

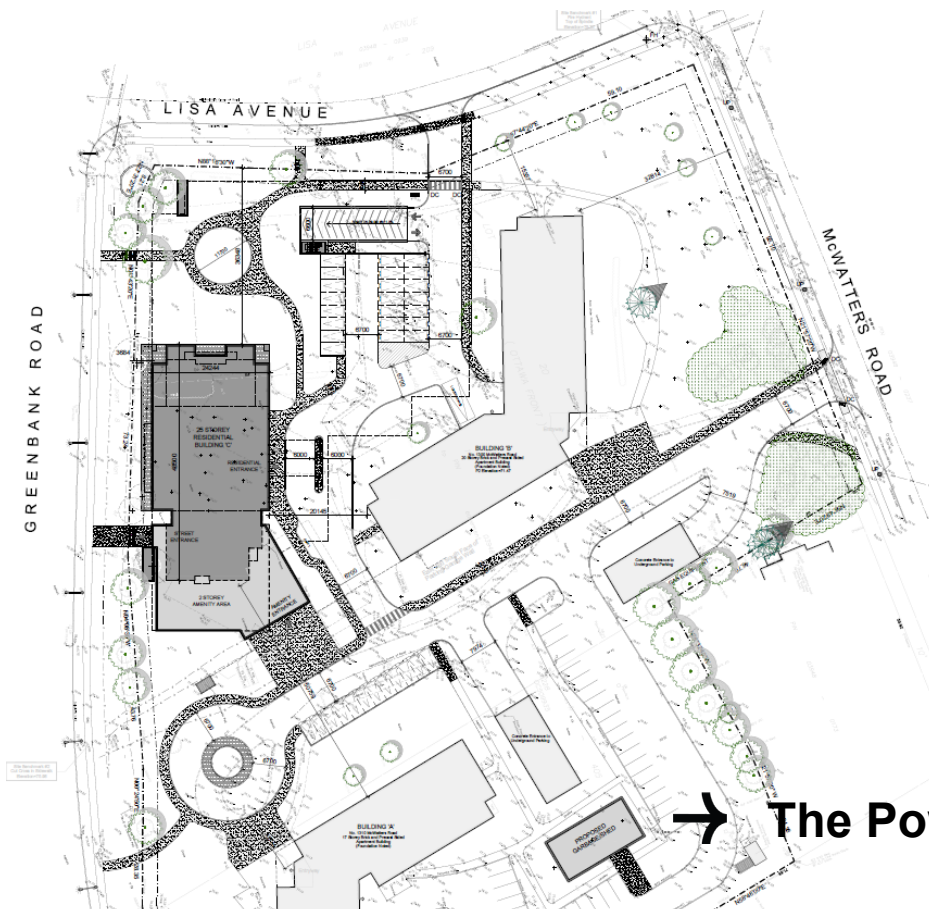


Residential Development at 1300 McWatters Road, Ottawa

Traffic Impact Assessment – Strategy Report

Homestead Land Holdings Limited

16 June 2022



➔ **The Power of Commitment**

GHD Limited


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1. Screening Form

GHD prepared a Transportation Impact Assessment (TIA) to support the new residential development at 1300 McWatters, Ottawa, Ontario. The TIA was completed according to the City of Ottawa's Transportation Impact Assessment Guidelines (2017). This study consists of the five mandatory steps which are screening, scoping, forecasting, analysis, and reporting. All steps and their respective modules are completed in sequence. The purpose of this study is to forecast the potential impacts of the new development on the existing transportation network and determine any improvements needed to mitigate these impacts. The Screening form has been prepared and is included as Appendix A. As shown in the Screening form, the Trip Generation and Safety Triggers are satisfied, and the TIA study must proceed into the next step.

2. Scoping

2.1 Description of Proposed Development

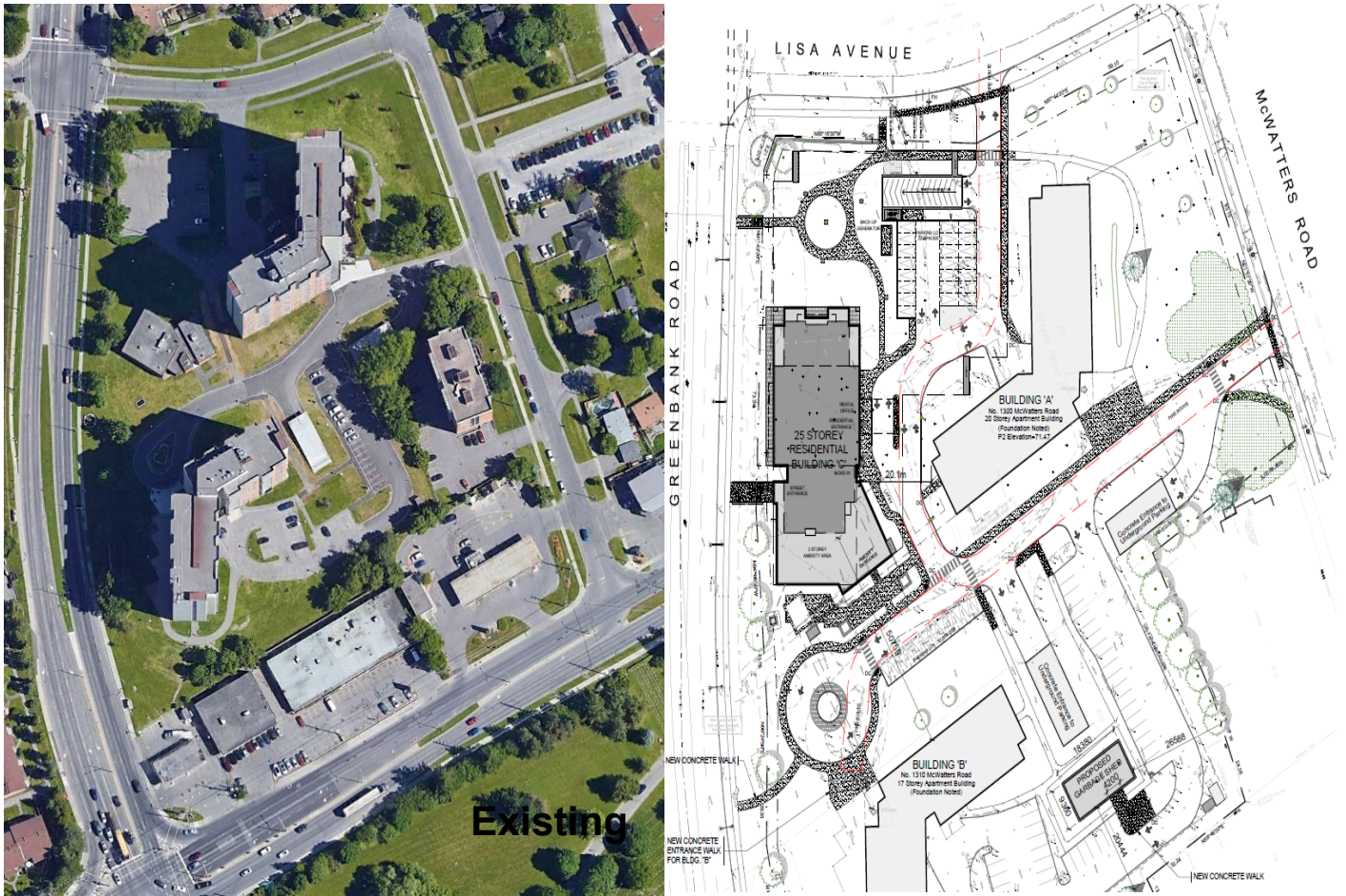
The proposed development is located on the corner of Greenbank Road and Lisa Avenue with a civic address of 1300 McWatters Road. The subject lands are designated General Urban Area in the City's Official Plan and are zoned R5B H18. According to the Official Plan's draft, the subjected lands are identified as being in the Outer Urban Transect and Greenbank Road and Baseline Road are both main street corridors. The proposed residential site plan is shown in Figure 1.

The proposed development involves converting the existing parking lot at Greenbank Road into a 25-storey high-rise residential building, and the redevelopment of the existing recreation center. A full-movement access is provided to the surface and underground parking from Lisa Avenue, a secondary access to the building is through McWatters Road. The existing accesses on Lisa Avenue and McWatters Road will be used for the development.

Pedestrians can access the building using an east-facing entrance connected to the parking area or a west-facing entrance connected by a pathway to the sidewalk on Greenbank Road. The proposed development is not within a Design Priority Area but because the project is the construction of a high-rise tower, it triggers the Urban Design and Compatibility guidelines for a High-Rise building, according to the City of Ottawa Official Plan.

The building will contain 235 residential units and provide 260 parking spaces in two underground parking levels and 29 surface parking spaces. The construction is planned to start in spring 2022 and be completed by the end of the year 2024 with occupancy in the same year.

Figure 1 – Existing site and proposed plan



2.2 Existing Conditions

2.2.1 Area Multi-Modal Network

Greenbank Road is a north-south arterial road. Within the study area it is a four-lane divided roadway with two lanes in each direction and a posted speed limit of 60 km/hr. There are sidewalks on both sides of the road.

Baseline Road is an east-west arterial road. Within the study area it is a four-lane divided roadway with two lanes in each direction with a posted speed limit of 60 km/hr. There are sidewalks on both sides of the road and a cycle lane in both directions west of Greenbank Road.

Lisa Avenue is a residential undivided two-lane, east-west local road with an unposted speed limit of 40 km/hr. There are sidewalks on both sides of the street.

Iris Street is an undivided two-lane, east-west major collector road with an unposted speed limit of 40 km/hr. There is a sidewalk on the north side of the road and a paved strip on the south side of the road.

McWatters Road is an undivided two-lane, north-south local road with a posted speed limit of 50 km/hr. There are sidewalks on both sides of the street.

Highway 417 (Queensway) is a provincial highway. The entrance and exit ramps to the highway are located on Greenbank Road and Pinecrest Road.

There are no traffic management measures existing in the study area. Baseline Road and Greenbank Road, north of Baseline Road, are full-load truck routes. The road classification is shown in Figure 2.

2.2.2 Intersections

Greenbank Rd / Iris St & Hwy 417 W-NS Off-Ramp is a signalized intersection. The northbound approach consists of three through lanes and a right-turn lane. The southbound approach consists of a channelized right-turn lane for buses, two left-turn lanes and two through lanes. The eastbound approach consists of a through lane, a channelized right-turn lane and two left-turn lanes. The westbound approach consists of two right-turn lanes and two left-turn lanes. The through movement on this approach is not allowed.

Lisa Avenue / Greenbank Road is a signalized intersection. The northbound approach consists of a left-turn lane, a through lane and a shared through/right turn lane. The southbound approach consists of left and right-turn lanes and two through lanes. The westbound and eastbound approaches have a shared through/left-turn/right-turn lane.

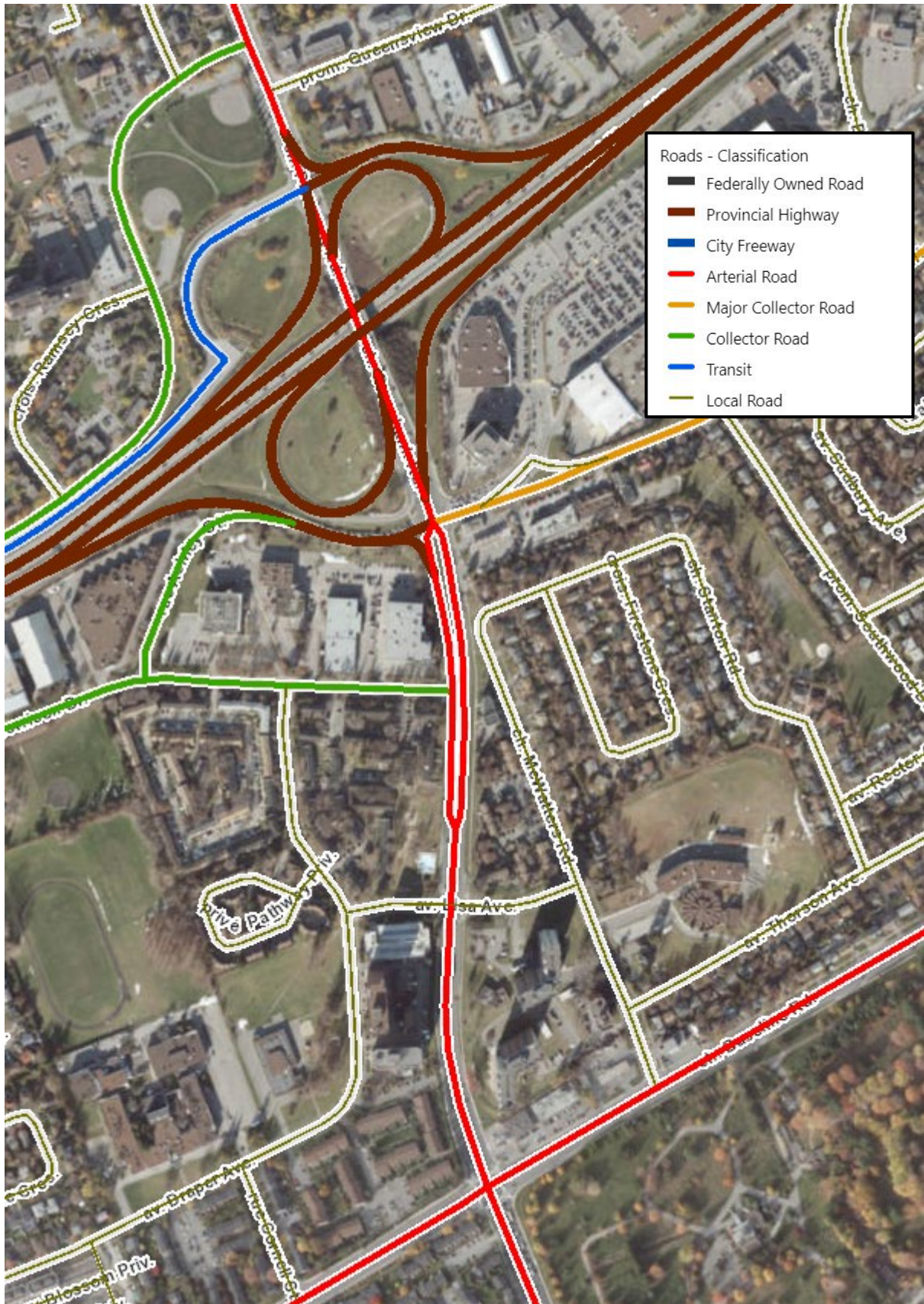
Greenbank Road / Baseline Road is a signalized intersection. The northbound approach consists of a left-turn lane, two through lanes and a channelized right turn lane. The southbound approach consists of a channelized right-turn lane, two left-turn lanes and two through lanes. The eastbound approach consists of a left-turn lane, a through lane and a shared through/right-turn lane. The westbound approach consists of two through lanes, two left-turn lanes and a channelized right turn lane.

McWatters Road / Baseline Road is controlled with a stop sign for southbound vehicles. The southbound approach consists of a right-turn only lane. Vehicles traveling westbound on Baseline Road have two travel lanes. Right-turning movements are permitted, except between 7AM and 9AM on weekdays. Eastbound on Baseline Road, there is a left-turn lane towards McWatters Road and two through lanes.

The intersection of McWatters Road and Lisa Avenue is controlled by a stop sign for all approaches. All the approaches have only one lane that is shared for all movements.

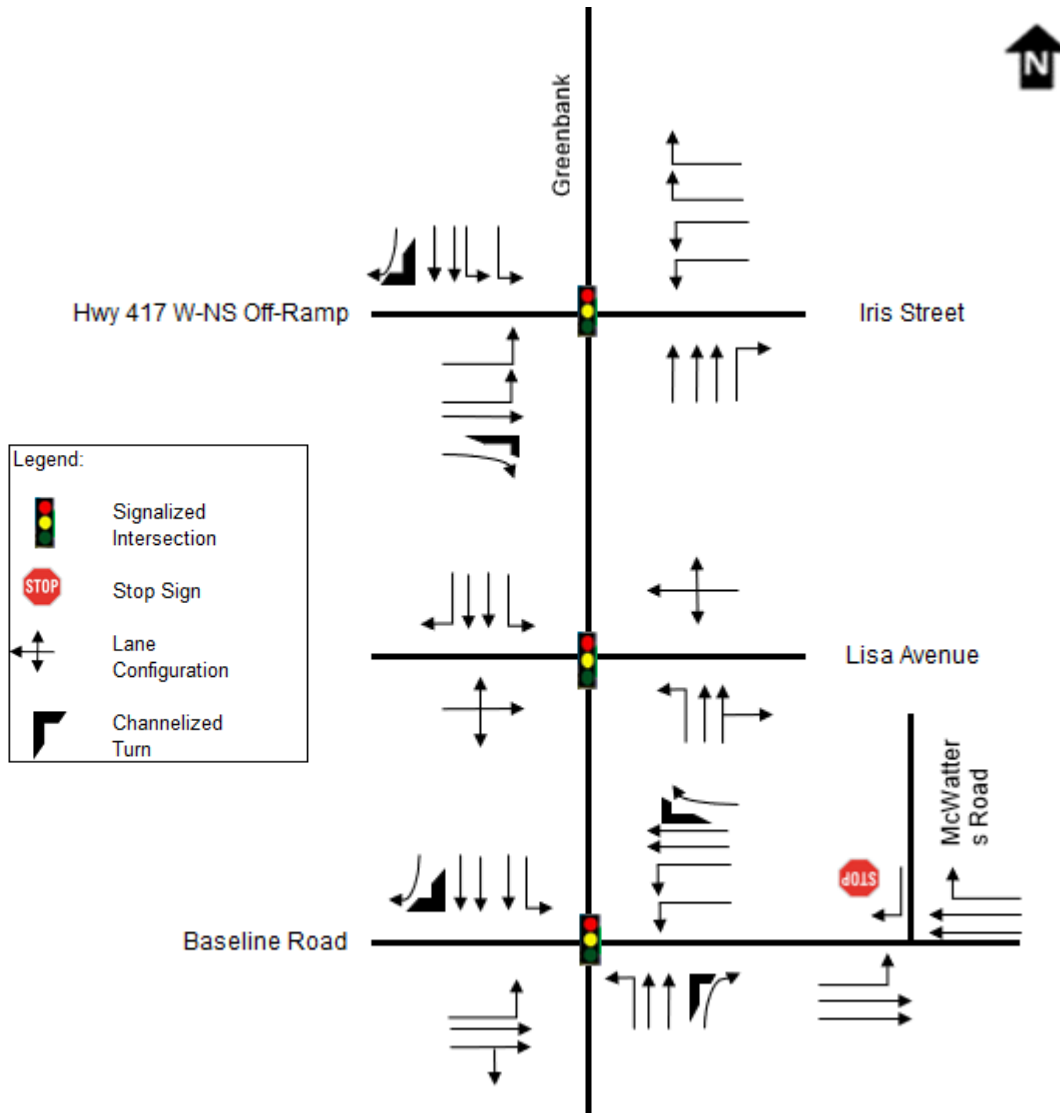
The intersection configuration is shown in Figure 3.

Figure 2 – Road Classification



Source: geoOttawa

Figure 3 – Intersection configuration



2.2.3 Driveways

Two existing driveways will provide vehicular access to the site. The locations of driveways in the study area are summarized in Table 1. Due to the low traffic volumes generated by the development, there are no concerns with the locations of the existing driveways.

Table 1 – Existing Driveways

ID	Land use	Location
1	Residential (proposed development main access)	Lisa Avenue – South side
2	Residential	McWatters Road – West side
3	Individual house	McWatters Road – East side
4	Individual house	McWatters Road – East side
5	Individual house	McWatters Road – East side
6	Individual house	McWatters Road – East side
7	Individual house	McWatters Road – East side
8	Institutional (Pinecrest Public School)	McWatters Road – East side
9	Private language school	McWatters Road – East side
10	Residential (proposed development secondary access)	McWatters Road – West side
11	Residential	McWatters Road – West side
12	Individual house	McWatters Road – East side

Figure 4 – Access locations

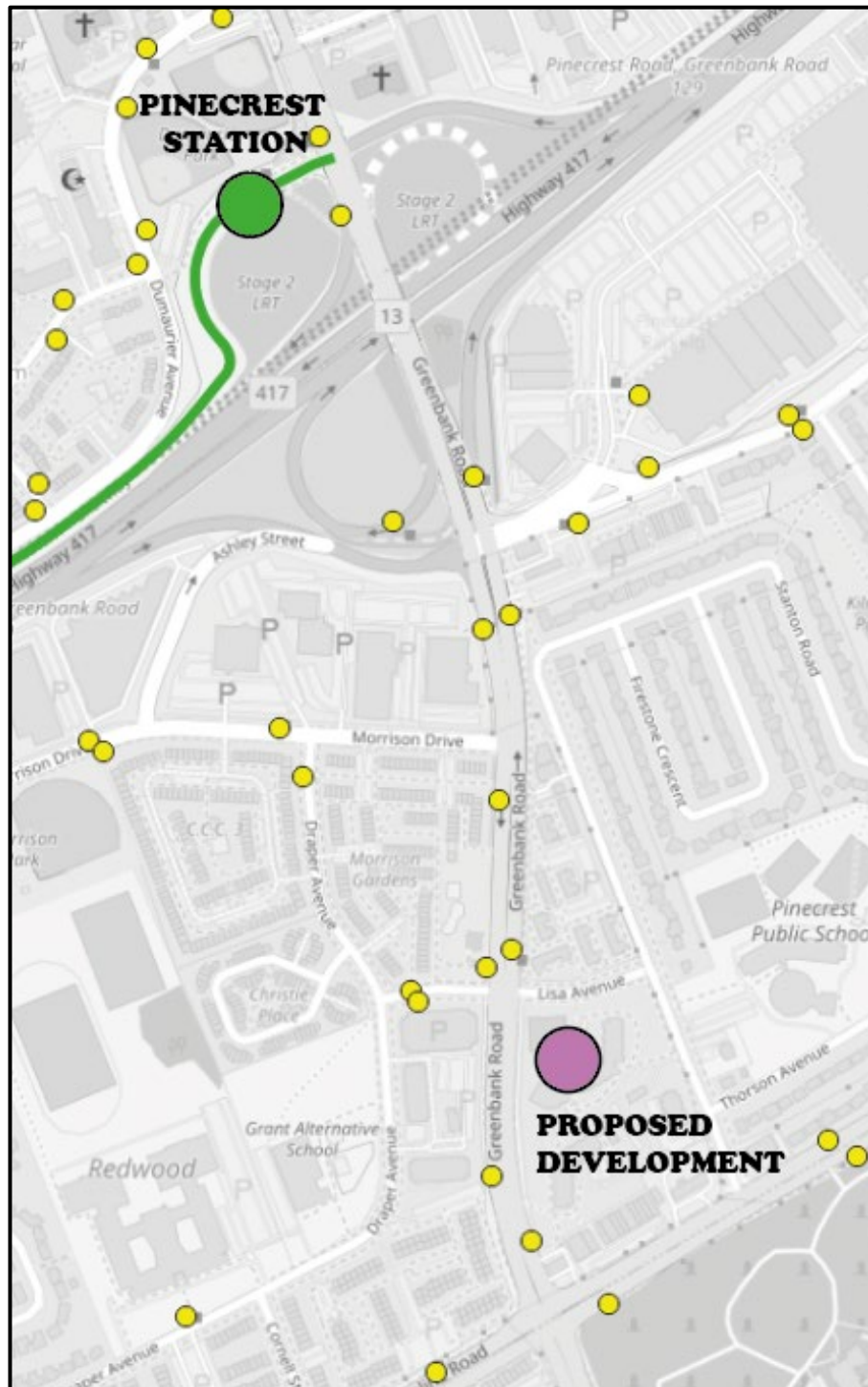


2.2.4 Transit

Within the study area, routes # 58, 82, 173, 282 and 691 have stops on Greenbank Road in the northbound and southbound directions. There are 16 bus stops on Greenbank Road between Queensview Dr and Meadowbank Drive. The nearest bus stop to the proposed development is at the corner of Greenbank Road and Lisa Avenue, which is approximately 110 meters from the entrance of the building. Route 88 is on Baseline Road. The location of the bus stops in the study area are shown in yellow in Figure 6, the bus routes in the study area are shown in Figure 6, and the bus schedules are provided in Appendix B.

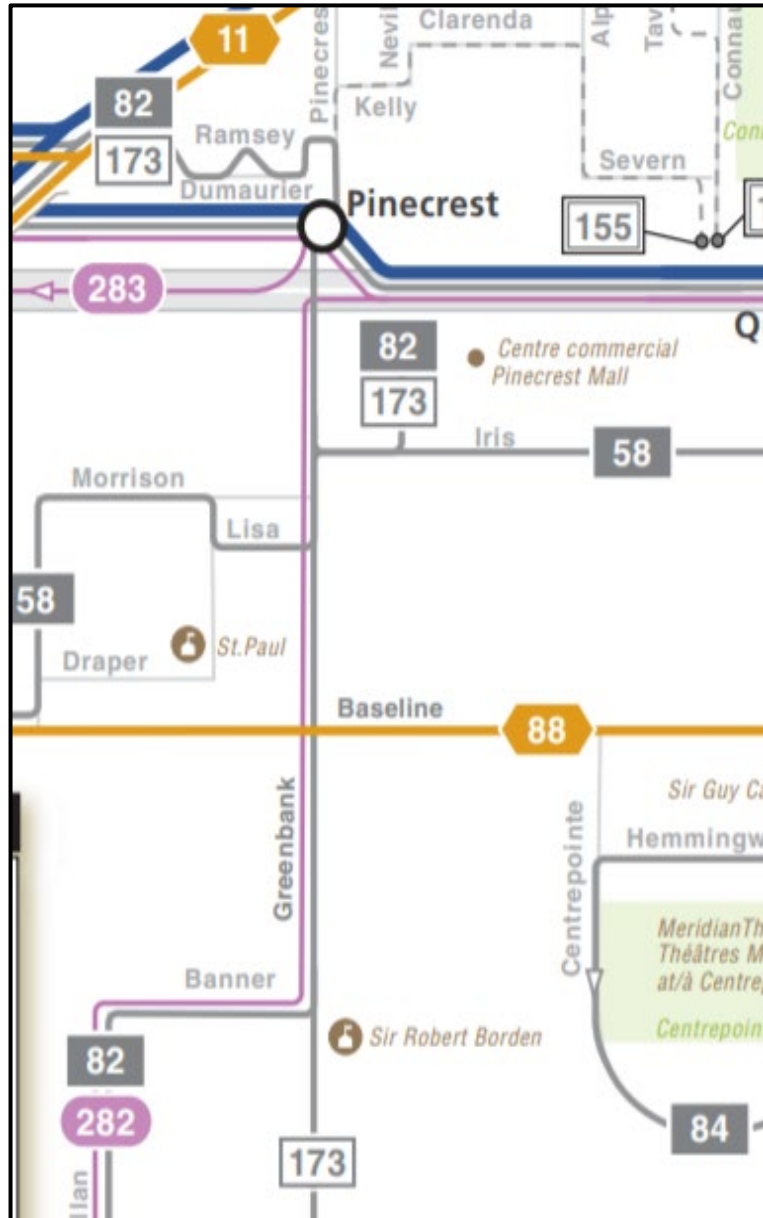
The nearest transitway station to the proposed development is Pinecrest Station.

Figure 5 – Transit facilities and bus stops



Source: OC Transpo GTFS

Figure 6 – Transit routes



Source: <https://www.octranspo.com/images/files/maps/systemmap.pdf>

2.2.5 Peak Hour Travel Demand

The existing traffic counts were acquired from the City of Ottawa for the intersections within the study area. The traffic data's date and peak hour time are summarized in Table 2. The traffic volumes used in the TIA are shown in Figures 6 and 7 and are provided in Appendix C.

Table 2 – Intersection Count Data

Intersection	Count Date	AM Peak Hour	PM Peak Hour
Baseline Rd/ McWatters Rd	Tuesday, May 25, 2021	08:00 - 09:00	16:00 - 17:00
Greenbank Rd / Iris St	Wednesday, January 16, 2019	07:45 - 08:45	16:00 - 17:00
Greenbank Rd / Lisa Ave	Thursday, August 11, 2016	08:00 - 09:00	16:00 - 17:00
Greenbank Rd / Baseline Rd	Thursday, August 11, 2016	07:45 - 08:45	16:15 - 17:15

Figure 7 – Vehicular volumes at the intersections

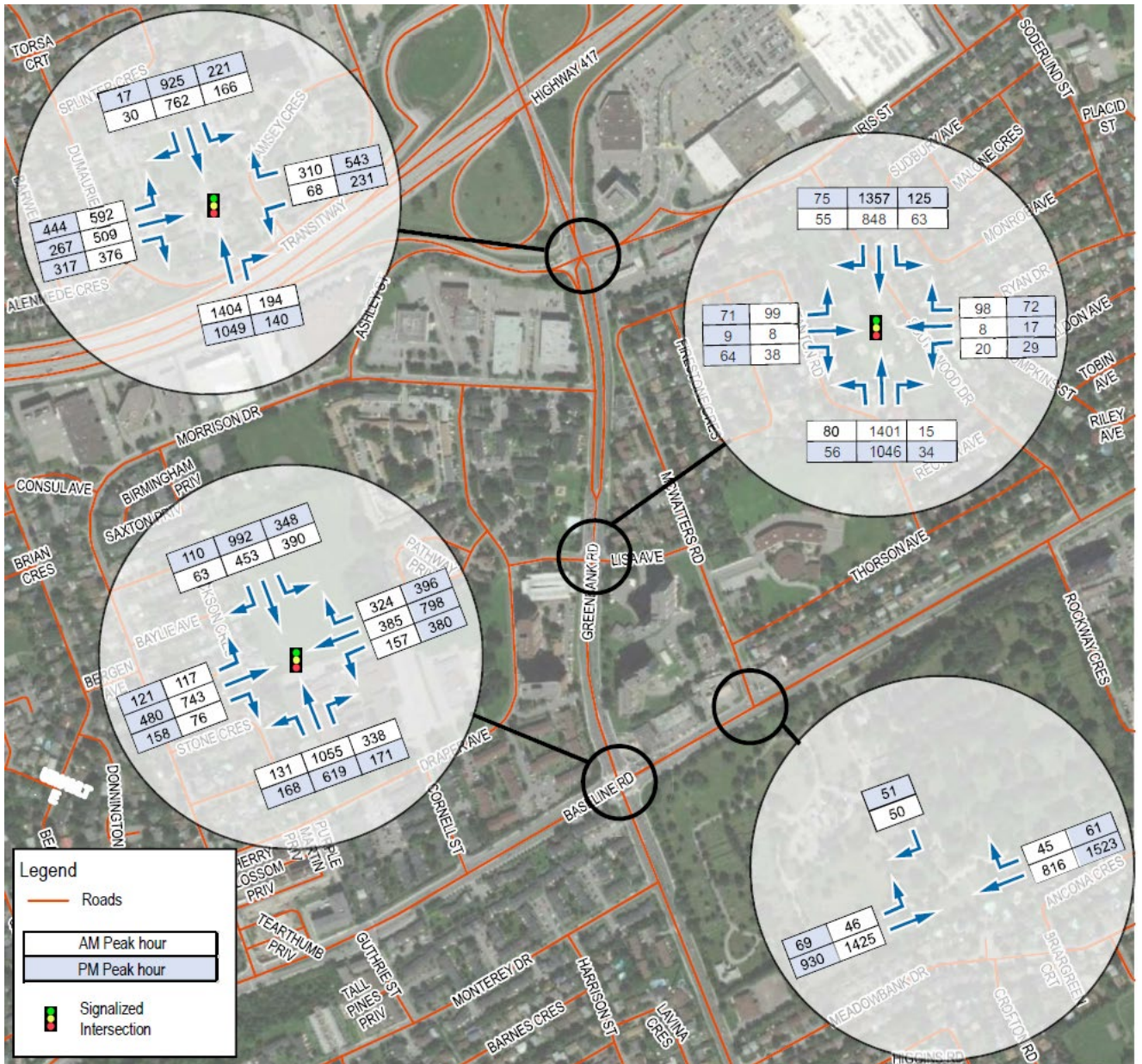
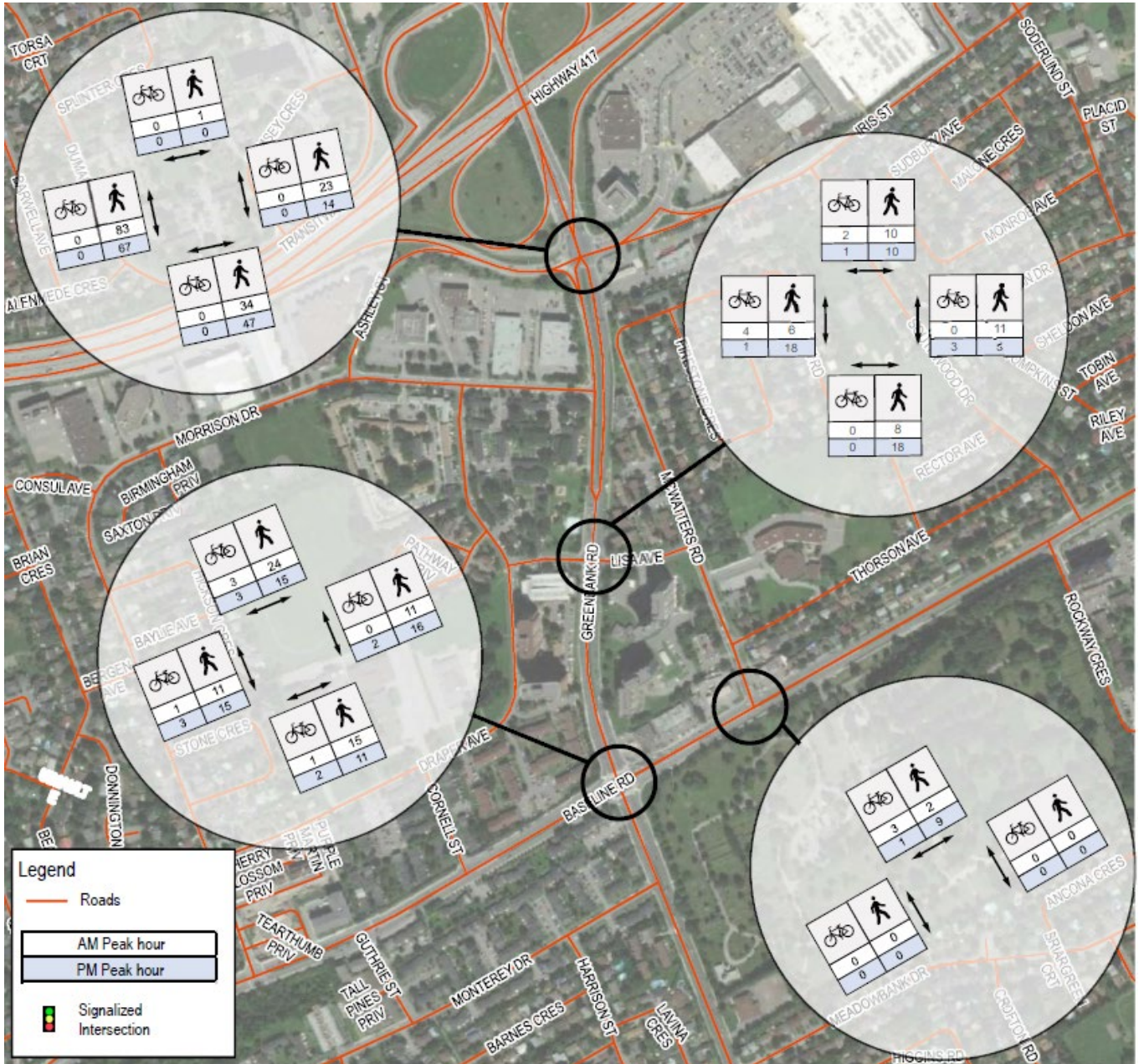


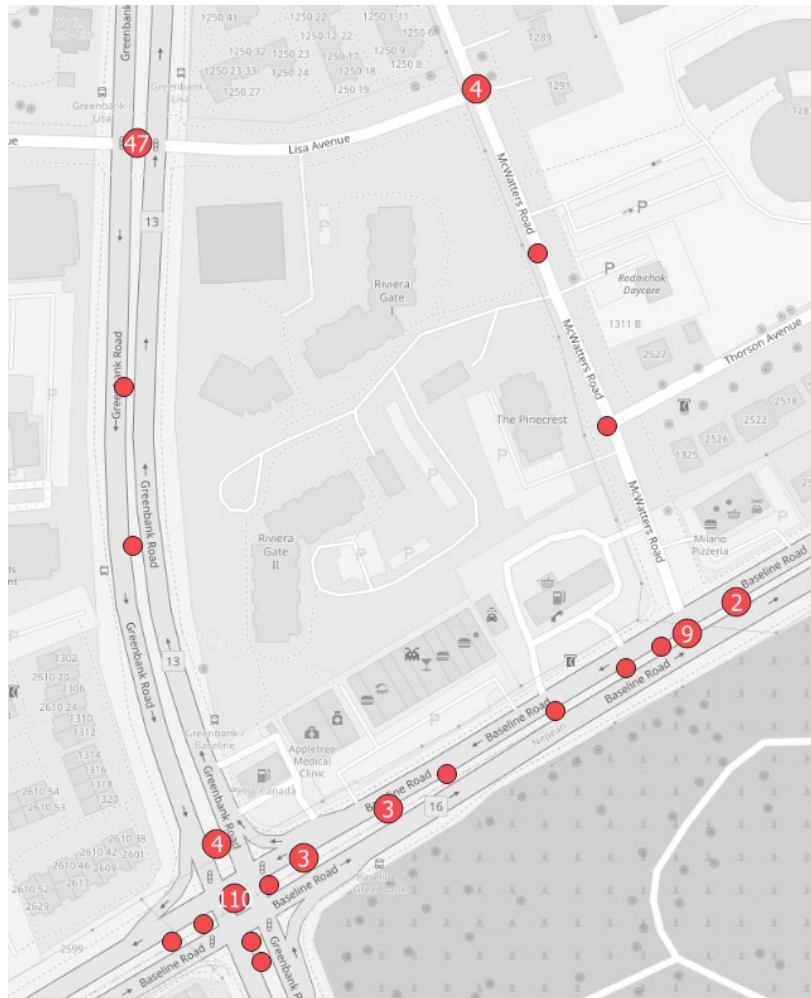
Figure 8 – Pedestrian and cyclist volumes at the intersections



2.2.6 Collision Analysis

Collision data was received from the Transportation Data Collection & Analytics Group within the Transportation Services Division at the City of Ottawa. Additional collision data was accessed through the City of Ottawa's Open Data Portal. The reviewed data spans the most-recent, complete five-year period from 2015 to 2019. In total, 171 collisions occurred at the intersections of Greenbank Road / Lisa Avenue, Greenbank Road / Baseline Road, McWatters Road / Lisa Avenue and McWatters Road / Baseline Road and the roadway segments between these intersections. The locations of the collisions are illustrated in Figure 9 and the collision data has been provided in Appendix D.

Figure 9 – Collision locations within the study area between 2015 and 2019



Source: City of Ottawa's Open Data Portal

GREENBANK ROAD / LISA AVENUE

Between 2015 and 2019, a total of 47 collisions occurred within the intersection with over half (24) being rear-end collisions. With respect to the initial direction of vehicle one, 49% of collisions involved southbound motorists and 32% involved northbound motorists. Most of the collisions occurred during daylight and while the pavement was dry. 23% of the collisions resulted in non-fatal injuries. There were no cyclist collisions and two pedestrian collisions.

LISA AVENUE / McWATTERS ROAD

At this intersection, there were four collisions over the five-year period and they were all property damage only collisions. Although the intersection is stop-controlled on all approaches, 50% of the collisions are classified as angle collisions. No collisions were documented with cyclists or pedestrians.

BASELINE ROAD / MCWATTERS ROAD

Of the nine collisions that happened between 2015 and 2019, 44% were angle or turning movement collisions. All collisions occurred during clear weather and 44% of them resulted in non-fatal injuries. One collision involved a pedestrian.

BASELINE ROAD / GREENBANK ROAD

A total of 110 collisions were reported at the intersection of Greenbank Road and Baseline Road between 2015 and 2019. Approximately 20% were non-fatal injury collisions with the remaining being property damage only. With respect to the initial direction of vehicle one, collisions were uniformly distributed amongst all intersection approaches. A majority of collisions (68%) were classified as rear-end collisions while 20% were sideswipe collisions. Almost 42% of collisions occurred between 3:00 pm and 7:00 pm. Two collisions were reported involving cyclists and only one collision involved a pedestrian.

BASELINE ROAD (BETWEEN MCWATTERS ROAD AND GREENBANK ROAD)

There were 11 collisions between 2015 and 2019 along this section of Baseline Road with 57% rear-end collisions. All of the collisions were vehicular collisions and resulted in property damage only. No collisions were documented with cyclists or pedestrians.

MCWATTERS ROAD (BETWEEN LISA AVENUE AND BASELINE ROAD)

There were two collisions on this segment with one at the intersection of Thorson Avenue. Both collisions were property damage only, were at different locations, happened with different lighting and weather conditions, thus there are no similarities. No collisions were documented with cyclists or pedestrians.

GREENBANK ROAD (BETWEEN BASELINE ROAD AND LISA AVENUE)

6 collisions were registered on this road segment with four happening during dark conditions. All collisions were property damage only and no collisions were documented with cyclists or pedestrians.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The new Pinecrest LRT station will be built 700 meters from the proposed development. The new transit station is part of the Confederation Line West extension project in which 11 new or converted stations will be added to the City's overall light rail transit network. It will be located on the north side of Highway 417 west of Pinecrest Road. The main access to the station will be on Dumaurier Avenue which will be connected to Pinecrest Road through a multi-use pathway. To support the new station, a pedestrian crosswalk is planned to be built from Pinecrest Road to the station's entrance. To ensure that the cyclist network is integrated with the project, a bidirectional cycle tracks will be added along the west side of Pinecrest Road, from station entrance to Queensview Drive. The station is planned to be in service by 2025. The new stations and the pedestrian projects in the area are shown in Figure 6, attached.

The City of Ottawa is planning to construct a Bus Rapid Transit (BRT) corridor between Bayshore station and Heron station along Baseline Road and will include dedicated bus-only lanes along the length of the 14 km corridor. The project is part of the City's Transportation Master Plan (TMP) Network Concept, therefore will not be in place until post-2031. Baseline Road has been identified as a Transit Priority Corridor with isolated measures as part of the Affordable Network in the TMP. The new development that is the subject of this TIA is 300 meters away from Baseline Road and therefore will be served by both a new LRT station and a BRT corridor within a distance of less than 1 km.

A cycling link is planned in the Ottawa Cycling Plan on Baseline Road, between Greenbank Road and the existing cycling facilities west of the transitway at Baseline Station.

2.3.2 Other Study Area Developments

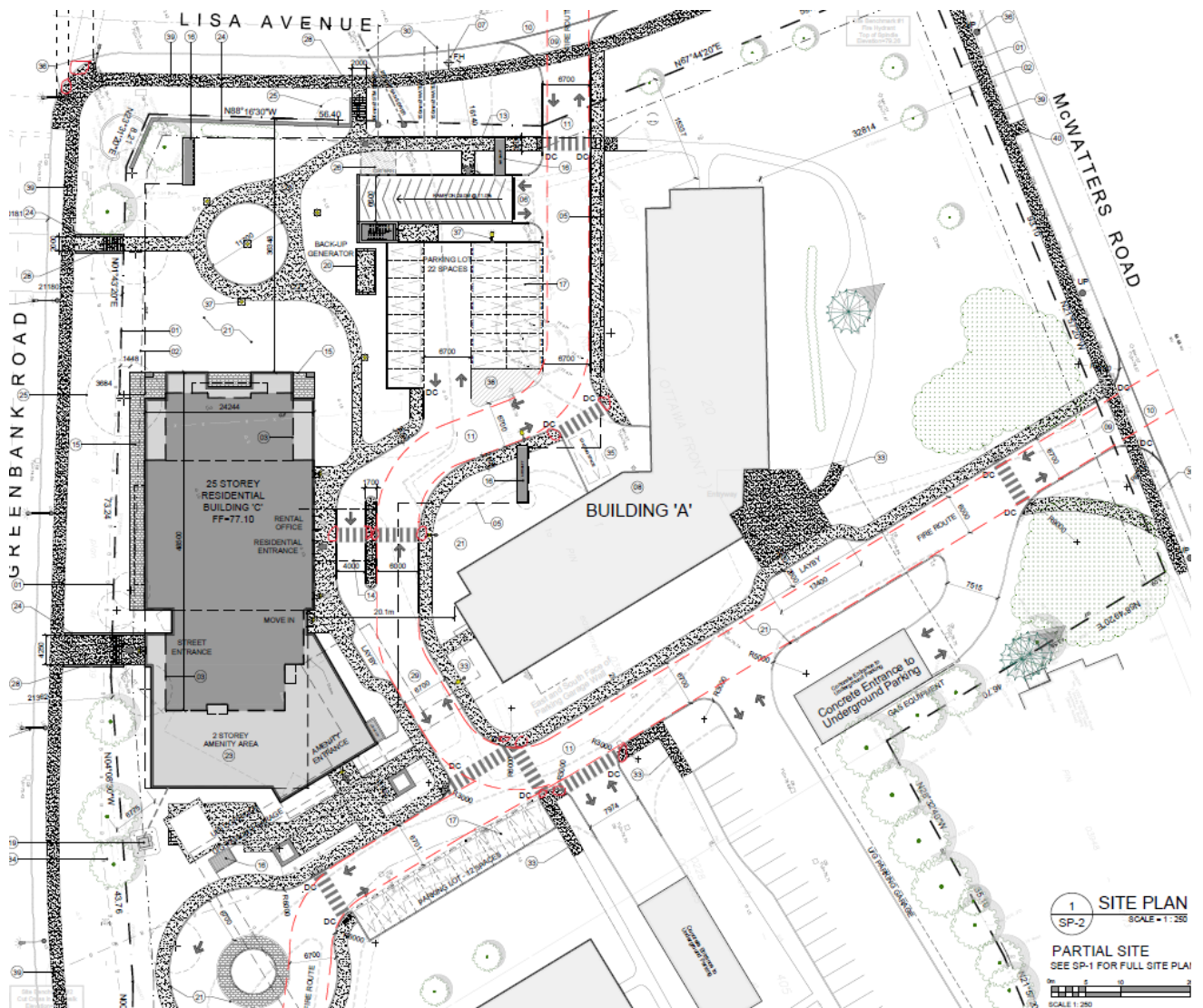
At the time the study was prepared, there were no other planned developments within the study area.

2.4 Study Area

The proposed development is located at the corner of Greenbank Road and Lisa Avenue. The building will contain 235 residential units, 260 underground parking spaces and 29 surface parking spaces. The proposed development will have its own underground parking and will not be connected to the existing underground parking.

The proposed development will be connected to the existing road and pedestrian network using the existing accesses on Lisa Avenue and McWatters Road. Another pedestrian connection will be constructed between the building and Greenbank Road.

Figure 10 – Site Plan



The development should generate low traffic volumes given its type and location. Thus, we reviewed the intersections that could be impacted by the new trips. There are 12 intersections with arterial roads that are within 1 km from the proposed development, as measured along roadways. However, it was found that there were only a few intersections that were impacted by the development. After calculating the trip distribution, few vehicles are expected to travel through the majority of the intersections within the 1 km distance. A comparison of the existing total traffic volumes entering each intersection during the PM peak hour and the new trips entering each intersection is shown in Table 3. The new traffic volumes at these intersections will have minimal impact on the overall traffic operations.

