

6728 SIXTH LINE - DERRY GREEN PROPOSED INDUSTRIAL DEVELOPMENT

Updated Traffic Impact Study and Parking Justification
Milton, Ontario

Prepared For: Anatolia Investments Corp.

December 2023



**MOVEMENT
IN URBAN
ENVIRONMENTS**

BAGROUP.COM

© BA Consulting Group Ltd.
95 St. Clair Avenue West, Suite 1000
Toronto, ON M4V 1N6
www.bagroup.com

**Responses to Town of Milton and Halton Region Comments – Submission 1
Official Plan Amendment / Zoning By-law Amendment / Draft Plan of Subdivision
Parts of Lots 10, Concession 6, New Survey (Geographic Township of Trafalgar)
6728 Sixth Line, Town of Milton**

Responses to June 19, 2023 Town of Milton comments

Development Services – Development Review

Comment 2b: A Peer Review of the Transportation Impact Study will be required. Upon submission of the Draft Plan of Subdivision Application, staff will provide the applicant with an invoice for the peer review.

Response: Noted.

Comment 2c: Confirm if the development will be phased. If so, provide a phasing plan.

Response: From a construction perspective, Phase 1 will be built in 2025 and Phase 2 will be built in 2026. As there is only one year between Phase 1 and Phase 2, the traffic analysis was undertaken for full build-out only.

Comment 2d: Comments have been provided from Halton Region and Town Transportation staff on the location of the Clark Boulevard Extension. The comments should be substantially addressed prior to the submission of the Draft Plan of Subdivision application.

Response: Noted. Comments related to Clark Boulevard are addressed further in this letter.

Comment 2e: Sixth line is identified as a minor arterial road in the Town of Milton Official Plan and a road widening will be required. Additionally, the Derry Green Secondary Plan includes the following policy: A portion of Sixth Line south of Derry Road is within the Regional Storm flood plain associated with the Sixteen Mile Creek and is subject to seasonal flooding. As a result, Sixth Line may have to be diverted in order to move it outside of the Regional Storm flood line. No development shall occur on adjacent lands until flood free access is available and has received all required approvals, including but not limited to the approval of an Environmental Assessment. (Section C.9.4.1.2). Staff have confirmed with Conservation Halton staff that Building 3 does not have flood free access to 6th line. Flood free access must be provided. Additional comments on the Sixth Line access, widenings, and road widening will be provided.

Response: Comments related to Sixth Line are addressed further in this letter.

Comment 2f: Further discussions regarding the Clark Boulevard Extension and Sixth Line will be required.

Response: Noted. The developer will participate in discussions with relevant parties, including Region and Town staff, regarding Clark Boulevard and Sixth Line as they pertain to the development.

Infrastructure & Traffic – Development Services

Comment: Please note detailed comments will be provided following the subsequent site plan application(s), and the following will be required:

- Updates to the TIS (if major changes to the site concept are proposed)
- Traffic Signage and Pavement Marking Plan
- AutoTURN / Swept Path analysis.

Response: Updates to the TIS, a Traffic Signage and Pavement marking Plan and the AutoTURN/ Swept Path analysis, have been included in BA Group's Updated December 2023 Traffic Impact Study and Parking Justification.

Comment: Please note that for the swept path analysis, the Town highly recommends one be submitted prior to Site Plan Application, in order to confirm access/site circulation requirements. See below for more detail:

- As part of a complete application, it must be ensured that truck traffic (garbage/loading) can enter and exit the site in a forward motion and access to the waste storage and loading areas are functional. On separate plans, illustrate truck turning movements with one continuous path with AutoTURN and insert the design vehicles on the plan. The site must be able to accommodate the largest design vehicles which will be accessing the property. Please also confirm via Auto-Turn (PTAC design vehicle) that ramps and underground parking stalls located near corners / walls and / or at the end of aisles are functional. Please be advised that reversing of vehicles onto/from the road allowance is not permitted. An access will not be granted unless the Owner/Applicant can demonstrate (via AutoTURN sweptpath analysis) that the design vehicles can enter the site in a forward manner, turn around on private property, and exit the site in a forward manner. Furthermore, the site access(es) must conform to Town of Milton Engineering Standard No. E-43, for heavy industrial land uses.

Response: Noted. The swept path analysis has been undertaken and is included in the appendices of BA Group's Updated December 2023 Traffic Impact Study and Parking Justification.

Comment: Additional comments will be provided on the ultimate right-of-way width requirement for Sixth Line. The Owner will be required to dedicate lands sufficient to provide the required widening.

Response: Comments related to Sixth Line are addressed further in this letter.

Comment: It is noted in the report that the consultant recommends the future intersection of Clark Boulevard with Derry Road be relocated 55-meters east of where it is currently proposed.

It is the Town's opinion that the Clark Boulevard intersection be located as per the Derry Green Secondary Plan. However, please be advised this needs to be further coordinated/discussed with Halton Region.

Response:

Based upon further discussions and justification, the Town is now supportive (see correspondence in **Appendix B** of BA Group's Updated December 2023 Traffic Impact Study and Parking Justification) of the site's proposed location for the intersection of Clark Boulevard at Derry Road that is 55 metres east of the location proposed within the Derry Green Secondary Plan.

Zoning – Development Services

Comment: Note: Any proposed second floor area and mezzanine areas are subject to parking supply requirements.

Response: Parking supply calculations have been updated within BA Group's Updated December 2023 Traffic Impact Study and Parking Justification as per Zoning By-law 016-2014 (HUSP Urban Area – June 2019).

Comment: The proposed factor should be expressed to a whole number of space rather than a fraction of a space (i.e. 1 space / 200 sq. m.) to be consistent with the parking ratio format in the by-law.

Response: BA Group's Updated December 2023 Traffic Impact Study and Parking Justification has been revised to describe the parking as 1 space/ "x" square metres.

Parks and Facility Planning – Community Services

Comment: We appreciate that the Applicant and their consultant team have referenced this future public trail (a label was included on the Composite Plan circulated). As depicted in **Schedule C-9-A Derry Green Corporate Business Park Structure Plan**, included in By-Law 088- Page 13 2015, connectivity of the trail from Fifth Line comprises three (3) potential links to Sixth Line, including one connection generally depicted in the area of proposed Block 6 (Natural Heritage System, NHS).

Response: Noted.

Comment: The Town standard for the existing trail is as follows: 3.0 m wide asphalt multi-use pathway with lighting, grading to meet AODA compliance, designed for year-round use and connectivity to the overall active transportation network of the adjacent road network, Town parks and open space areas. Tie-ins to a piped storm system and/or minimum 2% overland flow with an outlet for stormwater management (SWM) and electrical servicing to construct the trail to Town standard may be applicable to development applications. Since the MPT is part of an overall network, application submissions are to include contextual design and layout information around the trail; e.g. development plans of adjacent properties, design or as-built information of abutting roads etc.

Response: Noted.

Comment a: Proposed locations within the subject lands

Community Services will be carefully reviewing any subsequent drawing and report submissions for the subject property to ensure the Town's ability to design and construct the MPT will not be hindered or negatively impacted by the proposed development. Acknowledgment of the MPT, including information regarding how it is being addressed/considered, should be included in any relevant report submissions; e.g. the updated Constraints & Opportunities Map, the Functional Servicing & Stormwater Management Report (site grading, stormwater design), Planning Justification Report, Urban Design Brief (community plan), Traffic Impact Study and Parking Justification, as well as the forthcoming, detailed subdivision design drawings. Further, subsequent submittals must, where relevant, illustrate the opportunity(ies) that will be available with the proposed development to implement the MPT with the proposed design of the subject blocks; e.g. illustrate the layout(s) of the MPT within Blocks 5 and 6, with consideration for the NHS/stormwater and 'pipeline easement' functions necessary within those blocks. On the current draft plan, Street 1/Clark Blvd is shown solely within the limits of the subject property; however, in order to confirm that connections from the MPT to the easterly and westerly boulevards of Street 1 are feasible (to Town standard), information on the road design extending south into the limits of the gas corridor and the adjacent lands will be needed. Also recognizing that a crossing of Street 1 for trail users may be required by Town Traffic, details regarding the desired location(s) for that crossing should be included.

Response: Noted.

Comment: If the intent is to phase this development, please provide a phasing plan with any subsequent submission for the plan of subdivision or future site plan applications. It will be used for the purposes of informing the required PIL of land conveyance fees, as outlined in the preceding section above. Note if any access routes/roads/SWM ponds are to remain in private ownership, the building phase that is to include construction of the said access routes/roads/SWM ponds is to include these lands.

Response:

From a construction perspective, Phase 1 will be built in 2025 and Phase 2 will be built in 2026.

Responses to June 15, 2023 Town of Milton Development Engineering comments

Comment 1a: Development Engineering will require a 0.3m reserve, the entire width of Clarke Blvd at the south end of the development.

Response: Noted.

Comment 1b: Development Engineering will require a 0.3m reserve, along the frontage of Blocks 1 and 2 on Clarke Blvd and along the frontage of Block 3 on Sixth Line.

Response: Noted.

Comment 1c: Based on the Town of Milton Official Plan a road widening will be requirement along Sixth Line in order to provide a 26.0m road allowance. The applicant is to confirm the widening requirements on the west side of Sixth Line, as the constraints on the east side of the road may require the widening to be entirely (roughly 6m) on the west side, adjacent to Block 3.

Response: The development proposal supports the provision of a minimum right-of-way of 30.0 metres along Sixth Line as per the Secondary Plan and Town Staff comments. The entirety of the widening can be accommodated on the west side of the road.

Comment 1d: Based on the information provided with the submission, the proposed access onto Sixth Line will be used by commercial and large transportation vehicles. An assessment of Sixth Line including, but not limited to, structural integrity, truck turning movements, etc. will be required. Reconstruction, road improvements and urbanization of Sixth Line adjacent to the development will be required. Interim and ultimate conditions are to be considered. Depending on the widening requirements, a modified road cross section may be required.

Response: The truck turning movements included within BA Group's Updated December 2023 Traffic Impact Study and Parking Justification consider the existing (interim) design and conditions on Sixth Line. As the future design of Sixth Line is unknown at this time, truck turning movements were only undertaken for the existing (interim conditions). It is noted that a consultant has been retained to evaluate the structural integrity of Sixth Line. The results of the evaluation will be provided to the Town with the next submission.

Comment 1e: Coordination with the Landowner to the south is required for the construction of Clarke Boulevard, through the Union Gas corridor. The first landowner to construct will be responsible for the construction of this portion of the road to the adjacent land.

Response: Noted.

Comment 1f: Development Engineering requests additional information with regards to the proposed cul-de-sac shown on the Conceptual Site Plan at the south end of Clark Boulevard.

Response: The Town of Milton Standard has been used to inform the functional design of the proposed cul-de-sac at the south end of Clark Boulevard.

Comment 1g: Interim conditions may be required for Clark Blvd, depending on adjacent landowner's schedule.

Response: Noted

Comment 1h: Development Engineering defers comments regarding the intersection(s) of Clark Boulevard and Derry Road to the Region of Halton.

Response: Noted.

Comment 1i: Region of Halton to confirm road widening(s) and daylighting requirements along Derry Road and the requirement of a 0.3m reserve block along the Derry Road frontage.

Response: Noted.

Comment 3h: The FSR-SWM Report notes the following:

- i. "The EA concluded that the current 2-lane rural cross section ROW is to be widened to an urban 4-lane section within a 37.5 m ROW. This included a proposed realignment of the roadway and

centerline....In terms of profile, the existing road is proposed to be raised between 0.5 m to 1.5 m. It should be noted that Halton Region has indicated that consideration of a future 6 lane configuration of Fifth Line within a future 47.0 m road right-of-way, which is to be considered during the design and development of the Site. Through discussions with the Town, detail design of Fifth Line is anticipated to commence in 2022, with construction anticipated to start by 2024/2025...It is anticipated that Fifth Line reconstruction will be completed prior to the construction of Clark Boulevard, therefore no interim grade transition has been accounted for. This will be re-evaluated at the time of detailed design.”

Development Engineering notes that should Fifth Line not be reconstructed prior to the construction of Clark Boulevard that the interim road design drawings will be included at the time of detailed design/engineering submission.

Response: Noted. The proposed development includes protection for a future 47.0 metre right-of-way along Fifth Line in order to accommodate a future potential six-lane Regional Road.

Responses to June 13, 2023 Halton Region comments

Transportation

Comment : Halton Region’s Transportation Master Plan – The Road to Change (2011) identified the need for additional roadway network capacity to support new growth in the Town of Halton Hills and Town of Milton. A new 6 lane corridor, known as 5 ½ Line, is shown in the Region’s TMP between Fifth Line and Sixth Line and referred to in the policies of the Derry Green Corporate Business Park Secondary Plan (C.9.4.3.1). This corridor will provide additional north-south capacity between Britannia Road and Steeles Avenue, including a proposed interchange with Highway 401. 5 ½ Line is currently programmed by the Region for 2031. In consideration of the Council approved policy framework noted above, and in an effort to ensure the proposed development remains viable, the development proposal must consider that the future north-south roadway (Clark Boulevard) may ultimately be identified as a six-lane Regional Road, requiring a 47 metre right-of-way.

Response: The proposed development includes protection for a future 47.0 metre right-of-way along Clark Boulevard in order to accommodate a future potential six-lane Regional Road (5 ½ Line).

Comment: The development proposes a right-in/right-out (RI/RO) access to Derry Road for Building 3 on the easterly portion of the property (fronting Sixth Line). Per Halton Region’s preconsultation comments and TIS Terms of Reference comments, Halton Region Access By-law (NO.32-17). Section 6.1 (a) states that “access to a Regional Road from private property shall be permitted only where such access is necessary because access to a local road is not feasible.” It is noted that access to Derry Road could be provided solely via Sixth Line for this property, the site traffic volumes assigned to and from Building 3 do not indicate the need for an additional access to Derry Road, and the site frontage along Derry Road for this portion of the property would not allow for the minimum spacing requirement of 115 metres between the proposed RI/RO access and Sixth Line to be satisfied (per Halton Region’s Access Management Guideline). Therefore, Halton Region will not approve the proposed RI/RO access to Derry Road unless the TIS can demonstrate that access to Derry Road is absolutely necessary (i.e. from a traffic operations, safety and circulation perspective).

Halton Region must maintain priority and consideration for access requirements for adjacent properties on both the north and south side of Derry Road in the area, in coordination with the approved Derry Green Secondary Plan intersection locations.

If a RI/RO access to Derry Road is ultimately permitted, the RI/RO restriction must be enforced by a raised centre median on Derry Road (i.e. an extension of the raised intersection centre median at the west leg of Derry Road and Sixth Line) as opposed to the illustrated pork-chop island.

Response:

The previously proposed right-in/right-out along Derry Road has been removed from the development proposal. The revised plans for Building 3 only include a full movement access along Sixth Line.

Comment: Per Halton Region's pre-consultation comments, TIS Terms of Reference comments and subsequent discussions with the project team, the future intersection of Derry Road and Clark Boulevard must be located so that the future Clark Boulevard roadway alignment is in line with the easterly limit of the 11319 Derry Road property on the north side of Derry Road. This would require that the intersection be shifted to the west approximately 55 metres from where currently shown. This shift would meet the intent of the Derry Green Secondary Plan and Halton Region's overall corridor access plan. The TIS provides justification for the proposed intersection location of approximately 55 metres east of the location per the Derry Green Secondary Plan. Given the implications of this intersection location from a Transportation Planning perspective (especially when considering the future potential 5 ½ Line alignment as noted earlier), further review and discussion of the proposed intersection location and supporting justification will be required between the applicant's project team and all necessary stakeholders at Halton Region prior to the formal application submission.

Response: Based upon further discussions and justification, the Town is now supportive (see correspondence in **Appendix B** of BA Group's Updated December 2023 Traffic Impact Study and Parking Justification) of the site's proposed location for the intersection of Clark Boulevard at Derry Road, 55 metres east of the location included within the Derry Green Secondary Plan.

Comment: Include James Snow Parkway in the Existing Area Road Network description (Section 2.1.1).

Response: Noted and updated in BA Group's Updated December 2023 Traffic Impact Study and Parking Justification.

Comment: Update Figure 5 to identify the currently active Britannia Road improvement to a six-lane roadway instead of a four-lane roadway.

Response: Noted and updated in BA Group's Updated December 2023 Traffic Impact Study and Parking Justification.

Comment: Update Figure 9 to illustrate the existing multi-use path on the west side of James Snow Parkway in the study area.

Response: Noted and updated in BA Group's Updated December 2023 Traffic Impact Study and Parking Justification.

Comment: If the proposed development is to be built out in phases, then consider evaluating the horizon year associated with the build-out of each major phase as to quantify impacts associated with interim phases compared to impacts associated with the entire development.

Response: The development will not be phased.

Comment: Reference Halton Region's 2023 Budget and Business Plan as the source for the timing of future Regional roadway improvements under Section 2.1.2.1.

Response: Noted and updated in BA Group's Updated December 2023 Traffic Impact Study and Parking Justification.

Comment: Update the anticipated start year of construction for the future James Snow Parkway widening to six lanes from 2023 to 2026 per Halton Region's 2023 Budget and Business Plan.

Response: Noted and updated in BA Group's Updated December 2023 Traffic Impact Study and Parking Justification.

Comment: Ensure that the latest development concept and trip assignment estimates for the background developments are accounted for under future background conditions.

Response:

This has been included and updated in BA Group's Updated December 2023 Traffic Impact Study and Parking Justification.

Comment: Ensure that background development traffic has not been assigned to "Regional Road to-Regional Road" movements on the road network (e.g. eastbound and westbound through movements on Derry Road at Fifth and Sixth Line, or all intersection movements at Derry Road and James Snow Parkway) when forecasting future background traffic volumes. Per Halton Region's TIS Terms of Reference comments, it can be assumed that the growth rates provided for these Regional corridors includes background development traffic. Thus, this traffic should not be double counted for these movements. Background development traffic must still be assigned to "Regional Road-to-Town Road" movements and vice versa (e.g. eastbound left-turn or southbound right-turn movement at Derry Road and Fifth Line).

Response: Noted.

Comment: Incorporate the following missing analysis components agreed upon during the Terms of Reference consultation:

- A comparison between minimum clear throat length requirements and provided clear throat length availability at the proposed RI/RO access to Derry Road.
- A comparison between minimum corner clearance requirements and provided corner clearance availability on Sixth Line between Derry Road and the proposed full-moves access to Sixth Line.
- A comparison of the trip generation forecasts between the proposed development and the subject property from the Derry Green Secondary Plan Transportation Study.

Response:

The previously proposed right-in/right-out along Derry Road has been removed from the development proposal. The revised plans only include a full movement access along Sixth Line.

A comparison between minimum corner clearance requirements and provided corner clearance availability on Sixth Line between Derry Road and the proposed full-moves access to Sixth Line has been included in BA Group's Updated December 2023 Traffic Impact Study and Parking Justification, in addition to a comparison of the trip generation forecasts between the proposed development and the site from the Derry Green Secondary Plan Transportation Study.

Comment: Provide more details for the proxy sites for the trip generation data to justify how these proxy sites are comparable to the proposed development.

Response:

BA Group's Updated December 2023 Traffic Impact Study and Parking Justification did not adopt proxy rates but used ITE rates (as per the initial report) and adopted ITE rates for heavy vehicle percentages in the updated analysis.

Comment: For consistency with the other traffic studies prepared in the area, consider using data from the Institute of Transportation Engineers (ITE) Trip Generation Manual for the heavy truck trip generation forecasts.

Response: Consideration for using data from the Institute of Transportation Engineers (ITE) Trip Generation Manual for the heavy truck trip generation forecasts has been included in BA Group's Updated December 2023 Traffic Impact Study and Parking Justification.

Comment: Append all supporting trip generation and distribution data to the TIS report.

Response: The Transportation Tomorrow Survey (TTS) data is provided in the appendices of BA Group's Updated December 2023 Traffic Impact Study and Parking Justification. There is no additional background data to include.

Comment: Bold or highlight all critical volume-to-capacity ratios and 95th percentile queue lengths listed in the traffic operations results tables. Critical volume-to-capacity ratios are those which exceed 0.85 for through movements or shared through/turning movements and 0.95 for exclusive turning movements. Critical 95th percentile queue lengths are those which exceed the available turning storage length.

Response: This has been addressed in BA Group's Updated December 2023 Traffic Impact Study and Parking Justification.

Comment: Under the sensitivity analysis section where the acceleration of the future Derry Road widening is discussed, acknowledge:

- the benefit of the Region's long-term plans as identified in the 2011-2031 Transportation Master Plan, namely the future 5 ½ Line corridor to connect Britannia Road and Steeles Avenue to Highway 401 and provide additional roadway network capacity. The exact location and configuration

will be confirmed through a future Municipal Class Environmental Assessment 8 (MCEA) Study which has not yet been initiated. However, this future corridor would improve connectivity to and from the study area and thus be expected to alleviate traffic volumes on the existing Derry Road corridor.

- that the Region will monitor the need and timing of all corridor level improvement through future updates to the Transportation Master Plan.

Response: BA Group's Updated December 2023 Traffic Impact Study and Parking Justification includes further information regarding the benefit of the Region's long-term plans as identified in the 2011-2031 Transportation Master Plan, namely the future 5 ½ Line corridor to connect Britannia Road and Steeles Avenue to Highway 401 and provide additional roadway network capacity.

Comment: Halton Region's Transportation Master Plan identified the need to widen Derry Road to six lanes from Tremaine Road to Highway 407. This improvement is currently scheduled to start construction in 2031. A right-of-way dedication will be required from this development. Depending on when the development is finalized, the land dedication will be required to satisfy the greatest dedication of the following listed below. Currently, a Municipal Class Environmental Assessment or Detail Design project has not been initiated. Thus, the Transportation Master Plan Right-of-way requirement currently applies.

Response: Noted.

Comment: Official Plan/Transportation Master Plan Right-of-Way Requirements:

- Any lands within 23.5m of the centreline of the original right-of-way of Derry Road (Regional Road 7) that are part of the subject property shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements.

Response: Noted.

Comment: Municipal Class Environmental Assessment Study/Environmental Study Report (Transportation Planning) Right-of-Way Requirements – Derry Road:

- Any additional lands that are part of the subject property and have been identified as required for the future widening of Derry Road (Regional Road 7) per a Municipal Class Environmental Assessment Study / Environmental Study Report shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements.

Response: Noted.

Comment: Detail Design Project (Engineering & Construction) Right-of-Way Requirements – Derry Road:

- Any additional lands that are part of the subject property and have been identified as required for the future widening of Derry Road (Regional Road 7) per a Detail Design Project shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements.

Response: Noted.

Comment: A daylight triangle measuring 15m along Derry Road and 15m along Sixth Line shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements.

Response: Noted.

Comment: A daylight triangle measuring 15m along Derry Road and 15m along the future north-south collector roadway (Clark Boulevard) shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements.

Response: Noted.

Comment: All daylighting triangles must reference the ultimate Derry Road right-of-way limit.

Response: Noted.

TABLE OF CONTENTS

	Executive Summary	1
1.0	INTRODUCTION	5
1.1	Development Proposal	5
1.1.1	Summary of Site Statistics	5
1.1.2	Site Access and Circulation	6
1.2	Study Scope	10
2.0	TRANSPORTATION CONTEXT	12
2.1	Area Road Network	12
2.1.1	Existing Area Road Network	12
2.1.2	Future Area Road Network	12
2.1.3	Development Proposal Road Network	13
2.1.4	Intersection of Clark Boulevard at Derry Road	14
2.2	Area Transit Network	22
2.3	Area Cycling and Pedestrian Network	22
3.0	VEHICLE PARKING CONSIDERATIONS	24
3.1	Comprehensive Zoning By-Law 016-2014	24
3.2	Proposed Parking Supply	24
3.2.1	Summary of Proposed Parking Supply	24
3.3	Justification for Proposed Parking Supply	25
3.3.1	Parking Demand Survey Data	25
3.4	Summary of Proposed Vehicle Parking Supply	26
3.4.1	Proposed Vehicle Parking Supply	26
3.4.2	Accessible Parking	27
4.0	BICYCLE PARKING CONSIDERATIONS	28
5.0	LOADING CONSIDERATIONS	29
6.0	TRANSPORTATION DEMAND MANAGEMENT PLAN	30
6.1	Overview	30
6.1.1	Vehicle Parking	30
6.1.2	Bicycle Parking Spaces	30
6.1.3	Carpool Program & Emergency Ride Home Program	30
6.1.4	Employee Information and Education Program	30
6.1.5	Employee Reward Program	30

6.1.6	Monitoring	30
6.2	TDM Plan Implementation.....	32
7.0	TRAFFIC VOLUME FORECASTING	33
7.1	Existing Traffic Conditions	33
7.2	Future Background Traffic Conditions.....	35
7.2.1	Background Growth Scenarios	35
7.2.2	General Corridor Growth.....	37
7.2.3	Background Developments.....	37
7.2.4	Total Background Growth Traffic Volumes	38
7.2.5	Future Background Traffic Volumes	44
7.3	Site Traffic	50
7.3.1	Existing Site Traffic	50
7.3.2	Total Site Trip Generation.....	50
7.3.3	Heavy Vehicle Percentages.....	51
7.3.4	Site Traffic Distribution	52
7.3.5	Site Traffic Volumes	53
7.4	Future Total Traffic Volumes	60
8.0	TRAFFIC OPERATIONS ANALYSIS	66
8.1	Analysis Methodology.....	66
8.2	Analysis Assumption and Parameters.....	66
8.3	Traffic Analysis Summary	67
8.3.1	2023 Existing Conditions	67
8.3.2	2027 Future Horizon	71
8.3.3	2032 Future Horizon	77
8.3.4	Sensitivity Analysis – Derry Road Expansion	83
8.3.5	Overall Traffic Analysis Summary.....	86
8.3.6	DERRY GREEN SECONDARY PLAN TRAFFIC VOLUME COMPARISON	87
9.0	SAFETY ANALYSIS	88
9.1	Sight Distance Assessment	88
9.1.1	Site Access at Sixth line.....	88
9.1.2	Sight Distance Summary	90
9.2	Queuing Assessment.....	90
10.0	CONCLUSIONS AND RECOMMENDATIONS	93
10.1	Recommendations	95



LIST OF TABLES

Table 1	Proposed Development Summary	6
Table 2	Zoning By-Law 06-2014: Minimum Parking Requirements	24
Table 3	Proposed Parking Supply	25
Table 4	Parking Demand Survey Data at Industrial Warehouses	26
Table 5	Proposed Parking Supply	26
Table 6	Accessible Parking.....	27
Table 7	Summary of Bicycle Parking.....	28
Table 8	Summary of Loading Spaces.....	29
Table 9	Recommended TDM Strategies.....	31
Table 10	Turning Movement Count Summary	33
Table 11	Future Background Growth Scenarios.....	36
Table 12	Area Background Developments	38
Table 13:	Vehicle Trip Generation Rate Data	50
Table 14	Total Site Vehicle Trip Generation	51
Table 15	Site Heavy Vehicle Percentage	51
Table 16	Site Traffic Distribution.....	52
Table 17	Site Vehicle Trip Summary	53
Table 18	Existing Sixth Line / Derry Road Capacity Analysis Summary	68
Table 19	Existing Fifth Line / Derry Road Capacity Analysis Summary	69
Table 20	Existing James Snow Parkway / Derry Road Capacity Analysis Summary	70
Table 21	2027 Sixth Line / Derry Road Capacity Analysis Summary.....	71
Table 22	2027 Fifth Line / Derry Road Capacity Analysis Summary.....	72
Table 23	2027 James Snow Parkway / Derry Road Capacity Analysis Summary	73
Table 24	2027 Clark Boulevard / Derry Road Capacity Analysis Summary	74
Table 25	2027 Fifth Line / Clark Boulevard Capacity Analysis Summary	75
Table 26	2027 Unsignalized Intersection Capacity Analysis Summary.....	76
Table 27	2032 Sixth Line / Derry Road Capacity Analysis Summary.....	77
Table 28	2032 Fifth Line / Derry Road Capacity Analysis Summary.....	78
Table 29	2032 James Snow Parkway / Derry Road Capacity Analysis Summary	79
Table 30	2032 Clark Boulevard / Derry Road Capacity Analysis Summary	80
Table 31	2032 Fifth Line / Clark Boulevard Capacity Analysis Summary	81



Table 32	2032 Unsignalized Intersection Capacity Analysis Summary.....	82
Table 33	2032 Sixth Line / Derry Road Capacity Analysis Summary – Derry Road Expansion Sensitivity	84
Table 34	2032 Fifth Line / Derry Road Capacity Analysis Summary – Derry Road Expansion Sensitivity	85
Table 35	2032 Clark Boulevard / Derry Road Capacity Analysis Summary – Derry Road Expansion Sensitivity	86
Table 36	Secondary Plan Comparison – Clark Boulevard / Derry Road.....	87
Table 37	Sight Distance (Site Access at Sixth Line).....	89
Table 38	Queueing Summary – Existing Conditions	90
Table 39	Queueing Summary – 2027 Future Conditions	91
Table 40	Queueing Summary – 2032 Future Conditions	92

LIST OF FIGURES

Figure 1:	Site Location	8
Figure 2:	Development Proposal.....	9
Figure 3:	Existing Area Road Network.....	16
Figure 4:	Existing Lane Configuration & Traffic Control.....	17
Figure 5:	Future Area Road Improvements.....	18
Figure 6:	Future Lane Configuration & Traffic Control (2027 Horizon without Clark Boulevard Extension)	19
Figure 7:	Future Lane Configuration & Traffic Control (2027 Horizon with Clark Boulevard Extension)	20
Figure 8:	Future Lane Configuration & Traffic Control (2032 Horizon)	21
Figure 9:	Area Cycling Network.....	23
Figure 10:	Existing Traffic Volumes	34
Figure 11:	Background Growth Traffic Allowances – Scenario 1 (2027)	39
Figure 12:	Background Growth Traffic Allowances – Scenario 2 (2027)	40
Figure 13:	Background Growth Traffic Allowances – Scenario 3 (2027)	41
Figure 14:	Background Growth Traffic Allowances – Scenario 4 (2032)	42
Figure 15:	Background Growth Traffic Allowances – Scenario 5 (2032)	43
Figure 16:	Future Background Traffic Volumes – Scenario 1 (2027).....	45
Figure 17:	Future Background Traffic Volumes – Scenario 2 (2027).....	46
Figure 18:	Future Background Traffic Volumes – Scenario 3 (2027).....	47



Figure 19:	Future Background Traffic Volumes – Scenario 4 (2032).....	48
Figure 20:	Future Background Traffic Volumes – Scenario 5 (2032).....	49
Figure 21:	Light Vehicle Site Traffic Volumes – Scenario 1	54
Figure 22:	Light Vehicle Site Traffic Volumes – Scenarios 2 through 5.....	55
Figure 23:	Heavy Vehicle Site Traffic Volumes – Scenario 1	56
Figure 24:	Heavy Vehicle Site Traffic Volumes – Scenarios 2 through 5	57
Figure 25:	Total Vehicle Site Traffic Volumes – Scenario 1.....	58
Figure 26:	Total Vehicle Site Traffic Volumes – Scenarios 2 through 5	59
Figure 27:	Future Total Traffic Volumes – Scenario 1 (2027).....	61
Figure 28:	Future Total Traffic Volumes – Scenario 2 (2027).....	62
Figure 29:	Future Total Traffic Volumes – Scenario 3 (2027).....	63
Figure 30:	Future Total Traffic Volumes – Scenario 4 (2032).....	64
Figure 31:	Future Total Traffic Volumes – Scenario 5 (2032).....	65

TABLE OF APPENDICES

Appendix A:	Architectural Drawings
Appendix B:	Town & Region Comments for Terms of Reference
Appendix C:	Functional Road Plans
Appendix D:	Location of Clark Boulevard at Derry Road
Appendix E:	Parking Demand Survey Data
Appendix F:	Vehicle Maneuvering Diagrams
Appendix G:	Traffic Count Data
Appendix H:	TTS Data
Appendix I:	Traffic Signal Timings
Appendix J:	Synchro Worksheets
Appendix K:	Sight Distance Figures
Appendix L:	Pavement Marking and Signage Plan



EXECUTIVE SUMMARY

BA Group was retained by Anatolia Investments Corp. to provide transportation consulting services related to a proposed industrial development located at 6728 Sixth Line, in the Town of Milton, in the Region of Halton. The site is the current location of the Trafalgar Golf & Country Club, and is bounded by Derry Road to the north, future industrial lands to the west and south (Remington Lands) and Sixth Line to the east. The site is north of the future Milton Phase 4 lands and is within the Town's Derry Green Secondary Plan Area.

The proposed development of the site includes the construction of three industrial buildings, with a total gross floor area (GFA) of approximately 182,115 m². The proposed use of the buildings is warehouse/logistics facilities. It is estimated that the buildings will be completed and fully leased by the end of 2026.

The north-south portion of a new public road (Clark Boulevard) is proposed to be constructed as part of the development proposal. In the interim condition, Clark Boulevard is proposed to connect to a new signalized intersection at Derry Road in the north and terminate with a cul-de-sac to the south, adjacent to the Remington lands south of the site. In the future ultimate condition, the remaining east-west segment of Clark Boulevard will connect from the cul-de-sac on the Anatolia property (cul-de-sac to be eliminated in the ultimate condition) to a new signalized intersection at Fifth Line.

Access driveways to both Buildings 1 and 2 are proposed along the new Clark Boulevard while access to Building 3 is proposed via a full movement access along Sixth Line. The Remington lands to the west of the site will be provided access via a driveway easement to Clark Boulevard.

Area Transportation Context

The site is adjacent to Derry Road (Halton Regional Road 7), an east-west major arterial road. The Region has future plans to widen Derry Road in the area from 4 to 6 lanes. Town roads in the area include Fifth Line to the west of the site and Sixth Line, directly adjacent to the eastern border of the site. There are future plans to widen Fifth Line in the area from 2 to 4 lanes. GO Regional Bus Services provides direct connections from the Milton GO Station with the nearest stop to the site being located at Derry Road and James Snow Parkway. The distance between the site and the GO Station via the existing area road network is approximately 6 kilometres. In the vicinity of the site, a multi-use pathway is provided along James Snow Parkway and a shared roadway cycle route is located along Sixth Line, providing access to the Great Lakes Waterfront Trail and Greenbelt Route. Off-street multiuse trails are provided along Derry Road between Ontario Street South and Trudeau Drive, and painted bike lanes are provided Trudeau Drive approximately 1.8 kilometres west of the site.



Transportation Demand Management (TDM)

The TDM strategies incorporated into the development proposal will facilitate a reduction in vehicle trips and encourage a shift to sustainable modes of travel. TDM measures proposed as part of the development include a reduced vehicle parking supply (0.49 spaces/100 m² or 1 space/203 m²), a bicycle parking supply that meets the Zoning By-law requirements, carpool parking with an emergency ride home program, information and education for employees that promote sustainable travel and an employee travel monitoring program.

Vehicle Parking Considerations

The site is subject to the Town of Milton Comprehensive Zoning By-law 016-2014 (HUSP Urban Area – March 2023) for parking considerations. Application of this By-law to the site results in a total minimum parking requirement of 1,057 spaces (equivalent rate of 0.58 spaces/100 m² or 1 space/172 m²). On average, the proposed parking supply for the site of 897 spaces is equivalent to 0.49 spaces/100 m² (1 space/203 m²). However, as Building 1 includes a parking supply of 0.45 spaces/100 m² (1 space/223 m²), the proposed minimum parking rate for the site is 0.45 spaces/100 m² (1 space/223 m²), in order to align with the parking supply of Building 1. The proposed parking supply for the site is 160 spaces less than the Zoning By-law minimum requirements and will meet the needs of the site.

Bicycle Parking Considerations

Application of Zoning By-law 016-2014 to the site requires a total minimum of 34 bicycle parking spaces. The current architectural drawings provide a total of 34 parking spaces for bicycles. The proposed bicycle parking supply meets the requirements of the Zoning By-law and will meet the needs of the site.

Loading Considerations

Application of Zoning By-law 016-2014 to the site, results in a minimum requirement of 28 loading spaces. As the development proposal includes a total of 315 loading spaces, the requirements of the Zoning By-law are exceeded and the loading supply will meet the practical needs of the site.

Travel Demand

Travel demand forecasts were established for the near-term (2027) and long-term (2032) horizons. The detailed traffic analysis for both the 2027 and 2032 horizons include a variety of scenarios that consider the status of the Clark Boulevard Extension, as well as the potential development on the adjacent Remington Lands. Background traffic forecasts were based upon recent traffic data, traffic growth rates provided by the Town and Region, and transportation studies completed for nearby developments, in addition to the Derry Green Secondary Plan. The site is expected to generate a total of 334 and 353 two-way trips, during the morning and afternoon peak period, respectively. Within this total, 40 two-way trips during the morning peak period and approximately 60 two-way trips during the afternoon peak period, are expected to be heavy vehicles (trucks).



Traffic Analysis

While the area road network operates acceptably under existing conditions, capacity constraints arise in both the 2027 and 2032 future horizons. Specific vehicle movements at intersections along Derry Road are capacity constrained in 2027, and these operational issues are increased due to additional growth in 2032. It is noted, however, that the analysis includes compounding growth for every turning movement at intersections along Derry Road, and this contributes to substantial increases in traffic volumes for movements carrying high volumes under existing conditions. In practice, traffic growth may increase across a broader network with travel patterns reflecting capacity constraints for particular movements and intersections. The most pronounced capacity issues in the network occur at the intersections of Sixth Line / Derry Road and Fifth Line / Derry Road. Because the corridor growth rates adopted by the Region are meant to account for development in the area, the inclusion of site-specific growth on Town roads results in some degree of double-counting for area traffic growth. Furthermore, there is some uncertainty inherent in accounting for sites for which no transportation studies have yet been published, and the use of Secondary Plan traffic volumes to account for such sites may have led to unrealistically high volumes for specific turning movements.

A sensitivity analysis was undertaken in which Derry Road is expanded to six lanes beyond Sixth Line for the 2032 horizon. The results of the sensitivity analysis suggest that if all forecasted growth occurs, the widening of Derry Road would mitigate most capacity issues in the network, leaving all intersections essentially at, or below capacity. Overall, operational issues in the network under future conditions are primarily caused by the substantial background growth that is assumed to occur, and actual future operations will depend on the extent to which this growth actually materializes. Furthermore, the sensitivity analysis conducted shows that the widening of Derry Road can mitigate the impacts of high growth, and that the necessity of widening Derry Road is also dependent on the extent of actual growth.

Safety Assessment

A comprehensive sight distance review was completed for the proposed site access for Building 3 at the full movement access along Sixth Line. The sight distance review utilized both the vertical and horizontal profile data obtained from surveys. The sight distances were evaluated in accordance with the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads. The sight distance assessment assumed that there are curve advisory speed limit signs of 40 km/h posted for both the northbound and southbound directions of travel on Sixth Line. A 40 km/h advisory sign currently exists for the northbound direction of travel only. Based upon the comprehensive site driveway sight distance review, the site access at Sixth Line is expected to be adequate at the proposed access point. Sight lines do not restrict the ability for right-turns and left-turns inbound or outbound and are sufficient to functionally accommodate the proposed driveways.

A queuing analysis of key movements was also undertaken as part of the safety review. Queueing behaviour at intersections within the network was assessed according to Highway Capacity Manual (HCM) methodology using Synchro Version 11.0; 50th and 95th percentile queues were reported for signalized intersection movements. The queue assessment for key movements under existing conditions, 2027 future conditions, and 2032 future conditions indicates that queues can be accommodated by the available storage capacity in all scenarios. Storage capacities for key movements used by site traffic were based upon available plans for proposed intersections; 50th percentile and 95th percentile queues can be accommodated and are not expected to cause any safety or operational issues.



Conclusion & Recommendations

The traffic analysis indicated that, with consideration of the following recommendations, the existing and future transportation network can acceptably accommodate the travel demands of the site.

- As part of the development proposal, it is recommended that the location of intersection of Clark Boulevard on Derry Road be shifted approximately 55 metres east of the intersection location shown in the Derry Green Secondary Plan.
- It is recommended that future traffic operations at the intersections of Sixth Line / Derry Road and Fifth Line / Derry Road be monitored to assess the accuracy of the background growth assumptions and to confirm the timing of the widening of Derry Road between Fifth and Sixth Line, as the widening of Derry Road can mitigate the impacts of high growth, and that the necessity of widening Derry Road is also dependent on the extent of actual growth.
- A reduced posted curve advisory speed limit of 40 km/h is recommended to address visibility and sight distance concerns along Sixth Line's existing S-curve road segment, between the signalized Derry Road and Sixth Line intersection to the north and the newly proposed site driveway along Sixth Line to the south.



1.0 INTRODUCTION

BA Group has been retained by Anatolia Investments Corp. to provide transportation consulting services related to a proposed industrial development located at 6728 Sixth Line, in the Town of Milton, in the Region of Halton. The subject site has an area of 62 hectares and is the current location of the Trafalgar Golf & Country Club, and is bounded by Derry Road to the north, future industrial lands to the west and south (Remington Lands) and Sixth Line to the east. The site is north of the future Milton Phase 4 lands and is within the Town's Derry Green Secondary Plan Area. The site location is illustrated in **Figure 1**.

This Updated Traffic Impact Study and Parking Justification has been prepared as an update BA Group's May 2023 Traffic Impact Study and Parking Justification, in order to address comments provided by the Town of Milton and the Region of Halton. This report has been completed as part of the **Official Plan Amendment (OPA), Zoning By-law Amendment (ZBA)** application and **Draft Plan of Subdivision (DPOS)** being submitted to the Town of Milton.

1.1 DEVELOPMENT PROPOSAL

1.1.1 Summary of Site Statistics

The proposed development of the site is for the construction of three industrial buildings, with a total gross floor area (GFA) of approximately 182,115 m². The proposed use of the buildings will be warehouse/logistics facilities. It is estimated that the buildings will be completed and fully leased by the end of 2026.

The proposed development is summarized in **Table 1** and includes a comparison of the previous and current development proposal.

The development proposal is illustrated in **Figure 2** and a reduced scale drawing of the site plan is provided in **Appendix A**.

The pavement marking and signage plan is provided in **Appendix L**.



TABLE 1 PROPOSED DEVELOPMENT SUMMARY

Industrial Land Use Warehouse Buildings	Total Building GFA		Vehicle Parking (number of spaces)		Bicycle Parking (number of spaces)		Proposed Points of Access	
	May 2023	Current Submission	May 2023	Current Submission	May 2023	Current Submission	May 2023	Current Submission
Building 1	106,415 m ²	104,660 m ²	480	469	28	18	2 full movement accesses along west side of Clark Boulevard.	
Building 2	59,261 m ²	59,053 m ²	276	296	18	12	2 full movement accesses along east side of Clark Boulevard.	
Building 3	18,277 m ²	18,402 m ²	162	132	7	4	1 right-in/right-out access on Derry Road and 1 full movement access on Sixth Line.	1 full movement access on Sixth Line.
Total	183,953 m²	182,115 m²	918	897	53	34	--	--

Notes:

1. Site statistics based on site plans provided by Ware Malcolm dated November 28, 2023.

1.1.2 Site Access and Circulation

1.1.2.1 New Public Road - Clark Boulevard

The north-south portion of a new public road (Clark Boulevard) is proposed to be constructed as part of the development proposal.

In the interim condition, Clark Boulevard is proposed to be constructed with a 26.0 metre right-of-way and will connect to a new signalized intersection at Derry Road in the north and terminate in a cul-de-sac to the south, adjacent to the Remington lands south of the site.

In the future ultimate condition, the remaining east-west segment of Clark Boulevard is proposed to be constructed with a 26.0 metre right-of-way and will connect from the cul-de-sac on the Anatolia property (cul-de-sac to be eliminated in the ultimate condition) to a new signalized intersection at Fifth Line.



1.1.2.2 Connectivity to Remington Lands

Access driveways to both Buildings 1 and 2 are proposed along the new Clark Boulevard while access to Building 3 is proposed via a full movement access along Sixth Line. The Remington lands to the west of the site will be provided access via a driveway easement to Clark Boulevard.

1.1.2.3 Vehicle Access to Buildings

Building 1

- 2 full movement accesses east of the building at Clark Boulevard (one access north of the building and one access south of the building).
- The driveway along the north side of Building 1 is proposed to connect to the Remington lands such that vehicles from the future Remington Building 1 can travel across the Anatolia lands to Clark Boulevard.

Building 2

- 2 full accesses west of the building at Clark Boulevard (one access north of the building and one access south of the building).

Building 3

- One full movement access on Sixth Line (east side of the building).

In the interim condition, all Buildings 1 & 2 site traffic will access Clark Boulevard via Derry Road while in the ultimate condition, Buildings 1 & 2 site traffic will be able to access the site via both Clark Boulevard and Fifth Line.



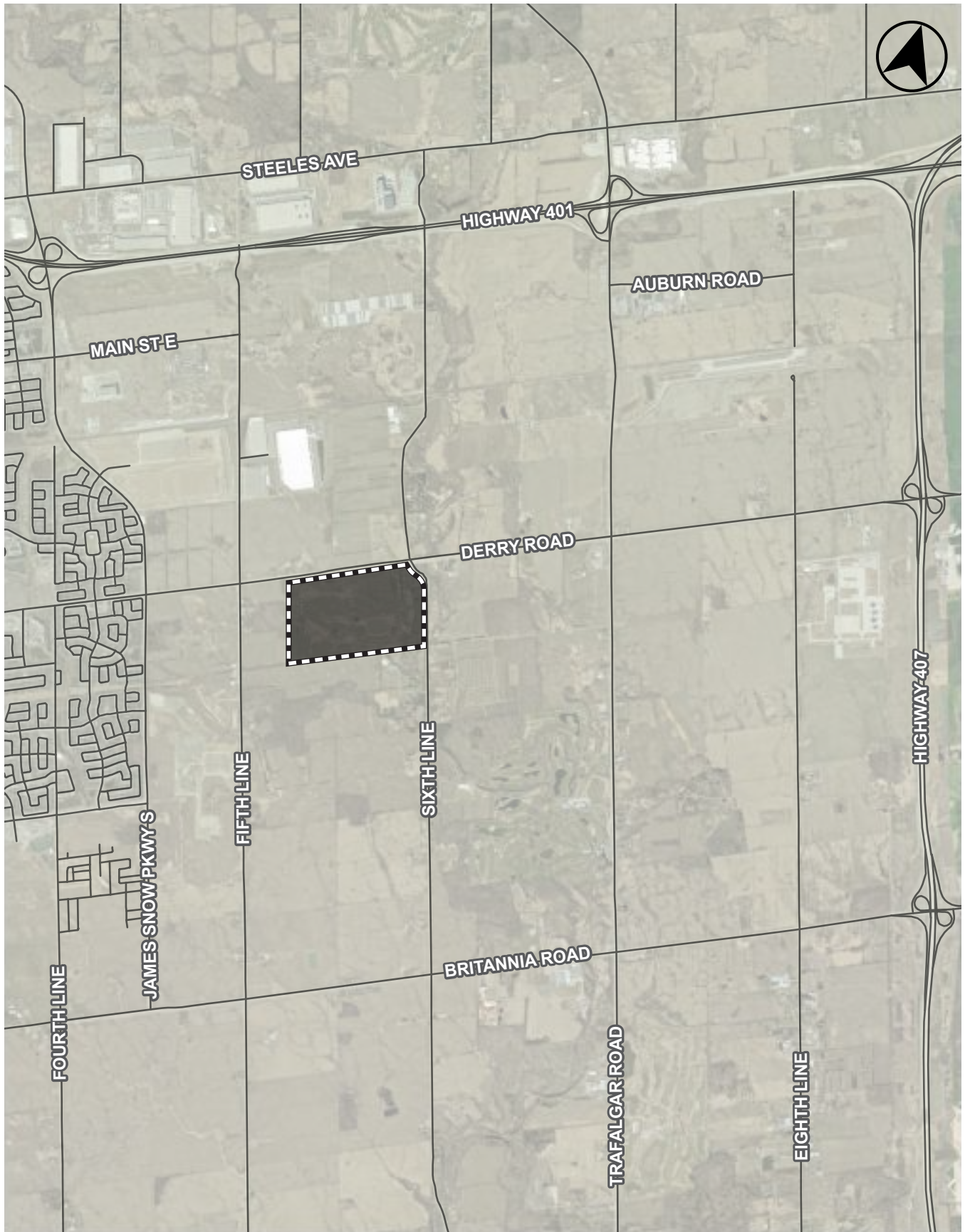
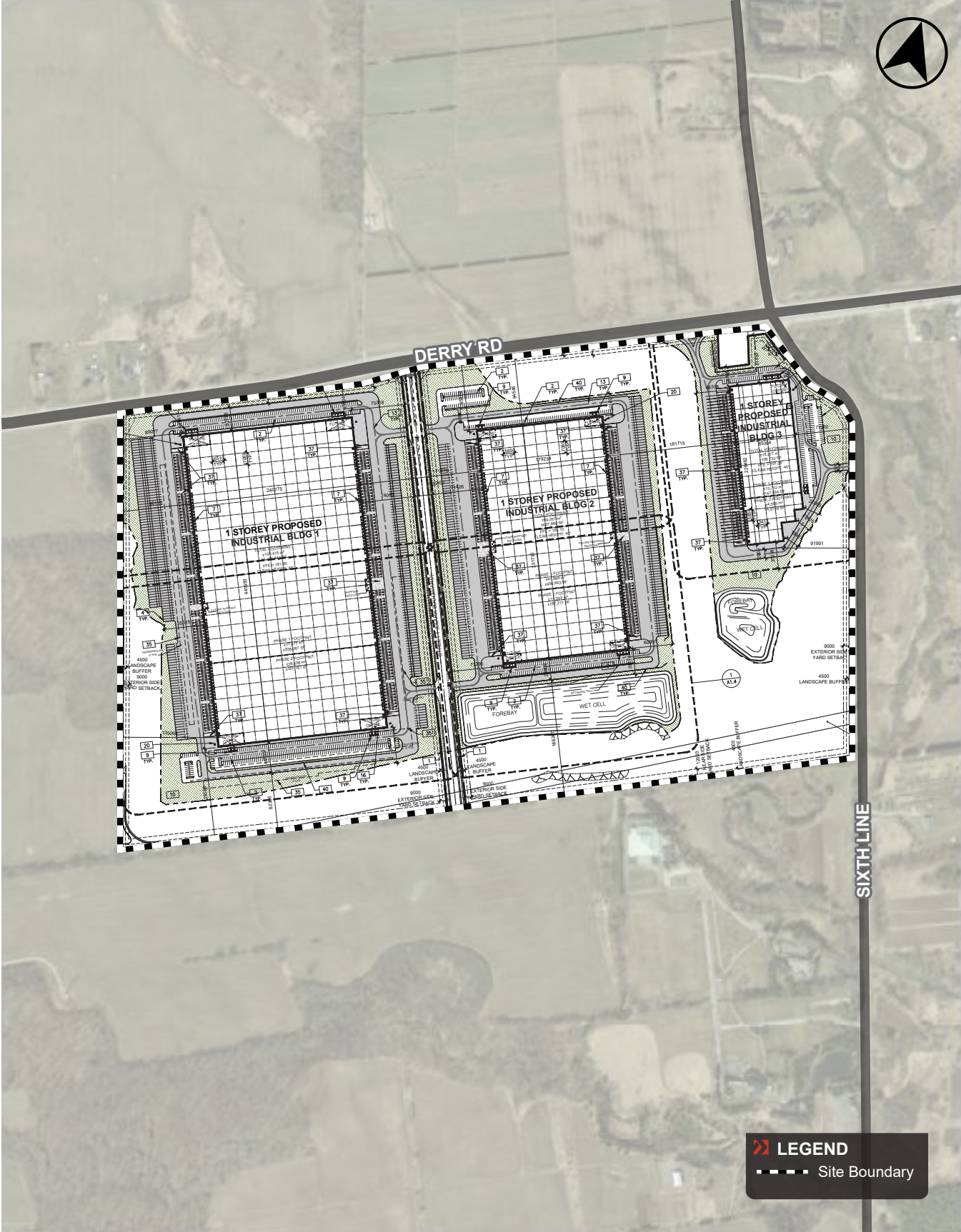


FIGURE 1 SITE LOCATION



P:\81184\01 - Anatolia Milton\Graphics\Adobe\ID\81184-01 - Figures for Report.indd

Aerial maps provided courtesy of Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 2 DEVELOPMENT PROPOSAL

1.2 STUDY SCOPE

The study scope is summarized below. The initial comprehensive comments received from the Halton Region and the Town of Milton regarding the terms of reference for the Traffic Impact Study, are provide in **Appendix B**.

Development Proposal

- A summary of the development proposal.
- An overview of the site and the area-wide transportation system that provides for automobiles but encourages a shift towards non-automobile travel for prospective residents and visitors while still being able to meet the practical and operational needs of the proposed development plan.
- A review of the transportation elements of the proposed development plan that includes vehicle access and circulation, loading and parking facilities.

Transportation Context

- A description of the existing transportation context with consideration for the area road network, transit system and active transportation facilities.
- A description of future transportation changes and/or improvements to the area context such as planned road upgrades, transit and active transportation improvements.

Transportation Demand Management Framework

- An overview of potential Transportation Demand Management (TDM) measures and initiatives that are being considered to encourage prospective employees and visitors to use more active and sustainable modes of transportation.

Site Plan

- A review of the adequacy of the vehicle parking supply.
- A review of the adequacy of the loading space provisions.
- A review of the bicycle parking supply.
- A review of the functionality and appropriateness of the proposed vehicle and cycling facilities incorporated into the site plan including loading/garbage collection facility arrangements.

Traffic Operations Review

- An assessment of the existing traffic patterns and traffic volumes in the study area during the key weekday morning and afternoon peak hours.
- A comprehensive review of traffic-related changes that may occur in the area with consideration for corridor growth and construction of other area development projects.
- A review of traffic operations at intersections in the area under existing and future conditions, including an assessment of the operational impacts of the proposed development.

Safety Review

- A review of the proposed accesses at the intersections with Derry Road, Sixth Line and Fifth Line.
- Confirmation of the proposed traffic control and lane configuration at the site access points.
- Evaluation of the need for road improvements.
- Evaluation of the sight distance at the proposed access points.
- Queuing assessment for key vehicle movements.

The findings of this review are summarized in the following sections.

2.0 TRANSPORTATION CONTEXT

2.1 AREA ROAD NETWORK

2.1.1 Existing Area Road Network

The existing area road network is illustrated in **Figure 3** and described in detail as follows. The existing lane configuration and traffic control is provided in

Derry Road (Halton Regional Road 7) is an east-west major arterial road under the jurisdiction of the Region of Halton in the vicinity of the site. It extends from Milborough Line in the west to Ninth Line in the east, where it continues into Mississauga. In the vicinity of the site, Derry Road has a 4-lane cross section with 2 lanes in each direction. Auxiliary turn lanes are provided at the signalized intersections of Fifth Line and Sixth Line (eastbound and westbound left turn lanes). In the study area, the posted speed limit is 80 km/h in both directions.

Fifth Line is a north-south collector road under the jurisdiction of the Town of Milton in the vicinity of the site. It extends from Lower Base Line in the south and 32 Side Road (Region of Halton border) in the north where it continues north into the County of Wellington. In the vicinity of the site, Fifth Line has a 2-lane cross section with 1 lane in each direction. Auxiliary turn lanes are provided at the signalized intersection of Derry Road (northbound and southbound left turn lanes). In the study area, the posted speed limit is 70 km/h in both directions.

Sixth Line is a north-south minor arterial road under the jurisdiction of the Town of Milton in the vicinity of the site. It extends from Queen Elizabeth Way in the south and 32 Side Road (Region of Halton border) in the north, where it continues into the County of Wellington. In the vicinity of the site, Sixth Line has a 2-lane cross section with 1 lane in each direction. Auxiliary turn lanes are provided at the signalized intersection of Derry Road (northbound and southbound left turn lanes). North of Derry Road, the posted speed limit is 60 km/h in both directions, and south of Derry Road the posted speed limit is 70 km/h in both directions.

James Snow Parkway is a north-south major arterial road under the jurisdiction of the Region of Halton and is located to the west of the site. It extends from Dublin Line East in the north and Britannia Road in the south. In the vicinity of the site, James Snow Parkway has a 2-lane cross section with 1 lane in each direction. Auxiliary turn lanes are provided on all approaches at the signalized intersection of Derry Road. James Snow Parkway has a posted speed limit of 70 km/h.

2.1.2 Future Area Road Network

Figure 5 illustrates the major road improvements proposed for the area road network. Key elements are described in detail as follows.

2.1.2.1 Planned Road Upgrades

The Region of Halton has identified several future roadway improvements in the vicinity of the site, outlined in Halton Region's 2023 Budget and Business Plan.

Additionally, a review of the Town of Milton’s construction project forecasts and the *2019 - 2023 Milton Transit Services Review & Master Plan Update* has identified other improvements in the study area. The planned road improvements are described below.

Region of Halton

- **“5 ½ Line”** – A new 6-lane road from Britannia Road to Steeles Avenue and Interchange at Highway 401; construction to begin in 2031.
- **Derry Road** – Road widening from 4 to 6 lanes between Tremaine Road and Highway 407; construction to begin in 2031.
- **Britannia Road** – Road widening from 2 to 6 lanes between Tremaine Road and Highway 407. Project to be completed in three Phases. Phase 1 (Tremaine Road to Regional Road 25) began construction in September of 2019 and completed in February of 2022. Phase 2 (James Snow Parkway to Highway 407) and Phase 3 (Regional Road 25 to James Snow Parkway) began construction in June 2021 and is anticipated to be completed by December 2024.
- **James Snow Parkway** – Road widening from 4 to 6 lanes between Britannia Road to Highway 401; construction to begin in 2026.
- **Trafalgar Road** – Road widening from 4 to 6 lanes between Britannia Road to Steeles Avenue; construction to begin in 2030.

Town of Milton

- **Fifth Line** – Road widening from 2 to 4 lanes between Highway 401 and Derry Road. Construction between Highway 401 and Main Street East began in 2021 and is anticipated to be completed by early 2023. The remaining segment is anticipated to be completed by 2024.
- **Louis St. Laurent Extension to Fifth Line** – A new 4-lane road with a 35 metre right-of-way from James Snow Parkway to Fifth Line. Construction began in early 2022, with expected completion to base asphalt by late 2022.
- **Louis St. Laurent Extension to Sixth Line** – A new road construction from Fifth Line to Sixth Line, which will require a Schedule C Municipal Class Environmental Assessment (MCEA). MCEA work to begin in 2024 and construction anticipated for 2026-2027.

2.1.3 Development Proposal Road Network

The proposed alignment and functional plans for the interim and future condition of Clark Boulevard, along with the functional plan for the proposed site access on Sixth Line, are shown in **Appendix C**.

2.1.3.1 Clark Boulevard

The north-south portion of a new public road (Clark Boulevard) is proposed to be constructed as part of the development proposal. In the interim condition, Clark Boulevard is proposed to be constructed with a 26.0 metre right-of-way and will connect to a new signalized intersection at Derry Road in the north and end in a cul-de-sac to the south, adjacent to the Remington lands south of the site.

In the future ultimate condition, the remaining east-west segment of Clark Boulevard is proposed to be constructed with a 26.0 metre right-of-way and will connect from the cul-de-sac on the Anatolia property (cul-de-sac to be eliminated in the ultimate condition) to a new signalized intersection at Fifth Line.



The future lane configuration and traffic control for the 2027 horizon, **without** the Clark Boulevard Extension is provided in **Figure 6**. The future lane configuration and traffic control for the 2027 horizon, **with** the Clark Boulevard Extension is provided in **Figure 7**. The future lane configuration and traffic control for the 2032 horizon is provided in **Figure 8**.

2.1.4 Intersection of Clark Boulevard at Derry Road

As part of the transportation work undertaken for this study, consideration was provided to Halton Region's July 13, 2021 pre-consultation following comments that were reiterated in the Region's April 27, 2022 comments regarding the Traffic Impact Study Terms of Reference:

“The Conceptual Site Plan illustrates a future north-south collector roadway (labelled as Clark Boulevard on the plan) spanning through the subject property. This north-south collector roadway was identified in the Derry Green Secondary Plan but the Secondary Plan illustrates the roadway alignment to be in line with the easterly limit of the 11319 Derry Road property on the north side of Derry Road. Consideration must be given to the location of the future north-south collector roadway alignment through the subject property and intersection location to Derry Road to be consistent with the Secondary Plan. This will result in the slight shifting of the future north-south collector roadway to the west to achieve this alignment and meet the intent of the Secondary Plan and Halton Region's overall corridor access plan.”

It is acknowledged that the Region requested that the location of the intersection of Clark Boulevard at Derry Road align with the location shown in the Derry Green Secondary Plan. However, as part of the development proposal, the location of intersection of Clark Boulevard on Derry Road has been shifted approximately **55 metres east** of the intersection location shown in the Derry Green Secondary Plan.

The Town's Derry Green Secondary Plan shows the conceptual location and alignment of the future Clark Boulevard based on existing natural heritage conditions. The Secondary Plan also provides policy flexibility to assess the appropriate alignment of future roads, in relation to the final determination of the natural heritage system, derived through the approved Subwatershed Implementation Study (SIS), without an amendment to the Secondary Plan.

The natural heritage features and systems impacted by the future Clark Boulevard alignment were assessed through the SIS, which now has been approved by the Town. That SIS illustrates the appropriate realignment and channelization of the watercourse that traverses north and south of Derry Road. The proposed development shows the alignment of Clark Boulevard that is approximately 55 metres east of the alignment shown in the Secondary Plan, to respect and accommodate the future naturalized channel approved in the SIS.

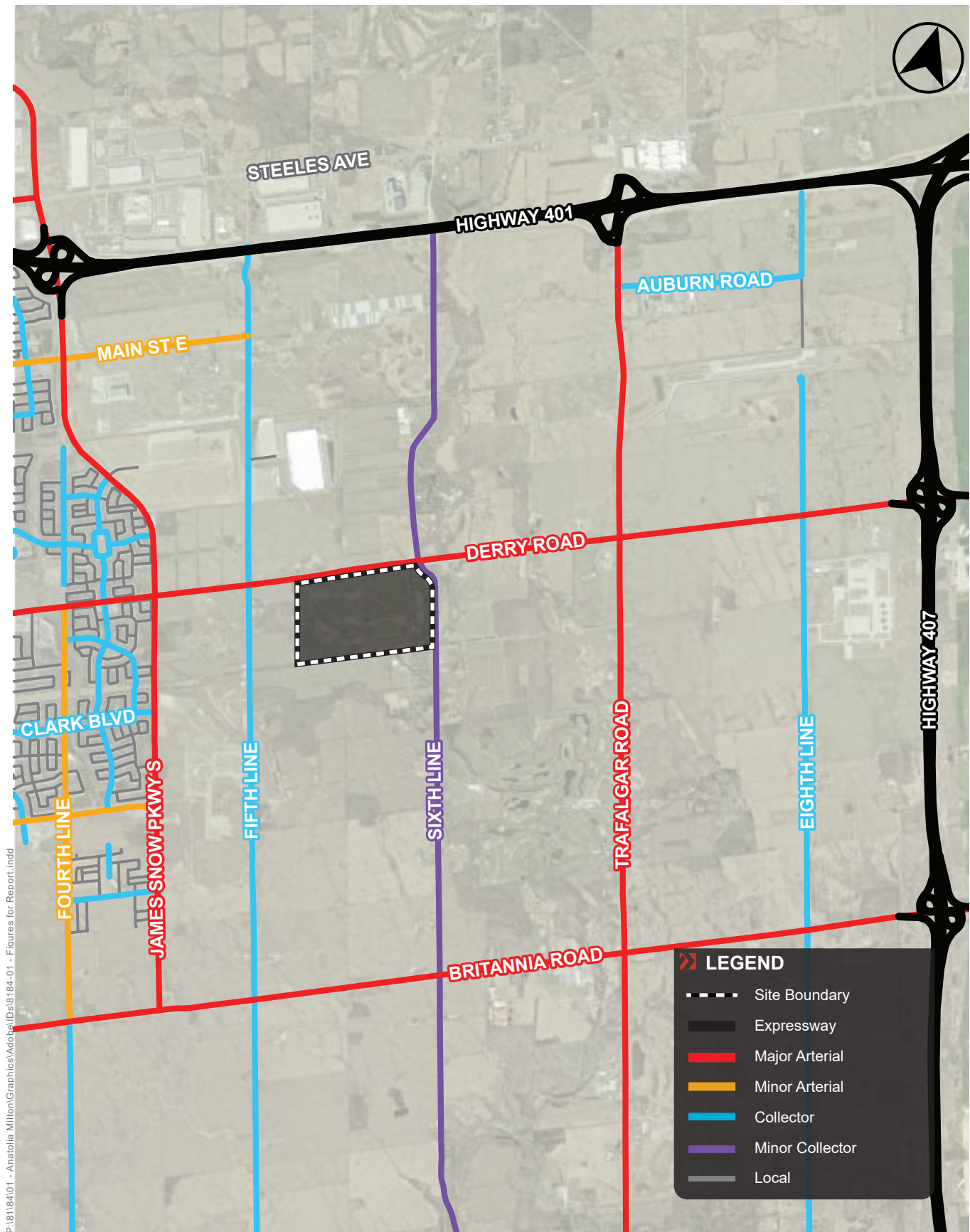
Based on further discussions with the Town, and as per the email provided by the Town in **Appendix B**, “*Staff are generally supportive of the Clark Boulevard alignment*”. It is important to note that the proposed location of the intersection of Clark Boulevard at Derry Road is not expected to create operational concerns in regard to other future planned driveways along Derry Road. For example, the distance between the approved driveway for the Brocollini property at 11319 Derry Road and the proposed location of Clark Boulevard, is approximately 291 metres. It is noted that the driveway at 11319 Derry Road will become a right-in/right-out once Clark Boulevard connects to Derry Road. There are no operational issues expected related to the Brocollini driveway and the proposed location of Clark Boulevard.

The location of the intersection of Clark Boulevard at Derry Road proposed as part of the development of the site, is deemed to be appropriate for the following reasons:

- The proposed intersection location of Clark Boulevard lessens the impact on the proposed channel boundary along the Broccolini eastern property limit, as the alignment of Clark Boulevard north of Derry Road would be required to cross a narrower section of the channel when compared to the alignment of the Secondary Plan that crosses the channel at an angle.
- The proposed location of Clark Boulevard also includes a relatively straight alignment north of Derry Road that follows the east side of the channel. By contrast, the Secondary Plan alignment includes back-to-back sharp curves until the alignment straightens on the east side of the channel.
- The angles of the intersection legs created at Derry Road and Clark Boulevard are closer to 90 degrees in the proposed alignment than in the Secondary Plan alignment.
- The proposed alignment allows the creation of larger rectangular blocks that facilitate a more efficient use of the site for a large scale industrial warehouse development.
- The proposed alignment is consistent with the Clark Boulevard alignment and NHS illustrated within the Subwatershed Impact Study Addendum SIS Area 5A prepared by MGM Consulting Ltd et al, dated May 2021, as reviewed and approved by the Town, Region and Conservation Halton
- As the Region requires a minimum distance of 115 metres between a right-in/ right-out access and the nearest point of access, the proposed location of Clark Boulevard at Derry Road provides more than adequate minimum spacing (and 56 metres more than the Secondary Plan location) for a right-in/ right-out access at the Broccolini property.
- The proposed alignment is consistent with the Town's Derry Green Secondary Plan, without shifting to the west, as noted by the Region in their comments to the Town.

As shown in the drawing in **Appendix D**, the distance between Clark Boulevard, as proposed by the Anatolia development, and the planned driveway on the Broccolini property at 11319 Derry Road, is 291 metres. The Broccolini driveway will operate as a full access initially but will become a right-in/ right-out once Clark Boulevard is constructed and/or Derry Road is widened to 6 lanes. As the minimum distance required between Clark Boulevard to a right-in/ right-out access is 115 metres (as per Halton Region's Access Management Guidelines), the distance between Clark Boulevard and the Broccolini driveway exceeds the Region's minimum spacing requirement.

The distance from Clark Boulevard, as proposed by the Anatolia development, to a proposed driveway for a development at 11801 Derry Road is 237 metres. As the 11801 Derry Road driveway is planned to be a right-in/right-out only, the spacing of 237 metres exceeds the Region's minimum spacing requirement of 155 metres. Figures that compare the proposed intersection of Clark Boulevard on Derry Road (drawing prepared by BA Group) vs. the location shown in the Derry Green Secondary location (Town of Milton Official Plan Schedule C-9-B Derry Green Corporate Business Park Land Use Plan), along with a figure that shows the distances between Clark Boulevard and future planned driveways along Derry Road, are included in **Appendix D**.



P:\81184\01 - Anatolia Milton\Graphics\Adobe\Ds8184-01 - Figures for Report.indd

Aerial maps provided courtesy of Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 3 EXISTING AREA ROAD NETWORK

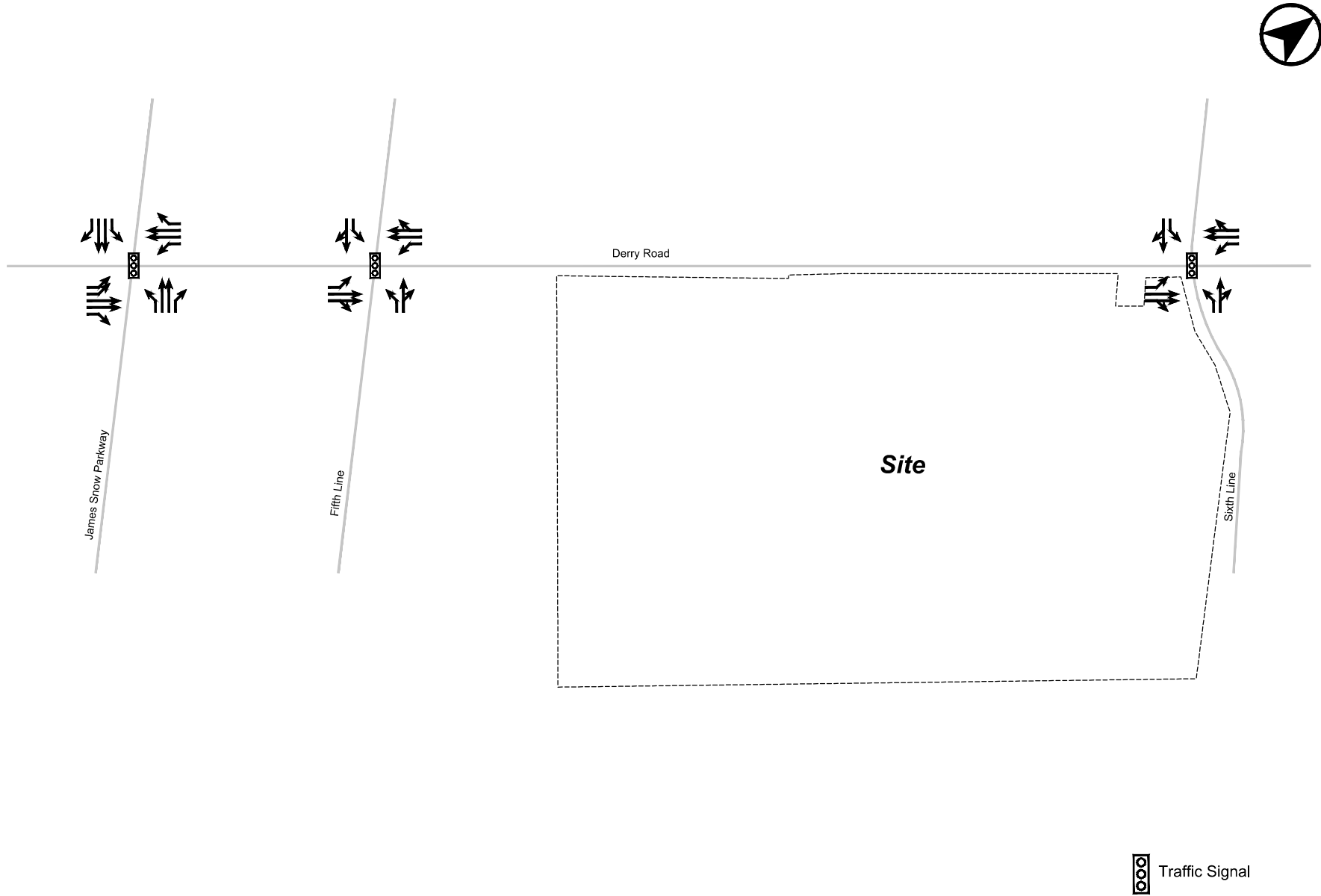
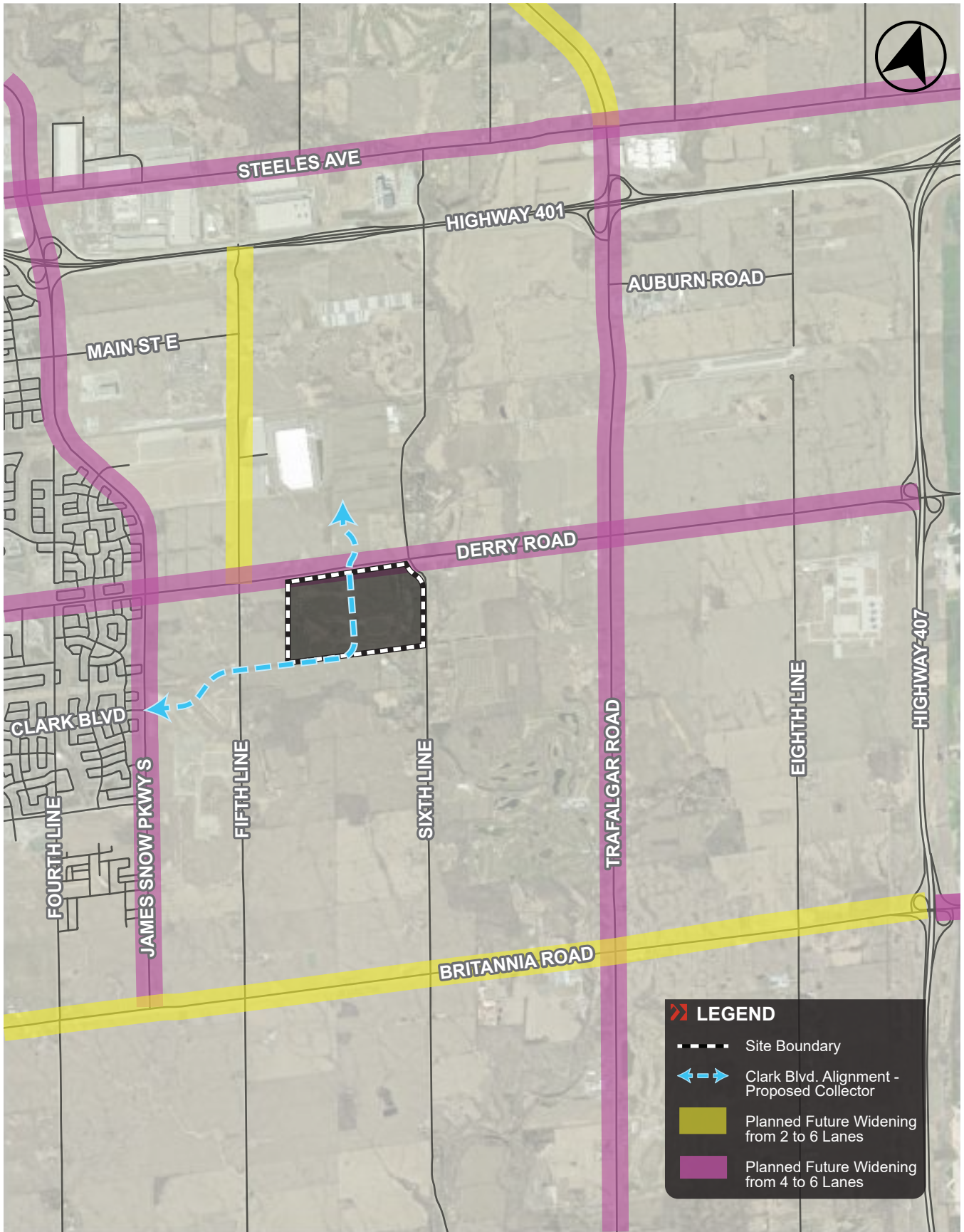


FIGURE 4 EXISTING LANE CONFIGURATION & TRAFFIC CONTROL



P:\81184\01 - Anatolia Milton\Graphics\Adobe\Ds\8184-01 - Figures for Report.indd

Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 5 FUTURE AREA ROAD IMPROVEMENTS

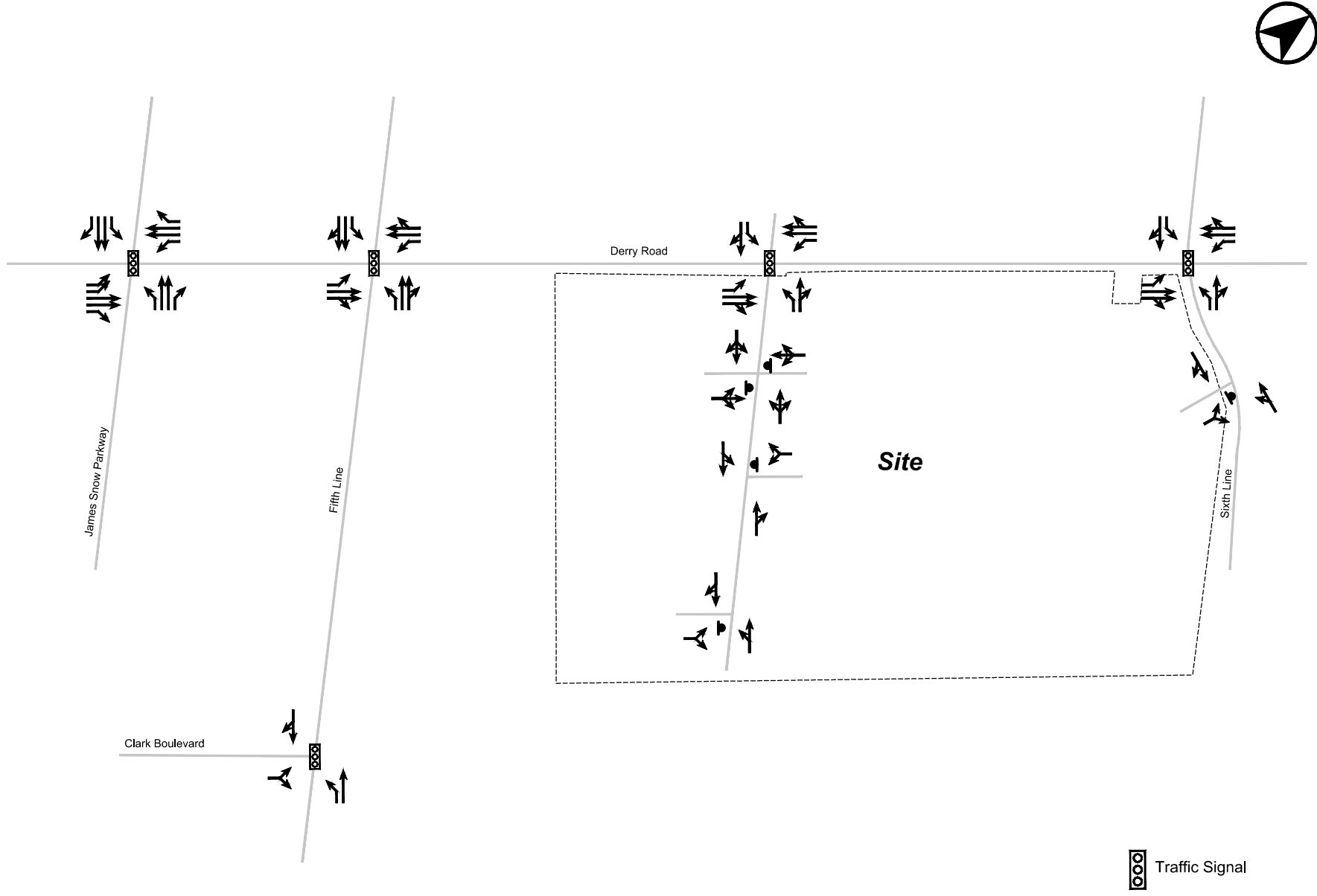


FIGURE 6 FUTURE LANE CONFIGURATION & TRAFFIC CONTROL - 2027 HORIZON - WITHOUT CLARK BOULEVARD EXTENSION

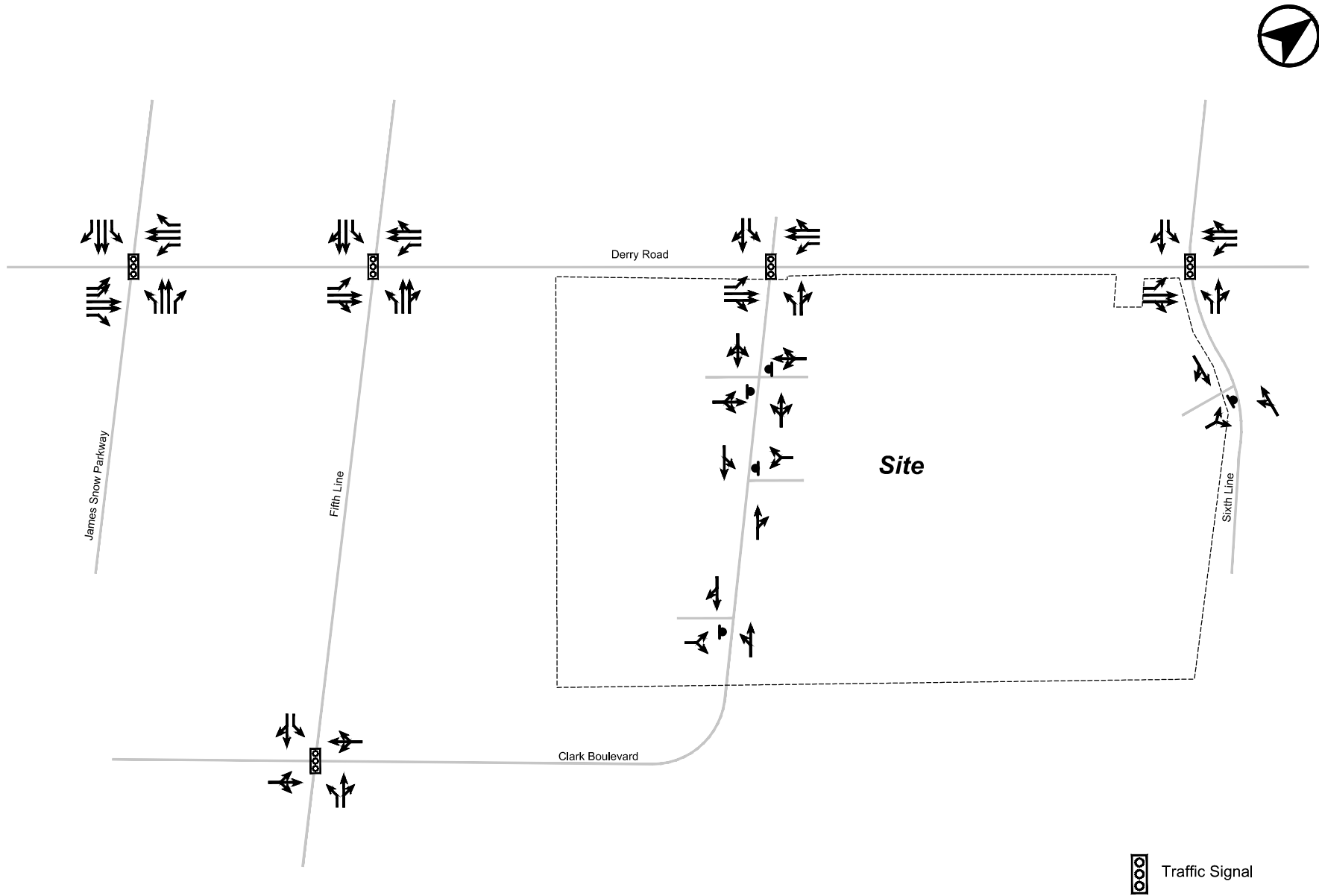


FIGURE 7 FUTURE LANE CONFIGURATION & TRAFFIC CONTROL - 2027 HORIZON - WITH CLARK BOULEVARD EXTENSION

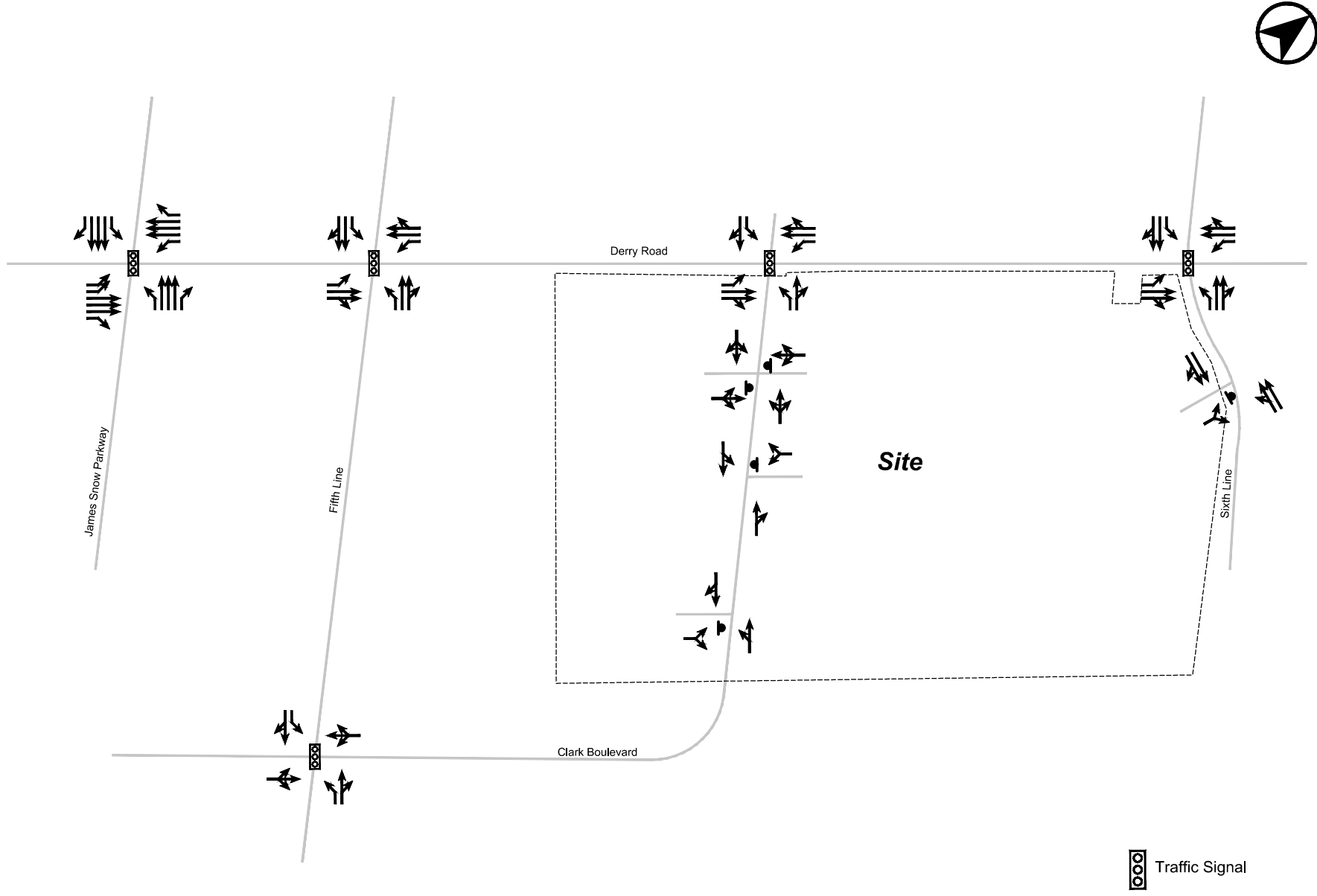


FIGURE 8 FUTURE LANE CONFIGURATION & TRAFFIC CONTROL - 2032 HORIZON

2.2 AREA TRANSIT NETWORK

The closest transit stops to the site are at the intersection of Derry Road and James Snow Parkway (approximately 700 to 1,000 meters away) and are serviced by GO Regional bus services.

Milton GO Rail Line provides a key transit link between Milton and Toronto. The distance between the site and the GO Station via the existing area road network is approximately 6 kilometres. The Milton GO Rail Line operates during peak hours, with rail service to Union Station during the morning peak hour and rail service from Union Station in the afternoon peak hour. All other times, the station is serviced by GO Regional Bus Services.

GO Regional Bus Services also provide direct connections from Milton GO Station to Meadowvale Town Centre, Mississauga, Square One and Union Station. The 21 Milton and 27 Milton – North York GO Bus routes operate along Derry Road in the vicinity of the site, the nearest stops are located at the Trafalgar Road and James Snow Parkway South intersections.

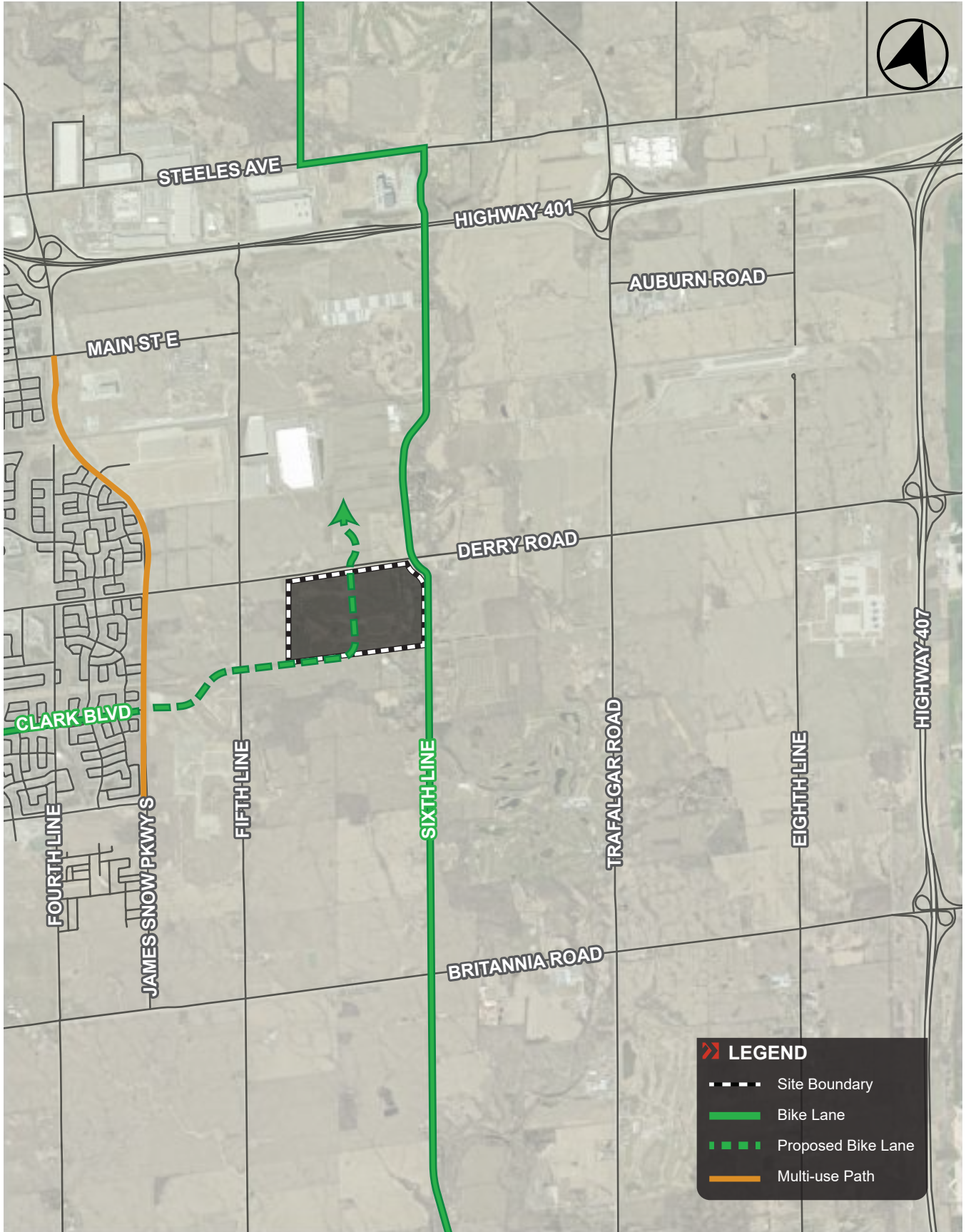
Milton Transit is a municipal bus service within the Town of Milton. The transit service consists of 12 bus lines, providing service within the area bounded by Steeles Avenue West to the north, Tremaine Road to the west, Trudeau Drive to the west and Louis St Laurent Avenue to the south. All bus lines provide service to Milton GO Station, which provides connections to the Milton GO Rail Line and GO Regional Bus Services. The bus service operates during the weekdays and Saturday.

2.3 AREA CYCLING AND PEDESTRIAN NETWORK

In the vicinity of the site, a multi-use pathway is provided on the west side of James Snow Parkway and a shared roadway cycle route is located along Sixth Line, providing access to the Great Lakes Waterfront Trail and Greenbelt Route. Off-street multiuse trails are provided along Derry Road between Ontario Street S and Trudeau Drive, and painted bike lanes are provided Trudeau Drive approximately 1.8 kilometres west of the site.

The area cycling network is illustrated in **Figure 9**.

The existing pedestrian infrastructure in the vicinity of the site is limited. However, sidewalks will be installed along both sides of Clark Boulevard and will likely be installed along both sides of Derry Road as part of the future planned widening.



Aerial maps provided courtesy of Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

P:\81184\01 - Anatolia Milton\Graphics\Adobe\Ds\81184-01 - Figures for Report.indd

FIGURE 9 AREA CYCLING NETWORK

3.0 VEHICLE PARKING CONSIDERATIONS

3.1 COMPREHENSIVE ZONING BY-LAW 016-2014

The site is subject to the Town of Milton Comprehensive Zoning By-law 016-2014 (HUSP Urban Area – March 2023) for parking considerations. Application of this By-law to the site is summarized in **Table 2** and results in a total minimum parking requirement of 1,057 spaces. The average required parking rate for the site is 0.58 spaces per unit (1 space/172 m²) while the highest required parking rate is for Building 1 at 0.55 spaces per unit (1 space/183 m²).

TABLE 2 ZONING BY-LAW 06-2014: MINIMUM PARKING REQUIREMENTS

Building	Gross Floor Area (GFA)	Zoning By-law Requirement	Minimum Number of Required Parking Spaces	Minimum Required Equivalent Parking Rate
Building 1	104,660 m ²	0 to 1,000 m ² = 1 space/30 m ² 1,001 m ² to 5,000 m ² = 1 space/100 m ² >5,000 m ² = 1 space/200 m ²	572	0.55 spaces/unit (1 space/183 m ²)
Building 2	59,053 m ²		344	0.58 spaces/unit (1 space/172 m ²)
Building 3	18,402 m ²		141	0.77 spaces/unit (1 space/131 m ²)
Total	182,115 m²	--	1,057	0.58 spaces/unit (1 space/172 m ²)

Notes:

1. Site statistics based on site plans provided by Ware Malcolm dated November 28, 2023.
2. As per Section 5.13 in the Zoning By-law, partial parking spaces must be rounded up to the nearest whole number.
3. As per Section 5.2, 10% may be deducted from the GFA for non-residential parking calculations.

3.2 PROPOSED PARKING SUPPLY

3.2.1 Summary of Proposed Parking Supply

As summarized in **Table 3**, the total proposed parking supply for the site is 897 spaces which is 160 spaces less than the minimum requirements of the Zoning By-law 016-2014.

On average, the proposed parking supply for the site is 0.49 spaces/100 m² (1 space/203 m²). However, as Building 1 includes a parking supply of 0.45 spaces/100 m² (1 space/223 m²), the proposed minimum parking rate for the site is 0.45 spaces/100 m² (1 space/223 m²), in order to align with the parking supply of Building 1. The proposed parking supply for the site is 160 spaces less than the Zoning By-law minimum requirements.

TABLE 3 PROPOSED PARKING SUPPLY

Land Use	Gross Floor Area (GFA)	Zoning By-law Minimum Parking Requirement (number of spaces)	Proposed Parking Supply (number of spaces)	Proposed Parking Rate	Difference (number of spaces)
Building 1	104,660 m ²	572	469	0.45 spaces/unit (1 space/223 m ²)	-103
Building 2	59,053 m ²	344	296	0.50 spaces/unit (1 space/200 m ²)	-48
Building 3	18,402 m ²	141	132	0.72 spaces/unit (1 space/139 m ²)	-9
Total	182,115 m²	1,057	897	0.49 spaces/100 m² (1 space/203 m ²)	-160
Proposed Site Parking Rate Based on Building 1 (lowest rate)				0.45 spaces/100 m² (1 space/223 m ²)	--

Notes:

1. Site statistics based on site plans provided by Ware Malcolm November 28, 2023.
2. As per Section 5.13 in the Zoning By-law, partial parking spaces must be rounded up to the nearest whole number.
3. As per Section 5.2, 10% may be deducted from the GFA for non-residential parking calculations.

3.3 JUSTIFICATION FOR PROPOSED PARKING SUPPLY

As the total proposed parking supply for the site is 897 spaces (equivalent to 0.45 spaces/100 m² GFA or 1 space/223 m² based on Building 1 supply) and the minimum parking requirement of Zoning By-law 016-2014 is a minimum of 1,057 spaces for the entire site (0.58 spaces/100 m² GFA or 1 space/172 m²), the proposed parking supply is 160 spaces less than the Zoning By-law requirement.

To confirm that the proposed parking supply is adequate for the site, a review of parking demand surveys at similar industrial developments was undertaken and is discussed below.

3.3.1 Parking Demand Survey Data

To gain a better understanding of parking demands at industrial warehouses that are similar to what is currently being proposed on the site, weekday parking demand data was recently collected at seven warehouse sites in the Town of Milton and in Bolton (Town of Caledon). The detailed parking demand survey data is provided in **Appendix E**.

As summarized in **Table 4**, the peak parking demand at the proxy sites ranged from 0.12 to 0.22 spaces/100 m² GFA, with an average peak parking demand of 0.17 spaces/100 m² GFA.

It is noted that the average demand of 0.17 spaces/100 m² GFA is well below the proposed parking supply for the site of 0.45 spaces/100 m² GFA. The results of the parking demand survey data confirm that the proposed parking supply for the site of 897 spaces is appropriate.

TABLE 4 PARKING DEMAND SURVEY DATA AT INDUSTRIAL WAREHOUSES

Location	Date	Peak Parking Demand (spaces/100 m ²)
2200 Yukon Court, Milton	Thursday, February 16, 2023	0.22
8350 Lawson Road, Milton	Thursday, February 16, 2023	0.16
205 Market Drive, Milton	Thursday, February 16, 2023	0.16
100 Pillsworth Road, Bolton	Wednesday, November 8, 2022	0.15
8339 George Bolton Parkway	Thursday, February 16, 2023	0.18
12315 Coleraine Drive	Thursday, February 16, 2023	0.20
12366 Coleraine Drive	Thursday, February 16, 2023	0.12
Average		0.17

3.4 SUMMARY OF PROPOSED VEHICLE PARKING SUPPLY

3.4.1 Proposed Vehicle Parking Supply

As summarized in **Table 5**, the total proposed parking supply for the site is 897 spaces (equivalent to 0.45 spaces/100 m² GFA or 1 space/223 m² based on Building 1 supply) is slightly less (160 spaces) than the equivalent Zoning By-law minimum parking rate for the entire site of 0.58 spaces/100 m² (1 space/172 m²) and will meet the needs of the site.

TABLE 5 PROPOSED PARKING SUPPLY

Land Use	Gross Floor Area (GFA)	Proposed Parking Supply (number of spaces)
Building 1	104,660 m ²	469
Building 2	59,053 m ²	296
Building 3	18,402 m ²	132
Total	182,115 m²	897
Proposed Site Parking Rate Based on Building 1 (lowest rate)		0.45 spaces/100 m² (1 space/223 m²)

Notes:

1. Site statistics based on site plans provided by Ware Malcolm November 28, 2023.
2. As per Section 5.13 in the Zoning By-law, partial parking spaces must be rounded up to the nearest whole number.
3. As per Section 5.2, 10% may be deducted from the GFA for non-residential parking calculations.



3.4.2 Accessible Parking

As per By-law 016-2014, as summarized in **Table 6**, the site requires a minimum of 29 accessible parking spaces. The proposed supply of 34 accessible parking spaces meets the requirements of the Zoning By-law.

TABLE 6 ACCESSIBLE PARKING

Land Use	Zoning By-law Required Number of Parking Spaces	Accessible Parking Zoning By-law Requirement	Accessible Parking Zoning By-law Requirement (number of spaces)	Proposed Accessible Parking Supply (number of spaces)
Building 1	572	2 accessible spaces + 2%	14	16
Building 2	344	2 accessible spaces + 2%	9	12
Building 3	141	1 accessible spaces + 3%	6	6
Total	1,057	--	29	34

Notes:

1. Site statistics based on site plans provided by Ware Malcolm dated November 28 2023.
2. As per Section 5.13 in the Zoning By-law, partial parking spaces must be rounded up to the nearest whole number.

In accordance with the By-law, where an even number of accessible parking spaces is required, an equal number of Type A and B accessible parking spaces shall be provided. Where an odd number of accessible parking spaces is required, an equal number of Type A and B accessible parking spaces shall be provided but the last accessible parking space may be Type B.

The architectural drawings for the site include 8 Type A and 8 Type B accessible spaces at Building 1, 6 Type A and 6 Type B accessible spaces and Building 2, while Building 3 includes 3 Type A and 3 Type B spaces.

The designated accessible parking spaces will be located in proximity to the primary entrances to the buildings and have direct access to the entrances by a minimum 1.5 metres wide unobstructed access route.

4.0 BICYCLE PARKING CONSIDERATIONS

As summarized in **Table 7**, Zoning By-law 016-2014 requires a total minimum of 34 bicycle parking spaces. The current architectural drawings provide a total of 34 parking spaces for bicycles. The proposed bicycle parking supply meets the requirements of the Zoning By-law and will meet the needs of the site.

The location of the bicycle parking areas is illustrated in the architectural drawings for the site included in **Appendix A**.

TABLE 7 SUMMARY OF BICYCLE PARKING

Land Use	Zoning By-law Minimum Required Number of Parking Spaces	Bicycle Parking Minimum Zoning By-law Requirement	Bicycle Parking Minimum Zoning By-law Requirement (number of spaces)	Proposed Bicycle Parking Supply (number of spaces)
Building 1	572	3% of minimum required vehicle parking	18	18
Building 2	344		11	12
Building 3	141		5	5
Total	1,057	--	34	34

Notes:

1. Site statistics based on site plans provided by Ware Malcolm dated November 28, 2023.
2. As per Section 5.13 in the Zoning By-law, partial parking spaces must be rounded up to the nearest whole number.



5.0 LOADING CONSIDERATIONS

As summarized in **Table 8**, application of Zoning By-law 016-2014 to the site for loading considerations, results in the minimum requirement of 28 loading spaces. As the development proposal includes a total of 315 loading spaces, the requirements of the Zoning By-law are exceeded and the loading supply will meet the practical needs of the site.

TABLE 8 SUMMARY OF LOADING SPACES

Building	Gross Floor Area (GFA)	Zoning By-law 06-2014 Minimum Requirement	Minimum Number of Required Loading Spaces	Proposed Number of Loading Spaces
Building 1	104,660 m ²	3 loading spaces + 1 additional loading space for each additional 9,300m ² or fraction thereof in excess of 7,441m ² .	14	155
Building 2	59,053 m ²		9	109
Building 3	18,402 m ²		5	51
Total	182,115 m²	--	28	315

Notes:

1. Site statistics based on site plans provided by Ware Malcolm November 28, 2023.

Vehicle manoeuvring drawings for the site are attached in **Appendix F**.

6.0 TRANSPORTATION DEMAND MANAGEMENT PLAN

6.1 OVERVIEW

The Transportation Demand Management (TDM) Plan strives to reduce automobile use through an on-going strategy by supporting and promoting the use of non-auto transportation modes. TDM strategies have been developed to further support the use of non-auto modes of travel. The recommended strategies are summarized in **Table 9**.

6.1.1 Vehicle Parking

Provide an appropriate parking supply for the site (0.49 spaces/100 m² or 1 space/203 m²) that is slightly less than the site equivalent minimum Zoning By-law requirement of 0.58 spaces/100 m² or 1 space/172 m²).

6.1.2 Bicycle Parking Spaces

Although the existing and future area transportation context provides limited facilities for active transportation to/from the site, some employees may choose to cycle to/from the site. Zoning By-law 016-2014 requires a total minimum of 34 spaces. The current architectural drawings for the site illustrate a total of 34 parking spaces for bicycles and meets the minimum parking requirements of the Zoning By-law.

6.1.3 Carpool Program & Emergency Ride Home Program

Through communication and education, employees will be encouraged to carpool to travel to/ from the site. A number of preferred parking spaces will be signed and dedicated to carpool vehicles. The building owner/occupant will consider emergency ride home options.

6.1.4 Employee Information and Education Program

Provide information and education for employees regarding sustainable travel options such as transit and car pooling to/from the site.

6.1.5 Employee Reward Program

Implement an employee reward program for employees that travel to/from site with sustainable modes of travel, including the car pool program, transit and active transportation.

6.1.6 Monitoring

The developer has plans to undertake employee surveys two years after building occupation, in order to assess employee travel behaviours and monitor the effectiveness of TDM measures.

Due to the nature of the warehouse business, employees would likely be working in shifts such that the number of trips occurring during the street peak periods of the day would be reduced but this will be confirmed as part of the monitoring program.

TABLE 9 RECOMMENDED TDM STRATEGIES

Measure	Description	Cost Estimate	Implementation Strategy
Vehicle Parking Supply	Provide an appropriate parking supply for the site that is slightly less than the minimum Zoning By-law requirements.	Integrated into overall development cost.	Construct as part of development.
Bicycle Parking	Provide a supply of bicycle parking spaces that meets the minimum Zoning By-law requirement.	Integrated into overall development cost.	Construct as part of development. A total of 34 bicycle parking spaces are proposed on the site.
Bicycle Repair Station	Provision of bicycle repair stations.	Integrated into overall development cost.	Construct as part of development
Carpool Program	Encourage employees to carpool.	Integrated into overall development cost.	Implement at occupancy.
Emergency Ride Home Program	The building owner/occupant will consider emergency ride home options.	Integrated into overall development cost.	Implement at occupancy.
Carpool spaces	Designating preferred parking spaces for carpool users adjacent to the main building entrances is a measure to encourage carpooling by employees.	Integrated into overall development cost.	Construct as part of development.
Information & Education	Provide information & education for employees regarding sustainable travel options to/from the site.	Integrated into overall development cost.	Implement at occupancy.
Employee Reward Program	Reward program for employees that travel to/from site with sustainable modes of travel, including the car pool program, transit and active transportation.	Integrated into overall development cost.	Implement at occupancy.
Monitoring	Undertake surveys to assess employee travel behaviour and TDM measures.	Integrated into overall development cost.	Developer committed to TDM monitoring follow-up surveys with employees 2 years after building occupation.

6.2 TDM PLAN IMPLEMENTATION

It is recommended that the TDM measures be incorporated into the site plan. The cost to implement these measures will be the responsibility of the developer.

Although no specific targets for changes in travel behaviour have been made, the proposed TDM initiatives are expected to support reduced levels of automobile use.

7.0 TRAFFIC VOLUME FORECASTING

7.1 EXISTING TRAFFIC CONDITIONS

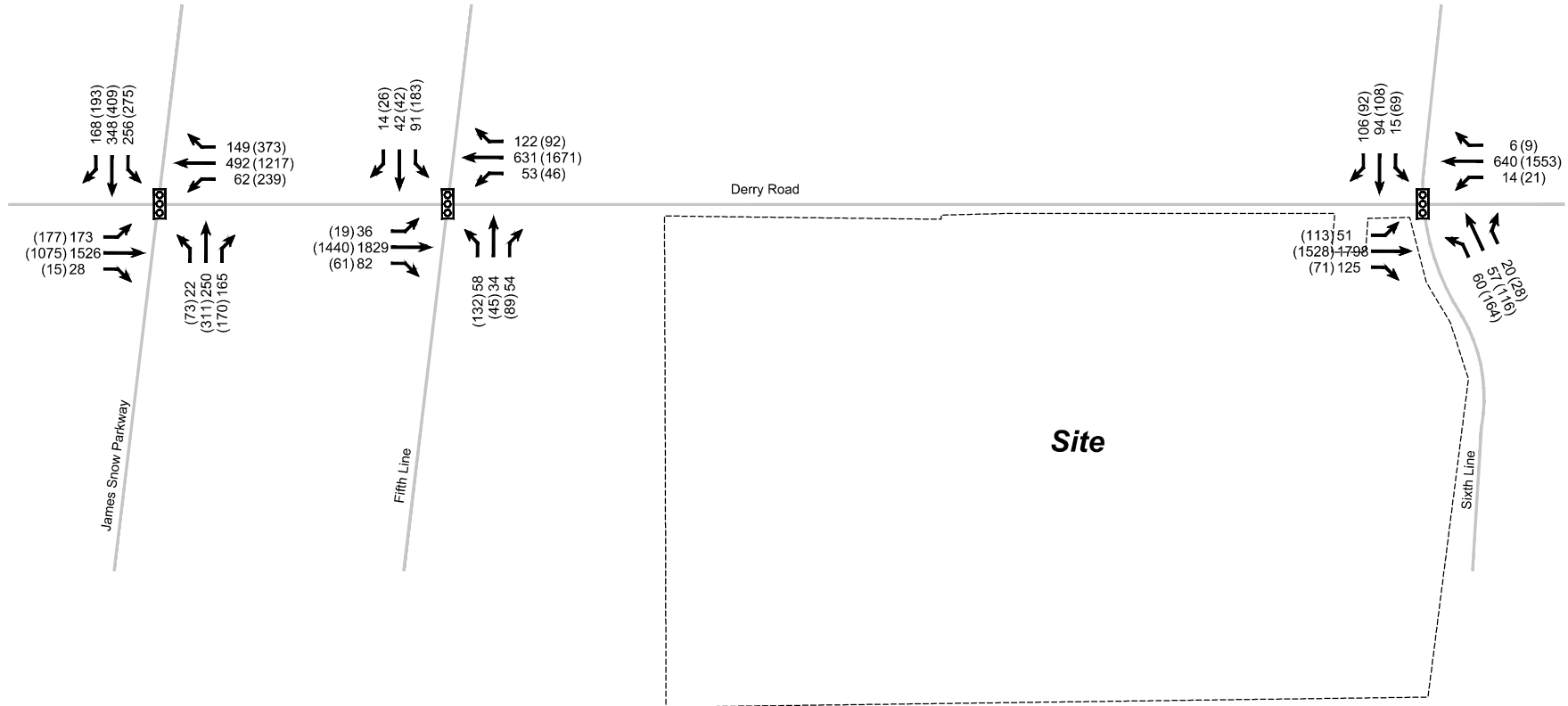
Existing traffic volumes were based on 2022 weekday peak hour turning movement counts conducted for the three existing intersections within the study area. Turning movement count information is summarized in **Table 10**.

TABLE 10 TURNING MOVEMENT COUNT SUMMARY

Intersection	Count Date	Peak Hours	Source
Sixth Line / Derry Road	Thursday, June 16 th , 2022	7:30-8:30 AM 4:30-5:30 PM	Ontario Traffic Inc.
Fifth Line / Derry Road			
James Snow Parkway / Derry Road			

Based on background growth assumptions outlined in detail in **Section 7.2.2**, a compounding growth rate of 2% was applied for one year to establish 2023 traffic volumes. These volumes were adopted to represent existing traffic conditions.

Existing traffic volumes are illustrated in **Figure 10**. Detailed turning movement counts are provided in **Appendix G**.




 Traffic Signal

FIGURE 10 EXISTING TRAFFIC VOLUMES

7.2 FUTURE BACKGROUND TRAFFIC CONDITIONS

7.2.1 Background Growth Scenarios

Multiple background growth scenarios were considered in order to account for uncertainties with regard to the buildout of network infrastructure and developments in the site vicinity. Specifically, it is unknown when the portion of Clark Boulevard between Fifth Line and the site boundary will be constructed, and the development of lands west and south of the site is uncertain.

It is understood that the development of parcels adjacent to the site, owned by Remington Group and referred to in this study as “the Remington Lands”, requires the extension of Clark Boulevard to be constructed between the site and Fifth Line (“the Clark Boulevard Extension”). However, if these lands are not developed, the extension may still be constructed by the Town. It is unknown whether, in the absence of development on the adjacent parcels, the extension will be constructed by 2028. However, it can be assumed that the extension will be in place by 2033, regardless of the development of the Remington Lands.

Therefore, three possible scenarios were considered for the 2028 horizon, and two scenarios were considered for the 2033 horizon, for a total of five background growth scenarios. The relevant network and development assumptions for these scenarios are summarized in **Table 11**.

TABLE 11 FUTURE BACKGROUND GROWTH SCENARIOS

Scenario	Horizon Year	Anatolia Site	Background Traffic	Road Network Improvements
Scenario 1	2027	Full build-out of Anatolia site	Background traffic as per Derry Green Secondary Plan but no development on Remington lands ³	No extension of Clark Boulevard between Fifth Line and Derry Road ²
Scenario 2			Background traffic as per Derry Green Secondary Plan but no development on Remington lands ³ ; background traffic can use Clark Boulevard	Clark Boulevard Extended between Fifth Line and Derry Road
Scenario 3			Background traffic as per Derry Green Secondary Plan with Remington lands built, background traffic can use Clark Boulevard	
Scenario 4	2032	5 years post build-out of Anatolia site	Background traffic as per Derry Green Secondary Plan but no development on Remington lands ³ ; background traffic can use Clark Boulevard	Clark Boulevard Extended between Fifth Line and Derry Road
Scenario 5			Background traffic as per Derry Green Secondary Plan with Remington lands built, background traffic can use Clark Boulevard	
Sensitivity Analysis				
Scenario 6	2032	5 years post build-out of Anatolia site	Background traffic as per Derry Green Secondary Plan but no development on Remington lands ³ ; background traffic can use Clark Boulevard	Clark Boulevard Extended between Fifth Line and + Derry Road widened to 6 lanes
Scenario 7			Background traffic as per Derry Green Secondary Plan with Remington lands built, background traffic can use Clark Boulevard	

Notes:

1. The portions of Clark Boulevard west of Fifth Line and north of Derry Road are assumed to be complete in all scenarios, consistent with the Derry Green Secondary Plan and with studies available for developments proposed on those lands.
2. The portion of Clark Boulevard directly south of Derry Road is to be constructed as part of the development of the site. It is assumed to be present under future total conditions in all scenarios, regardless of the status of the Clark Boulevard extension.
3. Traffic volumes related to Remington lands have been removed from the Derry Green Secondary Plan traffic volumes.

7.2.2 General Corridor Growth

Compounded growth was assumed on all existing corridors within the study area, based on requirements provided by the Town and Region. A growth rate of 2% was applied to all vehicle movements at existing intersections for five years up to the 2027 horizon. A 2% growth rate was maintained up to the 2032 horizon for all movements at existing intersections, with the exception of northbound and southbound movements (including left and right turns) on James Snow Parkway where it intersects with Derry Road. Movements on James Snow Parkway were subject to a 4% growth rate for 5 years between 2027 and 2032. No compounding growth was applied on Clark Boulevard where it intersects with Fifth Line and Derry Road, since these segments do not currently exist and there are no existing traffic volumes.

7.2.3 Background Developments

Additional growth volumes were added to account for specific development proposals in the site vicinity. Developments accounted for include approximately 593,900 m² of industrial GFA, 5,000 m² of commercial GFA, and 16,500 m² of office GFA, and further allowances were included to account for developments anticipated as part of the Derry Green Secondary Plan for which site-specific studies were not available.

Table 12 summarizes the characteristics of background developments included in the study.

TABLE 12 AREA BACKGROUND DEVELOPMENTS

Development	Location	Development Statistics	Source	Notes
Derry Green Corporate Business Park	Bounded by James Snow Parkway and by Fifth Line, extending north of Clark Boulevard and South of St. Laurent Avenue	294,242 m ² industrial GFA, 16,558 m ² office GFA	Crozier & Associates, October 2021	Includes Clark Boulevard extension to Fifth Line
6712 Fifth Line	Southwest quadrant of Fifth Line / Derry Road intersection	91,574 m ² industrial GFA	LEA, October 2021	--
11233 Derry Road	North of Derry Road, between Fifth Line and future Clark Boulevard extension	94,366 m ² industrial GFA	LEA, March 2022	--
Remington Lands	Bounded by Derry Road, Fifth Line, and the Anatolia site; includes lands abutting the Clark Boulevard extension	65,400 m ² industrial GFA (potential)	BA Group	Unknown buildout date and development status ¹
Other Secondary Plan Lands	Includes parcels north of Derry Road, and west of Fifth Line or east of future Clark Boulevard extension	Unknown	Read, Voorhees & Associates, February 2016	Traffic estimated based on Secondary Plan and other studies ²
11801 Derry Road	North of Derry Road, between Sixth Line and future Clark Boulevard extension	5070 m ² commercial GFA 34,084 m ² industrial GFA	TYLin, February 2023	Includes Clark Boulevard extension
11319 Derry Road	North of Derry Road, between Fifth Line and future Clark Boulevard extension	14,198 m ² industrial GFA	LEA, June 2023	--

Notes:

1. Traffic associated with the development of the Remington Lands (with the statistics provided) is included in Scenarios 3 and 5, and omitted in Scenarios 1, 2 and 4.
2. Minor adjustments are made to traffic volumes associated with other secondary plan lands in Scenario 1, in order to account for the lack of a connection between the Clark Boulevard extension north of Derry Road and west of Fifth Line.

7.2.4 Total Background Growth Traffic Volumes

Background growth traffic allowances in each growth scenario include corridor growth appropriate to the horizon year of the scenario (2027 or 2032) and traffic volumes for the specific background developments included in the scenario. Background growth traffic volumes for each scenario are illustrated in **Figure 11** through **Figure 15**.

