



IO & SOLGEN

**Brockville Correctional Complex St
Lawrence Valley Correctional Treatment
Centre**

Traffic Impact Study and Parking Review

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Brockville Correctional Complex St Lawrence Valley Correctional Treatment Centre

Traffic Impact Study and Parking Review

FINAL

2026-03-14

Prepared for

IO & SOLGEN

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1. Introduction

Infrastructure Ontario retained WSP to prepare a Traffic Impact Study (TIS) to support the Zoning By-law Amendment and Site Plan Control (SPC) applications for the new Brockville Correctional Centre – St. Lawrence Valley Correctional Treatment Centre (BCC-SLVCTC) at 1804 County Road 2 in the Township of Elizabethtown-Kitley, on the border of the City of Brockville. The site location is illustrated in **Figure 1-1**.

The study Terms of Reference (ToR) were established through correspondence between the project team and City staff in August 2025. This Report has incorporated the comments received. Refer to Appendix A for the ToR and comments received.

This Report includes:

- an assessment of the existing traffic operation conditions at the study area intersections;
- an assessment of the future background traffic conditions, including corridor background traffic growth and planned transportation improvements in the study area;
- an estimation of the traffic generated by the proposed development under ultimate conditions;
- an assessment of the impacts of the ultimate site-generated traffic on the operations of the study intersections under future total traffic conditions;
- a review of the proposed parking supply; and
- a review of the proposed vehicular access design and internal site circulation;

Information used in this study includes:

- site plan and statistics prepared by Architecture49
- turning movement counts (TMC) at boundary roadway intersections from Horizon Data Services Ltd.
- Township of Elizabethtown-Kitley Zoning By-Law No. 13-21, October 2022 Office Consolidation
- Geometric Design Guide for Canadian Roads, Transportation Association of Canada (TAC), June 2017

Intersection capacity analyses were conducted using Synchro 12.0, which implements the 2000 Highway Capacity Manual (HCM) methodology, and vehicular movements were simulated using AutoTURN 11.

Figure 1-1 Site Location and Study Area



2. Proposed Development

2.1 Current Land Use

The site is currently occupied by the existing St. Lawrence Valley Correctional Treatment Centre and Forensic Treatment Unit, which comprises the Brockville Mental Health Centre.

2.2 Proposed Land Use

The proposed development will consist of a correctional facility with 275 beds or a gross floor area (GFA) of approximately 24,616 m². The site will maintain the current accesses on Oxford Avenue at Broadway Avenue and Crawford Street. The proposed development will provide 315 parking spaces dedicated to the BCC-SLVCTC building, including 11 accessible parking spaces, bringing the total parking spaces on the entire property to 606.

Refer to **Figure 2-1** for the proposed development site plan.



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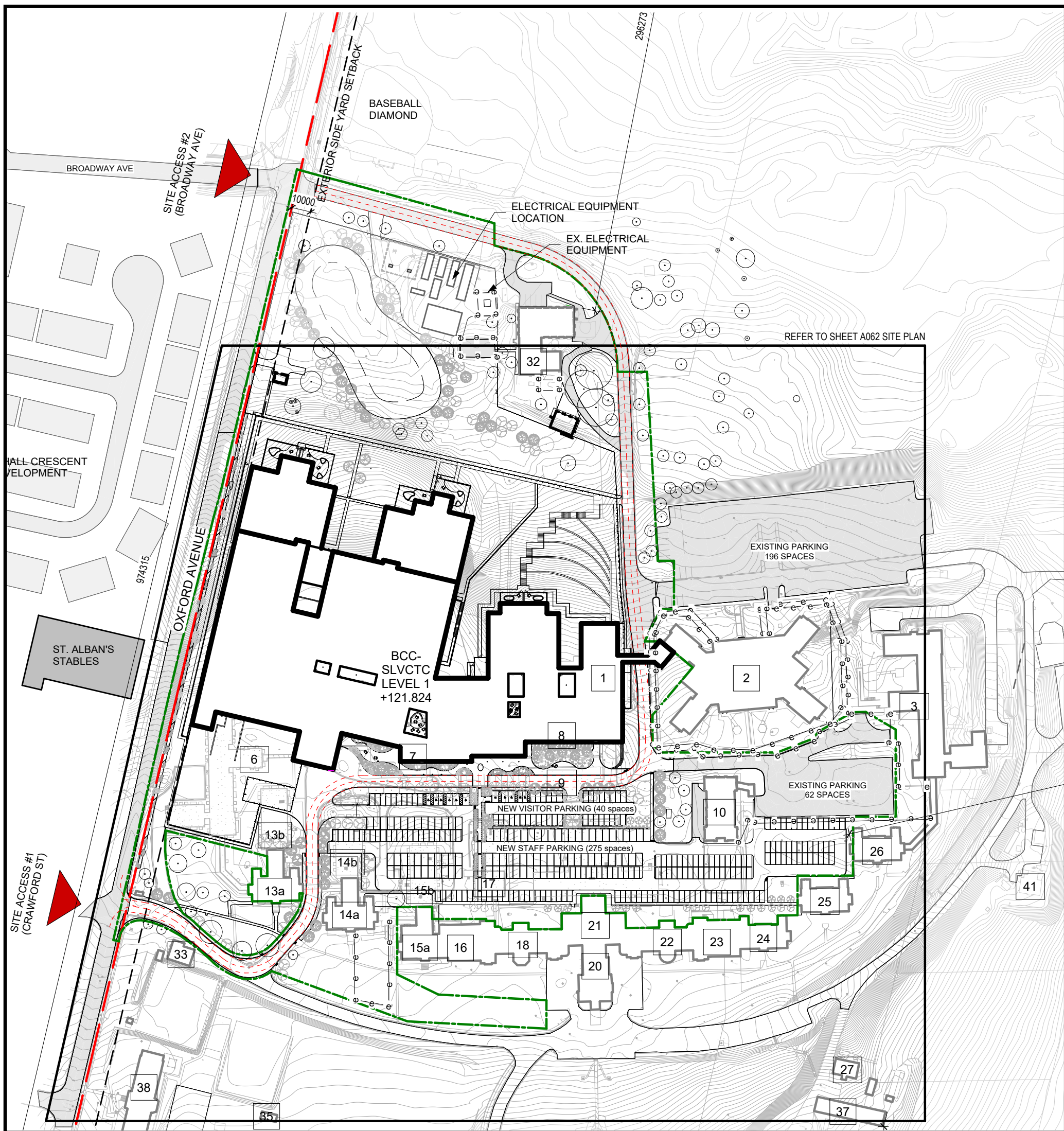


Figure 2-1

Proposed Site Plan

3. Existing Conditions

3.1 Roadway Network

The site is bounded by County Road 2 to the south, Oxford Avenue to the west, green space to the north, and a nursing home / green space to the east. The characteristics of the adjacent roads are summarized as follows:

- **Oxford Avenue** is a collector road running north-south under the jurisdiction of the City of Brockville. It has a two-lane cross-section, with one lane in each direction. The posted speed limit is 50 km/h.
- **County Road 2** runs east-west. The section east of Oxford Avenue is in the Township of Elizabethtown-Kitley boundary and is a County Road under the jurisdiction of the United Counties of Leeds and Grenville. The section west of Oxford Avenue is in the City of Brockville boundary and is also known as King Street East or Highway 2 under the jurisdiction of the City of Brockville. King Street East is an arterial road per the City's Official Plan.

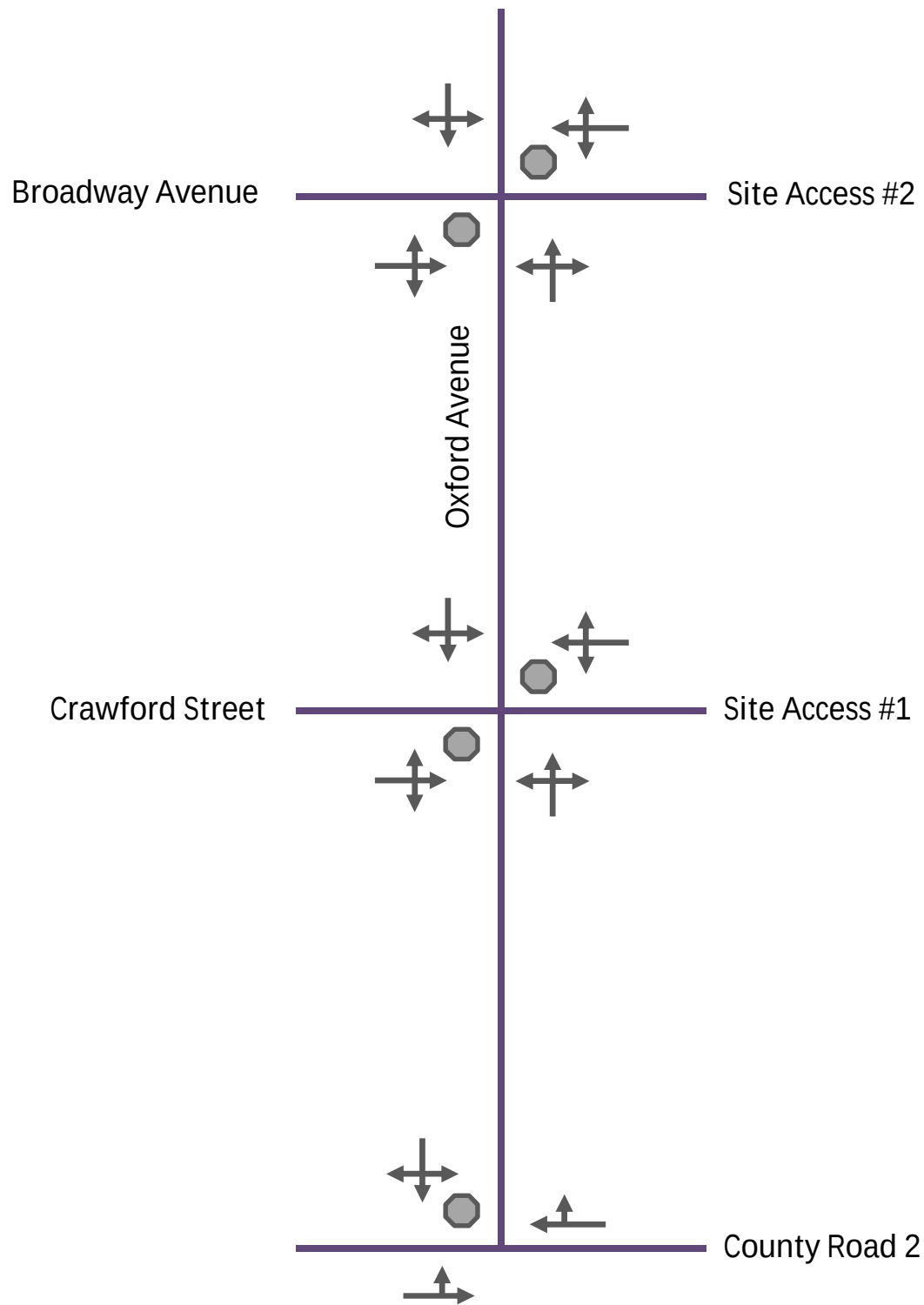
County Road 2 and **King Street East** have a two-lane cross-section, with one lane in each direction, and a posted speed limit of 60 km/h.

- **Broadway Avenue** is an east-west collector road under the jurisdiction of the City of Brockville. It has a two-lane cross-section, with one lane in each direction, and a posted speed limit of 50 km/h.
- **Crawford Street** is a local east-west roadway under the jurisdiction of the City of Brockville. It has a two-lane cross-section, one lane in each direction, and a posted speed limit of 50 km/h.

The existing lane configurations and traffic controls at each intersection are shown in **Figure 3-1**.

3.2 Active Transportation Network

As per Schedule 5 of The City of Brockville Official Plan (2012, Updated August 16, 2024, MMAH Approved), both King Street East and Oxford Avenue are designated as a Potential Spine Cycling Route. Spine Cycling Routes are networks that connect all parts of the City. These routes are of higher demand and are considered a priority for investment. Sidewalks are provided on the north side of King Street East/County Road 2 and on the east side of Oxford Street.



3.3 Transit Service

Brockville Transit provides the local bus services in the area. Bus routes connect several key locations within the City, including shopping centres, box stores, the courthouse, the hospital, and parks. Existing bus routes adjacent to the site are shown in **Figure 3-2**.

- **Red Bus** operates between the Court House Transfer and the Box Stores Transfer. This route provides service every 60 minutes during weekday AM, OFF and PM peak hours. The nearest stop to the site is at Oxford Avenue & Crawford Street.
- **Evening Bus** operates on a loop starting and ending at the Court House Transfer. The route provides service every 60 minutes during the evening, starting at 6:00 pm. The nearest stop to the site is at Oxford Avenue & Crawford Street.

Figure 3-2 Existing Transit Routes near the Site



Source: Brockville Transit Map, dated January 2025.

3.4 Traffic Volumes

The following intersections are included in this study area as agreed by the City and the Township on September 8, 2025 (refer to Appendix A):

- Oxford Avenue at County Road 2 (unsignalized)
- Oxford Avenue at Crawford Street (unsignalized)
- Oxford Avenue at Broadway Avenue (unsignalized)

Study periods include the weekday AM, midday and PM peak hours. WSP commissioned the turning movement counts from Horizon Data Services Ltd.

The intersection turning movement count survey dates and times are summarized in **Table 3-1**.

Table 3-1 Intersection Turning Movement Count Sources

Intersection	Survey Date	Observed Peak Periods
Oxford Avenue at County Road 2	September 10, 2025	AM: 7:45 am - 8:45 am Midday: 1:00 pm - 2:00 pm PM: 4:00 pm - 5:00 pm
Oxford Avenue at Crawford Street	September 10, 2025	AM: 7:30 am - 8:30 am Midday: 11:30 am - 12:30 pm PM: 4:00 pm - 5:00 pm
Oxford Avenue at Broadway Avenue	September 10, 2025	AM: 7:30 am - 8:30 am Midday: 12:00 pm - 1:00 pm PM: 4:00 pm - 5:00 pm

The intersection turning movement count sheets are provided in Appendix B. The existing 2025 traffic volumes are shown in **Figure 3-3**.



Legend

xx AM Peak Hour Traffic Volumes (xx) PM Peak Hour Traffic Volumes

Figure 3-3
Existing (2025) Traffic Volumes

3.5 Traffic Operations Assessment

3.5.1 Methodologies and Assumptions

The traffic operational conditions at the study area intersections were analyzed using Synchro 12 software. Synchro is a software implementation of the intersection capacity analysis methodology outlined in the Highway Capacity Manual (HCM) published by the Transportation Research Board. Synchro 12, the latest version, includes both the 2000 and 2010 editions of the HCM. For this study, all reported results are based on the HCM 2000 methodologies unless otherwise indicated.

The following parameters were used to model the study area under the existing conditions:

- Peak hour volumes, conflicting pedestrians and heavy vehicle percentages were based on the available traffic count data.
- Bus blockages were applied on lanes having near-side bus stops to account for the presence of transit buses during the analyzed peak hours.
- The peak-hour factor (PHF) was calculated for each intersection using the TMCs.
- The saturation flow rate of 1,900 vehicles per hour per lane (vphpl) was used for all roads.
- Lane widths were set to actual measurements from Google Earth.

3.5.2 Midday Peak Analysis Need

Based on the ToR, a traffic operations analysis for the midday peak was required as a part of this study. A comparison of existing traffic demand at site accesses and intersections was conducted across the AM, PM, and midday peaks to justify the need for a midday peak analysis. The AM peak is the worst-case scenario, as indicated in **Table 3-2**. Appendix B provides the volumes for all peak periods (AM, PM and midday).

Table 3-2 Peak Period Volume Comparison

Peak Period	Existing Site Access Volumes (two-way)	Total Intersection Volumes
AM	113	1071
PM	94	898
Midday	110	851

During the AM peak period, both site accesses and the entire intersection reach their highest volumes. In comparison, during the midday peak, total intersection volumes are the lowest across all peak periods. Site access volumes are lower than during the AM peak period. Therefore, a traffic operations analysis for the midday peak is unnecessary, as the AM peak period analysis adequately captures the most critical traffic conditions. All traffic operations analyses hereinafter include only the AM and PM peaks.

3.5.3 Intersection Levels of Service

Table 3-3 summarizes level-of-service (LOS) and volume-to-capacity (V/C) ratios for the intersections analyzed in the study area under existing conditions during the AM and PM peak hours. LOS definitions are provided in Appendix C, and intersection capacity reports are provided in Appendix D.

The assessment of the existing traffic conditions has the following findings:

- All study intersections operate within the acceptable Levels of Service and at an overall LOS of B or better during AM and PM peak hours.
- All turning movements operate within the capacity during the AM and PM peak hours.

Table 3-3 Intersection Level of Service, Existing 2025 Traffic Conditions

Movement		AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
Oxford Avenue & Broadway Avenue		--	7	A	--	7	A
EB Left+Through+Right	EBLTR	0.26	14	B	0.06	9	A
WB Left+Through+Right	WBLTR	0.03	13	B	0.18	11	B
NB Left+Through+Right	NBLTR	0.08	5	A	0.03	3	A
SB Left+Through+Right	SBLTR	0.01	2	A	0.00	0	A
County Road 2 & Oxford Avenue		--	2	A	--	2	A
EB Left+Through	EBLT	0.02	1	A	0.01	1	A
WB Through+Right	WBTR	0.16	0	A	0.19	0	A
SB Left+Right	SBLR	0.12	11	B	0.14	13	B
Oxford Avenue & Crawford Street		--	3	A	--	3	A
EB Left+Through+Right	EBLTR	0.03	9	A	0.03	9	A
WB Left+Through+Right	WBLTR	0.01	10	A	0.01	9	A
NB Left+Through+Right	NBLTR	0.07	3	A	0.02	2	A
SB Left+Through+Right	SBLTR	0.00	0	A	0.00	0	A

3.5.4 Queuing Analysis

Queues for the study intersections were assessed using the Synchro software. The Synchro 95th percentile queues are listed in **Table 3-4**. The queuing assessment for the existing traffic conditions indicates that all 95th percentile queues do not exceed the available roadway lengths, measured from the stop bar to the upstream driveway or intersection, while the roadway links are longer. Note that none of the study intersections have exclusive turn lanes.

The detailed Synchro reports are provided in **Appendix D**.

Table 3-4 Queuing, Existing 2025 Traffic Conditions

Movement	Available Storage (m)	95 th Percentile Queues (m)	
		AM Peak Hour	PM Peak Hour
Oxford Avenue & Broadway Avenue			
EB Left+Through+Right	43	8	1
WB Left+Through+Right	34	1	5
County Road 2 & Oxford Avenue			
SB Left+Right	45	3	4
Oxford Avenue & Crawford Street			
EB Left+Through+Right	22	1	1
WB Left+Through+Right	15	0	0

Note: Storage lengths were measured from the stop bar to the upstream driveway or intersection, while the roadway links are longer.

4. Future Background Conditions

A single five-year study horizon, 2030, was selected to assess the impacts of the proposed development on the boundary network. Note that the TIS study started in 2025, and the intersection turning movement count survey was conducted in 2025.

4.1 Future Network Improvements

According to the Township's ToR response, dated September 2025 (Refer to Appendix A), there are no capital infrastructure projects planned within the vicinity of the site.

4.2 Area Background Developments

As confirmed through ToR correspondence, no background developments in the study area were identified. Therefore, this study did not account for background traffic due to developments.

4.3 Corridor Background Traffic Growth

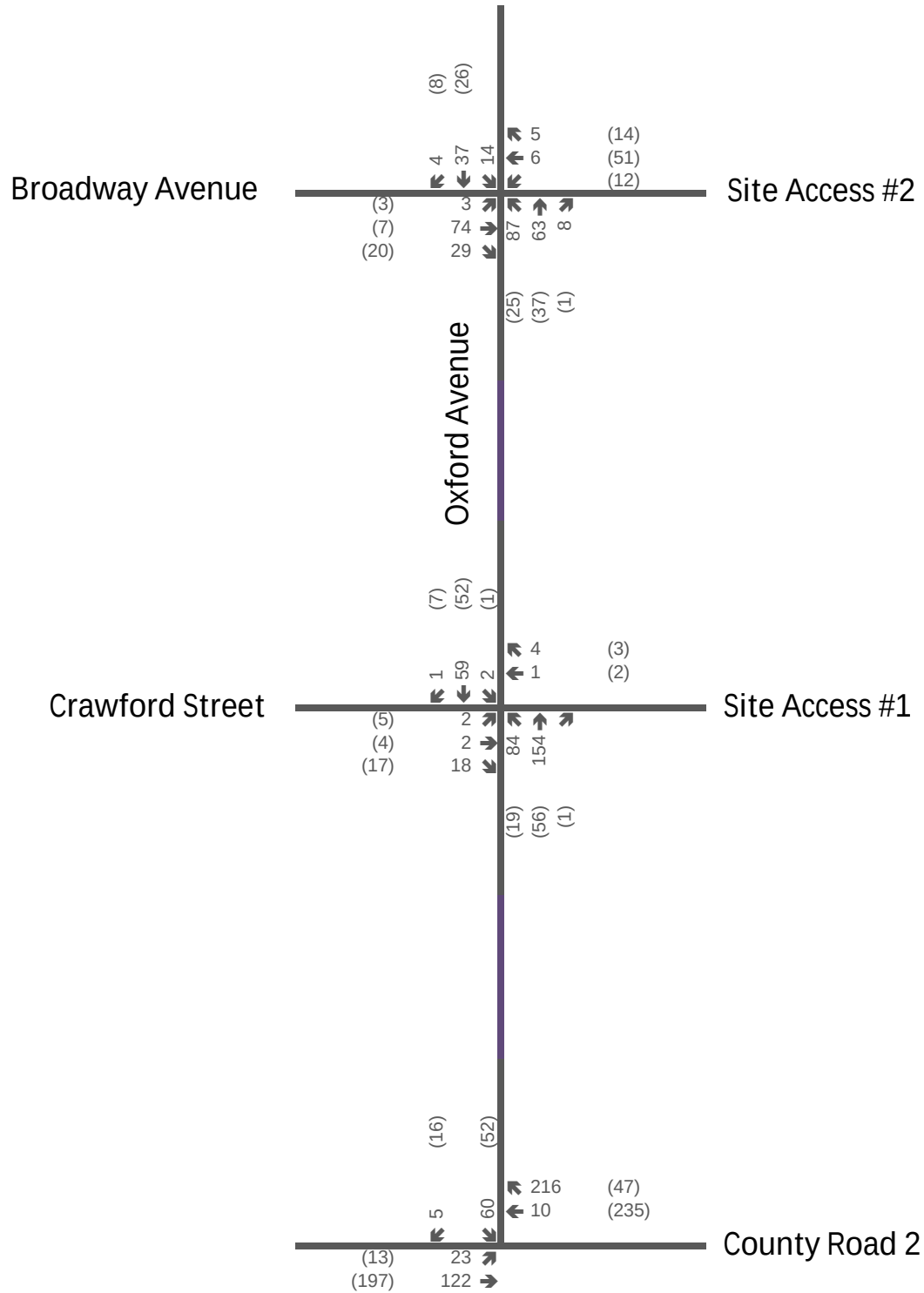
The growth rates for future volumes were estimated by reviewing historical Average Annual Daily Traffic (AADT) provided by the City of Brockville and the Counties. For County Road 2, an analysis of historical AADT data showed a 1% growth rate, which was applied to the through movements. The results show that Oxford Avenue have a negative growth. As a conservative approach, a 0.5% growth rate was applied to all through movements at each approach to Oxford Avenue, Crawford Street, and Broadway Avenue. Refer to Appendix E for the detailed growth analysis.

Table 4-1 Corridor Background Traffic Growth Rates

Roadway	Calculated Growth Rates (AM & PM)	Applied Growth Rates (AM & PM)
Oxford Avenue	-7%	0.5%
Crawford Street	N/A	0.5%
Broadway Avenue	N/A	0.5%
County Road 2	1%	1%

4.4 Future Background Traffic Volumes

Future background traffic volumes were derived by adding the above corridor growth rates to the existing traffic volumes. As discussed above, no background developments were considered in this study. The 2030 future background traffic volumes during the peak hour are illustrated in **Figure 4-1**.



Legend

xx AM Peak Hour Traffic Volumes
 (xx) PM Peak Hour Traffic Volumes

Figure 4-1
 2030 Future
 Background Traffic
 Volumes

4.5 Future Background Traffic Operations Assessment

4.5.1 Intersection Levels of Service

Table 4-2 summarizes LOS and V/C ratios for the analyzed intersections in the study area under future background traffic conditions during the AM and PM peak hours. LOS definitions are provided in Appendix C, and intersection capacity reports are provided in Appendix F.

The assessment of the 2030 future background traffic conditions has the following findings:

- All study intersections will operate within the acceptable Levels of Service and at an overall LOS of B or better during AM and PM peak hours.
- All turning movements will operate within the capacity during the AM and PM peak hours.

Table 4-2 Intersection Levels of Service, 2030 Future Background Traffic Conditions

Movement		AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
Oxford Avenue & Broadway Avenue		--	7	A	--	7	A
EB Left+Through+Right	EBLTR	0.26	14	B	0.06	10	A
WB Left+Through+Right	WBLTR	0.03	13	B	0.18	11	B
NB Left+Through+Right	NBLTR	0.08	4	A	0.03	3	A
SB Left+Through+Right	SBLTR	0.01	0	A	0.00	0	A
County Road 2 & Oxford Avenue		--	2	A	--	2	A
EB Left+Through	EBLT	0.02	1	A	0.01	1	A
WB Through+Right	WBTR	0.16	0	A	0.19	0	A
SB Left+Right	SBLR	0.13	12	A	0.15	13	B
Oxford Avenue & Crawford Street		--	3	A	--	3	A
EB Left+Through+Right	EBLTR	0.03	10	A	0.04	9	A
WB Left+Through+Right	WBLTR	0.01	10	A	0.01	9	A
NB Left+Through+Right	NBLTR	0.07	3	A	0.02	2	A
SB Left+Through+Right	SBLTR	0.00	0	A	0.00	0	A

4.5.2 Queuing Analysis

Queues for the study intersections were assessed using the Synchro software. The synchro 95th percentile queues are listed in **Table 4-3**. The queuing assessment for future background traffic conditions in 2030 indicates that the 95th percentile queues will not exceed the available storage lengths, measured from the stop bar to the upstream driveway or intersection, even when the roadway links are longer. The estimated queues will not impact the upstream driveways or intersections.

The detailed Synchro reports are provided in **Appendix F**.

Table 4-3 Queuing, 2030 Future Background Traffic Conditions

Movement	Available Storage (m)	95 th Percentile Queues (m)	
		AM Peak Hour	PM Peak Hour
Oxford Avenue & Broadway Avenue			
EB Left+Through+Right	43	8	1
WB Left+Through+Right	34	1	5
County Road 2 & Oxford Avenue			
SB Left+Right	45	3	4
Oxford Avenue & Crawford Street			
EB Left+Through+Right	22	1	1
WB Left+Through+Right	15	0	0

Note: Storage lengths were measured from the stop bar to the upstream driveway or intersection, while the roadway links are longer.

5. Site-generated Traffic

5.1 Trip Generation and Distribution

Trip rates from a similar site were used to estimate site-generated vehicle trips. These rates were developed in the *Quinte Detention Centre Expansion Transportation Impacts and Parking Needs Assessment*, dated July 2021. The rates used are shown in **Table 5-1**.

Table 5-1 Site-Generated Vehicle Trips

Number of Beds	Basis/Parameter	AM		PM	
		IN	OUT	IN	OUT
275 Beds	Rate (trips/bed)	0.17	0.03	0.03	0.10
	Vehicle Trips	47	8	8	28

As shown in **Table 5-1**, the proposed development is expected to generate 55 two-way auto trips during the AM peak hour and 36 during the PM peak hour.

