Rd

Lincolnton GO Transportation Study
Future Total (Medium Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	67	19	7	58	0	63	0	19	0	0	0
Future Volume (Veh/h)	0	67	19	7	58	0	63	0	19	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	74	21	8	64	0	70	0	21	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	64			95			164	164	84	186	175	64
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			95			164	164	84	186	175	64
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			91	100	98	100	100	100
cM capacity (veh/h)	1545			1505			795	728	969	753	718	995
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	95	72	70	21	0	0						
Volume Left	0	8	70	0	0	0						
Volume Right	21	0	0	21	0	0						
cSH	1545	1505	795	969	1700	1700						
Volume to Capacity	0.00	0.01	0.09	0.02	0.00	0.00						
Queue Length 95th (m)	0.0	0.1	2.2	0.5	0.0	0.0						
Control Delay (s)	0.0	0.9	10.0	8.8	0.0	0.0						
Lane LOS		A	A	A	A	A						
Approach Delay (s)	0.0	0.9	9.7		0.0							
Approach LOS			A		A							
Intersection Summary												
Average Delay				3.7								
Intersection Capacity Utilization				19.1%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnvile GO Transportation Study
Future Total (Medium Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	8	164	104	2	38	78	483	37	20	623	37
Future Volume (Veh/h)	50	8	164	104	2	38	78	483	37	20	623	37
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	61	10	200	127	2	46	95	589	45	24	760	45
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1362	1654	402	1434	1654	317	805				634	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1362	1654	402	1434	1654	317	805				634	
tC, single (s)	7.6	6.5	7.0	7.6	6.5	7.0	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	30	88	66	0	98	93	89				97	
cM capacity (veh/h)	87	86	592	51	86	673	828				959	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	61	210	127	48	390	340	404	425				
Volume Left	61	0	127	0	95	0	24	0				
Volume Right	0	200	0	46	0	45	0	45				
cSH	87	462	51	523	828	1700	959	1700				
Volume to Capacity	0.70	0.45	2.51	0.09	0.11	0.20	0.03	0.25				
Queue Length 95th (m)	26.1	17.7	100.1	2.3	2.9	0.0	0.6	0.0				
Control Delay (s)	112.5	19.1	860.3	12.6	3.5	0.0	0.8	0.0				
Lane LOS	F	C	F	B	A		A					
Approach Delay (s)	40.1		627.8		1.8		0.4					
Approach LOS	E		F									
Intersection Summary												
Average Delay				61.1								
Intersection Capacity Utilization				65.4%	ICU Level of Service				C			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

21: Tenth Line & Zone 2/Zone 3 South

Lincolville GO Transportation Study
Future Total (Medium Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	0	128	20	0	23	72	469	36	4	542	57
Future Volume (Veh/h)	90	0	128	20	0	23	72	469	36	4	542	57
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	100	0	142	22	0	26	80	521	40	4	602	63
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												205
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91		0.91					
vC, conflicting volume	1348	1362	634	1453	1374	541	665	561				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1333	1349	548	1448	1362	541	582	561				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	5	100	71	66	100	95	91	100				
cM capacity (veh/h)	105	126	485	65	123	537	907	1015				
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	100	142	22	26	80	561	4	665				
Volume Left	100	0	22	0	80	0	4	0				
Volume Right	0	142	0	26	0	40	0	63				
cSH	105	485	65	537	907	1700	1015	1700				
Volume to Capacity	0.95	0.29	0.34	0.05	0.09	0.33	0.00	0.39				
Queue Length 95th (m)	44.3	9.2	9.5	1.2	2.2	0.0	0.1	0.0				
Control Delay (s)	150.5	15.5	86.7	12.0	9.4	0.0	8.6	0.0				
Lane LOS	F	C	F	B	A		A					
Approach Delay (s)	71.3		46.2		1.2		0.1					
Approach LOS	F		E									
Intersection Summary												
Average Delay	12.7											
Intersection Capacity Utilization	60.6%			ICU Level of Service					B			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 29: Coronet Street & Forsyth Farm Dr

Lincolnvile GO Transportation Study
Future Total (Medium Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	121	2	8	76	33	5	0	25	76	0	0
Future Volume (Veh/h)	0	121	2	8	76	33	5	0	25	76	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	132	2	9	83	36	5	0	27	83	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	119			134			252	270	133	279	253	101
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	119			134			252	270	133	279	253	101
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	97	87	100	100
cM capacity (veh/h)	1469			1451			698	632	916	650	646	954
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	134	128	32	83								
Volume Left	0	9	5	83								
Volume Right	2	36	27	0								
cSH	1469	1451	874	650								
Volume to Capacity	0.00	0.01	0.04	0.13								
Queue Length 95th (m)	0.0	0.1	0.9	3.3								
Control Delay (s)	0.0	0.6	9.3	11.3								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	0.6	9.3	11.3								
Approach LOS			A	B								
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			30.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

32: Tenth Line & GO RIRO

Lincolnville GO Transportation Study
Future Total (Medium Term) AM Pk Hr

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	34	0	517	360	332
Future Volume (Veh/h)	0	34	0	517	360	332
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	37	0	562	391	361
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				108		
pX, platoon unblocked	0.85					
vC, conflicting volume	953	391	752			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	854	391	752			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	100			
cM capacity (veh/h)	279	658	858			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	37	562	391	361		
Volume Left	0	0	0	0		
Volume Right	37	0	0	361		
cSH	658	1700	1700	1700		
Volume to Capacity	0.06	0.33	0.23	0.21		
Queue Length 95th (m)	1.4	0.0	0.0	0.0		
Control Delay (s)	10.8	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	10.8	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			30.5%		ICU Level of Service	A
Analysis Period (min)			15			

Timings 7: Main St & Tenth Line

Lincolnvile GO Transportation Study
Future Total (Medium Term) AM Pk Hr

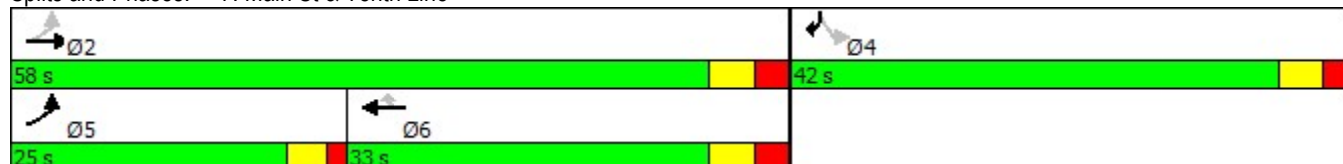
						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	412	108	137	159	210	732
Future Volume (vph)	412	108	137	159	210	732
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	10.5	32.0	32.0	32.0	31.7	31.7
Total Split (s)	25.0	58.0	33.0	33.0	42.0	42.0
Total Split (%)	25.0%	58.0%	33.0%	33.0%	42.0%	42.0%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	2.7	2.7	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effect Green (s)	54.0	52.5	32.3	32.3	19.5	19.5
Actuated g/C Ratio	0.64	0.63	0.38	0.38	0.23	0.23
v/c Ratio	0.59	0.10	0.21	0.26	0.61	0.84
Control Delay	12.9	8.6	22.4	5.5	35.1	11.3
Queue Delay	3.9	0.6	0.0	0.0	0.0	0.0
Total Delay	16.8	9.2	22.4	5.5	35.1	11.3
LOS	B	A	C	A	D	B
Approach Delay		15.2	13.3		16.6	
Approach LOS		B	B		B	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 83.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 15.7
Intersection Capacity Utilization 63.4%
Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service B

Splits and Phases: 7: Main St & Tenth Line



Timings 10: Tenth Line/Plaza & Main St

Lincolnvile GO Transportation Study
Future Total (Medium Term) AM Pk Hr

							
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	1	239	531	333	83	0	0
Future Volume (vph)	1	239	531	333	83	0	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	NA
Protected Phases		2	1	6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	1	6	8	8	4
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	9.5	29.5	27.5	27.5	27.5
Total Split (s)	33.4	33.4	39.0	72.4	27.6	27.6	27.6
Total Split (%)	33.4%	33.4%	39.0%	72.4%	27.6%	27.6%	27.6%
Yellow Time (s)	3.3	3.3	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Max	Max	None	Max	None	None	None
Act Effect Green (s)	37.9	37.9	67.9	66.9	12.4	12.4	12.4
Actuated g/C Ratio	0.42	0.42	0.75	0.74	0.14	0.14	0.14
v/c Ratio	0.00	0.51	0.77	0.27	0.52	0.36	0.00
Control Delay	22.0	24.6	13.3	4.7	46.9	1.2	0.0
Queue Delay	0.0	0.0	2.9	2.8	0.0	0.0	0.0
Total Delay	22.0	24.6	16.2	7.5	46.9	1.2	0.0
LOS	C	C	B	A	D	A	A
Approach Delay		24.6		12.8		11.6	
Approach LOS		C		B		B	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 90.4

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 15.1

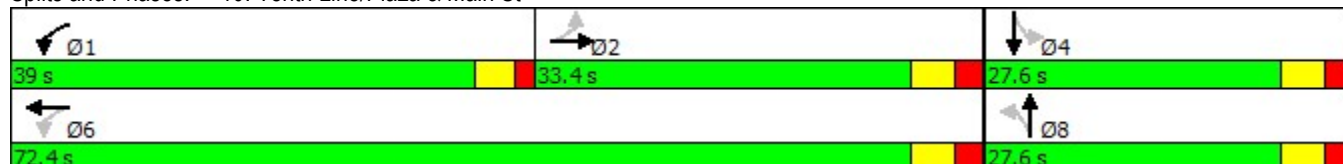
Intersection LOS: B

Intersection Capacity Utilization 78.5%

ICU Level of Service D

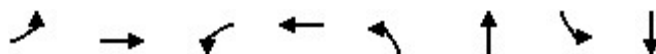
Analysis Period (min) 15

Splits and Phases: 10: Tenth Line/Plaza & Main St



Timings 18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

Lincolnville GO Transportation Study
Future Total (Medium Term) AM Pk Hr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	95	0	169	0	181	375	18	374
Future Volume (vph)	95	0	169	0	181	375	18	374
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	28.0	28.0	28.0	28.0	32.0	32.0	32.0	32.0
Total Split (%)	46.7%	46.7%	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effect Green (s)	13.0	13.0	13.0	13.0	30.7	30.7	30.7	30.7
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.60	0.60	0.60	0.60
v/c Ratio	0.31	0.11	0.57	0.08	0.36	0.41	0.04	0.38
Control Delay	17.8	0.3	23.6	0.3	11.3	9.9	8.1	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	17.8	0.3	23.6	0.3	11.3	10.2	8.1	9.7
LOS	B	A	C	A	B	B	A	A
Approach Delay		11.0		18.5		10.5		9.6
Approach LOS		B		B		B		A

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 51

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 11.6

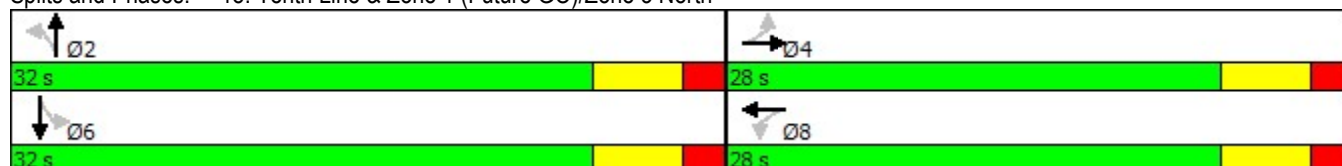
Intersection LOS: B

Intersection Capacity Utilization 60.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 18: Tenth Line & Zone 1 (Future GO)/Zone 3 North



Timings 34: Tenth Line & Bus Access

Lincolnvile GO Transportation Study
Future Total (Medium Term) AM Pk Hr

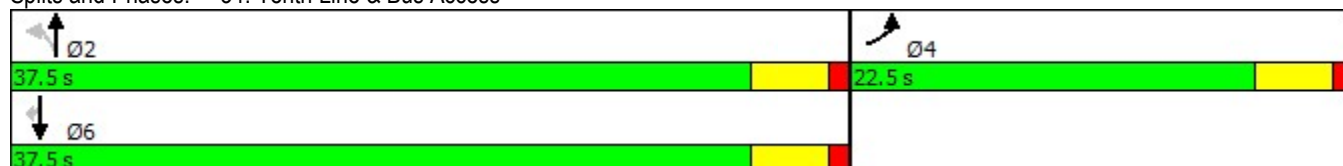
				
Lane Group	EBL	NBT	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	2	582	603	1
Future Volume (vph)	2	582	603	1
Turn Type	Prot	NA	NA	Perm
Protected Phases	4	2	6	
Permitted Phases				6
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	22.5	37.5	37.5	37.5
Total Split (%)	37.5%	62.5%	62.5%	62.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effect Green (s)	5.7	52.0	52.0	52.0
Actuated g/C Ratio	0.10	0.95	0.95	0.95
v/c Ratio	0.01	0.36	0.37	0.00
Control Delay	24.0	1.5	1.6	1.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	24.0	1.5	1.6	1.0
LOS	C	A	A	A
Approach Delay	24.0	1.5	1.6	
Approach LOS	C	A	A	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 54.6
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.37
Intersection Signal Delay: 1.6
Intersection Capacity Utilization 43.4%
Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service A

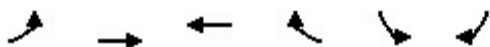
Splits and Phases: 34: Tenth Line & Bus Access



HCM Signalized Intersection Capacity Analysis

7: Main St & Tenth Line

Lincolnville GO Transportation Study
Future Total (Medium Term) PM Pk Hr



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	688	210	148	217	192	570
Future Volume (vph)	688	210	148	217	192	570
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.0	3.5
Total Lost time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1685	1860	1860	1478	1627	1566
Flt Permitted	0.57	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1011	1860	1860	1478	1627	1566
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	748	228	161	236	209	620
RTOR Reduction (vph)	0	0	0	158	0	502
Lane Group Flow (vph)	748	228	161	78	209	118
Confl. Peds. (#/hr)					3	
Heavy Vehicles (%)	0%	1%	1%	2%	3%	2%
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Actuated Green, G (s)	62.4	62.4	30.4	30.4	17.5	17.5
Effective Green, g (s)	62.4	62.4	30.4	30.4	17.5	17.5
Actuated g/C Ratio	0.68	0.68	0.33	0.33	0.19	0.19
Clearance Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	891	1267	617	490	310	299
v/s Ratio Prot	c0.25	0.12	0.09			0.08
v/s Ratio Perm	c0.32			0.05	c0.13	
v/c Ratio	0.84	0.18	0.26	0.16	0.67	0.40
Uniform Delay, d1	8.7	5.3	22.4	21.6	34.4	32.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.0	0.3	1.0	0.7	5.7	0.9
Delay (s)	15.7	5.6	23.4	22.3	40.1	33.3
Level of Service	B	A	C	C	D	C
Approach Delay (s)		13.3	22.7		35.0	
Approach LOS		B	C		D	
Intersection Summary						
HCM 2000 Control Delay			23.2		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			91.6		Sum of lost time (s)	16.2
Intersection Capacity Utilization			70.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

10: Tenth Line/Plaza & Main St

Lincolnville GO Transportation Study
Future Total (Medium Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	353	122	404	310	3	79	0	549	3	2	5
Future Volume (vph)	2	353	122	404	310	3	79	0	549	3	2	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1679	1788		1685	1840		1681	1581			1697	
Flt Permitted	0.55	1.00		0.26	1.00		0.75	1.00			0.44	
Satd. Flow (perm)	970	1788		456	1840		1328	1581			757	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	2	401	139	459	352	3	90	0	624	3	2	6
RTOR Reduction (vph)	0	10	0	0	0	0	0	510	0	0	5	0
Lane Group Flow (vph)	2	530	0	459	355	0	90	114	0	0	6	0
Confl. Peds. (#/hr)	3					3	1					1
Heavy Vehicles (%)	0%	1%	1%	0%	2%	0%	0%	0%	1%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.9	40.9		65.7	65.7		13.6	13.6			13.6	
Effective Green, g (s)	40.9	40.9		65.7	65.7		13.6	13.6			13.6	
Actuated g/C Ratio	0.45	0.45		0.73	0.73		0.15	0.15			0.15	
Clearance Time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	439	809		608	1338		200	238			114	
v/s Ratio Prot		0.30		c0.17	0.19			c0.07				
v/s Ratio Perm	0.00			c0.38			0.07				0.01	
v/c Ratio	0.00	0.65		0.75	0.27		0.45	0.48			0.05	
Uniform Delay, d1	13.5	19.2		9.8	4.2		34.9	35.1			32.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	4.1		5.3	0.5		1.6	1.5			0.2	
Delay (s)	13.6	23.3		15.1	4.6		36.6	36.6			33.0	
Level of Service	B	C		B	A		D	D			C	
Approach Delay (s)		23.3			10.6			36.6			33.0	
Approach LOS		C			B			D			C	
Intersection Summary												
HCM 2000 Control Delay			22.9			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			90.3			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			95.3%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