Table 3 – Intersections Minimally Impacted by Development

Intersection	Existing intersection volumes (PM)	Maximum new vehicles at intersection
Pinecrest Rd / Queensview Dr	2470	Maximum 5 vehicles travel southbound through the intersection
Hwy 417 E-NS Off-Ramp / Pinecrest Rd & Greenbank Rd	3020	Maximum 7 vehicles travel through the intersection
Greenbank Rd / Morrison Dr	1420	Maximum 12 vehicles travel southbound through the intersection
Greenbank Rd / Baseline Rd	4690	Maximum 8 vehicles southbound split between through, right-turn and left-turn directions
Greenbank Rd / Monterey Rd	1480	Maximum 6 vehicles southbound on Greenbank Road
Greenbank Rd / Meadowbank Rd	2100	Maximum 6 vehicles southbound on Greenbank Road
Baseline Rd / Cornell St	1840	Maximum 5 vehicles travel through intersection on Baseline Road
Baseline Rd / Guthrie St	1840	Maximum 5 vehicles travel through intersection on Baseline Road
Baseline Rd / Morrison Dr	1840	Maximum 5 vehicles travel through intersection on Baseline Road
Baseline Rd / McWatters Rd	2540	Maximum 6 vehicles travel through intersection; only possible movement related to development is the southbound or eastbound right turn

The intersections that will be directly impacted by the development are identified in the table below. The primary access to the apartment building will be Lisa Avenue, which means most vehicles exiting and entering the building will travel through the intersection of Lisa Avenue / Greenbank Road because Greenbank Rd gives access to Highway 417.

Table 4 – Impacted Intersections Within the Study Area

Intersection	Description
Greenbank Rd / Iris St & Hwy 417 W-NS Off-Ramp	Additional 20 vehicles travel through intersection at peak hour
Lisa Ave / Greenbank Rd	Adjacent to development
McWatters Rd / Baseline Rd	Within 150m of the development access
Greenbank Rd / Baseline Rd	Within 350m of the development access

2.5 Time Periods

The proposed development is a High-Rise residential building therefore the AM and PM peak hours will be examined since these times represent the peak travel time scenario.

2.6 Horizon Years

The planned year of development build-out is 2022 and full occupancy is predicted for 2025. Therefore, the build-out plus five years horizon is 2030. The analysis will be completed for 2021 (existing), 2025 and 2030.

2.7 Exemptions Review

Table 5 summarizes the possible exemptions for a Traffic Impact Analysis.

Table 5 – Exemptions Review

Module	Element	Exemption Considerations
4.1 Development Design	4.1.3 New Street Networks	Only required for plans of subdivision
4.2 Parking	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand
4.6 Neighborhood Traffic Management	4.6.1 Adjacent Neighborhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in the excess of the equivalent volume permitted by established zoning

Based on the development proposed and following the Transportation Impact Assessment Guidelines (2017), this TIA is exempted from:

- Module 4.1.3: This development is not a subdivision
- Module 4.2.2: The parking supply meets the demand
- Module 4.6: The additional 36 vehicles generated in AM peak hour or 37 vehicles in the PM peak hour will not change the existing classification of the road
- Module 4.8: The development generates fewer than 100 person-trips in the peak hour

3. Forecasting

3.1 Development-generated Traffic

3.1.1 Trip Generation and Mode Shares

No trip reduction factor was applied.

3.1.1.1 Trip Generation Rates

The projected site trips were estimated based on TRANS Trip Generation Manual October 2020. The person-trip rates for a multi-unit high-rise dwelling Unit (Land Use Code 221 and 222) is 0.80 for AM peak period and 0.90 for PM peak period. Thus, for the project, the total person-trips generated is 184 during AM peak period and 207 during PM peak period.

3.1.1.2 Mode Shares

The recommended mode shares by TRANS district for high-rise multi family dwelling are summarized in Table 6. After the application of modal share, the peak hour trips were calculated for the person and vehicle trips.

Table 6 – Residential Mode Share for High-Rise Housing in the Bayshore/ Cedarview District

Travel Mode	Mode Share	
	AM	PM
Auto-Driver	40 %	40 %
Auto Passenger	12 %	15 %
Transit	38 %	33 %
Cycling	2 %	1 %
Walking	8 %	11 %

Using the mode share, the number of generated trips per mode were calculated. The peak period to peak hour adjustment provided in the TRANS Trip Generation Manual October 2020 was used to calculate the number of trips that the proposed development will generate, per mode, per period. The recommended vehicle directional split for multi-unit high-rise is 31% inbound during AM Peak and 58% inbound during PM Peak. The trip generation by mode is summarized in Table 7.

Table 7 – Trip Generation by Mode

Period	Travel Mode	Mode share	Trips Peak Period	Peak period to peak hour factor	Trips Peak Hour	In	Out
AM	Auto Driver	40 %	74	0.48	36	11	25
	Auto Passenger	12 %	22	0.48	11	3	8
	Transit	38 %	70	0.55	39	12	27
	Active	10 %	18	0.58	10	3	7
	Total			184		96	29
PM	Auto Driver	40 %	83	0.44	37	21	16
	Auto Passenger	15 %	31	0.44	14	8	6
	Transit	33 %	68	0.47	32	19	13
	Active	12 %	25	0.5	13	8	5
	Total			207		96	56

The proposed development will generate 36 vehicle trips in the AM peak hour and 37 vehicle trips in the PM peak hour since we assume that the “auto passenger” mode are passengers to the “auto driver” mode.

3.1.2 Trip distribution

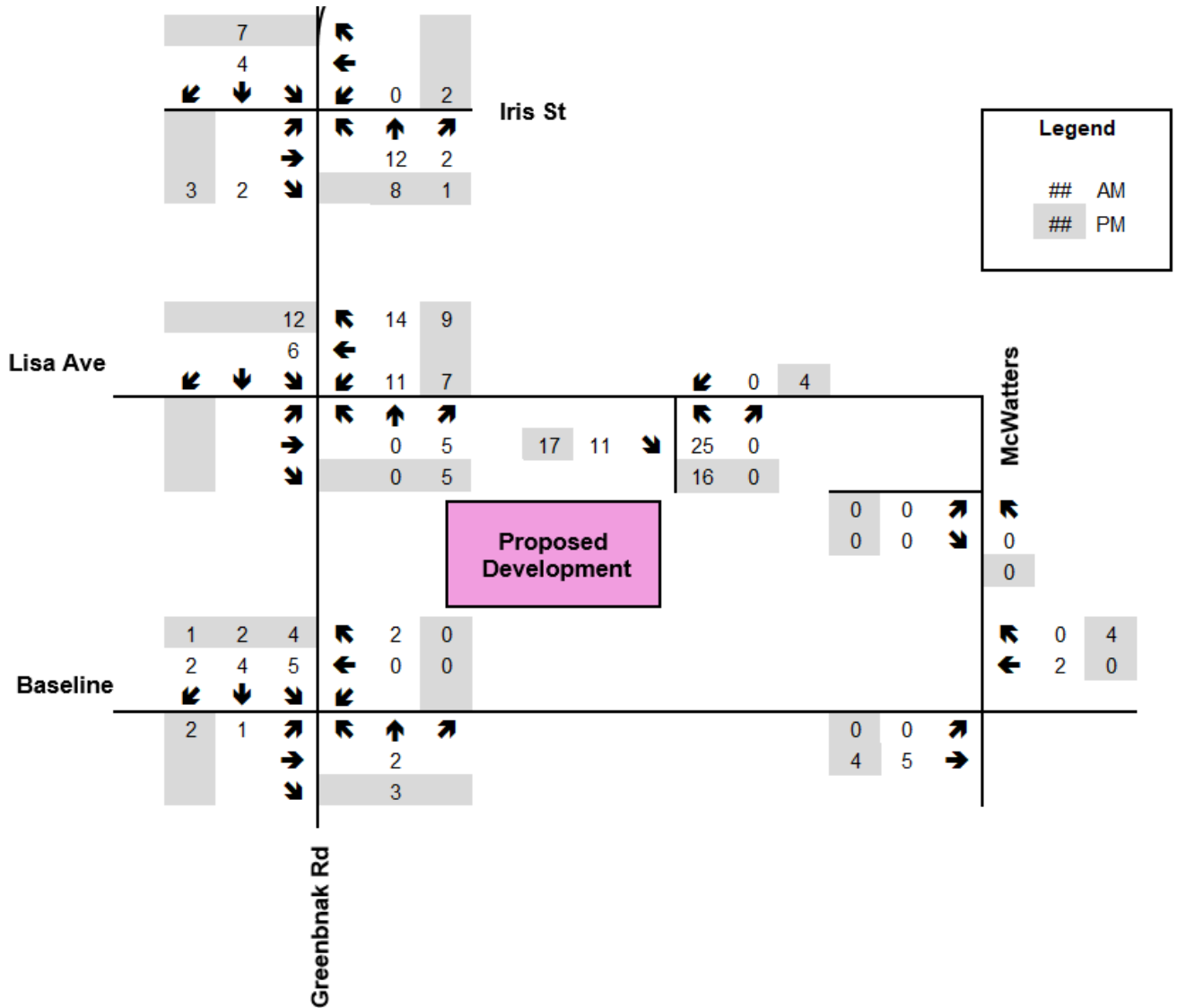
The trip distribution was completed using the existing travel patterns in the study area. Hence, the trip distribution is as follow for vehicles exiting the development in the AM peak hour. We assume the same proportions in the opposite direction for the PM peak hour.

- To the north using Greenbank Road towards Highway 417: 56%
- To the south using Greenbank Road: 16%
- To the west using Baseline Road: 8%
- To the east using Baseline Road: 20%

3.1.3 Trip assignment

Using the distribution above and the existing turning movement splits, the trips generated were assigned to the road network. Although there are accesses to the development on both Lisa Avenue and McWatters Road, no traffic has been assigned to the McWatters Road access, because it does not provide a logical path for drivers. The underground parking access to the proposed building is located near the Lisa Avenue access and drivers using the McWatters Road access would have to drive through the parking area in a convoluted pattern at slow speed and complete a 180° turn to enter the parking garage. In addition, at McWatters Road/Baseline Road, a southbound right-turn only movement is permitted and therefore all exiting traffic must travel through the intersection of Greenbank Road/ Baseline Road, which has long delays. Drivers using the Lisa Avenue access travel through the intersection of Lisa Avenue/ Greenbank Road where the intersection operates with minimal delay. Figure 11 shows the new trips assigned on the road network.

Figure 11 – Development New Trips Assignment



3.2 Background Network Traffic

3.2.1 Changes to the Background Transportation Network

The transportation network plans were discussed in the Scoping Report. No changes are planned on the road network.

3.2.2 General Background Growth Rates

The background growth rates were calculated using data from the TRANS Regional Model. GHD was provided snapshots for horizons 2011 and 2031. From the volumes estimated for both horizons, the growth was calculated on each road within the study area on a yearly basis. These annual growth rates were then used to expand the traffic counts, from the year they were completed to the forecasted horizons 2025 and 2031. The annual growth rates are the following:

- 0.5% on Greenbank Road;
- 0.1% on Baseline Road;
- 0.6% on Iris Street;

- 0.1% on Highway 417 Ramps;
- 1.5% on Lisa Street, east of Greenbank Road and 0.1% on Lisa Street, west of Greenbank Road.

Figure 12 and Figure 13 show the projected background volumes for 2025 and 2030.

Figure 12 – 2025 Background Volumes

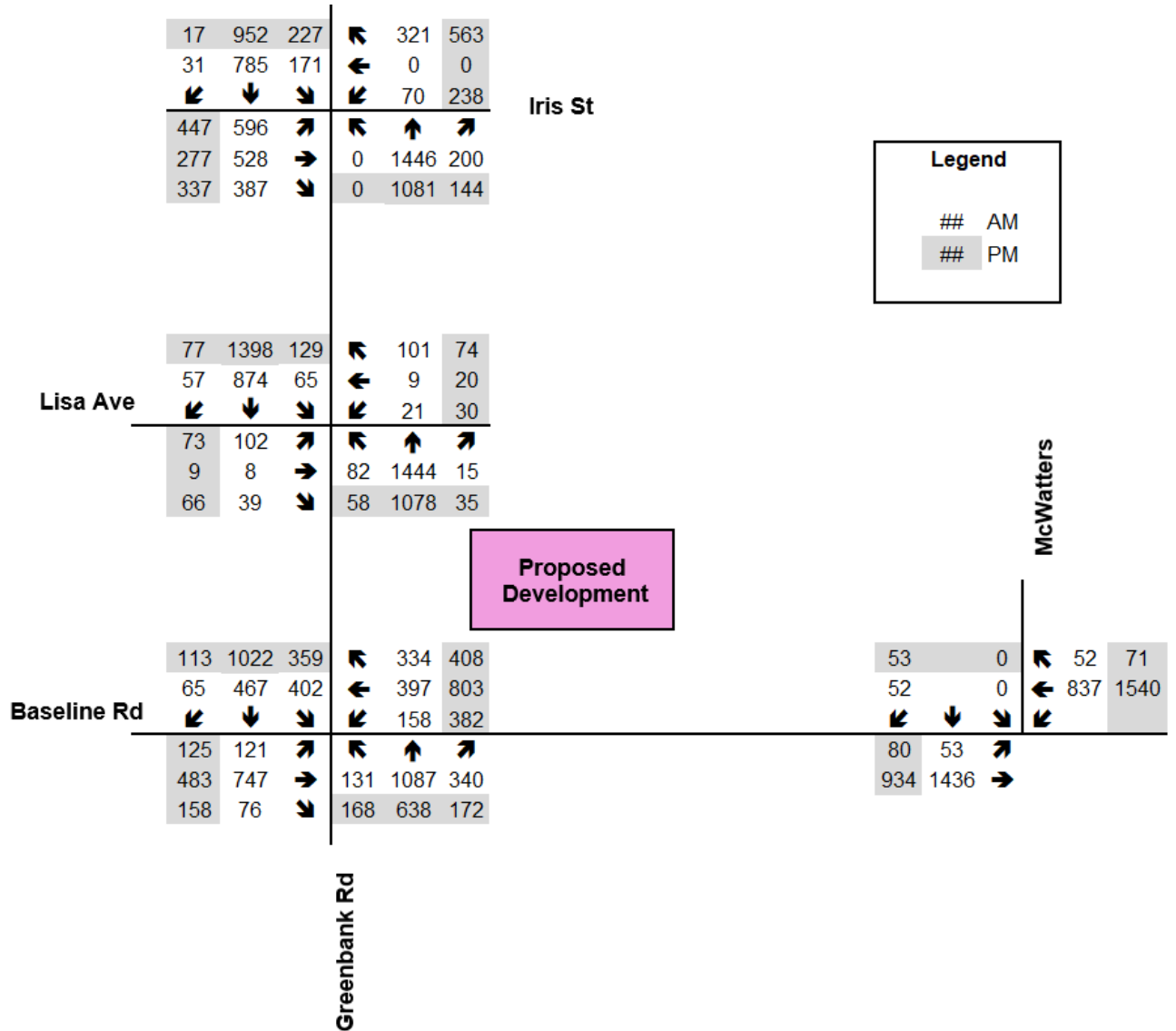
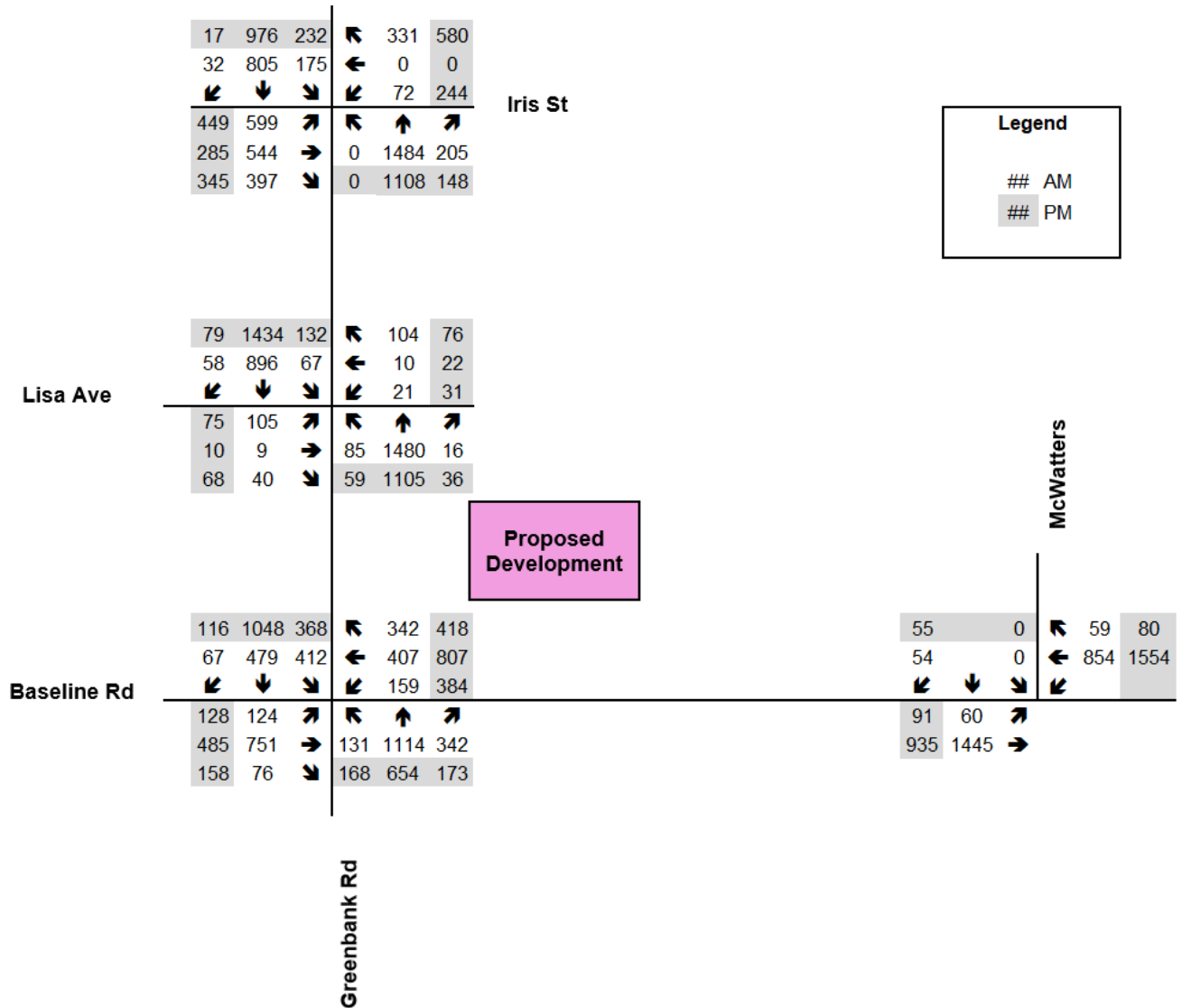


Figure 13 – 2030 Background Volumes



3.2.3 Other Area Development

At the time the study was prepared, there were no other planned developments within the study area.

3.3 Demand Rationalization

The trip generation is consistent with the procedure set by the City of Ottawa and since the traffic generated by the project is low, no adjustments are required.

Due to the low volume of traffic generated by the development, we reviewed the intersections that would be impacted by the new trips. There are 12 intersections with arterial roads that are within 1 km from the proposed development, as measured along roadways. However, it was found that there were only a few intersections that were impacted by the development. After calculating the trip distribution, few vehicles are expected to travel

through the majority of the intersections within the 1 km distance. A comparison of the existing total traffic volumes entering each intersection during the PM peak hour and the new trips entering each intersection is shown in Table 8.

Table 8 – Intersections Minimally Impacted by Development

Intersection	Existing intersection volumes (PM)	Maximum new vehicles at intersection
Pinecrest Rd / Queensview Dr	2470	Maximum 5 vehicles travel southbound through the intersection
Hwy 417 E-NS Off-Ramp / Pinecrest Rd & Greenbank Rd	3020	Maximum 7 vehicles travel through the intersection
Greenbank Rd / Morrison Dr	1420	Maximum 12 vehicles travel southbound through the intersection
Greenbank Rd / Baseline Rd	4740	Maximum 8 vehicles southbound split between through, right-turn and left-turn directions
Greenbank Rd / Monterey Rd	1480	Maximum 6 vehicles southbound on Greenbank Road
Greenbank Rd / Meadowbank Rd	2100	Maximum 6 vehicles southbound on Greenbank Road
Baseline Rd / Cornell St	1840	Maximum 5 vehicles travel through intersection on Baseline Road
Baseline Rd / Guthrie St	1840	Maximum 5 vehicles travel through intersection on Baseline Road
Baseline Rd / Morrison Dr	1840	Maximum 5 vehicles travel through intersection on Baseline Road
Baseline Rd / McWatters Rd	2540	Maximum 6 vehicles travel through intersection; only possible movement related to development is the southbound or eastbound right turn

The intersections that will be directly impacted by the development are identified in the table below. The primary access to the apartment building will be Lisa Avenue, which means most vehicles exiting and entering the building will travel through the intersection of Lisa Avenue / Greenbank Road because Greenbank Rd gives access to Highway 417.

Table 9 – Impacted Intersections Within the Study Area

Intersection	Description
Greenbank Rd / Iris St & Hwy 417 W-NS Off-Ramp	Additional 20 vehicles travel through intersection at peak hour
Lisa Ave / Greenbank Rd	Adjacent to development
McWatters Rd / Baseline Rd	Within 150m of the development access
Greenbank Rd / Baseline Rd	Within 350m of the development access

Despite existing capacity and delay issues at some study intersections, various City projects are planned or underway in the study area to mitigate traffic issues. The LRT line is to be extended west and an LRT station is to be constructed at Pinecrest Road. According to OC Transpo website, the O-Train Confederation Line is planned to have a capacity of 10,700 passengers per hour in each direction, during peak hours with a potential growth to 18,000 passenger per hour in each direction by 2031 and eventually reaching a maximum capacity of 24,000 passengers per hour in each direction. As part of the LRT work, an intersection improvement study was

completed by the City at Iris Street/Greenbank Road and some of the improvements proposed include a bi-directional bicycle track on Greenbank Road to connect to other active transportation facilities on Iris Street and north of the Highway 417 interchange. In addition, the Baseline BRT is planned as part of the TMP affordable network. A previous study completed for a development in the same area (1357 Baseline Road Transportation Impact Assessment) indicated that the transit modal share is expected to increase by 20% for the high-rise development in that study after the implementation of the Baseline BRT. We assume the same shift in modal share for this development. With the LRT, BRT and active transportation projects in the study area, it can be reasonably assumed that the City is addressing the existing traffic operational problems by investing in transit and active transportation. Therefore, the background traffic is expected to be reduced by at least 20% and the traffic issues presented in the existing conditions and in future conditions will be sufficiently addressed.

Figure 14 and Figure 15 show the total projected volumes, including the background traffic and development generated trips, for 2025 and 2030.

Figure 14 – 2025 Total Volumes (Background Plus Development New Trips)

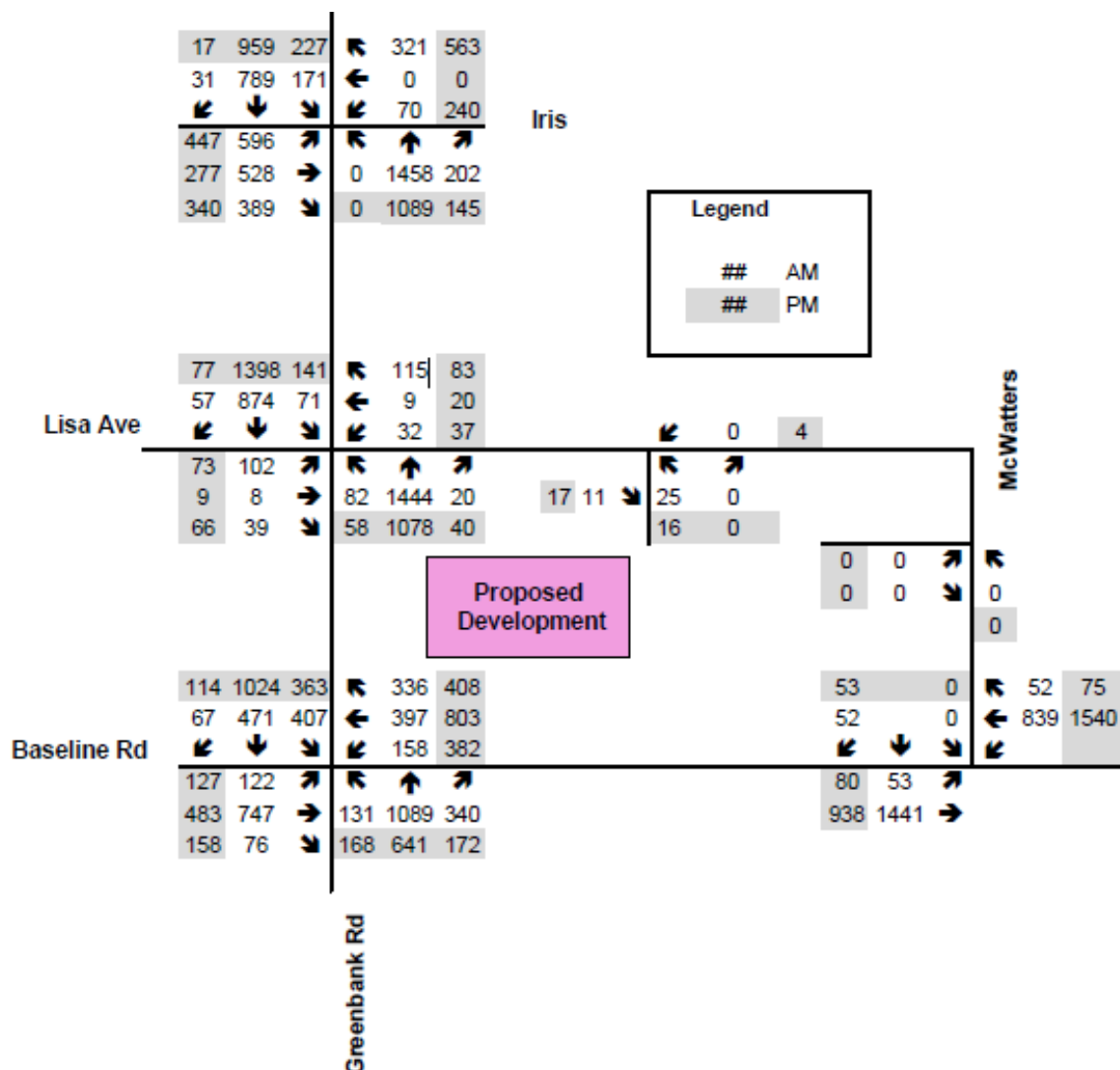
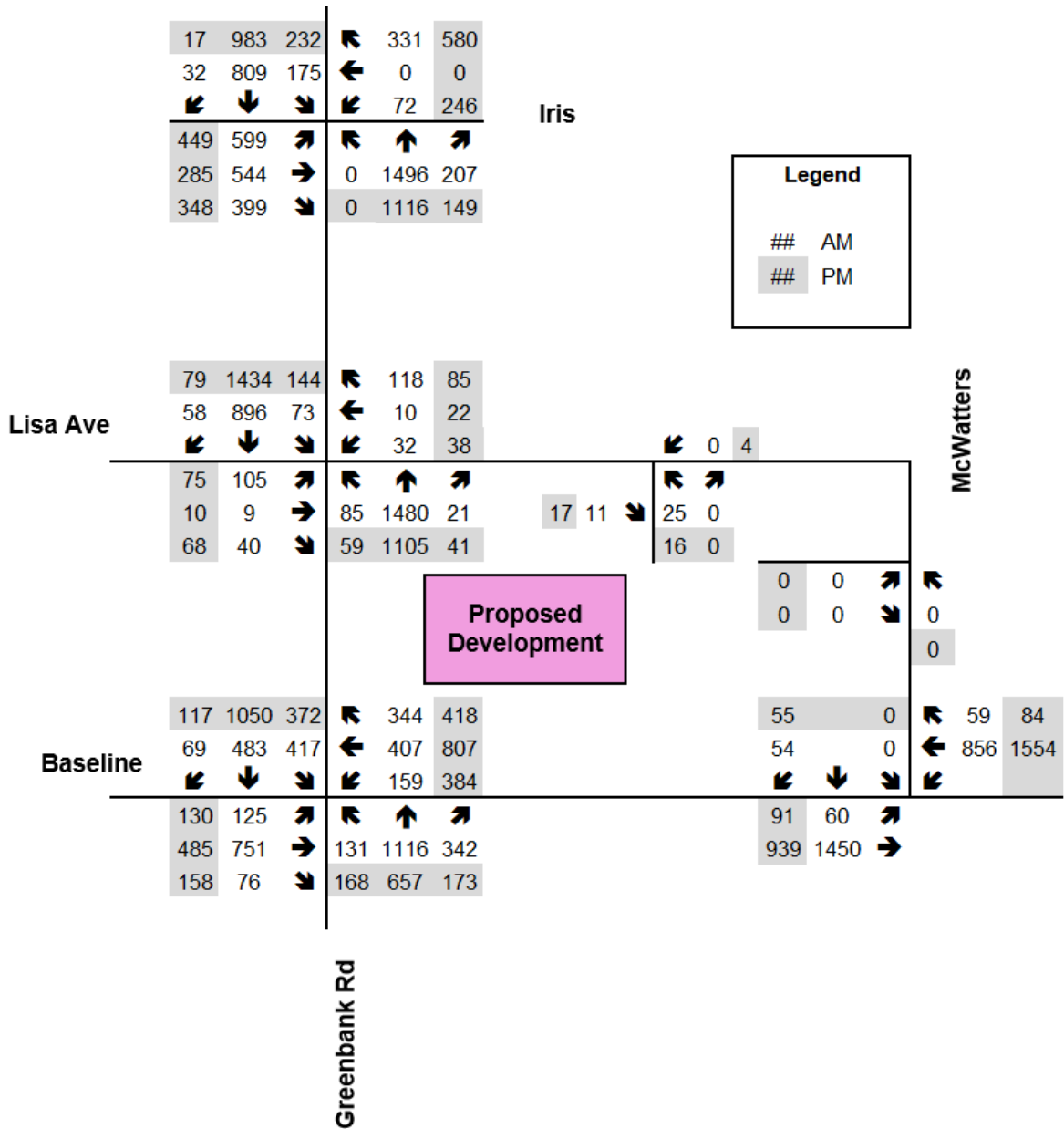


Figure 15 –2030 Total Volumes (Background Plus Development New Trips)



4. Strategy

4.1 Development Design

4.1.1 Design for Sustainable Modes

In addition to current pedestrian connections to the existing buildings from Lisa Avenue and McWatters Road, four additional pedestrian pathways to the proposed residential development will be constructed. Of these, there will be three pedestrian connections to Greenbank Road, including a street entrance providing a direct access to the west side of the building, and one access from Lisa Avenue. A pedestrian connection to the commercial development to the south would be beneficial, but because it is private property, a connection to Greenbank Road to the south of the proposed building has been provided.

Bicycle parking will be provided in the underground level.

OC Transpo bus service exists in the boundary streets. There are eight bus stops near the building street entrance. The bus stops on Greenbank are located 124 m north and 150 m south from the street entrance for northbound service and 135 m north and 265 m south for southbound service. The bus stops on Lisa Avenue are located 174 m northwest from the street entrance for eastbound service and 195 m northwest from the street entrance for westbound service. The bus stop on Baseline Road are located 275 m southeast from the street entrance for eastbound service and 340 m southwest for southbound service.

4.1.2 Circulation and Access

Service vehicles to the site would consist of small delivery trucks and garbage trucks. Both vehicles are able to enter, circulate and exit the site without a problem. The loading area is at the residential entrance (east side) of the building. Considering that in front this entrance two lanes are accessible on each side of the traffic island, delivery trucks can load and unload without impeding traffic flow. Another possible loading area is at the circle next to the parking lot south of the proposed building. The proposed development will offer access from Lisa Avenue and McWatters Road. However, the McWatters Road access will less likely be used due to the directional flow of traffic around the median island at the front entrance and the need for delivery vehicles to perform a 180 degree turn around the median island to be able to park and unload adjacent to the building. It is therefore expected that Lisa Avenue will be the main access.

Road design has taken into consideration the fire route as shown in Figure 10.

4.1.3 New Street Networks

Module 4.1.3 is exempt because this development is not a subdivision.

4.2 Parking

4.2.1 Parking supply

The Site Plan provides two outdoor parking lots and a 2-level underground parking garage with for a total of 266 new parking spaces of which 222 spaces are reserved for residents and 44 spaces are provided for visitors. The site meets the City of Ottawa Zoning By-law which requires a minimum of 155 parking spaces (111 for residents and 44 for visitors).

The proposed development provides 141 bicycle parking in the underground parking level. The site meets the City of Ottawa Zoning By-law which requires a minimum of 117.

4.2.2 Spillover Parking

Module 4.2.2 is exempt because the parking supply meets the demand.

4.3 Boundary Streets

The boundary roads to the site consist of the existing streets of Greenbank Road, Lisa Avenue, McWatters Road and Baseline Road. All boundary streets provide a 1.5 m sidewalk along both sides of the road, which is a substandard width. The intersections of Lisa/Greenbank and Baseline/Greenbank are both controlled by traffic signals with pedestrian cross walks and pedestrian signal heads and the intersections of Lisa/McWatters and Baseline/McWatters are stop controlled intersections. OC Transpo bus service and bus stops are in close proximity to the site and would be sufficient to accommodate the proposed development.

Collision data was received from the Transportation Data Collection & Analytics Group within the Transportation Services Division at the City of Ottawa. Additional collision data was accessed through the City of Ottawa's Open Data Portal. The reviewed data spans the most-recent, complete five-year period from 2015 to 2019. In total, 171 collisions occurred at the intersections of Greenbank Road / Lisa Avenue, Greenbank Road / Baseline Road, McWatters Road / Lisa Avenue and McWatters Road / Baseline Road and the roadway segments between these intersections. The locations of the collisions are illustrated in Figure 9 and the collision data has been provided in Appendix D.

The data determined a pattern of rear end collisions being the most prominent form of collision which would be mainly attributed to a high volume of traffic along Greenbank Road and Baseline Road.

The boundary streets provide the elements that meet the objectives of the Multi-Modal Level of Service (MMLOS). The MMLOS summary for the network segments is shown in Table 10. A detailed calculation sheet for the segment MMLOS is provided in Appendix G.

Table 10 – Segment MMLOS Results

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
Greenbank Rd. between Baseline Rd and Lisa Ave.	E	A	E	C	D	D	A	D
	✗		✗		✓		✓	
Baseline Rd. between Greenbank Rd. & McWatters Rd.	E	A	E	C	E	D	A	D
	✗		✗		✗		✓	
McWatters Rd. between Baseline Rd. & Lisa Ave.	D	A	B	B	N/A	D	B	D
	✗		✓		-		✓	
Lisa Ave. between McWatters Rd. & Greenbank Rd.	C	A	B	B	N/A	D	B	D
	✗		✓		-		✓	

The pedestrian level of service target is not met at any of the studied segments due to the sidewalk width and operating speed. The bicycle level of service is not met at Greenbank Road and Baseline Road because of the posted speed of 60 km/h and the multi-lane roadway that cyclists need to cross. The transit level of service was only assessed at the Greenbank Road and Baseline Road segment because the MMLOS guidelines indicate that the TLOS is intended to be applied along rapid transit corridors or corridors with transit priority measures. Although only the Baseline Road corridor is expected to have transit priority measures prior to 2031, Greenbank Road was included in the review and the target is met for Greenbank Road. The Transit LOS is not met at Baseline Road Segment due to the moderate driveway friction. The truck level of service is met on all the segments.

There are few recommendations that could improve the MMLOS results. To improve the pedestrian LOS, as part of a future road reconstruction project, the sidewalks could be widened to 2.0 m instead of the existing 1.5 m, which is sub-standard. As per the city of Ottawa Cycling Plan, Greenbank Road will have a spine route as part of the Ultimate Cycling Network. When the spine route is constructed, it is recommended to add left-turn bike boxes on the spine route, which will improve the bicycle LOS.

4.4 Access Intersections

4.4.1 Location and Design of Access

The site contains two accesses. The Lisa Avenue access is the main access to the development and will be shared with the existing facilities. It is located 66 m from Greenbank/Lisa intersection and 43 m from McWatters/Lisa intersection. The secondary access, McWatters Road entrance, is located 83 m from McWatters/Lisa intersection and 139 m from McWatters/Baseline intersection.

These accesses are reconstruction of the existing driveways that are approximately in the same location. The accesses are functioning adequately in the current situation, have no safety concerns and are consistent with

the City's Access Management Guidelines in current conditions, therefore are also acceptable for future conditions.

4.4.2 Intersection control

The accesses are currently operated with a stop sign at the exit approach and are operating adequately and are expected to continue operating adequately for future conditions.

4.4.3 Intersection design

Please refer to section 4.9

4.5 Transportation Demand Management

4.5.1 Context for TDM

The mode share used within the TIA represent the travel trends for this area of the City with auto and transit being the most important modes. Parking is planned in the development for the residents.

The development is not located within a Design Priority Area or a Transit-oriented Development zone. Homestead Land Holdings will be the property owner and property manager of the apartment building.

A total of 234 units are projected and there are no age restrictions. The total number of bedrooms will be 373.

4.5.2 Need and Opportunity

The auto and transit modes will be the main modes of travel for the development but given the size of the project, the volumes generated are low. To encourage active travel, there are 128 parking spaces planned for bicycles, which is more than the number required by the zoning.

4.5.3 TDM Program

The TDM Measures Checklist was completed and can be found in Appendix E. The key TDM measures for this development are to display local area maps with walking/cycling access routes and key destinations at major entrances, to also display relevant transit schedules and route maps at entrance and unbundle parking cost from monthly rent. Other measures to be put in place are:

- Bike parking locations in proximity to the entrances and that are easily accessible and connected to the surrounding network
- Connectivity for pedestrians to the adjacent network

4.6 Neighbourhood Traffic Management

This section is intentionally left blank as this module is exempt from the present study as agreed to with the City.

4.7 Transit

The expected transit volumes from the development are low with less than 40 new trips during peak hours.

According to the Transportation Master Plan Affordable Network, different measures are to be put in place in the vicinity of the project to increase the transit modal share. An LRT station is planned less than a kilometer from the site and Baseline Road is to become a transit priority corridor with the addition of transit signal priority and queue jump lanes.

According to OC Transpo website, the O-Train Confederation Line is planned to have a capacity of 10,700 passengers per hour in each direction, during peak hours with a potential growth to 18,000 passenger per hour in each direction by 2031 and eventually reaching a maximum capacity of 24,000 passengers per hour in each

direction. There are 0 passengers on the LRT currently, therefore the 40 transit trips anticipated from this development should not negatively impact the 10,700 available capacity on the LRT.

Given that there are currently 5 bus routes in the area surrounding the development and that new transit infrastructure will be put in place to improve transit in the area, the addition of 40 new trips in the transit system at peak hours should not be an issue. The current average load on the buses in the vicinity of the development during the AM and PM peak hour are between 6 passengers and 33 passengers. The standard OC Transpo bus has a capacity of 68 passengers according to the OC Transpo website. Therefore, even if 88% of all expected transit passengers boarded a single bus in the peak hour, the transit passengers from this development would be accommodated.

4.8 Review of Network Concept

This section is intentionally left blank as this module is exempt from the present study.

4.9 Intersection Design

4.9.1 Existing Intersection Operations

On Greenbank Road, the intersections at Lisa Avenue and at Baseline Road are coordinated. During the AM peak, they operate with a special phasing plan with a 140 second cycle length to maximize throughput. During PM peak, the signals operate with a 110 second cycle length. The intersection of Greenbank Rd / Iris St / Highway 417 operates with a 130 second cycle length during both AM and PM peak and is therefore not synchronized with the other intersections to the south. The level of service (LOS) is based on the volume to capacity ratio (v/c) according to the guidelines from the City’s Multimodal level of Service (MMLOS) Guide, as shown in Table 11. The results of the operational analysis at each intersection during AM and PM peak hours are shown in Table 12. The detailed performance results are provided in Appendix F.

Table 11 – Level of Service

Level of Service	Volume to Capacity Ratio
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	>1.00

Table 12 – Existing Intersection Operations

Intersection	Movement	AM		PM	
		V/C	LOS	V/C	LOS
Greenbank Rd & Baseline Rd (signalized)	EBL	0.96	E	0.83	D
	EBT	0.93	E	0.84	D
	EBR	0.93	E	0.84	D
	WBL	0.79	C	1.14	F
	WBT	0.46	A	0.97	E
	NBL	0.78	C	1.15	F
	NBT	1.02	F	0.67	B
	SBL	1.20	F	1.24	F
	SBT	0.44	A	1.07	F

	Overall	1.00	E	1.02	F
Greenbank Rd & Lisa Ave (signalized)	EBL/T/R	0.62	B	0.23	A
	WBL/T/R	0.52	A	0.30	A
	NBL	0.21	A	0.36	A
	NBT	0.60	A	0.56	A
	NBR	0.60	A	0.56	A
	SBL	0.30	A	0.52	A
	SBT	0.37	A	0.71	C
	SBR	0.06	A	0.09	A
	Overall	0.58	A	0.64	B
Greenbank Rd & Iris St & Highway 417 Ramp (signalized)	EBL	0.45	A	0.41	A
	EBT	0.90	D	0.82	D
	WBL	0.65	B	0.82	D
	NBT	0.94	E	0.60	C
	NBR	0.43	A	0.26	A
	SBL	1.36	F	1.17	F
	SBT	0.57	A	0.58	A
	Overall	0.91	E	0.74	C
Baseline Rd & McWatters Rd (unsignalized)	EBL	0.07	A	0.07	A
	SBR	0.10	A	0.10	A
	Overall		A		A

Note: saturation flow rate of 1800 veh/h/lane and PHF of 0.90

Most intersections within the study area show good overall performance with LOS 'A' to 'D', although there are a few movements that are close to or at capacity. A v/c ratio over 1.0 is not possible since the traffic volumes that travel through an intersection during the peak hour indicate that the volume capacity is at or above the number of vehicles counted. Therefore, the suggested saturation flow rate and PHF do not match the actual conditions. Using a saturation flow rate of 2000 veh/h/lane and a PHF of 1.0 provides a more realistic situation at the intersections. The results of the analysis indicate that:

- At Greenbank Road / Baseline Road, the eastbound movements southbound left movement and are close to capacity. Furthermore, northbound through and southbound left have high demand and are conflicting movements.
- At Greenbank Road / Iris Street / Highway 417 Ramp, the southbound left and the northbound through are the most critical movements.

4.9.2 Network Intersection MMLoS

Table 13 summarizes the MMLoS analysis for the network intersections. The MMLoS detailed worksheet is presented in Appendix G.

Table 13 – Network Intersection MMLoS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Greenbank Road & Baseline Road	F	A	F	C	B	D	B	D	E	E
	✗		✗		✓		✓		✓	
Greenbank Road & Lisa Avenue	F	A	F	B	N/A	D	E	D	A	E
	✗		✗		-		✗		✓	

Greenbank Road & Iris Street & Highway 417 Ramp	F	A	F	B	N/A	D	B	D	C	E
	✘		✘		-		✔		✔	

The pedestrian level of service target is not met at any of the studied intersections as there are many lanes for pedestrians to cross at the Greenbank Road intersections. The bicycle level of service is not met at any of the studied intersections in the study area because the presence of many lanes for cyclists to cross with a posted speed of 50 km/h, or the presence of either a long right-turning lanes or dual right-turn lanes. The truck level of service is met at the two intersections with truck routes. The truck level of service is not met for approaches with local streets that are not truck routes. The auto level of service is met at all the intersections. The transit level of service was not assessed except at the Greenbank Road & Baseline Road intersection because the MMLOS guidelines indicate that the TLOS is intended to be applied along rapid transit corridors or corridors with transit priority measures, and only the Baseline Road corridor is expected to have transit priority measures prior to 2031.

4.9.3 Future Intersection Operations - 2025

The results of the operational analysis at each intersection during AM and PM peak hours are shown in Table 14. The detailed results are provided in Appendix H.

Table 14 – 2025 Intersection Operations

Intersection	Movement	Background Traffic				Total Traffic			
		AM		PM		AM		PM	
		V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Greenbank Rd & Baseline Rd (signalized)	EBL	0.83	D	0.80	C	0.84	D	0.80	C
	EBT	0.88	D	0.75	C	0.88	D	0.75	C
	EBR	0.89	D	0.75	C	0.89	D	0.75	C
	WBL	0.75	C	0.93	E	0.75	C	0.93	E
	WBT	0.47	A	0.82	D	0.47	A	0.83	D
	NBL	0.63	B	0.93	E	0.63	B	0.93	E
	NBT	0.74	C	0.52	A	0.74	C	0.53	A
	SBL	1.01	F	1.03	F	1.02	F	1.05	F
	SBT	0.32	A	0.83	D	0.32	A	0.83	D
	Overall	0.83	D	0.83	D	0.83	D	0.84	D
Greenbank Rd & Lisa Ave (signalized)	EBL/T/R	0.59	A	0.20	A	0.59	A	0.19	A
	WBL/T/R	0.52	A	0.26	A	0.58	A	0.29	A
	NBL	0.17	A	0.27	A	0.16	A	0.26	A
	NBT	0.48	A	0.46	A	0.49	A	0.47	A
	NBR	0.48	A	0.46	A	0.49	A	0.47	A
	SBL	0.23	A	0.42	A	0.23	B	0.43	A
	SBT	0.30	A	0.59	A	0.30	A	0.59	B
	SBR	0.05	A	0.08	A	0.05	A	0.08	A
	Overall	0.475	A	0.53	A	0.48	A	0.53	A
Greenbank Rd & Iris St & Highway 417 Ramp (signalized)	EBL	0.40	A	0.38	A	0.40	A	0.38	A
	EBT	0.84	D	0.78	C	0.84	D	0.78	C
	WBL	0.58	A	0.78	C	0.58	A	0.78	C
	NBT	0.70	B	0.46	A	0.71	C	0.46	A
	NBR	0.32	A	0.20	A	0.32	A	0.20	A
	SBL	1.01	F	0.97	E	1.01	F	0.97	E
	SBT	0.45	A	0.45	A	0.45	A	0.45	A
	Overall	0.72	C	0.48	A	0.72	C	0.48	A
Baseline Rd & McWatters Rd (unsignalized)	EBL	0.07	A	0.20	A	0.07	A	0.20	A
	SBR	0.09	A	0.16	A	0.09	A	0.16	A
	Overall		A		A		A		A

Note: saturation flow rate of 2000 veh/h/lane and PHF of 1.00

The 2025 intersection operations are expected to operate adequately and similar to existing conditions. Traffic operation results for the background and total traffic is similar due to the low number of development generated trips.

4.9.4 Future Intersection Operations- 2030

The results of the operational analysis at each intersection during AM and PM peak hours are shown in Table 15. The detailed results are provided in Appendix I.