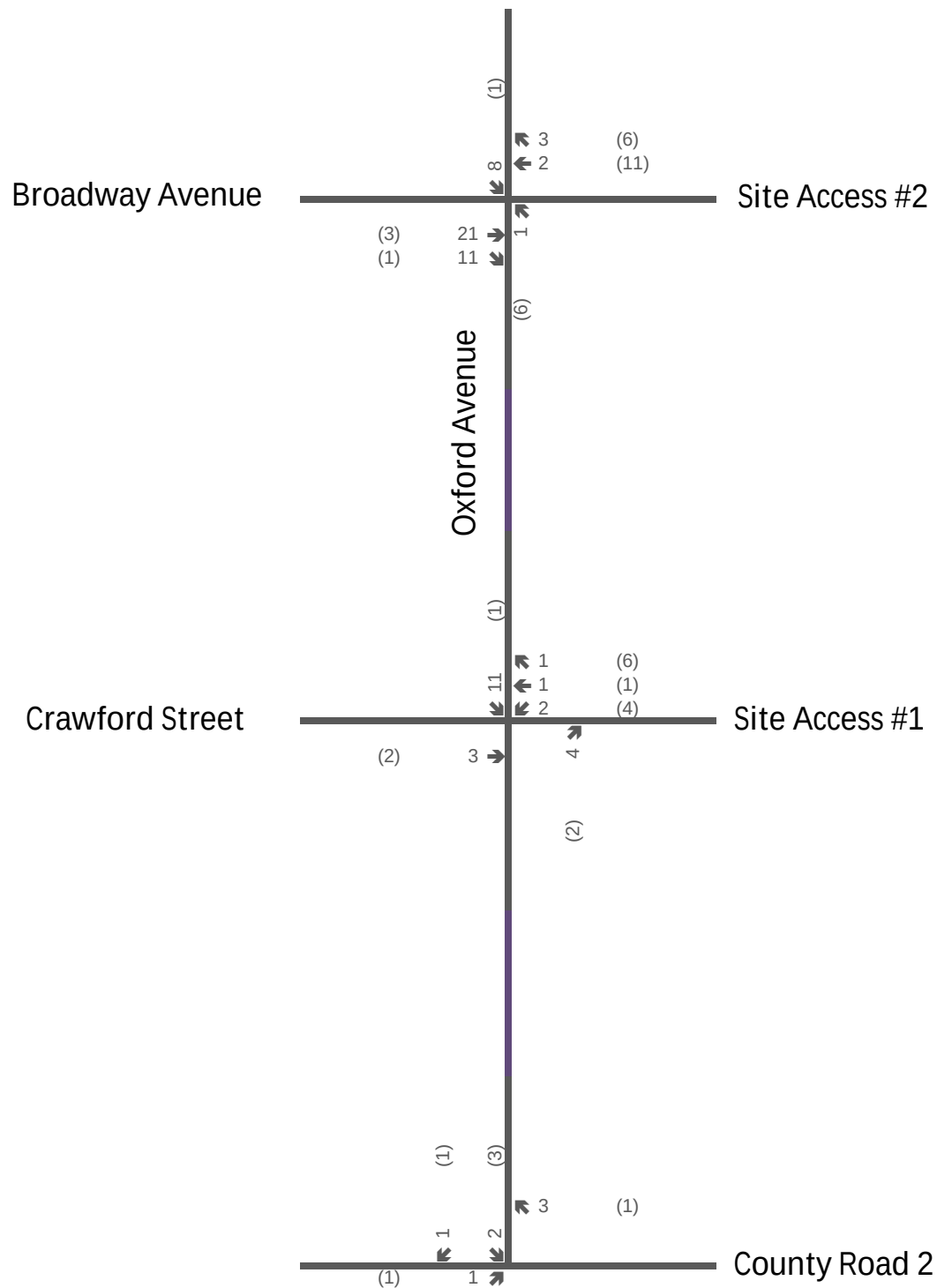
The site-generated vehicle trips were distributed based on the existing count distribution and sound engineering judgment. The assignment of trips from the proposed development to surrounding roadways is summarized in **Table 5-2**. The assigned site vehicle trips at the study intersections are illustrated in **Figure 5-1**.

Table 5-2 Trip Assignment

Locations	AM		PM	
	IN	OUT	IN	OUT
North on Broadway Avenue	16%	31%	8%	21%
West on Broadway Avenue	69%	38%	50%	62%
West on Crawford Street	6%	6%	20%	2%
West on County Road 2	3%	6%	8%	4%
East on County Road 2	5%	19%	14%	11%
Total	100%	100%	100%	100%

5.2 Future Total Traffic Volumes

The 2030 future total traffic volumes were derived by adding site-generated traffic volumes to the future background traffic volumes. The future total traffic volumes during the AM and PM peak hours are shown in **Figure 5-2**.

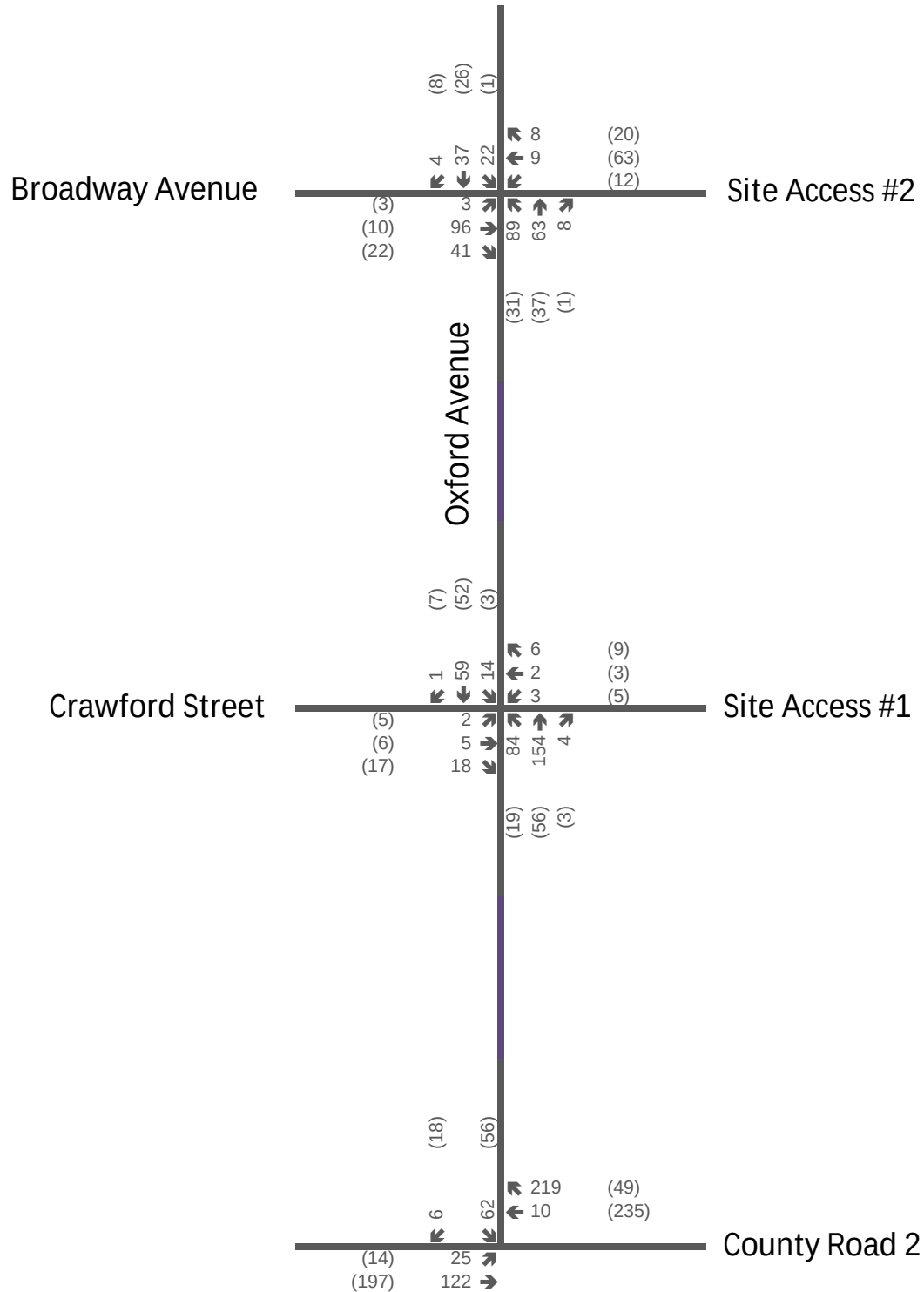


Legend

xx AM Peak Hour Traffic Volumes
 (xx) PM Peak Hour Traffic Volumes

Figure 5-1

Site Generated Traffic Volumes



Legend

xx AM Peak Hour Traffic Volumes
 (xx) PM Peak Hour Traffic Volumes

Figure 5-2
 2030 Future Total
 Traffic Volumes

6. Future Total Conditions

6.1 Future Total Intersection Level of Service

Table 6-1 summarizes intersection level-of-service (LOS) and volume-to-capacity (V/C) ratios for the intersections analysed in the study area under 2030 future total conditions during the AM and PM peak hours. LOS definitions are provided in Appendix C, and intersection capacity reports are Appendix G.

The assessment of the 2030 future total traffic conditions has the following findings:

- All study intersections will operate within the acceptable Levels of Service and at an overall LOS of B or better during AM and PM peak hours.
- All turning movements will operate within the capacity during AM and PM peak hours.
- The driveway access at Broadway Avenue and Crawford Street will operate within capacity, with an acceptable LOS of B.

Table 6-1 Intersection Level of Service, 2030 Future Total Traffic Conditions

Movement		AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
Oxford Avenue & Broadway Avenue		--	9	A	--	7	A
EB Left+Through+Right	EBLTR	0.36	15	C	0.07	10	A
WB Left+Through+Right	WBLTR	0.05	13	B	0.23	12	B
NB Left+Through+Right	NBLTR	0.08	5	A	0.03	4	A
SB Left+Through+Right	SBLTR	0.02	3	A	0.00	0	A
County Road 2 & Oxford Avenue		--	2	A	--	2	A
EB Left+Through	EBLT	0.02	2	A	0.01	1	A
WB Through+Right	WBTR	0.17	0	A	0.20	0	A
SB Left+Right	SBLR	0.13	12	B	0.17	13	B
Oxford Avenue & Crawford Street		--	4	A	--	3	A
EB Left+Through+Right	EBLTR	0.04	10	B	0.04	9	A
WB Left+Through+Right	WBLTR	0.02	11	B	0.03	10	A
NB Left+Through+Right	NBLTR	0.07	3	A	0.02	2	A
SB Left+Through+Right	SBLTR	0.01	2	A	0.00	0	A

6.1.1 Maintenance Building Driveway Access

One driveway access proposed for the maintenance building is located along Oxford Avenue between Broadway Avenue and Crawford Avenue. It is expected to generate only two trips per week and, therefore, will not have a notable impact on the boundary roadway.

6.2 Future Total Queuing Analysis

Queues for the study intersections were assessed using the Synchro software. The synchro 95th percentile queues are listed in **Table 6-2**. The queuing assessment for the 2030 future total traffic conditions continues to indicate that the 95th percentile queues do not exceed the available storage lengths.

The details of the Synchro reports are provided in **Appendix G**.

Table 6-2 Queuing, 2030 Future Total Traffic Conditions

Movement	Available Storage (m)	95 th Percentile Queues (m)	
		AM Peak Hour	PM Peak Hour
Oxford Avenue & Broadway Avenue			
EB Left+Through+Right	145	12	2
WB Left+Through+Right	105	1	7
County Road 2 & Oxford Avenue			
SB Left+Right	140	4	5
Oxford Avenue & Crawford Street			
EB Left+Through+Right	150	1	1
WB Left+Through+Right	75	1	1

Note: Storage lengths were determined based on the available distance to the upstream intersection.

7. Site Access and On-site Vehicle Circulation Review

7.1 Site Access Review

The site has two access driveways on Oxford Avenue. The northern one is out of scope for this design; it remains in its current condition and is also considered the existing fire access route. The southern driveway, Main Entrance, is to be designed as follows:

7.1.1 Main Entrance

7.1.1.1 Design Dimensions

At the throat, the driveway has a width of approximately 15.8 m at the road boundary, a curb radius of 12.0 m on the southern side, and a curb radius of 6.0 m on the northern side.

A wider width and large curb radius (e.g., southern side) at the throat of the driveway intersection with Oxford Avenue (as well as at the internal intersection) are required and thus proposed to accommodate the turning templates of 53-foot tractor-trailers accessing the proposed loading facilities on the site, as well as the fire trucks and garbage trucks. The driveway specifications are illustrated in **Figure 7-1**.

The southern driveway providing access to the principal entrance and the internal driveway meet Ontario Building Code requirements for a “Fire Route”: a minimum width of 6.0 m and a minimum centreline radius of 12.0 m. One principal entrance is proposed on the private driveway, providing fire access to the building. Please refer to **Figure 7-2** for the design dimensions of the driveways.

The AutoTurn simulation of the turning templates for the service trucks, provided in Section 7.3, demonstrates that the above proposed designs can accommodate all on-site service trucks and passenger vehicles. Therefore, the designs are appropriate.

7.1.1.2 Driveway Angle

The proposed driveway, noted as “Site Access #1” on the Site Plan, will connect to an existing intersection at Oxford Avenue and Crawford Street. The driveway will have an 86° angle to Oxford Avenue and will be aligned with Crawford Street. The angle meets the minimum 70° angle requirement per the TAC Geometric Design Guide, Section 8.9.6. Please refer to **Figure 7-1** for the specifications of the driveway.

7.1.1.3 Driveway Sightline and Sight Triangle Review

Stopping sight distance and intersection sight distance were reviewed at this southern driveway in accordance with the TAC Geometric Design Guidelines. The posted speed along Oxford Avenue is 50 km/h; thus, a design speed of 60 km/h was assumed.

For a design speed of 60 km/h, as per TAC guideline section 2.5.3, a minimum stopping sight distance of 85 m is required. The sightline review for Site Access #1 is shown in **Figure 7-3**. As shown in this figure, the sightline for southbound vehicles on Oxford Avenue will cross the boulevard. The figure presents a snapshot of the intersection sight triangle view, demonstrating that the aforementioned boulevard will be free of obstructions. The sightline for a northbound-travelling vehicle is also expected to be free of obstructions.

It is noted that the left turn decision sight distance is the worst-case scenario for intersection sight distance. As per the TAC guideline Table 9.9.4, a minimum left-turn decision sight distance of 130 m is required for the design speed of 60 km/h. The sightline review is demonstrated in **Figure 7-4**. The sightline from a turning vehicle looking left and right along Oxford Avenue is expected to be free of obstructions.

7.1.2 Driveway Access for Maintenance Building

A driveway access is proposed on Oxford Avenue for a maintenance building. The access is located on a sloped section of the road. The internal driving aisle features a hammerhead to facilitate the turnaround of pick-up trucks.

- The proposed driveway access and internal driving aisle can accommodate the entering, turnaround, and exiting of service trucks. Refer to **Figure 7-5**.
- Stopping sight distance and intersection (left-turn) sight distance were reviewed on the plan and the road profile. The same sight distance requirements on the plan as for Site Access #1 were applied. On the profile sightline review, the TAC guidelines were applied.
 - Stopping sight distance: As per TAC Geometric Guideline Section 2.4.3.3, driver's eye height for typical passenger vehicles on the road is assumed to be 1.03 m above the road profile. As per TAC Geometric Guideline Table 2.5.1, the vehicle tail light is to be used for stopping sight distance, and the height of that is assumed to be 0.38 m above the road profile.
 - Intersection (left turn) sight distance: As per TAC Geometric Guideline Section 2.4.3.3, driver's eye height for single-unit vehicles (pick-up trucks) at the driveway is assumed to be 1.80 m above the road profile. As per TAC Geometric Guideline Table 2.5.1, the top of the car is to be used for decision-making sight distance, and its height is assumed to be 1.30 m above the road profile.
- The proposed driveway location meets sight distance requirements per the TAC guidelines. Refer to **Figure 7-6** to **Figure 7-9**.

7.2 Site Plan Dimensions

The proposed Site Plan was reviewed to determine whether the design elements conform to the standards set out in the Township of Elizabethtown-Kitley Zoning By-Law No. 13-21. **Figure 7-2** and **Figure 2-1** (also refer to the large-scale Architectural Site Plan) provide the dimensions of the driveways, driving aisles, loading spaces, and parking spaces on the site plan. They meet the By-law requirements.

Certain parking spaces have been designed with widths and lengths exceeding the minimum requirement, having 3.50 m in width and 6.50 m in length. These spaces will be for larger vehicles (special transport vehicles) that are to access the facility. The AutoTurn simulation review indicates they can accommodate vehicles' ingress and egress.

The proposed loading space must meet the Township of Elizabethtown-Kitley Zoning By-Law No. 13-21. This section specifies that a 9.0 m by 3.5 m unobstructed space will be required for a truck to pick up building waste.

As discussed earlier, the internal driveway meets Ontario Building Code requirements for a "Fire Route": a minimum width of 6.0 m and a minimum centreline radius of 12.0 m.

7.3 On-Site Circulation

WSP reviewed on-site circulation using AutoTURN 11.0 vehicle turning template software to determine whether vehicles can enter, exit, and circulate the site without conflicts. The site circulation was simulated with various service vehicles, including a typical fire truck, as per instructions of Brockville Fire Department, a typical front-end waste collection truck, a TAC WB-20 truck representing a tractor-trailer with a 53 ft. long trailer, a TAC light single-unit (LSU) truck representing a delivery truck, a Ford E-350 vehicle representing a special transport vehicle, and a Transportation Association of Canada (TAC) passenger vehicle (PTAC).

7.3.1 Fire Truck

A 14.22-metre-long custom fire truck, created in the software in compliance with the Brockville Fire Department's specifications, was tested for emergency access to the site. As previously mentioned, the driveway is designed in accordance with Ontario Building Code requirements for a fire route and extends from the front of the building's principal entrance.

Figure 7-10 to **Figure 7-13** illustrate the entering and exiting manoeuvres at the driveway and the immediate approach along site access #1 and site access #2, as well as at the internal intersection along the internal driving aisle.

Figure 7-14 and **Figure 7-15** demonstrate the on-site circulation manoeuvres for fire trucks that would access the site from site access #1 or site access #2.

The AutoTurn simulation analyses indicate that fire trucks can drive through the site without any obstructions and can access the principal entrance of the building within 15 m, as required by the Ontario Building Code.

7.3.2 Garbage Collection Truck

For this site development, one loading space is proposed where waste collection trucks will pick up the building's waste. This loading space is designed in accordance with the Township of Elizabethtown-Kitley Zoning By-Law No. 13-21. A custom garbage truck representing a typical front-load municipal waste collection truck was tested entering and exiting the site via site access #1 and accessing the loading space.

Figure 7-16 and **Figure 7-17** illustrate the entering and exiting manoeuvres at the southern driveway and the immediate approach along the driveway, as well as at the internal intersection along the driveway. At these locations, garbage truck manoeuvres were tested simultaneously with the manoeuvres of a standard TAC passenger vehicle in the opposing direction.

Figure 7-18 shows the entering and exiting manoeuvres for the garbage truck to access the loading space.

The AutoTurn simulation analyses indicate that no manoeuvring issues were identified.

7.3.3 Tractor-Trailer

At the building, two loading docks for tractor-trailers are designed. These loading docks are expected to accept 53-foot trailers. The 53-foot tractor-trailers were represented and reviewed using a TAC WB-20 vehicle.

Figure 7-19 and **Figure 7-20** illustrate the entering and exiting manoeuvres at the southern driveway and the immediate approach along the driveway, as well as at the internal intersection along the driveway. These two figures also show the required wider widths and larger curb radii to accommodate the manoeuvres.

Figure 7-21 shows the entering and exiting manoeuvres for the tractor-trailer to access the loading dock on the east, labelled as "loading dock #1". No manoeuvring issues were identified. **Figure 7-22** shows the entering and exiting manoeuvres for the tractor-trailer to access the loading dock on the west, labelled as "loading dock #2". No manoeuvring issues were identified.

7.3.4 Delivery Truck

A space designated as "A&D Entrance" is designed in the building. This area has two vehicular overhead doors and is expected to accept delivery trucks. A TAC light single-unit vehicle (LSU) was tested driving to and from this area. **Figure 7-23** illustrates the entering and exiting manoeuvres. No manoeuvring issues were identified.

7.3.5 Parking Lot Review

As previously mentioned, the parking lot is designed in accordance with the Township of Elizabethtown-Kitley Zoning By-Law No. 13-21. Also, as mentioned before, certain parking spaces are designed with dimensions that exceed the minimum requirements. They are 3.50 m wide and 6.50 m long. These spaces will be for special transport vehicles that are to access the facility.

A TAC standard passenger vehicle (PTAC) was tested for regular parking spaces. To test the wider spaces expected to accommodate special transport vehicles, a Ford E-350 (from Autoturn software's own library) was used.

Figure 7-24 and **Figure 7-25** illustrate parking access manoeuvres for both passenger cars (PTAC) and Ford E-350 trucks at critical, dead-end, and sample locations. No encroachment issues were identified.

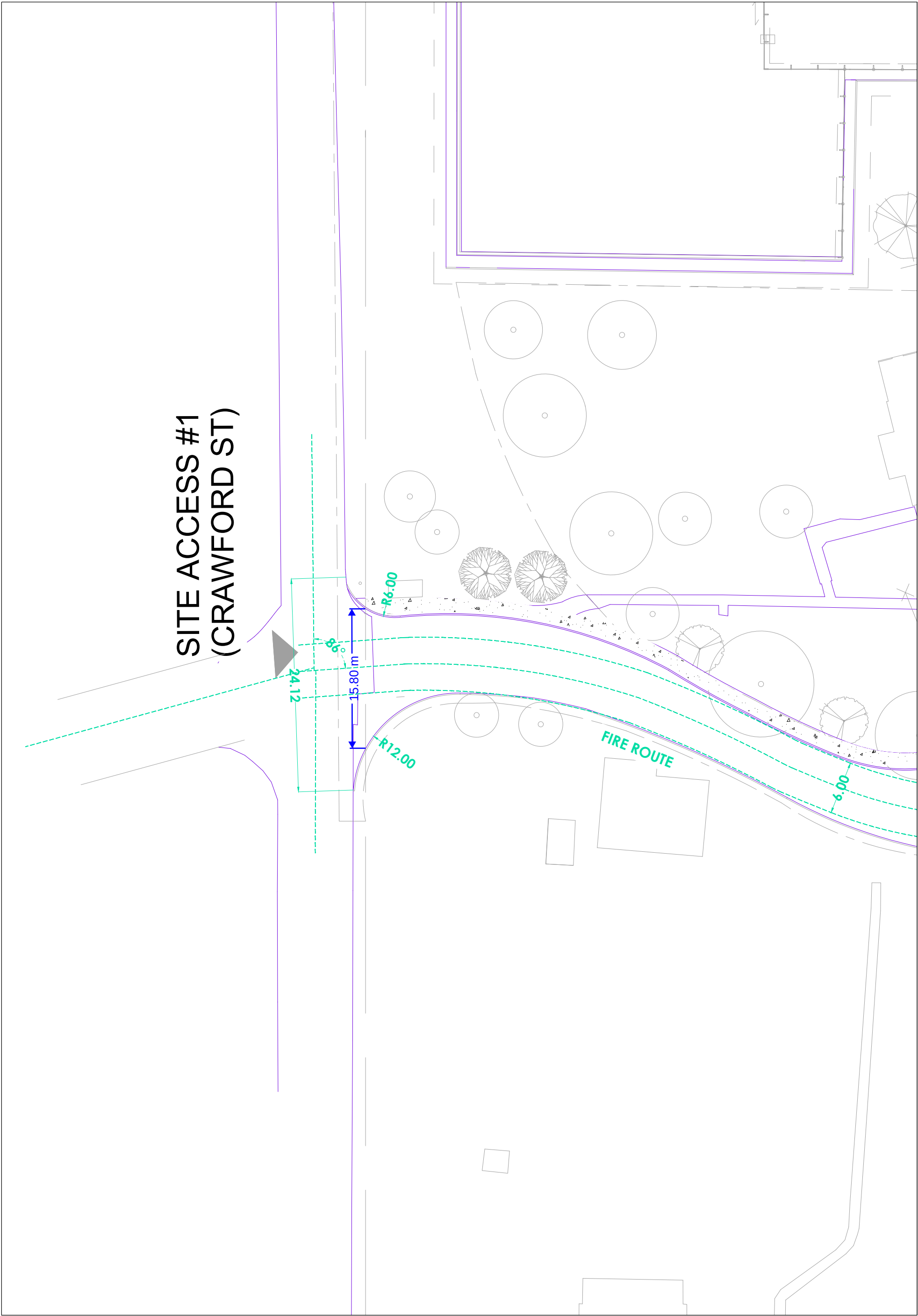
7.4 Pavement Marking and Signage Plan

Figure 7-26 shows the proposed pavement marking and signage plan for the site to regulate on-site traffic.



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Figure 7-1
Driveway Specifications - Site Access #1 Intersection at Oxford Ave
Brockville Correctional Complex

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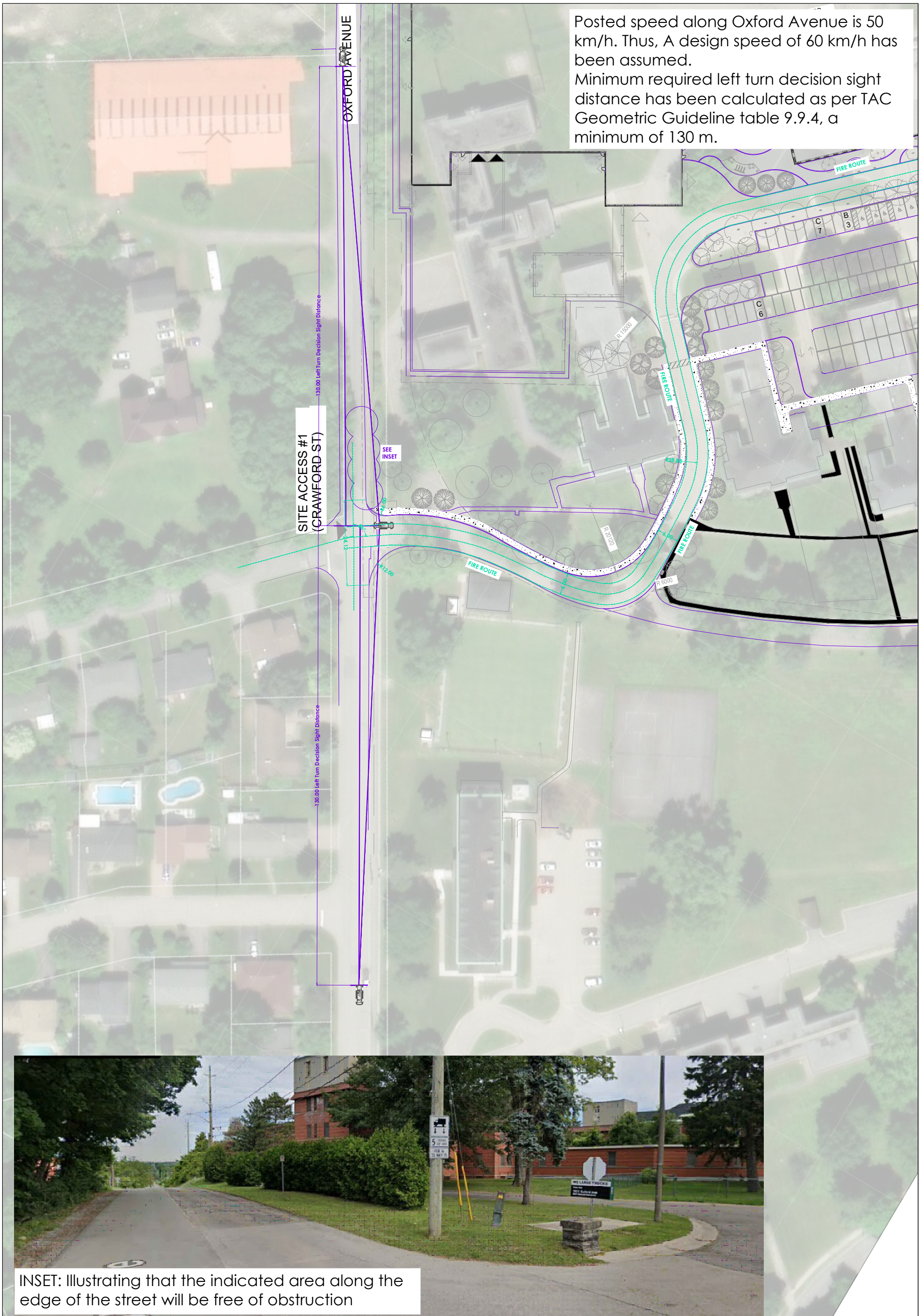
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Figure 7-2
Specifications and Dimensions - Parking Lot and Fire Route
Brockville Correctional Complex