Lincolnville GO Transportation Study

Future Total (Medium Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	372	0	117	94	0	28	85	370	83	53	521	6
Future Volume (vph)	372	0	117	94	0	28	85	370	83	53	521	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1581		1767	1581		1785	1813		1785	1839	
Flt Permitted	0.74	1.00		0.67	1.00		0.27	1.00		0.35	1.00	
Satd. Flow (perm)	1371	1581		1253	1581		515	1813		666	1839	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	413	0	130	104	0	31	94	411	92	59	579	7
RTOR Reduction (vph)	0	84	0	0	20	0	0	13	0	0	1	0
Lane Group Flow (vph)	413	46	0	104	11	0	94	490	0	59	585	0
Heavy Vehicles (%)	1%	0%	1%	1%	0%	1%	0%	1%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.3	20.3		20.3	20.3		25.1	25.1		25.1	25.1	
Effective Green, g (s)	20.3	20.3		20.3	20.3		25.1	25.1		25.1	25.1	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.44	0.44		0.44	0.44	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	484	559		443	559		225	792		291	804	
v/s Ratio Prot		0.03			0.01			0.27			c0.32	
v/s Ratio Perm	c0.30			0.08			0.18			0.09		
v/c Ratio	0.85	0.08		0.23	0.02		0.42	0.62		0.20	0.73	
Uniform Delay, d1	17.2	12.3		13.1	12.1		11.1	12.5		10.0	13.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.6	0.1		0.3	0.0		5.6	3.6		1.6	5.7	
Delay (s)	30.8	12.4		13.3	12.1		16.7	16.1		11.5	19.1	
Level of Service	C	B		B	B		B	B		B	B	
Approach Delay (s)		26.4			13.1			16.2			18.4	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			57.4			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			78.4%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

34: Tenth Line & Bus Access

Lincolnville GO Transportation Study
Future Total (Medium Term) PM Pk Hr

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	W	W	W
Traffic Volume (vph)	2	1	0	536	728	4
Future Volume (vph)	2	1	0	536	728	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	1.00			1.00	1.00	1.00
Frt	0.95			1.00	1.00	0.85
Flt Protected	0.97			1.00	1.00	1.00
Satd. Flow (prot)	1702			1842	1842	1566
Flt Permitted	0.97			1.00	1.00	1.00
Satd. Flow (perm)	1702			1842	1842	1566
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1	0	583	791	4
RTOR Reduction (vph)	1	0	0	0	0	1
Lane Group Flow (vph)	2	0	0	583	791	3
Turn Type	Prot		Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases			2			6
Actuated Green, G (s)	1.1			48.3	48.3	48.3
Effective Green, g (s)	1.1			48.3	48.3	48.3
Actuated g/C Ratio	0.02			0.83	0.83	0.83
Clearance Time (s)	4.5			4.5	4.5	4.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	32			1523	1523	1295
v/s Ratio Prot	c0.00			0.32	c0.43	
v/s Ratio Perm						0.00
v/c Ratio	0.06			0.38	0.52	0.00
Uniform Delay, d1	28.1			1.3	1.5	0.9
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.8			0.7	1.3	0.0
Delay (s)	29.0			2.0	2.8	0.9
Level of Service	C			A	A	A
Approach Delay (s)	29.0			2.0	2.8	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			2.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			58.4		Sum of lost time (s)	9.0
Intersection Capacity Utilization			50.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

3: York Durham Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Medium Term) PM Pk Hr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	3	93	111	264	184	6
Future Volume (Veh/h)	3	93	111	264	184	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	106	126	300	209	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	764	212	216			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	764	212	216			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	87	91			
cM capacity (veh/h)	333	833	1336			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	109	426	216			
Volume Left	3	126	0			
Volume Right	106	0	7			
cSH	800	1336	1700			
Volume to Capacity	0.14	0.09	0.13			
Queue Length 95th (m)	3.6	2.4	0.0			
Control Delay (s)	10.2	3.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.2	3.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			46.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Medium Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	119	295	22	90	19	353	411	6	20	303	34
Future Volume (Veh/h)	56	119	295	22	90	19	353	411	6	20	303	34
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	60	128	317	24	97	20	380	442	6	22	326	37
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								225				
pX, platoon unblocked												
vC, conflicting volume	1659	1596	344	1953	1609	442	363			448		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1659	1596	344	1953	1609	442	363			448		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.3			2.2		
p0 queue free %	0	0	55	0	0	97	67			98		
cM capacity (veh/h)	0	70	703	0	67	605	1168			1123		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2				
Volume Total	505	24	117	380	442	6	22	363				
Volume Left	60	24	0	380	0	0	22	0				
Volume Right	317	0	20	0	0	6	0	37				
cSH	0	0	79	1168	1700	1700	1123	1700				
Volume to Capacity	Err	Err	1.48	0.33	0.26	0.00	0.02	0.21				
Queue Length 95th (m)	Err	Err	71.5	10.8	0.0	0.0	0.5	0.0				
Control Delay (s)	Err	Err	362.9	9.6	0.0	0.0	8.3	0.0				
Lane LOS	F	F	F	A			A					
Approach Delay (s)	Err	Err		4.4			0.5					
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			81.7%		ICU Level of Service				D			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Zone 3 & 8 /Existing GO & Bethesda Side Rd

Lincolnton GO Transportation Study

Future Total (Medium Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	84	61	23	94	0	37	0	12	0	0	0
Future Volume (Veh/h)	0	84	61	23	94	0	37	0	12	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	93	68	26	104	0	41	0	13	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	104			161			283	283	127	296	317	104
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	104			161			283	283	127	296	317	104
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			94	100	99	100	100	100
cM capacity (veh/h)	1500			1430			660	618	923	638	591	951
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	161	130	41	13	0	0						
Volume Left	0	26	41	0	0	0						
Volume Right	68	0	0	13	0	0						
cSH	1500	1430	660	923	1700	1700						
Volume to Capacity	0.00	0.02	0.06	0.01	0.00	0.00						
Queue Length 95th (m)	0.0	0.4	1.5	0.3	0.0	0.0						
Control Delay (s)	0.0	1.6	10.8	9.0	0.0	0.0						
Lane LOS		A	B	A	A	A						
Approach Delay (s)	0.0	1.6	10.4		0.0							
Approach LOS			B		A							
Intersection Summary												
Average Delay			2.2									
Intersection Capacity Utilization			27.7%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnvile GO Transportation Study
Future Total (Medium Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	5	71	76	7	30	154	589	108	60	627	53
Future Volume (Veh/h)	32	5	71	76	7	30	154	589	108	60	627	53
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	33	5	74	79	7	31	160	614	113	63	653	55
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1468	1854	354	1520	1824	364	708				727	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1468	1854	354	1520	1824	364	708				727	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	49	91	89	0	88	95	82				93	
cM capacity (veh/h)	64	57	648	56	60	639	900				886	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	33	79	79	38	467	420	390	382				
Volume Left	33	0	79	0	160	0	63	0				
Volume Right	0	74	0	31	0	113	0	55				
cSH	64	392	56	229	900	1700	886	1700				
Volume to Capacity	0.51	0.20	1.40	0.17	0.18	0.25	0.07	0.22				
Queue Length 95th (m)	15.7	5.7	53.5	4.4	4.9	0.0	1.7	0.0				
Control Delay (s)	108.8	16.5	380.0	23.8	4.8	0.0	2.2	0.0				
Lane LOS	F	C	F	C	A		A					
Approach Delay (s)	43.7		264.3		2.5		1.1					
Approach LOS	E		F									
Intersection Summary												
Average Delay				20.6								
Intersection Capacity Utilization				65.8%	ICU Level of Service				C			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

21: Tenth Line & Zone 2/Zone 3 South

Lincolnvile GO Transportation Study
Future Total (Medium Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	0	109	12	0	15	98	445	105	17	621	91
Future Volume (Veh/h)	76	0	109	12	0	15	98	445	105	17	621	91
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	84	0	121	13	0	17	109	494	117	19	690	101
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												205
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84					
vC, conflicting volume	1508	1608	740	1620	1600	552	791	611				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1509	1628	599	1642	1618	552	659	611				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	0	100	71	70	100	97	86	98				
cM capacity (veh/h)	72	73	424	43	74	535	791	978				
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	84	121	13	17	109	611	19	791				
Volume Left	84	0	13	0	109	0	19	0				
Volume Right	0	121	0	17	0	117	0	101				
cSH	72	424	43	535	791	1700	978	1700				
Volume to Capacity	1.17	0.29	0.30	0.03	0.14	0.36	0.02	0.47				
Queue Length 95th (m)	49.0	8.8	7.8	0.7	3.6	0.0	0.5	0.0				
Control Delay (s)	261.9	16.8	122.7	12.0	10.3	0.0	8.8	0.0				
Lane LOS	F	C	F	B	B		A					
Approach Delay (s)	117.3		59.9		1.6		0.2					
Approach LOS	F		F									
Intersection Summary												
Average Delay			15.4									
Intersection Capacity Utilization			64.5%	ICU Level of Service				C				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

29: Coronet Street & Forsyth Farm Dr

Lincolnvile GO Transportation Study
Future Total (Medium Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	52	5	25	97	92	2	0	8	48	0	0
Future Volume (Veh/h)	0	52	5	25	97	92	2	0	8	48	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	57	5	27	105	100	2	0	9	52	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	205			62			268	318	60	278	271	155
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	205			62			268	318	60	278	271	155
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			100	100	99	92	100	100
cM capacity (veh/h)	1366			1541			675	587	1006	660	624	891
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	62	232	11	52								
Volume Left	0	27	2	52								
Volume Right	5	100	9	0								
cSH	1366	1541	924	660								
Volume to Capacity	0.00	0.02	0.01	0.08								
Queue Length 95th (m)	0.0	0.4	0.3	1.9								
Control Delay (s)	0.0	1.0	8.9	10.9								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	1.0	8.9	10.9								
Approach LOS			A	B								
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			34.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

32: Tenth Line & GO RIRO

Lincolnville GO Transportation Study
Future Total (Medium Term) PM Pk Hr

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	55	0	770	525	95
Future Volume (Veh/h)	0	55	0	770	525	95
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	0	837	571	103
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				108		
pX, platoon unblocked	0.61					
vC, conflicting volume	1408	571	674			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1350	571	674			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	88	100			
cM capacity (veh/h)	102	520	917			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	60	837	571	103		
Volume Left	0	0	0	0		
Volume Right	60	0	0	103		
cSH	520	1700	1700	1700		
Volume to Capacity	0.12	0.49	0.34	0.06		
Queue Length 95th (m)	3.0	0.0	0.0	0.0		
Control Delay (s)	12.8	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	12.8	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			43.9%	ICU Level of Service		A
Analysis Period (min)			15			

Timings 7: Main St & Tenth Line

Lincolnvile GO Transportation Study
Future Total (Medium Term) PM Pk Hr

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	688	210	148	217	192	570
Future Volume (vph)	688	210	148	217	192	570
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	10.5	32.0	32.0	32.0	31.7	31.7
Total Split (s)	36.0	68.2	32.2	32.2	31.8	31.8
Total Split (%)	36.0%	68.2%	32.2%	32.2%	31.8%	31.8%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	2.7	2.7	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effect Green (s)	63.9	62.4	30.4	30.4	17.5	17.5
Actuated g/C Ratio	0.70	0.68	0.33	0.33	0.19	0.19
v/c Ratio	0.82	0.18	0.26	0.36	0.67	0.78
Control Delay	18.6	6.6	27.2	5.7	45.3	10.2
Queue Delay	39.6	1.6	0.0	0.0	0.0	0.0
Total Delay	58.3	8.2	27.2	5.7	45.3	10.2
LOS	E	A	C	A	D	B
Approach Delay		46.5	14.4		19.0	
Approach LOS		D	B		B	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 91.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 30.4
Intersection Capacity Utilization 70.6%
Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service C

Splits and Phases: 7: Main St & Tenth Line



Timings 10: Tenth Line/Plaza & Main St

Lincolnville GO Transportation Study
Future Total (Medium Term) PM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	2	353	404	310	79	0	3	2
Future Volume (vph)	2	353	404	310	79	0	3	2
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	9.5	29.5	27.5	27.5	27.5	27.5
Total Split (s)	41.0	41.0	30.0	71.0	29.0	29.0	29.0	29.0
Total Split (%)	41.0%	41.0%	30.0%	71.0%	29.0%	29.0%	29.0%	29.0%
Yellow Time (s)	3.3	3.3	3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.5	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.5	5.5	4.5	5.5	5.5	5.5		5.5
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	None	Max	None	None	None	None
Act Effect Green (s)	40.9	40.9	66.7	65.7	13.6	13.6		13.6
Actuated g/C Ratio	0.45	0.45	0.74	0.73	0.15	0.15		0.15
v/c Ratio	0.00	0.66	0.75	0.27	0.45	0.83		0.09
Control Delay	19.0	26.2	16.6	5.4	41.8	14.6		24.9
Queue Delay	0.0	0.0	2.7	2.7	0.0	0.0		0.0
Total Delay	19.0	26.2	19.3	8.1	41.8	14.6		24.9
LOS	B	C	B	A	D	B		C
Approach Delay		26.2		14.4		18.1		24.9
Approach LOS		C		B		B		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 90.4

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 18.8

Intersection LOS: B

Intersection Capacity Utilization 95.3%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Tenth Line/Plaza & Main St



Timings
18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

Lincolnville GO Transportation Study
Future Total (Medium Term) PM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	372	0	94	0	85	370	53	521
Future Volume (vph)	372	0	94	0	85	370	53	521
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	29.0	29.0	29.0	29.0	31.0	31.0	31.0	31.0
Total Split (%)	48.3%	48.3%	48.3%	48.3%	51.7%	51.7%	51.7%	51.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effect Green (s)	20.3	20.3	20.3	20.3	25.1	25.1	25.1	25.1
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.44	0.44	0.44	0.44
v/c Ratio	0.86	0.19	0.24	0.04	0.42	0.62	0.20	0.73
Control Delay	36.4	1.9	14.3	0.1	19.6	16.9	13.5	21.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
Total Delay	36.4	1.9	14.3	0.1	19.6	18.4	13.5	21.3
LOS	D	A	B	A	B	B	B	C
Approach Delay		28.1		11.1		18.6		20.5
Approach LOS		C		B		B		C

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 57.4

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 21.4

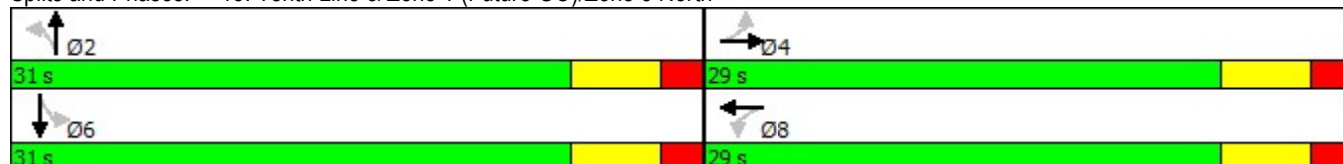
Intersection LOS: C

Intersection Capacity Utilization 78.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 18: Tenth Line & Zone 1 (Future GO)/Zone 3 North