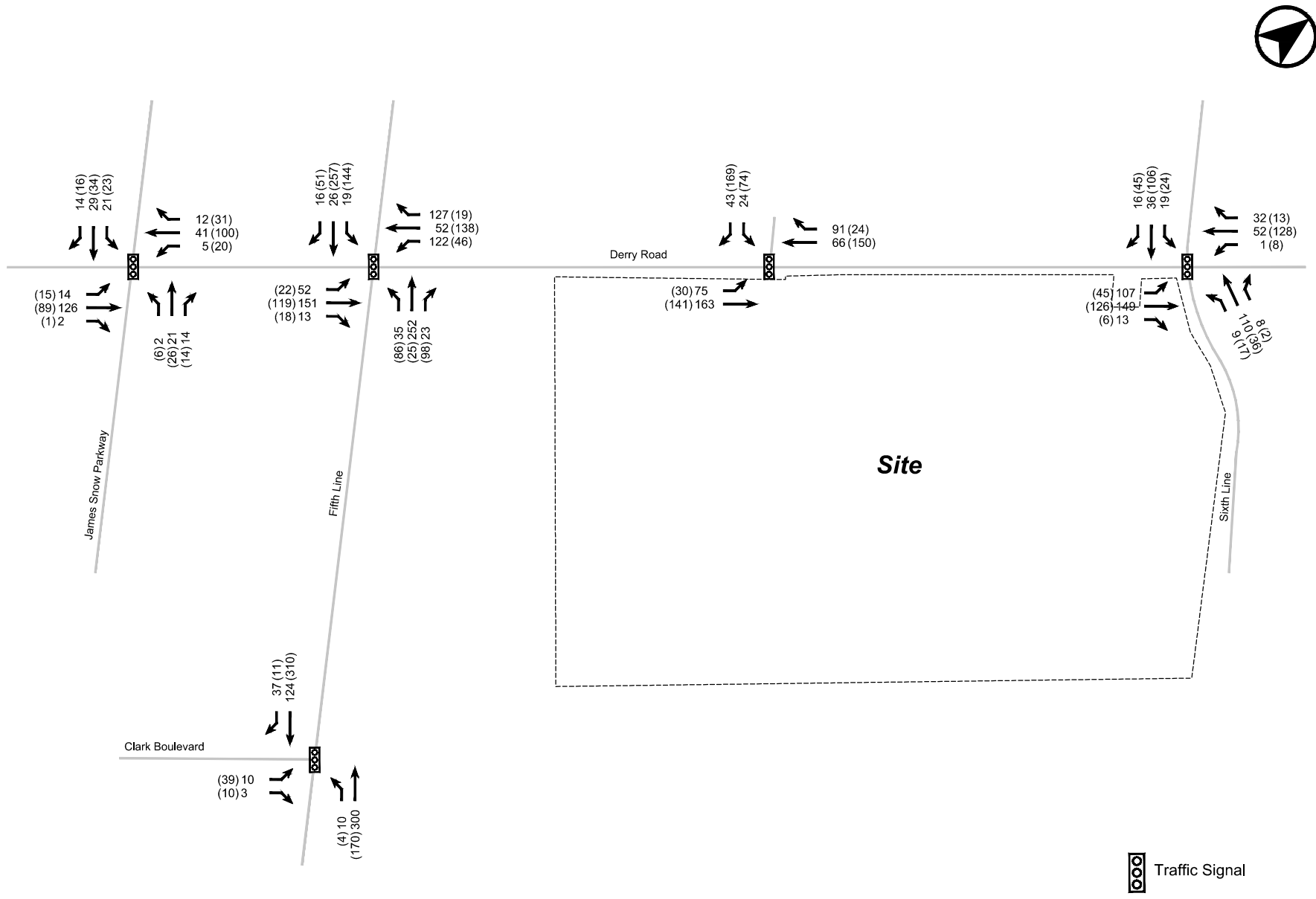


FIGURE 11 BACKGROUND TRAFFIC GROWTH VOLUMES - 2027 HORIZON - SCENARIO 1

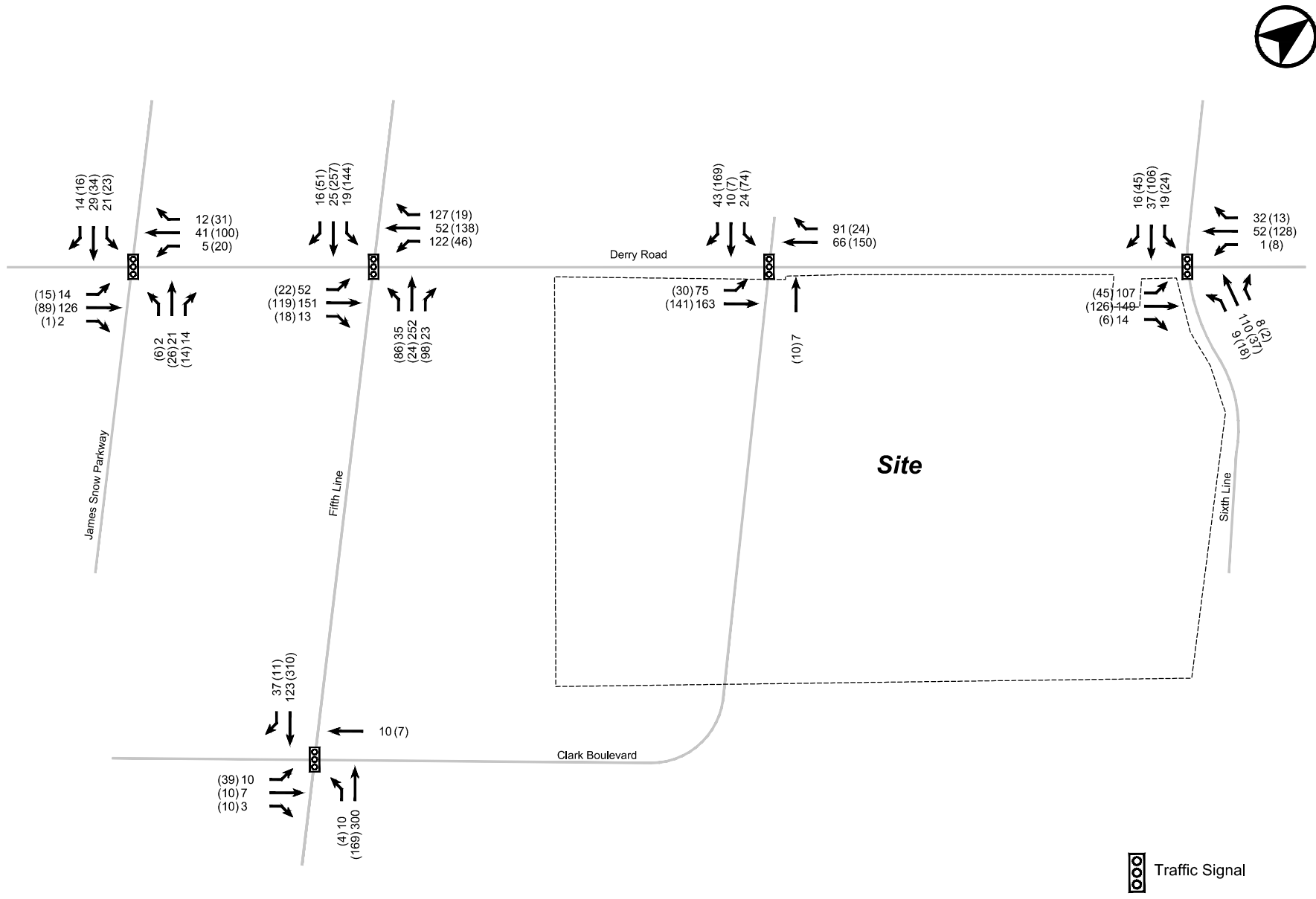


FIGURE 12 BACKGROUND TRAFFIC GROWTH VOLUMES - 2027 HORIZON - SCENARIO 2

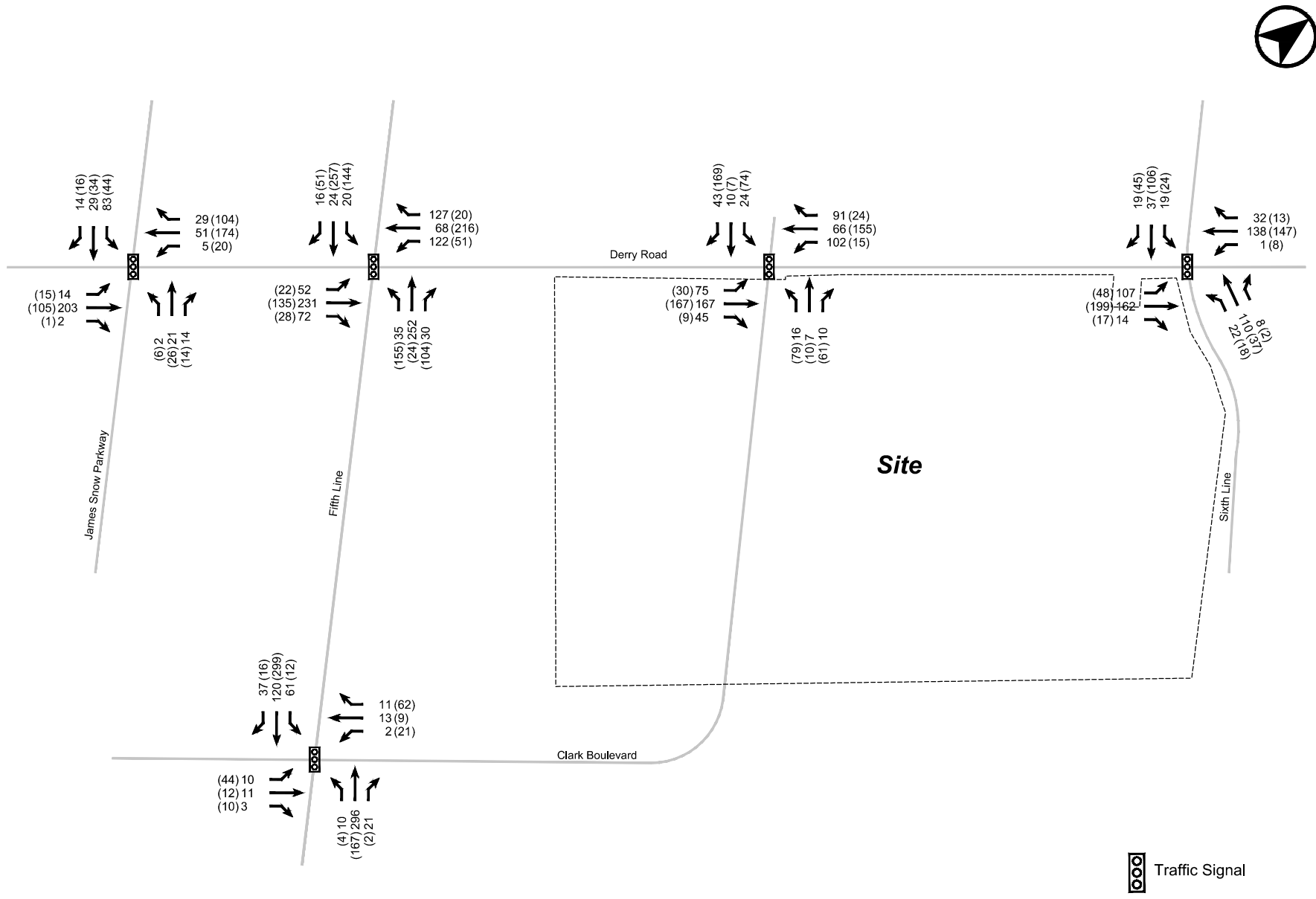


FIGURE 13 BACKGROUND TRAFFIC GROWTH VOLUMES - 2027 HORIZON - SCENARIO 3

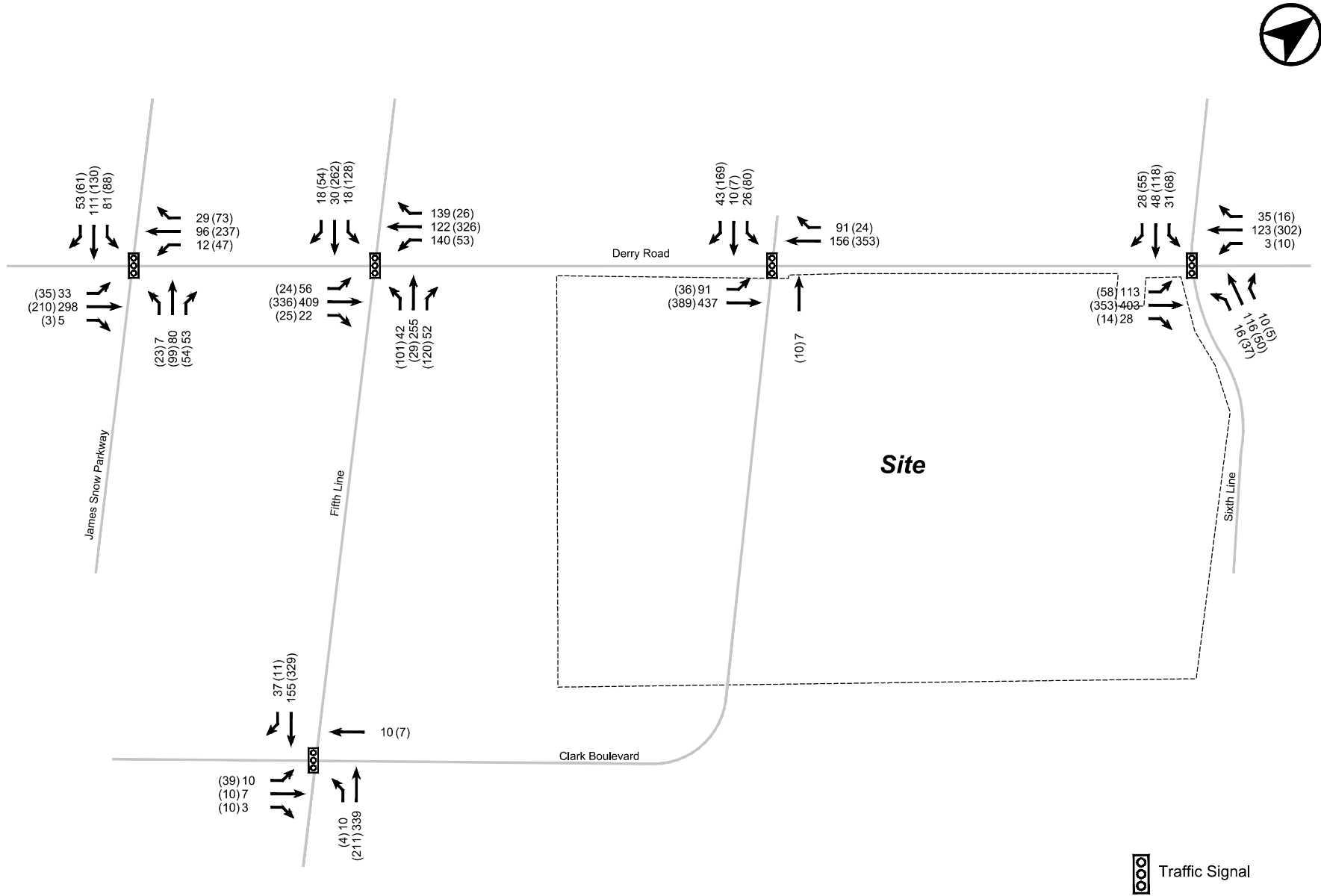


FIGURE 14 BACKGROUND TRAFFIC GROWTH VOLUMES - 2032 HORIZON - SCENARIO 4

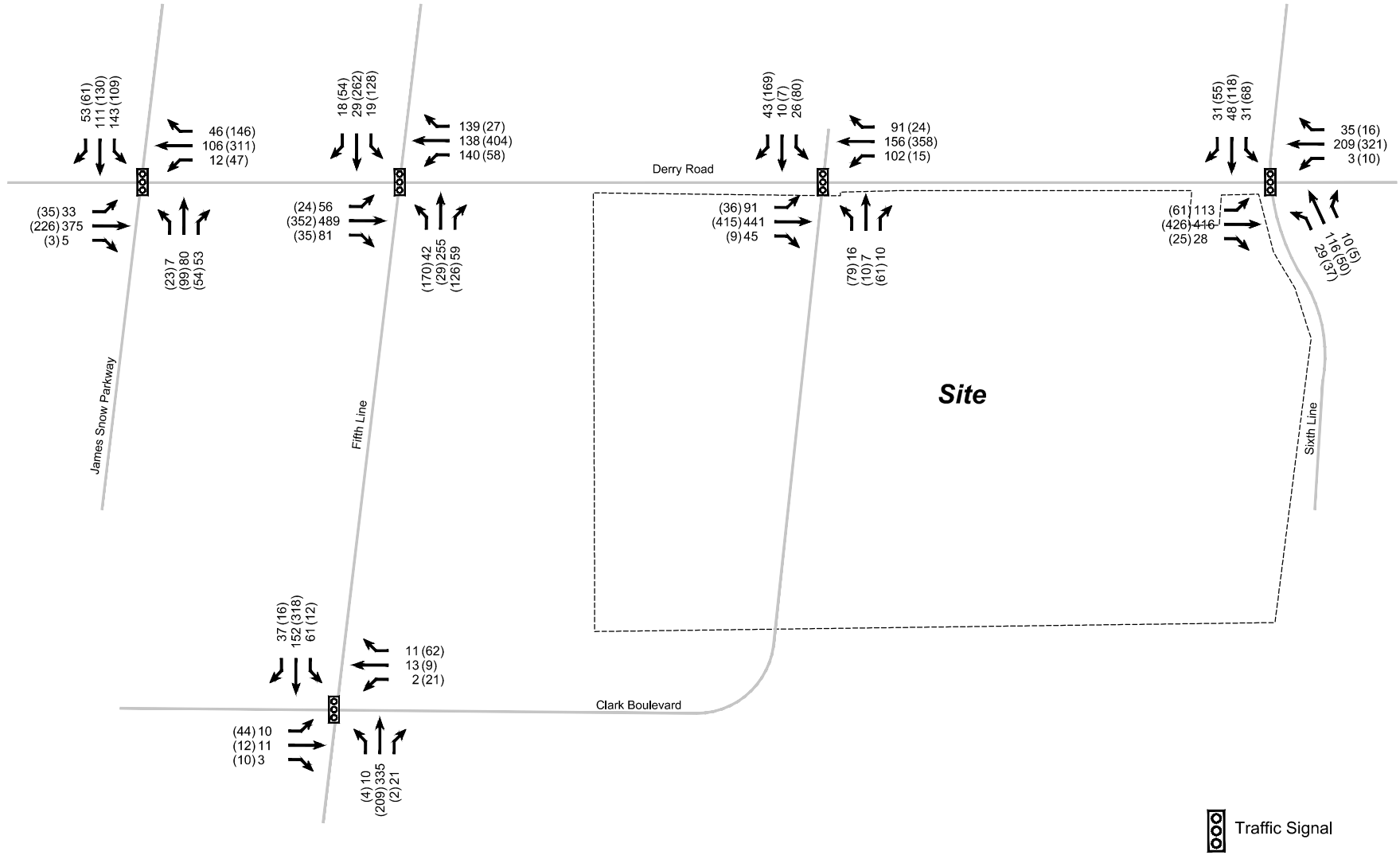


FIGURE 15 BACKGROUND TRAFFIC GROWTH VOLUMES - 2032 HORIZON - SCENARIO 5

7.2.5 Future Background Traffic Volumes

Future background traffic volumes represent the sum of existing traffic volumes and background growth volumes specific to each scenario. Future background traffic volumes for the five background growth scenarios are illustrated in **Figure 16** through **Figure 20**.

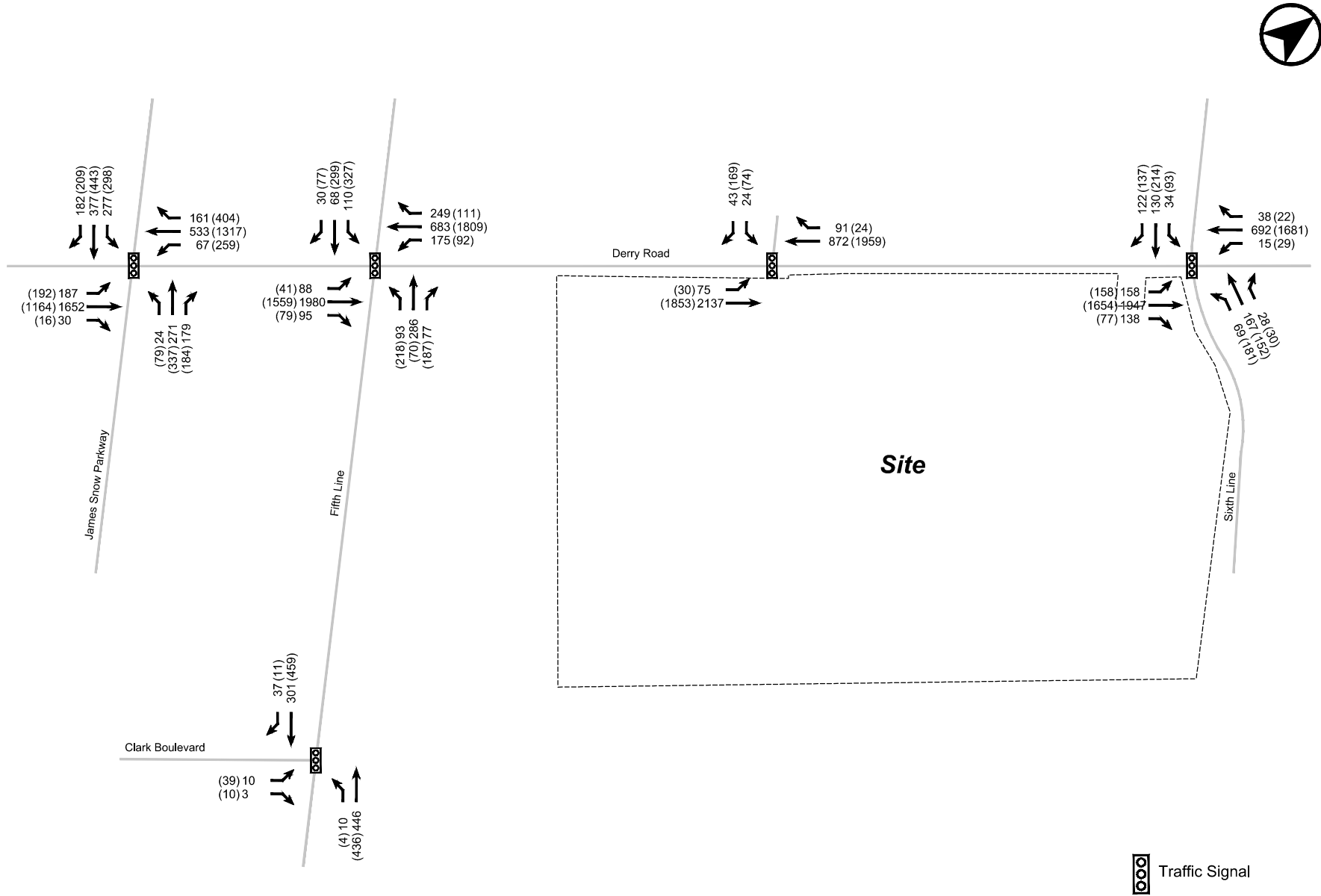


FIGURE 16 FUTURE BACKGROUND TRAFFIC VOLUMES - 2027 HORIZON - SCENARIO 1

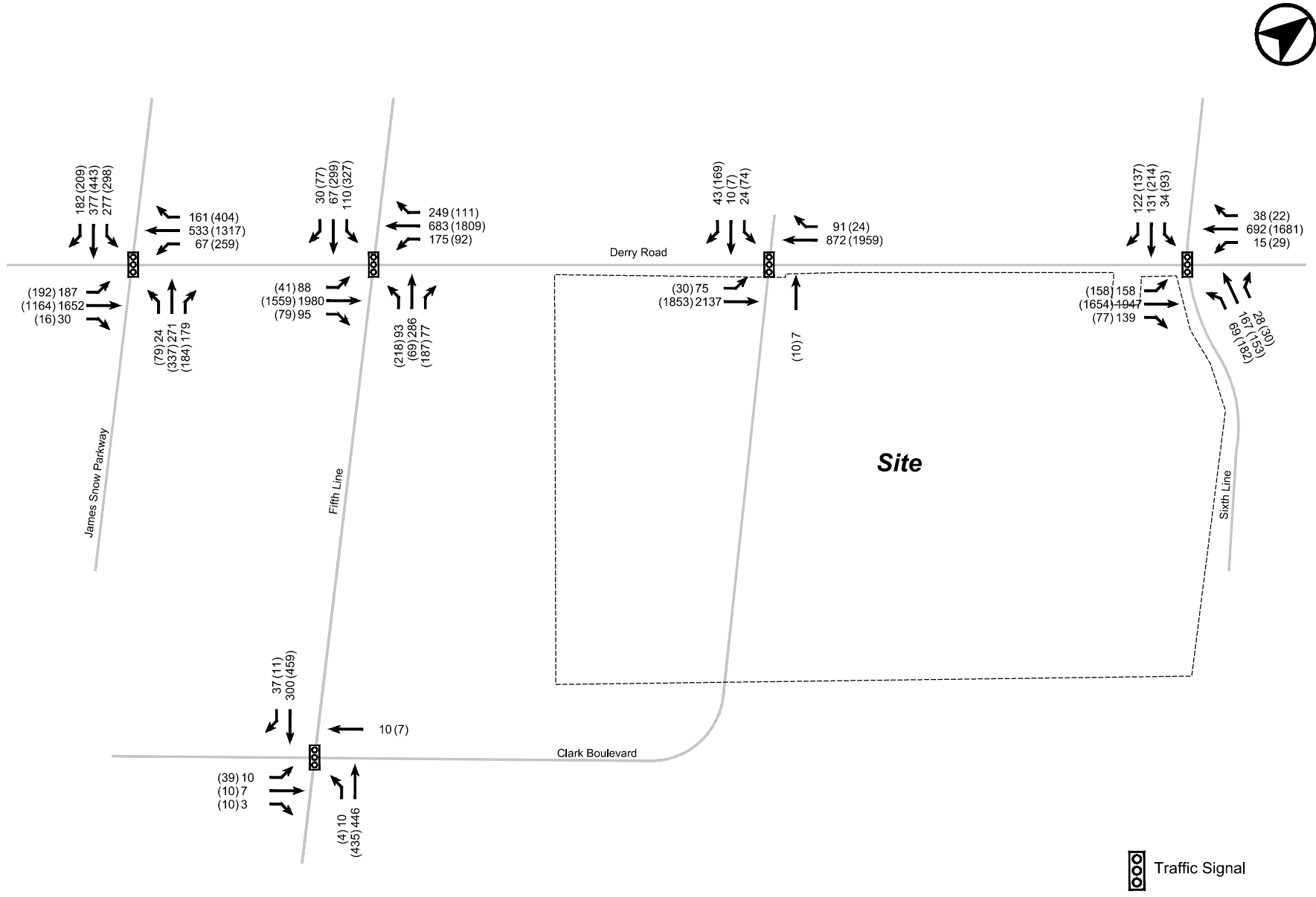


FIGURE 17 FUTURE BACKGROUND TRAFFIC VOLUMES - 2027 HORIZON - SCENARIO 2

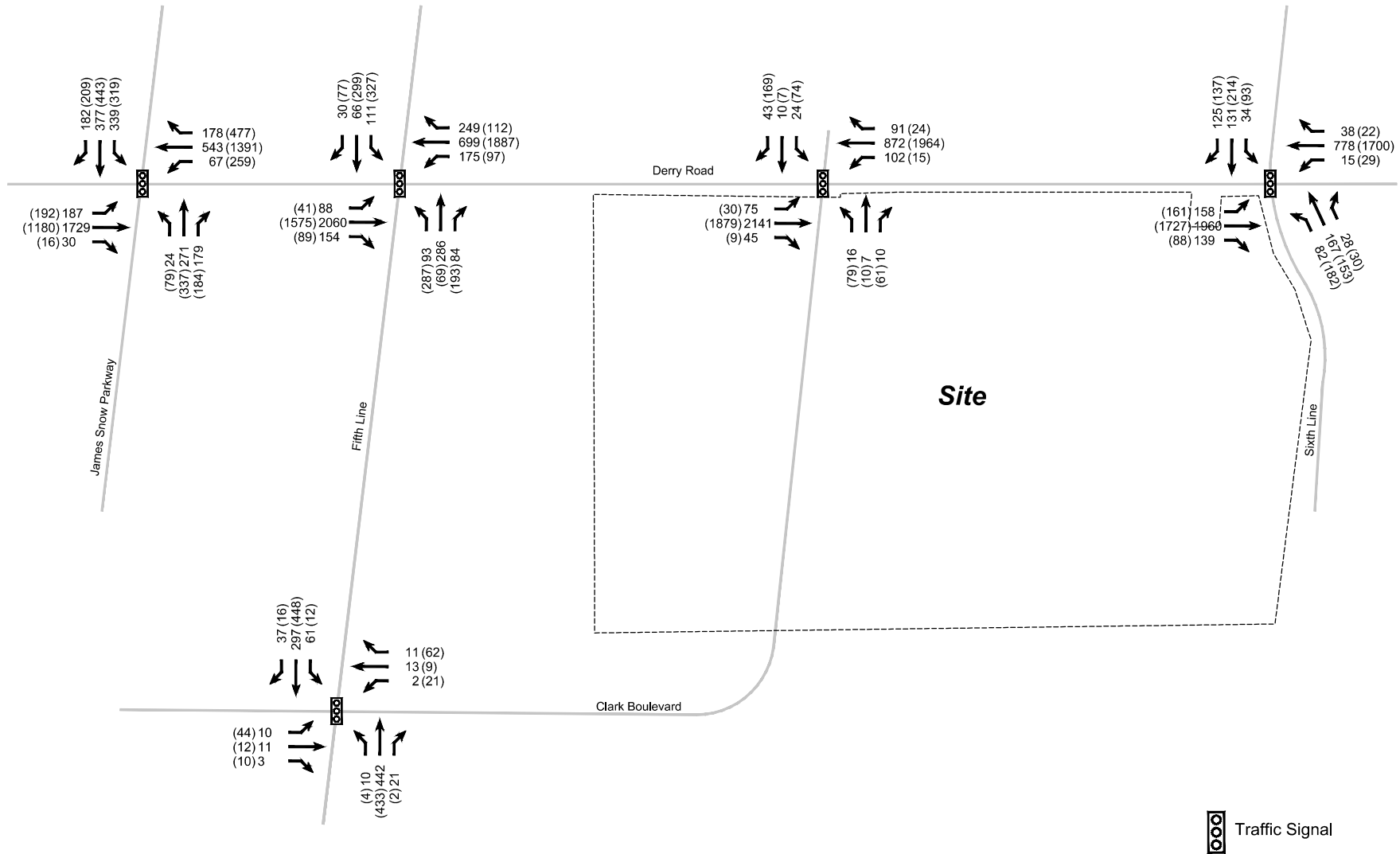


FIGURE 18 FUTURE BACKGROUND TRAFFIC VOLUMES - 2027 HORIZON - SCENARIO 3

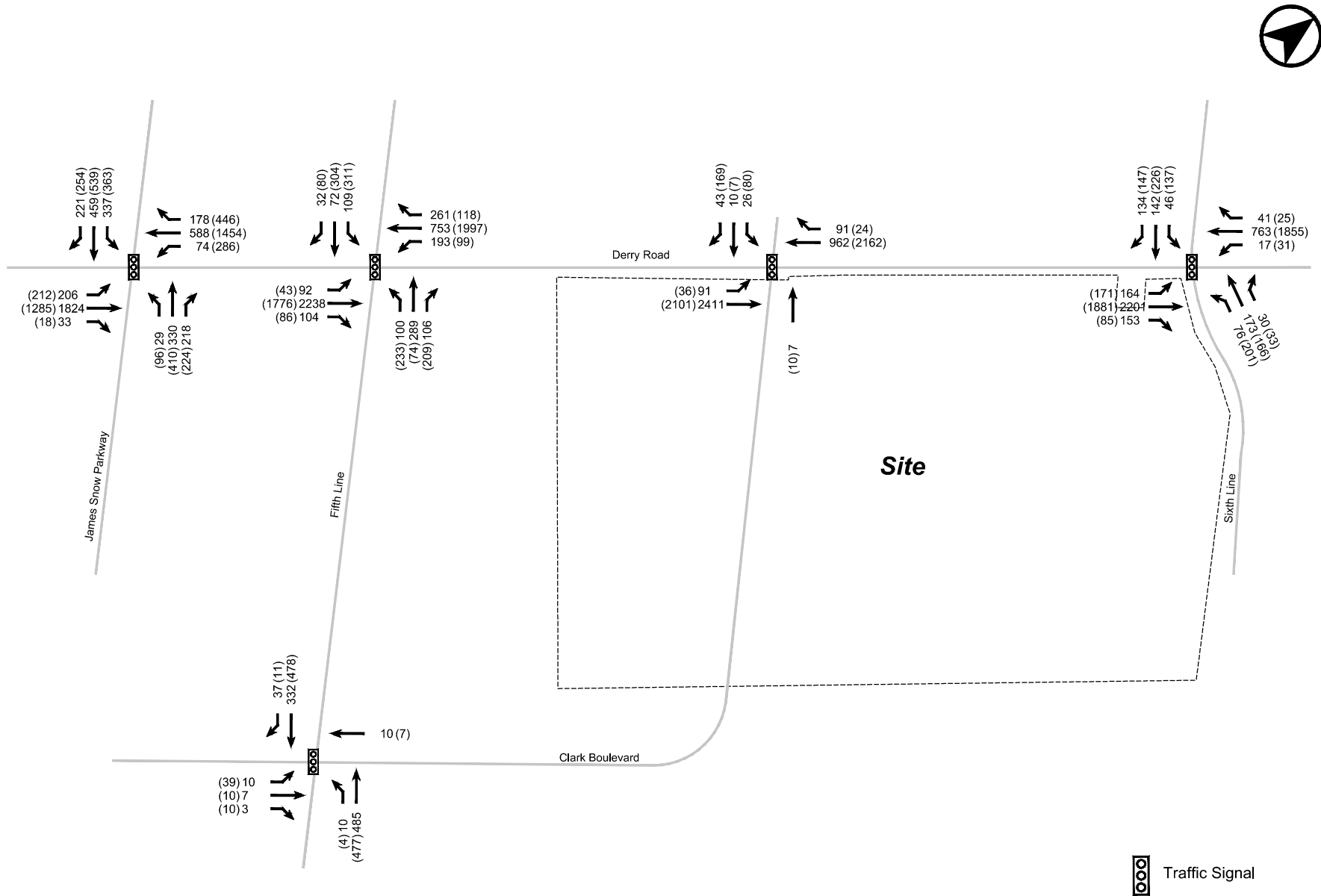


FIGURE 19 FUTURE BACKGROUND TRAFFIC VOLUMES - 2032 HORIZON - SCENARIO 4

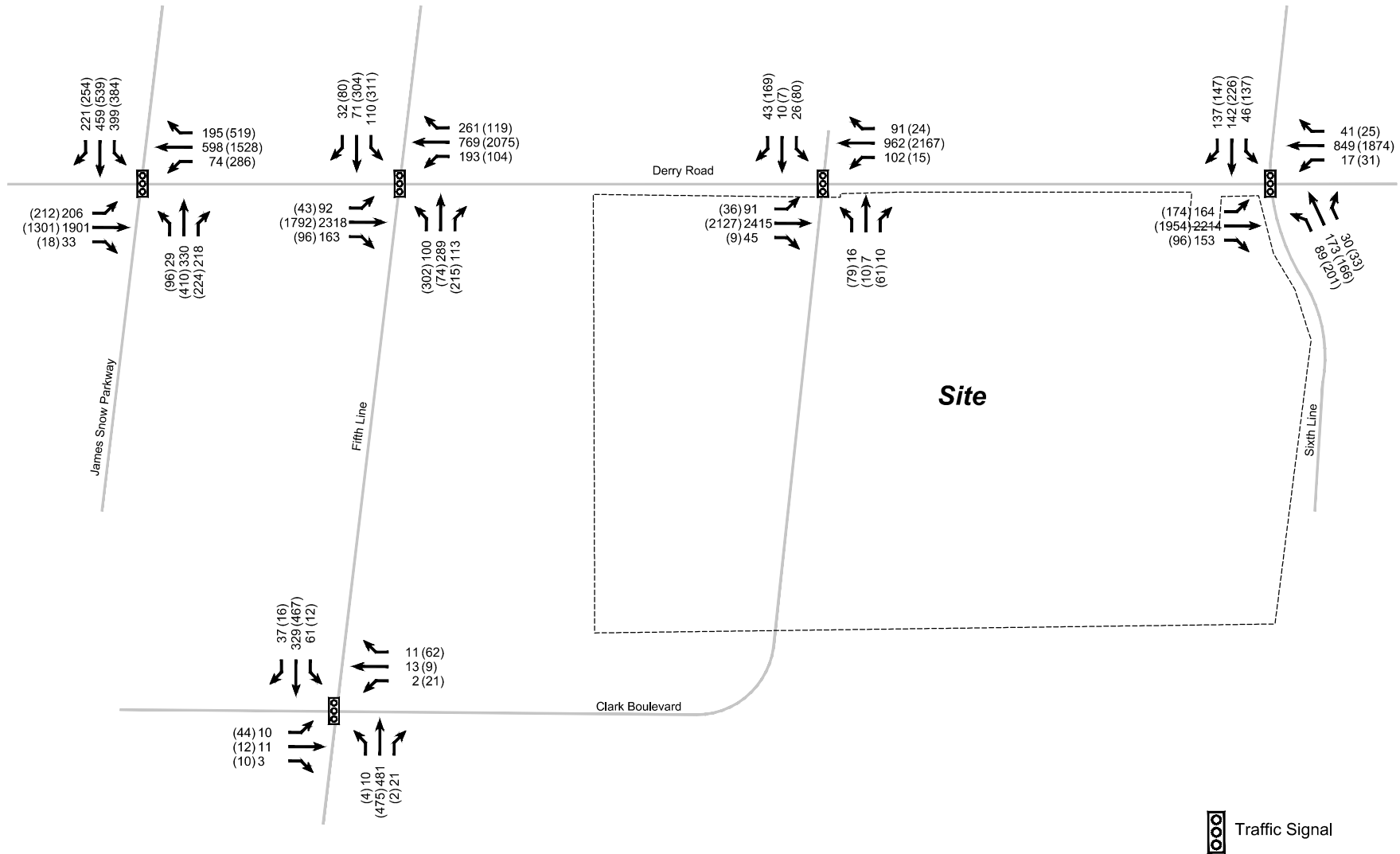


FIGURE 20 FUTURE BACKGROUND TRAFFIC VOLUMES - 2032 HORIZON - SCENARIO 5

7.3 SITE TRAFFIC

7.3.1 Existing Site Traffic

The site is currently occupied by the Trafalgar Golf and Country Club, consisting of several low-rise recreational buildings and a golf course. The volume of traffic associated with these uses is unknown, but it is expected to be minor. For the traffic analysis, no existing traffic was removed from the network with the redevelopment of the site.

7.3.2 Total Site Trip Generation

The total number of weekday peak hour trips associated with each of the three proposed buildings were forecasted based on ITE 11th Edition trip generation rates for LUC 150 – Warehousing. The adopted ITE trip generation rates and proxy data collected by BA Group are summarized in **Table 13**.

TABLE 13: VEHICLE TRIP GENERATION RATE DATA

Warehouse Type	Source	Vehicle Trip Rate (vehicle trips per 1,000 ft ²)					
		AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
General Warehousing	ITE 10 th Edition + Supplement LUC 150 Warehousing General Urban/Suburban	0.13	0.04	0.17	0.05	0.13	0.18
	Prologis 8020 & 8030 Esquesing Line, Milton, ON Tuesday, February 2, 2016	0.13	0.02	0.15	0.02	0.13	0.15
	Prologis 8020 & 8030 Esquesing Line, Milton, ON Thursday, August 16, 2018	0.16	0.03	0.19	0.03	0.15	0.18
	Average	0.14	0.03	0.17	0.03	0.14	0.17
Adopted Trip Rates (ITE)		0.13	0.04	0.17	0.05	0.13	0.18

Notes:

1. This information is property of BA Consulting Group Ltd. It should not be altered, abbreviated, taken out of context, or used for any purpose other than the intended purpose in connection with the Anatolia Milton Lands development application.

Forecasted site trips for each of the three proposed buildings are summarized in **Table 14**.

TABLE 14 TOTAL SITE VEHICLE TRIP GENERATION

Building	GFA	AM Peak Hour			PM Peak Hour		
		In	Out	2-way	In	Out	2-way
Trip Generation Rate (LUC 150) (per 1000 ft ²)		0.13	0.04	0.17	0.05	0.13	0.18
Building 1	1,126,550 ft ²	147	44	192	57	146	203
Building 2	635,635 ft ²	83	25	108	32	82	114
Building 3	198,078 ft ²	26	8	34	10	26	36
Total Vehicle Trips	1,960,264 ft ²	256	77	334	99	254	353

7.3.3 Heavy Vehicle Percentages

The ITE rates summarized in **Table 13** account for both heavy vehicles using the proposed warehouse loading and light vehicles primarily used by warehouse staff. Heavy vehicle percentages for warehouse traffic were adopted from the ITE documentation, as summarized in **Table 15**.

TABLE 15 SITE HEAVY VEHICLE PERCENTAGE

Study	Date	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
ITE 150 – Warehousing	--	8%	24%	12%	31%	10%	16%
Prologis – 8020 & 8030 Esquesing Lane, Milton, ON	Tuesday, February 2 nd , 2016	10%	71%	17%	60%	10%	16%
	Thursday, August 16 th , 2018	9%	35%	13%	31%	5%	10%
Average Heavy Vehicle %		9%	43%	14%	41%	8%	14%
Adopted Heavy Vehicle % (ITE)		8%	24%	12%	31%	10%	16%

Notes:

1. This information is property of BA Consulting Group Ltd. It should not be altered, abbreviated, taken out of context, or used for any purpose other than the intended purpose in connection with the Anatolia Milton Lands development application.

7.3.4 Site Traffic Distribution

Site traffic was assigned to the area road network based on the results of the 2016 TTS, prevailing traffic patterns and area turn restrictions. General direction of approach percentages for work/employment traffic was based on the results of the TTS and is summarized in **Table 16**.

TABLE 16 SITE TRAFFIC DISTRIBUTION

Direction	Route	Light Vehicles ¹		Heavy Vehicles ²	
		Inbound	Outbound	Inbound	Outbound
North	James Snow Parkway	20%	26%	50%	50%
	Fifth Line	1%	2%	0%	0%
	Clark Boulevard	0%	0%	0%	0%
	Sixth Line	1%	1%	0%	0%
South	James Snow Parkway	0%	0%	20%	20%
	Fifth Line	11%	9%	0%	0%
	Sixth Line	5%	4%	0%	0%
East	Derry Road	33%	28%	20%	20%
West	Derry Road	29%	30%	10%	10%
	Clark Boulevard	0%	0%	0%	0%
Total		100%	100%	100%	100%

Notes:

1. Light vehicle distribution is based on work trips for TTS Zones 4112, 4116-4118, 4121, 4145, 4147 and 4148. TTC queries and analysis are provided in **Appendix H**.
2. Heavy vehicle distribution is based on area travel patterns for heavy vehicles.

7.3.5 Site Traffic Volumes

As summarized above, vehicle trips associated with the proposed development are forecasted based on ITE 11th Edition trip generation rates for LUC 150 – Warehousing and separated into heavy and light vehicle trips based on ITE data.

Vehicle trips, disaggregated by vehicle type and by building within the proposed development, are summarized in **Table 17**.

TABLE 17 SITE VEHICLE TRIP SUMMARY

Vehicle Type	AM Peak Hour			PM Peak Hour		
	In	Out	2-way	In	Out	2-way
Building 1						
Light Vehicles	136	33	169	39	131	170
Heavy Vehicles	12	11	23	18	15	33
Total	148	44	192	57	146	203
Building 2						
Light Vehicles	77	19	96	22	74	96
Heavy Vehicles	7	6	13	10	8	18
Total	84	25	109	32	82	114
Building 3						
Light Vehicles	24	6	30	7	23	30
Heavy Vehicles	2	2	4	3	3	6
Total	26	8	34	10	26	36
Total Vehicle Trips	258	77	335	99	254	353

Site traffic route choices vary depending on the construction of the Clark Boulevard extension between Fifth Line and the site, necessitating a separate assignment for background growth Scenario 1.

The site is expected to generate a total of 335 and 353 two-way trips, during the morning and afternoon peak period, respectively. Within this total, 40 two-way trips during the morning peak period and 57 two-way trips during the afternoon peak period are expected to be heavy vehicles (trucks).

Light vehicle site traffic volumes for Scenario 1 are illustrated in **Figure 21** while light vehicle site volumes for Scenarios 2 through 5 are illustrated in **Figure 22**.

Heavy vehicle site traffic volumes for Scenario 1 are illustrated in **Figure 23** while heavy vehicle site volumes for Scenarios 2 through 5 are illustrated in **Figure 24**.

Total vehicle site traffic volumes for Scenario 1 are illustrated in **Figure 25** while total vehicle site volumes for Scenarios 2 through 5 are illustrated in and **Figure 26**.

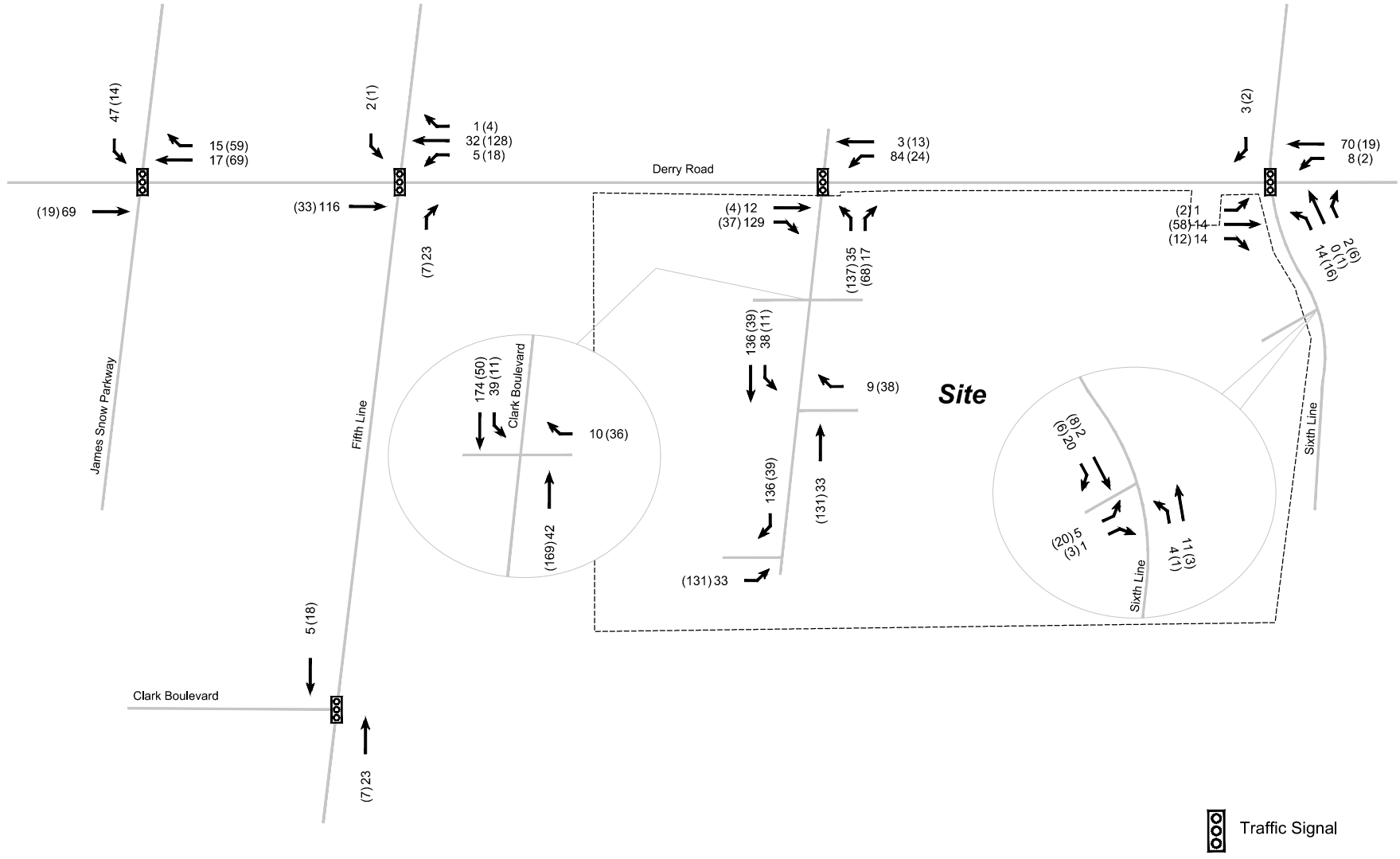


FIGURE 21 LIGHT VEHICLE TRAFFIC VOLUMES - SCENARIO 1

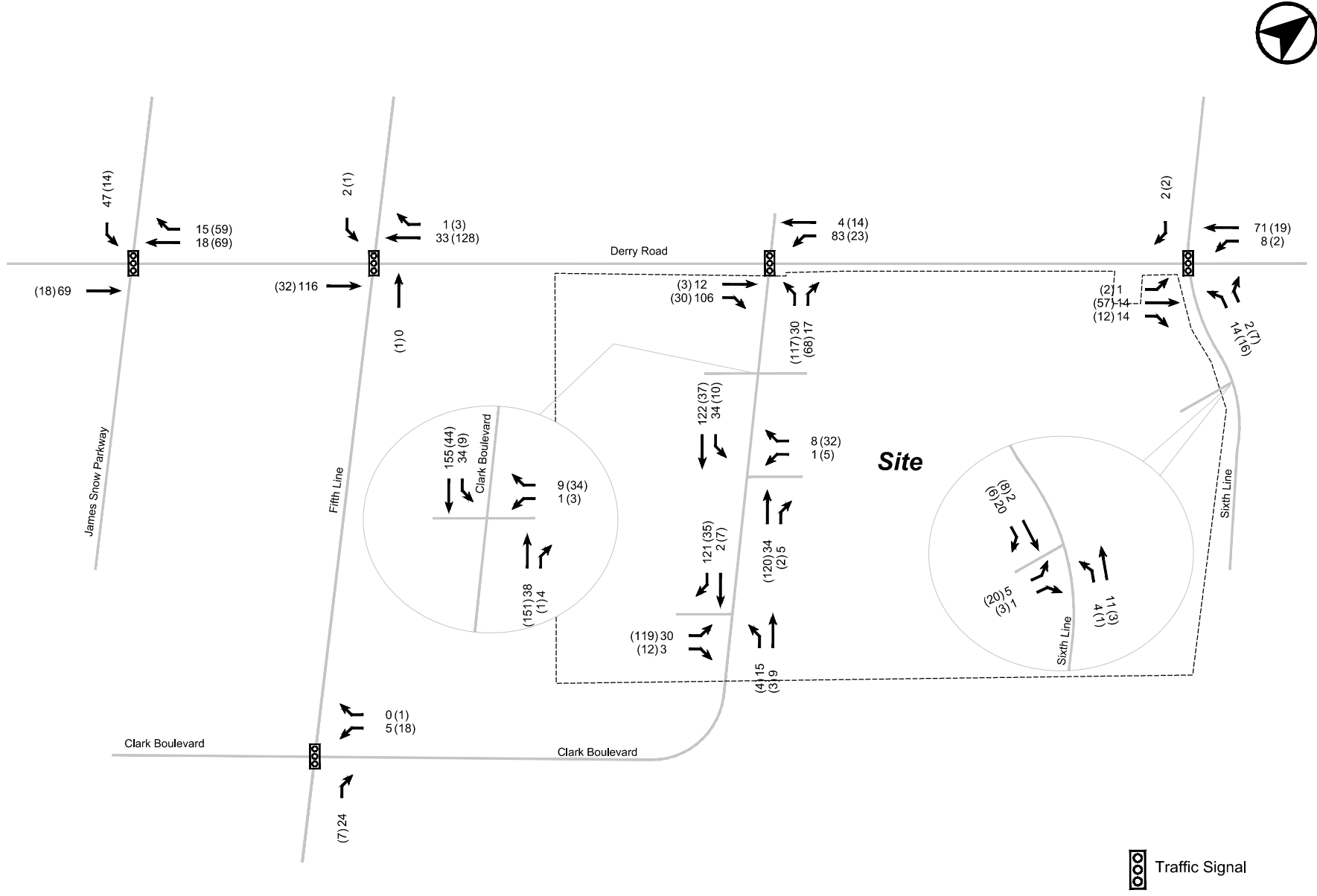


FIGURE 22 LIGHT VEHICLE SITE TRAFFIC VOLUMES - SCENARIOS 2 THROUGH 5

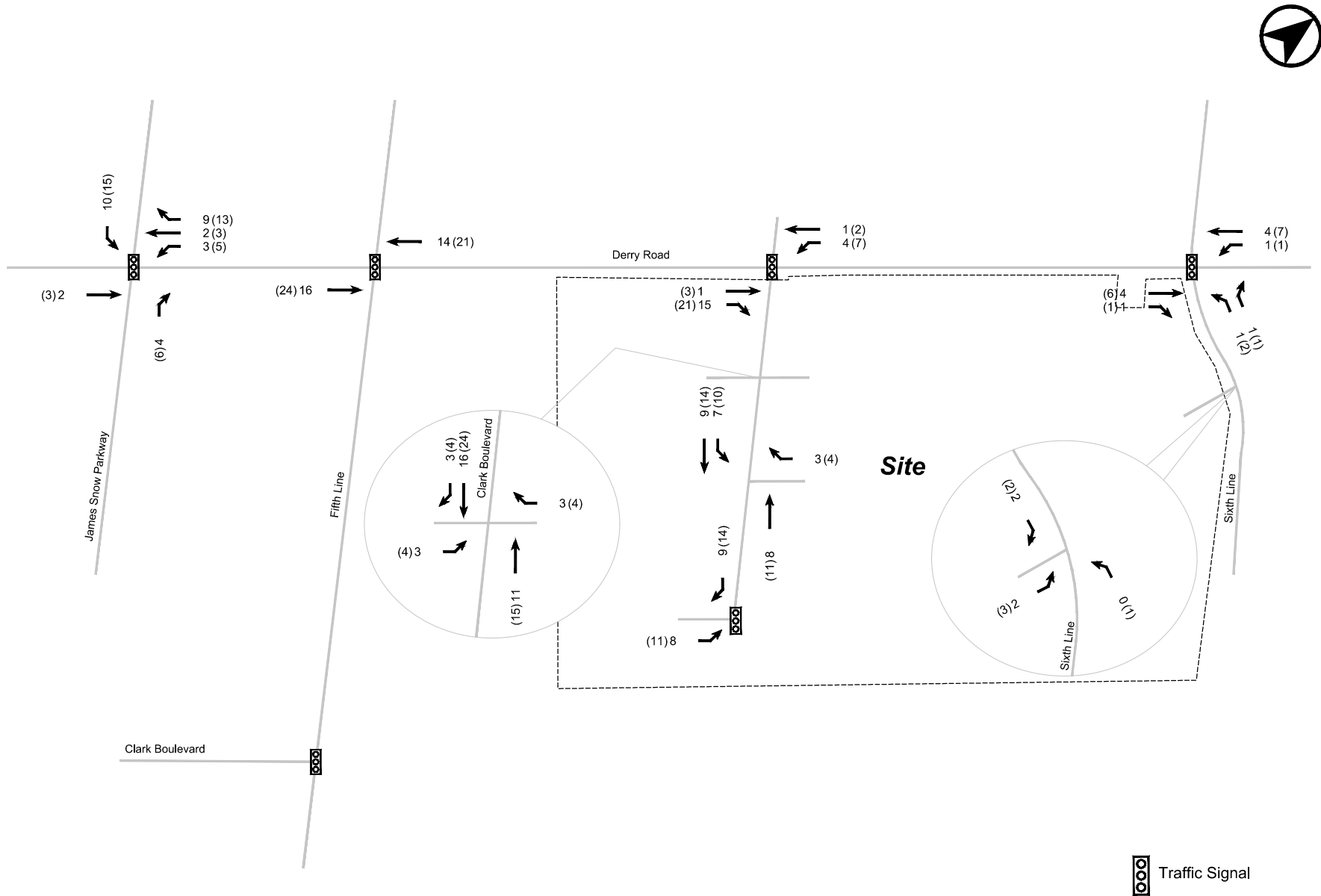


FIGURE 23 HEAVY VEHICLE SITE TRAFFIC VOLUMES - SCENARIO 1

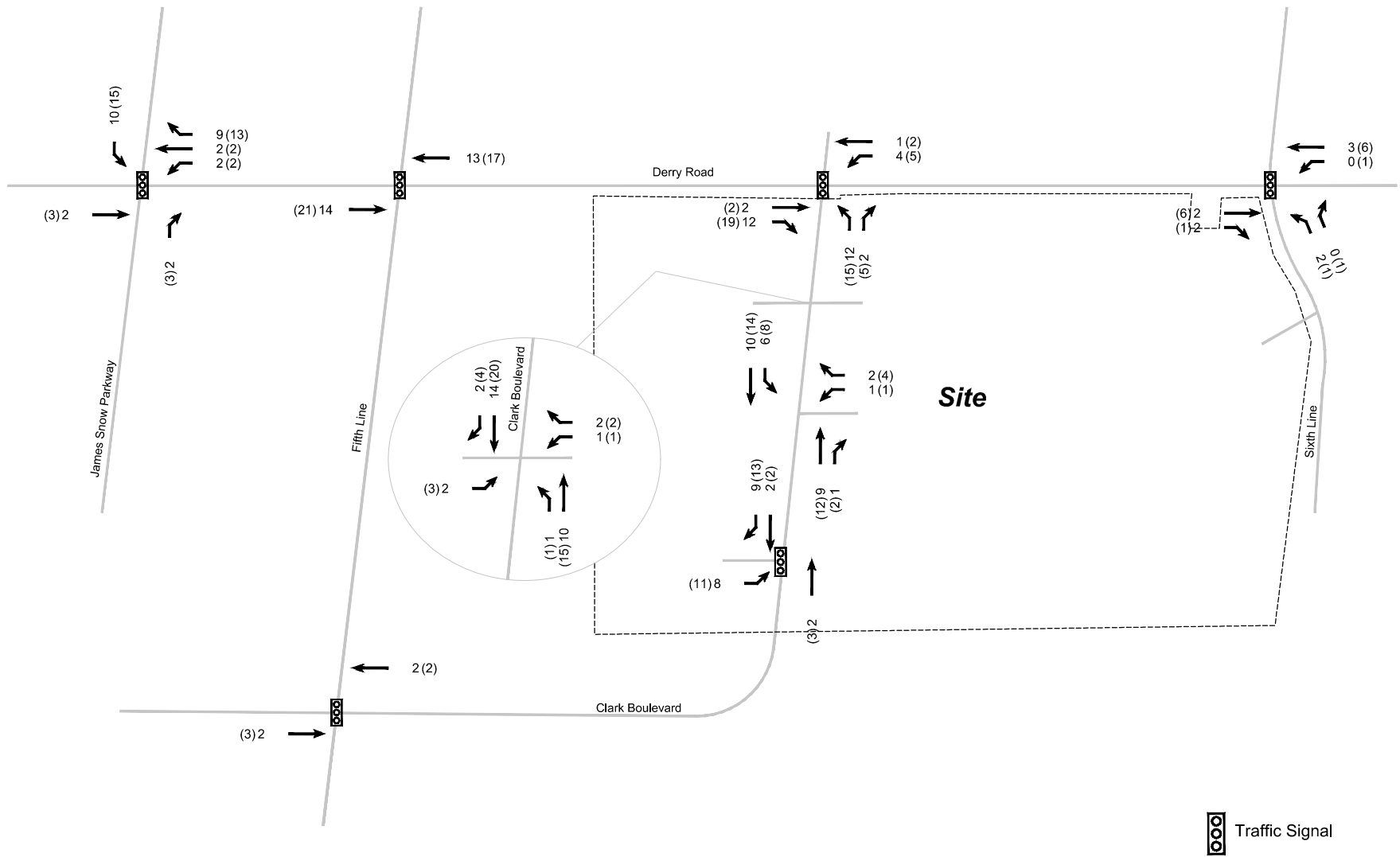


FIGURE 24 HEAVY VEHICLE SITE TRAFFIC VOLUMES - SCENARIOS 2 THROUGH 5

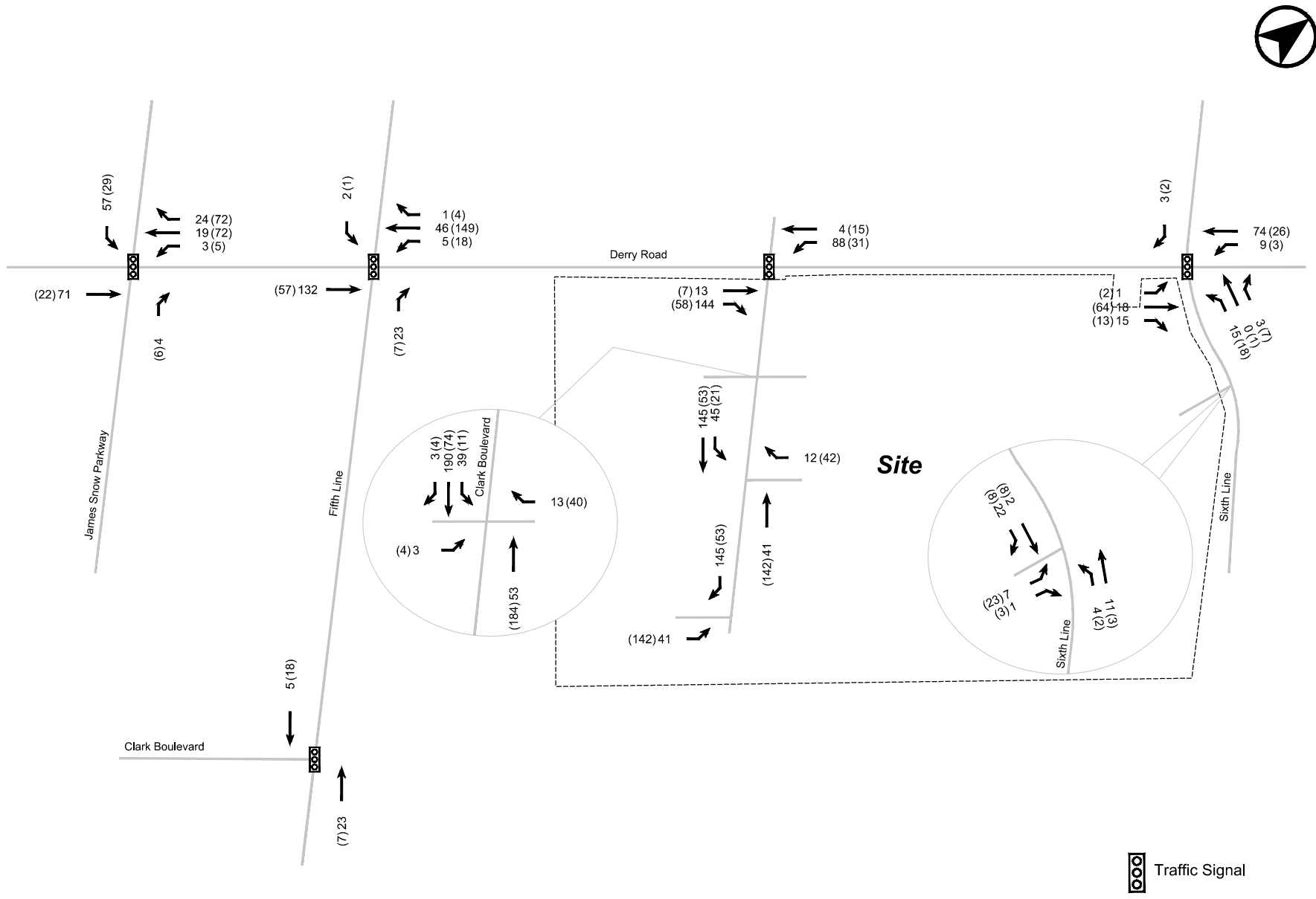


FIGURE 25 TOTAL SITE TRAFFIC VOLUMES - SCENARIO 1

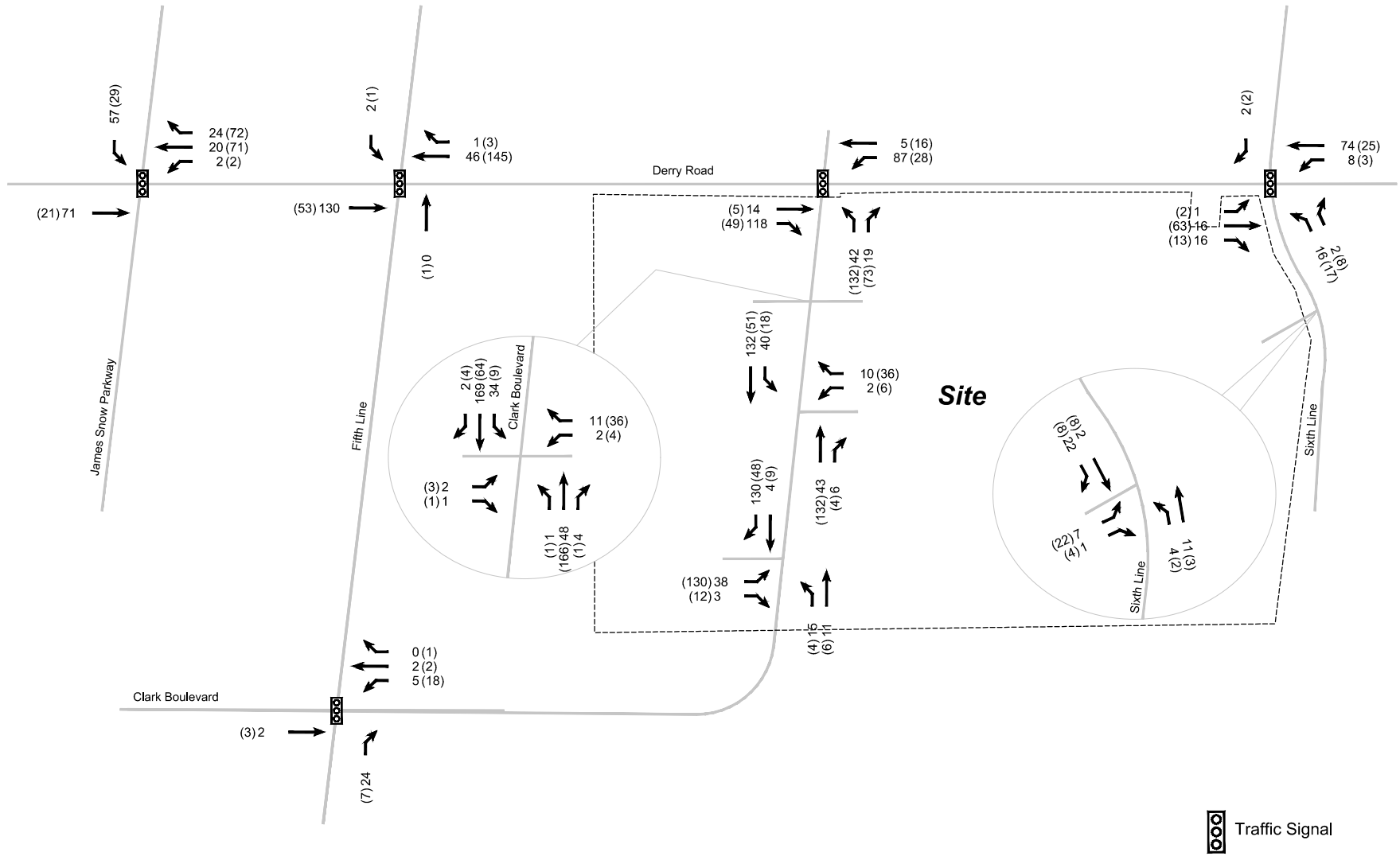


FIGURE 26 TOTAL SITE TRAFFIC VOLUMES - SCENARIOS 2 THROUGH 5

7.4 FUTURE TOTAL TRAFFIC VOLUMES

Future total traffic volumes represent the sum of future background traffic volumes and total site traffic volumes for a given scenario. Future total volumes for the five analysis scenarios are illustrated in **Figure 27** through **Figure 31**.

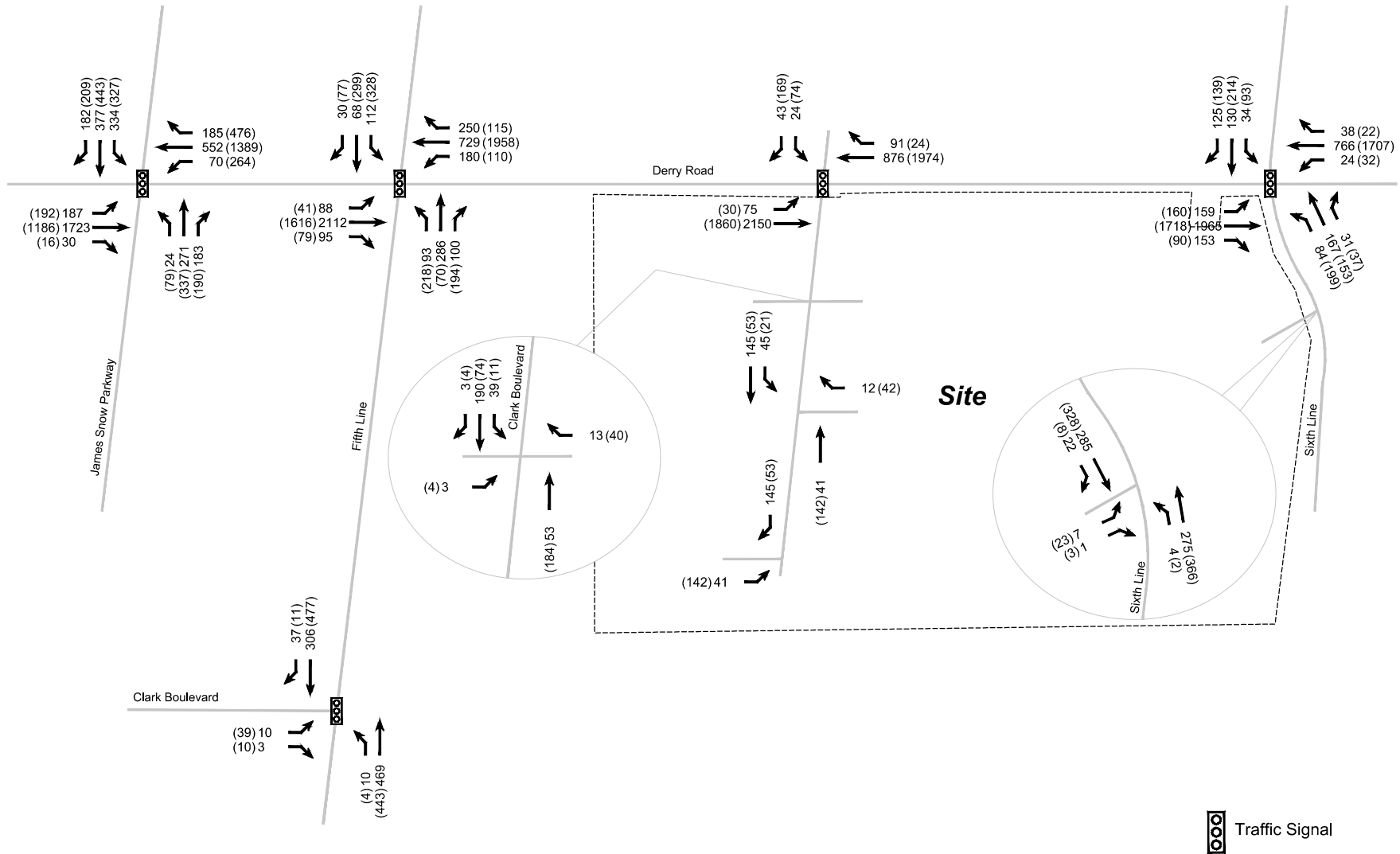


FIGURE 27 FUTURE TOTAL TRAFFIC VOLUMES - 2027 HORIZON - SCENARIO 1

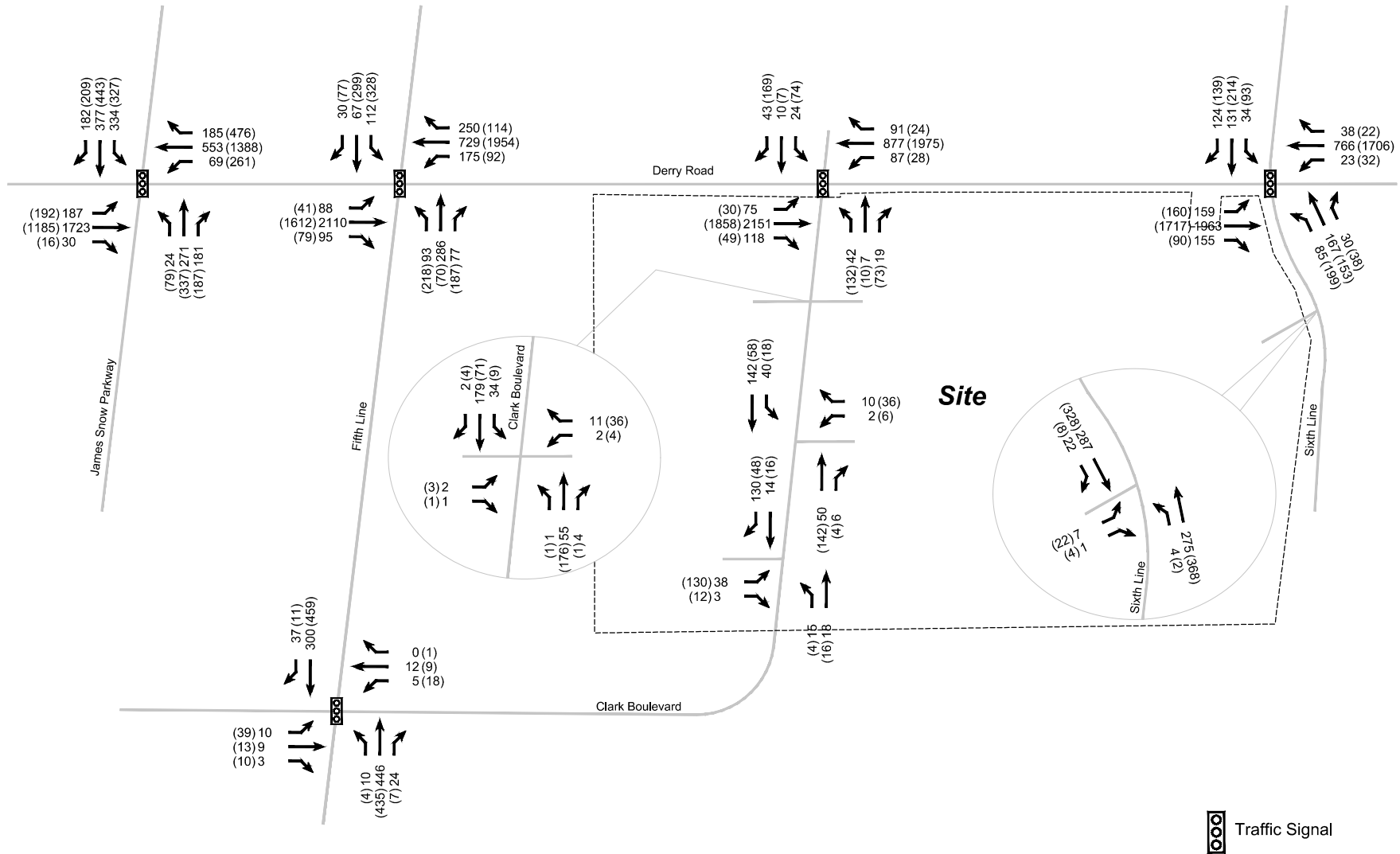


FIGURE 28 FUTURE TOTAL TRAFFIC VOLUMES - 2027 HORIZON - SCENARIO 2

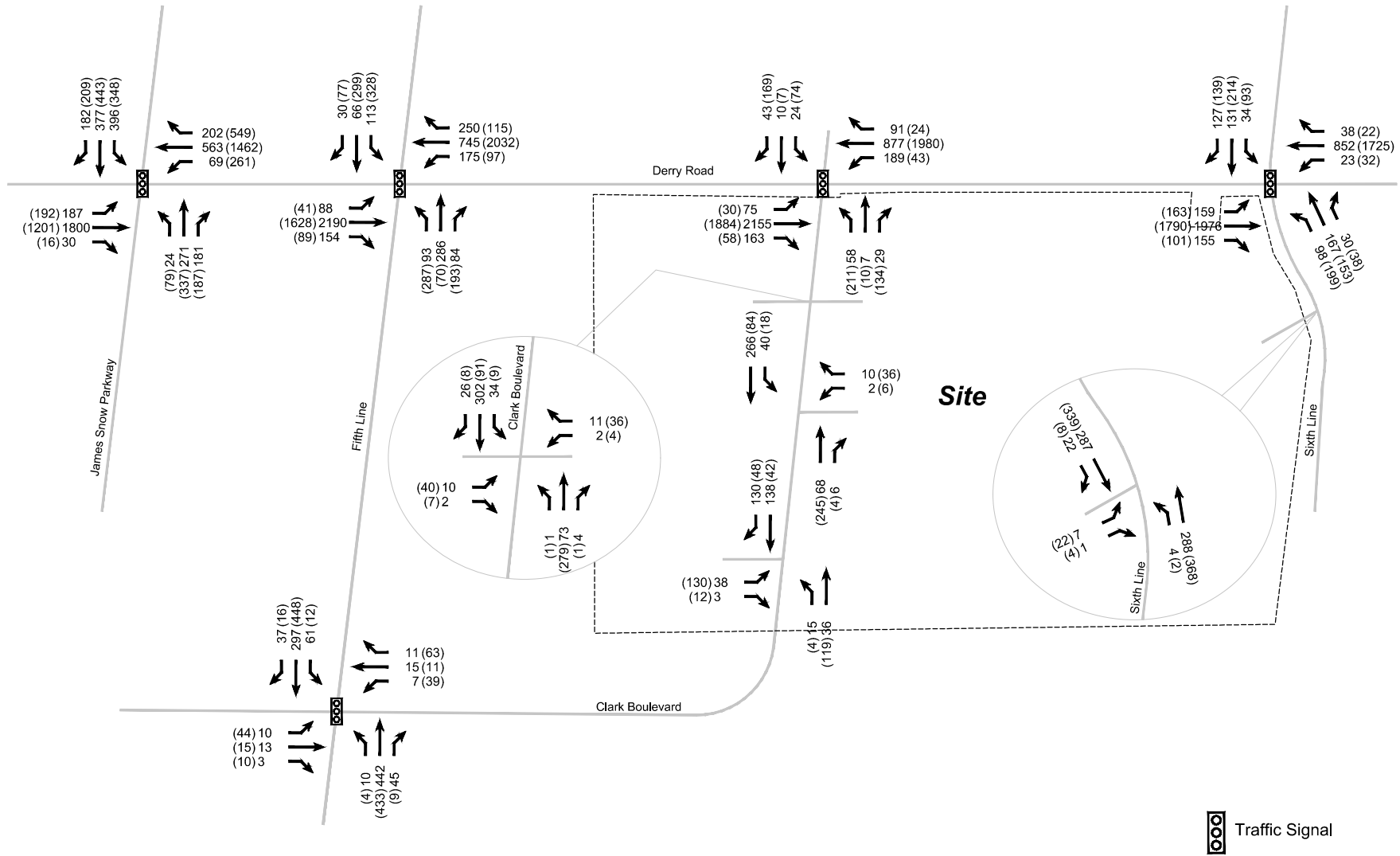


FIGURE 29 FUTURE TOTAL TRAFFIC VOLUMES - 2027 HORIZON - SCENARIO 3

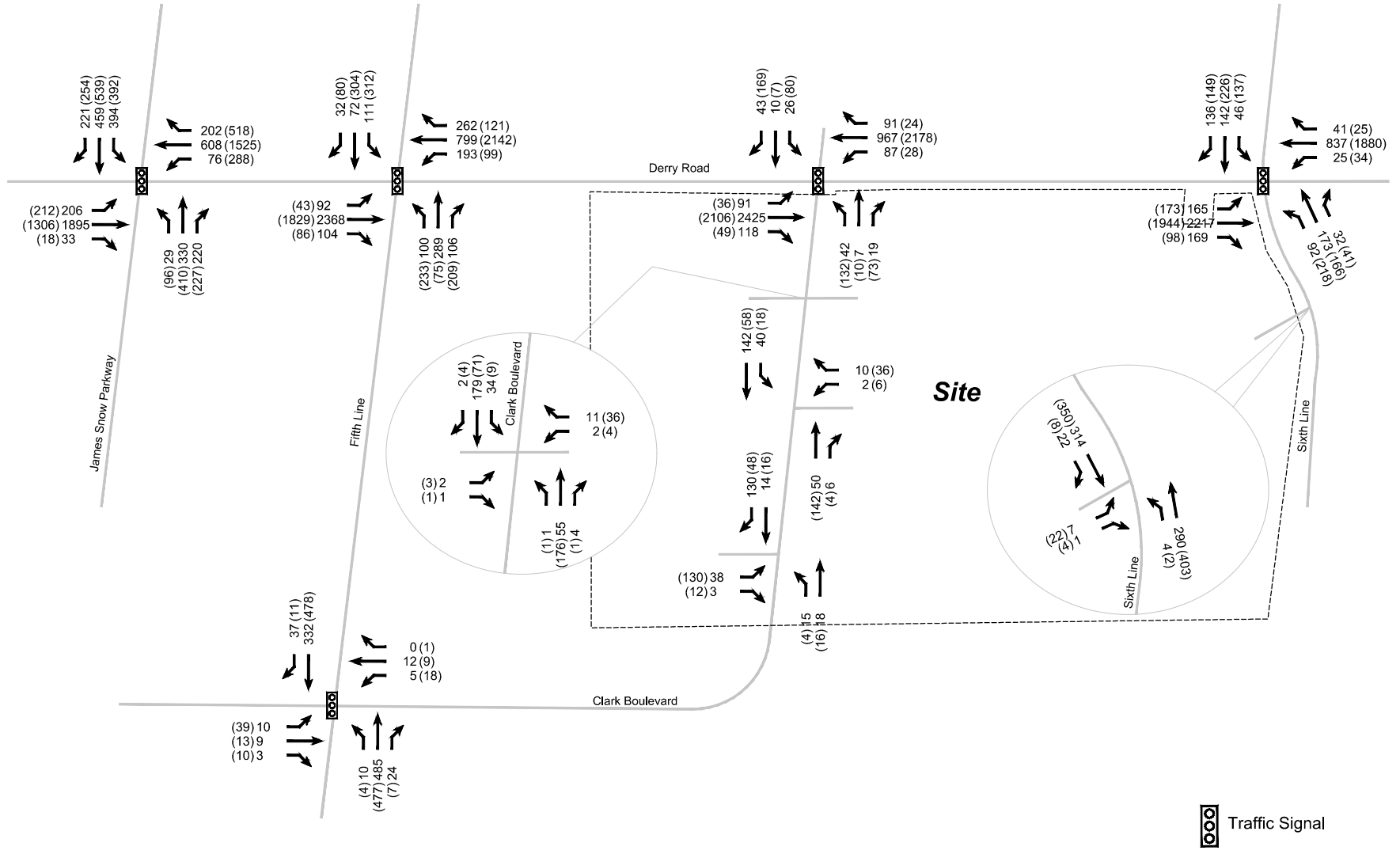


FIGURE 30 FUTURE TOTAL TRAFFIC VOLUMES - 2032 HORIZON - SCENARIO 4

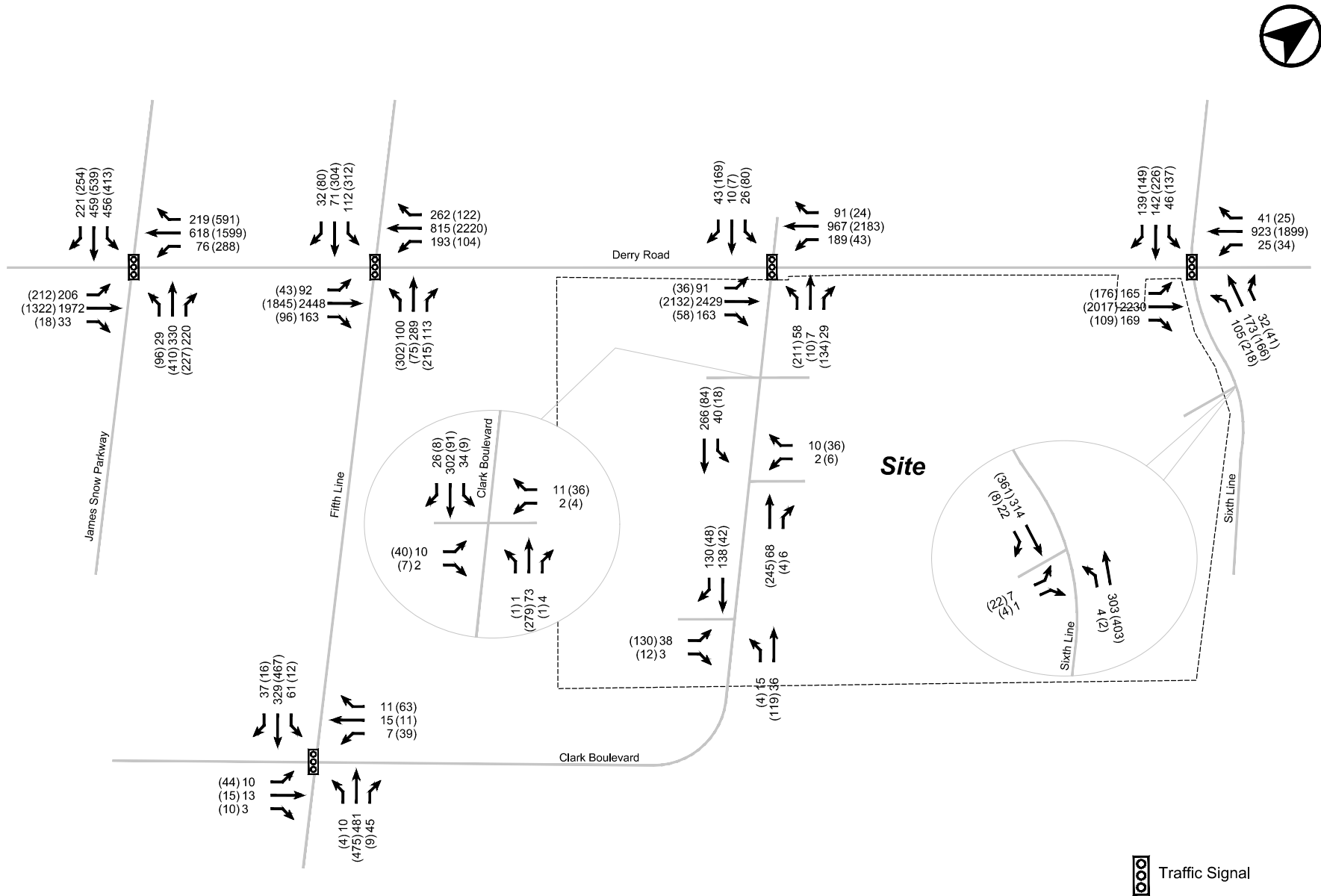


FIGURE 31 FUTURE TOTAL TRAFFIC VOLUMES - 2032 HORIZON - SCENARIO 5

8.0 TRAFFIC OPERATIONS ANALYSIS

8.1 ANALYSIS METHODOLOGY

Synchro Version 11 and the Highway Capacity Manual (HCM) methodology were used to analyze the study area signalized and unsignalized stop-controlled intersections.

For signalized intersections, the volume-to-capacity ratio (v/c) is an indicator of the capacity utilization for the key movements in the intersection. A v/c of 1.00 indicates that a traffic movement through an intersection is operating at or near maximum capacity.

For unsignalized intersections, level of service (LOS) characterizes operational conditions for key movements in terms of average delay experienced by vehicles attempting to complete a manoeuvre through the intersection. LOS 'A' represents a good level of service with short delays, while LOS 'F' represents a poor level of service with extended delays.

8.2 ANALYSIS ASSUMPTION AND PARAMETERS

The Synchro analysis performed conforms to the requirements of the *Halton Regional Guidelines for Using Synchro Version 7.0*.

Existing traffic signal timing plans for study area intersections have been obtained from the Region of Halton and are attached in **Appendix I**. Traffic signal timings for future intersections where Clark Boulevard meets Fifth Line and Derry Road have been assumed based on the timing and cycle characteristics of surrounding intersections.

8.3 TRAFFIC ANALYSIS SUMMARY

Intersection capacity analysis results include the following scenarios:

- 2023 Existing Conditions
- 2027 Future Horizon
 - Scenario 1 Future Background Conditions
 - Scenario 1 Future Total Conditions
 - Scenario 2 Future Background Conditions
 - Scenario 2 Future Total Conditions
 - Scenario 3 Future Background Conditions
 - Scenario 3 Future Total Conditions
- 2032 Future Horizon
 - Scenario 4 Future Background Conditions
 - Scenario 4 Future Total Conditions
 - Scenario 5 Future Background Conditions
 - Scenario 5 Future Total Conditions
- 2032 Future Horizon Sensitivity – Derry Road Expansion
 - Scenario 6 Future Background Conditions
 - Scenario 6 Future Total Conditions
 - Scenario 7 Future Background Conditions
 - Scenario 7 Future Total Conditions

The traffic analysis is provided for signalized and unsignalized intersections. Detailed Synchro analysis sheets are provided in **Appendix J**.

8.3.1 2023 Existing Conditions

Under existing conditions, the study area includes three signalized intersections. Analysis results for these intersections are summarized below.

Sixth Line / Derry Road

The intersection of **Sixth Line / Derry Road** operates with a cycle length of 111 seconds under existing conditions. Analysis results for this intersection are summarized in **Table 18**.



TABLE 18 EXISTING SIXTH LINE / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	V/C	LOS
EBL	0.10 (0.59)	A (C)
EBTR	0.95 (0.86)	C (C)
WBL	0.15 (0.17)	B (B)
WBTR	0.35 (0.87)	A (C)
NBL	0.62 (0.90)	E (F)
NBTR	0.25 (0.38)	D (D)
SBL	0.12 (0.32)	D (D)
SBTR	0.68 (0.48)	D (D)
Overall	0.88 (0.87)	C (C)

Notes:

1. 00 (00) – AM (PM)
2. Capacity analysis is carried out using the existing signal timing plan for this intersection.

This intersection operates acceptably under existing conditions.

Fifth Line / Derry Road

The intersection of **Fifth Line / Derry Road** operates with a cycle length of 120 seconds under existing conditions. Analysis results for this intersection are summarized in **Table 19**.

TABLE 19 EXISTING FIFTH LINE / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	V/C	LOS
EBL	0.09 (0.21)	A (C)
EBTR	0.90 (0.84)	B (C)
WBL	0.47 (0.30)	C (B)
WBTR	0.35 (0.92)	A (C)
NBL	0.39 (0.45)	D (D)
NBTR	0.21 (0.21)	D (D)
SBL	0.68 (0.86)	E (E)
SBTR	0.23 (0.13)	D (D)
Overall	0.84 (0.89)	B (C)

Notes:

1. 00 (00) – AM (PM)
2. Capacity analysis is carried out using the existing signal timing plan for this intersection.

This intersection operates acceptably under existing conditions.

James Snow Parkway / Derry Road

The intersection of **James Snow Parkway / Derry Road** operates with a cycle length of 120 seconds under existing conditions. Analysis results for this intersection are summarized in **Table 20**.

TABLE 20 EXISTING JAMES SNOW PARKWAY / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	V/C	LOS
EBL	0.55 (0.58)	D (D)
EBT	0.86 (1.07)	C (F)
EBR	0.02 (0.01)	B (C)
WBL	1.03 (0.64)	F (C)
WBT	0.39 (0.90)	C (D)
WBR	0.10 (0.40)	E (D)
NBL	0.11 (0.34)	D (D)
NBT	0.56 (0.65)	D (D)
NBR	0.11 (0.12)	D (D)
SBL	0.60 (0.67)	C (C)
SBT	0.36 (0.46)	C (D)
SBR	0.12 (0.13)	C (C)
Overall	0.86 (0.85)	D (D)

Notes:

1. 00 (00) – AM (PM)
2. Capacity analysis is carried out using the existing signal timing plan for this intersection.

This intersection operates acceptably under existing conditions.

8.3.2 2027 Future Horizon

Under future conditions in 2027, the study area includes five signalized intersections and four unsignalized intersections to be considered with the development of the site. The 2027 horizon includes three separate forecasting scenarios. Analysis results for these intersections are summarized below.

Sixth Line / Derry Road

The intersection of **Sixth Line / Derry Road** operates with a cycle length of 111 seconds under future conditions. Analysis results for this intersection are summarized in **Table 21**.

TABLE 21 2027 SIXTH LINE / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	Scenario 1				Scenario 2				Scenario 3			
	Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.35 (0.89)	A (E)	0.38 (0.89)	A (E)	0.35 (0.89)	A (E)	0.38 (0.89)	A (E)	0.36 (0.87)	A (E)	0.39 (0.88)	A (E)
EBTR	1.08 (1.18)	E (F)	1.12 (1.23)	F (F)	1.08 (1.18)	E (F)	1.12 (1.23)	F (F)	1.08 (1.22)	E (F)	1.13 (1.27)	F (F)
WBL	0.14 (0.23)	C (C)	0.19 (0.25)	C (C)	0.14 (0.23)	C (C)	0.18 (0.25)	C (C)	0.14 (0.23)	C (C)	0.18 (0.25)	C (C)
WBTR	0.44 (1.32)	B (F)	0.49 (1.35)	B (F)	0.44 (1.32)	B (F)	0.49 (1.35)	B (F)	0.43 (1.17)	B (F)	0.47 (1.19)	B (F)
NBL	0.70 (1.02)	E (F)	0.86 (1.13)	F (F)	0.71 (1.03)	E (F)	0.87 (1.13)	F (F)	0.81 (0.97)	E (F)	0.96 (1.06)	F (F)
NBTR	0.61 (0.32)	D (C)	0.62 (0.33)	D (C)	0.61 (0.32)	D (C)	0.61 (0.33)	D (C)	0.60 (0.32)	D (C)	0.60 (0.33)	D (C)
SBL	0.34 (0.53)	D (D)	0.34 (0.54)	D (D)	0.34 (0.53)	D (D)	0.34 (0.54)	D (D)	0.23 (0.37)	D (D)	0.23 (0.37)	D (D)
SBTR	0.76 (0.91)	D (E)	0.76 (0.91)	D (E)	0.76 (0.91)	D (E)	0.76 (0.91)	D (E)	0.75 (0.89)	D (E)	0.75 (0.90)	D (E)
Overall	1.00 (1.21)	D (F)	1.04 (1.26)	E (F)	1.00 (1.21)	D (F)	1.04 (1.26)	E (F)	1.01 (1.17)	D (F)	1.06 (1.23)	E (F)

Notes:

- 00 (00) – AM (PM)
- Capacity analysis is carried out using a signal timing plan adjustments to account for future travel patterns, while maintaining the existing cycle length.

This intersection is forecasted to operate essentially at capacity under 2027 future conditions during the weekday morning peak hour. Eastbound and westbound through movements may be capacity-constrained under 2027 future conditions, especially during the weekday afternoon peak hour. This is primarily due to substantial corridor growth and greatly increased flows on specific turning movements due to background developments. The development of the site is expected to have a modest impact relative to background growth within the study area.

Fifth Line / Derry Road

The intersection of **Fifth Line / Derry Road** operates with a cycle length of 120 seconds under future conditions. Analysis results for this intersection are summarized in **Table 22**.

TABLE 22 2027 FIFTH LINE / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	Scenario 1				Scenario 2				Scenario 3			
	Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.27 (0.33)	A (D)	0.28 (0.33)	A (D)	0.27 (0.33)	A (D)	0.28 (0.33)	A (D)	0.24 (0.29)	A (D)	0.25 (0.29)	A (D)
EBTR	1.09 (0.99)	D (D)	1.15 (1.04)	F (D)	1.09 (0.99)	D (D)	1.15 (1.02)	F (D)	1.16 (1.00)	F (D)	1.22 (1.03)	F (D)
WBL	1.16 (0.62)	F (C)	1.19 (0.70)	F (C)	1.16 (0.62)	F (C)	1.16 (0.62)	F (C)	1.01 (0.58)	F (C)	1.01 (0.58)	F (C)
WBTR	0.50 (1.11)	B (F)	0.52 (1.20)	B (F)	0.50 (1.11)	B (F)	0.52 (1.20)	B (F)	0.49 (1.14)	B (F)	0.52 (1.22)	B (F)
NBL	0.43 (1.07)	D (F)	0.43 (1.07)	D (F)	0.43 (1.04)	D (F)	0.43 (1.04)	D (F)	0.43 (1.33)	D (F)	0.43 (1.33)	D (F)
NBTR	0.61 (0.37)	D (D)	0.64 (0.39)	D (D)	0.61 (0.36)	D (D)	0.61 (0.37)	D (D)	0.57 (0.36)	D (D)	0.57 (0.36)	D (D)
SBL	1.09 (1.43)	F (F)	1.21 (1.45)	F (F)	1.09 (1.43)	F (F)	1.11 (1.44)	F (F)	1.14 (1.45)	F (F)	1.16 (1.45)	F (F)
SBTR	0.13 (0.74)	D (D)	0.13 (0.74)	D (D)	0.13 (0.74)	D (D)	0.13 (0.74)	D (D)	0.13 (0.75)	D (D)	0.13 (0.75)	D (D)
Overall	1.14 (1.19)	D (E)	1.19 (1.26)	E (F)	1.14 (1.19)	D (E)	1.15 (1.24)	E (F)	1.14 (1.20)	E (F)	1.19 (1.26)	F (F)

Notes:

- 00 (00) – AM (PM)
- Capacity analysis is carried out using a signal timing plan adjustments to account for future travel patterns, while maintaining the existing cycle length.

This intersection is forecasted to be pushed over capacity under 2027 future conditions. This is primarily due to substantial corridor growth and greatly increased flows on specific turning movements due to background developments. The development of the site is expected to have a modest impact relative to background growth within the study area.

James Snow Parkway / Derry Road

The intersection of **James Snow Parkway / Derry Road** operates with a cycle length of 120 seconds under future conditions. Analysis results for this intersection are summarized in **Table 23**.

TABLE 23 2027 JAMES SNOW PARKWAY / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	Scenario 1				Scenario 2				Scenario 3			
	Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.56 (0.57)	D (D)	0.56 (0.57)	D (D)	0.56 (0.57)	D (D)	0.56 (0.57)	D (D)	0.56 (0.57)	D (D)	0.56 (0.57)	D (D)
EBT	0.98 (0.88)	D (D)	1.02 (0.90)	E (D)	0.98 (0.88)	D (D)	1.02 (0.90)	E (D)	1.07 (0.95)	E (D)	1.12 (0.97)	F (E)
EBR	0.02 (0.01)	B (C)	0.02 (0.01)	B (C)	0.02 (0.01)	B (C)	0.02 (0.01)	B (C)	0.02 (0.01)	B (C)	0.02 (0.01)	B (C)
WBL	0.44 (0.82)	B (C)	0.46 (0.84)	C (C)	0.44 (0.82)	B (C)	0.45 (0.83)	C (C)	0.44 (0.79)	C (C)	0.45 (0.80)	C (C)
WBT	0.36 (0.93)	B (C)	0.37 (0.98)	B (D)	0.36 (0.93)	B (C)	0.38 (0.98)	C (D)	0.36 (0.96)	C (D)	0.38 (1.01)	C (D)
WBR	0.11 (0.39)	D (D)	0.12 (0.47)	D (D)	0.11 (0.39)	D (D)	0.12 (0.47)	D (D)	0.13 (0.51)	E (D)	0.14 (0.60)	E (D)
NBL	0.11 (0.30)	D (D)	0.11 (0.30)	D (D)	0.11 (0.30)	D (D)	0.11 (0.30)	D (D)	0.13 (0.32)	D (D)	0.13 (0.32)	D (D)
NBT	0.60 (0.67)	D (D)	0.60 (0.67)	D (D)	0.60 (0.67)	D (D)	0.60 (0.67)	D (D)	0.59 (0.66)	D (D)	0.59 (0.66)	D (D)
NBR	0.15 (0.17)	D (D)	0.23 (0.22)	D (D)	0.15 (0.17)	D (D)	0.22 (0.21)	D (D)	0.24 (0.22)	D (D)	0.30 (0.27)	D (D)
SBL	0.82 (0.91)	D (E)	0.99 (1.00)	F (F)	0.82 (0.91)	D (E)	0.99 (1.00)	F (F)	0.94 (0.91)	E (E)	1.10 (1.00)	F (F)
SBT	0.51 (0.63)	D (D)	0.51 (0.63)	D (D)	0.51 (0.63)	D (D)	0.51 (0.63)	D (D)	0.46 (0.58)	D (D)	0.46 (0.58)	D (D)
SBR	0.13 (0.15)	D (D)	0.13 (0.15)	D (D)	0.13 (0.15)	D (D)	0.13 (0.15)	D (D)	0.12 (0.14)	C (D)	0.12 (0.14)	C (D)
Overall	0.93 (0.95)	D (D)	1.02 (1.02)	D (D)	0.93 (0.95)	D (D)	1.02 (1.01)	D (D)	1.03 (0.97)	E (D)	1.12 (1.02)	E (D)

Notes:

- 00 (00) – AM (PM)
- Capacity analysis is carried out using a signal timing plan adjustments to account for future travel patterns, while maintaining the existing cycle length.

This intersection is forecasted to operate essentially at capacity under 2027 future conditions. This is primarily due to substantial corridor growth and greatly increased flows on specific turning movements due to background developments. It is noted that in Scenario 3, due to the additional background traffic volumes added relative to Scenario 2, the southbound left-turn movement is capacity-constrained under future total

conditions. The development of the site is expected to have a modest impact relative to background growth within the study area.

Clark Boulevard / Derry Road

The intersection of **Clark Boulevard / Derry Road** is assumed to operate with a cycle length of 120 seconds under future conditions. Analysis results for this intersection are summarized in **Table 24**.

TABLE 24 2027 CLARK BOULEVARD / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	Scenario 1				Scenario 2				Scenario 3			
	Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.20 (0.52)	A (B)	0.22 (0.53)	A (C)	0.20 (0.53)	A (B)	0.22 (0.53)	A (B)	0.22 (0.53)	A (B)	0.27 (0.53)	B (C)
EBTR	0.78 (0.75)	B (B)	0.97 (0.92)	C (C)	0.78 (0.76)	B (B)	0.96 (0.89)	C (C)	0.92 (0.83)	C (C)	1.18 (1.01)	F (D)
WBL	-- (--)	-- (--)	0.53 (0.30)	D (C)	-- (--)	-- (--)	0.52 (0.26)	D (C)	0.57 (0.16)	D (B)	0.53 (0.36)	D (C)
WBTR	0.36 (0.81)	A (B)	0.36 (0.87)	A (B)	0.36 (0.81)	A (B)	0.36 (0.85)	A (B)	0.36 (0.81)	A (B)	0.36 (0.93)	A (C)
NBL	-- (--)	-- (--)	0.50 (0.90)	E (F)	-- (--)	-- (--)	0.46 (0.91)	E (F)	0.19 (0.70)	D (E)	0.57 (0.97)	E (F)
NBTR	-- (--)	-- (--)	0.01 (0.05)	D (D)	0.06 (0.04)	D (D)	0.08 (0.09)	D (D)	0.08 (0.08)	D (D)	0.08 (0.22)	D (D)
SBL	0.22 (0.30)	D (D)	0.24 (0.30)	D (D)	0.28 (0.37)	D (D)	0.25 (0.34)	D (D)	0.28 (0.39)	D (D)	0.23 (0.30)	D (D)
SBTR	0.03 (0.71)	D (E)	0.03 (0.43)	D (D)	0.13 (0.72)	D (E)	0.12 (0.62)	D (D)	0.13 (0.72)	D (E)	0.11 (0.47)	D (D)
Overall	0.74 (0.79)	B (B)	0.90 (0.93)	C (C)	0.77 (0.83)	B (B)	0.88 (0.90)	C (C)	0.84 (0.83)	B (C)	0.99 (1.01)	E (D)

Notes:

- 00 (00) – AM (PM)

This intersection generally operates acceptably under 2027 future conditions. It is noted that in Scenario 3, due to the additional background traffic volumes added relative to Scenario 2, the eastbound through movement is capacity-constrained under future total conditions. The development of the site is expected to have a modest impact relative to background growth within the study area.

Fifth Line / Clark Boulevard

The intersection of **Fifth Line / Clark Boulevard** is assumed to operate with a cycle length of 120 seconds under future conditions. Analysis results for this intersection are summarized in **Table 25**.

TABLE 25 2027 FIFTH LINE / CLARK BOULEVARD CAPACITY ANALYSIS SUMMARY

Movement	Scenario 1				Scenario 2				Scenario 3			
	Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.20 (0.20)	C (B)	0.20 (0.21)	C (B)	0.16 (0.23)	B (B)	0.14 (0.22)	B (B)	0.14 (0.24)	B (B)	0.07 (0.18)	B (B)
EBTR	0.00 (0.01)	B (B)	0.00 (0.01)	B (B)	0.12 (0.06)	B (B)	0.14 (0.06)	B (B)	0.16 (0.06)	B (B)	0.09 (0.05)	B (B)
WBL	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	0.07 (0.10)	B (B)	0.02 (0.11)	B (B)	0.05 (0.15)	B (B)
WBTR	-- (--)	-- (--)	-- (--)	-- (--)	0.16 (0.03)	B (B)	0.17 (0.04)	B (B)	0.19 (0.08)	B (B)	0.12 (0.08)	B (B)
NBL	0.02 (0.01)	A (A)	0.02 (0.01)	A (A)	0.02 (0.01)	A (A)	0.02 (0.01)	A (A)	0.02 (0.01)	A (A)	0.02 (0.01)	A (A)
NBTR	0.37 (0.40)	A (A)	0.39 (0.41)	A (A)	0.38 (0.42)	A (A)	0.41 (0.44)	A (A)	0.40 (0.45)	A (A)	0.45 (0.51)	A (A)
SBL	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	0.11 (0.03)	A (A)	0.12 (0.03)	A (A)
SBTR	0.28 (0.43)	A (A)	0.29 (0.45)	A (A)	0.29 (0.45)	A (A)	0.29 (0.47)	A (A)	0.29 (0.48)	A (A)	0.31 (0.53)	A (A)
Overall	0.36 (0.40)	A (A)	0.38 (0.41)	A (A)	0.37 (0.41)	A (A)	0.39 (0.42)	A (A)	0.39 (0.43)	A (A)	0.41 (0.43)	A (A)

Notes:

- 00 (00) – AM (PM)

This intersection operates acceptably under 2027 future conditions. The development of the site is expected to have a minor impact relative to background growth within the study area.

Unsignalized Intersections

Analysis results for unsignalized intersections within the study area (where site driveways intersect with public roads) are summarized in **Table 26**.

TABLE 26 2027 UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Movement	Scenario 1		Scenario 2		Scenario 3	
	Future Total		Future Total		Future Total	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
Sixth Line / Building 3 Access						
EBLR	B (B)	12.9 (14.9)	B (B)	12.9 (14.7)	B (B)	13.1 (14.9)
NBTL	A (A)	0.1 (0.1)	A (A)	0.1 (0.1)	A (A)	0.1 (0.1)
SBTR	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
Clark Boulevard / Building 1 & 2 North Accesses						
EBTLR	B (B)	11.3 (11.4)	B (B)	10.5 (10.5)	B (B)	12.6 (12.7)
WBTLR	A (A)	8.6 (9.5)	A (A)	9.0 (9.6)	A (B)	9.3 (10.4)
NBTLR	A (A)	0.0 (0.0)	A (A)	0.1 (0.0)	A (A)	0.1 (0.0)
SBTLR	A (A)	1.4 (1.0)	A (A)	1.3 (0.9)	A (A)	0.9 (0.7)
Clark Boulevard / Building 2 South Access						
WBLR	A (A)	8.6 (9.3)	A (A)	8.9 (9.4)	A (B)	9.2 (10.2)
NBTR	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
SBTL	A (A)	1.9 (2.2)	A (A)	1.8 (1.9)	A (A)	1.2 (1.5)
Clark Boulevard / Building 1 South Access						
EBLR	A (A)	9.1 (9.3)	A (A)	9.4 (9.6)	B (B)	10.5 (10.6)
NBTL	A (A)	0.0 (0.0)	A (A)	3.4 (1.4)	A (A)	2.4 (0.2)
SBTR	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)

Notes:

1. 00 (00) – AM (PM)

These intersections operate acceptably under 2027 future conditions.

8.3.3 2032 Future Horizon

Under future conditions in 2032, the study area includes five signalized intersections and four unsignalized intersections to be included with the development of the Site. The 2032 horizon includes two separate forecasting scenarios. Analysis results for these intersections are summarized below.

Sixth Line / Derry Road

The intersection of **Sixth Line / Derry Road** operates with a cycle length of 111 seconds under future conditions. Analysis results for this intersection are summarized in **Table 27**.

TABLE 27 2032 SIXTH LINE / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	Scenario 4				Scenario 5			
	Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.36 (0.85)	A (E)	0.40 (0.86)	A (E)	0.40 (0.86)	A (E)	0.45 (0.87)	A (E)
EBTR	1.14 (1.29)	F (F)	1.20 (1.34)	F (F)	1.17 (1.35)	F (F)	1.23 (1.40)	F (F)
WBL	0.16 (0.24)	C (C)	0.20 (0.26)	C (C)	0.16 (0.24)	C (C)	0.20 (0.26)	C (C)
WBTR	0.45 (1.45)	B (F)	0.51 (1.48)	B (F)	0.51 (1.47)	B (F)	0.56 (1.49)	B (F)
NBL	0.70 (0.80)	E (D)	0.74 (0.87)	E (E)	0.73 (0.80)	E (D)	0.77 (0.87)	E (E)
NBTR	0.43 (0.19)	D (C)	0.40 (0.19)	D (C)	0.40 (0.19)	D (C)	0.36 (0.19)	D (C)
SBL	0.46 (0.87)	D (E)	0.42 (0.88)	D (E)	0.42 (0.87)	D (E)	0.38 (0.88)	D (E)
SBTR	0.39 (0.43)	D (D)	0.36 (0.43)	D (D)	0.36 (0.43)	D (D)	0.33 (0.43)	D (D)
Overall	1.05 (1.20)	E (F)	1.09 (1.24)	E (F)	1.08 (1.22)	E (F)	1.12 (1.26)	F (F)

Notes:

- 00 (00) – AM (PM)
- Capacity analysis is carried out using a signal timing plan adjustments to account for future travel patterns, while maintaining the existing cycle length.

This intersection is forecasted to be pushed over capacity under 2032 future conditions. This is primarily due to substantial corridor growth and greatly increased flows on specific turning movements due to background developments. The development of the site is expected to have a modest impact relative to background growth within the study area.

Fifth Line / Derry Road

The intersection of **Fifth Line / Derry Road** operates with a cycle length of 120 seconds under future conditions. Analysis results for this intersection are summarized in **Table 28**.

TABLE 28 2032 FIFTH LINE / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	Scenario 4				Scenario 5			
	Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.30 (0.35)	A (E)	0.32 (0.35)	A (D)	0.31 (0.35)	A (E)	0.33 (0.35)	A (D)
EBTR	1.23 (1.13)	F (F)	1.29 (1.16)	F (F)	1.30 (1.15)	F (F)	1.37 (1.18)	F (F)
WBL	1.27 (0.66)	F (C)	1.27 (0.66)	F (C)	1.27 (0.69)	F (C)	1.27 (0.69)	F (C)
WBTR	0.54 (1.23)	B (F)	0.57 (1.31)	B (F)	0.55 (1.27)	B (F)	0.57 (1.36)	B (F)
NBL	0.47 (1.11)	D (F)	0.47 (1.11)	D (F)	0.47 (1.44)	D (F)	0.47 (1.44)	D (F)
NBTR	0.65 (0.43)	D (D)	0.65 (0.43)	D (D)	0.66 (0.45)	D (D)	0.66 (0.45)	D (D)
SBL	1.22 (1.41)	F (F)	1.24 (1.42)	F (F)	1.26 (1.43)	F (F)	1.28 (1.44)	F (F)
SBTR	0.14 (0.75)	D (D)	0.14 (0.75)	D (D)	0.14 (0.75)	D (D)	0.14 (0.75)	D (D)
Overall	1.26 (1.26)	F (F)	1.28 (1.32)	F (F)	1.29 (1.30)	F (F)	1.34 (1.36)	F (F)

Notes:

- 00 (00) – AM (PM)
- Capacity analysis is carried out using a signal timing plan adjustments to account for future travel patterns, while maintaining the existing cycle length.

This intersection is forecasted to be pushed over capacity under 2032 future conditions. This is primarily due to substantial corridor growth and greatly increased flows on specific turning movements due to background developments. The development of the site is expected to have a modest impact relative to background growth within the study area.

James Snow Parkway / Derry Road

The intersection of **James Snow Parkway / Derry Road** operates with a cycle length of 120 seconds under future conditions. Analysis results for this intersection are summarized in **Table 29**.

TABLE 29 2032 JAMES SNOW PARKWAY / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	Scenario 4				Scenario 5			
	Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.58 (0.59)	D (D)	0.58 (0.59)	D (D)	0.58 (0.59)	D (D)	0.58 (0.59)	D (D)
EBT	0.80 (0.79)	C (D)	0.84 (0.80)	C (D)	0.90 (0.80)	D (D)	0.94 (0.82)	D (D)
EBR	0.02 (0.01)	B (C)	0.02 (0.01)	B (C)	0.02 (0.01)	B (C)	0.02 (0.01)	B (C)
WBL	0.48 (0.81)	B (C)	0.49 (0.83)	C (C)	0.47 (0.82)	C (C)	0.49 (0.84)	C (C)
WBT	0.30 (0.78)	B (C)	0.31 (0.82)	B (C)	0.33 (0.82)	C (C)	0.34 (0.87)	C (C)
WBR	0.12 (0.39)	D (D)	0.14 (0.48)	D (D)	0.13 (0.48)	D (D)	0.15 (0.57)	D (D)
NBL	0.16 (0.38)	D (D)	0.16 (0.38)	D (D)	0.16 (0.38)	D (D)	0.16 (0.38)	D (D)
NBT	0.55 (0.66)	D (D)	0.55 (0.66)	D (D)	0.55 (0.66)	D (D)	0.55 (0.65)	D (D)
NBR	0.26 (0.30)	D (D)	0.35 (0.35)	D (D)	0.24 (0.32)	D (D)	0.33 (0.37)	D (D)
SBL	0.84 (0.90)	D (D)	0.97 (0.95)	E (E)	0.87 (0.94)	D (E)	0.99 (0.99)	E (E)
SBT	0.37 (0.48)	C (D)	0.37 (0.47)	C (D)	0.33 (0.47)	C (D)	0.33 (0.46)	C (D)
SBR	0.16 (0.18)	C (D)	0.16 (0.19)	C (C)	0.16 (0.18)	C (C)	0.16 (0.18)	C (C)
Overall	0.83 (0.89)	C (D)	0.91 (0.93)	D (D)	0.90 (0.92)	D (D)	0.98 (0.97)	D (D)

Notes:

- 00 (00) – AM (PM)
- Capacity analysis is carried out using a signal timing plan adjustments to account for future travel patterns, while maintaining the existing cycle length.

This intersection operates acceptably under 2032 future conditions. The planned widening of James Snow Parkway and Derry Road to six lanes each, allows substantial background growth to be accommodated. The development of the site is expected to have a modest impact relative to background growth within the study area.

Clark Boulevard / Derry Road

The intersection of **Clark Boulevard / Derry Road** is assumed to operate with a cycle length of 120 seconds under future conditions. Analysis results for this intersection are summarized in **Table 30**.

TABLE 30 2032 CLARK BOULEVARD / DERRY ROAD CAPACITY ANALYSIS SUMMARY

Movement	Scenario 4				Scenario 5			
	Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.27 (0.63)	A (B)	0.29 (0.63)	A (C)	0.29 (0.64)	B (C)	0.35 (0.63)	B (C)
EBTR	0.88 (0.86)	B (B)	1.07 (1.00)	E (D)	1.04 (0.95)	D (C)	1.32 (1.14)	F (F)
WBL	-- (--)	-- (--)	0.52 (0.26)	D (C)	0.57 (0.16)	D (C)	0.53 (0.36)	D (C)
WBTR	0.39 (0.90)	A (B)	0.39 (0.93)	A (C)	0.39 (0.90)	A (B)	0.40 (1.02)	A (D)
NBL	-- (--)	-- (--)	0.46 (0.91)	E (F)	0.19 (0.68)	D (E)	0.57 (0.97)	E (F)
NBTR	0.06 (0.04)	D (D)	0.08 (0.09)	D (D)	0.08 (0.08)	D (D)	0.08 (0.23)	D (D)
SBL	0.29 (0.39)	D (D)	0.27 (0.37)	D (D)	0.30 (0.41)	D (D)	0.25 (0.33)	D (D)
SBTR	0.13 (0.73)	D (E)	0.12 (0.64)	D (D)	0.13 (0.73)	D (E)	0.11 (0.48)	D (D)
Overall	0.87 (0.90)	B (C)	0.98 (0.99)	D (C)	0.94 (0.92)	C (C)	1.08 (1.10)	F (E)

Notes:

- 00 (00) – AM (PM)

This intersection generally operates acceptably under 2032 future conditions in Scenario 4, but heavy eastbound through traffic may push the intersection above its theoretical capacity in Scenario 5. Particularly, due to the additional background traffic volumes added relative to Scenario 4, the eastbound through movement in Scenario 5 is capacity-constrained under future total conditions. The development of the site is expected to have a modest impact relative to background growth within the study area.

Fifth Line / Clark Boulevard

The intersection of **Fifth Line / Clark Boulevard** is assumed to operate with a cycle length of 120 seconds under future conditions. Analysis results for this intersection are summarized in **Table 31**.

TABLE 31 2032 FIFTH LINE / CLARK BOULEVARD CAPACITY ANALYSIS SUMMARY

Movement	Scenario 4				Scenario 5			
	Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.17 (0.24)	C (B)	0.16 (0.22)	B (B)	0.14 (0.25)	B (B)	0.07 (0.18)	B (B)
EBTR	0.13 (0.06)	B (B)	0.15 (0.07)	B (B)	0.16 (0.06)	B (B)	0.09 (0.05)	B (B)
WBL	-- (--)	-- (--)	0.07 (0.11)	B (B)	0.03 (0.11)	B (B)	0.05 (0.15)	B (B)
WBTR	0.17 (0.03)	C (B)	0.19 (0.04)	B (B)	0.20 (0.08)	B (B)	0.12 (0.08)	B (B)
NBL	0.02 (0.01)	A (A)	0.02 (0.01)	A (A)	0.02 (0.01)	A (A)	0.02 (0.01)	A (A)
NBTR	0.41 (0.45)	A (A)	0.44 (0.48)	A (A)	0.43 (0.49)	A (A)	0.48 (0.55)	A (A)
SBL	-- (--)	-- (--)	-- (--)	-- (--)	0.11 (0.03)	A (A)	0.13 (0.03)	A (A)
SBTR	0.31 (0.46)	A (A)	0.32 (0.48)	A (A)	0.32 (0.50)	A (A)	0.33 (0.55)	A (A)
Overall	0.40 (0.43)	A (A)	0.42 (0.43)	A (A)	0.42 (0.45)	A (A)	0.44 (0.45)	A (A)

Notes:

1. 00 (00) – AM (PM)

This intersection operates acceptably under 2032 future conditions. The development of the site is expected to have a minor impact relative to background growth within the study area.

Unsignalized Intersections

Analysis results for unsignalized intersections within the study area (where site driveways intersect with public roads) are summarized in **Table 32**.

TABLE 32 2032 UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Movement	Scenario 4		Scenario 5	
	Future Total		Future Total	
	LOS	Delay (s)	LOS	Delay (s)
Sixth Line / Building 3 East Access				
EBLR	B (B)	12.2 (13.4)	B (B)	12.3 (13.5)
NBTL	A (A)	0.3 (0.1)	A (A)	0.3 (0.1)
SBTR	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
Clark Boulevard / Building 1 & 2 North Accesses				
EBTLR	B (B)	10.5 (10.5)	B (B)	12.6 (12.7)
WBTLR	A (A)	9.0 (9.6)	A (B)	9.3 (10.4)
NBTLR	A (A)	0.1 (0.0)	A (A)	0.1 (0.0)
SBTLR	A (A)	1.3 (0.9)	A (A)	0.9 (0.7)
Clark Boulevard / Building 2 South Access				
WBLR	A (A)	8.9 (9.4)	A (B)	9.2 (10.2)
NBTR	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)
SBTL	A (A)	1.8 (1.9)	A (A)	1.2 (1.5)
Clark Boulevard / Building 1 South Access				
EBLR	A (A)	9.4 (9.6)	B (B)	10.5 (10.6)
NBTL	A (A)	3.4 (1.4)	A (A)	2.4 (0.2)
SBTR	A (A)	0.0 (0.0)	A (A)	0.0 (0.0)

Notes:

1. 00 (00) – AM (PM)

These intersections operate acceptably under 2032 future conditions.

8.3.4 Sensitivity Analysis – Derry Road Expansion

Under future conditions, particularly for the 2032 horizon, intersections along Derry Road are forecasted to be pushed beyond their theoretical capacity, primarily due to significant background traffic growth. The only exception to this is the intersection of **James Snow Parkway / Derry Road**, which operates acceptably in 2032 due to the planned increase in the number of through lanes in all directions at the intersection. As the expansion of Derry Road to a six-lane cross-section east, beyond Sixth Line is expected to occur between 2031 and 2041, a sensitivity analysis was conducted to determine the impacts on intersection capacity if the widening is complete by 2032.

Two additional future analysis scenarios were thus included. In Scenario 6, the widening of Derry Road was assumed to be complete, while all other network and traffic assumptions were maintained from Scenario 4. In Scenario 7, all network and traffic assumptions other than the widening of Derry Road, were maintained from Scenario 5. Capacity analysis results for affected signalized intersections are provided below.

A new corridor labelled “5 ½ Line” was identified in between Fifth and Sixth Line in the 2011-2031 Transportation Master Plan, which will extend from Steeles Avenue to Britannia Road with an interchange to Highway 401. The corridor will have six lanes, with three lanes in each direction. The additional road capacity will address the travel demand and alleviate traffic volumes on the existing Derry Road corridor, as existing roads (James Snow Parkway, Trafalgar Road) were already designated to have six lanes, and there are no opportunities to widen local roads in Milton. The location and configuration of the corridor is subject to future study through a future Municipal Class Environmental Assessment 8 (MCEA) study, which has not been started. The need and timing of all corridor level improvement will be monitored by the Region through future updates to the Halton Region Transportation Master Plan.

Sixth Line / Derry Road

The intersection of **Sixth Line / Derry Road** operates with a cycle length of 111 seconds under future conditions. Analysis results for this intersection are summarized in **Table 33**.

TABLE 33 2032 SIXTH LINE / DERRY ROAD CAPACITY ANALYSIS SUMMARY – DERRY ROAD EXPANSION SENSITIVITY

Movement	Scenario 6 (With Clark Boulevard but no Remington Development)				Scenario 7 (With Clark Boulevard and Remington Development)			
	Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.35 (0.91)	A (E)	0.38 (0.95)	A (E)	0.38 (0.91)	A (E)	0.43 (0.96)	A (F)
EBTR	0.76 (0.81)	B (C)	0.81 (0.86)	B (C)	0.78 (0.84)	B (C)	0.83 (0.90)	B (C)
WBL	0.16 (0.24)	A (B)	0.20 (0.26)	B (B)	0.16 (0.24)	B (B)	0.20 (0.26)	B (B)
WBTR	0.30 (0.89)	A (C)	0.34 (0.92)	B (C)	0.34 (0.90)	B (C)	0.38 (0.93)	B (D)
NBL	0.70 (0.95)	E (F)	0.74 (0.97)	E (F)	0.73 (0.95)	E (F)	0.77 (0.96)	E (F)
NBTR	0.43 (0.21)	D (C)	0.40 (0.21)	D (C)	0.40 (0.21)	D (C)	0.36 (0.20)	D (C)
SBL	0.46 (0.67)	D (D)	0.42 (0.64)	D (D)	0.42 (0.67)	D (D)	0.38 (0.63)	D (D)
SBTR	0.39 (0.34)	D (C)	0.36 (0.33)	D (C)	0.36 (0.34)	D (C)	0.33 (0.32)	D (C)
Overall	0.75 (0.94)	B (C)	0.78 (0.98)	B (C)	0.77 (0.95)	B (C)	0.80 (0.98)	B (D)

Notes:

- 00 (00) – AM (PM)
- Capacity analysis is carried out using a signal timing plan adjustments to account for future travel patterns, while maintaining the existing cycle length.

This intersection operates acceptably under 2032 future conditions if Derry Road is widened to six lanes.



Fifth Line / Derry Road

The intersection of **Fifth Line / Derry Road** operates with a cycle length of 120 seconds under future conditions. Analysis results for this intersection are summarized in **Table 34**.

TABLE 34 2032 FIFTH LINE / DERRY ROAD CAPACITY ANALYSIS SUMMARY – DERRY ROAD EXPANSION SENSITIVITY

Movement	Scenario 6				Scenario 7			
	Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.30 (0.35)	A (D)	0.31 (0.35)	A (D)	0.30 (0.35)	A (D)	0.32 (0.35)	A (D)
EBTR	0.92 (0.86)	B (C)	0.97 (0.88)	C (C)	0.97 (0.88)	C (C)	1.02 (0.90)	C (C)
WBL	0.96 (0.65)	F (D)	0.96 (0.65)	F (D)	0.96 (0.68)	F (D)	0.96 (0.68)	F (D)
WBTR	0.38 (0.94)	B (D)	0.40 (1.00)	B (D)	0.38 (0.98)	B (D)	0.40 (1.04)	B (E)
NBL	0.41 (0.78)	D (D)	0.41 (0.78)	D (D)	0.41 (1.00)	D (F)	0.41 (1.00)	D (F)
NBTR	0.57 (0.41)	D (D)	0.57 (0.41)	D (D)	0.58 (0.41)	D (D)	0.58 (0.41)	D (D)
SBL	0.96 (1.02)	F (F)	1.00 (1.02)	F (F)	1.02 (1.04)	F (F)	1.03 (1.04)	F (F)
SBTR	0.12 (0.74)	D (D)	0.12 (0.74)	D (D)	0.12 (0.75)	D (D)	0.12 (0.75)	D (D)
Overall	0.98 (0.98)	C (D)	0.99 (1.02)	C (D)	0.99 (1.00)	C (D)	1.02 (1.04)	C (D)

Notes:

1. 00 (00) – AM (PM)
2. Capacity analysis is carried out using a signal timing plan adjustments to account for future travel patterns, while maintaining the existing cycle length.

Although the southbound left-turning movement may be capacity constrained due to particularly heavy volumes, this intersection essentially operates at capacity under 2032 future conditions if Derry Road is widened to six lanes.



Clark Boulevard / Derry Road

The intersection of **Clark Boulevard / Derry Road** is assumed to operate with a cycle length of 120 seconds under future conditions. Analysis results for this intersection are summarized in **Table 35**.

TABLE 35 2032 CLARK BOULEVARD / DERRY ROAD CAPACITY ANALYSIS SUMMARY – DERRY ROAD EXPANSION SENSITIVITY

Movement	Scenario 6				Scenario 7			
	Future Background		Future Total		Future Background		Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
EBL	0.27 (0.60)	A (C)	0.31 (0.63)	B (D)	0.31 (0.61)	B (C)	0.37 (0.63)	C (D)
EBTR	0.61 (0.60)	B (B)	0.75 (0.70)	B (C)	0.72 (0.66)	B (B)	0.92 (0.80)	D (C)
WBL	-- (--)	-- (--)	0.52 (0.26)	C (B)	0.56 (0.16)	C (A)	0.53 (0.36)	C (B)
WBTR	0.27 (0.63)	A (A)	0.27 (0.65)	A (A)	0.27 (0.63)	A (A)	0.28 (0.72)	A (B)
NBL	-- (--)	-- (--)	0.46 (0.91)	E (F)	0.19 (0.68)	D (E)	0.57 (0.93)	E (F)
NBTR	0.06 (0.04)	D (D)	0.08 (0.09)	D (D)	0.08 (0.08)	D (D)	0.08 (0.22)	D (D)
SBL	0.29 (0.39)	D (D)	0.27 (0.37)	D (D)	0.30 (0.41)	D (D)	0.25 (0.32)	D (D)
SBTR	0.13 (0.73)	D (E)	0.12 (0.64)	D (D)	0.13 (0.73)	D (E)	0.11 (0.47)	D (D)
Overall	0.61 (0.67)	A (B)	0.70 (0.75)	B (B)	0.68 (0.68)	B (B)	0.80 (0.84)	C (C)

Notes:

1. 00 (00) – AM (PM)

This intersection operates below capacity under 2032 future conditions if Derry Road is widened to six lanes.

8.3.5 Overall Traffic Analysis Summary

While the area road network operates acceptably under existing conditions, capacity constraints arise in both the 2027 and 2032 future horizons. Specific vehicle movements at intersections along Derry Road are capacity constrained in 2027, and these operational issues are increased due to additional growth in 2032. It is noted, however, that the analysis includes compounding growth for every turning movement at intersections along Derry Road, and this contributes to substantial increases in traffic volumes for movements carrying high volumes under existing conditions. In practice, traffic growth may increase across a broader network with travel patterns reflecting capacity constraints for particular movements and intersections.

The most pronounced capacity issues in the network occur at the intersections of Sixth Line / Derry Road and Fifth Line / Derry Road. In accordance with the study terms of reference and comments provided by the Town and Region, growth for specific background developments is included at these intersections in addition to the

compounding growth applied to all intersections. Because the corridor growth rates adopted by the Region are meant to account for development in the area, the inclusion of site-specific growth on Town roads results in some degree of double-counting for area traffic growth. Furthermore, there is some uncertainty inherent in accounting for sites for which no transportation studies have yet been published, and the use of Secondary Plan traffic volumes to account for such sites may have led to unrealistically high volumes for specific turning movements.

Overall, operational issues in the network under future conditions are primarily caused by the substantial background growth that is assumed to occur, and actual future operations will depend on the extent to which this growth actually materializes. The sensitivity analysis conducted shows that the widening of Derry Road can mitigate the impacts of high growth, and that the necessity of widening Derry Road is also dependent on the extent of actual growth. Furthermore, as highlighted in the 2011-2031 Halton Region Transportation Master Plan, the addition of “5½ Line” will provide additional road capacity to alleviate the impacts of heavy traffic on Derry Road.

8.3.6 DERRY GREEN SECONDARY PLAN TRAFFIC VOLUME COMPARISON

The Derry Green Secondary Plan accounted for development on the site, though it is not clear from available documentation what network and site access configurations were assumed for the Anatolia Lands. The Secondary Plan development traffic can be compared with the proposed development on the basis of inbound and outbound traffic at the south leg of the Clark Boulevard Extension south of Derry Road. This comparison is provided in **Table 36**. The site trips considered for this report for the Anatolia lands are higher than what was estimated within the Derry Green Secondary Plan.

TABLE 36 SECONDARY PLAN COMPARISON – CLARK BOULEVARD / DERRY ROAD

	AM Peak Hour			PM Peak Hour		
	Inbound ¹	Outbound ²	2-Way	Inbound ¹	Outbound ²	2-Way
Derry Green Secondary Plan	No AM traffic volumes provided			47	150	197
Proposed Anatolia Development	232	69	301	89	228	317
Difference				+42	+78	+120

Notes:

1. Represents the sum of eastbound right-turn and westbound left-turn movements at the intersection of Clark Boulevard / Derry Road.
2. Represents the sum of northbound right-turn and left-turn movements at the intersection of Clark Boulevard / Derry Road.



9.0 SAFETY ANALYSIS

9.1 SIGHT DISTANCE ASSESSMENT

A comprehensive sight distance review was completed for the proposed site access for Building 3 at the proposed full movement access along Sixth Line. The sight distance review utilized both the vertical and horizontal profile data obtained from surveys. The horizontal profile data is provided in **Appendix K**.

The site driveway accommodates light vehicles and heavy trucks for the purpose of industrial and commercial uses. The sight distances were evaluated in accordance with the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads. Key parameters include:

- Assumed driver's eye height of 1.08 metres for a passenger vehicle and 2.3 metres for a large truck
- Assumed setback distance of 4.4 metres between minor-road driver's eye to edge of major-road travel way
- Proposed posted 40 km/h curve advisory speed limit (50 km/h design speed) on Sixth Line between the Derry Road / Sixth Line intersection and Sixth Line site access

From a vertical profile perspective, the consultant Stantec will be providing grading plans that demonstrate that no visibility issues from minor road to major road will occur for both passenger vehicles and larger trucks at the proposed site access and have no visibility issues at proposed site driveway. It is important to note that the available sight distance is dependent on the right-of-way being kept clear of vertical obstructions up to the property line.

9.1.1 Site Access at Sixth line

A sight distance review was undertaken for the t-intersection located mid-block along the eastern edge of the site on Sixth Line, for the left-turning sight distances using a proposed reduced design speed of 50 km/h (10 km/h over the proposed posted curve advisory speed limit of 40 km/h) north of the site access and assuming the existing design speed of 90 km/h (20 km/h over the existing posted speed limit of 70 km/h), south of the site access. The sight distance calculations considered that there are curve advisory speed limit signs of 40 km/h posted for both the northbound and southbound directions of travel on Sixth Line. A 40 km/h advisory sign currently exists for the northbound direction of travel only.

Although the current posted speed limit is 70 km/h along Sixth Line south of Derry Road, a reduced posted curve advisory speed limit of 40 km/h is being proposed to address visibility and sight distance concerns along Sixth Line's existing S-curve road segment, between the signalized Derry Road and Sixth Line intersection to the north and the newly proposed site driveway along Sixth Line to the south. This proposed condition matches the existing 40 km/h posted curve advisory signage travelling northbound along Sixth Line as a motorist approaches the curved segment of the road towards Derry Road. The posted speed limit would resume at 70 km/h (design speed of 90 km/h) south of the site access along Sixth Line.

The sight distance calculations considered that there are curve advisory speed limit signs of 40 km/h posted for both the northbound and southbound directions of travel on Sixth Line. A 40 km/h advisory sign currently exists for the northbound direction of travel only.

Additional safety measures, including warning signs are proposed to support the reduced posted curve advisory 40 km/h speed limit heading southbound along the S-curve portion of Sixth Line as illustrated in the sight distance review plan, SD-01 in **Appendix K**.

The minimum required sight distances along Sixth Line at the proposed site access is shown in **Table 37** and are achieved in SD-01. Furthermore, the left-turn sight distance from the site driveway to Sixth Line is similar to the left-turn sight distance from Sixth Line to the site driveway.

It is noted that if vertical profile data is required, it could be provided in a subsequent submission. However, the current submission addresses potential vertical sightline obstructions as the site plan identifies the removal of existing trees within the sight distance triangle and the parking spaces adjacent to Building 3 are located outside of the sight distance triangle.

TABLE 37 SIGHT DISTANCE (SITE ACCESS AT SIXTH LINE)

Movement	TAC Minimum Requirement (metres)	Available Sight Distance (metres)
Turning Sight Distance from Left – Southbound (Design Speed of 50 km/h)		
Site Access at Sixth Line		
Left-turn from Site Access to Sixth Line ¹	160	>>160
Turning Sight Distance from Right – Northbound (Design Speed of 90 km/h)		
Site Access at Sixth Line		
Left-turn from Site Access to Sixth Line ¹	290	>>290

Notes:

1. Transportation Association of Canada (TAC) Manual, Case B1, Table 9.9.3.

9.1.2 Sight Distance Summary

Further detail regarding the turning sight distance criteria applied to the site access along Sixth Line is shown in **Appendix K**.

Sufficient turning sight distances are available for traffic turning left (considering traffic approaching from either the left or right) and for traffic turning right (considering traffic approaching from the left) to comply with the TAC Geometric Design Guide for Canadian Roads.

Based upon the comprehensive site driveway sight distance review, the site access at Sixth Line is not expected to have sight line restrictions that would affect driveway operations. Specifically, sight lines do not restrict the ability for right-turns and left-turns inbound or outbound. Therefore, the sight lines are sufficient to functionally accommodate the proposed driveway.

9.2 QUEUING ASSESSMENT

Queueing behaviour at intersections within the network was assessed according to Highway Capacity Manual (HCM) methodology using Synchro Version 11.0; 50th and 95th percentile queues are reported for signalized intersection movements.

Queues for key movements under existing conditions, 2027 future conditions, and 2032 future conditions are summarized in **Table 38**, **Table 39** and **Table 40**, respectively.