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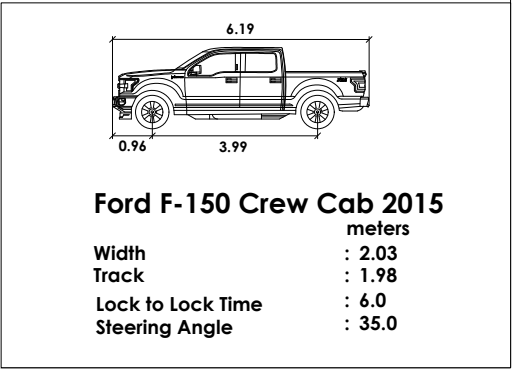
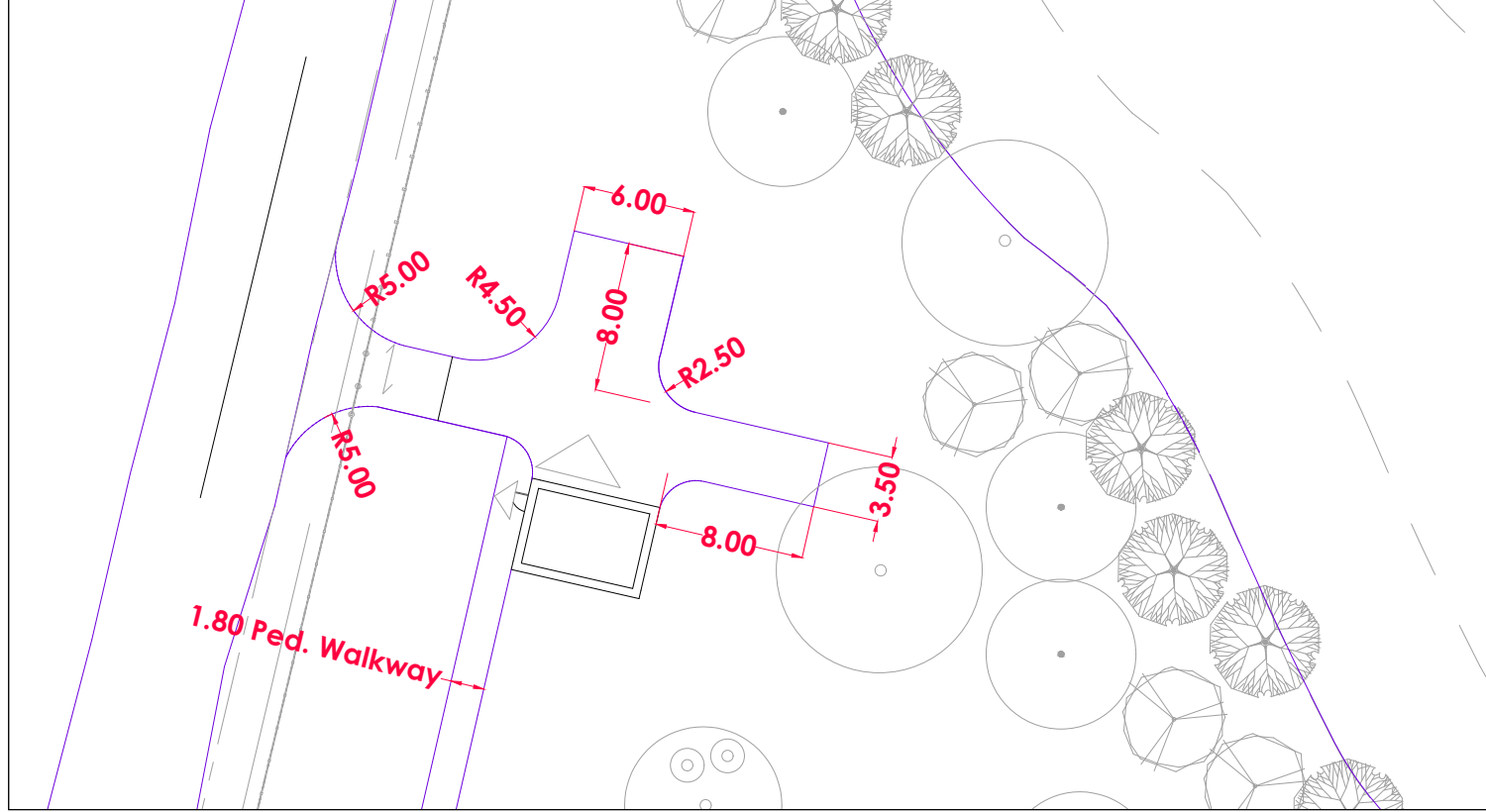
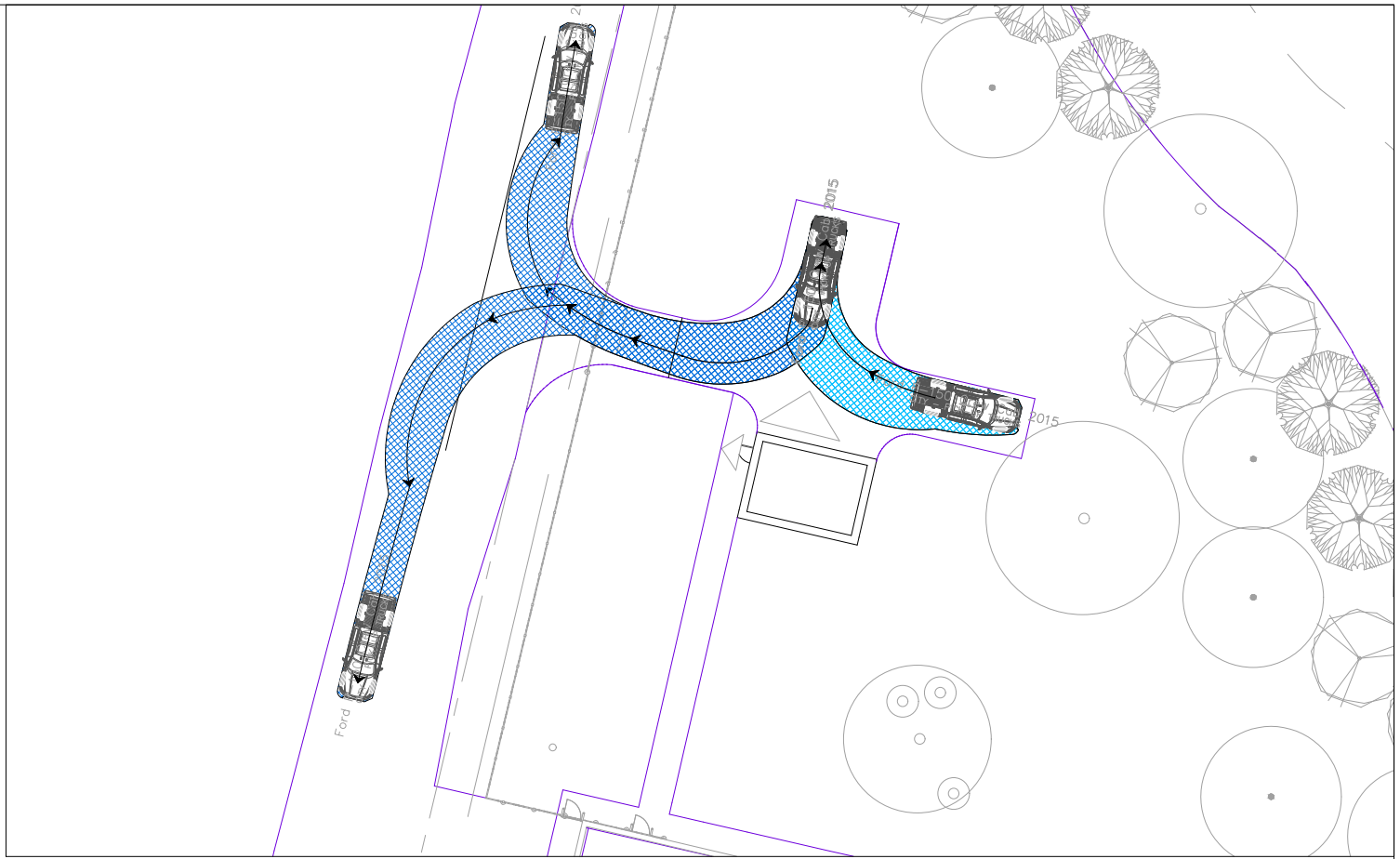
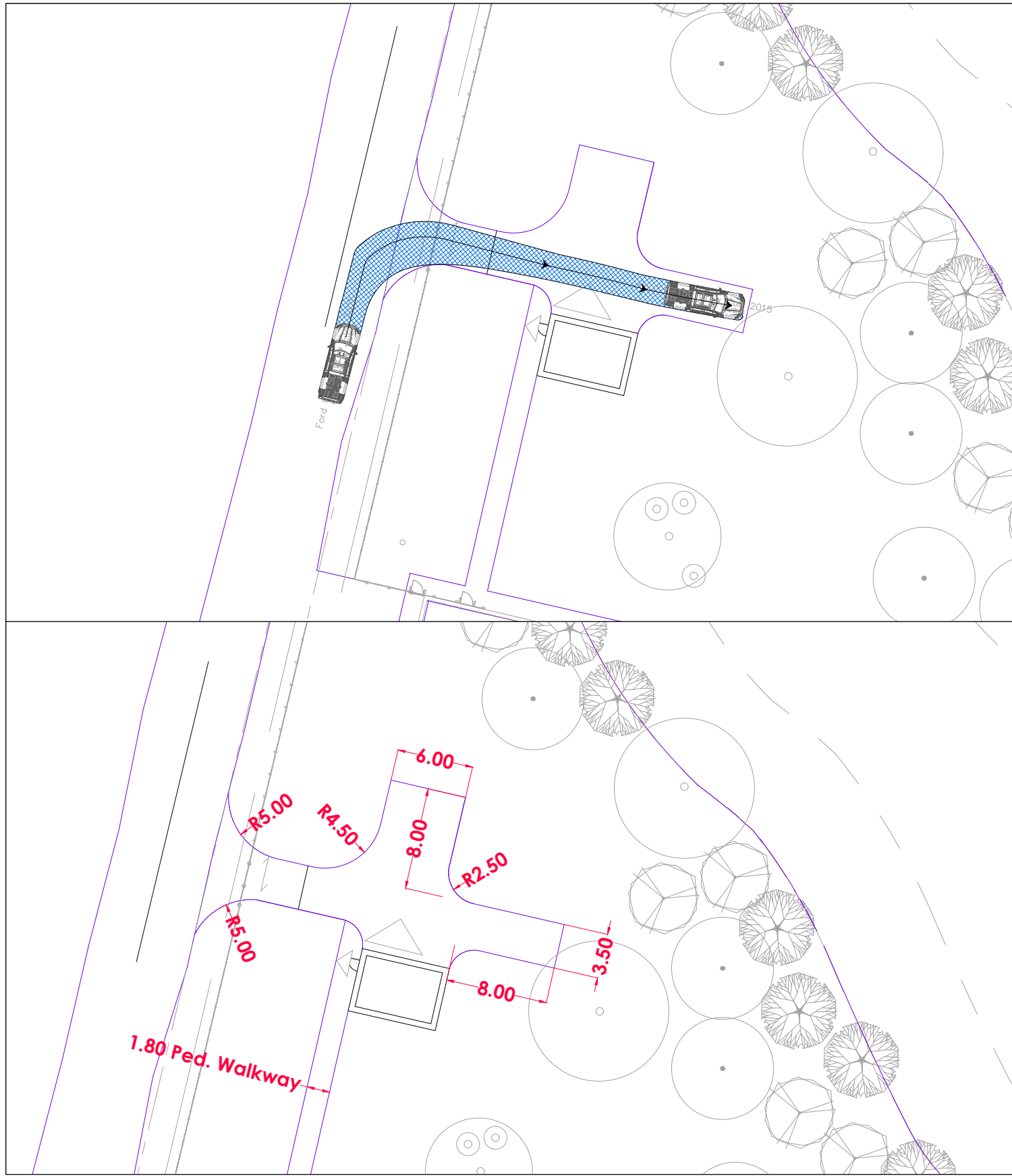
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Figure 7-4
Left Turn Sight Distance Review - Site Access #1 Intersection at Oxford Ave
Brockville Correctional Complex

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Figure 7-5
Maintenance Building Driveway Design (Large Pick-up Truck)
Brockville Correctional Complex

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Figure 7-6
Stopping Sight Distance Review - Maintenance Building Driveway Intersection at Oxford Ave
Brockville Correctional Complex

Posted speed along Oxford Avenue is 50 km/h. Thus, A design speed of 60 km/h has been assumed.
Minimum required left turn decision sight distance has been calculated as per TAC Geometric Guideline table 9.9.4, a minimum of 130 m.

130.00 Left Turn Decision Sight Distance

130.00 Left Turn Decision Sight Distance

OXFORD AVENUE

BCC-SLVCTC
LEVEL 1
+121.824

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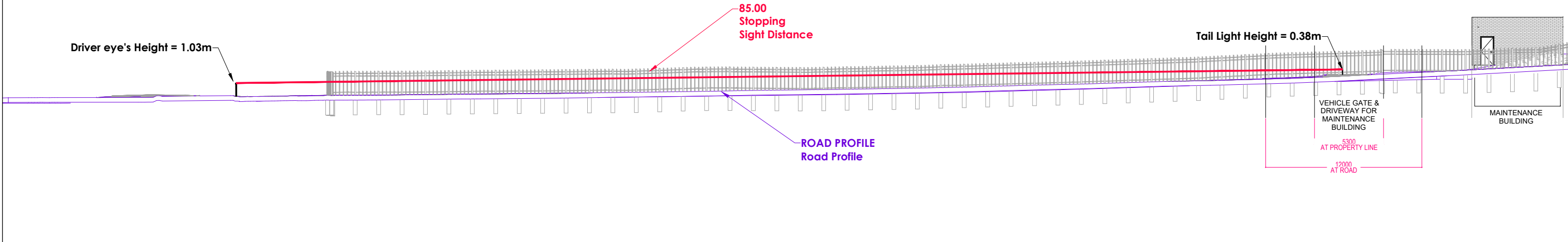
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Figure 7-7
Left Turn Sight Distance Review - Maintenance Building Driveway Intersection at Oxford Ave
Brockville Correctional Complex

Southbound Approach

Posted speed along Oxford Avenue is 50 km/h. Thus, A design speed of 60 km/h has been assumed.
Minimum required stopping sight distance has been calculated as per TAC Geometric Guideline Section 2.5.3.



Northbound Approach



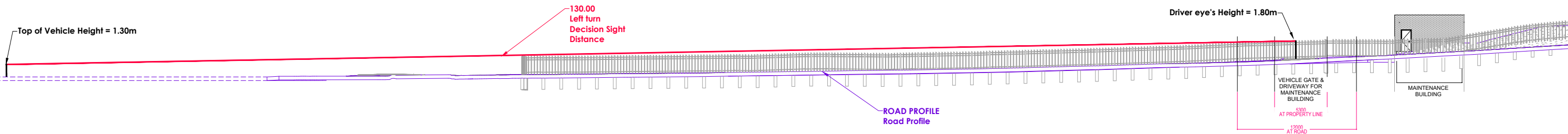
As per TAC Geometric Guideline Section 2.4.3.3, driver's eye height for typical passenger vehicles on the road is assumed to be 1.03 m above the road profile.
As per TAC Geometric Guideline Table 2.5.1, vehicle tail light is to be used for stopping sight distance, and the height of that is assumed to be 0.38 m above the road profile.



Figure 7-8
Stopping Sight Distance Review (Road Profile) - Maintenance Building Driveway Intersection at Oxford Ave
Brockville Correctional Complex

Southbound Approach

Posted speed along Oxford Avenue is 50 km/h. Thus, A design speed of 60 km/h has been assumed.
Minimum required left turn decision sight distance has been calculated as per TAC Geometric Guideline table 9.9.4, a minimum of 130 m.



Northbound Approach

As per TAC Geometric Guideline Section 2.4.3.3, driver's eye height for single-unit vehicle at the driveway is assumed to be 1.80 m above the road profile.
As per TAC Geometric Guideline Table 2.5.1, top of the car is to be used for decision-making sight distance, and the height of that is assumed to be 1.30 m above the road profile.

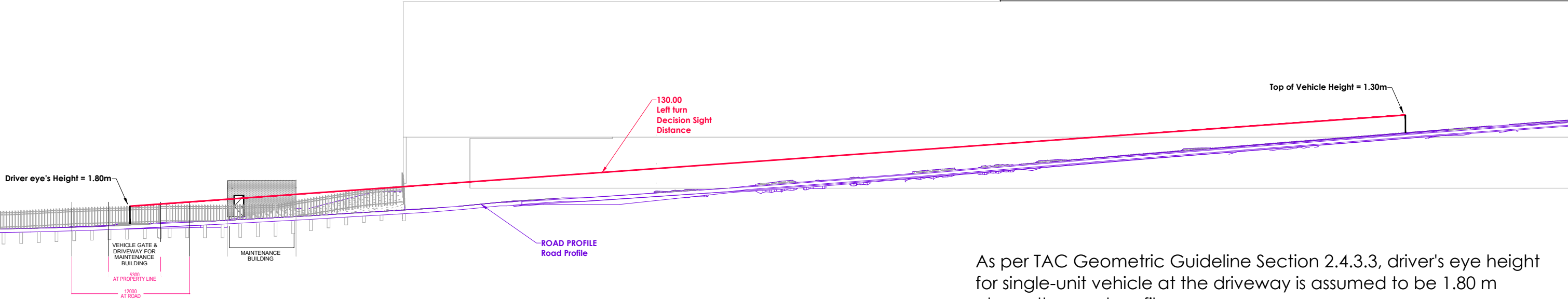


Figure 7-9
Left Turn Sight Distance Review (Road Profile) - Maintenance Building Driveway Intersection at Oxford Ave
Brockville Correctional Complex

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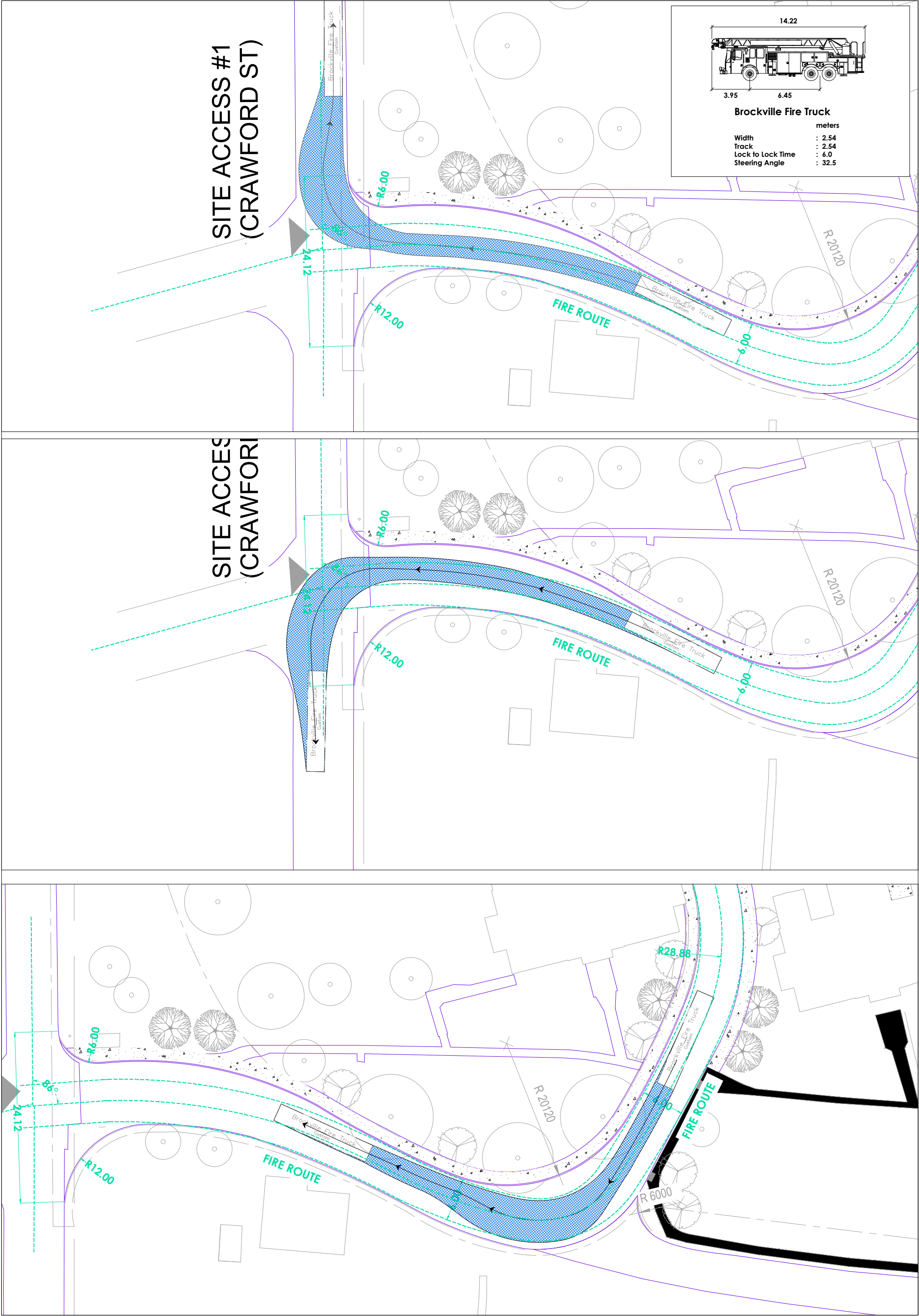
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Figure 7-10
Fire truck Turning Manoeuvres at Site Access #1 - Inbound
Brockville Correctional Complex

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Figure 7-11
Fire truck Turning Manoeuvres at Site Access #1 - Outbound
Brockville Correctional Complex

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Figure 7-12
Fire truck Turning Manoeuvres at Site Access #2- Inbound
Brockville Correctional Complex

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Figure 7-13
Fire truck Turning Manoeuvres at Site Access #2- Outbound
Brockville Correctional Complex

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Figure 7-14
Fire Truck Site Circulation Manoeuvre Review - from Site Access #1
Brockville Correctional Complex

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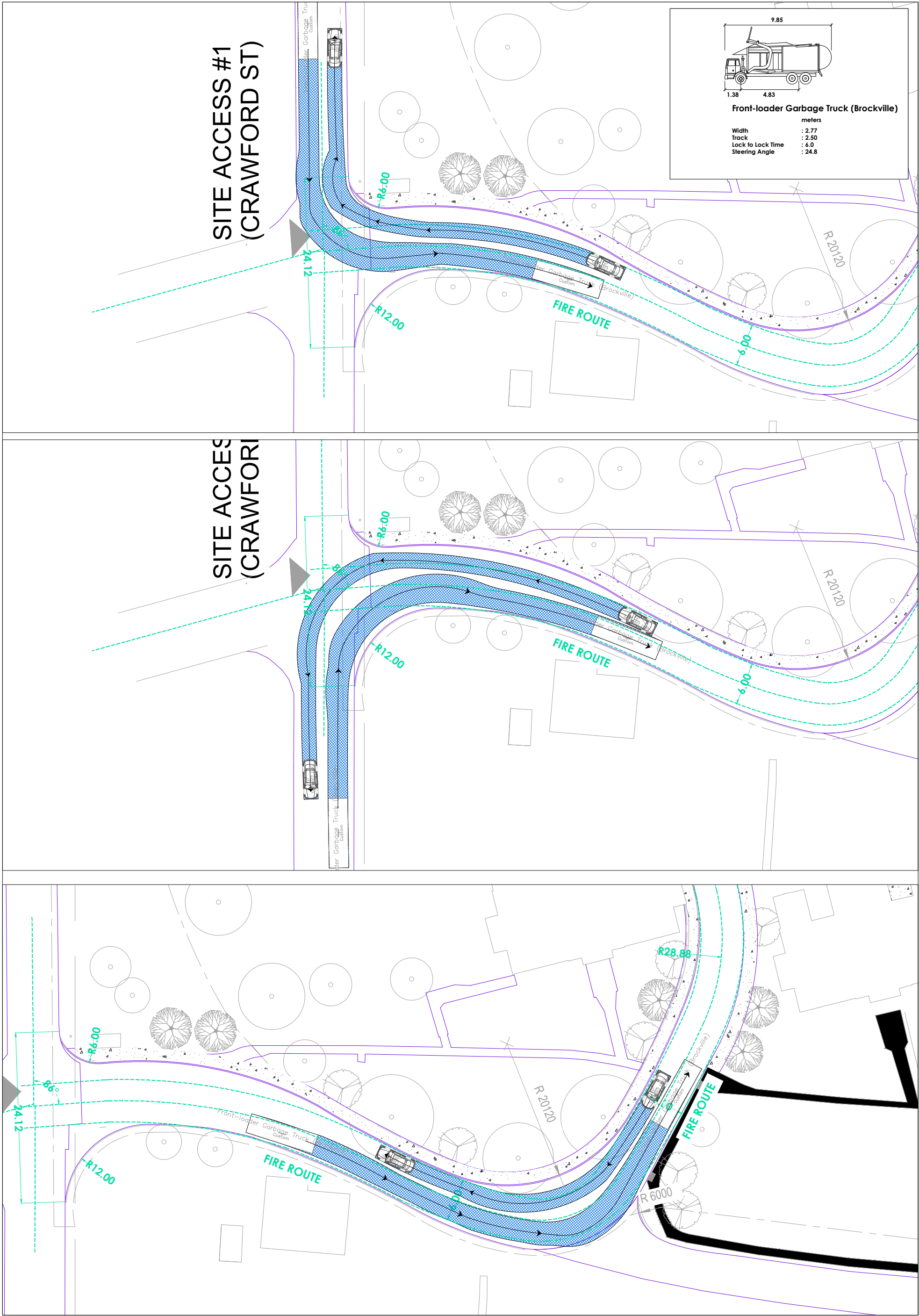
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Figure 7-15
Fire Truck Site Circulation Manoeuvre Review - from Site Access #2
Brockville Correctional Complex

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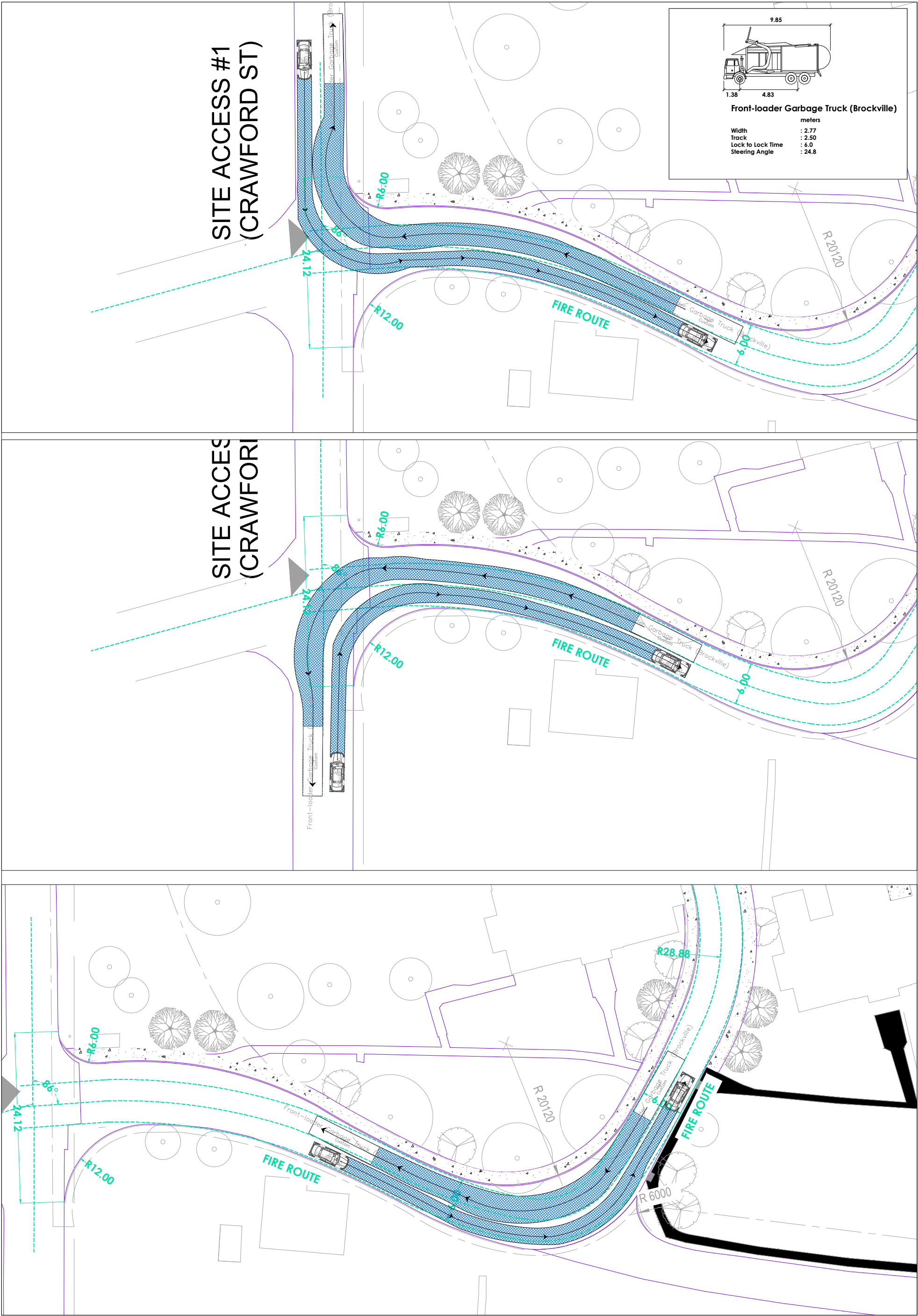
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Figure 7-16
Garbage truck Turning Manoeuvres at Site Access #1 - Inbound
Brockville Correctional Complex

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Figure 7-17
Garbage truck Turning Manoeuvres at Site Access #1 - Outbound
Brockville Correctional Complex