Table 15 – 2030 Intersection Operations

Intersection	Movement	Background Traffic				Total Traffic			
		AM		PM		AM		PM	
		V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Greenbank Rd & Baseline Rd (signalized)	EBL	0.84	D	0.80	C	0.84	D	0.80	C
	EBT	0.89	D	0.75	C	0.89	D	0.75	C
	EBR	0.89	D	0.76	C	0.89	D	0.76	C
	WBL	0.75	C	0.94	E	0.75	C	0.94	E
	WBT	0.48	A	0.83	D	0.48	A	0.83	D
	NBL	0.63	B	0.93	E	0.63	B	0.93	E
	NBT	0.76	C	0.54	A	0.76	C	0.54	A
	SBL	1.03	F	1.06	F	1.04	F	1.07	F
	SBT	0.33	A	0.85	D	0.33	A	0.86	E
	Overall	0.85	D	0.85	D	0.85	D	0.85	D
Greenbank Rd & Lisa Ave (signalized)	EBL/T/R	0.59	A	0.19	A	0.60	A	0.20	A
	WBL/T/R	0.52	A	0.27	A	0.58	A	0.30	A
	NBL	0.16	A	0.27	A	0.17	A	0.27	A
	NBT	0.50	A	0.48	A	0.50	A	0.48	A
	NBR	0.50	A	0.48	A	0.50	A	0.48	A
	SBL	0.22	A	0.41	A	0.25	A	0.45	A
	SBT	0.31	A	0.61	B	0.31	A	0.61	B
	SBR	0.05	A	0.08	A	0.05	A	0.08	A
	Overall	0.55	A	0.55	A	0.49	A	0.55	A
Greenbank Rd & Iris St & Highway 417 Ramp (signalized)	EBL	0.40	A	0.37	A	0.40	A	0.37	A
	EBT	0.85	D	0.78	C	0.85	D	0.78	C
	WBL	0.59	A	0.78	C	0.59	A	0.78	C
	NBT	0.74	C	0.47	A	0.74	C	0.48	A
	NBR	0.34	A	0.21	A	0.34	A	0.21	A
	SBL	1.04	F	0.99	E	1.04	F	0.95	E
	SBT	0.46	A	0.46	A	0.46	A	0.47	A
	Overall	0.64	B	0.49	A	0.75	C	0.49	A
Baseline Rd & McWatters Rd (unsignalized)	EBL	0.08	A	0.23	A	0.08	A	0.23	A
	SBR	0.10	A	0.17	A	0.10	A	0.17	A
	Overall		A		A		A		A

Note: saturation flow rate of 2000 veh/h/lane and PHF of 1.00

The 2030 intersection operations are similar to the 2025 conditions. Thus, traffic will operate adequately even with the impacts of the development. Traffic operation results for the background and total traffic is similar due to the low number of development generated trips. It is expected that the transit projects in the area, the LRT and BRT, will shift the travel mode to transit and hence the traffic operations will improve by 2030.

4.10 Summary of Improvements Indicated and Modification Options

The following summarizes the analysis and the results presented in this TIA report:

Proposed site and screening

- Located in the south-east corner of Greenbank Road / Lisa Avenue intersection
- Residential development with 235 units and 260 underground parking spaces
- Construction planned to start in 2022 and be completed by the end of 2024
- A connection is planned to the sidewalk on Greenbank Road
- Site well served by transit and at less than a kilometer from the future LRT Pinecrest Station

Forecasting

- Development will generate 96 new person trips during the AM and PM peak hours
- 36 new vehicle trips during AM peak hour and 37 during PM peak hour
- New vehicle trips will mostly be heading northbound on Greenbank Road
- Yearly background rates were calculated on each road using TRANS model outputs. Annual growth rates are below 1% for all arterial and collector roads

Strategy

- Managers of the development will unbundle parking costs from monthly rent
- Bike parking spaces are planned for the site and will be easily accessible
- The development generates less than 40 transit trips at peak hour which should not cause issues with the existing transit system (5 bus routes in the area) or planned transit system
- The intersection of Baseline Road / Greenbank Road is the most critical in the study area. However, the development is adding less than 5 trips at this intersection and does not create additional issues
- The operations of the intersections within the study area remain similar between the existing and projected conditions (2025 and 2030). No mitigation is required.

All of Which is Respectfully Submitted,

GHD

Vanessa Skelton, P.Eng.

Appendices

Appendix A

Screening Form



Certification Form for TIA Study PM

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

- I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
- I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
- I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
- I am either a licensed¹ or registered² professional in good standing, whose field of expertise
 - is either transportation engineering
 - or transportation planning .

^{1,2} License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

Dated at this day of , 20 .

(City)

Name :

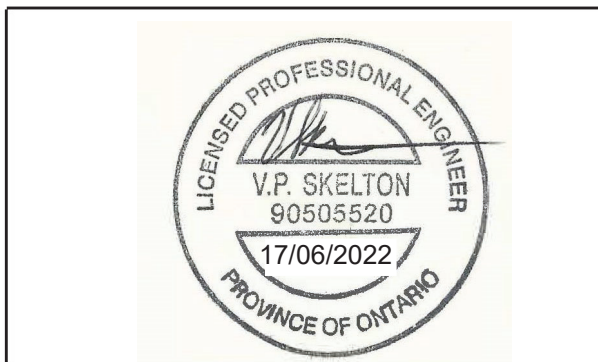
Professional title:



Signature of individual certifier that s/he meets the above criteria

Office Contact Information (Please Print)	
Address:	<input type="text" value="179 Colonnade Road South Suite 400"/>
City / Postal Code:	<input type="text" value="K2E 7J4"/>
Telephone / Extension:	<input type="text" value="+1 613 288-1727"/>
E-Mail Address:	<input type="text" value="Vanessa.Skelton@ghd.com"/>

Stamp



City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	1300 McWatters Road Ottawa, Ontario
Description of Location	Located on the corner of Lisa Avenue & Greenbank Road
Land Use Classification	Ground Floor Amenities and Apartments
Development Size (units)	235
Development Size (m ²)	Ground floor: 1484 square meters
Number of Accesses and Locations	Two accesses for underground parking through McWatters & Lisa Av
Phase of Development	Single
Buildout Year	2022

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m ²
Industrial	5,000 m ²
Fast-food restaurant or coffee shop	100 m ²
Destination retail	1,000 m ²
Gas station or convenience market	75 m ²

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City’s Transit Priority, Rapid Transit or Spine Bicycle Networks?		X
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		X

*DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).

If any of the above questions were answered with ‘Yes,’ the Location Trigger is satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		X
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		X
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	X	
Is the proposed driveway within auxiliary lanes of an intersection?		X
Does the proposed driveway make use of an existing median break that serves an existing site?		X
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		X

If any of the above questions were answered with ‘Yes,’ the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?	X	
Does the development satisfy the Location Trigger?		X
Does the development satisfy the Safety Trigger?	X	

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

Appendix B

Bus Schedules

Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Tue, Jun 29

58 Moodie

LINCOLN FIELDS 3A	IRIS / PINECREST MALL	MORRISON / DRAPER	BAYSHORE 4A	HYENA / CARLING CAMPUS	MOODIE C	FITZGERALD / AD. 16
			06:14	06:30	06:34	
06:37	06:43	06:47	06:54	07:10	07:14	
07:07	07:13	07:17	07:24	07:40	07:44	
07:37	07:43	07:48	07:56	08:11	08:16	
08:08	08:14	08:18	08:26	08:42	08:46	
08:38	08:44	08:48	08:56	09:12	09:16	
09:07	09:13	09:17	09:24	09:40	09:44	
09:37	09:43	09:47	09:54	10:10	10:14	
10:07	10:13	10:17	10:24	10:40	10:44	
10:33	10:39	10:43	10:50	11:06	11:10	11:16
10:59	11:05	11:09	11:16	11:32	11:36	11:42
11:29	11:35	11:39	11:46	12:02	12:06	12:12
11:58	12:04	12:08	12:15	12:31	12:35	
12:28	12:34	12:38	12:45	13:01	13:05	
12:58	13:04	13:08	13:15	13:31	13:35	
13:28	13:34	13:38	13:45	14:01	14:05	
13:58	14:04	14:08	14:15	14:31	14:35	
14:28	14:34	14:38	14:45	15:02	15:06	
14:58	15:04	15:08	15:16	15:33	15:37	
15:29	15:35	15:39	15:47	16:04	16:08	
15:43	15:49	15:54	16:02			
15:58	16:04	16:09	16:17	16:33	16:38	
16:27	16:33	16:38	16:46	17:02	17:07	
16:57	17:03	17:08	17:16	17:32	17:37	
17:29	17:35	17:39	17:47	18:04	18:08	
17:57	18:03	18:07	18:15	18:32	18:36	
18:31	18:37	18:41	18:48	19:03	19:07	
19:01	19:07	19:11	19:18	19:33	19:37	
19:31	19:37	19:41	19:47	20:02	20:06	
20:00	20:05	20:09	20:15	20:30	20:35	
20:31	20:36	20:40	20:46	21:01	21:06	
21:02	21:07	21:11	21:17	21:31	21:36	
21:32	21:37	21:41	21:47	22:01	22:06	
22:02	22:07	22:11	22:17	22:31	22:36	
22:32	22:37	22:41	22:47	23:01	23:06	

Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Tue, Jun 29

58 Lincoln Fields

MOODIE / FITZGERALD	FITZGERALD / AD. 16	MOODIE E	HYENA / CARLING CAMPUS	WOODRIDGE / BAYSHORE	BAYSHORE 3A	MORRISON / BASELINE	MORRISON / DRAPER	LINCOLN FIELDS 2A
		06:10	06:13	06:23	06:24	06:31	06:31	06:47
		06:40	06:43	06:53	06:54	07:01	07:01	07:19
		07:09	07:12	07:22	07:23	07:30	07:30	07:48
		07:25	07:28	07:38	07:39	07:46	07:46	08:04
					07:54	08:01	08:01	08:19
		07:55	07:58	08:08	08:09	08:16	08:16	08:34
		08:24	08:27	08:37	08:38	08:45	08:45	09:03
		08:53	08:56	09:06	09:07	09:14	09:14	09:32
		09:23	09:26	09:36	09:37	09:43	09:43	10:00
		09:55	09:58	10:08	10:09	10:15	10:15	10:32
		10:25	10:28	10:38	10:39	10:45	10:45	11:02
		10:55	10:58	11:08	11:09	11:15	11:15	11:32
		11:29	11:32	11:42	11:43	11:49	11:49	12:06
11:52	11:56	11:58	12:02	12:12	12:13	12:19	12:19	12:36
12:22	12:26	12:28	12:32	12:42	12:43	12:49	12:49	13:06
12:46	12:50	12:52	12:56	13:05	13:06	13:12	13:12	13:29
		13:16	13:19	13:28	13:29	13:36	13:36	13:53
		13:46	13:49	13:58	13:59	14:06	14:06	14:23
		14:16	14:19	14:28	14:29	14:36	14:36	14:53
		14:46	14:49	14:58	14:59	15:06	15:07	15:25
		15:16	15:19	15:28	15:29	15:36	15:37	15:55
		15:46	15:49	15:58	15:59	16:06	16:07	16:25
		16:17	16:20	16:29	16:30	16:37	16:38	16:56
		16:46	16:49	16:58	16:59	17:06	17:07	17:25
		17:18	17:21	17:30	17:31	17:38	17:39	17:57
		17:47	17:50	17:59	18:00	18:07	18:07	18:23
		18:17	18:20	18:29	18:30	18:37	18:37	18:53
		18:47	18:50	18:59	19:00	19:06	19:06	19:21
		19:17	19:20	19:29	19:30	19:36	19:36	19:51
		19:47	19:50	19:59	20:00	20:06	20:06	20:21
		20:16	20:19	20:28	20:29	20:35	20:35	20:50
		20:45	20:48	20:57	20:58	21:04	21:04	21:19
		21:16	21:19	21:28	21:29	21:35	21:35	21:50
		21:46	21:49	21:57	21:58	22:04	22:04	22:18
		22:16	22:19	22:27	22:28	22:34	22:34	22:48
		23:16	23:19	23:27	23:28	23:34	23:34	23:48

Schedules & Maps

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Tue, Jun 29

82 Lincoln Fields & Tunney's Pasture

[L] Continues to Tunney's Pasture

[S] Ends at Baseline

BAYSHORE 4A	DUMAURIER / PINECREST	PINECREST MALL	GREENBANK / BASELINE	CRAIG HENRY / GREENBANK	MAJESTIC / NEWHAVEN	WOODROFFE / MEDHURST	BASELINE 2B	LINCOLN FIELDS 2A	TUNNEY'S PASTURE C
				04:42[S]	04:48[S]	04:50[S]	04:54[S]		
				05:12[L]	05:18[L]	05:20[L]	05:24[L]	05:30	05:36
05:36[L]	05:40[L]		05:41[L]	05:50[L]	05:56[L]	05:58[L]	06:02[L]	06:08	06:14
06:06[L]	06:10[L]		06:11[L]	06:20[L]	06:26[L]	06:28[L]	06:32[L]	06:38	06:44
06:36[L]	06:40[L]		06:41[L]	06:50[L]	06:56[L]	06:58[L]	07:02[L]	07:08	07:14
07:06[L]	07:11[L]		07:12[L]	07:20[L]	07:27[L]	07:29[L]	07:33[L]	07:39	07:45
07:36[L]	07:41[L]		07:42[L]	07:50[L]	07:57[L]	07:59[L]	08:03[L]	08:10	08:16
08:06[L]	08:11[L]		08:13[L]	08:22[L]	08:29[L]	08:32[L]	08:36[L]	08:42	08:48
08:36[L]	08:41[L]		08:43[L]	08:52[L]	08:59[L]	09:02[L]	09:06[L]	09:12	09:18
09:05	09:10	09:12	09:15	09:24	09:30	09:33	09:37	09:44	
09:31	09:35	09:37	09:40	09:48	09:54	09:57	10:01	10:08	
10:01	10:05	10:07	10:10	10:18	10:24	10:27	10:31	10:38	
10:31	10:35	10:37	10:40	10:48	10:54	10:57	11:01	11:08	
11:01	11:05	11:07	11:10	11:18	11:25	11:28	11:32	11:38	
11:31	11:35	11:37	11:40	11:48	11:55	11:58	12:02	12:08	
12:01	12:05	12:07	12:10	12:18	12:25	12:28	12:32	12:38	
12:31	12:35	12:37	12:40	12:48	12:55	12:58	13:02	13:08	
13:01	13:05	13:07	13:10	13:18	13:25	13:28	13:32	13:38	
13:31	13:35	13:37	13:40	13:48	13:55	13:58	14:02	14:09	
14:03	14:07	14:09	14:12	14:20	14:27	14:30	14:34	14:41	
14:33	14:37	14:39	14:42	14:50	14:57	15:00	15:04	15:11	
15:05[L]	15:09[L]	15:11[L]	15:14[L]	15:22[L]	15:29[L]	15:32[L]	15:36[L]	15:43	15:50
15:28[L]	15:32[L]	15:34[L]	15:37[L]	15:45[L]	15:52[L]	15:55[L]	15:59[L]	16:06	16:13
15:56[L]	16:00[L]	16:02[L]	16:05[L]	16:13[L]	16:20[L]	16:23[L]	16:27[L]	16:34	16:41
16:26[L]	16:30[L]	16:32[L]	16:35[L]	16:43[L]	16:50[L]	16:53[L]	16:57[L]	17:04	17:11
16:56[L]	17:00[L]	17:02[L]	17:05[L]	17:13[L]	17:20[L]	17:23[L]	17:27[L]	17:34	17:41
17:26[L]	17:30[L]	17:32[L]	17:35[L]	17:43[L]	17:49[L]	17:51[L]	17:55[L]	18:03	18:10
17:56[L]	18:00[L]	18:02[L]	18:05[L]	18:13[L]	18:19[L]	18:21[L]	18:25[L]	18:33	18:40
18:24	18:28	18:30	18:33	18:41	18:47	18:49	18:53	18:59	
18:53	18:57	18:59	19:02	19:10	19:16	19:18	19:22	19:28	
19:23	19:27	19:29	19:32	19:40	19:46	19:48	19:52	19:58	
19:53	19:57	19:59	20:01	20:09	20:15	20:17	20:21	20:27	
20:23	20:27	20:29	20:31	20:39	20:45	20:47	20:51	20:57	

BAYSHORE 4A	DUMAUER / PINECREST	PINECREST MALL	GREENBANK / BASELINE	CRAIG HENRY / GREENBANK	MAJESTIC / NEWHAVEN	WOODROFFE / MEDHURST	BASELINE 2B	LINCOLN FIELDS 2A	TUNNEY'S PASTURE C
20:53	20:57	20:59	21:01	21:09	21:15	21:17	21:21	21:27	
21:23	21:27	21:29	21:31	21:39	21:45	21:47	21:51	21:57	
21:53	21:57		21:59	22:07	22:13	22:15	22:18	22:25	
22:23	22:27		22:29	22:37	22:43	22:45	22:48	22:55	
22:53	22:57		22:59	23:07	23:13	23:15	23:18	23:25	
23:27	23:31		23:33	23:41	23:47	23:49	23:52	23:59	

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2021

TUNNEY'S PASTURE F	LINCOLN FIELDS 3A	BASELINE 1C	MAJESTIC / NEWHAVEN	CRAIG HENRY / ELVASTON	GREENBANK / BANNER	GREENBANK / BASELINE	GREENBANK / IRIS
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Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Tue, Jun 29

82 Bayshore

[V] via Majestic

TUNNEY'S PASTURE F	LINCOLN FIELDS 3A	BASELINE 1C	MAJESTIC / NEWHAVEN	CRAIG HENRY / ELVASTON	GREENBANK / BANNER	GREENBANK / BASELINE	GREENBANK / IRIS	PINECREST MALL	DUMAUQUIER / PINECREST	BAYSHORE 3A
06:00	06:06	06:09	06:14	06:21	06:28	06:30	06:32		06:33	06:43
06:38	06:44	06:47	06:52	06:59	07:06	07:08	07:10		07:11	07:21
07:08	07:15	07:18	07:23	07:31	07:38	07:40	07:42		07:44	07:55
07:38	07:45	07:48	07:53	08:01	08:08	08:10	08:12		08:14	08:25
08:08	08:15	08:18	08:23	08:31	08:38	08:40	08:42		08:44	08:55
08:38	08:45	08:48	08:53	09:00	09:07	09:10	09:11		09:13	09:23
	09:15[V]	09:18[V]	09:23[V]	09:29[V]	09:36[V]	09:39[V]	09:40	09:41	09:43	09:53
	09:45[V]	09:48[V]	09:53[V]	09:59[V]	10:06[V]	10:09[V]	10:10	10:11	10:13	10:23
	10:15[V]	10:18[V]	10:23[V]	10:29[V]	10:36[V]	10:39[V]	10:40	10:41	10:43	10:53
	10:45[V]	10:48[V]	10:53[V]	10:59[V]	11:06[V]	11:09[V]	11:10	11:11	11:13	11:23
	11:15[V]	11:18[V]	11:23[V]	11:29[V]	11:36[V]	11:39[V]	11:40	11:41	11:43	11:53
	11:45[V]	11:48[V]	11:53[V]	11:59[V]	12:06[V]	12:09[V]	12:10	12:11	12:13	12:23
	12:15[V]	12:18[V]	12:23[V]	12:29[V]	12:36[V]	12:39[V]	12:40	12:41	12:43	12:53
	12:45[V]	12:48[V]	12:53[V]	12:59[V]	13:06[V]	13:09[V]	13:10	13:11	13:13	13:23
	13:15[V]	13:18[V]	13:23[V]	13:31[V]	13:38[V]	13:40[V]	13:42	13:43	13:45	13:55
	13:45[V]	13:48[V]	13:53[V]	14:01[V]	14:08[V]	14:10[V]	14:12	14:13	14:15	14:25
	14:15[V]	14:18[V]	14:23[V]	14:31[V]	14:38[V]	14:40[V]	14:42	14:43	14:45	14:56
	14:41[V]	14:44[V]	14:49[V]	14:57[V]	15:04[V]	15:06[V]	15:08	15:09	15:11	15:22
15:04[V]	15:11[V]	15:14[V]	15:19[V]	15:27[V]	15:34[V]	15:37[V]	15:39	15:40	15:43	15:54
15:27[V]	15:34[V]	15:37[V]	15:42[V]	15:50[V]	15:57[V]	15:59[V]	16:01	16:02	16:05	16:16
15:57[V]	16:04[V]	16:07[V]	16:12[V]	16:20[V]	16:27[V]	16:29[V]	16:31	16:32	16:35	16:46
16:27[V]	16:34[V]	16:37[V]	16:42[V]	16:50[V]	16:57[V]	16:59[V]	17:01	17:02	17:05	17:16
16:57[V]	17:04[V]	17:07[V]	17:12[V]	17:20[V]	17:27[V]	17:29[V]	17:31	17:32	17:34	17:45
17:27[V]	17:34[V]	17:37[V]	17:42[V]	17:50[V]	17:57[V]	17:59[V]	18:01	18:02	18:04	18:15
17:57[V]	18:04[V]	18:07[V]	18:12[V]	18:20[V]	18:27[V]	18:29[V]	18:31	18:32	18:34	18:45
	18:36[V]	18:39[V]	18:44[V]	18:51[V]	18:58[V]	19:00[V]	19:01	19:01	19:03	19:13
	19:06[V]	19:09[V]	19:14[V]	19:21[V]	19:28[V]	19:30[V]	19:31	19:31	19:33	19:43
	19:36[V]	19:39[V]	19:44[V]	19:51[V]	19:58[V]	20:00[V]	20:01	20:01	20:03	20:13
	20:06[V]	20:09[V]	20:14[V]	20:21[V]	20:28[V]	20:30[V]	20:31	20:31	20:33	20:43
	20:35[V]	20:38[V]	20:43[V]	20:50[V]	20:57[V]	20:59[V]	21:00	21:00	21:02	21:12
	21:05[V]	21:08[V]	21:13[V]	21:20[V]	21:27[V]	21:29[V]	21:30	21:30	21:32	21:42
	21:35[V]	21:38[V]	21:42[V]	21:49[V]	21:56[V]	21:59[V]	22:00		22:01	22:11
	22:05[V]	22:08[V]	22:13[V]	22:19[V]	22:25[V]	22:27[V]	22:28		22:29	22:39

TUNNEY'S PASTURE F	LINCOLN FIELDS 3A	BASELINE 1C	MAJESTIC / NEWHAVEN	CRAIG HENRY / ELVASTON	GREENBANK / BANNER	GREENBANK / BASELINE	GREENBANK / IRIS		
			ELVASTON						
	22:35[V]	22:38[V]	22:43[V]	22:49[V]	22:55[V]	22:57[V]	22:58	22:59	23:09
	23:05[V]	23:08[V]	23:13[V]	23:19[V]	23:25[V]	23:27[V]	23:28	23:29	23:39
	23:35[V]	23:38[V]	23:43[V]	23:49[V]	23:55[V]	23:57[V]	23:58	23:59	00:09

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Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Tue, Jun 29

88 Hurdman

[V] Via Navaho/Woodroffe

[a] From May 10 at 5:00 am until August 1 at 6:00 pm, Route 88 will be detoured due to the closure of Navaho north-side access road at Algonquin in front of the Residence building for construction. [Read more](#)

[x] Via Tyrell/Moodie

[y] Via Tyrell/Moodie & Navaho/Woodroffe

TERRY FOX 4A	HAZELDEAN MALL / WEST STOP	MOODIE / HADLEY	MOODIE / TYRELL	ROBERTSON / MOODIE	BASELINE 1A	NAVAHO / ALGONQUIN COLLEGE RESIDENCE	1305 BASELINE	BILLINGS BRIDGE 2A	HURDMAN B
					04:35[V]	04:37	04:42	04:52	04:57
04:34[y]	04:42[y]	04:47[y]	04:47[y]		05:00[y]	05:02	05:07	05:17	05:22
04:57[y]	05:05[y]	05:10[y]	05:10[y]		05:23[y]	05:25	05:30	05:40	05:45
05:27[V]	05:35[V]			05:41[V]	05:56[V]	05:58	06:03	06:15	06:21
		05:55[x]	05:56[x]		06:08[x]	06:10	06:15	06:28	06:33
05:51[V]	06:02[V]			06:08[V]	06:23[V]	06:25	06:30	06:43	06:48
		06:19[x]	06:20[x]		06:35[x]	06:37	06:43	06:58	07:03
06:15[V]	06:26[V]			06:32[V]	06:47[V]	06:49	06:55	07:09	07:14
		06:43	06:44		07:00	07:03	07:15	07:31	07:36
06:39	06:50			06:56	07:11	07:14	07:26	07:42	07:47
		07:07	07:08		07:30	07:33	07:42	07:58	08:06
07:03	07:15			07:22	07:45	07:48	07:57	08:13	08:21
		07:31	07:32		07:54	07:57	08:06	08:20	08:28
07:27	07:39			07:46	08:09	08:12	08:21	08:37	08:45
		07:55	07:56		08:18	08:21	08:30	08:44	08:52
07:51	08:03			08:10	08:35	08:38	08:47	09:01	09:09
		08:19	08:20		08:39	08:42	08:51	09:05	09:13
08:15	08:27			08:34	08:52	08:55	09:04	09:18	09:26
		08:43	08:44		09:03	09:06	09:17	09:30	09:38
08:39	08:50			08:56	09:11	09:14	09:25	09:38	09:46
08:49	09:00			09:06	09:21	09:24	09:35	09:48	09:56
09:04	09:15			09:21	09:36	09:39	09:50	10:01	10:07
09:19	09:30			09:36	09:51	09:54	10:05	10:16	10:22
09:34	09:45			09:51	10:06	10:09	10:20	10:31	10:37
09:49	10:00			10:06	10:21	10:24	10:35	10:46	10:52

TERRY FOX 4A	HAZELDEAN MALL / WEST STOP	MOODIE / HADLEY	MOODIE / TYRELL	ROBERTSON / MOODIE	BASELINE 1A	NAVAHO / ALGONQUIN COLLEGE RESIDENCE	1305 BASELINE	BILLINGS BRIDGE 2A	HURDMAN B
10:04	10:15			10:21	10:36	10:39	10:50	11:01	11:07
10:19	10:30			10:36	10:51	10:54	11:05	11:16	11:22
10:34	10:46			10:52	11:08	11:11	11:22	11:32	11:38
10:49	11:01			11:07	11:23	11:26	11:37	11:47	11:53
11:04	11:16			11:22	11:38	11:41	11:52	12:02	12:08
11:19	11:31			11:37	11:53	11:56	12:07	12:17	12:23
11:34	11:46			11:52	12:08	12:11	12:22	12:32	12:39
11:49	12:01			12:07	12:23	12:26	12:37	12:47	12:54
12:04	12:16			12:22	12:37	12:40	12:51	13:03	13:11
12:19	12:31			12:37	12:52	12:55	13:06	13:18	13:26
12:34	12:46			12:52	13:07	13:10	13:21	13:33	13:41
12:49	13:01			13:07	13:22	13:25	13:36	13:48	13:56
13:04	13:16			13:22	13:37	13:40	13:51	14:03	14:11
13:19	13:31			13:37	13:52	13:55	14:06	14:18	14:26
13:34	13:46			13:52	14:07	14:10	14:21	14:33	14:41
13:49	14:01			14:07	14:22	14:25	14:36	14:48	14:56
14:04	14:17			14:24	14:41	14:44	14:54	15:07	15:15
					14:54	14:57	15:07	15:23	15:33
14:27	14:40			14:47	15:04	15:07	15:17	15:30	15:38
					15:14	15:17	15:27	15:43	15:53
14:47	15:00			15:07	15:24	15:27	15:37	15:53	16:03
					15:34	15:36	15:47	16:02	16:12
15:07	15:20			15:27	15:44	15:47	15:57	16:13	16:23
					15:54	15:56	16:07	16:22	16:32
15:27	15:40			15:47	16:04	16:07	16:17	16:33	16:43
					16:16	16:18	16:29	16:43	16:54
15:47	16:00			16:08	16:26	16:28	16:39	16:54	17:04
					16:36	16:38	16:49	17:03	17:14
16:07	16:20			16:28	16:46	16:48	16:59	17:14	17:24
					16:56	16:58	17:09	17:23	17:34
16:27	16:40			16:48	17:06	17:08	17:19	17:33	17:44
					17:16	17:19	17:30	17:43	17:54
16:47	17:00			17:08	17:26	17:28	17:39	17:53	18:04
					17:36	17:39	17:49	18:00	18:10
17:07	17:20			17:28	17:46	17:48	17:59	18:13	18:24
					17:56	17:59	18:09	18:20	18:29
17:35	17:47			17:54	18:09	18:12	18:22	18:33	18:43
17:50	18:02			18:09	18:24	18:27	18:37	18:48	18:57
18:05	18:17			18:24	18:39	18:42	18:52	19:03	19:11
18:20	18:32			18:39	18:54	18:57	19:07	19:18	19:26
18:35	18:47			18:53	19:08	19:11	19:21	19:32	19:39
18:50	19:02			19:08	19:23	19:26	19:36	19:47	19:54
19:05	19:16			19:22	19:36	19:39	19:50	20:01	20:06
19:20	19:31			19:37	19:51	19:54	20:05	20:16	20:21
19:40	19:50			19:56	20:10	20:12	20:23	20:33	20:38
20:00	20:10			20:16	20:29	20:31	20:42	20:52	20:57
20:21	20:31			20:37	20:50	20:52	21:03	21:13	21:18
20:41	20:51			20:57	21:09	21:11	21:22	21:32	21:37
21:01	21:10			21:16	21:28	21:31	21:41	21:49	21:55
21:21	21:30			21:36	21:48	21:51	22:01	22:09	22:15
21:41	21:50			21:56	22:08	22:11	22:21	22:29	22:35
22:01	22:10			22:16	22:28	22:31	22:41	22:49	22:55
22:20[V]	22:29[V]			22:35[V]	22:47[V]	22:50	22:57	23:05	23:11
22:41[V]	22:50[V]			22:56[V]	23:08[V]	23:11	23:18	23:26	23:31

TERRY FOX 4A	HAZELDEAN MALL / WEST STOP	MOODIE / HADLEY	MOODIE / TYRELL	ROBERTSON / MOODIE	BASELINE 1A	NAVAHO / ALGONQUIN COLLEGE RESIDENCE	1305 BASELINE	BILLINGS BRIDGE 2A	HURDMAN B
23:01[V]	23:10[V]			23:16[V]	23:26[V]	23:29	23:35	23:43	23:48
23:31[V]	23:40[V]			23:45[V]	23:55[V]	23:58	00:04	00:10	00:15
00:03[V]	00:12[V]			00:17[V]	00:27[V]	00:30	00:36	00:42	00:47
00:33[V]	00:42[V]			00:47[V]	00:57[V]	01:00	01:06	01:12	01:17

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Tue, Jun 29

88 Terry Fox

[V] Via Woodroffe/Navaho

[a] From May 10 at 5:00 am until August 1 at 6:00 pm, Route 88 will be detoured due to the closure of Navaho north-side access road at Algonquin in front of the Residence building for construction. [Read more](#)

[x] Via Tyrell/Moodie

[y] Via Tyrell/Moodie & Navaho/Woodroffe

HURDMAN D	BILLINGS BRIDGE 1A	BASELINE / MERIVALE	NAVAHO / ALGONQUIN COLLEGE RESIDENCE	BASELINE 2A	MOODIE / TYRELL	MOODIE / HADLEY	ROBERTSON / MOODIE	HAZELDEAN MALL / EAST STOP	TERRY FOX 3B
04:23[y]	04:28[y]	04:34[y]	04:39[y]	04:41[y]	04:53[y]	04:54		05:00	05:12
04:53[y]	04:58[y]	05:04[y]	05:09[y]	05:11[y]	05:23[y]	05:24		05:30	05:42
05:23[y]	05:28[y]	05:34[y]	05:40[y]	05:42[y]	05:54[y]	05:55		06:02	06:14
05:53[V]	05:58[V]	06:06[V]	06:13	06:15			06:30	06:40	06:51
06:08[V]	06:13[V]	06:21[V]	06:28	06:31			06:46	06:56	07:07
06:23[V]	06:28[V]	06:36[V]	06:43	06:46			07:01	07:10	07:21
06:37	06:42	06:51	07:02	07:05			07:19	07:28	07:40
06:47	06:52	07:01	07:12	07:15					
06:57	07:02	07:11	07:22	07:25			07:39	07:48	08:00
07:07	07:12	07:22	07:33	07:36					
07:17	07:22	07:32	07:43	07:46			08:03	08:12	08:25
07:27	07:32	07:42	07:53	07:56					
07:37	07:42	07:53	08:03	08:06			08:24	08:32	08:45
07:47	07:52	08:03	08:13	08:16					
07:57	08:02	08:13	08:23	08:26			08:44	08:52	09:05
08:07	08:12	08:23	08:33	08:36					
08:19	08:24	08:35	08:45	08:48			09:06	09:14	09:27
08:34	08:39	08:48	08:58	09:01			09:17	09:25	09:41
08:52	08:57	09:06	09:16	09:19			09:35	09:43	09:59
09:07	09:12	09:21	09:31	09:34			09:50	09:58	10:14
09:22	09:27	09:36	09:46	09:49			10:05	10:13	10:29
09:37	09:42	09:51	10:01	10:04			10:20	10:28	10:44
09:54	09:59	10:08	10:18	10:21			10:37	10:45	11:01
10:11	10:16	10:25	10:35	10:38			10:54	11:02	11:18
10:24	10:29	10:38	10:48	10:51			11:07	11:15	11:31

HURDMAN D	BILLINGS BRIDGE 1A	BASELINE / MERIVALE	NAVAHO / ALGONQUIN COLLEGE RESIDENCE	BASELINE 2A	MOODIE / TYRELL	MOODIE / HADLEY	ROBERTSON / MOODIE	HAZELDEAN MALL / EAST STOP	TERRY FOX 3B
10:37	10:42	10:51	11:01	11:04			11:20	11:28	11:44
10:52	10:57	11:06	11:16	11:19			11:35	11:43	11:59
11:07	11:12	11:21	11:31	11:34			11:50	11:58	12:14
11:22	11:27	11:36	11:46	11:49			12:06	12:14	12:30
11:36	11:41	11:50	12:00	12:03			12:20	12:28	12:44
11:53	11:58	12:07	12:17	12:20			12:37	12:45	13:01
12:08	12:13	12:22	12:32	12:35			12:52	13:00	13:16
12:23	12:28	12:37	12:47	12:50			13:07	13:15	13:31
12:38	12:43	12:52	13:02	13:05			13:22	13:30	13:46
12:54	12:59	13:08	13:18	13:21			13:38	13:46	14:02
13:09	13:14	13:23	13:35	13:38			13:57	14:05	14:20
13:26	13:31	13:40	13:52	13:55			14:14	14:22	14:37
13:41	13:46	13:55	14:07	14:10			14:29	14:37	14:52
13:56	14:01	14:10	14:22	14:25			14:44	14:52	15:07
14:11	14:16	14:26	14:38	14:41			15:00	15:10	15:25
14:26	14:31	14:41	14:53	14:56			15:15	15:25	15:40
14:41	14:46	14:56	15:08	15:11			15:30	15:40	15:55
14:56[x]	15:01[x]	15:11[x]	15:23[x]	15:26[x]	15:40[x]	15:42			
15:08	15:13	15:26	15:38	15:40			15:59	16:10	16:25
15:20[x]	15:25[x]	15:38[x]	15:50[x]	15:52[x]	16:14[x]	16:15			
15:32	15:37	15:53	16:05	16:08			16:25	16:36	16:51
15:44[x]	15:49[x]	16:05[x]	16:17[x]	16:20[x]	16:42[x]	16:43			
15:56	16:01	16:17	16:29	16:32			16:49	17:00	17:15
16:08[x]	16:13[x]	16:29[x]	16:41[x]	16:44[x]	17:06[x]	17:07			
16:20	16:25	16:41	16:53	16:56			17:13	17:24	17:39
16:32[x]	16:37[x]	16:53[x]	17:05[x]	17:08[x]	17:30[x]	17:31			
16:44	16:49	17:05	17:17	17:20			17:36	17:45	17:59
16:56[x]	17:01[x]	17:17[x]	17:29[x]	17:32[x]	17:51[x]	17:53			
17:08	17:13	17:25	17:38	17:40			17:57	18:06	18:17
17:20[x]	17:25[x]	17:37[x]	17:50[x]	17:52[x]	18:11[x]	18:13			
17:32	17:37	17:49	18:02	18:04			18:21	18:30	18:41
17:44	17:49	18:01	18:14	18:16			18:33	18:42	18:53
17:57	18:02	18:14	18:27	18:29			18:46	18:55	19:06
18:12	18:17	18:29	18:42	18:44			19:01	19:10	19:21
18:27	18:32	18:41	18:54	18:57			19:11	19:20	19:32
18:42	18:47	18:56	19:09	19:12			19:26	19:35	19:47
18:57	19:02	19:11	19:24	19:27			19:41	19:50	20:02
19:09	19:14	19:23	19:36	19:39			19:53	20:02	20:14
19:29	19:34	19:42	19:51	19:53			20:08	20:17	20:28
19:49	19:54	20:02	20:11	20:13			20:28	20:37	20:48
20:09	20:14	20:22	20:31	20:33			20:48	20:57	21:08
20:34	20:39	20:47	20:56	20:58			21:13	21:20	21:32
20:54	20:59	21:07	21:16	21:18			21:33	21:40	21:52
21:14	21:19	21:27	21:36	21:38			21:53	22:00	22:12
21:34	21:39	21:47	21:56	21:58			22:13	22:20	22:32
21:54	21:59	22:07	22:16	22:18			22:33	22:40	22:52
22:14	22:19	22:27	22:36	22:38			22:53	23:00	23:12
22:33[V]	22:38[V]	22:45[V]	22:52	22:55			23:06	23:13	23:25
23:00[V]	23:05[V]	23:12[V]	23:19	23:22			23:33	23:40	23:52
23:30[V]	23:35[V]	23:42[V]	23:49	23:52			00:03	00:10	00:19
00:01[V]	00:06[V]	00:13[V]	00:19	00:21			00:32	00:39	00:48
00:31[V]	00:36[V]	00:43[V]	00:49	00:51			01:02	01:09	01:18
01:01[V]	01:06[V]	01:13[V]	01:19	01:21			01:32	01:39	01:48

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Schedules & Maps

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Tue, Jun 29

173 Barrhaven Centre

BAYSHORE 4A	DUMAURIER / PINECREST	PINECREST MALL	GREENBANK / BASELINE	GREENBANK / GIBBARD	WOODROFFE / KNOXDALE	FALLOWFIELD 1A	MALVERN / VENTNOR	STRANDHERD / JOCKVALE	MARKETPLACE 1A	BARRHAVEN CENTRE 1A
						05:53	05:58	06:08	06:11	06:12
						06:30	06:35	06:44	06:48	06:49
						07:00	07:05	07:14	07:18	07:19
						07:29	07:34	07:43	07:47	07:48
						08:00	08:05	08:14	08:18	08:19
						08:30	08:35	08:44	08:48	08:49
						09:01	09:06	09:15	09:18	09:19
						09:30	09:35	09:44	09:47	09:48
						10:00	10:05	10:14	10:17	10:18
10:03	10:09	10:12	10:15	10:18	10:23	10:30	10:35	10:44	10:47	10:48
						11:00	11:05	11:14	11:17	11:18
11:03	11:09	11:12	11:15	11:18	11:23	11:30	11:35	11:44	11:47	11:48
						12:00	12:05	12:14	12:17	12:18
12:03	12:09	12:12	12:15	12:18	12:23	12:30	12:35	12:44	12:47	12:48
						13:00	13:05	13:14	13:17	13:18
13:03	13:09	13:12	13:15	13:18	13:23	13:30	13:35	13:44	13:47	13:48
						14:00	14:05	14:14	14:17	14:18
14:03	14:09	14:12	14:15	14:18	14:23	14:30	14:35	14:44	14:47	14:48
						15:00	15:05	15:15	15:18	15:19
15:03	15:08	15:11	15:14	15:17	15:22	15:29	15:34	15:44	15:47	15:48
15:31	15:36	15:39	15:42	15:45	15:50	15:57	16:02	16:12	16:15	16:16
16:03	16:08	16:11	16:14	16:17	16:22	16:29	16:34	16:44	16:47	16:48
16:33	16:38	16:41	16:44	16:47	16:52	16:59	17:04	17:14	17:17	17:18
17:03	17:08	17:11	17:14	17:17	17:22	17:29	17:34	17:44	17:47	17:48
17:33	17:38	17:41	17:44	17:47	17:52	17:59	18:04	18:14	18:17	18:18
18:03	18:08	18:10	18:13	18:17	18:21	18:28	18:33	18:42	18:45	18:46

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Tue, Jun 29

173 Bayshore

[S] Ends at Fallowfield

[V] Bypass Pinecrest Mall

BARRHAVEN CENTRE 2A	MARKETPLACE 2A	STRANDHERD / JOCKVALE	FOXFIELD / KADEER	FALLOWFIELD 2A	KNOXDALE / WOODROFFE	GIBBARD / GREENBANK	GREENBANK / BASELINE	GREENBANK / IRIS	PINECREST MALL	DUMAURIER / PINECREST	BAYSHORE 4A
06:17[S]	06:18[S]	06:22[S]	06:32[S]	06:39[S]							
06:54[V]	06:55[V]	06:59[V]	07:09[V]	07:16[V]	07:20[V]	07:26[V]	07:31[V]	07:33		07:35	07:43
07:24[V]	07:25[V]	07:29[V]	07:39[V]	07:46[V]	07:50[V]	07:56[V]	08:01[V]	08:03		08:05	08:13
07:54[V]	07:55[V]	07:59[V]	08:09[V]	08:16[V]	08:20[V]	08:26[V]	08:31[V]	08:33		08:35	08:43
08:26	08:27	08:31	08:41	08:48	08:52	08:58	09:03	09:05	09:06	09:08	09:16
08:57	08:58	09:02	09:12	09:19	09:23	09:29	09:34	09:36	09:37	09:39	09:47
09:30[S]	09:31[S]	09:35[S]	09:44[S]	09:50[S]							
10:00	10:01	10:05	10:14	10:20	10:24	10:31	10:35	10:37	10:38	10:41	10:49
10:30[S]	10:31[S]	10:35[S]	10:44[S]	10:50[S]							
11:00	11:01	11:05	11:14	11:20	11:24	11:31	11:35	11:37	11:38	11:41	11:49
11:30[S]	11:31[S]	11:35[S]	11:44[S]	11:50[S]							
12:00	12:01	12:05	12:14	12:20	12:24	12:31	12:35	12:37	12:38	12:41	12:49
12:30[S]	12:31[S]	12:35[S]	12:44[S]	12:50[S]							
13:00	13:01	13:05	13:14	13:20	13:24	13:31	13:35	13:37	13:38	13:41	13:49
13:30[S]	13:31[S]	13:35[S]	13:44[S]	13:50[S]							
14:00	14:01	14:05	14:14	14:20	14:24	14:31	14:35	14:37	14:38	14:41	14:49
14:30[S]	14:31[S]	14:35[S]	14:44[S]	14:50[S]							
15:00	15:01	15:05	15:14	15:20	15:24	15:31	15:35	15:37	15:38	15:41	15:49
15:28[S]	15:29[S]	15:33[S]	15:43[S]	15:50[S]							
16:00[S]	16:01[S]	16:05[S]	16:15[S]	16:22[S]							
16:28[S]	16:29[S]	16:33[S]	16:43[S]	16:50[S]							
16:59[S]	17:00[S]	17:04[S]	17:14[S]	17:21[S]							
17:30[S]	17:31[S]	17:35[S]	17:45[S]	17:52[S]							
18:00[S]	18:01[S]	18:05[S]	18:15[S]	18:22[S]							
18:30[S]	18:31[S]	18:35[S]	18:44[S]	18:51[S]							
19:00[S]	19:01[S]	19:05[S]	19:14[S]	19:21[S]							

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Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Tue, Jun 29

282 Tunney's Pasture

KNOXDALE / RIVERBROOK	GREENBANK / MONTEREY	TUNNEY'S PASTURE C
06:08	06:17	06:32
06:38	06:48	07:05
07:08	07:18	07:35
07:35	07:46	08:05
08:04	08:14	08:32
08:35	08:45	09:03

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Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Tue, Jun 29

282 Trend-Arlington

TUNNEY'S PASTURE F	GREENBANK / BASELINE	SISKIN / RIVERBROOK
15:37	15:51	16:02
16:07	16:21	16:32
16:34	16:48	16:59
16:59	17:13	17:24
17:24	17:37	17:47
17:53	18:06	18:16
18:24	18:37	18:47

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[Ottawa](#)
[OC Transpo](#)
[route 691](#)

691

Bayshore

OC Transpo



There have been recent changes to this line

For updated information, [visit our website](#)

691 bus Route Schedule and Stops

The 691 bus (Bayshore) has 46 stops departing from Chesterton / Omer-Deslauriers and ending in Bayshore.

691 bus time schedule overview for the upcoming week: Starts operating at 3:19 PM and ends at 3:19 PM. Operating days this week: weekdays.

Choose any of the 691 bus stops below to find updated real-time schedules and to see their route map.