TABLE 38 QUEUING SUMMARY – EXISTING CONDITIONS

Key Movement	Available Storage Length (m)	Existing Conditions	
		50 th Percentile Queue (m)	95 th Percentile Queue (m)
Sixth Line / Derry Road			
EBL	150	2.5 (10.4)	7.1 (29.7)
EBTR	670	154.5 (131.5)	328.6 (245.8)
Fifth Line / Derry Road			
WBL	115	2.7 (4.2)	15.5 (6.0)
WBTR	540	37.8 (197.1)	57.7 (228.2)

Notes:

- xx (xx) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)

TABLE 39 QUEUEING SUMMARY – 2027 FUTURE CONDITIONS

Key Movement	Available Storage Length (m)	Scenario 1				Scenario 2				Scenario 3			
		Future Background		Future Total		Future Background		Future Total		Future Background		Future Total	
		50 th %ile Queue (m)	95 th %ile Queue (m)	50 th %ile Queue (m)	95 th %ile Queue (m)	50 th %ile Queue (m)	95 th %ile Queue (m)	50 th %ile Queue (m)	95 th %ile Queue (m)	50 th %ile Queue (m)	95 th %ile Queue (m)	50 th %ile Queue (m)	95 th %ile Queue (m)
Sixth Line / Derry Road													
EBL	150	10.1 (22.9)	21.1 (66.8)	10.2 (23.4)	21.2 (68.2)	10.1 (22.9)	21.1 (66.8)	10.2 (23.4)	21.2 (68.2)	9.7 (22.7)	20.6 (66.5)	9.8 (23.0)	20.7 (67.2)
EBTR	670	229.8 (280.5)	384.2 (325.8)	325.1 (301.3)	393.2 (346.7)	231.2 (280.5)	384.4 (325.8)	325.0 (301.1)	393.1 (346.5)	225.0 (293.2)	377.0 (338.4)	316.6 (313.2)	385.1 (358.5)
Fifth Line / Derry Road													
WBL	115	39.0 (13.2)	87.8 (19.9)	41.7 (17.9)	90.9 (22.0)	39.2 (13.5)	87.7 (19.7)	39.7 (13.2)	87.9 (17.9)	29.1 (12.8)	79.1 (19.0)	29.4 (13.4)	79.3 (15.0)
WBTR	540	55.1 (306.9)	65.4 (366.7)	56.3 (352.5)	67.8 (411.1)	55.0 (307.1)	64.7 (366.8)	56.1 (351.5)	67.9 (410.0)	54.5 (323.6)	64.4 (381.1)	55.4 (367.0)	65.5 (422.1)
Clark Boulevard / Derry Road													
WBL	135	-- (--)	-- (--)	6.2 (2.3)	24.8 (6.0)	-- (--)	-- (--)	5.9 (1.8)	24.4 (5.4)	9.9 (0.8)	28.8 (3.2)	29.1 (3.6)	56.8 (7.6)
NBL	85	-- (--)	-- (--)	12.5 (40.7)	25.2 (74.1)	-- (--)	-- (--)	11.0 (34.8)	23.0 (62.3)	4.0 (20.4)	11.7 (37.2)	15.1 (56.3)	29.3 (108.1)
Fifth Line / Clark Boulevard													
WBL	115	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	0.2 (1.3)	2.2 (4.7)	0.1 (1.0)	1.2 (5.3)	0.4 (1.9)	2.7 (8.1)
WBTR	>115	-- (--)	-- (--)	-- (--)	-- (--)	0.4 (0.6)	3.8 (2.7)	0.4 (0.7)	3.9 (3.1)	0.6 (0.4)	4.9 (7.7)	0.7 (0.5)	5.1 (7.9)

Notes:

1. xx (xx) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)
2. Storage is broken up into a 70m segment north of the proposed site driveways, and an additional 15m south of the driveways.

TABLE 40 QUEUEING SUMMARY – 2032 FUTURE CONDITIONS

Key Movement	Available Storage Length (m)	Scenario 4				Scenario 5			
		Future Background		Future Total		Future Background		Future Total	
		50 th %ile Queue (m)	95 th %ile Queue (m)	50 th %ile Queue (m)	95 th %ile Queue (m)	50 th %ile Queue (m)	95 th %ile Queue (m)	50 th %ile Queue (m)	95 th %ile Queue (m)
Sixth Line / Derry Road									
EBL	150	8.0 (29.2)	17.9 (75.2)	8.8 (30.2)	19.8 (76.7)	8.6 (30.7)	19.5 (77.2)	9.5 (31.6)	21.3 (78.6)
EBTR	670	326.2 (343.9)	436.2 (388.7)	382.3 (364.6)	454.2 (409.5)	335.3 (366.9)	447.6 (411.8)	391.5 (387.7)	464.8 (432.4)
Fifth Line / Derry Road									
WBL	115	49.2 (15.3)	100.2 (19.3)	49.2 (14.2)	100.0 (17.9)	49.2 (15.8)	99.8 (20.3)	49.4 (14.5)	99.2 (16.4)
WBTR	540	61.0 (366.4)	72.7 (422.6)	62.0 (410.6)	78.1 (465.8)	61.3 (390.1)	75.7 (446.1)	62.2 (434.0)	78.7 (439.6)
Clark Boulevard / Derry Road									
WBL	135	-- (--)	-- (--)	5.9 (1.8)	24.4 (5.4)	9.9 (0.8)	28.8 (3.2)	29.1 (3.6)	56.8 (7.6)
NBL	85	-- (--)	-- (--)	11.0 (34.8)	23.0 (62.3)	4.0 (20.3)	11.6 (36.9)	15.1 (56.3)	29.3 (108.1)
Fifth Line / Clark Boulevard									
WBL	115	-- (--)	-- (--)	0.2 (1.3)	2.3 (4.9)	0.1 (1.0)	1.3 (5.5)	0.4 (1.9)	2.9 (8.3)
WBTR	>115	0.4 (0.6)	3.9 (2.8)	0.4 (0.7)	4.0 (3.3)	0.6 (0.5)	5.1 (7.8)	0.8 (0.5)	5.4 (8.2)

Notes:

1. xx (xx) – Weekday Morning Peak Hour (Weekday Afternoon Peak Hour)
2. Storage is broken up into a 70m segment north of the proposed site driveways, and an additional 15m south of the driveways.

The queuing assessment indicates that queues for the intersection movement most impacted by site traffic can be accommodated by the available storage capacity in most of the scenarios. Storage capacities for key movements used by site traffic are based upon available plans for proposed intersections. 50th percentile and 95th percentile queues can be accommodated and are not expected to cause any safety or operational issues.

10.0 CONCLUSIONS AND RECOMMENDATIONS

- The proposed development of the site includes the construction of three industrial buildings, with a total gross floor area (GFA) of approximately 182,115 m². The proposed use of the buildings will be warehouse/logistics facilities. It is estimated that the buildings will be completed and fully leased by the end of 2026. The site is the current location of the Trafalgar Golf & Country Club, and is bounded by Derry Road to the north, future industrial lands to the west and south (Remington Lands) and Sixth Line to the east. The site is north of the future Milton Phase 4 lands and is within the Town's Derry Green Secondary Plan Area.
- The north-south portion of a new public road (Clark Boulevard) is proposed to be constructed as part of the development proposal. In the interim condition, Clark Boulevard is proposed to connect to a new signalized intersection at Derry Road in the north and terminate with a cul-de-sac to the south, adjacent to the Remington lands south of the site. In the future ultimate condition, the remaining east-west segment of Clark Boulevard will connect from the cul-de-sac on the Anatolia property (cul-de-sac to be eliminated in the ultimate condition) to a new signalized intersection at Fifth Line. Access driveways to both Building 1 and 2 are proposed along the new Clark Boulevard while access to Building 3 is proposed via a full access along Sixth Line.
- The TDM strategies incorporated into the development proposal will facilitate a reduction in vehicle trips and encourage a shift to sustainable modes of travel. TDM measures proposed as part of the development include a reduced vehicle parking supply, a bicycle parking supply that exceeds Zoning By-law requirements, carpool parking with an emergency ride home program, information and education for employees that promote sustainable travel and an employee travel monitoring program.
- The site is subject to the Town of Milton Comprehensive Zoning By-law 016-2014 (HUSP Urban Area – March 2023) for parking considerations. Application of this By-law to the site results in a total minimum parking requirement of 1,057 spaces (equivalent rate of 0.58 spaces/100 m² or 1 space/172 m²). The total proposed parking supply for the site is 897 spaces (0.49 spaces/100 m² or 1 space/203 m²).
- Application of Zoning By-law 016-2014 to the site requires a total minimum of 34 bicycle parking spaces. The current architectural drawings provide a total of 34 parking spaces for bicycles. The proposed bicycle parking supply meets the requirements of the Zoning By-law and will meet the needs of the site.
- Application of Zoning By-law 016-2014 to the site, results in a minimum requirement of 28 loading spaces. As the development proposal includes a total of 315 loading spaces, the requirements of the Zoning By-law are exceeded and the loading supply will meet the practical needs of the site.
- Travel demand forecasts were established for the near-term (2027) and long-term (2032) horizons. The detailed traffic analysis for both the 2027 and 2032 horizons included a variety of scenarios that considered the status of the Clark Boulevard Extension, as well as the potential development on the adjacent Remington Lands. Background traffic forecasts were based upon recent traffic data, traffic growth rates provided by the Town and Region, and transportation studies completed for nearby developments, in addition to the Derry Green Secondary Plan. The site is expected to generate a

total of 334 and 353 two-way trips, during the morning and afternoon peak period, respectively. Within this total, 40 two-way trips during the morning peak period and approximately 60 two-way trips during the afternoon peak period, are expected to be heavy vehicles (trucks).

- A comprehensive sight distance review was completed for the proposed site access along Sixth Line. The sight distance review utilized both the vertical and horizontal profile data obtained from surveys. The sight distances were evaluated in accordance with the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads. Based upon the comprehensive site driveway sight distance review, the site access at Sixth Line is not expected to have sight line restrictions that would affect driveway operations. Specifically, sight lines do not restrict the ability for right-turns and left-turns inbound or outbound. Therefore, the sight lines are sufficient to functionally accommodate the proposed driveways.
- A queuing analysis of key movements was also undertaken as part of the safety review. Queuing behaviour at intersections within the network was assessed according to Highway Capacity Manual (HCM) methodology using Synchro Version 11.0; 50th and 95th percentile queues were reported for signalized intersection movements. The queue assessment for key movements under existing conditions, 2027 future conditions, and 2032 future conditions indicates that queues can be accommodated by the available storage capacity in all scenarios. Storage capacities for key movements used by site traffic are based upon available plans for proposed intersections; 50th percentile and 95th percentile queues can be accommodated and are not expected to cause any safety or operational issues.
- The traffic analysis indicated that, with consideration for the future widening of Derry Road, the existing and future transportation network can acceptably accommodate the travel demands of the site. While the area road network operates acceptably under existing conditions, capacity constraints arise in both the 2027 and 2032 future horizons. Specific vehicle movements at intersections along Derry Road are capacity constrained in 2027, and these operational issues are increased due to additional growth in 2032. It is noted, however, that the analysis includes compounding growth for every turning movement at intersections along Derry Road, and this contributes to substantial increases in traffic volumes for movements carrying high volumes under existing conditions. In practice, traffic growth may increase across a broader network with travel patterns reflecting capacity constraints for particular movements and intersections.
- The most pronounced capacity issues in the network occur at the intersections of Sixth Line / Derry Road and Fifth Line / Derry Road. Because the corridor growth rates adopted by the Region are meant to account for development in the area, the inclusion of site-specific growth on Town roads results in some degree of double-counting for area traffic growth. Furthermore, there is some uncertainty inherent in accounting for sites for which no transportation studies have yet been published, and the use of Secondary Plan traffic volumes to account for such sites may have led to unrealistically high volumes for specific turning movements.
- A sensitivity analysis was undertaken in which Derry Road is expanded to six lanes beyond Sixth Line for the 2032 horizon. The results of the sensitivity analysis suggest that if all forecasted growth occurs, the widening of Derry Road would mitigate most capacity issues in the network, leaving all intersections essentially at, or below capacity.



- Overall, operational issues in the network under future conditions are primarily caused by the substantial background growth that is assumed to occur, and actual future operations will depend on the extent to which this growth actually materializes. Furthermore, the sensitivity analysis conducted shows that the widening of Derry Road can mitigate the impacts of high growth, and that the necessity of widening Derry Road is also dependent on the extent of actual growth.

10.1 RECOMMENDATIONS

Location of Clark Boulevard Intersection at Derry Road

As part of the development proposal, it is recommended that the location of the intersection of Clark Boulevard on Derry Road be shifted approximately **55 metres east** of the intersection location shown in the Derry Green Secondary Plan. The location of the intersection of Clark Boulevard at Derry Road proposed as part of the development of the site, is deemed to be appropriate for the following reasons:

- The proposed intersection location of Clark Boulevard on Derry Road lessens the impact on the proposed channel boundary along the Broccolini eastern property limit, as the alignment of Clark Boulevard, north of Derry Road would be required to cross a narrower section of the channel, when compared to the alignment of the Secondary Plan that crosses the channel at an angle.
- The proposed location of Clark Boulevard also includes a relatively straight alignment north of Derry Road that follows the east side of the channel. By contrast, the Secondary Plan alignment includes back-to-back sharp curves, until the alignment straightens on the east side of the channel.
- The approach angles of the intersection created at Derry Road and Clark Boulevard, are closer to 90 degrees in the proposed alignment than in the Secondary Plan alignment.
- The proposed alignment location enables the creation of larger rectangular blocks, that facilitate a more efficient development of the site, for a large scale industrial warehouse development.
- The proposed alignment is consistent with the Clark Boulevard alignment and the NHS illustrated within the Subwatershed Impact Study Addendum SIS Area 5A, prepared by MGM Consulting Ltd et al, dated May 2021, as reviewed and approved by the Town, Region and Conservation Halton.
- As the Region requires a minimum distance of 115 metres between a right-in/ right-out access and the nearest point of access, the proposed location of Clark Boulevard at Derry Road provides more than adequate minimum spacing (and 56 metres more than the Secondary Plan location) for the future right-in/ right-out access at the Broccolini property.
- The proposed alignment is consistent with the Town's Derry Green Secondary Plan, without shifting to the west, as noted by the Region in their comments to the Town.

Derry Road Capacity Concerns

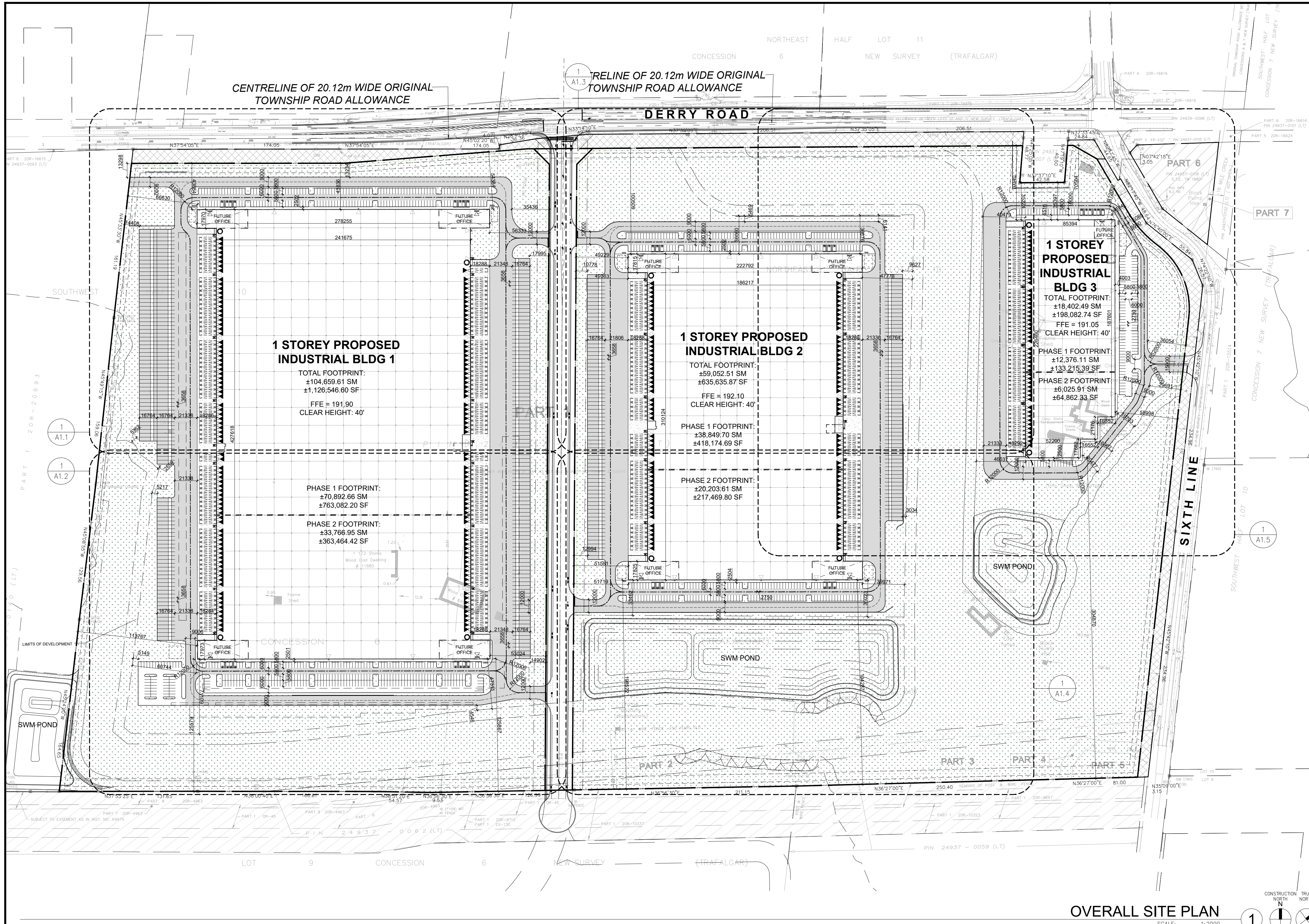
It is noted that there are capacity concerns at the intersections of Sixth Line / Derry Road and Fifth Line / Derry Road. As corridor growth rates adopted by the Region are meant to account for development in the area, the inclusion of site-specific growth on Town roads results in some degree of double-counting for area traffic growth. In addition, there is some uncertainty inherent in accounting for sites for which no transportation studies have yet been published, and the use of Secondary Plan traffic volumes to account for such sites may have led to unrealistically high volumes for specific turning movements.

For these reasons, it is recommended that future traffic operations at the intersections of Sixth Line / Derry Road and Fifth Line / Derry Road be monitored to assess the accuracy of the background growth assumptions and to confirm the timing of the widening of Derry Road between Fifth and Sixth Line as the widening of Derry Road can mitigate the impacts of high growth, and that the necessity of widening Derry Road is also dependent on the extent of actual growth.

Sight Distance on Sixth Line & Site Driveway

Although the current posted speed limit is 70 km/h along Sixth Line south of Derry Road, a reduced posted curve advisory speed limit of 40 km/h is being proposed to address visibility and sight distance concerns along Sixth Line's existing S-curve road segment, between the signalized Derry Road and Sixth Line intersection to the north and the newly proposed site driveway along Sixth Line to the south. This proposed condition matches the existing 40 km/h posted curve advisory signage travelling northbound along Sixth Line as a motorist approaches the curved segment of the road towards Derry Road. The posted speed limit would resume at 70 km/h (design speed of 90 km/h) south of the site access along Sixth Line.

Appendix A: Architectural Drawings



OVERALL SITE PLAN
SCALE: 1:2000

BLDG 1-Zoning Matrix

Provision	Required (M1 Zone)	Proposed (M1-XX Zone)
Zoning Category	M1 Zone	M1-XX
Lot Frontage (min)	40.0 m	388.53 m
Lot Area (Block 1)	0.80 ha	211,950 m ²
Gross Floor Area	N/A	104,660 m ²
Lot Coverage (with municipal services)	No maximum	49.38%
Front Yard Setback (Min)	9.0 m	43.84 m
Interior Side Yard Setback (Min)	3.0 m	66.63 m
Exterior Side Yard Setback (Min)	9.0 m	53.02 m
Rear Yard Setback (Min)	12.0 m	125.58 m
Landscape Open Space (min)	10%	16.85%
Number of Parking Spaces (min)	572	469
Number of Accessible Parking Space (min)	14	16
Number of Loading Spaces (min)	14	155
Bicycle Parking (min)	17	18
Building Height (max)	15 m	13.716 m

BLDG 2-Zoning Matrix

Provision	Required (M1 Zone)	Proposed (M1-XX Zone)
Zoning Category	M1 Zone	M1-XX
Lot Frontage (min)	40.0 m	69.45
Lot Area (Block 2)	0.80 ha	154,107 m ²
Gross Floor Area	N/A	59,053 m ²
Lot Coverage (with municipal services)	No maximum	38.32%
Front Yard Setback (Min)	9.0 m	100.51 m
Interior Side Yard Setback (Min)	3.0 m	39.97 m
Exterior Side Yard Setback (Min)	9.0 m	49.23 m
Rear Yard Setback (Min)	12.0 m	194.29 m
Landscape Open Space (min)	10%	15.26%
Number of Parking Spaces (min)	344	296
Number of Accessible Parking Space (min)	9	12
Number of Loading Spaces (min)	9	109
Bicycle Parking (min)	10	12
Building Height (max)	15 m	13.716 m

BLDG 3-Zoning Matrix

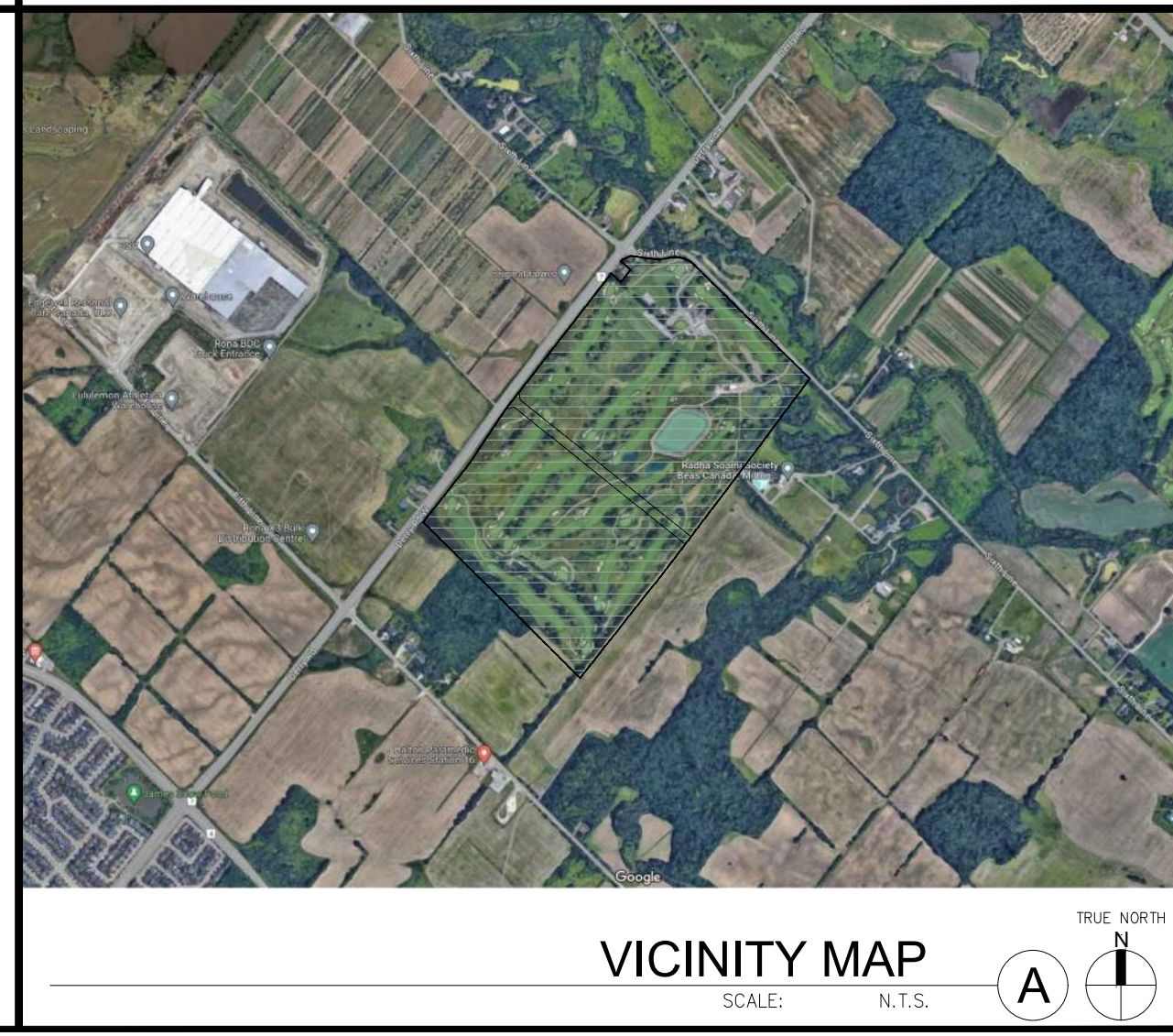
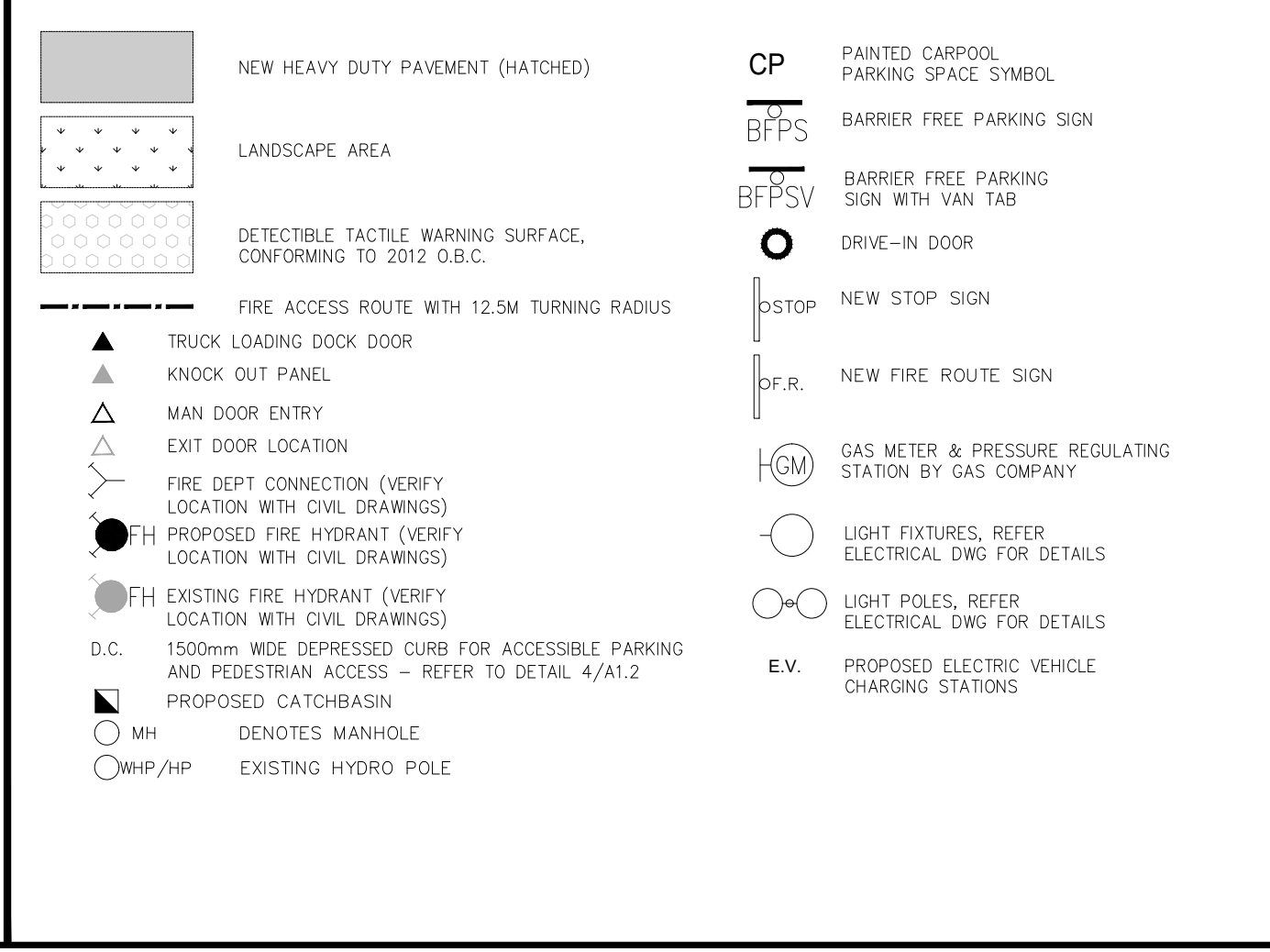
Provision	Required (M1 Zone)	Proposed (M1-XX Zone)
Zoning Category	M1 Zone	M1-XX
Lot Frontage (min)	40.0 m	96.51m(66.05+30.51)
Lot Area (Block 3)	0.80 ha	60,346 m ²
Gross Floor Area	N/A	18,402 m ²
Lot Coverage (with municipal services)	No maximum	30.49%
Front Yard Setback (Min)	9.0 m	70.34 m
Interior Side Yard Setback (Min)	3.0 m	40.48 m
Exterior Side Yard Setback (Min)	9.0 m	14.18 m
Rear Yard Setback (Min)	12.0 m	304.87 m
Landscape Open Space (min)	10%	39.60%
Number of Parking Spaces (min)	140	132
Number of Accessible Parking Space (min)	6	6
Number of Loading Spaces (min)	5	51
Bicycle Parking (min)	4	4
Building Height (max)	15 m	13.716 m

ZBL Ser.	Minimum ZBL Requirements	Requirement BLD 1 (M1 Zone)	Proposed BLD 1	Requirement BLD 2 (M1 Zone)	Proposed BLD 2	Requirement BLD 3 (M1 Zone)	Proposed BLD 3	Total Requirement	Total Proposed
N/A	Warehouse Building GFA - Approx	N/A	104,660 m ²	N/A	59,053 m ²	N/A	18,402 m ²		
N/A	Office Space GFA (5% of warehouse)	N/A	5,233 m ²	N/A	2,953 m ²	N/A	920 m ²		
Zoning By-law 016-2014	For the first 1,000m ² , 1 parking space per 30m ² of gross floor area	520	469	315	296	131	132	966	897
	For gross floor area between 1,001m ² to 5,000m ² , 1 parking space per 100 m ² of gross floor area								
	Gross floor area greater than 5,000m ² ; 1 parking space of 200m ² of gross floor area (As per section 5.2, 10% deducted from GFA)								
	Number of Accessible Parking Spaces	13	16	9	12	5	6	27	34
Bicycle Parking	16	18	9	12	4	4	28	34	
3 Loading space +1 additional loading space for each additional 9,300 m ² or fraction thereof in excess of 7,441 m ²	14	155	9	109	5	51	28	315	

GENERAL NOTES

- 1 PROPERTY LINE
- 2 2.75m x 5.8m PARKING STALL, PAINTED PARKING STRIPING PER CITY STANDARDS, WITH 6M WIDE DOUBLE LOADED AISLE.
- 3 PRINCIPAL ENTRY - TENANT FIT-UP SUBJECT TO INTERIOR ALTERATION PERMIT
- 4 TYPICAL SHARED ACCESSIBLE PARKING STALLS, PAINTED PARKING STRIPING PER CITY STANDARDS, TO HAVE TYPE A STALLS (3400x5800), TYPE B (2750x5800), OR ONE OF EACH WITH 1500mm PATH STRIP BETWEEN - REFER TO CITY OF MILTON'S ACCESSIBLE PARKING STANDARDS.
- 5 150mm WIDE CURB TYPICAL
- 6 MIN. 1500mm WIDE SIDEWALK TYPICAL U.N.O
- 7 TRAILER PARKING STALL - 12'-0" X 55'-0"
- 8 ACCESSIBLE CURB RAMP AS PER DETAIL
- 9 FIRE DEPARTMENT CONNECTION / SIAMISE
- 10 PROPOSED LOCATION OF TRANSFORMER C/W CONCRETE PAD 1.8m HIGH BLACK VINYL CHAIN LINK FENCING OR APPROVED EQUAL ALONG DEVELOPMENT LIMIT BOUNDARY CONCRETE APRON
- 11 LANDSCAPE AREA - SEE LANDSCAPE DWGS.
- 12 PEDESTRIAN RAIL (1070mm HIGH) SET INTO RETAINING WALL WHERE GRADE CHANGE GREATER THAN 600mm. PROVIDE CONCRETE-FILLED STEEL BOLLARD AT END OF RETAINING WALL - SEE CIVIL DWGS.
- 13 EXTERIOR STEEL STAIRS W/ TUBE STEEL GUARDRAIL, TYP.
- 14 TRUCK LOADING DOCK (TYPICAL)
- 15 LOADING SPACE - L.S. (MIN. 12.0m X 3.5m)
- 16 FIRE ACCESS ROUTE W/ 12M TURNING RADIUS
- 17 PROPOSED ELECTRICAL ROOM
- 20 PROPOSED MECHANICAL ROOM
- 21 CURB RADI AT ENTRANCES WITHIN MUNICIPAL SIDEWALK LIMITS TO CONFORM TO OPSD 350.010. - SEE CIVIL DWGS.
- 22 1.8M WIDE PAINTED PEDESTRIAN PATHWAY
- 23 HATCHED AREA DENOTES HEAVY DUTY ASPHALT, TYPICAL FOR ALL AREAS REQUIRING FIRE TRUCK OR TRACTOR TRUCK ACCESS.
- 24 15.0m CENTERLINE RADIUS DISTANCE TO FIRE ACCESS ROAD
- 25 ROAD CURB AND SIDEWALK TO BE CONTINUOUS THROUGH THE DRIVEWAY, DRIVEWAY GRADE TO BE COMPATIBLE WITH EXIST. SIDEWALK AND A CURB DEPRESSION WILL BE PROVIDED FOR AT EACH ENTRANCE.
- 26 INVERTED U-SHAPE GALVANIZED BICYCLE RACKS MIN. 1.8Mx0.6M PER SPACE
- 27 PROPOSED STOP SIGN LOCATION
- 28 PRESSED PATTERNED ASPHALT PEDESTRIAN PATHWAY
- 29 YELLOW PAINTED LINES
- 30 RETAINING WALL
- 31 PRECAST SCREEN WALL TO BE INSTALLED ON TOP OF RETAINING WALL - REFER TO STRUC. DWGS
- 32 PROPOSED FIRE ROUTE SIGN LOCATION
- 33 RESERVED
- 34 PROPOSED AMENITY AREA
- 35 SNOW STORAGE ON SITE AT 2% TOTAL SITE AREA
- 36 PROPOSED CHAIN-LINK FENCE
- 37 CONCRETE/STEEL SAFETY BOLLARD
- 38 SCREEN WALL
- 39 PROPOSED PYLON SIGNAGE
- 40 DRIVE-IN RAMP WITH GALVANIZED GUARDRAIL ON EACH SIDE. SEE CIVIL DWGS FOR SLOPE %
- 41 RESERVED
- 42 DETECTIBLE TACTILE WARNING SURFACE, CONFORMING TO 2012 O.B.C. MIN. 3m WIDE CONCRETE DOLLY PAD AT TRAILER STALLS
- 43 ACCESSIBLE PARKING GRADE SLOPING UP TO MEET PROPOSED CURB LEVEL
- 44

SITE LEGEND



WARE MALCOMB
ARCHITECTURE
PLANNING
INTERIORS
6220 Highway 7, Suite 300
Vaughan, ON L4H 0R1, Canada
P 905.760.1221

anatolia
TILE + STONE

**6728 SIXTH LINE,
MILTON**
6728 SIXTH LINE
MILTON, ONTARIO L9T 2Y3

OVERALL SITE PLAN

DATE	ISSUED FOR COORDINATION	REMARKS
2023-11-28		

PA / PM:	C.R.
DRAWN BY:	HW
JOB NO.:	TOR21-0016-01

SHEET
A1.0

W:\TOR\21\0016\01\Architectural\Cad\SD\0016_A10.dwg

Appendix B: Town & Region Comments for Terms of Reference



From: Kavleen.Sachdeva@milton.ca
To: [Robin Marinac](#)
Cc: [Mark Crockford](#)
Subject: RE: Anatolia Milton Industrial TIS TOR
Date: April 28, 2022 1:46:08 PM
Attachments: [image001.png](#)
[esig_cb7daa72-4770-4979-b68f-eed4c3985ef2.png](#)

Afternoon Robin, Mark,

Please see the Town's comments in green below.



Kavleen Sachdeva, P.Eng
Transportation Planning Technologist
150 Mary Street., Milton ON, L9T 6Z5
905-878-7252 ext. 2363
www.milton.ca

Confidentiality notice: This message and any attachments are intended only for the recipient named above. This message may contain confidential or personal information that may be subject to the Municipal Freedom of Information Act and must not be distributed or disclosed to unauthorized persons. If you received this message in error, please notify the sender immediately. Thank you for your assistance.

From: Loro, Darren <Darren.Loro@halton.ca>
Sent: Wednesday, April 27, 2022 3:49 PM
To: Robin Marinac <robin.marinac@cghtransportation.com>
Cc: Mark Crockford <mark.crockford@cghtransportation.com>; Krusto, Matt <Matt.Krusto@halton.ca>; Kavleen Sachdeva <Kavleen.Sachdeva@milton.ca>
Subject: RE: Anatolia Milton Industrial TIS TOR

Hi Robin,

Please see Transportation Planning's comments in blue on the proposed Anatolia Milton TIS TOR text pasted below. These comments have been provided to promote consistency with other completed studies in the Derry Green Secondary Plan area. Some of these comments are also reminders from our pre-consultation comments regarding access to Derry Road and the Clark Boulevard extension.

Let us know if you wish to discuss further!

Cheers,
Darren

We have been asked to undertake a Transportation Impact Study (TIS) to support the proposed industrial development located east of Fifth Line, south of Derry Road, west of Sixth Line and north of the Milton Phase 4 lands (MP4) within the Derry Green Corporate Business Park Secondary Plan, in Milton, Ontario, referred to herein as the 'study area'. Within the study area, there are two landowners, Anatolia Capital Corp, and Neamsby Investments Inc, as illustrated on the attached Figure 1.2 extracted from SIS Area 5A Addendum (SIS) shown in Attachment 1. Combined, the developments will include approximately 1.9 million square feet of industrial space across six building and 145,000 square feet of commercial space

across five buildings, as illustrated on the attached Figure 1.3 extracted from the SIS and shown in Attachment 2. These properties will have direct access to Derry Road, Sixth Line, and Fifth Line via the future extension of Clark Boulevard. Clark Boulevard is a collector road that connects to Fifth Line to the west of the property and Derry Road to the north. This plan includes the conceptual alignment of the Clark Boulevard extension which will be confirmed as part of the TIS.

It is anticipated that a separate TIS will be required for each developer's zoning bylaw amendment and draft plan of subdivision application. As such, this Terms of Reference (TOR) has been prepared to support the Anatolia Capital Corp. Lands. [Acceptable](#).

The Anatolia Capital Corp. site includes three industrial buildings with a total building area of 1.5 million square feet. Access to these buildings will be via Derry Road, Clark Boulevard, and Sixth Line as shown in Attachment 2.

We have prepared the following scope of work for review and endorsement. Please let us know if you have any comments or additions. All data requests are noted in *red* and have also been summarized at the end of the memo.

[The Transportation Impact Assessment Report must be stamped, signed, and dated by a Licensed Professional Engineer in the Province of Ontario \(P.Eng.\).](#)

Transportation Impact Assessment Requirements (TIA):

The study will be in accordance with Halton Region's *Transportation Impact Study Guidelines (2015)*.

Study Area:

- An overview of the transportation system existing conditions will be documented (including transit, cycling, pedestrian and automobile modes).
- A summary of existing transportation policies within the Study Area will be identified.
- An overview of the Study Area road network will be provided including the road classification and descriptions of:
 - Fifth Line
 - Sixth Line
 - Clark Boulevard
 - Derry Road
 - [James Snow Parkway](#)
- The following intersections will be included in the Transportation Impact Assessment:
 - Fifth Line at Derry Road
 - Sixth Line at Derry Road
 - Clark Boulevard at Derry Road (future) - [assume four-legged intersection for 2027 beyond](#)
 - Clark Boulevard at Fifth Line (future)
 - All proposed future Site Accesses (two accesses on Derry Road, one access on Sixth Line, and proposed accesses on Clark Boulevard)
 - [Given the scale of the proposed development, please add the intersection of Derry Road and James Snow Parkway to the study scope.](#)

Existing Traffic Data:

- Turning Movement Counts (TMCs) at the two existing Study Area intersections of Fifth Line at Derry Road (2019), and Sixth Line at Derry Road (2018) have been received from Halton Region staff. Updated traffic counts can be commissioned and used as existing traffic volumes if preferred. The Town is now accepting new traffic counts to be used existing analysis.
- Signal Timing Plans have been received for the intersections of Fifth Line and Derry Road, and Sixth Line and Derry Road from Halton Region staff.
- The following compound annual growth rates will be assumed at the Study Area intersections to determine the 2022 existing traffic volumes. These growth rates and corresponding application methodology is based on the *Derry Green Corporate Business Park Transportation Impact Study (2021)* prepared by Crozier Consulting Engineers: If historical traffic data is being used as the base traffic data, then please apply a growth rate of 2% compounded annually to all movements at all Regional road intersections to inflate the historical volumes to 2022 “existing” traffic volumes. Agreed.
 - 2.0% compound annual growth rate for Derry Road. This growth rate will be applied to the eastbound through and westbound through movements at the two Study Area intersections.
 - 2.0% compound annual growth rate for Fifth Line. This growth rate will be applied to all northbound and southbound movements, as well as the eastbound left-turn, eastbound right-turn, westbound left-turn and westbound right-turn movements at the intersection of Derry Road and Fifth Line.
 - 2.0% compound annual growth rate for Sixth Line. This growth rate will be applied to all northbound and southbound movements, as well as the eastbound left-turn, eastbound right-turn, westbound left-turn and westbound right-turn movements at the intersection of Derry Road and Sixth Line.
- Collision data (over the past five years) has been received from Halton Region for the intersections of Derry Road at Fifth Line and Derry Road at Sixth Line.

Proposed Development Overview:

- A description of the proposed development and any planned active mode facilities.
- Outline of land use as it relates to the development and site statistics.
- Transportation Demand Management (TDM) supportive elements of the proposed development.

Study Horizon and Peak Periods:

- Base year 2022, followed by a future build-out and occupancy horizon of 2027, and future build-out and occupancy horizon plus five years of 2032. Acceptable. If the proposed development is to be built out in phases, then the horizon year associated with the build-out of each major phase should be evaluated as to quantify impacts associated with interim phases compared to impacts associated with the entire development. Please analyze the anticipated opening year of each major phase (assuming full build-out and occupancy), the anticipated year of complete build-out and occupancy, and 5 years post complete build-out and occupancy.
- AM and PM peak hours for all horizons. Agreed

Background Growth:

- The following compound annual growth rates will be assumed at the Study Area intersections for application to the 2022 existing intersection volumes to determine the Study Area intersection volumes for the future horizon years of 2027 and 2032. These growth rates and corresponding application methodology is based on the *Derry Green Corporate Business Park Transportation*

Impact Study (2021) prepared by Crozier Consulting Engineers:

- 2.0% compound annual growth rate for Derry Road. This growth rate will be applied to the eastbound through and westbound through movements at the two Study Area intersections. Acceptable. [Please apply to the eastbound and westbound through movements on Derry Road at the future Clark Boulevard intersection, and to the eastbound left/through/right and westbound left/through/right movements on Derry Road at James Snow Parkway. Please assume that this growth rate includes background site traffic generated by background developments.](#)
- [Please apply a growth rate of 2% compounded annually to the northbound left/through/right and southbound left/through/right movements on James Snow Parkway at Derry Road up to 2027 future conditions. Please assume that this growth rate includes background site traffic generated by background developments.](#)
- [Please apply a growth rate of 4% compounded annually to the northbound left/through/right and southbound left/through/right movements on James Snow Parkway at Derry Road beyond 2027 future conditions. Please assume that this growth rate includes background site traffic generated by background developments.](#)
- 2.0% compound annual growth rate for Fifth Line. This growth rate will be applied to all northbound and southbound movements, as well as the eastbound left-turn, eastbound right-turn, westbound left-turn and westbound right-turn movements at the intersection of Derry Road and Fifth Line. This growth rate will be applied to the northbound through and southbound through movements only at the intersection of Fifth Line and Clark Boulevard.
- 2.0% compound annual growth rate for Sixth Line. This growth rate will be applied to all northbound and southbound movements, as well as the eastbound left-turn, eastbound right-turn, westbound left-turn and westbound right-turn movements at the intersection of Derry Road and Sixth Line. This growth rate will be applied to the northbound through and southbound through movements only at the intersection of Fifth Line and Clark Boulevard as well as all site access intersections on Sixth Line.
- 2.0% compound annual growth rate for Clark Boulevard. This growth rate will be applied to all intersection movements at Derry Road and Clark Boulevard with the exception of the eastbound and westbound through movements, and all turning movements at the intersection of Clark Boulevard and Fifth Line with the exception of the northbound through and southbound through movements. Additionally, this growth rate will be applied to the through movements on Clark Boulevard only at all site access intersections on Clark Boulevard.
- Surrounding background development traffic projections will be considered on both Town of Milton and Halton Region roads despite Town and Region comments made in the *Derry Green Corporate Business Park Transportation Impact Study (2021)* prepared by Crozier Consulting Engineers. These comments indicate that background development traffic only be considered on Town of Milton roads. This approach will create significant imbalances between future intersections and therefore a consolidated approach of considering a compound annual growth rate of 2% as well as surrounding background development traffic is proposed for all roadways.
- The following background developments and reports may be considered: [Please contact Halton Region Community Planning or the Town of Milton's Planning Department to obtain the latest version of these studies. Some studies will come through in a separate email.](#)
 - *Boyne Secondary Plan Survey Area – Road Network Assessment* prepared by GHD
 - *Derry Green Secondary Plan Survey Area – Transportation Strategy Report (2010)* prepared

- by Entra Consultants *(Data request)* See above.
- o Derry Green Corporate Business Park Secondary Plan Modification (2016) prepared by Read, Voorhees & Associates *(Data request)* See above.
- o Derry Green Corporate Business Park Transportation Impact Study (2021) prepared by Crozier Consulting Engineers
- o Transportation Impact Study for the Sun Life Broccolini lands (south of Derry Road) within the Derry Green Business Park *(Data request)* See above.
- o Transportation Impact Study for the Orlando Corporation lands within the Derry Green Business Park *(Data request)* See above.
- o Menkes Milton Industrial Inc. Phase 1 lands within the Derry Green Business Park *(Data request)* See above.
- o Broccolini Lands (north of Derry Road) within the Derry Green Business Park *(Data request)* See above.

Please include any other studies to be considered *(Data request)* Background site traffic from the adjacent Neamsby industrial/commercial development must be accounted for in accordance with the background development site traffic and growth rate methodologies listed in this section. Agreed

As previously stated, the provided growth rate for all “Region-to-Region” movements at Region-owned intersections (e.g. eastbound and westbound through movements at Derry Road and Sixth Line, or all movements at Derry Road and James Snow Parkway) include background site traffic generated by background developments. For consistency with other studies prepared in the Derry Green Secondary Plan area and to avoid double counting background development traffic on the road network, please follow this growth rate methodology for all “Region-to-Region” movements under all horizon years.

For all “Region-to-Town” or “Town-to-Region” movements at Region-owned intersections (e.g. eastbound left-turn movement or southbound right-turn movement at Derry Road and Sixth Line), please apply a growth rate of 2% compounded annually to these movements plus background site traffic generated by the background developments listed above for all horizon years.

Changes to Area Transportation Network

- The Region’s 2022 Budget and Business Plan indicates a construction start date of 2026 for the James Snow Parkway widening to six lanes. Therefore, it is not reasonable to assume that the road widening will be complete by 2027 and thus should only be accounted for under the 2032 horizon year.
 - o For consistency with other studies prepared in the Derry Green Secondary Plan area, an additional eastbound and westbound through lane on Derry Road can be assumed at the intersection of James Snow Parkway (starting upstream the intersection and ending downstream the intersection) as part of the James Snow Parkway widening to be accounted for under the 2032 horizon year.
 - o Assume that all lanes are general use.
- Derry Road widening from four to six lanes within the proposed Study Area. The Region’s 2022 Budget and Business Plan indicates a construction start date of 2031 for the Derry Road widening to six lanes. Therefore, it is not reasonable to assume that the road widening will be complete by 2032 and thus should not be accounted for in the TIS.
 - o As per the Halton Region TMP, Derry Road is classified as a C4 Urban road with a 47 metre cross-section with two standard travel lanes in each direction, and an HOV/RBL lane in both directions. Please indicate if this lane should be assumed to be an RBL or HOV lane. *(Data request)* See above.
 - o It is assumed that the changes to Derry Road will be present in the 2032 future analysis

horizons.

- o As no further information regarding the anticipated changes to Derry Road are available, it has been assumed that storage lanes at intersections will remain the same with the only changes being additional through lanes, and the posted speed limit will remain as is. Please confirm if there are any available roadway designs, and if not, please confirm if the assumptions above are reasonable. *(Data request) See above.*
- Fifth Line is indicated to be widened from two to four lanes by 2031 in the Town of Milton Transportation Master Plan. Additionally, Halton Region has indicated that Fifth Line is being protected to be expanded to a six-lane cross-section in lieu of construction of 5 ½ Line.
 - o Please clarify the future plans for Fifth Line as well as the timeline for these changes. It has been assumed that Fifth Line will be widened to a six-lane cross-section. *(Data request) Fifth Line is a multi-phased project. The first phase is presently under construction for the widening / realignment from Hwy. 401 to south of Main St. E. with the reconstruction and widening of Main St. E. from JSP to Fifth Line. The second phase of widening from south of Main to south of Derry is presently in detailed design (between 60-90% design level) and will start construction in spring 2023. The third phase from south of Derry to south of Britannia is going to be starting detailed design in June (the RFP for design just closed yesterday) and will start construction in spring 2025. . If Fifth Line does go to 6 lanes, that would fall under a scenario where the Region would assume control of Fifth Line and it would no longer be Town owned. At the present time some preliminary options have been reviewed but the Region would still need to go through an EA study and then detailed design. If it occurs, this won't occur until after 2030.*
 - o Please indicate the intent of the additional lanes (general use lane, HOV lane etc.) *(Data request)*
 - o As no further information regarding the anticipated changes to Fifth Line are available, it has been assumed that storage lanes at intersections will remain the same with the only changes being additional through lanes, and the posted speed limit will remain as is. Please confirm if there are any available roadway designs, and if not, please confirm if the assumptions above are reasonable. *(Data request) All of the Fifth Line works are being completed in accordance with the EA Studies that were completed in 2015 and 2016 respectively – EA study (coming through in a separate email) reports including preliminary designs that were incorporated as part of the studies.*
- Future plans for the extension of Clark Boulevard through the subject lands between Derry Road and Fifth Line will be considered.
 - o A conceptual design of this extension will be prepared to support the TIS and will include the intersections of Clark Boulevard and Fifth Line, and Clark Boulevard and Derry Road. *The intersection design for Derry Road and Clark Boulevard must consider WB-20 tractor semi-trailer swept path maneuverability for turning movements to and from Clark Boulevard. Conceptual design for Clark Blvd and Fifth Line can be done as part of the Nearsby Industrial Site.*
 - o Alignment alternatives for Clark Boulevard will be evaluated as part of the TIS. The Intersection location at Fifth Line is fixed to match the west approach being constructed as part of the Oxford James Snow Business Park works (DM-1063) but alignment and intersection location at Derry Road is subject to review. *As stated at pre-consultation, the Secondary Plan illustrates the future Clark Boulevard roadway alignment to be in line with the easterly limit of the 11319 Derry Road property on the north side of Derry Road. Consideration must be given to the location of the future Clark Boulevard alignment through the subject property and intersection location to Derry Road to be consistent with the Secondary Plan. This will result in the slight shifting of the future Clark Boulevard connection to the west to achieve this alignment and meet the intent of the Secondary Plan and Halton Region's overall corridor access plan.*

- o This extension will be considered in both the 2027 and 2032 future analysis horizons. If any development phases prior to full build-out are analyzed before 2027, then the Clark Boulevard extension should be considered under any horizon year beyond 2023.
- o Please provide any additional information or drawings of Clark Boulevard west of Fifth Line. *(Data request)* Please contact Halton Region Community Planning or the Town of Milton's Planning Department to obtain the Clark Boulevard and Fifth Line engineering drawings prepared for the Oxford subdivision.
- o Please identify any additional information to be considered. *(Data request)* The TIS prepared for the Oxford subdivision considered diversions to traffic on James Snow Parkway and Derry Road resulting from the extension of Clark Boulevard from James Snow Parkway to Fifth Line (implemented as part of the Oxford subdivision). These diversions should be considered under future background conditions in this analysis. Diversions to traffic on Derry Road and Fifth Line resulting from the extension of Clark Boulevard from Fifth Line to Derry Road (implemented as part of the proposed development) should be considered under future total conditions in this analysis, with all assumptions, methodologies and calculations clearly documented in the TIS.
- No other changes to the Study Area transportation network are noted. Please provide information on any additional future changes to the Study Area Transportation network to be considered. *(Data request)* At present, Sixth Line is in our forecast for 2028 construction for Hwy. 401 to Derry and 2029 construction for Derry to Britannia. These are partially development driven as well.

Development Site Traffic:

- Trip generation: ITE Trip Generation Manual 11th Edition.
 - o ITE LUC 130 – Industrial Park is proposed. The TIS must justify this ITE land use as the most appropriate land use category to apply to the proposed industrial buildings. Agreed with Region.
 - o Site-generated Heavy Vehicle volumes will be determined using ITE Trip Generation Manual 11th Edition Truck Trip Generation Data Plot Appendix. Differentiate between passenger vehicles and trucks in the trip generation, analyze the impacts of the considerable increase in truck traffic to the road network, and review design considerations needed to accommodate the truck traffic.
- Modal Split: No transit, pedestrian, or cycling mode split will be considered.
- The TIS will also need to compare trip generation forecasts between the proposed development and the subject property from the Derry Green Secondary Plan Transportation Study.
- All trip generation assumptions must be clearly documented in the TIS with supporting data appended.
- Trip distribution and assignment of auto trips: Transportation Tomorrow Survey (TTS), existing traffic routing patterns and surrounding area characteristics based on an existing proxy zone of similar characteristics to the proposed development zone.
- Trip distribution and assignment of heavy vehicle trips: Surrounding area characteristics
- Trip distribution for the proposed development should also consider the trip distribution assumptions from the TIS' prepared for other development applications within the Derry Green Secondary Plan area.
- All trip distribution assumptions must be clearly documented in the TIS with supporting data appended.
- Please ensure the methodology and all engineering judgement is thoroughly documented and explained within the report

Traffic Analysis:

- Traffic analysis to be performed using Synchro 10 on Study Area network intersections to determine the LOS, delay, V / C ratio and the 95th percentile queues for overall intersections as well as individual movements using Highway Capacity Manual (HCM) methodology.
 - Heavy Vehicle %, Peak Hour Factors, pedestrian volumes, and cyclist volumes will be taken from the collected TMC data. Where information is not available, a pedestrian volume of 5 pedestrians/hour, a cyclist volume of 5 cyclists/hour, and a Heavy Vehicle % of 2%, and the Peak Hour Factor of an adjacent intersection will be applied.
 - Other Synchro inputs will be based on site observations, Halton Region's Transportation Impact Study Guidelines, as well as Synchro default parameters.
 - Critical movements and intersections will be identified as defined in Halton Region's Transportation Impact Study Guidelines.
- Qualitative transit, cycling, and pedestrian analysis
- If traffic operations issues are identified under future background or total conditions, then the TIS will need to recommend mitigation measures to address these issues. The TIS should identify who is responsible for each recommended mitigation measure, if required.
- As stated at pre-consultation, Halton Region Access By-law (NO.32-17). Section 6.1 (a) states that *"access to a Regional Road from private property shall be permitted only where such access is necessary because access to a local road is not feasible."* As access to Derry Road could be provided solely via Sixth Line and future Clark Boulevard, any proposed access to Derry Road will need to be approved by the Region and justified in the TIS. The justification should demonstrate that the proposed access conforms to the Region's Access Management Guideline (spacing, geometrics, sightlines, etc.), demonstrate the benefits of permitting access to Derry Road (e.g. traffic operations, safety, circulation, etc.) and highlight any negative impacts of not permitting access to Derry Road.
 - Any proposed unsignalized accesses directly to Derry Road must be restricted to a right-in/right-out (RI/RO) operation.
 - Halton Region must maintain priority and consideration for access requirements for adjacent properties on both the north and south side of Derry Road in the area, in coordination with the approved Derry Green Secondary Plan intersection locations.
 - The TIS must acknowledge that an access easement may be considered for the adjacent Neamsby development.
- The TIS must analyze auxiliary right-turn lane requirements on Derry Road at the proposed accesses and future Clark Boulevard.
- The TIS must analyze traffic safety components associated with the proposed accesses to Derry Road including (but not limited to):
 - Sightlines along Derry Road;
 - the proposed clear throat length at the accesses; and
 - swept path analysis for the largest design vehicle at each access.
- The TIS must also review the proposed corner clearance on Sixth Line between Derry Road and the southerly proposed access to Sixth Line.

Recommendations:

- Any recommended offsite and onsite improvements or mitigation measures, which may include turn lane requirements, pedestrian / cycling / transit amenities, TDM measures, construction impacts, safety measures etc.
- The Region ultimately requires confirmation that the planned Regional Road Network can

accommodate the planned growth in this area as well as the proposed development. As such, if there are intersections where capacity is an issue in the 2032 horizon year (e.g. on Derry Road), please demonstrate how the Derry Road widening to six lanes could mitigate these constraints under the 2032 horizon year.

- The TIS should acknowledge the benefit of the Region's long-term plans as identified in the 2011-2031 Transportation Master Plan. These plans include a new north south six-lane Regional corridor (known as 5 ½ Line) that would connect Britannia Road and Steeles Avenue to Highway 401 and provide additional roadway network capacity. The exact location and configuration will be confirmed through a future Municipal Class Environmental Assessment (MCEA) Study which has not yet been initiated. However, this future corridor (if implemented) would improve connectivity to and from the study area and thus be expected to alleviate traffic volumes on the existing Derry Road and James Snow Parkway corridors.
- If necessary, the report could also mention that the Region will monitor the need and timing of all corridor level improvement through future updates to the Transportation Master Plan.
- Include traffic control signal and roundabout warrants where applicable
- Transportation Demand Management Plan – to be included with detailed recommendations.
- Site Circulation. Please provide a detailed review of vehicular and pedestrian circulation.
- Detailed Recommendations regarding on-site/off-site roadway improvements, site access, site circulation, and TDM measures should be made.

Parking & Loading

If the subject site is deficient in parking supply per the Town's ZBL, a parking justification study will be required. A terms of reference will be required to be reviewed and approved by the Town prior to commencing the study.

Traffic Signage & Pavement Marking Plan

Create a traffic signage & pavement marking plan to reinforce the function of the internal circulation systems, encourage the utilization of access drives, and direct the facility user to the desired building or exit so that they can concentrate on safe driving instead of figuring out how to reach a destination point. A significant emphasis must be placed on pedestrian circulation and safety. Signs and pavement markings are to conform to the Ontario Traffic Manual.

Auto-Turn Analysis

As part of a complete application, ensure that truck traffic (garbage/loading/transport truck) can enter/exit the site in a forward motion and access to the garbage and loading areas are functional. On separate plans, illustrate truck turning movements with one continuous path with AutoTURN and insert the design vehicles on the plan. The site must be able to accommodate the largest design vehicles which will be accessing the property.

Site Access Review

Referencing the TAC manual, please conduct a detailed and comprehensive Site Access Review including, but not limited to, the following:

- determine if the proposed site access location meets TAC minimum standards for crossing sight distance, stopping sight distance, decision sight distance, turning sight distance, etc

- corner clearance from adjacent intersections
- spacing between adjacent driveways
- spacing considerations for opposing driveways
- ensure design conformance of the site access(es) to OPSD Rural Entrance standards
- Determination whether the proposed site access is feasible from a safety and traffic operations perspective and why
- A list of any potential or required mitigation measures to support the access (if site access determined to be feasible) OR a proposed new site access location(s)

Darren Loro, C.E.T.

Project Manager I – Transportation Planning Coordination

Infrastructure Planning & Policy

Public Works

Halton Region

905-825-6000, ext. 2694 | 1-866-442-5866



This message, including any attachments, is intended only for the person(s) named above and may contain confidential and/or privileged information. Any use, distribution, copying or disclosure by anyone other than the intended recipient is strictly prohibited. If you are not the intended recipient, please notify us immediately by telephone or e-mail and permanently delete the original transmission from us, including any attachments, without making a copy.

From: Robin Marinac <robin.marinac@cghtransportation.com>

Sent: Tuesday, April 19, 2022 3:02 PM

To: Loro, Darren <Darren.Loro@halton.ca>; Kavleen.Sachdeva@milton.ca

Cc: Mark Crockford <mark.crockford@cghtransportation.com>

Subject: Anatolia Milton Industrial TIS TOR

CAUTION: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. If you are unsure or need assistance please contact the IT Service Desk.

Hi Darren and Kavleen

Please find attached our Anatolia Milton Industrial Transportation Impact Study Terms of Reference (TOR) for your review. As described in a previous email, the Anatolia industrial lands are part of a proposed industrial development with two landowners (Neamsby Investments Inc. and Anatolia Capital Corp.). As it is anticipated that a separate TIS will be required for each developer’s zoning by-law amendment and draft plan of subdivision application, two separate TORs have been prepared. Please let us know if you have any comments or questions.

Kind regards,
Robin Marinac



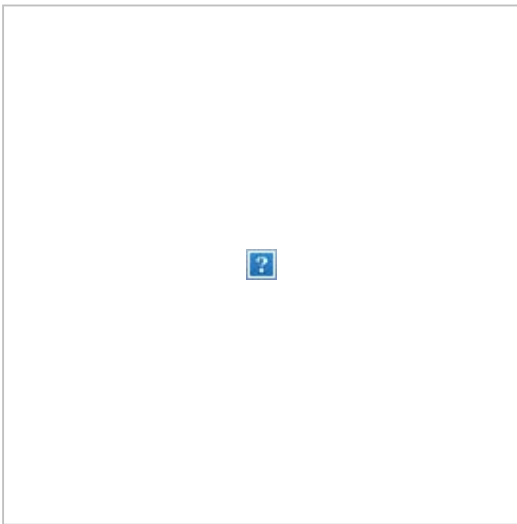
Robin Marinac, EIT
CGH Transportation Inc.
P: 437-242-5183
E: robin.marinac@cghtransportation.com

From: [Josh Berry \(Anatolia Capital Corp\)](#)
To: [Deanna Green](#); [William Gates-Crease](#)
Cc: [Behnaz Bahrefar](#)
Subject: FW: Anatolia Clark Blvd Intersection Alignment
Date: September 11, 2023 10:46:53 AM
Attachments: [7427e42438cbefc5839a677c83f3caf3_1683889662.jpg](#)
[image002.png](#)

FYI

Josh Berry, M.PI, MCIP, RPP
Senior Manager - Planning

T +1 905 771 3800 x 5636



From: Natalie.Stopar@milton.ca <Natalie.Stopar@milton.ca>
Sent: September 8, 2023 11:19 AM
To: Josh Berry (Anatolia Capital Corp) <Josh.Berry@anatolia.com>; Colin Chung <colinc@gsai.ca>
Cc: Chris.Toews@milton.ca; christian.lupis@milton.ca; 'Clackett, Robert' <Robert.Clackett@halton.ca>; Loro, Darren <Darren.Loro@halton.ca>
Subject: Anatolia Clark Blvd Intersection Alignment

[CAUTION: EXTERNAL EMAIL] Sender may not be who they say they are – please VERIFY sender’s email address and DO NOT click links or open attachments unless you know the sender is LEGITIMATE and the content is SAFE.

Good afternoon,

I had a meeting with Regional and Town Transportation staff yesterday to discuss the memo dated August 18, 2023. Staff are generally supportive of the proposed Clark Blvd alignment.

To confirm that the alignment is appropriate, please ensure that the TIS includes a discussion of the proposed alignment and intersection. The TIS should also confirm if the proposed location of the intersection will impact future driveway access opportunities to

Derry Road.

Regards,

Natalie



Natalie Stopar, MCIP, RPP

Acting Senior Planner, Development Review

150 Mary Street, Milton ON, L9T 6Z5

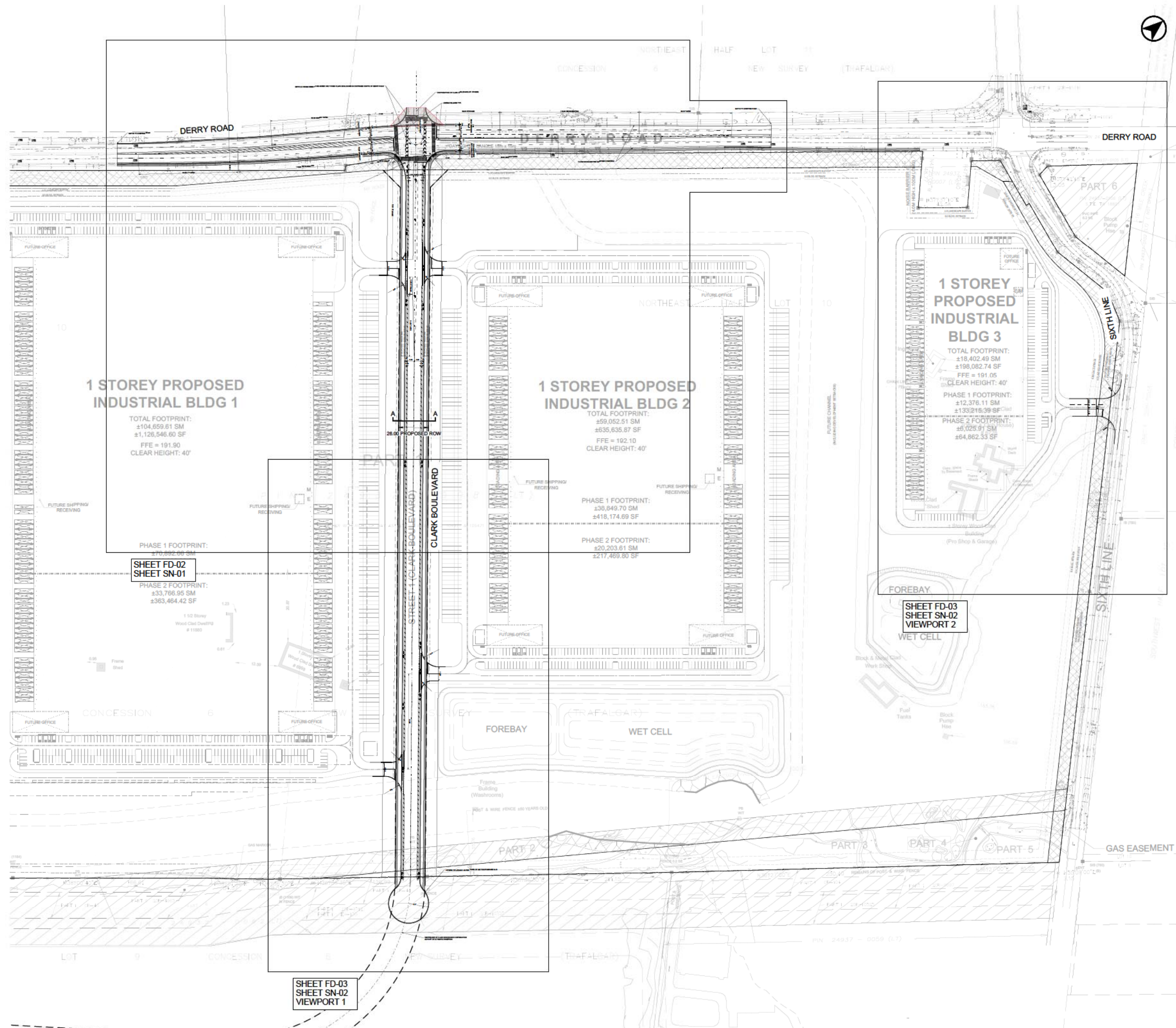
905-878-7252 ext. 2297

www.milton.ca

Confidentiality notice: This message and any attachments are intended only for the recipient named above. This message may contain confidential or personal information that may be subject to the Municipal Freedom of Information Act and must not be distributed or disclosed to unauthorized persons. If you received this message in error, please notify the sender immediately. Thank you for your assistance.

Appendix C: Functional Road Plans





GENERAL NOTES

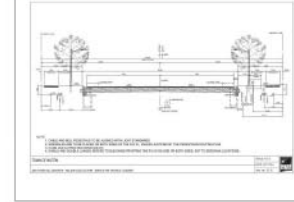
1. TOPOGRAPHIC SURVEY BY STANTEC DATED DECEMBER 2023
2. SITE PLAN BY WARE MALCOMB DATED DECEMBER 2023

LEGEND

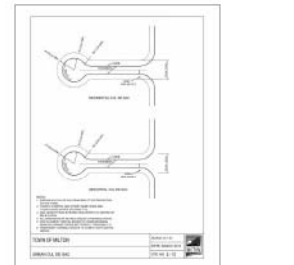
- PROPERTY LINE
- - - PROPOSED RIGHT-OF-WAY
- ▬▬▬ PROPOSED 150mm BARRIER CURB

SECTION A-A

TOWN OF MILTON STANDARD - 26m ROAD ALLOWANCE - MAJOR COLLECTOR



TOWN OF MILTON STANDARD - URBAN CUL-DE-SAC



- 04 13-11-23** WGC ISSUED FOR RESUBMISSION
- 03 15-10-23** WGC ISSUED FOR CLIENT REVIEW
- 02 04-04-23** WGC ISSUED FOR SUBMISSION
- 01 03-14-23** WGC ISSUED FOR CLIENT REVIEW
- 00** MMCD/VR INT REVISION NOTE



6728 SIXTH LINE / DERRY ROAD ANATOLIA DEVELOPMENT

FUNCTIONAL ROAD PLAN SITE OVERVIEW

Date: October 16, 2023
 Project No: 8194-01
 Scale: 1:1,000

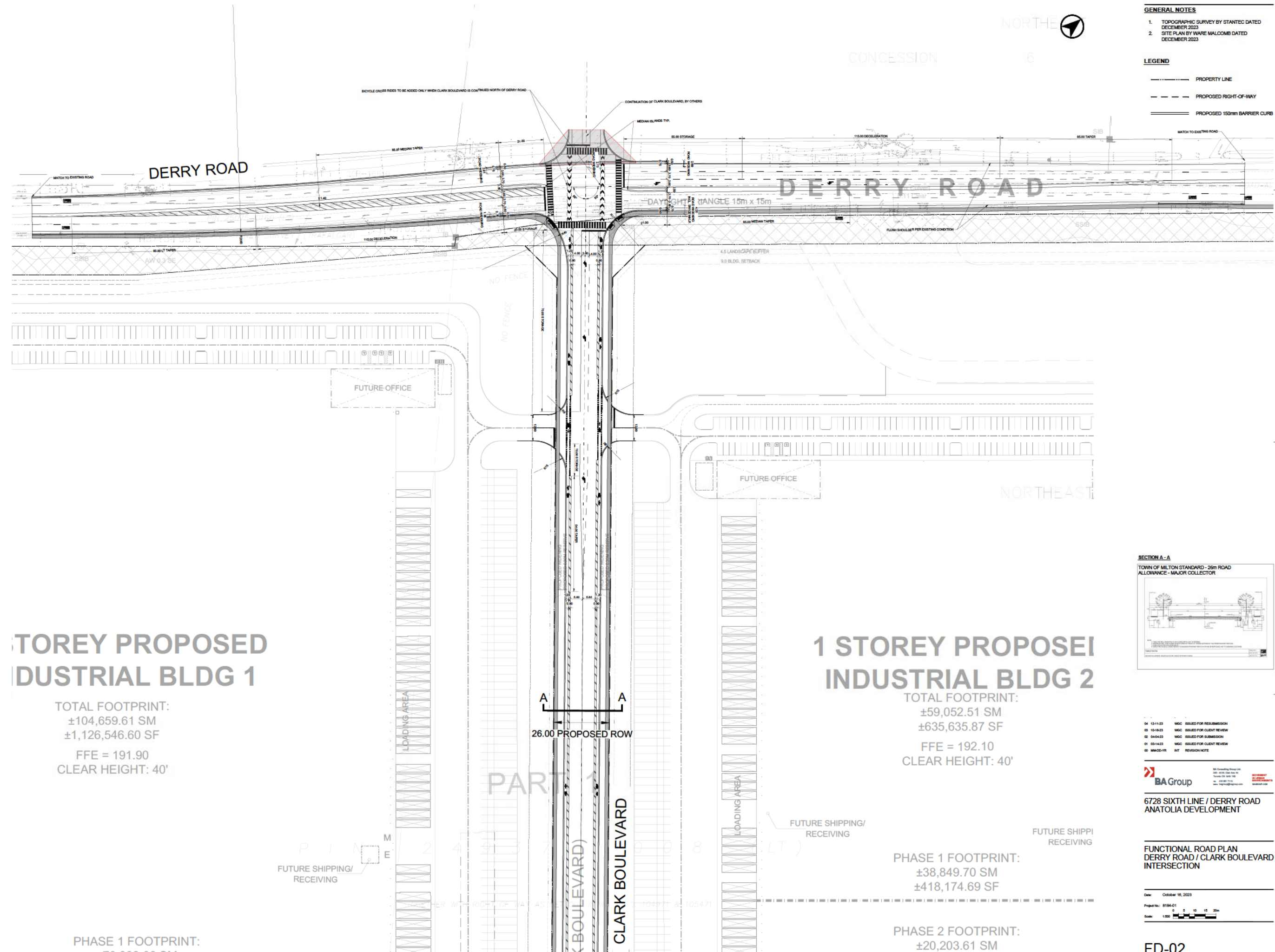


GENERAL NOTES

1. TOPOGRAPHIC SURVEY BY STANTEC DATED DECEMBER 2023
2. SITE PLAN BY WARE MALCOMB DATED DECEMBER 2023

LEGEND

- PROPERTY LINE
- - - PROPOSED RIGHT-OF-WAY
- ===== PROPOSED 150mm BARRIER CURB



TOREY PROPOSED INDUSTRIAL BLDG 1

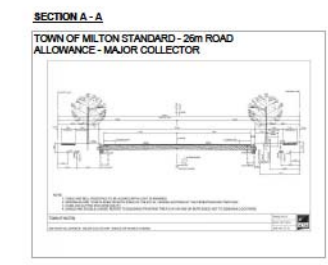
TOTAL FOOTPRINT:
 ±104,659.61 SM
 ±1,126,546.60 SF
 FFE = 191.90
 CLEAR HEIGHT: 40'

1 STOREY PROPOSED INDUSTRIAL BLDG 2

TOTAL FOOTPRINT:
 ±59,052.51 SM
 ±635,635.87 SF
 FFE = 192.10
 CLEAR HEIGHT: 40'

PHASE 1 FOOTPRINT:
 ±38,849.70 SM
 ±418,174.69 SF

PHASE 2 FOOTPRINT:
 ±20,203.61 SM



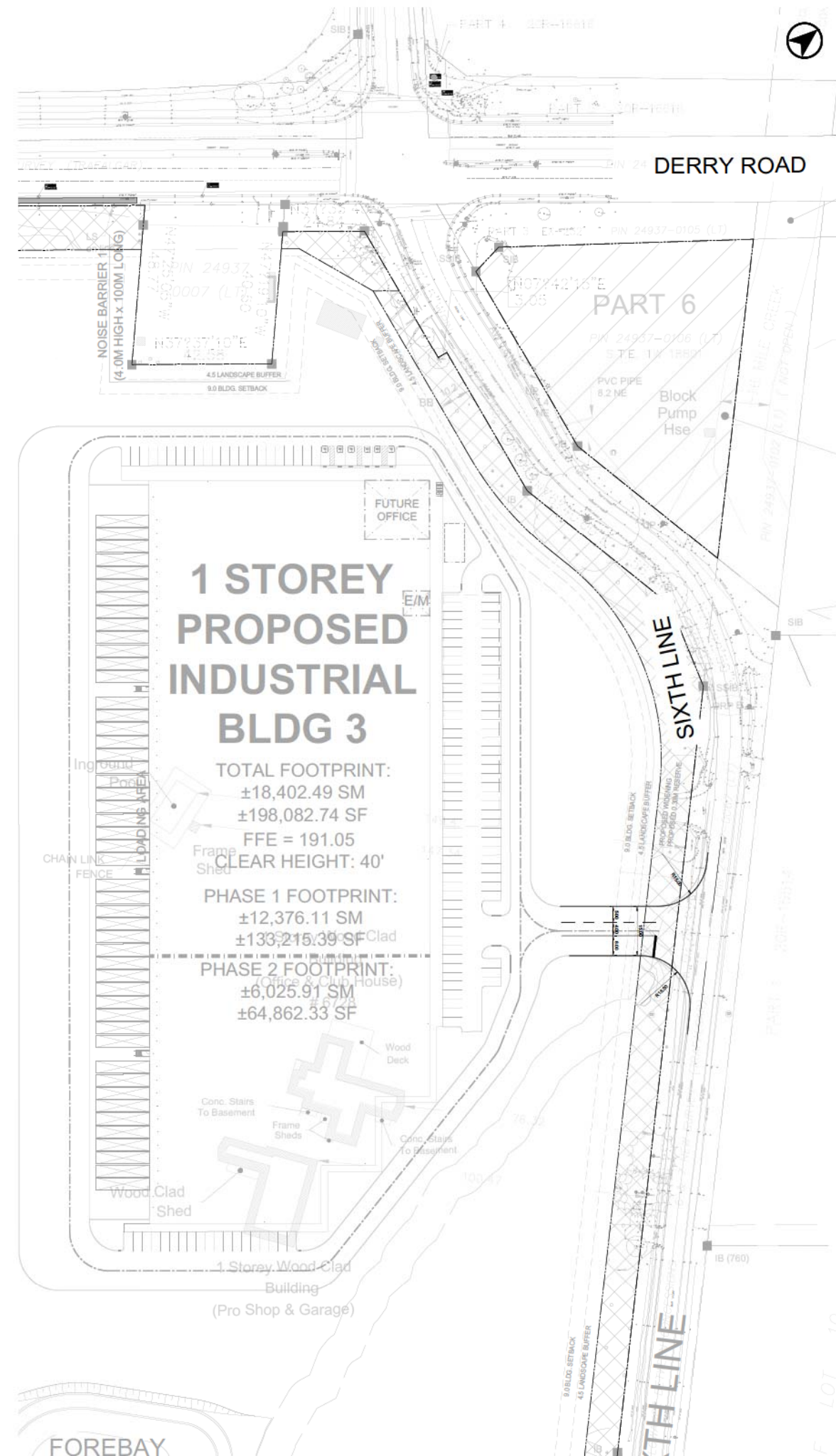
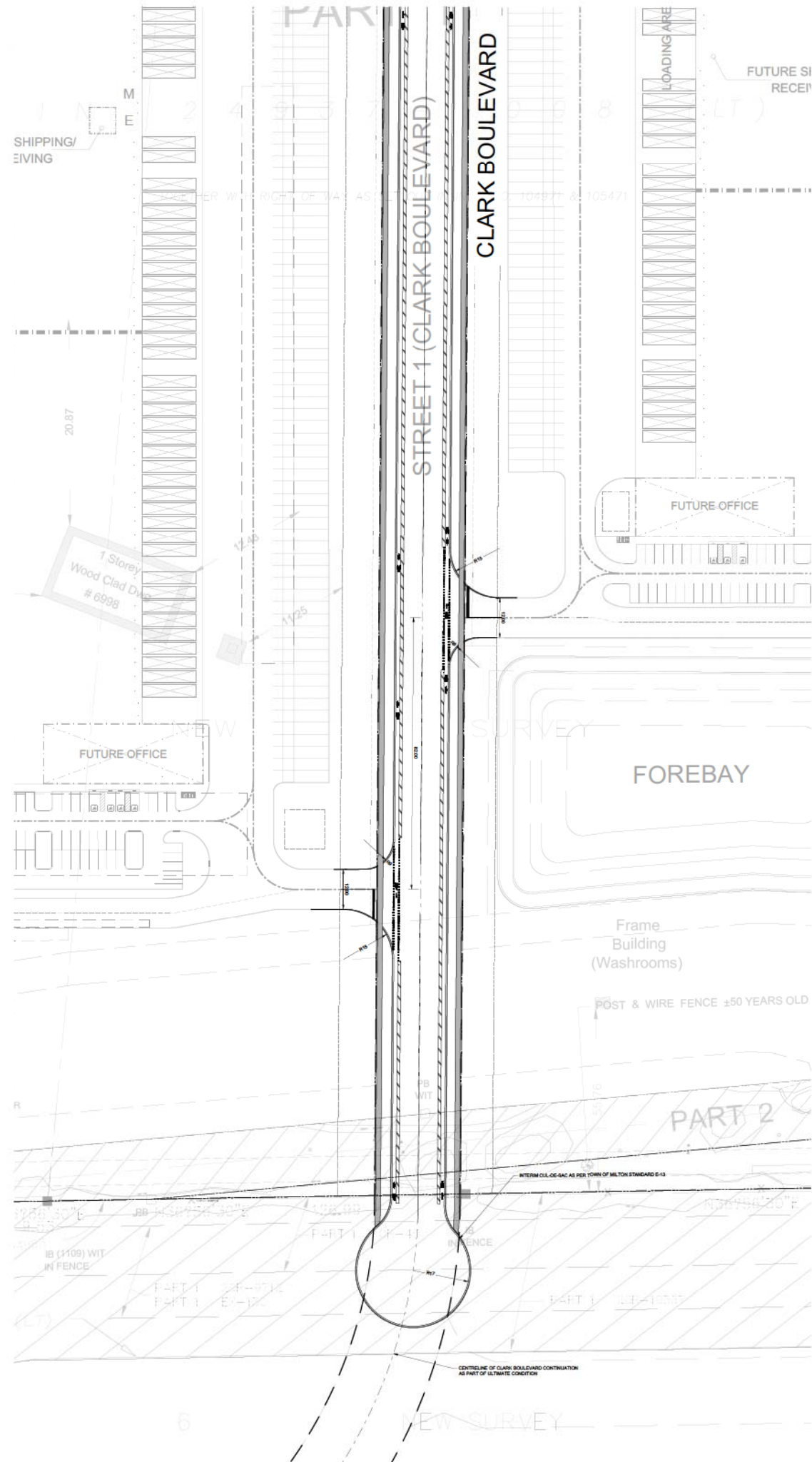
- 04 13-11-23 WGC ISSUED FOR RESUBMISSION
- 03 13-10-23 WGC ISSUED FOR CLIENT REVIEW
- 02 04-04-23 WGC ISSUED FOR SUBMISSION
- 01 03-14-23 WGC ISSUED FOR CLIENT REVIEW
- 00 00-00-00 INT REVISION NOTE



6728 SIXTH LINE / DERRY ROAD
 ANATOLIA DEVELOPMENT

**FUNCTIONAL ROAD PLAN
 DERRY ROAD / CLARK BOULEVARD
 INTERSECTION**

Date: October 16, 2023
 Project No: 0194-01
 Scale: 1:500



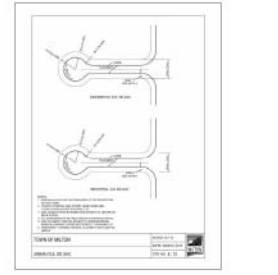
GENERAL NOTES

1. TOPOGRAPHIC SURVEY BY STANTEC DATED DECEMBER 2023
2. SITE PLAN BY WARE MALCOMB DATED DECEMBER 2023

LEGEND

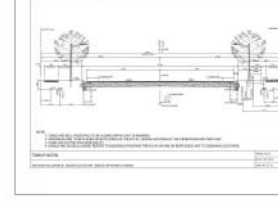
- PROPERTY LINE
- - - PROPOSED RIGHT-OF-WAY
- ===== PROPOSED 150mm BARRIER CURB

TOWN OF MILTON STANDARD - URBAN CUL-DE-SAC



SECTION A - A

TOWN OF MILTON STANDARD - 29m ROAD ALLOWANCE - MAJOR COLLECTOR



- 04 131123 WGC ISSUED FOR RESUBMISSION
- 03 151623 WGC ISSUED FOR CLIENT REVIEW
- 02 040423 WGC ISSUED FOR SUBMISSION
- 01 031423 WGC ISSUED FOR CLIENT REVIEW
- 00 000000 INT REVISION NOTE



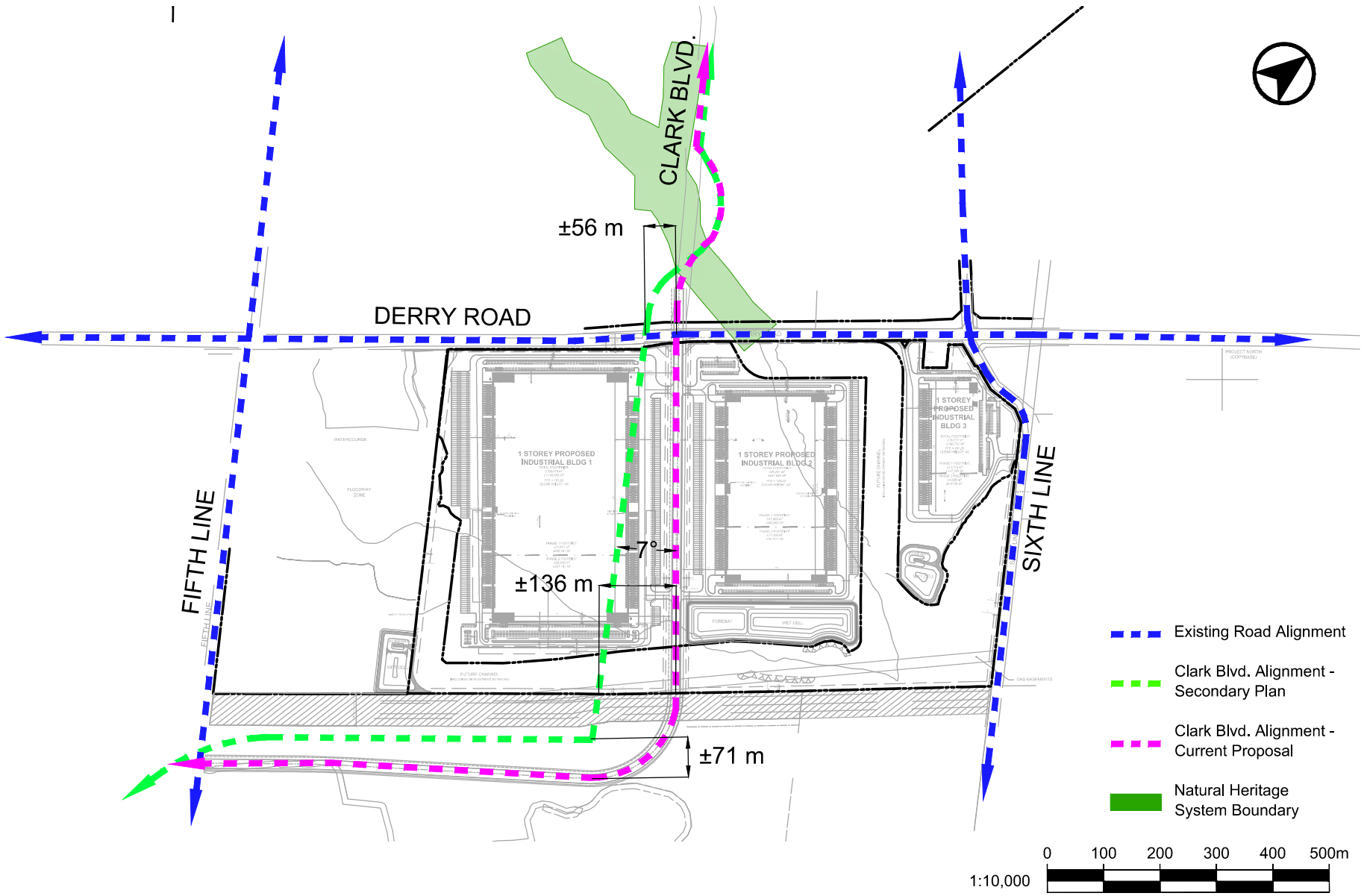
6728 SIXTH LINE / DERRY ROAD
ANATOLIA DEVELOPMENT

**FUNCTIONAL ROAD PLAN
CONTINUATION OF CLARK AND
BUILDING 3**

Date: October 16, 2023
Project No: 0194-01
Scale: 1:500

Appendix D: Location of Clark Boulevard at Derry Road





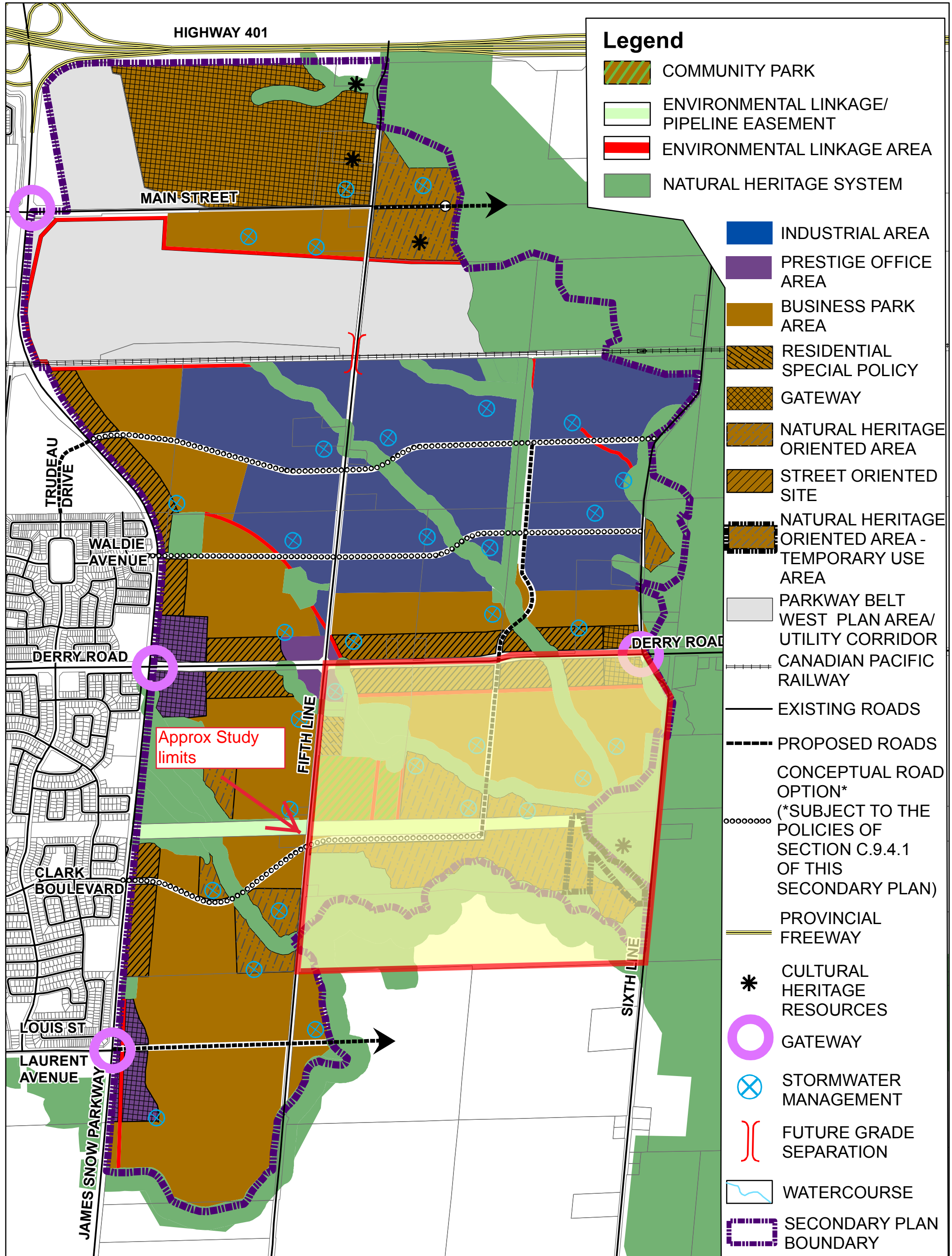
6728 SIXTH LINE / DERRY ROAD ANATOLIA DEVELOPMENT
 Comparison Between Secondary Plan alignment of Clark Boulevard and Current Proposed Alignment



TOWN OF MILTON OFFICIAL PLAN Schedule C-9-B



DERRY GREEN CORPORATE BUSINESS PARK LAND USE PLAN



Appendix E: Parking Demand Survey Data



Project: Brodie Lands - 9481 Leslie
Project No: 6620-20
Location: Milton Proxy Location - 2200 Yukon
Date: Thursday February 16, 2023

GFA: 96000 m² *from Google Earth

Parking Demand Study

Area	A	B	C	D	D pool	E	F	F Access	F pool	F eV	Total
Supply	123	126	59	39	23	62	212	17	13	2	676
8:00	2	14	0	13	12	28	83	1	11	0	164
9:00	3	15	0	14	13	28	92	1	10	0	176
10:00	3	16	0	14	13	28	118	1	13	0	206
11:00	3	16	0	14	13	29	110	1	13	1	200
12:00	3	15	0	13	13	28	110	1	10	1	194
13:00	3	16	0	13	12	29	119	1	13	1	207
14:00	3	17	0	14	11	30	109	1	12	1	198
15:00	3	18	0	13	12	26	101	0	7	1	181
16:00	3	15	0	14	5	19	93	1	7	1	158
17:00	3	3	0	5	2	11	50	0	4	1	79
18:00	2	2	0	4	2	8	26	1	4	0	49

Parking Supply Rate: 0.704167 per 100m²

Parking Demand Rate: 0.215625 per 100m²

Project: Brodie Lands - 9481 Leslie
Project No: 6620-20
Location: Milton Proxy Location - 8350 Lawson Rd
Date: Thursday February 16, 2023

GFA: 29600 m² *from Google Earth

Parking Demand Study

Area	A	A Access	B	C	C Access	Total
Supply	9	3	48	78	4	142
8:00	8	0	2	20	1	31
9:00	8	0	2	28	1	39
10:00	8	0	2	31	1	42
11:00	8	0	3	34	1	46
12:00	8	0	3	31	1	43
13:00	7	0	4	32	1	44
14:00	7	0	3	35	0	45
15:00	0	0	2	32	0	34
16:00	0	0	0	29	0	29
17:00	0	0	0	22	0	22
18:00	0	0	0	22	0	22

Parking Supply Rate: 0.47973 per 100m²

Parking Demand Rate: 0.155405 per 100m²

https://www.gwlrealtyadvisors.com/post_news/gwl-realty-advisors-acquires-best-in-class-distribution-facility/

Project No: 8184.01
 Project: 6728 6th Line, Milton
 Study Location: 100 Pillsworth Rd
 Municipality: Bolton
 Study Time: 07:00-19:00

Parking Demand Study 90,103 m² building

Tuesday, November 8, 2022

Area Supply	B	B Access	C	C Access	D	E	F	F Access	G	G Access	H	Total Regular	Total Accessible	Grand Total	Occupancy
	177	3	125	3	27	15	11	1	30	7	69	454	14	468	
Time															
7:00	5	0	0	0	7	6	0	0	30	1	44	92	1	93	20%
8:00	8	0	0	0	7	7	0	0	29	1	44	95	1	96	21%
9:00	13	0	0	0	7	7	0	0	29	2	47	103	2	105	22%
10:00	14	0	0	0	7	7	0	0	30	2	47	105	2	107	23%
11:00	15	0	0	0	7	7	0	0	30	1	50	109	1	110	24%
12:00	15	0	0	0	8	7	0	0	30	0	51	111	0	111	24%
13:00	18	0	0	0	8	7	0	0	30	1	49	112	1	113	24%
14:00	20	0	0	0	8	7	0	0	29	1	47	111	1	112	24%
15:00	13	0	0	0	8	7	0	0	30	2	49	107	2	109	23%
16:00	7	0	0	0	7	3	0	0	2	1	10	29	1	30	6%
17:00	5	0	0	0	6	0	0	0	10	1	8	29	1	30	6%
18:00	0	0	0	0	3	0	0	0	21	1	18	42	1	43	9%
19:00	0	0	0	0	3	0	0	0	22	1	17	42	1	43	9%

Wednesday, November 9, 2022

Area Supply	B	B Access	C	C Access	D	E	F	F Access	G	G Access	H	Total Regular	Total Accessible	Grand Total	Occupancy
	177	3	125	3	27	15	11	1	30	7	69	454	14	468	
Time															
7:00	8	0	0	0	10	10	0	0	28	1	49	105	1	106	23%
8:00	13	0	0	0	9	9	0	0	29	1	50	110	1	111	24%
9:00	25	0	0	0	8	9	0	0	30	1	53	125	1	126	27%
10:00	33	0	0	0	8	9	0	0	30	1	54	134	1	135	29%
11:00	32	0	0	0	8	9	0	0	30	1	58	137	1	138	29%
12:00	30	0	0	0	8	9	0	0	30	0	53	130	0	130	28%
13:00	25	0	0	0	8	9	0	0	30	2	51	123	2	125	27%
14:00	24	0	0	0	8	9	0	0	30	1	53	124	1	125	27%
15:00	16	0	0	0	6	6	0	0	30	3	55	113	3	116	25%
16:00	9	0	0	0	6	3	0	0	4	2	13	35	2	37	8%
17:00	5	0	0	0	6	3	0	0	7	1	9	30	1	31	7%
18:00	0	0	0	0	4	2	0	0	19	1	19	44	1	45	10%
19:00	0	0	0	0	2	2	0	0	19	1	17	40	1	41	9%

Note: There were no parking spaces in Area A.

Project: Brodie Lands - 9481 Leslie
Project No: 6620-20
Location: Milton Proxy Location - 205 Market Dr
Date: Thursday February 16, 2023

GFA: 36000 m² *from Google Earth

Parking Demand Study

Area	A	A Access	B	Total
Supply	63	6	70	139
8:00	29	0	14	43
9:00	41	0	15	56
10:00	41	0	16	57
11:00	41	0	16	57
12:00	40	0	16	56
13:00	37	0	16	53
14:00	38	0	18	56
15:00	35	0	14	49
16:00	21	0	10	31
17:00	25	0	10	35
18:00	18	0	5	23

Supply Rate: 0.386111 per 100m²

Demand Rate: 0.158333 per 100m²

Project: Brodie Lands - 9481 Leslie
 Project No: 6620-20
 Location: Bolton Proxy Location - 8339 George Bolton Pkwy
 Date: Thursday February 16, 2023

GFA: 72250 m² *from Google Earth

Parking Demand Study

Area	A	A Access	A Ev	B	B EV	C	D	D Access	E	E Access	E Ev	F	G	G Access	Total
Supply	46	3	4	60	6	62	60	3	68	3	10	80	82	3	490
8:00	3	0	1	0	0	0	0	0	32	0	0	4	42	0	82
9:00	4	0	1	0	0	0	0	0	42	0	0	6	55	0	108
10:00	4	0	1	0	0	1	0	0	50	0	0	11	50	0	117
11:00	5	0	1	0	0	0	0	0	50	0	0	11	66	0	133
12:00	4	0	1	0	0	1	0	0	50	0	0	11	57	0	124
13:00	6	0	1	0	0	0	0	0	47	0	0	11	56	0	121
14:00	4	0	1	0	0	0	0	0	48	0	0	10	57	0	120
15:00	3	0	1	0	0	0	0	0	45	0	0	10	45	0	104
16:00	4	0	1	0	0	1	0	0	39	0	0	7	37	0	89
17:00	1	0	1	0	0	0	0	0	24	0	0	5	34	0	65
18:00	2	0	1	0	0	0	0	0	9	0	0	2	13	0	27

*Field crew noted all lights in building appeared to be off

Parking Supply Rate: 0.678201 per 100m²
 Parking Demand Rate: 0.184083 per 100m²

Project: Brodie Lands - 9481 Leslie
Project No: 6620-20
Location: Bolton Proxy Location - 8400 George Bolton Pkwy
Date: Thursday February 16, 2023

GFA: 40750 m² *from Google Earth

Parking Demand Study

Area	A	A Access	A Ev	B	C	D	D Access	D Ev	Total
Supply	37	8	4	77	74	71	3	2	276
8:00	13	0	2	1	0	12	0	0	28
9:00	14	0	2	1	0	13	0	0	30
10:00	11	0	2	1	0	13	0	0	27
11:00	13	0	2	2	0	15	0	0	32
12:00	14	0	2	1	1	14	0	0	32
13:00	15	0	2	1	0	13	0	0	31
14:00	14	0	2	1	0	12	0	0	29
15:00	10	0	1	1	0	3	0	0	15
16:00	9	0	1	1	0	2	0	0	13
17:00	9	0	1	1	0	0	0	0	11
18:00	10	0	1	1	0	0	0	0	12

Parking Supply | 0.677301 per 100m2

Parking Demand 0.078528 per 100m2

Project: Brodie Lands - 9481 Leslie
Project No: 6620-20
Location: Bolton Proxy Location - 12315 Coleraine Dr
Date: Thursday February 16, 2023

GFA: 41800 m² *from Google Earth

Parking Demand Study

Area	A	A Access	Total
Supply	143	5	148
8:00	64	0	64
9:00	71	0	71
10:00	77	0	77
11:00	79	0	79
12:00	64	0	64
13:00	77	0	77
14:00	80	0	80
15:00	84	0	84
16:00	74	0	74
17:00	64	0	64
18:00	59	0	59

*Field crew noted shift change at 3pm

Supply Rate: 0.354067 per 100m²

Demand Rate: 0.200957 per 100m²

Project: Brodie Lands - 9481 Leslie
 Project No: 6620-20
 Location: Bolton Proxy Location - 12366 Coleraine
 Date: Thursday February 16, 2023

GFA: 21500 m² *from Google Earth

Parking Demand Study

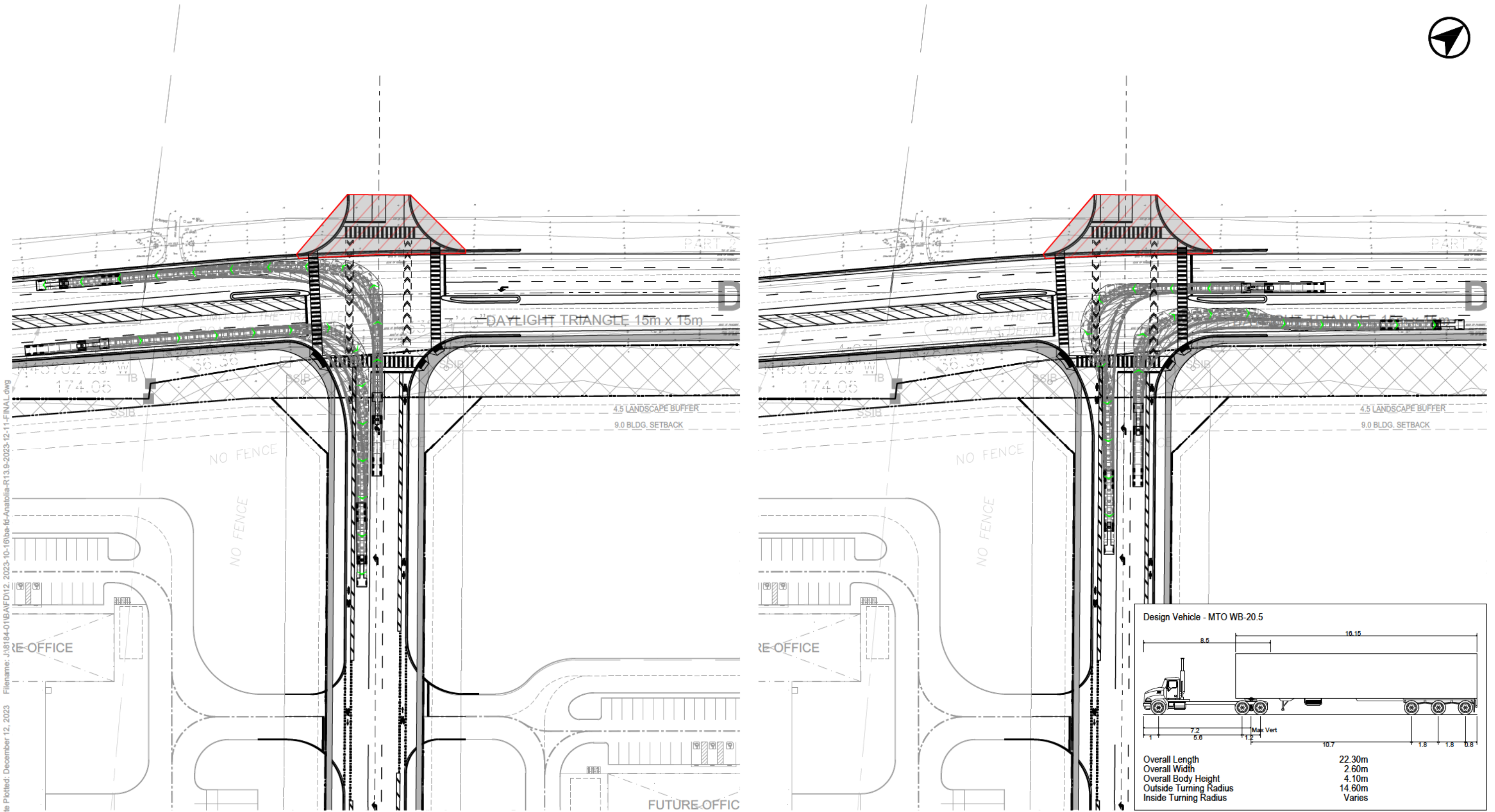
Area	A	A Access	B	B Access	B Ev	C	D	Total
Supply	82	4	19	4	5	22	69	205
8:00	23	0	0	0	0	0	0	23
9:00	22	0	1	0	0	0	0	23
10:00	24	0	0	0	0	0	0	24
11:00	25	0	0	0	0	0	0	25
12:00	26	0	0	0	0	0	0	26
13:00	26	0	0	0	0	0	0	26
14:00	25	0	0	0	0	0	0	25
15:00	24	0	0	0	0	0	0	24
16:00	20	0	0	0	0	0	0	20
17:00	19	0	0	0	0	0	0	19
18:00	20	0	0	0	0	0	0	20

Parking Supply Rate: 0.953488 per 100m²
 Parking Demand Rate: 0.12093 per 100m²

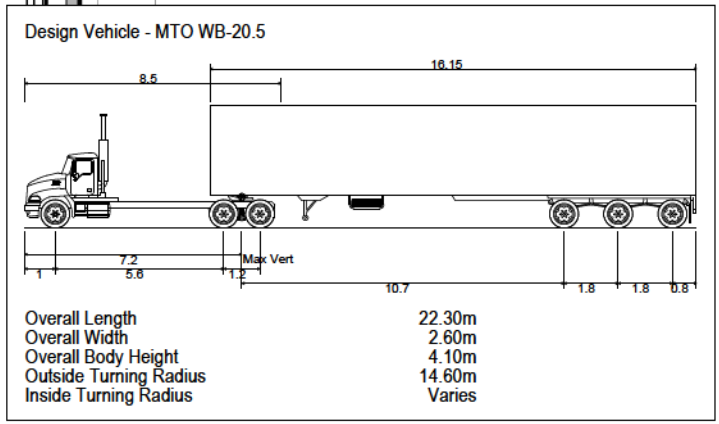
*Field crew noted all lights in building appeared to be off - Those parked in area A seemed to be part of a training course

Appendix F: Vehicle Maneuvering Diagrams





Date Plotted: December 12, 2023 File name: J:\8184-01\BA\FD\12_2023-10-16\ba-fd-Anatolia-R13.9-2023-12-11-FINAL.dwg

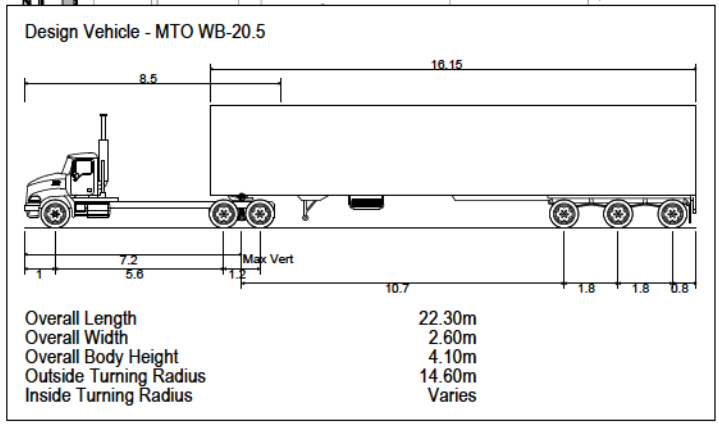
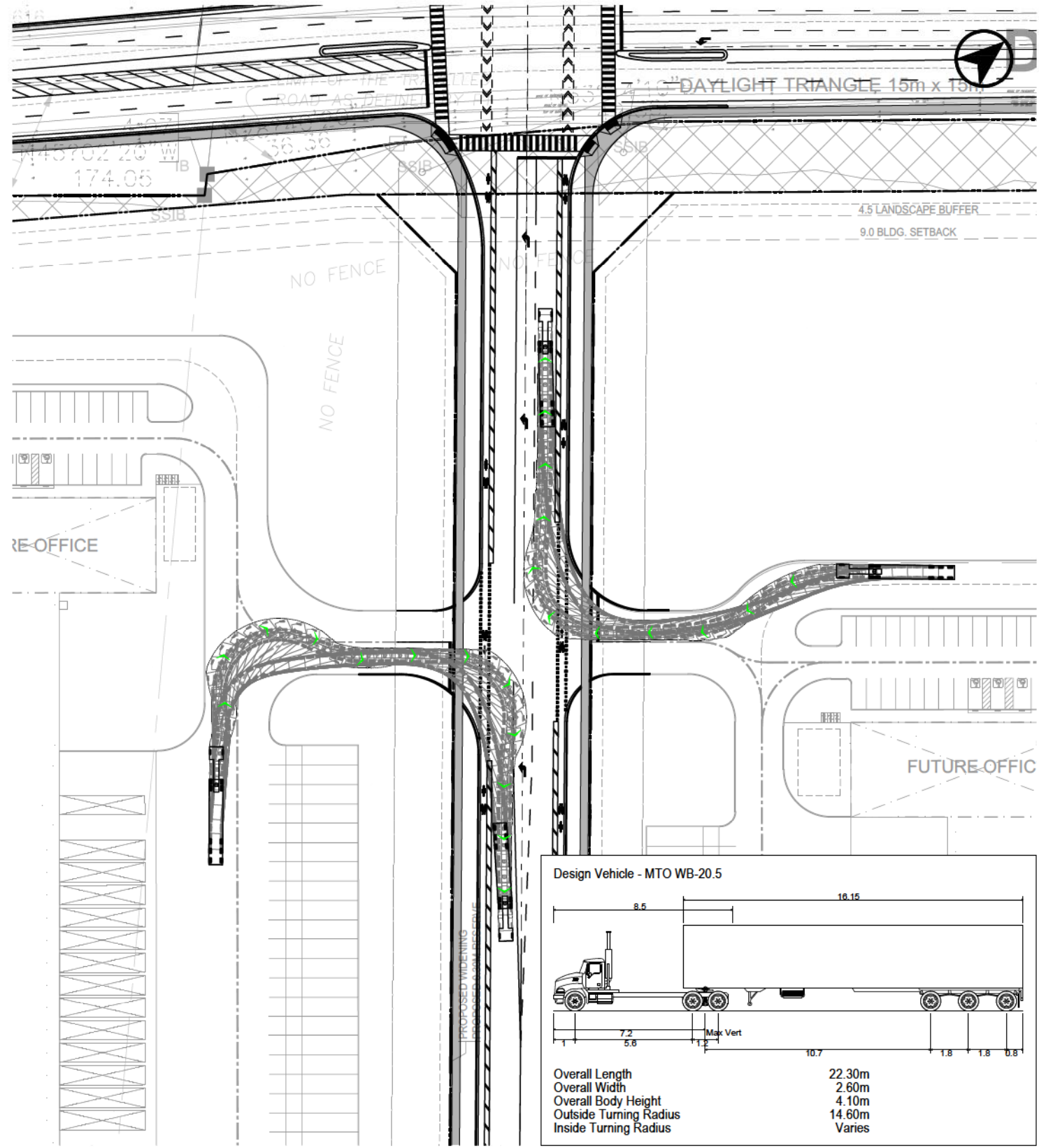
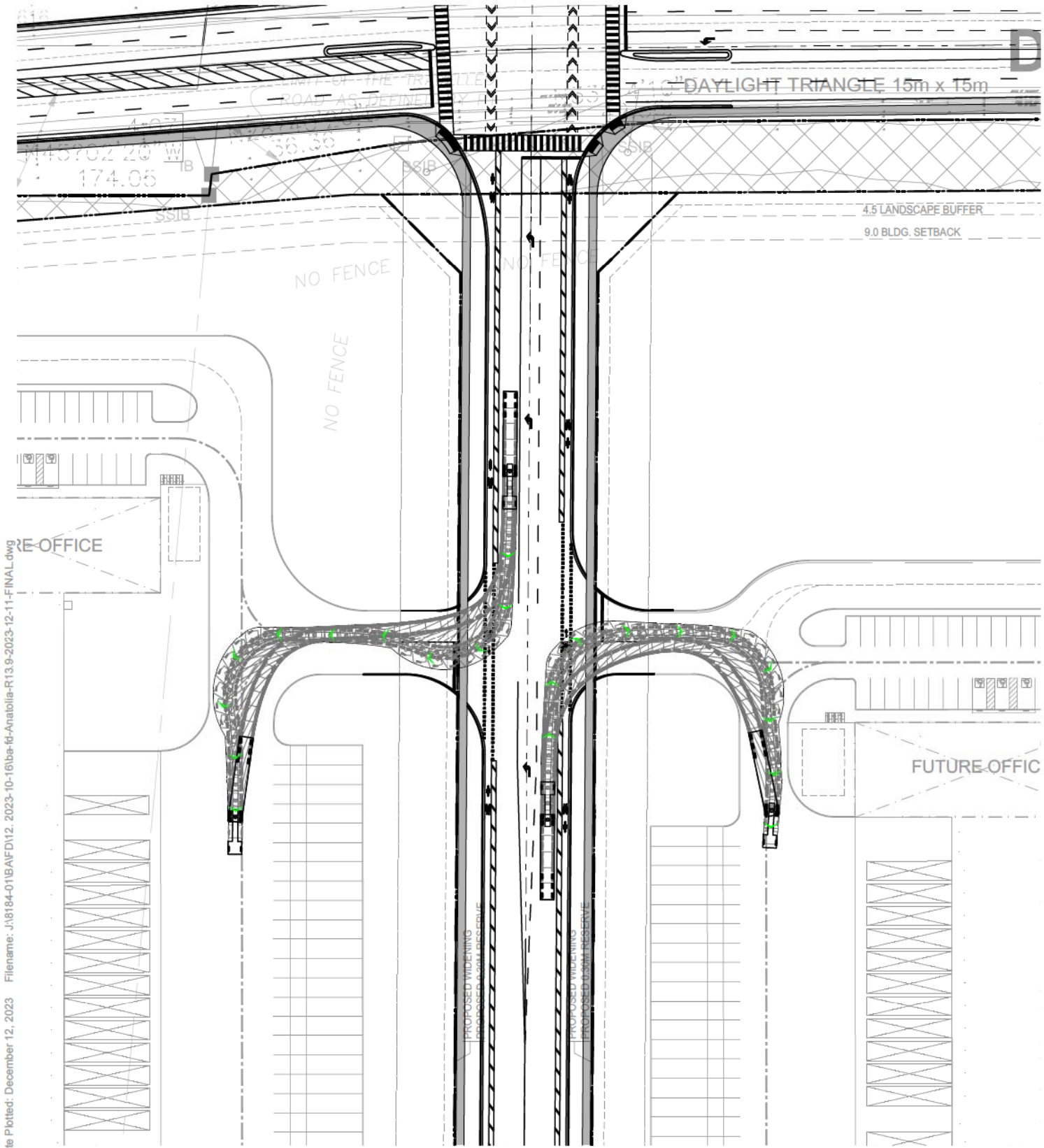


6728 SIXTH LINE / DERRY ROAD ANATOLIA DEVELOPMENT
 VEHICLE MANOEUVRING DIAGRAM
 CLARK BOULEVARD / DERRY ROAD
 MTO WB-20.5 TRACTOR TRAILER VEHICLE

Project: 6728 SIXTH LINE
 Project No. 8184-01
 Date: March 01, 2023
 Revised: December 12, 2023

Scale: 1:1,000

Drawing No. **VMD-01**



Date Plotted: December 12, 2023 File name: J:\8184-01\BA\FD\12_2023-10-16\ba-fd-Anatolia-R13.9-2023-12-11-FINAL.dwg

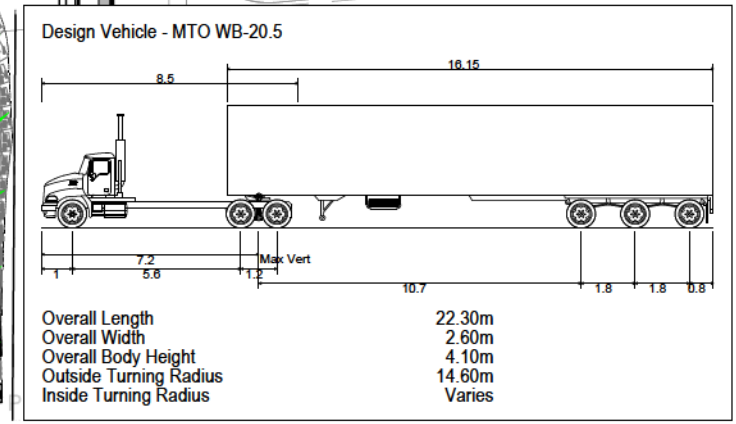
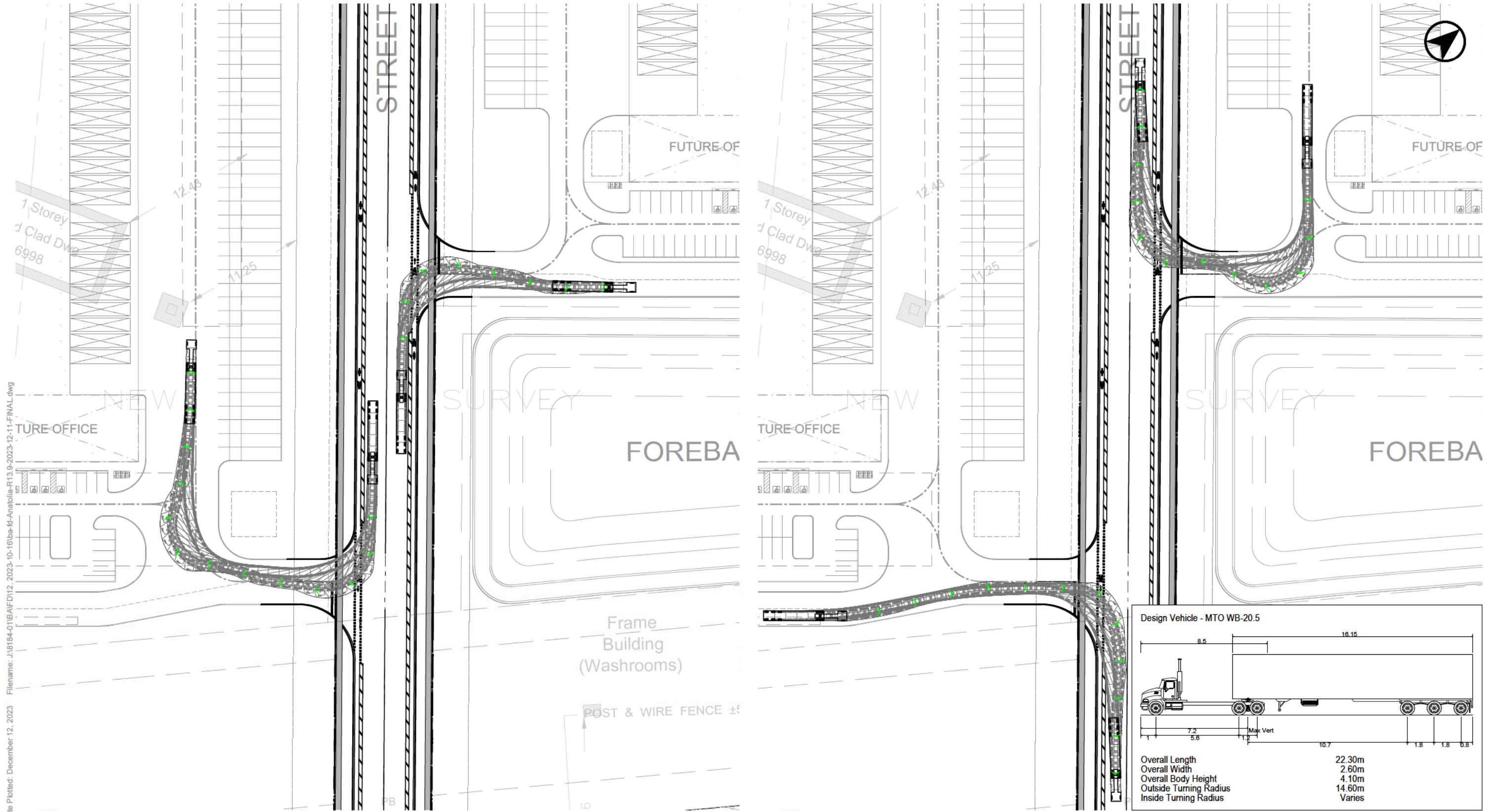


6728 SIXTH LINE / DERRY ROAD ANATOLIA DEVELOPMENT
VEHICLE MANOEUVRING DIAGRAM
BUILDINGS 1 AND 2 - CLARK BOULEVARD NORTH SITE ACCESS
MTO WB-20.5 TRACTOR TRAILER VEHICLE

Project: 6728 SIXTH LINE
 Project No. 8184-01
 Date: March 01, 2023
 Revised: December 12, 2023

Scale 1:1,000
 Drawing No. **VMD-02**

Date Plotted: December 12, 2023
Filename: J:\8184-01\BA\FD\12_2023-10-16\ba-fd-Anatolia-R13.9-2023-12-11-FINAL.dwg

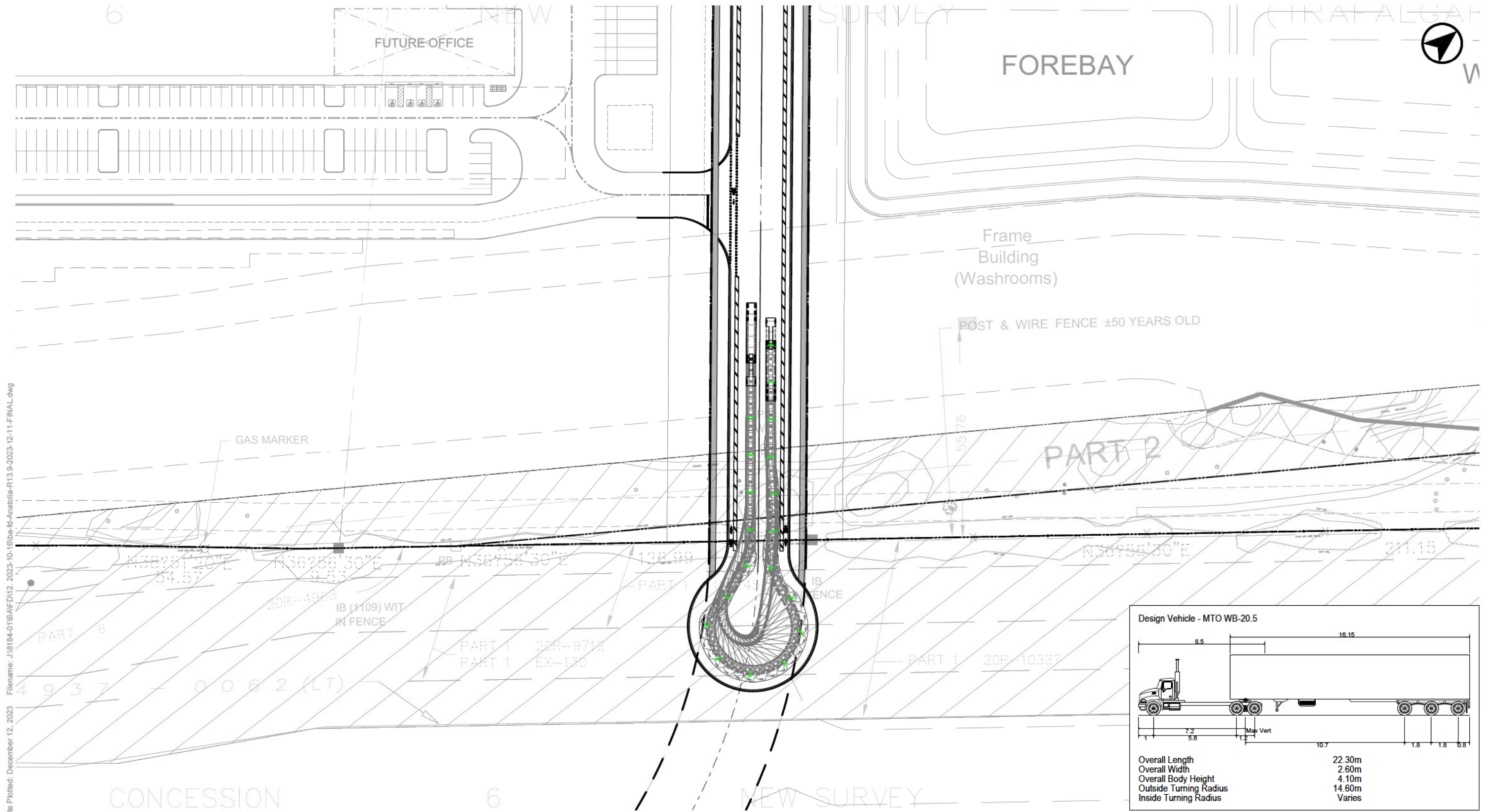


6728 SIXTH LINE / DERRY ROAD ANATOLIA DEVELOPMENT
VEHICLE MANOEUVRING DIAGRAM
BUILDINGS 1 AND 2 - CLARK BOULEVARD SOUTH SITE ACCESS
MTO WB-20.5 TRACTOR TRAILER VEHICLE

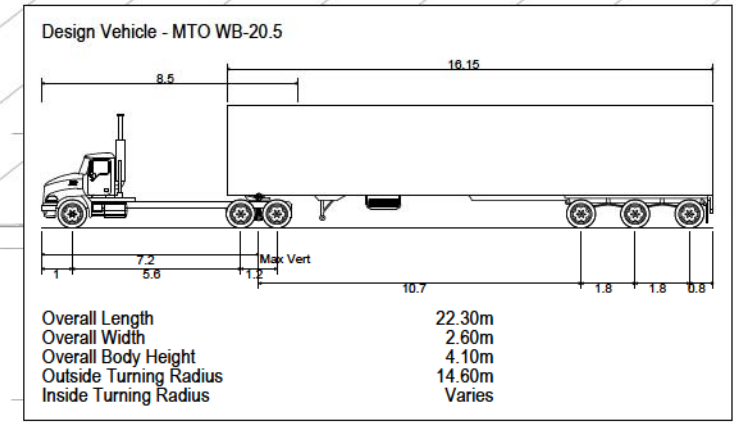
Project: 6728 SIXTH LINE
Project No. 8184-01
Date: March 01, 2023
Revised: December 12, 2023

Scale 1:1,000

Drawing No. **VMD-03**



Date Plotted: December 12, 2023
 Filename: J:\8184-01\BAFDV12_2023-10-16\ba-fd-Anatolia-R13.9-2023-12-11-FINAL.dwg



6728 SIXTH LINE / DERRY ROAD ANATOLIA DEVELOPMENT
 VEHICLE MANOEUVRING DIAGRAM
 CLARK BOULEVARD CUL-DE-SAC
 MTO WB-20.5 TRACTOR TRAILER VEHICLE