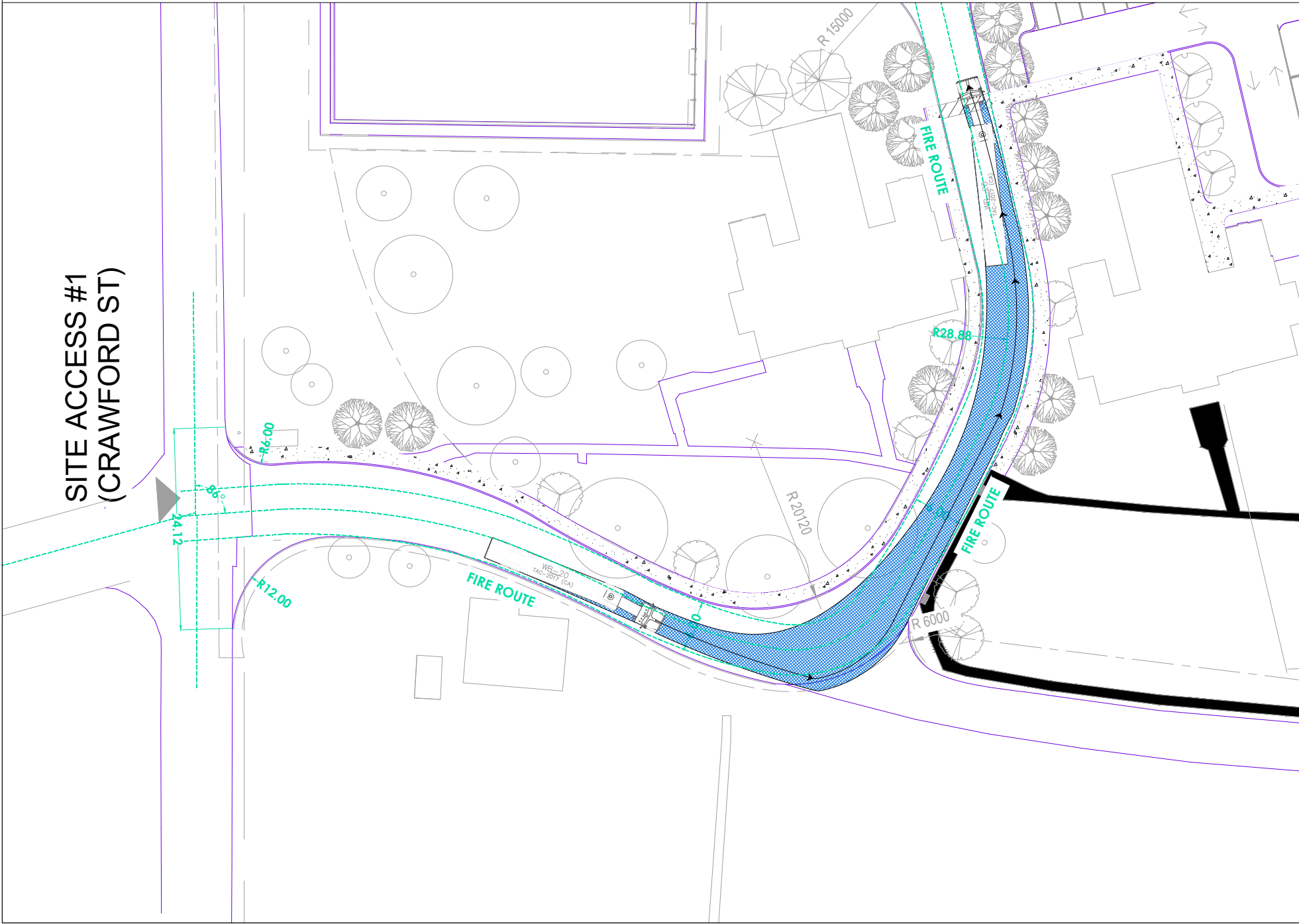
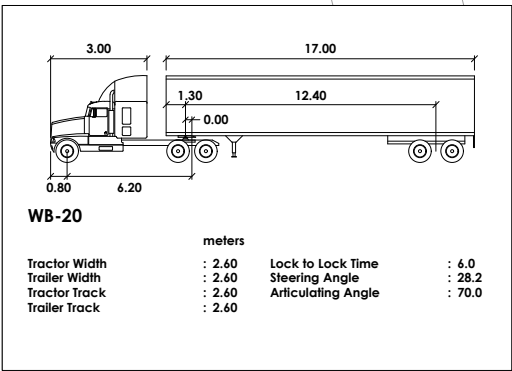
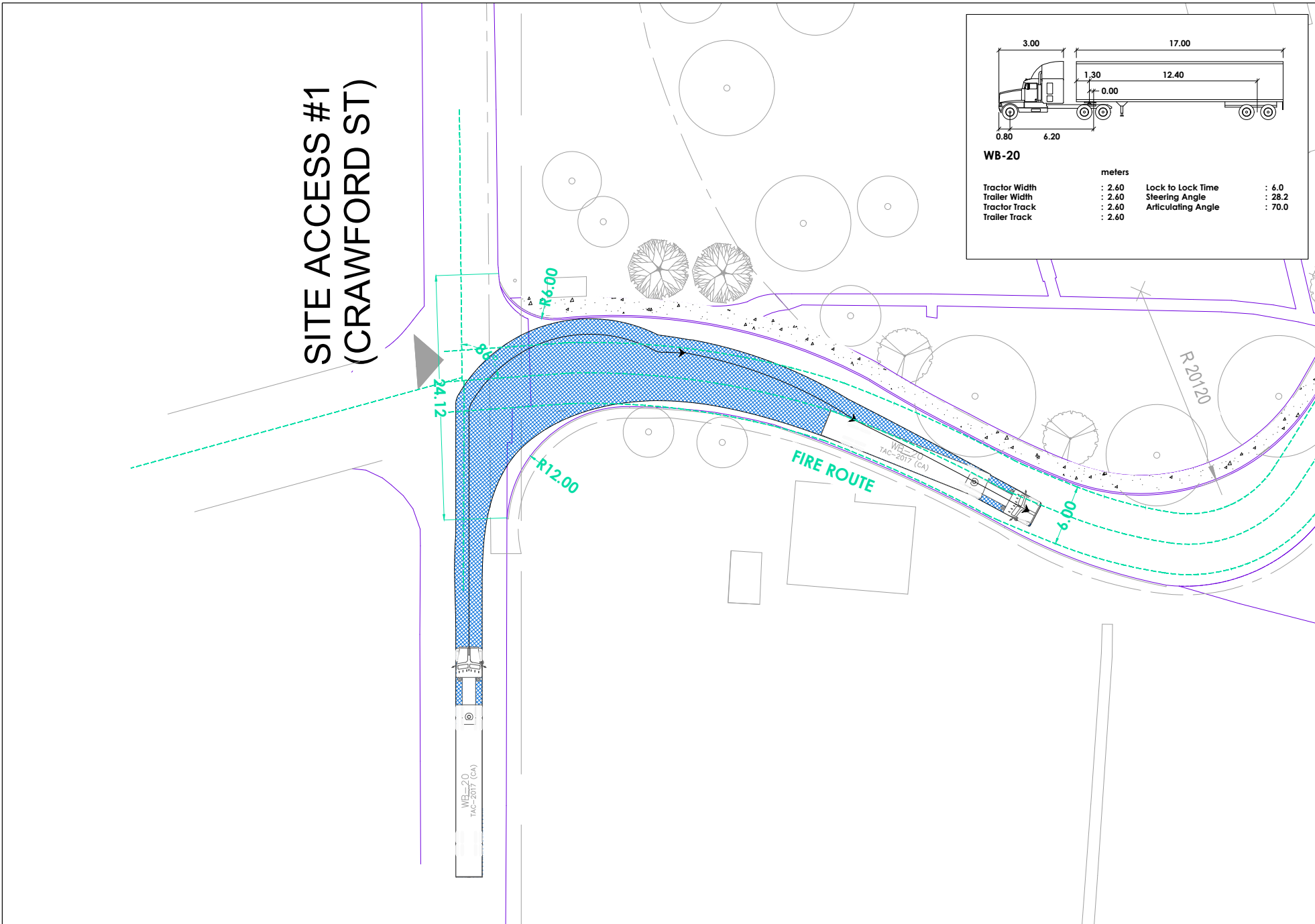


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Figure 7-18
Garbage Truck Loading Bay Access Manoeuvre Review
Brockville Correctional Complex

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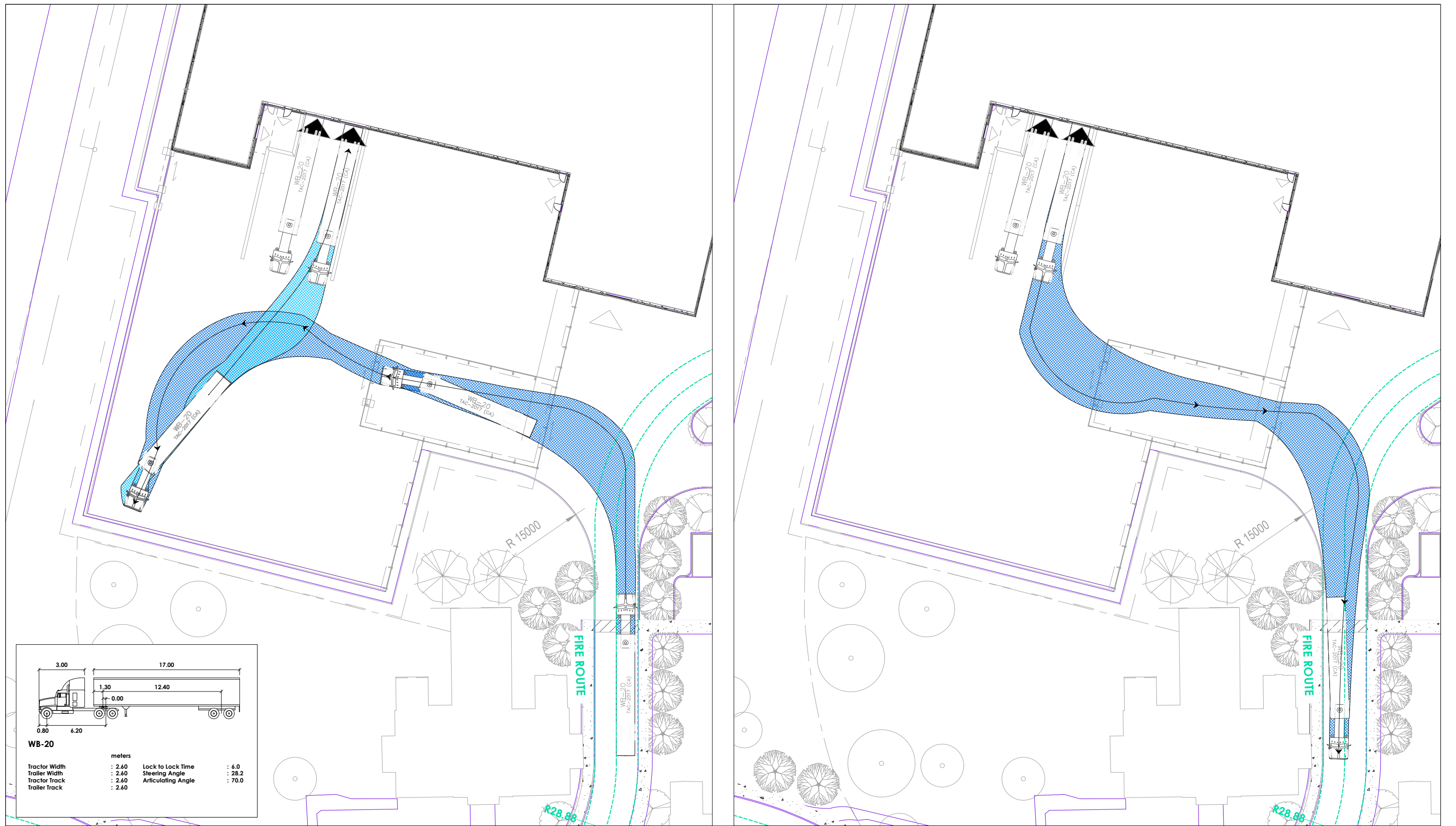
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Figure 7-19
Tractor-Trailer (53ft) Turning Manoeuvres at Site Access #1 - Inbound
Brockville Correctional Complex

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Figure 7-21
Tractor-Trailer (53ft) Loading Dock Access Manoeuvre Review (Loading Dock 1)
Brockville Correctional Complex

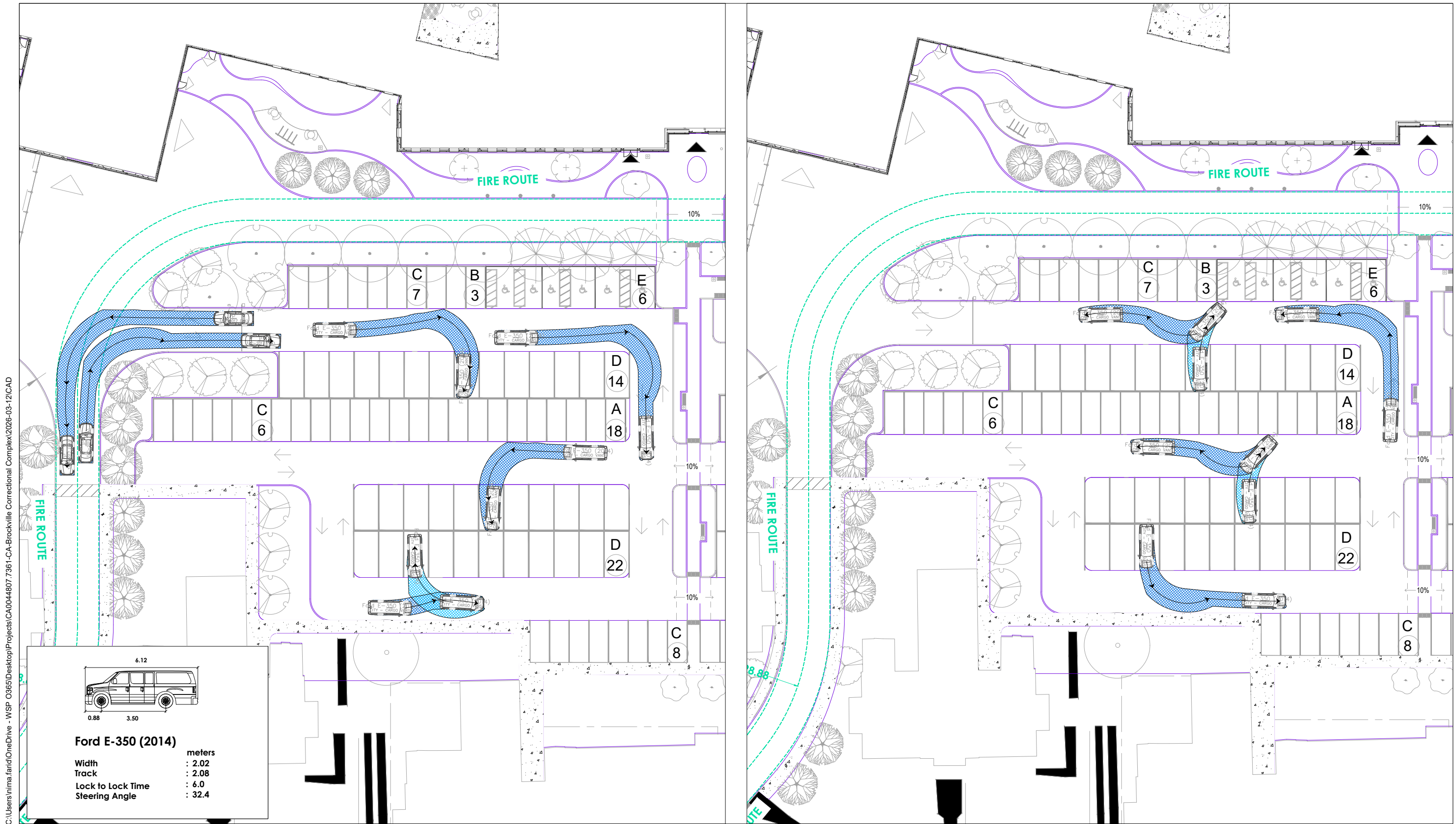
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Figure 7-23
Delivery Truck Access Manoeuvre Review
Brockville Correctional Complex

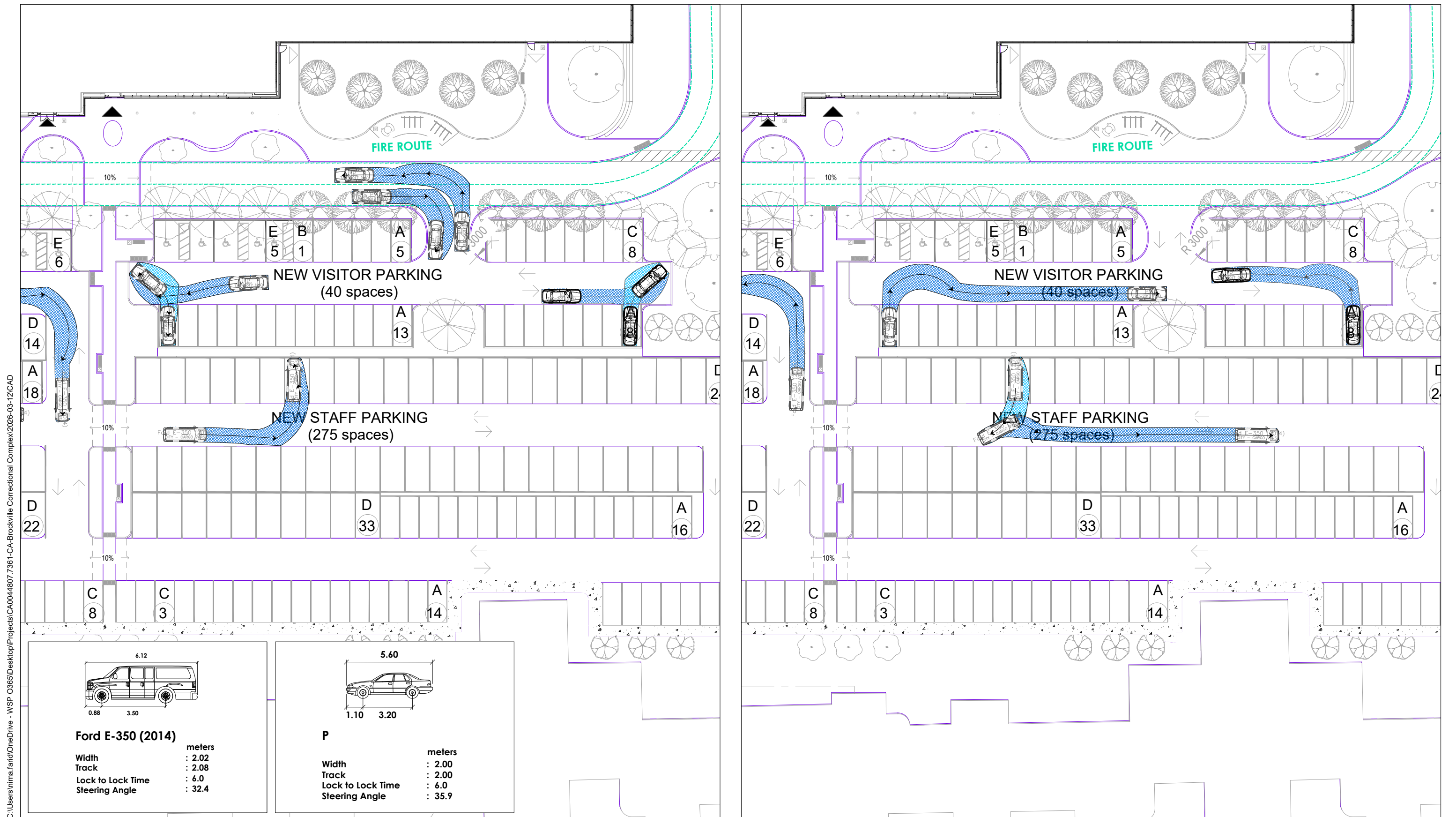


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Figure 7-24
 Passenger and Service Vehicle Parking Space Access Review (Western portion of the Parking Lot)
 Brockville Correctional Complex



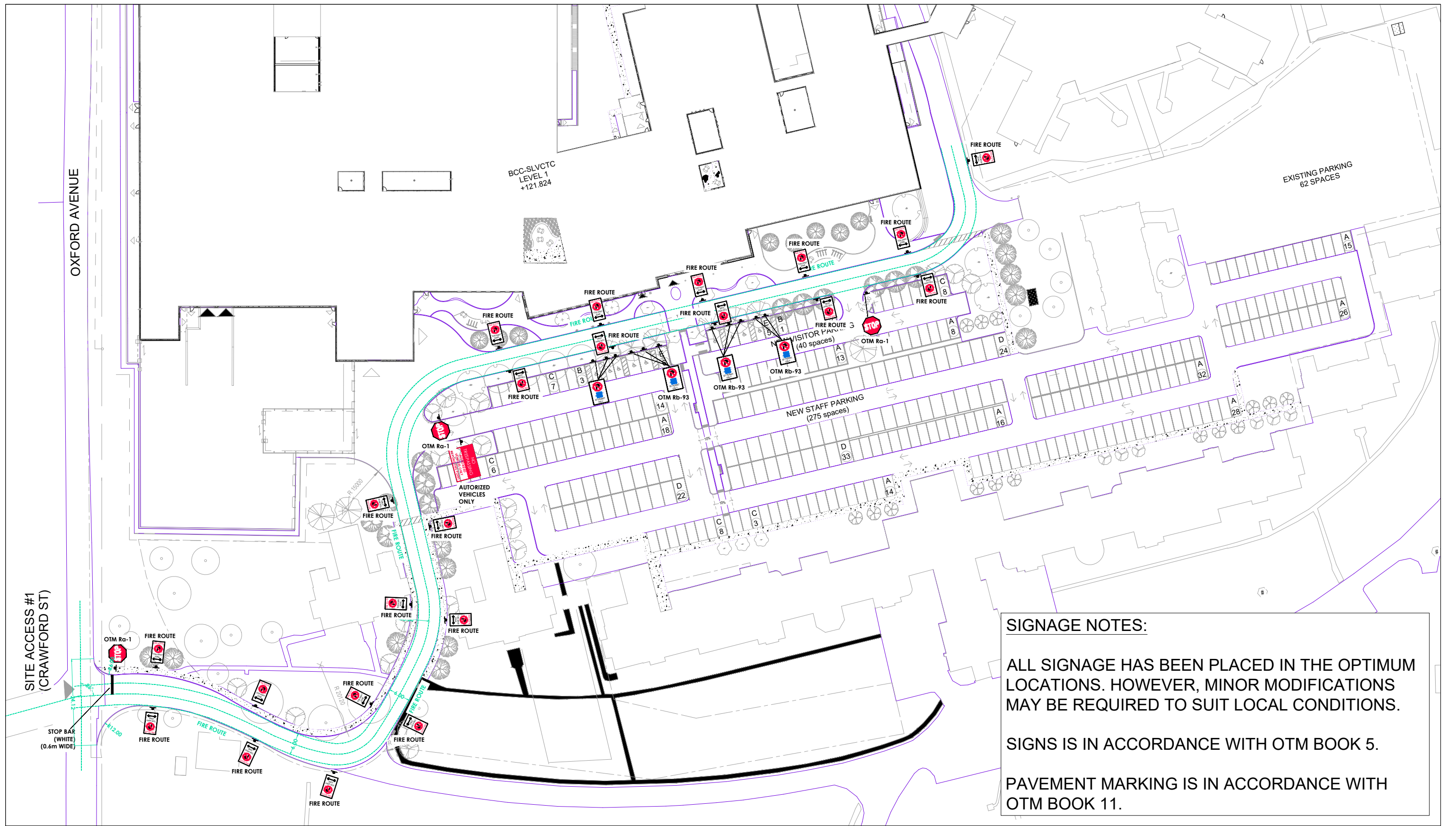
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Figure 7-25
 Passenger and Service Vehicle Parking Space Access Review (Middle portion of the Parking Lot)
 Brockville Correctional Complex

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Figure 7-26
Pavement Marking and Signage Plan
Brockville Correctional Complex

8. Parking Review

8.1 Vehicular Parking

The vehicular parking requirements outlined in the Township of Elizabethtown-Kitley By-law No. 13-21 require one space per 40 m² GFA for Institutional Use or Public Use. As shown in **Table 8-1** below, the proposed development will require 615 spaces.

Table 8-1 By-Law Parking Requirements and Parking Supply

Land Use	GFA	Required Rate	Required Parking Spaces
Institutional Use or Public Use	24,616 m ²	1 parking space per 40m ² GFA	615 spaces
Proposed Supply			315 spaces
Existing Supply			291 spaces
Total Supply			606 spaces

The proposed development has a supply of 315 spaces, which is 300 spaces short of the Township's requirement. However, given the site's intended use, the current By-law requirement is overly conservative. Given the site's use as a correctional facility, parking demand will be generated primarily by the site's non-residential components, which total 9,920 m² GFA. If the Township's requirement is applied only to the non-residential portion, the resulting minimum parking requirement is 248 spaces. As such, the proposed supply meets this reduced parking requirement.

Based on this analysis, it is recommended that the Township's minimum parking requirement for the total site be reduced to 600 spaces. With this requirement, the proposed supply (315 spaces) and the existing spaces on the current site (291 spaces), totalling 606 spaces, would be sufficient for the site's needs. Further details and justifications are provided in the Planning Rationale Report.

8.2 Accessible Parking

Based on the Township's By-Law No. 13-21, accessible parking spaces should be determined based on the number of required parking spaces at a rate of one parking space per 30 required parking spaces. **Table 8-2** summarizes the accessible parking requirements. Therefore, 11 accessible spaces are required. The proposed accessible parking supply meets this requirement.

Table 8-2 Accessible Parking Requirements

Required Rate	Number of Required Parking Spaces	Required Accessible Parking	Proposed Supply
1 accessible parking space per 30 required spaces	315 spaces	11 spaces	11 spaces

9. Conclusions

9.1 Traffic Impact Study

- The proposed development is estimated to generate 55 two-way auto trips during the AM peak hour and 36 during the PM peak hour.
- Under the 2030 future total traffic conditions, all study intersections are projected to operate with an overall LOS of B or better during the AM and PM peak hours, with all turning movements under capacity. The study intersections include the proposed driveway accesses at Broadway Avenue and Crawford Street.
- Site-generated traffic is projected to have no significant impact on the operations of the adjacent intersections.
- All queues can also be accommodated under the 2030 future total scenario.
- Additionally, the proposed driveway access for the maintenance building is expected to have no impact on the boundary roadway.

9.2 Site Plan Review

- The sightline study was conducted for the proposed site accesses (the main entrance and the maintenance building driveway access). No sightline issues were found in either direction.
- The proposed driveway designs are acceptable to accommodate service vehicles.
- The design dimensions for parking spaces (including accessible parking spaces), fire routes, loading facilities, and driving aisles meet municipal standards.
- On-site circulation reviews indicate that the current layout can adequately accommodate various service vehicles (including 53-foot Tractor-Trailers, fire trucks, garbage trucks, ambulance vehicles, delivery trucks, and passenger vehicles) throughout the site.

9.3 Parking Review

- Based on the site's intended use, it is recommended that a reduced requirement be applied, with the total site parking reduced to 600 spaces. Under this reduction, the 315 proposed parking spaces and the 291 existing spaces (totalling 606 spaces) would satisfy the requirement. Further details and justifications are provided in the Planning Rationale Report.
- The proposed accessible parking supply meets the By-law accessible parking requirement.

10. Limitations Statement

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Appendices



Appendix A – Study Terms of Reference



MEMO

TO: Royal Metcalfe, Township of Elizabethtown-Kitley; Pat Brown, City of Brockville

CC: Jim Hutton, Township of Elizabethtown-Kitley; Andrew McGinnis, City of Brockville; Matt Rafati, Cecilia Yung, Infrastructure Ontario; Bryan Cuadra, Durga Dalal, Pankti Bhatt, WSP

FROM: Thomas You, M.A.Sc., P.Eng., PMP

SUBJECT: **Proposed Re-development at 1804 Highway 2 East, Brockville Correctional Centre and St. Lawrence Valley Correctional and Treatment Centre - Traffic Impact Study Terms of Reference and Data Request**

DATE: **August 29, 2025**

This Memorandum is intended to describe to the City and Township our proposed Terms of Reference (TOR) for a Traffic Impact Study (TIS) in support of the Zoning By-law Amendment and Site Plan Control (SPC) applications for the proposed development located at 1804 Highway 2 in the City of Brockville.

1. Development Concept Plan

The proposed development at the subject property will consist of a correctional facility with a gross floor area (GFA) of approximately 20,411 sq.m. The current site has two accesses on Oxford Avenue.

2. Traffic Impact Assessment

Study Horizons and Peak Periods

The study analysis will include one future five year horizon for weekday AM, midday and PM peak hours:

- Existing Conditions (2025)
- Future five-year horizon (five years beyond the site opening year that is to be confirmed)

Study Intersections

The assessment will include the following three intersections:

- A. Oxford Avenue at Highway 2 East (County Road 2) (unsignalized)
- B. Oxford Avenue at Crawford Street (unsignalized)
- C. Oxford Avenue at Broadway Avenue (unsignalized)

Refer to **Figure 1**.

Figure 1 Proposed Study Intersections





Existing Traffic Counts

WSP will commission eight-hour turning movement counts (TMC) at the study intersections during the typical weekday AM, midday and PM peak periods (7:00 am – 10:00 am, 11:00 am – 2:00 pm, 4:00 pm – 6:00 pm). The traffic data will be collected on a weekday in mid-September (2nd week of September) after schools have started.

Existing Transportation Networks and Traffic Volumes

- We will review and document the existing transportation networks and traffic volumes surrounding the subject site, including;
 - Road Network
 - Transit Network
 - Active Transportation Network
 - Traffic Volumes
- Complete a capacity analysis for existing conditions during weekday AM, midday and PM peak hours using the Synchro 12 software package that implements the Highway Capacity Manual (HCM) 2000 methodology. The 95th queue lengths will be obtained from the Synchro output.

Future Background Transportation Networks and Traffic Volumes

Planned Improvements:

We will review future transportation networks, including road, transit and active transportation

City and Township: Please advise of any future roadway improvements within the vicinity of the proposed development that should be considered in the study. If there are any, please provide the plans or details for these improvements.

Background Developments:

WSP is not aware of any background developments that need to be included in the future scenarios of the traffic analysis.

City and Township: Please advise if there are any background developments that need to be included in our study. If any, please provide the relevant TIS documents (including site traffic generation, site traffic volume figures, and development timing) for all background developments.

Corridor Traffic Growth Rates:

Without any historical traffic data, we assume the following annual growth rates for the corridors will be applied to all through traffic in the network.

- Highway 2 East (County Road 2): annual growth rate of 1%
- Oxford Avenue, Crawford Street and Broadway Avenue: No growth rates will be considered given the mature community.

City and Township:

- Provide any historical traffic counts (including intersection TMC, roadway AADT)
- Please confirm if the assumed growth rates are acceptable, or advise on the appropriate growth rate that should be used for this assessment.