Timings 34: Tenth Line & Bus Access

Lincolnvile GO Transportation Study
Future Total (Medium Term) PM Pk Hr

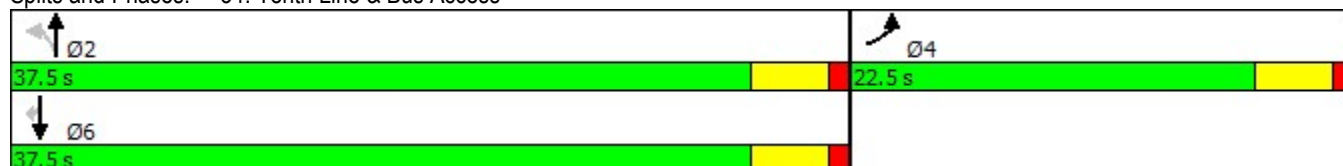
				
Lane Group	EBL	NBT	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	2	536	728	4
Future Volume (vph)	2	536	728	4
Turn Type	Prot	NA	NA	Perm
Protected Phases	4	2	6	
Permitted Phases				6
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	22.5	37.5	37.5	37.5
Total Split (%)	37.5%	62.5%	62.5%	62.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effect Green (s)	5.7	52.0	52.0	52.0
Actuated g/C Ratio	0.10	0.95	0.95	0.95
v/c Ratio	0.02	0.33	0.45	0.00
Control Delay	22.0	1.4	2.0	1.0
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	22.0	1.4	2.1	1.0
LOS	C	A	A	A
Approach Delay	22.0	1.4	2.1	
Approach LOS	C	A	A	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 54.6
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.45
Intersection Signal Delay: 1.8
Intersection Capacity Utilization 50.0%
Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service A

Splits and Phases: 34: Tenth Line & Bus Access



HCM Signalized Intersection Capacity Analysis

5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study

Future Total (Medium Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	72	272	8	90	23	302	215	0	14	412	47
Future Volume (vph)	37	72	272	8	90	23	302	215	0	14	412	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.90		1.00	0.97		1.00	1.00		1.00	0.98	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1590		1685	1696		1620	1824		1546	1759	
Flt Permitted		0.96		0.32	1.00		0.18	1.00		0.61	1.00	
Satd. Flow (perm)		1528		563	1696		304	1824		993	1759	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	41	80	302	9	100	26	336	239	0	16	458	52
RTOR Reduction (vph)	0	168	0	0	18	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	255	0	9	108	0	336	239	0	16	503	0
Heavy Vehicles (%)	6%	0%	8%	0%	8%	5%	4%	3%	13%	9%	5%	7%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		2			6		7	4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)		12.6		12.6	12.6		32.0	32.0		17.9	17.9	
Effective Green, g (s)		12.6		12.6	12.6		32.0	32.0		17.9	17.9	
Actuated g/C Ratio		0.24		0.24	0.24		0.60	0.60		0.33	0.33	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		359		132	398		417	1088		331	587	
v/s Ratio Prot					0.06		c0.14	0.13			0.29	
v/s Ratio Perm		c0.17		0.02			c0.34			0.02		
v/c Ratio		0.71		0.07	0.27		0.81	0.22		0.05	0.86	
Uniform Delay, d1		18.8		15.9	16.8		9.7	5.0		12.1	16.7	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.5		0.2	0.4		10.8	0.1		0.1	11.8	
Delay (s)		25.4		16.2	17.1		20.5	5.1		12.1	28.5	
Level of Service		C		B	B		C	A		B	C	
Approach Delay (s)		25.4			17.1			14.1			28.0	
Approach LOS		C			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			21.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			53.6				Sum of lost time (s)			13.5		
Intersection Capacity Utilization			81.7%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnvile GO Transportation Study

Future Total (Medium Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	8	164	104	2	38	78	483	37	20	623	37
Future Volume (vph)	50	8	164	104	2	38	78	483	37	20	623	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.0
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.86		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1551		1733	1549		1685	3339		1785	3413	
Flt Permitted	0.73	1.00		0.56	1.00		0.33	1.00		0.41	1.00	
Satd. Flow (perm)	1249	1551		1020	1549		584	3339		769	3413	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	61	10	200	127	2	46	95	589	45	24	760	45
RTOR Reduction (vph)	0	129	0	0	36	0	0	7	0	0	6	0
Lane Group Flow (vph)	61	81	0	127	12	0	95	627	0	24	799	0
Heavy Vehicles (%)	3%	0%	4%	3%	0%	4%	0%	4%	29%	0%	3%	16%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.5	11.5		11.5	11.5		34.4	34.4		34.4	34.4	
Effective Green, g (s)	11.5	11.5		11.5	11.5		34.4	34.4		34.4	34.4	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.63	0.63		0.63	0.63	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	261	324		213	324		365	2092		481	2138	
v/s Ratio Prot		0.05			0.01			0.19			c0.23	
v/s Ratio Perm	0.05			c0.12			0.16			0.03		
v/c Ratio	0.23	0.25		0.60	0.04		0.26	0.30		0.05	0.37	
Uniform Delay, d1	18.0	18.1		19.6	17.3		4.6	4.7		4.0	5.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4		4.4	0.0		1.7	0.4		0.2	0.5	
Delay (s)	18.5	18.5		24.0	17.3		6.3	5.1		4.1	5.5	
Level of Service	B	B		C	B		A	A		A	A	
Approach Delay (s)		18.5			22.2			5.2			5.5	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.6					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		54.9					Sum of lost time (s)		9.0			
Intersection Capacity Utilization		54.0%					ICU Level of Service		A			
Analysis Period (min)		15										

c Critical Lane Group

Timings 5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Medium Term) AM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	37	72	8	90	302	215	14	412
Future Volume (vph)	37	72	8	90	302	215	14	412
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		2		6	7	4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	7	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	23.4	23.4	23.4	23.4	14.0	36.6	22.6	22.6
Total Split (%)	39.0%	39.0%	39.0%	39.0%	23.3%	61.0%	37.7%	37.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes		Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	Min
Act Effect Green (s)		12.6	12.6	12.6	32.0	32.0	17.8	17.8
Actuated g/C Ratio		0.23	0.23	0.23	0.60	0.60	0.33	0.33
v/c Ratio		0.80	0.07	0.30	0.81	0.22	0.05	0.87
Control Delay		21.6	16.1	15.6	29.5	6.9	15.0	37.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		21.6	16.1	15.6	29.5	6.9	15.0	37.0
LOS		C	B	B	C	A	B	D
Approach Delay		21.6		15.7		20.1		36.3
Approach LOS		C		B		C		D

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 53.7

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 25.3

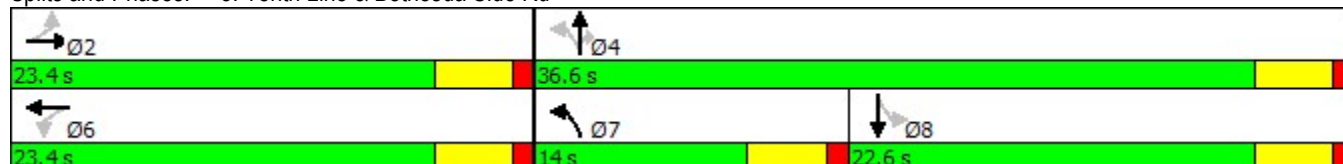
Intersection LOS: C

Intersection Capacity Utilization 81.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Tenth Line & Bethesda Side Rd



Timings 14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnvile GO Transportation Study
Future Total (Medium Term) AM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	50	8	104	2	78	483	20	623
Future Volume (vph)	50	8	104	2	78	483	20	623
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	24.0	24.0	36.0	36.0	36.0	36.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effect Green (s)	11.5	11.5	11.5	11.5	34.4	34.4	34.4	34.4
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.63	0.63	0.63	0.63
v/c Ratio	0.23	0.46	0.60	0.13	0.26	0.30	0.05	0.38
Control Delay	18.4	8.8	30.1	6.9	8.5	5.7	5.8	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	8.8	30.1	6.9	8.5	5.7	5.8	6.3
LOS	B	A	C	A	A	A	A	A
Approach Delay		11.0		23.8		6.1		6.2
Approach LOS		B		C		A		A

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 55

Natural Cycle: 45

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 8.4

Intersection LOS: A

Intersection Capacity Utilization 54.0%

ICU Level of Service A

Analysis Period (min) 15

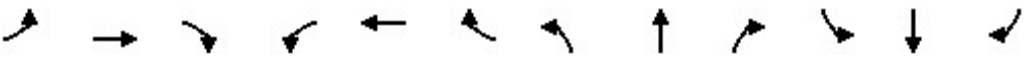
Splits and Phases: 14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

	
36 s	24 s
	
36 s	24 s

HCM Signalized Intersection Capacity Analysis

5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Medium Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔	↔	↔	↔	
Traffic Volume (vph)	56	119	295	22	90	19	353	411	6	20	303	34
Future Volume (vph)	56	119	295	22	90	19	353	411	6	20	303	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)		4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.92		1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1692		1574	1698		1574	1860	1507	1685	1818	
Flt Permitted		0.95		0.27	1.00		0.31	1.00	1.00	0.51	1.00	
Satd. Flow (perm)		1613		455	1698		507	1860	1507	898	1818	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	60	128	317	24	97	20	380	442	6	22	326	37
RTOR Reduction (vph)	0	106	0	0	13	0	0	0	3	0	7	0
Lane Group Flow (vph)	0	399	0	24	104	0	380	442	3	22	356	0
Heavy Vehicles (%)	0%	4%	0%	7%	8%	7%	7%	1%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		2			6		7	4		3	8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)		16.4		16.4	16.4		32.7	27.3	27.3	19.3	18.4	
Effective Green, g (s)		16.4		16.4	16.4		32.7	27.3	27.3	19.3	18.4	
Actuated g/C Ratio		0.28		0.28	0.28		0.56	0.47	0.47	0.33	0.32	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		455		128	479		465	873	708	310	575	
v/s Ratio Prot					0.06		0.14	0.24		0.00	0.20	
v/s Ratio Perm		0.25		0.05			0.32		0.00	0.02		
v/c Ratio		0.88		0.19	0.22		0.82	0.51	0.00	0.07	0.62	
Uniform Delay, d1		19.9		15.8	15.9		8.8	10.7	8.2	13.1	16.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		17.0		0.7	0.2		10.7	0.5	0.0	0.1	2.0	
Delay (s)		36.9		16.5	16.2		19.5	11.2	8.2	13.2	18.9	
Level of Service		D		B	B		B	B	A	B	B	
Approach Delay (s)		36.9			16.2			15.0			18.5	
Approach LOS		D			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			21.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			58.1				Sum of lost time (s)			13.5		
Intersection Capacity Utilization			83.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnville GO Transportation Study
Future Total (Medium Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	5	71	76	7	30	154	589	108	60	627	53
Future Volume (vph)	32	5	71	76	7	30	154	589	108	60	627	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.0
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.88		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1685	1615		1785	1649		1685	3457		1785	3464	
Flt Permitted	0.73	1.00		0.71	1.00		0.38	1.00		0.38	1.00	
Satd. Flow (perm)	1299	1615		1326	1649		678	3457		705	3464	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	33	5	74	79	7	31	160	614	112	62	653	55
RTOR Reduction (vph)	0	64	0	0	27	0	0	17	0	0	7	0
Lane Group Flow (vph)	33	15	0	79	11	0	160	710	0	63	701	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	7.5	7.5		7.5	7.5		37.9	37.9		37.9	37.9	
Effective Green, g (s)	7.5	7.5		7.5	7.5		37.9	37.9		37.9	37.9	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.70	0.70		0.70	0.70	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	179	222		182	227		472	2408		491	2413	
v/s Ratio Prot		0.01			0.01			0.21			0.20	
v/s Ratio Perm	0.03			c0.06			c0.24			0.09		
v/c Ratio	0.18	0.07		0.43	0.05		0.34	0.29		0.13	0.29	
Uniform Delay, d1	20.7	20.4		21.5	20.4		3.3	3.1		2.7	3.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.1		1.7	0.1		1.9	0.3		0.5	0.3	
Delay (s)	21.2	20.5		23.2	20.4		5.2	3.5		3.3	3.4	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		20.7			22.3			3.8			3.4	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings 5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Medium Term) PM Pk Hr

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	56	119	22	90	353	411	6	20	303
Future Volume (vph)	56	119	22	90	353	411	6	20	303
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		2		6	7	4		3	8
Permitted Phases	2		6		4		4	8	
Detector Phase	2	2	6	6	7	4	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	23.4	23.4	23.4	23.4	14.1	27.1	27.1	9.5	22.5
Total Split (%)	39.0%	39.0%	39.0%	39.0%	23.5%	45.2%	45.2%	15.8%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min
Act Effect Green (s)		16.4	16.4	16.4	29.0	27.3	27.3	19.7	14.7
Actuated g/C Ratio		0.30	0.30	0.30	0.53	0.50	0.50	0.36	0.27
v/c Ratio		0.86	0.18	0.22	0.83	0.48	0.01	0.06	0.73
Control Delay		29.9	18.6	14.2	28.4	12.7	0.0	7.7	27.7
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		29.9	18.6	14.2	28.4	12.7	0.0	7.7	27.7
LOS		C	B	B	C	B	A	A	C
Approach Delay		29.9		15.0		19.8			26.6
Approach LOS		C		B		B			C

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 54.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 23.6

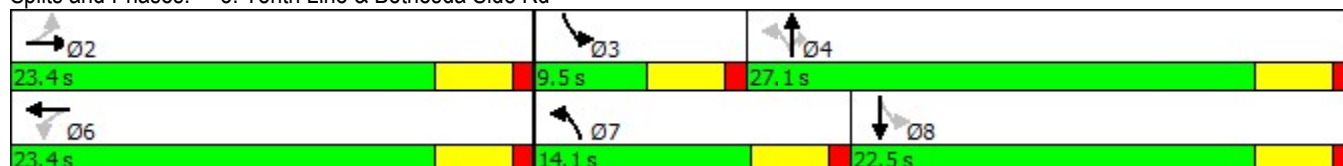
Intersection LOS: C

Intersection Capacity Utilization 83.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Tenth Line & Bethesda Side Rd



Timings 14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolville GO Transportation Study
Future Total (Medium Term) PM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	32	5	76	7	154	589	60	627
Future Volume (vph)	32	5	76	7	154	589	60	627
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	37.5	37.5	37.5	37.5
Total Split (%)	37.5%	37.5%	37.5%	37.5%	62.5%	62.5%	62.5%	62.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effect Green (s)	8.6	8.6	8.6	8.6	38.8	38.8	38.8	38.8
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.73	0.73	0.73	0.73
v/c Ratio	0.16	0.25	0.37	0.13	0.33	0.29	0.12	0.28
Control Delay	19.6	8.1	24.2	9.8	6.8	3.8	4.7	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	8.1	24.2	9.8	6.8	3.8	4.7	4.0
LOS	B	A	C	A	A	A	A	A
Approach Delay		11.5		19.5		4.4		4.0
Approach LOS		B		B		A		A

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 53.5

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 5.6

Intersection LOS: A

Intersection Capacity Utilization 49.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

	
Ø2	Ø4
37.5 s	22.5 s
	
Ø6	Ø8
37.5 s	22.5 s

HCM Signalized Intersection Capacity Analysis

5: Tenth Line & Bethesda Side Rd

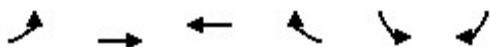
Lincolville GO Transportation Study
Future Total (Long Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔	↔	↔	↔	
Traffic Volume (vph)	65	235	468	8	143	37	365	232	0	58	464	56
Future Volume (vph)	65	235	468	8	143	37	365	232	0	58	464	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.92		1.00	0.97		1.00	1.00		1.00	0.98	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1629		1685	1696		1620	1824		1546	1757	
Flt Permitted		0.95		0.22	1.00		0.13	1.00		0.60	1.00	
Satd. Flow (perm)		1560		383	1696		220	1824		976	1757	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	72	261	520	9	159	41	406	258	0	64	516	62
RTOR Reduction (vph)	0	56	0	0	9	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	797	0	9	191	0	406	258	0	64	574	0
Heavy Vehicles (%)	6%	0%	8%	0%	8%	5%	4%	3%	13%	9%	5%	7%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		2			6		7	4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)		43.5		43.5	43.5		47.5	47.5		26.5	26.5	
Effective Green, g (s)		43.5		43.5	43.5		47.5	47.5		26.5	26.5	
Actuated g/C Ratio		0.44		0.44	0.44		0.48	0.48		0.26	0.26	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		678		166	737		335	866		258	465	
v/s Ratio Prot					0.11		c0.20	0.14			0.33	
v/s Ratio Perm		c0.51		0.02			c0.38			0.07		
v/c Ratio		1.18		0.05	0.26		1.21	0.30		0.25	1.23	
Uniform Delay, d1		28.2		16.3	18.0		29.0	16.1		28.9	36.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		94.0		0.1	0.2		119.8	0.2		0.5	122.6	
Delay (s)		122.2		16.5	18.2		148.8	16.2		29.4	159.4	
Level of Service		F		B	B		F	B		C	F	
Approach Delay (s)		122.2			18.1			97.3			146.4	
Approach LOS		F			B			F			F	
Intersection Summary												
HCM 2000 Control Delay			112.6			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			1.23									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			117.5%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