Project: 6728 SIXTH LINE
 Project No. 8184-01
 Date: March 01, 2023
 Revised: December 12, 2023

Scale 1:1,000

Drawing No. **VMD-04**

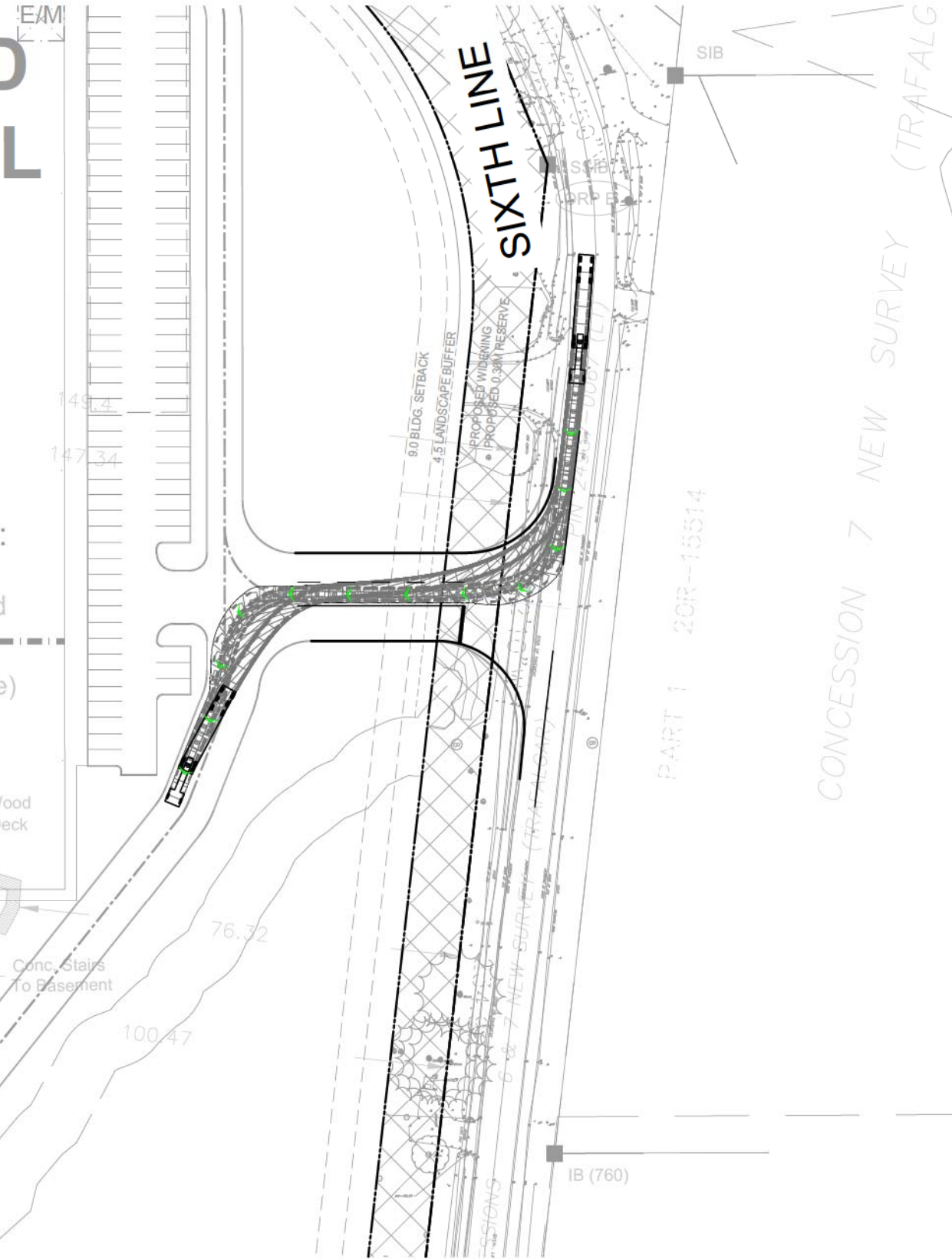
USED TRIAL G 3

DOTPRINT:
2.49 SM
12.74 SF
191.05
HEIGHT: 40'

DOTPRINT:
5.11 SM
5.39 SF

DOTPRINT:
91 SM
1.33 SF

Date Plotted: December 12, 2023 File name: J:\8184-01\BAFDV12_2023-10-16\ba-fd-Anatolia-R13.9-2023-12-11-FINAL.dwg

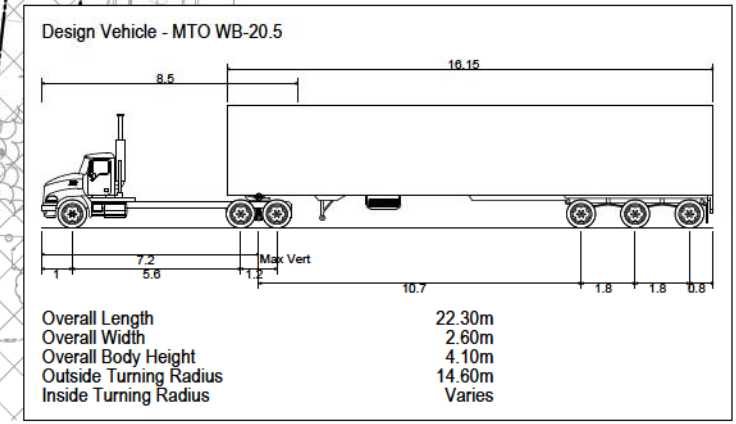
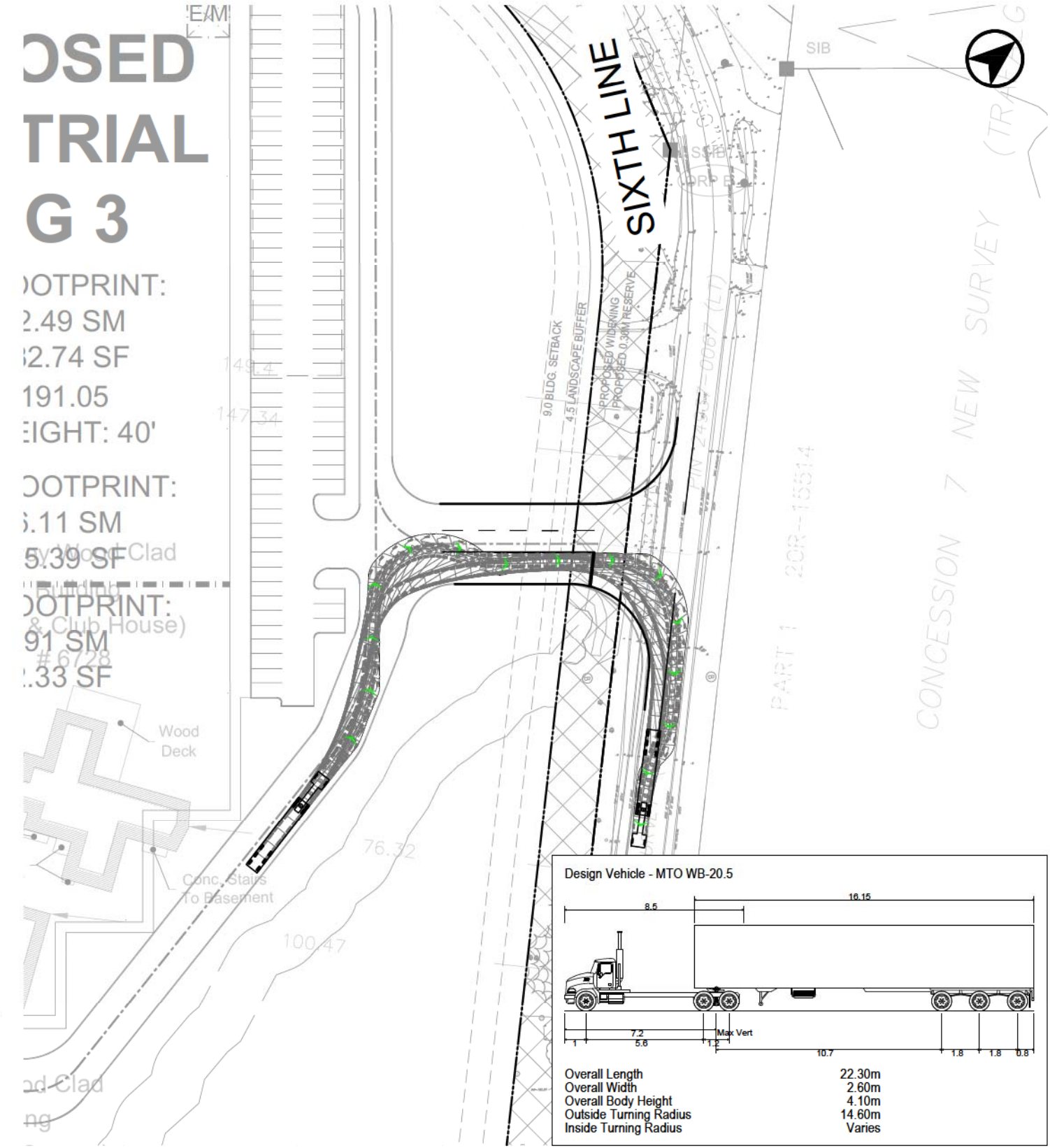


USED TRIAL G 3

DOTPRINT:
2.49 SM
12.74 SF
191.05
HEIGHT: 40'

DOTPRINT:
5.11 SM
5.39 SF

DOTPRINT:
91 SM
1.33 SF



6728 SIXTH LINE / DERRY ROAD ANATOLIA DEVELOPMENT VEHICLE MANOEUVRING DIAGRAM BUILDING 3 - SIXTH LINE ACCESS - RIGHT TURNS MTO WB-20.5 TRACTOR TRAILER VEHICLE

Project: 6728 SIXTH LINE
Project No. 8184-01
Date: March 01, 2023
Revised: December 12, 2023

Scale 1:1,000
0 10 20 30 40 50m

Drawing No. VMD-05

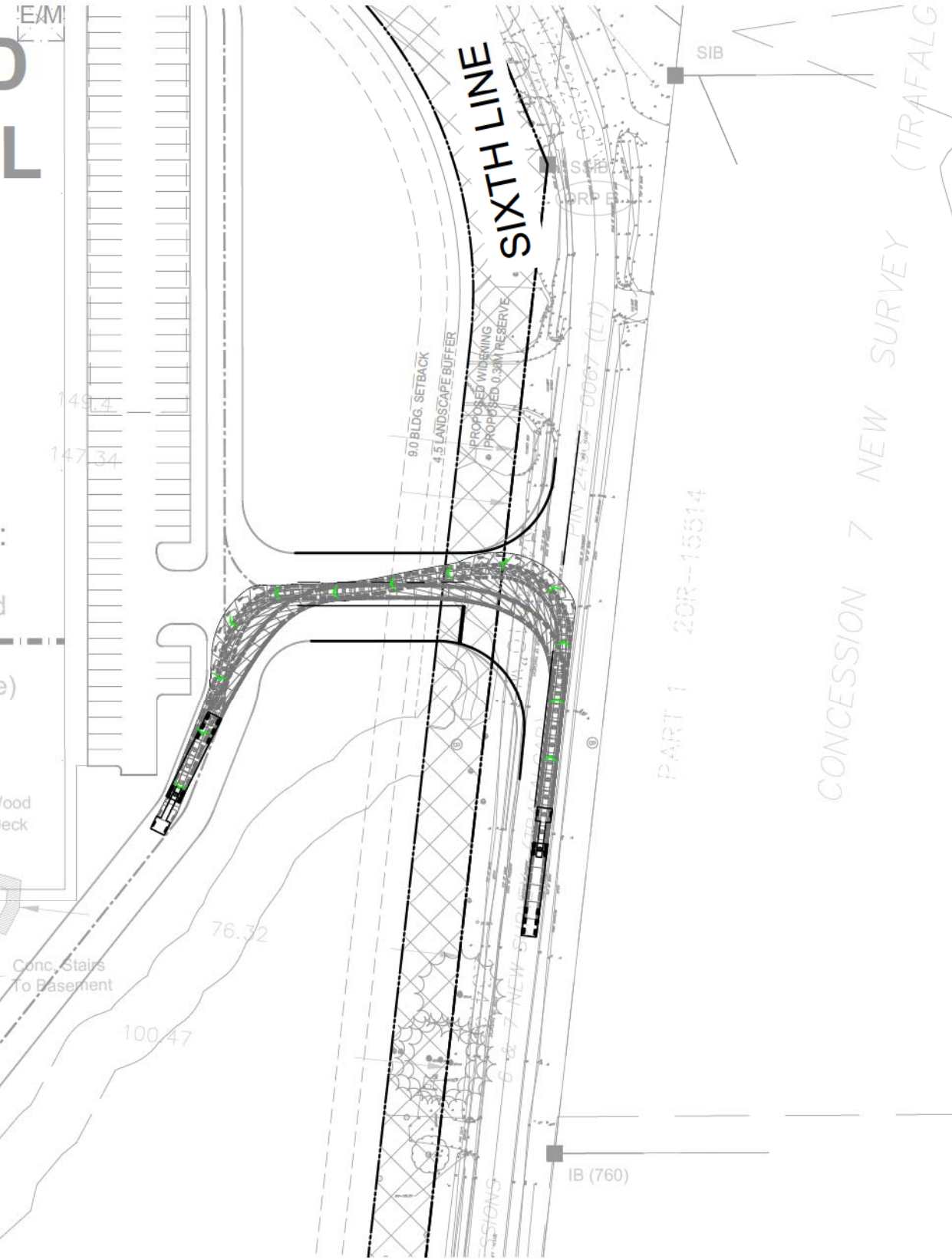
USED TRIAL G 3

DOTPRINT:
2.49 SM
12.74 SF
191.05
HEIGHT: 40'

DOTPRINT:
3.11 SM
5.39 SF

DOTPRINT:
91 SM
1.33 SF

Date Plotted: December 12, 2023 File name: J:\8184-01\BA\FD\12_2023-10-16\ba-fd-Anatolia-R13.9-2023-12-11-FINAL.dwg

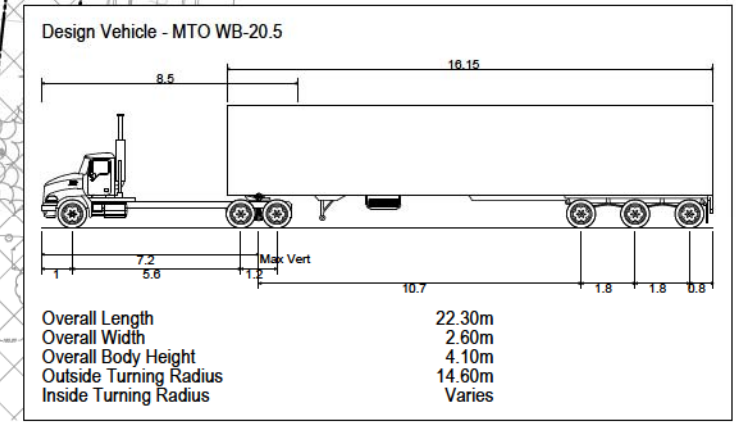
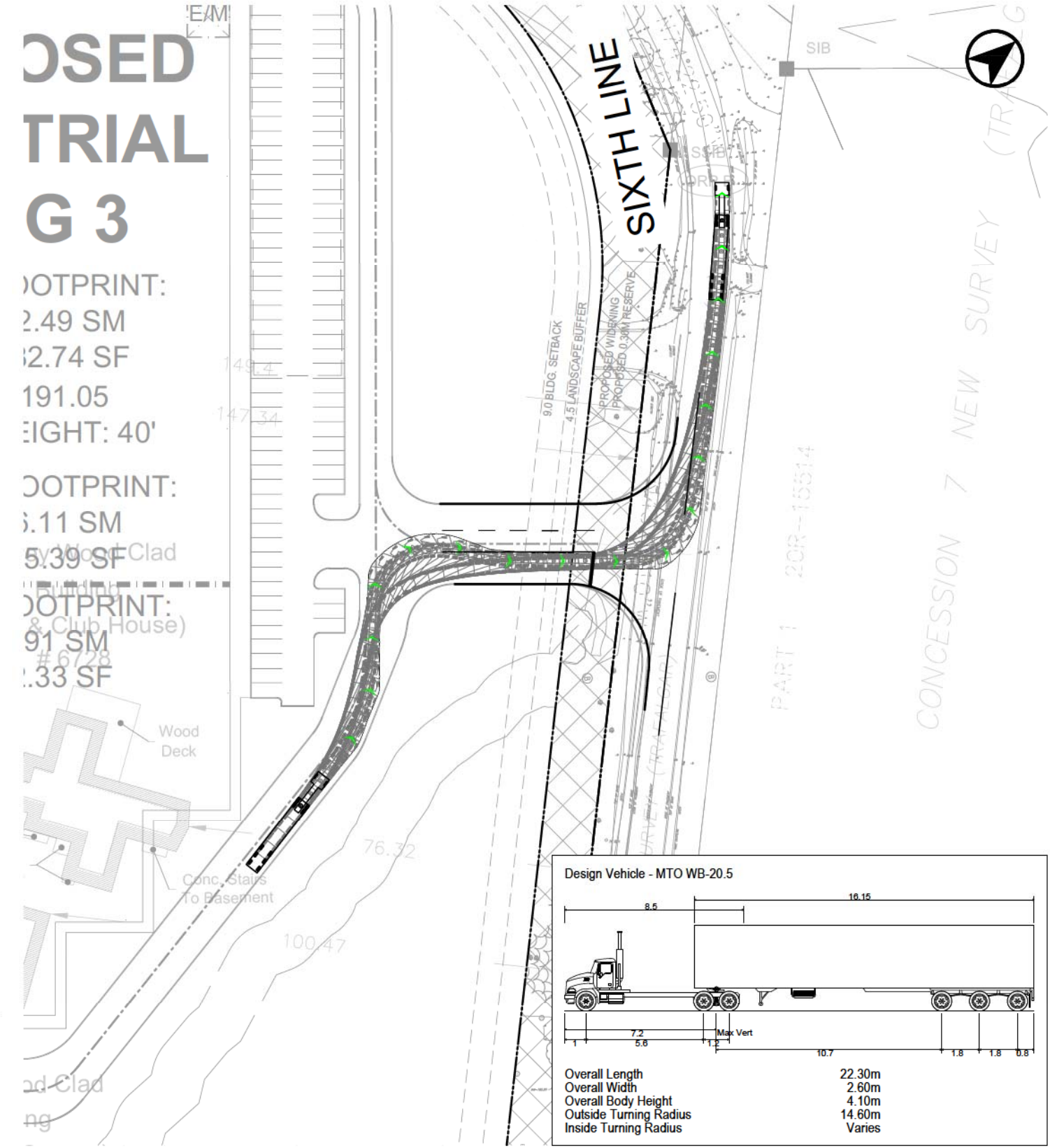


USED TRIAL G 3

DOTPRINT:
2.49 SM
12.74 SF
191.05
HEIGHT: 40'

DOTPRINT:
3.11 SM
5.39 SF

DOTPRINT:
91 SM
1.33 SF



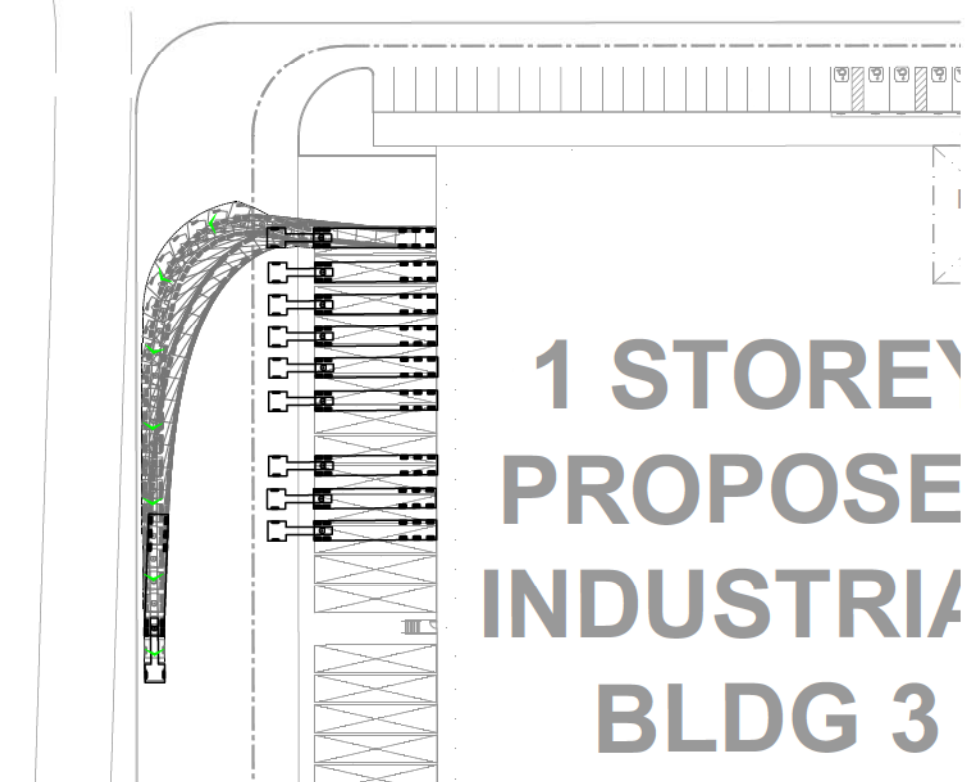
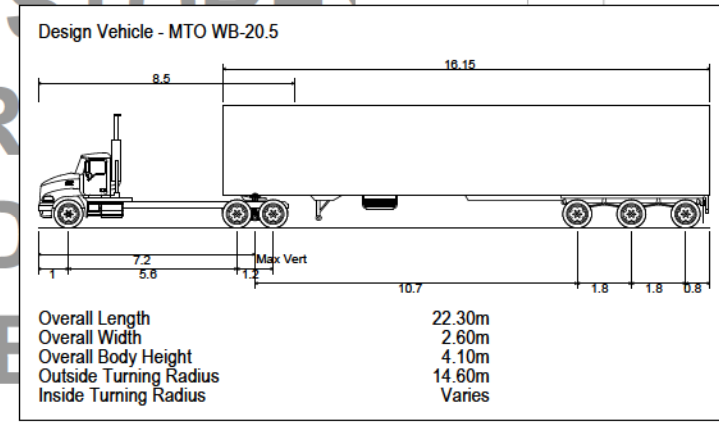
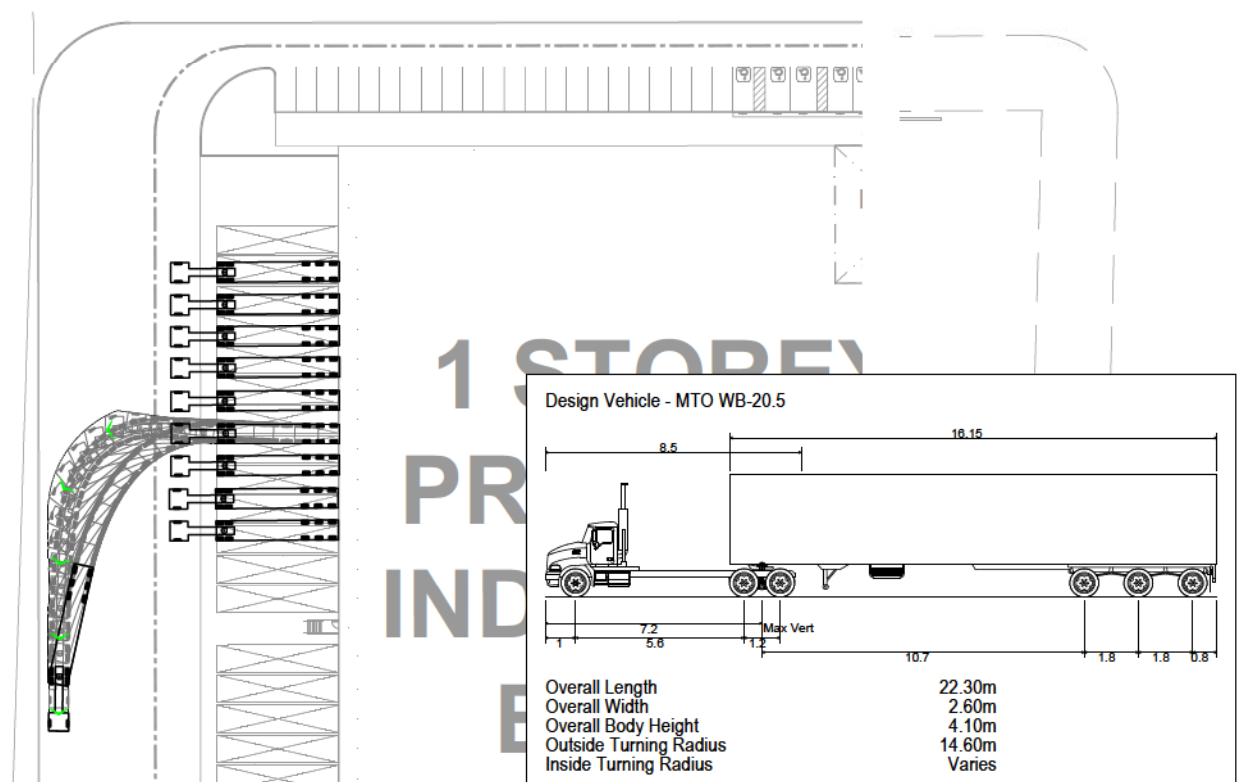
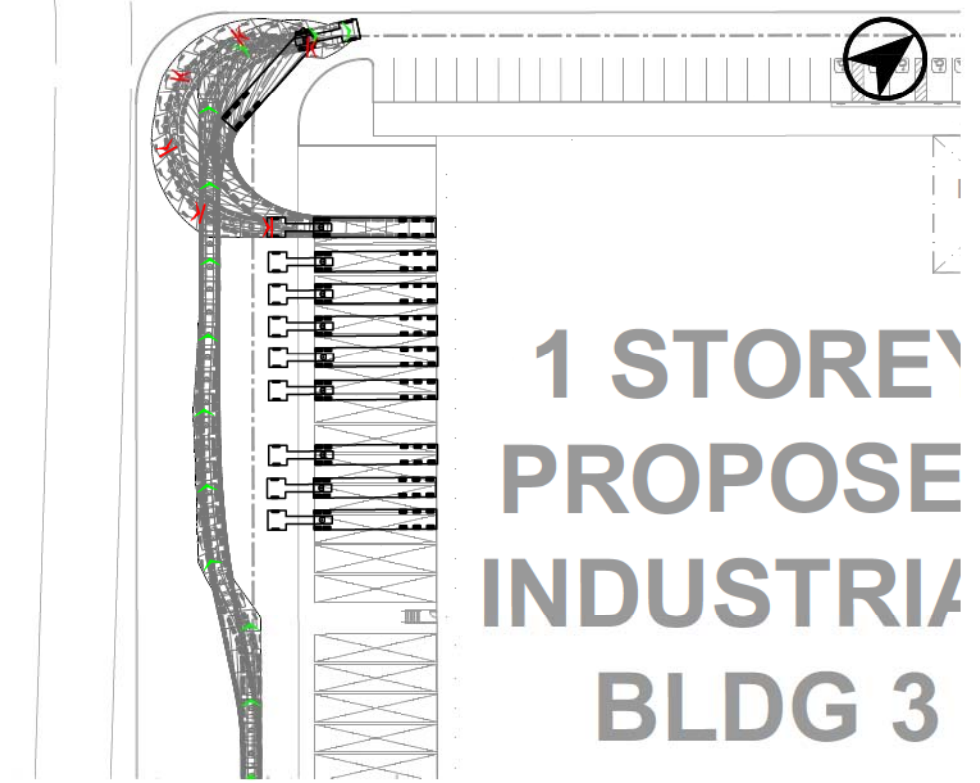
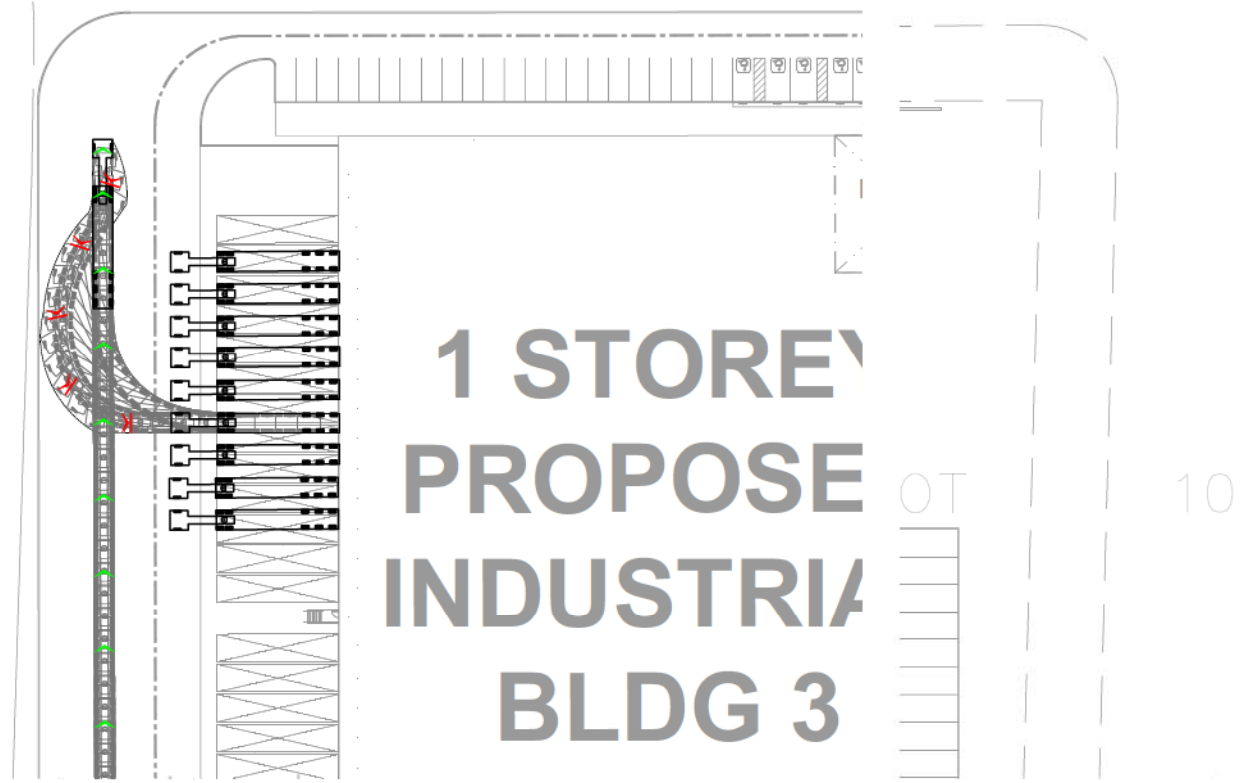
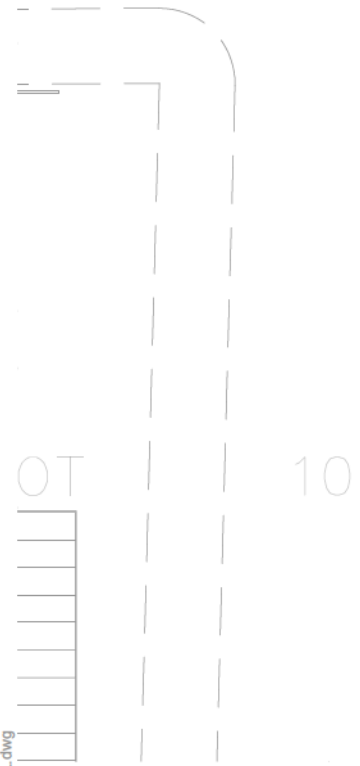
6728 SIXTH LINE / DERRY ROAD ANATOLIA DEVELOPMENT VEHICLE MANOEUVRING DIAGRAM BUILDING 3 - SIXTH LINE ACCESS - LEFT TURNS MTO WB-20.5 TRACTOR TRAILER VEHICLE

Project: 6728 SIXTH LINE
Project No. 8184-01
Date: March 01, 2023
Revised: December 12, 2023

Scale: 1:1,000
0 10 20 30 40 50m

Drawing No. VMD-06

Date Plotted: December 12, 2023
Filename: J:\8184-01\BA\FD\12_2023-10-16\ba-fd-Anatolia-R13.9-2023-12-11-FINAL.dwg



6728 SIXTH LINE / DERRY ROAD ANATOLIA DEVELOPMENT
VEHICLE MANOEUVRING DIAGRAM
TYPICAL DOCK ENTRY AND EXIT MANOEUVRES
MTO WB-20.5 TRACTOR TRAILER VEHICLE

Project: 6728 SIXTH LINE
Project No. 8184-01
Date: March 01, 2023
Revised: December 12, 2023

Scale 1:1,000

Drawing No. VMD-07

Appendix G: Traffic Count Data





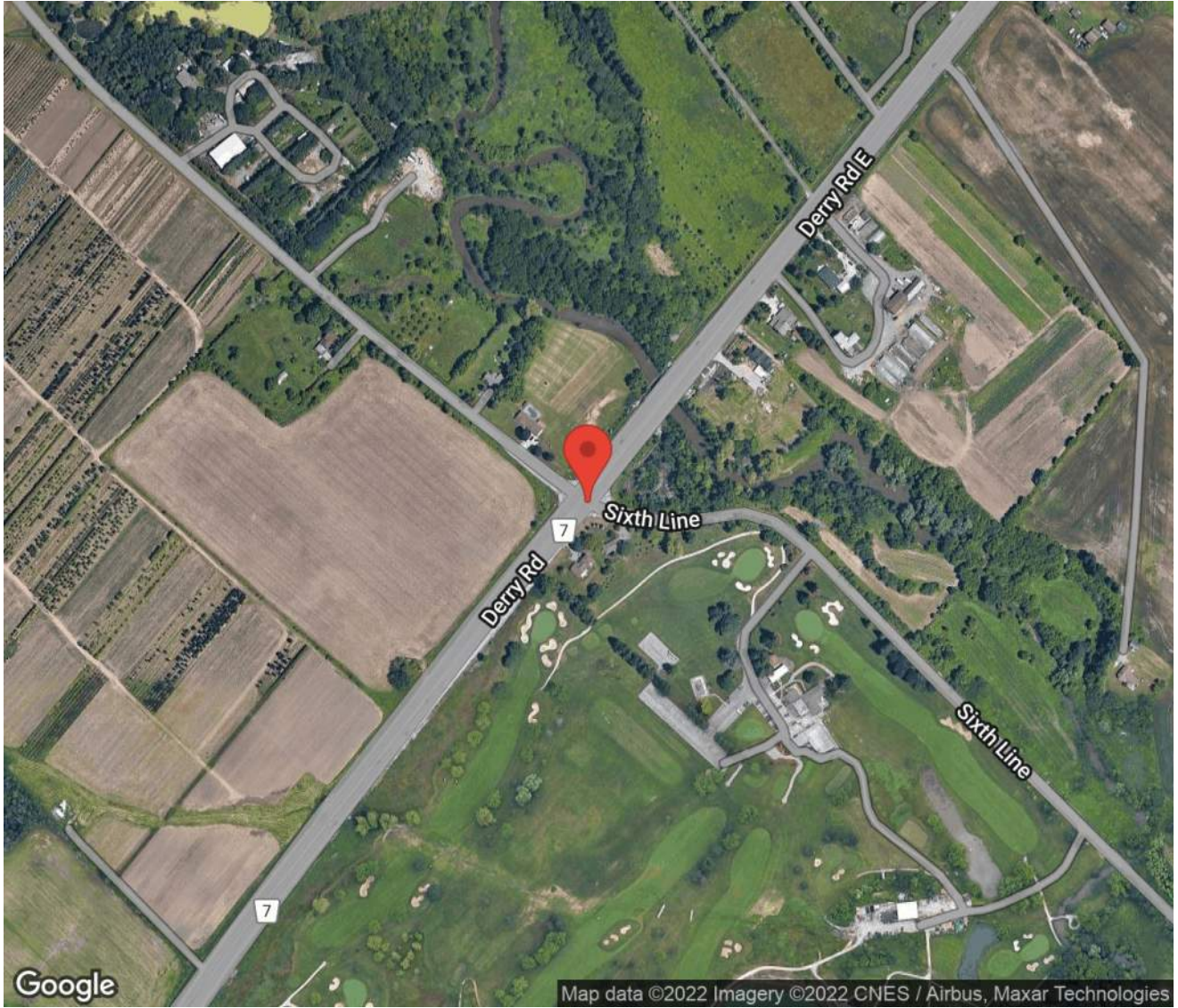
Project #22-199 - CGH Transportation

Intersection Count Report

Intersection: Sixth Line & Derry Rd
Municipality: Milton
Count Date: Thursday, Jun 16, 2022
Site Code: 2219900003
Count Categories: Cars, Trucks, Buses, Bicycles, Pedestrians
Count Period: 07:00-09:00, 15:00-18:00
Weather: Clear
Comments:

Traffic Count Map

Intersection: Sixth Line & Derry Rd
Site Code: 2219900003
Municipality: Milton
Count Date: Jun 16, 2022



Traffic Count Summary

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Municipality: Milton
 Count Date: Jun 16, 2022

Sixth Line - Traffic Summary

Hour	North Approach Totals						South Approach Totals						Total
	Includes Cars, Trucks, Buses, Bicycles						Includes Cars, Trucks, Buses, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	10	80	84	0	174	0	41	53	20	0	114	0	288
08:00 - 09:00	14	99	89	0	202	0	65	55	16	0	136	0	338
BREAK													
15:00 - 16:00	53	80	106	0	239	0	170	67	23	0	260	0	499
16:00 - 17:00	51	92	112	0	255	0	166	123	23	0	312	0	567
17:00 - 18:00	58	86	78	0	222	0	131	74	31	0	236	0	458
GRAND TOTAL	186	437	469	0	1092	0	573	372	113	0	1058	0	2150

Traffic Count Summary

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Municipality: Milton
 Count Date: Jun 16, 2022

Derry Rd - Traffic Summary

Hour	East Approach Totals						West Approach Totals						Total
	Includes Cars, Trucks, Buses, Bicycles						Includes Cars, Trucks, Buses, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	12	502	6	0	520	0	55	1658	104	0	1817	0	2337
08:00 - 09:00	14	655	8	0	677	0	41	1515	113	0	1669	0	2346
BREAK													
15:00 - 16:00	15	1382	10	0	1407	0	72	1314	68	0	1454	0	2861
16:00 - 17:00	20	1446	10	0	1476	0	110	1436	64	0	1610	0	3086
17:00 - 18:00	17	1424	6	0	1447	0	68	1426	69	0	1563	0	3010
GRAND TOTAL	78	5409	40	0	5527	0	346	7349	418	0	8113	0	13640



Traffic Count Data

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Municipality: Milton
 Count Date: Jun 16, 2022

North Approach - Sixth Line

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	1	14	10	0	25	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	0
07:15	2	17	11	0	30	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
07:30	1	26	41	0	68	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
07:45	2	22	19	0	43	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0
08:00	2	20	11	0	33	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
08:15	4	22	31	0	57	2	0	0	0	2	0	1	1	0	2	0	0	0	0	0	0
08:30	3	39	22	0	64	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
08:45	0	17	20	0	37	1	0	3	0	4	0	0	1	0	1	0	0	0	0	0	0
SUBTOTAL	15	177	165	0	357	9	1	6	0	16	0	1	2	0	3	0	0	0	0	0	0



Traffic Count Data

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Municipality: Milton
 Count Date: Jun 16, 2022

North Approach - Sixth Line

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	15	18	28	0	61	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
15:15	14	21	24	0	59	1	1	0	0	2	0	0	1	0	1	0	0	0	0	0	0
15:30	13	19	27	0	59	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
15:45	8	20	23	0	51	1	0	1	0	2	0	0	1	0	1	0	0	0	0	0	0
16:00	12	19	31	0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	9	21	24	0	54	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0
16:30	19	26	34	0	79	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
16:45	10	26	20	0	56	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
17:00	18	26	17	0	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	20	25	18	0	63	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
17:30	10	22	17	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	10	11	26	0	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	158	254	289	0	701	4	4	3	0	11	0	0	4	0	4	0	0	0	0	0	0
GRAND TOTAL	173	431	454	0	1058	13	5	9	0	27	0	1	6	0	7	0	0	0	0	0	0



Traffic Count Data

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Municipality: Milton
 Count Date: Jun 16, 2022

South Approach - Sixth Line

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	4	8	5	0	17	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
07:15	4	10	2	0	16	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
07:30	9	19	5	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	24	15	7	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	14	16	4	0	34	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
08:15	12	5	3	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	17	16	3	0	36	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
08:45	21	16	5	0	42	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0
SUBTOTAL	105	105	34	0	244	0	3	0	0	3	1	0	2	0	3	0	0	0	0	0	0



Traffic Count Data

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Municipality: Milton
 Count Date: Jun 16, 2022

South Approach - Sixth Line

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	40	17	3	0	60	1	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0
15:15	37	21	8	0	66	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
15:30	48	13	5	0	66	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0
15:45	41	16	5	0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	36	26	4	0	66	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
16:15	38	22	5	0	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	33	39	7	0	79	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
16:45	58	35	7	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	28	18	5	0	51	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
17:15	42	20	8	0	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	35	17	9	0	61	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0
17:45	25	16	9	0	50	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	461	260	75	0	796	5	4	2	0	11	1	0	0	0	1	0	0	0	0	0	0
GRAND TOTAL	566	365	109	0	1040	5	7	2	0	14	2	0	2	0	4	0	0	0	0	0	0



Traffic Count Data

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Municipality: Milton
 Count Date: Jun 16, 2022

East Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds	
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total		
07:00	3	63	1	0	67	0	5	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0
07:15	3	95	2	0	100	0	8	1	0	9	0	1	0	0	1	0	0	0	0	0	0	0
07:30	1	144	0	0	145	0	10	0	0	10	0	1	0	0	1	0	0	0	0	0	0	0
07:45	5	164	0	0	169	0	7	1	0	8	0	4	0	0	4	0	0	0	0	0	0	0
08:00	5	136	3	0	144	0	16	0	0	16	0	1	0	0	1	0	0	0	0	0	0	0
08:15	3	145	1	0	149	0	14	1	0	15	0	1	0	0	1	0	0	0	0	0	0	0
08:30	3	170	3	0	176	0	9	0	0	9	0	1	0	0	1	0	0	0	0	0	0	0
08:45	3	153	0	0	156	0	9	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	26	1070	10	0	1106	0	78	4	0	82	0	9	0	0	9	0	0	0	0	0	0	0



Traffic Count Data

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Municipality: Milton
 Count Date: Jun 16, 2022

East Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	3	304	2	0	309	0	21	0	0	21	0	4	0	0	4	0	0	0	0	0	0
15:15	4	358	3	0	365	0	14	0	0	14	0	0	0	0	0	0	0	0	0	0	0
15:30	6	298	2	0	306	0	13	0	0	13	0	1	0	0	1	0	0	0	0	0	0
15:45	2	361	2	0	365	0	8	1	0	9	0	0	0	0	0	0	0	0	0	0	0
16:00	4	343	1	0	348	0	8	0	0	8	0	2	0	0	2	0	0	0	0	0	0
16:15	3	355	2	0	360	0	5	0	0	5	0	1	0	0	1	0	0	0	0	0	0
16:30	9	360	1	0	370	0	18	0	0	18	0	0	0	0	0	0	0	0	0	0	0
16:45	4	347	5	0	356	0	6	1	0	7	0	1	0	0	1	0	0	0	0	0	0
17:00	3	388	1	0	392	0	5	1	0	6	0	0	0	0	0	0	0	0	0	0	0
17:15	4	386	0	0	390	1	7	0	0	8	0	0	0	0	0	0	0	0	0	0	0
17:30	3	331	0	0	334	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0
17:45	6	295	4	0	305	0	6	0	0	6	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	51	4126	23	0	4200	1	116	3	0	120	0	10	0	0	10	0	0	0	0	0	0
GRAND TOTAL	77	5196	33	0	5306	1	194	7	0	202	0	19	0	0	19	0	0	0	0	0	0



Traffic Count Data

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Municipality: Milton
 Count Date: Jun 16, 2022

West Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	5	313	12	0	330	0	5	0	0	5	0	0	1	0	1	0	0	0	0	0	0
07:15	17	420	21	0	458	2	3	0	0	5	0	0	0	0	0	0	0	0	0	0	0
07:30	15	465	38	0	518	0	11	0	0	11	0	1	0	0	1	0	0	0	0	0	0
07:45	15	428	30	0	473	0	11	2	0	13	1	1	0	0	2	0	0	0	0	0	0
08:00	9	419	29	0	457	0	10	0	0	10	0	3	0	0	3	0	0	0	0	0	0
08:15	10	407	24	0	441	0	12	0	0	12	0	0	0	0	0	0	0	0	0	0	0
08:30	16	342	33	0	391	0	15	0	0	15	1	2	1	0	4	0	0	0	0	0	0
08:45	5	298	26	0	329	0	7	0	0	7	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	92	3092	213	0	3397	2	74	2	0	78	2	7	2	0	11	0	0	0	0	0	0



Traffic Count Data

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Municipality: Milton
 Count Date: Jun 16, 2022

West Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	18	278	13	0	309	0	19	0	0	19	0	1	0	0	1	0	0	0	0	0	0
15:15	18	300	16	0	334	0	22	0	0	22	1	0	0	0	1	0	0	0	0	0	0
15:30	19	317	18	0	354	0	20	1	0	21	0	7	0	0	7	0	0	0	0	0	0
15:45	16	332	19	0	367	0	16	0	0	16	0	2	1	0	3	0	0	0	0	0	0
16:00	22	298	19	0	339	1	21	0	0	22	0	1	0	0	1	0	0	0	0	0	0
16:15	15	330	18	0	363	0	24	0	0	24	0	1	0	0	1	0	0	0	0	0	0
16:30	27	348	9	0	384	1	19	0	0	20	0	2	0	0	2	0	0	0	0	0	0
16:45	42	381	18	0	441	2	10	0	0	12	0	1	0	0	1	0	0	0	0	0	0
17:00	19	339	19	0	377	0	12	0	0	12	0	0	0	0	0	0	0	0	0	0	0
17:15	20	362	24	0	406	0	14	0	0	14	0	0	0	0	0	0	0	0	0	0	0
17:30	13	359	17	0	389	0	8	0	0	8	0	2	0	0	2	0	0	0	0	0	0
17:45	15	320	9	0	344	1	8	0	0	9	0	2	0	0	2	0	0	0	0	0	0
SUBTOTAL	244	3964	199	0	4407	5	193	1	0	199	1	19	1	0	21	0	0	0	0	0	0
GRAND TOTAL	336	7056	412	0	7804	7	267	3	0	277	3	26	3	0	32	0	0	0	0	0	0

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 09:00:00

One Hour Peak

From: 07:30:00
To: 08:30:00

Intersection: Sixth Line & Derry Rd
Site Code: 2219900003
Count Date: Jun 16, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Derry Rd runs E/W

North Approach

	Out	In	Total
	201	108	309
	7	2	9
	2	1	3
	0	0	0
Totals	210	111	321

Sixth Line

	0	0	0	0
	1	1	0	0
	1	0	6	0
	102	90	9	0
Totals	104	91	15	0

East Approach

	Out	In	Total
	607	1747	2354
	49	50	99
	7	6	13
	0	0	0
Totals	663	1803	2466

Derry Rd

				Totals
0	0	0	0	0
0	1	0	49	50
0	5	44	1719	1768
0	0	2	121	123

Peds: 0



Derry Rd

Totals				
0	0	0	0	0
6	4	2	0	0
643	589	47	7	0
14	14	0	0	0

West Approach

	Out	In	Total
	1889	750	2639
	46	48	94
	6	8	14
	0	0	0
Totals	1941	806	2747

Totals	59	55	20	0
	59	55	19	0
	0	0	0	0
	0	0	1	0
	0	0	0	0

Sixth Line

South Approach

	Out	In	Total
	133	225	358
	0	2	2
	1	1	2
	0	0	0
Totals	134	228	362

- Cars

- Trucks

- Buses

- Bicycles

Comments



Peak Hour Summary

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Count Date: Jun 16, 2022
 Period: 07:00 - 09:00

Peak Hour Data (07:30 - 08:30)

Start Time	North Approach Sixth Line						South Approach Sixth Line						East Approach Derry Rd						West Approach Derry Rd						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
07:30	2	26	41	0	0	69	9	19	5	0	0	33	1	155	0	0	0	156	15	477	38	0	0	530	788
07:45	4	22	20	0	0	46	24	15	7	0	0	46	5	175	1	0	0	181	16	440	32	0	0	488	761
08:00	3	20	11	0	0	34	14	16	5	0	0	35	5	153	3	0	0	161	9	432	29	0	0	470	700
08:15	6	23	32	0	0	61	12	5	3	0	0	20	3	160	2	0	0	165	10	419	24	0	0	453	699
Grand Total	15	91	104	0	0	210	59	55	20	0	0	134	14	643	6	0	0	663	50	1768	123	0	0	1941	2948
Approach %	7.1	43.3	49.5	0	-	-	44	41	14.9	0	-	-	2.1	97	0.9	0	-	-	2.6	91.1	6.3	0	-	-	
Totals %	0.5	3.1	3.5	0	7.1	4.5	2	1.9	0.7	0	4.5	0.5	21.8	0.2	0	22.5	1.7	60	4.2	0	65.8				
PHF	0.63	0.88	0.63	0	0.76	0.73	0.61	0.72	0.71	0	0.73	0.7	0.92	0.5	0	0.92	0.78	0.93	0.81	0	0.92	0.94			
Cars	9	90	102	0	201	133	59	55	19	0	133	14	589	4	0	607	49	1719	121	0	1889	2830			
% Cars	60	98.9	98.1	0	95.7	99.3	100	100	95	0	99.3	100	91.6	66.7	0	91.6	98	97.2	98.4	0	97.3	96			
Trucks	6	0	1	0	7	0	0	0	0	0	0	0	47	2	0	49	0	44	2	0	46	102			
% Trucks	40	0	1	0	3.3	0	0	0	0	0	0	0	7.3	33.3	0	7.4	0	2.5	1.6	0	2.4	3.5			
Buses	0	1	1	0	2	1	0	0	1	0	1	0	7	0	0	7	1	5	0	0	6	16			
% Buses	0	1.1	1	0	1	0.7	0	0	5	0	0.7	0	1.1	0	0	1.1	2	0.3	0	0	0.3	0.5			
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Peds					0	-					0	-					0	-					0	-	0
% Peds					0	-					0	-					0	-					0	-	

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:30:00
To: 17:30:00

Intersection: Sixth Line & Derry Rd
Site Code: 2219900003
Count Date: Jun 16, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Derry Rd runs E/W

North Approach

	Out	In	Total
	259	227	486
	3	7	10
	1	0	1
	0	0	0
Totals	263	234	497

Sixth Line

	0	0	0	0
	1	0	0	0
	0	2	1	0
	89	103	67	0
Totals	90	105	68	0

East Approach

	Out	In	Total
	1508	1524	3032
	39	56	95
	1	3	4
	0	0	0
Totals	1548	1583	3131

Derry Rd

					Totals
	0	0	0	0	0
	0	0	3	108	111
	0	3	55	1430	1488
	0	0	0	70	70

Peds: 0

Peds: 0



Peds: 0

Peds: 0

Derry Rd

Totals				
0	0	0	0	0
9	7	2	0	0
1518	1481	36	1	0
21	20	1	0	0

West Approach

	Out	In	Total
	1608	1731	3339
	58	36	94
	3	2	5
	0	0	0
Totals	1669	1769	3438

Totals				
161	114	27	0	
	161	112	27	0
	0	2	0	0
	0	0	0	0
	0	0	0	0

Sixth Line

South Approach

	Out	In	Total
	300	193	493
	2	3	5
	0	0	0
	0	0	0
Totals	302	196	498

- Cars

- Trucks

- Buses

- Bicycles

Comments



Peak Hour Summary

Intersection: Sixth Line & Derry Rd
 Site Code: 2219900003
 Count Date: Jun 16, 2022
 Period: 15:00 - 18:00

Peak Hour Data (16:30 - 17:30)

Start Time	North Approach Sixth Line						South Approach Sixth Line						East Approach Derry Rd						West Approach Derry Rd						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
16:30	19	26	35	0	0	80	33	40	7	0	0	80	9	378	1	0	0	388	28	369	9	0	0	406	954
16:45	11	26	20	0	0	57	58	35	7	0	0	100	4	354	6	0	0	364	44	392	18	0	0	454	975
17:00	18	26	17	0	0	61	28	19	5	0	0	52	3	393	2	0	0	398	19	351	19	0	0	389	900
17:15	20	27	18	0	0	65	42	20	8	0	0	70	5	393	0	0	0	398	20	376	24	0	0	420	953
Grand Total	68	105	90	0	0	263	161	114	27	0	0	302	21	1518	9	0	0	1548	111	1488	70	0	0	1669	3782
Approach %	25.9	39.9	34.2	0	-	-	53.3	37.7	8.9	0	-	-	1.4	98.1	0.6	0	-	-	6.7	89.2	4.2	0	-	-	-
Totals %	1.8	2.8	2.4	0	7	4.3	3	0.7	0	8	0.6	40.1	0.2	0	40.9	2.9	39.3	1.9	0	44.1	-	-	-	-	
PHF	0.85	0.97	0.64	0	0.82	0.69	0.71	0.84	0	0.76	0.58	0.97	0.38	0	0.97	0.63	0.95	0.73	0	0.92	0.97	0.97	0.92	0.97	0.97
Cars	67	103	89	0	259	161	112	27	0	300	20	1481	7	0	1508	108	1430	70	0	1608	3675				
% Cars	98.5	98.1	98.9	0	98.5	100	98.2	100	0	99.3	95.2	97.6	77.8	0	97.4	97.3	96.1	100	0	96.3	97.2				
Trucks	1	2	0	0	3	0	2	0	0	2	1	36	2	0	39	3	55	0	0	58	102				
% Trucks	1.5	1.9	0	0	1.1	0	1.8	0	0	0.7	4.8	2.4	22.2	0	2.5	2.7	3.7	0	0	3.5	2.7				
Buses	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	3	0	0	3	5				
% Buses	0	0	1.1	0	0.4	0	0	0	0	0	0	0.1	0	0	0.1	0	0.2	0	0	0.2	0.1				
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Peds					0	-				0	-				0	-				0	-	-	0		
% Peds					0	-				0	-				0	-				0	-	-	0		



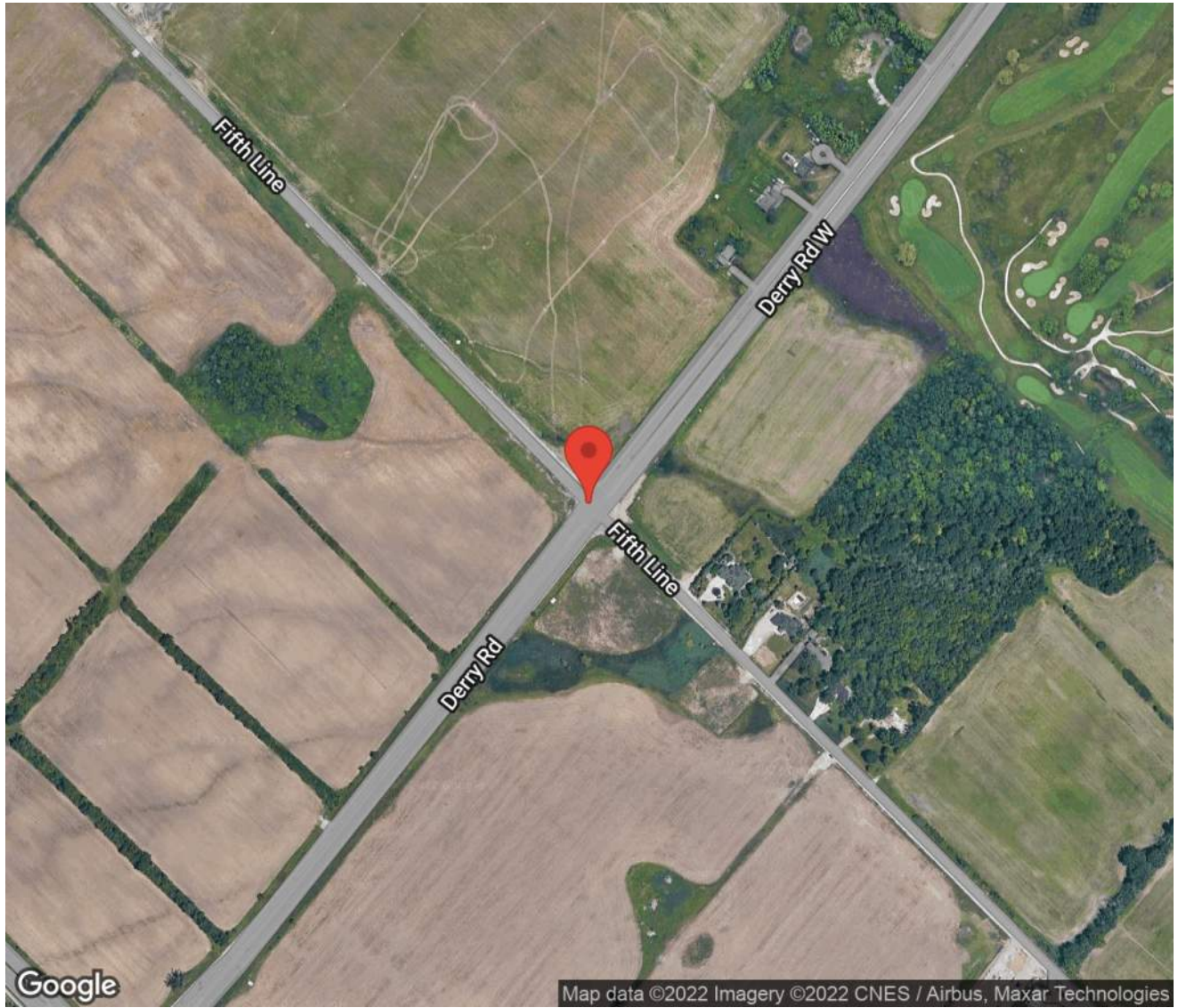
Project #22-199 - CGH Transportation

Intersection Count Report

Intersection: Fifth Line & Derry Rd
Municipality: Milton
Count Date: Thursday, Jun 16, 2022
Site Code: 2219900002
Count Categories: Cars, Trucks, Buses, Bicycles, Pedestrians
Count Period: 07:00-09:00, 15:00-18:00
Weather: Clear
Comments:

Traffic Count Map

Intersection: Fifth Line & Derry Rd
Site Code: 2219900002
Municipality: Milton
Count Date: Jun 16, 2022



Traffic Count Summary

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Municipality: Milton
 Count Date: Jun 16, 2022

Fifth Line - Traffic Summary

Hour	North Approach Totals						South Approach Totals						Total
	Includes Cars, Trucks, Buses, Bicycles						Includes Cars, Trucks, Buses, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	52	34	10	0	96	0	33	30	36	0	99	0	195
08:00 - 09:00	87	36	10	0	133	0	56	33	52	0	141	0	274
BREAK													
15:00 - 16:00	112	37	13	0	162	0	127	37	66	0	230	0	392
16:00 - 17:00	151	44	25	0	220	0	121	63	100	0	284	0	504
17:00 - 18:00	139	60	23	0	222	0	125	49	97	0	271	0	493
GRAND TOTAL	541	211	81	0	833	0	462	212	351	0	1025	0	1858

Traffic Count Summary

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Municipality: Milton
 Count Date: Jun 16, 2022

Derry Rd - Traffic Summary

Hour	East Approach Totals						West Approach Totals						Total
	Includes Cars, Trucks, Buses, Bicycles						Includes Cars, Trucks, Buses, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	41	486	95	0	622	0	24	1729	70	0	1823	0	2445
08:00 - 09:00	58	668	83	0	809	0	31	1535	66	0	1632	0	2441
BREAK													
15:00 - 16:00	43	1541	67	0	1651	0	22	1272	56	0	1350	0	3001
16:00 - 17:00	59	1577	100	0	1736	0	21	1368	64	0	1453	0	3189
17:00 - 18:00	52	1504	71	0	1627	0	36	1329	63	0	1428	0	3055
GRAND TOTAL	253	5776	416	0	6445	0	134	7233	319	0	7686	0	14131



Traffic Count Data

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Municipality: Milton
 Count Date: Jun 16, 2022

North Approach - Fifth Line

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds	
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total		
15:00	20	6	3	0	29	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0
15:15	14	9	1	0	24	12	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0
15:30	26	11	3	0	40	12	0	2	0	14	1	0	0	0	1	0	0	0	0	0	0	0
15:45	15	10	2	0	27	6	1	2	0	9	0	0	0	0	0	0	0	0	0	0	0	0
16:00	13	8	2	0	23	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0
16:15	25	16	5	0	46	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0
16:30	24	4	10	0	38	10	3	1	0	14	0	0	0	0	0	0	0	0	0	0	0	0
16:45	62	13	6	0	81	5	0	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0
17:00	42	12	3	0	57	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
17:15	28	8	4	0	40	4	1	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
17:30	27	21	5	0	53	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
17:45	32	18	11	0	61	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	328	136	55	0	519	73	5	6	0	84	1	0	0	0	1	0	0	0	0	0	0	0
GRAND TOTAL	443	203	72	0	718	97	8	9	0	114	1	0	0	0	1	0	0	0	0	0	0	0



Traffic Count Data

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Municipality: Milton
 Count Date: Jun 16, 2022

South Approach - Fifth Line

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	5	7	3	0	15	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
07:15	6	6	12	0	24	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
07:30	7	6	12	0	25	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
07:45	11	9	9	0	29	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
08:00	25	6	21	0	52	1	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0
08:15	11	9	9	0	29	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
08:30	14	4	13	0	31	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
08:45	4	11	6	0	21	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	83	58	85	0	226	5	5	3	0	13	1	0	0	0	1	0	0	0	0	0	0



Traffic Count Data

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Municipality: Milton
 Count Date: Jun 16, 2022

South Approach - Fifth Line

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	30	3	9	0	42	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
15:15	36	7	15	0	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	38	9	17	0	64	1	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0
15:45	20	18	23	0	61	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
16:00	31	16	29	0	76	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0
16:15	21	27	19	0	67	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0
16:30	26	8	22	0	56	3	0	2	0	5	0	0	0	0	0	0	0	0	0	0	0
16:45	40	12	23	0	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	37	10	20	0	67	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
17:15	20	15	18	0	53	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0
17:30	33	14	29	0	76	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
17:45	29	10	27	0	66	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	361	149	251	0	761	12	0	12	0	24	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL	444	207	336	0	987	17	5	15	0	37	1	0	0	0	1	0	0	0	0	0	0



Traffic Count Data

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Municipality: Milton
 Count Date: Jun 16, 2022

East Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	4	71	6	0	81	0	8	1	0	9	0	1	0	0	1	0	0	0	0	0	0
07:15	10	85	18	0	113	1	5	1	0	7	0	0	0	0	0	0	0	0	0	0	0
07:30	14	143	33	0	190	3	2	3	0	8	0	0	1	0	1	0	0	0	0	0	0
07:45	7	165	28	0	200	2	3	4	0	9	0	3	0	0	3	0	0	0	0	0	0
08:00	12	133	20	0	165	1	5	8	0	14	0	2	0	0	2	0	0	0	0	0	0
08:15	13	155	17	0	185	0	7	6	0	13	0	0	0	0	0	0	0	0	0	0	0
08:30	21	176	11	0	208	2	3	5	0	10	0	2	0	0	2	0	0	0	0	0	0
08:45	9	173	11	0	193	0	9	5	0	14	0	3	0	0	3	0	0	0	0	0	0
SUBTOTAL	90	1101	144	0	1335	9	42	33	0	84	0	11	1	0	12	0	0	0	0	0	0



Traffic Count Data

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Municipality: Milton
 Count Date: Jun 16, 2022

East Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	12	346	10	0	368	2	11	9	0	22	0	2	1	0	3	0	0	0	0	0	0
15:15	11	397	15	0	423	1	12	3	0	16	0	1	1	0	2	0	0	0	0	0	0
15:30	11	349	12	0	372	0	11	2	0	13	0	1	0	0	1	0	0	0	0	0	0
15:45	6	402	12	0	420	0	7	2	0	9	0	2	0	0	2	0	0	0	0	0	0
16:00	13	385	16	0	414	1	5	3	0	9	0	1	0	0	1	0	0	0	0	0	0
16:15	12	389	20	0	421	0	2	3	0	5	0	1	0	0	1	0	0	0	0	0	0
16:30	22	378	25	0	425	0	9	10	0	19	0	3	0	0	3	0	0	0	0	0	0
16:45	11	400	20	0	431	0	3	3	0	6	0	1	0	0	1	0	0	0	0	0	0
17:00	4	420	11	0	435	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0
17:15	8	415	20	0	443	0	5	1	0	6	0	0	0	0	0	0	0	0	0	0	0
17:30	19	351	10	0	380	1	4	1	0	6	0	0	0	0	0	0	0	0	0	0	0
17:45	20	298	28	0	346	0	5	0	0	5	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	149	4530	199	0	4878	5	79	37	0	121	0	13	2	0	15	0	0	0	0	0	0
GRAND TOTAL	239	5631	343	0	6213	14	121	70	0	205	0	24	3	0	27	0	0	0	0	0	0



Traffic Count Data

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Municipality: Milton
 Count Date: Jun 16, 2022

West Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	3	321	12	0	336	1	5	0	0	6	0	1	0	0	1	0	0	0	0	0	0
07:15	4	438	16	0	458	1	5	1	0	7	0	0	0	0	0	0	0	0	0	0	0
07:30	5	490	20	0	515	1	10	0	0	11	0	2	0	0	2	0	0	0	0	0	0
07:45	9	447	19	0	475	0	8	2	0	10	0	2	0	0	2	0	0	0	0	0	0
08:00	5	412	20	0	437	1	5	0	0	6	0	3	0	0	3	0	0	0	0	0	0
08:15	12	408	19	0	439	2	6	0	0	8	0	0	0	0	0	0	0	0	0	0	0
08:30	4	370	14	0	388	0	9	3	0	12	0	3	0	0	3	0	0	0	0	0	0
08:45	6	314	10	0	330	1	4	0	0	5	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	48	3200	130	0	3378	7	52	6	0	65	0	12	0	0	12	0	0	0	0	0	0



Traffic Count Data

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Municipality: Milton
 Count Date: Jun 16, 2022

West Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	5	280	12	0	297	4	13	0	0	17	0	0	0	0	0	0	0	0	0	0	0
15:15	3	308	9	0	320	1	8	0	0	9	0	2	0	0	2	0	0	0	0	0	0
15:30	1	308	17	0	326	2	8	2	0	12	0	4	0	0	4	0	0	0	0	0	0
15:45	3	329	16	0	348	3	10	0	0	13	0	2	0	0	2	0	0	0	0	0	0
16:00	3	300	15	0	318	0	13	1	0	14	0	1	0	0	1	0	0	0	0	0	0
16:15	4	322	17	0	343	3	14	0	0	17	0	2	0	0	2	0	0	0	0	0	0
16:30	7	332	8	0	347	0	10	0	0	10	0	4	0	0	4	0	0	0	0	0	0
16:45	4	362	23	0	389	0	7	0	0	7	0	1	0	0	1	0	0	0	0	0	0
17:00	2	316	15	0	333	0	7	0	0	7	0	0	0	0	0	0	0	0	0	0	0
17:15	6	363	14	0	383	0	10	0	0	10	0	0	0	0	0	0	0	0	0	0	0
17:30	3	325	14	0	342	0	7	0	0	7	0	2	0	0	2	0	0	0	0	0	0
17:45	25	290	20	0	335	0	7	0	0	7	0	2	0	0	2	0	0	0	0	0	0
SUBTOTAL	66	3835	180	0	4081	13	114	3	0	130	0	20	0	0	20	0	0	0	0	0	0
GRAND TOTAL	114	7035	310	0	7459	20	166	9	0	195	0	32	0	0	32	0	0	0	0	0	0

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 09:00:00

One Hour Peak

From: 07:30:00
To: 08:30:00

Intersection: Fifth Line & Derry Rd
Site Code: 2219900002
Count Date: Jun 16, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Derry Rd runs E/W

North Approach

	Out	In	Total
	129	159	288
	16	28	44
	0	1	1
	0	0	0
Totals	145	188	333

Fifth Line

	0	0	0	0
	0	0	0	0
	2	1	13	0
	12	41	76	0
Totals	14	42	89	0

East Approach

	Out	In	Total
	740	1884	2624
	44	44	88
	6	7	13
	0	0	0
Totals	790	1935	2725

Derry Rd

					Totals
	0	0	0	0	0
	0	0	4	31	35
	0	7	29	1757	1793
	0	0	2	78	80

Peds: 0



Peds: 0

Peds: 0

Peds: 0

Derry Rd

Totals				
0	0	0	0	0
120	98	21	1	0
618	596	17	5	0
52	46	6	0	0

West Approach

	Out	In	Total
	1866	662	2528
	35	22	57
	7	5	12
	0	0	0
Totals	1908	689	2597

Totals				
57	33	53	0	
	54	30	51	0
	3	3	2	0
	0	0	0	0
	0	0	0	0

Fifth Line

South Approach

	Out	In	Total
	135	165	300
	8	9	17
	0	0	0
	0	0	0
Totals	143	174	317

- Cars

- Trucks

- Buses

- Bicycles

Comments



Peak Hour Summary

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Count Date: Jun 16, 2022
 Period: 07:00 - 09:00

Peak Hour Data (07:30 - 08:30)

Start Time	North Approach Fifth Line						South Approach Fifth Line						East Approach Derry Rd						West Approach Derry Rd						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
07:30	18	11	7	0	0	36	9	6	12	0	0	27	17	145	37	0	0	199	6	502	20	0	0	528	790
07:45	18	11	1	0	0	30	11	11	9	0	0	31	9	171	32	0	0	212	9	457	21	0	0	487	760
08:00	29	10	3	0	0	42	26	7	22	0	0	55	13	140	28	0	0	181	6	420	20	0	0	446	724
08:15	24	10	3	0	0	37	11	9	10	0	0	30	13	162	23	0	0	198	14	414	19	0	0	447	712
Grand Total	89	42	14	0	0	145	57	33	53	0	0	143	52	618	120	0	0	790	35	1793	80	0	0	1908	2986
Approach %	61.4	29	9.7	0	-	-	39.9	23.1	37.1	0	-	-	6.6	78.2	15.2	0	-	-	1.8	94	4.2	0	-	-	
Totals %	3	1.4	0.5	0	4.9	1.9	1.1	1.8	0	4.8	1.7	20.7	4	0	26.5	1.2	60	2.7	0	63.9					
PHF	0.77	0.95	0.5	0	0.86	0.55	0.75	0.6	0	0.65	0.76	0.9	0.81	0	0.93	0.63	0.89	0.95	0	0.9	0.94				
Cars	76	41	12	0	129	54	30	51	0	135	46	596	98	0	740	31	1757	78	0	1866	2870				
% Cars	85.4	97.6	85.7	0	89	94.7	90.9	96.2	0	94.4	88.5	96.4	81.7	0	93.7	88.6	98	97.5	0	97.8	96.1				
Trucks	13	1	2	0	16	3	3	2	0	8	6	17	21	0	44	4	29	2	0	35	103				
% Trucks	14.6	2.4	14.3	0	11	5.3	9.1	3.8	0	5.6	11.5	2.8	17.5	0	5.6	11.4	1.6	2.5	0	1.8	3.4				
Buses	0	0	0	0	0	0	0	0	0	0	0	5	1	0	6	0	7	0	0	7	13				
% Buses	0	0	0	0	0	0	0	0	0	0	0	0.8	0.8	0	0.8	0	0.4	0	0	0.4	0.4				
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Peds					0	-				0	-				0	-				0	-	0			
% Peds					0	-				0	-				0	-				0	-	0			

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:30:00
To: 17:30:00

Intersection: Fifth Line & Derry Rd
Site Code: 2219900002
Count Date: Jun 16, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Derry Rd runs E/W

North Approach

	Out	In	Total
	216	140	356
	29	14	43
	0	0	0
	0	0	0
Totals	245	154	399

Fifth Line

	0	0	0	0
	0	0	0	0
	2	4	23	0
	23	37	156	0
Totals	25	41	179	0

East Approach

	Out	In	Total
	1734	1612	3346
	36	61	97
	4	5	9
	0	0	0
Totals	1774	1678	3452

Derry Rd

					Totals
	0	0	0	0	0
	0	0	0	19	19
	0	5	34	1373	1412
	0	0	0	60	60

Peds: 0

Peds: 0



Peds: 0

Peds: 0

Derry Rd

Totals				
0	0	0	0	0
90	76	14	0	0
1639	1613	22	4	0
45	45	0	0	0

West Approach

	Out	In	Total
	1452	1759	3211
	34	30	64
	5	4	9
	0	0	0
Totals	1491	1793	3284

Totals	129	45	87	0
	123	45	83	0
	6	0	4	0
	0	0	0	0
	0	0	0	0

Fifth Line

South Approach

	Out	In	Total
	251	142	393
	10	4	14
	0	0	0
	0	0	0
Totals	261	146	407

- Cars

- Trucks

- Buses

- Bicycles

Comments



Peak Hour Summary

Intersection: Fifth Line & Derry Rd
 Site Code: 2219900002
 Count Date: Jun 16, 2022
 Period: 15:00 - 18:00

Peak Hour Data (16:30 - 17:30)

Start Time	North Approach Fifth Line						South Approach Fifth Line						East Approach Derry Rd						West Approach Derry Rd						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
16:30	34	7	11	0	0	52	29	8	24	0	0	61	22	390	35	0	0	447	7	346	8	0	0	361	921
16:45	67	13	7	0	0	87	40	12	23	0	0	75	11	404	23	0	0	438	4	370	23	0	0	397	997
17:00	46	12	3	0	0	61	38	10	21	0	0	69	4	425	11	0	0	440	2	323	15	0	0	340	910
17:15	32	9	4	0	0	45	22	15	19	0	0	56	8	420	21	0	0	449	6	373	14	0	0	393	943
Grand Total	179	41	25	0	0	245	129	45	87	0	0	261	45	1639	90	0	0	1774	19	1412	60	0	0	1491	3771
Approach %	73.1	16.7	10.2	0	-	-	49.4	17.2	33.3	0	-	-	2.5	92.4	5.1	0	-	-	1.3	94.7	4	0	-	-	-
Totals %	4.7	1.1	0.7	0	6.5	6.5	3.4	1.2	2.3	0	6.9	6.9	1.2	43.5	2.4	0	47	47	0.5	37.4	1.6	0	39.5	39.5	39.5
PHF	0.67	0.79	0.57	0	0.7	0.7	0.81	0.75	0.91	0	0.87	0.87	0.51	0.96	0.64	0	0.99	0.99	0.68	0.95	0.65	0	0.94	0.94	0.95
Cars	156	37	23	0	0	216	123	45	83	0	0	251	45	1613	76	0	0	1734	19	1373	60	0	0	1452	3653
% Cars	87.2	90.2	92	0	88.2	88.2	95.3	100	95.4	0	96.2	96.2	100	98.4	84.4	0	97.7	97.7	100	97.2	100	0	0	97.4	96.9
Trucks	23	4	2	0	0	29	6	0	4	0	0	10	0	22	14	0	0	36	0	34	0	0	0	34	109
% Trucks	12.8	9.8	8	0	11.8	11.8	4.7	0	4.6	0	3.8	3.8	0	1.3	15.6	0	2	2	0	2.4	0	0	0	2.3	2.9
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	5	0	0	0	5	9
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0.2	0.2	0	0.4	0	0	0	0.3	0.2
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peds					0	-					0	-					0	-					0	-	0
% Peds					0	-					0	-					0	-					0	-	0



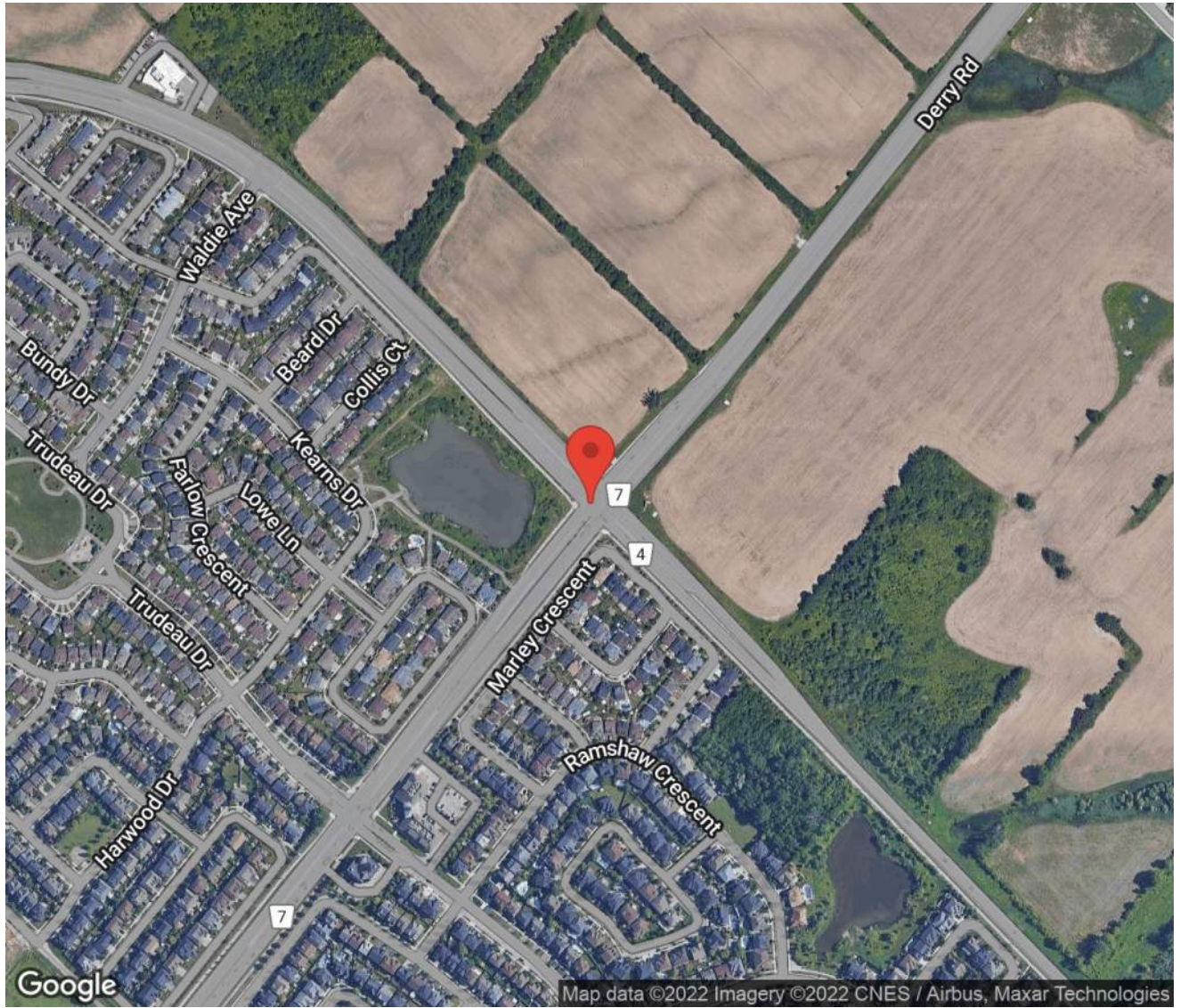
Project #22-199 - CGH Transportation

Intersection Count Report

Intersection: James Snow Pkwy S & Derry Rd
Municipality: Milton
Count Date: Thursday, Jun 16, 2022
Site Code: 2219900001
Count Categories: Cars, Trucks, Buses, Bicycles, Pedestrians
Count Period: 07:00-09:00, 15:00-18:00
Weather: Clear
Comments:

Traffic Count Map

Intersection: James Snow Pkwy S & Derry Rd
Site Code: 2219900001
Municipality: Milton
Count Date: Jun 16, 2022





Traffic Count Summary

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Municipality: Milton
 Count Date: Jun 16, 2022

James Snow Pkwy S - Traffic Summary

Hour	North Approach Totals						South Approach Totals						Total
	Includes Cars, Trucks, Buses, Bicycles						Includes Cars, Trucks, Buses, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	234	327	111	0	672	0	13	180	143	0	336	0	1008
08:00 - 09:00	234	281	172	0	687	2	25	221	141	0	387	0	1074
BREAK													
15:00 - 16:00	242	393	194	0	829	0	94	332	127	0	553	0	1382
16:00 - 17:00	277	382	176	0	835	0	88	325	163	0	576	0	1411
17:00 - 18:00	255	349	189	0	793	0	59	268	128	0	455	1	1248
GRAND TOTAL	1242	1732	842	0	3816	2	279	1326	702	0	2307	1	6123

Traffic Count Summary

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Municipality: Milton
 Count Date: Jun 16, 2022

Derry Rd - Traffic Summary

Hour	East Approach Totals						West Approach Totals						Total
	Includes Cars, Trucks, Buses, Bicycles						Includes Cars, Trucks, Buses, Bicycles						
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	45	373	110	0	528	0	120	1444	24	0	1588	7	2116
08:00 - 09:00	58	498	178	0	734	0	180	1256	35	0	1471	2	2205
BREAK													
15:00 - 16:00	182	1121	375	0	1678	0	223	985	31	0	1239	3	2917
16:00 - 17:00	236	1169	318	0	1723	0	201	1011	23	0	1235	0	2958
17:00 - 18:00	235	1108	312	0	1655	1	168	1039	13	0	1220	1	2875
GRAND TOTAL	756	4269	1293	0	6318	1	892	5735	126	0	6753	13	13071



Traffic Count Data

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Municipality: Milton
 Count Date: Jun 16, 2022

North Approach - James Snow Pkwy S

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds	
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total		
07:00	38	45	13	0	96	5	4	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0
07:15	64	78	20	0	162	4	7	2	0	13	1	3	0	0	4	0	0	0	0	0	0	0
07:30	60	96	32	0	188	5	10	5	0	20	1	0	1	0	2	0	0	0	0	0	0	0
07:45	52	70	34	0	156	4	13	4	0	21	0	1	0	0	1	0	0	0	0	0	0	0
08:00	54	57	33	0	144	1	7	0	0	8	0	1	0	0	1	0	0	0	0	0	0	1
08:15	70	82	53	0	205	4	4	3	0	11	0	0	0	0	0	0	0	0	0	0	0	0
08:30	42	65	43	0	150	7	5	4	0	16	0	1	1	0	2	0	0	0	0	0	0	0
08:45	54	55	35	0	144	2	4	0	0	6	0	0	0	0	0	0	0	0	0	0	0	1
SUBTOTAL	434	548	263	0	1245	32	54	18	0	104	2	6	2	0	10	0	0	0	0	0	0	2



Traffic Count Data

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Municipality: Milton
 Count Date: Jun 16, 2022

North Approach - James Snow Pkwy S

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds	
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total		
15:00	59	81	51	0	191	6	1	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
15:15	65	123	51	0	239	4	3	0	0	7	0	0	1	0	1	0	0	0	0	0	0	0
15:30	53	82	43	0	178	4	8	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0
15:45	45	88	48	0	181	6	6	0	0	12	0	1	0	0	1	0	0	0	0	0	0	0
16:00	48	58	43	0	149	7	5	1	0	13	0	0	1	0	1	0	0	0	0	0	0	0
16:15	75	100	40	0	215	6	1	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
16:30	58	105	38	0	201	2	5	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
16:45	81	100	50	0	231	0	8	3	0	11	0	0	0	0	0	0	0	0	0	0	0	0
17:00	63	70	42	0	175	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
17:15	62	108	56	0	226	4	1	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
17:30	55	72	45	0	172	3	0	1	0	4	0	0	1	0	1	0	0	0	0	0	0	0
17:45	66	94	43	0	203	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	730	1081	550	0	2361	44	42	6	0	92	0	1	3	0	4	0	0	0	0	0	0	0
GRAND TOTAL	1164	1629	813	0	3606	76	96	24	0	196	2	7	5	0	14	0	0	0	0	0	0	2



Traffic Count Data

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Municipality: Milton
 Count Date: Jun 16, 2022

South Approach - James Snow Pkwy S

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds	
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total		
07:00	2	32	16	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	4	36	36	0	76	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0
07:30	3	39	31	0	73	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0
07:45	4	64	57	0	125	0	1	1	0	2	0	3	1	0	4	0	0	0	0	0	0	0
08:00	4	64	36	0	104	0	5	0	0	5	0	1	0	0	1	0	0	0	0	0	0	0
08:15	11	57	36	0	104	0	6	0	0	6	0	1	0	0	1	0	0	0	0	0	0	0
08:30	4	38	39	0	81	0	2	1	0	3	0	1	0	0	1	0	0	0	0	0	0	0
08:45	6	44	28	0	78	0	1	1	0	2	0	1	0	0	1	0	0	0	0	0	0	0
SUBTOTAL	38	374	279	0	691	0	18	4	0	22	0	9	1	0	10	0	0	0	0	0	0	0



Traffic Count Data

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Municipality: Milton
 Count Date: Jun 16, 2022

South Approach - James Snow Pkwy S

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	17	59	22	0	98	0	5	2	0	7	0	1	0	0	1	0	0	0	0	0	0
15:15	30	98	44	0	172	0	3	0	0	3	1	1	0	0	2	0	0	0	0	0	0
15:30	20	69	24	0	113	1	4	4	0	9	0	1	0	0	1	0	0	0	0	0	0
15:45	24	86	28	0	138	1	5	2	0	8	0	0	1	0	1	0	0	0	0	0	0
16:00	15	77	32	0	124	0	4	2	0	6	0	1	1	0	2	0	0	0	0	0	0
16:15	32	72	32	0	136	0	4	2	0	6	0	1	0	0	1	0	0	0	0	0	0
16:30	23	85	46	0	154	0	3	2	0	5	1	0	0	0	1	0	0	0	0	0	0
16:45	17	76	43	0	136	0	2	3	0	5	0	0	0	0	0	0	0	0	0	0	0
17:00	18	59	26	0	103	2	4	1	0	7	0	1	0	0	1	0	0	0	0	0	1
17:15	11	74	45	0	130	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0
17:30	16	53	23	0	92	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0
17:45	11	72	31	0	114	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	234	880	396	0	1510	5	38	20	0	63	2	7	2	0	11	0	0	0	0	0	1
GRAND TOTAL	272	1254	675	0	2201	5	56	24	0	85	2	16	3	0	21	0	0	0	0	0	1



Traffic Count Data

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Municipality: Milton
 Count Date: Jun 16, 2022

East Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	8	58	9	0	75	0	3	3	0	6	0	0	2	0	2	0	0	0	0	0	0
07:15	6	61	27	0	94	0	3	4	0	7	0	1	0	0	1	0	0	0	0	0	0
07:30	14	115	26	0	155	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0
07:45	16	120	38	0	174	1	4	1	0	6	0	3	0	0	3	0	0	0	0	0	0
08:00	15	103	39	0	157	1	3	2	0	6	0	2	0	0	2	0	0	0	0	0	0
08:15	14	120	38	0	172	0	7	1	0	8	0	0	1	0	1	0	0	0	0	0	0
08:30	14	130	44	0	188	1	1	2	0	4	0	1	0	0	1	0	0	0	0	0	0
08:45	12	125	48	0	185	1	5	2	0	8	0	1	1	0	2	0	0	0	0	0	0
SUBTOTAL	99	832	269	0	1200	4	31	15	0	50	0	8	4	0	12	0	0	0	0	0	0



Traffic Count Data

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Municipality: Milton
 Count Date: Jun 16, 2022

East Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	33	235	115	0	383	0	6	5	0	11	0	2	0	0	2	0	0	0	0	0	0
15:15	44	300	84	0	428	0	4	7	0	11	0	1	1	0	2	0	0	0	0	0	0
15:30	61	244	87	0	392	1	7	7	0	15	0	1	0	0	1	0	0	0	0	0	0
15:45	43	314	64	0	421	0	6	5	0	11	0	1	0	0	1	0	0	0	0	0	0
16:00	60	295	61	0	416	0	2	2	0	4	0	2	0	0	2	0	0	0	0	0	0
16:15	60	283	73	0	416	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0
16:30	54	291	71	0	416	0	5	7	0	12	0	1	0	0	1	0	0	0	0	0	0
16:45	62	283	100	0	445	0	3	4	0	7	0	0	0	0	0	0	0	0	0	0	0
17:00	60	314	87	0	461	1	3	1	0	5	0	1	0	0	1	0	0	0	0	0	1
17:15	56	288	93	0	437	1	4	3	0	8	0	0	0	0	0	0	0	0	0	0	0
17:30	60	273	56	0	389	0	4	3	0	7	0	0	0	0	0	0	0	0	0	0	0
17:45	56	220	66	0	342	1	0	3	0	4	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	649	3340	957	0	4946	4	46	47	0	97	0	12	1	0	13	0	0	0	0	0	1
GRAND TOTAL	748	4172	1226	0	6146	8	77	62	0	147	0	20	5	0	25	0	0	0	0	0	1



Traffic Count Data

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Municipality: Milton
 Count Date: Jun 16, 2022

West Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
07:00	23	279	4	0	306	0	2	0	0	2	0	1	1	0	2	0	0	0	0	0	0
07:15	31	356	7	0	394	0	4	0	0	4	0	1	0	0	1	0	0	0	0	0	2
07:30	30	423	8	0	461	0	4	1	0	5	0	1	0	0	1	0	0	0	0	0	1
07:45	35	368	3	0	406	1	4	0	0	5	0	1	0	0	1	0	0	0	0	0	4
08:00	51	350	7	0	408	2	4	0	0	6	0	0	0	0	0	0	0	0	0	0	0
08:15	49	335	8	0	392	1	5	0	0	6	1	0	0	0	1	0	0	0	0	0	1
08:30	46	305	8	0	359	0	4	0	0	4	0	4	0	0	4	0	0	0	0	0	1
08:45	28	246	12	0	286	1	2	0	0	3	1	1	0	0	2	0	0	0	0	0	0
SUBTOTAL	293	2662	57	0	3012	5	29	1	0	35	2	9	1	0	12	0	0	0	0	0	9



Traffic Count Data

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Municipality: Milton
 Count Date: Jun 16, 2022

West Approach - Derry Rd

Start Time	Cars					Trucks					Buses					Bicycles					Total Peds
	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	←	↑	→	↻	Total	
15:00	51	215	14	0	280	0	10	0	0	10	1	0	0	0	1	0	0	0	0	0	0
15:15	50	207	7	0	264	0	5	0	0	5	0	1	0	0	1	0	0	0	0	0	0
15:30	61	252	5	0	318	2	4	0	0	6	1	3	0	0	4	0	0	0	0	0	3
15:45	56	280	5	0	341	1	5	0	0	6	0	3	0	0	3	0	0	0	0	0	0
16:00	63	235	1	0	299	1	6	0	0	7	1	0	0	0	1	0	0	0	0	0	0
16:15	40	233	11	0	284	4	9	0	0	13	1	2	0	0	3	0	0	0	0	0	0
16:30	54	240	2	0	296	1	5	1	0	7	0	3	0	0	3	0	0	0	0	0	0
16:45	36	272	8	0	316	0	4	0	0	4	0	2	0	0	2	0	0	0	0	0	0
17:00	40	240	4	0	284	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0
17:15	41	280	0	0	321	2	4	0	0	6	0	0	0	0	0	0	0	0	0	0	0
17:30	43	265	3	0	311	0	4	0	0	4	0	2	0	0	2	0	0	0	0	0	0
17:45	40	232	6	0	278	2	5	0	0	7	0	2	0	0	2	0	0	0	0	0	1
SUBTOTAL	575	2951	66	0	3592	13	66	1	0	80	4	18	0	0	22	0	0	0	0	0	4
GRAND TOTAL	868	5613	123	0	6604	18	95	2	0	115	6	27	1	0	34	0	0	0	0	0	13

Peak Hour Diagram

Specified Period

From: 07:00:00
To: 09:00:00

One Hour Peak

From: 07:30:00
To: 08:30:00

Intersection: James Snow Pkwy S & Derry Rd
Site Code: 2219900001
Count Date: Jun 16, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Derry Rd runs E/W

North Approach

	Out	In	Total
	693	530	1223
	60	22	82
	4	9	13
	0	0	0
Totals	757	561	1318

James Snow Pkwy S

	0	0	0	0
	1	2	1	0
	12	34	14	0
	152	305	236	0
Totals	165	341	251	0

East Approach

	Out	In	Total
	658	1872	2530
	25	32	57
	6	4	10
	0	0	0
Totals	689	1908	2597

Derry Rd

				Totals
0	0	0	0	0
0	1	4	165	170
0	2	17	1476	1495
0	0	1	26	27

Peds: 1



Peds: 6

Peds: 0

Peds: 0

Derry Rd

Totals				
0	0	0	0	0
146	141	4	1	0
482	458	19	5	0
61	59	2	0	0

West Approach

	Out	In	Total
	1667	632	2299
	22	31	53
	3	6	9
	0	0	0
Totals	1692	669	2361

Totals	22	245	162	0
	22	224	160	0
	0	14	1	0
	0	7	1	0
	0	0	0	0

James Snow Pkwy S

South Approach

	Out	In	Total
	406	390	796
	15	37	52
	8	2	10
	0	0	0
Totals	429	429	858

- Cars

- Trucks

- Buses

- Bicycles

Comments



Peak Hour Summary

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Count Date: Jun 16, 2022
 Period: 07:00 - 09:00

Peak Hour Data (07:30 - 08:30)

Start Time	North Approach James Snow Pkwy S						South Approach James Snow Pkwy S						East Approach Derry Rd						West Approach Derry Rd						Total Vehicles	
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total		
07:30	66	106	38	0	0	210	3	43	31	0	0	77	14	120	26	0	0	160	30	428	9	0	1	467	914	
07:45	56	84	38	0	0	178	4	68	59	0	0	131	17	127	39	0	0	183	36	373	3	0	4	412	904	
08:00	55	65	33	0	1	153	4	70	36	0	0	110	16	108	41	0	0	165	53	354	7	0	0	414	842	
08:15	74	86	56	0	0	216	11	64	36	0	0	111	14	127	40	0	0	181	51	340	8	0	1	399	907	
Grand Total	251	341	165	0	1	757	22	245	162	0	0	429	61	482	146	0	0	689	170	1495	27	0	6	1692	3567	
Approach %	33.2	45	21.8	0	-	-	5.1	57.1	37.8	0	-	-	8.9	70	21.2	0	-	-	10	88.4	1.6	0	-	-	-	
Totals %	7	9.6	4.6	0	21.2	-	0.6	6.9	4.5	0	12	-	1.7	13.5	4.1	0	19.3	-	4.8	41.9	0.8	0	47.4	-	-	
PHF	0.85	0.8	0.74	0	0.88	0.88	0.5	0.88	0.69	0	0.82	0.82	0.9	0.95	0.89	0	0.94	0.94	0.8	0.87	0.75	0	0.91	0.91	0.98	
Cars	236	305	152	0	693	693	22	224	160	0	406	406	59	458	141	0	658	658	165	1476	26	0	1667	1667	3424	
% Cars	94	89.4	92.1	0	91.5	91.5	100	91.4	98.8	0	94.6	94.6	96.7	95	96.6	0	95.5	95.5	97.1	98.7	96.3	0	98.5	98.5	96	
Trucks	14	34	12	0	60	60	0	14	1	0	15	15	2	19	4	0	25	25	4	17	1	0	22	22	122	
% Trucks	5.6	10	7.3	0	7.9	7.9	0	5.7	0.6	0	3.5	3.5	3.3	3.9	2.7	0	3.6	3.6	2.4	1.1	3.7	0	1.3	1.3	3.4	
Buses	1	2	1	0	4	4	0	7	1	0	8	8	0	5	1	0	6	6	1	2	0	0	3	3	21	
% Buses	0.4	0.6	0.6	0	0.5	0.5	0	2.9	0.6	0	1.9	1.9	0	1	0.7	0	0.9	0.9	0.6	0.1	0	0	0.2	0.2	0.6	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peds					1	-					0	-					0	-					6	-	7	
% Peds					14.3	-					0	-					0	-					85.7	-	-	

Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:30:00
To: 17:30:00

Intersection: James Snow Pkwy S & Derry Rd
Site Code: 2219900001
Count Date: Jun 16, 2022

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Derry Rd runs E/W

North Approach

	Out	In	Total
	833	816	1649
	27	27	54
	0	2	2
	0	0	0
Totals	860	845	1705

James Snow Pkwy S

	0	0	0	0
	0	0	0	0
	3	18	6	0
	186	383	264	0
Totals	189	401	270	0

East Approach

	Out	In	Total
	1759	1456	3215
	32	31	63
	2	5	7
	0	0	0
Totals	1793	1492	3285

Derry Rd

					Totals
	0	0	0	0	0
	0	0	3	171	174
	0	5	18	1032	1055
	0	0	1	14	15

Peds: 0



Derry Rd

Totals				
0	0	0	0	0
366	351	15	0	0
1193	1176	15	2	0
234	232	2	0	0

West Approach

	Out	In	Total
	1217	1431	2648
	22	20	42
	5	3	8
	0	0	0
Totals	1244	1454	2698

Totals				
72	69	294	160	0
2	2	9	7	0
1	1	2	0	0
0	0	0	0	0

Peds: 1

James Snow Pkwy S

South Approach

	Out	In	Total
	523	629	1152
	18	21	39
	3	0	3
	0	0	0
Totals	544	650	1194

- Cars

- Trucks

- Buses

- Bicycles

Comments



Peak Hour Summary

Intersection: James Snow Pkwy S & Derry Rd
 Site Code: 2219900001
 Count Date: Jun 16, 2022
 Period: 15:00 - 18:00

Peak Hour Data (16:30 - 17:30)

Start Time	North Approach James Snow Pkwy S						South Approach James Snow Pkwy S						East Approach Derry Rd						West Approach Derry Rd						Total Vehicles
	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	←	↑	→	↻	Peds	Total	
16:30	60	110	38	0	0	208	24	88	48	0	0	160	54	297	78	0	0	429	55	248	3	0	0	306	1103
16:45	81	108	53	0	0	242	17	78	46	0	0	141	62	286	104	0	0	452	36	278	8	0	0	322	1157
17:00	63	74	42	0	0	179	20	64	27	0	1	111	61	318	88	0	1	467	40	245	4	0	0	289	1046
17:15	66	109	56	0	0	231	11	75	46	0	0	132	57	292	96	0	0	445	43	284	0	0	0	327	1135
Grand Total	270	401	189	0	0	860	72	305	167	0	1	544	234	1193	366	0	1	1793	174	1055	15	0	0	1244	4441
Approach %	31.4	46.6	22	0	-	-	13.2	56.1	30.7	0	-	-	13.1	66.5	20.4	0	-	-	14	84.8	1.2	0	-	-	-
Totals %	6.1	9	4.3	0	19.4	12.2	1.6	6.9	3.8	0	12.2	5.3	26.9	8.2	0	40.4	3.9	23.8	0.3	0	28	-	-	-	
PHF	0.83	0.91	0.84	0	0.89	0.85	0.75	0.87	0.87	0	0.85	0.94	0.94	0.88	0	0.96	0.79	0.93	0.47	0	0.95	0.96	0.95	0.96	
Cars	264	383	186	0	833	523	69	294	160	0	523	232	1176	351	0	1759	171	1032	14	0	1217	4332	4332		
% Cars	97.8	95.5	98.4	0	96.9	96.1	95.8	96.4	95.8	0	96.1	99.1	98.6	95.9	0	98.1	98.3	97.8	93.3	0	97.8	97.5	97.8	97.5	
Trucks	6	18	3	0	27	18	2	9	7	0	18	2	15	15	0	32	3	18	1	0	22	99	99		
% Trucks	2.2	4.5	1.6	0	3.1	3.3	2.8	3	4.2	0	3.3	0.9	1.3	4.1	0	1.8	1.7	1.7	6.7	0	1.8	2.2	2.2		
Buses	0	0	0	0	0	3	1	2	0	0	3	0	2	0	0	2	0	5	0	0	5	10	10		
% Buses	0	0	0	0	0	0.6	1.4	0.7	0	0	0.6	0	0.2	0	0	0.1	0	0.5	0	0	0.4	0.2	0.2		
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Peds					0	-					1	-				1	-				0	-	2	2	
% Peds					0	-					50	-				50	-				0	-	0	0	

Appendix H: TTS Data



SUMMARY**ROUNDED**

	Inbound	Outbound	Inbound	Outbound
North - JSP	20.52%	26.27%	20%	26%
North - 5th Line	1.20%	1.47%	1%	2%
North - 6th Line	0.91%	1.18%	1%	1%
South - JSP	0.00%	0.00%	0%	0%
South - 5th Line	10.55%	9.02%	11%	9%
South - 6th Line	4.65%	4.26%	5%	4%
East - Derry	33.22%	27.41%	33%	28%
West - Derry	28.94%	30.39%	29%	30%
Total	100%	100%	100%	100%

OUTBOUND

Thu Nov 10 2022 10:20:40 GMT-0500 (Eastern Standard Time) - Run Time: 2583ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gla06_orig

RowG: ColG:(4112,4116,4117,4118,4121,4145,4147,4148)
TblG:

Filters:
Start time of trip - start_time In 1500-1759
and
Trip purpose of origin - purp_orig In W,
and
Primary travel mode of trip - mode_prime In D,U,M,P,T,S

Trip 2016
Table:

		North JSP	North 5th Line	North 6th Line	South JSP	South 5th Line	South 6th Line	East Derry	West Derry	Total	North JSP	North 5th Line	North 6th Line	South JSP	South 5th Line	South 6th Line	East Derry	West Derry	Total	North JSP	North 5th Line	North 6th Line	South JSP	South 5th Line	South 6th Line	East Derry	West Derry	Total											
,1																																							
	PD 3 of Toronto,24	24	1%					100%		100%	0%	0%	0%	0%	0%	0%	100%		100%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%									
	PD 8 of Toronto,7	7	0%					100%		100%	0%	0%	0%	0%	0%	0%	100%		100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%								
	PD 9 of Toronto,39	39	1%					100%		100%	0%	0%	0%	0%	0%	0%	100%		100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%								
	PD 12 of Toronto,13	13	0%					100%		100%	0%	0%	0%	0%	0%	0%	100%		100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%								
	Caledon,18	18	1%					100%		100%	0%	0%	0%	0%	0%	0%	100%		100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%								
	Brampton,293	293	10%					100%		100%	0%	0%	0%	0%	0%	0%	100%		100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%								
	Mississauga,310	310	11%					100%		100%	0%	0%	0%	0%	0%	0%	100%		100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%								
	Haltim Hills,280	280	10%	10%	10%	70%	10%	10%		100%	7%	1%	1%	0%	0%	0%	7%		100%	0%	0%	1%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%							
	Milton,1000										0%	0%	0%	0%	0%	0%	0%			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%							
	4103,112	112	4%					100%	100%	100%	0%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%						
	4105,71	71	2%					100%	100%	100%	0%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%				
	4108,15	15	1%					100%	100%	100%	0%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%			
	4110,107	107	4%					100%	100%	100%	0%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	4%	0%	0%			
	4118,17	17	1%	50%				100%		100%	0%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
	4119,132	132	5%					100%		100%	5%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
	4120,116	116	4%					100%		100%	1%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
	4123,86	86	3%					100%	70%	100%	2%	0%	0%	0%	0%	0%	70%	50%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
	4124,96	96	3%					100%	70%	100%	1%	0%	0%	0%	0%	0%	70%	70%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	4125,91	91	3%					100%	70%	100%	1%	0%	0%	0%	0%	0%	70%	70%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	4126,68	68	2%					100%	70%	100%	1%	0%	0%	0%	0%	0%	70%	70%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	4127,63	63	2%					100%	70%	100%	1%	0%	0%	0%	0%	0%	70%	70%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	4130,8	8	0%					100%	30%	100%	0%	0%	0%	0%	0%	0%	30%	30%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	4135,9	9	0%					100%	30%	100%	0%	0%	0%	0%	0%	0%	30%	30%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	4148,9	9	0%					100%	30%	100%	0%	0%	0%	0%	0%	0%	30%	30%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Oakville,152	152	5%					100%	30%	100%	0%	0%	0%	0%	0%	0%	30%	30%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Burlington,337	337	12%					100%	30%	100%	0%	0%	0%	0%	0%	0%	30%	30%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Flamborough,12	12	0%					100%	40%	100%	0%	0%	0%	0%	0%	0%	40%	40%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Dundas,31	31	1%					100%	50%	100%	0%	0%	0%	0%	0%	0%	50%	30%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Hamilton,71	71	2%					100%	50%	100%	0%	0%	0%	0%	0%	0%	50%	30%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Waterloo,23	23	1%					100%	100%	100%	1%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Cambridge,31	31	1%					100%	100%	100%	1%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	City of Guelph,92	92	3%					100%	100%	100%	3%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Guelph/Eramosa,4	4	0%					100%	100%	100%	0%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Centre Wellington,58	58	2%					100%	100%	100%	2%	0%	0%	0%	0%	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Erin,56	56	2%	10%	10%	70%	10%	10%	10%	100%	1%	0%	0%	0%	0%	0%	10%	10%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Brantford,6	6	0%					100%	30%	100%	0%	0%	0%	0%	0%	0%	30%	30%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Total	###	100%								26%	1%	1%	0%	9%	4%	27%	30%		26%	1%	1%	0%	9%	4%	27%	30%	100%											

Thu Nov 10 2022 10:21:24 GMT-0500 (Eastern Standard Time) - Run Time: 2459ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gla06_dest
Column: 2006 GTA zone of origin - gla06_orig

RowG: ColG:(4112,4116,4117,4118,4121,4145,4147,4148)
TblG:

Filters:
Start time of trip - start_time In 1500-1759
and
Trip purpose of origin - purp_orig In W,
and
Primary travel mode of trip - mode_prime In D,U,M,P,T,S
and
Planning district of destination - pd_dest In 38,

Appendix I: Traffic Signal Timings



Sixth Line & Derry Road

Colorado Springs



MOVING TRAFFIC FORWARD

Cobalt - 1 @ 2 - Econolite Type - Cobalt

Configuration Controller Sequence

Phase Ring Sequence and Assignment (MM) 1-1-1

Hardware Alternate Sequence Enable: No

Phase Ring Sequence.....(Note: Sequences identical to the prior one are not printed)

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
	B	B	B	B	B											
Sequence 1																
Ring 1	1	2	3	4	9	10	13	14	.	.	.	.	.	.	.	.
Ring 2	5	6	7	8	11	12	15	16	.	.	.	.	.	.	.	.
Sequence 2																
Ring 1	2	1	3	4	10	9	13	14	.	.	.	.	.	.	.	.
Ring 2	5	6	7	8	11	12	15	16	.	.	.	.	.	.	.	.
Sequence 3																
Ring 1	1	2	4	3	9	10	14	13	.	.	.	.	.	.	.	.
Ring 2	5	6	7	8	11	12	15	16	.	.	.	.	.	.	.	.
Sequence 4																
Ring 1	2	1	4	3	10	9	14	13	.	.	.	.	.	.	.	.
Ring 2	5	6	7	8	11	12	15	16	.	.	.	.	.	.	.	.
Sequence 5																
Ring 1	1	2	3	4	9	10	13	14	.	.	.	.	.	.	.	.
Ring 2	6	5	7	8	12	11	15	16	.	.	.	.	.	.	.	.
Sequence 6																
Ring 1	2	1	3	4	10	9	13	14	.	.	.	.	.	.	.	.
Ring 2	6	5	7	8	12	11	15	16	.	.	.	.	.	.	.	.
Sequence 7																
Ring 1	1	2	4	3	9	10	14	13	.	.	.	.	.	.	.	.
Ring 2	6	5	7	8	12	11	15	16	.	.	.	.	.	.	.	.
Sequence 8																
Ring 1	2	1	4	3	10	9	14	13	.	.	.	.	.	.	.	.
Ring 2	6	5	7	8	12	11	15	16	.	.	.	.	.	.	.	.
Sequence 9																
Ring 1	1	2	3	4	9	10	13	14	.	.	.	.	.	.	.	.
Ring 2	5	6	8	7	11	12	16	15	.	.	.	.	.	.	.	.
Sequence 10																
Ring 1	2	1	3	4	10	9	13	14	.	.	.	.	.	.	.	.
Ring 2	5	6	8	7	11	12	16	15	.	.	.	.	.	.	.	.
Sequence 11																
Ring 1	1	2	4	3	9	10	14	13	.	.	.	.	.	.	.	.
Ring 2	5	6	8	7	11	12	16	15	.	.	.	.	.	.	.	.
Sequence 12																
Ring 1	2	1	4	3	10	9	14	13	.	.	.	.	.	.	.	.
Ring 2	5	6	8	7	11	12	16	15	.	.	.	.	.	.	.	.

Sequence 13

Ring 1	| 1	2	| 3	4	| 9	10	| 13	14	| .	.	.	.	.	.	.	.
Ring 2	| 6	5	| 8	7	| 12	11	| 16	15	| .	.	.	.	.	.	.	.

Sequence 14

Ring 1	| 2	1	| 3	4	| 10	9	| 13	14	| .	.	.	.	.	.	.	.
Ring 2	| 6	5	| 8	7	| 12	11	| 16	15	| .	.	.	.	.	.	.	.

Sequence 15

Ring 1	| 1	2	| 4	3	| 9	10	| 14	13	| .	.	.	.	.	.	.	.
Ring 2	| 6	5	| 8	7	| 12	11	| 16	15	| .	.	.	.	.	.	.	.

Sequence 16

Ring 1	| 2	1	| 4	3	| 10	9	| 14	13	| .	.	.	.	.	.	.	.
Ring 2	| 6	5	| 8	7	| 12	11	| 16	15	| .	.	.	.	.	.	.	.