Future Background Traffic Volumes:

The future background traffic will be forecasted by applying the appropriate growth rates, as well as adding any background development traffic to the existing volumes.

Future Background Traffic Operations Assessment:

Using the Synchro 12 software package, we will complete weekday AM, midday and PM peak hour intersection capacity and queuing analyses of the future background traffic conditions for the study intersection. The 95th queue lengths will be obtained from the Synchro output.

Future Total Conditions

Trip Generation, Distribution and Assignment:

We will review the published trip generation rates from the 11th Edition of the ITE Trip Generation Manual, the applied rates in Stantec's background report, and the derived rates from existing site-generated traffic data at the driveways to determine the appropriate trip rates. Then, site-generated trips will be estimated based on the determined rates.

The site-generated traffic will then be assigned to the surrounding road network based on existing traffic patterns and the most logical routes to and from the site.

Future Total Traffic Volumes

We will estimate the total traffic volumes generated by adding site-generated traffic to the future background traffic.

Future Total Traffic Operations Assessment

Using the Synchro 12 software package, we will complete weekday AM, midday and PM peak hour intersection capacity and queuing analyses of the future total traffic conditions for the study intersection. The 95th queue lengths will be obtained from the Synchro output.



Site Access and Plan Review

- WSP will conduct a review of the site accesses.
 - The review will include sight distances. We noted that an assessment was done in Stantec's report. We will review and confirm the report's findings, identifying any deficiencies.
 - The review will also include any new driveway design dimensions and curb radii to ensure efficient traffic operations and conformance with municipal standards.
- We will review parking space dimensions (including accessible parking spaces), garbage and loading facility dimensions, and drive aisles in accordance with municipal standards.
- Review on-site circulation and site access using the AutoTURN vehicle turning template software for service vehicles (including passenger vehicles, loading, garbage and fire trucks) to conform to municipal standards and ensure safe, conflict-free operations on the site. The AutoTURN analysis will include site access to ensure that service vehicles can ingress and egress the site safely and in conflict-free operations.
- The review will include the circulation impact of the expansion to the existing shipping and receiving facility.

Parking Review

- The Township of Elizabethtown-Kitley By-Law No. 13-21 requires one space per 40 m² GFA for Institutional Use or Public Use. However, a reduced parking requirement will be pursued for this development; The Rationale Planning Report will propose an appropriate new requirement.
- We will conduct a desktop review of the proposed vehicular parking and accessible parking supply based on the proposed requirement, comment on parking supply deficiencies, and recommend parking allocations for staff, visitors, and service vehicles.

WSP Transportation and Parking Team would appreciate your comments on the proposed Terms of Reference at your earliest convenience within five business days. Should you have any questions, please don't hesitate to contact Thomas You at 289-982-4762 or by e-mail at thomas.you@wsp.com.

Thanks for your time.

Thomas You

You, Thomas

From: Patrick Brown <pbrown@brockville.com>
Sent: September 8, 2025 9:35 AM
To: You, Thomas; Gunajothy, Sangave; rmetcalfe@ektwp.ca
Cc: Andrew McGinnis; jhutton@ektwp.ca; matt.rafati@infrastructureontario.ca; cecilia.yung@infrastructureontario.ca; Cuadra, Bryan; MacDonald, Jill; Bhatt, Pankti; De Santi, Nadia; Dalal, Durga
Subject: RE: BCC-SLVCTC Traffic Impact Study TOR
Categories: Comments

Hello Thomas,

I am confirming your traffic count process and locations.

Thank you,



Patrick Brown
Supervisor of Transportation & Fleet Services

City of Brockville
1 King St. West PO. Box 5000
Brockville, Ontario, K6V 5T1
613-342-8772 ext. 3225
pbrown@brockville.com
www.brockville.com

From: You, Thomas <Thomas.You@wsp.com>
Sent: Monday, September 8, 2025 9:20 AM
To: Gunajothy, Sangave <Sangave.Gunajothy@wsp.com>; rmetcalfe@ektwp.ca; Patrick Brown <pbrown@brockville.com>
Cc: Andrew McGinnis <amcginnis@brockville.com>; jhutton@ektwp.ca; matt.rafati@infrastructureontario.ca; cecilia.yung@infrastructureontario.ca; Cuadra, Bryan <Bryan.Cuadra@wsp.com>; MacDonald, Jill <Jill.MacDonald@wsp.com>; Bhatt, Pankti <Pankti.Bhatt@wsp.com>; De Santi, Nadia <Nadia.De-Santi@wsp.com>; Dalal, Durga <Durga.Dalal@wsp.com>
Subject: RE: BCC-SLVCTC Traffic Impact Study TOR

Good morning, Pat, Royal,

We wanted to follow up on the TIS TOR we submitted last week. We appreciate your comments at your earliest convenience so we can move forward.

But the most critical items are to confirm the following two items so we can commission a new traffic survey ASAP:

1) Study periods: weekday AM, midday and PM peak hours

WSP will commission eight-hour turning movement counts (TMC) at the study intersections during the typical weekday AM, midday and PM peak periods (7:00 am – 10:00 am, 11:00 am – 2:00 pm, 4:00 pm – 6:00 pm). The traffic data will be collected on a weekday in mid-September (2nd week of September) after schools have started.

2) Study area or intersections:

Study Intersections

The assessment will include the following three intersections:

- A. Oxford Avenue at Highway 2 East (County Road 2) (unsignalized)
- B. Oxford Avenue at Crawford Street (unsignalized)
- C. Oxford Avenue at Broadway Avenue (unsignalized)

Refer to **Figure 1**.

Figure 1 Proposed Study Intersections

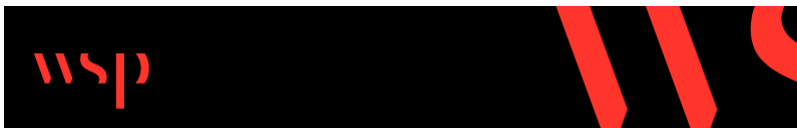


Could you please confirm the above before 2:00 pm so that we can deploy the survey for the 2nd day?

Thanks,

Thomas You, P.Eng., PMP
Project Manager
Transportation Planning and Science

T +1 289-982-4762



From: Gunajothy, Sangave <Sangave.Gunajothy@wsp.com>
Sent: September 2, 2025 11:09 AM
To: rmetcalfe@ektwp.ca; pbrown@brockville.com

Cc: amcginnis@brockville.com; jhutton@ektwp.ca; matt.rafati@infrastructureontario.ca; cecilia.yung@infrastructureontario.ca; Cuadra, Bryan <Bryan.Cuadra@wsp.com>; MacDonald, Jill <Jill.MacDonald@wsp.com>; You, Thomas <Thomas.You@wsp.com>; Bhatt, Pankti <Pankti.Bhatt@wsp.com>; De Santi, Nadia <Nadia.De-Santi@wsp.com>; Dalal, Durga <Durga.Dalal@wsp.com>
Subject: BCC-SLVCTC Traffic Impact Study TOR

Good morning,

I hope this email finds you well.

Please see the attached memo for our Terms of Reference (TOR) for the proposed re-development at 1804 Highway 2 East, Brockville Correctional Centre and St. Lawrence Valley Correctional and Treatment Centre.

We kindly request your comments within five business days.

If you have any questions, please do not hesitate to reach out. We look forward to hearing from you.

Best Regards,

Sangave Gunajothy, BASc
She/Her
EIT, Junior Planner
Sangave.Gunajothy@wsp.com



T+: 1 289-982-4246

150 Commerce Valley Drive West
Thornhill, Ontario
L3T 7Z3 Canada

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-LAEmHhHzdJzBITWia4Hgs7pbKI

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You, Thomas

From: Royal Metcalfe <rmetcalfe@ektwp.ca>
Sent: September 19, 2025 9:09 AM
To: You, Thomas
Cc: Findlay, Chad
Subject: RE: BCC-SLVCTC Traffic Impact Study TOR

Good morning,

Please see the responses to your questions below;

- 1) **Data request**, highlighted in BLUE text: Could you provide the requested data?
 - a. ***The Township has not data to share. The Township does not complete traffic counts at or near the subject site save and except at Sharpes Lane (approx.. 1.6 km east of the subject site). There are currently no capital infrastructure projects planned within 5 +/- km of the subject site.***
- 2) **Assumptions, methodology, and approaches** we proposed: Could you please confirm whether you have any comments on the TOR?
 - a. **The Township does not have any comments on the TOR**

In reviewing this request, it was noted that the United Counties of Leeds and Grenville were not included on the circulation. For context; Oxford Acres is owned and operated by City of Brockville and Cty Rd 2 is owned and operated by the United Counties of Leeds and Grenville. I have included a contact that may assist with some of the information you are requesting, Mr. Chad Findlay. Alternatively traffic data for this area can be found here: <https://geohub-uclg.hub.arcgis.com/apps/UCLG::leeds-grenville-traffic-counts-on-county-roads/explore>

Kind regards,

Royal Metcalfe
Public Works Manager
Township of Elizabethtown-Kitley



Phone: 613-345-7480 ext. 236
Email: rmetcalfe@ektwp.ca
Fax: 613-345-7235
6544 New Dublin Rd
Addison, ON, K0E 1A0
www.ektwp.ca

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Appendix B – Traffic Data

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Your Traffic Count Specialist

File Name : Broadway Avenue at Oxford Avenue

Site Code : Loc-3

Start Date : 2025-09-10

Page No : 4

	Oxford Ave From North				Broadway Ave From East				Oxford Ave From South				Broadway Ave From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	1	9	4	14	2	0	0	2	0	14	25	39	4	15	1	20	75
07:45 AM	1	14	4	19	2	3	0	5	7	13	28	48	8	31	1	40	112
08:00 AM	1	3	2	6	0	0	0	0	1	15	18	34	8	18	0	26	66
08:15 AM	1	10	4	15	1	3	0	4	0	19	16	35	9	8	1	18	72
Total Volume	4	36	14	54	5	6	0	11	8	61	87	156	29	72	3	104	325
% App. Total	7.4	66.7	25.9		45.5	54.5	0		5.1	39.1	55.8		27.9	69.2	2.9		
PHF	1.00	.643	.875	.711	.625	.500	.000	.550	.286	.803	.777	.813	.806	.581	.750	.650	.725
Light	3	35	14	52	5	6	0	11	8	60	84	152	25	72	2	99	314
% Light	75.0	97.2	100	96.3	100	100	0	100	100	98.4	96.6	97.4	86.2	100	66.7	95.2	96.6
Heavy	1	1	0	2	0	0	0	0	0	1	3	4	4	0	1	5	11
% Heavy	25.0	2.8	0	3.7	0	0	0	0	0	1.6	3.4	2.6	13.8	0	33.3	4.8	3.4

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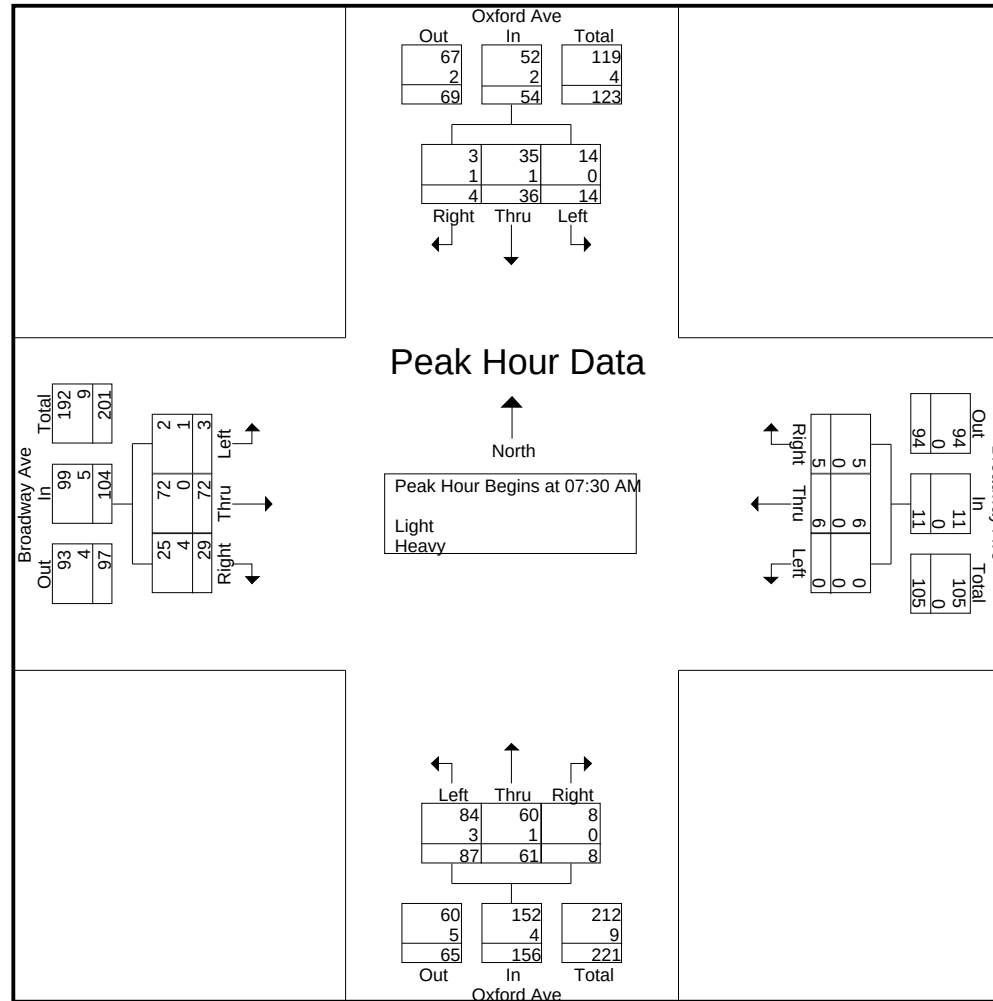
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Site Code : Loc-3

Start Date : 2025-09-10

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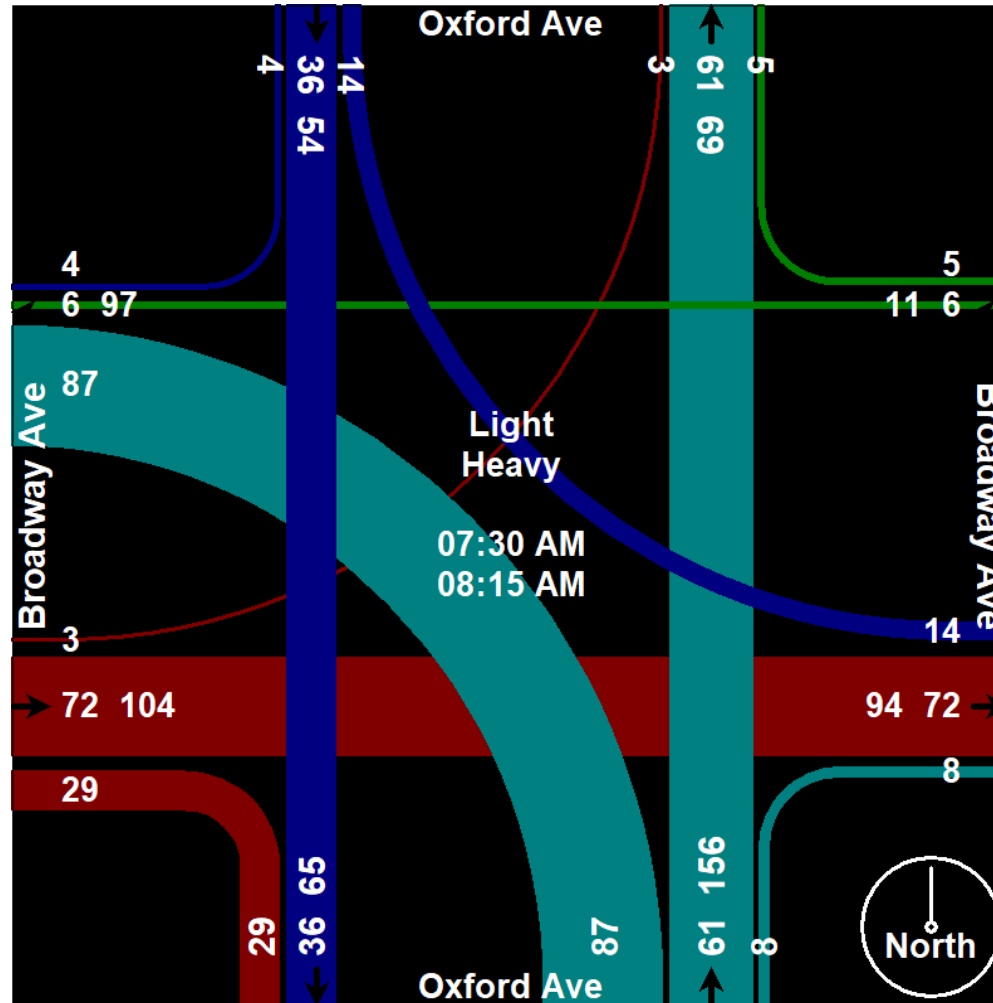
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Site Code : Loc-3

Start Date : 2025-09-10

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Your Traffic Count Specialist

File Name : Broadway Avenue at Oxford Avenue

Site Code : Loc-3

Start Date : 2025-09-10

Page No : 7

	Oxford Ave From North				Broadway Ave From East				Oxford Ave From South				Broadway Ave From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	0	3	0	3	2	19	2	23	2	4	7	13	8	6	2	16	55
12:15 PM	0	9	1	10	1	5	2	8	3	3	8	14	7	11	1	19	51
12:30 PM	0	7	1	8	0	7	1	8	0	5	10	15	4	11	3	18	49
12:45 PM	2	11	2	15	1	6	1	8	0	5	6	11	9	18	3	30	64
Total Volume	2	30	4	36	4	37	6	47	5	17	31	53	28	46	9	83	219
% App. Total	5.6	83.3	11.1		8.5	78.7	12.8		9.4	32.1	58.5		33.7	55.4	10.8		
PHF	.250	.682	.500	.600	.500	.487	.750	.511	.417	.850	.775	.883	.778	.639	.750	.692	.855
Light	2	29	4	35	4	36	6	46	5	16	31	52	28	46	9	83	216
% Light	100	96.7	100	97.2	100	97.3	100	97.9	100	94.1	100	98.1	100	100	100	100	98.6
Heavy	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	3
% Heavy	0	3.3	0	2.8	0	2.7	0	2.1	0	5.9	0	1.9	0	0	0	0	1.4

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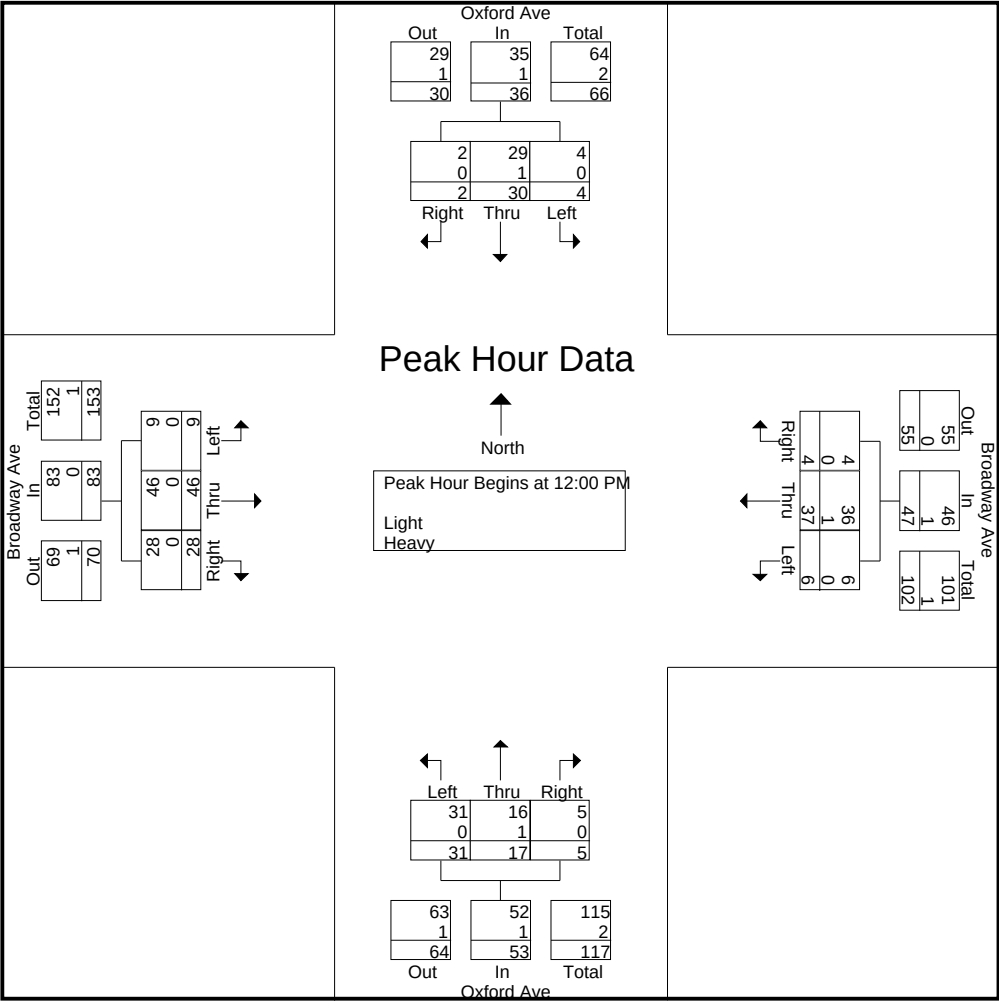
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File Name : Broadway Avenue at Oxford Avenue

Site Code : Loc-3

Start Date : 2025-09-10

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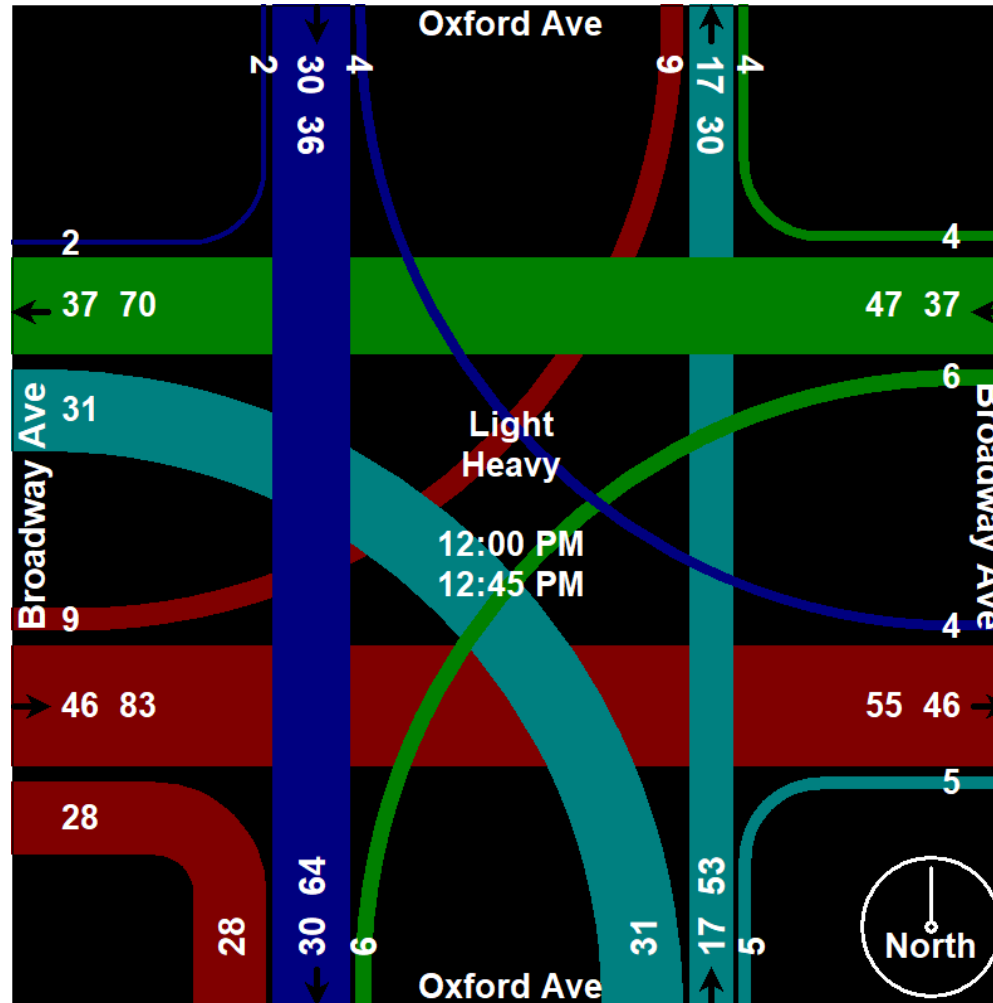
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Site Code : Loc-3

Start Date : 2025-09-10

Page No : 9



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Site Code : Loc-3

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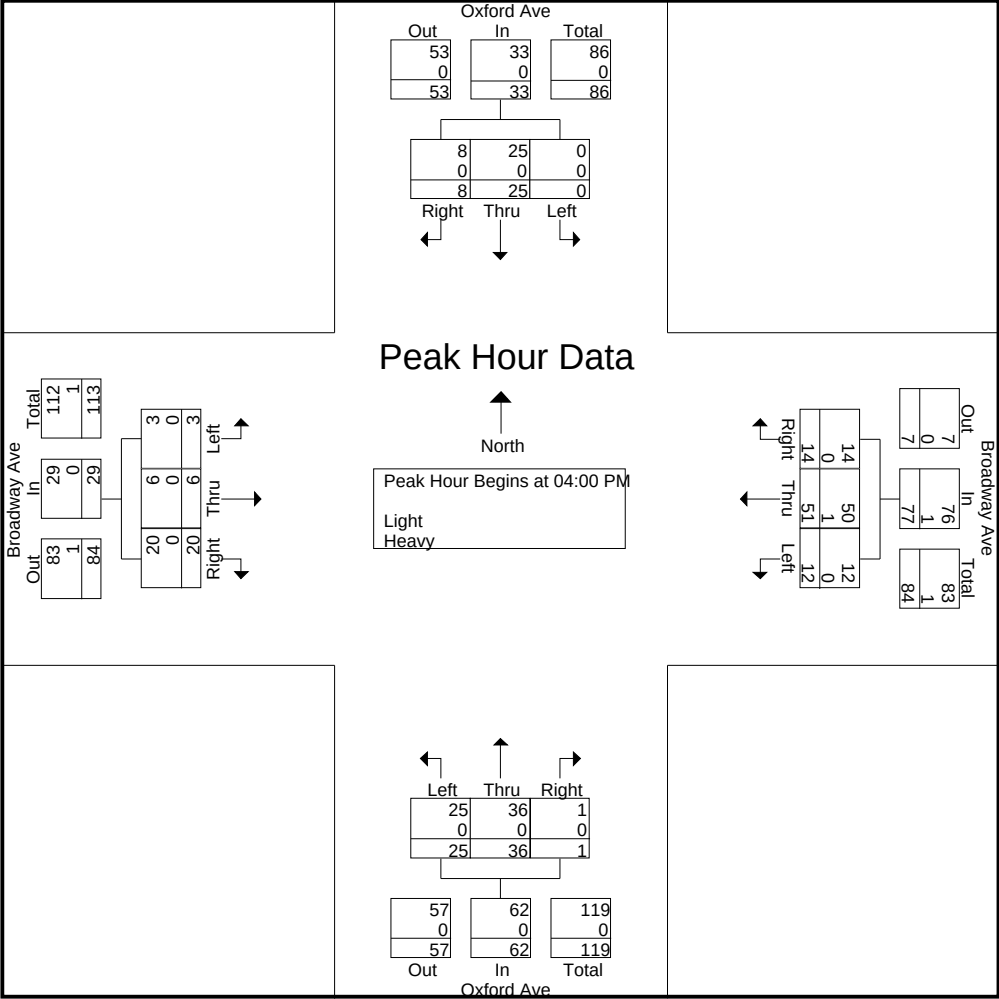
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File Name : Broadway Avenue at Oxford Avenue