7: Main St & Tenth Line

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	479	108	137	172	251	939
Future Volume (vph)	479	108	137	172	251	939
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.0	3.5
Total Lost time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1636	1807	1860	1436	1611	1536
Flt Permitted	0.56	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	970	1807	1860	1436	1611	1536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	521	117	149	187	273	1021
RTOR Reduction (vph)	0	0	0	134	0	476
Lane Group Flow (vph)	521	117	149	53	273	545
Confl. Peds. (#/hr)					3	
Heavy Vehicles (%)	3%	4%	1%	5%	4%	4%
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Actuated Green, G (s)	49.2	49.2	27.3	27.3	35.7	35.7
Effective Green, g (s)	49.2	49.2	27.3	27.3	35.7	35.7
Actuated g/C Ratio	0.51	0.51	0.28	0.28	0.37	0.37
Clearance Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	614	920	525	405	595	567
v/s Ratio Prot	c0.15	0.06	0.08			c0.35
v/s Ratio Perm	c0.28			0.04	0.17	
v/c Ratio	0.85	0.13	0.28	0.13	0.46	0.96
Uniform Delay, d1	18.4	12.4	27.0	25.8	23.1	29.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.6	0.3	1.4	0.7	0.6	28.2
Delay (s)	29.0	12.7	28.4	26.5	23.7	57.9
Level of Service	C	B	C	C	C	E
Approach Delay (s)		26.0	27.3		50.7	
Approach LOS		C	C		D	
Intersection Summary						
HCM 2000 Control Delay			40.3		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.94			
Actuated Cycle Length (s)			96.6		Sum of lost time (s)	16.2
Intersection Capacity Utilization			76.2%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

10: Tenth Line/Plaza & Main St

Lincolville GO Transportation Study
Future Total (Long Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	239	103	738	333	1	83	0	347	0	0	2
Future Volume (vph)	1	239	103	738	333	1	83	0	347	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00			1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.85			0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1685	1717		1652	1824		1610	1536			1583	
Flt Permitted	0.54	1.00		0.24	1.00		0.76	1.00			1.00	
Satd. Flow (perm)	962	1717		421	1824		1282	1536			1583	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	263	113	811	366	1	91	0	381	0	0	2
RTOR Reduction (vph)	0	15	0	0	0	0	0	328	0	0	2	0
Lane Group Flow (vph)	1	361	0	811	367	0	91	53	0	0	0	0
Confl. Peds. (#/hr)							3					3
Heavy Vehicles (%)	0%	3%	8%	2%	3%	0%	4%	0%	4%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA			NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	25.1	25.1		67.1	67.1		12.5	12.5			12.5	
Effective Green, g (s)	25.1	25.1		67.1	67.1		12.5	12.5			12.5	
Actuated g/C Ratio	0.28	0.28		0.74	0.74		0.14	0.14			0.14	
Clearance Time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	266	475		821	1350		176	211			218	
v/s Ratio Prot		0.21		c0.41	0.20			0.03			0.00	
v/s Ratio Perm	0.00			c0.32			c0.07					
v/c Ratio	0.00	0.76		0.99	0.27		0.52	0.25			0.00	
Uniform Delay, d1	23.7	30.0		18.0	3.8		36.2	34.9			33.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	10.9		28.1	0.5		2.6	0.6			0.0	
Delay (s)	23.7	40.9		46.1	4.3		38.8	35.5			33.7	
Level of Service	C	D		D	A		D	D			C	
Approach Delay (s)		40.8			33.1			36.1			33.7	
Approach LOS		D			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			35.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			90.6			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			94.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	8	164	104	2	38	78	563	37	20	871	37
Future Volume (vph)	50	8	164	104	2	38	78	563	37	20	871	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.0
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.86		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1551		1733	1549		1685	3351		1785	3427	
Flt Permitted	0.73	1.00		0.55	1.00		0.22	1.00		0.36	1.00	
Satd. Flow (perm)	1249	1551		1004	1549		387	3351		679	3427	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	61	10	200	127	2	46	95	687	45	24	1062	45
RTOR Reduction (vph)	0	67	0	0	36	0	0	7	0	0	4	0
Lane Group Flow (vph)	61	143	0	127	12	0	95	725	0	24	1103	0
Heavy Vehicles (%)	3%	0%	4%	3%	0%	4%	0%	4%	29%	0%	3%	16%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.8	11.8		11.8	11.8		35.9	35.9		35.9	35.9	
Effective Green, g (s)	11.8	11.8		11.8	11.8		35.9	35.9		35.9	35.9	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.63	0.63		0.63	0.63	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	259	322		208	322		245	2121		429	2169	
v/s Ratio Prot		0.09			0.01			0.22			c0.32	
v/s Ratio Perm	0.05			c0.13			0.25			0.04		
v/c Ratio	0.24	0.45		0.61	0.04		0.39	0.34		0.06	0.51	
Uniform Delay, d1	18.7	19.6		20.4	17.9		5.1	4.9		4.0	5.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.0		5.2	0.0		4.6	0.4		0.2	0.9	
Delay (s)	19.2	20.6		25.6	18.0		9.6	5.3		4.2	6.5	
Level of Service	B	C		C	B		A	A		A	A	
Approach Delay (s)		20.3			23.5			5.8			6.4	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

Lincolnville GO Transportation Study
Future Total (Long Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	0	61	169	0	47	181	455	28	18	622	2
Future Volume (vph)	95	0	61	169	0	47	181	455	28	18	622	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1733	1536		1733	1536		1767	1794		1767	1823	
Flt Permitted	0.72	1.00		0.71	1.00		0.29	1.00		0.41	1.00	
Satd. Flow (perm)	1319	1536		1300	1536		535	1794		754	1823	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	0	68	188	0	52	201	506	31	20	691	2
RTOR Reduction (vph)	0	54	0	0	41	0	0	3	0	0	0	0
Lane Group Flow (vph)	106	14	0	188	11	0	201	534	0	20	693	0
Heavy Vehicles (%)	3%	0%	4%	3%	0%	4%	1%	4%	1%	1%	3%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.9	10.9		10.9	10.9		29.4	29.4		29.4	29.4	
Effective Green, g (s)	10.9	10.9		10.9	10.9		29.4	29.4		29.4	29.4	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.56	0.56		0.56	0.56	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	274	320		270	320		300	1008		423	1024	
v/s Ratio Prot		0.01			0.01			0.30			c0.38	
v/s Ratio Perm	0.08			c0.14			0.38			0.03		
v/c Ratio	0.39	0.04		0.70	0.03		0.67	0.53		0.05	0.68	
Uniform Delay, d1	17.8	16.5		19.2	16.5		8.0	7.1		5.2	8.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.1		7.6	0.0		11.3	2.0		0.2	3.6	
Delay (s)	18.7	16.6		26.8	16.5		19.4	9.1		5.4	11.7	
Level of Service	B	B		C	B		B	A		A	B	
Approach Delay (s)		17.9			24.5			11.9			11.5	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			52.3			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			73.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

34: Tenth Line & Bus Access

Lincolnville GO Transportation Study
Future Total (Long Term) AM Pk Hr

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	W	W	W
Traffic Volume (vph)	2	0	0	662	851	1
Future Volume (vph)	2	0	0	662	851	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	1750			1842	1842	1566
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	1750			1842	1842	1566
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	0	720	925	1
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2	0	0	720	925	1
Turn Type	Prot		Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases			2			6
Actuated Green, G (s)	1.0			48.3	48.3	48.3
Effective Green, g (s)	1.0			48.3	48.3	48.3
Actuated g/C Ratio	0.02			0.83	0.83	0.83
Clearance Time (s)	4.5			4.5	4.5	4.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	30			1526	1526	1297
v/s Ratio Prot	c0.00			0.39	c0.50	
v/s Ratio Perm						0.00
v/c Ratio	0.07			0.47	0.61	0.00
Uniform Delay, d1	28.2			1.4	1.7	0.9
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.9			1.0	1.8	0.0
Delay (s)	29.1			2.5	3.5	0.9
Level of Service	C			A	A	A
Approach Delay (s)	29.1			2.5	3.5	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			3.1		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			58.3		Sum of lost time (s)	9.0
Intersection Capacity Utilization			56.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

3: York Durham Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	291	131	150	343	1
Future Volume (Veh/h)	2	291	131	150	343	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	2	313	141	161	369	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	812	370	370			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	812	370	370			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	54	88			
cM capacity (veh/h)	305	674	1183			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	315	302	370			
Volume Left	2	141	0			
Volume Right	313	0	1			
cSH	669	1183	1700			
Volume to Capacity	0.47	0.12	0.22			
Queue Length 95th (m)	19.2	3.1	0.0			
Control Delay (s)	15.1	4.5	0.0			
Lane LOS	C	A				
Approach Delay (s)	15.1	4.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			6.2			
Intersection Capacity Utilization			61.4%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 6: Zone 3 & 8 /Existing GO & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	274	19	7	125	0	63	0	19	0	0	0
Future Volume (Veh/h)	0	274	19	7	125	0	63	0	19	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	304	21	8	139	0	70	0	21	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)	173											
pX, platoon unblocked												
vC, conflicting volume	139			325			470	470	314	490	480	139
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	139			325			470	470	314	490	480	139
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			86	100	97	100	100	100
cM capacity (veh/h)	1451			1240			500	492	721	470	485	904
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	325	147	70	21	0	0						
Volume Left	0	8	70	0	0	0						
Volume Right	21	0	0	21	0	0						
cSH	1451	1240	500	721	1700	1700						
Volume to Capacity	0.00	0.01	0.14	0.03	0.00	0.00						
Queue Length 95th (m)	0.0	0.1	3.7	0.7	0.0	0.0						
Control Delay (s)	0.0	0.5	13.4	10.1	0.0	0.0						
Lane LOS		A	B	B	A	A						
Approach Delay (s)	0.0	0.5	12.6		0.0							
Approach LOS			B		A							
Intersection Summary												
Average Delay			2.2									
Intersection Capacity Utilization			25.7%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

21: Tenth Line & Zone 2/Zone 3 South

Lincolville GO Transportation Study
Future Total (Long Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	0	128	20	0	23	72	549	36	4	790	57
Future Volume (Veh/h)	90	0	128	20	0	23	72	549	36	4	790	57
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	100	0	142	22	0	26	80	610	40	4	878	63
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												205
pX, platoon unblocked	0.73	0.73	0.73	0.73	0.73		0.73					
vC, conflicting volume	1714	1728	910	1818	1739	630	941	650				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1794	1814	686	1938	1830	630	729	650				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	0	100	56	0	100	95	87	100				
cM capacity (veh/h)	38	50	322	18	49	478	638	941				
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	100	142	22	26	80	650	4	941				
Volume Left	100	0	22	0	80	0	4	0				
Volume Right	0	142	0	26	0	40	0	63				
cSH	38	322	18	478	638	1700	941	1700				
Volume to Capacity	2.61	0.44	1.23	0.05	0.13	0.38	0.00	0.55				
Queue Length 95th (m)	84.3	16.4	23.9	1.3	3.3	0.0	0.1	0.0				
Control Delay (s)	952.0	24.7	594.3	13.0	11.5	0.0	8.8	0.0				
Lane LOS	F	C	F	B	B		A					
Approach Delay (s)	407.9		279.4		1.3		0.0					
Approach LOS	F		F									
Intersection Summary												
Average Delay				57.5								
Intersection Capacity Utilization				73.6%	ICU Level of Service				D			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis 29: Coronet Street & Forsyth Farm Dr

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	121	2	8	76	33	5	0	25	76	0	0
Future Volume (Veh/h)	0	121	2	8	76	33	5	0	25	76	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	132	2	9	83	36	5	0	27	83	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	119			134			252	270	133	279	253	101
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	119			134			252	270	133	279	253	101
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	97	87	100	100
cM capacity (veh/h)	1469			1451			698	632	916	650	646	954
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	134	128	32	83								
Volume Left	0	9	5	83								
Volume Right	2	36	27	0								
cSH	1469	1451	874	650								
Volume to Capacity	0.00	0.01	0.04	0.13								
Queue Length 95th (m)	0.0	0.1	0.9	3.3								
Control Delay (s)	0.0	0.6	9.3	11.3								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	0.6	9.3	11.3								
Approach LOS			A	B								
Intersection Summary												
Average Delay												
Intersection Capacity Utilization												
Analysis Period (min)												

HCM Unsignalized Intersection Capacity Analysis

32: Tenth Line & GO RIRO

Lincolnton GO Transportation Study
Future Total (Long Term) AM Pk Hr

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	34	0	597	608	332
Future Volume (Veh/h)	0	34	0	597	608	332
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	37	0	649	661	361
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				108	116	
pX, platoon unblocked	0.87	0.77	0.77			
vC, conflicting volume	1310	661	1022			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	763	412	880			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	325	493	592			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	37	649	661	361		
Volume Left	0	0	0	0		
Volume Right	37	0	0	361		
cSH	493	1700	1700	1700		
Volume to Capacity	0.07	0.38	0.39	0.21		
Queue Length 95th (m)	1.8	0.0	0.0	0.0		
Control Delay (s)	12.9	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	12.9	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			42.0%	ICU Level of Service		A
Analysis Period (min)			15			

Timings 5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study

Future Total (Long Term) AM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	65	235	8	143	365	232	58	464
Future Volume (vph)	65	235	8	143	365	232	58	464
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		2		6	7	4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	7	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	48.0	48.0	48.0	48.0	21.0	52.0	31.0	31.0
Total Split (%)	48.0%	48.0%	48.0%	48.0%	21.0%	52.0%	31.0%	31.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes		Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	Min
Act Effect Green (s)		43.5	43.5	43.5	47.5	47.5	26.5	26.5
Actuated g/C Ratio		0.44	0.44	0.44	0.48	0.48	0.26	0.26
v/c Ratio		1.16	0.05	0.27	1.21	0.30	0.25	1.23
Control Delay		113.2	17.6	17.7	146.8	17.3	32.1	154.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		113.2	17.6	17.7	146.8	17.3	32.1	154.3
LOS		F	B	B	F	B	C	F
Approach Delay		113.2		17.7		96.4		142.1
Approach LOS		F		B		F		F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Natural Cycle: 100

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.23

Intersection Signal Delay: 107.9

Intersection LOS: F

Intersection Capacity Utilization 117.5%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 5: Tenth Line & Bethesda Side Rd

 Ø2	 Ø4
48 s	52 s
 Ø6	 Ø7
48 s	21 s
	 Ø8
	31 s

Timings
7: Main St & Tenth Line

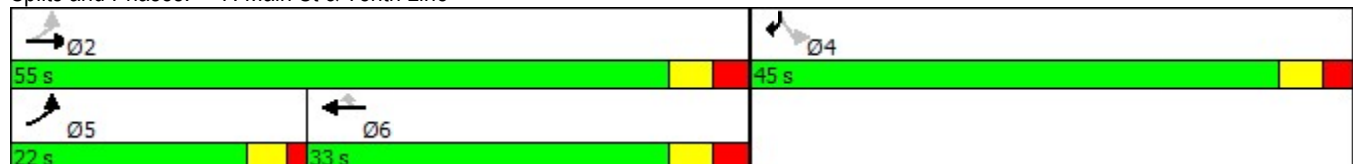
Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	479	108	137	172	251	939
Future Volume (vph)	479	108	137	172	251	939
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	10.5	32.0	32.0	32.0	31.7	31.7
Total Split (s)	22.0	55.0	33.0	33.0	45.0	45.0
Total Split (%)	22.0%	55.0%	33.0%	33.0%	45.0%	45.0%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	2.7	2.7	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effect Green (s)	50.7	49.2	27.3	27.3	35.7	35.7
Actuated g/C Ratio	0.52	0.51	0.28	0.28	0.37	0.37
v/c Ratio	0.83	0.13	0.28	0.35	0.46	0.98
Control Delay	31.7	14.2	30.3	6.3	25.7	32.3
Queue Delay	51.7	1.0	0.0	0.0	0.0	0.0
Total Delay	83.4	15.2	30.3	6.3	25.7	32.3
LOS	F	B	C	A	C	C
Approach Delay		70.9	17.0		30.9	
Approach LOS		E	B		C	