Phases In Use/Exclusive Ped (MM) 1-2

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Phases In Use	X	X		X	X	X		X								
Exclusive Ped																

Phase Compatibility (MM) 1-1-2

Phase	
n/a	Barrier Mode

Phase and Overlap Descriptions

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Approach	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Movement																
Associated PED																
Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Approach	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Movement																

Administration (MM) 1-7-1

Enable Controller/Cabinet Interlock CRC No
 CRC (16 bit) 32CB
 Enable Automatic Backup to Datakey No

Backup Prevent (MM) 1-1-3

Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Timing	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phases	2	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	4	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.
	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	6	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.
	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	8	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.
	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Simultaneous Gap (MM) 1-1-4

Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phase	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Must	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gap	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
With	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Phase	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	15	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Disable		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Load Switch Assignments (MM) 1-3

	Phase / Overlap	Type	Dimming				Power Up	Auto		Flash Together
			Red	Yellow	Green	Dark		Red	Yellow	
1	1	V				-	Auto	X		
2	2	V				-	Auto	X		X
3	3	V				-	Auto	X		
4	4	V				-	Auto	X		X
5	5	V				+	Auto	X		
6	6	V				+	Auto	X		X
7	7	V				+	Auto	X		
8	8	V				+	Auto	X		X
9	2	P				-	Auto			

10	4	P				-	Auto			
11	6	P				+	Auto			
12	8	P				+	Auto			
13	1	O				-	Auto	X		
14	2	O				+	Auto	X		X
15	3	O				-	Auto	X		
16	4	O				+	Auto	X		X



MOVING TRAFFIC FORWARD

Cobalt - 1 @ 2 - Econolite Type - Cobalt

Configuration Port 1 (SDLC)**Port 1 SDLC (MM) 1-4-1**

BIU	1	2	3	4	5	6	7	8
Term & Facility	X	X						
Detector Rack	X							

Enable TS2/MMU Type Cabinet: No
 Enable MMU Extended Status: Yes
 Enable SDLC Stop Time: No
 Enable 3 Critical RFE's Lockup: Yes

MMU Program (MM) 1-4-2

Channel Can Serve With Channel	
Channel 1	Channel 2

Color Check Enable (MM) 1-4-3

Enable Color Check: No

MMU/LS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Green																
Yellow																
Red																

Secondary Stations/Tests (MM) 1-4-4

ID	1	2	3	4	5	6	7	8	MMU
Term & Facility									

ID	1	2	3	4	5	6	7	8	Diag
Detector Rack									

Enable SDLC Diagnostic Test: No



MOVING TRAFFIC FORWARD

Cobalt - 1 @ 2 - Econolite Type - Cobalt

Configuration Communications 1 (SDLC)**Ethernet Port Configuration (MM) 1-5-1**

DHCP Enable: No
 Controller IP: 10.70.10.51
 Subnet Mask: 255.255.255.0
 Default Gateway IP: 10.70.10.1
 Server IP: 10.70.10.1

NTCIP (MM) 1-5-5

NTCIP Backup Time (Sec): 0
 NTCIP UDP Port: 501
 Ethernet Priority: 1
 Port 2 Priority (Port C50S for 2070): 4
 Port 3A Priority (Port C21S for 2070): 2
 Port 3B Priority (Port C22S for 2070): 3

Port Configuration (MM) 1-5-2 to 1-5-4

Port	2 (C50S)	3A (C21S)	3B (C22S)
Comm Module	FSK	Telem	Telem
Protocol	TERMINAL	NTCIP	ECPIP
Enable	No	No	No
Data Rate (BPS)	9600	19.2K	1200
Data, Parity, Stop	8 N 1	8 N 1	8 N 1
Address	0	0	0
Telemetry Response Delay	0.0	0.0	0.9
Duplex - Half or Full	Half	Full	Full
Flow Control	Yes	Yes	Yes
Group Address	0	0	0
Single Flag Enable	Yes	Yes	Yes
RTS to CTS Delay	n/a	n/a	14.0
RTS Turn Off Delay	n/a	n/a	2.0
Dropout Time	10	10	10
Early RTS	n/a	n/a	No
Telemetry Mode	n/a	n/a	FSK
ATCS Railroad	0	n/a	n/a
ATCS Railroad Line	0	n/a	n/a
ATCS Group	0	n/a	n/a
Wayside Device	0	n/a	n/a
ATC Device	0	n/a	n/a
Wayside Subnode	0	n/a	n/a
ATC Subnode	0	n/a	n/a

ECPIP (MM) 1-5-6

Controller Address: 0
 Expanded System Detector Address:0

**System Detector
Assignment**

System Detector	Local Detector
----------------------------	---------------------------

Wireless Configuration (MM) 1-5-7

Wireless Channel Number: 6

Wireless Access Code: 327723274



MOVING TRAFFIC FORWARD

Cobalt - 1 @ 2 - Econolite Type - Cobalt

Configuration Logging / Display**Event Logging (MM) 1-6-1**

Critical RFE's (MMU/TF)	Yes	3 Critical Errors Within 24 Hours	Yes
MMU Flash Faults	Yes	Local Flash Fault	Yes
Non-Critical RFE's (Det/Test)	Yes	Detector Errors	Yes
Coordination Errors	Yes	Controller Download	Yes
Preemption Events	Yes	TSP Events	Yes
Power On/Off	Yes	Low Battery	Yes
Access	Yes	Data Change	Yes
Online / Offline	Yes		

Alarm Event	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Enable Logging	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Display Options (MM) 1-7-2

Key Click Enable:	Yes
Switch to Graphics Mode:	No
LED Mode:	Auto
Display Mode:	Basic
Trans Mode Pop-Up Disable:	No

Sign On (MM) 8-5

Sign On Message Line 1: Dual Walk Term & Call Next Thru
 Sign On Message Line 2:

Software Modules (MM) 8-7

Application Version: 32.66.10
 OS (Boot) Version: 06.07.00



MOVING TRAFFIC FORWARD

Cobalt - 1 @ 2 - Econolite Type - Cobalt

Logic Processor Page 1
Logic Statement Control (MM) 1-8-1

Logic #	Statement Control
---------	-------------------



MOVING TRAFFIC FORWARD

Cobalt - 1 @ 2 - Econolite Type - Cobalt

Logic Processor Page 2

Logic Statements (MM) 1-8-2



MOVING TRAFFIC FORWARD

Cobalt - 1 @ 2 - Econolite Type - Cobalt

Controller Timing Plan (MM) 2-1

Plan 1 - ""

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Min Green	7	25	0	10	7	25	0	10	5	5	5	5	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	7	0	10	0	7	0	10	0	10	0	10	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	14	0	16	0	14	0	16	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	3.0	5.0	3.0	3.5	3.0	5.0	3.0	3.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	20	65	0	26	20	65	0	26	35	35	35	35	35	35	35	35
Max2	12	50	0	23	12	50	0	23	40	40	40	40	40	40	40	40
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	1.0	2.2	0.0	2.3	1.0	2.2	0.0	2.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Plan 2 - ""

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Min Green	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	16	0	16	0	16	0	16	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Max2	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Plan 3 - ""

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Min Green	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	16	0	16	0	16	0	16	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Max2	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Plan 4 - ""

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Direction	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Min Green	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Bk Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear	0	16	0	16	0	16	0	16	0	16	0	16	0	16	0	16
Ped Clear 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clear Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Ext	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Ext 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max1	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Max2	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Max3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DYM Max	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dym Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Red Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Act B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec/Act	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Int	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time B4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars Wt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STPTDuc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TTReduc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Date: 9-Jul-2018

Intersection: Derry Road & Fifth Line

8 Phase Basic Timing Sheet												
	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use	X	X		X	X	X		X	x	x	x	x
Direction	WBLT	EB		SB	EBLT	WB		NB				
Min Green	5	20		10	5	20		10				
Veh Ext.	-	3.5		3.5	-	3.5		3.5				
Yellow	3	4.6		4.6	3	4.6		4.6				
Red	1	3		3	1	3		3				
Walk	-	7		7	-	7		7				
Don't Walk	-	15		23	-	15		23				
Max 1	15	40		25	15	40		25				
Max 2												
Max 3												
Veh Recall												
Ped Recall												
Notes:	Check timings in controller											
	Sync Reference to 3:15											

<p>Pattern 1 Time: 6:00 Cycle Length: 120 Offset (%): 70%</p> <table border="0"> <tr> <td>Direction</td> <td>WBLT</td> <td>EB</td> <td>3</td> <td>SB</td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td>0</td> <td>4</td> </tr> <tr> <td>%</td> <td>9</td> <td>68</td> <td>0</td> <td>23</td> </tr> <tr> <td>Direction</td> <td>EBLT</td> <td>WB</td> <td>7</td> <td>NB</td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td>0</td> <td>8</td> </tr> <tr> <td>%</td> <td>9</td> <td>68</td> <td>0</td> <td>23</td> </tr> </table>	Direction	WBLT	EB	3	SB	Phase	1	2	0	4	%	9	68	0	23	Direction	EBLT	WB	7	NB	Phase	5	6	0	8	%	9	68	0	23	<p>Pattern 2 Time: Cycle Length: Offset (%):</p> <table border="0"> <tr> <td>Direction</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Phase</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>%</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Direction</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>Phase</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>%</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Direction	1	2	3	4	Phase					%					Direction	5	6	7	8	Phase					%				
Direction	WBLT	EB	3	SB																																																									
Phase	1	2	0	4																																																									
%	9	68	0	23																																																									
Direction	EBLT	WB	7	NB																																																									
Phase	5	6	0	8																																																									
%	9	68	0	23																																																									
Direction	1	2	3	4																																																									
Phase																																																													
%																																																													
Direction	5	6	7	8																																																									
Phase																																																													
%																																																													
<p>Pattern 3 Time: 15:15 Cycle Length: 120 Offset (%): 4%</p> <table border="0"> <tr> <td>Direction</td> <td>WBLT</td> <td>EB</td> <td>3</td> <td>SB</td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td>0</td> <td>4</td> </tr> <tr> <td>%</td> <td>9</td> <td>68</td> <td>0</td> <td>23</td> </tr> <tr> <td>Direction</td> <td>EBLT</td> <td>WB</td> <td>7</td> <td>NB</td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td>0</td> <td>8</td> </tr> <tr> <td>%</td> <td>9</td> <td>68</td> <td>0</td> <td>23</td> </tr> </table>	Direction	WBLT	EB	3	SB	Phase	1	2	0	4	%	9	68	0	23	Direction	EBLT	WB	7	NB	Phase	5	6	0	8	%	9	68	0	23	<p>Pattern 4 Time: Cycle Length: Offset (%):</p> <table border="0"> <tr> <td>Direction</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Phase</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>%</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Direction</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>Phase</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>%</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Direction	1	2	3	4	Phase					%					Direction	5	6	7	8	Phase					%				
Direction	WBLT	EB	3	SB																																																									
Phase	1	2	0	4																																																									
%	9	68	0	23																																																									
Direction	EBLT	WB	7	NB																																																									
Phase	5	6	0	8																																																									
%	9	68	0	23																																																									
Direction	1	2	3	4																																																									
Phase																																																													
%																																																													
Direction	5	6	7	8																																																									
Phase																																																													
%																																																													
<p>Pattern 5 Time: 09:30, 18:30 Cycle Length: Local Offset (%):</p> <table border="0"> <tr> <td>Direction</td> <td>WBLT</td> <td>EB</td> <td>3</td> <td>SB</td> </tr> <tr> <td>Phase</td> <td>1</td> <td>2</td> <td></td> <td>4</td> </tr> <tr> <td>%</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Direction</td> <td>EBLT</td> <td>WB</td> <td>7</td> <td>NB</td> </tr> <tr> <td>Phase</td> <td>5</td> <td>6</td> <td></td> <td>8</td> </tr> <tr> <td>%</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Direction	WBLT	EB	3	SB	Phase	1	2		4	%					Direction	EBLT	WB	7	NB	Phase	5	6		8	%					<p>Pattern 6 Time: Cycle Length: Offset (%):</p> <table border="0"> <tr> <td>Direction</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Phase</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>%</td> <td></td> <td>x</td> <td></td> <td>x</td> </tr> <tr> <td>Direction</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>Phase</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>%</td> <td></td> <td>x</td> <td></td> <td>x</td> </tr> </table>	Direction	1	2	3	4	Phase					%		x		x	Direction	5	6	7	8	Phase					%		x		x
Direction	WBLT	EB	3	SB																																																									
Phase	1	2		4																																																									
%																																																													
Direction	EBLT	WB	7	NB																																																									
Phase	5	6		8																																																									
%																																																													
Direction	1	2	3	4																																																									
Phase																																																													
%		x		x																																																									
Direction	5	6	7	8																																																									
Phase																																																													
%		x		x																																																									



Date: 9-Jul-2018

Intersection: Derry Rd & James Snow Pkwy

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use	X	X	X	X	X	X	X	X	X	x	x	x
Direction	WBL	EB	NBL	SB	EBL	WB	SBL	NB				
Min Green	5	20	5	8	10	20	5	8				
Veh Ext.	3.0	3.5	3.0	3.0	3.0	3.5	3.0	3.0				
Yellow	3	3.7	3	4.2	3	3.7	3	4.2				
Red	1	3	1	3	2	3	1	3				
Walk		7		7		7		7				
Don't Walk		29		28		29		28				
Max 1	15	40	15	25	15	40	15	25				
Max 2												
Max 3												
Veh Recall		x				x						
Ped Recall												
Notes:	<p>Local Zero Override' in use. Sync Reference to 3:15</p>											

Pattern 1 Time: 6:00 Cycle Length: 120 Offset (%): 58%					Pattern 2 Time: 9:30, 18:30 Cycle Length: 110 Offset (%): 59%				
Direction	WBL	EB	NBL	SB	Direction	WBL	EB	NBL	SB
Phase	1	2	3	4	Phase	1	2	3	4
%	0	34	9	57	%	10	25	10	55
Direction	EBL	WB	SBL	NB	Direction	EBL	WB	SBL	NB
Phase	5	6	7	8	Phase	5	6	7	8
%	14	20	46	20	%	10	25	45	20
Pattern 3 Time: 15:15 Cycle Length: 120 Offset (%): 58%					Pattern 4 Time: Weekend, 07:00-19:00 Cycle Length: 110 Offset (%): 59%				
Direction	WBL	EB	NBL	SB	Direction	WBL	EB	NBL	SB
Phase	1	2	3	4	Phase	1	2	3	4
%	10	36	12	42	%	10	25	10	55
Direction	EBL	WB	SBL	NB	Direction	EBL	WB	SBL	NB
Phase	5	6	7	8	Phase	5	6	7	8
%	10	36	36	18	%	10	25	45	20
Pattern 5 Time: 21:00 Cycle Length: Local Offset (%):					Pattern 6 Time: Cycle Length: Offset (%):				
Direction	WBL	EB	NBL	SB	Direction				
Phase	1	2	3	4	Phase	1	2	3	4
%					%		x		x
Direction	EBL	WB	SBL	NB	Direction				
Phase	5	6	7	8	Phase	5	6	7	8
%					%		x		x

Appendix J: Synchro Worksheets



HCM Signalized Intersection Capacity Analysis

1: Sixth Line & Derry Road

Existing (AM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	51	1798	125	14	640	6	60	57	20	15	94	106	
Traffic Volume (vph)	51	1798	125	14	640	6	60	57	20	15	94	106	
Future Volume (vph)	51	1798	125	14	640	6	60	57	20	15	94	106	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	
Total Lost time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.96	1.00	0.92	1.00	
Flt Protected	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.92	1.00	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.96	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1704	3163	1745	2972	1745	2972	1745	1804	1216	1216	1725	1725	
Flt Permitted	0.36	1.00	0.06	1.00	0.06	1.00	0.38	1.00	0.70	1.00	0.70	1.00	
Satd. Flow (perm)	641	3163	101	2972	696	1804	696	1804	901	1725	1725	1725	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	54	1913	133	15	681	6	64	61	21	16	100	113	
RTOR Reduction (vph)	0	3	0	0	0	0	0	1.3	0	0	41	0	
Lane Group Flow (vph)	54	2043	0	15	687	0	64	69	0	16	172	0	
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%	
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	NA	NA	NA	Perm	NA	NA	
Permitted Phases	5	2	6	1	6	8	8	8	4	4	4	4	
Prohibited Phases	2												
Actuated Green, G (s)	81.1	75.4	75.3	72.5	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	
Effective Green, g (s)	81.1	75.4	75.3	72.5	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3	
Actuated q/C Ratio	0.73	0.68	0.68	0.65	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	522	2148	109	1941	102	264	132	253					
V/S Ratio Prot	c0.01	c0.65	0.00	0.23	0.00	0.04	0.04	0.04	0.04	0.02	0.02	c0.10	
V/S Ratio Perm	0.07		0.09		0.09		0.09		0.09		0.02		
v/c Ratio	0.10	0.95	0.14	0.35	0.63	0.26	0.12	0.68	0.26	0.12	0.68	0.68	
Uniform Delay, d1	4.4	16.1	15.0	8.7	44.5	42.0	41.1	44.9	42.0	41.1	44.9	44.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	10.9	0.6	0.5	11.5	0.5	0.4	7.3	0.5	0.4	7.3	7.3	
Delay (s)	4.4	27.0	15.6	9.2	56.0	42.5	41.5	52.2	42.5	41.5	52.2	52.2	
Level of Service	A	C	B	A	E	D	D	D	D	D	D	D	
Approach Delay (s)	26.5		9.3		48.4		48.4		48.4		51.4		
Approach LOS	C		A		D		D		D		D		
Intersection Summary													
HCM 2000 Control Delay	25.5											HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88												
Actuated Cycle Length (s)	111.0											Sum of lost time (s)	16.5
Intersection Capacity Utilization	89.1%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

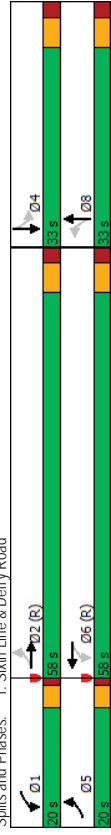
12-14-2023 BA Group

Synchro 11 Report

Existing (AM)

1: Sixth Line & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	51	1798	14	640	60	57	20	15	94	106		
Traffic Volume (vph)	51	1798	14	640	60	57	20	15	94	106		
Future Volume (vph)	51	1798	14	640	60	57	20	15	94	106		
Lane Group Flow (vph)	54	2046	15	687	64	82	16	213				
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	NA	NA
Protected Phases	5	2	1	6	8	8	8	4	4	4	4	4
Permitted Phases	2											
Detector Phase	5	2	1	6	8	8	8	4	4	4	4	4
Switch Phase	5	2	1	6	8	8	8	4	4	4	4	4
Minimum Initial (s)	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Total Split (s)	20.0	58.0	20.0	58.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (%)	18.0%	52.3%	18.0%	52.3%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
v/c Ratio	0.10	0.92	0.08	0.35	0.63	0.29	0.12	0.72	0.29	0.12	0.72	0.72
Control Delay	4.6	24.9	5.4	10.2	69.5	35.3	40.3	48.4	35.3	40.3	48.4	48.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.6	24.9	5.4	10.2	69.5	35.3	40.3	48.4	35.3	40.3	48.4	48.4
Queue Length 50th (m)	2.5	153.2	0.7	35.2	13.9	13.7	3.2	36.5	13.7	3.2	36.5	36.5
Queue Length 95th (m)	7.2	#327.7	2.9	56.4	27.7	26.6	9.3	58.7	26.6	9.3	58.7	58.7
Internal Link Dist (m)	475.1		256.2		211.8		201.7		211.8		201.7	
Turn Bay Length (m)	120.0	100.0	45.0		30.0		30.0		30.0		30.0	
Base Capacity (vph)	639	2217	313	1961	167	445	216	451	167	445	216	451
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.92	0.05	0.35	0.38	0.18	0.07	0.47	0.38	0.18	0.07	0.47
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 140												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



12-14-2023 BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

2: Fifth Line & Derry Road

Existing (AM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	
Traffic Volume (vph)	36	1829	82	53	631	122	58	34	54	91	42	14	
Future Volume (vph)	36	1829	82	53	631	122	58	34	54	91	42	14	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.91	1.00	0.96	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1547	3263	1534	3194	1642	1618	1642	1618	1451	1735	1642	1735	
Flt Permitted	0.33	1.00	0.05	1.00	0.72	1.00	0.72	1.00	0.70	1.00	0.70	1.00	
Satd. Flow (perm)	540	3263	76	3194	1241	1618	1241	1618	1064	1735	1241	1735	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	38	1946	87	56	671	130	62	36	57	97	45	15	
RTOR Reduction (vph)	0	2	0	0	11	0	0	49	0	0	10	0	
Lane Group Flow (vph)	38	2031	0	56	790	0	62	44	0	97	50	14	
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	14%	
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	2	
Turn Type	pm+pt	NA	NA	pm+pt	NA	NA	Perm	NA	Perm	NA	Perm	NA	
Permitted Phases	5	2	2	1	6	6	8	8	4	4	4	4	
Prohibited Phases	2												
Actuated Green, G (s)	87.4	83.2	90.2	84.6	162	162	162	162	16.2	16.2	16.2	16.2	
Effective Green, g (s)	87.4	83.2	90.2	84.6	162	162	162	162	16.2	16.2	16.2	16.2	
Actuated q/C Ratio	0.73	0.69	0.75	0.70	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	
Clearance Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	428	2262	125	2251	167	218	167	218	143	234	143	234	
V/S Ratio Prot	0.00	0.02	0.02	0.25	0.02	0.03	0.02	0.03	0.03	0.03	0.03	0.03	
V/S Ratio Perm	0.06	0.31	0.31	0.05	0.05	0.05	0.05	0.05	0.09	0.09	0.09	0.09	
v/c Ratio	0.09	0.90	0.45	0.35	0.37	0.20	0.37	0.20	0.68	0.21	0.68	0.21	
Uniform Delay, d1	4.6	14.9	18.7	6.9	47.3	46.1	49.4	46.2	46.2	46.2	46.2	46.2	
Progression Factor	0.60	0.51	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	4.5	2.5	0.4	1.4	0.5	1.4	0.5	12.1	0.5	12.1	0.5	
Delay (s)	2.8	12.1	21.3	7.4	48.7	46.6	48.7	46.6	61.5	46.7	61.5	46.7	
Level of Service	A	B	C	A	D	D	D	D	E	D	E	D	
Approach Delay (s)	12.0			8.3			47.4				55.8		
Approach LOS	B			A			D				E		
Intersection Summary													
HCM 2000 Control Delay	14.8											HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	15.0
Intersection Capacity Utilization	74.0%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

12-14-2023

BA Group

Synchro 11 Report

Existing (AM)

2: Fifth Line & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	1829	82	53	631	122	58	34	54	91	42	14
Future Volume (vph)	36	1829	82	53	631	122	58	34	54	91	42	14
Lane Group Flow (vph)	38	2033	56	801	62	93	97	60	60	60	60	60
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	2	1	6	6	8	8	4	4	4	4
Permitted Phases	2											
Detector Phase	5	2	2	1	6	6	8	8	4	4	4	4
Switch Phase	5	2	2	1	6	6	8	8	4	4	4	4
Minimum Initial (s)	7.0	20.0	7.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	34.3	11.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	11.0	81.0	11.0	81.0	81.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	9.2%	67.5%	9.2%	67.5%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.08	0.89	0.39	0.35	0.37	0.35	0.37	0.35	0.68	0.25	0.68	0.25
Control Delay	2.5	13.6	20.0	7.7	52.1	23.5	23.5	23.5	23.5	23.5	23.5	23.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.5	13.6	20.0	7.7	52.1	23.5	23.5	23.5	23.5	23.5	23.5	23.5
Queue Length 50th (m)	1.2	246.3	2.6	38.1	14.2	8.0	23.2	10.7	10.7	10.7	10.7	10.7
Queue Length 95th (m)	m1.6	#324.5	14.4	58.0	27.1	22.9	40.4	22.8	22.8	22.8	22.8	22.8
Internal Link Dist (m)	354.1											
Turn Bay Length (m)	100.0											
Base Capacity (vph)	468	2288	143	2306	230	347	197	332	332	332	332	332
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.89	0.39	0.35	0.27	0.27	0.27	0.27	0.49	0.18	0.49	0.18
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 130												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												

Spills and Phases: 2: Fifth Line & Derry Road



12-14-2023

BA Group

Synchro 11 Report

3. James Snow Parkway & Derry Road

Existing (AM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Traffic Volume (vph)	173	1526	28	62	492	149	22	250	165	256	348	168
Future Volume (vph)	173	1526	28	62	492	149	22	250	165	256	348	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	5.3	5.3	5.3	5.3	4.0	5.7	4.0	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp. ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98
Frbp. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3285	3438	1544	1680	3305	1499	1741	3202	1569	1562	3046	1388
Flt Permitted	0.95	1.00	1.00	0.08	1.00	1.00	0.54	1.00	1.00	1.00	0.40	1.00
Satd. Flow (perm)	3285	3438	1544	145	3305	1499	988	3202	1569	658	3046	1388
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	177	1557	29	63	502	152	22	255	168	261	355	171
RTOR Reduction (vph)	0	0	13	0	0	90	0	0	145	0	0	119
Lane Group Flow (vph)	177	1557	16	63	502	62	22	255	23	261	355	52
Conf. Peds. (#/hr)	1					1	6					6
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Type	Prot	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		6	6	3	8		8	7	4	
Permitted Phases	5	2		6	6	3	8		8	7	4	
Actuated Green, G (s)	11.8	64.6	64.6	48.8	48.8	20.6	16.4	16.4	44.4	36.2	36.2	36.2
Effective Green, g (s)	11.8	64.6	64.6	48.8	48.8	20.6	16.4	16.4	44.4	36.2	36.2	36.2
Actuated g/C Ratio	0.10	0.54	0.54	0.41	0.41	0.17	0.14	0.14	0.37	0.30	0.30	0.30
Clearance Time (s)	4.0	5.3	5.3	5.3	5.3	4.0	5.7	4.0	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	323	1850	831	58	1344	609	195	437	214	424	918	418
v/s Ratio Prot	0.05	c0.45		0.15		0.00	0.08		c0.12	0.12		
v/s Ratio Perm	0.55	0.84	0.02	1.09	0.37	0.10	0.11	0.58	0.11	0.62	0.39	0.12
Uniform Delay, d1	51.6	23.4	12.9	35.6	24.9	22.0	41.7	48.6	45.4	28.8	33.1	30.4
Progression Factor	1.00	1.00	1.00	1.00	0.97	2.45	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	4.8	0.0	141.5	0.8	0.3	0.3	2.0	0.2	2.7	0.3	0.1
Delay (s)	53.5	28.2	13.0	177.0	24.8	54.2	42.0	50.6	45.6	31.5	33.4	30.5
Level of Service	D	C	B	F	C	D	D	D	D	D	C	C
Approach Delay (s)	30.5			44.4			48.3			32.1		
Approach LOS	C			D			D			D		C
Intersection Summary												
HCM 2000 Control Delay	35.7 HCM 2000 Level of Service D											
HCM 2000 Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	98.3%											
Sum of lost time (s)	19.0											
ICU Level of Service	F											
Analysis Period (min)	15											
c Critical Lane Group												

Synchro 11 Report

12-14-2023
BA Group

3. James Snow Parkway & Derry Road

Existing (AM)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Traffic Volume (vph)	173	1526	28	62	492	149	22	250	165	256	348	168
Future Volume (vph)	173	1526	28	62	492	149	22	250	165	256	348	168
Lane Group Flow (vph)	177	1557	29	63	502	152	22	255	168	261	355	171
Turn Type	Prot	NA	Perm	NA	Perm	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		6	6	3	8		8	7	4	
Permitted Phases	5	2		6	6	3	8		8	7	4	
Detector Phase	5	2		6	6	3	8		8	7	4	
Switch Phase	5	2		6	6	3	8		8	7	4	
Minimum Initial (s)	7.0	20.0	20.0	20.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	34.3	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	41.0	41.0	24.0	24.0	24.0	11.0	24.0	24.0	55.0	68.0	68.0
Total Split (%)	14.2%	34.2%	34.2%	20.0%	20.0%	20.0%	9.2%	20.0%	20.0%	45.8%	56.7%	56.7%
Yellow Time (s)	3.0	3.7	3.7	3.7	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.6	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	5.3	5.3	4.0	5.7	4.0	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None	None
v/c Ratio	0.55	0.82	0.03	1.03	0.36	0.21	0.09	0.65	0.49	0.62	0.39	0.32
Control Delay	57.8	28.2	0.1	166.0	26.0	12.3	24.1	57.6	12.0	33.9	34.0	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.8	28.2	0.1	166.0	26.0	12.3	24.1	57.6	12.0	33.9	34.0	5.7
Queue Length 50th (m)	21.9	156.5	0.0	-15.6	46.2	7.4	3.5	32.1	0.0	49.0	39.0	0.0
Queue Length 95th (m)	32.9	255.8	0.0	45.2	76.8	28.9	7.7	45.0	20.0	61.3	46.1	14.9
Internal Link Dist (m)	156.1			305.1			381.6			213.2		
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	115.0	95.0	115.0	115.0
Base Capacity (vph)	367	1897	895	61	1390	718	237	491	382	669	1581	802
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.82	0.03	1.03	0.36	0.21	0.09	0.52	0.44	0.39	0.22	0.21
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBT and 6WBTL, Start of Green												
Natural Cycle: 95												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
Spills and Phases: 3. James Snow Parkway & Derry Road												
BA Group												

Synchro 11 Report

12-14-2023
BA Group

HCM Signalized Intersection Capacity Analysis

1: Sixth Line & Derry Road

Existing (PM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	113	1528	71	21	1553	9	164	116	28	69	108	92
Future Volume (vph)	113	1528	71	21	1553	9	164	116	28	69	108	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5
Total Lost time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.93	1.00
Satd. Flow (prot)	1690	3082	1671	3271	1745	1815	1721	1737	1721	1737	1737	1737
Flt Permitted	0.06	1.00	0.08	1.00	0.49	1.00	0.61	1.00	0.61	1.00	0.61	1.00
Satd. Flow (perm)	107	3082	149	3271	900	1815	1114	1737	1114	1737	1737	1737
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	116	1575	73	22	1601	9	169	120	29	71	111	95
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	29
Lane Group Flow (vph)	116	1646	0	22	1610	0	169	141	0	71	177	0
Heavy Vehicles (%)	2%	3%	0%	4%	2%	22%	0%	1%	0%	1%	1%	1%
Bus Blockages (#/hr)	3	58	0	1	37	2	0	2	0	1	2	1
Turn Type	pm+pl	NA	NA	pm+pl	NA	NA	NA	NA	NA	Perm	NA	NA
Permitted Phases	5	2		1	6		8		8		4	
Prohibited Phases	2			6			8		8		4	
Actuated Green, G (s)	75.5	68.7		65.3	62.5		23.0	23.0	23.0		23.0	
Effective Green, g (s)	75.5	68.7		65.3	62.5		23.0	23.0	23.0		23.0	
Actuated q/C Ratio	0.68	0.62		0.59	0.56		0.21	0.21	0.21		0.21	
Clearance Time (s)	4.0	6.2		4.0	6.2		6.3	6.3	6.3		6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	201	1907		126	1841		186	376	230		359	
v/s Ratio Prot	c0.05	c0.53		0.00	0.49		0.08	0.08	0.08		0.10	
v/s Ratio Perm	0.35			0.10			c0.19				0.06	
v/c Ratio	0.58	0.86		0.17	0.87		0.91	0.38	0.31		0.49	
Uniform Delay, d1	20.7	17.3		13.1	20.9		43.0	37.8	37.3		38.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	4.0	5.5		0.7	6.1		40.6	0.6	0.8		1.1	
Delay (s)	C	C		B	C		F	D	D		D	
Level of Service	C	C		B	C		F	D	D		D	
Approach Delay (s)	22.9			26.8			62.5		62.5		39.4	
Approach LOS	C	C		C			E		E		D	
Intersection Summary												
HCM 2000 Control Delay	28.8											C
HCM 2000 Volume to Capacity ratio	0.87											C
Actuated Cycle Length (s)	111.0											Sum of lost time (s)
Intersection Capacity Utilization	89.7%											ICU Level of Service
Analysis Period (min)	15											E
c Critical Lane Group												

12-14-2023 BA Group

Synchro 11 Report

Existing (PM)

1: Sixth Line & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	113	1528	71	21	1553	9	164	116	28	69	108	92
Future Volume (vph)	113	1528	71	21	1553	9	164	116	28	69	108	92
Lane Group Flow (vph)	116	1648	22	1610	169	149	71	206				
Turn Type	pm+pl	NA	NA	pm+pl	NA	NA	NA	NA	Perm	NA	NA	NA
Protected Phases	5	2		1	6		8		8		4	
Permitted Phases	2			6			8		8		4	
Detector Phase	5	2		1	6		8		8		4	
Switch Phase	5	2		1	6		8		8		4	
Minimum Initial (s)	7.0	25.0		7.0	25.0		10.0	10.0	10.0		10.0	
Minimum Split (s)	11.0	31.2		11.0	31.2		32.3	32.3	32.3		32.3	
Total Split (s)	20.0	58.0		20.0	58.0		33.0	33.0	33.0		33.0	
Total Spill (%)	18.0%	52.3%		18.0%	52.3%		29.7%	29.7%	29.7%		29.7%	
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0		4.0	
All-Red Time (s)	1.0	2.2		1.0	2.2		2.3	2.3	2.3		2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	
Total Lost Time (s)	4.0	6.2		4.0	6.2		6.3	6.3	6.3		6.3	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes		Yes	Yes
Recall Mode	None	C-Min		None	C-Min		None	None	None		None	None
v/c Ratio	0.57	0.83		0.11	0.87		0.91	0.39	0.31		0.53	
Control Delay	27.7	22.7		7.8	29.0		88.4	37.3	39.5		36.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	27.7	22.7		7.8	29.0		88.4	37.3	39.5		36.2	
Queue Length 50th (m)	9.7	132.6		1.5	164.0		36.7	26.6	13.4		33.3	
Queue Length 95th (m)	28.7	#245.6		4.2	#245.2		#73.2	45.3	26.7		56.2	
Internal Link Dist (m)		475.1			256.2			211.8			201.7	
Turn Bay Length (m)	120.0			100.0			45.0		30.0			
Base Capacity (vph)	302	1974		324	1841		216	444	267		445	
Starvation Cap Reductn	0	0		0	0		0	0	0		0	
Spillback Cap Reductn	0	0		0	0		0	0	0		0	
Storage Cap Reductn	0	0		0	0		0	0	0		0	
Reduced v/c Ratio	0.38	0.83		0.07	0.87		0.78	0.34	0.27		0.46	
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 100												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
Spills and Phases: 1: Sixth Line & Derry Road												



12-14-2023 BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road

Existing (PM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Traffic Volume (vph)	19	1440	61	46	1671	92	132	45	89	183	42	26	
Future Volume (vph)	19	1440	61	46	1671	92	132	45	89	183	42	26	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Flt Protected	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.94	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1745	3246	1745	3338	1745	3338	1637	1666	1415	1623	1415	1623	
Flt Permitted	0.06	1.00	0.07	1.00	0.07	1.00	0.71	1.00	0.62	1.00	0.62	1.00	
Satd. Flow (perm)	105	3246	129	3338	129	3338	1225	1666	977	1623	977	1623	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	20	1516	64	48	1759	97	139	47	94	193	44	27	
RTOR Reduction (vph)	0	3	0	0	4	0	0	56	0	0	17	0	
Lane Group Flow (vph)	20	1577	0	48	1852	0	139	85	0	193	54	0	
Heavy Vehicles (%)	0%	2%	0%	0%	1%	15%	4%	0%	4%	12%	9%	8%	
Bus Blockages (#/hr)	0	39	0	0	26	14	6	0	4	23	4	2	
Turn Type	pm+pl	NA	NA	pm+pl	NA	NA	Perm	NA	NA	Perm	NA	NA	
Permitted Phases	5	2		1	6		8		8		4		
Prohibited Phases	2			6			8		4				
Actuated Green, G (s)	72.6	69.8		78.2	72.6		29.6	29.6	29.6		29.6	29.6	
Effective Green, g (s)	72.6	69.8		78.2	72.6		29.6	29.6	29.6		29.6	29.6	
Actuated q/C Ratio	0.60	0.58		0.65	0.60		0.25	0.25	0.25		0.25	0.25	
Clearance Time (s)	4.0	5.3		4.0	5.3		5.7	5.7	5.7		5.7	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	101	1888		159	2019		302	410	228		400		
v/s Ratio Prot	0.00	0.49		c0.01	c0.56		0.11	0.05			0.03		
v/s Ratio Perm	0.11			0.18			0.11				c0.21		
v/c Ratio	0.20	0.84		0.30	0.92		0.46	0.21			0.85	0.13	
Uniform Delay, d1	19.7	20.4		15.7	21.0		38.4	35.9			43.0	35.2	
Progression Factor	1.44	1.26		1.00	1.00		1.00	1.00			1.00	1.00	
Incremental Delay, d2	0.4	2.1		1.1	8.1		1.1	0.3			24.0	0.2	
Delay (s)	28.9	27.8		16.8	29.2		39.5	36.1			67.1	35.4	
Level of Service	C	C		B	C		D	D			E	D	
Approach Delay (s)	27.8			28.9			37.8				58.5		
Approach LOS	C			C			D				E		
Intersection Summary													
HCM 2000 Control Delay	31.0											HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	15.0
Intersection Capacity Utilization	81.5%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

12-14-2023
 BA Group
 Synchro 11 Report

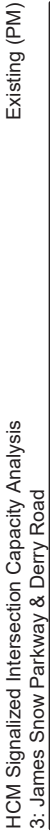
Existing (PM)
 2: Fifth Line & Derry Road

Existing (PM)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	19	1440	46	1671	92	132	45	89	183	42	26	
Future Volume (vph)	19	1440	46	1671	92	132	45	89	183	42	26	
Lane Group Flow (vph)	20	1580	48	1856	139	141	193	71				
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	NA	NA
Protected Phases	5	2		1	6		8		8		4	
Permitted Phases	2			6			8		4			
Detector Phase	5	2		1	6		8		8		4	
Switch Phase	5	2		1	6		8		8		4	
Minimum Initial (s)	7.0	20.0		7.0	20.0		10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	11.0	34.3		11.0	34.3		34.7	34.7	34.7		34.7	34.7
Total Split (s)	11.0	81.0		11.0	81.0		28.0	28.0	28.0		28.0	28.0
Total Split (%)	9.2%	67.5%		9.2%	67.5%		23.3%	23.3%	23.3%		23.3%	23.3%
Yellow Time (s)	3.0	3.7		3.0	3.7		3.7	3.7	3.7		3.7	3.7
All-Red Time (s)	1.0	1.6		1.0	1.6		2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	5.3		4.0	5.3		5.7	5.7	5.7		5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes		Yes	Yes
Recall Mode	None	C-Min		None	C-Min		None	None	None		None	None
v/c Ratio	0.12	0.83		0.27	0.89		0.46	0.30	0.85		0.17	0.17
Control Delay	8.5	27.2		9.5	25.6		46.5	21.6	75.6		28.5	28.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	8.5	27.2		9.5	25.6		46.5	21.6	75.6		28.5	28.5
Queue Length 50th (m)	2.4	136.3		4.3	196.3		27.4	12.2	42.7		8.7	8.7
Queue Length 95th (m)	m1.2	m82.8		6.1	228.5		54.9	33.9	#103.2		23.9	23.9
Internal Link Dist (m)	354.1											
Turn Bay Length (m)	100.0											
Base Capacity (vph)	163	2050		179	2109		302	466	228		417	417
Starvation Cap Reductn	0	0		0	0		0	0	0		0	0
Spillback Cap Reductn	0	0		0	0		0	0	0		0	0
Storage Cap Reductn	0	0		0	0		0	0	0		0	0
Reduced v/c Ratio	0.12	0.77		0.27	0.88		0.46	0.30	0.85		0.17	0.17
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 110												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												
Spills and Phases: 2: Fifth Line & Derry Road												
12-14-2023												
BA Group												
Synchro 11 Report												

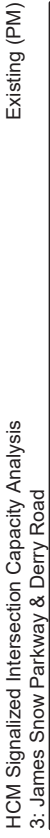
HCM Signalized Intersection Capacity Analysis

Existing (PM)



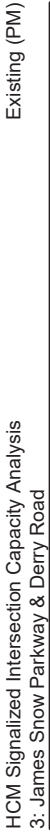
3: James Snow Parkway & Derry Road

Existing (PM)



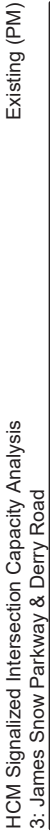
3: James Snow Parkway & Derry Road

Existing (PM)



3: James Snow Parkway & Derry Road

Existing (PM)



3: James Snow Parkway & Derry Road

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Traffic Volume (vph)	177	1075	15	239	1217	373	73	311	170	275
Future Volume (vph)	177	1075	15	239	1217	373	73	311	170	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.6	3.5	3.3	3.6	3.5	3.3	3.6	3.5	3.5
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	4.0	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Fpb. ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Fpb. pd/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3331	3376	1481	1731	3453	1443	879	3428	1473	3346
Flt Permitted	0.95	1.00	1.00	0.10	1.00	0.50	1.00	1.00	0.32	1.00
Satd. Flow (perm)	3331	3376	1481	177	3453	1443	879	3428	1473	3346
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	184	1120	16	249	1268	389	76	324	177	286
R/TOR Reduction (vph)	184	1120	5	249	1268	231	76	324	26	286
Heavy Vehicles (%)	1%	2%	6%	0%	1%	4%	4%	3%	4%	2%
Bus Blockages (#/hr)	3	23	1	2	17	15	3	11	7	6
Turn Type	Prot	MA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt
Protected Phases	5	2		1	6	6	8	8	7	4
Permitted Phases										
Actuated Green, G (s)	11.5	37.1	37.1	64.0	48.5	48.5	25.0	17.5	17.5	45.0
Effective Green, g (s)	11.5	37.1	37.1	64.0	48.5	48.5	25.0	17.5	17.5	45.0
Actuated g/C Ratio	0.10	0.31	0.31	0.53	0.40	0.40	0.21	0.15	0.15	0.38
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	4.0	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	319	1043	457	390	1395	583	231	499	214	428
v/s Ratio Prot	0.06	c0.33		c0.12	c0.37		0.02	0.09	c0.13	0.13
v/s Ratio Perm	0.58	1.07	0.01	0.64	0.91	0.40	0.33	0.65	0.12	0.67
Uniform Delay, d1	51.9	41.5	28.7	28.4	33.7	25.4	39.4	44.6	28.8	35.7
Progression Factor	1.00	1.00	1.00	0.76	1.15	1.76	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	49.9	0.0	1.8	5.8	1.0	0.8	2.9	0.3	3.9
Delay (s)	54.4	91.4	28.8	23.3	44.4	45.6	40.2	51.3	44.8	32.7
Level of Service	D	F	C	C	D	D	D	D	D	C
Approach Delay (s)		85.5		41.9			47.8		34.2	
Approach LOS		F		D			D		D	
Intersection Summary										
HCM 2000 Control Delay		53.3								D
HCM 2000 Volume to Capacity ratio		0.85								
Actuated Cycle Length (s)		120.0								19.0
Intersection Capacity Utilization		83.1%								E
Analysis Period (min)		15								

c Critical Lane Group

12-14-2023
BA Group

Synchro 11 Report

3: James Snow Parkway & Derry Road

Existing (PM)



3: James Snow Parkway & Derry Road

Existing (PM)



3: James Snow Parkway & Derry Road

Existing (PM)



3: James Snow Parkway & Derry Road

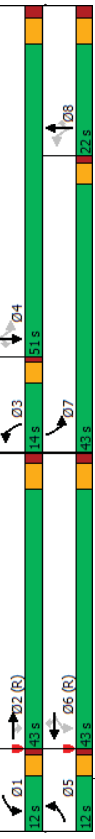
Existing (PM)



3: James Snow Parkway & Derry Road

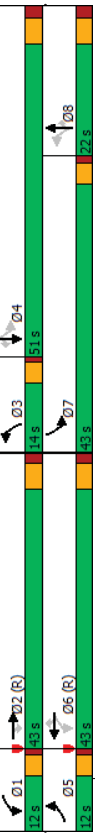
EBL	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBT	SBR	
Minimum Initial (s)	7.0	20.0	7.0	20.0	7.0	10.0	10.0	7.0	10.0	
Minimum Split (s)	11.0	34.3	11.0	34.3	11.0	34.3	11.0	34.7	11.0	
Total Split (s)	12.0	43.0	12.0	43.0	12.0	43.0	12.0	22.0	43.0	
Total Split (%)	10.0%	35.8%	10.0%	35.8%	11.7%	18.3%	18.3%	35.8%	42.5%	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.0	3.7	3.0	3.7	
Yellow Time (%)	1.0	1.6	1.6	1.0	1.6	1.0	2.0	2.0	2.0	
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	4.0	5.7	4.0	5.7	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	
v/c Ratio	0.58	1.05	0.03	0.63	0.89	0.52	0.30	0.68	0.50	
Control Delay	59.5	81.7	0.1	26.4	43.9	18.5	26.7	56.4	11.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	59.5	81.7	0.1	26.4	43.9	18.5	26.7	56.4	11.4	
Queue Length 50th (m)	22.6	-160.1	0.0	43.9	176.5	58.1	12.2	40.8	0.0	
Queue Length 95th (m)	35.5	#203.5	0.0	m#79.1	#246.8	m#74.3	18.9	54.1	19.7	
Internal Link Dist (m)	156.1			305.1			381.6		213.2	
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	75.0	95.0		115.0	
Base Capacity (vph)	319	1067	560	393	1420	749	272	508	369	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.58	1.05	0.03	0.63	0.89	0.52	0.28	0.64	0.48	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 110 (92%), Referenced to phase 2:EBT and 6:WBLT, Start of Green										
Natural Cycle: 95										
Control Type: Actuated-Coordinated										
- Volume exceeds capacity, queue is theoretically infinite.										
Queue shown is maximum after two cycles.										
# 95th percentile volume exceeds capacity, queue may be longer.										
Queue shown is maximum after two cycles.										
m Volume for 95th percentile queue is metered by upstream signal.										

Spills and Phases: 3: James Snow Parkway & Derry Road



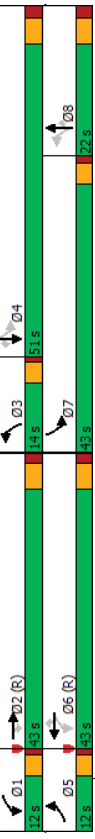
3: James Snow Parkway & Derry Road

Existing (PM)



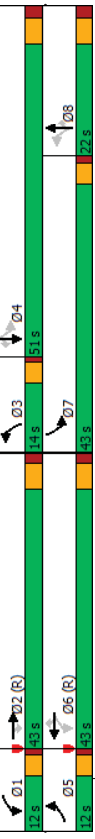
3: James Snow Parkway & Derry Road

Existing (PM)



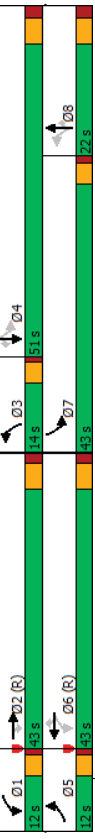
3: James Snow Parkway & Derry Road

Existing (PM)



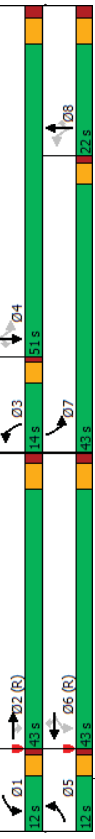
3: James Snow Parkway & Derry Road

Existing (PM)



3: James Snow Parkway & Derry Road

Existing (PM)



3: James Snow Parkway & Derry Road

2027 Scenario 1
 HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road

2027 Scenario 1
 Future Background (AM)
 1: Sixth Line & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	158	1947	138	15	692	38	69	167	28	34	130	122
Future Volume (vph)	158	1947	138	15	692	38	69	167	28	34	130	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.93	1.00	0.93
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	3163	1805	2924	1805	2924	1805	1846	1258	1737	1258	1737
Flt Permitted	0.30	1.00	0.06	1.00	0.31	1.00	0.45	1.00	0.45	1.00	0.45	1.00
Satd. Flow (perm)	562	3163	114	2924	582	1846	597	1737	597	1737	597	1737
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	168	2071	147	16	736	40	73	178	30	36	138	130
RTOR Reduction (vph)	0	4	0	3	0	0	6	0	0	0	33	0
Lane Group Flow (vph)	168	2214	0	16	773	0	73	202	0	36	235	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	8	8	8	8	8	8	8	4
Permitted Phases	2	78.6	71.8	69.4	66.6	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Effective Green, G (s)	78.6	71.8	69.4	66.6	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Actuated Green, g (s)	0.71	0.65	0.63	0.60	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Actuated g/C Ratio	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	484	2045	113	1754	104	330	107	311	107	311	107	311
Lane Grip Cap (vph)	c0.02	c0.70	0.00	0.26	0.11	0.11	c0.14	0.11	0.11	0.11	0.11	0.11
v/s Ratio Prot	0.22	0.08	0.08	0.13	0.13	0.13	0.06	0.13	0.13	0.13	0.06	0.13
v/s Ratio Perm	0.35	1.08	0.14	0.44	0.70	0.61	0.34	0.76	0.61	0.34	0.76	0.61
Uniform Delay, d1	5.9	19.6	24.8	12.1	42.8	42.0	39.8	43.2	42.0	39.8	43.2	42.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	46.5	0.6	0.8	19.2	3.4	1.9	10.0	3.4	1.9	10.0	3.4
Delay (s)	6.4	66.1	25.4	12.9	62.0	45.4	41.6	53.3	45.4	41.6	53.3	45.4
Level of Service	A	E	C	B	E	D	D	D	D	D	D	D
Approach Delay (s)	61.9	13.1	49.7	49.7	49.7	49.7	51.9	51.9	49.7	49.7	51.9	49.7
Approach LOS	E	B	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	49.9 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	1.00											
Actuated Cycle Length (s)	111.0 Sum of lost time (s)											
Intersection Capacity Utilization	105.7% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												

12-14-2023
 BA Group
 Synchro 11 Report

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	158	1947	138	15	692	38	69	167	28	34	130	122
Future Volume (vph)	158	1947	138	15	692	38	69	167	28	34	130	122
Lane Group Flow (vph)	168	2218	16	776	73	208	36	268	36	268	36	268
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	8	8	8	8	8	8	8	4
Permitted Phases	2	78.6	71.8	69.4	66.6	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Effective Green, G (s)	78.6	71.8	69.4	66.6	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Actuated Green, g (s)	0.71	0.65	0.63	0.60	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Actuated g/C Ratio	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	484	2045	113	1754	104	330	107	311	107	311	107	311
Lane Grip Cap (vph)	c0.02	c0.70	0.00	0.26	0.11	0.11	c0.14	0.11	0.11	0.11	0.11	0.11
v/s Ratio Prot	0.22	0.08	0.08	0.13	0.13	0.13	0.06	0.13	0.13	0.13	0.06	0.13
v/s Ratio Perm	0.35	1.08	0.14	0.44	0.70	0.61	0.34	0.76	0.61	0.34	0.76	0.61
Uniform Delay, d1	5.9	19.6	24.8	12.1	42.8	42.0	39.8	43.2	42.0	39.8	43.2	42.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	46.5	0.6	0.8	19.2	3.4	1.9	10.0	3.4	1.9	10.0	3.4
Delay (s)	6.4	66.1	25.4	12.9	62.0	45.4	41.6	53.3	45.4	41.6	53.3	45.4
Level of Service	A	E	C	B	E	D	D	D	D	D	D	D
Approach Delay (s)	61.9	13.1	49.7	49.7	49.7	49.7	51.9	51.9	49.7	49.7	51.9	49.7
Approach LOS	E	B	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
Spills and Phases: 1: Sixth Line & Derry Road												

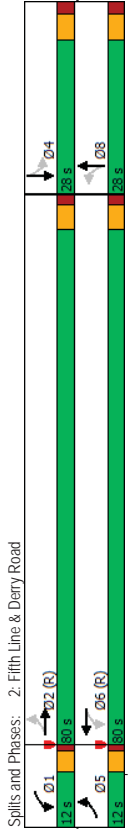
12-14-2023
 BA Group
 Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road
 2027 Scenario 1

Queues
 2: Fifth Line & Derry Road
 2027 Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	88	1980	95	175	683	249	93	286	77	110
Traffic Volume (vph)	88	1980	95	175	683	249	93	286	77	110
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.96	1.00	0.97	1.00	0.97	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	3262	1587	3096	1698	3225	1501	3251	1501	3251
Flt Permitted	0.24	1.00	0.05	1.00	0.69	1.00	0.37	1.00	0.37	1.00
Satd. Flow (perm)	405	3262	89	3096	1227	3225	577	3251	577	3251
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	94	2106	101	186	727	265	99	304	82	117
RTOR Reduction (vph)	0	3	0	0	31	0	0	20	0	0
Lane Group Flow (vph)	94	2204	0	186	961	0	99	366	0	117
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	8	4	4
Permitted Phases	82.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3
Effective Green, G (s)	82.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.69	0.62	0.69	0.63	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	352	2030	161	1940	228	599	107	604	107	604
v/s Ratio Prot	0.02	0.68	c<0.08	0.31	0.08	0.11	0.08	0.11	0.08	0.11
v/s Ratio Perm	0.17	1.09	0.72	0.50	0.43	0.61	0.43	0.61	0.43	0.61
Uniform Delay, d1	7.1	22.6	41.2	12.1	43.3	44.9	48.9	40.7	1.09	0.13
Progression Factor	0.53	0.47	0.99	0.94	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	44.0	117.9	0.9	1.3	1.8	114.4	0.1	114.4	0.1
Delay (s)	4.0	54.7	158.8	12.3	44.6	46.7	163.3	40.8	163.3	40.8
Level of Service	A	D	F	B	D	D	F	D	F	D
Approach Delay (s)	52.6		35.4		46.3		105.7		46.3	
Approach LOS	D		D		D		F		D	
Intersection Summary										
HCM 2000 Control Delay	49.8		HCM 2000 Level of Service		D					
HCM 2000 Volume to Capacity ratio	1.14									
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		15.0					
Intersection Capacity Utilization	103.4%		ICU Level of Service		G					
Analysis Period (min)	15									
c Critical Lane Group										

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	88	1980	175	683	249	93	286	77	110	68
Traffic Volume (vph)	88	1980	175	683	249	93	286	77	110	68
Future Volume (vph)	94	2207	186	992	99	386	117	104	104	104
Lane Group Flow (vph)	94	2207	186	992	99	386	117	104	104	104
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	8	4	4
Permitted Phases	5	2	1	6	6	8	8	8	4	4
Detector Phase	5	2	1	6	6	8	8	8	4	4
Switch Phase	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	11.0	34.3	11.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7
Minimum Split (s)	12.0	80.0	12.0	80.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	10.0%	66.7%	10.0%	66.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Total Split (%)	3.0	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Yellow Time (s)	1.0	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.26	1.09	1.15	0.50	0.44	0.62	1.09	0.17	1.09	0.17
Control Delay	3.5	58.0	144.7	11.4	50.2	47.0	160.8	29.0	160.8	29.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	58.0	144.7	11.4	50.2	47.0	160.8	29.0	160.8	29.0
Queue Length 50th (m)	3.5	-324.4	-39.0	55.1	22.0	43.7	-32.7	7.8	43.7	7.8
Queue Length 95th (m)	170.5	124.7	340.6	70.0	50.0	275.9	70.0	50.0	275.9	70.0
Internal Link Dist (m)	100.0	90.0	70.0	170.5	124.7	340.6	70.0	50.0	275.9	70.0
Turn Bay Length (m)	363	2032	162	1971	227	619	107	630	107	630
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	1.09	1.15	0.50	0.44	0.62	1.09	0.17	1.09	0.17
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green										
Natural Cycle: 150										
Control Type: Actuated-Coordinated										
- Volume exceeds capacity, queue is theoretically infinite.										
Queue shown is maximum after two cycles.										
# 95th percentile volume exceeds capacity, queue may be longer.										
Queue shown is maximum after two cycles.										
m Volume for 95th percentile queue is metered by upstream signal.										



HCM Signalized Intersection Capacity Analysis

3: James Snow Parkway & Derry Road

Queues

3: James Snow Parkway & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B
Traffic Volume (vph)	187	1652	30	67	533	161	24	271	179	277	377	182
Future Volume (vph)	187	1652	30	67	533	161	24	271	179	277	377	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	4.0	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3438	1562	1738	3305	1516	1801	3202	1586	1616	3046	1403
Flt Permitted	0.95	1.00	1.00	0.07	1.00	1.00	0.52	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	3399	3438	1562	134	3305	1516	993	3202	1586	650	3046	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	191	1686	31	68	544	164	24	277	183	283	385	186
RTOR Reduction (vph)	0	0	15	0	0	89	0	0	150	0	0	140
Lane Group Flow (vph)	191	1686	16	68	544	75	24	277	33	283	385	47
Confl. Peds. (/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	8	7	4	4
Permitted Phases	12	0	6	2	6	6	8	8	8	8	4	4
Actuated Green, G (s)	12.0	60.2	60.2	61.0	54.6	54.6	21.8	17.4	17.4	38.4	30.0	30.0
Effective Green, g (s)	12.0	60.2	60.2	61.0	54.6	54.6	21.8	17.4	17.4	38.4	30.0	30.0
Actuated G/C Ratio	0.10	0.50	0.50	0.51	0.46	0.46	0.18	0.14	0.14	0.32	0.25	0.25
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	4.0	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	339	1724	783	153	1503	689	210	464	229	344	761	350
v/s Ratio Prot	c0.06	c0.49	0.01	0.02	0.16	0.05	0.00	0.09	0.02	c0.12	0.13	0.03
v/s Ratio Perm	0.56	0.98	0.02	0.44	0.36	0.11	0.11	0.60	0.15	0.82	0.51	0.13
Uniform Delay, d1	51.5	29.3	15.1	25.1	21.3	18.7	40.7	48.0	44.8	34.1	38.6	34.9
Progression Factor	1.00	1.00	1.00	0.68	0.90	2.37	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	17.0	0.0	1.8	0.6	0.3	0.2	2.1	0.3	14.6	0.5	0.2
Delay (s)	53.6	46.3	15.1	19.0	19.8	44.7	41.0	50.1	45.1	48.7	39.2	35.1
Level of Service	D	D	B	B	B	D	D	D	D	D	D	D
Approach Delay (s)	46.5			25.0			47.7			41.4		D
Approach LOS	D			C			D			D		D
Intersection Summary												
HCM 2000 Control Delay	41.4 HCM 2000 Level of Service D											
HCM 2000 Volume to Capacity ratio	0.93											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) F											
Intersection Capacity Utilization	91.0% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B
Traffic Volume (vph)	187	1652	30	67	533	161	24	271	179	277	377	182
Future Volume (vph)	187	1652	30	67	533	161	24	271	179	277	377	182
Lane Group Flow (vph)	191	1686	31	68	544	164	24	277	183	283	385	186
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	8	7	4	4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase	5	2	2	1	6	6	3	8	8	7	4	4
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	53.0	53.0	11.0	47.0	47.0	21.0	35.0	35.0	21.0	35.0	35.0
Total Split (%)	14.2%	44.2%	44.2%	9.2%	39.2%	39.2%	17.5%	29.2%	29.2%	17.5%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
v/c Ratio	0.56	0.94	0.04	0.38	0.35	0.21	0.09	0.66	0.51	0.82	0.51	0.38
Control Delay	57.6	40.0	0.1	14.7	19.9	8.6	28.1	56.7	12.7	53.4	41.8	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	40.0	0.1	14.7	19.9	8.6	28.1	56.7	12.7	53.4	41.8	7.6
Queue Length 50th (m)	23.6	205.0	0.0	6.8	48.5	7.1	4.1	34.8	1.8	57.7	45.5	0.0
Queue Length 95th (m)	35.0	#294.1	0.0	14.0	71.6	26.3	9.9	47.5	22.2	#87.2	59.6	18.4
Internal Link Dist (m)	156.1 488.7											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	75.0	95.0	75.0	95.0
Base Capacity (vph)	383	1791	860	177	1545	796	400	781	519	345	790	501
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.94	0.04	0.38	0.35	0.21	0.06	0.35	0.35	0.82	0.49	0.37
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 115												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
Spills and Phases: 3 - James Snow Parkway & Derry Road												
D1	D2 (R)	D3	D4	D5	D6 (R)	D7	D8					

12-14-2023
BA Group

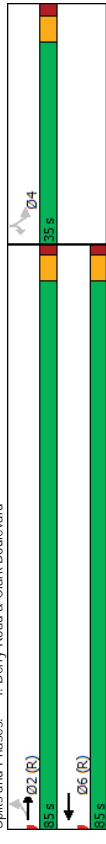
Synchro 11 Report

2027 Scenario 1
 Future Background (AM)
 HCM Signalized Intersection Capacity Analysis
 4: Derry Road & Clark Boulevard

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	75	2137	872	91	24	43
Future Volume (vph)	75	2137	872	91	24	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	0.99	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	3489	1770	1583	1583
Flt Permitted	0.27	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	494	3539	3489	1770	1583	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	2323	948	99	26	47
RTOR Reduction (vph)	0	0	3	0	0	44
Lane Group Flow (vph)	82	2323	1044	0	26	3
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases	2		6			
Permitted Phases	2		4		4	
Actuated Green, G (s)	101.0	101.0	101.0	8.0	8.0	8.0
Effective Green, g (s)	101.0	101.0	101.0	8.0	8.0	8.0
Actuated g/C Ratio	0.84	0.84	0.84	0.07	0.07	0.07
Clearance Time (s)	5.3	5.3	5.3	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	415	2978	2936	118	105	105
v/s Ratio Prot	c0.66		0.30			
v/s Ratio	0.17	0.20	0.78	0.36	0.22	0.03
Uniform Delay, d1	1.8	4.4	2.1	53.0	52.4	52.4
Progression Factor	1.69	2.82	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.3	0.9	0.1	0.1
Delay (s)	3.1	12.5	2.5	54.0	52.5	52.5
Level of Service	A	B	A	D	D	D
Approach Delay (s)	12.2		2.5		53.0	
Approach LOS	B		A		D	
Intersection Summary						
HCM 2000 Control Delay	10.2		HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.74					
Actuated Cycle Length (s)	120.0					
Sum of lost time (s)	11.0					
Intersection Capacity Utilization	76.6%					
Analysis Period (min)	15					
c. Critical Lane Group						

2027 Scenario 1
 Future Background (AM)
 Queues
 4: Derry Road & Clark Boulevard

Lane Group	EBL	EBT	WBT	SBL	SBR	
Lane Configurations	↔	↔	↔	↔	↔	
Traffic Volume (vph)	75	2137	872	24	43	
Future Volume (vph)	75	2137	872	24	43	
Lane Group Flow (vph)	82	2323	1047	26	47	
Turn Type	Perm	NA	NA	Perm	Perm	
Protected Phases	2		6			
Permitted Phases	2		6		4	
Detector Phase	2		6		4	
Switch Phase	2		6		4	
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	34.3	34.3	34.3	34.7	34.7	
Total Split (s)	85.0	85.0	85.0	35.0	35.0	
Total Split (%)	70.8%	70.8%	70.8%	29.2%	29.2%	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	1.6	1.6	1.6	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.3	5.3	5.3	5.7	5.7	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min	C-Min	C-Min	None	None	
v/c Ratio	0.19	0.76	0.35	0.18	0.27	
Control Delay	3.9	14.1	2.5	54.3	18.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	3.9	14.1	2.5	54.3	18.7	
Queue Length 50th (m)	5.2	259.7	25.6	6.1	0.0	
Queue Length 95th (m)	m5.0	m229.4	31.5	15.6	12.2	
Internal Link Dist (m)	336.0		475.1		313.3	
Turn Bay Length (m)	70.0					
Base Capacity (vph)	424	3043	3004	432	422	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.19	0.76	0.35	0.06	0.11	
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBT, Start of Green						
Natural Cycle: 110						
Control Type: Actuated-Coordinated						
m. Volume for 95th percentile queue is metered by upstream signal.						
Spills and Phases: 4: Derry Road & Clark Boulevard						

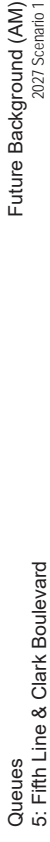
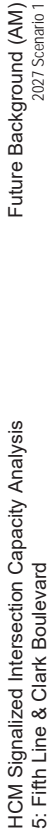
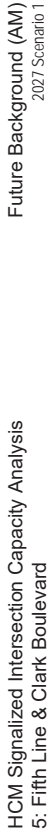


HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard
 2027 Scenario 1

Queues
 5: Fifth Line & Clark Boulevard
 2027 Scenario 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	10	3	10	446	301	37
Traffic Volume (vph)	10	3	10	446	301	37
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.3	5.3	5.7	5.7	5.7	5.7
Total Lost Time (s)	1.00	1.00	1.00	1.00	1.00	0.99
Lane Util. Factor	1.00	0.85	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	1863	1835	1835
Flt Permitted	0.95	1.00	0.54	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1011	1863	1835	1835
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	3	11	485	327	40
RTOR Reduction (vph)	0	3	0	0	3	0
Lane Group Flow (vph)	11	0	11	485	364	0
Turn Type	Perm	Perm	Perm	NA	NA	NA
Protected Phases				8	4	
Permitted Phases	2	2	8			
Actuated Green, G (s)	1.3	1.3	28.5	28.5	28.5	
Effective Green, g (s)	1.3	1.3	28.5	28.5	28.5	
Actuated g/C Ratio	0.03	0.03	0.70	0.70	0.70	
Clearance Time (s)	5.3	5.3	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	56	50	706	1301	1281	
v/s Ratio Prot	0.01	0.00	0.01	0.26	0.20	
v/s Ratio	0.20	0.00	0.02	0.37	0.28	
Uniform Delay, d1	19.2	19.1	1.9	2.5	2.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	0.0	0.0	0.2	0.1	
Delay (s)	21.0	19.1	1.9	2.7	2.4	
Level of Service	C	B	A	A	A	
Approach Delay (s)	20.6		2.7	2.4		
Approach LOS	C		A	A		
Intersection Summary						
HCM 2000 Control Delay	2.9 HCM 2000 Level of Service A					
HCM 2000 Volume to Capacity ratio	0.36					
Actuated Cycle Length (s)	40.8 Sum of lost time (s) 11.0					
Intersection Capacity Utilization	41.0% ICU Level of Service A					
Analysis Period (min)	15					
c Critical Lane Group						

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	10	3	10	446	301	37
Traffic Volume (vph)	10	3	10	446	301	37
Future Volume (vph)	10	3	10	446	301	37
Lane Group Flow (vph)	11	3	11	485	367	
Turn Type	Perm	Perm	Perm	NA	NA	NA
Protected Phases				8	4	
Permitted Phases	2	2	8			
Detector Phase	2	2	8	8	4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	34.3	34.3	34.7	34.7	34.7	
Total Split (s)	35.0	35.0	85.0	85.0	85.0	
Total Spill (%)	29.2%	29.2%	70.8%	70.8%	70.8%	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	1.6	1.6	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.3	5.3	5.7	5.7	5.7	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
v/c Ratio	0.02	0.01	0.01	0.28	0.22	
Control Delay	14.2	11.7	2.3	2.4	2.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.2	11.7	2.3	2.4	2.1	
Queue Length 50th (m)	0.4	0.0	0.0	0.0	0.0	
Queue Length 95th (m)	4.4	1.7	1.8	37.5	26.2	
Internal Link Dist (m)	204.0			156.9	372.1	
Turn Bay Length (m)	35.0			35.0		
Base Capacity (vph)	1512	1353	1011	1863	1835	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.01	0.00	0.01	0.26	0.20	
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 36.5						
Natural Cycle: 70						
Control Type: Actuated-Uncoordinated						



HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road

Future Background (PM)
 2027 Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	158	1654	77	29	1681	22	181	152	30	93	214	
Future Volume (vph)	158	1654	77	29	1681	22	181	152	30	93	214	
Ideal Flow (vphpt)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.94	
Satd. Flow (prot)	1763	3172	1805	2967	1805	1838	1805	1838	1258	1764	1764	
Flt Permitted	0.07	1.00	0.08	1.00	0.16	1.00	0.64	1.00	0.64	1.00	1.00	
Satd. Flow (perm)	136	3172	148	2967	295	1838	842	1764	842	1764	1764	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	168	1760	82	31	1788	23	193	162	32	99	228	
RTOR Reduction (vph)	0	3	0	0	1	0	0	7	0	0	21	
Lane Group Flow (vph)	168	1839	0	31	1810	0	193	187	0	99	353	
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	NA	
Protected Phases	5	2	1	6	3	8	4	4	4	4	4	
Permitted Phases	2	6	6	6	3	8	4	4	4	4	4	
Actuated Green, G (s)	62.4	54.7	55.4	51.2	35.6	35.6	24.6	24.6	24.6	24.6	24.6	
Effective Green, g (s)	62.4	54.7	55.4	51.2	35.6	35.6	24.6	24.6	24.6	24.6	24.6	
Actuated g/C Ratio	0.56	0.49	0.50	0.46	0.32	0.32	0.22	0.22	0.22	0.22	0.22	
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	189	1563	136	1368	189	589	186	390	186	390	390	
v/s Ratio Prot	c0.06	0.58	0.10	c0.61	c0.06	0.10	0.20	0.20	0.10	0.20	0.20	
v/s Ratio Perm	0.44	0.10	0.10	c0.26	c0.26	0.10	0.12	0.12	0.10	0.12	0.12	
v/c Ratio	0.89	1.18	0.23	1.32	1.02	0.32	0.53	0.91	0.32	0.53	0.91	
Uniform Delay, d1	29.6	28.1	24.4	29.9	34.5	28.5	38.1	42.1	28.5	38.1	42.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	35.9	86.5	0.9	150.7	71.1	0.3	2.9	23.8	0.3	2.9	23.8	
Delay (s)	65.4	114.6	25.2	180.6	105.6	28.8	41.0	65.8	28.8	41.0	65.8	
Level of Service	E	F	C	F	F	C	D	E	C	D	E	
Approach Delay (s)		110.5		178.0		67.1		60.6				
Approach LOS		F		F		E		E				
Intersection Summary												
HCM 2000 Control Delay	128.3				HCM 2000 Level of Service				F			
HCM 2000 Volume to Capacity ratio	1.21											
Actuated Cycle Length (s)	111.0				Sum of lost time (s)				20.5			
Intersection Capacity Utilization	102.7%				ICU Level of Service				G			
Analysis Period (min)	15											

c Critical Lane Group

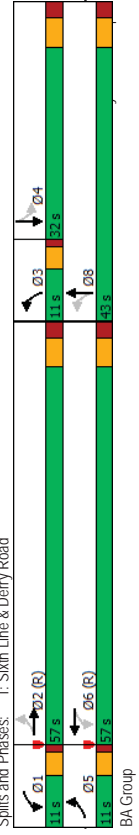
12-14-2023
 BA Group

Queues
 1: Sixth Line & Derry Road

Future Background (PM)
 2027 Scenario 1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	158	1654	29	1681	22	181	152	30	93	214	137
Future Volume (vph)	158	1654	29	1681	22	181	152	30	93	214	137
Lane Group Flow (vph)	168	1842	31	1811	193	181	194	99	37.4	99	37.4
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	NA
Protected Phases	5	2	1	6	3	8	4	4	4	4	4
Detector Phase	5	2	1	6	3	8	4	4	4	4	4
Switch Phase	5	2	1	6	3	8	4	4	4	4	4
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	25.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	11.0	31.2	11.0	32.3	32.3	32.3	32.3
Total Split (s)	11.0	57.0	11.0	57.0	11.0	57.0	11.0	43.0	43.0	43.0	43.0
Total Split (%)	9.9%	51.4%	9.9%	51.4%	9.9%	51.4%	9.9%	38.7%	38.7%	28.8%	28.8%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	1.0	2.2	1.0	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	None	None
v/c Ratio	0.89	1.14	0.17	1.32	0.99	0.33	0.54	0.91	0.33	0.54	0.91
Control Delay	66.6	99.9	12.3	178.8	94.0	28.5	49.4	66.5	28.5	49.4	66.5
Total Delay	66.6	99.9	12.3	178.8	94.0	28.5	49.4	66.5	28.5	49.4	66.5
Queue Length 50th (m)	22.9	-280.5	2.9	-285.4	31.7	31.1	19.8	77.2	31.1	19.8	77.2
Queue Length 95th (m)	#66.8	#325.8	7.1	#330.8	#70.0	50.8	38.4	#131.4	50.8	38.4	#131.4
Internal Link Dist (m)	475.1	475.1	256.2	256.2	211.8	201.7	201.7	201.7	211.8	201.7	201.7
Turn Bay Length (m)	120.0	100.0	100.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Base Capacity (vph)	189	1612	185	1369	195	614	194	428	614	194	428
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	1.14	0.17	1.32	0.99	0.32	0.51	0.87	0.32	0.51	0.87
Intersection Summary											
Cycle Length: 111											
Actuated Cycle Length: 111											
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBTL, Start of Green											
Natural Cycle: 150											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											

Spills and Phases: 1: Sixth Line & Derry Road



12-14-2023
 BA Group

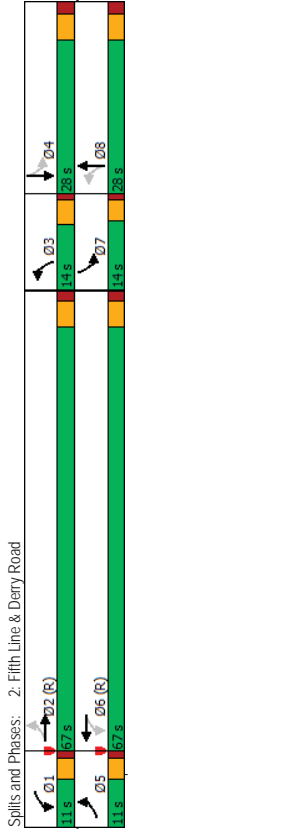
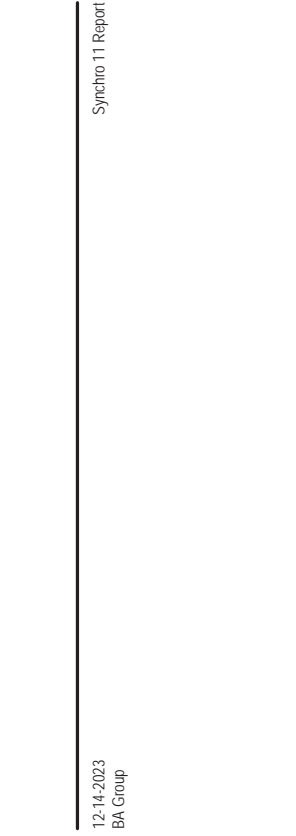
Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road
 2027 Scenario 1

Queues
 2: Fifth Line & Derry Road
 2027 Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	41	1559	79	92	1809	111	218	70	187	327
Future Volume (vph)	41	1559	79	92	1809	111	218	70	187	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	3261	1587	3294	1698	3055	1501	3343	1600	3261
Flt Permitted	0.06	1.00	0.06	1.00	0.30	1.00	0.49	1.00	0.06	1.00
Satd. Flow (perm)	104	3261	100	3294	537	3055	768	3343	104	3261
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	44	1659	84	98	1924	118	232	74	199	348
RTOR Reduction (vph)	0	3	0	0	4	0	0	101	0	19
Lane Group Flow (vph)	44	1740	0	98	2038	0	232	172	0	348
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4
Permitted Phases	2	70.4	64.7	74.6	66.8	28.0	18.5	28.5	18.5	18.5
Effective Green, G (s)	70.4	64.7	74.6	66.8	28.0	18.5	28.5	18.5	18.5	
Actuated g/C Ratio	0.59	0.54	0.62	0.56	0.23	0.15	0.24	0.15	0.24	0.15
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	132	1758	158	1833	217	470	243	515	132	1758
v/s Ratio Prot	0.02	0.53	0.04	0.62	0.08	0.06	0.12	0.11	0.02	0.53
v/s Ratio Perm	0.18	0.34	0.34	0.16	0.16	0.16	0.22	0.11	0.18	0.34
v/c Ratio	0.33	0.99	0.62	1.11	1.07	0.37	1.43	0.74	0.33	0.99
Uniform Delay, d1	26.3	27.3	24.2	26.6	43.5	45.5	44.2	48.4	26.3	27.3
Progression Factor	1.80	0.78	1.09	0.99	1.00	1.00	1.00	1.00	1.80	0.78
Incremental Delay, d2	0.9	14.6	4.5	55.7	80.6	0.5	216.5	5.5	0.9	14.6
Delay (s)	48.2	35.9	30.8	82.1	124.2	46.0	260.6	53.9	48.2	35.9
Level of Service	D	D	C	F	F	D	F	D	D	D
Approach Delay (s)	36.2	79.8	81.9	150.1	150.1	81.9	150.1	150.1	36.2	79.8
Approach LOS	D	D	E	F	F	D	F	D	D	D
Intersection Summary										
HCM 2000 Control Delay	75.1 HCM 2000 Level of Service E									
HCM 2000 Volume to Capacity ratio	1.19									
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 19.5									
Intersection Capacity Utilization	101.7% ICU Level of Service G									
Analysis Period (min)	15									
c Critical Lane Group										

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	41	1559	92	1809	218	70	187	327	299	77
Future Volume (vph)	41	1559	92	1809	218	70	187	327	299	77
Lane Group Flow (vph)	44	1743	98	2042	232	273	348	400	348	400
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4
Detector Phase	5	2	2	1	6	3	8	7	4	4
Switch Phase	7.0	20.0	7.0	20.0	5.0	10.0	7.0	10.0	7.0	10.0
Minimum Initial (s)	11.0	34.3	11.0	34.3	9.5	34.7	11.0	34.7	11.0	34.7
Minimum Split (s)	11.0	67.0	11.0	67.0	14.0	28.0	14.0	28.0	14.0	28.0
Total Split (s)	9.2%	55.8%	9.2%	55.8%	11.7%	23.3%	11.7%	23.3%	9.2%	55.8%
Total Split (%)	3.0	3.7	3.0	3.7	3.5	3.7	3.0	3.7	3.0	3.7
Yellow Time (s)	1.0	1.6	1.0	1.6	1.0	1.6	1.0	1.6	1.0	1.6
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.29	0.99	0.62	1.10	1.05	0.48	1.37	0.75	0.29	0.99
Control Delay	19.0	37.4	31.2	77.0	111.5	28.0	222.9	54.6	19.0	37.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	37.4	31.2	77.0	111.5	28.0	222.9	54.6	19.0	37.4
Queue Length 50th (m)	3.4	-116.7	13.2	-306.9	-50.2	18.0	-110.0	47.4	3.4	-116.7
Queue Length 95th (m)	m5.4	#283.7	m19.9	#366.7	#81.6	31.0	#167.5	63.2	m5.4	#283.7
Internal Link Dist (m)	170.5	124.7	170.5	124.7	340.6	275.9	340.6	275.9	170.5	124.7
Turn Bay Length (m)	100.0	90.0	100.0	90.0	70.0	50.0	70.0	50.0	100.0	90.0
Base Capacity (vph)	151	1760	159	1859	222	664	254	639	151	1760
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.99	0.62	1.10	1.05	0.41	1.37	0.63	0.29	0.99
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green										
Natural Cycle: 145										
Control Type: Actuated-Coordinated										
- Volume exceeds capacity, queue is theoretically infinite.										
Queue shown is maximum after two cycles.										
# 95th percentile volume exceeds capacity, queue may be longer.										
Queue shown is maximum after two cycles.										
m Volume for 95th percentile queue is metered by upstream signal.										



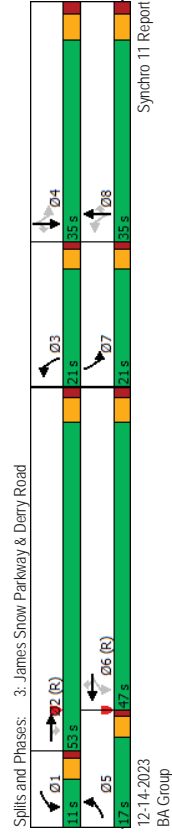
HCM Signalized Intersection Capacity Analysis
 3. James Snow Parkway & Derry Road
 Future Background (PM)
 2027 Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Traffic Volume (vph)	192	1164	16	259	1317	404	79	337	184	298	443	209
Future Volume (vph)	192	1164	16	259	1317	404	79	337	184	298	443	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98
Fllp. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fll Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3438	1562	1738	3305	1516	1802	3202	1586	1616	3046	1403
Fll Permitted	0.95	1.00	1.00	0.85	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3399	3438	1562	144	3305	1516	931	3202	1586	1616	3046	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	196	1188	16	264	1344	412	81	344	188	304	452	213
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	196	1188	6	264	1344	256	81	344	43	304	452	50
Conf. Ped. (#/hr)	1			1		1	6					6
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	7	4	4	4
Permitted Phases	5	2	2	1	6	3	8	8	7	4	4	4
Actuated Green, G (s)	12.2	46.9	46.9	68.8	52.6	52.6	27.1	19.2	19.2	40.2	28.3	28.3
Effective Green, g (s)	12.2	46.9	46.9	68.8	52.6	52.6	27.1	19.2	19.2	40.2	28.3	28.3
Actuated g/C Ratio	0.10	0.39	0.39	0.57	0.44	0.44	0.23	0.16	0.16	0.34	0.24	0.24
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	345	1343	610	320	1448	664	267	512	253	334	718	330
v/s Ratio Prot	0.06	0.35	0.00	c0.12	c0.41	0.02	0.11	0.02	0.11	c0.13	0.15	0.04
v/s Ratio Perm	0.57	0.88	0.01	0.82	0.93	0.39	0.30	0.67	0.17	0.91	0.63	0.15
Uniform Delay, d1	51.4	34.0	22.4	34.2	31.9	22.8	37.7	47.4	43.5	34.1	41.1	36.3
Progression Factor	1.00	1.00	1.00	0.81	1.03	1.56	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	8.8	0.0	1.7	1.4	0.2	0.6	3.5	0.3	27.7	1.7	0.2
Delay (s)	53.5	42.8	22.4	29.5	34.2	35.6	38.3	50.9	43.8	61.8	42.9	36.6
Level of Service	D	D	C	C	C	D	D	D	D	D	E	D
Approach Delay (s)	44.1			33.9			47.1			47.4		
Approach LOS	D			C			D			D		
Intersection Summary												
HCM 2000 Control Delay	41.0 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	88.2% ICU Level of Service											
Analysis Period (min)	15											
Critical Lane Group	c											

12-14-2023
 BA Group
 Synchro 11 Report

3. James Snow Parkway & Derry Road
 Future Background (PM)
 2027 Scenario 1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Traffic Volume (vph)	192	1164	16	259	1317	404	79	337	184	298	443	209
Future Volume (vph)	192	1164	16	259	1317	404	79	337	184	298	443	209
Lane Group Flow (vph)	196	1188	16	264	1344	412	81	344	188	304	452	213
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	7	4	4	4
Permitted Phases	5	2	2	1	6	3	8	8	7	4	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	53.0	53.0	11.0	47.0	47.0	21.0	35.0	35.0	21.0	35.0	35.0
Total Split (%)	14.2%	44.2%	44.2%	9.2%	39.2%	39.2%	17.5%	29.2%	29.2%	17.5%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimized?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	None	None	None	None	None
v/s Ratio	0.57	0.87	0.02	0.82	0.91	0.50	0.27	0.70	0.48	0.90	0.63	0.43
Control Delay	57.6	41.5	0.1	29.4	34.5	13.2	29.0	55.7	12.3	62.4	46.0	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	41.5	0.1	29.4	34.5	13.2	29.0	55.7	12.3	62.4	46.0	7.8
Queue Length 50th (m)	24.2	140.8	0.0	40.9	177.4	48.6	13.8	43.2	3.2	60.9	54.6	0.0
Queue Length 95th (m)	35.7	172.2	0.0	mm#51.5m#174.5	m#54.1	23.7	56.4	23.4	84.4	71.0	19.8	0.0
Internal Link Dist (m)	156.1 488.7											
Turn Bay Length (m)	100.0 70.0 110.0 75.0 100.0 75.0 95.0 115.0											
Base Capacity (vph)	386	1366	679	320	1470	828	411	781	518	338	769	513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.87	0.02	0.82	0.91	0.50	0.20	0.44	0.36	0.90	0.59	0.42
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 105												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
m Volume for 95th percentile queue is metered by upstream signal.												

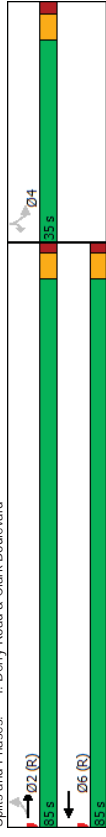


2027 Scenario 1
 Future Background (PM)
 HCM Signalized Intersection Capacity Analysis
 4: Derry Road & Clark Boulevard

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	30	1853	1959	24	74	169
Future Volume (vph)	30	1853	1959	24	74	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	0.95	1.00
Satd. Flow (prot)	1770	3539	3533	1770	1583	1583
Flt Permitted	0.04	1.00	1.00	0.95	0.95	1.00
Satd. Flow (perm)	84	3539	3533	1770	1583	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	2014	2129	26	80	184
RTOR Reduction (vph)	0	0	0	0	0	12
Lane Group Flow (vph)	33	2014	2155	0	80	172
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases	2		6			
Permitted Phases	2		4		4	
Actuated Green, G (s)	90.7	90.7	90.7	18.3	18.3	18.3
Effective Green, g (s)	90.7	90.7	90.7	18.3	18.3	18.3
Actuated g/C Ratio	0.76	0.76	0.76	0.15	0.15	0.15
Clearance Time (s)	5.3	5.3	5.3	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	63	2674	2670	269	241	241
v/s Ratio Prot	0.39	0.57	0.61			
v/s Ratio	0.52	0.75	0.81	0.30	0.71	
Uniform Delay, d1	5.9	8.3	9.2	45.1	48.4	
Progression Factor	1.75	1.70	1.00	1.00	1.00	
Incremental Delay, d2	7.0	0.5	2.7	0.6	9.6	
Delay (s)	17.3	14.5	11.9	45.8	58.0	
Level of Service	B	B	B	D	E	
Approach Delay (s)	14.6		11.9		54.3	
Approach LOS	B		B		D	
Intersection Summary						
HCM 2000 Control Delay	15.6		HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.79					
Actuated Cycle Length (s)	120.0					
Intersection Capacity Utilization	74.5%		ICU Level of Service		D	
Analysis Period (min)	15					
c. Critical Lane Group						

2027 Scenario 1
 Future Background (PM)
 Queues
 4: Derry Road & Clark Boulevard

Lane Group	EBL	EBT	WBT	SBL	SBR	
Lane Configurations	↔	↔	↔	↔	↔	
Traffic Volume (vph)	30	1853	1959	74	169	
Future Volume (vph)	30	1853	1959	74	169	
Lane Group Flow (vph)	33	2014	2155	80	184	
Turn Type	Perm	NA	NA	Perm	Perm	
Protected Phases	2		6			
Permitted Phases	2		6		4	
Detector Phase	2		6		4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	34.3	34.3	34.3	34.7	34.7	
Total Split (s)	85.0	85.0	85.0	35.0	35.0	
Total Spill (%)	70.8%	70.8%	70.8%	29.2%	29.2%	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	1.6	1.6	1.6	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.3	5.3	5.3	5.7	5.7	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Min	C-Min	C-Min	None	None	
v/c Ratio	0.52	0.75	0.81	0.30	0.73	
Control Delay	30.7	16.6	13.4	46.3	60.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	30.7	16.6	13.4	46.3	60.6	
Queue Length 50th (m)	5.8	232.2	150.7	17.8	40.7	
Queue Length 95th (m)	m6.5	m216.7	239.2	31.1	62.0	
Internal Link Dist (m)	336.0		475.1		313.3	
Turn Bay Length (m)	70.0					
Base Capacity (vph)	63	2676	2671	432	397	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.52	0.75	0.81	0.19	0.46	
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBT, Start of Green						
Natural Cycle: 100						
Control Type: Actuated-Coordinated						
m. Volume for 95th percentile queue is metered by upstream signal.						
Spills and Phases: 4: Derry Road & Clark Boulevard						



HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard
 2027 Scenario 1

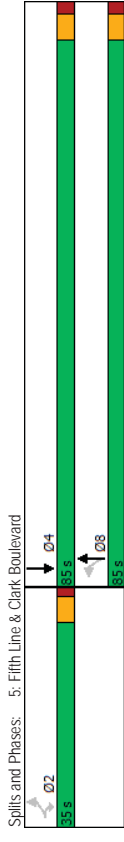
Queues
 5: Fifth Line & Clark Boulevard
 2027 Scenario 1

Future Background (PM)
 2027 Scenario 1

Future Background (PM)
 2027 Scenario 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	39	10	4	436	459	11
Future Volume (vph)	39	10	4	436	459	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	1863	1857	1857
Flt Permitted	0.95	1.00	0.46	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	864	1863	1857	1857
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	11	4	474	499	12
RTOR Reduction (vph)	0	10	0	0	1	0
Lane Group Flow (vph)	42	1	4	474	510	0
Turn Type	Perm	Perm	Perm	NA	NA	NA
Protected Phases	2	2	8	8	4	4
Permitted Phases	2	2	8	8	4	4
Actuated Green, G (s)	5.1	5.1	27.8	27.8	27.8	27.8
Effective Green, g (s)	5.1	5.1	27.8	27.8	27.8	27.8
Actuated g/C Ratio	0.12	0.12	0.63	0.63	0.63	0.63
Clearance Time (s)	5.3	5.3	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	205	183	547	1179	1175	1175
v/s Ratio Prot	0.02	0.00	0.00	0.25	0.27	0.27
v/s Ratio Perm	0.20	0.01	0.01	0.40	0.43	0.43
Uniform Delay, d1	17.6	17.2	3.0	4.0	4.1	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0	0.0	0.2	0.3	0.3
Delay (s)	18.1	17.2	3.0	4.2	4.3	4.3
Level of Service	B	B	A	A	A	A
Approach Delay (s)	17.9		4.2	4.2	4.3	
Approach LOS	B		A	A	A	
Intersection Summary						
HCM 2000 Control Delay	4.9 HCM 2000 Level of Service A					
HCM 2000 Volume to Capacity ratio	0.40					
Actuated Cycle Length (s)	43.9 Sum of lost time (s) 11.0					
Intersection Capacity Utilization	42.3% ICU Level of Service A					
Analysis Period (min)	15					
c. Critical Lane Group						

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	EBL	EBR	NBL	NBT	SBT
Traffic Volume (vph)	39	10	4	436	459
Future Volume (vph)	39	10	4	436	459
Lane Group Flow (vph)	42	11	4	474	511
Turn Type	Perm	Perm	Perm	NA	NA
Protected Phases	2	2	8	8	4
Detector Phase	2	2	8	8	4
Switch Phase	2	2	8	8	4
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.7	34.7	34.7
Total Split (s)	35.0	35.0	85.0	85.0	85.0
Total Spill (%)	29.2%	29.2%	70.8%	70.8%	70.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.7	5.7	5.7
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.09	0.03	0.01	0.34	0.37
Control Delay	15.8	9.2	4.8	5.8	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	9.2	4.8	5.8	6.1
Queue Length 50th (m)	3.3	0.0	0.2	21.2	23.4
Queue Length 95th (m)	8.5	2.8	1.1	38.9	43.0
Internal Link Dist (m)	204.0 156.9 372.1				
Turn Bay Length (m)	35.0				
Base Capacity (vph)	1332	1194	864	1863	1857
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.03	0.01	0.00	0.25	0.28
Intersection Summary					
Cycle Length: 120					
Actuated Cycle Length: 41.6					
Natural Cycle: 70					
Control Type: Actuated-Uncoordinated					

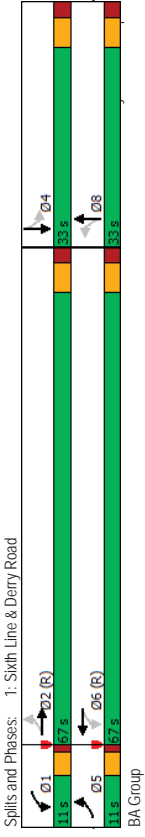


2027 Scenario 1
 Future Total (AM)
 HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Traffic Volume (vph)	159	1965	153	24	766	38	84	167	31	34	130	125
Future Volume (vph)	159	1965	153	24	766	38	84	167	31	34	130	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	3160	1805	2929	1805	2929	1805	1841	1805	1841	1258	1736
Flt Permitted	0.27	1.00	0.06	1.00	0.06	1.00	0.30	1.00	0.44	1.00	0.44	1.00
Satd. Flow (perm)	504	3160	114	2929	573	1841	573	1841	589	1736	589	1736
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	169	2090	163	26	815	40	89	178	33	36	138	133
RTOR Reduction (vph)	0	4	0	0	3	0	0	7	0	0	34	0
Lane Group Flow (vph)	169	2249	0	26	852	0	89	204	0	36	237	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	8	8	8	8	8	8	8	8
Permitted Phases	2	78.4	70.3	70.6	66.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Effective Green, G (s)	78.4	70.3	70.6	66.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Actuated Green, g (s)	0.71	0.63	0.64	0.60	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Actuated g/C Ratio	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	447	2001	136	1752	103	331	106	312	106	312	106	312
Lane Grp Cap (vph)	c0.03	c0.71	0.01	0.29	0.11	0.11	0.14	0.14	0.14	0.14	0.14	0.14
v/s Ratio Prot	0.24	0.38	0.19	0.49	0.86	0.62	0.34	0.76	0.34	0.76	0.34	0.76
v/s Ratio Perm	6.3	20.4	25.2	12.6	44.2	42.0	39.7	43.2	39.7	43.2	39.7	43.2
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	63.0	0.7	1.0	48.2	3.4	1.9	10.4	1.9	10.4	1.9	10.4
Incremental Delay, d2	6.8	83.3	25.9	13.6	92.4	45.4	41.6	53.7	41.6	53.7	41.6	53.7
Delay (s)	A	F	C	B	F	D	D	D	D	D	D	D
Level of Service	E	78.0	14.0	B	59.3	E	52.3	D	E	D	D	D
Approach Delay (s)	E	14.0	B	59.3	E	52.3	D	E	52.3	D	D	D
Approach LOS	E	14.0	B	59.3	E	52.3	D	E	52.3	D	D	D
Intersection Summary												
HCM 2000 Control Delay	60.1	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	1.04	E										
Actuated Cycle Length (s)	111.0	Sum of lost time (s)										
Intersection Capacity Utilization	106.6%	16.5										
Analysis Period (min)	15	ICU Level of Service										
c Critical Lane Group												

2027 Scenario 1
 Future Total (AM)
 Queues
 1: Sixth Line & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Traffic Volume (vph)	159	1965	153	24	766	38	84	167	31	34	130	125
Future Volume (vph)	159	1965	153	24	766	38	84	167	31	34	130	125
Lane Group Flow (vph)	169	2253	26	855	89	211	36	271	36	271	36	271
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	8	8	8	8	8	8	8	8
Permitted Phases	2	78.4	70.3	70.6	66.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Effective Green, G (s)	78.4	70.3	70.6	66.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Actuated Green, g (s)	0.71	0.63	0.64	0.60	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Actuated g/C Ratio	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	447	2001	136	1752	103	331	106	312	106	312	106	312
Lane Grp Cap (vph)	c0.03	c0.71	0.01	0.29	0.11	0.11	0.14	0.14	0.14	0.14	0.14	0.14
v/s Ratio Prot	0.24	0.38	0.19	0.49	0.86	0.62	0.34	0.76	0.34	0.76	0.34	0.76
v/s Ratio Perm	6.3	20.4	25.2	12.6	44.2	42.0	39.7	43.2	39.7	43.2	39.7	43.2
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	63.0	0.7	1.0	48.2	3.4	1.9	10.4	1.9	10.4	1.9	10.4
Incremental Delay, d2	6.8	83.3	25.9	13.6	92.4	45.4	41.6	53.7	41.6	53.7	41.6	53.7
Delay (s)	A	F	C	B	F	D	D	D	D	D	D	D
Level of Service	E	78.0	14.0	B	59.3	E	52.3	D	E	D	D	D
Approach Delay (s)	E	14.0	B	59.3	E	52.3	D	E	52.3	D	D	D
Approach LOS	E	14.0	B	59.3	E	52.3	D	E	52.3	D	D	D
Intersection Summary												
Cycle Length: 111	Actuated Cycle Length: 111											
Offset: 0 (0%)	Referenced to phase 2EBTL and 6:WBTL, Start of Green											
Natural Cycle: 150	Natural Cycle: 150											
Control Type: Actuated-Coordinated	Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.												
# Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



2: Fifth Line & Derry Road

Future Total (AM)
2027 Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	88	2112	95	180	729	250	93	286	100	112	68	30
Traffic Volume (vph)	88	2112	95	180	729	250	93	286	100	112	68	30
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.96	1.00	0.96	1.00	0.96	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	3263	1587	3107	1698	3210	1501	3251	1501	3251	1501	3251
Flt Permitted	0.22	1.00	0.05	1.00	0.69	1.00	0.34	1.00	0.34	1.00	0.34	1.00
Satd. Flow (perm)	377	3263	89	3107	1227	3210	532	3251	532	3251	532	3251
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	94	2247	101	191	776	266	99	304	106	119	72	32
RTOR Reduction (vph)	0	3	0	0	28	0	0	29	0	0	26	0
Lane Group Flow (vph)	94	2345	0	191	1014	0	99	381	0	119	78	0
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	8	8	4	4	4
Permitted Phases	2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Effective Green, G (s)	83.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.69	0.62	0.69	0.63	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grip Cap (vph)	334	2031	161	1947	228	596	161	1947	228	596	161	1947
v/s Ratio Prot	0.02	0.72	c0.08	0.33	0.08	0.12	0.08	0.12	0.08	0.12	0.08	0.12
v/s Ratio Perm	0.17	60.74	0.74	0.52	0.43	0.64	0.22	0.64	0.22	0.64	0.22	0.64
Uniform Delay, d1	0.28	1.15	1.19	0.52	0.43	0.64	0.22	0.64	0.22	0.64	0.22	0.64
Progression Factor	0.55	0.49	0.55	0.49	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	72.6	128.9	1.0	1.3	2.3	159.4	0.1	159.4	0.1	159.4	0.1
Delay (s)	4.2	83.7	169.5	12.3	44.6	47.4	208.2	40.8	208.2	40.8	208.2	40.8
Level of Service	A	F	F	B	D	D	F	D	F	D	F	D
Approach Delay (s)	80.6	36.6	46.8	130.2	46.8	130.2	46.8	130.2	46.8	130.2	46.8	130.2
Approach LOS	F	D	D	F	D	D	F	D	F	D	F	D
Intersection Summary	HCM 2000 Control Delay: 66.9 HCM 2000 Level of Service: E HCM 2000 Volume to Capacity ratio: 1.19 Actuated Cycle Length (s): 120.0 Sum of lost time (s): 15.0 Intersection Capacity Utilization: 108.1% ICU Level of Service: G Analysis Period (min): 15											

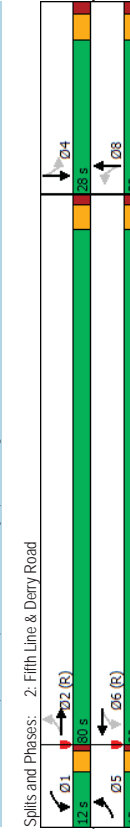
c Critical Lane Group

2: Fifth Line & Derry Road

Future Total (AM)
2027 Scenario 1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	88	2112	93	180	729	250	93	286	100	112	68	30
Traffic Volume (vph)	88	2112	93	180	729	250	93	286	100	112	68	30
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Group Flow (vph)	94	2348	191	1042	99	410	119	104	119	104	119	104
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	8	8	4	4	4
Permitted Phases	2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Detector Phase	5	2	1	6	6	8	8	8	8	4	4	4
Switch Phase	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	11.0	34.3	11.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Minimum Split (s)	12.0	80.0	12.0	80.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	10.0%	66.7%	10.0%	66.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Total Split (%)	3.0	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Yellow Time (s)	1.0	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.28	1.15	1.18	0.53	0.44	0.66	0.22	0.66	0.22	0.66	0.22	0.66
Control Delay	3.5	87.5	155.3	11.6	50.2	46.8	201.7	29.0	201.7	29.0	201.7	29.0
Nature Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	87.5	155.3	11.6	50.2	46.8	201.7	29.0	201.7	29.0	201.7	29.0
Queue Length 50th (m)	3.5	-356.8	-41.7	56.3	22.0	45.6	-35.9	7.8	-35.9	7.8	-35.9	7.8
Queue Length 95th (m)	ms.4	m#370.4	#90.9	67.8	40.2	63.6	#75.1	16.1	#75.1	16.1	#75.1	16.1
Internal Link Dist (m)	170.5	124.7	340.6	70.0	50.0	275.9	70.0	50.0	275.9	70.0	50.0	275.9
Turn Bay Length (m)	345	2035	162	1976	227	625	98	630	98	630	98	630
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	1.15	1.18	0.53	0.44	0.66	0.22	0.66	0.22	0.66	0.22	0.66
Intersection Summary	Cycle Length: 120 Actuated Cycle Length: 120 Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green Natural Cycle: 150 Control Type: Actuated-Coordinated - Volume exceeds capacity, queue is theoretically infinite. - Queue shown is maximum after two cycles. # 95th percentile volume exceeds capacity, queue may be longer. - Queue shown is maximum after two cycles. m Volume for 95th percentile queue is metered by upstream signal.											

Spills and Phases: 2: Fifth Line & Derry Road



2027 Scenario 1
 Future Total (AM)
 HCM Signalized Intersection Capacity Analysis
 3. James Snow Parkway & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	187	1723	30	70	552	185	24	271	183	334	377	182
Traffic Volume (vph)	187	1723	30	70	552	185	24	271	183	334	377	182
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	5.3	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	5.7	5.7
Total Lost Time (s)	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	0.98
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	3399	3438	1562	1738	3305	1516	1801	3202	1586	1616	3046	1403
Flt Permitted	0.95	1.00	1.00	0.07	1.00	1.00	0.52	1.00	0.52	1.00	0.38	1.00
Satd. Flow (perm)	3399	3438	1562	134	3305	1516	993	3202	1586	1650	3046	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	191	1758	31	71	563	189	24	277	187	341	385	186
RTOR Reduction (vph)	0	0	15	0	0	103	0	0	135	0	0	140
Lane Group Flow (vph)	191	1758	16	71	563	86	24	277	52	341	385	47
Confl. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	8	7	4	4
Permitted Phases	12.0	60.1	60.1	61.1	54.6	54.6	21.8	17.4	17.4	38.4	30.0	30.0
Actuated Green, G (s)	12.0	60.1	60.1	61.1	54.6	54.6	21.8	17.4	17.4	38.4	30.0	30.0
Effective Green, g (s)	0.10	0.50	0.50	0.51	0.46	0.46	0.18	0.14	0.14	0.32	0.25	0.25
Actuated G/C Ratio	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	339	1721	782	155	1503	689	210	464	229	344	761	350
Lane Grp Cap. (vph)	c0.06	c0.51	0.01	0.02	0.17	0.06	0.02	0.09	0.03	c0.14	0.13	0.03
v/s Ratio Prot	0.56	1.02	0.02	0.46	0.37	0.12	0.11	0.60	0.23	0.99	0.51	0.13
v/s Ratio Perm	51.5	299	15.1	26.2	21.5	18.9	40.7	48.0	45.4	37.5	38.6	34.9
Uniform Delay, d1	1.00	1.00	1.00	0.87	0.90	2.52	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.1	27.3	0.0	1.9	0.6	0.3	0.2	2.1	0.5	46.0	0.5	0.2
Incremental Delay, d2	53.6	57.2	15.1	24.5	19.9	47.9	41.0	50.1	45.9	83.5	39.2	35.1
Delay (s)	D	E	B	C	B	D	D	D	D	F	D	D
Level of Service	E	E	B	C	B	D	D	D	D	F	D	D
Approach Delay (s)	56.2	26.8						48.0			54.9	D
Approach LOS	E	C						D			D	
Intersection Summary												
HCM 2000 Control Delay												D
HCM 2000 Volume to Capacity Ratio	49.2											D
Actuated Cycle Length (s)	120.0											19.0
Intersection Capacity Utilization	96.1%											F
Analysis Period (min)	15											F
c Critical Lane Group												

12-14-2023
 BA Group
 Synchro 11 Report

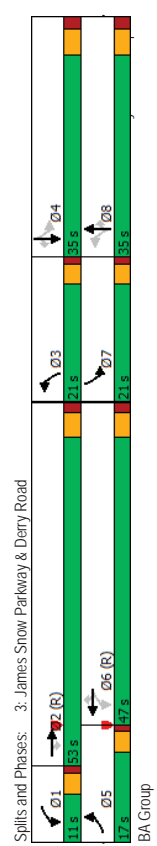
2027 Scenario 1
 Future Total (AM)
 3. James Snow Parkway & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	187	1723	30	70	552	185	24	271	183	334	377	182
Traffic Volume (vph)	187	1723	30	70	552	185	24	271	183	334	377	182
Future Volume (vph)	191	1758	31	71	563	189	24	277	187	341	385	186
Lane Group Flow (vph)	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	8	7	4	4
Permitted Phases	5	2	2	1	6	6	3	8	8	7	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	53.0	53.0	11.0	47.0	47.0	21.0	35.0	35.0	21.0	35.0	35.0
Total Split (%)	14.2%	44.2%	44.2%	9.2%	39.2%	39.2%	17.5%	29.2%	29.2%	17.5%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
v/c Ratio	0.56	0.98	0.04	0.40	0.36	0.23	0.09	0.66	0.54	0.99	0.51	0.38
Control Delay	57.6	47.2	0.1	17.6	20.1	8.7	28.1	56.7	16.7	82.4	41.8	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	47.2	0.1	17.6	20.1	8.7	28.1	56.7	16.7	82.4	41.8	7.6
Queue Length 50th (m)	23.6	-227.1	0.0	7.6	52.0	9.5	4.1	34.8	6.5	72.6	45.5	0.0
Queue Length 95th (m)	35.0	#314.4	0.0	17.2	75.4	30.6	9.9	47.5	27.8	#127.9	59.6	18.4
Internal Link Dist (m)	156.1			488.7				381.6			213.2	
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	100.0	75.0	95.0	115.0	100.0
Base Capacity (vph)	383	1789	859	178	1545	809	400	781	506	345	790	501
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.98	0.04	0.40	0.36	0.23	0.06	0.35	0.37	0.99	0.49	0.37

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated

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

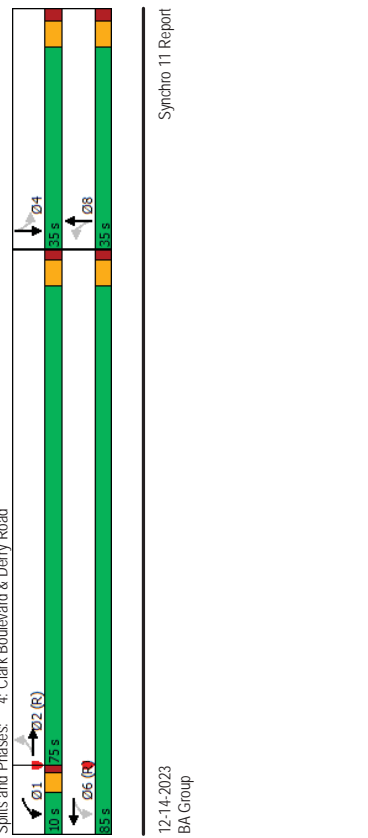


2027 Scenario 1
 HCM Signalized Intersection Capacity Analysis
 4: Clark Boulevard & Derry Road

2027 Scenario 1
 Future Total (AM)
 4: Clark Boulevard & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	75	2150	144	88	876	91	48	0	21	24	0	43
Future Volume (vph)	75	2150	144	88	876	91	48	0	21	24	0	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3506	1770	3489	1770	1583	1770	1583	1770	1583	1770	1583
Flt Permitted	0.27	1.00	0.04	1.00	0.73	1.00	0.74	1.00	0.74	1.00	0.74	1.00
Satd. Flow (perm)	507	3506	81	3489	1353	1583	1383	1583	1383	1583	1383	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	2337	157	96	952	99	52	0	23	26	0	47
RTOR Reduction (vph)	0	3	0	0	3	0	0	21	0	0	0	43
Lane Group Flow (vph)	82	2491	0	96	1048	0	52	2	0	26	4	0
Turn Type	Perm	NA	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2			1	6			8			4	
Permitted Phases	2			6				8			4	
Actuated Green, G (s)	87.5	87.5	99.7	99.7	99.7	93	9.3	9.3	9.3	9.3	9.3	9.3
Effective Green, g (s)	87.5	87.5	99.7	99.7	99.7	9.3	9.3	9.3	9.3	9.3	9.3	9.3
Actuated g/C Ratio	0.73	0.73	0.83	0.83	0.83	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	369	2556	182	2898	104	122	107	122	107	122	107	122
v/s Ratio Prot	c0.71	c0.71	c0.04	0.30	c0.04	0.00	0.02	0.02	0.02	0.02	0.02	0.02
v/s Ratio Perm	0.22	0.97	0.53	0.36	0.50	0.01	0.24	0.03	0.24	0.03	0.24	0.03
Uniform Delay, d1	5.3	15.2	37.5	2.5	53.1	53.1	51.1	51.1	52.0	51.2	52.0	51.2
Progression Factor	1.67	1.76	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	2.1	2.7	0.4	3.7	0.0	1.2	0.1	1.2	0.1	1.2	0.1
Delay (s)	8.9	28.8	40.3	2.8	56.9	51.2	53.2	51.3	53.2	51.3	53.2	51.3
Level of Service	A	C	D	A	E	D	D	D	D	D	D	D
Approach Delay (s)	28.2	5.9	55.1	0.05	0.16	0.05	0.08	0.08	0.08	0.08	0.08	0.09
Approach LOS	C	C	A	A	E	D	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	22.6 HCM 2000 Level of Service C											
HCM 2000 Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	90.8% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	75	2150	88	876	48	0	24	0	24	0	0	43
Future Volume (vph)	75	2150	88	876	48	0	24	0	24	0	0	43
Lane Group Flow (vph)	82	2494	96	1051	52	23	26	47	26	47	0	47
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6			8			4	
Permitted Phases	2			6				8			4	
Detector Phase	2			2			1	6			8	
Switch Phase	2			2			1	6			8	
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Spill (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	C-Min	None	None	None	C-Min	None
v/c Ratio	0.22	0.96	0.52	0.35	0.41	0.10	0.20	0.16	0.20	0.16	0.20	0.16
Control Delay	11.9	27.9	26.8	3.0	60.8	0.9	53.2	1.1	53.2	1.1	53.2	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	27.9	26.8	3.0	60.8	0.9	53.2	1.1	53.2	1.1	53.2	1.1
Queue Length 50th (m)	9.0	291.5	6.2	25.7	12.5	0.0	6.1	0.0	6.1	0.0	6.1	0.0
Queue Length 95th (m)	m10.9	m255.5	24.8	41.3	25.2	0.0	15.1	0.0	15.1	0.0	15.1	0.0
Internal Link Dist (m)	336.0 475.1 56.4 313.3											
Turn Bay Length (m)	70.0 70.0											
Base Capacity (vph)	374	2595	184	2967	330	454	337	511	337	511	337	511
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.96	0.52	0.35	0.41	0.10	0.20	0.16	0.20	0.16	0.20	0.16
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
m Volume for 95th percentile queue is metered by upstream signal.												



Splits and Phases: 4: Clark Boulevard & Derry Road

HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard

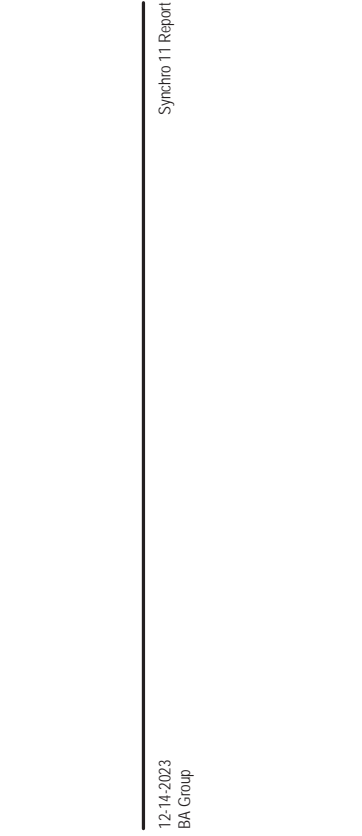
Queues
 5: Fifth Line & Clark Boulevard

Future Total (AM)
 2027 Scenario 1

Future Total (AM)
 2027 Scenario 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	10	3	10	469	306	37
Traffic Volume (vph)	10	3	10	469	306	37
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.3	5.3	5.7	5.7	5.7	5.7
Total Lost Time (s)	1.00	1.00	1.00	1.00	1.00	0.99
Lane Util. Factor	1.00	0.85	1.00	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	1863	1836	1836
Flt Permitted	0.95	1.00	0.54	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1005	1863	1836	1836
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	3	11	510	333	40
RTOR Reduction (vph)	0	3	0	0	3	0
Lane Group Flow (vph)	11	0	11	510	370	0
Turn Type	Perm	Perm	Perm	NA	NA	NA
Protected Phases				8	4	
Permitted Phases	2	2	8			
Actuated Green, G (s)	1.3	1.3	28.8	28.8	28.8	
Effective Green, g (s)	1.3	1.3	28.8	28.8	28.8	
Actuated g/C Ratio	0.03	0.03	0.70	0.70	0.70	
Clearance Time (s)	5.3	5.3	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	55	50	704	1305	1286	
v/s Ratio Prot	0.01	0.00	0.01	0.27	0.20	
v/s Ratio	0.20	0.00	0.02	0.39	0.29	
Uniform Delay, d1	19.4	19.3	1.9	2.5	2.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	0.0	0.0	0.2	0.1	
Delay (s)	21.2	19.3	1.9	2.7	2.4	
Level of Service	C	B	A	A	A	
Approach Delay (s)	20.8		2.7	2.4		
Approach LOS	C		A	A		
Intersection Summary						
HCM 2000 Control Delay			2.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio			0.38			
Actuated Cycle Length (s)			41.1	Sum of lost time (s)	11.0	
Intersection Capacity Utilization			42.2%	ICU Level of Service	A	
Analysis Period (min)			15			
c. Critical Lane Group						

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	10	3	10	469	306	37
Traffic Volume (vph)	10	3	10	469	306	37
Future Volume (vph)	10	3	10	469	306	37
Lane Group Flow (vph)	11	3	11	510	373	
Turn Type	Perm	Perm	Perm	NA	NA	NA
Protected Phases				8	4	
Permitted Phases	2	2	8			
Detector Phase	2	2	8	8	4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	34.3	34.3	34.7	34.7	34.7	
Total Split (s)	35.0	35.0	85.0	85.0	85.0	
Total Spilt (%)	29.2%	29.2%	70.8%	70.8%	70.8%	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	1.6	1.6	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.3	5.3	5.7	5.7	5.7	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min	Min	Min	
v/c Ratio	0.02	0.01	0.01	0.30	0.22	
Control Delay	14.5	12.0	2.2	2.4	2.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.5	12.0	2.2	2.4	2.1	
Queue Length 50th (m)	0.4	0.0	0.0	0.0	0.0	
Queue Length 95th (m)	4.5	1.8	1.8	39.9	26.6	
Internal Link Dist (m)	204.0			156.9	372.1	
Turn Bay Length (m)	35.0			35.0		
Base Capacity (vph)	1503	1345	1006	1863	1837	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.01	0.00	0.01	0.27	0.20	
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 36.9						
Natural Cycle: 70						
Control Type: Actuated-Uncoordinated						



HCM Unsignalized Intersection Capacity Analysis
 10: Clark Boulevard & Anatolia Building 1 North Access/Anatolia Building 2 North Access Scenario 1

HCM Unsignalized Intersection Capacity Analysis
 9: Sixth Line & Anatolia Building 3 East Access Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	3	0	0	0	0	13	0	53	0	39	190	3
Future Volume (Veh/h)	3	0	0	0	0	13	0	53	0	39	190	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	0	0	0	0	14	0	58	0	42	207	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												80
pX platoon unblocked												
VC, conflicting volume	364	350	208	350	352	58	210					58
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol	364	350	208	350	352	58	210					58
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1					4.1
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2					2.2
p0 queue free %	99	100	100	100	100	99	100					97
CM capacity (veh/h)	571	558	832	592	557	1008	1361					1546
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volumes Total	3	14	58	252								
Volume Left	3	0	0	42								
Volume Right	0	14	0	3								
cSH	571	1008	1361	1546								
Volumes to Capacity	0.01	0.01	0.00	0.03								
Queue Length 95th (m)	0.1	0.3	0.0	0.7								
Control Delay (s)	11.3	8.6	0.0	1.4								
Lane LOS	B	A	A	A								
Approach Delay (s)	11.3	8.6	0.0	1.4								
Approach LOS	B	A	A	A								
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization				29.0%								A
Analysis Period (min)				15								

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	7	1	4	275	285	22
Future Volume (Veh/h)	7	1	4	275	285	22
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	1	4	299	310	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						236
pX platoon unblocked						
VC, conflicting volume	629	322	334			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	629	322	334			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
CM capacity (veh/h)	445	719	1225			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	9	303	334			
Volume Left	8	4	0			
Volume Right	1	0	24			
cSH	464	1225	1700			
Volumes to Capacity	0.02	0.00	0.20			
Queue Length 95th (m)	0.5	0.1	0.0			
Control Delay (s)	12.9	0.1	0.0			
Lane LOS	B	A	A			
Approach Delay (s)	12.9	0.1	0.0			
Approach LOS	B	A	A			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			27.7%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Clark Boulevard & Anatolia Building 1 South Access

HCM Unsignalized Intersection Capacity Analysis
 11: Clark Boulevard & Anatolia Building 2 South Access

Future Total (AM)
 2027 Scenario 1

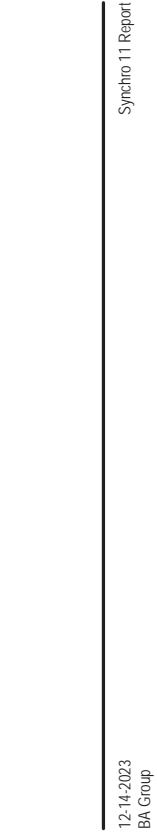
Future Total (AM)
 2027 Scenario 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W					
Traffic Volume (veh/h)	41	0	0	0	0	145
Future Volume (Veh/h)	41	0	0	0	0	145
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	0	0	0	0	158
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	79	79	158			
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	79	79	158			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	95	100	100			
CM capacity (veh/h)	924	981	1422			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	45	0	158			
Volume Left	45	0	0			
Volume Right	0	0	158			
CSH	924	1700	1700			
Volumes to Capacity	0.05	0.00	0.09			
Queue Length 95th (m)	1.2	0.0	0.0			
Control Delay (s)	9.1	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.1	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			19.0%			ICU Level of Service A
Analysis Period (min)			15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					
Traffic Volume (veh/h)	0	12	41	0	45	145
Future Volume (Veh/h)	0	12	41	0	45	145
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	13	45	0	49	158
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	301	45	45		45	
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	97			
CM capacity (veh/h)	669	1025	1563			
Direction, Lane #	WB 1	NB 1	SB 1			
Volumes Total	13	45	207			
Volume Left	0	0	49			
Volume Right	13	0	0			
CSH	1025	1700	1563			
Volumes to Capacity	0.01	0.03	0.03			
Queue Length 95th (m)	0.3	0.0	0.8			
Control Delay (s)	8.6	0.0	1.9			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	1.9			
Approach LOS	A		A			
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			26.8%			ICU Level of Service A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road
 Future Total (PM)
 2027 Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	160	1718	90	32	1707	22	199	153	37	93	214	139
Future Volume (vph)	160	1718	90	32	1707	22	199	153	37	93	214	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.94	1.00	0.94
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	3170	1805	2967	1805	2967	1805	1827	1805	1827	1258	1763
Flt Permitted	0.07	1.00	0.08	1.00	0.08	1.00	0.15	1.00	0.03	0.63	1.00	0.63
Satd. Flow (perm)	136	3170	149	2967	289	1827	289	1827	836	1763	1763	1763
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	170	1828	96	34	1816	23	212	163	39	99	228	148
RTOR Reduction (vph)	0	3	0	0	1	0	0	8	0	0	21	0
Lane Group Flow (vph)	170	1921	0	34	1838	0	212	194	0	99	355	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	NA	Perm	NA	NA
Protected Phases	5	2	1	6	3	8	3	8	3	8	4	4
Permitted Phases	2	62.5	54.7	55.3	51.1	35.6	35.6	35.6	24.6	24.6	24.6	24.6
Effective Green, G (s)	62.5	54.7	55.3	51.1	35.6	35.6	35.6	35.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.56	0.49	0.50	0.46	0.32	0.32	0.32	0.32	0.22	0.22	0.22	0.22
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	190	1562	136	1365	188	585	188	585	185	390	185	390
v/s Ratio Prot	c0.06	0.61	0.01	c0.62	c0.07	0.11	c0.07	0.11	0.12	0.20	0.12	0.20
v/s Ratio Perm	0.44	0.11	0.11	c0.29	0.11	c0.29	0.11	c0.29	0.12	0.20	0.12	0.20
v/c Ratio	0.89	1.23	0.25	1.35	0.25	1.35	0.25	1.35	0.33	0.54	0.91	0.54
Uniform Delay, d1	29.8	28.1	24.4	29.9	34.5	28.7	34.5	28.7	38.2	42.1	38.2	42.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.2	109.3	1.0	161.0	104.1	0.3	104.1	0.3	3.0	24.8	3.0	24.8
Delay (s)	67.0	137.4	25.4	191.0	138.6	29.0	138.6	29.0	41.1	66.9	41.1	66.9
Level of Service	E	F	C	F	C	F	C	F	D	D	D	E
Approach Delay (s)	131.7		188.0		188.0		188.0		85.1		85.1	
Approach LOS	F		F		F		F		F		F	E
Intersection Summary												
HCM 2000 Control Delay	142.6	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	1.26	F										
Actuated Cycle Length (s)	111.0	Sum of lost time (s)										
Intersection Capacity Utilization	104.6%	ICU Level of Service										
Analysis Period (min)	15	G										
c Critical Lane Group												



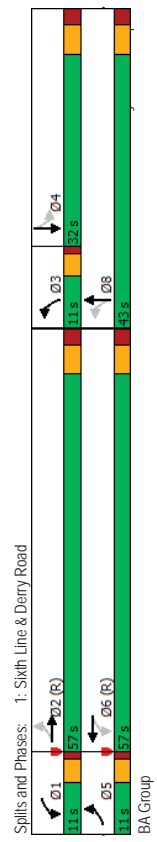
12-14-2023

BA Group

Syncho 11 Report

Queues
 1: Sixth Line & Derry Road
 Future Total (PM)
 2027 Scenario 1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	160	1718	90	32	1707	22	199	153	37	93	214	139
Future Volume (vph)	160	1718	90	32	1707	22	199	153	37	93	214	139
Lane Group Flow (vph)	170	1924	34	1839	212	202	199	376				
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	NA	NA
Protected Phases	5	2	1	6	3	8	3	8	4			
Permitted Phases	2	6	2	6	3	8	4					
Detector Phase	5	2	1	6	3	8	4					
Switch Phase												
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	25.0	7.0	25.0	7.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3
Total Split (s)	11.0	57.0	11.0	57.0	11.0	57.0	11.0	43.0	32.0	32.0	32.0	32.0
Total Split (%)	9.9%	51.4%	9.9%	51.4%	9.9%	51.4%	9.9%	38.7%	28.8%	28.8%	28.8%	28.8%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	1.0	2.2	1.0	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	None	None	None
v/c Ratio	0.89	1.20	0.18	1.35	1.09	0.34	1.09	0.34	0.54	0.91	0.54	0.91
Control Delay	68.2	121.6	12.6	188.7	122.4	28.5	122.4	28.5	49.5	66.8	49.5	66.8
Total Delay	68.2	121.6	12.6	188.7	122.4	28.5	122.4	28.5	49.5	66.8	49.5	66.8
Queue Length 50th (m)	23.4	-301.3	3.2	-292.5	-39.1	32.3	19.8	71.7				
Queue Length 95th (m)	#68.2	#346.7	7.6	#338.0	#82.5	52.6	38.4	#132.3				
Internal Link Dist (m)	475.1		256.2		211.8		201.7					
Turn Bay Length (m)	120.0		100.0		45.0		30.0					
Base Capacity (vph)	190	1610	184	1366	194	612	193	428				
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	1.20	0.18	1.35	1.09	0.33	1.09	0.33	0.51	0.88	0.51	0.88
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



2027 Scenario 1
Future Total (PM)

2: Fifth Line & Derry Road

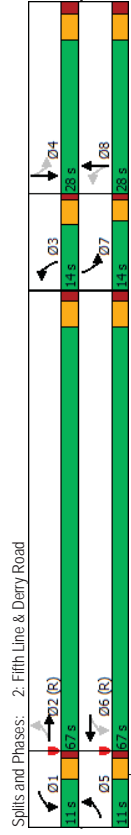
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	41	1616	79	110	1958	115	218	70	194	328	299
Future Volume (vph)	41	1616	79	110	1958	115	218	70	194	328	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.5	5.7	4.5	5.7	4.0	5.7	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1600	3261	1587	3296	1698	3052	1501	3343	1501	3343	1501
Flt Permitted	0.06	1.00	0.06	1.00	0.30	1.00	0.47	1.00	0.47	1.00	0.47
Satd. Flow (perm)	105	3261	100	3296	537	3052	750	3343	750	3343	750
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	44	1719	84	117	2083	122	232	74	206	349	318
RTOR Reduction (vph)	0	3	0	0	3	0	0	99	0	0	19
Lane Group Flow (vph)	44	1800	0	117	2202	0	232	181	0	349	381
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4	4
Permitted Phases	5	2	2	6	6	6	8	8	7	7	4
Actuated Green, G (s)	69.7	64.0	75.3	66.8	28.0	18.5	28.5	18.5	28.5	18.5	18.5
Effective Green, g (s)	69.7	64.0	75.3	66.8	28.0	18.5	28.5	18.5	28.5	18.5	
Actuated g/C Ratio	0.58	0.53	0.63	0.56	0.23	0.15	0.24	0.15	0.24	0.15	0.15
Clearance Time (s)	4.0	5.3	4.0	5.3	4.5	5.7	4.0	5.7	4.0	5.7	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	132	1739	168	1834	217	470	240	515	240	515	240
v/s Ratio Prot	0.02	0.55	c0.05	c0.67	0.08	0.06	c0.12	0.11	c0.12	0.11	c0.12
v/s Ratio Perm	0.18	0.39	0.39	0.39	0.16	0.16	c0.22	c0.22	c0.22	c0.22	c0.22
v/c Ratio	0.33	1.04	0.70	1.20	1.07	0.39	1.45	0.74	1.45	0.74	0.74
Uniform Delay, d1	26.2	28.0	29.9	26.6	43.5	45.6	44.1	48.4	44.1	48.4	48.4
Progression Factor	1.74	0.78	0.91	1.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	26.4	6.5	93.3	80.6	0.5	226.1	5.5	226.1	5.5	5.5
Delay (s)	46.5	48.2	33.8	124.3	124.2	46.2	270.2	53.9	270.2	53.9	53.9
Level of Service	D	D	C	F	F	D	F	D	F	D	D
Approach Delay (s)	48.1			119.8		81.5	154.7		154.7		154.7
Approach LOS	D			F		F	F		F		F
Intersection Summary											
HCM 2000 Control Delay	96.6 HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	1.26										
Actuated Cycle Length (s)	120.0 Sum of lost time (s)										
Intersection Capacity Utilization	106.0% ICU Level of Service										
Analysis Period (min)	15										
c Critical Lane Group											

12-14-2023
BA Group
Synchro 11 Report

2027 Scenario 1
Future Total (PM)

2: Fifth Line & Derry Road

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	41	1616	110	1958	218	70	328	299	77	328	299
Future Volume (vph)	41	1616	110	1958	218	70	328	299	77	328	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.5	5.7	4.5	5.7	4.0	5.7	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1600	3261	1587	3296	1698	3052	1501	3343	1501	3343	1501
Flt Permitted	0.06	1.00	0.06	1.00	0.30	1.00	0.47	1.00	0.47	1.00	0.47
Satd. Flow (perm)	105	3261	100	3296	537	3052	750	3343	750	3343	750
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	44	1719	84	117	2083	122	232	74	206	349	318
RTOR Reduction (vph)	0	3	0	0	3	0	0	99	0	0	19
Lane Group Flow (vph)	44	1800	0	117	2202	0	232	181	0	349	381
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4	4
Permitted Phases	5	2	2	6	6	6	8	8	7	7	4
Actuated Green, G (s)	69.7	64.0	75.3	66.8	28.0	18.5	28.5	18.5	28.5	18.5	18.5
Effective Green, g (s)	69.7	64.0	75.3	66.8	28.0	18.5	28.5	18.5	28.5	18.5	18.5
Actuated g/C Ratio	0.58	0.53	0.63	0.56	0.23	0.15	0.24	0.15	0.24	0.15	0.15
Clearance Time (s)	4.0	5.3	4.0	5.3	4.5	5.7	4.0	5.7	4.0	5.7	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	132	1739	168	1834	217	470	240	515	240	515	240
v/s Ratio Prot	0.02	0.55	c0.05	c0.67	0.08	0.06	c0.12	0.11	c0.12	0.11	c0.12
v/s Ratio Perm	0.18	0.39	0.39	0.39	0.16	0.16	c0.22	c0.22	c0.22	c0.22	c0.22
v/c Ratio	0.33	1.04	0.70	1.20	1.07	0.39	1.45	0.74	1.45	0.74	0.74
Uniform Delay, d1	26.2	28.0	29.9	26.6	43.5	45.6	44.1	48.4	44.1	48.4	48.4
Progression Factor	1.74	0.78	0.91	1.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	26.4	6.5	93.3	80.6	0.5	226.1	5.5	226.1	5.5	5.5
Delay (s)	46.5	48.2	33.8	124.3	124.2	46.2	270.2	53.9	270.2	53.9	53.9
Level of Service	D	D	C	F	F	D	F	D	F	D	D
Approach Delay (s)	48.1			119.8		81.5	154.7		154.7		154.7
Approach LOS	D			F		F	F		F		F
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle: 145											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											



HCM Signalized Intersection Capacity Analysis
3. James Snow Parkway & Derry Road

Future Total (PM)
2027 Scenario 1

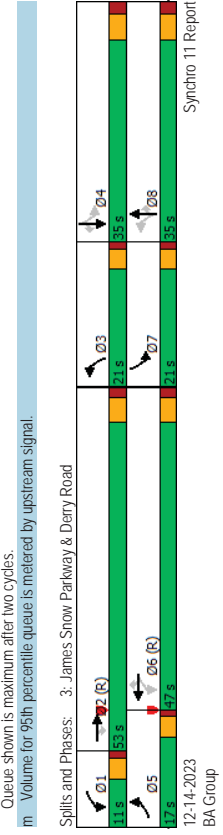
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Traffic Volume (vph)	192	1186	16	264	1389	476	79	337	190	327	443	209
Future Volume (vph)	192	1186	16	264	1389	476	79	337	190	327	443	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp_psd/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98
Frbp_psd/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3438	1562	1738	3305	1516	1802	3202	1586	1616	3046	1403
Flt Permitted	0.95	1.00	1.00	0.98	1.00	1.00	0.49	1.00	0.49	1.00	0.32	1.00
Satd. Flow (perm)	3399	3438	1562	144	3305	1516	931	3202	1586	1616	3046	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	196	1210	16	269	1417	486	81	344	194	334	452	213
RTOR Reduction (vph)	0	0	10	0	0	175	0	0	138	0	0	163
Lane Group Flow (vph)	196	1210	6	269	1417	311	81	344	56	334	452	50
Conf. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	7	4	7	4	4
Permitted Phases	12	46.9	46.9	68.8	52.6	52.6	27.1	19.2	19.2	40.2	28.3	28.3
Actuated Green, G (s)	12.2	46.9	46.9	68.8	52.6	52.6	27.1	19.2	19.2	40.2	28.3	28.3
Effective Green, g (s)	0.10	0.39	0.39	0.57	0.44	0.44	0.23	0.16	0.16	0.34	0.24	0.24
Actuated g/C Ratio	4.0	5.3	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	5.7	5.7
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	345	1343	610	320	1448	664	267	512	253	334	718	330
Lane Grp Cap. (vph)	0.06	0.35	0.00	0.13	0.43	0.02	0.11	0.04	0.14	0.15	0.15	0.04
v/s Ratio Prot	0.57	0.90	0.01	0.84	0.98	0.47	0.30	0.67	0.22	1.00	0.63	0.15
v/s Ratio Perm	51.4	34.4	22.4	34.7	33.1	23.8	37.7	47.4	43.9	36.1	41.1	36.3
Uniform Delay, d1	1.00	1.00	1.00	0.80	1.02	1.55	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.1	10.0	0.0	1.9	3.7	0.2	0.6	3.5	0.4	49.2	1.7	0.2
Incremental Delay, d2	53.5	44.3	22.4	29.9	37.5	37.1	38.3	50.9	44.3	85.4	42.9	36.6
Delay (s)	D	D	C	C	D	D	D	D	D	D	F	D
Level of Service	D	D	C	C	D	D	D	D	D	D	F	D
Approach Delay (s)	D	45.4	D	36.5	D	D	47.2	D	D	55.7	D	E
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	E
Intersection Summary												
HCM 2000 Control Delay	43.9 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	90.7% ICU Level of Service											
Analysis Period (min)	15											
Critical Lane Group	E											

12-14-2023
BA Group
Synchro 11 Report

Queues
3. James Snow Parkway & Derry Road

Future Total (PM)
2027 Scenario 1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Traffic Volume (vph)	192	1186	16	264	1389	476	79	337	190	327	443	209
Future Volume (vph)	192	1186	16	264	1389	476	79	337	190	327	443	209
Lane Group Flow (vph)	196	1210	16	269	1417	486	81	344	194	334	452	213
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	7	4	7	4	4
Permitted Phases	5	2	2	1	6	3	8	7	4	7	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	53.0	53.0	17.0	47.0	47.0	21.0	35.0	35.0	21.0	35.0	35.0
Total Split (%)	14.2%	44.2%	44.2%	9.2%	39.2%	39.2%	17.5%	29.2%	29.2%	17.5%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.57	0.89	0.02	0.84	0.96	0.57	0.27	0.70	0.51	0.99	0.63	0.43
Control Delay	57.6	42.8	0.1	29.8	36.6	14.9	29.0	55.7	14.8	81.0	46.0	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	42.8	0.1	29.8	36.6	14.9	29.0	55.7	14.8	81.0	46.0	7.8
Queue Length 50th (m)	24.2	144.8	0.0	42.3	190.0	71.6	13.8	43.2	6.5	68.5	54.6	0.0
Queue Length 95th (m)	35.7	178.0	0.0	64.7	302.7	118.7	21.2	66.3	10.0	101.7	71.0	19.8
Internal Link Dist (m)	156.1											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	75.0	95.0	213.2	115.0
Base Capacity (vph)	386	1366	679	320	1470	847	411	781	511	338	769	513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.89	0.02	0.84	0.96	0.57	0.20	0.44	0.38	0.99	0.59	0.42
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 115												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
m Volume for 95th percentile queue is metered by upstream signal.												



HCM Signalized Intersection Capacity Analysis
4: Clark Boulevard & Derry Road

Future Total (PM)
2027 Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	1860	58	31	1974	24	156	0	72	74	0	169
Future Volume (vph)	30	1860	58	31	1974	24	156	0	72	74	0	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3523		1770	3533		1770	1583		1770	1583	
Flt Permitted	0.05	1.00		0.05	1.00		0.50	1.00		0.71	1.00	
Satd. Flow (perm)	97	3523		92	3533		938	1583		1316	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	2022	63	34	2146	26	170	0	78	80	0	184
RTOR Reduction (vph)	0	1	0	0	1	0	0	62	0	0	46	0
Lane Group Flow (vph)	33	2084	0	34	2171	0	170	16	0	80	138	0
Turn Type	Perm	NA	pm+pt	NA	pm+pt	NA	Perm	NA	NA	Perm	NA	NA
Protected Phases	2 2 1 6 8 8											
Permitted Phases	2 2 6 6 8 8											
Actual Green, G (s)	77.2	77.2	84.8	84.8	84.8	24.2	24.2	24.2	24.2	24.2	24.2	24.2
Effective Green, g (s)	77.2	77.2	84.8	84.8	84.8	24.2	24.2	24.2	24.2	24.2	24.2	24.2
Actuated g/C Ratio	0.64	0.64	0.71	0.71	0.71	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	62	2266	115	2496	189	319	265	319	265	319	265	319
v/s Ratio Prot	c0.59		0.01	c0.61		0.01		0.01		0.06		0.09
v/s Ratio Perm	0.53	0.92	0.30	0.87	0.90	0.05	0.30	0.43	0.30	0.43	0.30	0.43
Uniform Delay, d1	11.6	18.7	24.5	13.4	46.7	38.6	40.7	41.9	40.7	41.9	40.7	41.9
Progression Factor	1.51	1.42	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	0.8	1.4	4.5	38.1	0.1	0.6	0.9	0.6	0.9	0.6	0.9
Delay (s)	20.4	27.4	26.0	17.9	84.8	38.7	41.4	42.9	41.4	42.9	41.4	42.9
Level of Service	C	C	C	C	B	F	D	D	D	D	D	D
Approach Delay (s)	27.3			18.0			70.3			42.4		
Approach LOS	C			B			E			D		

Intersection Summary	
HCM 2000 Control Delay	26.1
HCM 2000 Volume to Capacity ratio	0.93
Actuated Cycle Length (s)	120.0
Intersection Capacity Utilization	88.4%
Analysis Period (min)	15
c Critical Lane Group	

12-14-2023
BA Group

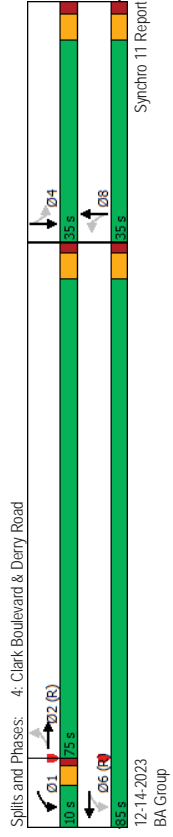
Synchro 11 Report

Queues
4: Clark Boulevard & Derry Road

Future Total (PM)
2027 Scenario 1

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations									
Traffic Volume (vph)	30	1860	31	1974	156	0	74	0	
Future Volume (vph)	30	1860	31	1974	156	0	74	0	
Lane Group Flow (vph)	33	2085	34	2172	170	78	80	184	
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases	2 2 1 6 6 8 8 4								
Permitted Phases	2 2 1 6 6 8 8 4								
Detector Phase	2 2 1 6 6 8 8 4								
Switch Phase	2 2 1 6 6 8 8 4								
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	
Total Split (s)	75.0	75.0	10.0	85.0	35.0	35.0	35.0	35.0	
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	
v/c Ratio	0.52	0.90	0.23	0.87	0.90	0.20	0.30	0.50	
Control Delay	35.1	28.1	9.6	19.7	90.1	5.9	42.0	32.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	35.1	28.1	9.6	19.7	90.1	5.9	42.0	32.8	
Queue Length 50th (m)	6.4	240.9	2.3	203.7	40.7	0.0	16.7	27.3	
Queue Length 95th (m)	m7.1	m226.3	6.0	275.8	#74.1	9.1	30.7	48.8	
Internal Link Dist (m)	336.0			475.1			56.4		
Turn Bay Length (m)	70.0								
Base Capacity (vph)	63	2312	149	2495	228	458	321	429	
Starvation Cap Reductn	0								
Spillback Cap Reductn	0								
Storage Cap Reductn	0								
Reduced v/c Ratio	0.52	0.90	0.23	0.87	0.75	0.17	0.25	0.43	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBTL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



12-14-2023
BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
5: Fifth Line & Clark Boulevard

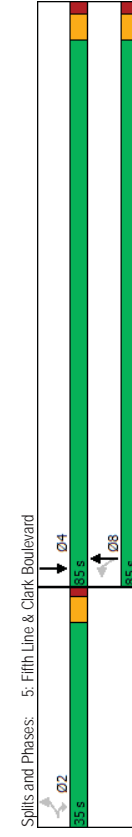
Future Total (PM)
2027 Scenario 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	39	10	4	443	477	11
Future Volume (vph)	39	10	4	443	477	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	1863	1857	1857
Flt Permitted	0.95	1.00	0.45	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	839	1863	1857	1857
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	11	4	482	518	12
RTOR Reduction (vph)	0	10	0	0	1	0
Lane Group Flow (vph)	42	1	4	482	529	0
Turn Type	Perm	Perm	Perm	NA	NA	NA
Protected Phases				8	4	
Permitted Phases	2	2	8			
Actuated Green, G (s)	5.1	5.1	28.4	28.4	28.4	
Effective Green, g (s)	5.1	5.1	28.4	28.4	28.4	
Actuated g/C Ratio	0.11	0.11	0.64	0.64	0.64	
Clearance Time (s)	5.3	5.3	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap. (vph)	202	181	535	1188	1185	
v/s Ratio Prot	0.02	0.00	0.00	0.26	0.29	
v/s Ratio	0.21	0.01	0.01	0.41	0.45	
Uniform Delay, d1	17.9	17.5	2.9	3.9	4.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.0	0.0	0.2	0.3	
Delay (s)	18.4	17.5	2.9	4.2	4.3	
Level of Service	B	B	A	A	A	
Approach Delay (s)	18.2		4.1	4.3		
Approach LOS	B		A	A		
Intersection Summary						
HCM 2000 Control Delay	4.9 HCM 2000 Level of Service A					
HCM 2000 Volume to Capacity ratio	0.41					
Actuated Cycle Length (s)	44.5					
Sum of lost time (s)	11.0					
Intersection Capacity Utilization	43.3% ICU Level of Service A					
Analysis Period (min)	15					
c. Critical Lane Group						

Queues
5: Fifth Line & Clark Boulevard

Future Total (PM)
2027 Scenario 1

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	EBL	EBR	NBL	NBT	SBT
Traffic Volume (vph)	39	10	4	443	477
Future Volume (vph)	39	10	4	443	477
Lane Group Flow (vph)	42	11	4	482	530
Turn Type	Perm	Perm	Perm	NA	NA
Protected Phases				8	4
Permitted Phases	2	2	8		
Detector Phase	2	2	8	8	4
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.7	34.7	34.7
Total Split (s)	35.0	35.0	85.0	85.0	85.0
Total Spilt (%)	29.2%	29.2%	70.8%	70.8%	70.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.7	5.7	5.7
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Min	Min	Min
v/c Ratio	0.09	0.03	0.01	0.35	0.38
Control Delay	16.4	9.4	4.8	5.8	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	9.4	4.8	5.8	6.0
Queue Length 50th (m)	3.3	0.0	0.1	21.7	24.6
Queue Length 95th (m)	8.9	2.9	1.0	39.1	44.6
Internal Link Dist (m)	204.0			156.9	372.1
Turn Bay Length (m)	35.0				
Base Capacity (vph)	1319	1182	838	1863	1857
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.03	0.01	0.00	0.26	0.29
Intersection Summary					
Cycle Length: 120					
Actuated Cycle Length: 42.2					
Natural Cycle: 70					
Control Type: Actuated-Uncoordinated					



HCM Unsignalized Intersection Capacity Analysis
 10: Clark Boulevard & Anatolia Building 1 North Access/Anatolia Building 2 North Access Scenario 1

HCM Unsignalized Intersection Capacity Analysis
 9: Sixth Line & Anatolia Building 3 East Access Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	0	0	0	0	0	40	0	184	0	11	74
Traffic Volume (veh/h)	4	0	0	0	0	40	0	184	0	11	74	4
Future Volume (Veh/h)	4	0	0	0	0	40	0	184	0	11	74	4
Sign Control	Stop	0%	0%	Stop	0%	0%	Free	0%	Free	Free	0%	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	0	0	0	0	43	0	200	0	12	80	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												80
pX platoon unblocked												
VC, conflicting volume	349	306	82	306	308	200	84			200		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol	349	306	82	306	308	200	84			200		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
IF (s)	99	100	100	100	100	95	100			99		
pM capacity (veh/h)	571	602	978	642	601	841	1513			1372		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volumes Total	4	43	200	9%								
Volume Left	4	0	0	12								
Volume Right	0	43	0	4								
cSH	571	841	1513	1372								
Volumes to Capacity	0.01	0.05	0.00	0.01								
Queue Length 95th (m)	0.2	1.3	0.0	0.2								
Control Delay (s)	11.4	9.5	0.0	1.0								
Lane LOS	B	A	A	A								
Approach Delay (s)	11.4	9.5	0.0	1.0								
Approach LOS	B	A										
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			23.5%									A
Analysis Period (min)			15									

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W	3	2	366	328	8
Traffic Volume (veh/h)	23	3	2	366	328	8
Future Volume (Veh/h)	23	3	2	366	328	8
Sign Control	Stop	Free	Free	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	3	2	398	357	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					236	
pX platoon unblocked						
VC, conflicting volume	764	362	366			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	697	259	264			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
p0 queue free %	3.5	3.3	2.2			
IF (s)	93	100	100			
pM capacity (veh/h)	373	715	1193			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	28	400	366			
Volume Left	25	2	0			
Volume Right	3	0	9			
cSH	393	1193	1700			
Volumes to Capacity	0.07	0.00	0.22			
Queue Length 95th (m)	1.8	0.0	0.0			
Control Delay (s)	14.9	0.1	0.0			
Lane LOS	B	A	A			
Approach Delay (s)	14.9	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			30.9%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Clark Boulevard & Anatolia Building 1 South Access
 Future Total (PM)
 2027 Scenario 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W					
Traffic Volume (veh/h)	142	0	0	0	0	53
Future Volume (Veh/h)	142	0	0	0	0	53
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	154	0	0	0	0	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	29	29	58			
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol	29	29	58			
VCu unblocked vol	6.4	6.2	4.1			
IC single (s)						
IC 2 stage (s)	3.5	3.3	2.2			
p0 queue free %	84	100	100			
CM capacity (veh/h)	986	1046	1546			
Direction_Lane #	EB 1	NB 1	SB 1			
Volumes Total	154	0	58			
Volume Left	154	0	0			
Volume Right	0	0	58			
cSH	986	1700	1700			
Volumes to Capacity	0.16	0.00	0.03			
Queue Length 95th (m)	4.4	0.0	0.0			
Control Delay (s)	9.3	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.3	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		6.8				
Intersection Capacity Utilization		17.9%				A
ICU Level of Service						
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
 11: Clark Boulevard & Anatolia Building 2 South Access
 Future Total (PM)
 2027 Scenario 1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					
Traffic Volume (veh/h)	0	42	142	0	21	53
Future Volume (Veh/h)	0	42	142	0	21	53
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	46	154	0	23	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked			258	154	154	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	258	154			154	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)	3.5	3.3			2.2	
p0 queue free %	100	95			98	
CM capacity (veh/h)	719	892			1426	
Direction_Lane #	WB 1	NB 1	SB 1			
Volumes Total	46	154	81			
Volume Left	0	0	23			
Volume Right	46	0	0			
cSH	892	1700	1426			
Volumes to Capacity	0.05	0.09	0.02			
Queue Length 95th (m)	1.3	0.0	0.4			
Control Delay (s)	9.3	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	2.2			
Approach LOS	A		A			
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		24.8%				A
ICU Level of Service						
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
1: Sixth Line & Derry Road

Queues
1: Sixth Line & Derry Road

Future Background (AM)
2027 Scenario 2

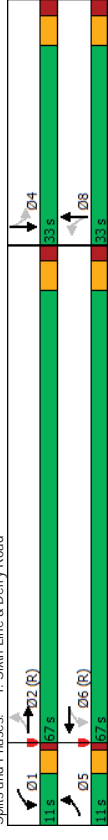
Future Background (AM)
2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	158	1947	139	15	692	38	69	167	28	34	131	122
Future Volume (vph)	158	1947	139	15	692	38	69	167	28	34	131	122
Ideal Flow (vehph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
F/I	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.93	1.00	0.93
F/I Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	3163	1805	2924	1805	1846	1805	1846	1805	1738	1805	1738
F/I Permitted	0.30	1.00	0.06	1.00	0.30	1.00	0.30	1.00	0.45	1.00	0.45	1.00
Satd. Flow (perm)	562	3163	114	2924	578	1846	578	1846	597	1738	597	1738
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	168	2071	148	16	736	40	73	178	30	36	139	130
RTOR Reduction (vph)	0	4	0	0	3	0	0	6	0	0	33	0
Lane Group Flow (vph)	168	2215	0	16	773	0	73	202	0	36	236	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	NA	NA	NA	Perm	NA	NA
Protected Phases	5	2	1	6	6	8	8	8	8	4	4	4
Permitted Phases	2	78.6	71.8	69.4	66.6	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Effective Green, G (s)	78.6	71.8	69.4	66.6	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Actuated Green, g (s)	0.71	0.65	0.63	0.60	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Actuated g/C Ratio	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	484	2045	113	1754	103	330	107	311	107	311	107	311
Lane Grp Cap (vph)	c0.02	c0.70	0.00	0.26	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
v/s Ratio Prot	0.22	0.35	1.08	0.14	0.44	0.71	0.61	0.61	0.61	0.61	0.61	0.61
v/s Ratio Perm	5.9	19.6	24.8	12.1	42.8	42.0	39.8	43.3	43.3	43.3	43.3	43.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.4	46.7	0.6	0.8	19.9	3.4	1.9	10.2	1.9	10.2	1.9	10.2
Incremental Delay, d2	6.4	66.3	25.4	12.9	62.8	45.4	41.6	53.5	41.6	53.5	41.6	53.5
Delay (s)	A	E	C	B	E	D	D	D	D	D	D	D
Level of Service	62.1	13.1	49.9	52.1	49.9	52.1	49.9	52.1	49.9	52.1	49.9	52.1
Approach Delay (s)	E	E	B	D	D	D	D	D	D	D	D	D
Approach LOS	E	E	B	D	D	D	D	D	D	D	D	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	158	1947	139	15	692	38	69	167	28	34	131	122
Future Volume (vph)	158	1947	139	15	692	38	69	167	28	34	131	122
Lane Group Flow (vph)	168	2219	16	776	73	208	36	269	36	269	36	269
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	NA	NA	NA	Perm	NA	NA
Protected Phases	5	2	1	6	6	8	8	8	8	4	4	4
Permitted Phases	2	78.6	71.8	69.4	66.6	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Effective Green, G (s)	78.6	71.8	69.4	66.6	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
Actuated Green, g (s)	0.71	0.65	0.63	0.60	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Actuated g/C Ratio	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	484	2045	113	1754	103	330	107	311	107	311	107	311
Lane Grp Cap (vph)	c0.02	c0.70	0.00	0.26	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
v/s Ratio Prot	0.22	0.35	1.08	0.14	0.44	0.71	0.61	0.61	0.61	0.61	0.61	0.61
v/s Ratio Perm	5.9	19.6	24.8	12.1	42.8	42.0	39.8	43.3	43.3	43.3	43.3	43.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.4	46.7	0.6	0.8	19.9	3.4	1.9	10.2	1.9	10.2	1.9	10.2
Incremental Delay, d2	6.4	66.3	25.4	12.9	62.8	45.4	41.6	53.5	41.6	53.5	41.6	53.5
Delay (s)	A	E	C	B	E	D	D	D	D	D	D	D
Level of Service	62.1	13.1	49.9	52.1	49.9	52.1	49.9	52.1	49.9	52.1	49.9	52.1
Approach Delay (s)	E	E	B	D	D	D	D	D	D	D	D	D
Approach LOS	E	E	B	D	D	D	D	D	D	D	D	D

Intersection Summary
 HCM 2000 Control Delay: 50.1 HCM 2000 Level of Service: D
 HCM 2000 Volume to Capacity ratio: 1.00
 Actuated Cycle Length (s): 111.0 Sum of lost time (s): 16.5
 Intersection Capacity Utilization: 105.8% ICU Level of Service: G
 Analysis Period (min): 15
 Critical Lane Group

Intersection Summary
 Cycle Length: 111
 Actuated Cycle Length: 111
 Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.