Site Code : Loc-3

Start Date : 2025-09-10

Page No : 11



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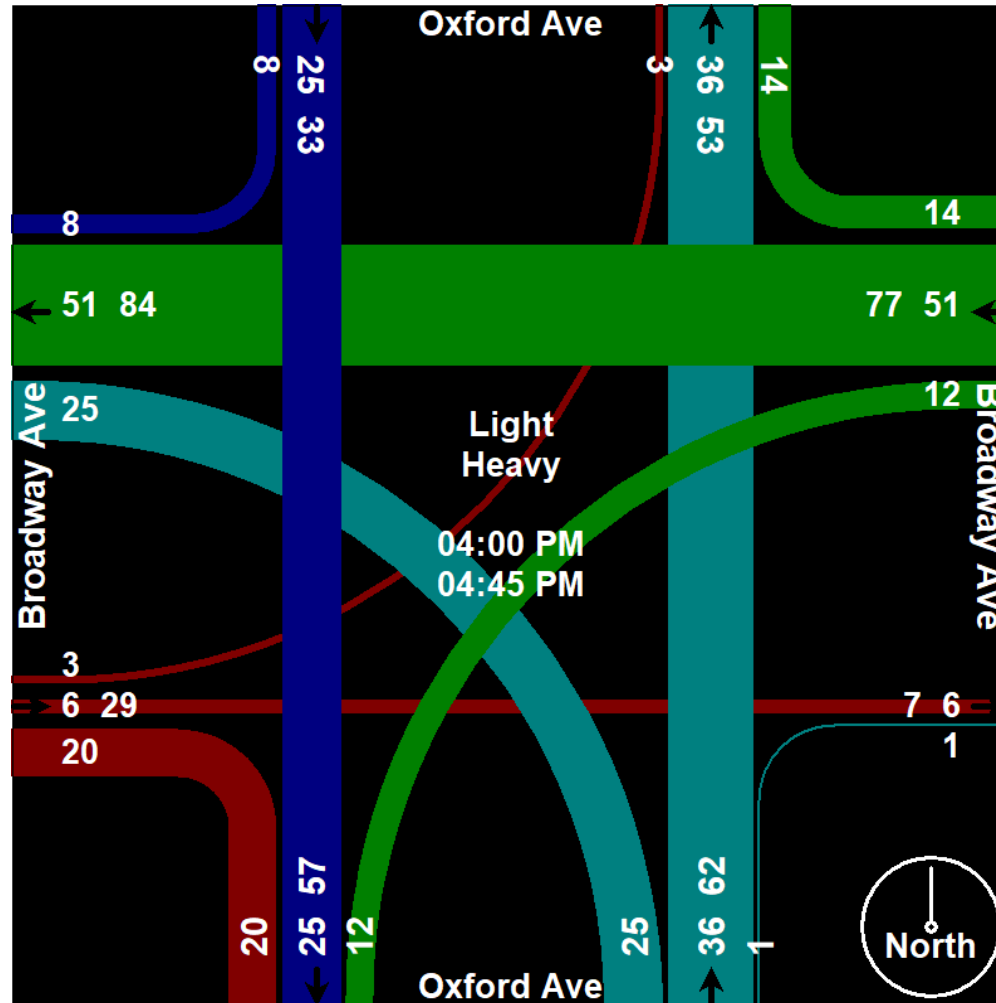
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Your Traffic Count Specialist

File Name : County Road 2 at Oxford Avenue

Site Code : Loc-1

Start Date : 2025-09-10

Page No : 4

	Oxford Ave From North				County 2 Rd From East				Private Access From South				Kingst Street E From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	1	0	15	16	63	8	0	71	0	0	0	0	0	35	10	45	132
08:00 AM	1	0	17	18	50	0	0	50	0	0	0	0	0	29	3	32	100
08:15 AM	0	0	14	14	58	1	0	59	0	0	0	0	0	29	4	33	106
08:30 AM	2	0	12	14	45	0	0	45	0	0	0	0	0	23	6	29	88
Total Volume	4	0	58	62	216	9	0	225	0	0	0	0	0	116	23	139	426
% App. Total	6.5	0	93.5		96	4	0		0	0	0		0	83.5	16.5		
PHF	.500	.000	.853	.861	.857	.281	.000	.792	.000	.000	.000	.000	.000	.829	.575	.772	.807
Light	4	0	54	58	213	9	0	222	0	0	0	0	0	111	23	134	414
% Light	100	0	93.1	93.5	98.6	100	0	98.7	0	0	0	0	0	95.7	100	96.4	97.2
Heavy	0	0	4	4	3	0	0	3	0	0	0	0	0	5	0	5	12
% Heavy	0	0	6.9	6.5	1.4	0	0	1.3	0	0	0	0	0	4.3	0	3.6	2.8

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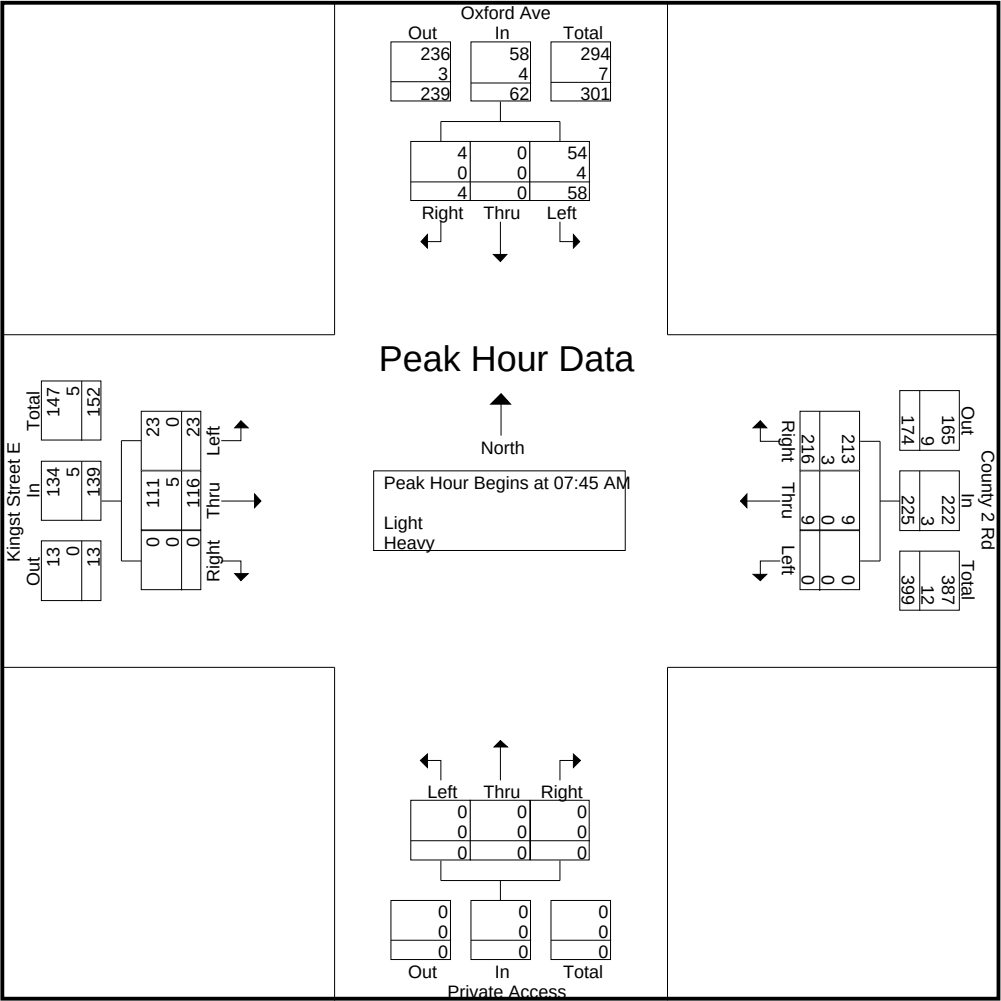
Your Traffic Count Specialist

File Name : County Road 2 at Oxford Avenue

Site Code : Loc-1

Start Date : 2025-09-10

Page No : 5



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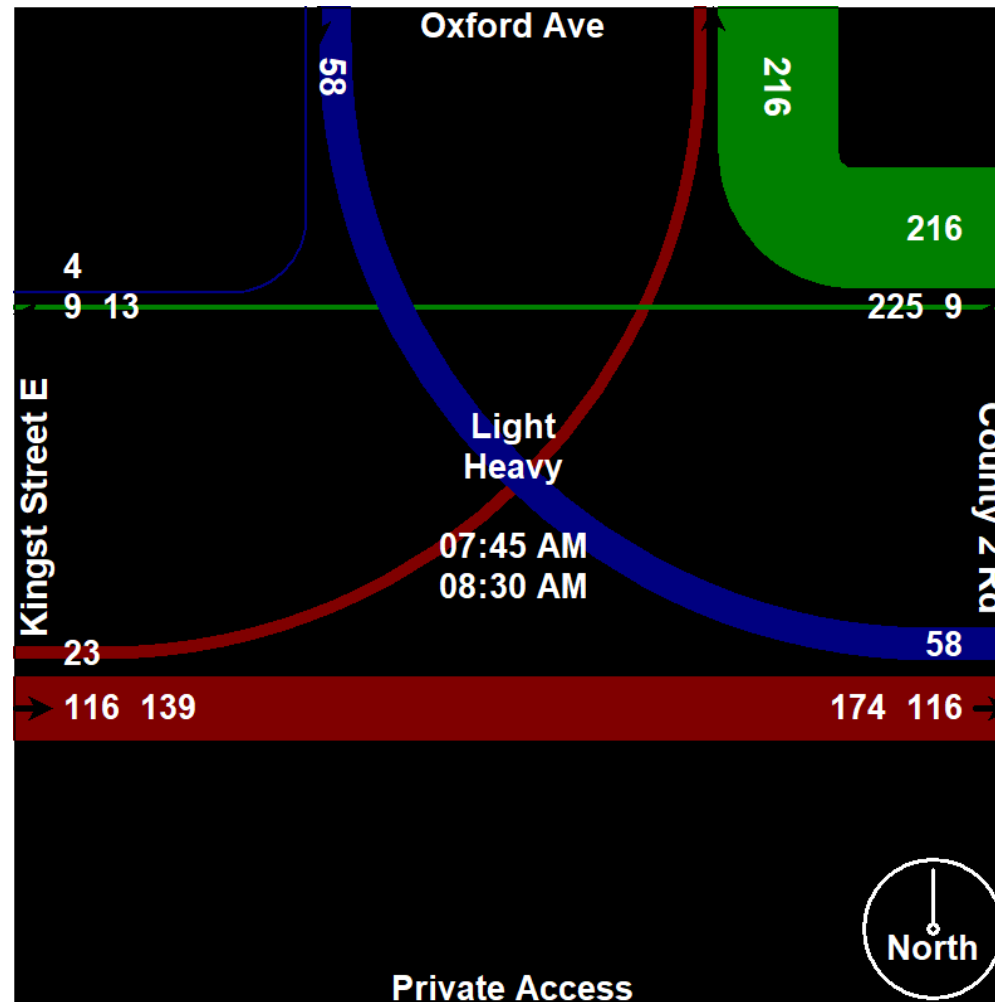
Your Traffic Count Specialist

File Name : County Road 2 at Oxford Avenue

Site Code : Loc-1

Start Date : 2025-09-10

Page No : 6



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Your Traffic Count Specialist

File Name : County Road 2 at Oxford Avenue

Site Code : Loc-1

Start Date : 2025-09-10

Page No : 7

	Oxford Ave From North				County 2 Rd From East				Private Access From South				Kingst Street E From West				
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Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	6	0	17	23	17	30	0	47	0	0	0	0	0	45	4	49	119
01:15 PM	5	0	9	14	20	43	0	63	0	0	0	0	0	37	2	39	116
01:30 PM	2	0	15	17	14	32	0	46	0	0	0	0	0	40	3	43	106
01:45 PM	1	0	13	14	13	38	0	51	0	0	0	0	0	36	5	41	106
Total Volume	14	0	54	68	64	143	0	207	0	0	0	0	0	158	14	172	447
% App. Total	20.6	0	79.4		30.9	69.1	0		0	0	0		0	91.9	8.1		
PHF	.583	.000	.794	.739	.800	.831	.000	.821	.000	.000	.000	.000	.000	.878	.700	.878	.939
Light	14	0	54	68	63	143	0	206	0	0	0	0	0	151	14	165	439
% Light	100	0	100	100	98.4	100	0	99.5	0	0	0	0	0	95.6	100	95.9	98.2
Heavy	0	0	0	0	1	0	0	1	0	0	0	0	0	7	0	7	8
% Heavy	0	0	0	0	1.6	0	0	0.5	0	0	0	0	0	4.4	0	4.1	1.8

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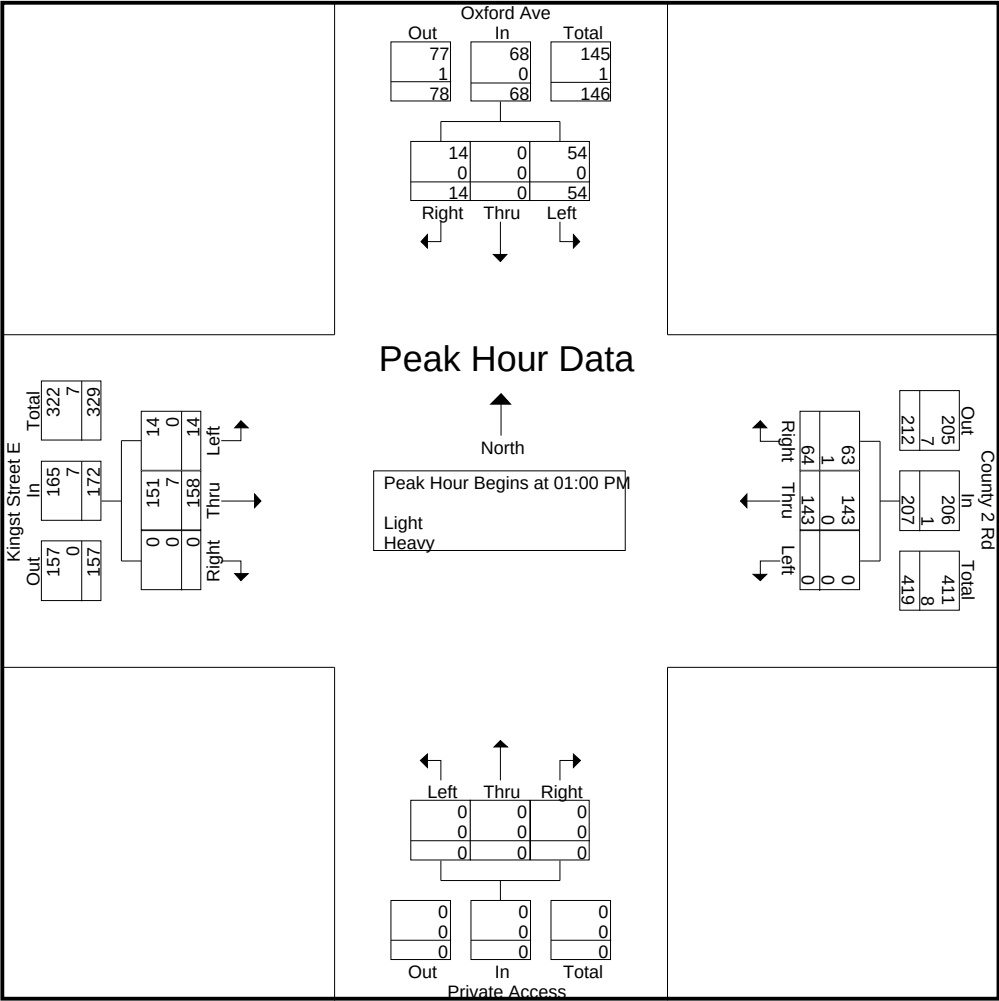
Your Traffic Count Specialist

File Name : County Road 2 at Oxford Avenue

Site Code : Loc-1

Start Date : 2025-09-10

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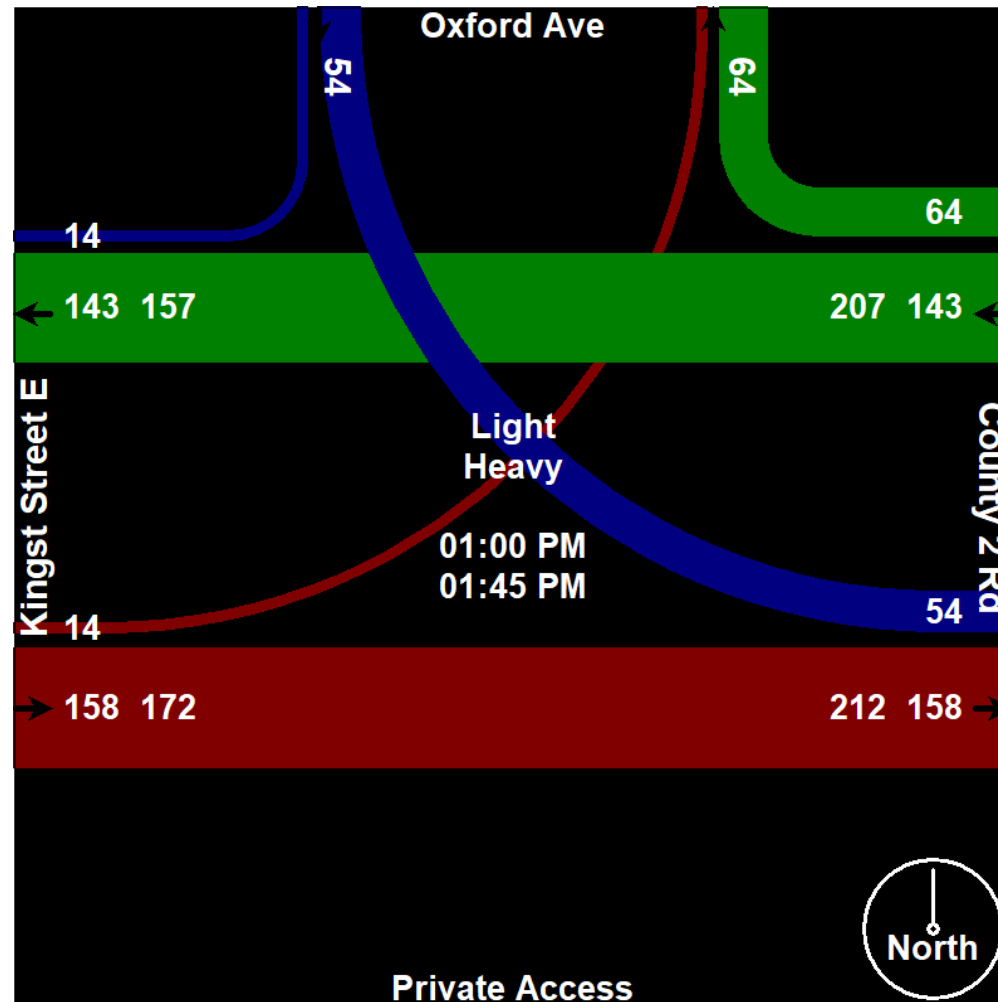
Your Traffic Count Specialist

File Name : County Road 2 at Oxford Avenue

Site Code : Loc-1

Start Date : 2025-09-10

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Your Traffic Count Specialist

File Name : County Road 2 at Oxford Avenue

Site Code : Loc-1

Start Date : 2025-09-10

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	Oxford Ave From North				County 2 Rd From East				Private Access From South				Kingst Street E From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	6	0	11	17	14	57	0	71	0	0	0	0	0	66	3	69	157
04:15 PM	4	0	16	20	17	56	0	73	0	0	0	0	0	32	6	38	131
04:30 PM	3	0	13	16	11	57	0	68	0	0	0	0	0	46	4	50	134
04:45 PM	2	0	10	12	5	53	0	58	0	0	0	0	0	43	0	43	113
Total Volume	15	0	50	65	47	223	0	270	0	0	0	0	0	187	13	200	535
% App. Total	23.1	0	76.9		17.4	82.6	0		0	0	0		0	93.5	6.5		
PHF	.625	.000	.781	.813	.691	.978	.000	.925	.000	.000	.000	.000	.000	.708	.542	.725	.852
Light	15	0	49	64	45	220	0	265	0	0	0	0	0	181	13	194	523
% Light	100	0	98.0	98.5	95.7	98.7	0	98.1	0	0	0	0	0	96.8	100	97.0	97.8
Heavy	0	0	1	1	2	3	0	5	0	0	0	0	0	6	0	6	12
% Heavy	0	0	2.0	1.5	4.3	1.3	0	1.9	0	0	0	0	0	3.2	0	3.0	2.2

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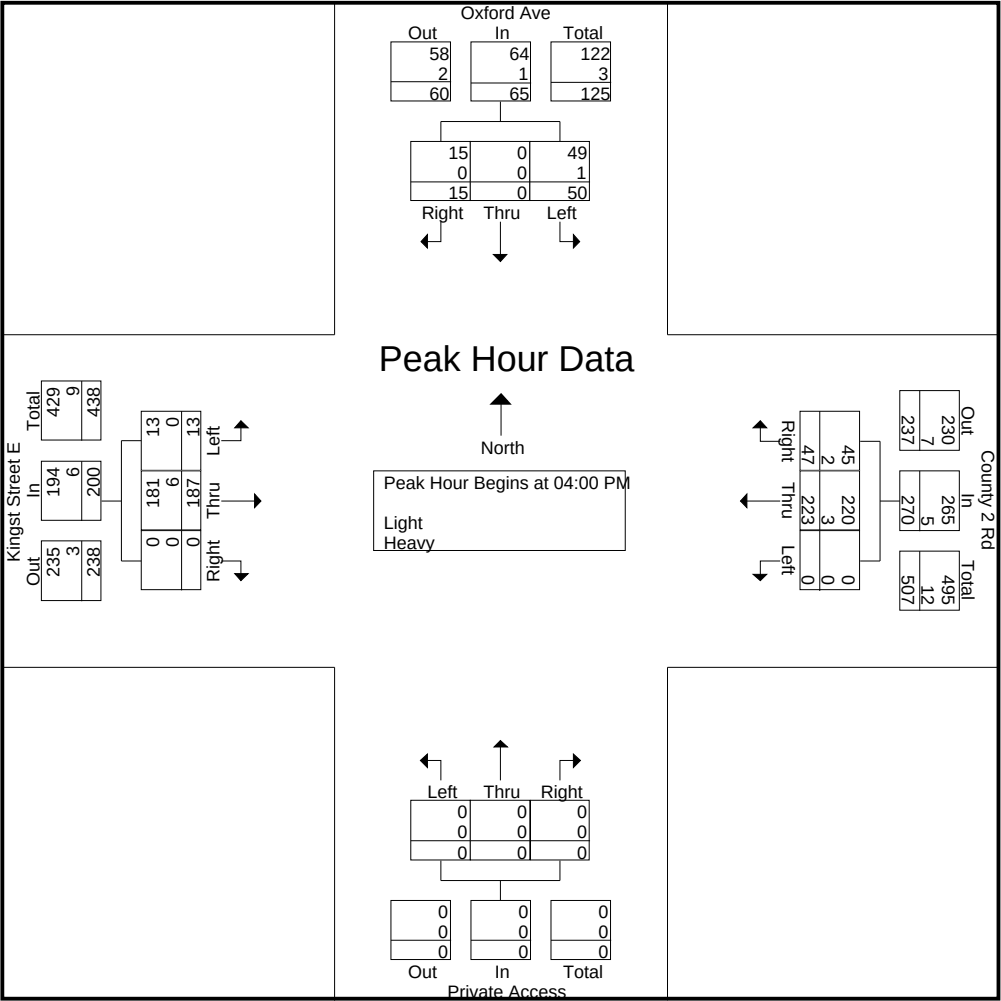
Your Traffic Count Specialist

File Name : County Road 2 at Oxford Avenue

Site Code : Loc-1

Start Date : 2025-09-10

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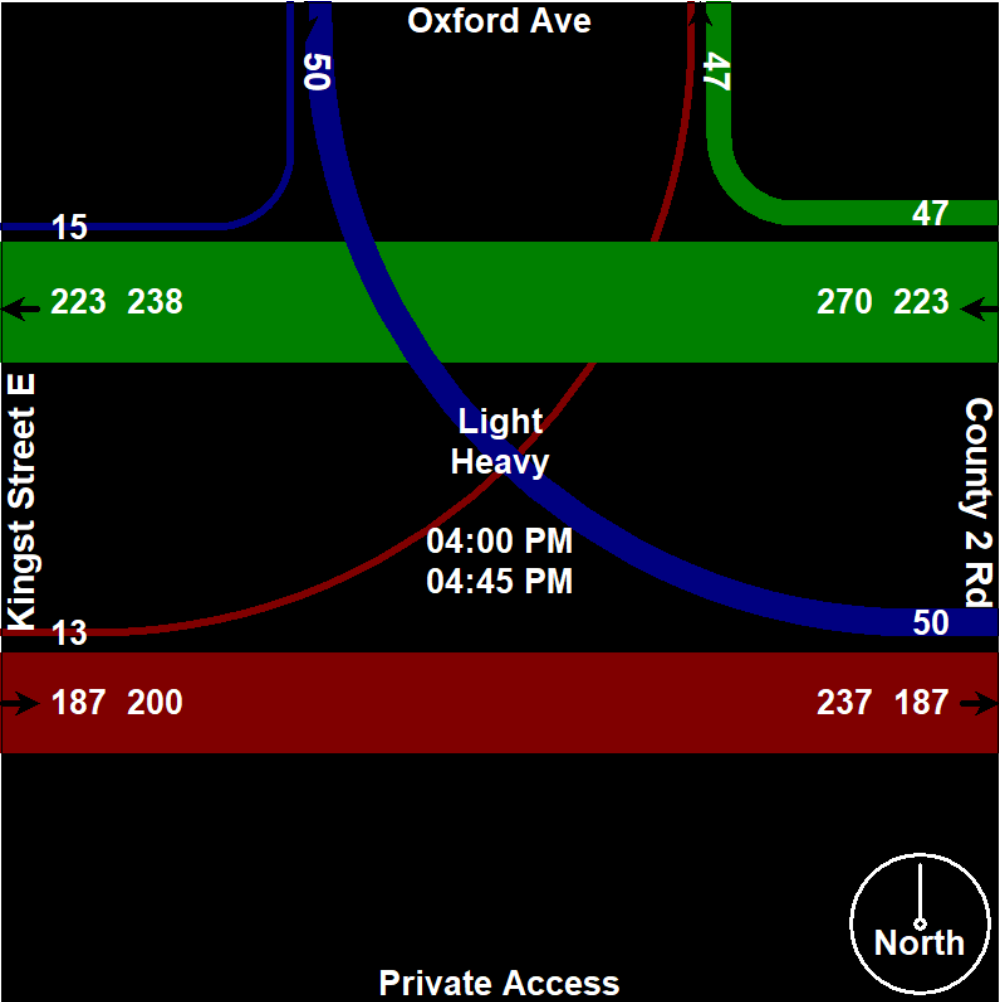


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File Name : County Road 2 at Oxford Avenue
Site Code : Loc-1
Start Date : 2025-09-10
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Your Traffic Count Specialist

File Name : Crawford Street at Oxford Avenue

Site Code : Loc-2

Start Date : 2025-09-10

Page No : 4

	Oxford Ave From North				Private Access From East				Oxford Ave From South				Crawford St From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	12	0	12	0	0	0	0	0	38	24	62	3	0	1	4	78
07:45 AM	0	20	2	22	2	0	0	2	0	46	22	68	8	0	0	8	100
08:00 AM	0	10	0	10	2	1	0	3	0	31	17	48	6	0	1	7	68
08:15 AM	1	15	0	16	0	0	0	0	0	35	21	56	1	1	0	2	74
Total Volume	1	57	2	60	4	1	0	5	0	150	84	234	18	1	2	21	320
% App. Total	1.7	95	3.3		80	20	0		0	64.1	35.9		85.7	4.8	9.5		
PHF	.250	.713	.250	.682	.500	.250	.000	.417	.000	.815	.875	.860	.563	.250	.500	.656	.800
Light	1	53	2	56	4	1	0	5	0	146	82	228	18	1	2	21	310
% Light	100	93.0	100	93.3	100	100	0	100	0	97.3	97.6	97.4	100	100	100	100	96.9
Heavy	0	4	0	4	0	0	0	0	0	4	2	6	0	0	0	0	10
% Heavy	0	7.0	0	6.7	0	0	0	0	0	2.7	2.4	2.6	0	0	0	0	3.1

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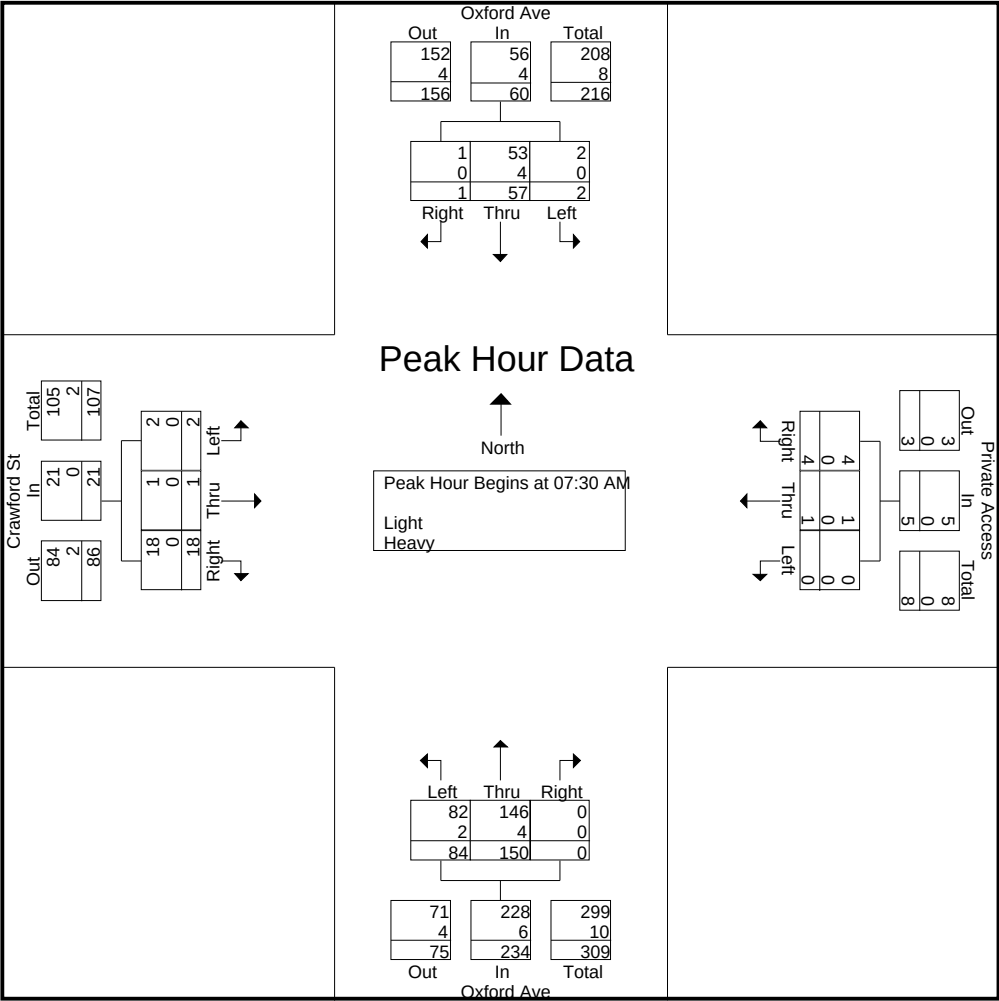
Your Traffic Count Specialist