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 96.7
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 40.1
 Intersection LOS: D
 Intersection Capacity Utilization 76.2%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 7: Main St & Tenth Line



Timings 10: Tenth Line/Plaza & Main St

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr

							
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	1	239	738	333	83	0	0
Future Volume (vph)	1	239	738	333	83	0	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	NA
Protected Phases		2	1	6		8	4
Permitted Phases	2		6		8		
Detector Phase	2	2	1	6	8	8	4
Switch Phase							
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	9.5	29.5	27.5	27.5	27.5
Total Split (s)	30.5	30.5	42.0	72.5	27.5	27.5	27.5
Total Split (%)	30.5%	30.5%	42.0%	72.5%	27.5%	27.5%	27.5%
Yellow Time (s)	3.3	3.3	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.5	5.5	5.5	5.5	5.5
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	Max	Max	None	Max	None	None	None
Act Effect Green (s)	25.0	25.0	68.0	67.0	12.5	12.5	12.5
Actuated g/C Ratio	0.28	0.28	0.75	0.74	0.14	0.14	0.14
v/c Ratio	0.00	0.77	0.98	0.27	0.52	0.44	0.00
Control Delay	25.0	41.1	45.7	4.7	47.0	1.6	0.0
Queue Delay	0.0	0.0	39.7	2.8	0.0	0.0	0.0
Total Delay	25.0	41.1	85.4	7.5	47.0	1.6	0.0
LOS	C	D	F	A	D	A	A
Approach Delay		41.1		61.1		10.4	
Approach LOS		D		E		B	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 90.5

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 45.5

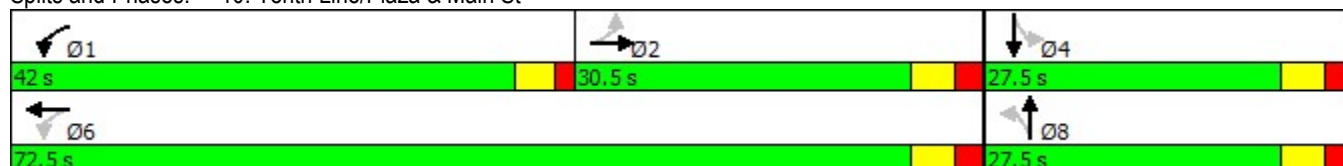
Intersection LOS: D

Intersection Capacity Utilization 94.1%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Tenth Line/Plaza & Main St



Timings 14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	50	8	104	2	78	563	20	871
Future Volume (vph)	50	8	104	2	78	563	20	871
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	37.5	37.5	37.5	37.5
Total Split (%)	37.5%	37.5%	37.5%	37.5%	62.5%	62.5%	62.5%	62.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effect Green (s)	11.8	11.8	11.8	11.8	35.9	35.9	35.9	35.9
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.63	0.63	0.63	0.63
v/c Ratio	0.23	0.54	0.61	0.13	0.39	0.34	0.06	0.51
Control Delay	19.0	16.3	31.7	7.1	13.0	6.0	6.0	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	16.3	31.7	7.1	13.0	6.0	6.0	7.4
LOS	B	B	C	A	B	A	A	A
Approach Delay		16.9		25.0		6.8		7.4
Approach LOS		B		C		A		A

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 56.8

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 9.6

Intersection LOS: A

Intersection Capacity Utilization 60.9%

ICU Level of Service B

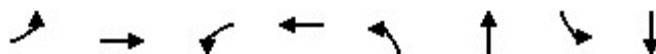
Analysis Period (min) 15

Splits and Phases: 14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

	
Ø2	Ø4
37.5 s	22.5 s
	
Ø6	Ø8
37.5 s	22.5 s

Timings 18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	95	0	169	0	181	455	18	622
Future Volume (vph)	95	0	169	0	181	455	18	622
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	28.0	28.0	28.0	28.0	32.0	32.0	32.0	32.0
Total Split (%)	46.7%	46.7%	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effect Green (s)	13.0	13.0	13.0	13.0	30.7	30.7	30.7	30.7
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.60	0.60	0.60	0.60
v/c Ratio	0.31	0.14	0.57	0.09	0.62	0.50	0.04	0.63
Control Delay	17.8	1.3	23.6	0.3	25.2	11.1	8.2	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	17.8	1.3	23.6	0.3	25.2	11.5	8.2	14.7
LOS	B	A	C	A	C	B	A	B
Approach Delay		11.3		18.6		15.2		14.6
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 51

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 15.0

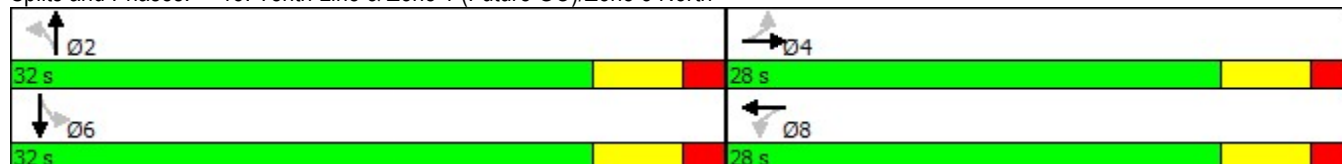
Intersection LOS: B

Intersection Capacity Utilization 73.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 18: Tenth Line & Zone 1 (Future GO)/Zone 3 North



Timings 34: Tenth Line & Bus Access

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr

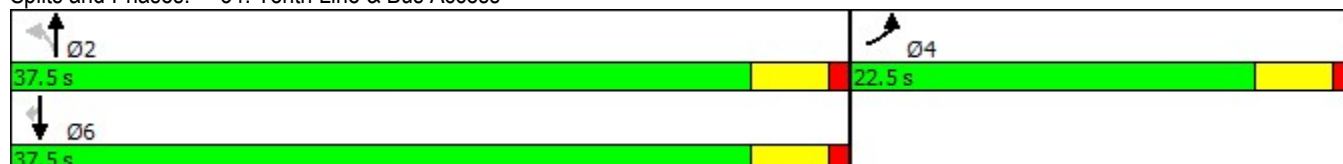
				
Lane Group	EBL	NBT	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	2	662	851	1
Future Volume (vph)	2	662	851	1
Turn Type	Prot	NA	NA	Perm
Protected Phases	4	2	6	
Permitted Phases				6
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	22.5	37.5	37.5	37.5
Total Split (%)	37.5%	62.5%	62.5%	62.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effect Green (s)	5.7	52.0	52.0	52.0
Actuated g/C Ratio	0.10	0.95	0.95	0.95
v/c Ratio	0.01	0.41	0.53	0.00
Control Delay	24.0	1.8	2.5	1.0
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	24.0	1.8	2.6	1.0
LOS	C	A	A	A
Approach Delay	24.0	1.8	2.6	
Approach LOS	C	A	A	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 54.6
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 2.3
Intersection Capacity Utilization 56.5%
Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service B

Splits and Phases: 34: Tenth Line & Bus Access



HCM Signalized Intersection Capacity Analysis

5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study

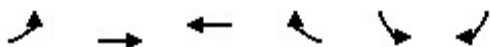
Future Total (Long Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	221	418	22	264	66	561	467	6	48	336	59
Future Volume (vph)	72	221	418	22	264	66	561	467	6	48	336	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)		4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.92		1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1700		1574	1691		1574	1860	1507	1685	1806	
Flt Permitted		0.84		0.24	1.00		0.16	1.00	1.00	0.48	1.00	
Satd. Flow (perm)		1436		401	1691		266	1860	1507	850	1806	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	77	238	449	24	284	71	603	502	6	52	361	63
RTOR Reduction (vph)	0	52	0	0	9	0	0	0	4	0	6	0
Lane Group Flow (vph)	0	712	0	24	346	0	603	502	2	52	418	0
Heavy Vehicles (%)	0%	4%	0%	7%	8%	7%	7%	1%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		2			6		7	4		3	8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)		42.5		42.5	42.5		49.4	40.8	40.8	24.5	20.4	
Effective Green, g (s)		42.5		42.5	42.5		49.4	40.8	40.8	24.5	20.4	
Actuated g/C Ratio		0.42		0.42	0.42		0.49	0.40	0.40	0.24	0.20	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		604		168	712		447	752	609	240	365	
v/s Ratio Prot					0.20		c0.33	0.27		0.01	0.23	
v/s Ratio Perm		c0.50		0.06			c0.33		0.00	0.04		
v/c Ratio		1.18		0.14	0.49		1.35	0.67	0.00	0.22	1.14	
Uniform Delay, d1		29.2		18.0	21.2		28.5	24.5	17.9	29.8	40.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		97.1		0.4	0.5		171.3	2.3	0.0	0.5	92.4	
Delay (s)		126.3		18.4	21.8		199.8	26.8	17.9	30.3	132.6	
Level of Service		F		B	C		F	C	B	C	F	
Approach Delay (s)		126.3			21.6			120.6			121.4	
Approach LOS		F			C			F			F	
Intersection Summary												
HCM 2000 Control Delay			108.6			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.31									
Actuated Cycle Length (s)			100.9			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			126.5%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

7: Main St & Tenth Line

Lincolnville GO Transportation Study
Future Total (Long Term) PM Pk Hr



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	909	210	148	260	218	700
Future Volume (vph)	909	210	148	260	218	700
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.5	3.0	3.0	3.5
Total Lost time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1685	1860	1860	1478	1626	1566
Flt Permitted	0.52	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	926	1860	1860	1478	1626	1566
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	988	228	161	283	237	761
RTOR Reduction (vph)	0	0	0	212	0	610
Lane Group Flow (vph)	988	228	161	71	237	151
Confl. Peds. (#/hr)					3	
Heavy Vehicles (%)	0%	1%	1%	2%	3%	2%
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Actuated Green, G (s)	72.2	72.2	26.1	26.1	20.7	20.7
Effective Green, g (s)	72.2	72.2	26.1	26.1	20.7	20.7
Actuated g/C Ratio	0.69	0.69	0.25	0.25	0.20	0.20
Clearance Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	941	1283	464	368	321	309
v/s Ratio Prot	c0.42	0.12	0.09			0.10
v/s Ratio Perm	c0.31			0.05	c0.15	
v/c Ratio	1.05	0.18	0.35	0.19	0.74	0.49
Uniform Delay, d1	12.7	5.7	32.2	30.9	39.4	37.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	43.3	0.3	2.0	1.2	8.6	1.2
Delay (s)	56.0	6.0	34.3	32.1	48.0	38.5
Level of Service	E	A	C	C	D	D
Approach Delay (s)		46.6	32.9		40.7	
Approach LOS		D	C		D	
Intersection Summary						
HCM 2000 Control Delay			42.1		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.02			
Actuated Cycle Length (s)			104.6		Sum of lost time (s)	16.2
Intersection Capacity Utilization			84.3%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

10: Tenth Line/Plaza & Main St

Lincolnville GO Transportation Study
Future Total (Long Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	353	122	534	310	3	79	0	770	3	2	5
Future Volume (vph)	2	353	122	534	310	3	79	0	770	3	2	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1678	1788		1685	1840		1681	1581			1696	
Flt Permitted	0.55	1.00		0.11	1.00		0.75	1.00			0.63	
Satd. Flow (perm)	969	1788		196	1840		1327	1581			1091	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	2	401	139	607	352	3	90	0	875	3	2	6
RTOR Reduction (vph)	0	11	0	0	0	0	0	471	0	0	4	0
Lane Group Flow (vph)	2	529	0	607	355	0	90	404	0	0	7	0
Confl. Peds. (#/hr)	3					3	1					1
Heavy Vehicles (%)	0%	1%	1%	0%	2%	0%	0%	0%	1%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8				4
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	31.6	31.6		68.6	68.6		28.5	28.5			28.5	
Effective Green, g (s)	31.6	31.6		68.6	68.6		28.5	28.5			28.5	
Actuated g/C Ratio	0.29	0.29		0.63	0.63		0.26	0.26			0.26	
Clearance Time (s)	5.5	5.5		4.5	5.5		5.5	5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	283	522		572	1167		349	416			287	
v/s Ratio Prot		0.30		c0.32	0.19			c0.26				
v/s Ratio Perm	0.00			c0.35			0.07				0.01	
v/c Ratio	0.01	1.01		1.06	0.30		0.26	0.97			0.02	
Uniform Delay, d1	27.1	38.2		31.2	8.9		31.4	39.4			29.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	42.6		54.9	0.7		0.4	36.7			0.0	
Delay (s)	27.2	80.9		86.1	9.6		31.8	76.1			29.5	
Level of Service	C	F		F	A		C	E			C	
Approach Delay (s)		80.7			57.8			72.0			29.5	
Approach LOS		F			E			E			C	
Intersection Summary												
HCM 2000 Control Delay			68.2			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			108.1			Sum of lost time (s)			15.5			
Intersection Capacity Utilization			116.2%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	5	71	76	7	30	154	853	108	60	783	53
Future Volume (vph)	32	5	71	76	7	30	154	853	108	60	783	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.5	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.0
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.88		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1685	1615		1785	1649		1685	3479		1785	3471	
Flt Permitted	0.73	1.00		0.71	1.00		0.32	1.00		0.27	1.00	
Satd. Flow (perm)	1299	1615		1326	1649		560	3479		504	3471	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	33	5	74	79	7	31	160	889	112	62	816	55
RTOR Reduction (vph)	0	64	0	0	27	0	0	11	0	0	5	0
Lane Group Flow (vph)	33	15	0	79	11	0	160	991	0	63	866	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	7.5	7.5		7.5	7.5		37.9	37.9		37.9	37.9	
Effective Green, g (s)	7.5	7.5		7.5	7.5		37.9	37.9		37.9	37.9	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.70	0.70		0.70	0.70	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	179	222		182	227		390	2423		351	2418	
v/s Ratio Prot		0.01			0.01			0.28			0.25	
v/s Ratio Perm	0.03			c0.06			c0.29			0.12		
v/c Ratio	0.18	0.07		0.43	0.05		0.41	0.41		0.18	0.36	
Uniform Delay, d1	20.7	20.4		21.5	20.4		3.5	3.5		2.9	3.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.1		1.7	0.1		3.2	0.5		1.1	0.4	
Delay (s)	21.2	20.5		23.2	20.4		6.7	4.0		4.0	3.7	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		20.7			22.3			4.4			3.8	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

Lincolnville GO Transportation Study
Future Total (Long Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	372	0	117	94	0	28	85	634	83	53	677	6
Future Volume (vph)	372	0	117	94	0	28	85	634	83	53	677	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1581		1767	1581		1785	1830		1785	1840	
Flt Permitted	0.74	1.00		0.67	1.00		0.18	1.00		0.15	1.00	
Satd. Flow (perm)	1371	1581		1253	1581		331	1830		279	1840	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	413	0	130	104	0	31	94	704	92	59	752	7
RTOR Reduction (vph)	0	88	0	0	21	0	0	6	0	0	0	0
Lane Group Flow (vph)	413	42	0	104	10	0	94	790	0	59	759	0
Heavy Vehicles (%)	1%	0%	1%	1%	0%	1%	0%	1%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.51	0.51		0.51	0.51	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	444	512		406	512		169	939		143	944	
v/s Ratio Prot		0.03			0.01			0.43			0.41	
v/s Ratio Perm	0.30			0.08			0.28			0.21		
v/c Ratio	0.93	0.08		0.26	0.02		0.56	0.84		0.41	0.80	
Uniform Delay, d1	24.2	17.4		18.4	17.0		12.3	15.4		11.1	14.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.2	0.1		0.3	0.0		12.6	9.0		8.6	7.2	
Delay (s)	50.4	17.4		18.8	17.0		24.8	24.4		19.7	22.1	
Level of Service	D	B		B	B		C	C		B	C	
Approach Delay (s)		42.5			18.4			24.5			21.9	
Approach LOS		D			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			74.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			89.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