2: Fifth Line & Derry Road

Future Background (AM)

2027 Scenario 2

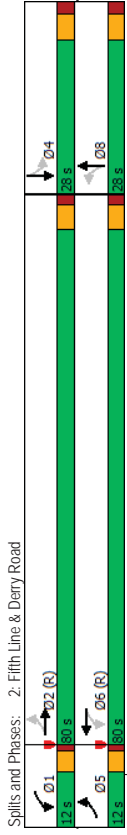
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	88	1980	95	175	683	249	93	286	77	110
Future Volume (vph)	88	1980	95	175	683	249	93	286	77	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	3262	1587	3096	1698	3225	1501	3249	1501	3249
Flt Permitted	0.24	1.00	0.05	1.00	0.69	1.00	0.37	1.00	0.37	1.00
Satd. Flow (perm)	405	3262	89	3096	1228	3225	577	3249	577	3249
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	94	2106	101	186	727	265	99	304	82	117
RTOR Reduction (vph)	0	3	0	0	31	0	0	20	0	26
Lane Group Flow (vph)	94	2204	0	186	961	0	99	366	0	117
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	8	4	4
Permitted Phases	2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3
Effective Green, G (s)	83.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.69	0.62	0.69	0.63	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	352	2030	161	1940	228	599	107	603	107	603
v/s Ratio Prot	0.02	0.68	c0.08	0.31	0.08	0.11	0.02	0.02	0.02	0.02
v/s Ratio Perm	0.17	60.72	60.72	0.88	0.08	0.11	0.02	0.02	0.02	0.02
v/c Ratio	0.27	1.09	1.16	0.50	0.43	0.61	1.09	0.13	1.09	0.13
Uniform Delay, d1	7.1	22.6	41.2	12.1	43.3	44.9	48.9	40.7	48.9	40.7
Progression Factor	0.53	0.47	0.97	0.94	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	44.0	117.9	0.9	1.3	1.8	114.4	0.1	114.4	0.1
Delay (s)	4.0	54.7	157.7	12.3	44.6	46.7	163.3	40.8	163.3	40.8
Level of Service	A	D	F	B	D	D	F	D	F	D
Approach Delay (s)	52.6		35.3		46.3		105.9		46.3	
Approach LOS	D		D		D		F		D	
Intersection Summary										
HCM 2000 Control Delay	49.8	HCM 2000 Level of Service								
HCM 2000 Volume to Capacity ratio	1.14	D								
Actuated Cycle Length (s)	120.0	Sum of lost time (s)								
Intersection Capacity Utilization	103.4%	15.0								
Analysis Period (min)	15	G								
c Critical Lane Group										

2: Fifth Line & Derry Road

Future Background (AM)

2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	88	1980	175	683	249	93	286	77	110	67
Future Volume (vph)	88	1980	175	683	249	93	286	77	110	67
Lane Group Flow (vph)	94	2207	186	992	99	386	117	103	103	103
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	8	4	4
Permitted Phases	2	6	6	6	6	8	8	8	4	4
Detector Phase	5	2	1	6	6	8	8	8	4	4
Switch Phase	5	2	1	6	6	8	8	8	4	4
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	34.3	11.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	12.0	80.0	12.0	80.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	10.0%	66.7%	10.0%	66.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.26	1.09	1.15	0.50	0.43	0.62	1.09	0.16	1.09	0.16
Control Delay	3.5	58.0	144.3	11.5	50.1	47.0	160.8	28.9	160.8	28.9
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	58.0	144.3	11.5	50.1	47.0	160.8	28.9	160.8	28.9
Queue Length 50th (m)	3.5	-324.4	-39.2	55.0	22.0	43.7	-32.7	17.7	-32.7	17.7
Queue Length 95th (m)	ms.3.4	ms.355.5	#87.7	64.7	40.2	61.1	#71.9	16.0	#71.9	16.0
Internal Link Dist (m)	170.5	124.7	170.5	124.7	70.0	340.6	275.9	70.0	340.6	275.9
Turn Bay Length (m)	100.0	90.0	90.0	70.0	70.0	50.0	50.0	50.0	50.0	50.0
Base Capacity (vph)	363	2032	162	1971	228	619	107	629	107	629
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	1.09	1.15	0.50	0.43	0.62	1.09	0.16	1.09	0.16
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green										
Natural Cycle: 150										
Control Type: Actuated-Coordinated										
- Volume exceeds capacity, queue is theoretically infinite.										
Queue shown is maximum after two cycles.										
# 95th percentile volume exceeds capacity, queue may be longer.										
Queue shown is maximum after two cycles.										
m Volume for 95th percentile queue is metered by upstream signal.										



HCM Signalized Intersection Capacity Analysis
 3. James Snow Parkway & Derry Road

Future Background (AM)
 2027 Scenario 2

	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBT	SBR
Lane Configurations	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBT	SBR
Traffic Volume (vph)	187	1652	30	67	533	161	24	271	179
Future Volume (vph)	187	1652	30	67	533	161	24	271	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frp. ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	0.98
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3399	3438	1562	1738	3305	1516	1801	3202	1586
Flt Permitted	0.95	1.00	1.00	0.07	1.00	0.52	1.00	0.38	1.00
Satd. Flow (perm)	3399	3438	1562	134	3305	1516	993	3202	1586
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	191	1686	31	68	544	164	24	277	183
RTOR Reduction (vph)	0	0	15	0	0	89	0	0	150
Lane Group Flow (vph)	191	1686	16	68	544	75	24	277	33
Confl. Peds. (#/hr)	1	6	1	6	1	6	1	6	6
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	1	6	6	3	8	7	4
Permitted Phases	12	6	2	6	6	8	8	4	4
Actuated Green, G (s)	60.2	60.2	61.0	54.6	54.6	21.8	17.4	17.4	38.4
Effective Green, g (s)	60.2	60.2	61.0	54.6	54.6	21.8	17.4	17.4	38.4
Actuated g/C Ratio	0.10	0.50	0.50	0.51	0.46	0.18	0.14	0.14	0.32
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	4.0	5.7	4.0	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	339	1724	783	153	1503	689	210	464	229
v/s Ratio Prot	c0.06	c0.49	0.01	0.20	0.02	0.16	0.00	0.09	c0.12
v/s Ratio Perm	0.56	0.98	0.02	0.44	0.36	0.11	0.11	0.60	0.15
Uniform Delay, d1	51.5	29.3	15.1	25.1	21.3	18.7	40.7	48.0	44.8
Progression Factor	1.00	1.00	1.00	0.71	0.89	2.35	1.00	1.00	1.00
Incremental Delay, d2	2.1	17.0	0.0	1.8	0.6	0.3	0.2	2.1	0.3
Delay (s)	53.6	46.3	15.1	19.7	19.7	44.3	41.0	50.1	48.7
Level of Service	D	D	B	B	B	D	D	D	D
Approach Delay (s)	46.5	24.9							41.4
Approach LOS	D	D	C						D
Intersection Summary									
HCM 2000 Control Delay	41.4								D
HCM 2000 Volume to Capacity ratio	0.93								
Actuated Cycle Length (s)	120.0								19.0
Intersection Capacity Utilization	91.0%								F
Analysis Period (min)	15								
Critical Lane Group									

12-14-2023
 BA Group

Synchro 11 Report

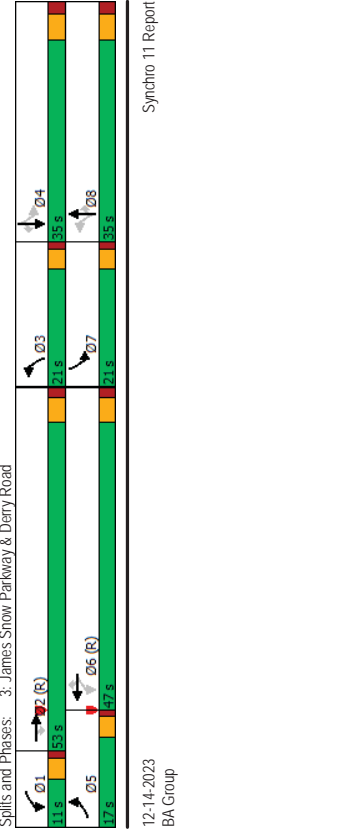
Queues
 3. James Snow Parkway & Derry Road

Future Background (AM)
 2027 Scenario 2

	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBT	SBR
Lane Configurations	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBT	SBR
Traffic Volume (vph)	187	1652	30	67	533	161	24	271	179
Future Volume (vph)	187	1652	30	67	533	161	24	271	179
Lane Group Flow (vph)	191	1686	31	68	544	164	24	277	183
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	1	6	6	3	8	7	4
Permitted Phases	5	2	2	2	1	6	6	3	8
Detector Phase	5	2	2	2	1	6	6	3	8
Switch Phase	5	2	2	2	1	6	6	3	8
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7
Total Split (s)	17.0	53.0	53.0	11.0	47.0	47.0	21.0	35.0	35.0
Total Split (%)	14.2%	44.2%	44.2%	9.2%	39.2%	39.2%	17.5%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.0	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.56	0.94	0.04	0.38	0.35	0.21	0.09	0.66	0.51
Control Delay	57.6	40.0	0.1	15.1	19.8	8.5	28.1	56.7	12.7
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	40.0	0.1	15.1	19.8	8.5	28.1	56.7	12.7
Queue Length 50th (m)	23.6	205.0	0.0	6.9	48.6	7.3	4.1	34.8	1.8
Queue Length 95th (m)	35.0	#294.1	0.0	14.2	71.6	26.3	9.9	47.5	22.2
Internal Link Dist (m)		156.1		488.7			381.6		213.2
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	115.0
Base Capacity (vph)	383	1791	860	177	1545	796	400	781	519
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.94	0.04	0.38	0.35	0.21	0.06	0.35	0.82
Intersection Summary									
Cycle Length: 120									
Actuated Cycle Length: 120									
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBLT, Start of Green									
Natural Cycle: 115									
Control Type: Actuated-Coordinated									
# 95th percentile volume exceeds capacity, queue may be longer.									
Queue shown is maximum after two cycles.									

12-14-2023
 BA Group

Synchro 11 Report



HCM Signalized Intersection Capacity Analysis
 4: Clark Boulevard & Derry Road

Future Background (AM)
 2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	75	2137	0	0	872	91	0	7	0	24	10	43
Future Volume (vph)	75	2137	0	0	872	91	0	7	0	24	10	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00	0.88	1.00
Satd. Flow (prot)	1770	3539	3489	1863	1770	1636	1863	1770	1636	1770	1636	1770
Flt Permitted	0.27	1.00	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00	0.75	1.00
Satd. Flow (perm)	494	3539	3489	1863	1402	1636	1863	1402	1636	1402	1636	1402
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	2323	0	0	948	99	0	8	0	26	11	47
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	44
Lane Group Flow (vph)	82	2323	0	0	1044	0	0	8	0	26	14	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	6	1	6	8	8	8	4	4	4	4
Permitted Phases	2	2	6	1	6	8	8	8	4	4	4	4
Actuated Green, G (s)	100.9	100.9	100.9	100.9	100.9	100.9	8.1	8.1	8.1	8.1	8.1	8.1
Effective Green, g (s)	100.9	100.9	100.9	100.9	100.9	8.1	8.1	8.1	8.1	8.1	8.1	8.1
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.84	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	415	2975	2933	0.30	2933	125	0.00	0.00	0.01	0.02	0.13	0.01
v/s Ratio Prot	0.17	0.20	0.78	0.36	0.28	0.06	0.06	0.06	0.28	0.13	0.13	0.01
v/s Ratio Perm	0.17	0.20	0.78	0.36	0.28	0.06	0.06	0.06	0.28	0.13	0.13	0.01
Uniform Delay, d1	1.8	4.4	2.2	1.00	1.00	52.4	53.2	52.6	53.2	52.6	52.6	52.6
Progression Factor	1.69	2.73	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.3	1.6	0.5	54.8	53.2	52.6	54.8	53.2	53.2	53.2
Delay (s)	3.2	12.3	2.5	2.5	2.5	52.6	52.6	52.6	54.8	53.2	53.2	53.2
Level of Service	A	B	A	A	A	D	D	D	D	D	D	D
Approach Delay (s)	12.0	2.5	2.5	2.5	2.5	52.6	52.6	52.6	54.8	53.2	53.2	53.2
Approach LOS	B	B	A	A	A	D	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	10.3 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	79.8% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												

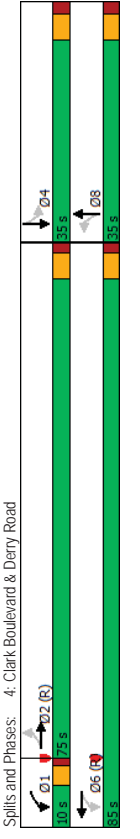
12-14-2023
 BA Group

Synchro 11 Report

Queues
 4: Clark Boulevard & Derry Road

Future Background (AM)
 2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	75	2137	872	7	24	10	43	7	24	10	43	7
Future Volume (vph)	75	2137	872	7	24	10	43	7	24	10	43	7
Lane Group Flow (vph)	82	2323	1047	8	26	58	8	26	58	8	26	58
Turn Type	Perm	NA	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	6	8	4	4	4	4	4	4	4	4
Detector Phase	2	2	6	8	4	4	4	4	4	4	4	4
Switch Phase	2	2	6	8	4	4	4	4	4	4	4	4
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	85.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	62.5%	62.5%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min
v/c Ratio	0.19	0.76	0.35	0.05	0.22	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Control Delay	4.0	14.0	2.6	51.3	56.1	23.8	23.8	23.8	23.8	23.8	23.8	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	14.0	2.6	51.3	56.1	23.8	23.8	23.8	23.8	23.8	23.8	23.8
Queue Length 50th (m)	5.2	258.2	25.6	1.9	6.1	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Queue Length 95th (m)	m5.2	m230.7	33.1	7.0	15.7	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Internal Link Dist (m)	336.0	475.1	56.4	56.4	56.4	313.3	313.3	313.3	313.3	313.3	313.3	313.3
Turn Bay Length (m)	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Base Capacity (vph)	424	3039	3000	454	342	434	434	434	434	434	434	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.76	0.35	0.02	0.08	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBTL, Start of Green												
Natural Cycle: 140												
Control Type: Actuated-Coordinated												
m Volume for 95th percentile queue is metered by upstream signal.												



12-14-2023
 BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard

Queues
 5: Fifth Line & Clark Boulevard

Future Background (AM) 2027 Scenario 2

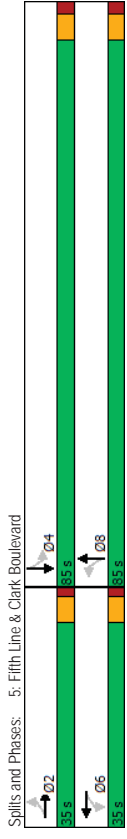
Future Background (AM) 2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	10	7	3	0	10	0	10	446	0	0	300
Traffic Volume (vph)	10	7	3	0	10	0	10	446	0	0	300
Future Volume (vph)	10	7	3	0	10	0	10	446	0	0	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1787	1863	1770	1863	1770	1863	1832	1832	1832	1832
Flt Permitted	1.00	1.00	1.00	0.54	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1863	1787	1863	1012	1863	1012	1863	1832	1832	1832	1832
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	8	3	0	11	0	11	485	0	0	326
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	11	8	0	0	11	0	11	485	0	0	363
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	2	6	6	6	8	8	8	8	4
Permitted Phases	2	6	6	6	6	6	8	8	8	8	4
Actuated Green, G (s)	1.5	1.5	1.5	1.5	1.5	1.5	27.1	27.1	27.1	27.1	27.1
Effective Green, g (s)	1.5	1.5	1.5	1.5	1.5	1.5	27.1	27.1	27.1	27.1	27.1
Actuated g/C Ratio	0.04	0.04	0.04	0.04	0.04	0.04	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	70	67	70	67	70	67	692	1274	692	1274	1253
v/s Ratio Prot	0.00	0.00	0.01	0.01	0.01	0.01	c0.26	c0.26	c0.26	c0.26	0.20
v/s Ratio	0.16	0.12	0.16	0.16	0.02	0.38	0.02	0.38	0.02	0.38	0.29
Uniform Delay, d1	18.4	18.4	18.4	18.4	2.0	2.7	1.00	1.00	1.00	1.00	2.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.8	1.1	0.8	0.0	0.2	0.0	0.2	0.0	0.2	0.1
Delay (s)	19.5	19.2	19.5	19.5	2.0	2.9	2.0	2.9	2.0	2.9	2.6
Level of Service	B	B	B	B	B	B	A	A	A	A	A
Approach Delay (s)	19.4	19.5	19.5	19.5	2.8	2.8	2.8	2.8	2.8	2.8	2.6
Approach LOS	B	B	B	B	B	B	A	A	A	A	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	10	7	3	0	10	0	10	446	0	0	300
Traffic Volume (vph)	10	7	3	0	10	0	10	446	0	0	300
Future Volume (vph)	10	7	3	0	10	0	10	446	0	0	300
Lane Group Flow (vph)	11	11	11	11	11	11	11	485	366	366	366
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	2	6	6	6	8	8	8	8	4
Detector Phase	2	2	2	6	6	6	8	8	8	8	4
Switch Phase	2	2	2	6	6	6	8	8	8	8	4
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	85.0	85.0	85.0	85.0	85.0
Total Spill (%)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.02	0.02	0.02	0.02	0.01	0.01	0.29	0.22	0.22	0.22	0.22
Control Delay	12.6	11.4	12.6	12.6	2.7	2.7	2.4	2.4	2.4	2.4	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	11.4	12.6	12.6	2.7	2.7	2.4	2.4	2.4	2.4	2.4
Queue Length 50th (m)	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	3.8	3.6	3.8	3.8	1.8	1.8	39.0	27.1	27.1	27.1	27.1
Internal Link Dist (m)	204.0	204.0	204.0	204.0	86.5	86.5	156.9	372.1	372.1	372.1	372.1
Turn Bay Length (m)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Base Capacity (vph)	1619	1552	1619	1011	1011	1011	1863	1833	1833	1833	1833
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.01	0.01	0.01	0.01	0.26	0.20	0.20	0.20	0.20

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 35.2
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated



HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road
 2027 Scenario 2

Queues
 1: Sixth Line & Derry Road
 2027 Scenario 2

Future Background (PM)
 2027 Scenario 2

Future Background (PM)
 2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	188	1654	77	29	1681	22	182	153	30	93	214	137
Traffic Volume (vph)	158	1654	77	29	1681	22	182	153	30	93	214	137
Future Volume (vph)	158	1654	77	29	1681	22	182	153	30	93	214	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.94
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	3172	1805	2967	1805	2967	1805	1838	1805	1838	1258	1764
Flt Permitted	0.07	1.00	0.08	1.00	0.08	1.00	0.16	1.00	0.04	1.00	0.64	1.00
Satd. Flow (perm)	136	3172	148	2967	148	2967	295	1838	841	1764	841	1764
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	168	1760	82	31	1788	23	194	163	32	99	228	146
RTOR Reduction (vph)	0	3	0	0	1	0	0	7	0	0	21	0
Lane Group Flow (vph)	168	1839	0	31	1810	0	194	188	0	99	353	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA	Perm	NA	NA
Protected Phases	5	2	1	6	3	8	3	8	4	4	4	4
Permitted Phases	2	62.4	54.7	55.4	51.2	35.6	35.6	35.6	24.6	24.6	24.6	24.6
Effective Green, G (s)	62.4	54.7	55.4	51.2	35.6	35.6	35.6	35.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.56	0.49	0.50	0.46	0.32	0.32	0.32	0.32	0.22	0.22	0.22	0.22
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	189	1563	136	1368	189	589	189	589	186	390	186	390
v/s Ratio Prot	c0.06	0.58	0.01	c0.61	c0.06	0.10	c0.06	0.10	0.20	0.20	0.20	0.20
v/s Ratio Perm	0.44	0.10	0.10	0.10	c0.26	0.10	c0.26	0.10	0.12	0.12	0.12	0.12
v/c Ratio	0.89	1.18	0.23	1.32	1.03	0.32	1.03	0.32	0.53	0.53	0.91	0.91
Uniform Delay, d1	29.6	28.1	24.4	29.9	34.5	28.5	34.5	28.5	38.1	42.1	42.1	42.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	35.9	86.5	0.9	150.7	72.5	0.3	72.5	0.3	2.9	23.8	23.8	23.8
Delay (s)	65.4	114.6	25.2	180.6	107.1	28.8	107.1	28.8	41.0	65.8	65.8	65.8
Level of Service	E	F	C	F	F	C	F	C	D	D	E	E
Approach Delay (s)	110.5			178.0		67.9		67.9	60.6			
Approach LOS	F			F		E		E				
Intersection Summary												
HCM 2000 Control Delay	128.4	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	1.21	F										
Actuated Cycle Length (s)	111.0	Sum of lost time (s)										
Intersection Capacity Utilization	102.7%	ICU Level of Service										
Analysis Period (min)	15	G										
c Critical Lane Group												



Spills and Phases: 1: Sixth Line & Derry Road



Spills and Phases: 1: Sixth Line & Derry Road

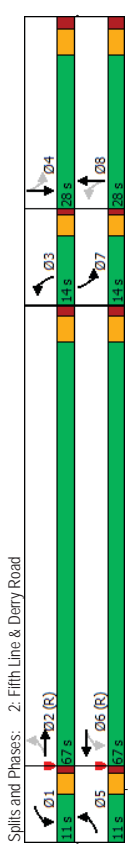
2027 Scenario 2
 Future Background (PM)
 HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	41	1559	79	92	1809	111	218	69	187	327	299
Future Volume (vph)	41	1559	79	92	1809	111	218	69	187	327	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	NA	4.0	5.3	4.0	4.0	5.7	4.0	4.0	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1600	3261	1587	3294	1698	3054	1501	3343	1501	3343	1501
Flt Permitted	0.06	1.00	0.06	1.00	0.30	1.00	0.30	1.00	0.49	1.00	0.49
Satd. Flow (perm)	104	3261	100	3294	537	3054	770	3343	770	3343	770
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	44	1659	84	98	1924	118	232	73	199	348	318
RTOR Reduction (vph)	0	3	0	0	4	0	0	101	0	0	19
Lane Group Flow (vph)	44	1740	0	98	2038	0	232	171	0	348	381
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4	4
Permitted Phases	5	2	2	6	6	8	8	8	4	4	4
Effective Green, G (s)	70.4	64.7	74.6	66.8	28.5	18.5	18.5	18.5	28.5	18.5	18.5
Effective Green, g (s)	70.4	64.7	74.6	66.8	28.5	18.5	18.5	18.5	28.5	18.5	18.5
Actuated g/C Ratio	0.59	0.54	0.62	0.56	0.24	0.15	0.24	0.15	0.24	0.15	0.15
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	132	1758	158	1833	224	470	243	515	243	515	515
v/s Ratio Prot	0.02	0.53	c0.04	c0.62	0.09	0.06	c0.12	0.11	c0.22	0.11	0.11
v/s Ratio Perm	0.18	0.34	0.34	0.16	0.16	0.16	0.22	0.11	0.22	0.11	0.11
v/c Ratio	0.33	0.99	0.62	1.11	1.04	0.36	1.43	0.74	1.43	0.74	0.74
Uniform Delay, d1	26.3	27.3	24.2	26.6	43.2	45.5	44.1	48.4	44.1	48.4	48.4
Progression Factor	1.80	0.78	1.09	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	14.6	4.4	55.7	69.8	0.5	216.5	5.5	216.5	5.5	5.5
Delay (s)	48.2	35.9	30.7	82.8	112.9	46.0	260.6	53.9	260.6	53.9	53.9
Level of Service	D	D	C	F	F	D	F	D	F	D	D
Approach Delay (s)	36.2	80.4	76.8	76.8	76.8	76.8	76.8	76.8	76.8	76.8	76.8
Approach LOS	D	F	F	F	F	F	F	F	F	F	F
Intersection Summary											
HCM 2000 Control Delay	74.9	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity Ratio	1.19	E									
Actuated Cycle Length (s)	120.0	Sum of lost time (s)									
Intersection Capacity Utilization	101.7%	ICU Level of Service									
Analysis Period (min)	15	G									

c Critical Lane Group

2027 Scenario 2
 Future Background (PM)
 Queues
 2: Fifth Line & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	4	4	4	4	4	4	4	4	4	4	
Traffic Volume (vph)	41	1559	79	92	1809	111	218	69	187	327	
Future Volume (vph)	41	1559	79	92	1809	111	218	69	187	327	
Lane Group Flow (vph)	44	1743	98	2042	232	272	272	272	348	400	
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	
Protected Phases	5	2	2	1	6	3	8	7	4	4	
Permitted Phases	5	2	2	6	6	8	8	8	4	4	
Detector Phase	5	2	2	1	6	3	8	7	4	4	
Switch Phase	5	2	2	1	6	3	8	7	4	4	
Minimum Initial (s)	7.0	20.0	7.0	20.0	7.0	20.0	7.0	10.0	7.0	10.0	
Minimum Split (s)	11.0	34.3	11.0	34.3	11.0	34.3	11.0	34.7	11.0	34.7	
Total Split (s)	11.0	67.0	11.0	67.0	11.0	67.0	14.0	28.0	14.0	28.0	
Total Split (%)	9.2%	55.8%	9.2%	55.8%	11.7%	23.3%	11.7%	11.7%	11.7%	23.3%	
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	
All-Red Time (s)	1.0	1.6	1.0	1.6	1.0	1.6	1.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	
v/c Ratio	0.29	0.99	0.62	1.10	1.00	0.48	1.37	0.75	1.37	0.75	
Control Delay	19.0	37.4	31.1	77.5	98.8	27.9	222.5	54.6	222.5	54.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	19.0	37.4	31.1	77.5	98.8	27.9	222.5	54.6	222.5	54.6	
Queue Length 50th (m)	3.4	-116.7	13.5	-307.1	47.5	17.9	-109.9	47.4	17.9	-109.9	
Queue Length 95th (m)	m5.4	#283.7	m19.7	#366.8	#78.6	#30.8	#167.4	63.2	#167.4	63.2	
Internal Link Dist (m)	170.5	124.7	170.5	124.7	170.5	124.7	340.6	275.9	170.5	340.6	
Turn Bay Length (m)	100.0	90.0	100.0	90.0	100.0	90.0	50.0	50.0	100.0	50.0	
Base Capacity (vph)	151	1760	159	1859	232	664	254	639	254	639	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.29	0.99	0.62	1.10	1.00	0.41	1.37	0.63	1.37	0.63	
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green											
Natural Cycle: 145											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											



HCM Signalized Intersection Capacity Analysis 3. James Snow Parkway & Derry Road

Future Background (PM)
2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	192	1164	16	259	1317	404	79	337	184	298	443	209
Future Volume (vph)	192	1164	16	259	1317	404	79	337	184	298	443	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3438	1562	1738	3305	1516	1802	3202	1586	1616	3046	1403
Flt Permitted	0.95	1.00	1.00	0.98	1.00	1.00	0.49	1.00	1.00	0.92	1.00	1.00
Satd. Flow (perm)	3399	3438	1562	144	3305	1516	931	3202	1586	545	3046	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	196	1188	16	264	1344	412	81	344	188	304	452	213
RTOR Reduction (vph)	0	10	0	0	156	0	0	145	0	0	0	163
Lane Group Flow (vph)	196	1188	6	264	1344	256	81	344	43	304	452	50
Conf. Ped. (#/hr)	1			1	6						6	
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	7	4	4	4
Permitted Phases												
Actuated Green, G (s)	12.2	46.9	46.9	68.8	52.6	52.6	27.1	19.2	19.2	40.2	28.3	28.3
Effective Green, g (s)	12.2	46.9	46.9	68.8	52.6	52.6	27.1	19.2	19.2	40.2	28.3	28.3
Actuated g/C Ratio	0.10	0.39	0.39	0.57	0.44	0.44	0.23	0.16	0.16	0.34	0.24	0.24
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	345	1343	610	320	1448	664	267	512	253	334	718	330
v/s Ratio Prot	0.06	0.35		c0.12	c0.41		0.02	0.11		c0.13	0.15	
v/s Ratio Perm				0.00	0.35	0.17	0.05		0.03	c0.18		0.04
v/s Ratio	0.57	0.88	0.01	0.82	0.93	0.39	0.30	0.67	0.17	0.91	0.63	0.15
Uniform Delay, d1	51.4	34.0	22.4	34.2	31.9	22.8	37.7	47.4	43.5	34.1	41.1	36.3
Progression Factor	1.00	1.00	1.00	0.81	1.03	1.56	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	8.8	0.0	1.7	1.4	0.2	0.6	3.5	0.3	27.7	1.7	0.2
Delay (s)	53.5	42.8	22.4	29.5	34.3	35.6	38.3	50.9	43.8	61.8	42.9	36.6
Level of Service	D	D	C	C	C	C	D	D	D	D	E	D
Approach Delay (s)												
Approach LOS	D	D	D	C	C	C	D	D	D	D	E	D

Intersection Summary	
HCM 2000 Control Delay	41.0
HCM 2000 Volume to Capacity ratio	0.95
Actuated Cycle Length (s)	120.0
Sum of lost time (s)	19.0
Intersection Capacity Utilization	88.2%
ICU Level of Service	E
Analysis Period (min)	15
Critical Lane Group	

12-14-2023
BA Group

Synchro 11 Report

3. James Snow Parkway & Derry Road

Future Background (PM)
2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	192	1164	16	259	1317	404	79	337	184	298	443	209
Future Volume (vph)	192	1164	16	259	1317	404	79	337	184	298	443	209
Lane Group Flow (vph)	196	1188	16	264	1344	412	81	344	188	304	452	213
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	7	4	4	4
Permitted Phases												
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	53.0	53.0	11.0	47.0	47.0	21.0	35.0	35.0	21.0	35.0	35.0
Total Split (%)	14.2%	44.2%	44.2%	9.2%	39.2%	39.2%	17.5%	29.2%	29.2%	17.5%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	None	None	None	None	None
v/s Ratio	0.57	0.87	0.02	0.82	0.91	0.50	0.27	0.70	0.48	0.90	0.63	0.43
Control Delay	57.6	41.5	0.1	29.3	34.5	13.2	29.0	55.7	12.3	62.4	46.0	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	41.5	0.1	29.3	34.5	13.2	29.0	55.7	12.3	62.4	46.0	7.8
Queue Length 50th (m)	24.2	140.8	0.0	40.9	177.6	48.6	13.8	43.2	3.2	60.9	54.6	0.0
Queue Length 95th (m)	35.7	172.2	0.0	m#52.1	m#176.1	m#54.9	23.7	56.4	23.4	#84.4	71.0	19.8
Internal Link Dist (m)		156.1			488.7			381.6			213.2	
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	75.0	100.0	75.0	95.0	115.0	75.0	95.0
Base Capacity (vph)	386	1366	679	320	1470	828	411	781	518	338	769	513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.87	0.02	0.82	0.91	0.50	0.20	0.44	0.36	0.90	0.59	0.42

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBTL, Start of Green	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Volume shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



12-14-2023
BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 4: Clark Boulevard & Derry Road

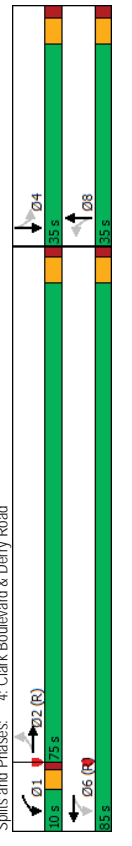
Future Background (PM)
 2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	EB	EB	EB	WB	WB	WB	NA	NA	NA	SB	SB
Traffic Volume (vph)	30	1853	0	0	1959	24	0	10	0	74	7
Future Volume (vph)	30	1853	0	0	1959	24	0	10	0	74	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3533	3533	3533	3533	1863	1770	1595	1770	1595
Flt Permitted	0.04	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	0.75	1.00
Satd. Flow (perm)	83	3539	3533	3533	3533	3533	1863	1398	1595	1398	1595
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	2014	0	0	2129	26	0	11	0	80	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	12
Lane Group Flow (vph)	33	2014	0	0	2155	0	0	11	0	80	180
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	6	1	6	8	8	4	4	4	4
Permitted Phases	2	6	6	8	8	8	8	4	4	4	4
Actuated Green, G (s)	90.2	90.2	90.2	90.2	90.2	90.2	18.8	18.8	18.8	18.8	18.8
Effective Green, g (s)	90.2	90.2	90.2	90.2	90.2	90.2	18.8	18.8	18.8	18.8	18.8
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.75	0.75	0.16	0.16	0.16	0.16	0.16
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	62	2660	2655	2655	2655	291	291	219	249	219	249
v/s Ratio Prot	0.57	c0.61	c0.61	c0.61	c0.61	0.01	0.01	0.06	c0.11	0.06	c0.11
v/s Ratio Perm	0.40	0.53	0.76	0.81	0.81	0.04	0.04	0.37	0.72	0.37	0.72
Uniform Delay, d1	6.2	8.6	9.5	9.5	9.5	42.9	42.9	45.3	48.1	45.3	48.1
Progression Factor	1.74	1.78	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	0.5	2.8	2.8	2.8	0.1	0.1	1.0	10.0	1.0	10.0
Delay (s)	18.1	15.8	12.3	12.3	12.3	43.0	43.0	46.3	58.1	46.3	58.1
Level of Service	B	B	B	B	B	D	D	D	E	D	E
Approach Delay (s)	15.8	12.3	12.3	12.3	12.3	43.0	43.0	54.6	54.6	43.0	54.6
Approach LOS	B	B	B	B	B	D	D	D	D	D	D
Intersection Summary											
HCM 2000 Control Delay	16.6 HCM 2000 Level of Service B										
HCM 2000 Volume to Capacity ratio	0.83										
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 15.0										
Intersection Capacity Utilization	74.9% ICU Level of Service D										
Analysis Period (min)	15										
c Critical Lane Group											

Queues
 4: Clark Boulevard & Derry Road

Future Background (PM)
 2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	EB	EB	EB	WB	WB	WB	NA	NA	NA	SB	SB
Traffic Volume (vph)	30	1853	1959	10	74	7	0	0	0	74	7
Future Volume (vph)	30	1853	1959	10	74	7	0	0	0	74	7
Lane Group Flow (vph)	33	2014	2155	11	80	192	0	0	0	80	192
Turn Type	Perm	NA	NA	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	6	8	4	4	4	4	4	4	4
Detector Phase	2	2	6	8	4	4	4	4	4	4	4
Switch Phase	2	2	6	8	4	4	4	4	4	4	4
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.7	34.7	34.7	10.0	10.0	10.0	10.0	10.0
Total Split (s)	75.0	75.0	85.0	35.0	35.0	35.0	10.0	10.0	10.0	10.0	10.0
Total Split (%)	62.5%	62.5%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.54	0.76	0.81	0.04	0.37	0.74	0.04	0.37	0.74	0.04	0.37
Control Delay	32.3	18.1	13.9	39.7	48.4	60.5	0.0	0.0	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	18.1	13.9	39.7	48.4	60.5	0.0	0.0	0.0	0.0	0.0
Queue Length 50th (m)	5.5	222.8	153.7	2.4	18.0	42.6	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	m6.5	m217.8	244.1	7.4	31.6	64.3	0.0	0.0	0.0	0.0	0.0
Internal Link Dist (m)	336.0	475.1	56.4	313.3	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Turn Bay Length (m)	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Base Capacity (vph)	61	2660	2656	454	341	400	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.76	0.81	0.02	0.23	0.48	0.02	0.23	0.48	0.02	0.48
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBTL, Start of Green											
Natural Cycle: 110											
Control Type: Actuated-Coordinated											
m Volume for 95th percentile queue is metered by upstream signal.											



HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard
 2027 Scenario 2

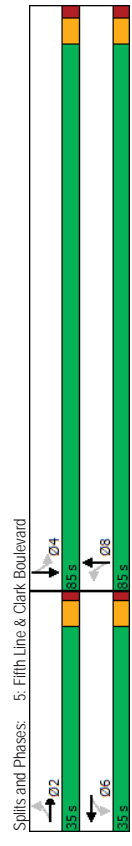
Queues
 5: Fifth Line & Clark Boulevard
 2027 Scenario 2

Future Background (PM)

Future Background (PM)

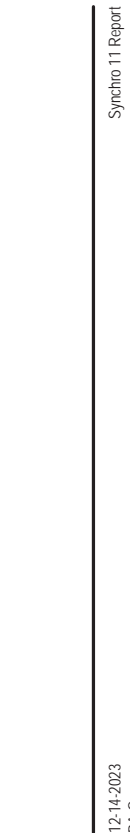
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	39	10	10	0	7	0	4	4	4	4	4
Traffic Volume (vph)	39	10	10	0	7	0	4	4	4	4	4
Future Volume (vph)	39	10	10	0	7	0	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1723	1863	1863	1863	1863	1770	1863	1863	1863	1863
Flt Permitted	0.75	1.00	1.00	1.00	1.00	1.00	0.46	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1402	1723	1863	1863	1863	1863	858	1863	1863	1863	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	11	11	0	8	0	4	4	4	4	4
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	42	12	0	0	8	0	4	4	4	4	4
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2			6			8			8	4
Permitted Phases	2	6	6	6	6	6	8	8	8	8	4
Actuated Green, G (s)	5.4	5.4	5.4	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7
Effective Green, g (s)	5.4	5.4	5.4	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7
Actuated g/C Ratio	0.13	0.13	0.13	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	179	221	238	523	1137	1137	523	1137	1137	1137	1137
v/s Ratio Prot	0.01			0.00	0.25	0.25					0.27
v/s Ratio	0.23	0.06	0.03	0.01	0.42	0.42	0.01	0.42	0.42	0.42	0.45
Uniform Delay, d1	16.5	16.1	16.1	3.2	4.3	4.3	3.2	4.3	4.3	4.3	4.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1	0.1	0.0	0.2	0.2	0.0	0.2	0.2	0.2	0.3
Delay (s)	17.2	16.2	16.1	3.2	4.5	4.5	3.2	4.5	4.5	4.7	4.7
Level of Service	B	B	B	A	A	A	A	A	A	A	A
Approach Delay (s)	16.8		16.1		4.5	4.5				4.7	4.7
Approach LOS	B		B		A	A				A	A
Intersection Summary											
HCM 2000 Control Delay	5.4										
HCM 2000 Volume to Capacity ratio	0.41										
Actuated Cycle Length (s)	42.1										
Intersection Capacity Utilization	42.8%										
Analysis Period (min)	15										
c. Critical Lane Group											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	39	10	10	0	7	0	4	4	4	4	4
Traffic Volume (vph)	39	10	10	0	7	0	4	4	4	4	4
Future Volume (vph)	39	10	10	0	7	0	4	4	4	4	4
Lane Group Flow (vph)	42	22	22	8	8	8	4	4	4	4	4
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2			6			8			8	4
Detector Phase	2	2	2	6	6	6	8	8	8	8	4
Switch Phase	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	34.3	34.3	34.3	34.3	34.3	34.3	34.3	34.3	34.3	34.3	34.3
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Total Spill (%)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Yellow Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Lead/Lag											
Lead-Lag Optimize?	None										
Recall Mode	None										
v/c Ratio	0.12	0.05	0.02	0.01	0.35	0.38	0.01	0.35	0.38	0.38	0.38
Control Delay	14.1	10.1	12.7	5.5	6.5	6.8	0.0	6.5	6.8	6.8	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	10.1	12.7	5.5	6.5	6.8	0.0	6.5	6.8	6.8	6.8
Queue Length 50th (m)	3.3	0.9	0.6	0.2	21.2	23.4	0.0	21.2	23.4	23.4	23.4
Queue Length 95th (m)	7.7	4.3	2.7	1.1	39.9	44.3	0.0	39.9	44.3	44.3	44.3
Internal Link Dist (m)	204.0										
Turn Bay Length (m)	35.0										
Base Capacity (vph)	1080	1330	1436	857	1863	1863	857	1863	1863	1863	1863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02	0.01	0.00	0.25	0.28	0.00	0.25	0.28	0.28	0.28
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 39.8											
Natural Cycle: 70											
Control Type: Actuated-Uncoordinated											



HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road
 Future Total (AM)
 2027 Scenario 2

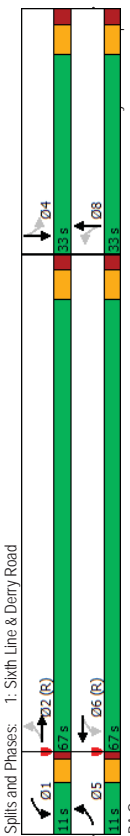
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	159	1963	155	23	766	38	85	167	30	34	131	124
Future Volume (vph)	159	1963	155	23	766	38	85	167	30	34	131	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.93
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	3160	1805	2929	1805	1843	1805	1843	1805	1843	1258	1737
Flt Permitted	0.27	1.00	0.06	1.00	0.30	1.00	0.30	1.00	0.45	1.00	0.45	1.00
Satd. Flow (perm)	504	3160	114	2929	573	1843	573	1843	593	1737	593	1737
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	169	2088	165	24	815	40	90	178	32	36	139	132
RTOR Reduction (vph)	0	4	0	0	3	0	0	7	0	0	34	0
Lane Group Flow (vph)	169	2249	0	24	852	0	90	203	0	36	237	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	6	8	8	8	8	8	8	4
Permitted Phases	2	78.4	70.3	70.6	66.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Effective Green, G (s)	78.4	70.3	70.6	66.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Actuated Green, g (s)	0.71	0.63	0.64	0.60	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Actuated g/C Ratio	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	447	2001	136	1752	103	332	106	312	106	312	106	312
Lane Grp Cap (vph)	c0.03	c0.71	0.01	0.29	0.11	0.11	0.14	0.14	0.14	0.14	0.14	0.14
v/s Ratio Prot	0.24	0.38	1.12	0.18	0.49	0.87	0.61	0.61	0.61	0.61	0.61	0.61
v/s Ratio Perm	6.3	20.4	25.2	12.6	44.3	41.9	39.7	43.2	39.7	43.2	43.2	43.2
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	62.9	0.6	1.0	50.7	3.3	1.9	10.4	1.9	10.4	1.9	10.4
Incremental Delay, d2	6.8	83.3	25.8	13.6	94.9	45.3	41.6	53.7	41.6	53.7	41.6	53.7
Delay (s)	A	F	C	B	F	D	D	D	D	D	D	D
Level of Service	77.9	13.9	60.2	60.2	60.2	60.2	60.2	60.2	60.2	60.2	60.2	60.2
Approach Delay (s)	E	E	B	E	E	E	E	E	E	E	E	E
Approach LOS	E	E	B	E	E	E	E	E	E	E	E	E
Intersection Summary												
HCM 2000 Control Delay	60.2 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	1.04											
Actuated Cycle Length (s)	111.0 Sum of lost time (s)											
Intersection Capacity Utilization	106.8% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												



Syncho 11 Report
 12-14-2023
 BA Group

Queues
 1: Sixth Line & Derry Road
 Future Total (AM)
 2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	159	1963	155	23	766	38	85	167	30	34	131	124
Future Volume (vph)	159	1963	155	23	766	38	85	167	30	34	131	124
Lane Group Flow (vph)	169	2253	0	24	855	90	210	36	271	36	271	0
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	6	8	8	8	8	8	8	4
Permitted Phases	2	78.4	70.3	70.6	66.4	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Detector Phase	5	2	1	6	6	8	8	8	8	8	8	4
Switch Phase	5	2	1	6	6	8	8	8	8	8	8	4
Minimum Initial (s)	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Total Split (s)	11.0	67.0	11.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0
Total Split (%)	9.9%	60.4%	9.9%	60.4%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
v/c Ratio	0.37	1.10	0.13	0.49	0.87	0.62	0.62	0.62	0.62	0.62	0.62	0.62
Control Delay	7.8	74.6	7.1	14.5	104.2	47.7	46.6	52.1	46.6	52.1	46.6	52.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	74.6	7.1	14.5	104.2	47.7	46.6	52.1	46.6	52.1	46.6	52.1
Queue Length 50th (m)	10.2	-325.0	1.3	55.2	20.1	42.8	7.2	50.7	7.2	50.7	7.2	50.7
Queue Length 95th (m)	21.2	#393.1	4.5	79.8	#43.9	63.3	16.8	75.6	16.8	75.6	16.8	75.6
Internal Link Dist (m)	475.1	475.1	256.2	211.8	211.8	211.8	211.8	211.8	211.8	211.8	211.8	211.8
Turn Bay Length (m)	120.0	100.0	100.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Base Capacity (vph)	451	2050	184	1756	137	449	142	448	142	448	142	448
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	1.10	0.13	0.49	0.66	0.47	0.25	0.60	0.47	0.25	0.60	0.60
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



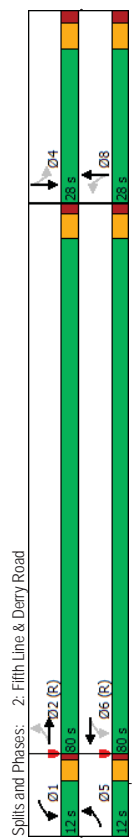
Splits and Phases: 1: Sixth Line & Derry Road
 BA Group

HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road
 Future Total (AM)
 2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	88	2110	95	175	729	250	93	286	77	112	67	30	
Traffic Volume (vph)	88	2110	95	175	729	250	93	286	77	112	67	30	
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Lane Util. Factor	1.00	0.99	1.00	0.96	1.00	0.96	1.00	0.97	1.00	0.95	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1600	3263	1587	3107	1698	3225	1501	3249	1501	3249	1501	3249	
Flt Permitted	0.22	1.00	0.05	1.00	0.69	1.00	0.37	1.00	0.37	1.00	0.37	1.00	
Satd. Flow (perm)	377	3263	89	3107	1228	3225	577	3249	577	3249	577	3249	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	94	2245	101	186	776	266	99	304	82	119	71	32	
RTOR Reduction (vph)	0	3	0	0	28	0	0	20	0	0	26	0	
Lane Group Flow (vph)	94	2343	0	186	1014	0	99	366	0	119	77	0	
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	14%	
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	2	
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	5	2	1	6	1	6	8	8	8	4	4	4	
Permitted Phases	2	82.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3	22.3	
Effective Green, G (s)	82.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	
Actuated g/C Ratio	0.69	0.62	0.69	0.63	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	
Clearance Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	334	2031	161	1947	228	599	107	603	107	603	107	603	
v/s Ratio Prot	0.02	0.72	c0.08	0.33	0.08	0.11	0.11	0.11	0.11	0.11	0.11	0.11	
v/s Ratio Perm	0.17	60.72	60.72	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
v/c Ratio	0.28	1.15	1.16	0.52	0.43	0.61	0.43	0.61	0.43	0.61	0.43	0.61	
Uniform Delay, d1	7.3	22.6	41.2	12.4	43.3	44.9	48.9	40.7	48.9	40.7	48.9	40.7	
Progression Factor	0.55	0.49	0.99	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	72.1	117.9	1.0	1.3	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
Delay (s)	4.2	83.2	158.7	12.2	44.6	46.7	169.2	40.8	46.7	169.2	40.8	40.8	
Level of Service	A	F	F	B	D	D	F	D	D	F	D	D	
Approach Delay (s)	80.2	F	34.4	C	46.3	D	109.7	F	D	109.7	F	D	
Approach LOS	F	F	C	C	D	D	F	D	D	F	D	D	
Intersection Summary													
HCM 2000 Control Delay	65.1											HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	15.0
Intersection Capacity Utilization	107.0%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

Queues
 2: Fifth Line & Derry Road
 Future Total (AM)
 2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	88	2110	93	175	729	250	93	286	77	112	67	30
Traffic Volume (vph)	88	2110	93	175	729	250	93	286	77	112	67	30
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Group Flow (vph)	94	2346	186	1042	99	386	119	103	103	103	103	103
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	1	6	8	8	8	4	4	4
Permitted Phases	2	6	6	6	6	6	8	8	8	4	4	4
Detector Phase	5	2	1	6	1	6	8	8	8	4	4	4
Switch Phase	5	2	1	6	1	6	8	8	8	4	4	4
Minimum Initial (s)	7.0	20.0	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	34.3	11.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	12.0	80.0	12.0	80.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	10.0%	66.7%	10.0%	66.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
v/c Ratio	0.28	1.15	1.15	0.53	0.43	0.62	0.43	0.62	0.43	0.62	0.43	0.62
Control Delay	3.5	87.0	144.7	11.5	50.1	47.0	166.1	28.9	47.0	166.1	28.9	28.9
Nature Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	87.0	144.7	11.5	50.1	47.0	166.1	28.9	47.0	166.1	28.9	28.9
Queue Length 50th (m)	3.5	-356.5	-39.7	56.1	22.0	43.7	-33.7	7.7	43.7	-33.7	7.7	7.7
Queue Length 95th (m)	ms.3.4	ms.369.8	#87.9	67.9	40.2	61.1	#72.9	16.0	61.1	#72.9	16.0	16.0
Internal Link Dist (m)	170.5	124.7	170.5	124.7	340.6	340.6	340.6	340.6	340.6	340.6	340.6	340.6
Turn Bay Length (m)	100.0	90.0	90.0	70.0	70.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Base Capacity (vph)	345	2035	162	1976	228	619	107	629	107	629	107	629
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	1.15	1.15	0.53	0.43	0.62	0.43	0.62	0.43	0.62	0.43	0.62
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



HCM Signalized Intersection Capacity Analysis
 3. James Snow Parkway & Derry Road

Queues
 3. James Snow Parkway & Derry Road

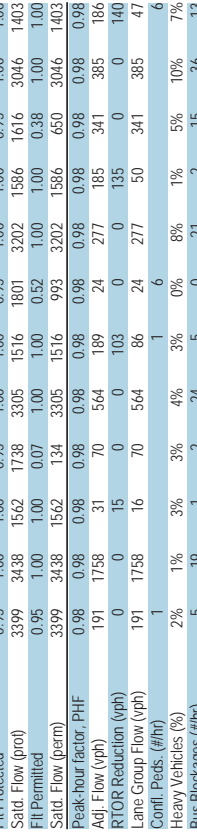
Future Total (AM) 2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	187	1723	30	69	553	185	24	271	181	334	377	182
Traffic Volume (vph)	187	1723	30	69	553	185	24	271	181	334	377	182
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	5.3	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	5.7	4.0
Total Lost time (s)	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98
Frbp_psd/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp_ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	3399	3438	1562	1738	3305	1516	1801	3202	1586	1616	3046	1403
Flt Permitted	0.95	1.00	1.00	0.07	1.00	1.00	0.52	1.00	0.52	1.00	0.38	1.00
Satd. Flow (perm)	3399	3438	1562	134	3305	1516	993	3202	1586	1650	3046	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	191	1758	31	70	564	189	24	277	185	341	385	186
RTOR Reduction (vph)	0	15	0	0	103	0	0	135	0	0	0	140
Lane Group Flow (vph)	191	1758	16	70	564	86	24	277	50	341	385	47
Confl. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	7	4	4	4
Permitted Phases	12.0	60.1	60.1	61.1	54.6	54.6	21.8	17.4	17.4	38.4	30.0	30.0
Actuated Green, G (s)	12.0	60.1	60.1	61.1	54.6	54.6	21.8	17.4	17.4	38.4	30.0	30.0
Effective Green, g (s)	0.70	0.50	0.50	0.51	0.46	0.46	0.18	0.14	0.14	0.32	0.25	0.25
Actuated g/C Ratio	4.0	5.3	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	4.0	5.7
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	339	1721	782	155	1503	689	210	464	229	344	761	350
Lane Grp Cap. (vph)	c0.06	c0.51	0.01	0.02	0.17	0.06	0.02	0.00	0.09	c0.14	c0.18	0.03
v/s Ratio Prot	0.56	1.02	0.02	0.45	0.38	0.12	0.11	0.60	0.22	0.99	0.51	0.13
v/s Ratio Perm	51.5	299	15.1	26.2	21.5	18.9	40.7	48.0	45.3	37.5	38.6	34.9
Uniform Delay, d1	1.00	1.00	1.00	0.82	0.90	2.56	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.1	27.3	0.0	1.8	0.6	0.3	0.2	2.1	0.5	46.0	0.5	0.2
Incremental Delay, d2	53.6	57.2	15.1	23.2	20.0	48.8	41.0	50.1	45.8	83.5	39.2	35.1
Delay (s)	D	E	B	C	C	D	D	D	D	F	D	D
Level of Service	E	E	B	C	C	D	D	D	D	F	D	D
Approach Delay (s)	E	E	26.9	C	C	D	D	D	D	54.9	D	D
Approach LOS	E	E	C	C	C	D	D	D	D	D	D	D

Intersection Summary

HCM 2000 Control Delay	49.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

Critical Lane Group

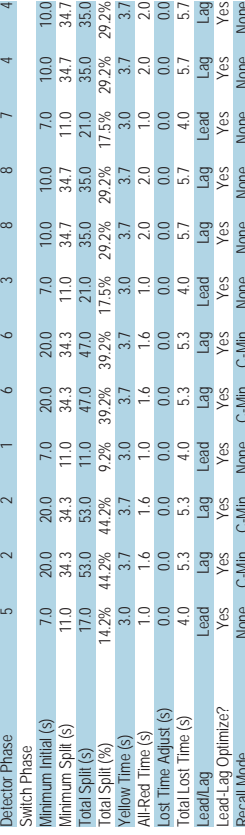


Future Total (AM) 2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	187	1723	30	69	553	185	24	271	181	334	377	182
Traffic Volume (vph)	187	1723	30	69	553	185	24	271	181	334	377	182
Future Volume (vph)	191	1758	31	70	564	189	24	277	185	341	385	186
Lane Group Flow (vph)	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	7	4	4	4
Permitted Phases	5	2	2	1	6	6	3	8	8	7	4	4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Minimum Split (s)	17.0	53.0	53.0	11.0	47.0	47.0	21.0	35.0	35.0	21.0	35.0	35.0
Total Split (s)	14.2%	44.2%	44.2%	9.2%	39.2%	39.2%	17.5%	29.2%	29.2%	17.5%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
v/s Ratio	0.56	0.98	0.04	0.39	0.37	0.23	0.09	0.66	0.53	0.99	0.51	0.38
Control Delay	57.6	47.2	0.1	16.8	20.2	8.8	28.1	56.7	16.4	82.4	41.8	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	47.2	0.1	16.8	20.2	8.8	28.1	56.7	16.4	82.4	41.8	7.6
Queue Length 50th (m)	23.6	-227.1	0.0	7.5	52.2	9.6	4.1	34.8	6.0	72.6	45.5	0.0
Queue Length 95th (m)	35.0	#314.4	0.0	16.7	75.7	30.9	9.9	47.5	27.3	#121.9	59.6	18.4
Internal Link Dist (m)	156.1			488.7			381.6				213.2	
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	100.0	75.0	95.0	115.0	100.0
Base Capacity (vph)	383	1789	859	178	1545	809	400	781	506	345	790	501
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.98	0.04	0.39	0.37	0.23	0.06	0.35	0.37	0.99	0.49	0.37

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



2027 Scenario 2
 HCM Signalized Intersection Capacity Analysis
 4: Clark Boulevard & Derry Road

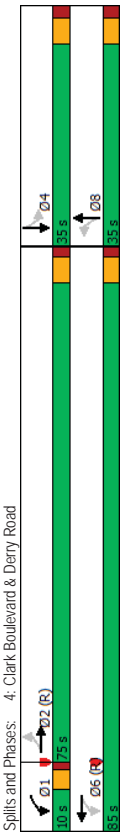
2027 Scenario 2
 Queues
 4: Clark Boulevard & Derry Road

Future Total (AM)

Future Total (AM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	75	2151	118	87	877	91	42	7	19	24	10	43
Future Volume (vph)	75	2151	118	87	877	91	42	7	19	24	10	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.89	1.00	0.88	1.00	0.88
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3512	1770	3489	1770	1660	1770	1660	1770	1636	1770	1636
Flt Permitted	0.27	1.00	0.04	1.00	0.72	1.00	0.74	1.00	0.74	1.00	0.74	1.00
Satd. Flow (perm)	507	3512	81	3489	1340	1660	1375	1636	1375	1636	1375	1636
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	2338	128	95	953	99	46	8	21	26	11	47
RTOR Reduction (vph)	0	2	0	0	3	0	0	19	0	0	43	0
Lane Group Flow (vph)	82	2464	0	95	1049	0	46	10	0	26	15	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2		1	6		8		8		4		4
Permitted Phases	2		6		8		8		4		4	
Actuated Green, G (s)	87.9	87.9	100.0	100.0	100.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Effective Green, g (s)	87.9	87.9	100.0	100.0	100.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Actuated g/C Ratio	0.73	0.73	0.83	0.83	0.83	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	371	2572	181	2907	100	124	103	122	103	122	103	122
v/s Ratio Prot	c0.70	c0.70	c0.04	0.30	c0.03	0.01	0.02	0.01	0.02	0.02	0.02	0.01
v/s Ratio Perm	0.16	0.40	0.40	0.36	0.46	0.08	0.25	0.12	0.25	0.12	0.25	0.12
v/c Ratio	0.22	0.96	0.52	0.36	0.46	0.08	0.25	0.12	0.25	0.12	0.25	0.12
Uniform Delay, d1	5.1	14.4	36.0	2.4	53.2	51.6	52.3	51.8	52.3	51.8	52.3	51.8
Progression Factor	1.70	1.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.3	2.7	0.3	3.3	0.3	1.3	0.4	1.3	0.4	1.3	0.4
Delay (s)	8.8	27.2	38.8	2.7	56.5	51.9	53.6	52.2	53.6	52.2	53.6	52.2
Level of Service	A	C	D	A	E	D	D	D	D	D	D	D
Approach Delay (s)	26.6	5.7	54.7	5.7	54.7	5.7	54.7	5.7	54.7	5.7	54.7	5.7
Approach LOS	C	C	A	C	A	D	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service C										
HCM 2000 Volume to Capacity ratio	0.88											
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	89.7%	ICU Level of Service E										
Analysis Period (min)	15											
c Critical Lane Group												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	75	2151	118	87	877	91	42	7	19	24	10	43
Future Volume (vph)	75	2151	118	87	877	91	42	7	19	24	10	43
Lane Group Flow (vph)	82	2466	95	1052	46	29	26	58	NA	Perm	NA	Perm
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2		1	6		8		8		4		4
Detector Phase	2		1	6		8		8		4		4
Switch Phase	2		1	6		8		8		4		4
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
v/c Ratio	0.22	0.95	0.52	0.36	0.46	0.08	0.25	0.12	0.25	0.12	0.25	0.12
Control Delay	11.7	27.2	26.5	2.9	59.9	26.7	53.9	22.4	53.9	22.4	53.9	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	27.2	26.5	2.9	59.9	26.7	53.9	22.4	53.9	22.4	53.9	22.4
Queue Length 50th (m)	9.1	287.7	5.9	25.7	11.0	1.9	6.1	2.6	11.3	15.2	15.6	6.1
Queue Length 95th (m)	m10.8	m252.5	24.4	40.0	23.0	11.3	15.2	15.6	15.6	15.6	15.6	15.6
Internal Link Dist (m)	336.0	475.1	56.4	313.3	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
Turn Bay Length (m)	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Base Capacity (vph)	376	2607	183	2974	326	421	335	434	335	434	335	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.95	0.52	0.35	0.46	0.08	0.25	0.12	0.25	0.12	0.25	0.12
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
m Volume for 95th percentile queue is metered by upstream signal.												



HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard

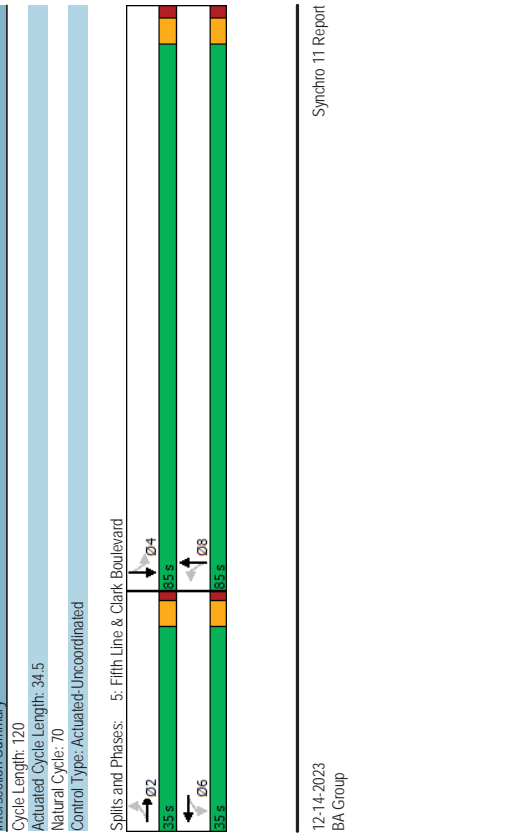
Queues
 5: Fifth Line & Clark Boulevard

Future Total (AM)
 2027 Scenario 2

Future Total (AM)
 2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	9	3	5	12	0	10	446	24	0	300	37
Traffic Volume (vph)	10	9	3	5	12	0	10	446	24	0	300	37
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost Time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.97	1.00	1.00	1.00	1.00	0.99	1.00	0.98	1.00	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1798	1770	1863	1770	1863	1770	1849	1832	1770	1849	1832
Flt Permitted	1.00	1.00	1.00	1.00	1.00	0.54	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1863	1798	1863	1863	1863	1012	1849	1832	1832	1863	1849	1832
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	10	3	5	13	0	11	485	26	0	326	40
RTOR Reduction (vph)	0	3	0	0	0	0	0	2	0	0	4	0
Lane Group Flow (vph)	11	10	0	5	13	0	11	509	0	0	362	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2		6		8		4					
Permitted Phases	2		6		8		4					
Actuated Green, G (s)	1.6	1.6	1.6	1.6	1.6	26.3	26.3	26.3	26.3	26.3	26.3	26.3
Effective Green, g (s)	1.6	1.6	1.6	1.6	1.6	26.3	26.3	26.3	26.3	26.3	26.3	26.3
Actuated g/C Ratio	0.04	0.04	0.04	0.04	0.04	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	76	73	76	76	76	684	1250	1238	1238	1238	1238	1238
v/s Ratio Prot	0.01	0.01	0.01	0.01	0.01	c0.28	c0.28	0.20	0.20	0.20	0.20	0.20
v/s Ratio Perm	0.14	0.14	0.07	0.17	0.17	0.02	0.41	0.29	0.29	0.29	0.29	0.29
Uniform Delay, d1	18.0	18.0	17.9	18.0	18.0	2.1	2.8	2.5	2.5	2.5	2.5	2.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.9	0.9	0.9	0.9	0.0	0.2	0.1	0.1	0.1	0.1	0.1
Delay (s)	18.9	18.9	18.3	19.1	19.1	2.1	3.0	2.7	2.7	2.7	2.7	2.7
Level of Service	B	B	B	B	B	A	A	A	A	A	A	A
Approach Delay (s)	18.9		18.9		3.0		2.7					
Approach LOS	B		B		A		A					
Intersection Summary												
HCM 2000 Control Delay	3.6											A
HCM 2000 Volume to Capacity ratio	0.39											A
Actuated Cycle Length (s)	38.9											11.0
Intersection Capacity Utilization	42.4%											A
Analysis Period (min)	15											
c. Critical Lane Group												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	9	3	5	12	0	10	446	24	0	300	37
Traffic Volume (vph)	10	9	3	5	12	0	10	446	24	0	300	37
Future Volume (vph)	10	9	3	5	12	0	10	446	24	0	300	37
Lane Group Flow (vph)	11	13	5	13	11	11	511	366	NA	Perm	NA	NA
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2		6		8		4					
Permitted Phases	2		6		8		4					
Detector Phase	2		6		8		4					
Switch Phase	2		6		8		4					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min	Min
v/c Ratio	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.31	0.22	0.22	0.22	0.22
Control Delay	11.6	10.7	11.6	11.6	11.6	3.1	2.6	2.6	2.6	2.6	2.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.6	10.7	11.6	11.6	11.6	3.1	2.6	2.6	2.6	2.6	2.6	2.6
Queue Length 50th (m)	0.4	0.4	0.2	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	3.5	3.7	2.2	3.9	1.9	42.9	28.0	28.0	28.0	28.0	28.0	28.0
Internal Link Dist (m)	204.0		86.5		156.9		372.1					
Turn Bay Length (m)	35.0		35.0		35.0		35.0					
Base Capacity (vph)	1635	1578	1635	1635	1635	1011	1848	1833	1833	1833	1833	1833
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.00	0.01	0.01	0.28	0.20	0.20	0.20	0.20	0.20	0.20
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 34.5												
Natural Cycle: 70												
Control Type: Actuated-Uncoordinated												



HCM Unsignalized Intersection Capacity Analysis
 10: Clark Boulevard & Anatolia Building 1 North Access/Anatolia Building 2 North Access Scenario 2

HCM Unsignalized Intersection Capacity Analysis
 9: Sixth Line & Anatolia Building 3 East Access Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	2	0	1	2	0	11	1	55	4	34	179	2
Future Volume (Veh/h)	2	0	1	2	0	11	1	55	4	34	179	2
Sign Control	Stop	0%	Free	Stop	0%	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	1	2	0	12	1	60	4	37	195	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												80
pX platoon unblocked												
VC, conflicting volume	346	336	196	335	335	62	197			64		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol	346	336	196	335	335	62	197			64		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	99	100			98		
CM capacity (veh/h)	590	570	845	606	571	1003	1376			1538		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volumes Total	3	14	65	234								
Volume Left	2	2	1	37								
Volume Right	1	12	4	2								
cSH	656	917	1376	1538								
Volumes to Capacity	0.00	0.02	0.00	0.02								
Queue Length 95th (m)	0.1	0.4	0.0	0.6								
Control Delay (s)	10.5	9.0	0.1	1.3								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.5	9.0	0.1	1.3								
Approach LOS	B	A	A	A								
Intersection Summary												
Average Delay				1.5								
Intersection Capacity Utilization				28.1%								A
Analysis Period (min)				15								

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	7	1	4	275	287	22
Future Volume (Veh/h)	7	1	4	275	287	22
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	1	4	299	312	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						236
pX platoon unblocked						
VC, conflicting volume	631	324	336			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	631	324	336			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
CM capacity (veh/h)	444	717	1223			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	9	303	336			
Volume Left	8	4	0			
Volume Right	1	0	24			
cSH	463	1223	1700			
Volumes to Capacity	0.02	0.00	0.20			
Queue Length 95th (m)	0.5	0.1	0.0			
Control Delay (s)	12.9	0.1	0.0			
Lane LOS	B	A	A			
Approach Delay (s)	12.9	0.1	0.0			
Approach LOS	B	A	A			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			27.7%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Clark Boulevard & Anatolia Building 1 South Access

HCM Unsignalized Intersection Capacity Analysis
 11: Clark Boulevard & Anatolia Building 2 South Access

Future Total (AM)
 2027 Scenario 2

Future Total (AM)
 2027 Scenario 2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W					
Traffic Volume (veh/h)	38	3	15	18	14	130
Future Volume (Veh/h)	38	3	15	18	14	130
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	3	16	20	15	141
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	138	86	156			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	138	86	156			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)	3.5	3.3	2.2			
p0 queue free %	95	100	99			
CM capacity (veh/h)	846	973	1424			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	44	36	156			
Volume Left	41	16	0			
Volume Right	3	0	141			
CSH	854	1424	1700			
Volumes to Capacity	0.05	0.01	0.09			
Queue Length 95th (m)	1.3	0.3	0.0			
Control Delay (s)	9.4	3.4	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	9.4	3.4	0.0			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay		2.3				A
Intersection Capacity Utilization		24.3%				ICU Level of Service
Analysis Period (min)		15				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					
Traffic Volume (veh/h)	2	10	50	6	40	142
Future Volume (Veh/h)	2	10	50	6	40	142
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	11	54	7	43	154
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	298	58	61			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	298	58	61			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)	3.5	3.3	2.2			
p0 queue free %	100	99	97			
CM capacity (veh/h)	674	1009	1542			
Direction, Lane #	WB 1	NB 1	SB 1			
Volumes Total	13	61	197			
Volume Left	2	0	43			
Volume Right	11	7	0			
CSH	937	1700	1542			
Volumes to Capacity	0.01	0.04	0.03			
Queue Length 95th (m)	0.3	0.0	0.7			
Control Delay (s)	8.9	0.0	1.8			
Lane LOS	A	A	A			
Approach Delay (s)	8.9	0.0	1.8			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			1.7			A
Intersection Capacity Utilization			26.4%			ICU Level of Service
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Sixth Line & Derry Road

Future Total (PM)
2027 Scenario 2

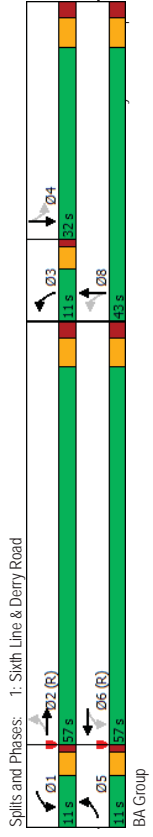
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB
Traffic Volume (vph)	160	1717	90	32	1706	22	199	153	38	93	214	139
Future Volume (vph)	160	1717	90	32	1706	22	199	153	38	93	214	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	3170	1805	2967	1805	1826	1805	1826	1805	1826	1805	1826
Flt Permitted	0.07	1.00	0.08	1.00	0.08	1.00	0.15	1.00	0.63	1.00	0.63	1.00
Satd. Flow (perm)	136	3170	149	2967	289	1826	289	1826	835	1763	835	1763
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	170	1827	96	34	1815	23	212	163	40	99	228	148
RTOR Reduction (vph)	0	3	0	0	1	0	0	8	0	0	21	0
Lane Group Flow (vph)	170	1920	0	34	1837	0	212	195	0	99	355	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA	Perm	NA	NA
Protected Phases	5	2	1	6	3	8	8	8	8	4	4	4
Permitted Phases	2	6	6	6	6	6	6	6	6	6	6	6
Actuated Green, G (s)	62.5	54.7	55.3	51.1	35.6	35.6	35.6	35.6	24.6	24.6	24.6	24.6
Effective Green, g (s)	62.5	54.7	55.3	51.1	35.6	35.6	35.6	35.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.56	0.49	0.50	0.46	0.32	0.32	0.32	0.32	0.22	0.22	0.22	0.22
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	190	1562	136	1365	188	585	188	585	185	390	185	390
v/s Ratio Prot	c0.06	0.61	0.01	c0.62	c0.07	0.11	c0.07	0.11	0.12	0.20	0.12	0.20
v/s Ratio Perm	0.44	0.11	0.11	c0.29	c0.29	0.11	c0.29	0.11	0.12	0.20	0.12	0.20
v/c Ratio	0.89	1.23	0.25	1.35	1.13	0.33	1.13	0.33	0.54	0.91	0.54	0.91
Uniform Delay, d1	29.8	28.1	24.4	29.9	34.5	28.7	34.5	28.7	38.2	42.1	38.2	42.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	37.2	109.0	1.0	160.7	104.1	0.3	104.1	0.3	3.0	24.8	3.0	24.8
Delay (s)	67.0	137.1	25.4	190.7	138.6	29.0	138.6	29.0	41.1	66.9	41.1	66.9
Level of Service	E	F	C	F	F	C	F	C	F	D	E	E
Approach Delay (s)		131.4		187.7		85.0		85.0		61.6		61.6
Approach LOS		F		F		F		F		F		F
Intersection Summary												
HCM 2000 Control Delay	142.3 HCM 2000 Level of Service F											
HCM 2000 Volume to Capacity ratio	1.26											
Actuated Cycle Length (s)	111.0 Sum of lost time (s) 20.5											
Intersection Capacity Utilization	104.6% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

12-14-2023
BA Group
Synchro 11 Report

Queues
1: Sixth Line & Derry Road

Future Total (PM)
2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB
Traffic Volume (vph)	160	1717	90	32	1706	22	199	153	38	93	214	139
Future Volume (vph)	160	1717	90	32	1706	22	199	153	38	93	214	139
Lane Group Flow (vph)	170	1923	34	1838	212	203	99	376	NA	Perm	NA	NA
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA	Perm	NA	NA
Protected Phases	5	2	1	6	3	8	8	8	8	4	4	4
Detector Phase	5	2	1	6	3	8	8	8	8	4	4	4
Switch Phase	5	2	1	6	3	8	8	8	8	4	4	4
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	25.0	7.0	25.0	7.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	11.0	31.2	11.0	31.2	11.0	32.3	32.3	32.3
Total Split (s)	11.0	57.0	11.0	57.0	11.0	57.0	11.0	57.0	11.0	43.0	43.0	43.0
Total Split (%)	9.9%	51.4%	9.9%	51.4%	9.9%	51.4%	9.9%	51.4%	9.9%	28.8%	28.8%	28.8%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	1.0	2.2	1.0	2.2	1.0	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	None	None	None
v/c Ratio	0.89	1.19	0.18	1.35	1.09	0.34	1.09	0.34	0.54	0.91	0.54	0.91
Control Delay	68.2	121.3	12.6	188.4	122.4	28.5	122.4	28.5	49.5	66.8	49.5	66.8
Total Delay	68.2	121.3	12.6	188.4	122.4	28.5	122.4	28.5	49.5	66.8	49.5	66.8
Queue Length 50th (m)	23.4	-301.1	3.2	-292.3	-39.1	32.5	-39.1	32.5	19.8	71.7	19.8	71.7
Queue Length 95th (m)	#68.2	#346.5	7.6	#337.7	#82.5	52.6	#82.5	52.6	38.5	#132.3	38.5	#132.3
Internal Link Dist (m)	475.1	475.1	475.1	475.1	475.1	475.1	475.1	475.1	475.1	475.1	475.1	475.1
Turn Bay Length (m)	120.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Base Capacity (vph)	190	1610	184	1366	194	611	194	611	193	428	193	428
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	1.19	0.18	1.35	1.09	0.33	1.09	0.33	0.51	0.88	0.51	0.88
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road

Future Total (PM)
 2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	4	1	1	2	2	2	2	2	2	2
Traffic Volume (vph)	41	1612	79	92	1954	114	218	70	187	328
Future Volume (vph)	41	1612	79	92	1954	114	218	70	187	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
FRT	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.89	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	3261	1587	3297	1698	3055	1501	3343	1501	3343
Flt Permitted	0.06	1.00	0.06	1.00	0.30	1.00	0.49	1.00	0.49	1.00
Satd. Flow (perm)	104	3261	100	3297	537	3055	768	3343	768	3343
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	44	1715	84	98	2079	121	232	74	199	349
RTOR Reduction (vph)	0	3	0	0	3	0	0	99	0	19
Lane Group Flow (vph)	44	1796	0	98	2197	0	232	174	0	349
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4
Permitted Phases	2	6	6	6	6	8	8	8	4	4
Effective Green, G (s)	70.4	64.7	74.6	66.8	28.5	18.5	28.5	18.5	28.5	18.5
Effective Green, g (s)	70.4	64.7	74.6	66.8	28.5	18.5	28.5	18.5	28.5	18.5
Actuated g/C Ratio	0.59	0.54	0.62	0.56	0.24	0.15	0.24	0.15	0.24	0.15
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	132	1758	158	1835	224	470	243	515	243	515
v/s Ratio Prot	0.02	0.55	0.04	0.67	0.09	0.06	0.12	0.11	0.12	0.11
v/s Ratio Perm	0.18	0.34	0.34	0.16	0.16	0.16	0.22	0.22	0.22	0.22
v/c Ratio	0.33	1.02	0.62	1.20	1.04	0.37	1.44	0.74	1.44	0.74
Uniform Delay, d1	26.3	27.6	25.3	26.6	43.2	45.5	44.2	48.4	44.2	48.4
Progression Factor	1.76	0.80	0.96	1.11	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	22.1	4.2	91.9	69.8	0.5	218.2	5.5	218.2	5.5
Delay (s)	47.0	44.1	28.4	121.5	112.9	46.0	262.4	53.9	262.4	53.9
Level of Service	D	D	C	F	F	D	F	D	F	D
Approach Delay (s)	44.1		117.5		76.8		151.1		76.8	
Approach LOS	D		F		E		F		E	
Intersection Summary										
HCM 2000 Control Delay	93.3	HCM 2000 Level of Service								
HCM 2000 Volume to Capacity ratio	1.24	F								
Actuated Cycle Length (s)	120.0	Sum of lost time (s)								
Intersection Capacity Utilization	105.8%	19.0								
Analysis Period (min)	15	G								

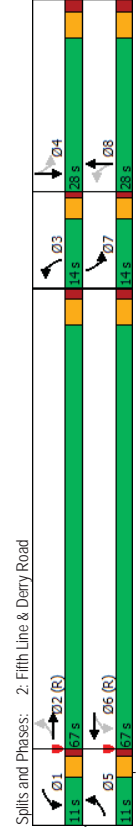
c Critical Lane Group



Queues
 2: Fifth Line & Derry Road

Future Total (PM)
 2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	4	1	1	2	2	2	2	2	2	2
Traffic Volume (vph)	41	1612	79	92	1954	114	218	70	187	328
Future Volume (vph)	41	1612	79	92	1954	114	218	70	187	328
Lane Group Flow (vph)	44	1799	98	2200	232	273	349	400	400	400
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4
Permitted Phases	2	6	6	6	6	8	8	8	4	4
Detector Phase	5	2	2	1	6	3	8	7	4	4
Switch Phase										
Minimum Initial (s)	7.0	20.0	7.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	11.0	34.3	11.0	34.7	11.0	34.7	11.0	34.7
Total Split (s)	11.0	67.0	11.0	67.0	14.0	28.0	14.0	28.0	14.0	28.0
Total Split (%)	9.2%	55.8%	9.2%	55.8%	11.7%	23.3%	11.7%	23.3%	11.7%	23.3%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7
All-Red Time (s)	1.0	1.6	1.0	1.6	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.29	1.02	0.62	1.18	1.00	0.48	1.37	0.75	1.37	0.75
Control Delay	18.4	45.5	28.4	114.1	98.8	28.4	224.5	54.6	224.5	54.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	45.5	28.4	114.1	98.8	28.4	224.5	54.6	224.5	54.6
Queue Length 50th (m)	3.4	-245.6	13.2	-351.5	47.5	18.3	-110.7	47.4	18.3	-110.7
Queue Length 95th (m)	m5.3	m292.1	m17.9	#410.0	#78.6	31.2	#168.0	63.2	31.2	#168.0
Internal Link Dist (m)	170.5	124.7	170.5	124.7	340.6	275.9	340.6	275.9	340.6	275.9
Turn Bay Length (m)	100.0	90.0	100.0	90.0	70.0	50.0	70.0	50.0	70.0	50.0
Base Capacity (vph)	151	1760	159	1860	232	663	254	639	254	639
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillover Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	1.02	0.62	1.18	1.00	0.41	1.37	0.63	1.37	0.63
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 0 (0%)	Referenced to phase 2EBTL and 6:WBT, Start of Green									
Natural Cycle: 145										
Control Type: Actuated-Coordinated										
-	Volume exceeds capacity, queue is theoretically infinite.									
#	95th percentile volume exceeds capacity, queue may be longer.									
m	Volume for 95th percentile queue is metered by upstream signal.									



12-14-2023
 BA Group
 Synchro 11 Report

3. James Snow Parkway & Derry Road

Future Total (PM)

2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	192	1185	16	261	1388	476	79	337	187	327	443	209
Traffic Volume (vph)	192	1185	16	261	1388	476	79	337	187	327	443	209
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpt)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Total Lost time (s)	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98
Fpb_psd/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb_psd/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	3438	1562	1738	3305	1516	1802	3202	1586	1616	3046	1403
Flt Permitted	0.95	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.92	1.00	1.00
Satd. Flow (perm)	3399	3438	1562	144	3305	1516	931	3202	1586	545	3046	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	196	1209	16	266	1416	486	81	344	191	334	452	213
RTOR Reduction (vph)	0	10	0	0	0	175	0	0	138	0	0	163
Lane Group Flow (vph)	1	1209	6	266	1416	311	81	344	53	334	452	50
Conf. Ped. (#/hr)	1	1	3	1	1	1	6	1	6	1	6	6
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	8	7	4	4
Permitted Phases	12	46.9	46.9	68.8	52.6	52.6	27.1	19.2	19.2	40.2	28.3	28.3
Actuated Green, G (s)	12.2	46.9	46.9	68.8	52.6	52.6	27.1	19.2	19.2	40.2	28.3	28.3
Effective Green, g (s)	0.70	0.39	0.39	0.57	0.44	0.44	0.23	0.16	0.16	0.34	0.24	0.24
Actuated G/C Ratio	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	345	1343	610	320	1448	664	267	512	253	334	718	330
Lane Grp Cap. (vph)	0.06	0.35	0.00	c0.12	c0.43	0.02	0.11	0.03	0.03	c0.14	0.15	0.04
v/s Ratio Prot	0.57	0.90	0.01	0.83	0.98	0.47	0.30	0.67	0.21	1.00	0.63	0.15
v/s Ratio Perm	51.4	34.4	22.4	34.5	33.1	23.8	37.7	47.4	43.8	36.1	41.1	36.3
Uniform Delay, d1	1.00	1.00	1.00	0.80	1.03	1.55	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.1	9.9	0.0	1.8	3.6	0.2	0.6	3.5	0.4	49.2	1.7	0.2
Incremental Delay, d2	53.5	44.3	22.4	29.4	37.7	37.2	38.3	50.9	44.2	85.4	42.9	36.6
Delay (s)	D	D	C	C	D	D	D	D	D	F	D	D
Level of Service	D	D	C	C	D	D	D	D	D	F	D	D
Approach Delay (s)	D	45.3	D	D	36.6	D	47.2	D	D	55.7	D	E
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	E
Intersection Summary												
HCM 2000 Control Delay	43.9	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	1.01	D										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	90.5%	ICU Level of Service										
Analysis Period (min)	15	E										
c. Critical Lane Group												

12-14-2023

BA Group

Synchro 11 Report

3. James Snow Parkway & Derry Road

Future Total (PM)

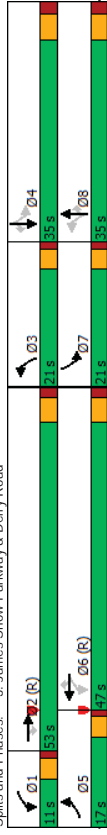
2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	192	1185	16	261	1388	476	79	337	187	327	443	209
Traffic Volume (vph)	192	1185	16	261	1388	476	79	337	187	327	443	209
Future Volume (vph)	196	1209	16	266	1416	486	81	344	191	334	452	213
Lane Group Flow (vph)	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	8	7	4	4
Permitted Phases	5	2	2	1	6	6	3	8	8	7	4	4
Detector Phase												
Switch Phase	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Initial (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Minimum Split (s)	17.0	53.0	53.0	11.0	47.0	47.0	21.0	35.0	35.0	21.0	35.0	35.0
Total Split (s)	14.2%	44.2%	44.2%	9.2%	39.2%	39.2%	17.5%	29.2%	29.2%	17.5%	29.2%	29.2%
Total Spill (%)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
Yellow Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Total Lost Time (s)	None	C-Min	None	C-Min	None	C-Min	None	None	None	None	None	None
Lead-Lag Optimized?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.57	0.89	0.02	0.83	0.96	0.57	0.27	0.70	0.50	0.99	0.63	0.43
Control Delay	57.6	42.8	0.1	29.3	36.8	14.9	29.0	55.7	14.4	81.0	46.0	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	42.8	0.1	29.3	36.8	14.9	29.0	55.7	14.4	81.0	46.0	7.8
Queue Length 50th (m)	24.2	144.7	0.0	41.4	189.9	71.6	13.8	43.2	5.9	68.5	54.6	0.0
Queue Length 95th (m)	35.7	#177.5	0.0	#41.9	#172.3	#64.2	23.7	56.4	26.6	#101.7	71.0	19.8
Internal Link Dist (m)	156.1											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	75.0	95.0	213.2	115.0
Base Capacity (vph)	386	1366	679	320	1470	847	411	781	511	338	769	513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.89	0.02	0.83	0.96	0.57	0.20	0.44	0.37	0.99	0.59	0.42
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: T03 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 115												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Volume shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												

12-14-2023

BA Group

Synchro 11 Report



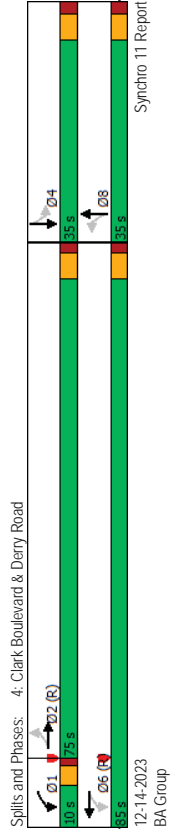
2027 Scenario 2
 Future Total (PM)
 HCM Signalized Intersection Capacity Analysis
 4: Clark Boulevard & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	30	1858	49	28	1975	24	132	10	73	74	7	169
Future Volume (vph)	30	1858	49	28	1975	24	132	10	73	74	7	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3526	1770	3533	1770	1617	1770	1617	1770	1595	1770	1595
Flt Permitted	0.05	1.00	0.05	1.00	0.46	1.00	0.70	1.00	0.70	1.00	0.70	1.00
Satd. Flow (perm)	94	3526	89	3533	863	1617	1301	1595	1301	1595	1301	1595
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	2020	53	30	2147	26	143	11	79	80	8	184
RTOR Reduction (vph)	0	1	0	0	1	0	0	65	0	0	11	0
Lane Group Flow (vph)	33	2072	0	30	2172	0	143	25	0	80	181	0
Turn Type	Perm	NA	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	2	1	6	8	8	8	4	4	4	4
Permitted Phases	2	6	6	1	6	8	8	8	4	4	4	4
Actuated Green, G (s)	79.3	79.3	87.0	87.0	87.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	79.3	79.3	87.0	87.0	87.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.66	0.66	0.72	0.72	0.72	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	62	2330	116	2561	158	296	238	292	238	292	238	292
v/s Ratio Prot	c0.59	0.01	c0.61	0.18	c0.17	0.02	0.06	0.11	0.06	0.11	0.06	0.11
v/s Ratio Perm	0.35	0.89	0.26	0.85	0.91	0.09	0.34	0.62	0.34	0.62	0.34	0.62
v/c Ratio	10.6	16.7	21.8	11.8	48.0	40.7	42.6	45.2	42.6	45.2	42.6	45.2
Uniform Delay, d1	1.50	1.43	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.9	0.6	1.2	3.7	44.6	0.1	0.8	4.1	0.8	4.1	0.8	4.1
Incremental Delay, d2	18.9	24.4	23.0	15.5	92.6	40.8	43.5	49.2	43.5	49.2	43.5	49.2
Delay (s)	B	C	C	B	F	D	D	D	D	D	D	D
Level of Service	B	C	C	B	F	D	D	D	D	D	D	D
Approach Delay (s)	24.3	15.6	72.6	15.6	72.6	15.6	72.6	15.6	72.6	15.6	72.6	15.6
Approach LOS	C	C	B	C	B	E	E	E	E	E	E	E
Intersection Summary												
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	0.90	C										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	88.4%	ICU Level of Service										
Analysis Period (min)	15	E										
c Critical Lane Group												

12-14-2023
 BA Group
 Synchro 11 Report

2027 Scenario 2
 Future Total (PM)
 4: Clark Boulevard & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	
Traffic Volume (vph)	30	1858	28	1975	132	10	74	7	7	7	7	
Future Volume (vph)	30	1858	28	1975	132	10	74	7	7	7	7	
Lane Group Flow (vph)	33	2073	30	2173	143	90	80	192	NA	Perm	NA	
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA	
Protected Phases	2	2	2	1	6	8	8	8	4	4	4	
Detector Phase	2	2	2	1	6	8	8	8	4	4	4	
Switch Phase	2	2	2	1	6	8	8	8	4	4	4	
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None	
v/c Ratio	0.53	0.87	0.20	0.85	0.91	0.25	0.34	0.63	0.34	0.63	0.63	
Control Delay	34.5	25.9	8.6	17.5	97.4	12.0	44.4	50.6	44.4	50.6	44.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	34.5	25.9	8.6	17.5	97.4	12.0	44.4	50.6	44.4	50.6	44.4	
Queue Length 50th (m)	5.8	234.1	1.8	183.5	34.8	2.2	17.3	41.1	17.3	41.1	17.3	
Queue Length 95th (m)	m7.3	m227.5	5.4	276.3	#62.3	15.6	30.7	62.2	15.6	30.7	62.2	
Internal Link Dist (m)	336.0	475.1	56.4	313.3	70.0	400	400	313.3	70.0	400	313.3	
Turn Bay Length (m)	62	2377	150	2560	210	454	317	399	210	454	317	
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.53	0.87	0.20	0.85	0.68	0.20	0.25	0.48	0.25	0.48	0.48	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green												
Natural Cycle: 120												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



12-14-2023
 BA Group
 Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard
 Future Total (PM)
 2027 Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	39	13	10	18	9	1	4	4	4	4	4	4
Traffic Volume (vph)	39	13	10	18	9	1	4	4	4	4	4	4
Future Volume (vph)	39	13	10	18	9	1	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1740	1770	1837	1770	1770	1858	1856	1856	1856	1856	1856
Flt Permitted	0.75	1.00	0.74	1.00	1.00	0.46	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1398	1740	1380	1837	1837	853	1858	1856	1856	1856	1856	1856
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	14	11	20	10	1	4	4	4	4	4	4
RTOR Reduction (vph)	0	9	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	42	16	0	20	10	0	4	4	4	4	4	4
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8				4	
Permitted Phases	2			6			8				4	
Actuated Green, G (s)	5.5	5.5	5.5	5.5	5.5	23.2	23.2	23.2	23.2	23.2	23.2	23.2
Effective Green, g (s)	5.5	5.5	5.5	5.5	5.5	23.2	23.2	23.2	23.2	23.2	23.2	23.2
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	193	241	191	254	191	498	1085	1085	1085	1084	1084	1084
v/s Ratio Prot	0.03		0.01			0.00	0.26			c0.27		
v/s Ratio Perm	0.22	0.06	0.10	0.04	0.10	0.01	0.44			0.47		
Uniform Delay, d1	15.2	14.9	14.9	14.8	14.8	3.4	4.6			4.7		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00		
Incremental Delay, d2	0.6	0.1	0.2	0.1	0.0	0.0	0.3			0.3		
Delay (s)	15.8	15.0	15.2	14.9	15.2	3.5	4.9			5.1		
Level of Service	B	B	B	B	B	A	A			A		
Approach Delay (s)	15.5		15.1			4.9				5.1		
Approach LOS	B		B			A				A		

Intersection Summary

HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	39.7	Sum of lost time (s)	11.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

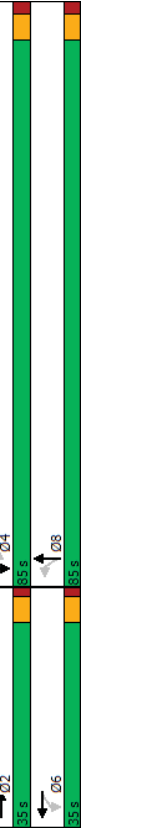
c. Critical Lane Group

Queues
 5: Fifth Line & Clark Boulevard
 Future Total (PM)
 2027 Scenario 2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	39	13	10	18	9	1	4	4	4	4	4	4
Traffic Volume (vph)	39	13	10	18	9	1	4	4	4	4	4	4
Future Volume (vph)	39	13	10	18	9	1	4	4	4	4	4	4
Lane Group Flow (vph)	42	25	20	11	4	4	4	4	4	4	4	4
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8				4	
Permitted Phases	2			6			8				4	
Detector Phase	2			6			8				4	
Switch Phase	2			6			8				4	
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag												
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	0.11	0.05	0.05	0.02	0.01	0.01	0.37	0.40	0.40	0.40	0.40	0.40
v/c Ratio	12.7	9.5	12.1	11.2	5.8	7.1	7.3	7.3	7.3	7.3	7.3	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	9.5	12.1	11.2	5.8	7.1	7.3	7.3	7.3	7.3	7.3	7.3
Queue Length 50th (m)	2.8	0.9	1.3	0.7	0.2	21.6	23.4	23.4	23.4	23.4	23.4	23.4
Queue Length 95th (m)	7.7	4.7	4.7	3.1	1.1	40.9	44.3	44.3	44.3	44.3	44.3	44.3
Internal Link Dist (m)	204.0			86.5		156.9	372.1					
Turn Bay Length (m)	35.0			35.0		35.0	35.0					
Base Capacity (vph)	1127	1406	1113	1482	853	1859	1855	1855	1855	1855	1855	1855
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02	0.02	0.01	0.00	0.26	0.28	0.28	0.28	0.28	0.28	0.28

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 37.5	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	



HCM Unsignalized Intersection Capacity Analysis
 10: Clark Boulevard & Anatolia Building 1 North Access/Anatolia Building 2 North Access Scenario 2

HCM Unsignalized Intersection Capacity Analysis
 9: Sixth Line & Anatolia Building 3 East Access Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	3	0	1	4	0	36	1	176	1	9	71	4
Traffic Volume (veh/h)	3	0	1	4	0	36	1	176	1	9	71	4
Future Volume (Veh/h)	3	0	1	4	0	36	1	176	1	9	71	4
Sign Control	Stop	0%	Free	Stop	0%	Free	Free	0%	Free	Free	0%	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	0	1	4	0	39	1	191	1	10	77	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)							None	None	None	None	None	None
Median type												
Median storage (veh)												
Upstream signal (m)												80
pX platoon unblocked												
VC, conflicting volume	332	293	79	294	294	192	81			192		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol	332	293	79	294	294	192	81			192		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	99	100	95	100			99		
pM capacity (veh/h)	590	613	981	654	612	850	1517			1381		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volumes Total	4	43	193	91								
Volume Left	3	4	1	10								
Volume Right	1	39	1	4								
cSH	655	827	1517	1381								
Volumes to Capacity	0.01	0.05	0.00	0.01								
Queue Length 95th (m)	0.1	1.3	0.0	0.2								
Control Delay (s)	10.5	9.6	0.0	0.9								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.5	9.6	0.0	0.9								
Approach LOS	B	A	A	A								
Intersection Summary												
Average Delay	1.6											
Intersection Capacity Utilization	20.6%											
ICU Level of Service	A											
Analysis Period (min)	15											

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W	4	2	368	328	8
Traffic Volume (veh/h)	22	4	2	368	328	8
Future Volume (Veh/h)	22	4	2	368	328	8
Sign Control	Stop	Free	Free	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	4	2	400	357	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						236
pX platoon unblocked	0.92	0.92	0.92			
VC, conflicting volume	766	362	366			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	699	259	264			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	100			
pM capacity (veh/h)	372	715	1193			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	28	402	366			
Volume Left	24	2	0			
Volume Right	4	0	9			
cSH	399	1193	1700			
Volumes to Capacity	0.07	0.00	0.22			
Queue Length 95th (m)	1.8	0.0	0.0			
Control Delay (s)	14.7	0.1	0.0			
Lane LOS	B	A	A			
Approach Delay (s)	14.7	0.1	0.0			
Approach LOS	B	A	A			
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	31.0%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 12: Clark Boulevard & Anatolia Building 1 South Access

HCM Unsignalized Intersection Capacity Analysis
 11: Clark Boulevard & Anatolia Building 2 South Access

Future Total (PM)
 2027 Scenario 2

Future Total (PM)
 2027 Scenario 2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W					
Traffic Volume (veh/h)	130	12	4	16	16	48
Future Volume (Veh/h)	130	12	4	16	16	48
Sign Control	Stop			Free	Free	Free
Grade	0%			0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	13	4	17	17	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)				None	None	
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	68	43	69			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	68	43	69			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	85	99	100			
CM capacity (veh/h)	934	1027	1532			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	154	21	69			
Volume Left	141	4	0			
Volume Right	13	0	52			
CSH	942	1532	1700			
Volumes to Capacity	0.16	0.00	0.04			
Queue Length 95th (m)	4.7	0.1	0.0			
Control Delay (s)	9.6	1.4	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	9.6	1.4	0.0			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			6.2			
Intersection Capacity Utilization			18.9%			ICU Level of Service A
Analysis Period (min)			15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					
Traffic Volume (veh/h)	6	36	142	4	18	58
Future Volume (Veh/h)	6	36	142	4	18	58
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	39	154	4	20	63
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	259	156		158		
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	259	156		158		
IC, single (s)	6.4	6.2		4.1		
IC, 2 stage (s)						
IF (s)	3.5	3.3		2.2		
p0 queue free %	99	96		99		
CM capacity (veh/h)	720	890		1422		
Direction, Lane #	WB 1	NB 1	SB 1			
Volumes Total	46	158	83			
Volume Left	7	0	20			
Volume Right	39	4	0			
CSH	859	1700	1422			
Volumes to Capacity	0.05	0.09	0.01			
Queue Length 95th (m)	1.4	0.0	0.3			
Control Delay (s)	9.4	0.0	1.9			
Lane LOS	A	A	A			
Approach Delay (s)	9.4	0.0	1.9			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			25.1%			ICU Level of Service A
Analysis Period (min)			15			

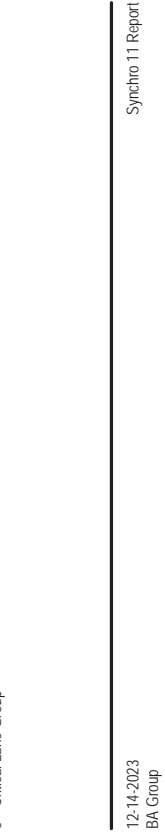
HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road
 2027 Scenario 3

Queues
 1: Sixth Line & Derry Road
 2027 Scenario 3

Future Background (AM)
 2027 Scenario 3

Future Background (AM)
 2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	158	1960	139	15	778	38	82	167	28	34	131	125
Future Volume (vph)	158	1960	139	15	778	38	82	167	28	34	131	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.93
FRT	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.93
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1748	3073	1729	3225	1805	1828	1805	1828	1780	1729	1780	1729
Flt Permitted	0.28	1.00	0.06	1.00	0.31	1.00	0.31	1.00	0.47	1.00	0.47	1.00
Satd. Flow (perm)	511	3073	109	3225	593	1828	593	1828	872	1729	872	1729
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	163	2021	143	15	802	39	85	172	29	35	135	129
RTOR Reduction (vph)	0	4	0	0	3	0	0	6	0	0	34	0
Lane Group Flow (vph)	163	2160	0	15	838	0	85	195	0	35	230	0
Heavy Vehicles (%)	2%	3%	0%	4%	2%	22%	0%	1%	0%	1%	1%	1%
Bus Blockages (#/hr)	3	58	0	1	37	2	0	2	0	1	2	1
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	2	1	6	8	8	8	8	8	4	4
Permitted Phases	2	78.8	72.0	69.6	66.8	19.7	19.7	19.7	19.7	19.7	19.7	19.7
Effective Green, G (s)	78.8	72.0	69.6	66.8	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7
Actuated Green, g (s)	0.71	0.65	0.63	0.60	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Actuated g/C Ratio	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	451	1993	109	1940	105	324	154	306	154	306	154	306
Lane Grp Cap (vph)	c0.03	c0.70	0.00	0.26	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.13
v/s Ratio Prot	0.23	0.36	1.08	0.14	0.43	0.81	0.60	0.60	0.23	0.75	0.23	0.75
v/s Ratio Perm	6.1	19.5	22.1	11.9	43.8	42.0	39.1	43.3	39.1	43.3	39.1	43.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	47.2	0.6	0.7	35.1	3.1	0.8	10.0	0.8	10.0	0.8	10.0
Incremental Delay, d2	6.6	66.7	22.7	12.6	79.0	45.2	39.9	53.3	39.9	53.3	39.9	53.3
Delay (s)	A	E	C	B	E	D	D	D	D	D	D	D
Level of Service	62.4	12.8	55.2	E	55.2	E	51.8	D	51.8	D	51.8	D
Approach Delay (s)	E	E	B	B	B	E	D	D	D	D	D	D
Approach LOS	E	E	B	B	B	E	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	49.8 HCM 2000 Level of Service D											
HCM 2000 Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	111.0 Sum of lost time (s) 16.5											
Intersection Capacity Utilization	106.3% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												



12-14-2023
 BA Group
 Synchro 11 Report

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	158	1960	139	15	778	38	82	167	28	34	131	125
Future Volume (vph)	158	1960	139	15	778	38	82	167	28	34	131	125
Lane Group Flow (vph)	163	2164	15	841	85	201	35	264	201	35	264	201
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	2	1	6	8	8	8	8	8	4	4
Permitted Phases	2	78.8	72.0	69.6	66.8	19.7	19.7	19.7	19.7	19.7	19.7	19.7
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Total Split (s)	11.0	67.0	11.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0
Total Split (%)	9.9%	60.4%	9.9%	60.4%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
v/c Ratio	0.36	1.05	0.09	0.43	0.81	0.61	0.61	0.61	0.23	0.78	0.23	0.78
Control Delay	7.5	54.7	6.6	13.5	40.9	47.7	40.4	51.6	40.4	51.6	40.4	51.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	54.7	6.6	13.5	40.9	47.7	40.4	51.6	40.4	51.6	40.4	51.6
Queue Length 50th (m)	9.7	225.0	0.8	51.4	18.8	41.1	6.9	49.1	6.9	49.1	6.9	49.1
Queue Length 95th (m)	20.6	#377.0	3.3	74.5	#39.3	61.1	15.5	73.3	15.5	73.3	15.5	73.3
Internal Link Dist (m)	256.2											
Turn Bay Length (m)	120.0											
Base Capacity (vph)	457	2062	176	1944	142	445	209	447	209	447	209	447
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	1.05	0.09	0.43	0.60	0.45	0.17	0.59	0.17	0.59	0.17	0.59
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.												
Spills and Phases: 1- Sixth Line & Derry Road												

12-14-2023
 BA Group
 Synchro 11 Report

2: Fifth Line & Derry Road

Future Background (AM)

2027 Scenario 3

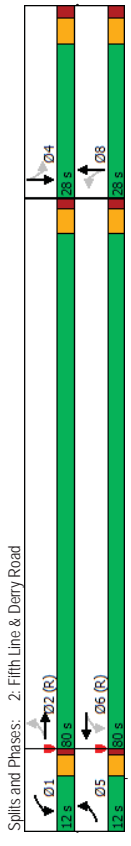
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	88	2060	154	175	699	249	93	286	84	111	66
Traffic Volume (vph)	88	2060	154	175	699	249	93	286	84	111	66
Future Volume (vph)	88	2060	154	175	699	249	93	286	84	111	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1805	3234	1805	3141	1694	3456	1694	3456	1463	3138	1463
Flt Permitted	0.24	1.00	0.05	1.00	0.69	1.00	0.36	1.00	0.36	1.00	0.36
Satd. Flow (perm)	454	3234	101	3141	1227	3456	557	3138	557	3138	557
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	93	2168	162	184	736	262	98	301	88	117	69
RTOR Reduction (vph)	0	5	0	0	29	0	0	23	0	0	26
Lane Group Flow (vph)	93	2325	0	184	969	0	98	366	0	117	75
Heavy Vehicles (%)	0%	2%	0%	0%	1%	15%	4%	0%	4%	12%	9%
Bus Blockages (#/hr)	0	39	0	0	26	14	6	0	4	23	4
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	6	8	8	8	8	4	4
Permitted Phases	2	74.7	83.3	75.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Effective Green, G (s)	82.1	74.7	83.3	75.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Actuated Green, g (s)	0.68	0.62	0.69	0.63	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Actuated g/C Ratio	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	393	2013	183	1970	228	642	103	583	103	583	103
Lane Grp Cap (vph)	0.01	c0.72	c0.07	0.31	0.08	0.11	0.08	0.11	0.08	0.11	0.08
v/s Ratio Prot	0.15	0.24	1.01	0.49	0.43	0.57	1.14	0.13	0.43	0.57	1.14
v/s Ratio Perm	7.1	22.6	41.2	12.0	43.2	44.5	48.9	40.7	43.2	44.5	48.9
Uniform Delay, d1	0.72	0.53	0.99	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.1	72.1	67.0	0.9	1.3	1.2	1.29	0.1	1.3	1.2	1.29
Incremental Delay, d2	5.2	84.1	107.8	12.1	44.5	45.7	178.8	40.8	44.5	45.7	178.8
Delay (s)	A	F	F	B	D	D	F	D	D	F	D
Level of Service	81.1	27.0	45.5	45.5	45.5	45.5	114.9	45.5	45.5	45.5	114.9
Approach Delay (s)	F	F	C	C	D	D	F	D	D	F	D
Approach LOS	F	F	C	C	D	D	F	D	D	F	D
Intersection Summary											
HCM 2000 Control Delay	63.9	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity ratio	1.14	E									
Actuated Cycle Length (s)	120.0	Sum of lost time (s)									
Intersection Capacity Utilization	107.7%	15.0									
Analysis Period (min)	15	ICU Level of Service									
G											
c Critical Lane Group											

2: Fifth Line & Derry Road

Future Background (AM)

2027 Scenario 3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	88	2060	175	699	249	93	286	84	111	66	30
Traffic Volume (vph)	88	2060	175	699	249	93	286	84	111	66	30
Future Volume (vph)	88	2060	175	699	249	93	286	84	111	66	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.99	1.00	0.96	1.00	0.97	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1805	3234	1805	3141	1694	3456	1694	3456	1463	3138	1463
Flt Permitted	0.24	1.00	0.05	1.00	0.69	1.00	0.36	1.00	0.36	1.00	0.36
Satd. Flow (perm)	454	3234	101	3141	1227	3456	557	3138	557	3138	557
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	93	2168	162	184	736	262	98	301	88	117	69
RTOR Reduction (vph)	0	5	0	0	29	0	0	23	0	0	26
Lane Group Flow (vph)	93	2325	0	184	969	0	98	366	0	117	75
Heavy Vehicles (%)	0%	2%	0%	0%	1%	15%	4%	0%	4%	12%	9%
Bus Blockages (#/hr)	0	39	0	0	26	14	6	0	4	23	4
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	6	8	8	8	8	4	4
Permitted Phases	2	74.7	83.3	75.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Effective Green, G (s)	82.1	74.7	83.3	75.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Actuated Green, g (s)	0.68	0.62	0.69	0.63	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Actuated g/C Ratio	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	393	2013	183	1970	228	642	103	583	103	583	103
Lane Grp Cap (vph)	0.01	c0.72	c0.07	0.31	0.08	0.11	0.08	0.11	0.08	0.11	0.08
v/s Ratio Prot	0.15	0.24	1.01	0.49	0.43	0.57	1.14	0.13	0.43	0.57	1.14
v/s Ratio Perm	7.1	22.6	41.2	12.0	43.2	44.5	48.9	40.7	43.2	44.5	48.9
Uniform Delay, d1	0.72	0.53	0.99	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.1	72.1	67.0	0.9	1.3	1.2	1.29	0.1	1.3	1.2	1.29
Incremental Delay, d2	5.2	84.1	107.8	12.1	44.5	45.7	178.8	40.8	44.5	45.7	178.8
Delay (s)	A	F	F	B	D	D	F	D	D	F	D
Level of Service	81.1	27.0	45.5	45.5	45.5	45.5	114.9	45.5	45.5	45.5	114.9
Approach Delay (s)	F	F	C	C	D	D	F	D	D	F	D
Approach LOS	F	F	C	C	D	D	F	D	D	F	D
Intersection Summary											
Cycle Length: 120	Actuated Cycle Length: 120										
Offset: 0 (0%)	Referenced to phase 2:EBTL and 6:WBTL, Start of Green										
Natural Cycle: 150	Control Type: Actuated-Coordinated										
- Volume exceeds capacity, queue is theoretically infinite.	Queue shown is maximum after two cycles.										
# 95th percentile volume exceeds capacity, queue may be longer.	Queue shown is maximum after two cycles.										
m Volume for 95th percentile queue is metered by upstream signal.											