File Name : Crawford Street at Oxford Avenue

Site Code : Loc-2

Start Date : 2025-09-10

Page No : 5

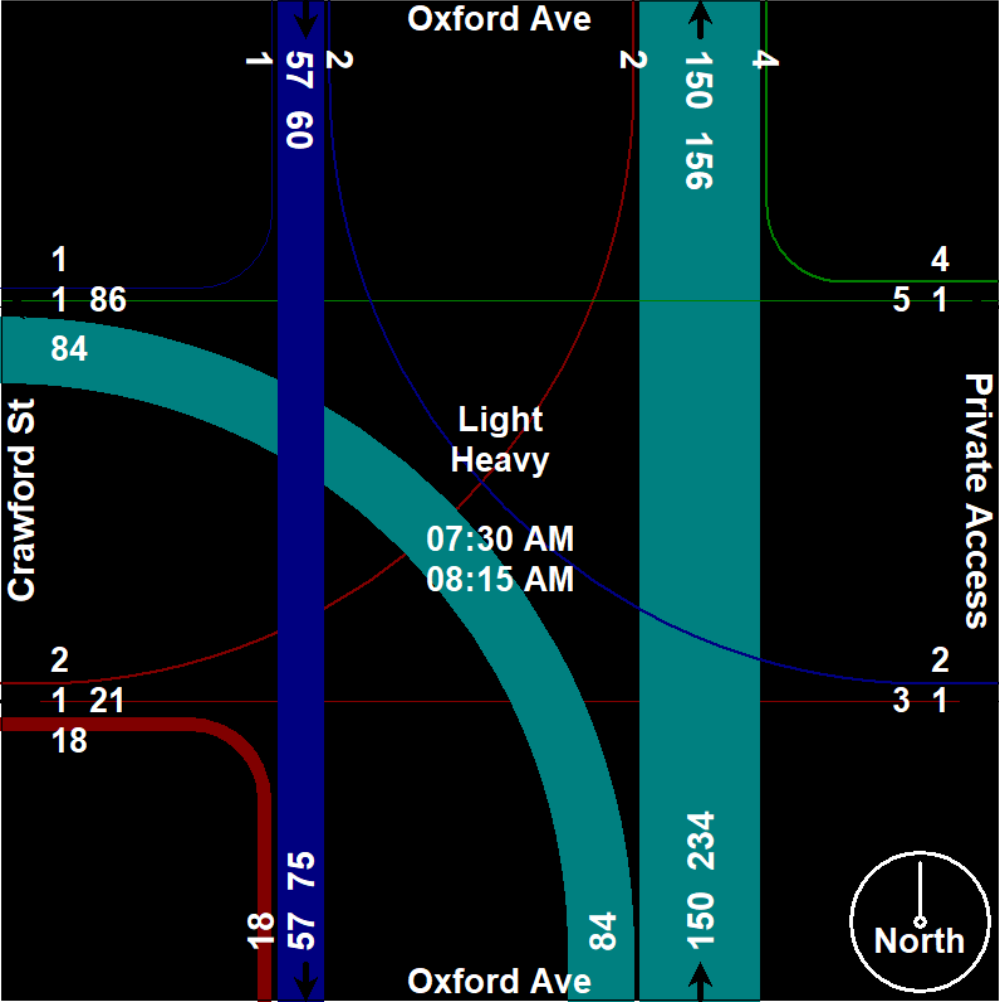


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Your Traffic Count Specialist

File Name : Crawford Street at Oxford Avenue
Site Code : Loc-2
Start Date : 2025-09-10
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Your Traffic Count Specialist

File Name : Crawford Street at Oxford Avenue

Site Code : Loc-2

Start Date : 2025-09-10

Page No : 7

	Oxford Ave From North				Private Access From East				Oxford Ave From South				Crawford St From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:30 AM																	
11:30 AM	2	18	0	20	0	1	0	1	1	18	8	27	6	0	0	6	54
11:45 AM	0	13	0	13	0	1	0	1	0	22	7	29	2	0	0	2	45
12:00 PM	0	14	0	14	0	1	0	1	0	13	1	14	11	1	1	13	42
12:15 PM	1	18	0	19	1	1	0	2	0	14	4	18	4	1	0	5	44
Total Volume	3	63	0	66	1	4	0	5	1	67	20	88	23	2	1	26	185
% App. Total	4.5	95.5	0		20	80	0		1.1	76.1	22.7		88.5	7.7	3.8		
PHF	.375	.875	.000	.825	.250	1.00	.000	.625	.250	.761	.625	.759	.523	.500	.250	.500	.856
Light	3	62	0	65	1	4	0	5	1	64	18	83	23	2	1	26	179
% Light	100	98.4	0	98.5	100	100	0	100	100	95.5	90.0	94.3	100	100	100	100	96.8
Heavy	0	1	0	1	0	0	0	0	0	3	2	5	0	0	0	0	6
% Heavy	0	1.6	0	1.5	0	0	0	0	0	4.5	10.0	5.7	0	0	0	0	3.2

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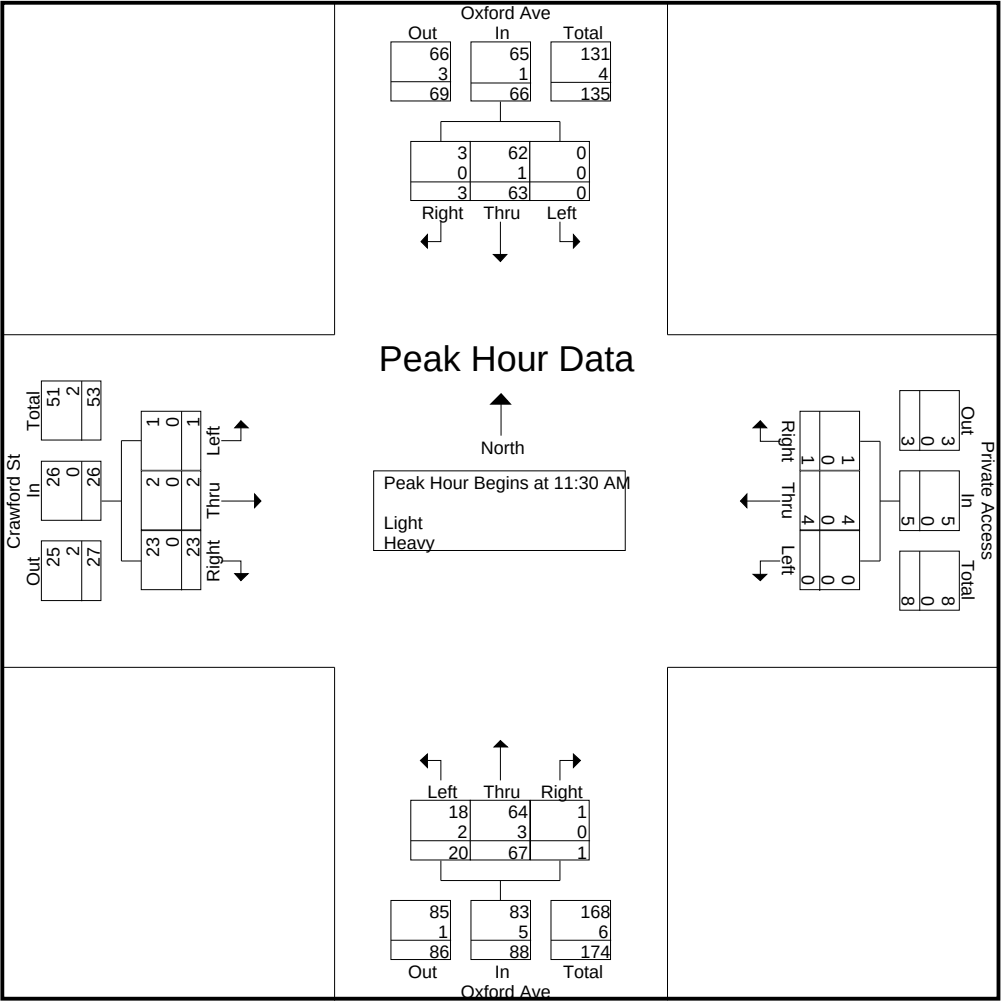
Your Traffic Count Specialist

File Name : Crawford Street at Oxford Avenue

Site Code : Loc-2

Start Date : 2025-09-10

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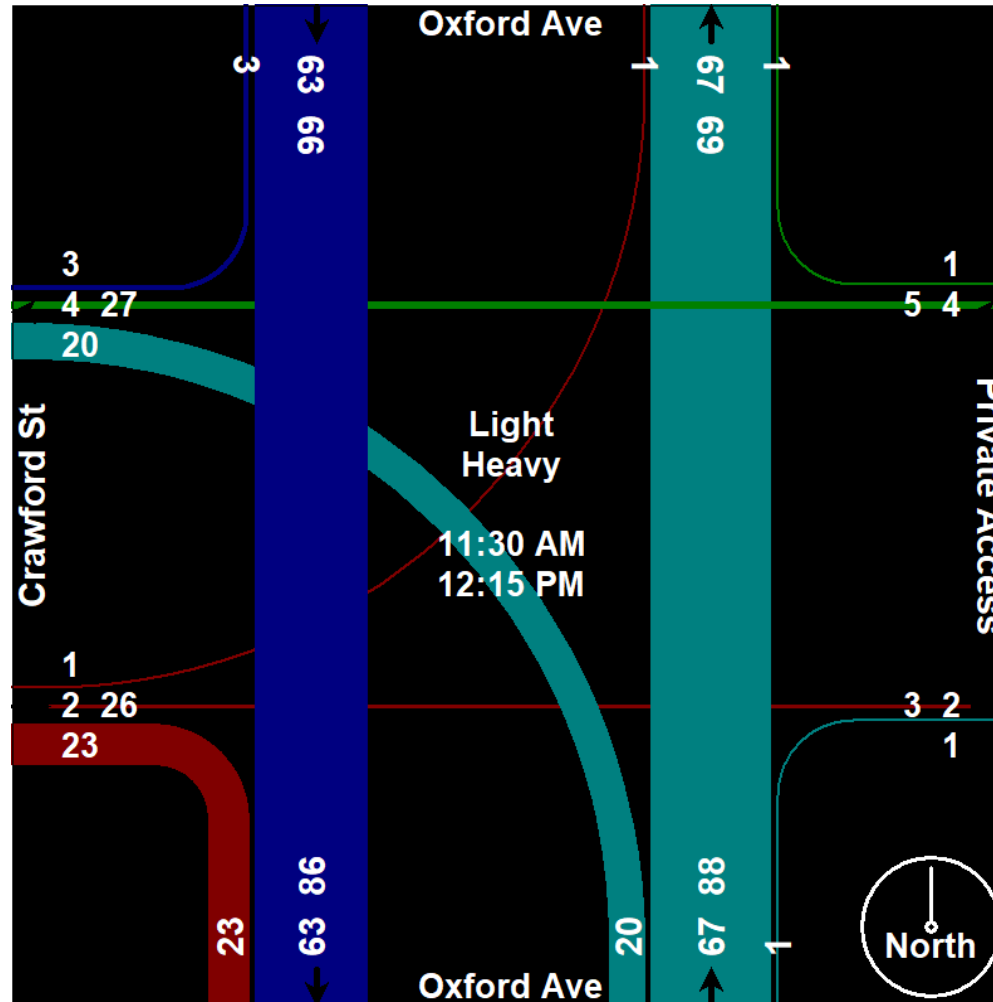
Your Traffic Count Specialist

File Name : Crawford Street at Oxford Avenue

Site Code : Loc-2

Start Date : 2025-09-10

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Your Traffic Count Specialist

File Name : Crawford Street at Oxford Avenue

Site Code : Loc-2

Start Date : 2025-09-10

Page No : 10

	Oxford Ave From North				Private Access From East				Oxford Ave From South				Crawford St From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	2	14	0	16	1	0	0	1	0	15	5	20	8	1	2	11	48
04:15 PM	3	12	1	16	0	1	0	1	0	20	7	27	3	0	2	5	49
04:30 PM	0	11	0	11	2	0	0	2	0	14	4	18	2	1	0	3	34
04:45 PM	2	13	0	15	0	1	0	1	1	5	3	9	4	1	1	6	31
Total Volume	7	50	1	58	3	2	0	5	1	54	19	74	17	3	5	25	162
% App. Total	12.1	86.2	1.7		60	40	0		1.4	73	25.7		68	12	20		
PHF	.583	.893	.250	.906	.375	.500	.000	.625	.250	.675	.679	.685	.531	.750	.625	.568	.827
Light	7	50	1	58	3	2	0	5	1	54	18	73	17	3	5	25	161
% Light	100	100	100	100	100	100	0	100	100	100	94.7	98.6	100	100	100	100	99.4
Heavy	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
% Heavy	0	0	0	0	0	0	0	0	0	0	5.3	1.4	0	0	0	0	0.6

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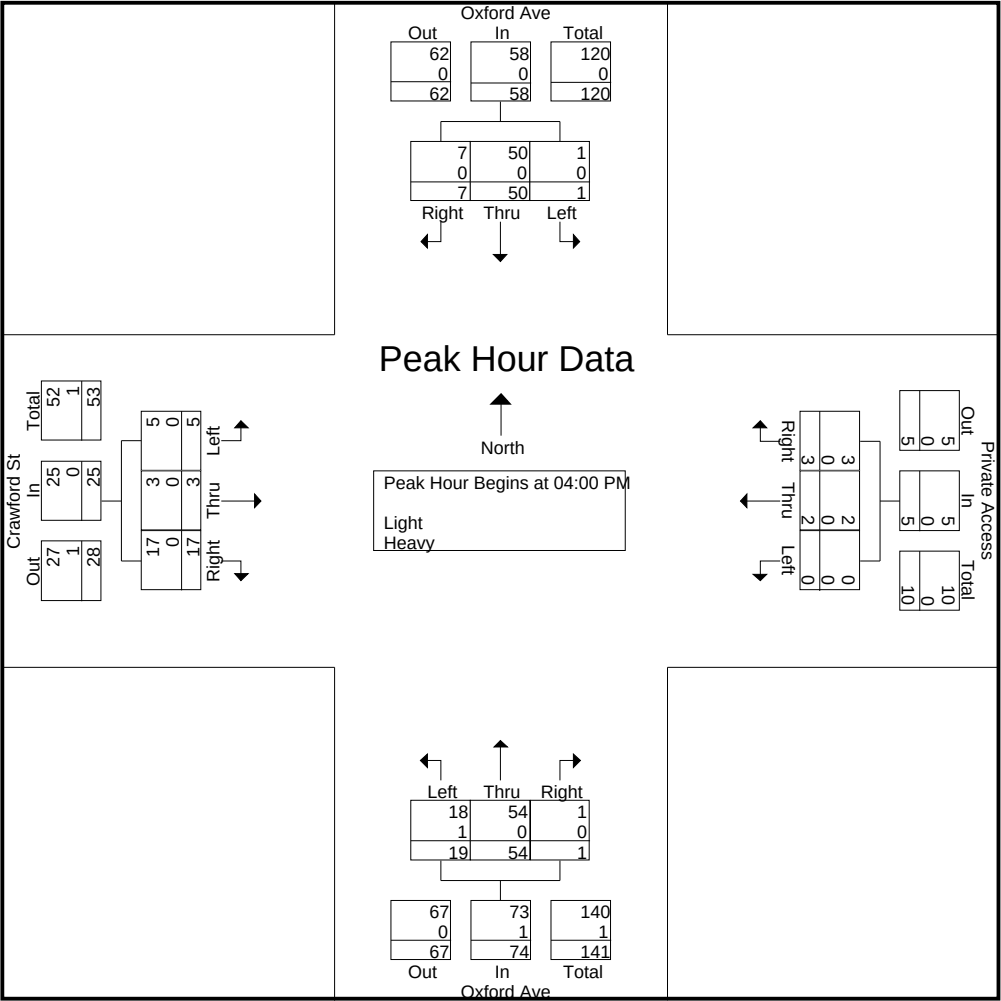
Your Traffic Count Specialist

File Name : Crawford Street at Oxford Avenue

Site Code : Loc-2

Start Date : 2025-09-10

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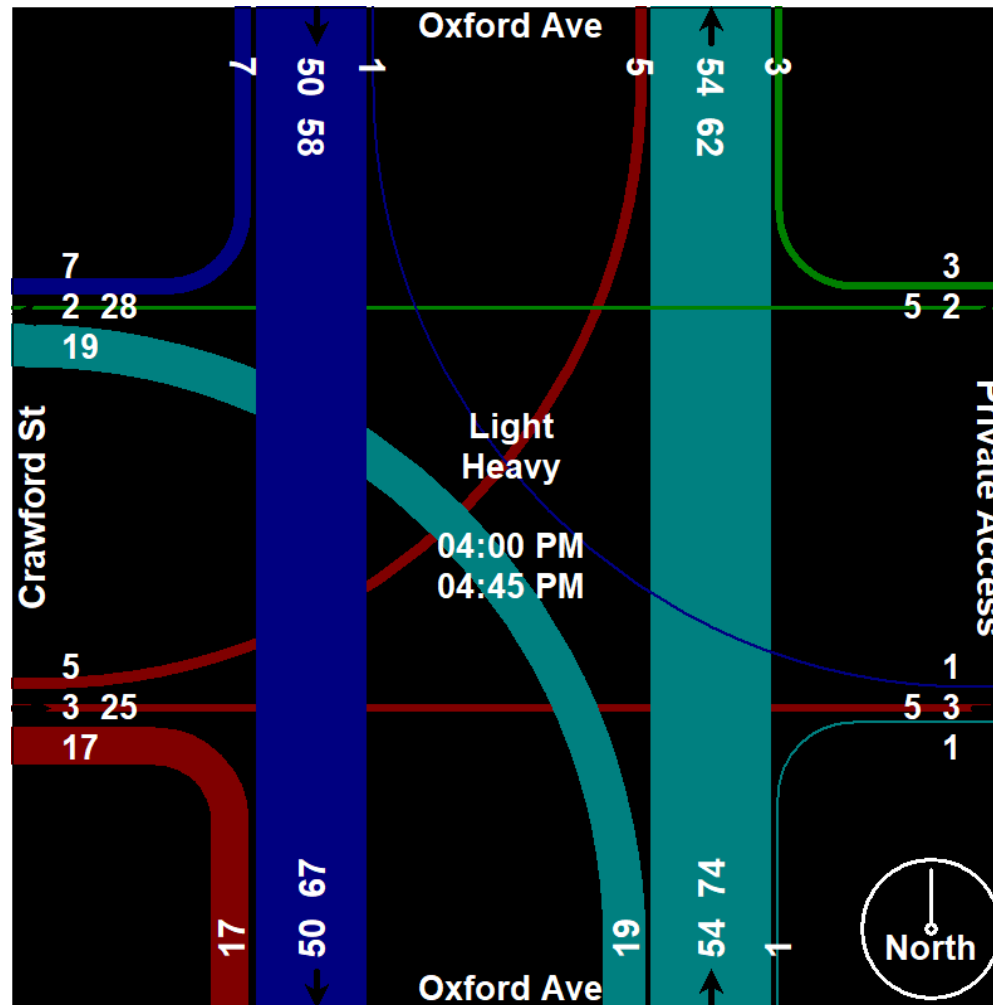
Your Traffic Count Specialist

File Name : Crawford Street at Oxford Avenue

Site Code : Loc-2

Start Date : 2025-09-10

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Appendix C – LOS Definition

LEVEL OF SERVICE DEFINITIONS AT SIGNALIZED INTERSECTIONS⁽¹⁾

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average control delay per vehicle, typically for a 15-min analysis period. The criteria are given in the table below. Delay may be measured in the field or estimated using software such as Highway Capacity Software. Delay is a complex measure and is dependent upon a number of variables, including quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group in question.

Level of Service	Features	Control Delay per vehicle (sec)
A	LOS A describes operations with very low delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favourable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	≤ 10
B	LOS B describes operations with delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	$> 10 \text{ and } \leq 20$
C	LOS C describes operations with delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.	$> 20 \text{ and } \leq 35$
D	LOS D describes operations with delay greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, of high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	$> 35 \text{ and } \leq 55$
E	LOS E describes operations with delay greater than 55 and up to 80 sec per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	$> 55 \text{ and } \leq 80$
F	LOS F describes operations with delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	> 80

(1) Highway Capacity Manual 2000

LEVEL OF SERVICE DEFINITIONS AT UNSIGNALIZED INTERSECTIONS⁽¹⁾

The level of service criteria for unsignalized intersections are given in the table below. As used here, total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position. The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation.

Level of Service	Features	Average Total Delay (sec/veh)
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.	≤ 10
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.	> 10 and ≤ 15
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.	> 15 and ≤ 25
D	Long traffic delays occur. Motorists emerging from the minor street experience significant restriction and frustration. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.	> 25 and ≤ 35
E	Very long traffic delays occur. Operations approach the capacity of the intersection.	> 35 and ≤ 50
F	Saturation occurs, with vehicle demand exceeding the available capacity. Very long traffic delays occur.	> 50

(1) Highway Capacity Manual 2000.

Appendix D – Existing Synchro Reports

HCM Unsignalized Intersection Capacity Analysis

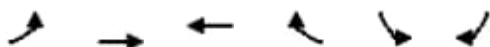
1: Oxford Avenue & Broadway Avenue/Site Access #2

BCC_Existing_AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	72	29	0	6	5	87	61	8	14	36	4
Future Volume (Veh/h)	3	72	29	0	6	5	87	61	8	14	36	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	4	99	40	0	8	7	119	84	11	19	49	5
Pedestrians								4			1	
Lane Width (m)								4.2			4.2	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	429	423	56	511	420	91	54			95		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	429	423	56	511	420	91	54			95		
tC, single (s)	7.4	6.5	6.3	7.1	7.5	7.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.4	3.5	4.9	4.2	2.2			2.2		
p0 queue free %	99	79	96	100	98	99	92			99		
cM capacity (veh/h)	440	479	974	355	367	753	1539			1512		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	143	15	214	73								
Volume Left	4	0	119	19								
Volume Right	40	7	11	5								
cSH	557	482	1539	1512								
Volume to Capacity	0.26	0.03	0.08	0.01								
Queue Length 95th (m)	7.7	0.7	1.9	0.3								
Control Delay (s/veh)	13.7	12.7	4.5	2.0								
Lane LOS	B	B	A	A								
Approach Delay (s/veh)	13.7	12.7	4.5	2.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			7.3									
Intersection Capacity Utilization			30.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 2: County Road 2 & Oxford Avenue

BCC_Existing_AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	116	9	216	58	4
Future Volume (Veh/h)	23	116	9	216	58	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	28	143	11	267	72	5
Pedestrians		3				
Lane Width (m)		3.7				
Walking Speed (m/s)		1.1				
Percent Blockage		0				
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	278				344	148
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	278				344	148
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	98				89	99
cM capacity (veh/h)	1296				629	902
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	171	278	77			
Volume Left	28	0	72			
Volume Right	0	267	5			
cSH	1296	1700	642			
Volume to Capacity	0.02	0.16	0.12			
Queue Length 95th (m)	0.5	0.0	3.1			
Control Delay (s/veh)	1.4	0.0	11.4			
Lane LOS	A		B			
Approach Delay (s/veh)	1.4	0.0	11.4			
Approach LOS			B			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			35.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 3: Oxford Avenue & Crawford Street/Site Access #1

BCC_Existing_AM

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Traffic Volume (veh/h)	2	1	18	0	1	4	84	150	0	2	57	1								
Future Volume (Veh/h)	2	1	18	0	1	4	84	150	0	2	57	1								
Sign Control	Stop			Stop			Free			Free										
Grade	0%			0%			0%			0%										
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80								
Hourly flow rate (vph)	2	1	22	0	1	5	105	188	0	2	71	1								
Pedestrians	4			1						2										
Lane Width (m)	4.1			4.5						4.5										
Walking Speed (m/s)	1.1			1.1						1.1										
Percent Blockage	0			0						0										
Right turn flare (veh)																				
Median type							None			None										
Median storage (veh)																				
Upstream signal (m)																				
pX, platoon unblocked																				
vC, conflicting volume	485	479	76	497	479	191	76				189									
vC1, stage 1 conf vol																				
vC2, stage 2 conf vol																				
vCu, unblocked vol	485	479	76	497	479	191	76				189									
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1									
tC, 2 stage (s)																				
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2									
p0 queue free %	100	100	98	100	100	99	93				100									
cM capacity (veh/h)	460	452	987	444	452	853	1510				1395									
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																
Volume Total	25	6	293	74																
Volume Left	2	0	105	2																
Volume Right	22	5	0	1																
cSH	867	743	1510	1395																
Volume to Capacity	0.03	0.01	0.07	0.00																
Queue Length 95th (m)	0.7	0.2	1.7	0.0																
Control Delay (s/veh)	9.3	9.9	3.1	0.2																
Lane LOS	A	A	A	A																
Approach Delay (s/veh)	9.3	9.9	3.1	0.2																
Approach LOS	A	A																		
Intersection Summary																				
Average Delay				3.0																
Intersection Capacity Utilization				29.9%	ICU Level of Service				A											
Analysis Period (min)				15																

HCM Unsignalized Intersection Capacity Analysis

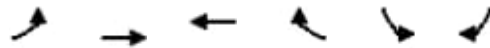
1: Oxford Avenue & Broadway Avenue/Site Access #2

BCC_Existing_PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	6	20	12	51	14	25	36	1	0	25	8
Future Volume (Veh/h)	3	6	20	12	51	14	25	36	1	0	25	8
Sign Control	Stop				Stop		Free				Free	
Grade	0%				0%		0%				0%	
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Hourly flow rate (vph)	5	10	33	20	85	23	42	60	2	0	42	13
Pedestrians								2			2	
Lane Width (m)								4.2			4.2	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	261	195	51	234	200	63	55			62		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	261	195	51	234	200	63	55			62		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	97	97	87	98	97			100		
cM capacity (veh/h)	601	685	1021	678	677	1005	1563			1541		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	128	104	55								
Volume Left	5	20	42	0								
Volume Right	33	23	2	13								
cSH	869	720	1563	1541								
Volume to Capacity	0.06	0.18	0.03	0.00								
Queue Length 95th (m)	1.3	4.9	0.6	0.0								
Control Delay (s/veh)	9.4	11.1	3.1	0.0								
Lane LOS	A	B	A									
Approach Delay (s/veh)	9.4	11.1	3.1	0.0								
Approach LOS	A	B										
Intersection Summary												
Average Delay			6.5									
Intersection Capacity Utilization			23.5%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 2: County Road 2 & Oxford Avenue

BCC_Existing_PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	187	223	47	50	15
Future Volume (Veh/h)	13	187	223	47	50	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	15	220	262	55	59	18
Pedestrians		3	1			
Lane Width (m)		3.7	4.1			
Walking Speed (m/s)		1.1	1.1			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	317				541	293
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	317				541	293
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				88	98
cM capacity (veh/h)	1255				496	749
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	235	317	77			
Volume Left	15	0	59			
Volume Right	0	55	18			
cSH	1255	1700	538			
Volume to Capacity	0.01	0.19	0.14			
Queue Length 95th (m)	0.3	0.0	3.8			
Control Delay (s/veh)	0.6	0.0	12.8			
Lane LOS	A		B			
Approach Delay (s/veh)	0.6	0.0	12.8			
Approach LOS			B			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			31.9%		ICU Level of Service	
Analysis Period (min)			15		A	

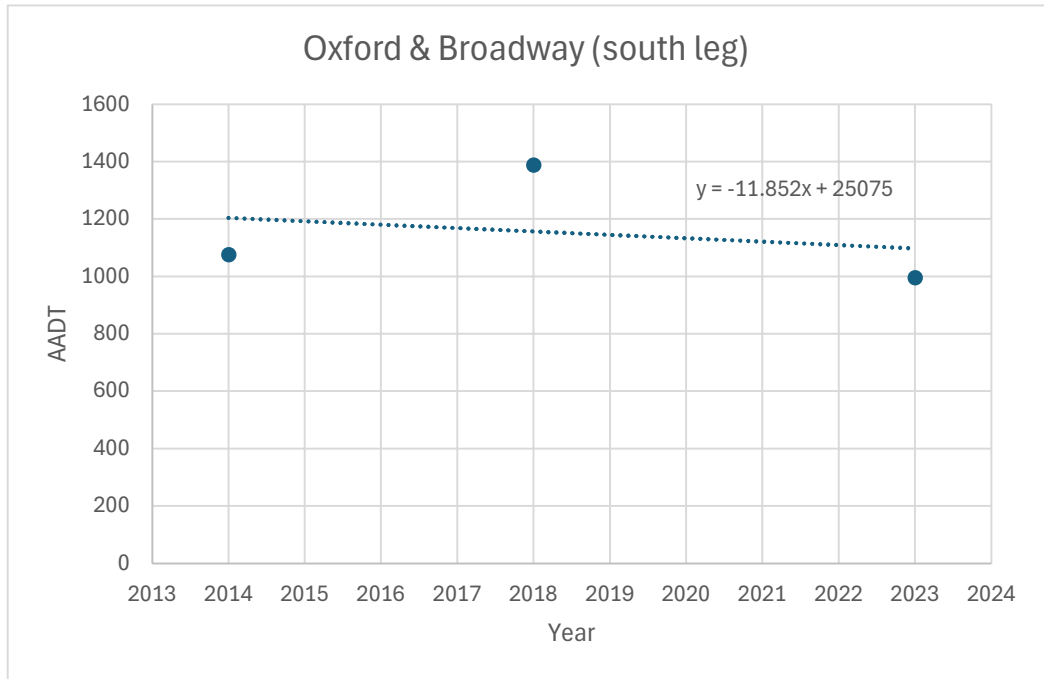
HCM Unsignalized Intersection Capacity Analysis 3: Oxford Avenue & Crawford Street/Site Access #1