34: Tenth Line & Bus Access

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	↑	↑	↑
Traffic Volume (vph)	2	1	0	800	884	4
Future Volume (vph)	2	1	0	800	884	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5	4.5	4.5
Lane Util. Factor	1.00			1.00	1.00	1.00
Frt	0.95			1.00	1.00	0.85
Flt Protected	0.97			1.00	1.00	1.00
Satd. Flow (prot)	1702			1842	1842	1566
Flt Permitted	0.97			1.00	1.00	1.00
Satd. Flow (perm)	1702			1842	1842	1566
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	1	0	870	961	4
RTOR Reduction (vph)	1	0	0	0	0	1
Lane Group Flow (vph)	2	0	0	870	961	3
Turn Type	Prot		Perm	NA	NA	Perm
Protected Phases	4			2	6	
Permitted Phases			2			6
Actuated Green, G (s)	1.1			63.2	63.2	63.2
Effective Green, g (s)	1.1			63.2	63.2	63.2
Actuated g/C Ratio	0.02			0.86	0.86	0.86
Clearance Time (s)	4.5			4.5	4.5	4.5
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	25			1588	1588	1350
v/s Ratio Prot	c0.00			0.47	c0.52	
v/s Ratio Perm						0.00
v/c Ratio	0.08			0.55	0.61	0.00
Uniform Delay, d1	35.6			1.3	1.5	0.7
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.4			1.4	1.7	0.0
Delay (s)	37.0			2.7	3.2	0.7
Level of Service	D			A	A	A
Approach Delay (s)	37.0			2.7	3.2	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			3.0		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			73.3		Sum of lost time (s)	9.0
Intersection Capacity Utilization			58.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

3: York Durham Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	223	332	264	184	6
Future Volume (Veh/h)	3	223	332	264	184	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	3	253	377	300	209	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1266	212	216			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1266	212	216			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	70	72			
cM capacity (veh/h)	132	833	1336			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	256	677	216			
Volume Left	3	377	0			
Volume Right	253	0	7			
cSH	784	1336	1700			
Volume to Capacity	0.33	0.28	0.13			
Queue Length 95th (m)	10.8	8.9	0.0			
Control Delay (s)	11.8	6.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.8	6.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			6.3			
Intersection Capacity Utilization			66.3%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 6: Zone 3 & 8 /Existing GO & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	214	61	23	315	0	37	0	12	0	0	0
Future Volume (Veh/h)	0	214	61	23	315	0	37	0	12	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	238	68	26	350	0	41	0	13	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	173											
pX, platoon unblocked												
vC, conflicting volume	350			306			674	674	272	687	708	350
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	350			306			674	674	272	687	708	350
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			89	100	98	100	100	100
cM capacity (veh/h)	1220			1266			363	371	767	349	355	693
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	306	376	41	13	0	0						
Volume Left	0	26	41	0	0	0						
Volume Right	68	0	0	13	0	0						
cSH	1220	1266	363	767	1700	1700						
Volume to Capacity	0.00	0.02	0.11	0.02	0.00	0.00						
Queue Length 95th (m)	0.0	0.5	2.9	0.4	0.0	0.0						
Control Delay (s)	0.0	0.7	16.2	9.8	0.0	0.0						
Lane LOS		A	C	A	A	A						
Approach Delay (s)	0.0	0.7	14.6		0.0							
Approach LOS			B		A							
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			45.5%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

21: Tenth Line & Zone 2/Zone 3 South

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	76	0	109	12	0	15	98	709	105	17	777	91
Future Volume (Veh/h)	76	0	109	12	0	15	98	709	105	17	777	91
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	84	0	121	13	0	17	109	788	117	19	863	101
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage veh												
Upstream signal (m)	205											
pX, platoon unblocked	0.75	0.75	0.75	0.75	0.75		0.75					
vC, conflicting volume	1974	2074	914	2086	2066	846	964	905				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2129	2262	722	2278	2251	846	789	905				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	0	100	63	0	100	95	83	98				
cM capacity (veh/h)	22	25	323	11	26	363	633	760				
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	84	121	13	17	109	905	19	964				
Volume Left	84	0	13	0	109	0	19	0				
Volume Right	0	121	0	17	0	117	0	101				
cSH	22	323	11	363	633	1700	760	1700				
Volume to Capacity	3.78	0.37	1.14	0.05	0.17	0.53	0.02	0.57				
Queue Length 95th (m)	Err	12.8	17.6	1.1	4.7	0.0	0.6	0.0				
Control Delay (s)	Err	22.7	755.4	15.4	11.9	0.0	9.9	0.0				
Lane LOS	F	C	F	C	B		A					
Approach Delay (s)	4110.5		336.1		1.3		0.2					
Approach LOS	F		F									
Intersection Summary												
Average Delay	382.7											
Intersection Capacity Utilization	72.7%			ICU Level of Service					C			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

29: Coronet Street & Forsyth Farm Dr

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	52	5	25	97	92	2	0	8	48	0	0
Future Volume (Veh/h)	0	52	5	25	97	92	2	0	8	48	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	57	5	27	105	100	2	0	9	52	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					133							
pX, platoon unblocked												
vC, conflicting volume	205			62			268	318	60	278	271	155
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	205			62			268	318	60	278	271	155
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			100	100	99	92	100	100
cM capacity (veh/h)	1366			1541			675	587	1006	660	624	891
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	62	232	11	52								
Volume Left	0	27	2	52								
Volume Right	5	100	9	0								
cSH	1366	1541	924	660								
Volume to Capacity	0.00	0.02	0.01	0.08								
Queue Length 95th (m)	0.0	0.4	0.3	1.9								
Control Delay (s)	0.0	1.0	8.9	10.9								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	1.0	8.9	10.9								
Approach LOS			A	B								
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			34.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

32: Tenth Line & GO RIRO

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	55	0	1034	681	95
Future Volume (Veh/h)	0	55	0	1034	681	95
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	60	0	1124	740	103
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				108	116	
pX, platoon unblocked	0.51	0.81	0.81			
vC, conflicting volume	1864	740	843			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1384	564	691			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	86	100			
cM capacity (veh/h)	81	426	734			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	60	1124	740	103		
Volume Left	0	0	0	0		
Volume Right	60	0	0	103		
cSH	426	1700	1700	1700		
Volume to Capacity	0.14	0.66	0.44	0.06		
Queue Length 95th (m)	3.7	0.0	0.0	0.0		
Control Delay (s)	14.8	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	14.8	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			57.8%	ICU Level of Service		B
Analysis Period (min)			15			

Timings 5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	72	221	22	264	561	467	6	48	336
Future Volume (vph)	72	221	22	264	561	467	6	48	336
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		2		6	7	4		3	8
Permitted Phases	2		6		4		4	8	
Detector Phase	2	2	6	6	7	4	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	47.0	47.0	47.0	47.0	29.0	43.4	43.4	9.6	24.0
Total Split (%)	47.0%	47.0%	47.0%	47.0%	29.0%	43.4%	43.4%	9.6%	24.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min
Act Effect Green (s)		42.5	42.5	42.5	48.5	40.8	40.8	24.6	19.5
Actuated g/C Ratio		0.42	0.42	0.42	0.48	0.41	0.41	0.25	0.20
v/c Ratio		1.16	0.14	0.49	1.34	0.66	0.01	0.21	1.18
Control Delay		112.5	20.4	22.7	195.1	29.9	0.0	18.9	144.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		112.5	20.4	22.7	195.1	29.9	0.0	18.9	144.2
LOS		F	C	C	F	C	A	B	F
Approach Delay		112.5		22.5		119.4			130.5
Approach LOS		F		C		F			F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.34

Intersection Signal Delay: 106.0

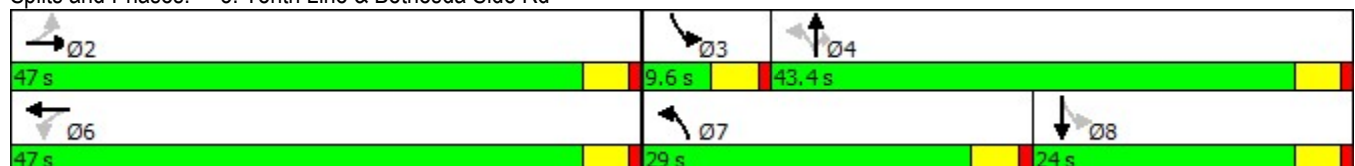
Intersection LOS: F

Intersection Capacity Utilization 126.5%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 5: Tenth Line & Bethesda Side Rd



Timings 7: Main St & Tenth Line

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

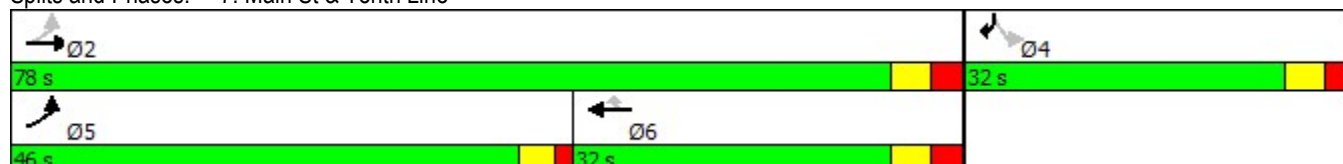
						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	909	210	148	260	218	700
Future Volume (vph)	909	210	148	260	218	700
Turn Type	pm+pt	NA	NA	Perm	Perm	Prot
Protected Phases	5	2	6			4
Permitted Phases	2			6	4	
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	10.5	32.0	32.0	32.0	31.7	31.7
Total Split (s)	46.0	78.0	32.0	32.0	32.0	32.0
Total Split (%)	41.8%	70.9%	29.1%	29.1%	29.1%	29.1%
Yellow Time (s)	3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.5	2.7	2.7	2.7	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	6.0	5.7	5.7
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	Max	Max	Max	None	None
Act Effect Green (s)	73.7	72.2	26.1	26.1	20.7	20.7
Actuated g/C Ratio	0.70	0.69	0.25	0.25	0.20	0.20
v/c Ratio	1.04	0.18	0.35	0.49	0.74	0.83
Control Delay	54.1	6.8	36.0	7.3	53.5	11.5
Queue Delay	25.1	1.9	0.0	0.0	0.0	0.0
Total Delay	79.2	8.8	36.0	7.3	53.5	11.5
LOS	E	A	D	A	D	B
Approach Delay		66.0	17.7		21.5	
Approach LOS		E	B		C	

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 104.6
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 41.2
Intersection Capacity Utilization 84.3%
Analysis Period (min) 15

Intersection LOS: D
ICU Level of Service E

Splits and Phases: 7: Main St & Tenth Line



Timings
10: Tenth Line/Plaza & Main St

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	2	353	534	310	79	0	3	2
Future Volume (vph)	2	353	534	310	79	0	3	2
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	9.5	29.5	27.5	27.5	27.5	27.5
Total Split (s)	37.0	37.0	37.0	74.0	36.0	36.0	36.0	36.0
Total Split (%)	33.6%	33.6%	33.6%	67.3%	32.7%	32.7%	32.7%	32.7%
Yellow Time (s)	3.3	3.3	3.0	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.5	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.5	5.5	4.5	5.5	5.5	5.5		5.5
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	Max	Max	None	Max	None	None	None	None
Act Effect Green (s)	31.5	31.5	69.6	68.6	28.5	28.5		28.5
Actuated g/C Ratio	0.29	0.29	0.64	0.63	0.26	0.26		0.26
v/c Ratio	0.01	1.02	1.06	0.30	0.26	0.99		0.04
Control Delay	28.5	80.9	83.6	10.2	33.4	38.6		21.4
Queue Delay	0.0	0.0	19.3	5.8	0.0	0.0		0.0
Total Delay	28.5	80.9	102.9	16.0	33.4	38.6		21.4
LOS	C	F	F	B	C	D		C
Approach Delay		80.7		70.8		38.1		21.4
Approach LOS		F		E		D		C

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 108.1

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 60.0

Intersection LOS: E

Intersection Capacity Utilization 116.2%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 10: Tenth Line/Plaza & Main St



Timings 14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	32	5	76	7	154	853	60	783
Future Volume (vph)	32	5	76	7	154	853	60	783
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	37.5	37.5	37.5	37.5
Total Split (%)	37.5%	37.5%	37.5%	37.5%	62.5%	62.5%	62.5%	62.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effect Green (s)	8.6	8.6	8.6	8.6	38.8	38.8	38.8	38.8
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.73	0.73	0.73	0.73
v/c Ratio	0.16	0.25	0.37	0.13	0.39	0.40	0.17	0.34
Control Delay	19.6	8.1	24.2	9.8	8.6	4.5	5.5	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	8.1	24.2	9.8	8.6	4.5	5.5	4.3
LOS	B	A	C	A	A	A	A	A
Approach Delay		11.5		19.5		5.1		4.4
Approach LOS		B		B		A		A

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 53.5

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 5.8

Intersection LOS: A

Intersection Capacity Utilization 54.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

	
Ø2	Ø4
37.5 s	22.5 s
	
Ø6	Ø8
37.5 s	22.5 s

Timings
18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

Lincolnville GO Transportation Study
Future Total (Long Term) PM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	372	0	94	0	85	634	53	677
Future Volume (vph)	372	0	94	0	85	634	53	677
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	31.0	31.0	31.0	31.0	44.0	44.0	44.0	44.0
Total Split (%)	41.3%	41.3%	41.3%	41.3%	58.7%	58.7%	58.7%	58.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effect Green (s)	24.0	24.0	24.0	24.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.51	0.51	0.51	0.51
v/c Ratio	0.93	0.21	0.26	0.05	0.56	0.84	0.42	0.80
Control Delay	54.9	3.3	20.4	0.1	28.9	25.9	22.8	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	49.5	0.0	0.0
Total Delay	54.9	3.3	20.4	0.1	28.9	75.4	22.8	23.6
LOS	D	A	C	A	C	E	C	C
Approach Delay		42.6		15.7		70.5		23.6
Approach LOS		D		B		E		C

Intersection Summary

Cycle Length: 75

Actuated Cycle Length: 74

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 45.0

Intersection LOS: D

Intersection Capacity Utilization 89.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

	
Ø2	Ø4
44 s	31 s
	
Ø6	Ø8
44 s	31 s

Timings 34: Tenth Line & Bus Access

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

				
Lane Group	EBL	NBT	SBT	SBR
Lane Configurations				
Traffic Volume (vph)	2	800	884	4
Future Volume (vph)	2	800	884	4
Turn Type	Prot	NA	NA	Perm
Protected Phases	4	2	6	
Permitted Phases				6
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	22.5	52.5	52.5	52.5
Total Split (%)	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
Act Effect Green (s)	5.7	66.9	66.9	66.9
Actuated g/C Ratio	0.08	0.96	0.96	0.96
v/c Ratio	0.02	0.49	0.54	0.00
Control Delay	28.7	2.0	2.3	0.8
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	28.7	2.0	2.4	0.8
LOS	C	A	A	A
Approach Delay	28.7	2.0	2.4	
Approach LOS	C	A	A	

Intersection Summary

Cycle Length: 75
 Actuated Cycle Length: 69.6
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 2.3
 Intersection Capacity Utilization 58.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 34: Tenth Line & Bus Access



HCM Signalized Intersection Capacity Analysis

5: Tenth Line & Bethesda Side Rd

Lincolville GO Transportation Study
Future Total (Long Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱		↰	↱	↱	↰	↱	
Traffic Volume (vph)	65	235	468	8	143	37	365	232	0	58	464	56
Future Volume (vph)	65	235	468	8	143	37	365	232	0	58	464	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)		4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	0.97		1.00	1.00		1.00	0.98	
Flt Protected		0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1835	1396	1685	1696		1620	1824		1546	1757	
Flt Permitted		0.85	1.00	0.32	1.00		0.14	1.00		0.60	1.00	
Satd. Flow (perm)		1584	1396	570	1696		243	1824		976	1757	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	72	261	520	9	159	41	406	258	0	64	516	62
RTOR Reduction (vph)	0	0	353	0	14	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	333	167	9	186	0	406	258	0	64	572	0
Heavy Vehicles (%)	6%	0%	8%	0%	8%	5%	4%	3%	13%	9%	5%	7%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		2			6		7	4			8	
Permitted Phases	2		2	6			4		4	8		
Actuated Green, G (s)		16.9	16.9	16.9	16.9		42.5	42.5		23.6	23.6	
Effective Green, g (s)		16.9	16.9	16.9	16.9		42.5	42.5		23.6	23.6	
Actuated g/C Ratio		0.25	0.25	0.25	0.25		0.62	0.62		0.35	0.35	
Clearance Time (s)		4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		391	344	140	419		440	1133		336	606	
v/s Ratio Prot					0.11		c0.19	0.14			0.33	
v/s Ratio Perm		c0.21	0.12	0.02			c0.38			0.07		
v/c Ratio		0.85	0.49	0.06	0.44		0.92	0.23		0.19	0.94	
Uniform Delay, d1		24.6	22.0	19.7	21.8		17.5	5.7		15.7	21.8	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		16.2	1.1	0.2	0.8		24.8	0.1		0.3	23.5	
Delay (s)		40.7	23.1	19.9	22.5		42.3	5.8		16.0	45.2	
Level of Service		D	C	B	C		D	A		B	D	
Approach Delay (s)		30.0			22.4			28.1			42.3	
Approach LOS		C			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			32.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			68.4			Sum of lost time (s)				13.5		
Intersection Capacity Utilization			88.8%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