3. James Snow Parkway & Derry Road

HCM Signalized Intersection Capacity Analysis

Future Background (AM) 2027 Scenario 3

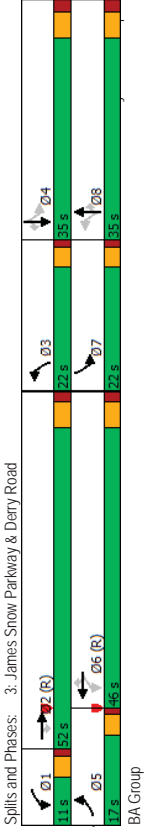
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	187	1729	30	67	543	178	24	271	179	339	377	182
Traffic Volume (vph)	187	1729	30	67	543	178	24	271	179	339	377	182
Future Volume (vph)	187	1729	30	67	543	178	24	271	179	339	377	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.99	1.00	1.00	0.95	1.00
Fpb. ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3446	3376	1497	1791	3453	1460	1715	3428	1489	1727	3346	1580
Flt Permitted	0.95	1.00	1.00	0.07	1.00	1.00	0.52	1.00	1.00	0.37	1.00	1.00
Satd. Flow (perm)	3446	3376	1497	140	3453	1460	938	3428	1489	671	3346	1580
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	195	1801	31	70	566	185	25	282	186	353	393	190
RTOR Reduction (vph)	0	0	16	0	0	102	0	0	137	0	0	142
Lane Group Flow (vph)	195	1801	15	70	566	83	25	282	49	353	393	48
Confl. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	1%	2%	6%	0%	1%	4%	4%	3%	4%	2%	4%	1%
Bus Blockages (#/hr)	3	23	1	2	17	15	3	11	7	6	18	3
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	7	4	4	4	4
Permitted Phases	2	2	2	1	6	6	3	8	8	7	4	4
Actuated Green, G (s)	12.1	59.7	59.7	60.4	54.0	54.0	21.4	16.9	16.9	38.9	30.4	30.4
Effective Green, g (s)	12.1	59.7	59.7	60.4	54.0	54.0	21.4	16.9	16.9	38.9	30.4	30.4
Actuated G/C Ratio	0.10	0.50	0.50	0.50	0.45	0.45	0.18	0.14	0.14	0.32	0.25	0.25
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	347	1679	744	158	1553	657	196	482	209	375	847	400
v/s Ratio Prot	c0.06	c0.53	0.01	0.20	0.02	0.16	0.00	0.08	0.03	c0.14	c0.12	0.03
v/s Ratio Perm	0.56	1.07	0.02	0.44	0.36	0.13	0.13	0.59	0.24	0.94	0.46	0.12
v/s Ratio	51.4	30.1	15.3	26.2	21.7	19.2	41.1	48.3	45.8	36.0	37.9	34.5
Uniform Delay, d1	1.00	1.00	1.00	0.73	1.00	2.91	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.1	44.4	0.1	1.8	0.6	0.4	0.3	1.8	0.6	3.1	0.4	0.1
Incremental Delay, d2	53.5	74.5	15.4	20.9	22.4	56.3	41.4	50.1	46.4	67.6	38.3	34.6
Delay (s)	D	E	B	C	C	E	D	D	D	E	D	C
Level of Service	D	E	B	C	C	E	D	D	D	E	D	C
Approach Delay (s)	E	71.6	29.9	C	48.3	D	48.6	D	48.6	D	48.6	D
Approach LOS	E	F	C	F	D	F	D	F	D	E	D	D
Intersection Summary												
HCM 2000 Control Delay	55.9 HCM 2000 Level of Service E											
HCM 2000 Volume to Capacity ratio	1.03											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) F											
Intersection Capacity Utilization	97.1% ICU Level of Service F											
Analysis Period (min)	15											
Critical Lane Group												

12-14-2023 Synchro 11 Report BA Group

3. James Snow Parkway & Derry Road

Future Background (AM) 2027 Scenario 3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	187	1729	30	67	543	178	24	271	179	339	377	182
Traffic Volume (vph)	187	1729	30	67	543	178	24	271	179	339	377	182
Future Volume (vph)	187	1729	30	67	543	178	24	271	179	339	377	182
Lane Group Flow (vph)	195	1801	31	70	566	185	25	282	186	353	393	190
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	7	4	4	4	4
Permitted Phases	5	2	2	1	6	6	3	8	8	7	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	52.0	52.0	11.0	46.0	46.0	22.0	35.0	35.0	22.0	35.0	35.0
Total Split (%)	14.2%	43.3%	43.3%	9.2%	38.3%	38.3%	18.3%	29.2%	29.2%	18.3%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
Yellow Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.56	1.03	0.04	0.38	0.35	0.24	0.11	0.64	0.57	0.94	0.46	0.35
Control Delay	57.6	60.2	0.1	15.2	22.5	10.2	28.2	56.3	17.6	69.1	40.5	7.0
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay	57.6	60.2	0.1	15.2	22.5	10.2	28.2	56.3	17.6	69.1	40.5	7.0
Queue Length 50th (m)	24.1	-258.2	0.0	7.2	53.5	8.9	4.2	35.5	6.0	74.1	45.7	0.0
Queue Length 95th (m)	35.6	#329.5	0.0	14.8	76.0	30.0	10.2	48.3	27.9	#100.4	59.9	18.5
Internal Link Dist (m)	156.1 488.7 381.6											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	75.0	100.0	75.0	95.0	115.0	75.0	115.0
Base Capacity (vph)	389	1745	820	182	1599	775	390	837	483	376	875	553
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	1.03	0.04	0.38	0.35	0.24	0.06	0.34	0.39	0.94	0.45	0.34
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 145												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



HCM Signalized Intersection Capacity Analysis
4: Clark Boulevard & Derry Road

Future Background (AM)
2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	75	2141	45	102	872	91	16	7	10	24	10	43
Future Volume (vph)	75	2141	45	102	872	91	16	7	10	24	10	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3528	1770	3489	1770	1701	1701	1701	1701	1770	1636	1636
Flt Permitted	0.27	1.00	0.04	1.00	0.72	1.00	1.00	0.75	1.00	0.75	1.00	0.75
Satd. Flow (perm)	509	3528	81	3489	1340	1701	1388	1636	1636	1388	1636	1636
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	2327	49	111	948	99	17	8	11	26	11	47
RTOR Reduction (vph)	0	1	0	0	3	0	0	10	0	0	0	44
Lane Group Flow (vph)	82	2375	0	111	1044	0	17	9	0	26	14	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2		1	6			8			4		
Permitted Phases	2		6			8			8	4		
Actuated Green, G (s)	87.8	87.8	100.9	100.9	100.9	8.1	8.1	8.1	8.1	8.1	8.1	8.1
Effective Green, g (s)	87.8	87.8	100.9	100.9	100.9	8.1	8.1	8.1	8.1	8.1	8.1	8.1
Actuated g/C Ratio	0.73	0.73	0.84	0.84	0.84	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Clearance Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	372	2581	196	2933	90	114	93	110	93	110	110	110
v/s Ratio Prot	c0.67		c0.04	0.30		0.01		c0.02				
v/s Ratio Perm	0.16		0.43			0.01		0.02				
v/c Ratio	0.22	0.92	0.57	0.36	0.19	0.08	0.28	0.13	0.08	0.28	0.13	0.13
Uniform Delay, d1	5.2	13.2	35.6	2.2	52.8	52.4	53.2	52.6	52.4	53.2	52.6	52.6
Progression Factor	1.68	1.78	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.7	3.7	0.3	1.0	0.3	1.6	0.5	0.3	1.6	0.5	0.5
Delay (s)	8.8	24.2	39.3	2.5	53.9	52.7	54.8	53.2	52.7	54.8	53.2	53.2
Level of Service	A	C	D	A	D	D	D	D	D	D	D	D
Approach Delay (s)	23.7		6.0		53.3				53.3			
Approach LOS	C		A		D				D			D
Intersection Summary												
HCM 2000 Control Delay	19.2											B
HCM 2000 Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	120.0											15.0
Intersection Capacity Utilization	87.1%											E
Analysis Period (min)	15											
c Critical Lane Group												

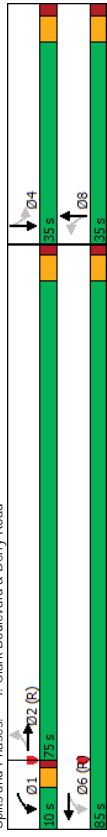
12-14-2023
BA Group

Synchro 11 Report

Queues
4: Clark Boulevard & Derry Road

Future Background (AM)
2027 Scenario 3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	75	2141	45	102	872	91	16	7	10	24	10	43
Future Volume (vph)	75	2141	45	102	872	91	16	7	10	24	10	43
Lane Group Flow (vph)	82	2376	111	1047	17	19	26	58	19	26	58	58
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2		1	6			8			4		
Permitted Phases	2		6			8			8	4		
Detector Phase	2		2			6			6	4		
Switch Phase	2		2			6			6	4		
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.22	0.91	0.56	0.35	0.15	0.12	0.22	0.32	0.15	0.22	0.32	0.32
Control Delay	11.4	25.7	29.9	2.6	54.2	34.0	56.2	23.8	2.6	54.2	34.0	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	25.7	29.9	2.6	54.2	34.0	56.2	23.8	2.6	54.2	34.0	23.8
Queue Length 50th (m)	9.6	276.0	9.9	25.6	4.0	1.9	6.1	2.6	4.0	1.9	6.1	2.6
Queue Length 95th (m)	m10.3	m242.9	28.8	33.1	11.7	9.6	15.7	16.0	11.7	9.6	15.7	16.0
Internal Link Dist (m)		336.0		475.1		56.4		313.3		56.4		313.3
Turn Bay Length (m)	70.0		70.0									
Base Capacity (vph)	377	2615	198	3000	326	423	338	434	326	423	338	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.91	0.56	0.35	0.05	0.04	0.08	0.13	0.05	0.04	0.08	0.13
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
m Volume for 95th percentile queue is metered by upstream signal.												
Splits and Phases: 4: Clark Boulevard & Derry Road												



12-14-2023
BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard
 2027 Scenario 3

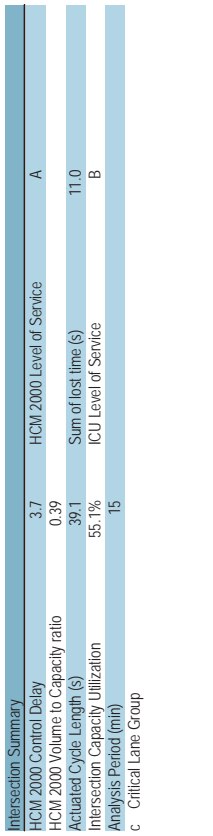
Queues
 5: Fifth Line & Clark Boulevard
 2027 Scenario 3

Future Background (AM)
 2027 Scenario 3

Future Background (AM)
 2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	10	11	3	2	13	11	10	442	21	61	297
Traffic Volume (vph)	10	11	3	2	13	11	10	442	21	61	297
Future Volume (vph)	10	11	3	2	13	11	10	442	21	61	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.93	1.00	0.95	1.00	0.95	1.00	0.98
Satd. Flow (prot)	1770	1807	1770	1734	1770	1850	1770	1850	1770	1832	1832
Flt Permitted	1.00	1.00	1.00	1.00	0.54	1.00	0.54	1.00	0.48	1.00	0.48
Satd. Flow (perm)	1863	1807	1863	1734	1015	1850	1015	1850	892	1832	1832
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	12	3	2	14	12	11	480	23	66	323
RTOR Reduction (vph)	0	3	0	0	11	0	0	1	0	0	4
Lane Group Flow (vph)	11	12	0	2	15	0	11	502	0	66	359
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2			6			8				4
Permitted Phases	2			6			8				4
Actuated Green, G (s)	1.7	1.7	1.7	1.7	1.7	26.4	26.4	26.4	26.4	26.4	26.4
Effective Green, g (s)	1.7	1.7	1.7	1.7	1.7	26.4	26.4	26.4	26.4	26.4	26.4
Actuated g/C Ratio	0.04	0.04	0.04	0.04	0.04	0.68	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	81	78	81	75	81	685	1249		602	1236	
v/s Ratio Prot	0.01			c0.01			c0.27			0.07	
v/s Ratio	0.14	0.16	0.02	0.19	0.02	0.02	0.40	0.11	0.29	0.11	0.29
Uniform Delay, d1	18.0	18.0	17.9	18.0	2.1	2.8	2.2	2.6	2.6	2.2	2.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.9	0.1	1.3	0.0	0.2	0.1	0.1	0.1	0.1	0.1
Delay (s)	18.8	18.9	18.0	19.3	2.1	3.0	2.3	2.7	2.7	2.3	2.7
Level of Service	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	18.9		19.2		3.0					2.6	
Approach LOS	B		B		B					A	
Intersection Summary											
HCM 2000 Control Delay	3.7 HCM 2000 Level of Service A										
HCM 2000 Volume to Capacity ratio	0.39										
Actuated Cycle Length (s)	39.1 Sum of lost time (s) 11.0										
Intersection Capacity Utilization	55.1% ICU Level of Service B										
Analysis Period (min)	15										
c Critical Lane Group											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	10	11	3	2	13	11	10	442	21	61	297
Traffic Volume (vph)	10	11	3	2	13	11	10	442	21	61	297
Future Volume (vph)	10	11	3	2	13	11	10	442	21	61	297
Lane Group Flow (vph)	11	15	2	26	11	503	66	363			
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2			6			8				4
Permitted Phases	2			6			8				4
Detector Phase	2			6			8				4
Switch Phase	2			6			8				4
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Yellow Time (%)	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
v/c Ratio	0.02	0.03	0.00	0.05	0.01	0.01	0.30	0.08	0.22	0.08	0.22
Control Delay	11.0	10.2	11.0	8.9	3.2	3.3	3.1	2.8	2.8	2.8	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	10.2	11.0	8.9	3.2	3.3	3.1	2.8	2.8	2.8	2.8
Queue Length 50th (m)	0.5	0.5	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	3.2	3.8	1.2	4.9	2.0	4.30	7.1	28.3			
Internal Link Dist (m)	204.0 86.5 156.9 372.1										
Turn Bay Length (m)	35.0 35.0 35.0										
Base Capacity (vph)	1610	1562	1610	1500	1015	1850	892	1831			
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.00	0.02	0.01	0.27	0.07	0.20			
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 34.8											
Natural Cycle: 70											
Control Type: Actuated-Uncoordinated											



Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 34.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

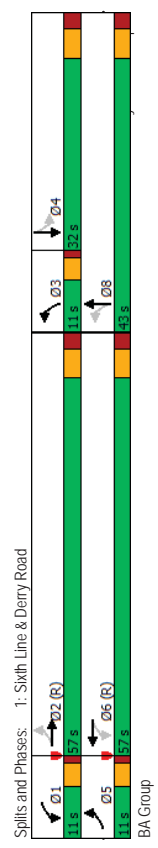
HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road
 Future Background (PM)
 2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	
Traffic Volume (vph)	161	1727	88	29	1700	22	182	153	30	93	214	
Future Volume (vph)	161	1727	88	29	1700	22	182	153	30	93	214	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	
FRT	1.00	0.99	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1748	3080	1729	3263	1805	1823	1780	1757	1780	1757	1757	
Flt Permitted	0.07	1.00	0.08	1.00	0.17	1.00	0.64	1.00	0.64	1.00	1.00	
Satd. Flow (perm)	133	3080	141	3263	314	1823	1196	1757	1196	1757	1757	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	166	1780	91	30	1753	23	188	158	31	96	221	
RTOR Reduction (vph)	0	3	0	0	1	0	0	7	0	0	21	
Lane Group Flow (vph)	166	1868	0	30	1775	0	188	182	0	96	341	
Heavy Vehicles (%)	2%	3%	0%	4%	2%	22%	0%	1%	0%	1%	1%	
Bus Blockages (#/hr)	3	58	0	1	37	2	0	2	0	1	2	
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	perm	NA	NA	
Protected Phases	5	2		1	6		3	8		3	8	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	63.1	55.2	55.7	51.5	35.1	35.1	35.1	35.1	24.1	24.1	24.1	
Effective Green, g (s)	63.1	55.2	55.7	51.5	35.1	35.1	35.1	35.1	24.1	24.1	24.1	
Actuated g/C Ratio	0.57	0.50	0.50	0.46	0.32	0.32	0.32	0.32	0.22	0.22	0.22	
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	190	1531	130	1513	193	576	193	576	259	381	381	
v/s Ratio Prot	c0.06	c0.61	0.01	0.54	c0.06	0.10	c0.06	0.10	0.19	0.19	0.19	
v/s Ratio Perm	0.43	0.11	0.11	c0.25	0.23	0.17	0.97	0.32	0.37	0.89	0.89	
Uniform Delay, d1	29.6	27.9	24.4	29.8	34.6	28.8	37.0	42.2	37.0	42.2	42.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	32.9	105.2	0.9	85.3	56.8	0.3	0.9	22.4	0.9	22.4	22.4	
Delay (s)	62.5	133.1	25.3	115.0	91.4	29.2	37.9	64.7	37.9	64.7	64.7	
Level of Service	E	F	C	F	F	C	F	D	F	D	E	
Approach Delay (s)		127.3		113.5		60.2		59.0				
Approach LOS		F		F		E		E		E		
Intersection Summary												
HCM 2000 Control Delay	109.9										HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17											
Actuated Cycle Length (s)	111.0										Sum of lost time (s)	20.5
Intersection Capacity Utilization	103.4%										ICU Level of Service	G
Analysis Period (min)	15											
c Critical Lane Group												

12-14-2023
 BA Group
 Synchro 11 Report

Queues
 1: Sixth Line & Derry Road
 Future Background (PM)
 2027 Scenario 3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	161	1727	29	1700	22	182	153	30	93	214	214
Future Volume (vph)	161	1727	29	1700	22	182	153	30	93	214	214
Lane Group Flow (vph)	166	1871	30	1776	188	189	96	362	96	362	362
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	perm	NA	NA
Protected Phases	5	2		1	6		3	8		4	
Permitted Phases	2			6			8			4	
Detector Phase	5	2		1	6		3	8		4	
Switch Phase	7.0	25.0	7.0	25.0	7.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	11.0	31.2	11.0	31.2	11.0	32.3	32.3	32.3	32.3	32.3	32.3
Minimum Split (s)	11.0	57.0	11.0	57.0	11.0	43.0	43.0	43.0	43.0	43.0	43.0
Total Split (s)	9.9%	51.4%	9.9%	51.4%	9.9%	38.7%	28.8%	28.8%	28.8%	28.8%	28.8%
Total Split (%)	3.0	4.0	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
Yellow Time (s)	1.0	2.2	1.0	2.2	1.0	2.3	2.3	2.3	2.3	2.3	2.3
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.87	1.18	0.17	1.17	0.94	0.32	0.37	0.90	0.37	0.90	0.90
Control Delay	63.5	117.4	12.4	115.2	82.0	28.6	40.9	65.0	40.9	65.0	65.0
Total Delay	63.5	117.4	12.4	115.2	82.0	28.6	40.9	65.0	40.9	65.0	65.0
Queue Length 50th (m)	22.7	-293.2	2.8	-258.8	30.8	30.2	18.4	73.9	30.2	18.4	73.9
Queue Length 95th (m)	#66.5	#338.4	6.9	#304.2	#64.0	49.6	34.7	#124.9	49.6	34.7	#124.9
Internal Link Dist (m)		475.1		256.2		211.8		201.7		201.7	201.7
Turn Bay Length (m)	120.0	100.0		45.0		30.0		30.0		30.0	30.0
Base Capacity (vph)	191	1579	177	1512	199	609	277	427	277	427	427
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	1.18	0.17	1.17	0.94	0.31	0.35	0.85	0.35	0.85	0.85
Intersection Summary											
Cycle Length: 111											
Actuated Cycle Length: 111											
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBTL, Start of Green											
Natural Cycle: 140											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											



2: Fifth Line & Derry Road

2: Fifth Line & Derry Road

2027 Scenario 3

2027 Scenario 3

Future Background (PM)

Future Background (PM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4	
Traffic Volume (vph)	41	1575	89	97	1887	112	287	69	193	327	299	77	
Future Volume (vph)	41	1575	89	97	1887	112	287	69	193	327	299	77	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
FRT	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.89	1.00	0.95	1.00	0.97	
FL Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3240	1805	3334	1694	3120	1694	3120	1463	3191	1463	3191	
FL Permitted	0.06	1.00	0.06	1.00	0.31	1.00	0.31	1.00	0.48	1.00	0.48	1.00	
Satd. Flow (perm)	117	3240	114	3334	553	3120	553	3120	745	3191	745	3191	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	43	1658	94	102	1986	118	302	73	203	344	315	81	
RTOR Reduction (vph)	0	3	0	0	3	0	0	0	100	0	0	20	
Lane Group Flow (vph)	43	1749	0	102	2101	0	302	176	0	344	376	0	
Heavy Vehicles (%)	0%	2%	0%	0%	1%	15%	4%	0%	4%	12%	9%	8%	
Bus Blockages (#/hr)	0	39	0	0	26	14	6	0	4	23	4	2	
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	
Protected Phases	5	2	1	6	3	8	7	4					
Permitted Phases	2		6		8		4						
Effective Green, G (s)	70.3	64.7	74.1	66.6	28.8	18.8	28.8	18.8	28.8	18.8	28.8	18.8	
Effective Green, g (s)	70.3	64.7	74.1	66.6	28.8	18.8	28.8	18.8	28.8	18.8	28.8	18.8	
Actuated g/C Ratio	0.59	0.54	0.62	0.55	0.24	0.16	0.24	0.16	0.24	0.16	0.24	0.16	
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	4.0	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	147	1746	176	1850	227	488	227	488	238	499	238	499	
v/s Ratio Prot	0.01	0.54	c0.04	c0.63	0.11	0.06	0.11	0.06	c0.12	0.12	c0.23	0.12	
v/s Ratio Perm	0.16	0.32	0.32	0.32	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	
Uniform Delay, d1	0.29	1.00	0.58	1.14	1.33	0.36	1.45	0.75	1.45	0.75	1.45	0.75	
Progression Factor	26.3	27.6	24.1	26.7	43.1	45.2	44.0	48.4	44.0	48.4	44.0	48.4	
Incremental Delay, d2	1.71	0.98	1.01	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Delay (s)	45.4	42.5	27.1	92.9	218.8	45.7	266.5	54.7	266.5	54.7	266.5	54.7	
Level of Service	D	D	C	F	F	D	F	D	F	D	F	D	
Approach Delay (s)	42.6		89.9		136.1		153.2		153.2		153.2		
Approach LOS	D		F		F		F		F		F		
Intersection Summary													
HCM 2000 Control Delay	87.8											HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	19.0
Intersection Capacity Utilization	104.0%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

Intersections Summary

Intersections Summary

Spills and Phases: 2: Fifth Line & Derry Road

Spills and Phases: 2: Fifth Line & Derry Road



12-14-2023
BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 3. James Snow Parkway & Derry Road

Future Background (PM)
 2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	192	1180	16	259	1391	477	79	337	184	319	443	209
Future Volume (vph)	192	1180	16	259	1391	477	79	337	184	319	443	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Fpb. ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3446	3376	1497	1791	3453	1460	1715	3428	1489	1727	3346	1580
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3446	3376	1497	151	3453	1460	879	3428	1489	553	3346	1580
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	200	1229	17	270	1449	497	82	351	192	332	461	218
RTOR Reduction (vph)	0	0	11	0	0	173	0	0	140	0	0	166
Lane Group Flow (vph)	200	1229	6	270	1449	324	82	351	52	332	461	52
Confit. Peds. (#/hr)	1	2	2	1	2	2	1	2	1	2	2	1
Heavy Vehicles (%)	1%	2%	6%	0%	1%	4%	4%	3%	4%	2%	4%	1%
Bus Blockages (#/hr)	3	23	1	2	17	15	3	11	7	6	18	3
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	6	3	8	8	7	4	4
Permitted Phases	12	45.8	45.8	68.4	52.2	52.2	26.8	18.6	18.6	40.6	28.4	28.4
Actuated Green, G (s)	12.2	45.8	45.8	68.4	52.2	52.2	26.8	18.6	18.6	40.6	28.4	28.4
Effective Green, g (s)	12.2	45.8	45.8	68.4	52.2	52.2	26.8	18.6	18.6	40.6	28.4	28.4
Actuated G/C Ratio	0.10	0.38	0.38	0.57	0.44	0.44	0.22	0.16	0.16	0.34	0.24	0.24
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	350	1288	571	340	1502	635	253	531	230	363	791	373
v/s Ratio Prot	0.06	0.36	0.00	c0.12	c0.42	0.02	0.10	0.03	c0.14	0.14	0.03	0.03
v/s Ratio Perm	0.57	0.95	0.01	0.79	0.96	0.51	0.32	0.66	0.22	0.91	0.58	0.14
Uniform Delay, d1	51.4	36.1	23.0	33.7	33.0	24.6	38.0	47.7	44.4	33.6	40.6	36.1
Progression Factor	1.00	1.00	1.00	0.75	1.09	1.62	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	16.3	0.0	1.2	2.5	0.3	0.7	3.1	0.5	26.8	1.1	0.2
Delay (s)	53.7	52.3	23.1	26.4	38.4	40.1	38.8	50.8	44.9	60.4	41.7	36.3
Level of Service	D	D	C	C	D	D	D	D	D	D	E	D
Approach Delay (s)	52.2	37.3	37.3	47.4	47.4	47.4	47.4	47.4	47.4	47.4	46.7	47.4
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	44.4 HCM 2000 Level of Service D											
HCM 2000 Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	90.3% ICU Level of Service E											
Analysis Period (min)	15											
Critical Lane Group												

12-14-2023
 BA Group

Synchro 11 Report

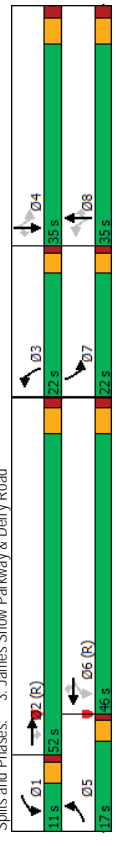
Queues
 3. James Snow Parkway & Derry Road
 2027 Scenario 3

Future Background (PM)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	192	1180	16	259	1391	477	79	337	184	319	443	209
Future Volume (vph)	192	1180	16	259	1391	477	79	337	184	319	443	209
Lane Group Flow (vph)	200	1229	17	270	1449	497	82	351	192	332	461	218
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	6	3	8	8	7	4	4
Permitted Phases	5	2	2	1	6	6	3	8	8	7	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	52.0	52.0	11.0	46.0	46.0	22.0	35.0	35.0	22.0	35.0	35.0
Total Split (%)	14.2%	43.3%	43.3%	9.2%	38.3%	38.3%	18.3%	29.2%	29.2%	18.3%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Recall Mode	None	C-Min	None	None	C-Min	None	None	None	None	None	None	None
v/s Ratio	0.57	0.94	0.03	0.79	0.95	0.61	0.29	0.69	0.53	0.91	0.58	0.40
Control Delay	57.5	49.3	0.1	26.2	37.7	17.0	29.5	55.7	15.3	61.5	44.5	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.5	49.3	0.1	26.2	37.7	17.0	29.5	55.7	15.3	61.5	44.5	7.3
Queue Length 50th (m)	24.7	152.1	0.0	41.4	194.1	78.6	13.9	44.0	5.7	66.4	54.9	0.0
Queue Length 95th (m)	36.2	#1992.0	0.0	m#1.2/m#175.0	m#622.2	24.3	57.7	27.0	#94.4	71.4	19.9	0.0
Internal Link Dist (m)	156.1 488.7											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	75.0	95.0	75.0	115.0
Base Capacity (vph)	391	1313	641	340	1525	816	399	837	489	366	848	563
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.94	0.03	0.79	0.95	0.61	0.21	0.42	0.39	0.91	0.54	0.39
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: T08 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 105												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
m Volume for 95th percentile queue is metered by upstream signal.												

12-14-2023
 BA Group

Synchro 11 Report



HCM Signalized Intersection Capacity Analysis
4: Clark Boulevard & Derry Road

Future Background (PM)
2027 Scenario 3

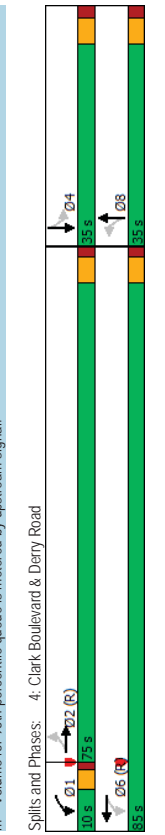
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	30	1879	9	15	1964	24	79	10	61	74	7	169
Future Volume (vph)	30	1879	9	15	1964	24	79	10	61	74	7	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3537	1770	3533	1770	1623	1770	1623	1770	1623	1770	1595
Flt Permitted	0.05	1.00	0.05	1.00	0.42	1.00	0.71	1.00	0.71	1.00	0.71	1.00
Satd. Flow (perm)	89	3537	85	3533	786	1623	1317	1595	1317	1595	1317	1595
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	2042	10	16	2135	26	86	11	66	80	8	184
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	33	2052	0	16	2161	0	86	21	0	80	181	0
Turn Type	Perm	NA	pm-pt	NA	NA	Perm	NA	NA	Perm	NA	NA	NA
Protected Phases	2			1	6			8				4
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	83.6	83.6	90.1	90.1	90.1	18.9	18.9	18.9	18.9	18.9	18.9	18.9
Effective Green, g (s)	83.6	83.6	90.1	90.1	90.1	18.9	18.9	18.9	18.9	18.9	18.9	18.9
Actuated g/C Ratio	0.70	0.70	0.75	0.75	0.75	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	62	2464	98	2652	123	255	207	251	207	251	207	251
v/s Ratio Prot	0.58	0.00	c0.61	0.12	0.11	0.11	0.06	0.11	0.06	0.11	0.06	c0.11
v/s Ratio Perm	0.37	0.53	0.83	0.16	0.81	0.70	0.08	0.39	0.72	0.39	0.72	0.39
v/c Ratio	8.8	13.1	16.5	9.6	47.9	43.2	45.3	48.0	45.3	48.0	45.3	48.0
Uniform Delay, d1	1.54	1.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Incremental Delay, d2	2.9	0.3	0.8	2.9	15.9	0.1	1.2	9.8	1.2	9.8	1.2	9.8
Delay (s)	16.4	20.9	17.3	12.5	63.8	43.3	46.5	57.8	46.5	57.8	46.5	57.8
Level of Service	B	C	B	B	B	E	D	D	E	D	D	E
Approach Delay (s)	20.8		12.5			54.1			54.1			54.5
Approach LOS	C		B			D			D			D
Intersection Summary												
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	0.83	C										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	88.1%	ICU Level of Service										
Analysis Period (min)	15	E										
c Critical Lane Group												



Queues
4: Clark Boulevard & Derry Road

Future Background (PM)
2027 Scenario 3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	30	1879	9	15	1964	24	79	10	61	74	7	169
Future Volume (vph)	30	1879	9	15	1964	24	79	10	61	74	7	169
Lane Group Flow (vph)	33	2052	0	16	2161	86	77	80	192	80	192	80
Turn Type	Perm	NA	pm-pt	NA	NA	Perm	NA	NA	Perm	NA	NA	NA
Protected Phases	2			1	6			8				4
Permitted Phases	2			6			8			4		4
Detector Phase	2			2			2			2		2
Switch Phase	2			2			2			2		2
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.52	0.81	0.11	0.81	0.70	0.25	0.39	0.74	0.39	0.74	0.39	0.74
Control Delay	30.8	21.8	6.0	14.0	75.2	14.3	49.2	60.8	49.2	60.8	49.2	60.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	21.8	6.0	14.0	75.2	14.3	49.2	60.8	49.2	60.8	49.2	60.8
Queue Length 50th (m)	5.1	215.4	0.8	155.7	20.4	2.3	18.0	42.8	18.0	42.8	18.0	42.8
Queue Length 95th (m)	m7.4	m229.1	3.2	245.8	37.2	15.2	31.9	64.6	31.9	64.6	31.9	64.6
Internal Link Dist (m)	336.0			475.1			56.4		56.4			313.3
Turn Bay Length (m)	70.0			70.0			40.0		40.0			40.0
Base Capacity (vph)	63	2536	150	2653	191	445	321	399	321	399	321	399
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.81	0.11	0.81	0.45	0.17	0.25	0.48	0.25	0.48	0.25	0.48
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green												
Natural Cycle: 120												
Control Type: Actuated-Coordinated												
m Volume for 95th percentile queue is metered by upstream signal.												
Splits and Phases: 4: Clark Boulevard & Derry Road												



HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard

Future Background (PM)
 2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	44	12	10	21	9	62	4	433	2	12	448	16
Future Volume (vph)	44	12	10	21	9	62	4	433	2	12	448	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	1735	1770	1620	1770	1620	1770	1862	1770	1862	1770	1853
Flt Permitted	0.71	1.00	0.74	1.00	0.74	1.00	0.46	1.00	0.49	1.00	0.49	1.00
Satd. Flow (perm)	1331	1735	1381	1620	1381	1620	859	1862	908	1853	908	1853
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	13	11	23	10	67	4	471	2	13	487	17
RTOR Reduction (vph)	0	9	0	0	57	0	0	0	0	0	1	0
Lane Group Flow (vph)	48	15	0	23	20	0	4	473	0	13	503	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8				4	
Permitted Phases	2			6			8				4	
Actuated Green, G (s)	5.6	5.6	5.6	5.6	5.6	5.6	21.2	21.2	21.2	21.2	21.2	21.2
Effective Green, g (s)	5.6	5.6	5.6	5.6	5.6	5.6	21.2	21.2	21.2	21.2	21.2	21.2
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.56	0.56	0.56	0.56	0.56	0.56
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	197	257	204	240	240	481	1044		509	1039		
v/s Ratio Prot	0.01		0.01			0.25			c0.27			
v/s Ratio Perm	0.24	0.06	0.11	0.08	0.11	0.08	0.01	0.45	0.03	0.48		
Uniform Delay, d1	14.2	13.8	13.9	13.9	13.9	3.7	4.9	3.7	4.9	3.7	5.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.1	0.2	0.1	0.0	0.3	0.0	0.3	0.0	0.4	0.0	
Delay (s)	14.9	13.9	14.2	14.0	14.0	3.7	5.2	3.7	5.2	3.7	5.4	
Level of Service	B	B	B	B	B	A	A	A	A	A	A	
Approach Delay (s)	14.6		14.1			5.2			5.3			
Approach LOS	B		B			A			A			

Intersection Summary	
HCM 2000 Control Delay	6.6
HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43
Actuated Cycle Length (s)	37.8
Sum of lost time (s)	11.0
Intersection Capacity Utilization	42.8%
ICU Level of Service	A
Analysis Period (min)	15
c. Critical Lane Group	

Queues
 5: Fifth Line & Clark Boulevard

Future Background (PM)
 2027 Scenario 3

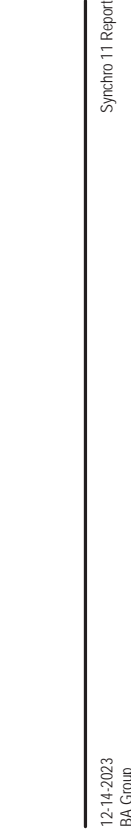
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	44	12	10	21	9	62	4	433	2	12	448	16
Future Volume (vph)	44	12	10	21	9	62	4	433	2	12	448	16
Lane Group Flow (vph)	48	24	23	77	4	473	13	504				
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8				4	
Permitted Phases	2			6			8				4	
Detector Phase	2			6			8				4	
Switch Phase	2			6			8				4	
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag												
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	0.13	0.05	0.06	0.15	0.01	0.38	0.02	0.41				
v/c Ratio	12.3	9.2	11.8	5.8	5.8	7.4	5.9	7.6				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	9.2	11.8	5.8	5.8	7.4	5.9	7.6				
Queue Length 50th (m)	2.1	0.6	1.0	0.4	0.2	21.2	0.5	22.9				
Queue Length 95th (m)	9.0	4.7	5.3	7.7	1.1	39.7	2.2	42.9				
Internal Link Dist (m)	204.0			86.5		156.9		372.1				
Turn Bay Length (m)	35.0			35.0		35.0		35.0				
Base Capacity (vph)	1122	1465	1166	1377	859	1861	907	1863				
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02	0.02	0.06	0.00	0.25	0.01	0.27				

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 35.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	



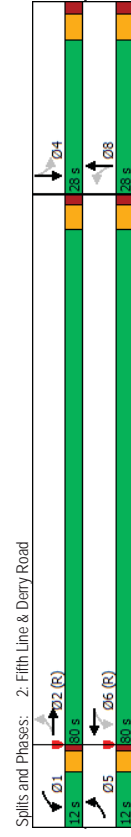
HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road
 Future Total (AM)
 2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	88	2190	154	175	745	250	93	286	84	113	66	30
Traffic Volume (vph)	88	2190	154	175	745	250	93	286	84	113	66	30
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.96	1.00	0.96	1.00	0.97	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	1805	3235	1805	3151	1694	3456	1694	3456	1463	3138	1463	3138
Flt Permitted	0.22	1.00	0.05	1.00	0.69	1.00	0.69	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	423	3235	101	3151	1227	3456	1227	3456	557	3138	557	3138
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	93	2305	162	184	784	263	98	301	88	119	69	32
RTOR Reduction (vph)	0	4	0	0	27	0	0	23	0	0	26	0
Lane Group Flow (vph)	93	2463	0	184	1020	0	98	366	0	119	75	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	15%	4%	0%	4%	12%	9%	8%
Bus Blockages (#/hr)	0	39	0	0	26	14	6	0	4	23	4	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		1	6		8		8		4	
Permitted Phases	2			6			8		8		4	
Actuated Green, G (s)	82.1	74.7	83.3	75.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Effective Green, g (s)	82.1	74.7	83.3	75.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.68	0.62	0.69	0.63	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	374	2013	183	1977	228	642	103	583	103	583	103	583
v/s Ratio Prot	0.02	c0.76	c0.07	0.32			0.11					0.02
v/s Ratio Perm	0.15		0.63	0.63	0.08	0.08				c0.21		
v/c Ratio	0.25	1.22	1.01	0.52	0.43	0.57	0.16	0.13				
Uniform Delay, d1	7.3	22.6	41.2	12.3	43.2	44.5	48.9	40.7				
Progression Factor	0.75	0.55	1.01	0.88	1.00	1.00	1.00	1.00				
Incremental Delay, d2	0.1	101.7	67.0	0.9	1.3	1.2	136.5	0.1				
Delay (s)	5.5	114.3	108.6	11.8	44.5	45.7	185.3	40.8				
Level of Service	A	F	F	B	D	D	F	D				
Approach Delay (s)		110.3		26.3		45.5		119.0				
Approach LOS		F		C		D		F				
Intersection Summary												
HCM 2000 Control Delay	80.7						HCM 2000 Level of Service	F				
HCM 2000 Volume to Capacity ratio	1.19											
Actuated Cycle Length (s)	120.0						Sum of lost time (s)	15.0				
Intersection Capacity Utilization	111.3%						ICU Level of Service	H				
Analysis Period (min)	15											



Queues
 2: Fifth Line & Derry Road
 Future Total (AM)
 2027 Scenario 3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	88	2190	154	175	745	250	93	286	84	113	66	30
Traffic Volume (vph)	88	2190	154	175	745	250	93	286	84	113	66	30
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Group Flow (vph)	93	2467	184	1047	98	389	119	101				
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		1	6		8		8		4	
Permitted Phases	2			6			8		8		4	
Detector Phase	5	2		1	6		8		8		4	
Switch Phase												
Minimum Initial (s)	7.0	20.0	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	34.3	11.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	12.0	80.0	12.0	80.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	10.0%	66.7%	10.0%	66.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
v/c Ratio	0.25	1.22	1.00	0.52	0.43	0.58	0.16	0.17				
Control Delay	3.9	118.9	95.6	11.2	50.0	45.3	180.7	28.8				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Delay	3.9	118.9	95.6	11.2	50.0	45.3	180.7	28.8				
Queue Length 50th (m)	4.3	-391.6	29.4	55.4	21.7	43.4	-34.6	7.5				
Queue Length 95th (m)	m4.3	m9350.7	#79.3	65.5	39.7	60.4	#73.8	15.8				
Internal Link Dist (m)	170.5		124.7		340.6		275.9					
Turn Bay Length (m)	100.0		90.0		70.0		50.0					
Base Capacity (vph)	388	2017	184	2004	228	665	103	609				
Starvation Cap Reductn	0	0	0	0	0	0	0	0				
Spillover Cap Reductn	0	0	0	0	0	0	0	0				
Storage Cap Reductn	0	0	0	0	0	0	0	0				
Reduced v/c Ratio	0.24	1.22	1.00	0.52	0.43	0.58	0.16	0.17				
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



HCM Signalized Intersection Capacity Analysis
 3. James Snow Parkway & Derry Road
 2027 Scenario 3

Future Total (AM)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
Traffic Volume (vph)	187	1800	30	69	563	202	24	271	181	396	377	182
Future Volume (vph)	187	1800	30	69	563	202	24	271	181	396	377	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp. ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Frbp. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp. ped/bikes	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Frbp. ped/bikes	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3446	3376	1497	1791	3453	1460	1715	3428	1489	1727	3346	1580
Flt Permitted	0.95	1.00	1.00	0.07	1.00	1.00	0.52	1.00	1.00	0.37	1.00	1.00
Satd. Flow (perm)	3446	3376	1497	140	3453	1460	938	3428	1489	671	3346	1580
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	195	1875	31	72	586	210	25	282	189	412	393	190
RTOR Reduction (vph)	0	0	16	0	0	116	0	0	125	0	0	142
Lane Group Flow (vph)	195	1875	15	72	586	95	25	282	64	413	393	48
Confl. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	1%	2%	6%	0%	1%	4%	4%	3%	4%	2%	4%	1%
Bus Blockages (#/hr)	3	23	1	2	17	15	3	11	7	6	18	3
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	6	3	8	8	7	4	4
Permitted Phases	12	1	1	2	1	1	1	1	1	1	1	1
Actuated Green, G (s)	12.1	59.6	59.6	60.5	54.0	54.0	21.4	16.9	16.9	38.9	30.4	30.4
Effective Green, g (s)	12.1	59.6	59.6	60.5	54.0	54.0	21.4	16.9	16.9	38.9	30.4	30.4
Actuated G/C Ratio	0.10	0.50	0.50	0.50	0.45	0.45	0.18	0.14	0.14	0.32	0.25	0.25
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	347	1676	743	160	1553	657	196	482	209	375	847	400
v/s Ratio Prot	c0.06	c0.56	0.01	0.02	0.17	0.06	0.02	0.00	0.08	c0.16	c0.12	0.03
v/s Ratio Perm	0.56	1.12	0.02	0.45	0.38	0.14	0.13	0.59	0.30	1.10	0.46	0.12
v/s Ratio	51.4	30.2	15.4	26.2	21.9	19.4	41.1	48.3	46.3	37.3	37.9	34.5
Uniform Delay, d1	1.00	1.00	1.00	0.83	1.01	3.08	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.1	62.1	0.1	1.8	0.6	0.4	0.3	1.8	0.8	76.6	0.4	0.1
Incremental Delay, d2	53.5	92.3	15.4	23.6	22.7	60.2	41.4	50.1	47.1	113.9	38.3	34.6
Delay (s)	D	F	B	C	C	E	D	D	D	F	D	C
Level of Service	D	F	B	C	C	E	D	D	D	F	D	C
Approach Delay (s)	F	F	B	C	C	E	D	D	D	F	D	C
Approach LOS	F	F	B	C	C	E	D	D	D	F	D	C
Intersection Summary												
HCM 2000 Control Delay	68.2 HCM 2000 Level of Service E											
HCM 2000 Volume to Capacity ratio	1.12											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 19.0											
Intersection Capacity Utilization	102.2% ICU Level of Service G											
Analysis Period (min)	15											
Critical Lane Group												

Queues
 3. James Snow Parkway & Derry Road
 2027 Scenario 3

Future Total (AM)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
Traffic Volume (vph)	187	1800	30	69	563	202	24	271	181	396	377	182
Future Volume (vph)	187	1800	30	69	563	202	24	271	181	396	377	182
Lane Group Flow (vph)	195	1875	31	72	586	210	25	282	189	413	393	190
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	6	3	8	8	7	4	4
Permitted Phases	5	2	2	1	6	6	3	8	8	7	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	52.0	52.0	11.0	46.0	46.0	22.0	35.0	35.0	22.0	35.0	35.0
Total Split (%)	14.2%	43.3%	43.3%	9.2%	38.3%	38.3%	18.3%	29.2%	29.2%	18.3%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.56	1.08	0.04	0.39	0.37	0.27	0.11	0.64	0.59	1.10	0.46	0.35
Control Delay	57.6	74.7	0.1	16.9	22.8	10.3	28.2	56.3	21.3	110.5	40.5	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	74.7	0.1	16.9	22.8	10.3	28.2	56.3	21.3	110.5	40.5	7.0
Queue Length 50th (m)	24.1	-278.3	0.0	7.9	57.0	11.4	4.2	35.5	9.7	-102.7	45.7	0.0
Queue Length 95th (m)	35.6	#350.3	0.0	15.7	80.1	34.9	10.2	48.3	32.6	#134.1	59.9	18.5
Internal Link Dist (m)	156.1 488.7 381.6 213.2											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	75.0	95.0	115.0	115.0
Base Capacity (vph)	389	1743	820	183	1599	788	390	837	473	376	875	553
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	1.08	0.04	0.39	0.37	0.27	0.06	0.34	0.40	1.10	0.45	0.34
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 145												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												

Spills and Phases: 3. James Snow Parkway & Derry Road



BA Group

HCM Signalized Intersection Capacity Analysis
4: Clark Boulevard & Derry Road

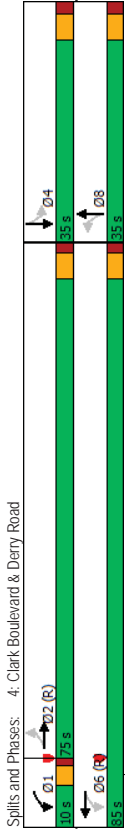
Future Total (AM)
2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	5	5	5	5	5	5	5	5	5	5	5
Traffic Volume (vph)	75	2155	163	189	877	91	58	7	29	24	10	43
Future Volume (vph)	75	2155	163	189	877	91	58	7	29	24	10	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3502	1770	3489	1770	1639	1770	1639	1770	1636	1770	1636
Flt Permitted	0.27	1.00	0.05	1.00	0.72	1.00	0.72	1.00	0.73	1.00	0.73	1.00
Satd. Flow (perm)	507	3502	97	3489	1340	1639	1340	1639	1362	1636	1362	1636
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	2342	177	205	953	99	63	8	32	26	11	47
RTOR Reduction (vph)	0	4	0	0	3	0	0	0	29	0	0	43
Lane Group Flow (vph)	82	2515	0	205	1049	0	63	11	0	26	15	0
Turn Type	Perm	NA	NA	pm+pt	NA	Perm	NA	NA	Perm	NA	Perm	NA
Protected Phases	2	2	2	1	6	6	8	8	8	4	4	4
Permitted Phases	2	2	2	6	99.0	99.0	10.0	10.0	10.0	10.0	10.0	10.0
Actuated Green, G (s)	73.0	73.0	99.0	99.0	99.0	99.0	10.0	10.0	10.0	10.0	10.0	10.0
Effective Green, g (s)	73.0	73.0	99.0	99.0	99.0	99.0	10.0	10.0	10.0	10.0	10.0	10.0
Actuated g/C Ratio	0.61	0.61	0.82	0.82	0.82	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	308	2130	386	2878	111	136	113	136	113	136	113	136
v/s Ratio Prot	c0.72	c0.10	0.30	0.34	c0.05	0.02	0.02	0.01	0.02	0.02	0.01	0.01
v/s Ratio Perm	0.16	0.27	1.18	0.53	0.36	0.57	0.08	0.23	0.11	0.23	0.11	0.11
v/c Ratio	11.0	23.5	35.1	2.6	52.9	50.7	51.4	50.9	51.4	50.9	51.4	50.9
Uniform Delay, d1	1.63	1.52	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.4	0.2	81.8	1.4	0.4	6.5	0.2	1.0	0.4	0.2	1.0	0.4
Incremental Delay, d2	18.1	117.5	36.5	3.0	59.4	51.0	52.4	51.2	52.4	51.2	52.4	51.2
Delay (s)	B	F	D	A	E	D	D	D	D	D	D	D
Level of Service	B	F	D	A	E	D	D	D	D	D	D	D
Approach Delay (s)	114.4	8.5	56.2									
Approach LOS	F	A	E									
Intersection Summary												
HCM 2000 Control Delay	78.7 HCM 2000 Level of Service E											
HCM 2000 Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) F											
Intersection Capacity Utilization	97.6% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												

Queues
4: Clark Boulevard & Derry Road

Future Total (AM)
2027 Scenario 3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	5	5	5	5	5	5	5	5	5	5	5
Traffic Volume (vph)	75	2155	163	189	877	91	58	7	29	24	10	43
Future Volume (vph)	75	2155	163	189	877	91	58	7	29	24	10	43
Lane Group Flow (vph)	82	2519	205	1052	63	40	26	58	NA	Perm	NA	Perm
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	2	1	6	6	8	8	8	4	4	4
Detector Phase	2	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.26	1.16	0.53	0.36	0.47	0.21	0.19	0.28	0.28	0.28	0.28	0.28
Control Delay	20.1	106.0	30.8	3.3	62.2	22.4	51.8	21.2	21.2	21.2	21.2	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.1	106.0	30.8	3.3	62.2	22.4	51.8	21.2	21.2	21.2	21.2	21.2
Queue Length 50th (m)	13.9	-386.0	29.1	27.6	15.1	1.8	6.1	2.6	2.6	2.6	2.6	2.6
Queue Length 95th (m)	m12.9	m291.3	56.8	44.6	29.3	12.4	14.9	15.2	15.2	15.2	15.2	15.2
Internal Link Dist (m)	336.0	475.1	56.4	313.3	400	400	400	400	400	400	400	400
Turn Bay Length (m)	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Base Capacity (vph)	313	2167	388	2946	326	424	332	434	434	434	434	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	1.16	0.53	0.36	0.19	0.09	0.08	0.13	0.13	0.13	0.13	0.13
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



HCM Signalized Intersection Capacity Analysis
5: Fifth Line & Clark Boulevard

Future Total (AM)
2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	13	3	7	15	11	10	442	45	61	297	37
Traffic Volume (vph)	10	13	3	7	15	11	10	442	45	61	297	37
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.97	1.00	1.00	0.94	1.00	0.99	1.00	0.98	1.00	0.98	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	1813	1770	1743	1770	1837	1770	1837	1770	1832	1770	1832
Flt Permitted	1.00	1.00	1.00	1.00	0.54	1.00	0.54	1.00	0.46	1.00	0.46	1.00
Satd. Flow (perm)	1863	1813	1863	1743	1015	1837	1015	1837	861	1832	861	1832
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	14	3	8	16	12	11	480	49	66	323	40
RTOR Reduction (vph)	0	3	0	0	11	0	0	3	0	0	4	0
Lane Group Flow (vph)	11	14	0	8	17	0	11	526	0	66	359	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8				4	
Permitted Phases	2			6			8				4	
Actuated Green, G (s)	3.4	3.4	3.4	3.4	3.4	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Effective Green, g (s)	3.4	3.4	3.4	3.4	3.4	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Actuated g/C Ratio	0.09	0.09	0.09	0.09	0.09	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	158	154	158	148	148	648	1174	648	1174	550	1170	1170
v/s Ratio Prot	0.01			c0.01				c0.29			0.08	0.20
v/s Ratio Perm	0.01			0.00		0.01		0.02		0.12	0.31	0.31
Uniform Delay, d1	16.8	16.8	16.8	16.9	16.9	2.6	3.6	2.6	3.6	2.8	3.2	3.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3	0.1	0.3	0.1	0.0	0.3	0.0	0.3	0.1	0.1	0.1
Delay (s)	17.0	17.1	16.9	17.2	16.9	2.6	3.9	2.6	3.9	2.9	3.4	3.4
Level of Service	B	B	B	B	B	A	A	A	A	A	A	A
Approach Delay (s)	17.0		17.1			3.9		3.9		3.3		3.3
Approach LOS	B		B			A		A		A		A

Intersection Summary	
HCM 2000 Control Delay	4.5
HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41
Actuated Cycle Length (s)	39.9
Sum of lost time (s)	11.0
Intersection Capacity Utilization	56.6%
ICU Level of Service	B
Analysis Period (min)	15

c Critical Lane Group

Future Total (AM)
2027 Scenario 3

Queue	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	13	3	7	15	11	10	442	45	61	297	37
Traffic Volume (vph)	10	13	3	7	15	11	10	442	45	61	297	37
Future Volume (vph)	10	13	3	7	15	11	10	442	45	61	297	37
Lane Group Flow (vph)	11	17	8	28	11	529	66	363				
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8				4	
Permitted Phases	2			6			8				4	
Detector Phase	2			6			8				4	
Switch Phase	2			6			8				4	
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Minimum Split (%)	35.0	35.0	35.0	35.0	35.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (s)	29.2%	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%	70.8%	70.8%
Total Split (%)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Yellow Time (s)	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag												
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	0.02	0.03	0.02	0.06	0.01	0.36	0.10	0.25				
v/c Ratio	12.3	11.5	12.3	10.0	4.8	5.3	4.9	4.5				
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Queue Delay	12.3	11.5	12.3	10.0	4.8	5.3	4.9	4.5				
Total Delay	0.5	0.6	0.4	0.7	0.0	0.0	0.0	0.0				
Queue Length 50th (m)	3.3	4.1	2.7	5.1	2.0	46.1	7.2	28.3				
Queue Length 95th (m)	204.0			86.5		156.9		372.1				
Internal Link Dist (m)	35.0			35.0		35.0		35.0				
Turn Bay Length (m)	1549	1509	1549	1452	1015	1837	861	1831				
Base Capacity (vph)	0	0	0	0	0	0	0	0				
Starvation Cap Reductn	0	0	0	0	0	0	0	0				
Spillback Cap Reductn	0	0	0	0	0	0	0	0				
Storage Cap Reductn	0	0	0	0	0	0	0	0				
Reduced v/c Ratio	0.01	0.01	0.01	0.02	0.01	0.29	0.08	0.20				

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 36.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated



HCM Unsignalized Intersection Capacity Analysis
 10: Clark Boulevard & Anatolia Building 1 North Access/Anatolia Building 2 North Access Scenario 3

HCM Unsignalized Intersection Capacity Analysis
 9: Sixth Line & Anatolia Building 3 East Access Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	10	0	2	2	0	11	1	73	4	34	302	26
Future Volume (Veh/h)	10	0	2	2	0	11	1	73	4	34	302	26
Sign Control	Stop	0%	Free	Stop	0%	Free	Free	0%	Free	Free	0%	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	2	2	0	12	1	79	4	37	328	28
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												80
pX platoon unblocked	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
VC, conflicting volume	511	501	342	501	513	81	356			83		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol	497	487	326	487	499	81	340			83		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	99	100			98		
CM capacity (veh/h)	462	462	705	473	455	979	1202			1514		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volumes Total	13	14	84	393								
Volume Left	11	2	1	37								
Volume Right	2	12	4	28								
cSH	488	849	1202	1514								
Volumes to Capacity	0.03	0.02	0.00	0.02								
Queue Length 95th (m)	0.7	0.4	0.0	0.6								
Control Delay (s)	12.6	9.3	0.1	0.9								
Lane LOS	B	A	A	A								
Approach Delay (s)	12.6	9.3	0.1	0.9								
Approach LOS	B	A	A	A								
Intersection Summary												
Average Delay	1.3											
Intersection Capacity Utilization	36.0%											
ICU Level of Service	A											
Analysis Period (min)	15											

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	7	1	4	288	287	22
Future Volume (Veh/h)	7	1	4	288	287	22
Sign Control	Stop	0%	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	1	4	313	312	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						236
pX platoon unblocked						
VC, conflicting volume	645	324	336			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	645	324	336			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
p0 queue free %	3.5	3.3	2.2			
p0 queue free %	98	100	100			
CM capacity (veh/h)	435	717	1223			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	9	317	336			
Volume Left	8	4	0			
Volume Right	1	0	24			
cSH	455	1223	1700			
Volumes to Capacity	0.02	0.00	0.20			
Queue Length 95th (m)	0.5	0.1	0.0			
Control Delay (s)	13.1	0.1	0.0			
Lane LOS	B	A	A			
Approach Delay (s)	13.1	0.1	0.0			
Approach LOS	B	A	A			
Intersection Summary						
Average Delay	0.2					
Intersection Capacity Utilization	28.4%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 12: Clark Boulevard & Anatolia Building 1 South Access
 Future Total (AM)
 2027 Scenario 3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W					
Traffic Volume (veh/h)	38	3	15	36	138	130
Future Volume (Veh/h)	38	3	15	36	138	130
Sign Control	Stop			Free	Free	Free
Grade	0%			0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	3	16	39	150	141
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)				None	None	
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	292	220	291			
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	292	220	291			
IC single (s)	6.4	6.2	4.1			
IC 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	94	100	99			
CM capacity (veh/h)	690	819	1271			
Direction_Lane #	EB 1	NB 1	SB 1			
Volumes Total	44	55	291			
Volume Left	41	16	0			
Volume Right	3	0	141			
CSH	698	1271	1700			
Volumes to Capacity	0.06	0.01	0.17			
Queue Length 95th (m)	1.6	0.3	0.0			
Control Delay (s)	10.5	2.4	0.0			
Lane LOS	B	A	A			
Approach Delay (s)	10.5	2.4	0.0			
Approach LOS	B	A	A			
Intersection Summary						
Average Delay			1.5			A
Intersection Capacity Utilization			25.2%			ICU Level of Service
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 11: Clark Boulevard & Anatolia Building 2 South Access
 Future Total (AM)
 2027 Scenario 3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					
Traffic Volume (veh/h)	2	10	68	6	40	266
Future Volume (Veh/h)	2	10	68	6	40	266
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	11	74	7	43	289
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	452	78			81	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	452	78			81	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			97	
CM capacity (veh/h)	549	983			1517	
Direction_Lane #	WB 1	NB 1	SB 1			
Volumes Total	13	81	332			
Volume Left	2	0	43			
Volume Right	11	7	0			
CSH	877	1700	1517			
Volumes to Capacity	0.01	0.05	0.03			
Queue Length 95th (m)	0.4	0.0	0.7			
Control Delay (s)	9.2	0.0	1.2			
Lane LOS	A	A	A			
Approach Delay (s)	9.2	0.0	1.2			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			1.2			A
Intersection Capacity Utilization			32.9%			ICU Level of Service
Analysis Period (min)			15			

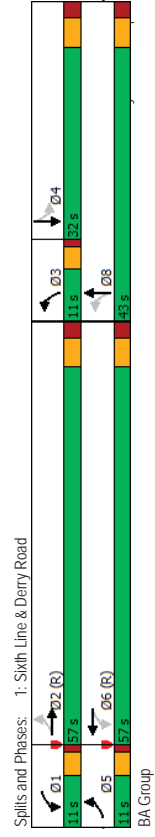
HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road
 Future Total (PM)
 2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	
Traffic Volume (vph)	163	1790	101	32	1725	22	199	153	38	93	214	139	
Future Volume (vph)	163	1790	101	32	1725	22	199	153	38	93	214	139	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1748	3078	1729	3263	1805	1814	1805	1814	1780	1756	1756	1756	
Flt Permitted	0.07	1.00	0.08	1.00	0.16	1.00	0.63	1.00	0.63	1.00	0.63	1.00	
Satd. Flow (perm)	134	3078	142	3263	312	1814	1188	1756	1188	1756	1188	1756	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	168	1845	104	33	1778	23	205	158	39	96	221	143	
RTOR Reduction (vph)	0	4	0	0	1	0	0	8	0	0	21	0	
Lane Group Flow (vph)	168	1945	0	33	1800	0	205	189	0	96	343	0	
Heavy Vehicles (%)	2%	3%	0%	4%	2%	22%	0%	1%	0%	1%	1%	1%	
Bus Blockages (#/hr)	3	58	0	1	37	2	0	2	0	1	2	1	
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	
Protected Phases	5	2	2	1	6	3	8	3	8	4	4	4	
Permitted Phases	2			6			8			4			
Actuated Green, G (s)	63.1	55.1	55.5	51.3	35.2	35.2	35.2	35.2	24.2	24.2	24.2	24.2	
Effective Green, g (s)	63.1	55.1	55.5	51.3	35.2	35.2	35.2	35.2	24.2	24.2	24.2	24.2	
Actuated g/C Ratio	0.57	0.50	0.50	0.46	0.32	0.32	0.32	0.32	0.22	0.22	0.22	0.22	
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	192	1527	131	1508	193	575	193	575	259	382	259	382	
v/s Ratio Prot	c0.06	c0.63	0.01	0.55	c0.07	0.10	c0.07	0.10	0.20	0.08	0.20	0.20	
v/s Ratio Perm	0.43	1.27	0.25	1.19	1.06	0.33	1.06	0.33	0.37	0.90	0.37	0.90	
Uniform Delay, d1	29.8	27.9	24.4	29.9	35.1	28.9	36.9	42.2	36.9	42.2	36.9	42.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	32.8	128.6	1.0	94.1	82.2	0.3	9.9	22.8	0.9	22.8	0.9	22.8	
Delay (s)	62.6	156.5	25.4	123.9	117.3	29.2	37.8	65.0	37.8	65.0	37.8	65.0	
Level of Service	E	F	C	F	F	C	F	D	E	D	E	E	
Approach Delay (s)		149.1		122.2		74.1		59.3		59.3		59.3	
Approach LOS		F		F		E		E		E		E	
Intersection Summary													
HCM 2000 Control Delay	124.0											HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23												
Actuated Cycle Length (s)	111.0											Sum of lost time (s)	20.5
Intersection Capacity Utilization	106.4%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

12-14-2023
 BA Group
 Synchro 11 Report

Queues
 1: Sixth Line & Derry Road
 Future Total (PM)
 2027 Scenario 3

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	←	←	←	←	←	←	←	←
Traffic Volume (vph)	163	1790	32	1725	199	153	93	214
Future Volume (vph)	163	1790	32	1725	199	153	93	214
Lane Group Flow (vph)	168	1949	33	1801	205	197	96	364
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA
Protected Phases	5	2	1	6	3	8	4	4
Detector Phase	5	2	1	6	3	8	4	4
Switch Phase	7.0	25.0	7.0	25.0	7.0	10.0	10.0	10.0
Minimum Initial (s)	11.0	31.2	11.0	31.2	11.0	32.3	32.3	32.3
Minimum Split (s)	11.0	57.0	11.0	57.0	11.0	43.0	32.0	32.0
Total Split (%)	9.9%	51.4%	9.9%	51.4%	9.9%	38.7%	28.8%	28.8%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	1.0	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
v/c Ratio	0.88	1.24	0.19	1.19	1.03	0.34	0.37	0.90
Control Delay	64.6	139.3	12.7	123.0	103.9	28.6	41.0	65.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.6	139.3	12.7	123.0	103.9	28.6	41.0	65.3
Queue Length 50th (m)	23.0	-313.2	3.1	-265.3	-34.2	31.4	18.4	74.5
Queue Length 95th (m)	#67.2	#358.5	7.5	#310.6	#74.1	51.1	34.7	#126.4
Internal Link Dist (m)	475.1	256.2	475.1	256.2	211.8	201.7	201.7	201.7
Turn Bay Length (m)	120.0	100.0	100.0	45.0	30.0	30.0	30.0	30.0
Base Capacity (vph)	191	1575	177	1509	199	607	275	427
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	1.24	0.19	1.19	1.03	0.32	0.35	0.85
Intersection Summary								
Cycle Length: 111								
Actuated Cycle Length: 111								
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green								
Natural Cycle: 150								
Control Type: Actuated-Coordinated								
- Volume exceeds capacity, queue is theoretically infinite.								
Queue shown is maximum after two cycles.								
# 95th percentile volume exceeds capacity, queue may be longer.								
Queue shown is maximum after two cycles.								



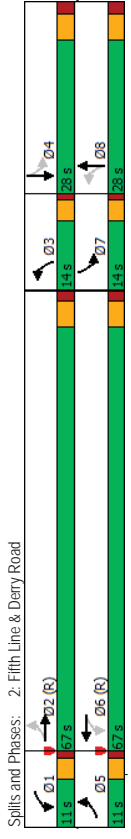
HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road
 Future Total (PM)
 2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	41	1628	89	97	2032	115	287	70	193	328	299
Future Volume (vph)	41	1628	89	97	2032	115	287	70	193	328	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1805	3241	1805	3336	1694	3122	1463	3191	1463	3191	1463
Flt Permitted	0.06	1.00	0.06	1.00	0.31	1.00	0.48	1.00	0.48	1.00	0.48
Satd. Flow (perm)	117	3241	114	3336	553	3122	742	3191	742	3191	742
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	43	1714	94	102	2139	121	302	74	203	345	315
RTOR Reduction (vph)	0	3	0	0	3	0	0	99	0	0	20
Lane Group Flow (vph)	43	1805	0	102	2257	0	302	178	0	345	376
Heavy Vehicles (%)	0%	2%	0%	0%	1%	15%	4%	0%	4%	12%	9%
Bus Blockages (#/hr)	0	39	0	0	26	14	6	0	4	23	4
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl
Protected Phases	5	2	2	1	6	3	8	7	4	4	4
Permitted Phases	2	70.3	64.7	74.1	66.6	28.8	18.8	18.8	28.8	18.8	18.8
Effective Green, G (s)	70.3	64.7	74.1	66.6	28.8	18.8	18.8	18.8	28.8	18.8	18.8
Actuated g/C Ratio	0.59	0.54	0.62	0.55	0.24	0.16	0.24	0.16	0.24	0.16	0.24
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	147	1747	176	1851	227	489	238	499	238	499	238
v/s Ratio Prot	0.01	0.56	c0.04	c0.68	0.11	0.06	c0.12	0.12	c0.23	0.12	c0.23
v/s Ratio Perm	0.16	0.32	0.32	0.32	0.21	0.21	0.21	0.21	0.21	0.21	0.21
v/c Ratio	0.29	1.03	0.58	1.22	1.33	0.36	1.45	0.75	1.45	0.75	0.75
Uniform Delay, d1	26.3	27.6	25.3	26.7	43.1	45.3	44.0	48.4	44.0	48.4	48.4
Progression Factor	1.68	0.98	0.95	1.29	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	23.9	1.9	100.9	175.7	0.5	224.3	6.3	224.3	6.3	6.3
Delay (s)	44.6	50.9	25.9	135.4	218.8	45.7	268.3	54.7	268.3	54.7	54.7
Level of Service	D	D	C	F	F	D	F	D	F	D	D
Approach Delay (s)	50.8	D	130.7	F	136.0	F	154.2	F	154.2	F	F
Approach LOS	D	D	F	F	F	F	F	F	F	F	F
Intersection Summary											
HCM 2000 Control Delay	107.7	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity ratio	1.26	F									
Actuated Cycle Length (s)	120.0	Sum of lost time (s)									
Intersection Capacity Utilization	108.1%	ICU Level of Service									
Analysis Period (min)	15	G									
c Critical Lane Group											

12-14-2023
 BA Group
 Synchro 11 Report

Queues
 2: Fifth Line & Derry Road
 Future Total (PM)
 2027 Scenario 3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	4	4	4	4	4	4	4	4	4	4	
Traffic Volume (vph)	41	1628	89	97	2032	115	287	70	193	328	
Future Volume (vph)	41	1628	89	97	2032	115	287	70	193	328	
Lane Group Flow (vph)	43	1808	102	2260	302	277	345	396	345	396	
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	
Protected Phases	5	2	2	1	6	3	8	7	4	4	
Detector Phase	5	2	2	1	6	3	8	7	4	4	
Switch Phase	7.0	20.0	7.0	20.0	7.0	20.0	7.0	20.0	7.0	20.0	
Minimum Initial (s)	11.0	34.3	11.0	34.3	11.0	34.3	11.0	34.7	11.0	34.7	
Minimum Split (s)	11.0	67.0	11.0	67.0	14.0	28.0	14.0	28.0	14.0	28.0	
Total Split (s)	9.2%	55.8%	9.2%	55.8%	11.7%	23.3%	11.7%	23.3%	11.7%	23.3%	
Total Spill (%)	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	
Yellow Time (s)	1.0	1.6	1.0	1.6	1.0	1.6	1.0	2.0	1.0	2.0	
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lost Time Adjust (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	
v/c Ratio	0.25	1.03	0.58	1.21	1.29	0.47	1.39	0.76	1.39	0.76	
Control Delay	16.4	51.6	22.2	126.2	189.6	28.3	230.8	55.2	230.8	55.2	
Total Delay	16.4	51.6	22.2	126.2	189.6	28.3	230.8	55.2	230.8	55.2	
Queue Length 50th (m)	4.3	-250.1	13.4	-367.0	-68.8	18.6	-109.9	46.8	-109.9	46.8	
Queue Length 95th (m)	m5.5	m282.2	m15.0	m422.1	#118.3	31.7	#168.1	63.0	#168.1	63.0	
Internal Link Dist (m)	170.5	124.7	170.5	124.7	340.6	275.9	340.6	275.9	340.6	275.9	
Turn Bay Length (m)	100.0	90.0	100.0	90.0	70.0	50.0	70.0	50.0	70.0	50.0	
Base Capacity (vph)	170	1750	176	1875	235	675	248	612	248	612	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.25	1.03	0.58	1.21	1.29	0.41	1.39	0.65	1.39	0.65	
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle: 145											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											



HCM Signalized Intersection Capacity Analysis
3. James Snow Parkway & Derry Road

Future Total (PM)
2027 Scenario 3

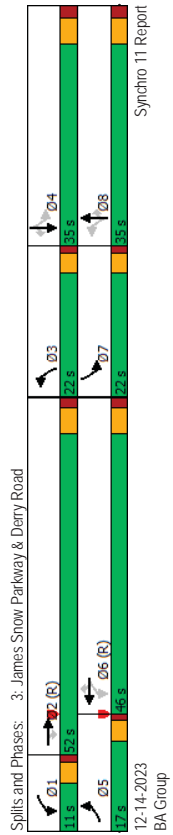
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	192	1201	16	261	1462	549	79	337	187	348	443	209
Future Volume (vph)	192	1201	16	261	1462	549	79	337	187	348	443	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frb. ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3446	3376	1497	1791	3453	1460	1715	3428	1489	1727	3346	1580
Satd. Flow (perm)	3446	3376	1497	151	3453	1460	879	3428	1489	553	3346	1580
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	200	1251	17	272	1523	572	82	351	195	362	461	218
RTOR Reduction (vph)	0	0	11	0	0	190	0	0	134	0	0	166
Lane Group Flow (vph)	200	1251	6	272	1523	382	82	351	61	363	461	52
Confl. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	1%	2%	6%	0%	1%	4%	4%	3%	4%	2%	4%	1%
Bus Blockages (#/hr)	3	23	1	2	17	15	3	11	7	6	18	3
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	6	3	8	8	7	4	4
Permitted Phases	12,2	45,8	45,8	68,4	52,2	52,2	26,8	18,6	18,6	40,6	28,4	28,4
Actuated Green, G (s)	12,2	45,8	45,8	68,4	52,2	52,2	26,8	18,6	18,6	40,6	28,4	28,4
Effective Green, g (s)	0,10	0,38	0,38	0,57	0,44	0,44	0,22	0,16	0,16	0,34	0,24	0,24
Actuated G/C Ratio	4,0	5,3	5,3	4,0	5,3	5,3	4,0	5,7	5,7	4,0	5,7	5,7
Clearance Time (s)	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0
Vehicle Extension (s)	350	1288	571	340	1502	635	253	531	230	363	791	373
Lane Grp Cap. (vph)	0,06	0,37	0,00	0,12	0,44	0,02	0,10	0,04	0,15	0,14	0,03	0,14
v/s Ratio Prot	0,57	0,97	0,01	0,80	1,01	0,60	0,32	0,66	0,27	1,00	0,58	0,14
v/s Ratio Perm	51,4	36,5	23,0	34,0	33,9	25,9	38,0	47,7	44,7	35,6	40,6	36,1
Uniform Delay, d1	1,00	1,00	1,00	0,74	1,10	1,62	1,00	1,00	1,00	1,00	1,00	1,00
Progression Factor	2,3	19,1	0,0	1,3	10,8	0,4	0,7	3,1	0,6	47,2	1,1	0,2
Incremental Delay, d2	53,7	55,5	23,1	26,3	48,0	42,5	38,8	50,8	45,3	82,9	41,7	36,3
Delay (s)	D	E	C	C	D	D	D	D	D	F	D	D
Level of Service	D	E	C	C	D	D	D	D	D	F	D	D
Approach Delay (s)	54,9			44,2			47,5			54,9		
Approach LOS	D			D			D			D		D
Intersection Summary												
HCM 2000 Control Delay	49.5 HCM 2000 Level of Service D											
HCM 2000 Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	1200 Sum of lost time (s) 19.0											
Intersection Capacity Utilization	92.6% ICU Level of Service F											
Analysis Period (min)	15											
Critical Lane Group												

12-14-2023
BA Group
Synchro 11 Report

Queues
3. James Snow Parkway & Derry Road

Future Total (PM)
2027 Scenario 3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	192	1201	16	261	1462	549	79	337	187	348	443	209
Future Volume (vph)	192	1201	16	261	1462	549	79	337	187	348	443	209
Lane Group Flow (vph)	200	1251	17	272	1523	572	82	351	195	363	461	218
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	6	3	8	8	7	4	4
Permitted Phases	5	2	2	1	6	6	3	8	8	7	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	7,0	20,0	20,0	7,0	20,0	20,0	7,0	10,0	10,0	7,0	10,0	10,0
Minimum Split (s)	11,0	34,3	34,3	11,0	34,3	34,3	11,0	34,7	34,7	11,0	34,7	34,7
Total Split (s)	17,0	52,0	52,0	11,0	46,0	46,0	22,0	35,0	35,0	22,0	35,0	35,0
Total Split (%)	14,2%	43,3%	43,3%	9,2%	38,3%	38,3%	18,3%	29,2%	29,2%	18,3%	29,2%	29,2%
Yellow Time (s)	3,0	3,7	3,7	3,0	3,7	3,7	3,0	3,7	3,7	3,0	3,7	3,7
All-Red Time (s)	1,0	1,6	1,6	1,0	1,6	1,6	1,0	2,0	2,0	1,0	2,0	2,0
Lost Time Adjust (s)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Total Lost Time (s)	4,0	5,3	5,3	4,0	5,3	5,3	4,0	5,7	5,7	4,0	5,7	5,7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	None	None	None	None	None
v/s Ratio	0,57	0,95	0,03	0,80	1,00	0,69	0,29	0,69	0,55	0,99	0,58	0,40
Control Delay	57,5	51,8	0,1	26,2	43,6	19,4	29,5	55,7	17,3	79,4	44,5	7,3
Queue Delay	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Total Delay	57,5	51,8	0,1	26,2	43,6	19,4	29,5	55,7	17,3	79,4	44,5	7,3
Queue Length 50th (m)	24,7	156,4	0,0	41,7	207,8	94,6	13,9	44,0	8,1	74,3	54,9	0,0
Queue Length 95th (m)	36,2	205,2	0,0	63,6	317,8	142,8	24,3	57,7	30,4	112,7	71,4	19,9
Internal Link Dist (m)	156.1 488.7 381.6											
Turn Bay Length (m)	100,0	70,0	110,0	75,0	100,0	100,0	75,0	95,0	75,0	95,0	75,0	95,0
Base Capacity (vph)	391	1313	641	340	1525	832	399	837	482	366	848	563
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0,51	0,95	0,03	0,80	1,00	0,69	0,21	0,42	0,40	0,99	0,54	0,39
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 115												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
m Volume for 95th percentile queue is metered by upstream signal.												



12-14-2023
BA Group
Synchro 11 Report

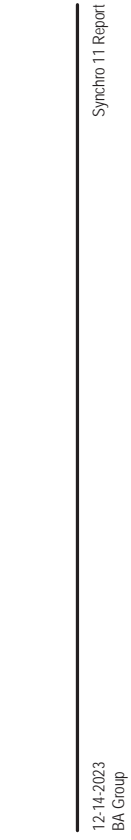
HCM Signalized Intersection Capacity Analysis
 4: Clark Boulevard & Derry Road
 Future Total (PM)
 2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	30	1884	58	43	1980	24	211	10	134	74	7	169
Traffic Volume (vph)	30	1884	58	43	1980	24	211	10	134	74	7	169
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost time (s)	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	0.86	1.00	0.86	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3523	1770	3533	1770	1603	1770	1603	1770	1595	1770	1595
Flt Permitted	0.06	1.00	0.05	1.00	0.52	1.00	0.52	1.00	0.59	1.00	0.59	1.00
Satd. Flow (perm)	105	3523	99	3533	977	1603	977	1603	1100	1595	1100	1595
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	2048	63	47	2152	26	229	11	146	80	8	184
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	71	0	0	10
Lane Group Flow (vph)	33	2109	0	47	2177	0	229	86	0	80	182	0
Turn Type	Perm	NA	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2			1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	71.0	71.0	79.8	79.8	79.8	29.2	29.2	29.2	29.2	29.2	29.2	29.2
Effective Green, g (s)	71.0	71.0	79.8	79.8	79.8	29.2	29.2	29.2	29.2	29.2	29.2	29.2
Actuated g/C Ratio	0.59	0.59	0.66	0.66	0.66	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	62	2084	132	2349	237	390	237	390	267	388	267	388
v/s Ratio Prot	0.31	c0.60	0.01	c0.62	0.22	c0.23	0.05	0.05	0.07	0.07	0.07	0.11
v/s Ratio Perm	0.53	1.01	0.36	0.93	0.97	0.22	0.22	0.22	0.30	0.30	0.47	0.47
Uniform Delay, d1	14.6	24.5	28.5	17.6	44.9	36.3	37.1	38.8	37.1	38.8	37.1	38.8
Progression Factor	1.49	1.32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	9.3	1.6	7.8	48.5	0.3	48.5	0.3	0.6	0.9	0.6	0.9
Delay (s)	24.7	41.6	30.1	25.4	93.4	36.6	37.7	39.7	37.7	39.7	37.7	39.7
Level of Service	C	D	C	C	C	F	D	D	D	D	D	D
Approach Delay (s)	41.4		25.5		70.3		39.1					
Approach LOS	D		C		E		D					

Intersection Summary

HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		

c. Critical Lane Group



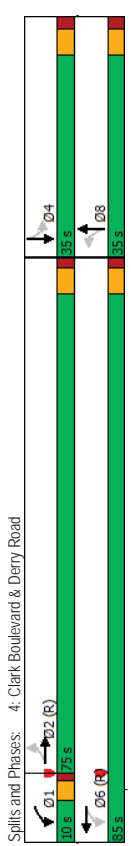
Syncho 11 Report
 12-14-2023
 BA Group

Queues
 4: Clark Boulevard & Derry Road
 Future Total (PM)
 2027 Scenario 3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	30	1884	43	1980	211	10	134	74	7	169		
Traffic Volume (vph)	30	1884	43	1980	211	10	134	74	7	169		
Future Volume (vph)	33	2111	47	2178	229	157	80	192				
Lane Group Flow (vph)	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA	NA
Protected Phases	2			1	6		8		4			
Permitted Phases	2			6			8		4			
Detector Phase	2			2			2		2			
Switch Phase	2			2			2		2			
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.53	1.00	0.31	0.93	0.97	0.34	0.30	0.48	0.30	0.48	0.30	0.48
Control Delay	35.2	37.7	12.0	26.1	95.9	18.0	40.7	40.9	40.7	40.9	40.7	40.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	37.7	12.0	26.1	95.9	18.0	40.7	40.9	40.7	40.9	40.7	40.9
Queue Length 50th (m)	6.3	-291.1	3.6	227.7	56.3	12.3	16.3	38.1	16.3	38.1	16.3	38.1
Queue Length 95th (m)	m6.8	m229.7	7.6	277.8	#108.1	31.6	31.4	62.2	31.6	62.2	31.6	62.2
Internal Link Dist (m)		336.0		475.1		56.4		313.3		313.3		313.3
Turn Bay Length (m)	70.0		70.0									
Base Capacity (vph)	62	2111	150	2349	238	462	268	399	268	399	268	399
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	1.00	0.31	0.93	0.96	0.34	0.30	0.48	0.30	0.48	0.30	0.48

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Splits and Phases: 4: Clark Boulevard & Derry Road

HCM Signalized Intersection Capacity Analysis
5: Fifth Line & Clark Boulevard

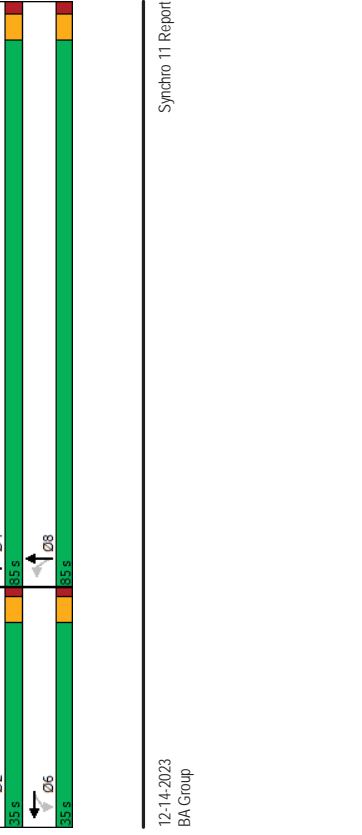
Queues
5: Fifth Line & Clark Boulevard

Future Total (PM)
2027 Scenario 3

Future Total (PM)
2027 Scenario 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	44	15	10	39	11	63	4	433	9	12	448
Future Volume (vph)	44	15	10	39	11	63	4	433	9	12	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	1749	1770	1625	1770	1625	1770	1857	1770	1857	1853
Flt Permitted	0.70	1.00	0.74	1.00	0.44	1.00	0.44	1.00	0.46	1.00	0.46
Satd. Flow (perm)	1313	1749	1378	1625	819	1857	819	1857	857	1853	857
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	16	11	42	12	68	4	471	10	13	487
RTOR Reduction (vph)	0	0	0	54	0	0	0	1	0	0	1
Lane Group Flow (vph)	48	18	0	42	26	0	4	480	0	13	503
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2			6			8				4
Permitted Phases	2	6	6	6	6	6	8	8	8	8	4
Actuated Green, G (s)	7.7	7.7	7.7	7.7	7.7	7.7	19.3	19.3	19.3	19.3	19.3
Effective Green, g (s)	7.7	7.7	7.7	7.7	7.7	7.7	19.3	19.3	19.3	19.3	19.3
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.51	0.51	0.51	0.51
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	266	354	279	329	415	943	415	943	435	941	435
v/s Ratio Prot	0.01		0.02				0.26				0.27
v/s Ratio Perm	0.04		0.03		0.03	0.00			0.02		0.02
v/c Ratio	0.18	0.05	0.15	0.08	0.15	0.08	0.01	0.51	0.03	0.53	0.53
Uniform Delay, d1	12.5	12.2	12.5	12.3	12.3	4.6	6.2	4.7	6.3	4.7	6.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	0.3	0.1	0.1	0.0	0.4	0.0	0.6	0.0	0.6
Delay (s)	12.9	12.3	12.7	12.4	12.4	4.6	6.6	4.7	6.9	4.7	6.9
Level of Service	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	12.7		12.5			6.6			6.8		6.8
Approach LOS	B		B			A			A		A
Intersection Summary											
HCM 2000 Control Delay	7.7 HCM 2000 Level of Service A										
HCM 2000 Volume to Capacity ratio	0.43										
Actuated Cycle Length (s)	38.0 Sum of lost time (s)										
Intersection Capacity Utilization	42.8% ICU Level of Service A										
Analysis Period (min)	15										
c Critical Lane Group											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	44	15	10	39	11	63	4	433	9	12	448
Future Volume (vph)	44	15	10	39	11	63	4	433	9	12	448
Lane Group Flow (vph)	48	27	42	80	4	481	13	504	13	504	504
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2			6			8				4
Permitted Phases	2	6	6	6	6	6	8	8	8	8	4
Detector Phase	2	2	2	2	2	2	2	2	2	2	2
Switch Phase	2	2	2	2	2	2	2	2	2	2	2
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	None										
v/c Ratio	0.13	0.06	0.11	0.16	0.16	0.01	0.46	0.03	0.49	0.03	0.49
Control Delay	12.5	9.4	12.3	6.0	5.8	9.1	6.0	9.3	6.0	9.3	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	9.4	12.3	6.0	5.8	9.1	6.0	9.3	6.0	9.3	6.0
Queue Length 50th (m)	2.1	0.7	1.9	0.5	0.1	21.6	0.5	22.9	0.5	22.9	0.5
Queue Length 95th (m)	9.0	5.1	8.1	7.9	1.1	40.3	2.2	42.9	2.2	42.9	2.2
Internal Link Dist (m)	204.0										
Turn Bay Length (m)	35.0										
Base Capacity (vph)	1071	1429	1124	1337	818	1857	857	1853	857	1853	857
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02	0.04	0.06	0.06	0.00	0.26	0.02	0.27	0.02	0.27
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 36.8											
Natural Cycle: 70											
Control Type: Actuated-Uncoordinated											



HCM Unsignalized Intersection Capacity Analysis
 10: Clark Boulevard & Anatolia Building 1 North Access/Anatolia Building 2 North Access Scenario 3

HCM Unsignalized Intersection Capacity Analysis
 9: Sixth Line & Anatolia Building 3 East Access Scenario 3

Future Total (PM)

Future Total (PM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	40	0	7	4	0	36	1	279	1	9	91	8
Traffic Volume (veh/h)	40	0	7	4	0	36	1	279	1	9	91	8
Future Volume (Veh/h)	40	0	7	4	0	36	1	279	1	9	91	8
Sign Control	Stop	0%	Free	Stop	0%	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	0	8	4	0	39	1	303	1	10	99	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												80
pX platoon unblocked												
VC, conflicting volume	468	430	104	437	434	304	108			304		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol	468	430	104	437	434	304	108			304		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	100	99	99	100	95	100			99		
pM capacity (veh/h)	475	514	951	522	511	736	1483			1257		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volumes Total	51	43	305	118								
Volume Left	43	4	1	10								
Volume Right	8	39	1	9								
cSH	516	709	1483	1257								
Volumes to Capacity	0.10	0.06	0.00	0.01								
Queue Length 95th (m)	2.6	1.5	0.0	0.2								
Control Delay (s)	12.7	10.4	0.0	0.7								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.7	10.4	0.0	0.7								
Approach LOS	B	B	A	A								
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			31.0%									A
Analysis Period (min)			15									

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W	4	2	368	339	8
Traffic Volume (veh/h)	22	4	2	368	339	8
Future Volume (Veh/h)	22	4	2	368	339	8
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	4	2	400	368	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						236
pX platoon unblocked	0.93	0.93	0.93			
VC, conflicting volume	776	372	377			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	719	283	288			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	100			
pM capacity (veh/h)	365	700	1180			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	28	402	377			
Volume Left	24	2	0			
Volume Right	4	0	9			
cSH	392	1180	1700			
Volumes to Capacity	0.07	0.00	0.22			
Queue Length 95th (m)	1.8	0.0	0.0			
Control Delay (s)	14.9	0.1	0.0			
Lane LOS	B	A	A			
Approach Delay (s)	14.9	0.1	0.0			
Approach LOS	B	A	A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			31.0%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Clark Boulevard & Anatolia Building 1 South Access

HCM Unsignalized Intersection Capacity Analysis
 11: Clark Boulevard & Anatolia Building 2 South Access

Future Total (PM)
 2027 Scenario 3

Future Total (PM)
 2027 Scenario 3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W					
Traffic Volume (veh/h)	130	12	4	119	42	48
Future Volume (Veh/h)	130	12	4	119	42	48
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	13	4	129	46	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	209	72	98			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	209	72	98			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	82	99	100			
CM capacity (veh/h)	777	990	1495			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	154	133	98			
Volume Left	141	4	0			
Volume Right	13	0	52			
cSH	792	1495	1700			
Volumes to Capacity	0.19	0.00	0.06			
Queue Length 95th (m)	5.7	0.1	0.0			
Control Delay (s)	10.6	0.2	0.0			
Lane LOS	B	A	A			
Approach Delay (s)	10.6	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		4.3				
Intersection Capacity Utilization		24.1%				ICU Level of Service A
Analysis Period (min)		15				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					
Traffic Volume (veh/h)	6	36	245	4	18	84
Future Volume (Veh/h)	6	36	245	4	18	84
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	39	266	4	20	91
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	399	268		270		
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	399	268		270		
IC, single (s)	6.4	6.2		4.1		
IC, 2 stage (s)						
IF (s)	3.5	3.3		2.2		
p0 queue free %	99	95		98		
CM capacity (veh/h)	597	771		1293		
Direction, Lane #	WB 1	NB 1	SB 1			
Volumes Total	46	270	111			
Volume Left	7	0	20			
Volume Right	39	4	0			
cSH	738	1700	1293			
Volumes to Capacity	0.06	0.16	0.02			
Queue Length 95th (m)	1.6	0.0	0.4			
Control Delay (s)	10.2	0.0	1.5			
Lane LOS	B	A	A			
Approach Delay (s)	10.2	0.0	1.5			
Approach LOS	B					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			29.9%			ICU Level of Service A
Analysis Period (min)			15			

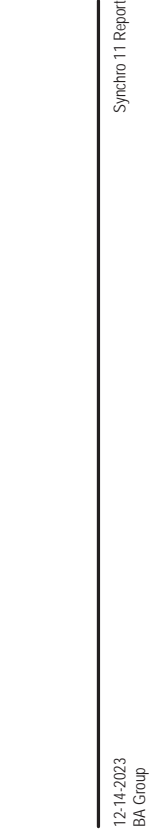
HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road
 2032 Scenario 4

Queues
 1: Sixth Line & Derry Road
 2032 Scenario 4

Future Background (AM)
 2032 Scenario 4

Future Background (AM)
 2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	164	2201	153	17	763	41	76	173	30	46	142	134
Traffic Volume (vph)	164	2201	153	17	763	41	76	173	30	46	142	134
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.93
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1763	3163	1805	2924	1805	2924	1805	3504	1258	3307	1258	3307
Flt Permitted	0.28	1.00	0.06	1.00	0.46	1.00	0.46	1.00	0.61	1.00	0.61	1.00
Satd. Flow (perm)	523	3163	107	2924	883	3504	883	3504	806	3307	806	3307
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	174	2341	163	18	812	44	81	184	32	49	151	143
RTOR Reduction (vph)	0	3	0	3	0	3	0	15	0	0	124	0
Lane Group Flow (vph)	174	2501	0	18	853	0	81	201	0	49	170	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	5	2	1	6	6	8	8	8	8	8	8	4
Permitted Phases	2	838	770	74.1	71.3	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Actuated Green, G (s)	838	770	74.1	71.3	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Effective Green, g (s)	838	770	74.1	71.3	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Actuated g/C Ratio	0.75	0.69	0.67	0.64	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	489	2194	114	1878	116	464	106	437	0.06	0.06	0.06	0.05
v/s Ratio Prot	c0.03	c0.79	0.00	0.29	0.00	0.06	0.06	0.06	0.06	0.06	0.06	0.05
v/s Ratio Perm	0.24	0.10	0.10	0.10	c0.09	0.00	0.06	0.06	0.06	0.06	0.06	0.06
v/c Ratio	0.36	1.14	0.16	0.45	0.70	0.43	0.46	0.39	0.46	0.39	0.46	0.39
Uniform Delay, d1	4.5	17.0	26.8	10.0	46.0	44.3	44.5	44.0	44.5	44.0	44.5	44.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	6.90	0.7	0.8	16.8	0.7	3.2	0.6	3.2	0.6	4.7	44.6
Delay (s)	4.9	86.0	27.4	10.8	62.8	45.0	47.7	44.6	47.7	44.6	47.7	44.6
Level of Service	A	F	C	B	E	D	D	D	D	D	D	D
Approach Delay (s)	80.8	111.2	49.8	49.8	49.8	49.8	45.1	45.1	49.8	45.1	45.1	45.1
Approach LOS	F	F	B	B	B	B	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	61.1	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	1.05	E										
Actuated Cycle Length (s)	111.0	Sum of lost time (s)										
Intersection Capacity Utilization	107.2%	16.5										
Analysis Period (min)	15	G										
c Critical Lane Group												



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	164	2201	17	763	41	76	173	30	46	142	134	134
Traffic Volume (vph)	164	2201	17	763	41	76	173	30	46	142	134	134
Future Volume (vph)	174	2504	18	856	81	216	49	294	NA	Perm	NA	NA
Lane Group Flow (vph)	174	2504	18	856	81	216	49	294	NA	Perm	NA	NA
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	5	2	1	6	6	8	8	8	8	8	8	4
Permitted Phases	2	6	6	8	8	8	8	8	8	8	8	4
Detector Phase	5	2	1	6	6	8	8	8	8	8	8	4
Switch Phase	5	2	1	6	6	8	8	8	8	8	8	4
Minimum Initial (s)	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Total Split (s)	11.0	67.0	11.0	67.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (%)	9.9%	60.4%	9.9%	60.4%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.35	1.11	0.10	0.46	0.69	0.45	0.46	0.39	0.46	0.39	0.46	0.39
Control Delay	5.6	73.3	5.2	11.8	74.3	43.0	57.0	25.3	43.0	57.0	25.3	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	73.3	5.2	11.8	74.3	43.0	57.0	25.3	43.0	57.0	25.3	25.3
Queue Length 50th (m)	7.9	-325.8	0.8	45.7	18.0	22.4	10.5	16.8	22.4	10.5	16.8	16.8
Queue Length 95th (m)	17.9	#436.2	3.1	77.4	33.4	32.4	22.2	28.7	32.4	22.2	28.7	28.7
Internal Link Dist (m)	475.1	256.2	3.1	77.4	33.4	32.4	22.2	28.7	32.4	22.2	28.7	28.7
Turn Bay Length (m)	120.0	100.0	100.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Base Capacity (vph)	498	2264	183	1879	212	856	194	904	212	856	194	904
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	1.11	0.10	0.46	0.38	0.25	0.25	0.33	0.25	0.25	0.33	0.33
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



2: Fifth Line & Derry Road

Future Background (AM)

2032 Scenario 4

	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Group	EBT	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Lane Configurations	2	2	1	1	6	6	8	4
Traffic Volume (vph)	92	2238	104	193	753	261	100	289
Future Volume (vph)	92	2238	104	193	753	261	100	289
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	3262	1587	3105	1698	3207	1501	3253
Flt Permitted	0.21	1.00	0.05	1.00	0.68	1.00	0.33	1.00
Satd. Flow (perm)	357	3262	89	3105	1219	3207	514	3253
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	98	2381	111	205	801	278	106	307
RTOR Reduction (vph)	0	3	0	0	28	0	32	0
Lane Group Flow (vph)	98	2489	0	205	1051	0	106	388
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	4
Permitted Phases	2	2	6	6	22.3	22.3	22.3	22.3
Effective Green, G (s)	82.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3
Actuated Green, g (s)	82.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.69	0.62	0.69	0.63	0.19	0.19	0.19	0.19
Clearance Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	322	2030	161	1945	226	595	161	604
v/s Ratio Prot	0.02	0.76	c0.08	0.34	0.12	0.12	0.03	0.03
v/s Ratio Perm	0.19	60.80	0.80	0.80	0.09	0.09	60.23	60.23
Uniform Delay, d1	0.30	1.23	1.27	0.54	0.47	0.65	1.22	0.14
Progression Factor	0.63	0.66	0.96	0.93	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	105.1	161.3	1.0	1.5	2.6	163.2	0.1
Delay (s)	5.1	120.1	200.8	12.8	45.1	47.8	212.1	40.9
Level of Service	A	F	F	B	D	D	F	D
Approach Delay (s)		115.7		42.8		47.3		128.4
Approach LOS		F		D		D		F
Intersection Summary								
HCM 2000 Control Delay	88.4							F
HCM 2000 Volume to Capacity ratio	1.26							
Actuated Cycle Length (s)	120.0							15.0
Intersection Capacity Utilization	112.8%							H
Analysis Period (min)	15							
c Critical Lane Group								

12-14-2023
BA Group

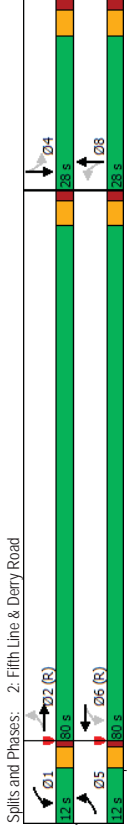
Synchro 11 Report

2: Fifth Line & Derry Road

Future Background (AM)

2032 Scenario 4

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	2	2	1	1	6	6	8	4
Traffic Volume (vph)	92	2238	193	753	100	289	109	72
Future Volume (vph)	92	2238	193	753	100	289	109	72
Lane Group Flow (vph)	98	2492	205	1079	106	420	116	111
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	4
Permitted Phases	2	2	6	6	8	8	8	4
Detector Phase	5	2	1	6	6	8	8	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	34.3	11.0	34.3	34.7	34.7	34.7	34.7
Total Split (s)	12.0	80.0	12.0	80.0	28.0	28.0	28.0	28.0
Total Split (%)	10.0%	66.7%	10.0%	66.7%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	1.6	1.0	1.6	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
v/c Ratio	0.30	1.23	1.27	0.55	0.47	0.67	1.22	0.18
Control Delay	4.7	124.1	186.2	12.1	51.4	47.0	205.4	29.2
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	124.1	186.2	12.1	51.4	47.0	205.4	29.2
Queue Length 50th (m)	3.8	-412.6	-49.2	61.0	23.7	46.7	-35.3	8.4
Queue Length 95th (m)	m#4.6	#457.1	#100.2	72.7	42.8	65.0	#74.4	17.0
Internal Link Dist (m)	170.5	124.7	124.7	42.8	340.6	340.6	275.9	275.9
Turn Bay Length (m)	100.0	90.0	90.0	70.0	50.0	50.0	50.0	50.0
Base Capacity (vph)	332	2032	162	1973	226	627	95	632
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	1.23	1.27	0.55	0.47	0.67	1.22	0.18
Intersection Summary								
Cycle Length: 120								
Actuated Cycle Length: 120								
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green								
Natural Cycle: 150								
Control Type: Actuated-Coordinated								
- Volume exceeds capacity, queue is theoretically infinite.								
Queue shown is maximum after two cycles.								
# 95th percentile volume exceeds capacity, queue may be longer.								
Queue shown is maximum after two cycles.								
m Volume for 95th percentile queue is metered by upstream signal.								



HCM Signalized Intersection Capacity Analysis
3. James Snow Parkway & Derry Road

Future Background (AM)
 2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	W	W	W	W	W	W	W	W	W	W	W	W
Traffic Volume (vph)	206	1824	33	74	588	178	29	330	218	337	459	221
Future Volume (vph)	206	1824	33	74	588	178	29	330	218	337	459	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	5006	1562	1738	4828	1516	1802	4668	1586	1616	4489	1403
Flt Permitted	0.95	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00
Satd. Flow (perm)	3399	5006	1562	147	4828	1516	899	4668	1586	1616	4489	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	210	1861	34	76	600	182	30	337	222	344	468	226
RTOR Reduction (vph)	0	18	0	0	106	0	0	168	0	0	162	0
Lane Group Flow (vph)	210	1861	16	76	600	76	30	337	54	344	468	64
Confl. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	7	4	7	4	4
Permitted Phases	5	2	2	6	6	6	8	8	8	8	4	4
Actuated Green, G (s)	12.7	55.7	55.7	56.6	49.8	49.8	20.4	15.8	15.8	42.5	33.9	33.9
Effective Green, g (s)	12.7	55.7	55.7	56.6	49.8	49.8	20.4	15.8	15.8	42.5	33.9	33.9
Actuated G/C Ratio	0.11	0.46	0.46	0.47	0.41	0.41	0.17	0.13	0.13	0.35	0.28	0.28
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	4.0	5.3	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	359	2323	725	159	2003	629	187	614	208	411	1268	396
v/s Ratio Prot	c0.06	c0.37	0.01	0.03	0.12	0.05	0.02	0.07	0.03	c0.16	0.10	0.05
v/s Ratio Perm	0.58	0.80	0.02	0.48	0.30	0.12	0.16	0.55	0.26	0.84	0.37	0.16
Uniform Delay, d1	51.1	27.4	17.4	21.7	23.4	21.6	42.0	48.8	46.8	32.0	34.5	32.4
Progression Factor	1.00	1.00	1.00	0.76	0.82	2.04	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	3.0	0.1	2.0	0.3	0.3	0.4	1.0	0.7	13.8	0.2	0.2
Delay (s)	53.6	30.4	17.5	18.5	19.6	44.3	42.4	49.8	47.5	45.8	34.7	32.6
Level of Service	D	C	B	B	B	D	D	D	D	D	D	C
Approach Delay (s)	32.5	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Approach LOS	C	C	C	C	C	C	C	C	C	C	C	D
Intersection Summary												
HCM 2000 Control Delay	34.3 HCM 2000 Level of Service C											
HCM 2000 Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 19.0											
Intersection Capacity Utilization	83.9% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												



Spills and Phases: 3.-James Snow Parkway & Derry Road
 12-14-2023 BA Group

Synchro 11 Report

Queues
3. James Snow Parkway & Derry Road
 2032 Scenario 4

Future Background (AM)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	W	W	W	W	W	W	W	W	W	W	W	W
Traffic Volume (vph)	206	1824	33	74	588	178	29	330	218	337	459	221
Future Volume (vph)	206	1824	33	74	588	178	29	330	218	337	459	221
Lane Group Flow (vph)	210	1861	34	76	600	182	30	337	222	344	468	226
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	7	4	7	4	4
Permitted Phases	5	2	2	6	6	6	8	8	8	8	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	47.0	47.0	11.0	41.0	41.0	11.0	29.5	29.5	35.0	27.0	35.0
Total Split (%)	14.2%	39.2%	39.2%	9.2%	34.2%	34.2%	22.5%	29.2%	29.2%	22.5%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
Yellow Time (%)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	None	None	None	None	None
v/s Ratio	0.58	0.77	0.04	0.42	0.29	0.24	0.13	0.61	0.62	0.83	0.37	0.41
Control Delay	57.6	29.5	0.1	17.5	19.5	8.1	27.0	54.9	17.8	50.2	36.0	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	29.5	0.1	17.5	19.5	8.1	27.0	54.9	17.8	50.2	36.0	6.7
Queue Length 50th (m)	25.9	139.4	0.0	7.5	37.4	8.3	4.8	29.5	6.3	69.3	35.7	0.0
Queue Length 95th (m)	37.8	178.6	0.0	18.3	54.8	29.1	11.0	39.0	30.4	#103.5	45.5	19.4
Internal Link Dist (m)	156.1 488.7											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	75.0	95.0	213.2	
Base Capacity (vph)	392	2425	806	182	2068	753	464	1139	533	414	1268	558
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.77	0.04	0.42	0.29	0.24	0.06	0.30	0.42	0.83	0.37	0.41
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBLT, Start of Green												
Natural Cycle: 95												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Volume shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



Spills and Phases: 3.-James Snow Parkway & Derry Road
 12-14-2023 BA Group

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
4: Clark Boulevard & Derry Road

Future Background (AM)
2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	91	2411	0	0	962	91	0	7	0	26	10	43
Future Volume (vph)	91	2411	0	0	962	91	0	7	0	26	10	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	3539	3493	1863	1770	1636	1770	1636	1770	1636	1770	1636
Flt Permitted	0.24	1.00	0.24	1.00	0.24	1.00	0.75	1.00	0.75	1.00	0.75	1.00
Satd. Flow (perm)	442	3539	442	3539	442	3539	1402	1636	1402	1636	1402	1636
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	2621	0	0	1046	99	0	8	0	28	11	47
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	44
Lane Group Flow (vph)	99	2621	0	0	1142	0	0	8	0	28	14	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6		8				4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	100.8	100.8		100.8			8.2			8.2		8.2
Effective Green, g (s)	100.8	100.8		100.8			8.2			8.2		8.2
Actuated g/C Ratio	0.84	0.84		0.84			0.07			0.07		0.07
Clearance Time (s)	5.3	5.3		5.3			5.7			5.7		5.7
Vehicle Extension (s)	3.0	3.0		3.0			3.0			3.0		3.0
Lane Grp Cap (vph)	371	2972		2934			127			95		111
v/s Ratio Prot	c0.74			0.33			0.00			c0.02		0.01
v/s Ratio Perm	0.27	0.88		0.39			0.06			0.29		0.13
Uniform Delay, d1	2.0	5.9		2.3			52.3			53.2		52.5
Progression Factor	1.84	2.57		1.00			1.00			1.00		1.00
Incremental Delay, d2	0.2	0.4		0.4			0.2			1.7		0.5
Delay (s)	3.8	15.6		2.7			52.5			54.9		53.1
Level of Service	A	B		A			D			D		D
Approach Delay (s)	15.2	2.7		52.5						53.7		
Approach LOS	B	A		A			D			D		D
Intersection Summary												
HCM 2000 Control Delay	12.5 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	92.3% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												

12-14-2023
BA Group
Synchro 11 Report

Queues
4: Clark Boulevard & Derry Road

Future Background (AM)
2032 Scenario 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	91	2411	0	0	962	91	0	7	0	26	10	43
Future Volume (vph)	91	2411	0	0	962	91	0	7	0	26	10	43
Lane Group Flow (vph)	99	2621	1145	8	28	58						
Turn Type	Perm	NA	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8			4		1
Permitted Phases	2			6			8			4		4
Detector Phase	2			6			8			4		4
Switch Phase	2			6			8			4		4
Minimum Initial (s)	10.0	10.0		10.0			10.0			10.0		10.0
Minimum Split (s)	34.3	34.3		34.3			34.7			34.7		34.7
Total Split (s)	75.0	75.0		85.0			35.0			35.0		35.0
Total Split (%)	62.5%	62.5%		70.8%			29.2%			29.2%		29.2%
Yellow Time (s)	3.7	3.7		3.7			3.7			3.7		3.7
All-Red Time (s)	1.6	1.6		1.6			2.0			2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0			0.0			0.0		0.0
Total Lost Time (s)	5.3	5.3		5.3			5.7			5.7		5.7
Lead/Lag	Lag	Lag		Lag			Lead			Lead		Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes		Yes
Recall Mode	C-Min	C-Min		C-Min			None			None		None
v/c Ratio	0.26	0.86		0.38			0.05			0.24		0.32
Control Delay	4.8	18.1		2.8			51.1			56.5		23.8
Queue Delay	0.0	0.0		0.0			0.0			0.0		0.0
Total Delay	4.8	18.1		2.8			51.1			56.5		23.8
Queue Length 50th (m)	7.1	308.1		29.2			1.9			6.6		2.6
Queue Length 95th (m)	m6.2	m234.4		98.1			7.0			16.4		16.0
Internal Link Dist (m)	336.0	475.1		56.4						313.3		
Turn Bay Length (m)	70.0									40.0		
Base Capacity (vph)	378	3038		3001			454			342		434
Starvation Cap Reductn	0	0		0			0			0		0
Spillback Cap Reductn	0	0		0			0			0		0
Storage Cap Reductn	0	0		0			0			0		0
Reduced v/c Ratio	0.26	0.86		0.38			0.02			0.08		0.13
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
m Volume for 95th percentile queue is metered by upstream signal.												

12-14-2023
BA Group
Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
5: Fifth Line & Clark Boulevard

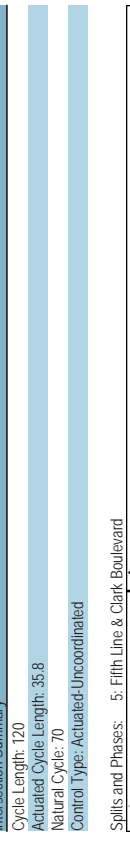
Queues
5: Fifth Line & Clark Boulevard

Future Background (AM)
2032 Scenario 4

Future Background (AM)
2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	10	7	3	0	10	0	10	485	0	0	332
Traffic Volume (vph)	10	7	3	0	10	0	10	485	0	0	332
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Total Lost Time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1787	1863	1863	1770	1863	1863	1863	1863	1863	1863
Flt Permitted	1.00	1.00	1.00	1.00	0.53	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1863	1787	1863	1863	980	1863	1863	1863	1863	1863	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	8	3	0	11	0	11	527	0	0	361
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	3
Lane Group Flow (vph)	11	8	0	0	11	0	11	527	0	0	398
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2	6	6	6	6	6	6	6	6	6	6
Permitted Phases	2	6	6	6	6	6	6	6	6	6	6
Actuated Green, G (s)	1.4	1.4	1.4	1.4	27.7	27.7	27.7	27.7	27.7	27.7	27.7
Effective Green, g (s)	1.4	1.4	1.4	1.4	27.7	27.7	27.7	27.7	27.7	27.7	27.7
Actuated g/C Ratio	0.03	0.03	0.03	0.03	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Clearance Time (s)	3.0	3.0	3.0	3.0	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	65	62	65	65	676	1286	676	1286	676	1286	676
v/s Ratio Prot	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
v/s Ratio Perm	0.17	0.13	0.17	0.17	0.02	0.41	0.02	0.41	0.02	0.41	0.02
Uniform Delay, d1	18.8	18.8	18.8	18.8	1.9	2.7	1.9	2.7	1.9	2.7	2.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.0	1.2	1.0	0.0	0.2	0.0	0.2	0.0	0.2	0.1
Delay (s)	20.0	19.7	20.0	19.7	2.0	2.9	2.0	2.9	2.0	2.9	2.6
Level of Service	C	B	C	B	C	A	C	A	C	A	A
Approach Delay (s)	19.9	19.9	20.0	19.9	2.9	2.9	2.9	2.9	2.9	2.9	2.6
Approach LOS	B	B	C	B	C	A	C	A	C	A	A
Intersection Summary											
HCM 2000 Control Delay	3.3 HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	0.40										
Actuated Cycle Length (s)	40.1 Sum of lost time (s)										
Intersection Capacity Utilization	43.0% ICU Level of Service										
Analysis Period (min)	15										
c Critical Lane Group											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	10	7	3	0	10	0	10	485	0	0	332
Traffic Volume (vph)	10	7	3	0	10	0	10	485	0	0	332
Future Volume (vph)	10	7	3	0	10	0	10	485	0	0	332
Lane Group Flow (vph)	11	11	11	11	11	11	11	527	0	0	401
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2	6	6	6	6	6	6	6	6	6	6
Detector Phase	2	2	2	2	2	2	2	2	2	2	2
Switch Phase	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	34.3	34.3	34.3	34.3	34.3	34.3	34.3	34.3	34.3	34.3	34.3
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Total Spill (%)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Yellow Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Lead/Lag											
Lead-Lag Optimize?	None										
Recall Mode	None										
v/c Ratio	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Control Delay	13.1	11.9	13.1	13.1	2.6	2.7	2.6	2.7	2.6	2.7	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.1	11.9	13.1	13.1	2.6	2.7	2.6	2.7	2.6	2.7	2.4
Queue Length 50th (m)	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	3.9	3.7	3.9	3.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Internal Link Dist (m)	204.0 86.5 156.9 372.1										
Turn Bay Length (m)	35.0										
Base Capacity (vph)	1602	1536	1602	1602	980	1863	1602	1863	1602	1863	1835
Starvation Cap Reductn	0										
Spillback Cap Reductn	0										
Storage Cap Reductn	0										
Reduced v/c Ratio	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 35.8											
Natural Cycle: 70											
Control Type: Actuated-Uncoordinated											



Spills and Phases: 5: Fifth Line & Clark Boulevard

HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road

2032 Scenario 4

Queues
 1: Sixth Line & Derry Road

2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	171	1881	85	31	1855	25	201	166	33	137	226
Future Volume (vph)	171	1881	85	31	1855	25	201	166	33	137	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.94	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.94
Satd. Flow (prot)	1763	3173	1805	2966	1805	3492	1805	3492	1258	3356	1258
Flt Permitted	0.07	1.00	0.08	1.00	0.08	1.00	0.34	1.00	0.62	1.00	0.62
Satd. Flow (perm)	134	3173	148	2966	148	2966	645	3492	820	3356	820
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow vph	182	2001	90	33	1973	27	214	177	35	146	240
RTOR Reduction (vph)	0	2	0	0	1	0	0	15	0	0	101
Lane Group Flow (vph)	182	2089	0	33	1999	0	214	197	0	146	295
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	perm	NA	NA
Protected Phases	5	2	1	6	3	8					
Permitted Phases	2		6			8			4		4
Actuated Green, G (s)	64.7	56.5	55.7	51.5	33.8	33.8	33.8	33.8	22.8	22.8	22.8
Effective Green, g (s)	64.7	56.5	55.7	51.5	33.8	33.8	33.8	33.8	22.8	22.8	22.8
Actuated g/C Ratio	0.58	0.51	0.50	0.46	0.30	0.30	0.30	0.30	0.21	0.21	0.21
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.3	4.0	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	213	1615	136	1376	269	1063			168	689	
v/s Ratio Prot	c0.07	c0.66	0.01	c0.67	c0.05	0.06			0.09		
v/s Ratio Perm	0.43	0.11	0.11	c0.19	0.19				0.18		
v/c Ratio	0.85	1.29	0.24	1.45	0.80	0.19			0.87	0.43	
Uniform Delay, d1	30.9	27.2	24.4	29.8	34.0	28.4			42.7	38.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	26.8	136.7	0.9	207.8	14.9	0.1			34.7	0.4	
Delay (s)	57.6	163.9	25.3	237.6	49.0	28.5			77.4	38.9	
Level of Service	E	F	C	F	D	C			E	D	
Approach Delay (s)	155.4		234.1		38.8				49.2		
Approach LOS	F		F		D				D		
Intersection Summary											
HCM 2000 Control Delay	165.4	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity ratio	1.20	F									
Actuated Cycle Length (s)	111.0	Sum of lost time (s)									
Intersection Capacity Utilization	100.7%	ICU Level of Service									
Analysis Period (min)	15	G									
c Critical Lane Group											

Synchro 11 Report
 12-14-2023
 BA Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	
Traffic Volume (vph)	171	1881	85	31	1855	25	201	166	33	137	
Future Volume (vph)	171	1881	85	31	1855	25	201	166	33	137	
Lane Group Flow (vph)	182	2091	33	2000	214	212	146	396	NA	NA	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	perm	NA	
Protected Phases	5	2	1	6	3	8			4		
Detector Phase	5	2	1	6	3	8			4		
Switch Phase	7.0	25.0	7.0	25.0	7.0	25.0	7.0	25.0	10.0	10.0	
Minimum Initial (s)	11.0	31.2	11.0	31.2	11.0	31.2	11.0	31.2	32.3	32.3	
Minimum Split (s)	11.0	57.0	11.0	57.0	11.0	57.0	11.0	43.0	32.0	32.0	
Total Split (s)	9.9%	51.4%	9.9%	51.4%	9.9%	51.4%	9.9%	38.7%	28.8%	28.8%	
Total Spill (%)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	4.0	4.0	
Yellow Time (s)	1.0	2.2	1.0	2.2	1.0	2.2	1.0	2.3	2.3	2.3	
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lost Time Adjust (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	None	
v/c Ratio	0.86	1.26	0.18	1.45	0.76	0.20	0.87	0.50	0.87	0.50	
Control Delay	60.1	146.7	12.4	234.1	47.9	25.2	85.1	27.8	85.1	27.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	60.1	146.7	12.4	234.1	47.9	25.2	85.1	27.8	85.1	27.8	
Queue Length 50th (m)	-29.2	-343.9	3.1	-333.5	35.6	16.0	31.3	27.2	31.3	27.2	
Queue Length 95th (m)	#75.2	#388.7	7.4	#378.6	#60.7	25.3	#65.7	42.5	#65.7	42.5	
Internal Link Dist (m)	475.1		475.1		475.1		475.1		475.1		
Turn Bay Length (m)	120.0		100.0		45.0		30.0		30.0		
Base Capacity (vph)	212	1665	185	1378	282	1168	189	874	189	874	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillover Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.86	1.26	0.18	1.45	0.76	0.18	0.77	0.45	0.77	0.45	
Intersection Summary											
Cycle Length: 111											
Actuated Cycle Length: 111											
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle: 150											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											

Spills and Phases: 1: Sixth Line & Derry Road



BA Group

HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road
 2032 Scenario 4

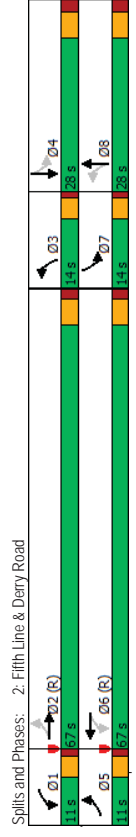
Queues
 2: Fifth Line & Derry Road
 2032 Scenario 4

Future Background (PM)

Future Background (PM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	43	1776	86	99	1997	118	233	74	209	311	304
Future Volume (vph)	43	1776	86	99	1997	118	233	74	209	311	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1600	3262	1587	3296	1698	3052	1501	3340	1501	3340	1501
Flt Permitted	0.06	1.00	0.06	1.00	0.06	1.00	0.29	1.00	0.44	1.00	0.44
Satd. Flow (perm)	105	3262	100	3296	100	3296	523	3052	702	3340	702
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	1889	91	105	2124	126	248	79	222	331	323
RTOR Reduction (vph)	0	3	0	0	3	0	0	96	0	0	20
Lane Group Flow (vph)	46	1977	0	105	2247	0	248	205	0	331	388
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	NA
Protected Phases	5	2	2	1	6	3	8	7	4	7	4
Permitted Phases	2	70.1	64.4	74.5	66.6	28.7	18.7	28.7	18.7	28.7	18.7
Effective Green, G (s)	70.1	64.4	74.5	66.6	28.7	18.7	18.7	28.7	18.7	28.7	18.7
Actuated g/C Ratio	0.58	0.54	0.62	0.55	0.24	0.16	0.24	0.16	0.24	0.16	0.16
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	132	1750	159	1829	223	475	234	520	234	520	234
v/s Ratio Prot	0.02	0.61	c0.04	c0.68	0.09	0.07	c0.12	0.12	c0.12	0.12	c0.22
v/s Ratio Perm	0.19	0.36	0.36	0.17	1.11	0.43	1.41	0.75	0.43	0.75	0.43
Uniform Delay, d1	26.3	27.8	27.9	26.7	43.0	45.8	43.9	48.4	45.8	48.4	43.9
Progression Factor	2.12	0.92	1.02	1.13	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	64.0	4.8	105.2	93.6	0.6	209.9	5.8	0.6	209.9	5.8
Delay (s)	56.7	89.6	33.1	135.3	136.6	46.5	253.8	54.1	46.5	253.8	54.1
Level of Service	E	F	C	F	F	D	F	D	F	D	F
Approach Delay (s)	88.9	F	130.7	F	87.2	F	143.6	F	87.2	F	143.6
Approach LOS	F	F	F	F	F	F	F	F	F	F	F
Intersection Summary											
HCM 2000 Control Delay	113.2	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity ratio	1.26	F									
Actuated Cycle Length (s)	120.0	Sum of lost time (s)									
Intersection Capacity Utilization	106.7%	19.0									
Analysis Period (min)	15	G									
c Critical Lane Group											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	43	1776	86	99	1997	118	233	74	209	311	304
Future Volume (vph)	43	1776	86	99	1997	118	233	74	209	311	304
Lane Group Flow (vph)	46	1980	105	2250	248	301	233	74	311	304	408
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	NA
Protected Phases	5	2	2	1	6	3	8	7	4	7	4
Detector Phase	5	2	2	1	6	3	8	7	4	7	4
Switch Phase	7.0	20.0	7.0	20.0	7.0	20.0	7.0	20.0	7.0	20.0	7.0
Minimum Initial (s)	11.0	34.3	11.0	34.3	11.0	34.3	11.0	34.7	11.0	34.7	11.0
Minimum Split (s)	11.0	67.0	11.0	67.0	11.0	67.0	11.0	28.0	11.0	28.0	11.0
Total Split (s)	9.2%	55.8%	9.2%	55.8%	11.7%	23.3%	11.7%	23.3%	11.7%	23.3%	11.7%
Total Split (%)	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	3.0
Yellow Time (s)	1.0	1.6	1.0	1.6	1.0	1.6	1.0	2.0	1.0	2.0	1.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.30	1.13	0.65	1.21	1.08	0.53	1.36	0.76	1.08	0.53	1.36
Control Delay	22.7	90.6	30.4	127.0	118.5	31.5	218.5	54.7	31.5	218.5	54.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	90.6	30.4	127.0	118.5	31.5	218.5	54.7	31.5	218.5	54.7
Queue Length 50th (m)	2.9	-309.5	15.3	-366.4	-65.7	22.1	-75.0	48.4	22.1	-75.0	48.4
Queue Length 95th (m)	m7.3	#344.0	m19.3	#422.6	#89.6	35.8	#161.6	64.4	35.8	#161.6	64.4
Internal Link Dist (m)	170.5	124.7	170.5	124.7	170.5	124.7	340.6	275.9	170.5	124.7	340.6
Turn Bay Length (m)	100.0	90.0	100.0	90.0	100.0	90.0	50.0	50.0	100.0	90.0	50.0
Base Capacity (vph)	151	1751	161	1855	230	659	244	640	230	659	244
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	1.13	0.65	1.21	1.08	0.46	1.36	0.64	1.08	0.46	1.36
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green											
Natural Cycle: 145											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											



HCM Signalized Intersection Capacity Analysis
3. James Snow Parkway & Derry Road

Future Background (PM)
2032 Scenario 4

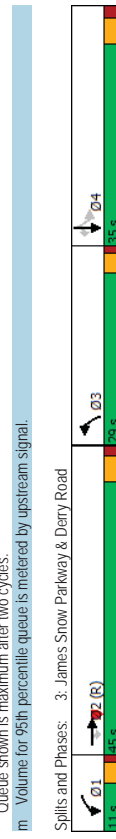
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	W	W	W	W	W	W	W	W	W	W	W	W
Traffic Volume (vph)	212	1285	18	286	1454	446	96	410	224	363	539	254
Future Volume (vph)	212	1285	18	286	1454	446	96	410	224	363	539	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	5006	1562	1738	4828	1516	1802	4668	1586	1616	4489	1403
Flt Permitted	0.95	1.00	1.00	0.99	1.00	1.00	0.44	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	3399	5006	1562	167	4828	1516	827	4668	1586	518	4489	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	216	1311	18	292	1484	455	98	418	229	370	550	259
RTOR Reduction (vph)	0	12	0	0	219	0	0	165	0	0	193	0
Lane Group Flow (vph)	216	1311	6	292	1484	236	98	418	64	370	550	66
Confl. Peds. (#/hr)	1			1	6						6	
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8		4	
Actuated Green, G (s)	12.9	39.7	39.7	64.4	47.5	47.5	26.2	16.4	16.4	44.6	30.8	30.8
Effective Green, g (s)	12.9	39.7	39.7	64.4	47.5	47.5	26.2	16.4	16.4	44.6	30.8	30.8
Actuated g/C Ratio	0.11	0.33	0.33	0.54	0.40	0.40	0.22	0.14	0.14	0.37	0.26	0.26
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	365	1656	516	360	1911	600	260	637	216	413	1152	360
v/s Ratio Prot	0.06	0.26		c0.14	0.31		0.03	0.09		c0.18	0.12	
v/s Ratio Perm			0.00	c0.29		0.16	0.05		0.04	c0.15		0.05
v/s Ratio	0.59	0.79	0.01	0.81	0.78	0.39	0.38	0.66	0.30	0.90	0.48	0.18
Uniform Delay, d1	51.0	36.4	27.0	32.5	31.6	25.9	38.8	49.1	46.6	31.2	37.8	34.8
Progression Factor	1.00	1.00	1.00	0.80	0.87	1.56	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	4.0	0.0	1.3	0.3	0.2	0.9	2.4	0.8	21.3	0.3	0.2
Delay (s)	53.6	40.4	27.0	27.3	27.8	27.8	40.6	39.7	51.6	47.4	52.4	35.1
Level of Service	D	D	C	C	C	C	D	D	D	D	D	D
Approach Delay (s)		42.1			30.3			48.7			41.9	
Approach LOS		D			C			D		D		D
Intersection Summary												
HCM 2000 Control Delay	38.3 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	85.0% ICU Level of Service											
Analysis Period (min)	15											
Critical Lane Group												



12-14-2023
BA Group
Synchro 11 Report

3. James Snow Parkway & Derry Road
Future Background (PM)
2032 Scenario 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	W	W	W	W	W	W	W	W	W	W	W	W
Traffic Volume (vph)	212	1285	18	286	1454	446	96	410	224	363	539	254
Future Volume (vph)	212	1285	18	286	1454	446	96	410	224	363	539	254
Lane Group Flow (vph)	216	1311	18	292	1484	455	98	418	229	370	550	259
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8		4	
Detector Phase	5	2	2	2	1	6	6	3	8	8	7	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	45.0	45.0	11.0	39.0	39.0	29.0	35.0	35.0	29.0	35.0	35.0
Total Split (%)	14.2%	37.5%	37.5%	9.2%	32.5%	32.5%	24.2%	29.2%	29.2%	24.2%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.59	0.79	0.03	0.81	0.78	0.56	0.36	0.66	0.60	0.88	0.48	0.47
Control Delay	57.6	40.7	0.1	28.2	29.3	11.0	28.2	53.9	17.4	51.8	39.0	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	40.7	0.1	28.2	29.3	11.0	28.2	53.9	17.4	51.8	39.0	7.1
Queue Length 50th (m)	26.7	107.3	0.0	46.5	133.0	47.2	15.5	36.5	8.5	71.7	42.1	0.0
Queue Length 95th (m)	38.5	126.1	0.0	m41.0	m115.7	m37.5	25.8	46.6	33.0	#105.7	53.2	20.8
Internal Link Dist (m)	156.1 488.7											
Turn Bay Length (m)	100.0 70.0 110.0 75.0 100.0 75.0 95.0 213.2											
Base Capacity (vph)	395	1656	581	360	1911	818	500	1139	531	428	1174	558
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.79	0.03	0.81	0.78	0.56	0.20	0.37	0.43	0.86	0.47	0.46
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 95												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Volume shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



12-14-2023
BA Group
Synchro 11 Report

HCM Signalized Intersection Capacity Analysis

Future Background (PM)

2032 Scenario 4

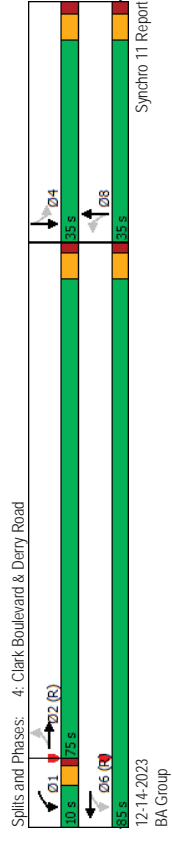
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2101	0	0	2162	24	0	10	0	80	7	169
Future Volume (vph)	36	2101	0	0	2162	24	0	10	0	80	7	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	3533	3533	1863	1863	1770	1995	1863	1770	1995	1863
Flt Permitted	0.04	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	0.75	1.00	1.00
Satd. Flow (perm)	83	3539	3533	3533	1863	1863	1398	1595	1863	1398	1595	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	2284	0	0	2350	26	0	11	0	87	8	184
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	7
Lane Group Flow (vph)	39	2284	0	0	2375	0	0	11	0	87	185	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6		8					4
Permitted Phases	2			6			8					4
Actuated Green, G (s)	89.8	89.8		89.8			19.2			19.2		19.2
Effective Green, g (s)	89.8	89.8		89.8			19.2			19.2		19.2
Actuated g/C Ratio	0.75	0.75		0.75			0.16			0.16		0.16
Clearance Time (s)	5.3	5.3		5.3			5.7			5.7		5.7
Vehicle Extension (s)	3.0	3.0		3.0			3.0			3.0		3.0
Lane Grp Cap (vph)	62	2648		2643			298			223		255
v/s Ratio Prot	0.65			c0.67			0.01			c0.12		
v/s Ratio Perm	0.47			0.39			0.04			0.06		
v/c Ratio	0.63	0.86		0.90			0.04			0.39		0.73
Uniform Delay, d1	7.2	10.7		11.6			42.6			45.2		47.9
Progression Factor	1.77	1.77		1.00			1.00			1.00		1.00
Incremental Delay, d2	4.3	0.4		5.4			0.1			1.1		9.9
Delay (s)	17.0	19.4		17.0			42.6			46.3		57.8
Level of Service	B	B		B			D			D		F
Approach Delay (s)	19.3			17.0			42.6			54.2		
Approach LOS	B			B			D			D		
Intersection Summary												
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	0.90	C										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	80.8%	ICU Level of Service										
Analysis Period (min)	15	D										
c. Critical Lane Group												

12-14-2023
BA Group
Synchro 11 Report

Future Background (PM)

2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2101	0	0	2162	24	0	10	0	80	7	169
Future Volume (vph)	36	2101	0	0	2162	24	0	10	0	80	7	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	3533	3533	1863	1863	1770	1995	1863	1770	1995	1863
Flt Permitted	0.04	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	0.75	1.00	1.00
Satd. Flow (perm)	83	3539	3533	3533	1863	1863	1398	1595	1863	1398	1595	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	2284	0	0	2350	26	0	11	0	87	8	184
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	7
Lane Group Flow (vph)	39	2284	0	0	2375	0	0	11	0	87	185	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6		8					4
Permitted Phases	2			6			8					4
Actuated Green, G (s)	89.8	89.8		89.8			19.2			19.2		19.2
Effective Green, g (s)	89.8	89.8		89.8			19.2			19.2		19.2
Actuated g/C Ratio	0.75	0.75		0.75			0.16			0.16		0.16
Clearance Time (s)	5.3	5.3		5.3			5.7			5.7		5.7
Vehicle Extension (s)	3.0	3.0		3.0			3.0			3.0		3.0
Lane Grp Cap (vph)	62	2648		2643			298			223		255
v/s Ratio Prot	0.65			c0.67			0.01			c0.12		
v/s Ratio Perm	0.47			0.39			0.04			0.06		
v/c Ratio	0.63	0.86		0.90			0.04			0.39		0.73
Uniform Delay, d1	7.2	10.7		11.6			42.6			45.2		47.9
Progression Factor	1.77	1.77		1.00			1.00			1.00		1.00
Incremental Delay, d2	4.3	0.4		5.4			0.1			1.1		9.9
Delay (s)	17.0	19.4		17.0			42.6			46.3		57.8
Level of Service	B	B		B			D			D		F
Approach Delay (s)	19.3			17.0			42.6			54.2		
Approach LOS	B			B			D			D		
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 140												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
m. Volume for 95th percentile queue is metered by upstream signal.												