BCC_Existing_PM

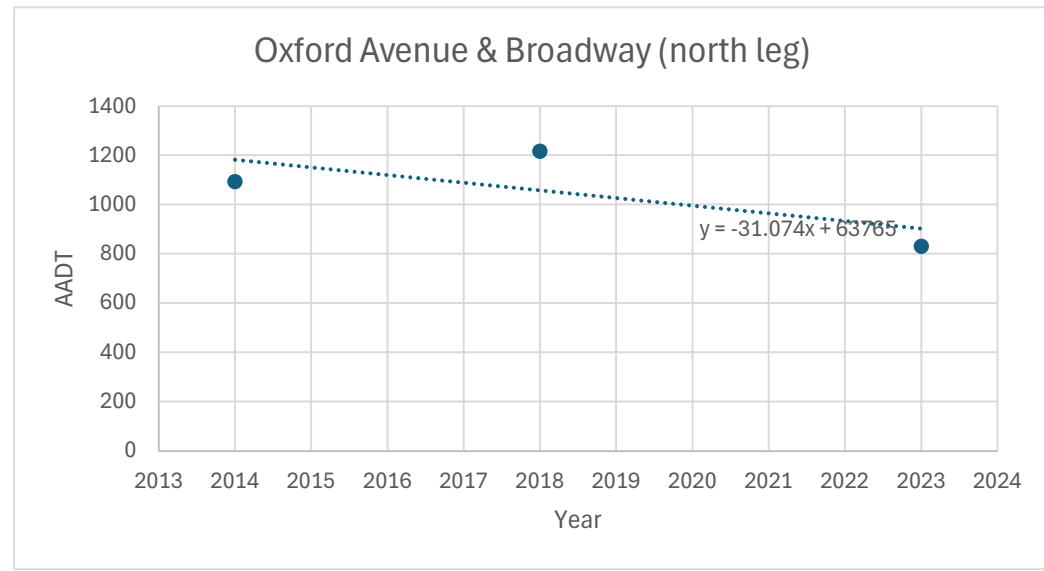
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	3	17	0	2	3	19	54	1	1	50	7
Future Volume (Veh/h)	5	3	17	0	2	3	19	54	1	1	50	7
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	6	4	20	0	2	4	23	65	1	1	60	8
Pedestrians					3							
Lane Width (m)					4.5							
Walking Speed (m/s)					1.1							
Percent Blockage					0							
Right turn flare (veh)												
Median type							None					
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	187	181	64	203	185	73	68				69	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	187	181	64	203	185	73	68				69	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.2				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3				2.2	
p0 queue free %	99	99	98	100	100	100	98				100	
cM capacity (veh/h)	759	703	1006	724	700	987	1508				1539	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	30	6	89	69								
Volume Left	6	0	23	1								
Volume Right	20	4	1	8								
cSH	896	868	1508	1539								
Volume to Capacity	0.03	0.01	0.02	0.00								
Queue Length 95th (m)	0.8	0.2	0.4	0.0								
Control Delay (s/veh)	9.2	9.2	2.0	0.1								
Lane LOS	A	A	A	A								
Approach Delay (s/veh)	9.2	9.2	2.0	0.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay				2.7								
Intersection Capacity Utilization				23.5%	ICU Level of Service			A				
Analysis Period (min)				15								

Appendix E – Growth Rate Data

Oxford Avenue & Broadway (south leg)	
Year	AADT
2014	1076
2018	1388
2023	995
	-6%



Oxford Avenue & Broadway	
Year	AADT
2014	1094
2018	1217
2023	832
	-7%

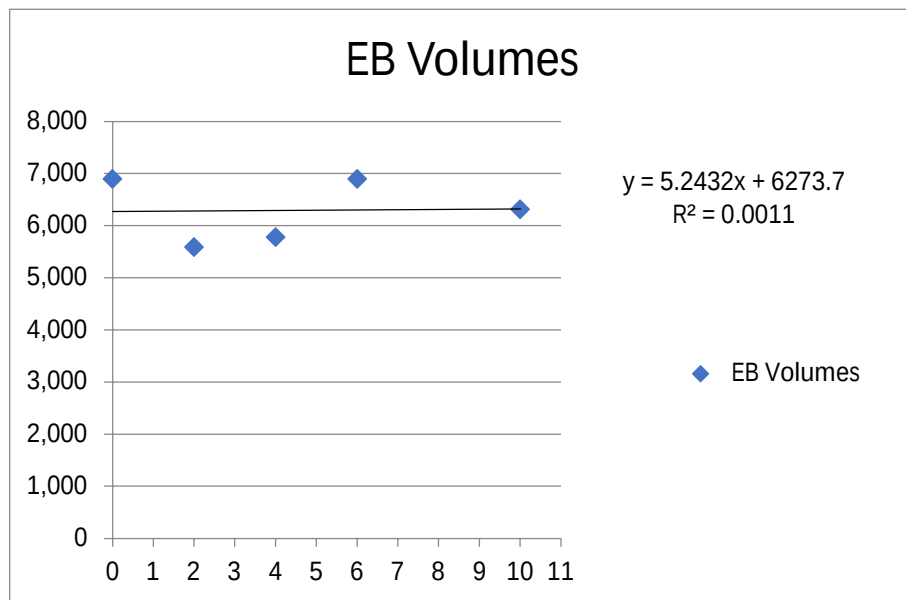


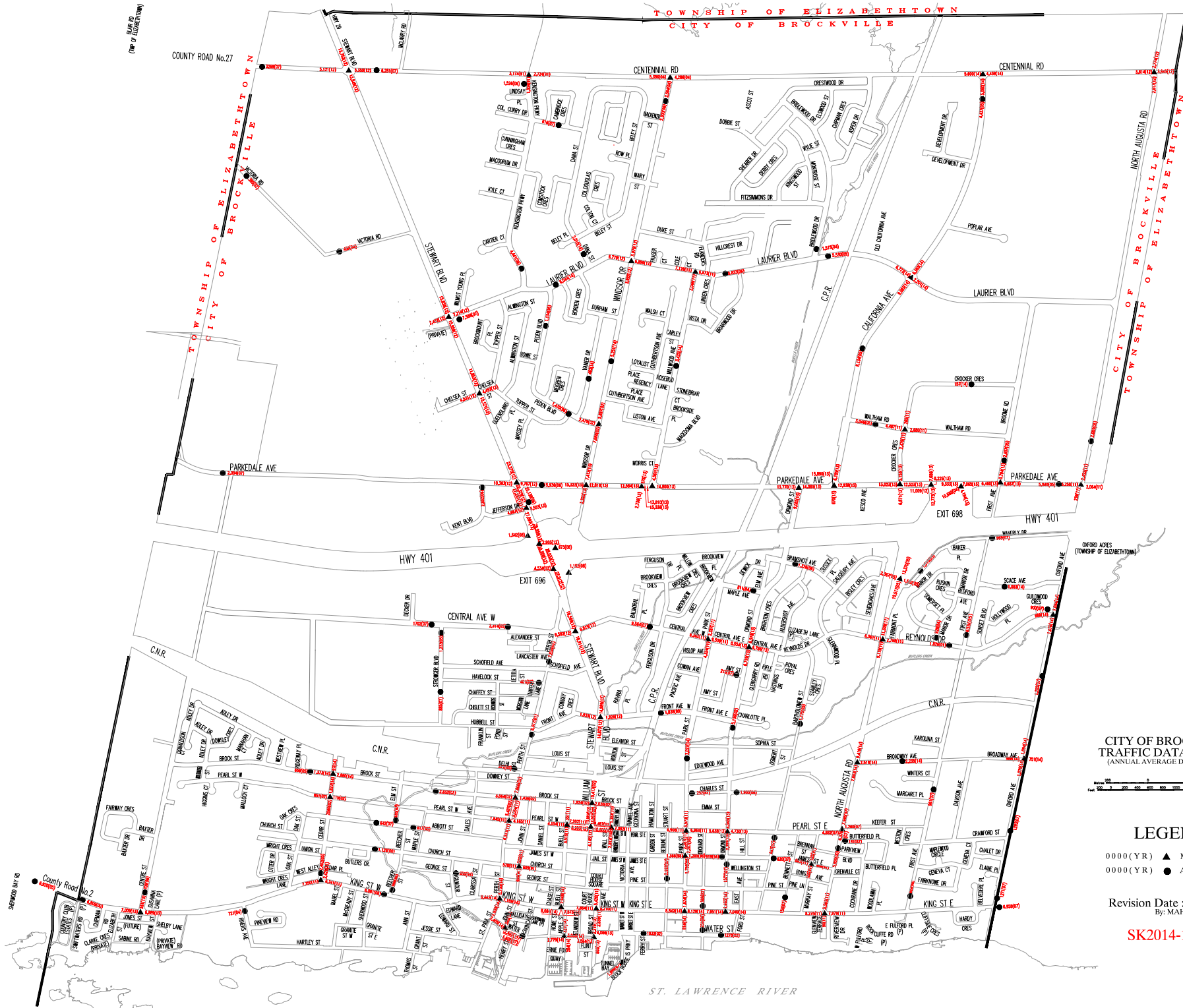
Background Traffic Growth Analysis - AM Peak

Highway 2, east of Oxford Ave

	Year	Number of Years	EB Volumes	Annual TMC Growth (%)
Historical Volumes	2013	0	6,900	
	2015	2	5,590	
	2017	4	5,780	
	2019	6	6,900	
	2023	10	6,314	
	Average		6,297	
Projection	2019	6	765	
	2022	9	792	1%

Historical EB Volumes Growth Trend





CITY OF BROCKVILLE
TRAFFIC DATA - A.A.D.T.
(ANNUAL AVERAGE DAILY TRAFFIC)

Scale: 0 200 400 600 800 1000 1200 1400 1600 1800 2000 Feet

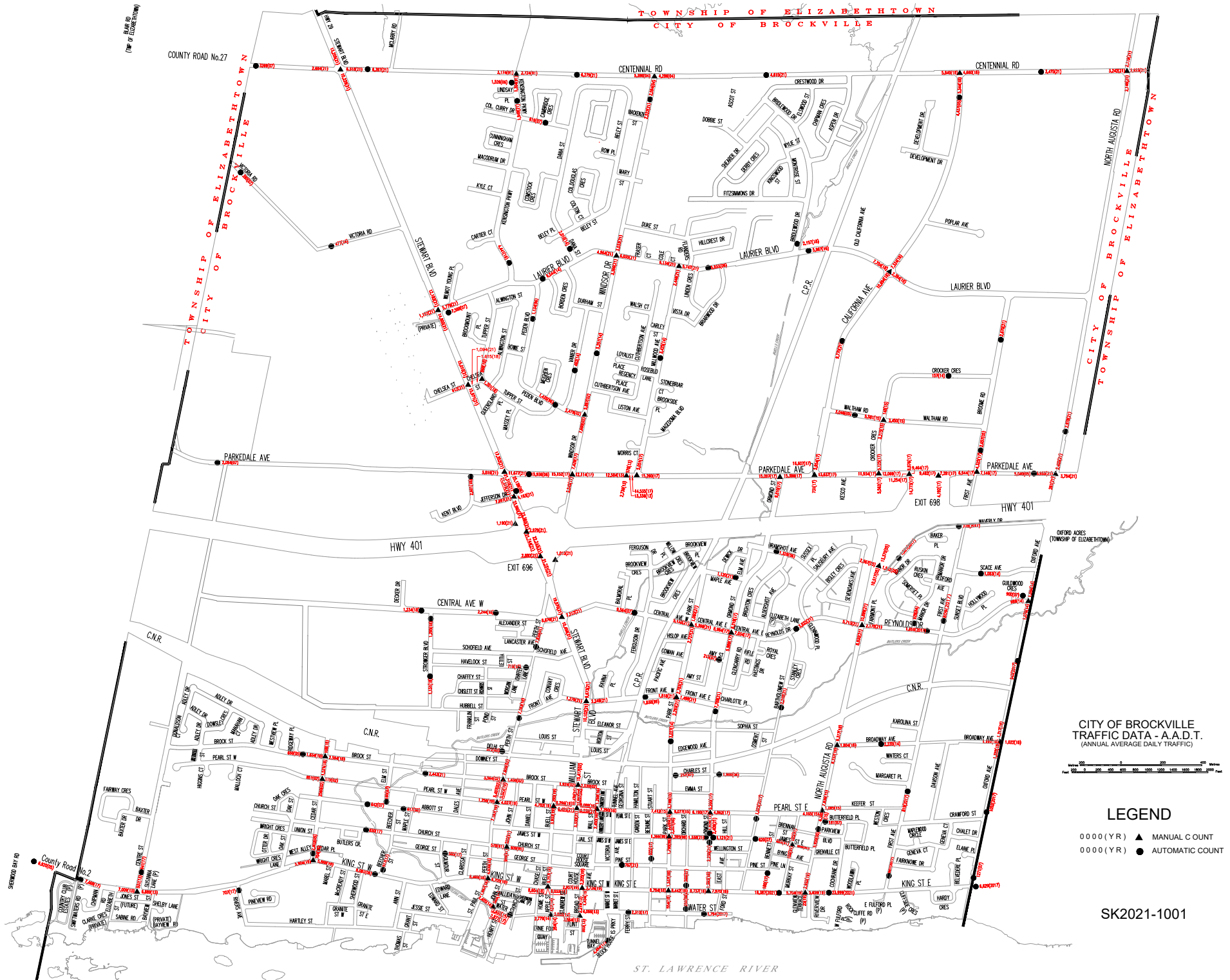
LEGEND

- 0000(YR) ▲ MANUAL COUNT
- 0000(YR) ● AUTOMATIC COUNT

Revision Date : 2014 08 28
By: MAH

SK2014-1001

TOWNSHIP OF ELIZABETHTOWN
CITY OF BROCKVILLE



CITY OF BROCKVILLE
TRAFFIC DATA - A.A.D.T.
(ANNUAL AVERAGE DAILY TRAFFIC)

Scale: 0 200 400 600 800 1000 1200 1400 1600 1800 2000 Feet

LEGEND

- 0000(YR) ▲ MANUAL COUNT
- 0000(YR) ● AUTOMATIC COUNT

SK2021-1001

Appendix F – Future Background Synchro Reports

HCM Unsignalized Intersection Capacity Analysis

1: Oxford Avenue & Broadway Avenue/Site Access #2

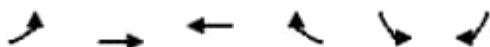
BCC_FB_AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	74	29	0	6	5	87	63	8	14	37	4
Future Volume (Veh/h)	3	74	29	0	6	5	87	63	8	14	37	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	4	101	40	0	8	7	119	86	11	19	51	5
Pedestrians								4			1	
Lane Width (m)								4.2			4.2	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	433	427	58	516	424	93	56			97		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	433	427	58	516	424	93	56			97		
tC, single (s)	7.4	6.5	6.3	7.1	7.5	7.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.4	3.5	4.9	4.2	2.2			2.2		
p0 queue free %	99	79	96	100	98	99	92			99		
cM capacity (veh/h)	437	477	971	351	364	751	1536			1509		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	145	15	216	75								
Volume Left	4	0	119	19								
Volume Right	40	7	11	5								
cSH	553	480	1536	1509								
Volume to Capacity	0.26	0.03	0.08	0.01								
Queue Length 95th (m)	7.9	0.7	1.9	0.3								
Control Delay (s/veh)	13.8	12.7	4.4	2.0								
Lane LOS	B	B	A	A								
Approach Delay (s/veh)	13.8	12.7	4.4	2.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			7.3									
Intersection Capacity Utilization			30.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

2: County Road 2 & Oxford Avenue

BCC_FB_AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	122	10	216	60	5
Future Volume (Veh/h)	23	122	10	216	60	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	28	151	12	267	74	6
Pedestrians		3				
Lane Width (m)		3.7				
Walking Speed (m/s)		1.1				
Percent Blockage		0				
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	279				353	149
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	279				353	149
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	98				88	99
cM capacity (veh/h)	1295				621	901
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	179	279	80			
Volume Left	28	0	74			
Volume Right	0	267	6			
cSH	1295	1700	636			
Volume to Capacity	0.02	0.16	0.13			
Queue Length 95th (m)	0.5	0.0	3.3			
Control Delay (s/veh)	1.4	0.0	11.5			
Lane LOS	A		B			
Approach Delay (s/veh)	1.4	0.0	11.5			
Approach LOS			B			
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			36.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Oxford Avenue & Crawford Street/Site Access #1

BCC_FB_AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	2	18	0	1	4	84	154	0	2	59	1
Future Volume (Veh/h)	2	2	18	0	1	4	84	154	0	2	59	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	2	2	22	0	1	5	105	192	0	2	74	1
Pedestrians	4			1						2		
Lane Width (m)	4.1			4.5						4.5		
Walking Speed (m/s)	1.1			1.1						1.1		
Percent Blockage	0			0						0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	492	486	79	505	486	195	79				193	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	492	486	79	505	486	195	79				193	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	98	100	100	99	93				100	
cM capacity (veh/h)	455	448	983	438	447	848	1506				1391	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	26	6	297	77								
Volume Left	2	0	105	2								
Volume Right	22	5	0	1								
cSH	832	738	1506	1391								
Volume to Capacity	0.03	0.01	0.07	0.00								
Queue Length 95th (m)	0.7	0.2	1.7	0.0								
Control Delay (s/veh)	9.5	9.9	3.1	0.2								
Lane LOS	A	A	A	A								
Approach Delay (s/veh)	9.5	9.9	3.1	0.2								
Approach LOS	A	A										
Intersection Summary												
Average Delay	3.0											
Intersection Capacity Utilization	30.1%			ICU Level of Service					A			
Analysis Period (min)	15											

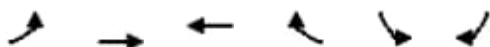
HCM Unsignalized Intersection Capacity Analysis 1: Oxford Avenue & Broadway Avenue/Site Access #2

BCC_FB_PM

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	3	7	20	12	51	14	25	37	1	0	26	8	
Future Volume (Veh/h)	3	7	20	12	51	14	25	37	1	0	26	8	
Sign Control	Stop				Stop				Free				
Grade	0%				0%				0%				
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
Hourly flow rate (vph)	5	12	33	20	85	23	42	62	2	0	43	13	
Pedestrians								2					2
Lane Width (m)								4.2					4.2
Walking Speed (m/s)								1.1					1.1
Percent Blockage								0					0
Right turn flare (veh)													
Median type								None					None
Median storage veh													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	264	198	52	238	203	65	56				64		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	264	198	52	238	203	65	56				64		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1		
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2		
p0 queue free %	99	98	97	97	87	98	97				100		
cM capacity (veh/h)	598	683	1020	673	675	1002	1562				1538		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	50	128	106	56									
Volume Left	5	20	42	0									
Volume Right	33	23	2	13									
cSH	858	716	1562	1538									
Volume to Capacity	0.06	0.18	0.03	0.00									
Queue Length 95th (m)	1.4	4.9	0.6	0.0									
Control Delay (s/veh)	9.5	11.1	3.0	0.0									
Lane LOS	A	B	A										
Approach Delay (s/veh)	9.5	11.1	3.0	0.0									
Approach LOS	A	B											
Intersection Summary													
Average Delay			6.5										
Intersection Capacity Utilization			23.7%		ICU Level of Service				A				
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis 2: County Road 2 & Oxford Avenue

BCC_FB_PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	197	235	47	52	16
Future Volume (Veh/h)	13	197	235	47	52	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	15	232	276	55	61	19
Pedestrians		3	1			
Lane Width (m)		3.7	4.1			
Walking Speed (m/s)		1.1	1.1			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	331				567	307
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	331				567	307
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				87	97
cM capacity (veh/h)	1240				479	736
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	247	331	80			
Volume Left	15	0	61			
Volume Right	0	55	19			
cSH	1240	1700	522			
Volume to Capacity	0.01	0.19	0.15			
Queue Length 95th (m)	0.3	0.0	4.1			
Control Delay (s/veh)	0.6	0.0	13.1			
Lane LOS	A		B			
Approach Delay (s/veh)	0.6	0.0	13.1			
Approach LOS			B			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			32.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Oxford Avenue & Crawford Street/Site Access #1

BCC_FB_PM

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	5	4	17	0	2	3	19	56	1	1	52	7	
Future Volume (Veh/h)	5	4	17	0	2	3	19	56	1	1	52	7	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
Hourly flow rate (vph)	6	5	20	0	2	4	23	67	1	1	63	8	
Pedestrians					3								4
Lane Width (m)					4.5								4.5
Walking Speed (m/s)					1.1								1.1
Percent Blockage					0								0
Right turn flare (veh)													
Median type							None						None
Median storage veh													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	192	186	67	208	190	75	71				71		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	192	186	67	208	190	75	71				71		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.2				4.1		
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3				2.2		
p0 queue free %	99	99	98	100	100	100	98				100		
cM capacity (veh/h)	753	698	1002	717	695	984	1504				1537		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	31	6	91	72									
Volume Left	6	0	23	1									
Volume Right	20	4	1	8									
cSH	884	864	1504	1537									
Volume to Capacity	0.04	0.01	0.02	0.00									
Queue Length 95th (m)	0.8	0.2	0.4	0.0									
Control Delay (s/veh)	9.2	9.2	2.0	0.1									
Lane LOS	A	A	A	A									
Approach Delay (s/veh)	9.2	9.2	2.0	0.1									
Approach LOS	A	A											
Intersection Summary													
Average Delay				2.6									
Intersection Capacity Utilization				23.6%	ICU Level of Service				A				
Analysis Period (min)				15									

Appendix G – Future Total Synchro Reports

Type here

HCM Unsignalized Intersection Capacity Analysis

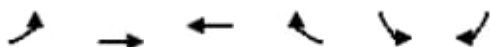
1: Oxford Avenue & Broadway Avenue/Site Access #2

BCC_FT_AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	96	41	0	9	8	89	63	8	22	37	4
Future Volume (Veh/h)	3	96	41	0	9	8	89	63	8	22	37	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	4	132	56	0	12	11	122	86	11	30	51	5
Pedestrians								4			1	
Lane Width (m)								4.2			4.2	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	467	455	58	575	452	93	56			97		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467	455	58	575	452	93	56			97		
tC, single (s)	7.4	6.5	6.3	7.1	7.5	7.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.4	3.5	4.9	4.2	2.2			2.2		
p0 queue free %	99	71	94	100	97	99	92			98		
cM capacity (veh/h)	405	455	971	290	346	751	1536			1509		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	192	23	219	86								
Volume Left	4	0	122	30								
Volume Right	56	11	11	5								
cSH	537	467	1536	1509								
Volume to Capacity	0.36	0.05	0.08	0.02								
Queue Length 95th (m)	12.2	1.2	2.0	0.5								
Control Delay (s/veh)	15.4	13.1	4.5	2.7								
Lane LOS	C	B	A	A								
Approach Delay (s/veh)	15.4	13.1	4.5	2.7								
Approach LOS	C	B										
Intersection Summary												
Average Delay			8.6									
Intersection Capacity Utilization			31.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 2: County Road 2 & Oxford Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	122	10	219	62	6
Future Volume (Veh/h)	25	122	10	219	62	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	31	151	12	270	77	7
Pedestrians		3				
Lane Width (m)		3.7				
Walking Speed (m/s)		1.1				
Percent Blockage		0				
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	282				360	150
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282				360	150
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	98				87	99
cM capacity (veh/h)	1292				614	899
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	182	282	84			
Volume Left	31	0	77			
Volume Right	0	270	7			
cSH	1292	1700	630			
Volume to Capacity	0.02	0.17	0.13			
Queue Length 95th (m)	0.6	0.0	3.5			
Control Delay (s/veh)	1.5	0.0	11.6			
Lane LOS	A		B			
Approach Delay (s/veh)	1.5	0.0	11.6			
Approach LOS			B			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			36.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Oxford Avenue & Crawford Street/Site Access #1

BCC_FT_AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	5	18	3	2	6	84	154	4	14	59	1
Future Volume (Veh/h)	2	5	18	3	2	6	84	154	4	14	59	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	2	6	22	4	2	8	105	192	5	18	74	1
Pedestrians	4			1						2		
Lane Width (m)	4.1			4.5						4.5		
Walking Speed (m/s)	1.1			1.1						1.1		
Percent Blockage	0			0						0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	530	523	79	541	521	198	79				198	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	530	523	79	541	521	198	79				198	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	99	98	99	100	99	93				99	
cM capacity (veh/h)	424	422	983	408	423	846	1506				1385	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	30	14	302	93								
Volume Left	2	4	105	18								
Volume Right	22	8	5	1								
cSH	726	583	1506	1385								
Volume to Capacity	0.04	0.02	0.07	0.01								
Queue Length 95th (m)	1.0	0.6	1.7	0.3								
Control Delay (s/veh)	10.2	11.3	3.0	1.6								
Lane LOS	B	B	A	A								
Approach Delay (s/veh)	10.2	11.3	3.0	1.6								
Approach LOS	B	B										
Intersection Summary												
Average Delay	3.5											
Intersection Capacity Utilization	30.3%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

1: Oxford Avenue & Broadway Avenue/Site Access #2

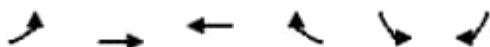
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	10	22	12	63	20	31	37	1	1	26	8
Future Volume (Veh/h)	3	10	22	12	63	20	31	37	1	1	26	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Hourly flow rate (vph)	5	17	37	20	105	33	52	62	2	2	43	13
Pedestrians								2			2	
Lane Width (m)								4.2			4.2	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	308	222	52	268	227	65	56			64		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	308	222	52	268	227	65	56			64		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	97	96	97	84	97	97			100		
cM capacity (veh/h)	534	657	1020	632	649	1002	1562			1538		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	59	158	116	58								
Volume Left	5	20	52	2								
Volume Right	37	33	2	13								
cSH	825	698	1562	1538								
Volume to Capacity	0.07	0.23	0.03	0.00								
Queue Length 95th (m)	1.8	6.6	0.8	0.0								
Control Delay (s/veh)	9.7	11.7	3.5	0.3								
Lane LOS	A	B	A	A								
Approach Delay (s/veh)	9.7	11.7	3.5	0.3								
Approach LOS	A	B										
Intersection Summary												
Average Delay			7.2									
Intersection Capacity Utilization			25.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

2: County Road 2 & Oxford Avenue

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	197	235	49	56	18
Future Volume (Veh/h)	14	197	235	49	56	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	16	232	276	58	66	21
Pedestrians		3	1			
Lane Width (m)		3.7	4.1			
Walking Speed (m/s)		1.1	1.1			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	334				570	308
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	334				570	308
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				86	97
cM capacity (veh/h)	1237				476	735
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	248	334	87			
Volume Left	16	0	66			
Volume Right	0	58	21			
cSH	1237	1700	520			
Volume to Capacity	0.01	0.20	0.17			
Queue Length 95th (m)	0.3	0.0	4.5			
Control Delay (s/veh)	0.6	0.0	13.3			
Lane LOS	A		B			
Approach Delay (s/veh)	0.6	0.0	13.3			
Approach LOS			B			
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			33.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 3: Oxford Avenue & Crawford Street/Site Access #1

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	5	6	17	5	3	9	19	56	3	3	52	7	
Future Volume (Veh/h)	5	6	17	5	3	9	19	56	3	3	52	7	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
Hourly flow rate (vph)	6	7	20	6	4	11	23	67	4	4	63	8	
Pedestrians					3								4
Lane Width (m)					4.5								4.5
Walking Speed (m/s)					1.1								1.1
Percent Blockage					0								0
Right turn flare (veh)													
Median type								None					None
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	207	195	67	217	197	76	71				74		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	207	195	67	217	197	76	71				74		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.2				4.1		
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3				2.2		
p0 queue free %	99	99	98	99	99	99	98				100		
cM capacity (veh/h)	728	689	1002	705	687	983	1504				1533		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	33	21	94	75									
Volume Left	6	6	23	4									
Volume Right	20	11	4	8									
cSH	860	823	1504	1533									
Volume to Capacity	0.04	0.03	0.02	0.00									
Queue Length 95th (m)	0.9	0.6	0.4	0.1									
Control Delay (s/veh)	9.4	9.5	1.9	0.4									
Lane LOS	A	A	A	A									
Approach Delay (s/veh)	9.4	9.5	1.9	0.4									
Approach LOS	A	A											
Intersection Summary													
Average Delay			3.2										
Intersection Capacity Utilization			22.3%	ICU Level of Service				A					
Analysis Period (min)			15										

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