21: Tenth Line & Zone 2/Zone 3 South

Lincolnville GO Transportation Study
Future Total (Long Term) AM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	0	128	20	0	23	72	549	36	4	790	57
Future Volume (vph)	90	0	128	20	0	23	72	549	36	4	790	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1733	1536		1733	1536		1767	1793		1767	1808	
Flt Permitted	0.74	1.00		0.67	1.00		0.21	1.00		0.36	1.00	
Satd. Flow (perm)	1350	1536		1216	1536		385	1793		678	1808	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	0	142	22	0	26	80	610	40	4	878	63
RTOR Reduction (vph)	0	122	0	0	22	0	0	3	0	0	3	0
Lane Group Flow (vph)	100	20	0	22	4	0	80	647	0	4	938	0
Heavy Vehicles (%)	3%	0%	4%	3%	0%	4%	1%	4%	1%	1%	3%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.4	8.4		8.4	8.4		41.7	41.7		41.7	41.7	
Effective Green, g (s)	8.4	8.4		8.4	8.4		41.7	41.7		41.7	41.7	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.71	0.71		0.71	0.71	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	218		172	218		271	1265		478	1275	
v/s Ratio Prot		0.01			0.00			0.36			c0.52	
v/s Ratio Perm	c0.07			0.02			0.21			0.01		
v/c Ratio	0.52	0.09		0.13	0.02		0.30	0.51		0.01	0.74	
Uniform Delay, d1	23.5	22.0		22.1	21.8		3.2	4.0		2.6	5.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.6	0.2		0.3	0.0		2.8	1.5		0.0	3.8	
Delay (s)	26.1	22.2		22.5	21.8		6.0	5.5		2.6	9.1	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		23.8			22.1			5.5			9.1	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.9			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			59.1			Sum of lost time (s)				9.0		
Intersection Capacity Utilization			76.3%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr

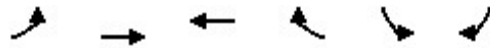
								
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	333	520	9	200	406	258	64	578
v/c Ratio	0.85	0.75	0.06	0.46	0.92	0.23	0.19	0.95
Control Delay	46.7	11.5	20.8	23.6	45.9	6.7	18.4	50.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.7	11.5	20.8	23.6	45.9	6.7	18.4	50.5
Queue Length 50th (m)	40.4	5.1	0.9	19.5	37.7	13.7	5.9	72.4
Queue Length 95th (m)	#78.8	34.9	4.1	36.9	#88.7	23.6	14.2	#134.0
Internal Link Dist (m)	100.0			70.6		92.4		150.8
Turn Bay Length (m)		25.0	20.0		85.0		125.0	
Base Capacity (vph)	431	721	155	475	441	1133	335	610
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.72	0.06	0.42	0.92	0.23	0.19	0.95

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
7: Main St & Tenth Line

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr



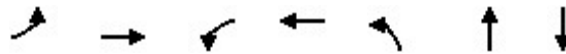
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	521	117	149	187	273	1021
v/c Ratio	0.83	0.13	0.28	0.35	0.46	0.98
Control Delay	31.7	14.2	30.3	6.3	25.7	32.3
Queue Delay	51.7	1.0	0.0	0.0	0.0	0.0
Total Delay	83.4	15.2	30.3	6.3	25.7	32.3
Queue Length 50th (m)	70.2	11.9	22.9	0.0	38.0	63.5
Queue Length 95th (m)	#125.0	21.6	39.4	15.7	59.9	#176.6
Internal Link Dist (m)		49.7	251.4		484.1	
Turn Bay Length (m)	20.0			160.0	40.0	
Base Capacity (vph)	630	919	526	540	658	1073
Starvation Cap Reductn	174	614	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.14	0.38	0.28	0.35	0.41	0.95

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
10: Tenth Line/Plaza & Main St

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1	376	811	367	91	381	2
v/c Ratio	0.00	0.77	0.98	0.27	0.52	0.44	0.00
Control Delay	25.0	41.1	45.7	4.7	47.0	1.6	0.0
Queue Delay	0.0	0.0	39.7	2.8	0.0	0.0	0.0
Total Delay	25.0	41.1	85.4	7.5	47.0	1.6	0.0
Queue Length 50th (m)	0.1	55.9	101.9	16.1	14.9	0.0	0.0
Queue Length 95th (m)	1.4	#106.1	#204.7	32.9	29.4	0.0	0.0
Internal Link Dist (m)		135.6		49.7		216.3	34.8
Turn Bay Length (m)	15.0		20.0		180.0		
Base Capacity (vph)	266	489	826	1350	311	952	794
Starvation Cap Reductn	0	0	205	850	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.77	1.31	0.73	0.29	0.40	0.00

Intersection Summary

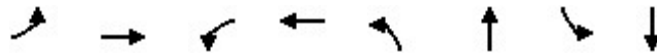
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

Lincolnvile GO Transportation Study

14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Future Total (Long Term) AM Pk Hr



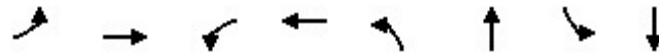
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	61	210	127	48	95	732	24	1107
v/c Ratio	0.23	0.54	0.61	0.13	0.39	0.34	0.06	0.51
Control Delay	19.0	16.3	31.7	7.1	13.0	6.0	6.0	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	16.3	31.7	7.1	13.0	6.0	6.0	7.4
Queue Length 50th (m)	4.9	10.5	11.1	0.2	3.9	14.5	0.8	25.8
Queue Length 95th (m)	11.2	21.7	21.7	5.3	14.9	27.2	3.5	45.7
Internal Link Dist (m)		108.9		118.8		480.3		69.9
Turn Bay Length (m)	25.0		25.0		50.0		50.0	
Base Capacity (vph)	398	552	320	525	244	2126	428	2171
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.38	0.40	0.09	0.39	0.34	0.06	0.51

Intersection Summary

Queues
18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

Lincolnville GO Transportation Study

Future Total (Long Term) AM Pk Hr



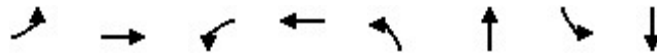
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	106	68	188	52	201	537	20	693
v/c Ratio	0.31	0.14	0.57	0.09	0.62	0.50	0.04	0.63
Control Delay	17.8	1.3	23.6	0.3	25.2	11.1	8.2	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	17.8	1.3	23.6	0.3	25.2	11.5	8.2	14.7
Queue Length 50th (m)	7.8	0.0	14.9	0.0	12.5	29.2	0.8	43.2
Queue Length 95th (m)	17.5	1.7	29.9	0.0	#50.4	68.2	4.1	#115.4
Internal Link Dist (m)		112.3		187.9		75.5		84.3
Turn Bay Length (m)	25.0		25.0		25.0		25.0	
Base Capacity (vph)	571	741	564	800	322	1080	453	1097
Starvation Cap Reductn	0	0	0	0	0	178	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.09	0.33	0.07	0.62	0.60	0.04	0.63

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
21: Tenth Line & Zone 2/Zone 3 South

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	100	142	22	26	80	650	4	941
v/c Ratio	0.45	0.38	0.11	0.05	0.28	0.49	0.01	0.71
Control Delay	28.0	7.0	20.6	0.2	8.1	6.6	4.0	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	7.0	20.6	0.2	8.1	6.6	4.0	11.3
Queue Length 50th (m)	9.4	0.0	1.9	0.0	2.7	26.2	0.1	50.8
Queue Length 95th (m)	20.8	10.6	6.7	0.0	11.3	60.0	1.0	#151.1
Internal Link Dist (m)		174.2		165.1		414.9		181.2
Turn Bay Length (m)	25.0		25.0		25.0		25.0	
Base Capacity (vph)	417	580	376	669	282	1316	496	1326
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.24	0.06	0.04	0.28	0.49	0.01	0.71

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
34: Tenth Line & Bus Access

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr

				
Lane Group	EBL	NBT	SBT	SBR
Lane Group Flow (vph)	2	720	925	1
v/c Ratio	0.01	0.41	0.53	0.00
Control Delay	24.0	1.8	2.5	1.0
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	24.0	1.8	2.6	1.0
Queue Length 50th (m)	0.2	0.0	0.0	0.0
Queue Length 95th (m)	2.0	37.4	61.8	0.2
Internal Link Dist (m)	73.5	181.2	75.5	
Turn Bay Length (m)				45.0
Base Capacity (vph)	580	1754	1754	1491
Starvation Cap Reductn	0	0	100	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.00	0.41	0.56	0.00
Intersection Summary				

Timings 5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Long Term) AM Pk Hr

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	65	235	468	8	143	365	232	58	464
Future Volume (vph)	65	235	468	8	143	365	232	58	464
Turn Type	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		2			6	7	4		8
Permitted Phases	2		2	6		4		8	
Detector Phase	2	2	2	6	6	7	4	8	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	23.1	23.1	23.1	23.1	23.1	18.9	46.9	28.0	28.0
Total Split (%)	33.0%	33.0%	33.0%	33.0%	33.0%	27.0%	67.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?						Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	Min
Act Effect Green (s)		16.9	16.9	16.9	16.9	42.4	42.4	23.5	23.5
Actuated g/C Ratio		0.25	0.25	0.25	0.25	0.62	0.62	0.34	0.34
v/c Ratio		0.85	0.75	0.06	0.46	0.92	0.23	0.19	0.95
Control Delay		46.7	11.5	20.8	23.6	45.9	6.7	18.4	50.5
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		46.7	11.5	20.8	23.6	45.9	6.7	18.4	50.5
LOS		D	B	C	C	D	A	B	D
Approach Delay		25.2			23.5		30.7		47.3
Approach LOS		C			C		C		D

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 68.3

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 32.6

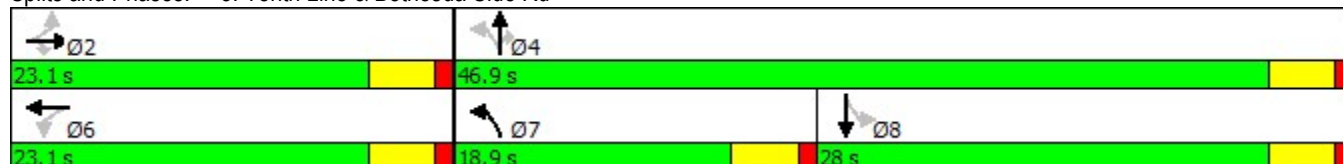
Intersection LOS: C

Intersection Capacity Utilization 88.8%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Tenth Line & Bethesda Side Rd



Timings 21: Tenth Line & Zone 2/Zone 3 South

Lincolville GO Transportation Study
Future Total (Long Term) AM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	90	0	20	0	72	549	4	790
Future Volume (vph)	90	0	20	0	72	549	4	790
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	42.5	42.5	42.5	42.5
Total Split (%)	34.6%	34.6%	34.6%	34.6%	65.4%	65.4%	65.4%	65.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effect Green (s)	9.5	9.5	9.5	9.5	42.6	42.6	42.6	42.6
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.73	0.73	0.73	0.73
v/c Ratio	0.45	0.38	0.11	0.05	0.28	0.49	0.01	0.71
Control Delay	28.0	7.0	20.6	0.2	8.1	6.6	4.0	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	7.0	20.6	0.2	8.1	6.6	4.0	11.3
LOS	C	A	C	A	A	A	A	B
Approach Delay		15.7		9.6		6.7		11.2
Approach LOS		B		A		A		B

Intersection Summary

Cycle Length: 65

Actuated Cycle Length: 58.2

Natural Cycle: 65

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 10.1

Intersection LOS: B

Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 21: Tenth Line & Zone 2/Zone 3 South



HCM Signalized Intersection Capacity Analysis

5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study

Future Total (Long Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	221	418	22	264	66	561	467	6	48	336	59
Future Volume (vph)	72	221	418	22	264	66	561	467	6	48	336	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)		4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.99	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1802	1507	1574	1691		1574	1860	1507	1685	1806	
Flt Permitted		0.55	1.00	0.37	1.00		0.12	1.00	1.00	0.48	1.00	
Satd. Flow (perm)		1011	1507	613	1691		201	1860	1507	850	1806	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	77	238	449	24	284	71	603	502	6	52	361	63
RTOR Reduction (vph)	0	0	186	0	8	0	0	0	3	0	5	0
Lane Group Flow (vph)	0	315	263	24	347	0	603	502	3	52	419	0
Heavy Vehicles (%)	0%	4%	0%	7%	8%	7%	7%	1%	0%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		2			6		7	4		3	8	
Permitted Phases	2		2	6			4		4	8		
Actuated Green, G (s)		37.1	37.1	37.1	37.1		73.4	64.5	64.5	32.8	28.4	
Effective Green, g (s)		37.1	37.1	37.1	37.1		73.4	64.5	64.5	32.8	28.4	
Actuated g/C Ratio		0.31	0.31	0.31	0.31		0.61	0.54	0.54	0.27	0.24	
Clearance Time (s)		4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		313	467	190	524		588	1003	813	264	429	
v/s Ratio Prot					0.21		0.35	0.27		0.01	0.23	
v/s Ratio Perm		0.31	0.17	0.04			0.28		0.00	0.05		
v/c Ratio		1.01	0.56	0.13	0.66		1.03	0.50	0.00	0.20	0.98	
Uniform Delay, d1		41.2	34.4	29.6	35.8		33.0	17.3	12.7	32.5	45.2	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		52.5	1.6	0.3	3.2		43.8	0.4	0.0	0.4	36.8	
Delay (s)		93.7	36.0	29.9	38.9		76.7	17.7	12.7	32.8	82.0	
Level of Service		F	D	C	D		E	B	B	C	F	
Approach Delay (s)		59.8			38.4			49.7			76.6	
Approach LOS		E			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			55.7			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			119.5			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			100.9%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

21: Tenth Line & Zone 2/Zone 3 South

Lincolville GO Transportation Study
Future Total (Long Term) PM Pk Hr

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	0	109	12	0	15	98	709	105	17	777	91
Future Volume (vph)	76	0	109	12	0	15	98	709	105	17	777	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.85		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1581		1767	1581		1785	1827		1785	1817	
Flt Permitted	0.75	1.00		0.68	1.00		0.21	1.00		0.24	1.00	
Satd. Flow (perm)	1388	1581		1264	1581		399	1827		453	1817	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	84	0	121	13	0	17	109	788	117	19	863	101
RTOR Reduction (vph)	0	106	0	0	15	0	0	5	0	0	4	0
Lane Group Flow (vph)	84	15	0	13	2	0	109	900	0	19	960	0
Heavy Vehicles (%)	1%	0%	1%	1%	0%	1%	0%	1%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.0	8.0		8.0	8.0		47.5	47.5		47.5	47.5	
Effective Green, g (s)	8.0	8.0		8.0	8.0		47.5	47.5		47.5	47.5	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.74	0.74		0.74	0.74	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	172	196		156	196		293	1345		333	1338	
v/s Ratio Prot		0.01			0.00			0.49			c0.53	
v/s Ratio Perm	c0.06			0.01			0.27			0.04		
v/c Ratio	0.49	0.08		0.08	0.01		0.37	0.67		0.06	0.72	
Uniform Delay, d1	26.3	25.0		25.0	24.8		3.1	4.4		2.3	4.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	0.2		0.2	0.0		3.6	2.7		0.3	3.3	
Delay (s)	28.5	25.2		25.2	24.8		6.7	7.1		2.7	8.1	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		26.5			25.0			7.0			8.0	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.5			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			64.5			Sum of lost time (s)				9.0		
Intersection Capacity Utilization			74.0%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