[View on Map](#)

Direction: Bayshore (46 stops)

[SHOW ON MAP](#) [CHANGE DIRECTION](#)

- Chesterton / Omer-Deslauriers**
 170 Chesterton Drive, Ottawa
[VIEW FULL SCHEDULE](#)
- Chesterton / Juniper**
 151 Chesterton Drive, Ottawa
[VIEW FULL SCHEDULE](#)

691 bus Route Map



691 bus Schedule

691 bus route operates on weekdays.
Regular schedule hours: 3:19 PM

Day	Operating Hours
Sunday	Not Operational
Monday	3:19 PM
Tuesday	3:19 PM

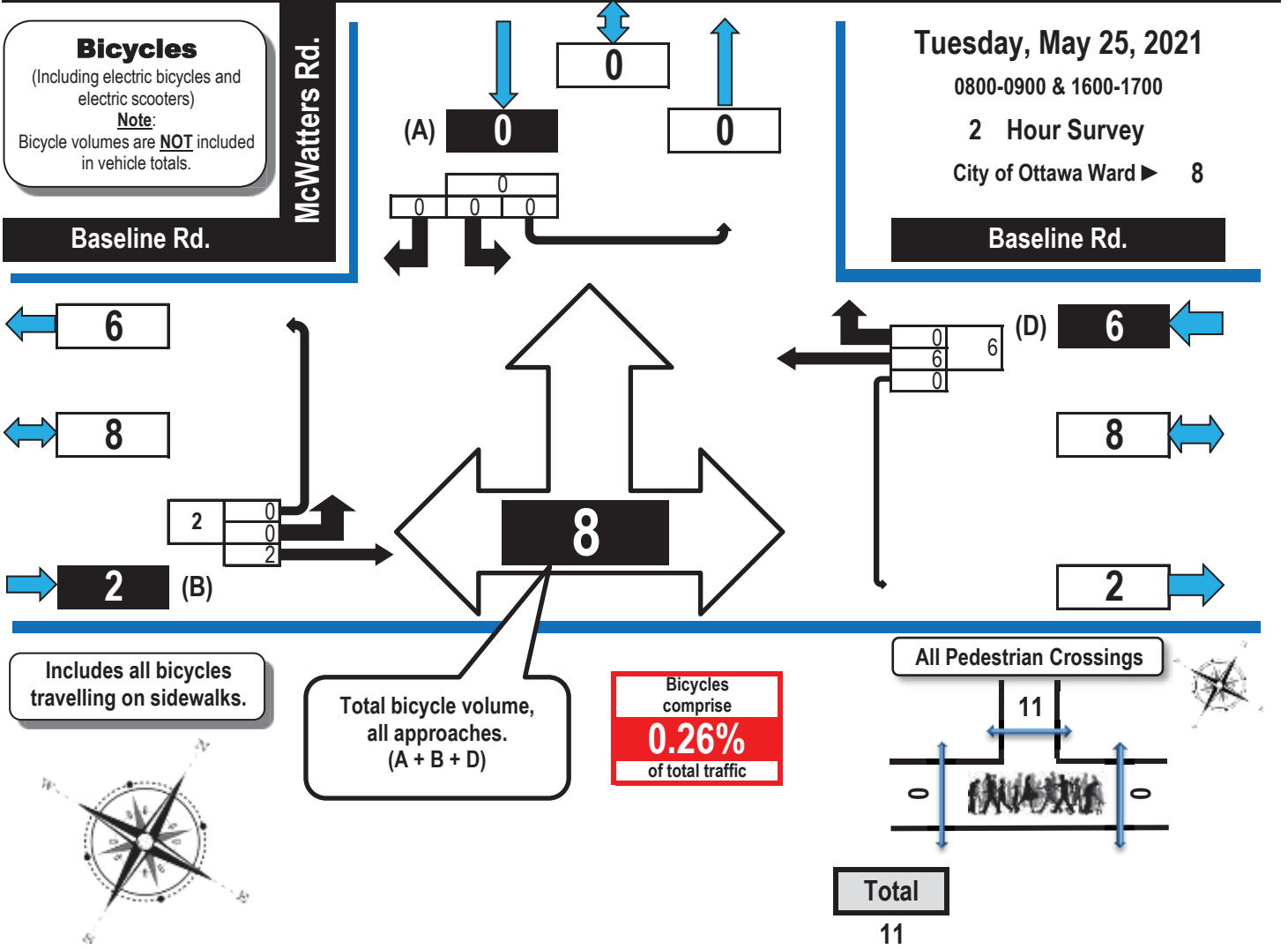
Appendix C

Traffic Data

Turning Movement Count Bicycle Summary Flow Diagram



Baseline Road & McWatters Road Ottawa, ON



Time Period	Baseline Rd. Eastbound					Baseline Rd. Westbound					N/A Northbound					McWatters Rd. Southbound					
	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	0		0	0		0	0	0	0						0		0	0	0	0
0800-0900	0	0		0	0		3	0	0	3						0		0	0	0	3
1600-1700	0	2		0	2		3	0	0	3						0		0	0	0	5
1700-1800	0	0		0	0		0	0	0	0						0		0	0	0	0
Totals	0	2		0	2		6	0	0	6						0		0	0	0	8

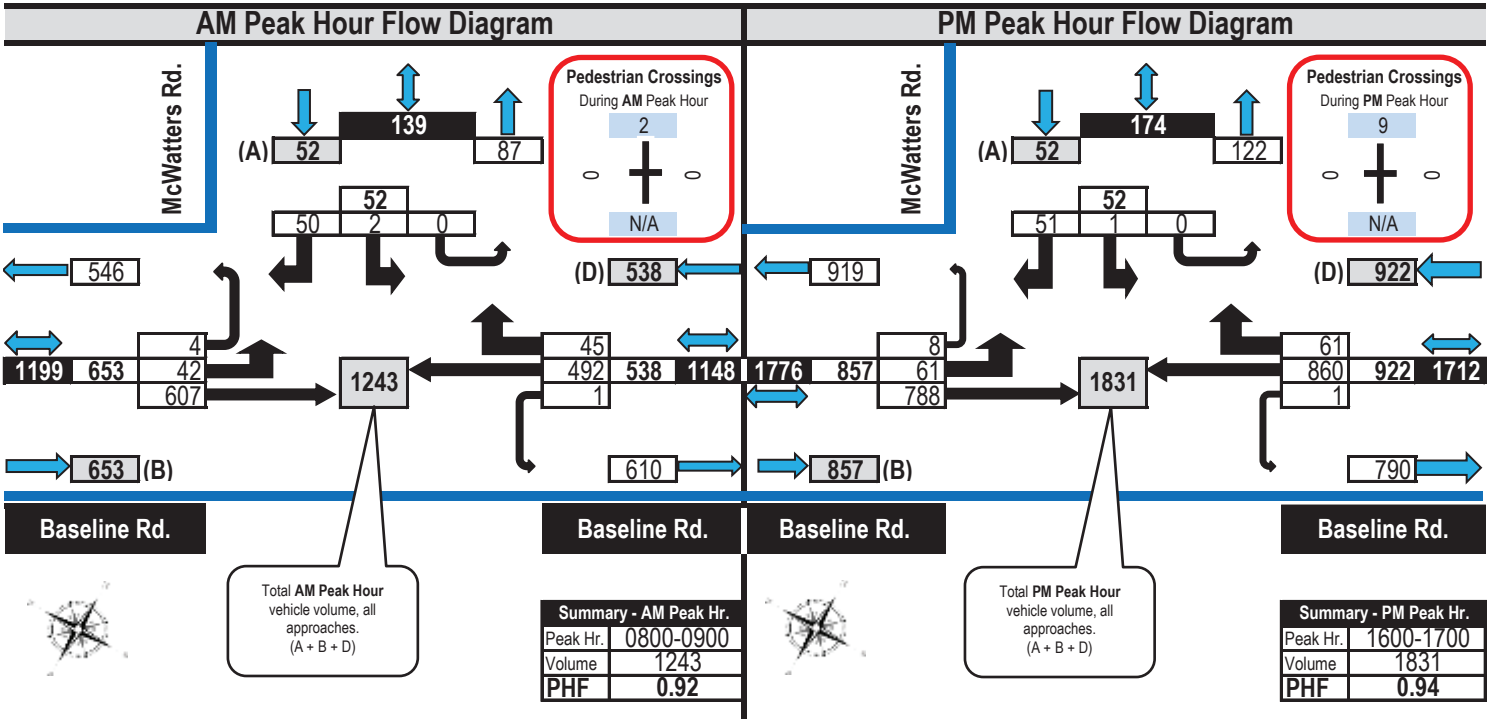
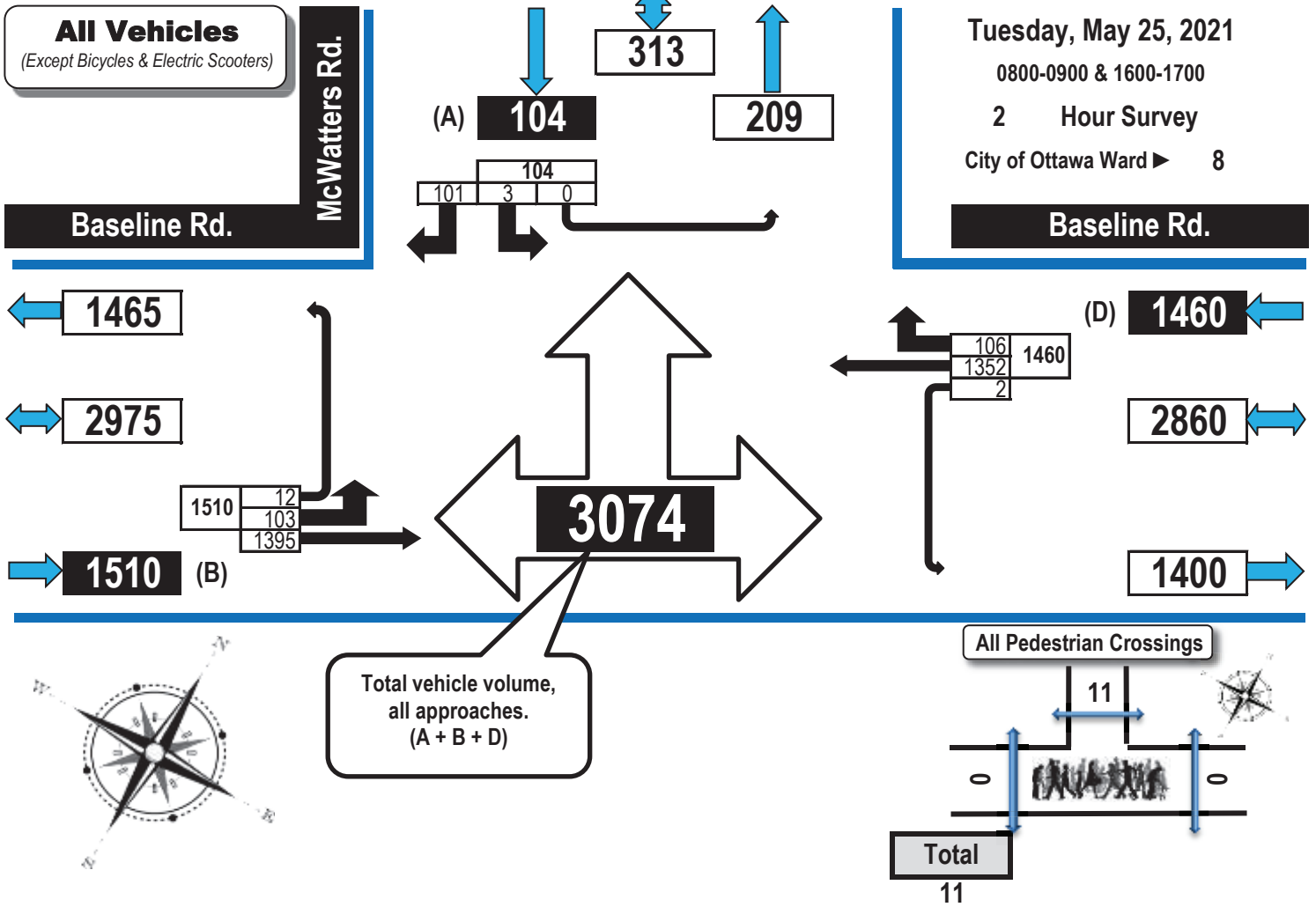


Turning Movement Count Summary, AM and PM Peak Hour Flow Diagrams All Vehicles Except Bicycles



Baseline Road & McWatters Road

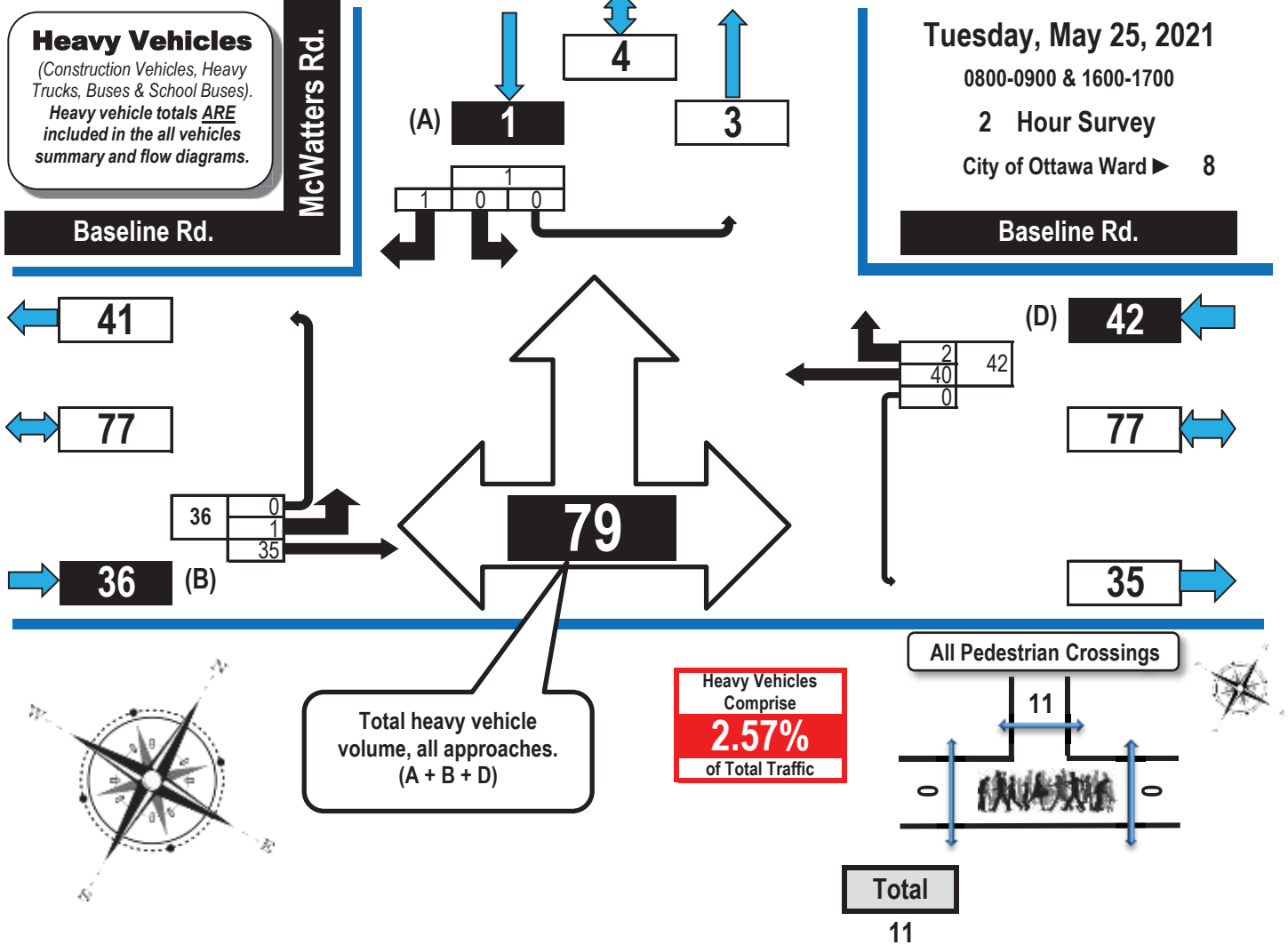
Ottawa, ON



Turning Movement Count Heavy Vehicle Summary Flow Diagram



Baseline Road & McWatters Road Ottawa, ON



Time Period	Baseline Rd. Eastbound					Baseline Rd. Westbound					N/A Northbound					McWatters Rd. Southbound						
	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot	
0700-0800	0	0		0	0		0	0	0	0						0		0	0	0	0	0
0800-0900	0	22		0	22		22	2	0	24						0		1	0	1	1	47
1600-1700	1	13		0	14		18	0	0	18						0		0	0	0	0	32
1700-1800	0	0		0	0		0	0	0	0						0		0	0	0	0	0
Totals	1	35		0	36		40	2	0	42						0		1	0	1	1	79



Turning Movement Count

Summary Report

Including AM and PM Peak Hours

All Vehicles Except Bicycles



Baseline Road & McWatters Road Ottawa, ON

Survey Date: Tuesday, May 25, 2021 **Start Time:** 0800 **AADT Factor:** 0.9
Weather AM: Partly Cloudy 12° C **Survey Duration:** 2 Hrs. **Survey Hours:** 0800-0900 & 1600-1700
Weather PM: Cloudy 25° C **Surveyor(s):** T. Carmody

Time Period	Baseline Rd. Eastbound					Baseline Rd. Westbound					N/A Northbound					McWatters Rd. Southbound								
	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total	
	0700-0800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0800-0900	42	607	0	4	653	0	492	45	1	538	1191	0	0	0	0	0	2	0	50	0	52	52	1243	
1600-1700	61	788	0	8	857	0	860	61	1	922	1779	0	0	0	0	0	1	0	51	0	52	52	1831	
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	103	1395	0	12	1510	0	1352	106	2	1460	2970	0	0	0	0	0	3	0	101	0	104	104	3074	

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 → 12 expansion factor of 1.39																								
Equ. 12 Hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9																								
AADT 12-hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 → 24 expansion factor of 1.31																								
AADT 24 Hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor → 0.92												Highest Hourly Vehicle Volume Between 0700h & 0900h											
AM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
0800-0900	42	607	0	4	653	0	492	45	1	538	1191	0	0	0	0	0	2	0	50	0	52	52	1243

PM Peak Hour Factor → 0.94												Highest Hourly Vehicle Volume Between 1600h & 1800h											
PM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1600-1700	61	788	0	8	857	0	860	61	1	922	1779	0	0	0	0	0	1	0	51	0	52	52	1831

Comments:

Traffic count conducted during the SARS-CoV-2 (Covid-19) pandemic. Pinecrest Public School closed. No left turn at any time southbound from McWatters Road and no right turn westbound from Baseline Road between 0700-0900, Monday to Friday. Northbound ramp on Pinecrest Road to Highway 417 westbound closed due to OTrain construction. Heavy vehicles comprise 2.57% of all traffic and buses comprise 37.97% of the heavy vehicle traffic. The bicycle total includes 1 E-Bicycle. During the AM time period between 0700 & 0900 almost every westbound right turn (illegal movement) travels to the Tim Horton's drive through.

Notes:

- Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
- When expansion and AADT factors are applied, the results will differ slightly due to rounding.

Turning Movement Count - Study Results

BASELINE RD @ GREENBANK RD

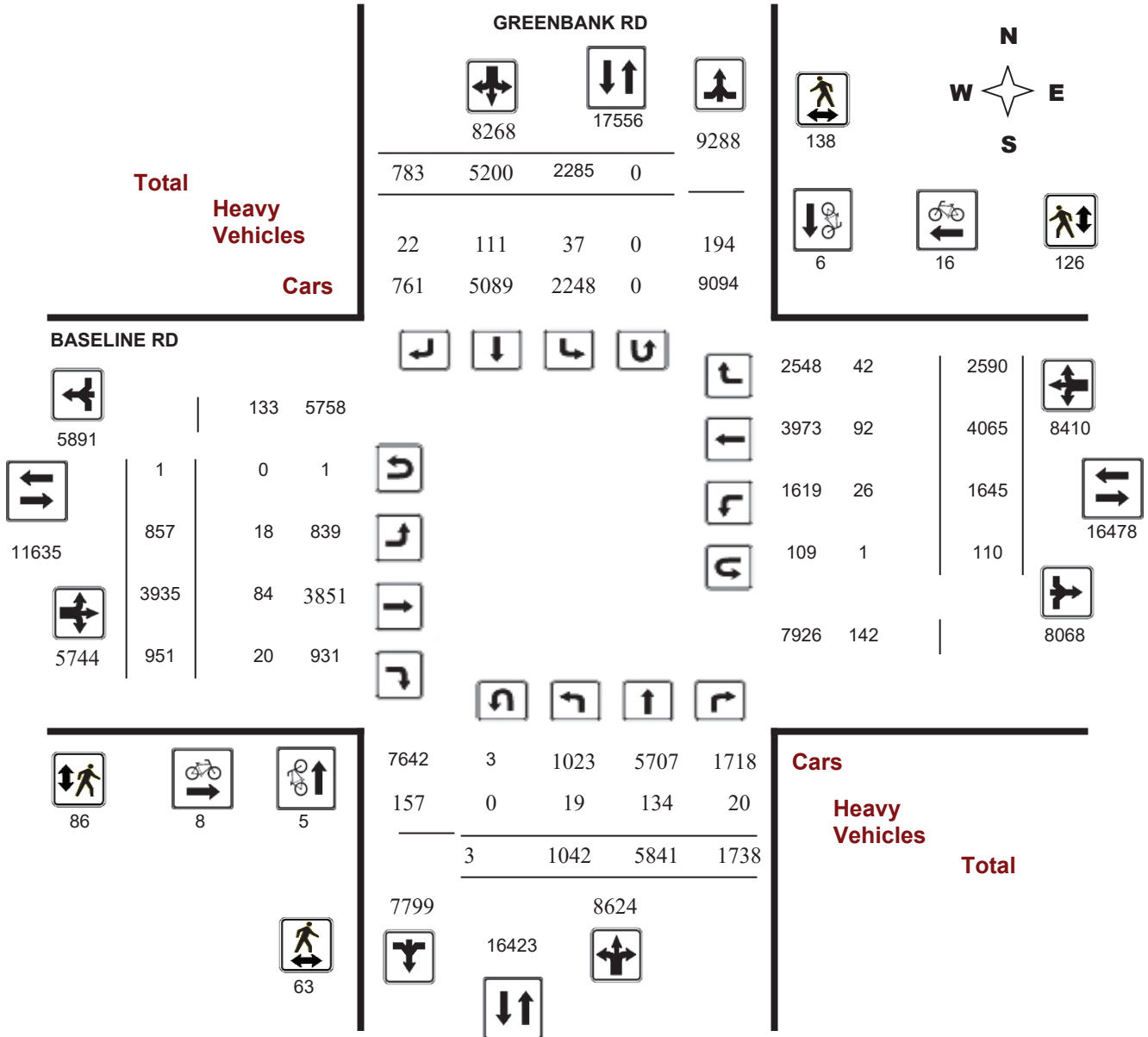
Survey Date: Thursday, August 11, 2016

WO No: 36185

Start Time: 07:00

Device: Miovision

Full Study Diagram



Turning Movement Count - Study Results

BASELINE RD @ GREENBANK RD

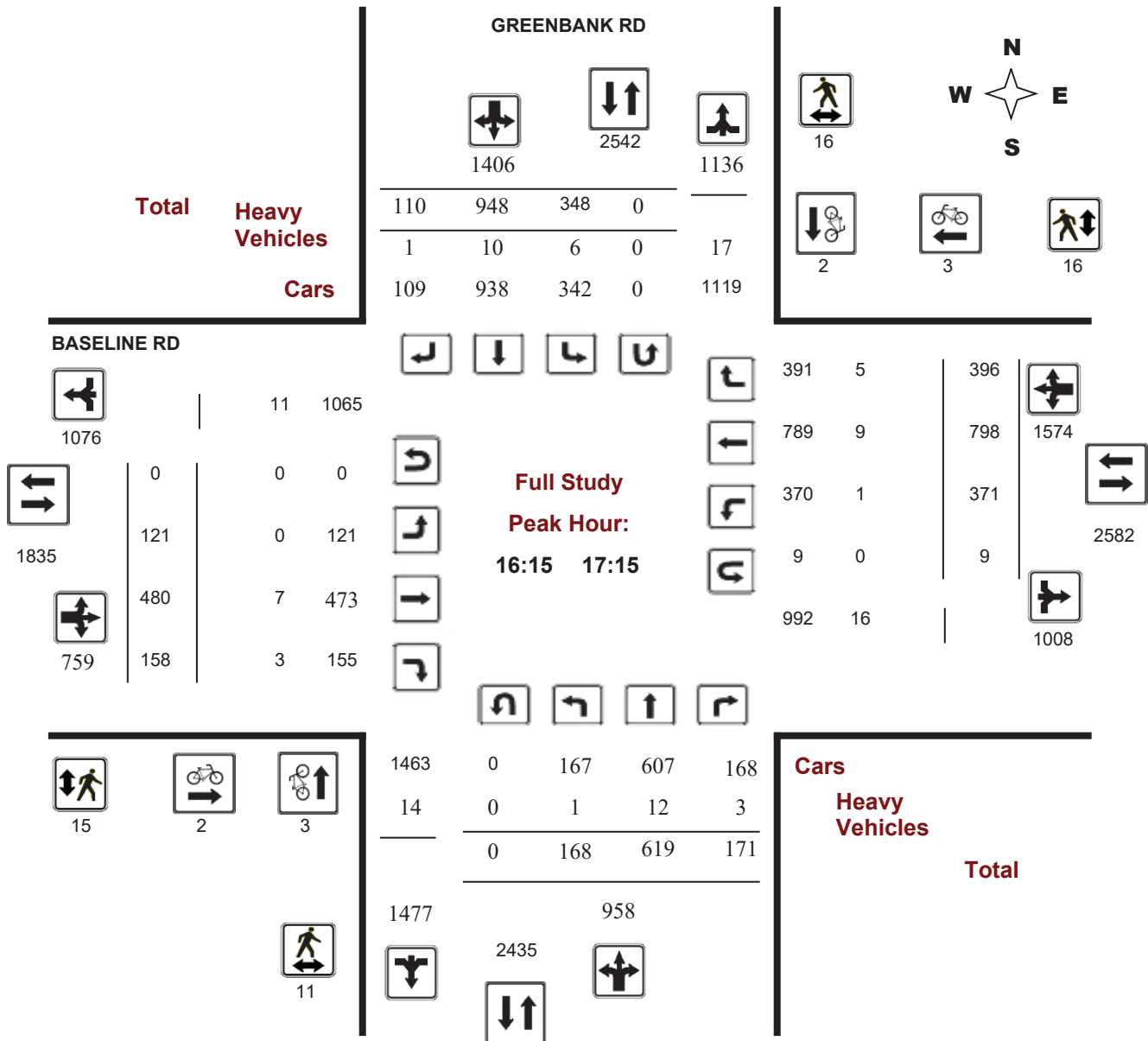
Survey Date: Thursday, August 11, 2016

WO No: 36185

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



Turning Movement Count - Peak Hour Diagram

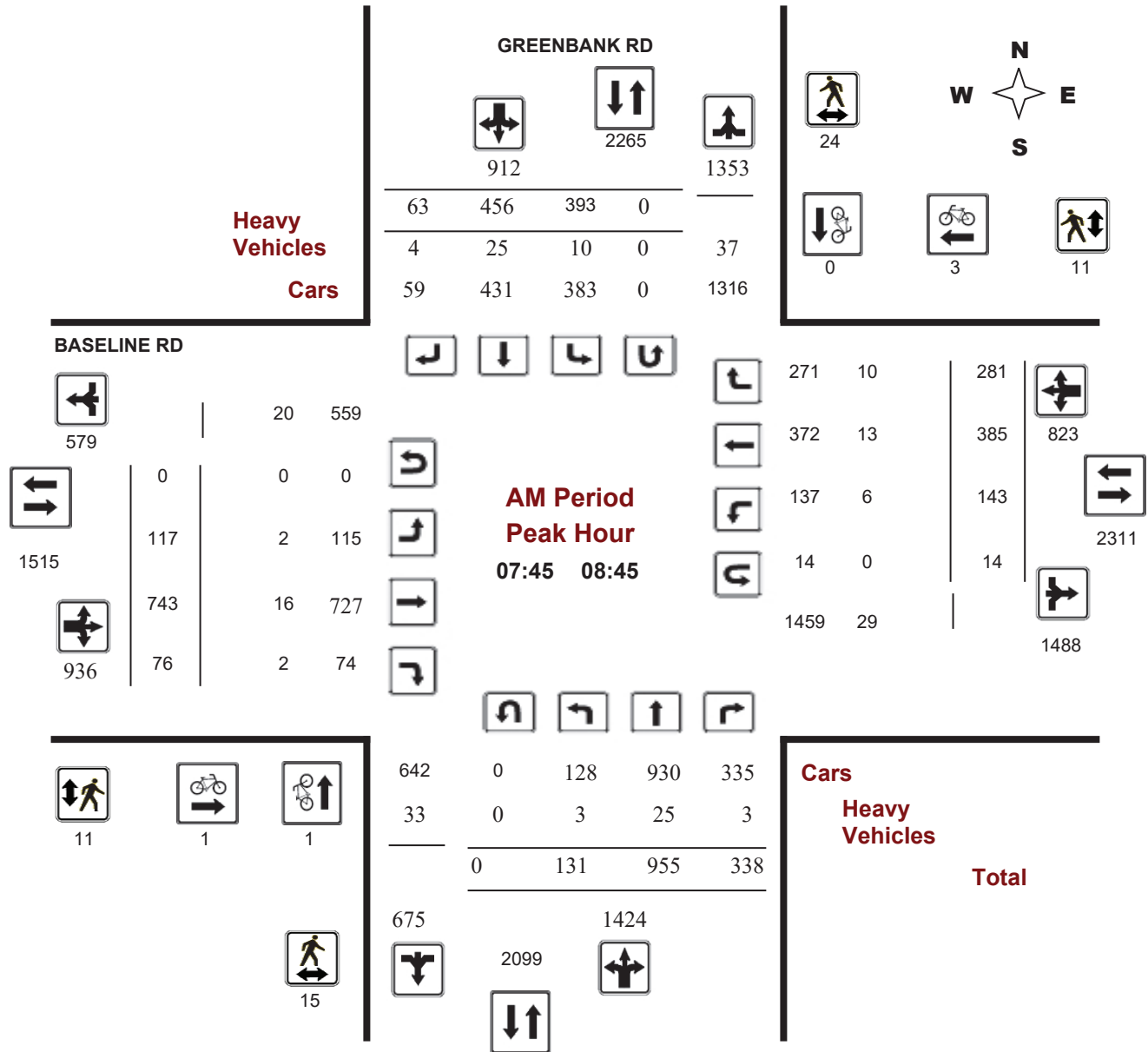
BASELINE RD @ GREENBANK RD

Survey Date: Thursday, August 11, 2016

Start Time: 07:00

WO No: 36185

Device: Miovision



Turning Movement Count - Peak Hour Diagram

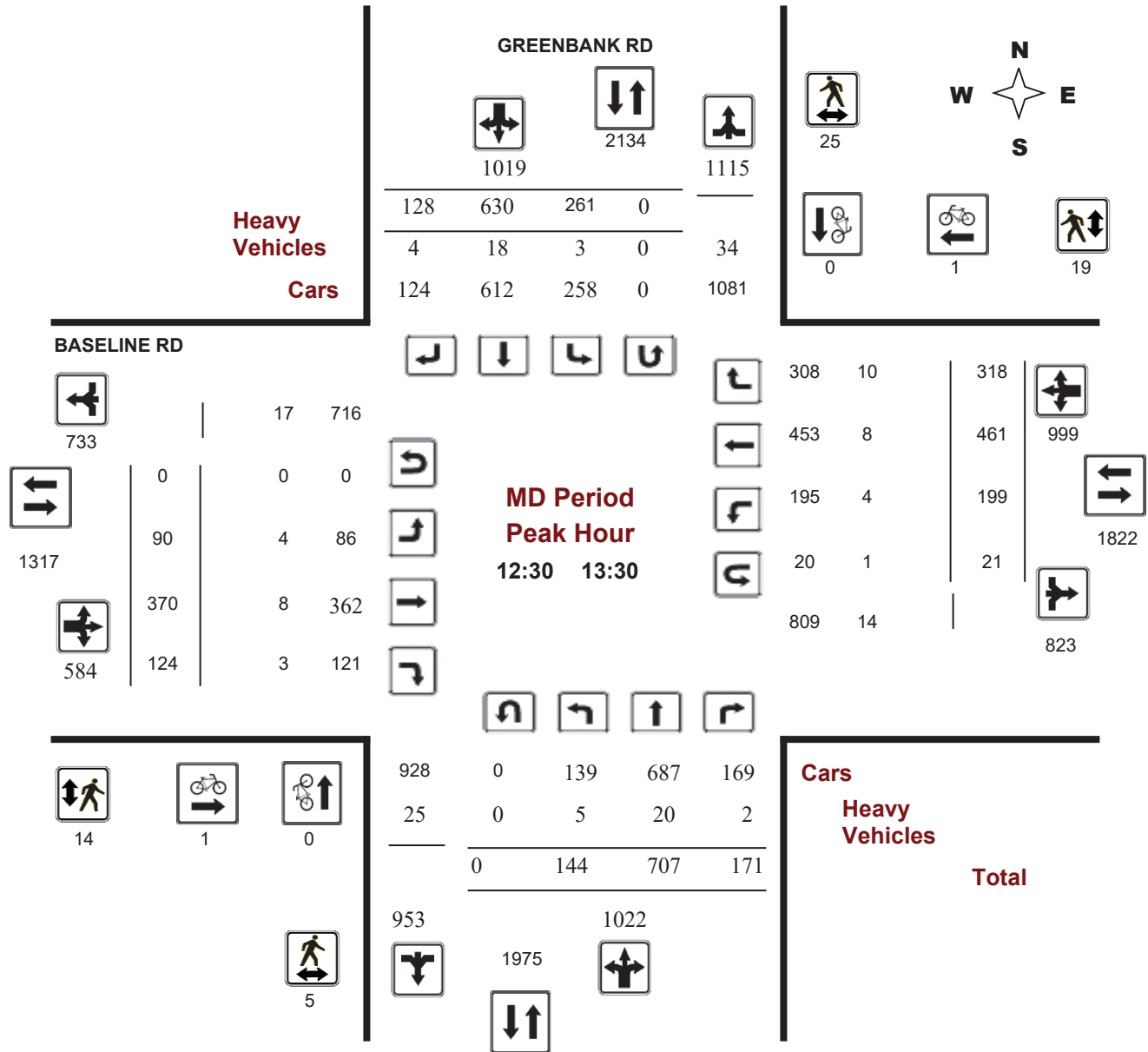
BASELINE RD @ GREENBANK RD

Survey Date: Thursday, August 11, 2016

Start Time: 07:00

WO No: 36185

Device: Miovision



Turning Movement Count - Peak Hour Diagram

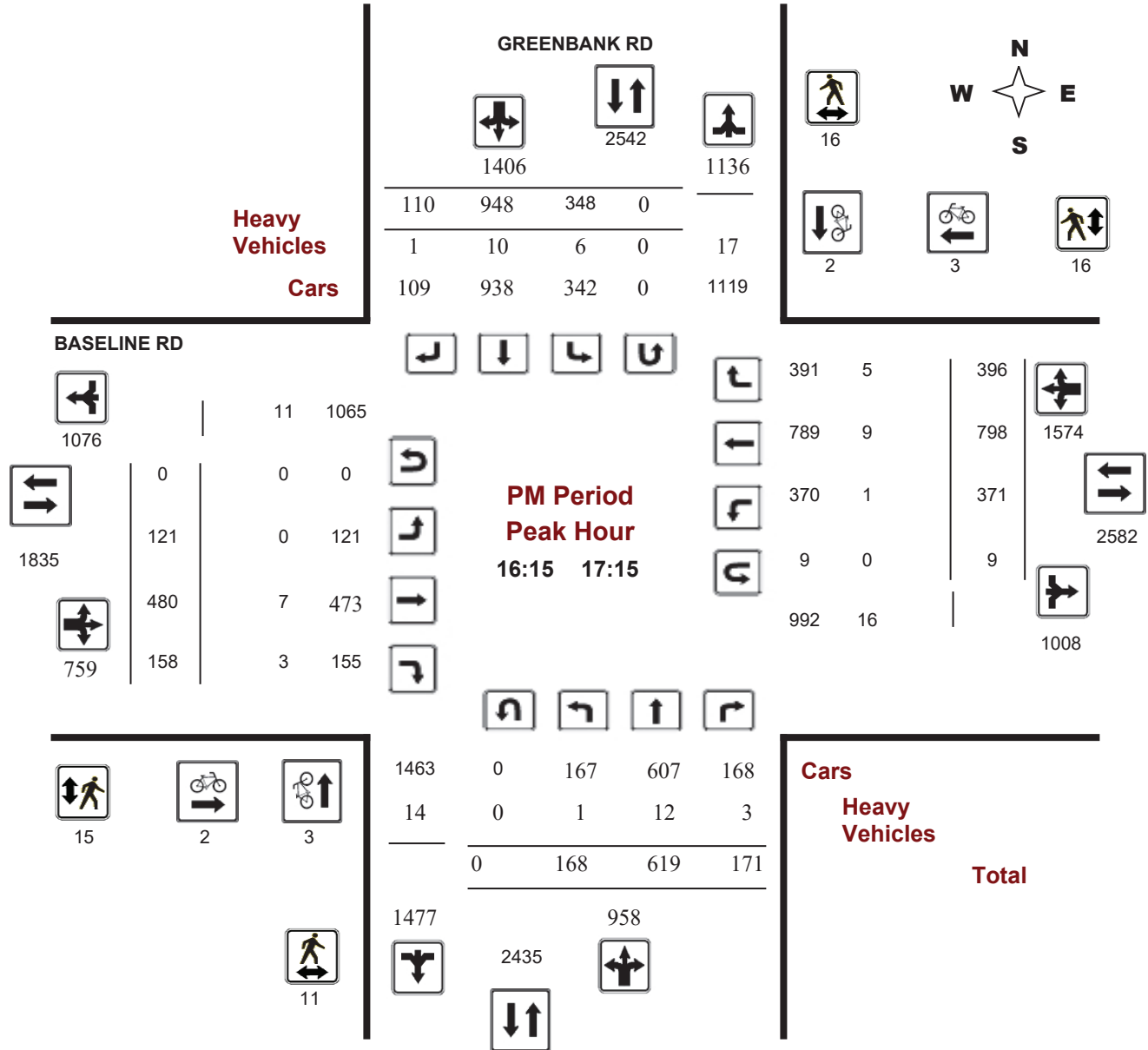
BASELINE RD @ GREENBANK RD

Survey Date: Thursday, August 11, 2016

Start Time: 07:00

WO No: 36185

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

BASELINE RD @ GREENBANK RD

Survey Date: Thursday, August 11, 2016

WO No: 36185

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, August 11, 2016

Total Observed U-Turns
 Northbound: 3 Southbound: 0
 Eastbound: 1 Westbound: 110

AADT Factor
 .90

GREENBANK RD

BASELINE RD

Period	GREENBANK RD					BASELINE RD					WB TOT	STR TOT	Grand Total						
	Northbound			Southbound		Eastbound			Westbound										
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT			
07:00 08:00	91	864	289	1244	329	400	61	790	2034	86	750	65	901	93	254	173	520	1421	3455
08:00 09:00	139	964	323	1426	369	458	67	894	2320	121	692	73	886	147	401	308	856	1742	4062
09:00 10:00	106	732	200	1038	192	422	65	679	1717	108	427	92	627	129	371	300	800	1427	3144
11:30 12:30	120	672	221	1013	274	607	91	972	1985	108	386	132	626	171	423	326	920	1546	3531
12:30 13:30	144	707	171	1022	261	630	128	1019	2041	90	370	124	584	199	461	318	978	1562	3603
15:00 16:00	129	621	181	931	234	820	134	1188	2119	109	382	137	628	223	665	418	1306	1934	4053
16:00 17:00	165	606	161	932	344	951	126	1421	2353	127	476	166	769	355	812	398	1565	2334	4687
17:00 18:00	148	675	192	1015	282	912	111	1305	2320	108	452	162	722	328	678	349	1355	2077	4397
Sub Total	1042	5841	1738	8621	2285	5200	783	8268	16889	857	3935	951	5743	1645	4065	2590	8300	14043	30932
U Turns	3			3	0			0	3	1			1	110			110	111	114
Total	1045	5841	1738	8624	2285	5200	783	8268	16892	858	3935	951	5744	1755	4065	2590	8410	14154	31046

EQ 12Hr 1453 8119 2416 11988 3176 7228 1088 11492 23480 1193 5470 1322 7985 2439 5650 3600 11689 19674 43154

Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**

AVG 12Hr 1308 7307 2174 10789 2858 6505 979 10342 21131 1074 4923 1190 7187 2195 5085 3240 10520 17707 38838

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **.90**

AVG 24Hr 1713 9572 2848 14133 3744 8522 1282 13548 27681 1407 6449 1559 9415 2875 6661 4244 13780 23195 50876

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BASELINE RD @ GREENBANK RD

Survey Date: Thursday, August 11, 2016

WO No: 36185

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

GREENBANK RD

BASELINE RD

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	14	182	57	253	61	96	16	173	426	13	148	17	178	22	34	27	83	261	687
07:15 07:30	15	224	69	308	76	86	12	174	482	27	189	10	226	29	59	48	136	362	844
07:30 07:45	25	218	70	313	99	91	16	206	519	21	215	18	254	23	76	38	137	391	910
07:45 08:00	37	240	93	370	93	127	17	237	607	25	198	20	243	37	85	60	182	425	1032
08:00 08:15	25	221	102	348	98	96	7	201	549	38	207	14	259	39	98	53	190	449	998
08:15 08:30	39	245	71	355	117	113	18	248	603	28	160	16	204	36	91	73	200	404	1007
08:30 08:45	30	249	72	351	85	120	21	226	577	26	178	26	230	45	111	95	251	481	1058
08:45 09:00	45	249	78	372	69	129	21	219	591	29	147	17	193	40	101	87	228	421	1012
09:00 09:15	23	192	57	272	54	110	16	180	452	26	146	28	200	30	113	71	214	414	866
09:15 09:30	26	211	45	282	50	93	15	158	440	24	98	27	149	34	87	92	213	362	802
09:30 09:45	20	163	51	234	49	99	14	162	396	30	73	16	119	43	77	69	189	308	704
09:45 10:00	38	166	47	251	39	120	20	179	430	29	110	21	160	34	94	68	196	356	786
11:30 11:45	30	177	50	257	68	150	19	237	494	27	74	32	133	44	93	65	202	335	829
11:45 12:00	27	161	60	248	82	151	32	265	513	21	116	33	170	48	117	77	242	412	925
12:00 12:15	29	179	52	260	76	146	21	243	503	31	90	28	149	36	103	93	232	381	884
12:15 12:30	34	155	59	248	48	160	19	227	475	29	106	39	174	62	110	91	263	437	912
12:30 12:45	41	183	34	258	57	143	33	233	491	20	75	37	132	53	108	75	236	368	859
12:45 13:00	38	186	44	268	67	178	33	278	546	26	105	26	157	53	120	79	252	409	955
13:00 13:15	29	172	43	244	70	138	29	237	481	18	96	28	142	65	128	78	271	413	894
13:15 13:30	36	166	50	252	67	171	33	271	523	26	94	33	153	49	105	86	240	393	916
15:00 15:15	29	148	40	217	61	197	25	283	500	23	95	21	139	61	140	104	305	444	944
15:15 15:30	26	143	40	209	56	210	30	296	505	29	84	38	151	49	166	108	323	474	979
15:30 15:45	42	151	52	245	60	200	55	315	560	24	97	32	153	43	167	107	317	470	1030
15:45 16:00	33	179	49	261	57	213	24	294	555	33	106	46	185	77	192	99	368	553	1108
16:00 16:15	36	145	35	216	74	224	37	335	551	30	116	48	194	80	197	107	384	578	1129
16:15 16:30	36	149	30	215	89	243	35	367	582	40	127	44	211	93	217	89	399	610	1192
16:30 16:45	46	157	48	251	83	229	27	339	590	27	119	37	183	97	209	98	404	587	1177
16:45 17:00	47	155	48	250	98	255	27	380	630	30	114	37	181	89	189	104	382	563	1193
17:00 17:15	39	158	45	242	78	221	21	320	562	24	120	40	184	101	183	105	389	573	1135
17:15 17:30	35	190	41	266	71	230	27	328	594	26	117	50	193	85	179	81	345	538	1132
17:30 17:45	32	157	52	241	67	233	28	328	569	29	115	35	179	81	161	94	336	515	1084
17:45 18:00	43	170	54	267	66	228	35	329	596	29	100	37	166	77	155	69	301	467	1063
Total:	1045	5841	1738	8624	2285	5200	783	8268	16892	858	3935	951	5744	1755	4065	2590	8410	16892	31,046

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BASELINE RD @ GREENBANK RD

Survey Date: Thursday, August 11, 2016

WO No: 36185

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

Time Period	GREENBANK RD			BASELINE RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15	0	0	0	0	2	2	2
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	0	0	0	0	2	2	2
07:45 08:00	1	0	1	0	1	1	2
08:00 08:15	0	0	0	1	0	1	1
08:15 08:30	0	0	0	0	1	1	1
08:30 08:45	0	0	0	0	1	1	1
08:45 09:00	1	0	1	0	0	0	1
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	1	0	1	1
09:45 10:00	0	0	0	0	1	1	1
11:30 11:45	0	0	0	2	0	2	2
11:45 12:00	0	0	0	1	0	1	1
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	1	1	1
12:30 12:45	0	0	0	1	1	2	2
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	1	1	0	0	0	1
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	1	1	0	0	0	1
15:45 16:00	0	0	0	0	0	0	0
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	1	0	1	0	1	1	2
16:30 16:45	0	0	0	1	1	2	2
16:45 17:00	2	2	4	0	0	0	4
17:00 17:15	0	0	0	1	1	2	2
17:15 17:30	0	1	1	0	0	0	1
17:30 17:45	0	0	0	0	1	1	1
17:45 18:00	0	1	1	0	2	2	3
Total	5	6	11	8	16	24	35



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BASELINE RD @ GREENBANK RD

Survey Date: Thursday, August 11, 2016

WO No: 36185

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

GREENBANK RD

BASELINE RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	3	4	3	3	6	10
07:15 07:30	3	3	6	2	5	7	13
07:30 07:45	10	8	18	1	5	6	24
07:45 08:00	6	7	13	2	2	4	17
08:00 08:15	5	4	9	3	1	4	13
08:15 08:30	3	8	11	6	2	8	19
08:30 08:45	1	5	6	0	6	6	12
08:45 09:00	0	6	6	3	3	6	12
09:00 09:15	0	5	5	1	7	8	13
09:15 09:30	1	4	5	3	3	6	11
09:30 09:45	1	3	4	0	7	7	11
09:45 10:00	1	2	3	1	1	2	5
11:30 11:45	2	6	8	4	2	6	14
11:45 12:00	2	4	6	0	3	3	9
12:00 12:15	2	6	8	3	2	5	13
12:15 12:30	0	0	0	2	8	10	10
12:30 12:45	2	5	7	1	6	7	14
12:45 13:00	2	7	9	3	7	10	19
13:00 13:15	0	7	7	5	1	6	13
13:15 13:30	1	6	7	5	5	10	17
15:00 15:15	5	2	7	3	4	7	14
15:15 15:30	1	2	3	4	2	6	9
15:30 15:45	0	6	6	2	5	7	13
15:45 16:00	1	5	6	7	7	14	20
16:00 16:15	2	3	5	2	6	8	13
16:15 16:30	4	4	8	5	6	11	19
16:30 16:45	0	6	6	4	2	6	12
16:45 17:00	3	3	6	2	2	4	10
17:00 17:15	4	3	7	4	6	10	17
17:15 17:30	0	2	2	2	3	5	7
17:30 17:45	0	2	2	2	2	4	6
17:45 18:00	0	1	1	1	2	3	4
Total	63	138	201	86	126	212	413



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BASELINE RD @ GREENBANK RD

Survey Date: Thursday, August 11, 2016

WO No: 36185

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

GREENBANK RD

BASELINE RD

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	0	5	0	5	2	7	1	10	15	0	4	0	4	3	1	0	4	8	23
07:15 07:30	2	3	0	5	0	8	2	10	15	1	3	0	4	1	2	0	3	7	22
07:30 07:45	1	3	1	5	3	5	1	9	14	1	4	0	5	1	3	0	4	9	23
07:45 08:00	1	7	0	8	1	5	2	8	16	0	3	0	3	1	3	2	6	9	25
08:00 08:15	0	5	1	6	1	7	0	8	14	1	5	0	6	1	5	4	10	16	30
08:15 08:30	1	4	0	5	4	7	1	12	17	1	6	0	7	2	0	2	4	11	28
08:30 08:45	1	9	2	12	4	6	1	11	23	0	2	2	4	2	5	2	9	13	36
08:45 09:00	3	5	0	8	3	1	0	4	12	2	3	0	5	1	1	1	3	8	20
09:00 09:15	0	5	0	5	2	2	0	4	9	0	5	0	5	1	4	1	6	11	20
09:15 09:30	1	3	0	4	0	2	0	2	6	2	1	1	4	0	5	1	6	10	16
09:30 09:45	0	4	0	4	2	2	2	6	10	1	3	0	4	0	4	0	4	8	18
09:45 10:00	0	1	2	3	0	2	0	2	5	0	2	2	4	1	2	1	4	8	13
11:30 11:45	1	3	2	6	0	2	0	2	8	0	2	0	2	0	4	3	7	9	17
11:45 12:00	0	0	1	1	1	1	1	3	4	0	4	0	4	1	2	2	5	9	13
12:00 12:15	0	10	0	10	2	3	1	6	16	0	2	3	5	2	6	3	11	16	32
12:15 12:30	0	5	0	5	1	3	1	5	10	1	2	0	3	0	2	2	4	7	17
12:30 12:45	0	3	1	4	1	4	1	6	10	0	3	0	3	1	1	4	6	9	19
12:45 13:00	2	7	1	10	1	6	2	9	19	2	1	2	5	2	3	2	7	12	31
13:00 13:15	2	7	0	9	0	6	0	6	15	0	1	1	2	1	2	1	4	6	22
13:15 13:30	1	3	0	4	1	2	1	4	8	2	3	0	5	0	2	3	5	10	18
15:00 15:15	0	3	0	3	1	3	1	5	8	2	4	1	7	0	4	0	4	11	19
15:15 15:30	0	3	0	3	0	2	2	4	7	2	1	1	4	1	6	1	8	12	19
15:30 15:45	1	5	1	7	1	5	1	7	14	0	2	0	2	0	2	1	3	5	19
15:45 16:00	0	3	0	3	0	2	0	2	5	0	3	3	6	1	4	0	5	11	16
16:00 16:15	1	4	2	7	0	3	0	3	10	0	2	1	3	1	3	1	5	8	18
16:15 16:30	1	3	1	5	2	3	0	5	10	0	1	0	1	0	3	1	4	5	15
16:30 16:45	0	2	0	2	2	3	1	6	8	0	2	2	4	1	2	4	7	11	19
16:45 17:00	0	3	0	3	1	1	0	2	5	0	2	1	3	0	3	0	3	6	11
17:00 17:15	0	4	2	6	1	3	0	4	10	0	2	0	2	0	1	0	1	3	13
17:15 17:30	0	1	2	3	0	2	0	2	5	0	2	0	2	0	4	0	4	6	11
17:30 17:45	0	6	1	7	0	2	0	2	9	0	2	0	2	1	1	0	2	4	13
17:45 18:00	0	5	0	5	0	1	0	1	6	0	2	0	2	0	2	0	2	4	10
Total: None	19	134	20	173	37	111	22	170	343	18	84	20	122	26	92	42	160	282	626



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BASELINE RD @ GREENBANK RD

Survey Date: Thursday, August 11, 2016

WO No: 36185

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

GREENBANK RD

BASELINE RD

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	2	2
07:15	07:30	0	0	0	7	7
07:30	07:45	0	0	0	5	5
07:45	08:00	0	0	0	4	4
08:00	08:15	0	0	0	4	4
08:15	08:30	0	0	0	4	4
08:30	08:45	0	0	0	2	2
08:45	09:00	0	0	0	3	3
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	1	4	5
09:30	09:45	1	0	0	3	4
09:45	10:00	0	0	0	5	5
11:30	11:45	0	0	0	4	4
11:45	12:00	0	0	0	5	5
12:00	12:15	0	0	0	5	5
12:15	12:30	0	0	0	5	5
12:30	12:45	0	0	0	4	4
12:45	13:00	0	0	0	5	5
13:00	13:15	0	0	0	9	9
13:15	13:30	0	0	0	3	3
15:00	15:15	0	0	0	3	3
15:15	15:30	0	0	0	2	2
15:30	15:45	0	0	0	0	0
15:45	16:00	1	0	0	2	3
16:00	16:15	0	0	0	1	1
16:15	16:30	0	0	0	1	1
16:30	16:45	0	0	0	1	1
16:45	17:00	0	0	0	1	1
17:00	17:15	0	0	0	6	6
17:15	17:30	1	0	0	3	4
17:30	17:45	0	0	0	6	6
17:45	18:00	0	0	0	1	1
Total		3	0	1	110	114

Turning Movement Count - Study Results

GREENBANK RD @ IRIS ST/HWY 417 IC129 RAMP51

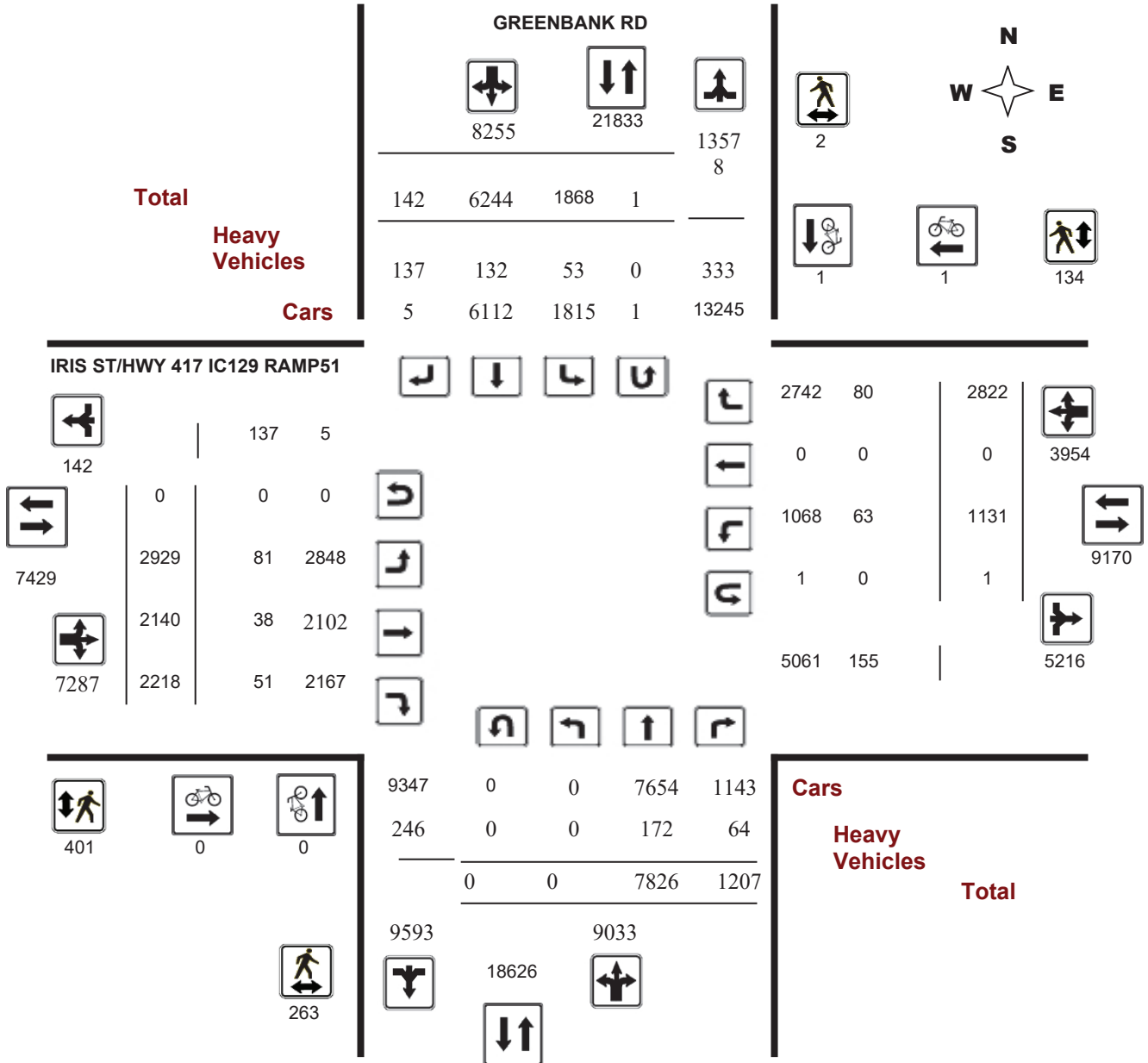
Survey Date: Wednesday, January 16, 2019

WO No: 38263

Start Time: 07:00

Device: Miovision

Full Study Diagram



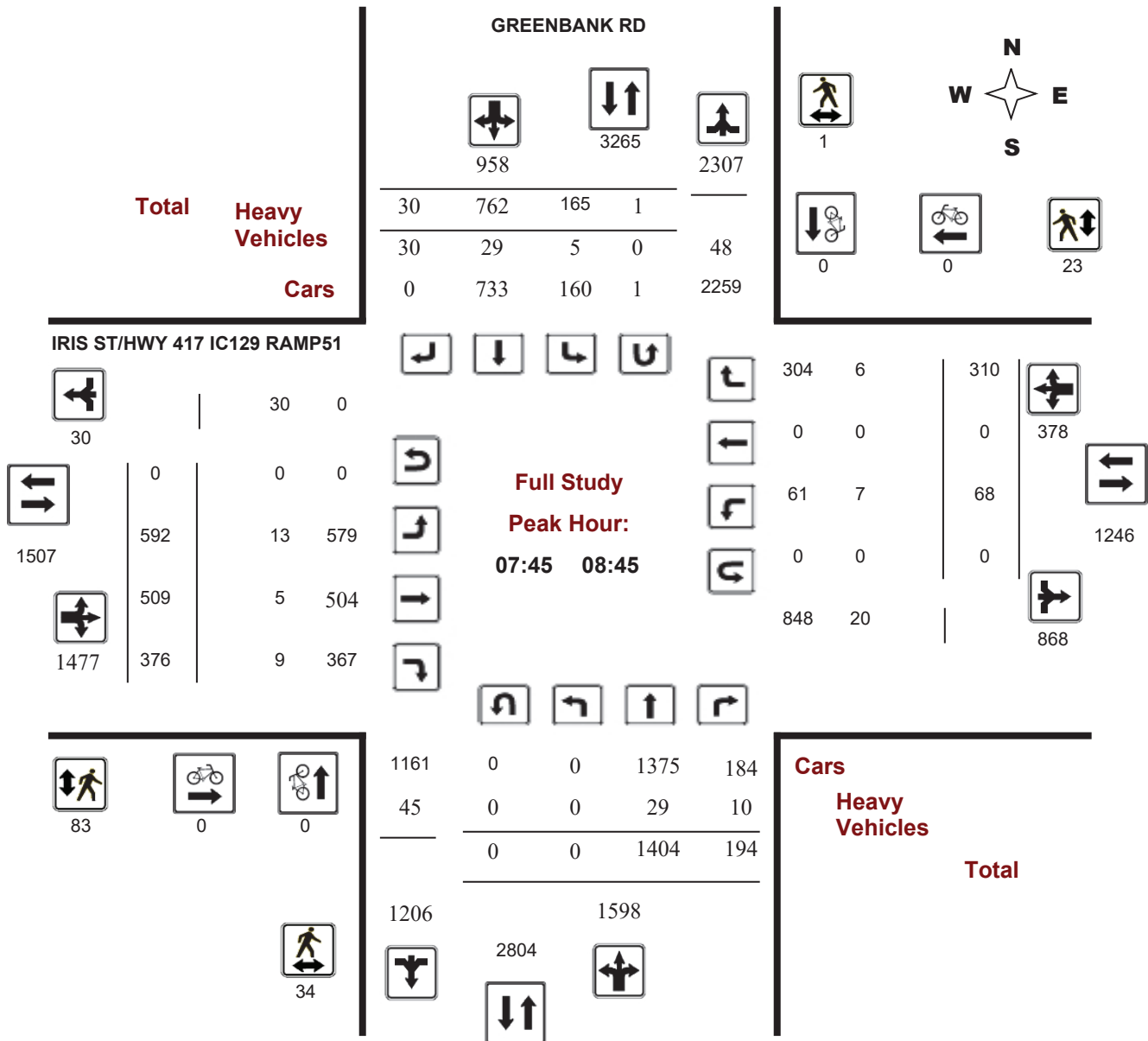
Survey Date: Wednesday, January 16, 2019

WO No: 38263

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



Turning Movement Count - Peak Hour Diagram

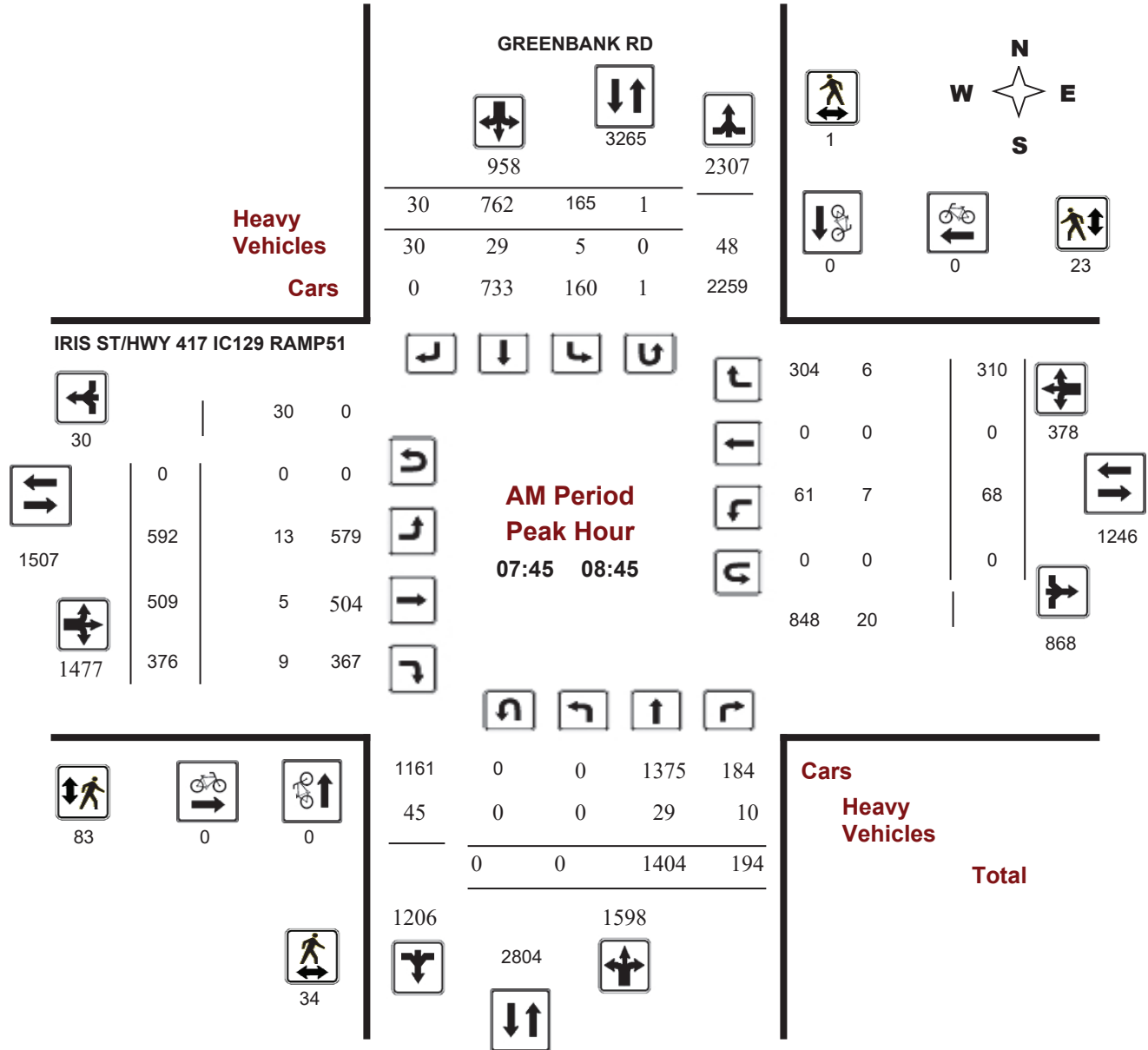
GREENBANK RD @ IRIS ST/HWY 417 IC129 RAMP51

Survey Date: Wednesday, January 16, 2019

Start Time: 07:00

WO No: 38263

Device: Miovision



Turning Movement Count - Peak Hour Diagram

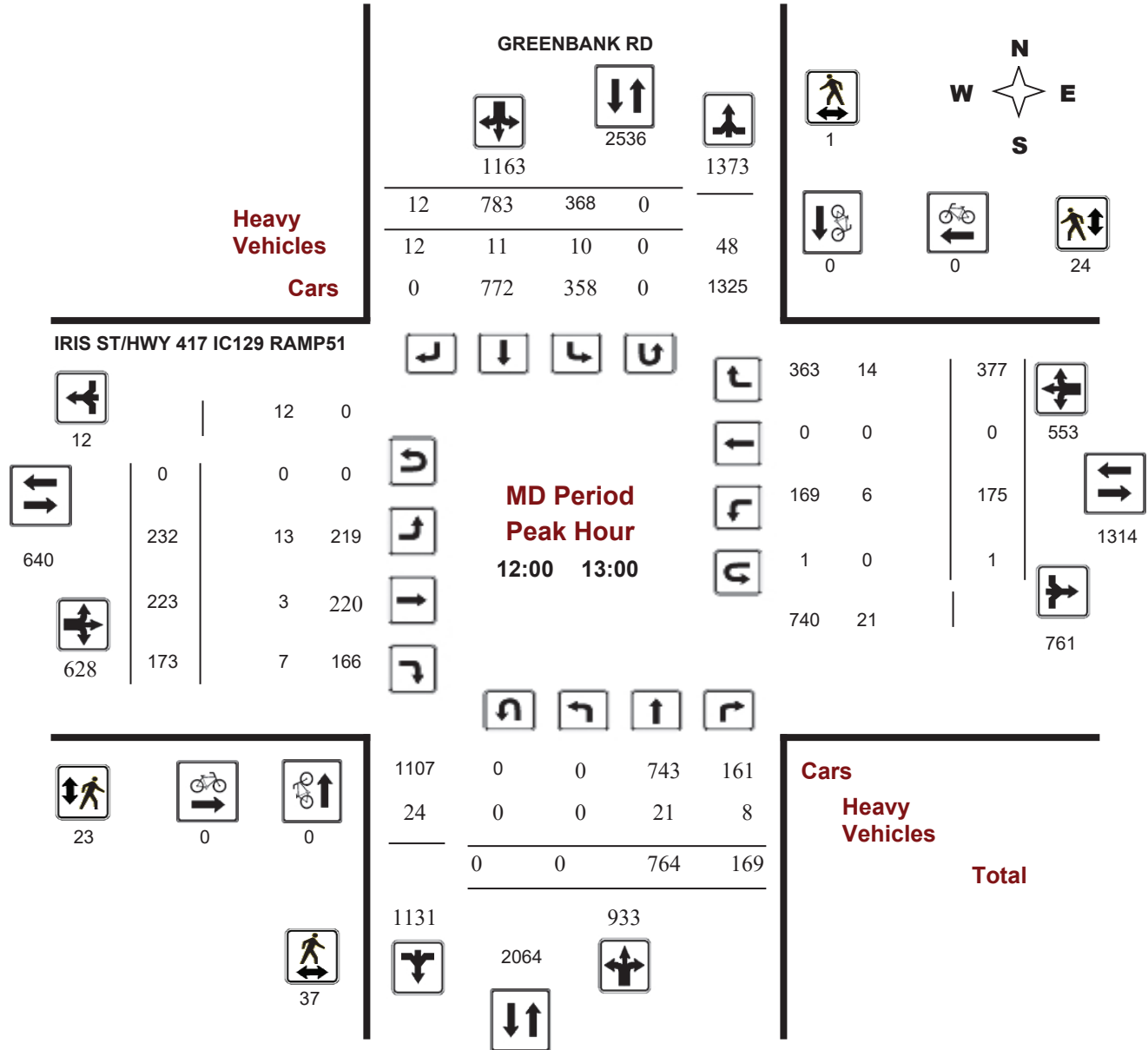
GREENBANK RD @ IRIS ST/HWY 417 IC129 RAMP51

Survey Date: Wednesday, January 16, 2019

Start Time: 07:00

WO No: 38263

Device: Miovision



Turning Movement Count - Peak Hour Diagram

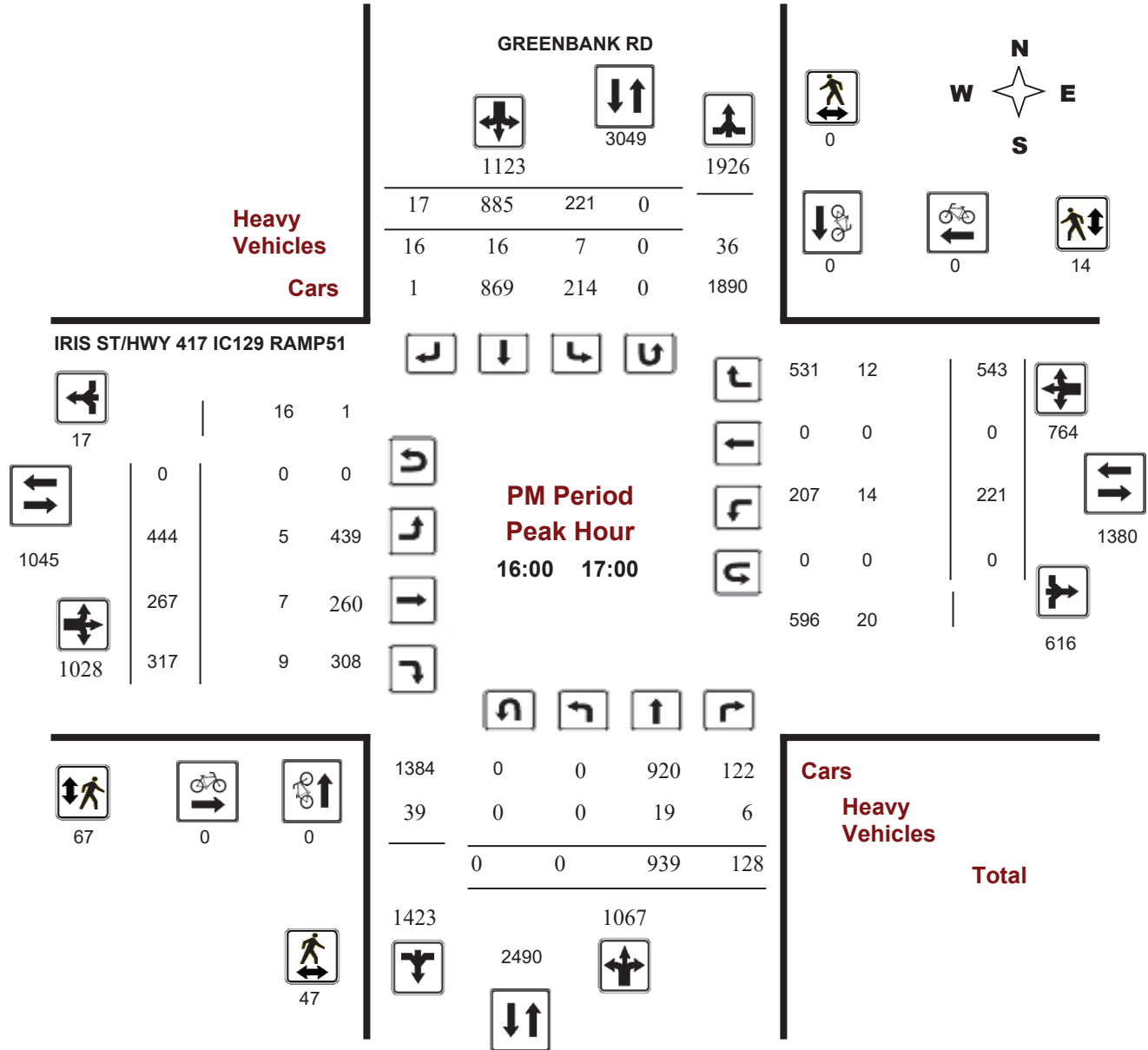
GREENBANK RD @ IRIS ST/HWY 417 IC129 RAMP51

Survey Date: Wednesday, January 16, 2019

Start Time: 07:00

WO No: 38263

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ IRIS ST/HWY 417 IC129 RAMP51

Survey Date: Wednesday, January 16, 2019

WO No: 38263

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, January 16, 2019

Total Observed U-Turns

AADT Factor

Northbound: 0 Southbound: 1
 Eastbound: 0 Westbound: 1

1.00

GREENBANK RD

IRIS ST/HWY 417 IC129 RAMP51

Period	GREENBANK RD Northbound					GREENBANK RD Southbound					IRIS ST/HWY 417 IC129 RAMP51 Eastbound					IRIS ST/HWY 417 IC129 RAMP51 Westbound					Grand Total
	LT	ST	RT	NB TOT	STR TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	STR TOT	LT	ST	RT	WB TOT	STR TOT	
07:00 08:00	0	1153	126	1279	2122	163	652	28	843	2122	484	404	354	1242	1442	48	0	152	200	1442	3564
08:00 09:00	0	1399	190	1589	2542	168	757	28	953	2542	609	457	394	1460	1828	71	0	297	368	1828	4370
09:00 10:00	0	1015	131	1146	2009	210	637	16	863	2009	284	178	257	719	974	91	0	164	255	974	2983
11:30 12:30	0	805	184	989	2079	341	739	10	1090	2079	257	220	183	660	1170	141	0	369	510	1170	3249
12:30 13:30	0	732	122	854	1941	329	746	12	1087	1941	245	189	176	610	1208	190	0	408	598	1208	3149
15:00 16:00	0	947	174	1121	2223	224	863	15	1102	2223	294	209	226	729	1374	201	0	444	645	1374	3597
16:00 17:00	0	939	128	1067	2190	221	885	17	1123	2190	444	267	317	1028	1792	221	0	543	764	1792	3982
17:00 18:00	0	836	152	988	2181	212	965	16	1193	2181	312	216	311	839	1452	168	0	445	613	1452	3633
Sub Total	0	7826	1207	9033	17287	1868	6244	142	8254	17287	2929	2140	2218	7287	11240	0	2822	3953	11240	28527	
U Turns	0			0	1				1	1	0			0	1			1	1	2	
Total	0	7826	1207	9033	17288	1869	6244	142	8255	17288	2929	2140	2218	7287	11321	0	2822	3954	11241	28529	
EQ 12Hr	0	10878	1678	12556	24030	2598	8679	197	11474	24030	4071	2975	3083	10129	15625	0	3923	5496	15625	39655	
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																			1.39		
AVG 12Hr	0	10878	1678	12556	24030	2598	8679	197	11474	24030	4071	2975	3083	10129	15625	0	3923	5496	15625	39655	
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																			1.00		
AVG 24Hr	0	14250	2198	16448	31478	3403	11369	258	15030	31478	5333	3897	4039	13269	20469	0	5139	7200	20469	51947	
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																			1.31		
Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.																					



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ IRIS ST/HWY 417 IC129 RAMP51

Survey Date: Wednesday, January 16, 2019

WO No: 38263

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

GREENBANK RD

IRIS ST/HWY 417 IC129 RAMP51

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	0	254	17	271	33	129	6	168	439	105	45	80	230	4	0	31	35	265	704
07:15 07:30	0	268	29	297	41	156	5	202	499	116	91	96	303	12	0	34	46	349	848
07:30 07:45	0	318	31	349	42	179	10	231	580	128	129	85	342	15	0	32	47	389	969
07:45 08:00	0	313	49	362	47	188	7	242	604	135	139	93	367	17	0	55	72	439	1043
08:00 08:15	0	346	44	390	52	194	9	255	645	152	140	79	371	16	0	85	101	472	1117
08:15 08:30	0	352	56	408	33	202	8	243	651	152	132	104	388	15	0	83	98	486	1137
08:30 08:45	0	393	45	438	34	178	6	218	656	153	98	100	351	20	0	87	107	458	1114
08:45 09:00	0	308	45	353	50	183	5	238	591	152	87	111	350	20	0	42	62	412	1003
09:00 09:15	0	306	35	341	44	176	5	225	566	84	49	75	208	25	0	52	77	285	851
09:15 09:30	0	264	32	296	45	160	2	207	503	80	42	55	177	25	0	32	57	234	737
09:30 09:45	0	234	34	268	58	161	6	225	493	68	42	63	173	20	0	42	62	235	728
09:45 10:00	0	211	30	241	63	140	3	206	447	52	45	64	161	21	0	38	59	220	667
11:30 11:45	0	199	41	240	72	174	2	248	488	76	46	39	161	31	0	87	118	279	767
11:45 12:00	0	194	47	241	87	181	2	270	511	62	57	48	167	37	0	106	143	310	821
12:00 12:15	0	194	52	246	99	199	2	300	546	67	59	50	176	38	0	96	134	310	856
12:15 12:30	0	218	44	262	83	185	4	272	534	52	58	46	156	35	0	80	115	271	805
12:30 12:45	0	168	33	201	107	181	3	291	492	50	58	31	139	47	0	89	136	275	767
12:45 13:00	0	184	40	224	79	218	3	300	524	63	48	46	157	56	0	112	168	325	849
13:00 13:15	0	209	22	231	57	168	3	228	459	64	40	55	159	45	0	98	143	302	761
13:15 13:30	0	171	27	198	86	179	3	268	466	68	43	44	155	43	0	109	152	307	773
15:00 15:15	0	190	32	222	61	196	3	260	482	72	55	57	184	48	0	129	177	361	843
15:15 15:30	0	268	55	323	58	248	5	311	634	68	44	70	182	45	0	103	148	330	964
15:30 15:45	0	255	36	291	55	212	2	269	560	82	61	46	189	51	0	105	156	345	905
15:45 16:00	0	234	51	285	50	207	5	262	547	72	49	53	174	57	0	107	164	338	885
16:00 16:15	0	243	34	277	43	231	4	278	555	98	56	75	229	47	0	135	182	411	966
16:15 16:30	0	251	27	278	67	234	5	306	584	114	64	96	274	61	0	144	205	479	1063
16:30 16:45	0	221	31	252	47	197	1	245	497	108	57	76	241	59	0	117	176	417	914
16:45 17:00	0	224	36	260	64	223	7	294	554	124	90	70	284	54	0	147	201	485	1039
17:00 17:15	0	202	38	240	60	230	5	295	535	80	72	84	236	47	0	119	166	402	937
17:15 17:30	0	207	22	229	44	260	0	304	533	93	49	85	227	48	0	115	163	390	923
17:30 17:45	0	213	38	251	56	246	7	309	560	74	48	71	193	28	0	113	141	334	894
17:45 18:00	0	214	54	268	52	229	4	285	553	65	47	71	183	45	0	98	143	326	879
Total:	0	7826	1207	9033	1869	6244	142	8255	17288	2929	2140	2218	7287	1132	0	2822	3954	17288	28,529

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ IRIS ST/HWY 417 IC129 RAMP51

Survey Date: Wednesday, January 16, 2019

WO No: 38263

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

GREENBANK RD

IRIS ST/HWY 417 IC129 RAMP51

Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	1	1	0	0	0	1
07:30 07:45	0	0	0	0	0	0	0
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	0	0	0	0	0	0	0
08:15 08:30	0	0	0	0	0	0	0
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	0	0	0
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	0	0	0	0
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	0	0	0	0	0	0
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	0	0	0	0	0	0
17:30 17:45	0	0	0	0	1	1	1
17:45 18:00	0	0	0	0	0	0	0
Total	0	1	1	0	1	1	2



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ IRIS ST/HWY 417 IC129 RAMP51

Survey Date: Wednesday, January 16, 2019

WO No: 38263

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

GREENBANK RD

IRIS ST/HWY 417 IC129 RAMP51

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	2	0	2	10	1	11	13
07:15 07:30	6	0	6	16	7	23	29
07:30 07:45	11	0	11	15	3	18	29
07:45 08:00	12	0	12	20	4	24	36
08:00 08:15	10	0	10	28	6	34	44
08:15 08:30	7	0	7	17	9	26	33
08:30 08:45	5	1	6	18	4	22	28
08:45 09:00	5	0	5	16	7	23	28
09:00 09:15	3	0	3	7	2	9	12
09:15 09:30	1	0	1	9	3	12	13
09:30 09:45	6	0	6	4	2	6	12
09:45 10:00	2	0	2	5	1	6	8
11:30 11:45	2	0	2	8	3	11	13
11:45 12:00	8	0	8	4	6	10	18
12:00 12:15	9	1	10	7	7	14	24
12:15 12:30	7	0	7	3	4	7	14
12:30 12:45	11	0	11	8	6	14	25
12:45 13:00	10	0	10	5	7	12	22
13:00 13:15	9	0	9	7	3	10	19
13:15 13:30	7	0	7	10	5	15	22
15:00 15:15	7	0	7	7	4	11	18
15:15 15:30	8	0	8	8	3	11	19
15:30 15:45	18	0	18	18	6	24	42
15:45 16:00	12	0	12	14	4	18	30
16:00 16:15	8	0	8	15	2	17	25
16:15 16:30	16	0	16	20	0	20	36
16:30 16:45	14	0	14	22	9	31	45
16:45 17:00	9	0	9	10	3	13	22
17:00 17:15	10	0	10	23	2	25	35
17:15 17:30	8	0	8	15	5	20	28
17:30 17:45	10	0	10	12	4	16	26
17:45 18:00	10	0	10	20	2	22	32
Total	263	2	265	401	134	535	800



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ IRIS ST/HWY 417 IC129 RAMP51

Survey Date: Wednesday, January 16, 2019

WO No: 38263

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

GREENBANK RD

IRIS ST/HWY 417 IC129 RAMP51

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	0	6	2	8	0	5	6	11	19	1	1	2	4	0	0	4	4	8	27
07:15 07:30	0	3	1	4	0	6	5	11	15	4	0	1	5	2	0	1	3	8	23
07:30 07:45	0	7	1	8	3	9	9	21	29	2	1	6	9	0	0	0	0	9	38
07:45 08:00	0	6	2	8	3	2	7	12	20	4	2	2	8	2	0	0	2	10	30
08:00 08:15	0	9	4	13	1	8	9	18	31	3	0	2	5	1	0	2	3	8	39
08:15 08:30	0	6	2	8	0	11	8	19	27	2	1	1	4	3	0	3	6	10	37
08:30 08:45	0	8	2	10	1	8	6	15	25	4	2	4	10	1	0	1	2	12	37
08:45 09:00	0	9	2	11	0	6	5	11	22	0	1	4	5	2	0	1	3	8	30
09:00 09:15	0	11	4	15	2	4	5	11	26	3	2	1	6	0	0	6	6	12	38
09:15 09:30	0	5	4	9	0	1	2	3	12	2	2	2	6	2	0	1	3	9	21
09:30 09:45	0	3	2	5	3	3	6	12	17	3	2	1	6	1	0	7	8	14	31
09:45 10:00	0	3	1	4	1	3	3	7	11	4	1	0	5	2	0	4	6	11	22
11:30 11:45	0	6	2	8	2	3	2	7	15	2	0	0	2	1	0	3	4	6	21
11:45 12:00	0	4	3	7	1	3	2	6	13	3	1	1	5	1	0	1	2	7	20
12:00 12:15	0	4	4	8	2	1	2	5	13	6	0	4	10	2	0	3	5	15	28
12:15 12:30	0	3	2	5	0	2	4	6	11	4	1	1	6	1	0	2	3	9	20
12:30 12:45	0	6	1	7	4	4	3	11	18	2	1	0	3	1	0	2	3	6	24
12:45 13:00	0	8	1	9	4	4	3	11	20	1	1	2	4	2	0	7	9	13	33
13:00 13:15	0	5	1	6	4	4	3	11	17	4	1	0	5	5	0	3	8	13	30
13:15 13:30	0	6	1	7	0	3	3	6	13	1	5	0	6	2	0	3	5	11	24
15:00 15:15	0	4	2	6	3	5	3	11	17	4	1	3	8	4	0	2	6	14	31
15:15 15:30	0	7	3	10	1	11	5	17	27	2	0	3	5	1	0	2	3	8	35
15:30 15:45	0	4	4	8	4	5	2	11	19	5	2	1	8	3	0	3	6	14	33
15:45 16:00	0	6	2	8	1	2	5	8	16	4	2	1	7	2	0	2	4	11	27
16:00 16:15	0	3	3	6	2	5	4	11	17	1	1	5	7	5	0	4	9	16	33
16:15 16:30	0	8	0	8	1	6	5	12	20	1	2	0	3	3	0	2	5	8	28
16:30 16:45	0	5	0	5	2	2	1	5	10	1	3	2	6	4	0	0	4	10	20
16:45 17:00	0	3	3	6	2	3	6	11	17	2	1	2	5	2	0	6	8	13	30
17:00 17:15	0	4	2	6	2	1	4	7	13	1	1	0	2	3	0	3	6	8	21
17:15 17:30	0	2	1	3	0	1	0	1	4	1	0	0	1	1	0	1	2	3	7
17:30 17:45	0	4	1	5	4	1	5	10	15	1	0	0	1	2	0	0	2	3	18
17:45 18:00	0	4	1	5	0	0	4	4	9	3	0	0	3	2	0	1	3	6	15
Total: None	0	172	64	236	53	132	137	322	558	81	38	51	170	63	0	80	143	313	871



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ IRIS ST/HWY 417 IC129 RAMP51

Survey Date: Wednesday, January 16, 2019

WO No: 38263

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

GREENBANK RD IRIS ST/HWY 417 IC129 RAMP51

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	1	0	0	1
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	1	1
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	1	0	1	2

Turning Movement Count - Study Results

GREENBANK RD @ LISA AVE

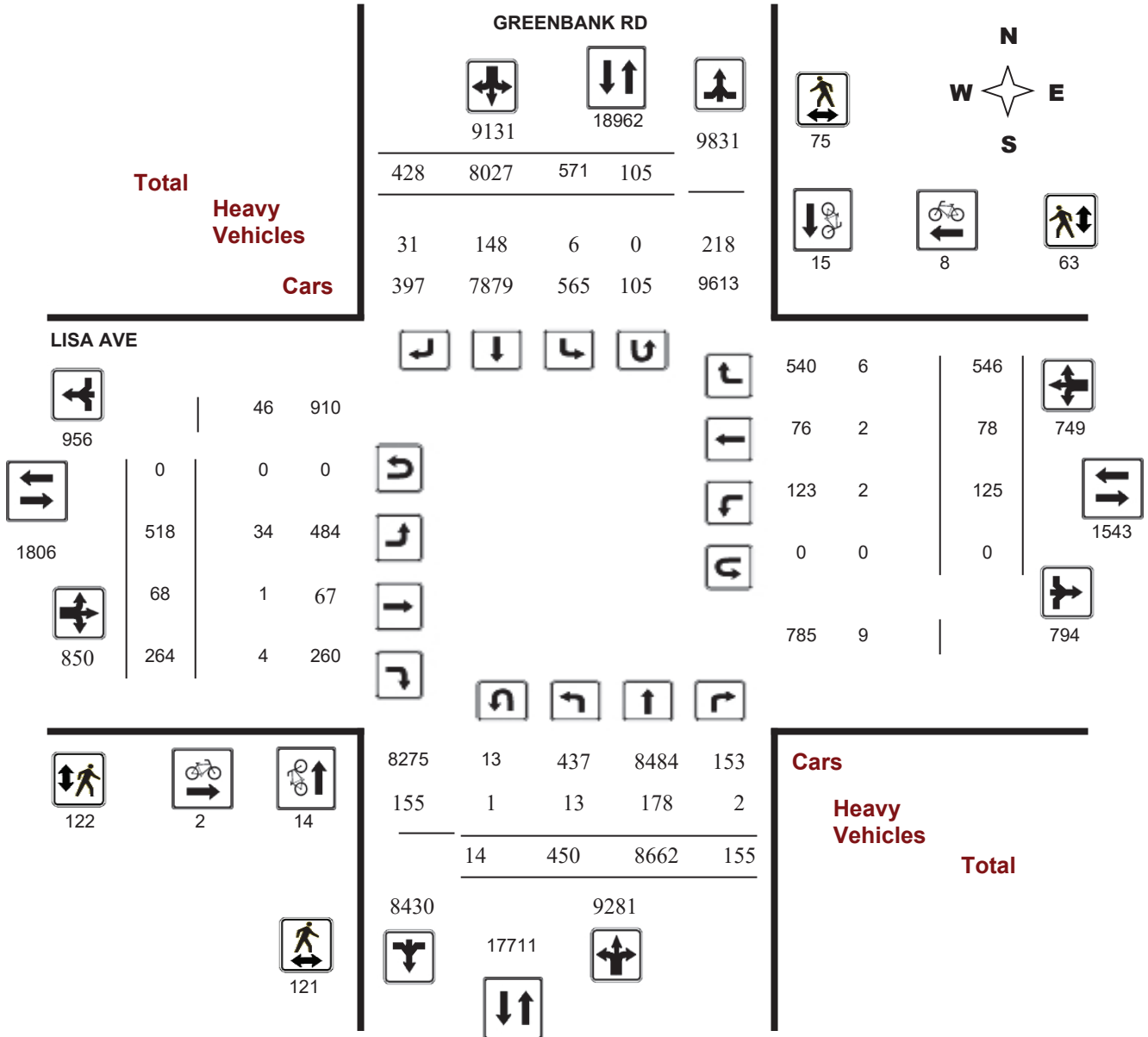
Survey Date: Thursday, August 11, 2016

WO No: 36183

Start Time: 07:00

Device: Miovision

Full Study Diagram



Turning Movement Count - Study Results

GREENBANK RD @ LISA AVE

Survey Date: Thursday, August 11, 2016

WO No:

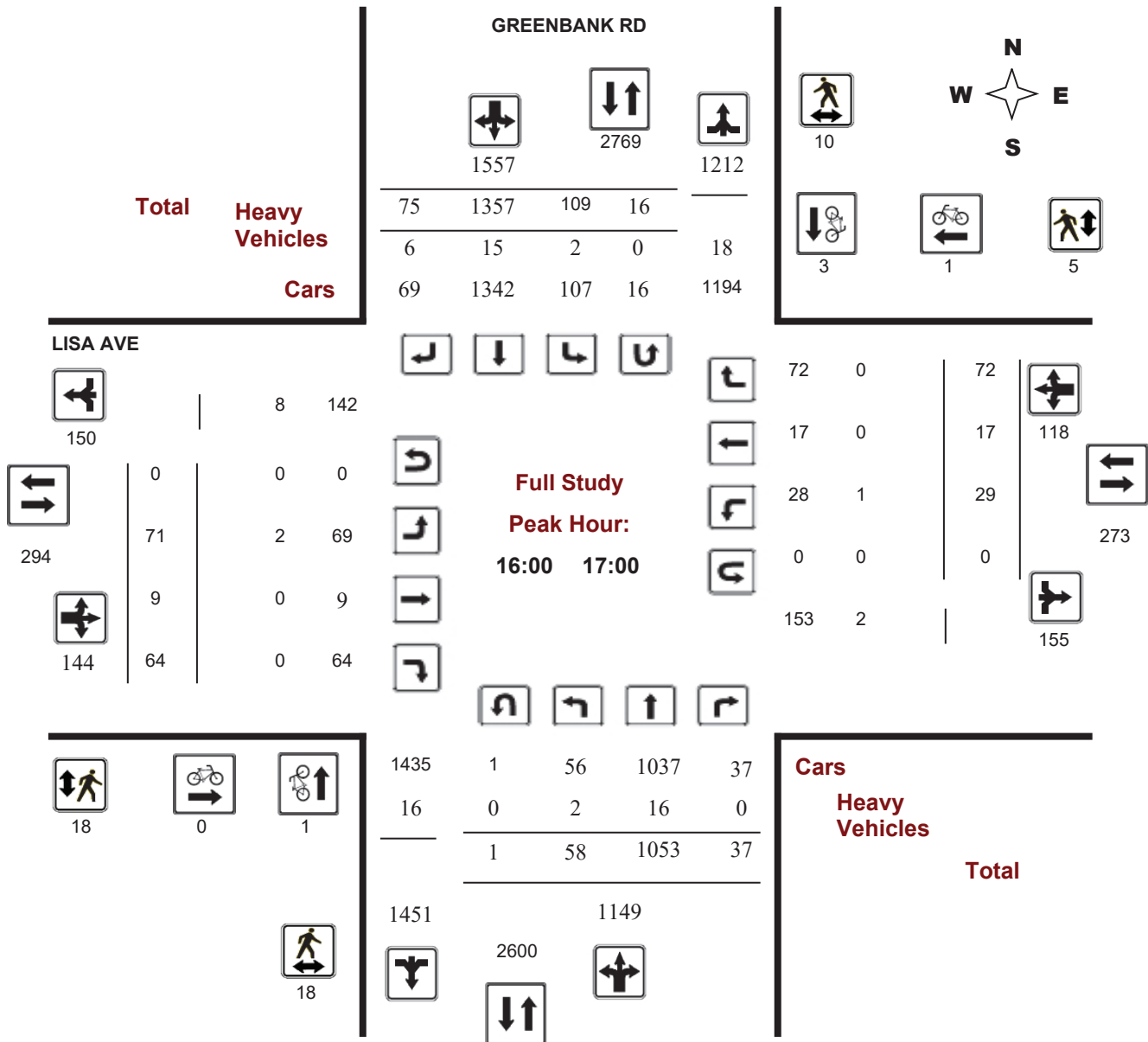
36183

Start Time: 07:00

Device:

Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

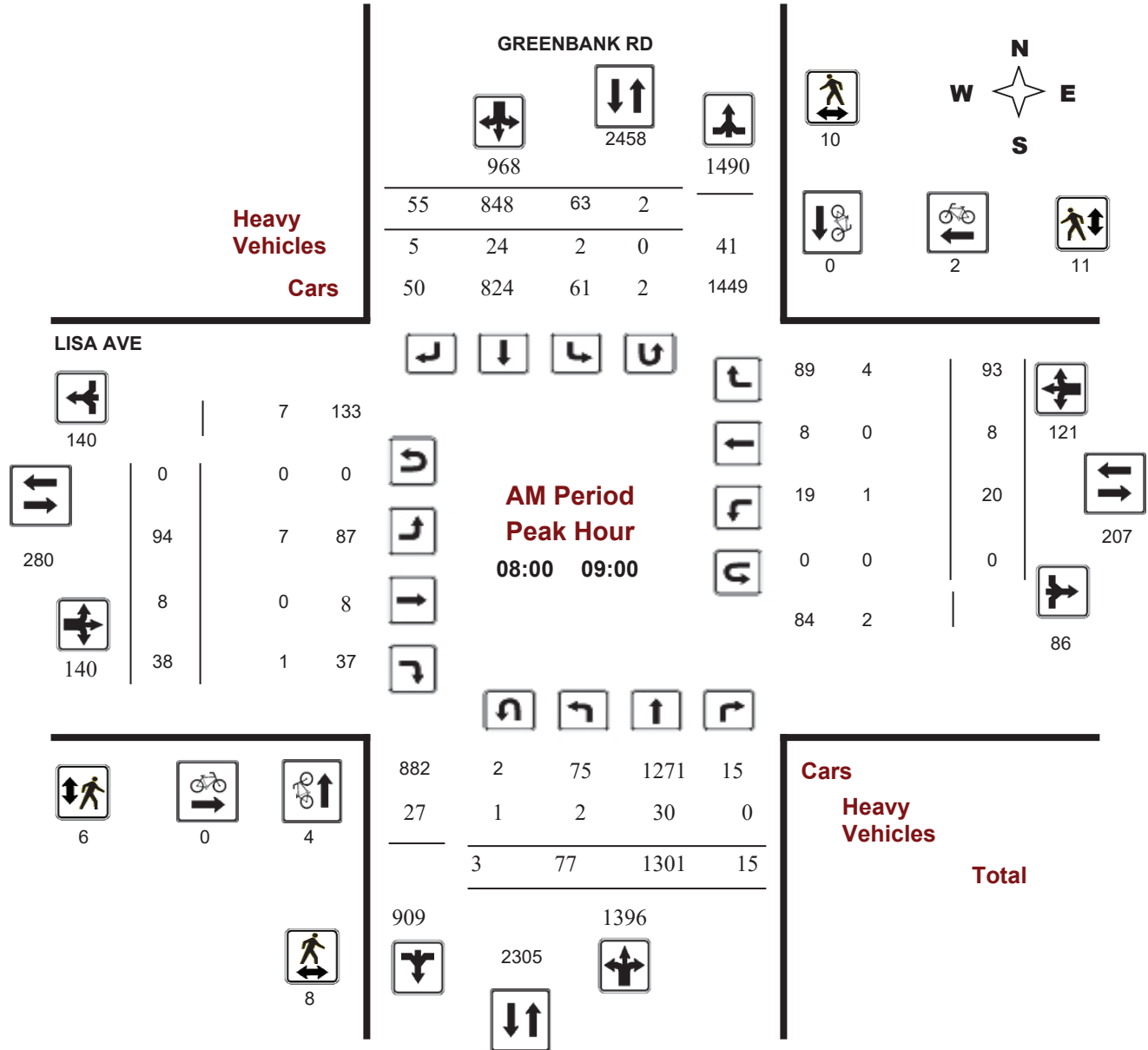
GREENBANK RD @ LISA AVE

Survey Date: Thursday, August 11, 2016

Start Time: 07:00

WO No: 36183

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

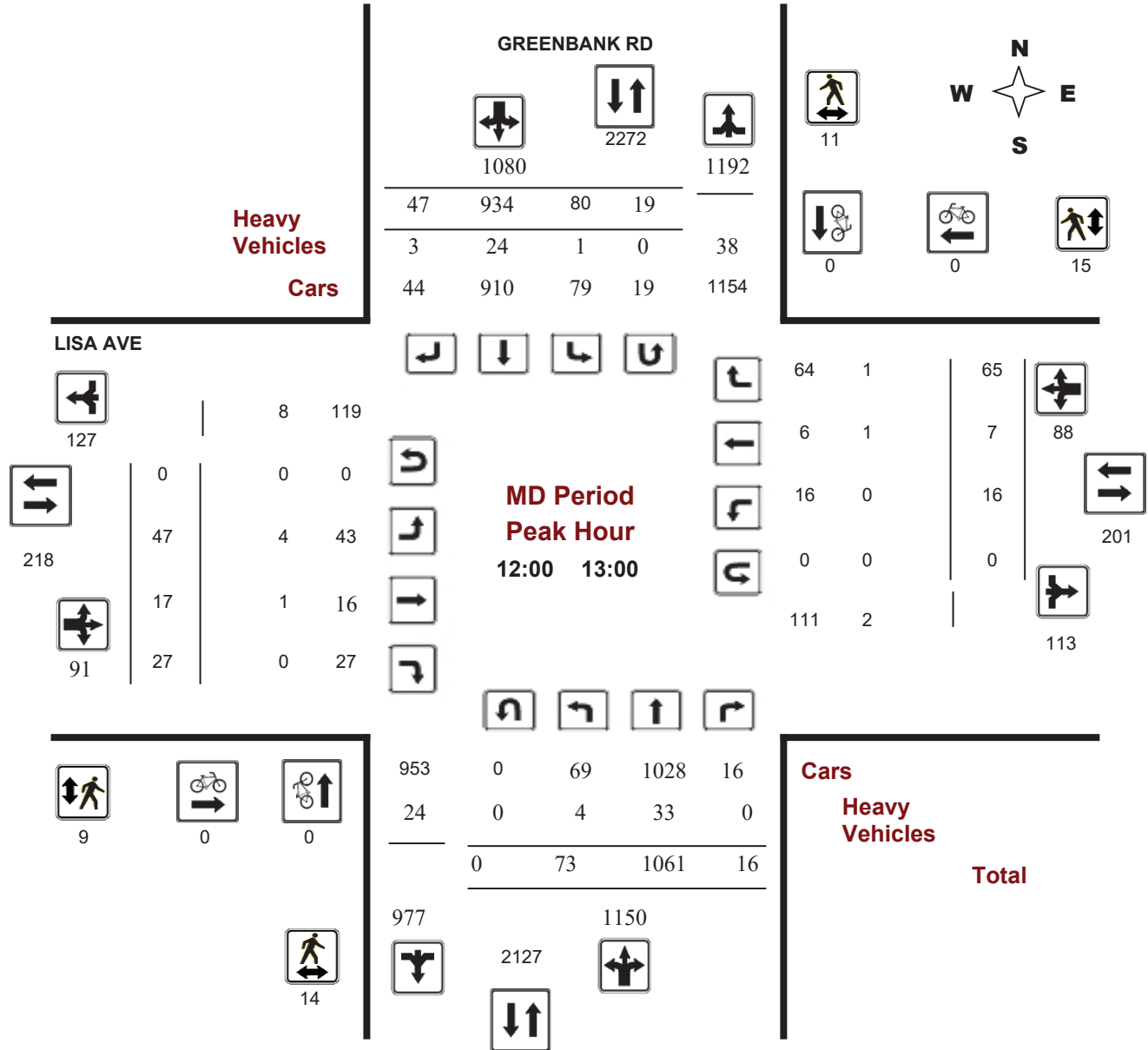
GREENBANK RD @ LISA AVE

Survey Date: Thursday, August 11, 2016

Start Time: 07:00

WO No: 36183

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ LISA AVE

Survey Date: Thursday, August 11, 2016

WO No: 36183

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, August 11, 2016

Total Observed U-Turns
 Northbound: 14 Southbound: 105
 Eastbound: 0 Westbound: 0

AADT Factor
 .90

GREENBANK RD

LISA AVE

Period	GREENBANK RD Northbound					GREENBANK RD Southbound					LISA AVE Eastbound					LISA AVE Westbound					Grand Total
	LT	ST	RT	NB TOT	STR TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	STR TOT	LT	ST	RT	WB TOT	STR TOT	
07:00 08:00	46	1105	8	1159	2014	63	772	20	855	2014	44	5	18	67	152	8	4	73	85	152	2166
08:00 09:00	77	1301	15	1393	2359	63	848	55	966	2359	94	8	38	140	261	20	8	93	121	261	2620
09:00 10:00	44	1089	16	1149	1881	47	645	40	732	1881	64	9	28	101	165	8	5	51	64	165	2046
11:30 12:30	62	1027	13	1102	2172	80	943	47	1070	2172	50	12	30	92	192	19	8	73	100	192	2364
12:30 13:30	59	1064	16	1139	2221	51	981	50	1082	2221	57	8	24	89	158	10	9	50	69	158	2379
15:00 16:00	55	1081	17	1153	2455	73	1167	62	1302	2455	66	6	28	100	211	14	13	84	111	211	2666
16:00 17:00	58	1053	37	1148	2689	109	1357	75	1541	2689	71	9	64	144	262	29	17	72	118	262	2951
17:00 18:00	49	942	33	1024	2502	85	1314	79	1478	2502	72	11	34	117	198	17	14	50	81	198	2700
Sub Total	450	8662	155	9267	18293	571	8027	428	9026	18293	518	68	264	850	1599	125	78	546	749	1599	19892
U Turns	14			14	119	105			105	119	0			0	0				0	0	119
Total	464	8662	155	9281	18412	676	8027	428	9131	18412	518	68	264	850	1599	125	78	546	749	1599	20011
EQ 12Hr	645	12040	215	12900	25593	940	11158	595	12693	25593	720	95	367	1182	2223	174	108	759	1041	2223	27816
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																	1.39				
AVG 12Hr	580	10836	194	11610	23034	846	10042	536	11424	23034	648	86	330	1064	2001	157	97	683	937	2001	25035
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																	.90				
AVG 24Hr	760	14195	254	15209	30174	1108	13155	702	14965	30174	849	113	432	1394	2622	206	127	895	1228	2622	32796
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																	1.31				

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ LISA AVE

Survey Date: Thursday, August 11, 2016

WO No: 36183

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

GREENBANK RD

LISA AVE

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	11	227	1	239	13	150	2	165	404	6	1	5	12	3	1	18	22	34	438
07:15 07:30	14	277	3	294	16	183	5	204	498	11	0	3	14	1	0	11	12	26	524
07:30 07:45	10	301	1	312	17	220	6	243	555	14	1	5	20	2	3	18	23	43	598
07:45 08:00	13	300	3	316	20	219	7	246	562	13	3	5	21	2	0	26	28	49	611
08:00 08:15	16	308	5	329	21	203	9	233	562	28	2	9	39	8	3	21	32	71	633
08:15 08:30	23	312	5	340	13	226	13	252	592	17	2	9	28	6	2	22	30	58	650
08:30 08:45	17	345	3	365	15	213	16	244	609	22	4	9	35	3	1	27	31	66	675
08:45 09:00	24	336	2	362	16	206	17	239	601	27	0	11	38	3	2	23	28	66	667
09:00 09:15	16	277	4	297	15	162	14	191	488	25	1	11	37	3	2	12	17	54	542
09:15 09:30	8	301	3	312	15	147	11	173	485	14	5	8	27	2	0	9	11	38	523
09:30 09:45	10	245	4	259	15	167	7	189	448	11	1	5	17	1	2	18	21	38	486
09:45 10:00	12	266	5	283	12	169	8	189	472	14	2	4	20	2	1	12	15	35	507
11:30 11:45	10	261	4	275	19	238	12	269	544	11	1	12	24	2	1	18	21	45	589
11:45 12:00	15	244	0	259	21	262	11	294	553	16	0	6	22	7	2	21	30	52	605
12:00 12:15	18	269	3	290	36	229	12	277	567	10	8	8	26	4	2	17	23	49	616
12:15 12:30	19	253	6	278	23	214	12	249	527	13	3	4	20	6	3	17	26	46	573
12:30 12:45	21	253	0	274	14	249	14	277	551	11	3	7	21	2	1	16	19	40	591
12:45 13:00	15	286	7	308	26	242	9	277	585	13	3	8	24	4	1	15	20	44	629
13:00 13:15	13	249	8	270	13	251	12	276	546	22	2	3	27	2	2	13	17	44	590
13:15 13:30	11	276	1	288	20	239	15	274	562	11	0	6	17	2	5	6	13	30	592
15:00 15:15	14	256	2	272	15	276	13	304	576	16	1	7	24	0	1	16	17	41	617
15:15 15:30	17	274	2	293	19	303	15	337	630	15	2	7	24	0	3	14	17	41	671
15:30 15:45	11	262	6	279	29	310	12	351	630	22	0	8	30	9	5	29	43	73	703
15:45 16:00	15	289	7	311	31	278	22	331	642	13	3	6	22	5	4	25	34	56	698
16:00 16:15	15	270	5	290	30	348	17	395	685	19	3	21	43	5	4	19	28	71	756
16:15 16:30	16	243	8	267	39	327	25	391	658	21	1	14	36	13	5	21	39	75	733
16:30 16:45	13	259	11	283	25	350	16	391	674	17	1	15	33	8	4	18	30	63	737
16:45 17:00	15	281	13	309	31	332	17	380	689	14	4	14	32	3	4	14	21	53	742
17:00 17:15	15	221	9	245	30	331	19	380	625	17	1	6	24	4	9	9	22	46	671
17:15 17:30	11	247	14	272	22	332	13	367	639	18	3	8	29	4	4	10	18	47	686
17:30 17:45	15	252	7	274	22	318	27	367	641	22	4	8	34	4	0	18	22	56	697
17:45 18:00	11	222	3	236	23	333	20	376	612	15	3	12	30	5	1	13	19	49	661
Total:	464	8662	155	9281	676	8027	428	9131	18412	518	68	264	850	125	78	546	749	18412	20,011

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ LISA AVE

Survey Date: Thursday, August 11, 2016

WO No: 36183

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

Time Period	GREENBANK RD			LISA AVE			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	0	0	0	1	0	1	1
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	1	0	1	0	1	1	2
08:15 08:30	0	0	0	0	0	0	0
08:30 08:45	0	0	0	0	1	1	1
08:45 09:00	3	0	3	0	0	0	3
09:00 09:15	1	0	1	0	0	0	1
09:15 09:30	0	0	0	0	1	1	1
09:30 09:45	2	0	2	0	0	0	2
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	1	1	1
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	1	1	0	0	0	1
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	1	1	0	0	0	1
15:30 15:45	1	1	2	0	0	0	2
15:45 16:00	0	0	0	0	0	0	0
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	1	2	3	0	1	1	4
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	1	1	0	0	0	1
17:00 17:15	3	1	4	0	2	2	6
17:15 17:30	0	3	3	1	1	2	5
17:30 17:45	1	3	4	0	0	0	4
17:45 18:00	1	2	3	0	0	0	3
Total	14	15	29	2	8	10	39



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ LISA AVE

Survey Date: Thursday, August 11, 2016

WO No: 36183

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

GREENBANK RD

LISA AVE

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	2	1	3	2	3	5	8
07:15 07:30	1	3	4	4	0	4	8
07:30 07:45	1	3	4	3	3	6	10
07:45 08:00	2	6	8	4	1	5	13
08:00 08:15	3	2	5	3	3	6	11
08:15 08:30	3	2	5	2	6	8	13
08:30 08:45	0	2	2	0	0	0	2
08:45 09:00	2	4	6	1	2	3	9
09:00 09:15	1	1	2	1	3	4	6
09:15 09:30	1	2	3	1	3	4	7
09:30 09:45	0	1	1	3	2	5	6
09:45 10:00	5	8	13	2	1	3	16
11:30 11:45	4	0	4	0	0	0	4
11:45 12:00	1	2	3	2	2	4	7
12:00 12:15	3	3	6	3	3	6	12
12:15 12:30	4	2	6	3	5	8	14
12:30 12:45	4	3	7	2	6	8	15
12:45 13:00	3	3	6	1	1	2	8
13:00 13:15	4	0	4	3	0	3	7
13:15 13:30	3	0	3	0	1	1	4
15:00 15:15	4	0	4	3	0	3	7
15:15 15:30	4	2	6	3	1	4	10
15:30 15:45	3	6	9	4	1	5	14
15:45 16:00	15	0	15	15	1	16	31
16:00 16:15	3	0	3	2	0	2	5
16:15 16:30	9	2	11	7	1	8	19
16:30 16:45	5	6	11	3	3	6	17
16:45 17:00	1	2	3	6	1	7	10
17:00 17:15	6	3	9	14	3	17	26
17:15 17:30	8	1	9	10	0	10	19
17:30 17:45	8	3	11	7	5	12	23
17:45 18:00	8	2	10	8	2	10	20
Total	121	75	196	122	63	185	381



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ LISA AVE

Survey Date: Thursday, August 11, 2016

WO No: 36183

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

GREENBANK RD

LISA AVE

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	0	7	0	7	0	5	0	5	12	1	0	0	1	0	0	0	0	1	13
07:15 07:30	0	2	0	2	0	8	1	9	11	1	0	1	2	0	0	0	0	2	13
07:30 07:45	0	5	0	5	0	10	0	10	15	1	0	0	1	0	0	0	0	1	16
07:45 08:00	1	12	0	13	0	5	1	6	19	1	0	1	2	0	0	0	0	2	21
08:00 08:15	1	9	0	10	0	9	1	10	20	2	0	0	2	1	0	0	1	3	23
08:15 08:30	1	6	0	7	2	9	2	13	20	2	0	0	2	0	0	1	1	3	24
08:30 08:45	0	6	0	6	0	4	0	4	10	1	0	1	2	0	0	2	2	4	14
08:45 09:00	0	9	0	9	0	2	2	4	13	2	0	0	2	0	0	1	1	3	16
09:00 09:15	0	2	1	3	0	3	0	3	6	1	0	1	2	0	0	0	0	2	8
09:15 09:30	0	6	0	6	1	3	2	6	12	3	0	0	3	0	0	0	0	3	15
09:30 09:45	0	5	0	5	0	5	1	6	11	1	0	0	1	0	0	0	0	1	12
09:45 10:00	0	3	0	3	0	3	1	4	7	2	0	0	2	0	0	0	0	2	9
11:30 11:45	0	5	0	5	0	4	0	4	9	0	0	0	0	0	0	0	0	0	9
11:45 12:00	0	2	0	2	0	1	1	2	4	2	0	0	2	0	0	0	0	2	6
12:00 12:15	1	12	0	13	0	7	1	8	21	0	0	0	0	0	0	0	0	0	21
12:15 12:30	0	6	0	6	0	4	1	5	11	1	0	0	1	0	1	0	1	2	13
12:30 12:45	3	4	0	7	1	10	0	11	18	1	0	0	1	0	0	1	1	2	20
12:45 13:00	0	11	0	11	0	3	1	4	15	2	1	0	3	0	0	0	0	3	18
13:00 13:15	1	7	1	9	0	5	0	5	14	0	0	0	0	0	0	0	0	0	14
13:15 13:30	1	8	0	9	0	3	1	4	13	1	0	0	1	0	0	0	0	1	14
15:00 15:15	0	6	0	6	0	7	2	9	15	1	0	0	1	0	0	1	1	2	17
15:15 15:30	1	6	0	7	0	4	2	6	13	0	0	0	0	0	1	0	1	1	14
15:30 15:45	0	6	0	6	0	9	2	11	17	2	0	0	2	0	0	0	0	2	19
15:45 16:00	0	4	0	4	0	1	1	2	6	0	0	0	0	0	0	0	0	0	6
16:00 16:15	1	3	0	4	0	3	1	4	8	1	0	0	1	0	0	0	0	1	9
16:15 16:30	0	4	0	4	2	6	2	10	14	0	0	0	0	1	0	0	1	1	15
16:30 16:45	1	7	0	8	0	5	1	6	14	1	0	0	1	0	0	0	0	1	15
16:45 17:00	0	2	0	2	0	1	2	3	5	0	0	0	0	0	0	0	0	0	5
17:00 17:15	0	2	0	2	0	2	0	2	4	1	0	0	1	0	0	0	0	1	5
17:15 17:30	0	1	0	1	0	3	1	4	5	0	0	0	0	0	0	0	0	0	5
17:30 17:45	1	6	0	7	0	0	1	1	8	2	0	0	2	0	0	0	0	2	10
17:45 18:00	0	4	0	4	0	4	0	4	8	1	0	0	1	0	0	0	0	1	9
Total: None	13	178	2	193	6	148	31	185	378	34	1	4	39	2	2	6	10	49	428



Transportation Services - Traffic Services

Turning Movement Count - Study Results

GREENBANK RD @ LISA AVE

Survey Date: Thursday, August 11, 2016

WO No: 36183

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

GREENBANK RD

LISA AVE

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	2	0	0	0	2
07:15	07:30	0	1	0	0	1
07:30	07:45	0	1	0	0	1
07:45	08:00	0	1	0	0	1
08:00	08:15	1	1	0	0	2
08:15	08:30	2	0	0	0	2
08:30	08:45	0	0	0	0	0
08:45	09:00	0	1	0	0	1
09:00	09:15	0	4	0	0	4
09:15	09:30	0	2	0	0	2
09:30	09:45	2	2	0	0	4
09:45	10:00	0	2	0	0	2
11:30	11:45	0	7	0	0	7
11:45	12:00	0	2	0	0	2
12:00	12:15	0	6	0	0	6
12:15	12:30	0	4	0	0	4
12:30	12:45	0	3	0	0	3
12:45	13:00	0	6	0	0	6
13:00	13:15	1	7	0	0	8
13:15	13:30	0	6	0	0	6
15:00	15:15	0	5	0	0	5
15:15	15:30	0	3	0	0	3
15:30	15:45	1	4	0	0	5
15:45	16:00	1	9	0	0	10
16:00	16:15	1	3	0	0	4
16:15	16:30	0	9	0	0	9
16:30	16:45	0	3	0	0	3
16:45	17:00	0	1	0	0	1
17:00	17:15	2	4	0	0	6
17:15	17:30	0	3	0	0	3
17:30	17:45	0	1	0	0	1
17:45	18:00	1	4	0	0	5
Total		14	105	0	0	119

Appendix D

Collision Data



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: BASELINE RD @ GREENBANK RD

Traffic Control: Traffic signal

Total Collisions: 110

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Jan-07, Wed,06:45	Clear	Rear end	Non-fatal injury	Slush	East	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Feb-08, Sun,11:30	Snow	Angle	P.D. only	Loose snow	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Feb-09, Mon,07:28	Snow	Rear end	P.D. only	Slush	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Feb-12, Thu,08:50	Clear	Rear end	P.D. only	Slush	West	Turning right	Pick-up truck	Other motor vehicle	0
					West	Turning right	Automobile, station wagon	Other motor vehicle	
2015-Mar-13, Fri,17:36	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Pick-up truck	Other motor vehicle	
2015-Mar-26, Thu,17:28	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2015-Apr-10, Fri,20:36	Clear	Rear end	Non-fatal injury	Wet	South	Going ahead	Pick-up truck	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-May-01, Fri,16:20	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2015-May-26, Tue,14:29	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Jun-04, Thu,15:50	Clear	Rear end	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jun-15, Mon,18:08	Clear	Rear end	P.D. only	Dry	North	Turning right	Unknown	Other motor vehicle	0
					North	Turning right	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: BASELINE RD @ GREENBANK RD

Traffic Control: Traffic signal

Total Collisions: 110

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jun-18, Thu,21:45	Rain	Turning movement	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Turning left	Pick-up truck	Other motor vehicle	
2015-Jun-25, Thu,05:58	Clear	SMV other	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Pedestrian	1
2015-Jun-26, Fri,17:03	Clear	Angle	Non-fatal injury	Dry	North	Turning right	Automobile, station wagon	Cyclist	0
					West	Going ahead	Bicycle	Other motor vehicle	
2015-Jun-30, Tue,12:45	Clear	Rear end	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	0
					West	Turning right	Pick-up truck	Other motor vehicle	
2015-Jul-14, Tue,07:17	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Pick-up truck	Other motor vehicle	
2015-Jul-29, Wed,21:01	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2015-Aug-07, Fri,16:19	Clear	Rear end	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	0
					West	Stopped	Pick-up truck	Other motor vehicle	
2015-Sep-01, Tue,20:39	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	0
					North	Going ahead	Pick-up truck	Other motor vehicle	
2015-Sep-12, Sat,11:49	Clear	Rear end	P.D. only	Dry	North	Going ahead	Passenger van	Other motor vehicle	0
					North	Stopped	Pick-up truck	Other motor vehicle	
2015-Oct-07, Wed,16:53	Clear	Sideswipe	P.D. only	Dry	West	Overtaking	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Oct-19, Mon,15:57	Rain	Sideswipe	P.D. only	Wet	South	Changing lanes	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Oct-29, Thu,08:10	Clear	Rear end	P.D. only	Wet	North	Turning right	Passenger van	Other motor vehicle	0
					North	Turning right	Pick-up truck	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: BASELINE RD @ GREENBANK RD

Traffic Control: Traffic signal

Total Collisions: 110

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2015-Nov-07, Sat,13:52	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Passenger van	Other motor vehicle	0
					North	Stopped	Pick-up truck	Other motor vehicle	
2016-Feb-10, Wed,17:05	Clear	Rear end	P.D. only	Wet	West	Slowing or stopping	Passenger van	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Feb-12, Fri,15:38	Clear	Rear end	Non-fatal injury	Ice	West	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Feb-17, Wed,07:45	Clear	Rear end	P.D. only	Slush	South	Slowing or stopping	Delivery van	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Feb-25, Thu,18:34	Snow	Sideswipe	P.D. only	Ice	North	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Pick-up truck	Other motor vehicle	
2016-Mar-04, Fri,10:09	Clear	Angle	P.D. only	Dry	South	Reversing	Snow plow	Other motor vehicle	0
					West	Going ahead	Municipal transit bus	Other motor vehicle	
2016-Mar-08, Tue,18:06	Rain	Angle	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Pick-up truck	Other motor vehicle	
2016-Mar-30, Wed,18:42	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Apr-09, Sat,09:14	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Apr-17, Sun,18:20	Clear	Rear end	P.D. only	Dry	North	Going ahead	Passenger van	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2016-May-20, Fri,14:00	Clear	Rear end	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Pick-up truck	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: BASELINE RD @ GREENBANK RD

Traffic Control: Traffic signal

Total Collisions: 110

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2016-Jun-05, Sun,15:23	Rain	Rear end	P.D. only	Wet	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Pick-up truck	Other motor vehicle	
					East	Changing lanes	Automobile, station wagon	Other	
2016-Jun-21, Tue,09:33	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jul-03, Sun,16:47	Clear	Angle	Non-fatal injury	Dry	West	Turning right	Automobile, station wagon	Cyclist	0
					South	Going ahead	Bicycle	Other motor vehicle	
2016-Jul-21, Thu,18:20	Clear	Sideswipe	Non-fatal injury	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Passenger van	Other motor vehicle	
2016-Aug-31, Wed,14:06	Clear	Rear end	Non-fatal injury	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Slowing or stopping	Pick-up truck	Other motor vehicle	
2016-Oct-05, Wed,14:32	Clear	Rear end	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Oct-11, Tue,07:48	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2016-Oct-19, Wed,04:07	Clear	Angle	Non-fatal injury	Dry	East	Going ahead	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Oct-23, Sun,17:17	Clear	Other	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Municipal transit bus	Other motor vehicle	
2016-Nov-03, Thu,16:55	Clear	Rear end	P.D. only	Dry	South	Going ahead	Passenger van	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Nov-22, Tue,22:46	Clear	Angle	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: BASELINE RD @ GREENBANK RD

Traffic Control: Traffic signal

Total Collisions: 110

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Dec-18, Sun,14:20	Clear	Sideswipe	P.D. only	Slush	West	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Jan-30, Mon,08:15	Clear	Rear end	P.D. only	Ice	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Jan-30, Mon,09:41	Clear	Rear end	P.D. only	Dry	East	Unknown	Unknown	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Feb-13, Mon,16:00	Clear	Other	P.D. only	Wet	West	Reversing	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Feb-15, Wed,10:51	Snow	Rear end	P.D. only	Loose snow	East	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					East	Stopped	Snow plow	Other motor vehicle	
2017-Mar-17, Fri,18:08	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					West	Slowing or stopping	Passenger van	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	
2017-Mar-20, Mon,09:58	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2017-Apr-21, Fri,12:39	Rain	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Apr-23, Sun,12:05	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2017-Apr-28, Fri,18:04	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2017-May-28, Sun,17:58	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: BASELINE RD @ GREENBANK RD

Traffic Control: Traffic signal

Total Collisions: 110

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2017-Jun-25, Sun,12:58	Rain	Rear end	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Passenger van	Other motor vehicle	
2017-Jul-04, Tue,17:43	Clear	Sideswipe	P.D. only	Dry	South	Stopped	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Aug-21, Mon,09:58	Clear	Rear end	Non-fatal injury	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					East	Turning right	Automobile, station wagon	Other motor vehicle	
2017-Aug-26, Sat,13:30	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Sep-25, Mon,08:49	Clear	Rear end	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Sep-26, Tue,16:59	Clear	Rear end	P.D. only	Dry	East	Unknown	Unknown	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Oct-03, Tue,07:41	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2017-Oct-05, Thu,11:29	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Oct-26, Thu,18:00	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Nov-02, Thu,17:34	Rain	Rear end	P.D. only	Wet	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2018-Jan-01, Mon,03:30	Clear	Rear end	P.D. only	Dry	North	Going ahead	Passenger van	Other motor vehicle	0
					North	Stopped	Passenger van	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: BASELINE RD @ GREENBANK RD

Traffic Control: Traffic signal

Total Collisions: 110

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2018-Jan-09, Tue,18:45	Snow	Rear end	P.D. only	Slush	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jan-15, Mon,14:36	Clear	Sideswipe	P.D. only	Loose snow	East	Changing lanes	Municipal transit bus	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jan-31, Wed,19:52	Snow	Sideswipe	P.D. only	Loose snow	West	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Feb-10, Sat,17:54	Snow	Rear end	P.D. only	Slush	North	Slowing or stopping	Passenger van	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Feb-13, Tue,13:52	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Feb-17, Sat,12:50	Clear	Rear end	P.D. only	Dry	West	Merging	Passenger van	Other motor vehicle	0
					West	Stopped	Pick-up truck	Other motor vehicle	
2018-Mar-08, Thu,20:15	Snow	Sideswipe	P.D. only	Slush	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Mar-11, Sun,15:21	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning right	Automobile, station wagon	Other motor vehicle	
2018-Apr-16, Mon,16:29	Rain	Rear end	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Municipal transit bus	Other motor vehicle	
2018-Jul-05, Thu,08:30	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Turning right	Passenger van	Other motor vehicle	
2018-Sep-13, Thu,17:33	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: BASELINE RD @ GREENBANK RD

Traffic Control: Traffic signal

Total Collisions: 110

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2018-Sep-15, Sat,10:30	Clear	Rear end	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Sep-21, Fri,22:18	Clear	Angle	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Oct-04, Thu,15:20	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Nov-07, Wed,17:11	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Nov-16, Fri,15:48	Snow	Sideswipe	P.D. only	Loose snow	West	Changing lanes	Delivery van	Other motor vehicle	0
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Nov-24, Sat,16:30	Clear	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Nov-26, Mon,15:45	Rain	Sideswipe	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Dec-05, Wed,15:55	Snow	Rear end	P.D. only	Loose snow	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Passenger van	Other motor vehicle	
2018-Dec-18, Tue,12:40	Clear	Rear end	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Dec-18, Tue,16:50	Clear	Sideswipe	P.D. only	Dry	North	Unknown	Passenger van	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Dec-29, Sat,02:20	Rain	Sideswipe	P.D. only	Wet	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: BASELINE RD @ GREENBANK RD

Traffic Control: Traffic signal

Total Collisions: 110

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Jan-17, Thu,09:57	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Delivery van	Other motor vehicle	
2019-Jan-22, Tue,12:54	Clear	Rear end	P.D. only	Ice	North	Going ahead	Pick-up truck	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jan-25, Fri,13:57	Clear	Rear end	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Slowing or stopping	Passenger van	Other motor vehicle	
2019-Feb-14, Thu,17:00	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Unknown	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Feb-17, Sun,13:47	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Feb-26, Tue,20:29	Clear	Rear end	Non-fatal injury	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2019-Mar-12, Tue,14:30	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Mar-19, Tue,08:00	Clear	Rear end	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Apr-13, Sat,14:15	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2019-Apr-20, Sat,13:48	Clear	Rear end	Non-fatal injury	Dry	North	Unknown	Unknown	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jun-13, Thu,21:15	Rain	Angle	P.D. only	Wet	East	Turning right	Unknown	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: BASELINE RD @ GREENBANK RD

Traffic Control: Traffic signal

Total Collisions: 110

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2019-Jun-14, Fri,15:20	Clear	Rear end	P.D. only	Wet	South	Going ahead	Truck - dump	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2019-Jul-29, Mon,17:13	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Aug-06, Tue,11:45	Clear	Rear end	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2019-Aug-12, Mon,11:16	Clear	Rear end	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					East	Turning right	Automobile, station wagon	Other motor vehicle	
2019-Aug-15, Thu,17:55	Clear	Rear end	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Aug-20, Tue,10:00	Clear	Sideswipe	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Sep-30, Mon,16:09	Clear	Rear end	P.D. only	Dry	West	Unknown	Unknown	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Oct-10, Thu,16:00	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Nov-22, Fri,07:53	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Dec-11, Wed,11:43	Clear	Rear end	Non-fatal injury	Dry	West	Turning right	Pick-up truck	Other motor vehicle	0
					West	Turning right	Automobile, station wagon	Other motor vehicle	
					West	Turning right	Fire vehicle	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: GREENBANK RD @ LISA AVE

Traffic Control: Traffic signal

Total Collisions: 47

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-12, Mon,03:43	Clear	SMV other	P.D. only	Wet	East	Going ahead	Snow plow	Pole (utility, power)	0
2015-May-28, Thu,18:46	Clear	Angle	P.D. only	Dry	West	Making "U" turn	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jun-26, Fri,16:10	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Aug-20, Thu,10:22	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Aug-27, Thu,14:28	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Sep-29, Tue,07:16	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Pick-up truck	Other motor vehicle	
					West	Stopped	Truck - closed	Other motor vehicle	
2015-Oct-14, Wed,12:24	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Dec-16, Wed,15:42	Clear	Turning movement	P.D. only	Dry	North	Making "U" turn	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jan-30, Sat,17:54	Clear	Rear end	Non-fatal injury	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Feb-17, Wed,12:23	Clear	Turning movement	P.D. only	Loose snow	North	Turning left	Unknown	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	
2016-May-20, Fri,15:57	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Pick-up truck	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: GREENBANK RD @ LISA AVE

Traffic Control: Traffic signal

Total Collisions: 47

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2016-Jul-09, Sat,17:05	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Oct-19, Wed,10:58	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Nov-03, Thu,07:18	Rain	SMV other	Non-fatal injury	Wet	West	Turning left	Automobile, station wagon	Pedestrian	1
2016-Dec-11, Sun,09:08	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2016-Dec-14, Wed,20:46	Snow	Turning movement	P.D. only	Packed snow	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	
2016-Dec-24, Sat,12:39	Clear	Turning movement	Non-fatal injury	Wet	South	Making "U" turn	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Pick-up truck	Other motor vehicle	
2017-Feb-10, Fri,11:17	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Passenger van	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Feb-16, Thu,07:31	Snow	Rear end	P.D. only	Loose snow	South	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2017-Apr-07, Fri,12:36	Clear	Rear end	P.D. only	Wet	West	Going ahead	Pick-up truck	Other motor vehicle	0
					West	Stopped	Pick-up truck	Other motor vehicle	
2017-Apr-21, Fri,00:11	Rain	Angle	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-May-18, Thu,17:45	Clear	Turning movement	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Pick-up truck	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: GREENBANK RD @ LISA AVE

Traffic Control: Traffic signal

Total Collisions: 47

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Aug-04, Fri,22:55	Rain	Turning movement	P.D. only	Wet	East	Turning left	Unknown	Other motor vehicle	0
					West	Turning right	Automobile, station wagon	Other motor vehicle	
2017-Aug-05, Sat,17:27	Clear	Angle	Non-fatal injury	Dry	South	Turning right	Unknown	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Sep-01, Fri,16:37	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2017-Sep-06, Wed,14:50	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Nov-11, Sat,12:43	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Delivery van	Other motor vehicle	0
					North	Slowing or stopping	Delivery van	Other motor vehicle	
2017-Nov-23, Thu,09:00	Clear	Rear end	P.D. only	Wet	South	Going ahead	Passenger van	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jan-15, Mon,12:43	Clear	Other	P.D. only	Dry	North	Reversing	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Police vehicle	Other motor vehicle	
2018-Jan-28, Sun,19:41	Clear	SMV other	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Pedestrian	1
2018-Mar-02, Fri,12:24	Clear	Rear end	Non-fatal injury	Dry	North	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Mar-07, Wed,16:23	Snow	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jul-05, Thu,11:21	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: GREENBANK RD @ LISA AVE

Traffic Control: Traffic signal

Total Collisions: 47

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2018-Oct-10, Wed,17:10	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2018-Nov-22, Thu,07:50	Clear	Rear end	P.D. only	Ice	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-14, Fri,12:37	Freezing Rain	Rear end	Non-fatal injury	Ice	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-14, Fri,19:48	Freezing Rain	Angle	P.D. only	Ice	North	Turning right	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jan-26, Sat,13:47	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Feb-27, Wed,07:34	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Mar-04, Mon,23:31	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Jun-05, Wed,08:31	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Jun-18, Tue,17:10	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Pick-up truck	Other motor vehicle	
2019-Jul-25, Thu,18:03	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2019-Aug-26, Mon,15:40	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: GREENBANK RD @ LISA AVE

Traffic Control: Traffic signal

Total Collisions: 47

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Aug-30, Fri,15:00	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2019-Oct-03, Thu,10:58	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Truck - closed	Other motor vehicle	
2019-Nov-06, Wed,08:30	Clear	Angle	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Delivery van	Other motor vehicle	

Location: PINECREST RD @ BASELINE RD

Traffic Control: Stop sign

Total Collisions: 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-18, Sun,01:03	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Jan-24, Sat,15:28	Clear	Turning movement	P.D. only	Wet	East	Turning left	Passenger van	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jul-07, Tue,16:14	Clear	Turning movement	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Motorcycle	Other motor vehicle	
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2016-Nov-17, Thu,15:56	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2018-Dec-16, Sun,16:40	Clear	Angle	Non-fatal injury	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Dec-19, Wed,08:54	Clear	SMV unattended vehicle	P.D. only	Wet	West	Turning right	Passenger van	Unattended vehicle	0
2019-Mar-18, Mon,16:32	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 To: December 31, 2019

Location: PINECREST RD @ BASELINE RD

Traffic Control: Stop sign

Total Collisions: 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Aug-22, Thu,15:40	Clear	Turning movement	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Nov-25, Mon,14:28	Clear	SMV other	Non-fatal injury	Dry	South	Turning right	Automobile, station wagon	Pedestrian	1

Appendix E

TDM Measures Checklist

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

Legend	
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance
★	The measure is one of the most dependably effective tools to encourage the use of sustainable modes

TDM measures: Residential developments		Check if proposed & add descriptions
1. TDM PROGRAM MANAGEMENT		
1.1 Program coordinator		
BASIC	★	1.1.1 Designate an internal coordinator, or contract with an external coordinator <input type="checkbox"/>
1.2 Travel surveys		
BETTER		1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress <input type="checkbox"/>
2. WALKING AND CYCLING		
2.1 Information on walking/cycling routes & destinations		
BASIC		2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances (<i>multi-family, condominium</i>) <input checked="" type="checkbox"/>
2.2 Bicycle skills training		
BETTER		2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses <input type="checkbox"/>

TDM measures: <i>Residential developments</i>		Check if proposed & add descriptions
3. TRANSIT		
3.1 Transit information		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances (<i>multi-family, condominium</i>)	<input checked="" type="checkbox"/>
BETTER	3.1.2 Provide real-time arrival information display at entrances (<i>multi-family, condominium</i>)	<input type="checkbox"/>
3.2 Transit fare incentives		
BASIC ★	3.2.1 Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	<input type="checkbox"/>
BETTER	3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	<input type="checkbox"/>
3.3 Enhanced public transit service		
BETTER ★	3.3.1 Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels (<i>subdivision</i>)	<input type="checkbox"/>
3.4 Private transit service		
BETTER	3.4.1 Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	<input type="checkbox"/>
4. CARSHARING & BIKESHARING		
4.1 Bikeshare stations & memberships		
BETTER	4.1.1 Contract with provider to install on-site bikeshare station (<i>multi-family</i>)	<input type="checkbox"/>
BETTER	4.1.2 Provide residents with bikeshare memberships, either free or subsidized (<i>multi-family</i>)	<input type="checkbox"/>
4.2 Carshare vehicles & memberships		
BETTER	4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	<input type="checkbox"/>
BETTER	4.2.2 Provide residents with carshare memberships, either free or subsidized	<input type="checkbox"/>
5. PARKING		
5.1 Priced parking		
BASIC ★	5.1.1 Unbundle parking cost from purchase price (<i>condominium</i>)	<input type="checkbox"/>
BASIC ★	5.1.2 Unbundle parking cost from monthly rent (<i>multi-family</i>)	<input checked="" type="checkbox"/>

TDM measures: <i>Residential developments</i>		Check if proposed & add descriptions
6. TDM MARKETING & COMMUNICATIONS		
6.1 Multimodal travel information		
BASIC ★	6.1.1 Provide a multimodal travel option information package to new residents	<input type="checkbox"/>
6.2 Personalized trip planning		
BETTER ★	6.2.1 Offer personalized trip planning to new residents	<input type="checkbox"/>
























Appendix F

Existing Intersection Operations

HCM 6th Signalized Intersection Summary

1: Greenbank Rd & Baseline Rd

06-04-2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	743	76	157	385	324	131	1055	338	390	453	63
Future Volume (veh/h)	117	743	76	157	385	324	131	1055	338	390	453	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1758	1744	1758	1744	1772	1758	1786	1758	1730	1716
Adj Flow Rate, veh/h	130	826	84	174	428	0	146	1172	0	433	503	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
Percent Heavy Veh, %	2	2	3	4	3	4	2	3	1	3	5	6
Cap, veh/h	135	892	91	220	927		187	1154		360	1135	
Arrive On Green	0.08	0.29	0.29	0.07	0.28	0.00	0.11	0.35	0.00	0.11	0.35	0.00
Sat Flow, veh/h	1688	3085	314	3222	3340	1478	1688	3340	1514	3248	3287	1454
Grp Volume(v), veh/h	130	451	459	174	428	0	146	1172	0	433	503	0
Grp Sat Flow(s),veh/h/ln	1688	1683	1715	1611	1670	1478	1688	1670	1514	1624	1643	1454
Q Serve(g_s), s	10.8	36.4	36.4	7.4	14.9	0.0	11.8	48.4	0.0	15.5	16.6	0.0
Cycle Q Clear(g_c), s	10.8	36.4	36.4	7.4	14.9	0.0	11.8	48.4	0.0	15.5	16.6	0.0
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	135	486	496	220	927		187	1154		360	1135	
V/C Ratio(X)	0.96	0.93	0.93	0.79	0.46		0.78	1.02		1.20	0.44	
Avail Cap(c_a), veh/h	135	525	535	258	1043		187	1154		360	1135	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	64.2	48.3	48.3	64.2	41.9	0.0	60.6	45.8	0.0	62.3	35.4	0.0
Incr Delay (d2), s/veh	65.9	21.8	21.5	13.2	0.4	0.0	27.0	30.5	0.0	115.4	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	19.0	19.3	3.6	6.6	0.0	6.7	26.0	0.0	12.4	7.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	130.1	70.1	69.9	77.4	42.3	0.0	87.6	76.3	0.0	177.6	36.7	0.0
LnGrp LOS	F	E	E	E	D		F	F		F	D	
Approach Vol, veh/h		1040			602	A		1318	A		936	A
Approach Delay, s/veh		77.5			52.4			77.6			101.9	
Approach LOS		E			D			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	54.9	16.4	46.8	22.0	54.9	18.0	45.1				
Change Period (Y+Rc), s	6.5	6.5	* 6.8	* 6.3	6.5	6.5	* 6.8	* 6.3				
Max Green Setting (Gmax), s	15.5	43.5	* 11	* 44	15.5	43.5	* 11	* 44				
Max Q Clear Time (g_c+I1), s	17.5	50.4	9.4	38.4	13.8	18.6	12.8	16.9				
Green Ext Time (p_c), s	0.0	0.0	0.1	2.1	0.1	2.5	0.0	2.1				

Intersection Summary

HCM 6th Ctrl Delay	79.5
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Greenbank Rd & Lisa Ave

06-04-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↕	↕	↔	↕	↕
Traffic Volume (veh/h)	99	8	38	20	8	98	80	1401	15	63	848	55
Future Volume (veh/h)	99	8	38	20	8	98	80	1401	15	63	848	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1702	1800	1758	1730	1800	1744	1758	1772	1800	1758	1758	1674
Adj Flow Rate, veh/h	110	9	0	22	9	109	89	1557	17	70	942	61
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
Percent Heavy Veh, %	7	0	3	5	0	4	3	2	0	3	3	9
Cap, veh/h	180	13		55	28	186	426	2609	28	235	2554	1085
Arrive On Green	0.14	0.14	0.00	0.14	0.14	0.14	0.76	0.76	0.76	0.76	0.76	0.76
Sat Flow, veh/h	913	89	0	173	196	1300	557	3411	37	323	3340	1418
Grp Volume(v), veh/h	119	0	0	140	0	0	89	768	806	70	942	61
Grp Sat Flow(s),veh/h/ln	1002	0	0	1670	0	0	557	1683	1765	323	1670	1418
Q Serve(g_s), s	6.1	0.0	0.0	0.0	0.0	0.0	8.7	27.6	27.7	16.8	12.9	1.5
Cycle Q Clear(g_c), s	17.2	0.0	0.0	11.1	0.0	0.0	21.7	27.6	27.7	44.4	12.9	1.5
Prop In Lane	0.92		0.00	0.16		0.78	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	193	0		269	0	0	426	1287	1350	235	2554	1085
V/C Ratio(X)	0.62	0.00		0.52	0.00	0.00	0.21	0.60	0.60	0.30	0.37	0.06
Avail Cap(c_a), veh/h	269	0		357	0	0	426	1287	1350	235	2554	1085
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.9	0.0	0.0	56.3	0.0	0.0	8.9	7.1	7.1	16.7	5.4	4.0
Incr Delay (d2), s/veh	3.2	0.0	0.0	1.6	0.0	0.0	1.1	2.0	2.0	3.2	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	0.0	5.0	0.0	0.0	1.3	11.5	12.0	1.6	5.1	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.1	0.0	0.0	57.9	0.0	0.0	10.1	9.2	9.1	20.0	5.8	4.1
LnGrp LOS	E	A		E	A	A	B	A	A	B	A	A
Approach Vol, veh/h		119	A		140			1663			1073	
Approach Delay, s/veh		63.1			57.9			9.2			6.6	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		113.1		26.9		113.1		26.9				
Change Period (Y+Rc), s		6.0		* 6.9		6.0		* 6.9				
Max Green Setting (Gmax), s		99.0		* 28		99.0		* 28				
Max Q Clear Time (g_c+I1), s		29.7		19.2		46.4		13.1				
Green Ext Time (p_c), s		56.2		0.8		28.6		1.5				

Intersection Summary

HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Greenbank Rd & Iris St

06-04-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑	↖	↖↗		↖↗		↑↑↑	↖	↖↗	↑↑	
Traffic Volume (veh/h)	592	509	376	68	0	310	0	1404	194	166	762	0
Future Volume (veh/h)	592	509	376	68	0	310	0	1404	194	166	762	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1786	1772	1660	0	1772	0	1772	1730	1758	1744	0
Adj Flow Rate, veh/h	658	566	0	76	0	344	0	1560	216	184	847	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
Percent Heavy Veh, %	2	1	2	10	0	2	0	2	5	3	4	0
Cap, veh/h	1450	627		117	0	0	0	1667	505	135	1473	0
Arrive On Green	0.44	0.35	0.00	0.04	0.00	0.00	0.00	0.34	0.34	0.04	0.44	0.00
Sat Flow, veh/h	3274	1786	1502	3066	76		0	4997	1466	3248	3400	0
Grp Volume(v), veh/h	658	566	0	76	67.6		0	1560	216	184	847	0
Grp Sat Flow(s),veh/h/ln	1637	1786	1502	1533	E		0	1612	1466	1624	1657	0
Q Serve(g_s), s	18.2	39.1	0.0	3.2			0.0	40.6	14.7	5.4	24.8	0.0
Cycle Q Clear(g_c), s	18.2	39.1	0.0	3.2			0.0	40.6	14.7	5.4	24.8	0.0
Prop In Lane	1.00		1.00	1.00			0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1450	627		117			0	1667	505	135	1473	0
V/C Ratio(X)	0.45	0.90		0.65			0.00	0.94	0.43	1.36	0.57	0.00
Avail Cap(c_a), veh/h	1450	673		257			0	1667	505	135	1473	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00			0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.2	40.1	0.0	61.7			0.0	41.2	32.7	62.3	26.9	0.0
Incr Delay (d2), s/veh	0.2	14.9	0.0	5.9			0.0	11.3	2.6	203.9	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	21.1	0.0	1.4			0.0	18.7	6.1	6.1	10.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.5	55.0	0.0	67.6			0.0	52.5	35.4	266.2	28.6	0.0
LnGrp LOS	C	E		E			A	D	D	F	C	A
Approach Vol, veh/h		1224	A					1776			1031	
Approach Delay, s/veh		39.1						50.4			71.0	
Approach LOS		D						D			E	
Timer - Assigned Phs	1	2	3	4		6	7					
Phs Duration (G+Y+Rc), s	13.0	52.3	12.1	52.6		65.3	64.7					
Change Period (Y+Rc), s	* 7.6	* 7.5	7.1	7.0		* 7.5	7.1					
Max Green Setting (Gmax), s	* 5.4	* 36	10.9	49.0		* 49	19.9					
Max Q Clear Time (g_c+I1), s	7.4	42.6	5.2	41.1		26.8	20.2					
Green Ext Time (p_c), s	0.0	0.0	0.1	4.5		13.0	0.0					

Intersection Summary

HCM 6th Ctrl Delay	52.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑			↗
Traffic Vol, veh/h	46	1425	816	45	0	50
Future Vol, veh/h	46	1425	816	45	0	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	1583	907	50	0	56

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	957	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.22	-	-
Pot Cap-1 Maneuver	714	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	714	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-
























Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	714	-	-	-	533
HCM Lane V/C Ratio	0.072	-	-	-	0.104
HCM Control Delay (s)	10.4	-	-	-	12.5
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3