	→	↘	↙	←	↖	↑	↗	↘	↓
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	315	449	24	355	603	502	6	52	424
v/c Ratio	1.00	0.68	0.13	0.66	1.02	0.50	0.01	0.19	1.00
Control Delay	91.3	19.4	31.1	41.0	74.0	20.0	0.0	18.4	89.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.3	19.4	31.1	41.0	74.0	20.0	0.0	18.4	89.4
Queue Length 50th (m)	73.0	35.8	4.0	69.2	~138.6	74.9	0.0	4.7	~101.0
Queue Length 95th (m)	#130.3	73.4	10.8	102.1	#207.9	104.7	0.0	9.8	#166.0
Internal Link Dist (m)	100.0			70.6		92.4			150.8
Turn Bay Length (m)		25.0	20.0		85.0		85.0	125.0	
Base Capacity (vph)	328	671	198	556	592	1011	845	276	424
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.67	0.12	0.64	1.02	0.50	0.01	0.19	1.00

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

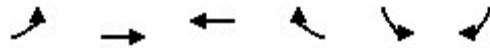
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues
7: Main St & Tenth Line

Lincolnton GO Transportation Study
Future Total (Long Term) PM Pk Hr



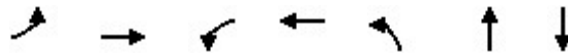
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	988	228	161	283	237	761
v/c Ratio	1.04	0.18	0.35	0.49	0.74	0.83
Control Delay	54.1	6.8	36.0	7.3	53.5	11.5
Queue Delay	25.1	1.9	0.0	0.0	0.0	0.0
Total Delay	79.2	8.8	36.0	7.3	53.5	11.5
Queue Length 50th (m)	~160.8	15.3	27.5	0.0	45.5	0.0
Queue Length 95th (m)	#254.5	27.4	48.0	20.8	71.6	39.7
Internal Link Dist (m)		49.7	251.4		484.1	
Turn Bay Length (m)	20.0			160.0	40.0	
Base Capacity (vph)	953	1283	463	580	409	963
Starvation Cap Reductn	166	898	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.26	0.59	0.35	0.49	0.58	0.79

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
10: Tenth Line/Plaza & Main St

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	2	540	607	355	90	875	11
v/c Ratio	0.01	1.02	1.06	0.30	0.26	0.99	0.04
Control Delay	28.5	80.9	83.6	10.2	33.4	38.6	21.4
Queue Delay	0.0	0.0	19.3	5.8	0.0	0.0	0.0
Total Delay	28.5	80.9	102.9	16.0	33.4	38.6	21.4
Queue Length 50th (m)	0.3	~122.1	~130.5	32.9	15.0	64.1	0.8
Queue Length 95th (m)	2.0	#180.5	#190.2	47.0	27.8	#146.7	5.0
Internal Link Dist (m)		135.6		49.7		216.3	34.8
Turn Bay Length (m)	15.0		20.0		180.0		
Base Capacity (vph)	282	532	574	1167	374	905	312
Starvation Cap Reductn	0	0	183	743	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	1.02	1.55	0.84	0.24	0.97	0.04

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

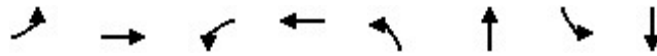
Queue shown is maximum after two cycles.

Queues

Lincolnvile GO Transportation Study

14: Tenth Line & Forsyth Farm Dr/Zone 6 & 7

Future Total (Long Term) PM Pk Hr



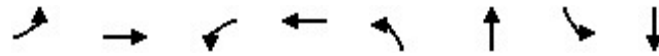
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	33	79	79	38	160	1002	63	871
v/c Ratio	0.16	0.25	0.37	0.13	0.39	0.40	0.17	0.34
Control Delay	19.6	8.1	24.2	9.8	8.6	4.5	5.5	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	8.1	24.2	9.8	8.6	4.5	5.5	4.3
Queue Length 50th (m)	2.6	0.4	6.4	0.5	5.4	16.7	1.7	14.2
Queue Length 95th (m)	8.2	8.4	15.7	6.2	20.0	32.5	6.9	27.5
Internal Link Dist (m)		108.9		118.8		480.3		69.9
Turn Bay Length (m)	25.0		25.0		50.0		50.0	
Base Capacity (vph)	438	594	447	577	406	2535	365	2526
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.13	0.18	0.07	0.39	0.40	0.17	0.34

Intersection Summary

Queues
18: Tenth Line & Zone 1 (Future GO)/Zone 3 North

Lincolnville GO Transportation Study

Future Total (Long Term) PM Pk Hr



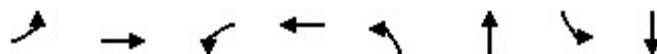
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	413	130	104	31	94	796	59	759
v/c Ratio	0.93	0.21	0.26	0.05	0.56	0.84	0.42	0.80
Control Delay	54.9	3.3	20.4	0.1	28.9	25.9	22.8	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	49.5	0.0	0.0
Total Delay	54.9	3.3	20.4	0.1	28.9	75.4	22.8	23.6
Queue Length 50th (m)	55.0	0.0	10.6	0.0	8.6	90.3	4.9	84.5
Queue Length 95th (m)	#105.8	7.7	21.9	0.0	#30.0	#161.3	16.5	#150.0
Internal Link Dist (m)		112.3		187.9		75.5		84.3
Turn Bay Length (m)	25.0		25.0		25.0		25.0	
Base Capacity (vph)	463	636	424	650	169	947	142	946
Starvation Cap Reductn	0	0	0	0	0	258	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.20	0.25	0.05	0.56	1.16	0.42	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
21: Tenth Line & Zone 2/Zone 3 South

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	84	121	13	17	109	905	19	964
v/c Ratio	0.42	0.32	0.07	0.04	0.36	0.65	0.06	0.70
Control Delay	30.5	4.2	22.6	0.2	8.7	8.3	4.0	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.5	4.2	22.6	0.2	8.7	8.3	4.0	9.7
Queue Length 50th (m)	8.7	0.0	1.3	0.0	3.8	44.1	0.5	51.0
Queue Length 95th (m)	19.6	5.9	5.2	0.0	15.5	101.5	2.6	#122.2
Internal Link Dist (m)		174.2		165.1		414.9		181.2
Turn Bay Length (m)	25.0		25.0		25.0		25.0	
Base Capacity (vph)	393	570	357	593	304	1395	344	1385
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.21	0.04	0.03	0.36	0.65	0.06	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

Lincolnvile GO Transportation Study

34: Tenth Line & Bus Access

Future Total (Long Term) PM Pk Hr



Lane Group	EBL	NBT	SBT	SBR
Lane Group Flow (vph)	3	870	961	4
v/c Ratio	0.02	0.49	0.54	0.00
Control Delay	28.7	2.0	2.3	0.8
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	28.7	2.0	2.4	0.8
Queue Length 50th (m)	0.3	0.0	0.0	0.0
Queue Length 95th (m)	2.7	50.9	63.7	0.4
Internal Link Dist (m)	73.5	181.2	75.5	
Turn Bay Length (m)				45.0
Base Capacity (vph)	442	1770	1770	1505
Starvation Cap Reductn	0	54	118	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.01	0.51	0.58	0.00
Intersection Summary				

Timings 5: Tenth Line & Bethesda Side Rd

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	72	221	418	22	264	561	467	6	48	336
Future Volume (vph)	72	221	418	22	264	561	467	6	48	336
Turn Type	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		2			6	7	4		3	8
Permitted Phases	2		2	6		4		4	8	
Detector Phase	2	2	2	6	6	7	4	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	43.0	43.0	43.0	43.0	43.0	45.0	66.9	66.9	10.1	32.0
Total Split (%)	35.8%	35.8%	35.8%	35.8%	35.8%	37.5%	55.8%	55.8%	8.4%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
Act Effect Green (s)		37.1	37.1	37.1	37.1	72.5	64.6	64.6	33.1	27.5
Actuated g/C Ratio		0.31	0.31	0.31	0.31	0.61	0.54	0.54	0.28	0.23
v/c Ratio		1.00	0.68	0.13	0.66	1.02	0.50	0.01	0.19	1.00
Control Delay		91.3	19.4	31.1	41.0	74.0	20.0	0.0	18.4	89.4
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		91.3	19.4	31.1	41.0	74.0	20.0	0.0	18.4	89.4
LOS		F	B	C	D	E	C	A	B	F
Approach Delay		49.1			40.4		49.2			81.6
Approach LOS		D			D		D			F

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 118.7

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 53.6

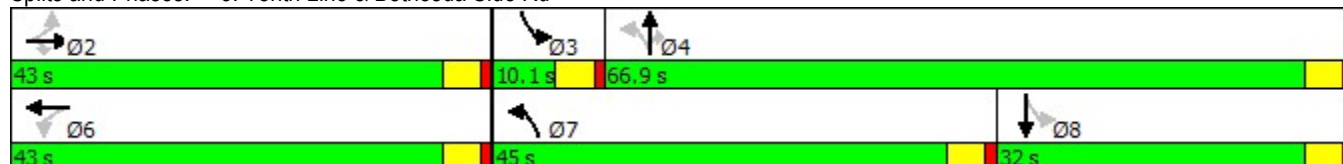
Intersection LOS: D

Intersection Capacity Utilization 100.9%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 5: Tenth Line & Bethesda Side Rd



Timings
21: Tenth Line & Zone 2/Zone 3 South

Lincolnvile GO Transportation Study
Future Total (Long Term) PM Pk Hr

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	76	0	12	0	98	709	17	777
Future Volume (vph)	76	0	12	0	98	709	17	777
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	47.5	47.5	47.5	47.5
Total Split (%)	32.1%	32.1%	32.1%	32.1%	67.9%	67.9%	67.9%	67.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effect Green (s)	9.2	9.2	9.2	9.2	48.4	48.4	48.4	48.4
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.76	0.76	0.76	0.76
v/c Ratio	0.42	0.32	0.07	0.04	0.36	0.65	0.06	0.70
Control Delay	30.5	4.2	22.6	0.2	8.7	8.3	4.0	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.5	4.2	22.6	0.2	8.7	8.3	4.0	9.7
LOS	C	A	C	A	A	A	A	A
Approach Delay		15.0		9.9		8.3		9.6
Approach LOS		B		A		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 63.6

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 9.5

Intersection LOS: A

Intersection Capacity Utilization 74.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 21: Tenth Line & Zone 2/Zone 3 South

	
Ø2	Ø4
47.5 s	22.5 s
	
Ø6	Ø8
47.5 s	22.5 s

Intersection									
Intersection Delay, s/veh	17.9								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	853		209		664		642		
Demand Flow Rate, veh/h	899		224		688		678		
Vehicles Circulating, veh/h	621		764		407		603		
Vehicles Exiting, veh/h	660		331		1113		385		
Follow-Up Headway, s	3.186		3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	19.7		10.1		10.1		26.0		
Approach LOS	C		B		B		D		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	L	TR	L	TR	L	TR	
Assumed Moves	LT	R	L	TR	L	TR	L	TR	
RT Channelized									
Lane Util	0.375	0.625	0.040	0.960	0.613	0.387	0.103	0.897	
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.113	
Entry Flow, veh/h	337	562	9	215	422	266	70	608	
Cap Entry Lane, veh/h	709	732	637	662	833	850	719	741	
Entry HV Adj Factor	0.988	0.925	1.000	0.931	0.962	0.971	0.914	0.951	
Flow Entry, veh/h	333	520	9	200	406	258	64	578	
Cap Entry, veh/h	701	677	637	617	801	825	657	705	
V/C Ratio	0.475	0.768	0.014	0.325	0.507	0.313	0.097	0.821	
Control Delay, s/veh	12.1	24.5	5.8	10.2	11.6	7.9	6.6	28.2	
LOS	B	C	A	B	B	A	A	D	
95th %tile Queue, veh	3	7	0	1	3	1	0	9	

Intersection									
Intersection Delay, s/veh	21.4								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	242		48		730		945		
Demand Flow Rate, veh/h	251		50		755		972		
Vehicles Circulating, veh/h	931		818		107		104		
Vehicles Exiting, veh/h	145		44		1075		764		
Follow-Up Headway, s	3.186		3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	9.4		6.4		12.0		32.4		
Approach LOS	A		A		B		D		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	L	TR	L	TR	L	TR	L	TR	
Assumed Moves	L	TR	L	TR	L	TR	L	TR	
RT Channelized									
Lane Util	0.410	0.590	0.460	0.540	0.107	0.893	0.004	0.996	
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.113	
Entry Flow, veh/h	103	148	23	27	81	674	4	968	
Cap Entry Lane, veh/h	562	589	612	637	1043	1048	1045	1051	
Entry HV Adj Factor	0.971	0.959	0.957	0.963	0.988	0.964	1.000	0.972	
Flow Entry, veh/h	100	142	22	26	80	650	4	941	
Cap Entry, veh/h	546	565	585	614	1030	1010	1045	1021	
V/C Ratio	0.183	0.251	0.038	0.042	0.078	0.643	0.004	0.921	
Control Delay, s/veh	9.0	9.8	6.6	6.3	4.2	13.0	3.5	32.6	
LOS	A	A	A	A	A	B	A	D	
95th %tile Queue, veh	1	1	0	0	0	5	0	14	

Intersection									
Intersection Delay, s/veh	19.5								
Intersection LOS	C								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	764		379		1111		476		
Demand Flow Rate, veh/h	774		409		1158		483		
Vehicles Circulating, veh/h	446		1229		377		978		
Vehicles Exiting, veh/h	1015		306		843		660		
Follow-Up Headway, s	3.186		3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	11.1		35.8		17.3		25.3		
Approach LOS	B		E		C		D		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	LT	R	L	TR	L	TR	L	TR	
Assumed Moves	LT	R	L	TR	L	TR	L	TR	
RT Channelized									
Lane Util	0.420	0.580	0.064	0.936	0.557	0.443	0.108	0.892	
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.113	
Entry Flow, veh/h	325	449	26	383	645	513	52	431	
Cap Entry Lane, veh/h	809	827	450	478	852	868	543	570	
Entry HV Adj Factor	0.971	1.000	0.923	0.928	0.935	0.990	1.000	0.983	
Flow Entry, veh/h	315	449	24	355	603	508	52	424	
Cap Entry, veh/h	785	827	415	443	796	859	543	560	
V/C Ratio	0.402	0.543	0.058	0.801	0.757	0.591	0.096	0.756	
Control Delay, s/veh	9.6	12.1	9.5	37.6	21.0	13.0	7.8	27.4	
LOS	A	B	A	E	C	B	A	D	
95th %tile Queue, veh	2	3	0	7	7	4	0	7	

Intersection									
Intersection Delay, s/veh	27.3								
Intersection LOS	D								
Approach	EB		WB		NB		SB		
Entry Lanes	2		2		2		2		
Conflicting Circle Lanes	2		2		2		2		
Adj Approach Flow, veh/h	205		30		1014		983		
Demand Flow Rate, veh/h	207		30		1022		1000		
Vehicles Circulating, veh/h	912		990		104		122		
Vehicles Exiting, veh/h	210		136		1015		898		
Follow-Up Headway, s	3.186		3.186		3.186		3.186		
Ped Vol Crossing Leg, #/h	0		0		0		0		
Ped Cap Adj	1.000		1.000		1.000		1.000		
Approach Delay, s/veh	8.5		6.8		23.2		36.0		
Approach LOS	A		A		C		E		
Lane	Left	Right	Left	Right	Left	Right	Left	Right	
Designated Moves	L	TR	L	TR	L	TR	L	TR	
Assumed Moves	L	TR	L	TR	L	TR	L	TR	
RT Channelized									
Lane Util	0.411	0.589	0.433	0.567	0.107	0.893	0.019	0.981	
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.113	
Entry Flow, veh/h	85	122	13	17	109	913	19	981	
Cap Entry Lane, veh/h	570	597	538	565	1045	1051	1031	1037	
Entry HV Adj Factor	0.988	0.992	1.000	1.000	1.000	0.991	1.000	0.982	
Flow Entry, veh/h	84	121	13	17	109	905	19	964	
Cap Entry, veh/h	563	592	538	565	1045	1042	1031	1019	
V/C Ratio	0.149	0.204	0.024	0.030	0.104	0.869	0.018	0.946	
Control Delay, s/veh	8.3	8.7	7.0	6.7	4.4	25.4	3.6	36.7	
LOS	A	A	A	A	A	D	A	E	
95th %tile Queue, veh	1	1	0	0	0	12	0	16	



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