HCM 6th Signalized Intersection Summary

1: Greenbank Rd & Baseline Rd

06-04-2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	480	158	380	798	396	168	619	171	348	992	110
Future Volume (veh/h)	121	480	158	380	798	396	168	619	171	348	992	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1772	1800	1786	1786	1786	1772	1772	1772	1786	1786
Adj Flow Rate, veh/h	134	533	176	422	887	0	187	688	0	387	1102	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
Percent Heavy Veh, %	0	1	2	0	1	1	1	2	2	2	1	1
Cap, veh/h	161	636	209	369	916		162	1020		313	1028	
Arrive On Green	0.09	0.25	0.25	0.11	0.27	0.00	0.10	0.30	0.00	0.10	0.30	0.00
Sat Flow, veh/h	1714	2509	825	3326	3393	1514	1701	3367	1502	3274	3393	1514
Grp Volume(v), veh/h	134	360	349	422	887	0	187	688	0	387	1102	0
Grp Sat Flow(s),veh/h/ln	1714	1697	1637	1663	1697	1514	1701	1683	1502	1637	1697	1514
Q Serve(g_s), s	8.4	22.1	22.3	12.2	28.4	0.0	10.5	19.7	0.0	10.5	33.3	0.0
Cycle Q Clear(g_c), s	8.4	22.1	22.3	12.2	28.4	0.0	10.5	19.7	0.0	10.5	33.3	0.0
Prop In Lane	1.00		0.50	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	161	430	415	369	916		162	1020		313	1028	
V/C Ratio(X)	0.83	0.84	0.84	1.14	0.97		1.15	0.67		1.24	1.07	
Avail Cap(c_a), veh/h	190	458	442	369	916		162	1020		313	1028	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.0	38.9	39.0	48.9	39.7	0.0	49.8	33.6	0.0	49.8	38.3	0.0
Incr Delay (d2), s/veh	22.6	12.2	13.1	92.1	22.2	0.0	117.3	3.6	0.0	131.7	49.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	7.9	7.8	8.6	11.0	0.0	8.7	6.0	0.0	9.0	16.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.5	51.1	52.1	141.0	61.9	0.0	167.0	37.1	0.0	181.4	87.7	0.0
LnGrp LOS	E	D	D	F	E		F	D		F	F	
Approach Vol, veh/h		843			1309	A		875	A		1489	A
Approach Delay, s/veh		54.8			87.4			64.9			112.0	
Approach LOS		D			F			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	39.8	19.0	34.2	17.0	39.8	17.2	36.0				
Change Period (Y+Rc), s	6.5	6.5	* 6.8	* 6.3	6.5	6.5	* 6.8	* 6.3				
Max Green Setting (Gmax), s	10.5	31.5	* 12	* 30	10.5	31.5	* 12	* 30				
Max Q Clear Time (g_c+I1), s	12.5	21.7	14.2	24.3	12.5	35.3	10.4	30.4				
Green Ext Time (p_c), s	0.0	6.0	0.0	3.6	0.0	0.0	0.1	0.0				

Intersection Summary

HCM 6th Ctrl Delay	85.1
HCM 6th LOS	F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Greenbank Rd & Lisa Ave

06-04-2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↕	↕	↔	↕	↕
Traffic Volume (veh/h)	71	9	64	29	17	72	56	1046	34	125	1357	75
Future Volume (veh/h)	71	9	64	29	17	72	56	1046	34	125	1357	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1758	1800	1800	1758	1800	1800	1758	1772	1800	1772	1786	1688
Adj Flow Rate, veh/h	79	10	0	32	19	80	62	1162	38	139	1508	83
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
Percent Heavy Veh, %	3	0	0	3	0	0	3	2	0	2	1	8
Cap, veh/h	352	41		116	79	242	171	2091	68	265	2133	899
Arrive On Green	0.25	0.25	0.00	0.25	0.25	0.25	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	1141	161	0	295	312	953	318	3327	109	466	3393	1430
Grp Volume(v), veh/h	89	0	0	131	0	0	62	588	612	139	1508	83
Grp Sat Flow(s),veh/h/ln	1302	0	0	1560	0	0	318	1683	1752	466	1697	1430
Q Serve(g_s), s	0.0	0.0	0.0	0.2	0.0	0.0	17.8	21.9	21.9	26.7	32.7	2.5
Cycle Q Clear(g_c), s	7.0	0.0	0.0	7.1	0.0	0.0	50.5	21.9	21.9	48.6	32.7	2.5
Prop In Lane	0.89		0.00	0.24		0.61	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	393	0		437	0	0	171	1058	1101	265	2133	899
V/C Ratio(X)	0.23	0.00		0.30	0.00	0.00	0.36	0.56	0.56	0.52	0.71	0.09
Avail Cap(c_a), veh/h	394	0		439	0	0	171	1058	1101	265	2133	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.1	0.0	0.0	33.3	0.0	0.0	30.5	11.7	11.7	25.6	13.7	8.1
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.4	0.0	0.0	5.9	2.1	2.0	7.2	2.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	2.2	0.0	0.0	1.2	3.1	3.2	2.3	4.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	0.0	0.0	33.7	0.0	0.0	36.4	13.8	13.7	32.8	15.7	8.3
LnGrp LOS	C	A		C	A	A	D	B	B	C	B	A
Approach Vol, veh/h		89	A		131			1262			1730	
Approach Delay, s/veh		33.4			33.7			14.8			16.7	
Approach LOS		C			C			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		75.1		34.9		75.1		34.9				
Change Period (Y+Rc), s		6.0		* 6.9		6.0		* 6.9				
Max Green Setting (Gmax), s		69.0		* 28		69.0		* 28				
Max Q Clear Time (g_c+I1), s		52.5		9.0		50.6		9.1				
Green Ext Time (p_c), s		13.9		1.0		17.1		1.6				

Intersection Summary

HCM 6th Ctrl Delay	17.1
HCM 6th LOS	B

Notes





























* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Greenbank Rd & Iris St

06-04-2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 		 		  		 	 	
Traffic Volume (veh/h)	444	267	327	231	0	543	0	1049	140	221	925	17
Future Volume (veh/h)	444	267	327	231	0	543	0	1049	140	221	925	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1758	1758	1716	0	1772	0	1772	1730	1758	1772	396
Adj Flow Rate, veh/h	493	297	0	257	0	603	0	1166	156	246	1028	19
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
Percent Heavy Veh, %	1	3	3	6	0	2	0	2	5	3	2	100
Cap, veh/h	1189	364		315	0	0	0	1955	592	210	1783	33
Arrive On Green	0.36	0.21	0.00	0.10	0.00	0.00	0.00	0.40	0.40	0.06	0.53	0.53
Sat Flow, veh/h	3300	1758	1490	3170	257		0	4997	1466	3248	3381	62
Grp Volume(v), veh/h	493	297	0	257	66.7		0	1166	156	246	512	535
Grp Sat Flow(s),veh/h/ln	1650	1758	1490	1585	E		0	1612	1466	1624	1683	1761
Q Serve(g_s), s	14.6	21.0	0.0	10.3			0.0	24.6	9.2	8.4	26.8	26.8
Cycle Q Clear(g_c), s	14.6	21.0	0.0	10.3			0.0	24.6	9.2	8.4	26.8	26.8
Prop In Lane	1.00		1.00	1.00			0.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	1189	364		315			0	1955	592	210	888	928
V/C Ratio(X)	0.41	0.82		0.82			0.00	0.60	0.26	1.17	0.58	0.58
Avail Cap(c_a), veh/h	1189	541		412			0	1955	592	210	888	928
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00			0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.3	49.2	0.0	57.4			0.0	30.4	25.8	60.8	20.9	20.9
Incr Delay (d2), s/veh	0.2	6.0	0.0	9.3			0.0	1.4	1.1	116.4	2.7	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	8.0	0.0	3.8			0.0	6.9	2.5	6.2	6.9	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.5	55.1	0.0	66.7			0.0	31.8	26.9	177.2	23.6	23.5
LnGrp LOS	C	E		E			A	C	C	F	C	C
Approach Vol, veh/h		790	A					1322			1293	
Approach Delay, s/veh		40.4						31.2			52.8	
Approach LOS		D						C			D	
Timer - Assigned Phs	1	2	3	4		6	7					
Phs Duration (G+Y+Rc), s	16.0	60.0	20.0	33.9		76.0	54.0					
Change Period (Y+Rc), s	* 7.6	* 7.5	7.1	7.0		* 7.5	7.1					
Max Green Setting (Gmax), s	* 8.4	* 36	16.9	40.0		* 52	16.9					
Max Q Clear Time (g_c+I1), s	10.4	26.6	12.3	23.0		28.8	16.6					
Green Ext Time (p_c), s	0.0	7.7	0.6	4.0		15.7	0.1					
Intersection Summary												
HCM 6th Ctrl Delay			43.3									
HCM 6th LOS			D									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑			↗
Traffic Vol, veh/h	69	930	1523	61	0	51
Future Vol, veh/h	69	930	1523	61	0	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	77	1033	1692	68	0	57

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1760	0	880
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.22	-	3.32
Pot Cap-1 Maneuver	351	-	290
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	351	-	290
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	20.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	351	-	-	-	290
HCM Lane V/C Ratio	0.218	-	-	-	0.195
HCM Control Delay (s)	18.1	-	-	-	20.4
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.8	-	-	-	0.7

Appendix G

MMLOS Analysis

SEGMENTS		Greenbank	Section	Baseline	Section	McWatters	Section	Lisa	Section		
									1	2	
PEDESTRIAN	Sidewalk Width		1.5m		1.5m		1.5m				
	Boulevard Width		2m+		0.5-2m		2m+		2m+	2m+	
	AADT		>3000		>3000		>3000		≤ 3000	≤ 3000	
	On-Street Parking		no		no		no		no	no	
	Operating Speed		51-60 km/h		51-60 km/h		31-50 km/h		31-50 km/h	31-50 km/h	
	Level of Service		E		E		D		C	C	
			E		E		D		C		
CYCLIST	Number of Travel Lanes (per direction)		2		2		1		1		
	Type of Bikeway		Mixed Traffic		Mixed Traffic		Mixed Traffic		Mixed Traffic		
	Bike Lane Width		N/A		N/A		N/A		N/A		
	Operating Speed		≥ 50 km/h		≥ 50 km/h		≤ 40 km/h		≤ 40 km/h	50 km/h	
	Bike Lane Blockages										
	Unsignalized Lane Crossings (no median)										
	Unsignalized Lane Crossings (median >1.8 m)										
	Sidestreet Operating Speed										
		Level of Service		E		E		B		B	B
				E		E		B		B	
TRANSIT	Facility Type		Mixed Traffic		Mixed Traffic		-		-	-	
	Friction/ Congestion/ Incident Potential		Vt/Vp ≥ 0.8		Vt/Vp ≤ 0.6		-		-	-	
	Level of Service		D		E		-		-	-	
			D		E		-		-		
TRUCK	Lane width (3, 3.3, 3.5 > 3.7)		> 3.7		> 3.7		> 3.7		> 3.7		
	Travel Lanes per Direction		2+		2+		2		2		
	Level of Service		A		A		B		B		
			A		A		B		B		

Greenbank Road / Baseline Road

INTERSECTIONS					
	NORTHBOUND	WESTBOUND	SOUTHBOUND	EASTBOUND	
PEDESTRIAN	Lanes	6	6	6	8
	Median	No median	No median	No median	No median
	Island Refuge	No	No	No	No
	Conflicting Left Turns	Protected	Protected	Protected	Protected
	Conflicting Right Turns	Permissive	Permissive	Permissive	Permissive
	RTOR?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval ?	Yes	Yes	Yes	Yes
	Corner Radius (largest)	0	3	0	0
	Crosswalk Type	Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
	Level of service	E (33)	E (33)	E (33)	F (-2)
F					
CYCLIST	Type of Bikeway	Mixed Traffic	Mixed Traffic	Mixed Traffic	Bike Lanes
	Turning Speed (25km/h to 80 km/h)	25	25	25	25
	Right Turn Storage Length	Over 50 m	0 to 25 m	Over 50 m	0 to 25 m
	Dual Right Turn ?	No	No	No	No
	Shared Through-Right ?	No	No	No	Yes
	Bike Box ?	No	No	No	No
	Number of Lanes Crossed for Left Turns	2+	2+	2+	2+
	Operating Speed on Approach	60-69 km/h	60-69 km/h	60-69 km/h	60-69 km/h
	Dual Left Turn Lanes ?	No	Yes	Yes	No
Level of service	F	A	F	A	
F					
TRANSIT	Average Signal Delay				
	Level of service				
TRUCK	Turning Radius (smallest)	15+ m	10-15 m	15+ m	10-15 m
	Number of Receiving Lanes	2	3	3	2
	Level of service	A	B	A	B
B					
AUTO	Level of service	E			

Greenbank Road / Lisa Ave					
INTERSECTIONS					
	NORTHBOUND	WESTBOUND	SOUTHBOUND	EASTBOUND	
PEDESTRIAN	Lanes	5	2	6	2
	Median	No median	No median	No median	No median
	Island Refuge	No	No	No	No
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive	Permissive	Permissive	Permissive
	RTOR?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval ?	No	No	No	No
	Corner Radius (largest)	0	2	0	0
	Crosswalk Type	Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
	Level of service	E (38)	B (86)	F (20)	B (85)
	F				
CYCLIST	Type of Bikeway	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Turning Speed (25km/h to 80 km/h)	25	25	25	25
	Right Turn Storage Length	0 to 25 m	0 to 25 m	25 to 50 m	0 to 25 m
	Dual Right Turn ?	No	No	No	No
	Shared Through-Right ?	No	No	No	No
	Bike Box ?	No	No	No	No
	Number of Lanes Crossed for Left Turns	2+	1	2+	1
	Operating Speed on Approach	60-69 km/h	50-59 km/h	60-69 km/h	50-59 km/h
	Dual Left Turn Lanes ?	No	No	No	No
	Level of service	F	A	D	A
	F				
TRANSIT	Average Signal Delay				
	Level of service				
TRUCK	Turning Radius (smallest)	10-15 m	0-10 m	10-15 m	10-15 m
	Number of Receiving Lanes	1	2	1	2
	Level of service	E	D	E	B
	E				
AUTO	Level of service	A			

INTERSECTIONS					Greenbank Road / Iris Street / Highway 417 Ramp				
		NORTHBOUND		WESTBOUND		SOUTHBOUND		EASTBOUND	
PEDESTRIAN	Lanes	9		9		NO PEDESTRIAN CROSSING		4	
	Median	Median >2.4 m		No median				Median >2.4 m	
	Island Refuge	Yes		No				Yes	
	Conflicting Left Turns	Protected		Protected				Protected	
	Conflicting Right Turns	Permissive		Permissive				No right turn / Prohibited	
	RTOR?	RTOR allowed		RTOR allowed				0	
	Ped Leading Interval ?	No		No				No	
	Corner Radius (largest)	0		3				0	
	Crosswalk Type	Standard transverse markings		Standard transverse markings				Standard transverse markings	
	Level of service	F (-8)		F (-21)				B (78)	
F									
CYCLIST	Type of Bikeway	Mixed Traffic		Mixed Traffic		Mixed Traffic		Mixed Traffic	
	Turning Speed (25km/h to 80 km/h)	25		25		25		25	
	Right Turn Storage Length	0 to 25 m		0 to 25 m		25 to 50 m		0 to 25 m	
	Dual Right Turn ?	No		No		No		No	
	Shared Through-Right ?	No		No		No		No	
	Bike Box ?	No		No		No		No	
	Number of Lanes Crossed for Left Turns	2+		1		2+		1	
	Operating Speed on Approach	60-69 km/h		50-59 km/h		60-69 km/h		50-59 km/h	
	Dual Left Turn Lanes ?	No		No		No		No	
	Level of service	F		A		A		F	
F									
TRANSIT	Average Signal Delay								
	Level of service								
TRUCK	Turning Radius (smallest)	10-15 m		15+ m		NO RIGHT TURN		15+ m	
	Number of Receiving Lanes	2		3				2	
	Level of service	B		A				A	
B									
AUTO	Level of service	C							
























Appendix H

2025 Intersection Operations

HCM 6th Signalized Intersection Summary

1: Greenbank Rd & Baseline Rd

10/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	747	76	158	397	334	131	1087	340	402	467	65
Future Volume (veh/h)	121	747	76	158	397	334	131	1087	340	402	467	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1969	1953	1938	1953	1938	1969	1953	1984	1953	1922	1906
Adj Flow Rate, veh/h	121	747	76	158	397	0	131	1087	0	402	467	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	3	4	3	4	2	3	1	3	5	6
Cap, veh/h	145	844	86	212	846		208	1475		400	1452	
Arrive On Green	0.08	0.25	0.25	0.06	0.23	0.00	0.11	0.40	0.00	0.11	0.40	0.00
Sat Flow, veh/h	1875	3428	349	3580	3711	1642	1875	3711	1682	3609	3652	1616
Grp Volume(v), veh/h	121	407	416	158	397	0	131	1087	0	402	467	0
Grp Sat Flow(s),veh/h/ln	1875	1870	1906	1790	1856	1642	1875	1856	1682	1804	1826	1616
Q Serve(g_s), s	8.9	29.4	29.4	6.1	12.9	0.0	9.4	34.9	0.0	15.5	12.4	0.0
Cycle Q Clear(g_c), s	8.9	29.4	29.4	6.1	12.9	0.0	9.4	34.9	0.0	15.5	12.4	0.0
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	145	461	469	212	846		208	1475		400	1452	
V/C Ratio(X)	0.83	0.88	0.89	0.75	0.47		0.63	0.74		1.01	0.32	
Avail Cap(c_a), veh/h	150	584	595	286	1158		208	1475		400	1452	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	63.7	50.8	50.9	64.8	46.7	0.0	59.5	35.9	0.0	62.3	29.1	0.0
Incr Delay (d2), s/veh	30.9	12.7	12.6	7.0	0.4	0.0	13.7	3.3	0.0	46.6	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	16.1	16.4	3.1	6.4	0.0	5.4	17.5	0.0	10.0	6.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	94.6	63.5	63.4	71.8	47.1	0.0	73.2	39.3	0.0	108.8	29.7	0.0
LnGrp LOS	F	E	E	E	D		E	D		F	C	
Approach Vol, veh/h		944			555	A		1218	A		869	A
Approach Delay, s/veh		67.5			54.2			42.9			66.3	
Approach LOS		E			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	62.1	15.1	40.8	22.0	62.1	17.6	38.2				
Change Period (Y+Rc), s	6.5	6.5	* 6.8	* 6.3	6.5	6.5	* 6.8	* 6.3				
Max Green Setting (Gmax), s	15.5	43.5	* 11	* 44	15.5	43.5	* 11	* 44				
Max Q Clear Time (g_c+I1), s	17.5	36.9	8.1	31.4	11.4	14.4	10.9	14.9				
Green Ext Time (p_c), s	0.0	3.1	0.2	3.1	0.2	2.3	0.0	1.9				

Intersection Summary

HCM 6th Ctrl Delay	56.8
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Greenbank Rd & Lisa Ave

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↕		↕	↕↕	↕
Traffic Volume (veh/h)	102	8	39	21	9	101	82	1444	15	65	874	57
Future Volume (veh/h)	102	8	39	21	9	101	82	1444	15	65	874	57
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1891	2000	1953	1922	2000	1938	1953	1969	2000	1953	1953	1860
Adj Flow Rate, veh/h	102	8	0	21	9	101	82	1444	15	65	874	57
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	0	3	5	0	4	3	2	0	3	3	9
Cap, veh/h	173	12		54	27	173	481	2982	31	288	2918	1239
Arrive On Green	0.12	0.12	0.00	0.12	0.12	0.12	0.79	0.79	0.79	0.79	0.79	0.79
Sat Flow, veh/h	1018	98	0	197	226	1422	596	3793	39	361	3711	1576
Grp Volume(v), veh/h	110	0	0	131	0	0	82	712	747	65	874	57
Grp Sat Flow(s),veh/h/ln	1117	0	0	1845	0	0	596	1870	1962	361	1856	1576
Q Serve(g_s), s	4.6	0.0	0.0	0.0	0.0	0.0	6.2	18.4	18.4	10.6	9.2	1.1
Cycle Q Clear(g_c), s	14.1	0.0	0.0	9.4	0.0	0.0	15.5	18.4	18.4	29.0	9.2	1.1
Prop In Lane	0.93		0.00	0.16		0.77	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	185	0		254	0	0	481	1470	1542	288	2918	1239
V/C Ratio(X)	0.59	0.00		0.52	0.00	0.00	0.17	0.48	0.48	0.23	0.30	0.05
Avail Cap(c_a), veh/h	291	0		386	0	0	481	1470	1542	288	2918	1239
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.7	0.0	0.0	58.3	0.0	0.0	6.3	5.2	5.2	10.2	4.2	3.3
Incr Delay (d2), s/veh	3.0	0.0	0.0	1.6	0.0	0.0	0.8	1.1	1.1	1.8	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	0.0	4.8	0.0	0.0	1.0	8.2	8.6	1.1	4.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.7	0.0	0.0	59.9	0.0	0.0	7.1	6.3	6.3	12.0	4.5	3.4
LnGrp LOS	E	A		E	A	A	A	A	A	B	A	A
Approach Vol, veh/h		110	A		131			1541			996	
Approach Delay, s/veh		63.7			59.9			6.3			4.9	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		116.1		23.9		116.1		23.9				
Change Period (Y+Rc), s		6.0		* 6.9		6.0		* 6.9				
Max Green Setting (Gmax), s		99.0		* 28		99.0		* 28				
Max Q Clear Time (g_c+I1), s		20.4		16.1		31.0		11.4				
Green Ext Time (p_c), s		56.8		1.0		28.8		1.5				

Intersection Summary

HCM 6th Ctrl Delay	10.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Greenbank Rd & Iris St

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↔	↔↔		↔↔		↑↑↑	↔	↔↔	↑↑	
Traffic Volume (veh/h)	596	528	387	70	0	321	0	1446	200	171	785	31
Future Volume (veh/h)	596	528	387	70	0	321	0	1446	200	171	785	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1984	1969	1844	0	1969	0	1969	1922	2197	1938	440
Adj Flow Rate, veh/h	596	528	0	70	0	321	0	1446	200	171	785	31
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	1	2	10	0	2	0	2	5	3	4	100
Cap, veh/h	1474	627		121	0	0	0	2055	623	169	1741	69
Arrive On Green	0.41	0.32	0.00	0.04	0.00	0.00	0.00	0.38	0.38	0.04	0.48	0.48
Sat Flow, veh/h	3638	1984	1668	3407	70		0	5552	1629	4060	3610	143
Grp Volume(v), veh/h	596	528	0	70	66.1		0	1446	200	171	400	416
Grp Sat Flow(s),veh/h/ln	1819	1984	1668	1704	E		0	1792	1629	2030	1841	1912
Q Serve(g_s), s	15.1	32.2	0.0	2.6			0.0	29.6	11.2	5.4	18.7	18.7
Cycle Q Clear(g_c), s	15.1	32.2	0.0	2.6			0.0	29.6	11.2	5.4	18.7	18.7
Prop In Lane	1.00		1.00	1.00			0.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	1474	627		121			0	2055	623	169	888	922
V/C Ratio(X)	0.40	0.84		0.58			0.00	0.70	0.32	1.01	0.45	0.45
Avail Cap(c_a), veh/h	1474	748		286			0	2055	623	169	888	922
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00			0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.5	41.4	0.0	61.7			0.0	33.9	28.3	62.3	22.3	22.3
Incr Delay (d2), s/veh	0.2	7.5	0.0	4.4			0.0	2.0	1.4	73.0	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	18.2	0.0	1.3			0.0	14.1	5.1	4.6	9.2	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	48.9	0.0	66.1			0.0	36.0	29.6	135.3	23.9	23.8
LnGrp LOS	C	D		E			A	D	C	F	C	C
Approach Vol, veh/h		1124	A					1646			987	
Approach Delay, s/veh		37.6						35.2			43.2	
Approach LOS		D						D			D	
Timer - Assigned Phs	1	2	3	4		6	7					
Phs Duration (G+Y+Rc), s	33.0	57.2	11.7	48.1		70.2	59.8					
Change Period (Y+Rc), s	7.6	* 7.5	7.1	7.0		* 7.5	7.1					
Max Green Setting (Gmax), s	54	* 36	10.9	49.0		* 49	19.9					
Max Q Clear Time (g_c+1), s	17.4	31.6	4.6	34.2		20.7	17.1					
Green Ext Time (p_c), s	0.0	3.8	0.1	6.9		14.2	1.0					

Intersection Summary

HCM 6th Ctrl Delay	38.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑			↗
Traffic Vol, veh/h	53	1436	837	52	0	52
Future Vol, veh/h	53	1436	837	52	0	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	1436	837	52	0	52

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	889	0	-	0	- 445
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	- 6.94
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	- 3.32
Pot Cap-1 Maneuver	758	-	-	-	0 561
Stage 1	-	-	-	-	0 -
Stage 2	-	-	-	-	0 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	758	-	-	-	- 561
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
























Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	758	-	-	-	561
HCM Lane V/C Ratio	0.07	-	-	-	0.093
HCM Control Delay (s)	10.1	-	-	-	12.1
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3

HCM 6th Signalized Intersection Summary

1: Greenbank Rd & Baseline Rd

10/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	483	158	382	803	408	168	638	172	359	1022	113
Future Volume (veh/h)	125	483	158	382	803	408	168	638	172	359	1022	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	1984	1969	2000	1984	1984	1984	1969	1969	1969	1984	1984
Adj Flow Rate, veh/h	125	483	158	382	803	0	168	638	0	359	1022	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	2	0	1	1	1	2	2	2	1	1
Cap, veh/h	156	644	209	410	977		180	1220		347	1229	
Arrive On Green	0.08	0.23	0.23	0.11	0.26	0.00	0.10	0.33	0.00	0.10	0.33	0.00
Sat Flow, veh/h	1905	2797	909	3695	3770	1682	1890	3741	1668	3638	3770	1682
Grp Volume(v), veh/h	125	325	316	382	803	0	168	638	0	359	1022	0
Grp Sat Flow(s),veh/h/ln	1905	1885	1821	1848	1885	1682	1890	1870	1668	1819	1885	1682
Q Serve(g_s), s	7.1	17.6	17.8	11.3	22.1	0.0	9.7	15.2	0.0	10.5	27.6	0.0
Cycle Q Clear(g_c), s	7.1	17.6	17.8	11.3	22.1	0.0	9.7	15.2	0.0	10.5	27.6	0.0
Prop In Lane	1.00		0.50	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	156	434	419	410	977		180	1220		347	1229	
V/C Ratio(X)	0.80	0.75	0.75	0.93	0.82		0.93	0.52		1.03	0.83	
Avail Cap(c_a), veh/h	211	509	492	410	1018		180	1220		347	1229	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.6	39.4	39.4	48.5	38.4	0.0	49.4	30.1	0.0	49.8	34.3	0.0
Incr Delay (d2), s/veh	14.3	5.1	5.6	28.1	5.3	0.0	47.5	1.6	0.0	57.3	6.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	9.2	9.1	7.1	11.5	0.0	7.2	7.6	0.0	7.8	14.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.9	44.4	45.0	76.6	43.7	0.0	96.9	31.7	0.0	107.1	40.9	0.0
LnGrp LOS	E	D	D	E	D		F	C		F	D	
Approach Vol, veh/h		766			1185	A		806	A		1381	A
Approach Delay, s/veh		47.8			54.3			45.3			58.1	
Approach LOS		D			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	42.4	19.0	31.6	17.0	42.4	15.8	34.8				
Change Period (Y+Rc), s	6.5	6.5	* 6.8	* 6.3	6.5	6.5	* 6.8	* 6.3				
Max Green Setting (Gmax), s	10.5	31.5	* 12	* 30	10.5	31.5	* 12	* 30				
Max Q Clear Time (g_c+I1), s	12.5	17.2	13.3	19.8	11.7	29.6	9.1	24.1				
Green Ext Time (p_c), s	0.0	7.5	0.0	5.5	0.0	1.7	0.1	4.1				

Intersection Summary

HCM 6th Ctrl Delay	52.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Greenbank Rd & Lisa Ave

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↙	↕		↙	↕	↗
Traffic Volume (veh/h)	73	9	66	30	20	74	58	1078	35	129	1398	77
Future Volume (veh/h)	73	9	66	30	20	74	58	1078	35	129	1398	77
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	2000	2000	1953	2000	2000	1953	1969	2000	1969	1984	1875
Adj Flow Rate, veh/h	73	9	0	30	20	74	58	1078	35	129	1398	77
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	0	0	3	0	0	3	2	0	2	1	8
Cap, veh/h	371	43		120	94	257	211	2324	75	306	2370	999
Arrive On Green	0.25	0.25	0.00	0.25	0.25	0.25	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	1216	168	0	314	369	1010	356	3698	120	506	3770	1589
Grp Volume(v), veh/h	82	0	0	124	0	0	58	545	568	129	1398	77
Grp Sat Flow(s),veh/h/ln	1383	0	0	1693	0	0	356	1870	1947	506	1885	1589
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	12.7	16.8	16.8	19.7	24.1	2.1
Cycle Q Clear(g_c), s	5.0	0.0	0.0	6.0	0.0	0.0	36.7	16.8	16.8	36.5	24.1	2.1
Prop In Lane	0.89		0.00	0.24		0.60	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	413	0		471	0	0	211	1176	1224	306	2370	999
V/C Ratio(X)	0.20	0.00		0.26	0.00	0.00	0.27	0.46	0.46	0.42	0.59	0.08
Avail Cap(c_a), veh/h	415	0		473	0	0	211	1176	1224	306	2370	999
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	0.0	0.0	32.9	0.0	0.0	22.9	10.7	10.7	20.3	12.1	8.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.0	0.0	3.2	1.3	1.3	4.2	1.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.0	2.9	0.0	0.0	1.3	8.0	8.3	2.9	11.3	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.7	0.0	0.0	33.2	0.0	0.0	26.1	12.0	12.0	24.5	13.1	8.1
LnGrp LOS	C	A		C	A	A	C	B	B	C	B	A
Approach Vol, veh/h		82	A		124			1171			1604	
Approach Delay, s/veh		32.7			33.2			12.7			13.8	
Approach LOS		C			C			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		75.2		34.8		75.2		34.8				
Change Period (Y+Rc), s		6.0		* 6.9		6.0		* 6.9				
Max Green Setting (Gmax), s		69.0		* 28		69.0		* 28				
Max Q Clear Time (g_c+I1), s		38.7		7.0		38.5		8.0				
Green Ext Time (p_c), s		21.8		0.9		26.5		1.6				

Intersection Summary

HCM 6th Ctrl Delay	14.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Greenbank Rd & Iris St

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↗	↔↔		↗↗		↑↑↑	↗	↔↔	↑↑	
Traffic Volume (veh/h)	447	277	337	238	0	563	0	1081	144	227	952	0
Future Volume (veh/h)	447	277	337	238	0	563	0	1081	144	227	952	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1953	1953	1906	0	1969	0	1969	1922	1953	1969	0
Adj Flow Rate, veh/h	447	277	0	238	0	563	0	1081	144	227	952	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	3	3	6	0	2	0	2	5	3	2	0
Cap, veh/h	1183	355		306	0	0	0	2376	720	233	2114	0
Arrive On Green	0.32	0.18	0.00	0.09	0.00	0.00	0.00	0.44	0.44	0.06	0.57	0.00
Sat Flow, veh/h	3666	1953	1655	3522	238		0	5552	1629	3609	3839	0
Grp Volume(v), veh/h	447	277	0	238	63.0		0	1081	144	227	952	0
Grp Sat Flow(s),veh/h/ln	1833	1953	1655	1761	E		0	1792	1629	1804	1870	0
Q Serve(g_s), s	12.2	17.6	0.0	8.6			0.0	18.3	7.0	8.2	19.3	0.0
Cycle Q Clear(g_c), s	12.2	17.6	0.0	8.6			0.0	18.3	7.0	8.2	19.3	0.0
Prop In Lane	1.00		1.00	1.00			0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1183	355		306			0	2376	720	233	2114	0
V/C Ratio(X)	0.38	0.78		0.78			0.00	0.46	0.20	0.97	0.45	0.00
Avail Cap(c_a), veh/h	1183	601		458			0	2376	720	233	2114	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00			0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.0	50.7	0.0	58.1			0.0	25.3	22.2	60.7	16.5	0.0
Incr Delay (d2), s/veh	0.2	3.7	0.0	4.8			0.0	0.6	0.6	51.3	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	9.5	0.0	4.3			0.0	8.5	3.1	5.6	9.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.2	54.4	0.0	63.0			0.0	26.0	22.8	112.0	17.2	0.0
LnGrp LOS	C	D		E			A	C	C	F	B	A
Approach Vol, veh/h		724	A					1225			1179	
Approach Delay, s/veh		41.9						25.6			35.4	
Approach LOS		D						C			D	
Timer - Assigned Phs	1	2	3	4		6	7					
Phs Duration (G+Y+Rc), s	60.0	65.0	18.4	30.6		81.0	49.0					
Change Period (Y+Rc), s	7.6	* 7.5	7.1	7.0		* 7.5	7.1					
Max Green Setting (Gmax), s	30.4	* 36	16.9	40.0		* 52	16.9					
Max Q Clear Time (g_c+110), s	110.2	20.3	10.6	19.6		21.3	14.2					
Green Ext Time (p_c), s	0.0	12.0	0.7	4.1		18.1	0.7					

Intersection Summary

HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑			↗
Traffic Vol, veh/h	80	934	1540	71	0	53
Future Vol, veh/h	80	934	1540	71	0	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	934	1540	71	0	53

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1611	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.22	-	3.32
Pot Cap-1 Maneuver	401	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	401	-	325
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-
























Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	18.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	401	-	-	-	325
HCM Lane V/C Ratio	0.2	-	-	-	0.163
HCM Control Delay (s)	16.2	-	-	-	18.2
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.7	-	-	-	0.6

HCM 6th Signalized Intersection Summary

1: Greenbank Rd & Baseline Rd

10/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	747	76	158	397	336	131	1089	340	407	471	67
Future Volume (veh/h)	122	747	76	158	397	336	131	1089	340	407	471	67
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1969	1953	1938	1953	1938	1969	1953	1984	1953	1922	1906
Adj Flow Rate, veh/h	122	747	76	158	397	0	131	1089	0	407	471	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	3	4	3	4	2	3	1	3	5	6
Cap, veh/h	146	844	86	212	844		208	1475		400	1451	
Arrive On Green	0.08	0.25	0.25	0.06	0.23	0.00	0.11	0.40	0.00	0.11	0.40	0.00
Sat Flow, veh/h	1875	3428	349	3580	3711	1642	1875	3711	1682	3609	3652	1616
Grp Volume(v), veh/h	122	407	416	158	397	0	131	1089	0	407	471	0
Grp Sat Flow(s),veh/h/ln	1875	1870	1906	1790	1856	1642	1875	1856	1682	1804	1826	1616
Q Serve(g_s), s	9.0	29.4	29.4	6.1	13.0	0.0	9.4	35.0	0.0	15.5	12.5	0.0
Cycle Q Clear(g_c), s	9.0	29.4	29.4	6.1	13.0	0.0	9.4	35.0	0.0	15.5	12.5	0.0
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	146	461	469	212	844		208	1475		400	1451	
V/C Ratio(X)	0.84	0.88	0.89	0.75	0.47		0.63	0.74		1.02	0.32	
Avail Cap(c_a), veh/h	150	584	595	286	1158		208	1475		400	1451	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	63.7	50.8	50.9	64.8	46.8	0.0	59.5	36.0	0.0	62.3	29.2	0.0
Incr Delay (d2), s/veh	31.2	12.7	12.6	7.0	0.4	0.0	13.7	3.3	0.0	49.8	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	16.1	16.4	3.1	6.4	0.0	5.4	17.6	0.0	10.2	6.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	94.9	63.5	63.4	71.8	47.2	0.0	73.2	39.3	0.0	112.1	29.8	0.0
LnGrp LOS	F	E	E	E	D		E	D		F	C	
Approach Vol, veh/h		945			555	A		1220	A		878	A
Approach Delay, s/veh		67.5			54.2			43.0			67.9	
Approach LOS		E			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	62.1	15.1	40.8	22.0	62.1	17.7	38.2				
Change Period (Y+Rc), s	6.5	6.5	* 6.8	* 6.3	6.5	6.5	* 6.8	* 6.3				
Max Green Setting (Gmax), s	15.5	43.5	* 11	* 44	15.5	43.5	* 11	* 44				
Max Q Clear Time (g_c+I1), s	17.5	37.0	8.1	31.4	11.4	14.5	11.0	15.0				
Green Ext Time (p_c), s	0.0	3.1	0.2	3.1	0.2	2.4	0.0	1.9				

Intersection Summary

HCM 6th Ctrl Delay	57.2
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Greenbank Rd & Lisa Ave

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↙	↕		↙	↕	↘
Traffic Volume (veh/h)	102	8	39	32	9	115	82	1444	20	71	874	57
Future Volume (veh/h)	102	8	39	32	9	115	82	1444	20	71	874	57
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1891	2000	1953	1922	2000	1938	1953	1969	2000	1953	1953	1860
Adj Flow Rate, veh/h	102	8	0	32	9	115	82	1444	20	71	874	57
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	0	3	5	0	4	3	2	0	3	3	9
Cap, veh/h	176	12		68	26	174	525	2952	41	309	2900	1232
Arrive On Green	0.13	0.13	0.00	0.13	0.13	0.13	0.78	0.78	0.78	0.78	0.78	0.78
Sat Flow, veh/h	997	96	0	289	202	1378	663	3777	52	399	3711	1576
Grp Volume(v), veh/h	110	0	0	156	0	0	82	715	749	71	874	57
Grp Sat Flow(s),veh/h/ln1093		0	0	1869	0	0	663	1870	1959	399	1856	1576
Q Serve(g_s), s	3.7	0.0	0.0	0.0	0.0	0.0	5.6	18.9	18.9	10.7	9.4	1.1
Cycle Q Clear(g_c), s	14.8	0.0	0.0	11.0	0.0	0.0	15.1	18.9	18.9	29.7	9.4	1.1
Prop In Lane	0.93		0.00	0.21		0.74	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	188	0		267	0	0	525	1462	1531	309	2900	1232
V/C Ratio(X)	0.59	0.00		0.58	0.00	0.00	0.16	0.49	0.49	0.23	0.30	0.05
Avail Cap(c_a), veh/h	296	0		393	0	0	525	1462	1531	309	2900	1232
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.6	0.0	0.0	58.4	0.0	0.0	6.5	5.4	5.4	10.7	4.4	3.5
Incr Delay (d2), s/veh	2.9	0.0	0.0	2.0	0.0	0.0	0.6	1.2	1.1	1.7	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	0.0	5.7	0.0	0.0	1.0	8.5	8.9	1.2	4.1	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.5	0.0	0.0	60.4	0.0	0.0	7.2	6.6	6.5	12.4	4.6	3.5
LnGrp LOS	E	A		E	A	A	A	A	A	B	A	A
Approach Vol, veh/h		110	A		156			1546			1002	
Approach Delay, s/veh		63.5			60.4			6.6			5.1	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		115.4		24.6		115.4		24.6				
Change Period (Y+Rc), s		6.0		* 6.9		6.0		* 6.9				
Max Green Setting (Gmax), s		99.0		* 28		99.0		* 28				
Max Q Clear Time (g_c+1), s		20.9		16.8		31.7		13.0				
Green Ext Time (p_c), s		56.5		0.9		28.6		1.8				

Intersection Summary

HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Greenbank Rd & Iris St

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↔	↔↔		↔↔		↑↑↑	↔	↔↔	↑↑	
Traffic Volume (veh/h)	596	528	389	70	0	321	0	1458	202	171	789	30
Future Volume (veh/h)	596	528	389	70	0	321	0	1458	202	171	789	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1984	1969	1844	0	1969	0	1969	1922	2197	1938	440
Adj Flow Rate, veh/h	596	528	0	70	0	321	0	1458	202	171	789	30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	1	2	10	0	2	0	2	5	3	4	100
Cap, veh/h	1474	627		121	0	0	0	2055	623	169	1744	66
Arrive On Green	0.41	0.32	0.00	0.04	0.00	0.00	0.00	0.38	0.38	0.04	0.48	0.48
Sat Flow, veh/h	3638	1984	1668	3407	70		0	5552	1629	4060	3616	137
Grp Volume(v), veh/h	596	528	0	70	66.1		0	1458	202	171	402	417
Grp Sat Flow(s),veh/h/ln	1819	1984	1668	1704	E		0	1792	1629	2030	1841	1913
Q Serve(g_s), s	15.1	32.2	0.0	2.6			0.0	29.9	11.4	5.4	18.8	18.8
Cycle Q Clear(g_c), s	15.1	32.2	0.0	2.6			0.0	29.9	11.4	5.4	18.8	18.8
Prop In Lane	1.00		1.00	1.00			0.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	1474	627		121			0	2055	623	169	888	923
V/C Ratio(X)	0.40	0.84		0.58			0.00	0.71	0.32	1.01	0.45	0.45
Avail Cap(c_a), veh/h	1474	748		286			0	2055	623	169	888	923
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00			0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.5	41.4	0.0	61.7			0.0	34.0	28.3	62.3	22.3	22.3
Incr Delay (d2), s/veh	0.2	7.5	0.0	4.4			0.0	2.1	1.4	73.0	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	18.2	0.0	1.3			0.0	14.2	5.1	4.6	9.2	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	48.9	0.0	66.1			0.0	36.1	29.7	135.3	23.9	23.9
LnGrp LOS	C	D		E			A	D	C	F	C	C
Approach Vol, veh/h		1124	A					1660			990	
Approach Delay, s/veh		37.6						35.3			43.1	
Approach LOS		D						D			D	
Timer - Assigned Phs	1	2	3	4		6	7					
Phs Duration (G+Y+Rc), s	3.0	57.2	11.7	48.1		70.2	59.8					
Change Period (Y+Rc), s	7.6	* 7.5	7.1	7.0		* 7.5	7.1					
Max Green Setting (Gmax), s	5.4	* 36	10.9	49.0		* 49	19.9					
Max Q Clear Time (g_c+1), s	17.4	31.9	4.6	34.2		20.8	17.1					
Green Ext Time (p_c), s	0.0	3.5	0.1	6.9		14.3	1.0					

Intersection Summary

HCM 6th Ctrl Delay	38.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑			↗
Traffic Vol, veh/h	53	1441	839	52	0	52
Future Vol, veh/h	53	1441	839	52	0	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	1441	839	52	0	52

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	891	0	-	0	- 446
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	- 6.94
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	- 3.32
Pot Cap-1 Maneuver	757	-	-	-	0 560
Stage 1	-	-	-	-	0 -
Stage 2	-	-	-	-	0 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	757	-	-	-	- 560
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
























Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	757	-	-	-	560
HCM Lane V/C Ratio	0.07	-	-	-	0.093
HCM Control Delay (s)	10.1	-	-	-	12.1
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3

HCM 6th Signalized Intersection Summary

1: Greenbank Rd & Baseline Rd

10/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	483	158	382	803	408	168	641	172	363	1024	114
Future Volume (veh/h)	127	483	158	382	803	408	168	641	172	363	1024	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	1984	1969	2000	1984	1984	1984	1969	1969	1969	1984	1984
Adj Flow Rate, veh/h	127	483	158	382	803	0	168	641	0	363	1024	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	2	0	1	1	1	2	2	2	1	1
Cap, veh/h	158	644	209	410	973		180	1220		347	1229	
Arrive On Green	0.08	0.23	0.23	0.11	0.26	0.00	0.10	0.33	0.00	0.10	0.33	0.00
Sat Flow, veh/h	1905	2797	909	3695	3770	1682	1890	3741	1668	3638	3770	1682
Grp Volume(v), veh/h	127	325	316	382	803	0	168	641	0	363	1024	0
Grp Sat Flow(s),veh/h/ln	1905	1885	1821	1848	1885	1682	1890	1870	1668	1819	1885	1682
Q Serve(g_s), s	7.2	17.6	17.8	11.3	22.1	0.0	9.7	15.3	0.0	10.5	27.6	0.0
Cycle Q Clear(g_c), s	7.2	17.6	17.8	11.3	22.1	0.0	9.7	15.3	0.0	10.5	27.6	0.0
Prop In Lane	1.00		0.50	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	158	434	419	410	973		180	1220		347	1229	
V/C Ratio(X)	0.80	0.75	0.75	0.93	0.83		0.93	0.53		1.05	0.83	
Avail Cap(c_a), veh/h	211	509	492	410	1018		180	1220		347	1229	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.5	39.4	39.4	48.5	38.5	0.0	49.4	30.2	0.0	49.8	34.3	0.0
Incr Delay (d2), s/veh	14.8	5.1	5.5	28.1	5.5	0.0	47.5	1.6	0.0	60.7	6.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	7.9	7.7	6.3	9.7	0.0	6.5	6.3	0.0	7.3	12.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.3	44.4	45.0	76.6	43.9	0.0	96.9	31.8	0.0	110.4	41.0	0.0
LnGrp LOS	E	D	D	E	D		F	C		F	D	
Approach Vol, veh/h		768			1185	A		809	A		1387	A
Approach Delay, s/veh		47.9			54.4			45.3			59.2	
Approach LOS		D			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	42.4	19.0	31.6	17.0	42.4	15.9	34.7				
Change Period (Y+Rc), s	6.5	6.5	* 6.8	* 6.3	6.5	6.5	* 6.8	* 6.3				
Max Green Setting (Gmax), s	10.5	31.5	* 12	* 30	10.5	31.5	* 12	* 30				
Max Q Clear Time (g_c+I1), s	12.5	17.3	13.3	19.8	11.7	29.6	9.2	24.1				
Green Ext Time (p_c), s	0.0	7.5	0.0	5.5	0.0	1.6	0.1	4.1				

Intersection Summary

HCM 6th Ctrl Delay	53.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Greenbank Rd & Lisa Ave

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↙	↕		↙	↕	↗
Traffic Volume (veh/h)	73	9	66	37	20	83	58	1078	40	141	1398	77
Future Volume (veh/h)	73	9	66	37	20	83	58	1078	40	141	1398	77
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	2000	2000	1953	2000	2000	1953	1969	2000	1969	1984	1875
Adj Flow Rate, veh/h	73	9	0	37	20	83	58	1078	40	141	1398	77
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	0	0	3	0	0	3	2	0	2	1	8
Cap, veh/h	386	44		133	86	260	227	2312	86	331	2370	999
Arrive On Green	0.25	0.25	0.00	0.25	0.25	0.25	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	1275	175	0	361	340	1021	395	3678	136	560	3770	1589
Grp Volume(v), veh/h	82	0	0	140	0	0	58	548	570	141	1398	77
Grp Sat Flow(s),veh/h/ln1450		0	0	1723	0	0	395	1870	1944	560	1885	1589
Q Serve(g_s), s	0.0	0.0	0.0	1.4	0.0	0.0	11.2	16.9	16.9	19.5	24.1	2.1
Cycle Q Clear(g_c), s	5.5	0.0	0.0	7.0	0.0	0.0	35.3	16.9	16.9	36.4	24.1	2.1
Prop In Lane	0.89		0.00	0.26		0.59	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	430	0		479	0	0	227	1175	1222	331	2370	999
V/C Ratio(X)	0.19	0.00		0.29	0.00	0.00	0.26	0.47	0.47	0.43	0.59	0.08
Avail Cap(c_a), veh/h	432	0		481	0	0	227	1175	1222	331	2370	999
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.6	0.0	0.0	33.2	0.0	0.0	22.5	10.7	10.7	20.3	12.1	8.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.0	0.0	2.7	1.3	1.3	4.0	1.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln1.6	0.0	0.0	0.0	2.8	0.0	0.0	1.1	5.3	5.5	2.4	7.3	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.8	0.0	0.0	33.5	0.0	0.0	25.2	12.1	12.0	24.3	13.2	8.1
LnGrp LOS	C	A		C	A	A	C	B	B	C	B	A
Approach Vol, veh/h		82	A		140			1176			1616	
Approach Delay, s/veh		32.8			33.5			12.7			13.9	
Approach LOS		C			C			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		75.1		34.9		75.1		34.9				
Change Period (Y+Rc), s		6.0		* 6.9		6.0		* 6.9				
Max Green Setting (Gmax), s		69.0		* 28		69.0		* 28				
Max Q Clear Time (g_c+11), s		37.3		7.5		38.4		9.0				
Green Ext Time (p_c), s		22.5		0.9		26.5		1.8				

Intersection Summary

HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Greenbank Rd & Iris St

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↔	↔↔		↔↔		↑↑↑	↔	↔↔	↑↑	
Traffic Volume (veh/h)	447	277	340	240	0	563	0	1089	145	227	959	0
Future Volume (veh/h)	447	277	340	240	0	563	0	1089	145	227	959	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1953	1953	1906	0	1969	0	1969	1922	1953	1969	0
Adj Flow Rate, veh/h	447	277	0	240	0	563	0	1089	145	227	959	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	3	3	6	0	2	0	2	5	3	2	0
Cap, veh/h	1185	355		308	0	0	0	2373	719	233	2112	0
Arrive On Green	0.32	0.18	0.00	0.09	0.00	0.00	0.00	0.44	0.44	0.06	0.56	0.00
Sat Flow, veh/h	3666	1953	1655	3522	240		0	5552	1629	3609	3839	0
Grp Volume(v), veh/h	447	277	0	240	63.1		0	1089	145	227	959	0
Grp Sat Flow(s),veh/h/ln	1833	1953	1655	1761	E		0	1792	1629	1804	1870	0
Q Serve(g_s), s	12.2	17.6	0.0	8.7			0.0	18.5	7.1	8.2	19.5	0.0
Cycle Q Clear(g_c), s	12.2	17.6	0.0	8.7			0.0	18.5	7.1	8.2	19.5	0.0
Prop In Lane	1.00		1.00	1.00			0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1185	355		308			0	2373	719	233	2112	0
V/C Ratio(X)	0.38	0.78		0.78			0.00	0.46	0.20	0.97	0.45	0.00
Avail Cap(c_a), veh/h	1185	601		458			0	2373	719	233	2112	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00			0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.9	50.7	0.0	58.1			0.0	25.4	22.3	60.7	16.6	0.0
Incr Delay (d2), s/veh	0.2	3.7	0.0	5.0			0.0	0.6	0.6	51.3	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	8.5	0.0	3.9			0.0	7.0	2.6	5.1	7.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	54.4	0.0	63.1			0.0	26.1	22.9	112.0	17.3	0.0
LnGrp LOS	C	D		E			A	C	C	F	B	A
Approach Vol, veh/h		724	A					1234			1186	
Approach Delay, s/veh		41.9						25.7			35.4	
Approach LOS		D						C			D	
Timer - Assigned Phs	1	2	3	4		6	7					
Phs Duration (G+Y+Rc), s	60.0	64.9	18.5	30.6		80.9	49.1					
Change Period (Y+Rc), s	7.6	* 7.5	7.1	7.0		* 7.5	7.1					
Max Green Setting (Gmax), s	30.0	* 36	16.9	40.0		* 52	16.9					
Max Q Clear Time (g_c+110), s	10.0	20.5	10.7	19.6		21.5	14.2					
Green Ext Time (p_c), s	0.0	11.9	0.7	4.1		18.1	0.7					

Intersection Summary

HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑			↗
Traffic Vol, veh/h	80	938	1540	75	0	53
Future Vol, veh/h	80	938	1540	75	0	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	938	1540	75	0	53

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1615	0	-	0	- 808
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	- 6.94
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	- 3.32
Pot Cap-1 Maneuver	400	-	-	-	0 324
Stage 1	-	-	-	-	0 -
Stage 2	-	-	-	-	0 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	400	-	-	-	- 324
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	18.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	400	-	-	-	324
HCM Lane V/C Ratio	0.2	-	-	-	0.164
HCM Control Delay (s)	16.2	-	-	-	18.3
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.7	-	-	-	0.6
























Appendix I

2030 Intersection Operations

HCM 6th Signalized Intersection Summary

1: Greenbank Rd & Baseline Rd

10/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	751	76	159	407	342	131	1114	342	412	479	67
Future Volume (veh/h)	124	751	76	159	407	342	131	1114	342	412	479	67
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1969	1953	1938	1953	1938	1969	1953	1984	1953	1922	1906
Adj Flow Rate, veh/h	124	751	76	159	407	0	131	1114	0	412	479	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	3	4	3	4	2	3	1	3	5	6
Cap, veh/h	148	848	86	213	845		208	1470		400	1447	
Arrive On Green	0.08	0.25	0.25	0.06	0.23	0.00	0.11	0.40	0.00	0.11	0.40	0.00
Sat Flow, veh/h	1875	3430	347	3580	3711	1642	1875	3711	1682	3609	3652	1616
Grp Volume(v), veh/h	124	409	418	159	407	0	131	1114	0	412	479	0
Grp Sat Flow(s),veh/h/ln	1875	1870	1906	1790	1856	1642	1875	1856	1682	1804	1826	1616
Q Serve(g_s), s	9.1	29.5	29.6	6.1	13.3	0.0	9.4	36.3	0.0	15.5	12.8	0.0
Cycle Q Clear(g_c), s	9.1	29.5	29.6	6.1	13.3	0.0	9.4	36.3	0.0	15.5	12.8	0.0
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	148	462	471	213	845		208	1470		400	1447	
V/C Ratio(X)	0.84	0.89	0.89	0.75	0.48		0.63	0.76		1.03	0.33	
Avail Cap(c_a), veh/h	150	584	595	286	1158		208	1470		400	1447	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	63.6	50.8	50.8	64.8	46.9	0.0	59.5	36.5	0.0	62.3	29.4	0.0
Incr Delay (d2), s/veh	31.9	12.8	12.7	7.1	0.4	0.0	13.7	3.7	0.0	53.3	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	16.2	16.5	3.1	6.6	0.0	5.4	18.2	0.0	10.4	6.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	95.5	63.6	63.4	71.9	47.3	0.0	73.2	40.2	0.0	115.5	30.0	0.0
LnGrp LOS	F	E	E	E	D		E	D		F	C	
Approach Vol, veh/h		951			566	A		1245	A		891	A
Approach Delay, s/veh		67.7			54.2			43.6			69.5	
Approach LOS		E			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	62.0	15.1	40.9	22.0	62.0	17.8	38.2				
Change Period (Y+Rc), s	6.5	6.5	* 6.8	* 6.3	6.5	6.5	* 6.8	* 6.3				
Max Green Setting (Gmax), s	15.5	43.5	* 11	* 44	15.5	43.5	* 11	* 44				
Max Q Clear Time (g_c+I1), s	17.5	38.3	8.1	31.6	11.4	14.8	11.1	15.3				
Green Ext Time (p_c), s	0.0	2.7	0.2	3.1	0.2	2.4	0.0	2.0				

Intersection Summary

HCM 6th Ctrl Delay	57.9
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Greenbank Rd & Lisa Ave

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	↕
Traffic Volume (veh/h)	105	9	40	21	10	104	85	1480	16	67	896	58
Future Volume (veh/h)	105	9	40	21	10	104	85	1480	16	67	896	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1891	2000	1953	1922	2000	1938	1953	1969	2000	1953	1953	1860
Adj Flow Rate, veh/h	105	9	0	21	10	104	85	1480	16	67	896	58
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	0	3	5	0	4	3	2	0	3	3	9
Cap, veh/h	179	13		53	29	176	516	2974	32	302	2912	1236
Arrive On Green	0.12	0.12	0.00	0.12	0.12	0.12	0.78	0.78	0.78	0.78	0.78	0.78
Sat Flow, veh/h	1053	107	0	191	233	1425	648	3791	41	387	3711	1576
Grp Volume(v), veh/h	114	0	0	135	0	0	85	730	766	67	896	58
Grp Sat Flow(s),veh/h/ln	160	0	0	1849	0	0	648	1870	1961	387	1856	1576
Q Serve(g_s), s	4.5	0.0	0.0	0.0	0.0	0.0	6.0	19.3	19.3	10.4	9.6	1.2
Cycle Q Clear(g_c), s	14.3	0.0	0.0	9.7	0.0	0.0	15.6	19.3	19.3	29.7	9.6	1.2
Prop In Lane	0.92		0.00	0.16		0.77	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	192	0		258	0	0	516	1467	1539	302	2912	1236
V/C Ratio(X)	0.59	0.00		0.52	0.00	0.00	0.16	0.50	0.50	0.22	0.31	0.05
Avail Cap(c_a), veh/h	307	0		389	0	0	516	1467	1539	302	2912	1236
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.8	0.0	0.0	58.2	0.0	0.0	6.5	5.3	5.3	10.6	4.3	3.4
Incr Delay (d2), s/veh	2.9	0.0	0.0	1.6	0.0	0.0	0.7	1.2	1.2	1.7	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	0.0	4.9	0.0	0.0	1.0	8.7	9.1	1.1	4.1	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.7	0.0	0.0	59.8	0.0	0.0	7.2	6.5	6.5	12.3	4.6	3.4
LnGrp LOS	E	A		E	A	A	A	A	A	B	A	A
Approach Vol, veh/h		114	A		135			1581			1021	
Approach Delay, s/veh		63.7			59.8			6.5			5.0	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		115.8		24.2		115.8		24.2				
Change Period (Y+Rc), s		6.0		* 6.9		6.0		* 6.9				
Max Green Setting (Gmax), s		99.0		* 28		99.0		* 28				
Max Q Clear Time (g_c+1), s		21.3		16.3		31.7		11.7				
Green Ext Time (p_c), s		57.8		1.0		29.5		1.6				

Intersection Summary

HCM 6th Ctrl Delay	10.8
HCM 6th LOS	B

Notes

- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Greenbank Rd & Iris St

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↔	↔↔		↔↔		↑↑↑	↔	↔↔	↑↑	
Traffic Volume (veh/h)	599	544	397	72	0	331	0	1484	205	175	805	0
Future Volume (veh/h)	599	544	397	72	0	331	0	1484	205	175	805	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1984	1969	1844	0	1969	0	1969	1922	2197	1938	0
Adj Flow Rate, veh/h	599	544	0	72	0	331	0	1484	205	175	805	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	1	2	10	0	2	0	2	5	3	4	0
Cap, veh/h	1500	641		121	0	0	0	2018	611	169	1750	0
Arrive On Green	0.41	0.32	0.00	0.04	0.00	0.00	0.00	0.38	0.38	0.04	0.48	0.00
Sat Flow, veh/h	3638	1984	1668	3407	72		0	5552	1629	4060	3778	0
Grp Volume(v), veh/h	599	544	0	72	66.3		0	1484	205	175	805	0
Grp Sat Flow(s),veh/h/ln	1819	1984	1668	1704	E		0	1792	1629	2030	1841	0
Q Serve(g_s), s	15.1	33.2	0.0	2.7			0.0	31.0	11.7	5.4	19.1	0.0
Cycle Q Clear(g_c), s	15.1	33.2	0.0	2.7			0.0	31.0	11.7	5.4	19.1	0.0
Prop In Lane	1.00		1.00	1.00			0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1500	641		121			0	2018	611	169	1750	0
V/C Ratio(X)	0.40	0.85		0.59			0.00	0.74	0.34	1.04	0.46	0.00
Avail Cap(c_a), veh/h	1500	748		286			0	2018	611	169	1750	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00			0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.9	41.1	0.0	61.8			0.0	35.0	29.0	62.3	22.9	0.0
Incr Delay (d2), s/veh	0.2	8.1	0.0	4.6			0.0	2.4	1.5	79.6	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	18.9	0.0	1.3			0.0	14.8	5.3	4.8	9.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.1	49.2	0.0	66.3			0.0	37.5	30.5	141.9	23.8	0.0
LnGrp LOS	C	D		E			A	D	C	F	C	A
Approach Vol, veh/h		1143	A					1689			980	
Approach Delay, s/veh		37.6						36.6			44.9	
Approach LOS		D						D			D	
Timer - Assigned Phs	1	2	3	4		6	7					
Phs Duration (G+Y+Rc), s	33.0	56.3	11.7	49.0		69.3	60.7					
Change Period (Y+Rc), s	7.6	* 7.5	7.1	7.0		* 7.5	7.1					
Max Green Setting (Gmax), s	54	* 36	10.9	49.0		* 49	19.9					
Max Q Clear Time (g_c+1), s	17.4	33.0	4.7	35.2		21.1	17.1					
Green Ext Time (p_c), s	0.0	2.4	0.1	6.7		14.4	1.1					

Intersection Summary

HCM 6th Ctrl Delay	39.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑			↗
Traffic Vol, veh/h	60	1445	854	59	0	54
Future Vol, veh/h	60	1445	854	59	0	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	1445	854	59	0	54

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	913	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.22	-	-
Pot Cap-1 Maneuver	742	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	742	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-
























Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	742	-	-	-	551
HCM Lane V/C Ratio	0.081	-	-	-	0.098
HCM Control Delay (s)	10.3	-	-	-	12.2
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.3

HCM 6th Signalized Intersection Summary

1: Greenbank Rd & Baseline Rd

10/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	485	158	384	807	418	168	654	173	368	1048	116
Future Volume (veh/h)	128	485	158	384	807	418	168	654	173	368	1048	116
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	1984	1969	2000	1984	1984	1984	1969	1969	1969	1984	1984
Adj Flow Rate, veh/h	128	485	158	384	807	0	168	654	0	368	1048	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	2	0	1	1	1	2	2	2	1	1
Cap, veh/h	159	646	209	410	973		180	1218		347	1228	
Arrive On Green	0.08	0.23	0.23	0.11	0.26	0.00	0.10	0.33	0.00	0.10	0.33	0.00
Sat Flow, veh/h	1905	2800	906	3695	3770	1682	1890	3741	1668	3638	3770	1682
Grp Volume(v), veh/h	128	326	317	384	807	0	168	654	0	368	1048	0
Grp Sat Flow(s),veh/h/ln	1905	1885	1821	1848	1885	1682	1890	1870	1668	1819	1885	1682
Q Serve(g_s), s	7.3	17.7	17.9	11.3	22.2	0.0	9.7	15.7	0.0	10.5	28.6	0.0
Cycle Q Clear(g_c), s	7.3	17.7	17.9	11.3	22.2	0.0	9.7	15.7	0.0	10.5	28.6	0.0
Prop In Lane	1.00		0.50	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	159	435	420	410	973		180	1218		347	1228	
V/C Ratio(X)	0.80	0.75	0.76	0.94	0.83		0.93	0.54		1.06	0.85	
Avail Cap(c_a), veh/h	211	509	492	410	1018		180	1218		347	1228	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.5	39.3	39.4	48.5	38.5	0.0	49.4	30.3	0.0	49.8	34.6	0.0
Incr Delay (d2), s/veh	15.0	5.1	5.6	29.1	5.7	0.0	47.5	1.7	0.0	65.0	7.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	7.9	7.8	6.4	9.8	0.0	6.5	6.4	0.0	7.5	12.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.5	44.5	45.0	77.6	44.2	0.0	96.9	32.0	0.0	114.7	42.3	0.0
LnGrp LOS	E	D	D	E	D		F	C		F	D	
Approach Vol, veh/h		771			1191	A		822	A		1416	A
Approach Delay, s/veh		48.0			55.0			45.3			61.1	
Approach LOS		D			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	42.3	19.0	31.7	17.0	42.3	16.0	34.7				
Change Period (Y+Rc), s	6.5	6.5	* 6.8	* 6.3	6.5	6.5	* 6.8	* 6.3				
Max Green Setting (Gmax), s	10.5	31.5	* 12	* 30	10.5	31.5	* 12	* 30				
Max Q Clear Time (g_c+I1), s	12.5	17.7	13.3	19.9	11.7	30.6	9.3	24.2				
Green Ext Time (p_c), s	0.0	7.4	0.0	5.5	0.0	0.8	0.1	4.0				

Intersection Summary

HCM 6th Ctrl Delay	53.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Greenbank Rd & Lisa Ave

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕		↗	↕	↗
Traffic Volume (veh/h)	75	10	68	31	22	76	59	1105	36	132	1434	79
Future Volume (veh/h)	75	10	68	31	22	76	59	1105	36	132	1434	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	2000	2000	1953	2000	2000	1953	1969	2000	1969	1984	1875
Adj Flow Rate, veh/h	75	10	0	31	22	76	59	1105	36	132	1434	79
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	0	0	3	0	0	3	2	0	2	1	8
Cap, veh/h	390	49		122	100	259	218	2324	76	323	2370	999
Arrive On Green	0.25	0.25	0.00	0.25	0.25	0.25	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	1292	191	0	320	392	1021	381	3697	120	548	3770	1589
Grp Volume(v), veh/h	85	0	0	129	0	0	59	559	582	132	1434	79
Grp Sat Flow(s),veh/h/ln1483		0	0	1733	0	0	381	1870	1947	548	1885	1589
Q Serve(g_s), s	0.0	0.0	0.0	0.1	0.0	0.0	12.1	17.4	17.4	18.5	25.1	2.1
Cycle Q Clear(g_c), s	5.4	0.0	0.0	6.3	0.0	0.0	37.2	17.4	17.4	35.9	25.1	2.1
Prop In Lane	0.88		0.00	0.24		0.59	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	439	0		481	0	0	218	1176	1224	323	2370	999
V/C Ratio(X)	0.19	0.00		0.27	0.00	0.00	0.27	0.48	0.48	0.41	0.61	0.08
Avail Cap(c_a), veh/h	440	0		483	0	0	218	1176	1224	323	2370	999
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.5	0.0	0.0	32.9	0.0	0.0	23.4	10.8	10.8	20.3	12.2	8.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.0	0.0	3.0	1.4	1.3	3.8	1.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln1.7	0.0	0.0	0.0	2.6	0.0	0.0	1.1	5.5	5.7	2.3	7.7	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.8	0.0	0.0	33.2	0.0	0.0	26.4	12.2	12.2	24.1	13.4	8.1
LnGrp LOS	C	A		C	A	A	C	B	B	C	B	A
Approach Vol, veh/h		85	A		129			1200			1645	
Approach Delay, s/veh		32.8			33.2			12.9			14.0	
Approach LOS		C			C			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		75.1		34.9		75.1		34.9				
Change Period (Y+Rc), s		6.0		* 6.9		6.0		* 6.9				
Max Green Setting (Gmax), s		69.0		* 28		69.0		* 28				
Max Q Clear Time (g_c+1), s		39.2		7.4		37.9		8.3				
Green Ext Time (p_c), s		21.9		1.0		27.2		1.6				

Intersection Summary

HCM 6th Ctrl Delay	14.9
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Greenbank Rd & Iris St

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↔	↔↔		↔↔		↑↑↑	↔	↔↔	↑↑	
Traffic Volume (veh/h)	449	285	345	244	0	580	0	1108	148	232	976	17
Future Volume (veh/h)	449	285	345	244	0	580	0	1108	148	232	976	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1953	1953	1906	0	1969	0	1969	1922	1953	1969	440
Adj Flow Rate, veh/h	449	285	0	244	0	580	0	1108	148	232	976	17
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	3	3	6	0	2	0	2	5	3	2	100
Cap, veh/h	1205	364		312	0	0	0	2343	710	233	2103	37
Arrive On Green	0.33	0.19	0.00	0.09	0.00	0.00	0.00	0.44	0.44	0.06	0.56	0.56
Sat Flow, veh/h	3666	1953	1655	3522	244		0	5552	1629	3609	3762	66
Grp Volume(v), veh/h	449	285	0	244	63.3		0	1108	148	232	485	508
Grp Sat Flow(s),veh/h/ln	1833	1953	1655	1761	E		0	1792	1629	1804	1870	1957
Q Serve(g_s), s	12.2	18.1	0.0	8.8			0.0	19.0	7.3	8.4	20.1	20.1
Cycle Q Clear(g_c), s	12.2	18.1	0.0	8.8			0.0	19.0	7.3	8.4	20.1	20.1
Prop In Lane	1.00		1.00	1.00			0.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	1205	364		312			0	2343	710	233	1045	1094
V/C Ratio(X)	0.37	0.78		0.78			0.00	0.47	0.21	0.99	0.46	0.46
Avail Cap(c_a), veh/h	1205	601		458			0	2343	710	233	1045	1094
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00			0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.4	50.4	0.0	58.0			0.0	26.1	22.8	60.8	17.1	17.1
Incr Delay (d2), s/veh	0.2	3.7	0.0	5.3			0.0	0.7	0.7	57.4	1.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	8.7	0.0	4.0			0.0	7.3	2.7	5.4	7.6	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.6	54.1	0.0	63.3			0.0	26.7	23.4	118.2	18.6	18.5
LnGrp LOS	C	D		E			A	C	C	F	B	B
Approach Vol, veh/h		734	A					1256			1225	
Approach Delay, s/veh		41.5						26.4			37.4	
Approach LOS		D						C			D	
Timer - Assigned Phs	1	2	3	4		6	7					
Phs Duration (G+Y+Rc), s	66.0	64.2	18.6	31.2		80.2	49.8					
Change Period (Y+Rc), s	7.6	* 7.5	7.1	7.0		* 7.5	7.1					
Max Green Setting (Gmax), s	40.4	* 36	16.9	40.0		* 52	16.9					
Max Q Clear Time (g_c+110), s	110.4	21.0	10.8	20.1		22.1	14.2					
Green Ext Time (p_c), s	0.0	11.6	0.7	4.1		18.0	0.8					

Intersection Summary

HCM 6th Ctrl Delay	36.1
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑			↗
Traffic Vol, veh/h	91	935	1554	80	0	55
Future Vol, veh/h	91	935	1554	80	0	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	91	935	1554	80	0	55

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1634	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.22	-	3.32
Pot Cap-1 Maneuver	393	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	393	-	320
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-
























Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	18.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	393	-	-	-	320
HCM Lane V/C Ratio	0.232	-	-	-	0.172
HCM Control Delay (s)	16.9	-	-	-	18.6
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.9	-	-	-	0.6

HCM 6th Signalized Intersection Summary

1: Greenbank Rd & Baseline Rd

10/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	125	751	76	159	407	344	131	1116	342	417	483	69
Future Volume (veh/h)	125	751	76	159	407	344	131	1116	342	417	483	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1969	1953	1938	1953	1938	1969	1953	1984	1953	1922	1906
Adj Flow Rate, veh/h	125	751	76	159	407	0	131	1116	0	417	483	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	3	4	3	4	2	3	1	3	5	6
Cap, veh/h	149	848	86	213	843		208	1470		400	1447	
Arrive On Green	0.08	0.25	0.25	0.06	0.23	0.00	0.11	0.40	0.00	0.11	0.40	0.00
Sat Flow, veh/h	1875	3430	347	3580	3711	1642	1875	3711	1682	3609	3652	1616
Grp Volume(v), veh/h	125	409	418	159	407	0	131	1116	0	417	483	0
Grp Sat Flow(s),veh/h/ln	1875	1870	1906	1790	1856	1642	1875	1856	1682	1804	1826	1616
Q Serve(g_s), s	9.2	29.5	29.6	6.1	13.3	0.0	9.4	36.4	0.0	15.5	12.9	0.0
Cycle Q Clear(g_c), s	9.2	29.5	29.6	6.1	13.3	0.0	9.4	36.4	0.0	15.5	12.9	0.0
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	149	462	471	213	843		208	1470		400	1447	
V/C Ratio(X)	0.84	0.89	0.89	0.75	0.48		0.63	0.76		1.04	0.33	
Avail Cap(c_a), veh/h	150	584	595	286	1158		208	1470		400	1447	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	63.6	50.8	50.8	64.8	46.9	0.0	59.5	36.5	0.0	62.3	29.4	0.0
Incr Delay (d2), s/veh	32.3	12.8	12.7	7.1	0.4	0.0	13.7	3.7	0.0	56.9	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	16.2	16.5	3.1	6.6	0.0	5.4	18.3	0.0	10.6	6.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	95.8	63.6	63.4	71.9	47.4	0.0	73.2	40.2	0.0	119.1	30.0	0.0
LnGrp LOS	F	E	E	E	D		E	D		F	C	
Approach Vol, veh/h		952			566	A		1247	A		900	A
Approach Delay, s/veh		67.8			54.3			43.7			71.3	
Approach LOS		E			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	22.0	62.0	15.1	40.9	22.0	62.0	17.9	38.1				
Change Period (Y+Rc), s	6.5	6.5	* 6.8	* 6.3	6.5	6.5	* 6.8	* 6.3				
Max Green Setting (Gmax), s	15.5	43.5	* 11	* 44	15.5	43.5	* 11	* 44				
Max Q Clear Time (g_c+I1), s	17.5	38.4	8.1	31.6	11.4	14.9	11.2	15.3				
Green Ext Time (p_c), s	0.0	2.7	0.2	3.1	0.2	2.4	0.0	2.0				

Intersection Summary

HCM 6th Ctrl Delay	58.4
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Greenbank Rd & Lisa Ave

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↙	↕		↙	↕	↘
Traffic Volume (veh/h)	105	9	40	32	10	118	85	1480	21	73	896	58
Future Volume (veh/h)	105	9	40	32	10	118	85	1480	21	73	896	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1891	2000	1953	1922	2000	1938	1953	1969	2000	1953	1953	1860
Adj Flow Rate, veh/h	105	9	0	32	10	118	85	1480	21	73	896	58
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	0	3	5	0	4	3	2	0	3	3	9
Cap, veh/h	178	13		68	27	180	509	2935	42	296	2884	1225
Arrive On Green	0.13	0.13	0.00	0.13	0.13	0.13	0.78	0.78	0.78	0.78	0.78	0.78
Sat Flow, veh/h	984	103	0	281	210	1378	648	3776	54	385	3711	1576
Grp Volume(v), veh/h	114	0	0	160	0	0	85	733	768	73	896	58
Grp Sat Flow(s),veh/h/ln1088		0	0	1869	0	0	648	1870	1959	385	1856	1576
Q Serve(g_s), s	4.0	0.0	0.0	0.0	0.0	0.0	6.2	20.1	20.1	12.0	9.9	1.2
Cycle Q Clear(g_c), s	15.4	0.0	0.0	11.3	0.0	0.0	16.1	20.1	20.1	32.1	9.9	1.2
Prop In Lane	0.92		0.00	0.20		0.74	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	191	0		275	0	0	509	1454	1523	296	2884	1225
V/C Ratio(X)	0.60	0.00		0.58	0.00	0.00	0.17	0.50	0.50	0.25	0.31	0.05
Avail Cap(c_a), veh/h	294	0		393	0	0	509	1454	1523	296	2884	1225
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.4	0.0	0.0	58.0	0.0	0.0	6.9	5.7	5.7	11.6	4.6	3.6
Incr Delay (d2), s/veh	2.9	0.0	0.0	1.9	0.0	0.0	0.7	1.3	1.2	2.0	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	0.0	5.9	0.0	0.0	1.1	9.1	9.5	1.3	4.3	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.3	0.0	0.0	59.9	0.0	0.0	7.7	7.0	6.9	13.6	4.9	3.7
LnGrp LOS	E	A		E	A	A	A	A	A	B	A	A
Approach Vol, veh/h		114	A		160			1586			1027	
Approach Delay, s/veh		63.3			59.9			7.0			5.4	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		114.8		25.2		114.8		25.2				
Change Period (Y+Rc), s		6.0		* 6.9		6.0		* 6.9				
Max Green Setting (Gmax), s		99.0		* 28		99.0		* 28				
Max Q Clear Time (g_c+1), s		22.1		17.4		34.1		13.3				
Green Ext Time (p_c), s		57.6		0.9		29.4		1.8				

Intersection Summary

HCM 6th Ctrl Delay	11.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Greenbank Rd & Iris St

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↔	↔↔		↔↔		↑↑↑	↔	↔↔	↑↑	
Traffic Volume (veh/h)	599	544	399	72	0	331	0	1496	207	175	809	0
Future Volume (veh/h)	599	544	399	72	0	331	0	1496	207	175	809	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1969	1984	1969	1844	0	1969	0	1969	1922	2197	1938	0
Adj Flow Rate, veh/h	599	544	0	72	0	331	0	1496	207	175	809	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	1	2	10	0	2	0	2	5	3	4	0
Cap, veh/h	1500	641		121	0	0	0	2018	611	169	1750	0
Arrive On Green	0.41	0.32	0.00	0.04	0.00	0.00	0.00	0.38	0.38	0.04	0.48	0.00
Sat Flow, veh/h	3638	1984	1668	3407	72		0	5552	1629	4060	3778	0
Grp Volume(v), veh/h	599	544	0	72	66.3		0	1496	207	175	809	0
Grp Sat Flow(s),veh/h/ln	1819	1984	1668	1704	E		0	1792	1629	2030	1841	0
Q Serve(g_s), s	15.1	33.2	0.0	2.7			0.0	31.3	11.8	5.4	19.2	0.0
Cycle Q Clear(g_c), s	15.1	33.2	0.0	2.7			0.0	31.3	11.8	5.4	19.2	0.0
Prop In Lane	1.00		1.00	1.00			0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1500	641		121			0	2018	611	169	1750	0
V/C Ratio(X)	0.40	0.85		0.59			0.00	0.74	0.34	1.04	0.46	0.00
Avail Cap(c_a), veh/h	1500	748		286			0	2018	611	169	1750	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00			0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.9	41.1	0.0	61.8			0.0	35.1	29.0	62.3	22.9	0.0
Incr Delay (d2), s/veh	0.2	8.1	0.0	4.6			0.0	2.5	1.5	79.6	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	18.9	0.0	1.3			0.0	15.0	5.3	4.8	9.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.1	49.2	0.0	66.3			0.0	37.6	30.5	141.9	23.8	0.0
LnGrp LOS	C	D		E			A	D	C	F	C	A
Approach Vol, veh/h		1143	A					1703			984	
Approach Delay, s/veh		37.6						36.8			44.8	
Approach LOS		D						D			D	
Timer - Assigned Phs	1	2	3	4		6	7					
Phs Duration (G+Y+Rc), s	33.0	56.3	11.7	49.0		69.3	60.7					
Change Period (Y+Rc), s	7.6	* 7.5	7.1	7.0		* 7.5	7.1					
Max Green Setting (Gmax), s	54	* 36	10.9	49.0		* 49	19.9					
Max Q Clear Time (g_c+1), s	17.4	33.3	4.7	35.2		21.2	17.1					
Green Ext Time (p_c), s	0.0	2.1	0.1	6.7		14.5	1.1					

Intersection Summary

HCM 6th Ctrl Delay	39.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑			↗
Traffic Vol, veh/h	60	1450	856	59	0	54
Future Vol, veh/h	60	1450	856	59	0	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	1450	856	59	0	54

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	915	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.22	-	3.32
Pot Cap-1 Maneuver	741	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	741	-	550
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-
























Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	741	-	-	-	550
HCM Lane V/C Ratio	0.081	-	-	-	0.098
HCM Control Delay (s)	10.3	-	-	-	12.3
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.3

HCM 6th Signalized Intersection Summary

1: Greenbank Rd & Baseline Rd

10/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	485	158	384	807	418	168	657	173	372	1050	117
Future Volume (veh/h)	130	485	158	384	807	418	168	657	173	372	1050	117
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	1984	1969	2000	1984	1984	1984	1969	1969	1969	1984	1984
Adj Flow Rate, veh/h	130	485	158	384	807	0	168	657	0	372	1050	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	2	0	1	1	1	2	2	2	1	1
Cap, veh/h	162	646	209	410	968		180	1218		347	1228	
Arrive On Green	0.08	0.23	0.23	0.11	0.26	0.00	0.10	0.33	0.00	0.10	0.33	0.00
Sat Flow, veh/h	1905	2800	906	3695	3770	1682	1890	3741	1668	3638	3770	1682
Grp Volume(v), veh/h	130	326	317	384	807	0	168	657	0	372	1050	0
Grp Sat Flow(s),veh/h/ln	1905	1885	1821	1848	1885	1682	1890	1870	1668	1819	1885	1682
Q Serve(g_s), s	7.4	17.7	17.9	11.3	22.3	0.0	9.7	15.8	0.0	10.5	28.6	0.0
Cycle Q Clear(g_c), s	7.4	17.7	17.9	11.3	22.3	0.0	9.7	15.8	0.0	10.5	28.6	0.0
Prop In Lane	1.00		0.50	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	162	435	420	410	968		180	1218		347	1228	
V/C Ratio(X)	0.80	0.75	0.76	0.94	0.83		0.93	0.54		1.07	0.86	
Avail Cap(c_a), veh/h	211	509	492	410	1018		180	1218		347	1228	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.4	39.3	39.4	48.5	38.6	0.0	49.4	30.3	0.0	49.8	34.7	0.0
Incr Delay (d2), s/veh	15.5	5.1	5.6	29.1	5.8	0.0	47.5	1.7	0.0	68.6	7.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	7.9	7.8	6.4	9.9	0.0	6.5	6.5	0.0	7.6	12.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.0	44.5	45.0	77.6	44.5	0.0	96.9	32.1	0.0	118.3	42.4	0.0
LnGrp LOS	E	D	D	E	D		F	C		F	D	
Approach Vol, veh/h		773			1191	A		825	A		1422	A
Approach Delay, s/veh		48.1			55.1			45.3			62.3	
Approach LOS		D			E			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	42.3	19.0	31.7	17.0	42.3	16.1	34.6				
Change Period (Y+Rc), s	6.5	6.5	* 6.8	* 6.3	6.5	6.5	* 6.8	* 6.3				
Max Green Setting (Gmax), s	10.5	31.5	* 12	* 30	10.5	31.5	* 12	* 30				
Max Q Clear Time (g_c+I1), s	12.5	17.8	13.3	19.9	11.7	30.6	9.4	24.3				
Green Ext Time (p_c), s	0.0	7.4	0.0	5.5	0.0	0.8	0.1	4.0				

Intersection Summary

HCM 6th Ctrl Delay	54.3
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: Greenbank Rd & Lisa Ave

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↙	↕		↙	↕	↗
Traffic Volume (veh/h)	75	10	68	38	22	85	59	1105	41	144	1434	79
Future Volume (veh/h)	75	10	68	38	22	85	59	1105	41	144	1434	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	2000	2000	1953	2000	2000	1953	1969	2000	1969	1984	1875
Adj Flow Rate, veh/h	75	10	0	38	22	85	59	1105	41	144	1434	79
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	0	0	3	0	0	3	2	0	2	1	8
Cap, veh/h	381	47		133	91	258	218	2311	86	321	2369	999
Arrive On Green	0.25	0.25	0.00	0.25	0.25	0.25	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	1255	186	0	359	356	1013	381	3678	136	545	3770	1589
Grp Volume(v), veh/h	85	0	0	145	0	0	59	562	584	144	1434	79
Grp Sat Flow(s),veh/h/ln1441		0	0	1727	0	0	381	1870	1944	545	1885	1589
Q Serve(g_s), s	0.0	0.0	0.0	1.4	0.0	0.0	12.1	17.5	17.6	21.0	25.1	2.1
Cycle Q Clear(g_c), s	5.8	0.0	0.0	7.2	0.0	0.0	37.2	17.5	17.6	38.5	25.1	2.1
Prop In Lane	0.88		0.00	0.26		0.59	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	428	0		481	0	0	218	1175	1222	321	2369	999
V/C Ratio(X)	0.20	0.00		0.30	0.00	0.00	0.27	0.48	0.48	0.45	0.61	0.08
Avail Cap(c_a), veh/h	430	0		483	0	0	218	1175	1222	321	2369	999
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.7	0.0	0.0	33.2	0.0	0.0	23.4	10.9	10.9	21.1	12.3	8.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.0	0.0	3.0	1.4	1.3	4.5	1.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln1.7	0.0	0.0	0.0	2.9	0.0	0.0	1.1	5.5	5.7	2.6	7.7	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	0.0	0.0	33.6	0.0	0.0	26.4	12.2	12.2	25.6	13.4	8.1
LnGrp LOS	C	A		C	A	A	C	B	B	C	B	A
Approach Vol, veh/h		85	A		145			1205			1657	
Approach Delay, s/veh		32.9			33.6			12.9			14.2	
Approach LOS		C			C			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		75.1		34.9		75.1		34.9				
Change Period (Y+Rc), s		6.0		* 6.9		6.0		* 6.9				
Max Green Setting (Gmax), s		69.0		* 28		69.0		* 28				
Max Q Clear Time (g_c+1), s		39.2		7.8		40.5		9.2				
Green Ext Time (p_c), s		22.0		1.0		25.2		1.8				

Intersection Summary

HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

3: Greenbank Rd & Iris St

10/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↔	↔↔		↔↔		↑↑↑	↔	↔↔	↑↑	
Traffic Volume (veh/h)	449	285	348	246	0	580	0	1116	149	221	983	17
Future Volume (veh/h)	449	285	348	246	0	580	0	1116	149	221	983	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1953	1953	1906	0	1969	0	1969	1922	1953	1969	440
Adj Flow Rate, veh/h	449	285	0	246	0	580	0	1116	149	221	983	17
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	3	3	6	0	2	0	2	5	3	2	100
Cap, veh/h	1207	364		314	0	0	0	2340	709	233	2101	36
Arrive On Green	0.33	0.19	0.00	0.09	0.00	0.00	0.00	0.44	0.44	0.06	0.56	0.56
Sat Flow, veh/h	3666	1953	1655	3522	246		0	5552	1629	3609	3762	65
Grp Volume(v), veh/h	449	285	0	246	63.4		0	1116	149	221	489	511
Grp Sat Flow(s),veh/h/ln	1833	1953	1655	1761	E		0	1792	1629	1804	1870	1957
Q Serve(g_s), s	12.2	18.1	0.0	8.9			0.0	19.2	7.4	7.9	20.3	20.3
Cycle Q Clear(g_c), s	12.2	18.1	0.0	8.9			0.0	19.2	7.4	7.9	20.3	20.3
Prop In Lane	1.00		1.00	1.00			0.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	1207	364		314			0	2340	709	233	1044	1093
V/C Ratio(X)	0.37	0.78		0.78			0.00	0.48	0.21	0.95	0.47	0.47
Avail Cap(c_a), veh/h	1207	601		458			0	2340	709	233	1044	1093
HCM Platoon Ratio	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00			0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.3	50.4	0.0	58.0			0.0	26.2	22.8	60.6	17.2	17.2
Incr Delay (d2), s/veh	0.2	3.7	0.0	5.4			0.0	0.7	0.7	44.5	1.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	8.7	0.0	4.0			0.0	7.4	2.7	4.8	7.6	8.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	54.1	0.0	63.4			0.0	26.9	23.5	105.0	18.7	18.6
LnGrp LOS	C	D		E			A	C	C	F	B	B
Approach Vol, veh/h		734	A					1265			1221	
Approach Delay, s/veh		41.5						26.5			34.3	
Approach LOS		D						C			C	
Timer - Assigned Phs	1	2	3	4		6	7					
Phs Duration (G+Y+Rc), s	60.0	64.1	18.7	31.2		80.1	49.9					
Change Period (Y+Rc), s	7.6	* 7.5	7.1	7.0		* 7.5	7.1					
Max Green Setting (Gmax), s	30.4	* 36	16.9	40.0		* 52	16.9					
Max Q Clear Time (g_c+19.5), s	19.5	21.2	10.9	20.1		22.3	14.2					
Green Ext Time (p_c), s	0.0	11.5	0.7	4.1		18.1	0.8					

Intersection Summary

HCM 6th Ctrl Delay	35.0
HCM 6th LOS	D

Notes

- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑			↗
Traffic Vol, veh/h	91	939	1554	84	0	55
Future Vol, veh/h	91	939	1554	84	0	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	450	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	91	939	1554	84	0	55

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1638	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.22	-	3.32
Pot Cap-1 Maneuver	392	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	392	-	319
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	18.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	392	-	-	-	319
HCM Lane V/C Ratio	0.232	-	-	-	0.172
HCM Control Delay (s)	16.9	-	-	-	18.6
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.9	-	-	-	0.6

Appendix J

Comments and Responses

Comments from Scoping Report Review

• **Element 2.1.2 - Existing Conditions:**

- Include description of McWatters Rd;
 - Done
- Include description of McWatters Rd/Greenbank Rd intersection;
 - Done
- Existing intersections should be described in text or table format within the existing conditions section of the report;
 - Done
- Include existing driveways to adjacent developments (both sides of all roads bordering the site) within 200 m of proposed site driveway, indicating the land use associated with the driveway;
 - Done
- Figure 3 should also include the location of bus stops within the study area;
 - Done
- Include existing area traffic management measures, if there are none this should be noted.
 - Done
- Include existing peak hour travel demands for all modes (i.e. pedestrian volumes and cyclist volumes are missing from Figure 4); and
 - Done
- The collision data should be separated by location and include all intersections (i.e. Greenbank/Lisa, Greenbank/Baseline, Lisa/McWatters, McWatters/Baseline) and segments (i.e. Greenbank, Lisa, McWatters and Baseline) of the boundary streets of the site. You can reach out to nancy.blair@ottawa.ca for collision data.
 - Done

• **Element 2.1.3 - Planned Conditions**

- Include planned cycling infrastructure as per the City's Cycling Plan. (https://documents.ottawa.ca/sites/documents/files/documents/ocp2013_report_en.pdf)
 - Done
- The BRT is on the TMP's Network Concept, therefore will not be in place until post-2031, this should be identified in the TIA.
 - Done
- The TMP also includes Baseline Road as being a Transit Priority Corridor with Isolated Measures as part of the Affordable Network, this should be identified in the TIA.
 - Done
- TIA should note that there were no other developments within the study area at the time the study was prepared. (<https://ottawa.ca/en/planning-development-and-construction/whats-happening-your-neighbourhood/development-application-search-tool>)
 - Done

• **Element 2.2.1 - Study Area**

- The site generated traffic volumes and distribution assumptions were not reviewed as part of this Scoping Report, these are to be included in the Forecasting report.
- If a reduction in study area is being sought based upon travel patterns, additional details are needed to confirm how vehicles access/egress the site and parking garage. Are parking garages connected underground?

- Additional details provided about parking garage locations and connections
- A reduced study area is supported, however, the study area should include: Baseline/Greenbank and Baseline/McWatters.
- Noted
- Keep the reasoning provided for excluding the additional intersections within the report. Note that upon circulation of the Forecasting Report, this section will be reviewed by additional City staff.

- **Module 2.3 - Exemptions Review**

- Module 4.5 is required, because the proposed site is residential.
- Module 4.7 is required.
- Modules 4.1.3, 4.2.2, 4.6 and 4.8 are exempt.

Comments from Forecasting Report Review

Transportation Engineering Services

The TIA report submissions are to be submitted as cumulative reports. The Forecasting Report should include the screening and scoping portions of the TIA study. Following the standardized format provides a simpler way to review the report and ensures that steps are not missed.

- Completed

TIA Screening and Scoping Report:

- Existing Conditions: Provide existing pedestrian and cycling facilities within the study area.
 - The existing pedestrian and cycling facilities are listed in section 3.1
- Area Multi-Modal Network: Include truck route information.
 - Added to section 3.1
- Driveways: Discuss any concerns on major driveways/accesses, i.e. Pinecrest Public School access.
 - Added
- Transit: Include the latest OC Transpo network map and route schedules.
 - Added

Peak Hour Travel Demand:

- The captured data shown in Figure 6 and 7 for Baseline Rd and McWatters Rd is not listed in Table 2 - Intersection Count Data, instead, the Pinecrest RD and Greenbank Rd / E-NS Off-Ramp Hwy 417 intersection in Table 2 is not within the study area. Update the list in Table 2.
 - Corrected
- The obtained existing traffic counts on studied intersections should be attached to this report as supporting documents.
 - Added
- Collision Analysis: Request detailed collision data from Nancy Blair (Nancy.blair@ottawa.ca) for studied intersections to determine if there are any directional patterns. Provide details on the pedestrian and cycling collisions. The collision data should be attached as supporting documents.
 - Added
- Appendix A, Trip Generation Trigger: Based on the provided general information of the proposed development, indicate which land use type is a trigger to be satisfied.
 - Completed

TIA Forecasting Report:

- Trip Generation and Mode Shares: Justify any trip reduction factor applied to the development site.
 - No trip reduction factor was applied
- Trip Assignment: Show estimated trips entering and leaving the 2 proposed accesses in Figure 1.
 - Added

General Background Growth Rates:

- In Figure 2, the projected volumes for 2025 are the same as the existing volumes shown in Figure 6 in TIA Screening and Scoping report. The growth rates were not factored in to calculate the background volumes for 2025.
- In Figure 3, the projected volumes calculated based on the inaccurate numbers shown in Figure 2. Update background volumes for both 2025 and 2030 horizons.
- Provide total volumes including future background volumes and new trips for both 2025 and 2030 horizons.
 - Review updated report.
- Demand Rationalization: The intersection capacity analysis needs to be conducted for both existing and background traffic conditions to determine V/C ratio or delays and Level of Service for each movement. Only the studies intersections need to be included in this analysis. Synchro Analysis Reports need to be attached as supporting documents.
 - Intersection capacity analysis is part of the Strategy Report

Traffic Signal Operations

- A pedestrian connection between this site and retail south of the site on Greenbank Road would be of benefit.
 - The development proposed in this project is at the corner of Lisa Avenue and Greenbank Road, which is 200m north of the retail. A pedestrian connection is provided from the new development to Greenbank Road. While pedestrian connections can be built to public property, a pedestrian connection to an adjacent private property requires agreement from the adjacent landowners, which has not been provided.

Development Review – Transportation

- We encourage you to provide the comments and responses from all previous circulations within the TIA appendix document.
 - Added

No.	Comment	Responsibility	HLH Comments
8.0	Transportation		
	Residential Development at 1300 McWatters Road Traffic Impact Assessment - Strategy Report, prepared by GHD Limited, Consultant's project #11224343, dated 16 July 2021, revised 08 April 2022.		
8.1	Section 4.3: The reference to the City's Complete Streets concept is not applicable, as there are no such designs within the study area. The MMLOS was undertaken, however the TIA must also identify potential changes to the area that would improve MMLOS results in the cases where targets are not met.	GHD Limited	Suggestions of potential changes to the area that would improve MMLOS result were added to the report
8.2	The 1.5m wide sidewalks are sub-standard and are to be upgraded. This should be noted in the TIA.	GHD Limited	It was added to the report that the 1.5m wide sidewalks are sub-standard
			"as part of a future road reconstruction project, the sidewalks could be widened to 2.0 m instead of the existing 1.5 m, which is sub-standard."
8.3	Section 4.4.1 indicates the accesses are "existing driveways", however the Site Plan proposes new accesses on both Lisa Ave and McWatters Rd. Revise TIA and ensure consistency throughout submission documents.	GHD Limited	The report states now "reconstructed accesses" instead of "existing accesses"
8.4	Section 4.5 makes reference to items that "will be reviewed... (will be) confirmed during site plan". As this TIA is submitted in support of the SP, these details should be addressed within the submission.	GHD Limited	The details about the number of units and the number of bedrooms was added to the report
8.5	TDM measures included in the Appendix should also be listed Section 4.5.3.	GHD Limited	TDM measures included in the Appendix were listed in Section 4.5.3 of the report



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