12-14-2023
BA Group
Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
5: Fifth Line & Clark Boulevard

Future Background (PM)
2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	39	10	10	0	7	0	4	477	0	0	478
Future Volume (vph)	39	10	10	0	7	0	4	477	0	0	478
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1723	1863	1770	1863	1770	1863	1856	1856	1856	1856
Flt Permitted	0.75	1.00	1.00	1.00	1.00	0.45	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1406	1723	1863	1863	831	1863	1863	1856	1856	1856	1856
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	11	11	0	8	0	4	518	0	0	520
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	42	12	0	0	8	0	4	518	0	0	531
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2			6			8			4	
Permitted Phases	2	6		6	8		8	4		4	
Actuated Green, G (s)	5.3	5.3	5.3	5.3	26.4	26.4	26.4	26.4		26.4	
Effective Green, g (s)	5.3	5.3	5.3	5.3	26.4	26.4	26.4	26.4		26.4	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.62	0.62	0.62	0.62		0.62	
Clearance Time (s)	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7		5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	174	213		231	513	1151				1147	
v/s Ratio Prot	0.01			0.00		0.28				c0.29	
v/s Ratio	0.24	0.06	0.03	0.03	0.01	0.45				0.46	
Uniform Delay, d1	16.9	16.5	16.4	16.4	3.1	4.3				4.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	
Incremental Delay, d2	0.7	0.1	0.1	0.0	0.0	0.3				0.3	
Delay (s)	17.6	16.6	16.5	16.5	3.1	4.6				4.7	
Level of Service	B	B	B	B	A	A				A	
Approach Delay (s)	17.3		16.5		4.6					4.7	
Approach LOS	B		B		A					A	
Intersection Summary											
HCM 2000 Control Delay	5.4										
HCM 2000 Volume to Capacity ratio	0.43										
Actuated Cycle Length (s)	42.7										
Intersection Capacity Utilization	43.8%										
Analysis Period (min)	15										
c Critical Lane Group	15										

12-14-2023
BA Group

Queues
5: Fifth Line & Clark Boulevard

Future Background (PM)
2032 Scenario 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	39	10	10	0	7	0	4	477	0	0	478
Future Volume (vph)	39	10	10	0	7	0	4	477	0	0	478
Lane Group Flow (vph)	42	22	8	8	4	518	532				
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2			6			8			4	
Permitted Phases	2	6		6	8		8	4		4	
Detector Phase	2	2		6			8			4	
Switch Phase	2	2		6			8			4	
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	
Minimum Split (s)	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7		34.7	
Total Split (s)	35.0	35.0	35.0	35.0	85.0	85.0	85.0	85.0		85.0	
Total Split (%)	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%		70.8%	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7		3.7	
All-Red Time (s)	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7		5.7	
Lead/Lag											
Lead-Lag Optimize?	None										
Recall Mode	None										
v/c Ratio	0.12	0.05	0.02	0.01	0.38	0.40				0.40	
Control Delay	14.6	10.5	13.3	5.2	6.6	6.7				6.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0				0.0	
Total Delay	14.6	10.5	13.3	5.2	6.6	6.7				6.7	
Queue Length 50th (m)	3.4	0.9	0.6	0.1	23.9	24.8				24.8	
Queue Length 95th (m)	8.1	4.5	2.8	1.1	44.6	46.2				46.2	
Internal Link Dist (m)	204.0										
Turn Bay Length (m)	35.0										
Base Capacity (vph)	1068	1311	1415	831	1863	1857				1857	
Starvation Cap Reductn	0	0	0	0	0	0				0	
Spillback Cap Reductn	0	0	0	0	0	0				0	
Storage Cap Reductn	0	0	0	0	0	0				0	
Reduced v/c Ratio	0.04	0.02	0.01	0.00	0.28	0.29				0.29	
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 40.4											
Natural Cycle: 70											
Control Type: Actuated-Uncoordinated											
Spills and Phases: 5: Fifth Line & Clark Boulevard											

12-14-2023
BA Group

HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road

Future Total (AM)
 2032 Scenario 4

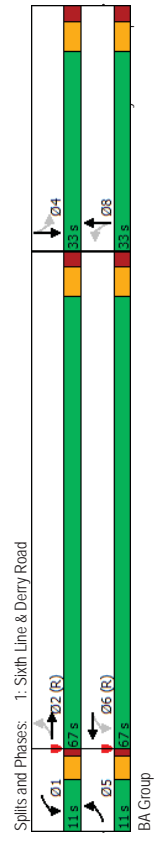
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB
Traffic Volume (vph)	165	2217	169	25	837	41	92	173	32	46	142	136
Future Volume (vph)	165	2217	169	25	837	41	92	173	32	46	142	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	3161	1805	2929	1805	3498	1258	3305				
Flt Permitted	0.25	1.00	0.06	1.00	0.48	1.00	0.61	1.00				
Satd. Flow (perm)	465	3161	109	2929	907	3498	808	3305				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	176	2359	180	27	890	44	98	184	34	49	151	145
RTOR Reduction (vph)	0	4	0	0	3	0	0	15	0	0	124	0
Lane Group Flow (vph)	176	2535	0	27	931	0	98	203	0	49	172	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pl	NA	pm+pl	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	5	2	1	6	6	8	8	8	8	4	4	4
Permitted Phases	2	74.0	73.9	69.7	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3
Effective Green, G (s)	82.2	74.0	73.9	69.7	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3
Actuated Green, g (s)	82.2	74.0	73.9	69.7	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3
Actuated g/C Ratio	0.74	0.67	0.67	0.63	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	443	2107	136	1839	133	513	118	485				
v/s Ratio Prot	c0.03	c0.80	0.01	0.32								
v/s Ratio Perm	0.26	0.12	0.12	c0.11								
v/c Ratio	0.40	1.20	0.20	0.51	0.74	0.40	0.42	0.36				
Uniform Delay, d1	5.3	18.5	26.0	11.3	45.3	42.9	43.0	42.6				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	0.6	96.3	0.7	1.0	19.0	0.5	2.4	0.4				
Delay (s)	5.9	114.8	26.7	12.3	64.3	43.4	45.4	43.1				
Level of Service	A	F	C	B	E	D	D	D				
Approach Delay (s)	107.7		12.7		49.9		43.4					
Approach LOS	F		B		D		D					
Intersection Summary												
HCM 2000 Control Delay	77.3	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	1.09	E										
Actuated Cycle Length (s)	111.0	Sum of lost time (s)										
Intersection Capacity Utilization	108.2%	ICU Level of Service										
Analysis Period (min)	15	G										
c Critical Lane Group												

12-14-2023
 BA Group
 Synchro 11 Report

Queues
 1: Sixth Line & Derry Road

Future Total (AM)
 2032 Scenario 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB	EB
Traffic Volume (vph)	165	2217	169	25	837	41	92	173	32	46	142	136
Future Volume (vph)	165	2217	169	25	837	41	92	173	32	46	142	136
Lane Group Flow (vph)	176	2539	27	934	98	218	49	296				
Turn Type	pm+pl	NA	pm+pl	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	5	2	1	6	6	8	8	8	8	4	4	4
Detector Phase	5	2	1	6	6	8	8	8	8	4	4	4
Switch Phase	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Minimum Split (s)	11.0	67.0	11.0	67.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (%)	9.9%	60.4%	9.9%	60.4%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.39	1.18	0.15	0.51	0.74	0.41	0.42	0.49				
Control Delay	6.9	106.3	6.4	13.4	74.7	40.5	51.7	23.5				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Delay	6.9	106.3	6.4	13.4	74.7	40.5	51.7	23.5				
Queue Length 50th (m)	8.8	-382.3	1.2	55.5	21.7	22.0	10.3	16.4				
Queue Length 95th (m)	19.8	#454.2	4.4	90.3	38.4	31.4	21.6	27.7				
Internal Link Dist (m)	475.1		256.2		211.8		201.7					
Turn Bay Length (m)	120.0		100.0		45.0		30.0					
Base Capacity (vph)	448	2153	183	1841	217	855	194	905				
Starvation Cap Reductn	0	0	0	0	0	0	0	0				
Spillback Cap Reductn	0	0	0	0	0	0	0	0				
Storage Cap Reductn	0	0	0	0	0	0	0	0				
Reduced v/c Ratio	0.39	1.18	0.15	0.51	0.45	0.25	0.25	0.33				
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												



2: Fifth Line & Derry Road

Future Total (AM)
2032 Scenario 4

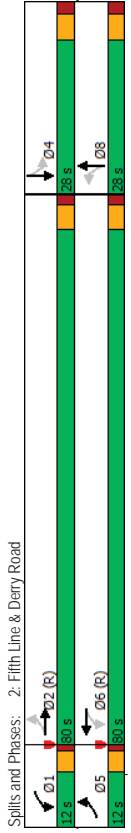
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																				
Lane Configurations	92	2368	104	193	799	262	100	289	106	111	72	32																				
Traffic Volume (vph)	92	2368	104	193	799	262	100	289	106	111	72	32																				
Future Volume (vph)	92	2368	104	193	799	262	100	289	106	111	72	32																				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900																				
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7																				
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95																				
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00																				
Satd. Flow (prot)	1600	3264	1587	3114	1698	3207	1501	3253	1501	3253	1501	3253																				
Flt Permitted	0.20	1.00	0.05	1.00	0.68	1.00	0.33	1.00	0.33	1.00	0.33	1.00																				
Satd. Flow (perm)	332	3264	89	3114	1219	3207	514	3253	514	3253	514	3253																				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94																				
Adj. Flow (vph)	98	2519	111	205	850	279	106	307	113	118	77	34																				
RTOR Reduction (vph)	0	3	0	0	26	0	0	32	0	0	0	28																				
Lane Group Flow (vph)	98	2627	0	205	1103	0	106	388	0	118	83	0																				
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	14%																				
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	2																				
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA	NA	NA	Perm	NA	NA																				
Protected Phases	5	2	1	6	6	8	8	8	8	4	4	4																				
Permitted Phases	2	82.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3	22.3																				
Effective Green, G (s)	82.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3																				
Actuated Green, g (s)	0.69	0.62	0.69	0.63	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19																				
Actuated g/C Ratio	0.0036	0.0032	0.0036	0.0033	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010																				
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7																				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0																				
Lane Grip Cap (vph)	306	2031	161	1951	226	595	161	1951	226	595	161	1951																				
v/s Ratio Prot	0.02	0.081	0.02	0.081	0.02	0.081	0.02	0.081	0.02	0.081	0.02	0.081																				
v/s Ratio Perm	0.32	1.29	0.32	1.29	0.32	1.29	0.32	1.29	0.32	1.29	0.32	1.29																				
Uniform Delay, d1	7.8	22.6	41.2	13.0	43.6	45.3	48.9	40.8	48.9	40.8	48.9	40.8																				
Progression Factor	0.65	0.67	0.65	0.67	0.65	0.67	0.65	0.67	0.65	0.67	0.65	0.67																				
Incremental Delay, d2	0.4	134.6	161.3	1.2	1.5	2.6	170.9	0.1	170.9	0.1	170.9	0.1																				
Delay (s)	5.5	149.7	202.0	12.8	45.1	47.8	219.8	40.9	219.8	40.9	219.8	40.9																				
Level of Service	A	F	F	B	D	D	F	D	F	F	D	D																				
Approach Delay (s)	144.5	F	41.9	D	47.3	D	133.1	D	47.3	D	133.1	D																				
Approach LOS	F	F	D	D	D	D	F	D	D	F	D	F																				
Intersection Summary	<table border="1"> <tr> <td>HCM 2000 Control Delay</td> <td>104.9</td> <td>HCM 2000 Level of Service</td> <td>F</td> </tr> <tr> <td>HCM 2000 Volume to Capacity ratio</td> <td>1.28</td> <td></td> <td></td> </tr> <tr> <td>Actuated Cycle Length (s)</td> <td>120.0</td> <td>Sum of lost time (s)</td> <td>15.0</td> </tr> <tr> <td>Intersection Capacity Utilization</td> <td>116.4%</td> <td>ICU Level of Service</td> <td>H</td> </tr> <tr> <td>Analysis Period (min)</td> <td>15</td> <td></td> <td></td> </tr> </table>												HCM 2000 Control Delay	104.9	HCM 2000 Level of Service	F	HCM 2000 Volume to Capacity ratio	1.28			Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	Intersection Capacity Utilization	116.4%	ICU Level of Service	H	Analysis Period (min)	15		
HCM 2000 Control Delay	104.9	HCM 2000 Level of Service	F																													
HCM 2000 Volume to Capacity ratio	1.28																															
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0																													
Intersection Capacity Utilization	116.4%	ICU Level of Service	H																													
Analysis Period (min)	15																															
c. Critical Lane Group																																

12-14-2023
BA Group
Synchro 11 Report

2: Fifth Line & Derry Road

Future Total (AM)
2032 Scenario 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																				
Lane Configurations	92	2368	104	193	799	262	100	289	106	111	72	32																				
Traffic Volume (vph)	92	2368	104	193	799	262	100	289	106	111	72	32																				
Future Volume (vph)	92	2368	104	193	799	262	100	289	106	111	72	32																				
Lane Group Flow (vph)	98	2630	205	1129	106	420	118	111	111	111	72	32																				
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA	NA	NA	Perm	NA	NA																				
Protected Phases	5	2	1	6	6	8	8	8	8	4	4	4																				
Permitted Phases	2	82.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3	22.3																				
Effective Green, G (s)	82.2	74.7	83.2	75.2	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3																				
Actuated Green, g (s)	0.69	0.62	0.69	0.63	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19																				
Actuated g/C Ratio	0.0036	0.0032	0.0036	0.0033	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010																				
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7																				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0																				
Lane Grip Cap (vph)	306	2031	161	1951	226	595	161	1951	226	595	161	1951																				
v/s Ratio Prot	0.02	0.081	0.02	0.081	0.02	0.081	0.02	0.081	0.02	0.081	0.02	0.081																				
v/s Ratio Perm	0.32	1.29	0.32	1.29	0.32	1.29	0.32	1.29	0.32	1.29	0.32	1.29																				
Uniform Delay, d1	7.8	22.6	41.2	13.0	43.6	45.3	48.9	40.8	48.9	40.8	48.9	40.8																				
Progression Factor	0.65	0.67	0.65	0.67	0.65	0.67	0.65	0.67	0.65	0.67	0.65	0.67																				
Incremental Delay, d2	0.4	134.6	161.3	1.2	1.5	2.6	170.9	0.1	170.9	0.1	170.9	0.1																				
Delay (s)	5.5	149.7	202.0	12.8	45.1	47.8	219.8	40.9	219.8	40.9	219.8	40.9																				
Level of Service	A	F	F	B	D	D	F	D	F	F	D	D																				
Approach Delay (s)	144.5	F	41.9	D	47.3	D	133.1	D	47.3	D	133.1	D																				
Approach LOS	F	F	D	D	D	D	F	D	D	F	D	F																				
Intersection Summary	<table border="1"> <tr> <td>HCM 2000 Control Delay</td> <td>104.9</td> <td>HCM 2000 Level of Service</td> <td>F</td> </tr> <tr> <td>HCM 2000 Volume to Capacity ratio</td> <td>1.28</td> <td></td> <td></td> </tr> <tr> <td>Actuated Cycle Length (s)</td> <td>120.0</td> <td>Sum of lost time (s)</td> <td>15.0</td> </tr> <tr> <td>Intersection Capacity Utilization</td> <td>116.4%</td> <td>ICU Level of Service</td> <td>H</td> </tr> <tr> <td>Analysis Period (min)</td> <td>15</td> <td></td> <td></td> </tr> </table>												HCM 2000 Control Delay	104.9	HCM 2000 Level of Service	F	HCM 2000 Volume to Capacity ratio	1.28			Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0	Intersection Capacity Utilization	116.4%	ICU Level of Service	H	Analysis Period (min)	15		
HCM 2000 Control Delay	104.9	HCM 2000 Level of Service	F																													
HCM 2000 Volume to Capacity ratio	1.28																															
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0																													
Intersection Capacity Utilization	116.4%	ICU Level of Service	H																													
Analysis Period (min)	15																															
c. Critical Lane Group																																



HCM Signalized Intersection Capacity Analysis

3. James Snow Parkway & Derry Road

2032 Scenario 4

Future Total (AM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	W	W	W	W	W	W	W	W	W	W	W	W
Traffic Volume (vph)	206	1895	33	76	608	202	29	330	220	394	459	221
Future Volume (vph)	206	1895	33	76	608	202	29	330	220	394	459	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7
Lane Util. Factor	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	0.98
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	5006	1562	1738	4828	1516	1802	4668	1586	1616	4489	1403
Flt Permitted	0.95	1.00	1.00	0.98	1.00	1.00	0.47	1.00	1.00	0.98	1.00	1.00
Satd. Flow (perm)	3399	5006	1562	148	4828	1516	899	4668	1586	643	4489	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	210	1934	34	78	620	206	30	337	224	402	468	226
RTOR Reduction (vph)	0	0	18	0	0	121	0	0	152	0	0	162
Lane Group Flow (vph)	210	1934	16	78	620	85	30	337	72	402	468	64
Conf. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	7	4	7	4	4
Permitted Phases	5	2	2	1	6	3	8	8	8	8	8	8
Actuated Green, G (s)	12.7	55.4	55.4	56.3	49.5	49.5	20.4	15.8	15.8	42.8	34.2	34.2
Effective Green, g (s)	12.7	55.4	55.4	56.3	49.5	49.5	20.4	15.8	15.8	42.8	34.2	34.2
Actuated G/C Ratio	0.11	0.46	0.46	0.47	0.41	0.41	0.17	0.13	0.13	0.36	0.29	0.29
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	4.0	5.7	4.0	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	359	2311	721	159	1991	625	187	614	208	415	1279	399
v/s Ratio Prot	c0.06	c0.39	0.01	0.03	0.13	0.06	0.01	0.07	0.05	c0.19	0.10	0.05
v/s Ratio Perm	0.58	0.84	0.02	0.49	0.31	0.14	0.16	0.55	0.35	0.97	0.37	0.16
Uniform Delay, d1	51.1	28.3	17.6	22.6	23.8	21.9	42.0	48.8	47.4	34.1	34.2	32.2
Progression Factor	1.00	1.00	1.00	0.82	0.82	2.19	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	3.8	0.1	2.0	0.3	0.4	0.4	1.0	1.0	35.6	0.2	0.2
Delay (s)	53.6	32.1	17.6	20.7	19.8	48.5	42.4	49.8	48.4	69.7	34.4	32.3
Level of Service	D	C	B	C	B	D	D	D	D	D	E	C
Approach Delay (s)	34.0			26.4				48.9			46.9	
Approach LOS	C			C				D			D	
Intersection Summary												
HCM 2000 Control Delay	37.4											
HCM 2000 Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	120.0											
Sum of lost time (s)	19.0											
Intersection Capacity Utilization	88.4%											
Analysis Period (min)	15											
Critical Lane Group	E											

12-14-2023
BA Group

Synchro 11 Report

Queues

3. James Snow Parkway & Derry Road

2032 Scenario 4

Future Total (AM)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	W	W	W	W	W	W	W	W	W	W	W	W
Traffic Volume (vph)	206	1895	33	76	608	202	29	330	220	394	459	221
Future Volume (vph)	206	1895	33	76	608	202	29	330	220	394	459	221
Lane Group Flow (vph)	210	1934	34	78	620	206	30	337	224	402	468	226
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	7	4	7	4	4
Permitted Phases	5	2	2	1	6	3	8	8	8	8	8	8
Detector Phase	5	2	2	1	6	3	8	8	8	8	8	8
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	47.0	47.0	11.0	41.0	41.0	27.0	35.0	35.0	27.0	35.0	35.0
Total Split (%)	14.2%	39.2%	39.2%	9.2%	34.2%	34.2%	22.5%	29.2%	29.2%	22.5%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.58	0.80	0.04	0.43	0.30	0.27	0.13	0.61	0.66	0.97	0.37	0.40
Control Delay	57.6	30.8	0.1	18.6	19.7	8.3	27.0	54.9	22.5	71.3	35.8	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	30.8	0.1	18.6	19.7	8.3	27.0	54.9	22.5	71.3	35.8	6.7
Queue Length 50th (m)	25.9	148.2	0.0	7.4	39.7	10.6	4.8	29.5	11.3	84.8	35.7	0.0
Queue Length 95th (m)	37.8	201.9	0.0	18.3	57.3	33.1	11.0	39.0	36.7	123.8	45.5	19.4
Internal Link Dist (m)	156.1											
Turn Bay Length (m)	100.0											
Base Capacity (vph)	392	2412	802	183	2057	764	464	1139	519	416	1279	561
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.80	0.04	0.43	0.30	0.27	0.06	0.30	0.43	0.97	0.37	0.40
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 105												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Volume shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												
Spills and Phases: 3.-James Snow Parkway & Derry Road												

12-14-2023
BA Group

Synchro 11 Report

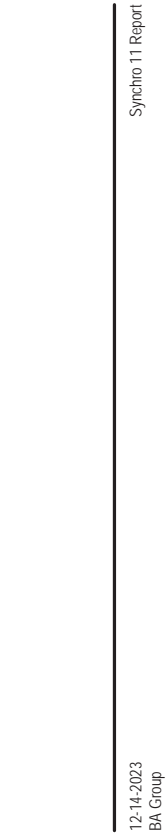
4: Clark Boulevard & Derry Road
2032 Scenario 4

4: Clark Boulevard & Derry Road
2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations											
Traffic Volume (vph)	91	2425	118	87	967	91	42	7	19	26	10
Future Volume (vph)	91	2425	118	87	967	91	42	7	19	26	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3515	1770	3494	1770	1660	1770	1660	1770	1636	1636
Flt Permitted	0.25	1.00	0.04	1.00	0.72	1.00	0.74	1.00	0.74	1.00	0.74
Satd. Flow (perm)	460	3515	81	3494	1340	1660	1375	1636	1375	1636	1636
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	2636	128	95	1051	99	46	8	21	28	11
RTOR Reduction (vph)	0	2	0	0	3	0	0	19	0	0	43
Lane Group Flow (vph)	99	2762	0	95	1147	0	46	10	0	28	15
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	1	6	6	8	8	8	8	4	4
Permitted Phases	2	2	6	6	6	8	8	8	8	4	4
Actual Green, G (s)	87.9	87.9	100.0	100.0	100.0	90	90	90	90	90	90
Effective Green, g (s)	87.9	87.9	100.0	100.0	100.0	90	90	90	90	90	90
Actuated g/C Ratio	0.73	0.73	0.83	0.83	0.83	0.08	0.08	0.08	0.08	0.08	0.08
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	336	2574	181	2911	100	124	103	122	103	122	122
v/s Ratio Prot	c0.79	c0.04	0.33	c0.04	0.33	c0.03	0.02	0.02	0.02	0.02	0.01
v/s Ratio Perm	0.29	1.07	0.52	0.39	0.46	0.08	0.27	0.12	0.27	0.12	0.12
Uniform Delay, d1	5.5	16.0	38.1	2.5	53.2	51.6	52.4	51.8	52.4	51.8	51.8
Progression Factor	1.76	1.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	0.4	3.3	0.3	3.3	0.3	1.4	0.4	1.4	0.4	0.4
Delay (s)	9.9	62.5	40.8	2.9	56.5	51.9	53.8	52.2	53.8	52.2	52.2
Level of Service	A	E	D	A	E	D	D	D	D	D	D
Approach Delay (s)	60.6	58	54.7	58	54.7	54.7	52.8	52.8	54.7	52.8	52.8
Approach LOS	E	E	A	E	A	D	D	D	D	D	D
Intersection Summary											
HCM 2000 Control Delay	44.4	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity ratio	0.98										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)									
Intersection Capacity Utilization	93.8%	ICU Level of Service									
Analysis Period (min)	15										
c Critical Lane Group											

12-14-2023
BA Group
Synchro 11 Report

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	91	2425	87	967	42	7	19	26
Future Volume (vph)	91	2425	87	967	42	7	19	26
Lane Group Flow (vph)	99	2764	95	1150	46	29	28	58
Turn Type	Perm	NA	pm+pt	INA	Perm	INA	Perm	NA
Protected Phases	2	2	1	6	6	8	8	4
Detector Phase	2	2	1	6	6	8	8	4
Switch Phase								
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	None	None	None	None
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None
v/c Ratio	0.29	1.06	0.52	0.39	0.38	0.17	0.22	0.30
Control Delay	13.2	55.6	26.5	3.1	59.9	26.7	54.3	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	55.6	26.5	3.1	59.9	26.7	54.3	22.4
Queue Length 50th (m)	12.3	-396.6	5.9	29.5	11.0	1.9	6.6	2.6
Queue Length 95th (m)	m12.3	m255.8	24.4	45.4	23.0	11.3	15.9	15.6
Internal Link Dist (m)	336.0	475.1	56.4	313.3	400	400	313.3	400
Turn Bay Length (m)	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Base Capacity (vph)	341	2609	183	2976	326	421	335	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	1.06	0.52	0.39	0.14	0.07	0.08	0.13
Intersection Summary								
Cycle Length: 120								
Actuated Cycle Length: 120								
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green								
Natural Cycle: 150								
Control Type: Actuated-Coordinated								
- Volume exceeds capacity, queue is theoretically infinite.								
Queue shown is maximum after two cycles.								
m Volume for 95th percentile queue is metered by upstream signal.								



12-14-2023
BA Group
Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
5: Fifth Line & Clark Boulevard

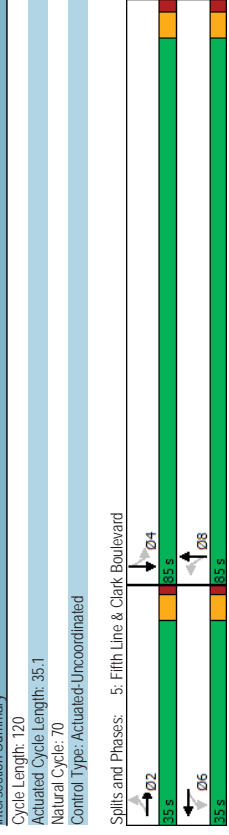
Future Total (AM)
2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Traffic Volume (vph)	10	9	3	5	12	0	10	485	24	0	332
Future Volume (vph)	10	9	3	5	12	0	10	485	24	0	332
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FRT	1.00	0.97	1.00	1.00	1.00	1.00	0.99	0.99	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1798	1770	1863	1770	1863	1770	1850	1770	1850	1835
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	0.53	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1863	1798	1863	1863	1863	1863	980	1850	1863	1850	1835
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	10	3	5	13	0	11	527	26	0	361
RTOR Reduction (vph)	0	3	0	0	0	0	0	1	0	0	3
Lane Group Flow (vph)	11	10	0	5	13	0	11	552	0	0	398
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	6	6	6	6	6	8	8	8	4	4
Permitted Phases	2	6	6	6	6	6	8	8	8	4	4
Actuated Green, G (s)	1.5	1.5	1.5	1.5	1.5	1.5	26.9	26.9	26.9	26.9	26.9
Effective Green, g (s)	1.5	1.5	1.5	1.5	1.5	1.5	26.9	26.9	26.9	26.9	26.9
Actuated g/C Ratio	0.04	0.04	0.04	0.04	0.04	0.04	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	70	68	70	70	70	669	1263	1263	1263	1252	1252
v/s Ratio Prot	0.01	0.01	0.01	0.01	0.01	0.01	c0.30	c0.30	c0.30	0.22	0.22
v/s Ratio Perm	0.16	0.15	0.07	0.19	0.02	0.44	0.02	0.44	0.02	0.32	0.32
Uniform Delay, d1	18.3	18.3	18.3	18.4	2.0	2.8	2.0	2.8	2.0	2.5	2.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	1.0	0.4	1.3	0.0	0.2	0.0	0.2	0.0	0.1	0.1
Delay (s)	19.4	19.3	18.7	19.6	2.0	3.1	2.0	3.1	2.0	2.7	2.7
Level of Service	B	B	B	B	B	B	A	A	A	A	A
Approach Delay (s)	19.4	19.4	19.4	19.4	19.4	19.4	3.0	3.0	3.0	2.7	2.7
Approach LOS	B	B	B	B	B	B	A	A	A	A	A
Intersection Summary											
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity ratio	0.42	A									
Actuated Cycle Length (s)	39.4	Sum of lost time (s)									
Intersection Capacity Utilization	44.5%	ICU Level of Service									
Analysis Period (min)	15	A									
c. Critical Lane Group											

Queues
5: Fifth Line & Clark Boulevard

Future Total (AM)
2032 Scenario 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Traffic Volume (vph)	10	9	3	5	12	0	10	485	24	0	332
Future Volume (vph)	10	9	3	5	12	0	10	485	24	0	332
Lane Group Flow (vph)	11	10	0	5	13	0	11	553	0	0	401
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	6	6	6	6	6	8	8	8	4	4
Permitted Phases	2	6	6	6	6	6	8	8	8	4	4
Detector Phase	2	6	6	6	6	6	8	8	8	4	4
Switch Phase	2	6	6	6	6	6	8	8	8	4	4
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.33	0.33	0.24	0.24
Control Delay	12.2	11.2	12.2	12.2	12.2	12.2	2.9	3.1	2.6	2.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	11.2	12.2	12.2	12.2	12.2	2.9	3.1	2.6	2.6	2.6
Queue Length 50th (m)	0.4	0.4	0.2	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	3.6	3.8	2.3	4.0	1.9	4.7	4.0	4.0	3.0	3.0	3.0
Internal Link Dist (m)	204.0										
Turn Bay Length (m)	35.0										
Base Capacity (vph)	1616	1560	1616	1616	1616	1616	980	1850	1850	1835	1835
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.00	0.01	0.01	0.01	0.30	0.30	0.22	0.22	0.22
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 35.1											
Natural Cycle: 70											
Control Type: Actuated-Uncoordinated											



HCM Unsignalized Intersection Capacity Analysis
 10: Clark Boulevard & Anatolia Building 1 North Access/Anatolia Building 2 North Access Scenario 4

HCM Unsignalized Intersection Capacity Analysis
 9: Sixth Line & Anatolia Building 3 East Access Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	2	0	1	2	0	11	1	55	4	34	179	2
Future Volume (Veh/h)	2	0	1	2	0	11	1	55	4	34	179	2
Sign Control	Stop	0%	Stop	0%	Stop	0%	Free	0%	Free	0%	Free	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	1	2	0	12	1	60	4	37	195	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)							None	None	None	None	None	None
Median type												
Median storage (veh)												
Upstream signal (m)												80
pX platoon unblocked												
VC, conflicting volume	346	336	196	335	335	62	197			64		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol	346	336	196	335	335	62	197			64		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	99	100			98		
pM capacity (veh/h)	590	570	845	606	571	1003	1376			1538		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volumes Total	3	14	65	234								
Volume Left	2	2	1	37								
Volume Right	1	12	4	2								
cSH	656	917	1376	1538								
Volumes to Capacity	0.00	0.02	0.00	0.02								
Queue Length 95th (m)	0.1	0.4	0.0	0.6								
Control Delay (s)	10.5	9.0	0.1	1.3								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.5	9.0	0.1	1.3								
Approach LOS	B	A	A	A								
Intersection Summary												
Average Delay	1.5											
Intersection Capacity Utilization	28.1%											
ICU Level of Service	A											
Analysis Period (min)	15											

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	7	1	4	290	314	22
Future Volume (Veh/h)	7	1	4	290	314	22
Sign Control	Stop	0%	Free	0%	Free	0%
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	1	4	315	341	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						236
pX platoon unblocked						
VC, conflicting volume	518	182	365			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	518	182	365			
IC, single (s)	6.8	6.9	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
pM capacity (veh/h)	485	829	1190			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volumes Total	9	109	210	227	138	
Volume Left	8	4	0	0	0	
Volume Right	1	0	0	0	24	
cSH	509	1190	1700	1700	1700	
Volumes to Capacity	0.02	0.00	0.12	0.13	0.08	
Queue Length 95th (m)	0.4	0.1	0.0	0.0	0.0	
Control Delay (s)	12.2	0.3	0.0	0.0	0.0	
Lane LOS	B	A	A	A	A	
Approach Delay (s)	12.2	0.1		0.0		
Approach LOS	B	A		A		
Intersection Summary						
Average Delay	0.2					
Intersection Capacity Utilization	20.8%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 12: Clark Boulevard & Anatolia Building 1 South Access

HCM Unsignalized Intersection Capacity Analysis
 11: Clark Boulevard & Anatolia Building 2 South Access

Future Total (AM)
 2032 Scenario 4

Future Total (AM)
 2032 Scenario 4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W					
Traffic Volume (veh/h)	38	3	15	18	14	130
Future Volume (Veh/h)	38	3	15	18	14	130
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	3	16	20	15	141
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	138	86	156			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	138	86	156			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)	3.5	3.3	2.2			
p0 queue free %	95	100	99			
CM capacity (veh/h)	846	973	1424			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	44	36	156			
Volume Left	41	16	0			
Volume Right	3	0	141			
CSH	854	1424	1700			
Volumes to Capacity	0.05	0.01	0.09			
Queue Length 95th (m)	1.3	0.3	0.0			
Control Delay (s)	9.4	3.4	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	9.4	3.4	0.0			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			2.3			A
Intersection Capacity Utilization			24.3%			ICU Level of Service
Analysis Period (min)			15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					
Traffic Volume (veh/h)	2	10	50	6	40	142
Future Volume (Veh/h)	2	10	50	6	40	142
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	11	54	7	43	154
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	298	58	61			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	298	58	61			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)	3.5	3.3	2.2			
p0 queue free %	100	99	97			
CM capacity (veh/h)	674	1009	1542			
Direction, Lane #	WB 1	NB 1	SB 1			
Volumes Total	13	61	197			
Volume Left	2	0	43			
Volume Right	11	7	0			
CSH	937	1700	1542			
Volumes to Capacity	0.01	0.04	0.03			
Queue Length 95th (m)	0.3	0.0	0.7			
Control Delay (s)	8.9	0.0	1.8			
Lane LOS	A	A	A			
Approach Delay (s)	8.9	0.0	1.8			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			1.7			A
Intersection Capacity Utilization			26.4%			ICU Level of Service
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
1: Sixth Line & Derry Road

Future Total (PM)
2032 Scenario 4

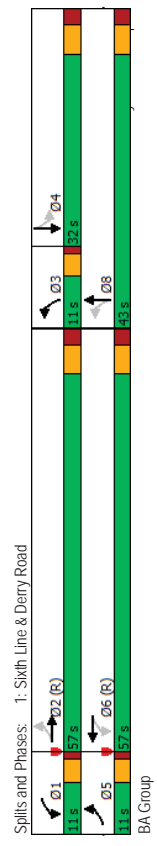
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	173	1944	98	34	1880	25	218	166	41	137	226
Traffic Volume (vph)	173	1944	98	34	1880	25	218	166	41	137	226
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.94	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1763	3171	1805	2966	1805	3468	1805	3468	1258	3354	3354
Flt Permitted	0.07	1.00	0.08	1.00	0.34	1.00	0.61	1.00	0.61	1.00	1.00
Satd. Flow (perm)	134	3171	148	2966	639	3468	813	3354	813	3354	3354
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow vph	184	2068	104	36	2000	27	232	177	44	146	240
RTOR Reduction (vph)	0	3	0	0	1	0	0	21	0	0	105
Lane Group Flow (vph)	184	2169	0	36	2026	0	232	200	0	146	294
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	NA
Protected Phases	5	2	1	6	3	8	8	8	4	4	4
Permitted Phases	2	64.7	56.5	55.6	51.4	33.8	33.8	33.8	22.8	22.8	22.8
Effective Green, G (s)	64.7	56.5	55.6	51.4	33.8	33.8	33.8	33.8	22.8	22.8	22.8
Actuated g/C Ratio	0.58	0.51	0.50	0.46	0.30	0.30	0.30	0.30	0.21	0.21	0.21
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	214	1614	136	1373	268	1056	166	688	166	688	688
v/s Ratio Prot	c0.07	c0.68	0.01	c0.68	c0.05	0.06	0.06	0.09	0.18	0.18	0.18
v/s Ratio Perm	0.43	0.86	1.34	0.26	1.48	0.87	0.87	0.87	0.88	0.88	0.88
v/c Ratio	31.0	27.2	24.4	29.8	35.2	28.5	28.5	28.5	42.8	38.4	38.4
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	27.3	159.0	1.0	218.0	24.0	0.1	37.2	0.4	37.2	0.4	0.4
Incremental Delay, d2	58.4	186.2	25.5	247.8	59.3	28.6	80.0	38.8	80.0	38.8	38.8
Delay (s)	E	F	C	F	E	C	E	D	E	D	D
Level of Service	E	F	C	F	E	C	E	D	E	D	D
Approach Delay (s)	F	176.3	243.9	F	44.3	D	49.9	D	49.9	D	D
Approach LOS	F	F	F	F	D	D	D	D	D	D	D
Intersection Summary											
HCM 2000 Control Delay	176.3 HCM 2000 Level of Service F										
HCM 2000 Volume to Capacity ratio	1.24										
Actuated Cycle Length (s)	111.0 Sum of lost time (s) 20.5										
Intersection Capacity Utilization	102.9% ICU Level of Service G										
Analysis Period (min)	15										
c Critical Lane Group											

12-14-2023
BA Group
Synchro 11 Report

Queues
1: Sixth Line & Derry Road

Future Total (PM)
2032 Scenario 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	173	1944	34	1880	218	166	41	137	226	149	
Traffic Volume (vph)	173	1944	34	1880	218	166	41	137	226	149	
Future Volume (vph)	184	2172	36	2027	232	221	146	399	399	399	
Lane Group Flow (vph)	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	
Turn Type	5	2	1	6	3	8	8	4	4	4	
Protected Phases	5	2	1	6	3	8	8	4	4	4	
Detector Phase	5	2	1	6	3	8	8	4	4	4	
Switch Phase	7.0	25.0	7.0	25.0	7.0	25.0	7.0	10.0	10.0	10.0	
Minimum Initial (s)	11.0	31.2	11.0	31.2	11.0	31.2	11.0	32.3	32.3	32.3	
Minimum Split (s)	11.0	57.0	11.0	57.0	11.0	57.0	11.0	43.0	32.0	32.0	
Total Split (s)	9.9%	51.4%	9.9%	51.4%	9.9%	51.4%	9.9%	38.7%	28.8%	28.8%	
Total Split (%)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	4.0	4.0	
Yellow Time (s)	1.0	2.2	1.0	2.2	1.0	2.2	1.0	2.3	2.3	2.3	
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lost Time Adjust (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	
Total Lost Time (s)	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead/Lag	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Lead-Lag Optimize?	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	
Recall Mode	0.86	1.31	0.19	1.47	0.83	0.21	0.87	0.50	0.87	0.50	
v/c Ratio	60.9	168.6	12.6	244.3	54.8	24.3	86.0	27.4	86.0	27.4	
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Delay	60.9	168.6	12.6	244.3	54.8	24.3	86.0	27.4	86.0	27.4	
Total Delay	-30.2	-364.6	3.4	-340.4	39.1	16.1	31.4	27.1	31.4	27.1	
Queue Length 50th (m)	#76.7	#409.5	7.9	#385.5	#72.0	25.6	#66.1	42.4	42.4	42.4	
Queue Length 95th (m)	475.1	256.2	211.8	201.7	201.7	201.7	201.7	201.7	201.7	201.7	
Internal Link Dist (m)	120.0	100.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Turn Bay Length (m)	213	1662	185	1375	281	1166	188	877	188	877	
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.86	1.31	0.19	1.47	0.83	0.19	0.78	0.45	0.78	0.45	
Intersection Summary											
Cycle Length: 111											
Actuated Cycle Length: 111											
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green											
Natural Cycle: 150											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											



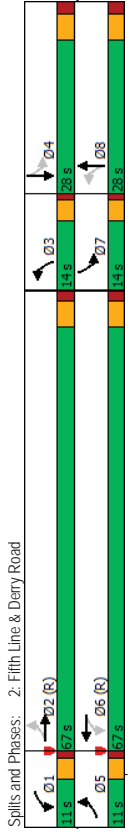
HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road
 Future Total (PM)
 2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	43	1829	86	99	2142	121	233	75	209	312	304
Future Volume (vph)	43	1829	86	99	2142	121	233	75	209	312	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1600	3262	1587	3298	1698	3053	1501	3340	1501	3340	1501
Flt Permitted	0.06	1.00	0.06	1.00	0.29	1.00	0.44	1.00	0.44	1.00	0.44
Satd. Flow (perm)	105	3262	100	3298	523	3053	700	3340	700	3340	700
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	1946	91	105	2279	129	248	80	222	332	323
RTOR Reduction (vph)	0	3	0	0	3	0	0	95	0	0	20
Lane Group Flow (vph)	46	2034	0	105	2405	0	248	207	0	332	388
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4	4
Permitted Phases	2	70.1	64.4	74.5	66.6	28.7	18.7	18.7	28.7	18.7	18.7
Effective Green, G (s)	70.1	64.4	74.5	66.6	28.7	18.7	18.7	18.7	28.7	18.7	18.7
Actuated g/C Ratio	0.58	0.54	0.62	0.55	0.24	0.16	0.24	0.16	0.24	0.16	0.16
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	132	1750	159	1830	223	475	234	520	234	520	234
v/s Ratio Prot	0.02	0.62	c0.04	c0.73	0.09	0.07	c0.12	0.12	c0.12	0.12	c0.12
v/s Ratio Perm	0.19	0.36	0.36	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.35	1.16	0.66	1.31	1.11	0.43	1.42	0.75	1.42	0.75	0.75
Uniform Delay, d1	26.3	27.8	27.9	26.7	43.0	45.9	43.9	48.4	43.9	48.4	48.4
Progression Factor	2.05	0.91	0.92	1.13	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	77.6	4.4	143.1	93.6	0.6	211.7	5.8	211.7	5.8	5.8
Delay (s)	55.0	102.8	30.1	173.2	136.6	46.5	255.6	54.1	255.6	54.1	54.1
Level of Service	D	F	C	F	F	D	F	D	F	D	D
Approach Delay (s)	101.7	F	167.2	F	87.1	F	144.5	F	144.5	F	F
Approach LOS	F	F	F	F	F	F	F	F	F	F	F
Intersection Summary											
HCM 2000 Control Delay	133.7	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity ratio	1.32	F									
Actuated Cycle Length (s)	120.0	Sum of lost time (s)									
Intersection Capacity Utilization	110.8%	ICU Level of Service									
Analysis Period (min)	15	H									
c Critical Lane Group											

12-14-2023
 BA Group
 Synchro 11 Report

Queues
 2: Fifth Line & Derry Road
 Future Total (PM)
 2032 Scenario 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	4	4	4	4	4	4	4	4	4	4	
Traffic Volume (vph)	43	1829	86	99	2142	121	233	75	209	312	
Future Volume (vph)	43	1829	86	99	2142	121	233	75	209	312	
Lane Group Flow (vph)	46	2037	105	2408	248	302	332	388	332	408	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	
Protected Phases	5	2	2	1	6	3	8	7	4	4	
Detector Phase	5	2	2	1	6	3	8	7	4	4	
Switch Phase	7.0	20.0	7.0	20.0	7.0	20.0	7.0	20.0	7.0	20.0	
Minimum Initial (s)	11.0	34.3	11.0	34.3	11.0	34.3	11.0	34.7	11.0	34.7	
Minimum Split (s)	11.0	67.0	11.0	67.0	14.0	28.0	14.0	28.0	14.0	28.0	
Total Split (s)	9.2%	55.8%	9.2%	55.8%	11.7%	23.3%	11.7%	23.3%	11.7%	23.3%	
Total Spill (%)	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	
Yellow Time (s)	1.0	1.6	1.0	1.6	1.0	1.6	1.0	2.0	1.0	2.0	
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lost Time Adjust (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	
v/c Ratio	0.30	1.16	0.65	1.30	1.08	0.53	1.36	0.76	1.36	0.76	
Control Delay	21.9	103.9	28.1	163.7	118.5	31.7	220.2	54.7	118.5	31.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.9	103.9	28.1	163.7	118.5	31.7	220.2	54.7	118.5	31.7	
Queue Length 50th (m)	2.9	-325.6	14.2	-410.6	-55.7	22.4	-75.7	48.4	-75.7	48.4	
Queue Length 95th (m)	m6.9	m359.6	m17.9	#465.8	#89.6	36.3	#161.7	64.4	36.3	#161.7	
Internal Link Dist (m)	170.5	124.7	170.5	124.7	170.5	124.7	170.5	124.7	170.5	124.7	
Turn Bay Length (m)	100.0	90.0	100.0	90.0	100.0	90.0	100.0	90.0	100.0	90.0	
Base Capacity (vph)	151	1751	161	1856	230	659	244	640	244	640	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.30	1.16	0.65	1.30	1.08	0.46	1.36	0.64	1.36	0.64	
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle: 145											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											



12-14-2023
BA Group

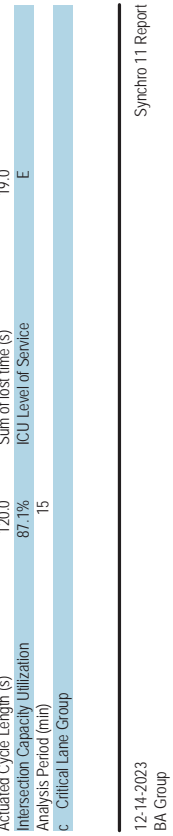
3. James Snow Parkway & Derry Road

HCM Signalized Intersection Capacity Analysis

Future Total (PM)

2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	W	W	W	W	W	W	W	W	W	W	W	W
Traffic Volume (vph)	212	1306	18	288	1525	518	96	410	227	392	539	254
Future Volume (vph)	212	1306	18	288	1525	518	96	410	227	392	539	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Flpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3399	5006	1562	1738	4828	1516	1802	4668	1586	1616	4489	1403
Flt Permitted	0.95	1.00	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00
Satd. Flow (perm)	3399	5006	1562	167	4828	1516	827	4668	1586	1616	4489	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	216	1333	18	294	1556	529	98	418	232	400	550	259
RTOR Reduction (vph)	0	12	0	0	245	0	0	156	0	0	0	191
Lane Group Flow (vph)	216	1333	6	294	1556	284	98	418	76	400	550	68
Confl. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	7	4	4	4	4
Permitted Phases	5	2	2	1	6	3	8	7	4	4	4	4
Actuated Green, G (s)	12.9	39.7	39.7	63.9	47.0	26.2	16.4	16.4	16.4	45.1	31.3	31.3
Effective Green, g (s)	12.9	39.7	39.7	63.9	47.0	26.2	16.4	16.4	16.4	45.1	31.3	31.3
Actuated g/C Ratio	0.11	0.33	0.33	0.53	0.39	0.22	0.14	0.14	0.14	0.38	0.26	0.26
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	365	1656	516	353	1890	593	260	637	216	420	1170	365
v/s Ratio Prot	0.06	0.27	0.00	c0.14	0.32	0.03	0.09	0.05	c0.20	0.12	0.05	0.05
v/s Ratio Perm	0.59	0.80	0.01	0.83	0.82	0.48	0.38	0.66	0.35	0.95	0.47	0.19
v/s Ratio	51.0	36.6	27.0	33.1	32.8	27.3	38.8	49.1	47.0	31.6	37.4	34.4
Uniform Delay, d1	1.00	1.00	1.00	0.79	0.87	1.57	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.6	4.3	0.0	1.6	0.4	0.3	0.9	2.4	1.0	31.8	0.3	0.2
Incremental Delay, d2	53.6	40.9	27.0	27.7	29.1	43.2	39.7	51.6	48.0	63.3	37.7	34.7
Delay (s)	D	D	C	C	C	D	D	D	D	D	E	D
Level of Service	D	D	C	C	C	D	D	D	D	D	E	D
Approach Delay (s)	42.5			32.0			48.9				45.5	
Approach LOS	D			C			D				D	
Intersection Summary												
HCM 2000 Control Delay	39.7 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	0.93											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	87.1% ICU Level of Service											
Analysis Period (min)	15											
Critical Lane Group	c											



12-14-2023
BA Group

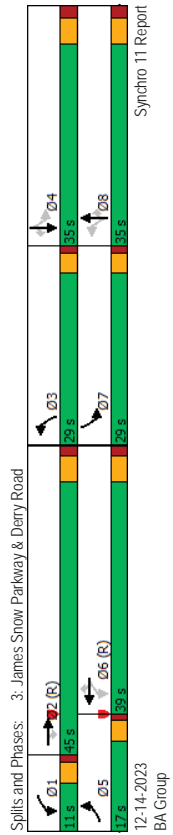
3. James Snow Parkway & Derry Road

Queues

Future Total (PM)

2032 Scenario 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	W	W	W	W	W	W	W	W	W	W	W	W
Traffic Volume (vph)	212	1306	18	288	1525	518	96	410	227	392	539	254
Future Volume (vph)	212	1306	18	288	1525	518	96	410	227	392	539	254
Lane Group Flow (vph)	216	1333	18	294	1556	529	98	418	232	400	550	259
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	7	4	4	4	4
Permitted Phases	5	2	2	1	6	3	8	7	4	4	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	45.0	45.0	11.0	39.0	39.0	29.0	35.0	35.0	29.0	35.0	35.0
Total Split (%)	14.2%	37.5%	37.5%	9.2%	32.5%	32.5%	24.2%	29.2%	29.2%	24.2%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.59	0.80	0.03	0.83	0.82	0.63	0.36	0.66	0.62	0.94	0.47	0.46
Control Delay	57.6	41.2	0.1	28.5	30.4	12.7	28.2	53.9	20.0	61.0	38.7	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	41.2	0.1	28.5	30.4	12.7	28.2	53.9	20.0	61.0	38.7	7.0
Queue Length 50th (m)	26.7	109.8	0.0	47.1	141.9	70.2	15.5	36.5	11.5	79.4	42.1	0.0
Queue Length 95th (m)	38.5	129.1	0.0	m37.5 m	114.4 m	45.0 m	25.8	46.6	36.6	#123.4	53.2	20.8
Internal Link Dist (m)	156.1 488.7											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	75.0	115.0	213.2	
Base Capacity (vph)	395	1656	581	354	1893	838	500	1139	524	430	1175	558
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.80	0.03	0.83	0.82	0.63	0.20	0.37	0.44	0.93	0.47	0.46
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 95												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Volume shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



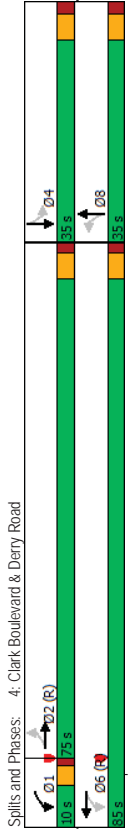
HCM Signalized Intersection Capacity Analysis
 4: Clark Boulevard & Derry Road
 Future Total (PM)
 2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2106	49	28	2178	24	132	10	73	80	7	169
Future Volume (vph)	36	2106	49	28	2178	24	132	10	73	80	7	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3527	1770	3533	1770	1617	1770	1617	1770	1595	1770	1595
Flt Permitted	0.05	1.00	0.05	1.00	0.46	1.00	0.70	1.00	0.70	1.00	0.70	1.00
Satd. Flow (perm)	94	3527	89	3533	863	1617	1301	1595	1301	1595	1301	1595
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	2289	53	30	2367	26	143	11	79	87	8	184
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	65	0	0	7
Lane Group Flow (vph)	39	2341	0	30	2392	0	143	25	0	87	185	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6		8				4	
Permitted Phases	2			6			8				4	
Actuated Green, G (s)	79.3	79.3	87.0	87.0	87.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	79.3	79.3	87.0	87.0	87.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.66	0.66	0.72	0.72	0.72	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	62	2930	116	2561	158	296	238	292	238	292	238	292
v/s Ratio Prot	c0.66		0.01	c0.68		0.02		0.12		0.07		0.12
v/s Ratio Perm	0.42		0.18		c0.17			0.07		0.37		0.64
v/c Ratio	0.63	1.00	0.26	0.93	0.91	0.09	0.09	0.37	0.64	0.37	0.64	0.64
Uniform Delay, d1	11.8	20.4	31.2	14.1	48.0	40.7	42.9	45.3	45.3	45.3	45.3	45.3
Progression Factor	1.50	1.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	6.8	1.2	7.9	44.6	0.1	1.0	4.5	4.5	4.5	4.5	4.5
Delay (s)	22.1	37.3	32.4	21.9	92.6	40.8	43.8	49.8	49.8	49.8	49.8	49.8
Level of Service	C	D	C	C	C	F	D	D	D	D	D	D
Approach Delay (s)	37.0		22.1		72.6		47.9		47.9		47.9	
Approach LOS	D		C		E		D		D		D	
Intersection Summary												
HCM 2000 Control Delay	32.3											C
HCM 2000 Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0											15.0
Intersection Capacity Utilization	94.0%											F
Analysis Period (min)	15											
c Critical Lane Group												

12-14-2023
 BA Group
 Synchro 11 Report

Queues
 4: Clark Boulevard & Derry Road
 Future Total (PM)
 2032 Scenario 4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2106	28	2178	132	10	80	7	80	7	80	7
Future Volume (vph)	36	2106	28	2178	132	10	80	7	80	7	80	7
Lane Group Flow (vph)	39	2342	30	2393	143	90	87	192	90	87	192	90
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6		8				4	
Permitted Phases	2			6			8				4	
Detector Phase	2			2			2				2	
Switch Phase	2			2			2				2	
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.63	0.98	0.20	0.93	0.91	0.25	0.37	0.64	0.64	0.64	0.64	0.64
Control Delay	38.2	32.1	8.6	24.0	97.4	12.0	45.3	52.4	52.4	52.4	52.4	52.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	32.1	8.6	24.0	97.4	12.0	45.3	52.4	52.4	52.4	52.4	52.4
Queue Length 50th (m)	7.9	-326.4	1.8	241.3	34.8	2.2	18.9	42.3	42.3	42.3	42.3	42.3
Queue Length 95th (m)	m7.9	m232.6	5.4	#374.8	#62.3	15.6	32.9	63.3	63.3	63.3	63.3	63.3
Internal Link Dist (m)	336.0		475.1		56.4		313.3		313.3		313.3	
Turn Bay Length (m)	70.0		70.0		40.0		40.0		40.0		40.0	
Base Capacity (vph)	62	2379	150	2560	210	454	317	395	395	395	395	395
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.98	0.20	0.93	0.68	0.20	0.27	0.49	0.49	0.49	0.49	0.49
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
- Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
- Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard

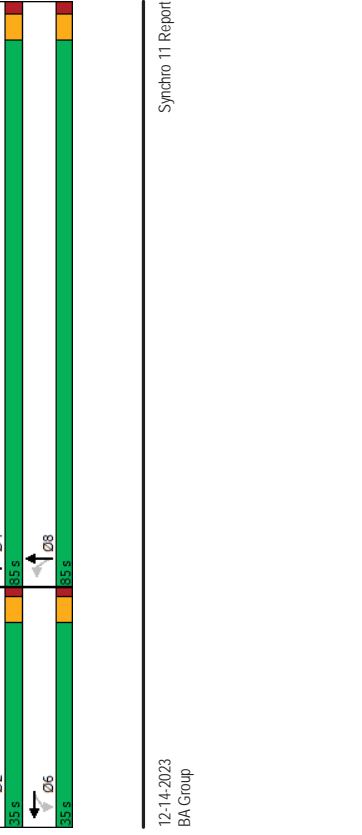
Queues
 5: Fifth Line & Clark Boulevard

Future Total (PM)
 2032 Scenario 4

Future Total (PM)
 2032 Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	39	13	10	18	9	1	4	477	7	0	478	11
Future Volume (vph)	39	13	10	18	9	1	4	477	7	0	478	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	1740	1770	1837	1770	1837	1770	1858	1856	1856	1856	1856
Flt Permitted	0.75	1.00	0.74	1.00	0.44	1.00	0.44	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1398	1740	1380	1837	824	1858	824	1858	1856	1856	1856	1856
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	14	11	20	10	1	4	518	8	0	520	12
RTOR Reduction (vph)	0	10	0	0	1	0	0	0	0	0	0	1
Lane Group Flow (vph)	42	15	0	20	10	0	4	526	0	0	531	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8				4	
Permitted Phases	2			6			8				4	
Actuated Green, G (s)	5.5	5.5	5.5	5.5	5.5	5.5	23.9	23.9	23.9	23.9	23.9	23.9
Effective Green, g (s)	5.5	5.5	5.5	5.5	5.5	5.5	23.9	23.9	23.9	23.9	23.9	23.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	190	236	187	250	187	250	487	1099	487	1099	1097	1097
v/s Ratio Prot	0.01			0.01			0.01	0.28			0.29	
v/s Ratio Perm	0.22	0.07	0.11	0.04	0.11	0.04	0.01	0.48	0.11	0.04	0.48	0.47
Uniform Delay, d1	15.5	15.2	15.3	15.2	15.2	15.2	3.4	4.7	3.4	4.7	4.7	4.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	0.3	0.1	0.0	0.3	0.0	0.3	0.0	0.3	0.3	0.3
Delay (s)	16.1	15.3	15.6	15.2	15.2	15.2	3.4	5.0	3.4	5.0	5.1	5.1
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	15.8		15.4		15.4		5.0		5.0		5.1	
Approach LOS	B		B		B		A		A		A	
Intersection Summary												
HCM 2000 Control Delay	5.9 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	0.43											
Actuated Cycle Length (s)	40.4 Sum of lost time (s)											
Intersection Capacity Utilization	43.8% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	39	13	10	18	9	1	4	477	7	0	478	11
Future Volume (vph)	39	13	10	18	9	1	4	477	7	0	478	11
Lane Group Flow (vph)	42	25	20	11	4	526	532					
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8				4	
Permitted Phases	2			6			8				4	
Detector Phase	2			6			8				4	
Switch Phase	2			6			8				4	
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag												
Lead-Lag Optimize?	None											
Recall Mode	None											
v/c Ratio	0.11	0.05	0.05	0.02	0.02	0.01	0.41	0.41	0.41	0.41	0.41	0.41
Control Delay	13.3	10.0	12.7	11.8	5.5	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	10.0	12.7	11.8	5.5	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Queue Length 50th (m)	2.9	0.9	1.3	0.7	0.1	24.5	24.8					
Queue Length 95th (m)	8.1	4.9	4.9	3.3	1.1	45.5	46.2					
Internal Link Dist (m)	204.0											
Turn Bay Length (m)	35.0											
Base Capacity (vph)	1110	1385	1096	1460	823	1859	1857					
Starvation Cap Reductn	0											
Spillback Cap Reductn	0											
Storage Cap Reductn	0											
Reduced v/c Ratio	0.04	0.02	0.02	0.01	0.00	0.28	0.29					
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 38.1												
Natural Cycle: 70												
Control Type: Actuated-Uncoordinated												



HCM Unsignalized Intersection Capacity Analysis
 10: Clark Boulevard & Anatolia Building 1 North Access/Anatolia Building 2 North Access Scenario 4

HCM Unsignalized Intersection Capacity Analysis
 9: Sixth Line & Anatolia Building 3 East Access Scenario 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	3	0	1	4	0	36	1	176	1	9	71	4
Future Volume (Veh/h)	3	0	1	4	0	36	1	176	1	9	71	4
Sign Control	Stop	0%	Free	Stop	0%	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	0	1	4	0	39	1	191	1	10	77	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)							None	None	None	None	None	None
Median type												
Median storage (veh)												
Upstream signal (m)												80
pX platoon unblocked												
VC conflicting volume	332	293	79	294	294	192	81			192		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU unblocked vol	332	293	79	294	294	192	81			192		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	99	100	95	100			99		
CM capacity (veh/h)	590	613	981	654	612	850	1517			1381		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volumes Total	4	43	193	91								
Volume Left	3	4	1	10								
Volume Right	1	39	1	4								
cSH	655	827	1517	1381								
Volumes to Capacity	0.01	0.05	0.00	0.01								
Queue Length 95th (m)	0.1	1.3	0.0	0.2								
Control Delay (s)	10.5	9.6	0.0	0.9								
Lane LOS	B	A	A	A								
Approach Delay (s)	10.5	9.6	0.0	0.9								
Approach LOS	B	A	A	A								
Intersection Summary												
Average Delay	1.6											
Intersection Capacity Utilization	20.6%											
ICU Level of Service	A											
Analysis Period (min)	15											

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	22	4	2	403	350	8
Future Volume (Veh/h)	22	4	2	403	350	8
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	4	2	438	380	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						236
pX platoon unblocked						
VC conflicting volume	608	194	389			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU unblocked vol	608	194	389			
IC, single (s)	6.8	6.9	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	94	100	100			
CM capacity (veh/h)	427	814	1166			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volumes Total	28	148	292	253	136	
Volume Left	24	2	0	0	0	
Volume Right	4	0	0	0	9	
cSH	458	1166	1700	1700	1700	
Volumes to Capacity	0.06	0.00	0.17	0.15	0.08	
Queue Length 95th (m)	1.6	0.0	0.0	0.0	0.0	
Control Delay (s)	13.4	0.1	0.0	0.0	0.0	
Lane LOS	B	A	A	A	A	
Approach Delay (s)	13.4	0.0	0.0	0.0	0.0	
Approach LOS	B	A	A	A	A	
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	22.5%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 12: Clark Boulevard & Anatolia Building 1 South Access

HCM Unsignalized Intersection Capacity Analysis
 11: Clark Boulevard & Anatolia Building 2 South Access

Future Total (PM)
 2032 Scenario 4

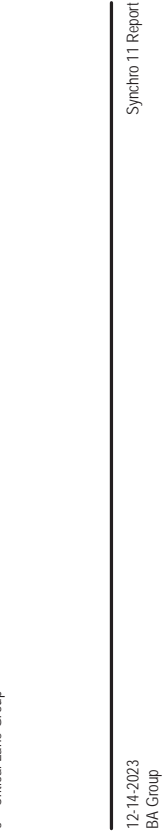
Future Total (PM)
 2032 Scenario 4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W					
Traffic Volume (veh/h)	130	12	4	16	16	48
Future Volume (Veh/h)	130	12	4	16	16	48
Sign Control	Stop			Free	Free	Free
Grade	0%			0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	13	4	17	17	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)				None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	68	43	69			
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	68	43	69			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	85	99	100			
CM capacity (veh/h)	934	1027	1532			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	154	21	69			
Volume Left	141	4	0			
Volume Right	13	0	52			
GSH	942	1532	1700			
Volumes to Capacity	0.16	0.00	0.04			
Queue Length 95th (m)	4.7	0.1	0.0			
Control Delay (s)	9.6	1.4	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	9.6	1.4	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			6.2			
Intersection Capacity Utilization			18.9%			ICU Level of Service A
Analysis Period (min)			15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					
Traffic Volume (veh/h)	6	36	142	4	18	58
Future Volume (Veh/h)	6	36	142	4	18	58
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	39	154	4	20	63
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	259	156			158	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	259	156			158	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	99	96			99	
CM capacity (veh/h)	720	890			1422	
Direction, Lane #	WB 1	NB 1	SB 1			
Volumes Total	46	158	83			
Volume Left	7	0	20			
Volume Right	39	4	0			
GSH	859	1700	1422			
Volumes to Capacity	0.05	0.09	0.01			
Queue Length 95th (m)	1.4	0.0	0.3			
Control Delay (s)	9.4	0.0	1.9			
Lane LOS	A	A	A			
Approach Delay (s)	9.4	0.0	1.9			
Approach LOS	A					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			25.1%			ICU Level of Service A
Analysis Period (min)			15			

2032 Scenario 5
 HCM Signalized Intersection Capacity Analysis
 Future Background (AM)
 1: Sixth Line & Derry Road

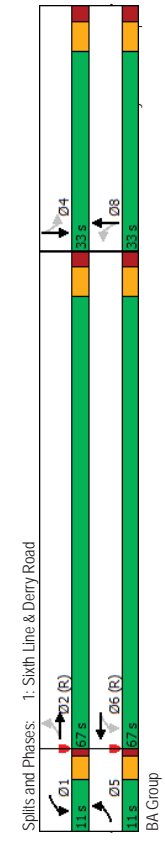
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	164	2214	153	17	849	41	89	173	30	46	142
Traffic Volume (vph)	164	2214	153	17	849	41	89	173	30	46	142
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.93	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1763	3163	1805	2929	1805	3504	1258	3304	1258	3304	1258
Flt Permitted	0.25	1.00	0.06	1.00	0.47	1.00	0.61	1.00	0.61	1.00	0.61
Satd. Flow (perm)	458	3163	109	2929	900	3504	812	3304	812	3304	812
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	174	2355	163	18	903	44	95	184	32	49	151
RTOR Reduction (vph)	0	3	0	0	3	0	0	15	0	0	125
Lane Group Flow (vph)	174	2515	0	18	944	0	95	201	0	49	172
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	6	8	8	8	8	4	4
Permitted Phases	2	82.4	75.6	72.7	69.9	16.1	16.1	16.1	16.1	16.1	16.1
Effective Green, G (s)	82.4	75.6	72.7	69.9	16.1	16.1	16.1	16.1	16.1	16.1	16.1
Actuated g/C Ratio	0.74	0.68	0.65	0.63	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	439	2154	114	1844	130	508	117	479	117	479	479
v/s Ratio Prot	c0.03	c0.79	0.00	0.32	0.00	0.06	0.05	0.05	0.06	0.05	0.05
v/s Ratio Perm	0.40	1.17	0.16	0.51	0.73	0.40	0.42	0.36	0.42	0.36	0.36
Uniform Delay, d1	5.3	17.7	26.4	11.2	45.4	43.0	43.2	42.8	43.2	42.8	42.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	80.8	0.7	1.0	18.9	0.5	2.4	0.5	2.4	0.5	0.5
Delay (s)	5.9	98.5	27.1	12.3	64.3	43.6	45.6	43.3	45.6	43.3	43.3
Level of Service	A	F	C	B	E	D	D	D	D	D	D
Approach Delay (s)	92.5	12.5	49.9	49.9	49.9	43.6	43.6	43.6	43.6	43.6	43.6
Approach LOS	F	B	B	B	B	D	D	D	D	D	D
Intersection Summary											
HCM 2000 Control Delay	67.6	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity ratio	1.08	E									
Actuated Cycle Length (s)	111.0	Sum of lost time (s)									
Intersection Capacity Utilization	107.6%	16.5									
Analysis Period (min)	15	G									
c Critical Lane Group											



12-14-2023
 BA Group
 Synchro 11 Report

2032 Scenario 5
 Queues
 Future Background (AM)
 1: Sixth Line & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	164	2214	17	849	41	89	173	30	46	142	137
Traffic Volume (vph)	164	2214	17	849	41	89	173	30	46	142	137
Future Volume (vph)	174	2518	18	947	95	216	49	297	297	297	297
Lane Group Flow (vph)	174	2518	18	947	95	216	49	297	297	297	297
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	6	8	8	8	8	4	4
Permitted Phases	2	6	6	8	8	8	8	8	8	4	4
Detector Phase	5	2	1	6	6	8	8	8	8	4	4
Switch Phase	5	2	1	6	6	8	8	8	8	4	4
Minimum Initial (s)	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Total Split (s)	11.0	67.0	11.0	67.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Spill (%)	9.9%	60.4%	9.9%	60.4%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.39	1.13	0.10	0.51	0.73	0.41	0.42	0.49	0.42	0.49	0.49
Control Delay	6.7	84.6	5.7	13.4	74.6	41.0	52.3	23.7	52.3	23.7	23.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	84.6	5.7	13.4	74.6	41.0	52.3	23.7	52.3	23.7	23.7
Queue Length 50th (m)	8.6	-335.3	0.8	56.1	21.1	22.0	10.3	16.5	10.3	16.5	16.5
Queue Length 95th (m)	19.4	#447.2	3.3	92.1	37.2	31.6	21.6	27.8	21.6	27.8	27.8
Internal Link Dist (m)	475.1	256.2	256.2	211.8	211.8	211.8	211.8	211.8	211.8	211.8	211.8
Turn Bay Length (m)	120.0	100.0	100.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Base Capacity (vph)	447	2226	184	1848	216	856	195	905	195	905	905
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	1.13	0.10	0.51	0.44	0.25	0.25	0.33	0.25	0.33	0.33
Intersection Summary											
Cycle Length: 111											
Actuated Cycle Length: 111											
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle: 150											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											



12-14-2023
 BA Group
 Synchro 11 Report

2032 Scenario 5
 Future Background (AM)
 HCM Signalized Intersection Capacity Analysis
 3. James Snow Parkway & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB
Traffic Volume (vph)	206	1901	33	74	598	195	29	330	218	399	459	221
Future Volume (vph)	206	1901	33	74	598	195	29	330	218	399	459	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	5006	1562	1738	4828	1516	1802	4668	1586	1616	4489	1403
Flt Permitted	0.95	1.00	1.00	0.99	1.00	1.00	0.47	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	3399	5006	1562	160	4828	1516	899	4668	1586	643	4489	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	210	1940	34	76	610	199	30	337	222	407	468	226
RTOR Reduction (vph)	0	0	19	0	0	123	0	0	173	0	0	154
Lane Group Flow (vph)	210	1940	15	76	610	76	30	337	49	407	468	72
Confl. Peds. (#/hr)	1					1	6					6
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		4
Actuated Green, G (s)	12.7	51.5	51.5	52.6	45.7	45.7	20.3	15.8	15.8	46.6	38.1	38.1
Effective Green, g (s)	12.7	51.5	51.5	52.6	45.7	45.7	20.3	15.8	15.8	46.6	38.1	38.1
Actuated G/C Ratio	0.11	0.43	0.43	0.44	0.38	0.38	0.17	0.13	0.13	0.39	0.32	0.32
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	359	2148	670	160	1838	577	185	614	208	467	1425	445
v/s Ratio Prot	c0.06	c0.39	0.01	0.03	0.13	0.05	0.02	0.07	c0.19	0.10	0.05	0.05
v/s Ratio Perm			0.01	0.18	0.05	0.02		0.03	c0.14		0.16	
v/s Ratio	0.68	0.90	0.02	0.47	0.33	0.13	0.16	0.55	0.24	0.87	0.33	0.16
Uniform Delay, d1	51.1	31.9	19.7	25.2	26.3	24.2	42.1	48.8	46.7	30.3	31.2	29.5
Progression Factor	1.00	1.00	1.00	0.76	0.85	1.98	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	6.8	0.1	1.9	0.4	0.4	0.4	1.0	0.6	1.6	0.1	0.2
Delay (s)	53.6	38.7	19.8	21.0	22.8	48.3	42.5	49.8	47.3	46.5	31.3	29.6
Level of Service	D	D	B	C	C	C	D	D	D	D	D	C
Approach Delay (s)		39.8		28.3				48.5			36.6	
Approach LOS		D		C				D			D	
Intersection Summary												
HCM 2000 Control Delay	38.0 HCM 2000 Level of Service D											
HCM 2000 Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 19.0											
Intersection Capacity Utilization	88.8% ICU Level of Service E											
Analysis Period (min)	15											
Critical Lane Group												

12-14-2023
 BA Group
 Synchro 11 Report

2032 Scenario 5
 Future Background (AM)
 3. James Snow Parkway & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB	WB
Traffic Volume (vph)	206	1901	33	74	598	195	29	330	218	399	459	221
Future Volume (vph)	206	1901	33	74	598	195	29	330	218	399	459	221
Lane Group Flow (vph)	210	1940	34	76	610	199	30	337	222	407	468	226
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		4
Detector Phase	5	2	2	2	1	6	6	3	8	8	7	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	43.0	43.0	11.0	37.0	37.0	31.0	35.0	35.0	31.0	35.0	35.0
Total Split (%)	14.2%	35.8%	35.8%	9.2%	30.8%	30.8%	25.8%	29.2%	29.2%	25.8%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.58	0.86	0.05	0.41	0.32	0.28	0.13	0.61	0.61	0.61	0.87	0.33
Control Delay	57.6	36.0	0.1	17.7	22.7	8.5	25.3	54.9	16.9	50.1	32.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	36.0	0.1	17.7	22.7	8.5	25.3	54.9	16.9	50.1	32.5	6.0
Queue Length 50th (m)	25.9	159.8	0.0	8.4	41.5	9.5	4.6	29.5	5.2	81.4	34.0	0.0
Queue Length 95th (m)	37.8	218.7	0.0	17.8	58.8	31.3	10.4	39.0	29.0	112.6	43.1	18.2
Internal Link Dist (m)	156.1 488.7											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	75.0	95.0	213.2	
Base Capacity (vph)	392	2247	754	185	1903	718	524	1139	537	469	1425	599
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.86	0.05	0.41	0.32	0.28	0.06	0.30	0.41	0.87	0.33	0.38
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: T03 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 105												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
m Volume for 95th percentile queue is metered by upstream signal.												
Spills and Phases: 3.-James Snow Parkway & Derry Road												

12-14-2023
 BA Group
 Synchro 11 Report

Future Background (AM)
2032 Scenario 5
4: Clark Boulevard & Derry Road

Future Background (AM)
2032 Scenario 5
4: Clark Boulevard & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	91	2415	45	102	962	91	16	7	10	26	10	43
Future Volume (vph)	91	2415	45	102	962	91	16	7	10	26	10	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3529	1770	3493	1770	1701	1701	1701	1701	1636	1636	1636
Flt Permitted	0.25	1.00	0.04	1.00	0.72	1.00	0.75	1.00	0.75	1.00	0.75	1.00
Satd. Flow (perm)	462	3529	81	3493	1340	1701	1388	1636	1388	1636	1388	1636
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	2625	49	111	1046	99	17	8	11	28	11	47
RTOR Reduction (vph)	0	1	0	0	3	0	0	10	0	0	44	0
Lane Group Flow (vph)	99	2673	0	111	1142	0	17	9	0	28	14	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	1	6	6	6	8	8	4	4	4	4
Permitted Phases	2	2	1	6	6	6	8	8	4	4	4	4
Actual Green, G (s)	87.7	87.7	100.8	100.8	100.8	82	82	82	82	82	82	82
Effective Green, g (s)	87.7	87.7	100.8	100.8	100.8	82	82	82	82	82	82	82
Actuated g/C Ratio	0.73	0.73	0.84	0.84	0.84	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	337	2579	196	2934	196	2934	91	116	94	111	111	111
v/s Ratio Prot	c0.76	c0.04	0.33	0.43	0.33	0.01	0.01	0.01	c0.02	c0.02	c0.02	0.01
v/s Ratio Perm	0.29	1.04	0.57	0.39	0.19	0.08	0.30	0.13	0.30	0.13	0.30	0.13
Uniform Delay, d1	5.5	16.1	39.9	2.3	52.8	52.4	53.2	52.5	53.2	52.5	52.5	52.5
Progression Factor	1.78	1.77	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	18.1	3.7	0.4	1.0	0.3	1.8	0.5	1.8	0.5	0.5	0.5
Delay (s)	10.0	46.7	43.6	2.7	53.8	52.6	54.9	53.1	54.9	53.1	53.1	53.1
Level of Service	B	D	D	A	D	D	D	D	D	D	D	D
Approach Delay (s)	45.3	6.3	53.2	6.3	53.2	6.3	53.2	6.3	53.2	6.3	53.2	6.3
Approach LOS	D	D	A	A	D	D	D	D	D	D	D	D

Intersection Summary	HCM 2000 Control Delay	HCM 2000 Level of Service
Control Type: Actuated-Coordinated	33.8	C
Volume exceeds capacity, queue is theoretically infinite.	0.94	
Queue shown is maximum after two cycles.	120.0	15.0
Volume for 95th percentile queue is metered by upstream signal.	94.7%	F
	15	

c Critical Lane Group

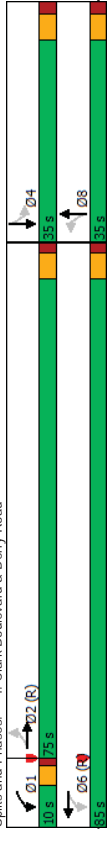


12-14-2023
BA Group
Synchro 11 Report

Future Background (AM)
2032 Scenario 5
4: Clark Boulevard & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	91	2415	102	962	16	7	10	26	10	43	10	43
Future Volume (vph)	91	2415	102	962	16	7	10	26	10	43	10	43
Lane Group Flow (vph)	99	2674	111	1145	17	19	28	28	58	28	58	58
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	1	6	6	6	8	8	4	4	4	4
Detector Phase	2	2	1	6	6	6	8	8	4	4	4	4
Switch Phase	2	2	1	6	6	6	8	8	4	4	4	4
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.29	1.02	0.56	0.38	0.15	0.12	0.24	0.32	0.24	0.32	0.24	0.32
Control Delay	13.1	40.7	30.0	2.8	54.1	33.9	56.5	23.7	56.5	23.7	23.7	23.7
Total Delay	13.1	40.7	30.0	2.8	54.1	33.9	56.5	23.7	56.5	23.7	23.7	23.7
Queue Length 50th (m)	12.8	-376.4	9.9	29.2	4.0	1.9	6.6	2.6	6.6	2.6	2.6	2.6
Queue Length 95th (m)	m11.6	m245.1	28.8	38.3	11.6	9.6	16.4	16.0	16.4	16.0	16.0	16.0
Internal Link Dist (m)	336.0	475.1	56.4	313.3	70.0	70.0	400	400	400	400	400	400
Turn Bay Length (m)	341	2613	198	3000	326	423	338	434	423	338	434	434
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	1.02	0.56	0.38	0.05	0.04	0.08	0.13	0.08	0.13	0.08	0.13

Intersections Summary



12-14-2023
BA Group
Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard
 2032 Scenario 5

Queues
 5: Fifth Line & Clark Boulevard
 2032 Scenario 5

Future Background (AM)
 Future Background (AM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	10	11	3	2	13	11	10	481	21	61	329
Traffic Volume (vph)	10	11	3	2	13	11	10	481	21	61	329
Future Volume (vph)	10	11	3	2	13	11	10	481	21	61	329
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.93	1.00	0.99	1.00	0.98	1.00	0.98
Satd. Flow (prot)	1770	1807	1770	1734	1770	1851	1770	1851	1770	1835	1770
Flt Permitted	1.00	1.00	1.00	1.00	0.53	1.00	0.53	1.00	0.46	1.00	0.46
Satd. Flow (perm)	1863	1807	1863	1734	1863	1851	1863	1851	1863	1851	1835
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	12	3	2	14	12	11	523	23	66	358
RTOR Reduction (vph)	0	3	0	0	11	0	0	1	0	0	3
Lane Group Flow (vph)	11	12	0	2	15	0	11	545	0	66	395
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2	6	6	6	6	8	8	8	8	8	8
Permitted Phases	2	6	6	6	6	8	8	8	8	8	8
Switch Phase	2	2	2	2	2	2	2	2	2	2	2
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag											
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	0.02	0.03	0.00	0.05	0.01	0.33	0.09	0.24	0.09	0.24	0.24
v/c Ratio	11.7	10.9	11.5	9.4	3.1	3.3	3.1	2.8	3.1	2.8	2.8
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Delay	11.7	10.9	11.5	9.4	3.1	3.3	3.1	2.8	3.1	2.8	2.8
Total Delay	11.7	10.9	11.5	9.4	3.1	3.3	3.1	2.8	3.1	2.8	2.8
Queue Length 50th (m)	0.5	0.5	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	3.4	3.9	1.3	5.1	2.0	47.7	7.1	31.2	7.1	31.2	31.2
Internal Link Dist (m)	204.0			86.5		156.9		372.1			372.1
Turn Bay Length (m)	35.0			35.0		35.0		35.0			35.0
Base Capacity (vph)	1581	1534	1581	1473	982	1852	1852	1835	1852	1835	1835
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.00	0.02	0.01	0.29	0.08	0.22	0.08	0.22	0.22
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 35.5											
Natural Cycle: 70											
Control Type: Actuated-Uncoordinated											

Spills and Phases: 5: Fifth Line & Clark Boulevard											

12-14-2023
 BA Group

12-14-2023
 BA Group

Synchro 11 Report

Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
1: Sixth Line & Derry Road

Future Background (PM)
2032 Scenario 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	
Lane Configurations	[Diagram: 1 left, 2 through, 1 right]											
Traffic Volume (vph)	174	1954	96	31	1874	25	201	166	33	137	226	
Future Volume (vph)	174	1954	96	31	1874	25	201	166	33	137	226	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.95	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1763	3171	1805	2966	1805	3492	1258	3356	1258	3356	3356	
Flt Permitted	0.07	1.00	0.08	1.00	0.34	1.00	0.62	1.00	0.62	1.00	1.00	
Satd. Flow (perm)	134	3171	148	2966	645	3492	820	3356	820	3356	3356	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	185	2079	102	33	1994	27	214	177	35	146	240	
RTOR Reduction (vph)	0	3	0	0	1	0	0	15	0	0	101	
Lane Group Flow (vph)	185	2178	0	33	2020	0	214	197	0	146	295	
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	NA	
Protected Phases	5	2	1	6	3	8	3	8	4	4	4	
Permitted Phases	2	64.7	56.5	55.5	51.3	33.8	33.8	33.8	22.8	22.8	22.8	
Effective Green, G (s)	64.7	56.5	55.5	51.3	33.8	33.8	33.8	33.8	22.8	22.8	22.8	
Actuated g/C Ratio	0.58	0.51	0.50	0.46	0.30	0.30	0.30	0.30	0.21	0.21	0.21	
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	216	1614	136	1370	269	1063	168	689	168	689	689	
v/s Ratio Prot	c0.07	c0.69	0.11	c0.68	c0.05	0.06	0.09	0.09	0.18	0.18	0.18	
v/s Ratio Perm	0.43	0.01	0.24	1.47	0.80	0.19	0.87	0.43	0.87	0.43	0.43	
Uniform Delay, d1	31.0	27.2	24.4	29.9	34.0	28.4	42.7	38.4	42.7	38.4	38.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.7	161.5	0.9	217.5	14.9	0.1	34.7	0.4	34.7	0.4	0.4	
Delay (s)	57.8	188.7	25.3	247.3	49.0	28.5	77.4	38.9	77.4	38.9	38.9	
Level of Service	E	F	C	F	D	C	E	D	E	D	D	
Approach Delay (s)	178.5			243.8			38.8			49.2		
Approach LOS	F			F			D			D		
Intersection Summary												
HCM 2000 Control Delay	179.3										HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.22											
Actuated Cycle Length (s)	111.0										Sum of lost time (s)	20.5
Intersection Capacity Utilization	102.1%										ICU Level of Service	G
Analysis Period (min)	15											
c Critical Lane Group												

12-14-2023
BA Group
Synchro 11 Report

Queues
1: Sixth Line & Derry Road

Future Background (PM)
2032 Scenario 5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	[Diagram: 1 left, 2 through, 1 right]										
Traffic Volume (vph)	174	1954	96	31	1874	25	201	166	33	137	
Future Volume (vph)	174	1954	96	31	1874	25	201	166	33	137	
Lane Group Flow (vph)	185	2181	33	2021	214	212	146	396	NA	NA	
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	
Protected Phases	5	2	1	6	3	8	3	8	4	4	
Detector Phase	5	2	1	6	3	8	3	8	4	4	
Switch Phase	5	2	1	6	3	8	3	8	4	4	
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	25.0	7.0	25.0	10.0	10.0	
Minimum Split (s)	11.0	31.2	11.0	31.2	11.0	31.2	11.0	32.3	32.3	32.3	
Total Split (s)	11.0	57.0	11.0	57.0	11.0	57.0	11.0	43.0	32.0	32.0	
Total Split (%)	9.9%	51.4%	9.9%	51.4%	9.9%	51.4%	9.9%	38.7%	28.8%	28.8%	
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	2.2	1.0	2.2	1.0	2.2	1.0	2.3	2.3	2.3	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	None	
v/c Ratio	0.86	1.31	0.18	1.47	0.76	0.20	0.87	0.50	0.87	0.50	
Control Delay	60.7	170.4	12.4	243.0	47.9	25.2	85.1	27.8	85.1	27.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	60.7	170.4	12.4	243.0	47.9	25.2	85.1	27.8	85.1	27.8	
Queue Length 50th (m)	-30.7	-366.9	3.1	-338.8	35.6	16.0	31.3	27.2	31.3	27.2	
Queue Length 95th (m)	#77.2	#411.8	7.4	#384.0	#60.7	25.3	#65.7	42.5	#65.7	42.5	
Internal Link Dist (m)	475.1										
Turn Bay Length (m)	120.0										
Base Capacity (vph)	215	1663	185	1373	282	1168	189	874	189	874	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.86	1.31	0.18	1.47	0.76	0.18	0.77	0.45	0.77	0.45	
Intersection Summary											
Cycle Length: 111											
Actuated Cycle Length: 111											
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBTL, Start of Green											
Natural Cycle: 150											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
Spills and Phases: 1: Sixth Line & Derry Road											
[Diagram: Spillback and phase timing diagram showing phases 01, 02, 03, 04, 05, 06, 07, 08 with durations like 11s, 57s, 32s, 43s]											
BA Group											

HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road
 2032 Scenario 5

Queues
 2: Fifth Line & Derry Road
 2032 Scenario 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	43	1792	96	104	2075	119	302	74	215	311	304
Future Volume (vph)	43	1792	96	104	2075	119	302	74	215	311	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
FRT	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.89	1.00	0.97	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1600	3259	1587	3297	1698	3050	1501	3340	1501	3340	1501
Flt Permitted	0.06	1.00	0.06	1.00	0.29	1.00	0.43	1.00	0.43	1.00	0.43
Satd. Flow (perm)	105	3259	100	3297	523	3050	685	3340	685	3340	685
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	1906	102	111	2207	127	321	79	229	331	323
RTOR Reduction (vph)	0	3	0	0	3	0	0	95	0	0	20
Lane Group Flow (vph)	46	2005	0	111	2331	0	321	213	0	331	388
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4	4
Permitted Phases	2	6	6	6	6	6	6	6	6	6	6
Effective Green, G (s)	69.9	64.2	74.7	66.6	28.7	18.7	28.7	18.7	28.7	18.7	18.7
Effective Green, g (s)	69.9	64.2	74.7	66.6	28.7	18.7	28.7	18.7	28.7	18.7	18.7
Actuated g/C Ratio	0.58	0.54	0.62	0.55	0.24	0.16	0.24	0.16	0.24	0.16	0.16
Clearance Times (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	132	1743	162	1829	223	475	231	520	231	520	231
v/s Ratio Prot	0.02	0.62	c0.05	c0.71	c0.12	0.07	0.12	0.12	0.12	0.12	0.12
v/s Ratio Perm	0.19	0.38	0.38	0.38	c0.22	c0.22	0.22	0.22	0.22	0.22	0.22
v/c Ratio	0.35	1.15	0.69	1.27	1.44	0.45	1.43	0.75	1.43	0.75	0.75
Uniform Delay, d1	26.3	27.9	29.3	26.7	43.0	46.0	43.8	48.4	43.8	48.4	48.4
Progression Factor	2.08	0.91	0.94	1.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	72.4	5.8	125.7	221.4	0.7	217.9	5.8	217.9	5.8	5.8
Delay (s)	55.6	97.8	33.3	154.9	264.4	46.6	261.7	54.1	261.7	54.1	54.1
Level of Service	E	F	C	F	F	D	F	D	F	D	D
Approach Delay (s)			96.8		149.3		157.8		147.1		147.1
Approach LOS			F		F		F		F		F

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	43	1792	104	2075	119	302	74	215	311	304
Future Volume (vph)	43	1792	104	2075	119	302	74	215	311	304
Lane Group Flow (vph)	46	2008	111	2334	321	308	331	408	331	408
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4
Permitted Phases	2	6	6	6	6	6	6	6	6	6
Detector Phase	5	2	2	1	6	3	8	7	4	4
Switch Phase	7.0	20.0	7.0	20.0	7.0	20.0	7.0	20.0	7.0	20.0
Minimum Initial (s)	11.0	34.3	11.0	34.3	11.0	34.3	11.0	34.7	11.0	34.7
Minimum Split (s)	11.0	67.0	11.0	67.0	14.0	28.0	14.0	28.0	14.0	28.0
Total Split (s)	9.2%	55.8%	9.2%	55.8%	11.7%	23.3%	11.7%	23.3%	11.7%	23.3%
Total Split (%)	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7
Yellow Time (s)	1.0	1.6	1.0	1.6	1.0	1.6	1.0	2.0	1.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.30	1.15	0.68	1.26	1.40	0.54	1.37	0.76	1.37	0.76
Control Delay	22.2	98.8	31.4	146.0	233.0	32.3	225.0	54.7	225.0	54.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	98.8	31.4	146.0	233.0	32.3	225.0	54.7	225.0	54.7
Queue Length 50th (m)	2.8	-320.0	15.8	-390.1	-81.5	23.1	-76.5	48.4	-76.5	48.4
Queue Length 95th (m)	m6.8	#352.3	m20.3	#446.1	#131.9	37.1	#162.4	64.4	#162.4	64.4
Internal Link Dist (m)	170.5	124.7	170.5	124.7	340.6	275.9	340.6	275.9	340.6	275.9
Turn Bay Length (m)	100.0	90.0	90.0	70.0	70.0	50.0	50.0	50.0	50.0	50.0
Base Capacity (vph)	151	1745	163	1856	230	658	241	640	241	640
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	1.15	0.68	1.26	1.40	0.47	1.37	0.64	1.37	0.64

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
- Volume exceeds capacity, queue is theoretically infinite.	
- Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
- Volume exceeds capacity, queue is theoretically infinite.	
- Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
- Volume exceeds capacity, queue is theoretically infinite.	
- Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
- Volume exceeds capacity, queue is theoretically infinite.	
- Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
- Volume exceeds capacity, queue is theoretically infinite.	
- Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
- Volume exceeds capacity, queue is theoretically infinite.	
- Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green	
Natural Cycle: 1	

HCM Signalized Intersection Capacity Analysis

3. James Snow Parkway & Derry Road

2032 Scenario 5

Future Background (PM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Traffic Volume (vph)	212	1301	18	286	1528	519	96	410	224	384	539	254
Future Volume (vph)	212	1301	18	286	1528	519	96	410	224	384	539	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	1.00
Frbp_psd/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98
Fllb_psd/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	5006	1562	1738	4828	1516	1802	4668	1586	1616	4489	1403
Flt Permitted	0.95	1.00	1.00	0.99	1.00	1.00	0.44	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	3399	5006	1562	167	4828	1516	827	4668	1586	518	4489	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	216	1328	18	292	1559	530	98	418	229	392	550	259
RTOR Reduction (vph)	0	12	0	0	244	0	0	159	0	0	192	0
Lane Group Flow (vph)	216	1328	6	292	1559	286	98	418	70	392	550	67
Confl. Peds. (#/hr)	1	1	1	1	1	1	1	1	1	1	1	1
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	8	7	4	4
Permitted Phases	2	6	6	6	8	8	8	8	8	8	4	4
Actuated Green, G (s)	12.9	39.7	39.7	64.1	47.2	47.2	26.2	16.4	16.4	44.9	31.1	31.1
Effective Green, g (s)	12.9	39.7	39.7	64.1	47.2	47.2	26.2	16.4	16.4	44.9	31.1	31.1
Actuated G/C Ratio	0.11	0.33	0.33	0.53	0.39	0.39	0.22	0.14	0.14	0.37	0.26	0.26
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	365	1656	516	356	1899	596	260	637	216	417	1163	363
v/s Ratio Prot	0.06	0.27	0.00	c0.14	c0.32	0.03	0.09	0.04	0.19	0.16	0.12	0.05
v/s Ratio Perm	0.59	0.80	0.01	0.82	0.82	0.48	0.38	0.66	0.32	0.94	0.47	0.18
v/s Ratio	51.0	36.6	27.0	32.7	32.6	27.2	38.8	49.1	46.8	31.5	37.5	34.6
Uniform Delay, d1	1.00	1.00	1.00	0.82	0.87	1.45	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.6	4.2	0.0	1.5	0.4	0.3	0.9	2.4	0.9	2.9	0.3	0.2
Incremental Delay, d2	53.6	40.8	27.0	28.2	28.8	39.7	39.7	51.6	47.7	60.8	37.8	34.8
Delay (s)	D	D	C	C	C	C	D	D	D	D	E	D
Level of Service	D	D	C	C	C	C	D	D	D	D	E	D
Approach Delay (s)	42.4	31.2					48.8				44.7	
Approach LOS	D	C					D				D	
Intersection Summary												
HCM 2000 Control Delay	39.1 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	86.4% ICU Level of Service											
Analysis Period (min)	15											
Critical Lane Group	c											

12-14-2023
BA Group

Queues

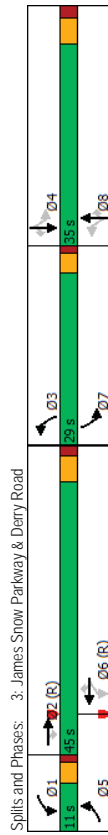
3. James Snow Parkway & Derry Road

2032 Scenario 5

Future Background (PM)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Traffic Volume (vph)	212	1301	18	286	1528	519	96	410	224	384	539	254
Future Volume (vph)	212	1301	18	286	1528	519	96	410	224	384	539	254
Lane Group Flow (vph)	216	1328	18	292	1559	530	98	418	229	392	550	259
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8	8	8	7	4	4
Permitted Phases	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	45.0	45.0	11.0	39.0	39.0	29.0	35.0	35.0	29.0	35.0	35.0
Total Split (%)	14.2%	37.5%	37.5%	9.2%	32.5%	32.5%	24.2%	29.2%	29.2%	24.2%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	None	C-Min	None	None	None	None	None	None	None
v/s Ratio	0.59	0.80	0.03	0.82	0.82	0.63	0.36	0.66	0.61	0.92	0.47	0.47
Control Delay	57.6	41.1	0.1	28.8	30.2	11.8	28.2	53.9	18.7	58.4	38.8	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	41.1	0.1	28.8	30.2	11.8	28.2	53.9	18.7	58.4	38.8	7.0
Queue Length 50th (m)	26.7	109.2	0.0	46.9	138.8	63.6	15.5	36.5	10.1	77.3	42.1	0.0
Queue Length 95th (m)	38.5	128.3	0.0	m37.3 m	112.4	m39.9	25.8	46.6	34.9	#118.0	53.2	20.8
Internal Link Dist (m)	156.1			488.7								
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	75.0	95.0	213.2	
Base Capacity (vph)	395	1656	581	356	1899	840	500	1139	526	430	1174	558
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.80	0.03	0.82	0.82	0.63	0.20	0.37	0.44	0.91	0.47	0.46
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBLT, Start of Green												
Natural Cycle: 95												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Volume shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												

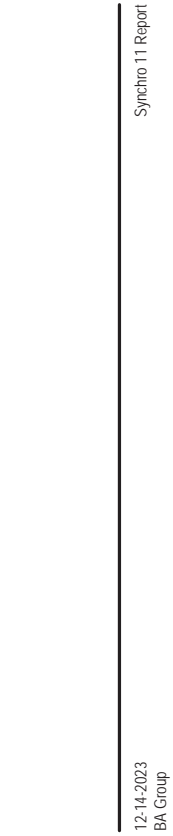
12-14-2023
BA Group



HCM Signalized Intersection Capacity Analysis
4: Clark Boulevard & Derry Road

Future Background (PM)
2032 Scenario 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2127	9	15	2167	24	79	10	61	80	7
Future Volume (vph)	36	2127	9	15	2167	24	79	10	61	80	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3537	1770	3533	1770	1623	1770	1623	1770	1595	1770
Flt Permitted	0.05	1.00	0.05	1.00	0.43	1.00	0.71	1.00	0.71	1.00	0.71
Satd. Flow (perm)	89	3537	85	3533	795	1623	1317	1595	1317	1595	1317
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	2312	10	16	2355	26	86	11	66	87	8
RTOR Reduction (vph)	0	0	0	0	1	0	0	55	0	0	7
Lane Group Flow (vph)	39	2322	0	16	2380	0	86	22	0	87	185
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	6	1	6	1	6	1	6	1	6
Permitted Phases	2	2	6	1	6	1	6	1	6	1	6
Actual Green, G (s)	83.3	83.3	89.8	89.8	89.8	19.2	19.2	19.2	19.2	19.2	19.2
Effective Green, g (s)	83.3	83.3	89.8	89.8	89.8	19.2	19.2	19.2	19.2	19.2	19.2
Actuated g/C Ratio	0.69	0.69	0.75	0.75	0.75	0.16	0.16	0.16	0.16	0.16	0.16
Clearance Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	61	2455	98	2643	127	259	210	255	210	255	210
v/s Ratio Prot	0.44	c0.66	0.00	c0.67	0.12	0.11	0.07	0.07	0.07	0.07	c0.12
v/s Ratio Perm	0.64	0.95	0.16	0.90	0.68	0.08	0.41	0.73	0.41	0.73	0.41
Uniform Delay, d1	10.1	16.3	28.7	11.7	47.5	42.9	46.3	47.9	46.3	47.9	46.3
Progression Factor	1.54	1.62	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	1.1	0.8	5.5	13.4	0.1	1.3	9.9	1.3	9.9	1.3
Delay (s)	20.2	27.5	29.5	17.2	60.9	43.0	46.7	57.8	46.7	57.8	46.7
Level of Service	C	C	C	B	E	D	D	E	D	D	E
Approach Delay (s)	27.4	C	17.2	B	52.5	D	54.3	D	54.3	D	54.3
Approach LOS	C	C	B	B	D	D	D	D	D	D	D
Intersection Summary											
HCM 2000 Control Delay	24.9		HCM 2000 Level of Service		C						
HCM 2000 Volume to Capacity ratio	0.92										
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		15.0						
Intersection Capacity Utilization	93.7%		ICU Level of Service		F						
Analysis Period (min)	15										
c Critical Lane Group											

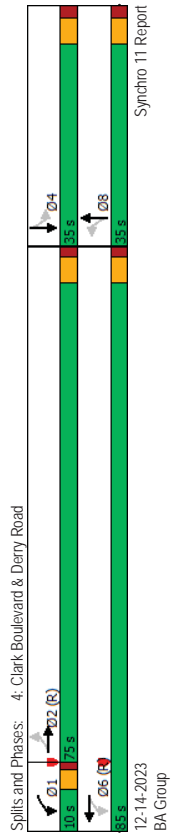


12-14-2023
BA Group
Synchro 11 Report

Queues
4: Clark Boulevard & Derry Road

Future Background (PM)
2032 Scenario 5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2127	9	15	2167	24	79	10	61	80	7
Future Volume (vph)	36	2127	9	15	2167	24	79	10	61	80	7
Lane Group Flow (vph)	39	2322	0	16	2381	86	77	87	0	87	192
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	6	1	6	1	6	1	6	1	6
Permitted Phases	2	2	6	1	6	1	6	1	6	1	6
Detector Phase	2	2	6	1	6	1	6	1	6	1	6
Switch Phase	2	2	6	1	6	1	6	1	6	1	6
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.62	0.92	0.11	0.90	0.68	0.25	0.41	0.74	0.41	0.74	0.41
Control Delay	34.8	25.7	6.1	18.9	72.2	14.2	49.9	61.9	49.9	61.9	49.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	25.7	6.1	18.9	72.2	14.2	49.9	61.9	49.9	61.9	49.9
Queue Length 50th (m)	6.6	266.1	0.8	207.0	20.3	2.3	19.6	44.0	19.6	44.0	19.6
Queue Length 95th (m)	m/7.9	m/232.6	3.2	#359.1	36.9	15.1	34.0	65.6	34.0	65.6	34.0
Internal Link Dist (m)	336.0	70.0	475.1	56.4	313.3	70.0	400	400	70.0	400	400
Turn Bay Length (m)	63	2527	150	2644	194	445	321	395	321	395	321
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.92	0.11	0.90	0.44	0.17	0.27	0.49	0.17	0.27	0.49
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green											
Natural Cycle: 140											
Control Type: Actuated-Coordinated											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											



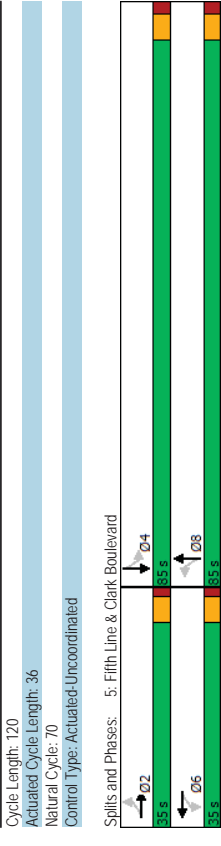
12-14-2023
BA Group
Synchro 11 Report

2032 Scenario 5
 Future Background (PM)
 HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	44	12	10	21	9	62	4	475	2	12	467	16
Future Volume (vph)	44	12	10	21	9	62	4	475	2	12	467	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	1735	1770	1620	1770	1862	1770	1862	1770	1854	1770	1854
Flt Permitted	0.71	1.00	0.74	1.00	0.44	1.00	0.44	1.00	0.45	1.00	0.45	1.00
Satd. Flow (perm)	1331	1735	1381	1620	828	1862	828	1862	839	1854	839	1854
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	13	11	23	10	67	4	516	2	13	508	17
RTOR Reduction (vph)	0	9	0	0	57	0	0	0	0	0	1	0
Lane Group Flow (vph)	48	15	0	23	20	0	4	518	0	13	524	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8				4	
Permitted Phases	2			6			8				4	
Actuated Green, G (s)	5.6	5.6	5.6	5.6	5.6	21.7	21.7	21.7	21.7	21.7	21.7	21.7
Effective Green, g (s)	5.6	5.6	5.6	5.6	5.6	21.7	21.7	21.7	21.7	21.7	21.7	21.7
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	194	253	201	236	469	1054	475	1050			475	1050
v/s Ratio Prot	0.01			0.01		0.28		0.28			c0.28	
v/s Ratio Perm	0.04			0.02		0.00		0.02			0.02	
v/c Ratio	0.25	0.06	0.11	0.08	0.11	0.08	0.01	0.49	0.03	0.50	0.03	0.50
Uniform Delay, d1	14.5	14.1	14.2	14.1	3.6	5.0	3.6	5.0	3.7	5.0	3.7	5.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1	0.3	0.2	0.0	0.4	0.0	0.4	0.0	0.4	0.0	0.4
Delay (s)	15.2	14.2	14.5	14.3	3.6	5.3	3.6	5.3	3.7	5.4	3.7	5.4
Level of Service	B	B	B	B	B	A	A	A	A	A	A	A
Approach Delay (s)	14.8		14.3		5.3		5.3		5.3		5.3	
Approach LOS	B		B		A		A		A		A	
Intersection Summary												
HCM 2000 Control Delay	6.6 HCM 2000 Level of Service A											
HCM 2000 Volume to Capacity ratio	0.45											
Actuated Cycle Length (s)	38.3 Sum of lost time (s) 11.0											
Intersection Capacity Utilization	43.8% ICU Level of Service A											
Analysis Period (min)	15											
c Critical Lane Group												

2032 Scenario 5
 Future Background (PM)
 Queues
 5: Fifth Line & Clark Boulevard

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	44	12	10	21	9	62	4	475	2	12	467	16
Future Volume (vph)	44	12	10	21	9	62	4	475	2	12	467	16
Lane Group Flow (vph)	48	24	23	77	4	518	13	525				
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6			8				4	
Permitted Phases	2			6			8				4	
Detector Phase	2			6			8				4	
Switch Phase	2			6			8				4	
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
v/c Ratio	0.13	0.05	0.06	0.15	0.01	0.15	0.01	0.41	0.02	0.42	0.02	0.42
Control Delay	12.6	9.5	12.1	6.0	5.5	7.6	5.8	7.7				
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	9.5	12.1	6.0	5.5	7.6	5.8	7.7				
Queue Length 50th (m)	2.2	0.6	1.0	0.5	0.1	23.9	0.5	24.3				
Queue Length 95th (m)	9.2	4.8	5.5	7.8	1.1	44.4	2.2	45.3				
Internal Link Dist (m)	204.0 86.5 156.9 372.1											
Turn Bay Length (m)	35.0 35.0 35.0 35.0											
Base Capacity (vph)	1109	1448	1153	1362	829	1861	838	1863				
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02	0.02	0.06	0.00	0.28	0.02	0.28				
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 36												
Natural Cycle: 70												
Control Type: Actuated-Uncoordinated												



HCM Signalized Intersection Capacity Analysis
 3. James Snow Parkway & Derry Road

Future Total (AM)
 2032 Scenario 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	W	W	W	W	W	W	W	W	W	W	W	W
Traffic Volume (vph)	206	1972	33	76	618	219	29	330	220	456	459	221
Future Volume (vph)	206	1972	33	76	618	219	29	330	220	456	459	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fllb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fll Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	5006	1562	1738	4828	1516	1802	4668	1586	1616	4489	1403
Fll Permitted	0.95	1.00	1.00	0.99	1.00	1.00	0.47	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	3399	5006	1562	161	4828	1516	899	4668	1586	643	4489	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	210	2012	34	78	631	223	30	337	224	465	468	226
RTOR Reduction (vph)	0	0	19	0	0	138	0	0	156	0	0	154
Lane Group Flow (vph)	210	2012	15	78	631	85	30	337	68	465	468	72
Conf. Ped. (/hr)	1			1	6							6
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8			7	4	
Permitted Phases	5	2	2	6	6	6	8	8	8	4	4	4
Actuated Green, G (s)	12.7	51.3	51.3	52.4	45.5	45.5	20.3	15.8	15.8	46.8	38.3	38.3
Effective Green, g (s)	12.7	51.3	51.3	52.4	45.5	45.5	20.3	15.8	15.8	46.8	38.3	38.3
Actuated G/C Ratio	0.11	0.43	0.43	0.44	0.38	0.38	0.17	0.13	0.13	0.39	0.32	0.32
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	359	2140	667	160	1830	574	185	614	208	469	1432	447
v/s Ratio Prot	c0.06	c0.40	0.01	0.03	0.13	0.06	0.02	0.07	0.04	c0.22	0.10	0.05
v/s Ratio Perm	0.58	0.94	0.02	0.49	0.34	0.15	0.16	0.55	0.33	0.99	0.33	0.16
Uniform Delay, d1	51.1	32.9	19.9	26.1	26.6	24.5	42.1	48.8	47.3	32.4	31.1	29.3
Progression Factor	1.00	1.00	1.00	0.89	0.83	2.04	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	9.7	0.1	2.0	0.4	0.5	0.4	1.0	0.9	39.2	0.1	0.2
Delay (s)	53.6	42.6	19.9	25.2	22.6	50.4	42.5	49.8	48.2	71.6	31.2	29.5
Level of Service	D	D	B	C	C	D	D	D	D	D	E	C
Approach Delay (s)	43.3			29.5				48.8		47.1		
Approach LOS	D			C				D		D		D
Intersection Summary												
HCM 2000 Control Delay	42.2 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	120.0 Sum of lost time (s)											
Intersection Capacity Utilization	93.4% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												

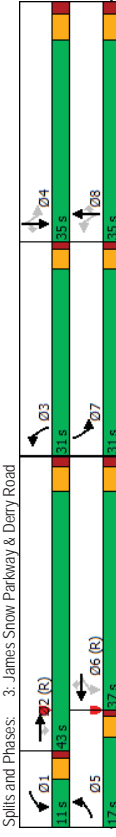
12-14-2023
 BA Group
 Synchro 11 Report

Queues
 3. James Snow Parkway & Derry Road

Future Total (AM)
 2032 Scenario 5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	W	W	W	W	W	W	W	W	W	W	W	W
Traffic Volume (vph)	206	1972	33	76	618	219	29	330	220	456	459	221
Future Volume (vph)	206	1972	33	76	618	219	29	330	220	456	459	221
Lane Group Flow (vph)	210	2012	34	78	631	223	30	337	224	465	468	226
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	3	8			7	4	
Permitted Phases	5	2	2	6	6	6	8	8	8	4	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	43.0	43.0	11.0	37.0	37.0	31.0	35.0	35.0	31.0	35.0	35.0
Total Split (%)	14.2%	35.8%	35.8%	9.2%	30.8%	30.8%	25.8%	29.2%	29.2%	25.8%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.58	0.90	0.05	0.42	0.33	0.31	0.13	0.61	0.65	0.99	0.33	0.38
Control Delay	57.6	38.4	0.1	20.1	22.4	8.5	25.3	54.9	21.2	72.1	32.4	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	38.4	0.1	20.1	22.4	8.5	25.3	54.9	21.2	72.1	32.4	5.9
Queue Length 50th (m)	25.9	169.7	0.0	8.3	43.8	11.6	4.6	29.5	10.1	97.7	34.0	0.0
Queue Length 95th (m)	37.8	232.6	0.0	19.0	61.2	34.8	10.4	39.0	35.3	144.8	43.1	18.2
Internal Link Dist (m)	156.1 488.7											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	75.0	100.0	75.0	95.0	115.0	75.0	95.0
Base Capacity (vph)	392	2239	752	185	1896	730	524	1139	523	470	1431	601
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.90	0.05	0.42	0.33	0.31	0.06	0.30	0.43	0.99	0.33	0.38
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 115												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Volume shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												

12-14-2023
 BA Group
 Synchro 11 Report



4: Clark Boulevard & Derry Road

Future Total (AM)

2032 Scenario 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	91	2429	163	189	967	91	58	7	29	26	10	43
Traffic Volume (vph)	91	2429	163	189	967	91	58	7	29	26	10	43
Future Volume (vph)	91	2429	163	189	967	91	58	7	29	26	10	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3506	1770	3494	1770	1639	1770	1639	1770	1636	1770	1636
Flt Permitted	0.25	1.00	0.05	1.00	0.72	1.00	0.72	1.00	0.73	1.00	0.73	1.00
Satd. Flow (perm)	460	3506	97	3494	1340	1639	1340	1639	1362	1636	1362	1636
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	2640	177	205	1051	99	63	8	32	28	11	47
RTOR Reduction (vph)	0	4	0	0	3	0	0	29	0	0	43	0
Lane Group Flow (vph)	99	2813	0	205	1147	0	63	11	0	28	15	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6				8			4
Permitted Phases	2			6					8			4
Actuated Green, G (s)	73.0	73.0	99.0	99.0	99.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Effective Green, g (s)	73.0	73.0	99.0	99.0	99.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Actuated g/C Ratio	0.61	0.61	0.82	0.82	0.82	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Clearance Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	2132	386	2882	111	136	113	136	113	136	113	136
v/s Ratio Prot	c0.80	c0.10	0.33									
v/s Ratio Perm	0.22	0.34	0.34	c0.05	c0.05	0.02	0.02	0.02	0.02	0.02	0.02	0.02
v/c Ratio	0.35	1.32	0.53	0.40	0.57	0.08	0.25	0.11	0.25	0.11	0.25	0.11
Uniform Delay, d1	11.7	23.5	35.1	2.7	52.9	50.7	51.5	50.9	51.5	50.9	51.5	50.9
Progression Factor	1.66	1.51	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	144.1	1.4	0.4	6.5	0.2	1.2	0.4	1.2	0.4	1.2	0.4
Delay (s)	19.8	179.5	36.5	3.1	59.4	51.0	52.6	51.2	52.6	51.2	52.6	51.2
Level of Service	B	F	D	A	E	D	D	D	D	D	D	D
Approach Delay (s)	174.1		8.2		56.2				51.7			
Approach LOS	F		A		E				D			D
Intersection Summary												
HCM 2000 Control Delay	118.6	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	1.08	F										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	105.2%	ICU Level of Service										
Analysis Period (min)	15	G										
c Critical Lane Group												

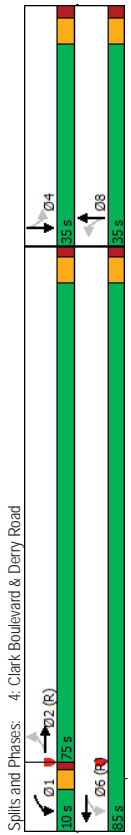
12-14-2023
BA Group

4: Clark Boulevard & Derry Road

Future Total (AM)

2032 Scenario 5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	91	2429	189	967	91	58	7	29	26	10	43	
Traffic Volume (vph)	91	2429	189	967	91	58	7	29	26	10	43	
Future Volume (vph)	91	2429	189	967	91	58	7	29	26	10	43	
Lane Group Flow (vph)	99	2817	205	1150	63	40	28	58				
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			2			1	6			8	4
Permitted Phases	2			2			1	6			8	4
Detector Phase	2			2			1	6			8	4
Switch Phase	2			2			1	6			8	4
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.35	1.30	0.53	0.39	0.47	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Control Delay	22.2	165.1	30.8	3.4	62.2	22.4	52.2	21.2	22.4	21.2	52.2	21.2
Total Delay	22.2	165.1	30.8	3.4	62.2	22.4	52.2	21.2	22.4	21.2	52.2	21.2
Queue Length 50th (m)	18.6	-467.2	29.1	31.5	15.1	1.8	6.6	2.6	15.1	1.8	6.6	2.6
Queue Length 95th (m)	m14.9	m295.2	56.8	50.7	29.3	12.4	15.6	15.2	29.3	12.4	15.6	15.2
Internal Link Dist (m)	336.0		475.1		56.4				56.4		313.3	
Turn Bay Length (m)	70.0		70.0						40.0		40.0	
Base Capacity (vph)	284	2171	388	2948	326	424	332	434	326	424	332	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	1.30	0.53	0.39	0.19	0.09	0.08	0.13	0.19	0.09	0.08	0.13
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green												
Natural Cycle: 150												
Control Type: Actuated-Coordinated												
- Volume exceeds capacity, queue is theoretically infinite.												
Queue shown is maximum after two cycles.												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



Syncho 11 Report

HCM Signalized Intersection Capacity Analysis
5: Fifth Line & Clark Boulevard

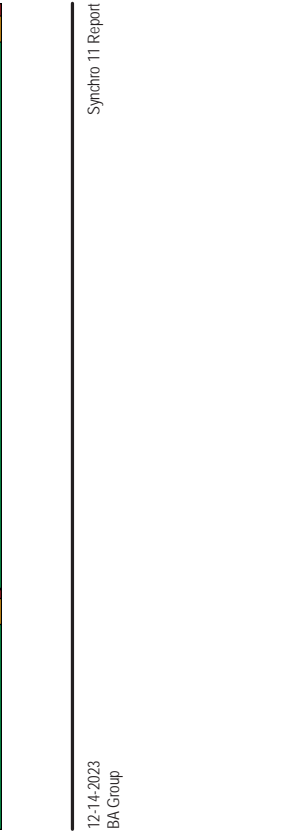
Queues
5: Fifth Line & Clark Boulevard

Future Total (AM)
2032 Scenario 5

Future Total (AM)
2032 Scenario 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	13	3	7	15	11	10	481	45	61	329	37
Traffic Volume (vph)	10	13	3	7	15	11	10	481	45	61	329	37
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.97	1.00	1.00	0.94	1.00	0.99	1.00	0.99	1.00	0.98	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	1813	1770	1743	1770	1839	1770	1839	1770	1835	1770	1835
Flt Permitted	1.00	1.00	1.00	1.00	1.00	0.53	1.00	0.43	1.00	0.43	1.00	0.43
Satd. Flow (perm)	1863	1813	1863	1743	1863	1839	1863	1839	1863	1835	1863	1835
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	14	3	8	16	12	11	523	49	66	358	40
RTOR Reduction (vph)	0	3	0	0	11	0	0	3	0	0	4	0
Lane Group Flow (vph)	11	14	0	8	17	0	11	569	0	66	394	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	6	6	6	6	6	8	8	8	8	8	4
Permitted Phases	2	3.4	3.4	3.4	3.4	3.4	26.4	26.4	26.4	26.4	26.4	26.4
Actuated Green, G (s)	3.4	3.4	3.4	3.4	3.4	3.4	26.4	26.4	26.4	26.4	26.4	26.4
Effective Green, g (s)	3.4	3.4	3.4	3.4	3.4	3.4	26.4	26.4	26.4	26.4	26.4	26.4
Actuated g/C Ratio	0.08	0.08	0.08	0.08	0.08	0.08	0.65	0.65	0.65	0.65	0.65	0.65
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	155	151	155	145	155	145	636	1189	520	1187	520	1187
v/s Ratio Prot	0.01	0.01	0.01	0.01	0.01	0.01	c0.31	c0.31	0.08	0.08	0.22	0.22
v/s Ratio Perm	0.07	0.09	0.05	0.12	0.02	0.48	0.02	0.48	0.13	0.33	0.13	0.33
Uniform Delay, d1	17.2	17.3	17.2	17.3	17.2	17.3	2.6	3.7	2.8	3.2	2.8	3.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3	0.1	0.4	0.1	0.4	0.0	0.3	0.1	0.2	0.1	0.2
Delay (s)	17.4	17.6	17.4	17.7	17.4	17.7	2.6	4.0	2.9	3.4	2.9	3.4
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	17.5	17.6	17.6	17.6	17.6	17.6	4.0	4.0	3.3	3.3	3.3	3.3
Approach LOS	B	B	B	B	B	B	A	A	A	A	A	A
Intersection Summary												
HCM 2000 Control Delay	4.5 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	0.44											
Actuated Cycle Length (s)	40.8											
Sum of lost time (s)	11.0											
Intersection Capacity Utilization	58.6%											
ICU Level of Service	B											
Analysis Period (min)	15											
c Critical Lane Group												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	13	3	7	15	11	10	481	45	61	329	37
Traffic Volume (vph)	10	13	3	7	15	11	10	481	45	61	329	37
Future Volume (vph)	10	13	3	7	15	11	10	481	45	61	329	37
Lane Group Flow (vph)	11	17	8	28	11	572	66	398	66	398	66	398
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	6	6	6	6	6	8	8	8	8	8	4
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Detector Phase	2	2	2	2	2	2	2	2	2	2	2	2
Switch Phase	2	2	2	2	2	2	2	2	2	2	2	2
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag												
Lead-Lag Optimize?	None											
Recall Mode	None											
v/c Ratio	0.02	0.03	0.02	0.02	0.06	0.01	0.38	0.10	0.27	0.10	0.27	0.27
Control Delay	13.1	12.1	13.0	10.5	4.6	5.4	4.8	4.5	4.5	4.8	4.5	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.1	12.1	13.0	10.5	4.6	5.4	4.8	4.5	4.5	4.8	4.5	4.5
Queue Length 50th (m)	0.5	0.7	0.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	3.4	4.3	2.9	5.4	2.0	50.8	7.2	31.1	7.2	31.1	7.2	31.1
Internal Link Dist (m)	204.0											
Turn Bay Length (m)	35.0											
Base Capacity (vph)	1521	1482	1521	1426	982	1839	805	1835	805	1835	805	1835
Starvation Cap Reductn	0											
Spillback Cap Reductn	0											
Storage Cap Reductn	0											
Reduced v/c Ratio	0.01	0.01	0.01	0.02	0.01	0.31	0.08	0.22	0.08	0.22	0.08	0.22
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 37.4												
Natural Cycle: 70												
Control Type: Actuated-Uncoordinated												



HCM Unsignalized Intersection Capacity Analysis
 10: Clark Boulevard & Anatolia Building 1 North Access/Anatolia Building 2 North Access Scenario 5

HCM Unsignalized Intersection Capacity Analysis
 9: Sixth Line & Anatolia Building 3 East Access

Future Total (AM)

Future Total (AM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔			↔		↔		↔	
Traffic Volume (veh/h)	10	0	2	2	0	11	1	73	4	34	302	26
Future Volume (Veh/h)	10	0	2	2	0	11	1	73	4	34	302	26
Sign Control	Stop		Stop		Free		Free		Free		Free	
Grade	0%		0%		0%		0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	2	2	0	12	1	79	4	37	328	28
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)							None					
Median type							None					
Median storage (veh)												
Upstream signal (m)											80	
pX platoon unblocked	0.99	0.99	0.99	0.99	0.99	0.99	0.99					
VC, conflicting volume	511	501	342	501	513	81	356			83		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCU, unblocked vol	497	487	326	487	499	81	340			83		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
p0 queue free %	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	100	100	99	100			98		
CM capacity (veh/h)	462	462	705	473	455	979	1202			1514		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volumes Total	13	14	84	393								
Volume Left	11	2	1	37								
Volume Right	2	12	4	28								
cSH	488	849	1202	1514								
Volumes to Capacity	0.03	0.02	0.00	0.02								
Queue Length 95th (m)	0.7	0.4	0.0	0.6								
Control Delay (s)	12.6	9.3	0.1	0.9								
Lane LOS	B	A	A	A								
Approach Delay (s)	12.6	9.3	0.1	0.9								
Approach LOS	B	A	A	A								
Intersection Summary												
Average Delay	1.3											
Intersection Capacity Utilization	36.0%											
ICU Level of Service	A											
Analysis Period (min)	15											

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	7	1	4	303	314	22
Future Volume (Veh/h)	7	1	4	303	314	22
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	1	4	329	341	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None		None	
Median type			None		None	
Median storage (veh)						
Upstream signal (m)					236	
pX platoon unblocked						
VC, conflicting volume	526	182	365			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	526	182	365			
IC, single (s)	6.8	6.9	4.1			
IC, 2 stage (s)						
p0 queue free %	3.5	3.3	2.2			
p0 queue free %	98	100	100			
CM capacity (veh/h)	480	829	1190			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volumes Total	9	114	219	227	138	
Volume Left	8	4	0	0	0	
Volume Right	1	0	0	0	24	
cSH	504	1190	1700	1700	1700	
Volumes to Capacity	0.02	0.00	0.13	0.13	0.08	
Queue Length 95th (m)	0.4	0.1	0.0	0.0	0.0	
Control Delay (s)	12.3	0.3	0.0	0.0	0.0	
Lane LOS	B	A	A	A	A	
Approach Delay (s)	12.3	0.1		0.0		
Approach LOS	B	A		A		
Intersection Summary						
Average Delay	0.2					
Intersection Capacity Utilization	21.2%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 12: Clark Boulevard & Anatolia Building 1 South Access

HCM Unsignalized Intersection Capacity Analysis
 11: Clark Boulevard & Anatolia Building 2 South Access

Future Total (AM)
 2032 Scenario 5

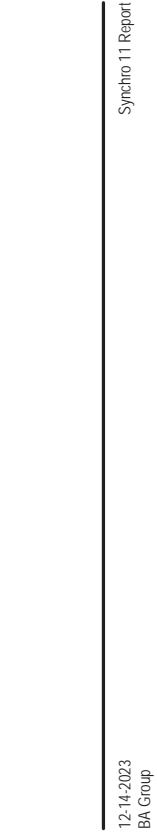
Future Total (AM)
 2032 Scenario 5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W					
Traffic Volume (veh/h)	38	3	15	36	138	130
Future Volume (Veh/h)	38	3	15	36	138	130
Sign Control	Stop			Free	Free	Free
Grade	0%			0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	3	16	39	150	141
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)				None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	292	220	291			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	292	220	291			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	94	100	99			
CM capacity (veh/h)	690	819	1271			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	44	55	291			
Volume Left	41	16	0			
Volume Right	3	0	141			
CSH	698	1271	1700			
Volumes to Capacity	0.06	0.01	0.17			
Queue Length 95th (m)	1.6	0.3	0.0			
Control Delay (s)	10.5	2.4	0.0			
Lane LOS	B	A	A			
Approach Delay (s)	10.5	2.4	0.0			
Approach LOS	B	A	A			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			25.2%			ICU Level of Service A
Analysis Period (min)			15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					
Traffic Volume (veh/h)	2	10	68	6	40	266
Future Volume (Veh/h)	2	10	68	6	40	266
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	11	74	7	43	289
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	452	78				81
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	452	78				81
IC, single (s)	6.4	6.2				4.1
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	100	99				97
CM capacity (veh/h)	549	983				1517
Direction, Lane #	WB 1	NB 1	SB 1			
Volumes Total	13	81	332			
Volume Left	2	0	43			
Volume Right	11	7	0			
CSH	877	1700	1517			
Volumes to Capacity	0.01	0.05	0.03			
Queue Length 95th (m)	0.4	0.0	0.7			
Control Delay (s)	9.2	0.0	1.2			
Lane LOS	A	A	A			
Approach Delay (s)	9.2	0.0	1.2			
Approach LOS	A	A	A			
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			32.9%			ICU Level of Service A
Analysis Period (min)			15			

1: Sixth Line & Derry Road

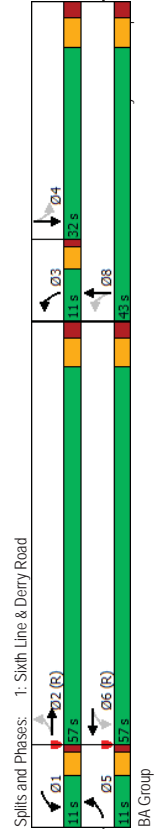
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	176	2017	109	34	1899	25	218	166	41	137	226	149
Future Volume (vph)	176	2017	109	34	1899	25	218	166	41	137	226	149
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	3169	1805	2967	1805	3468	1805	3468	1805	3468	1805	3468
Flt Permitted	0.07	1.00	0.08	1.00	0.08	1.00	0.34	1.00	0.61	1.00	0.61	1.00
Satd. Flow (perm)	134	3169	148	2967	148	2967	639	3468	813	3354	813	3354
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	187	2146	116	36	2020	27	232	177	44	146	240	159
RTOR Reduction (vph)	0	3	0	0	1	0	0	21	0	0	105	0
Lane Group Flow (vph)	187	2259	0	36	2046	0	232	200	0	146	294	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8		4		4
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	64.7	56.5		55.5	51.3		33.8	33.8		22.8		22.8
Effective Green, g (s)	64.7	56.5		55.5	51.3		33.8	33.8		22.8		22.8
Actuated g/C Ratio	0.58	0.51		0.50	0.46		0.30	0.30		0.21		0.21
Clearance Time (s)	4.0	6.2		4.0	6.2		4.0	6.3		6.3		6.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Lane Grip Cap (vph)	216	1613		136	1371		268	1056		166		688
v/s Ratio Prot	c0.07	c0.71		0.01	c0.69		c0.05	0.06		0.09		0.09
v/s Ratio Perm	0.43			0.12			c0.21			0.18		0.18
v/c Ratio	0.87	1.40		0.26	1.49		0.87	0.19		0.88		0.43
Uniform Delay, d1	31.3	27.2		24.4	29.9		35.2	28.5		42.8		38.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	28.4	184.1		1.0	225.4		24.0	0.1		37.2		0.4
Delay (s)	59.7	211.3		25.5	255.3		59.3	28.6		80.0		38.8
Level of Service	E	F		C	F		E	C		E		D
Approach Delay (s)		199.7			251.3			44.3				49.9
Approach LOS		F			F			D				D
Intersection Summary	HCM 2000 Level of Service F HCM 2000 Volume to Capacity ratio 191.7 Actuated Cycle Length (s) 1.26 Sum of lost time (s) 111.0 ICU Level of Service 20.5 Analysis Period (min) 105.2% Critical Lane Group 15											



Synchro 11 Report

1: Sixth Line & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	176	2017	109	34	1899	25	218	166	41	137	226	149
Future Volume (vph)	176	2017	109	34	1899	25	218	166	41	137	226	149
Lane Group Flow (vph)	187	2262	36	2047	232	221	146	399				
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		3	8		4		4
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		1	6		3	8		4		4
Switch Phase	5	2		1	6		3	8		4		4
Minimum Initial (s)	7.0	25.0		7.0	25.0		7.0	10.0		10.0		10.0
Minimum Split (s)	11.0	31.2		11.0	31.2		11.0	32.3		32.3		32.3
Total Split (s)	11.0	57.0		11.0	57.0		11.0	43.0		32.0		32.0
Total Split (%)	9.9%	51.4%		9.9%	51.4%		9.9%	38.7%		28.8%		28.8%
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		4.0		4.0
All-Red Time (s)	1.0	2.2		1.0	2.2		1.0	2.3		2.3		2.3
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.0	6.3		6.3		6.3
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead		Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		Yes
Recall Mode	None	C-Min		None	C-Min		None	None		None		None
v/c Ratio	0.87	1.36		0.19	1.49		0.83	0.21		0.87		0.50
Control Delay	61.5	192.7		12.6	253.0		54.8	24.3		86.0		27.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	61.5	192.7		12.6	253.0		54.8	24.3		86.0		27.4
Queue Length 50th (m)	-31.6	-387.7		3.4	-345.4		39.1	16.1		31.4		27.1
Queue Length 95th (m)	#78.6	#432.4		7.9	#390.6		#72.0	25.6		#66.1		42.4
Internal Link Dist (m)		475.1			256.2			211.8				201.7
Turn Bay Length (m)	120.0			100.0			45.0			30.0		
Base Capacity (vph)	216	1660		185	1370		281	1166		188		877
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillover Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.87	1.36		0.19	1.49		0.83	0.19		0.78		0.45
Intersection Summary	Cycle Length: 111 Actuated Cycle Length: 111 Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green Natural Cycle: 150 Control Type: Actuated-Coordinated - Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles. # 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.											



BA Group

HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road
 Future Total (PM)
 2032 Scenario 5

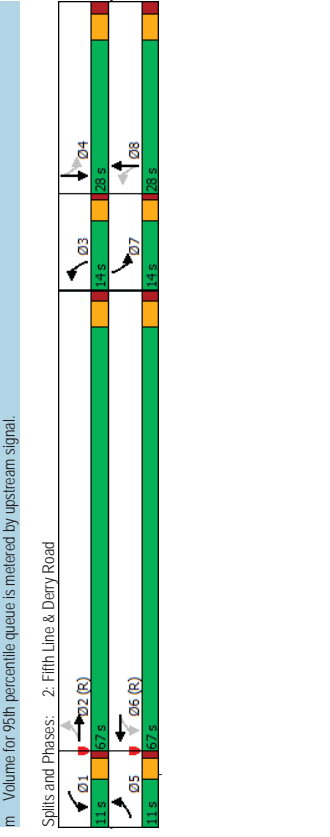
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	
Traffic Volume (vph)	43	1845	96	104	2220	122	302	75	215	312	304	
Future Volume (vph)	43	1845	96	104	2220	122	302	75	215	312	304	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7		
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1600	3260		1587	3299		1698	3051		1501	3340	
Flt Permitted	0.06	1.00		0.06	1.00		0.29	1.00		0.43	1.00	
Satd. Flow (perm)	105	3260		100	3299		523	3051		683	3340	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	46	1963	102	111	2362	130	321	80	229	332	323	
RTOR Reduction (vph)	0	3	0	0	3	0	0	95	0	0	20	
Lane Group Flow (vph)	46	2062	0	111	2489	0	321	214	0	332	388	
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	69.9	64.2		74.7	66.6		28.7	18.7		28.7	18.7	
Effective Green, g (s)	69.9	64.2		74.7	66.6		28.7	18.7		28.7	18.7	
Actuated g/C Ratio	0.58	0.54		0.62	0.55		0.24	0.16		0.24	0.16	
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	5.7		4.0	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1744		162	1830		223	475		231	520	
v/s Ratio Prot	0.02	0.63		c0.05	c0.75		c0.12	0.07		0.12	0.12	
v/s Ratio Perm	0.19			0.38			c0.22			0.22		
v/c Ratio	0.35	1.18		0.69	1.36		1.44	0.45		1.44	0.75	
Uniform Delay, d1	26.3	27.9		29.3	26.7		43.0	46.0		43.9	48.4	
Progression Factor	2.02	0.89		0.87	1.30		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	86.1		3.2	163.0		221.4	0.7		219.7	5.8	
Delay (s)	54.2	111.0		28.6	197.7		264.4	46.7		263.6	54.1	
Level of Service	D	F		C	F		F	D		F	D	
Approach Delay (s)									157.6			
Approach LOS									F		F	
Intersection Summary												
HCM 2000 Control Delay	153.9	HCM 2000 Level of Service										F
HCM 2000 Volume to Capacity ratio	1.36											
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										19.0
Intersection Capacity Utilization	114.6%	ICU Level of Service										H
Analysis Period (min)	15											

c Critical Lane Group

Queues
 2: Fifth Line & Derry Road
 Future Total (PM)
 2032 Scenario 5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	43	1845	96	104	2220	122	302	75	215	312	304
Future Volume (vph)	43	1845	96	104	2220	122	302	75	215	312	304
Lane Group Flow (vph)	46	2065	111	2492	321	309	332	408			
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA
Protected Phases	5	2		1	6		3	8		7	4
Permitted Phases	2			6			8			4	
Detector Phase	5	2		1	6		3	8		7	4
Switch Phase											
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	10.0		7.0	10.0
Minimum Split (s)	11.0	34.3		11.0	34.3		11.0	34.7		11.0	34.7
Total Split (s)	11.0	67.0		11.0	67.0		14.0	28.0		14.0	28.0
Total Split (%)	9.2%	55.8%		9.2%	55.8%		11.7%	23.3%		11.7%	23.3%
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	3.7		3.0	3.7
All-Red Time (s)	1.0	1.6		1.0	1.6		1.0	2.0		1.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	5.3		4.0	5.3		4.0	5.7		4.0	5.7
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Recall Mode	None	C-Min		None	C-Min		None	None		None	None
v/c Ratio	0.30	1.18		0.68	1.34		1.40	0.54		1.38	0.76
Control Delay	21.6	111.9		25.4	185.1		233.0	32.6		227.6	54.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	21.6	111.9		25.4	185.1		233.0	32.6		227.6	54.7
Queue Length 50th (m)	2.8	-335.8		14.5	-434.0		-81.5	23.4		-77.2	48.4
Queue Length 95th (m)	m6.2	m#362.3		m16.4	m#439.6		m#131.9	37.4		m#162.6	64.4
Internal Link Dist (m)	170.5			124.7			340.6			275.9	
Turn Bay Length (m)	100.0			90.0			70.0			50.0	
Base Capacity (vph)	151	1746		163	1856		230	658		241	640
Starvation Cap Reductn	0	0		0	0		0	0		0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0
Reduced v/c Ratio	0.30	1.18		0.68	1.34		1.40	0.47		1.38	0.64
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120	Referenced to phase 2EBTL and 6:WBTL, Start of Green										
Offset: 0 (0%)											
Natural Cycle: 145											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											

Splits and Phases: 2: Fifth Line & Derry Road

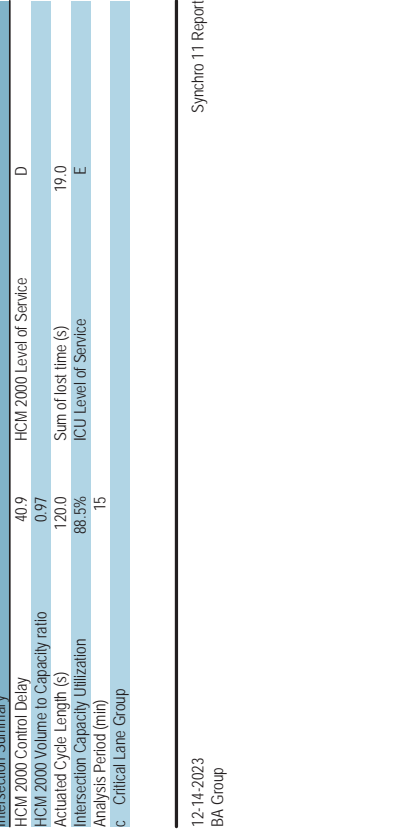


3. James Snow Parkway & Derry Road

Future Total (PM)

2032 Scenario 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	212	1322	18	288	1599	591	96	410	227	413	539	254
Future Volume (vph)	212	1322	18	288	1599	591	96	410	227	413	539	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Fpb. ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3399	5006	1562	1738	4828	1516	1802	4668	1586	1616	4489	1403
Flt Permitted	0.95	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00
Satd. Flow (perm)	3399	5006	1562	168	4828	1516	827	4668	1586	520	4489	1403
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	216	1349	18	294	1632	603	98	418	232	421	550	259
RTOR Reduction (vph)	0	12	0	0	267	0	0	151	0	0	0	191
Lane Group Flow (vph)	216	1349	6	294	1632	336	98	418	81	421	550	68
Confit. Peds. (#/hr)	1	6	6	1	6	6	1	6	6	1	6	6
Heavy Vehicles (%)	2%	1%	3%	3%	4%	3%	0%	8%	1%	5%	10%	7%
Bus Blockages (#/hr)	5	19	1	2	24	5	0	21	2	15	36	13
Turn Types	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	6	3	8	8	7	4	4
Permitted Phases	5	2	2	1	6	6	3	8	8	7	4	4
Actuated Green, G (s)	12.9	39.6	39.6	63.5	46.6	46.6	26.3	16.5	16.5	45.5	31.7	31.7
Effective Green, g (s)	12.9	39.6	39.6	63.5	46.6	46.6	26.3	16.5	16.5	45.5	31.7	31.7
Actuated G/C Ratio	0.11	0.33	0.33	0.53	0.39	0.39	0.22	0.14	0.14	0.38	0.26	0.26
Clearance Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap. (vph)	365	1651	515	349	1874	588	260	641	218	425	1185	370
v/s Ratio Prot	0.06	0.27	0.00	0.14	0.34	0.03	0.09	0.05	0.05	0.21	0.12	0.12
v/s Ratio Perm	0.59	0.82	0.01	0.84	0.87	0.57	0.38	0.65	0.37	0.99	0.46	0.18
Uniform Delay, d1	51.0	36.9	27.0	33.3	33.9	28.9	38.7	49.0	47.0	32.3	37.0	34.2
Progression Factor	1.00	1.00	1.00	0.80	0.88	1.51	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	4.6	0.0	1.8	0.6	0.4	0.9	2.4	1.1	41.0	0.3	0.2
Delay (s)	53.6	41.5	27.1	28.6	30.4	43.8	39.6	51.4	48.1	73.3	37.3	34.4
Level of Service	D	D	C	C	C	C	D	D	D	D	E	D
Approach Delay (s)	D	D	C	C	C	C	D	D	D	D	E	D
Approach LOS	D	D	C	C	C	C	D	D	D	D	E	D
Intersection Summary												
HCM 2000 Control Delay	40.9 HCM 2000 Level of Service D											
HCM 2000 Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 19.0											
Intersection Capacity Utilization	88.5% ICU Level of Service E											
Analysis Period (min)	15											
Critical Lane Group	c											

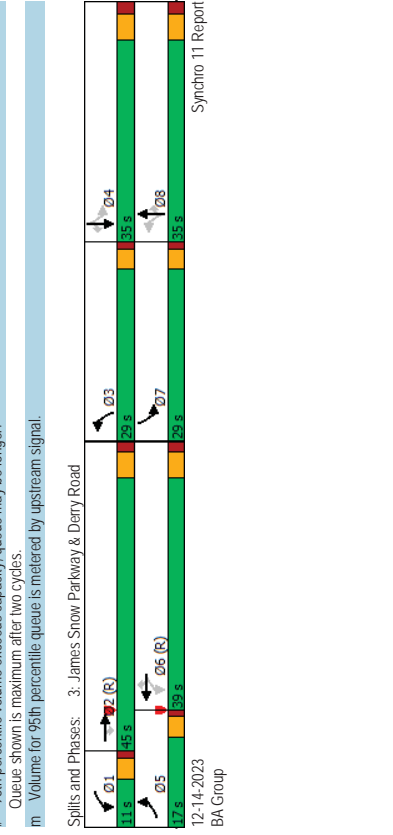


3. James Snow Parkway & Derry Road

Future Total (PM)

2032 Scenario 5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	212	1322	18	288	1599	591	96	410	227	413	539	254
Future Volume (vph)	212	1322	18	288	1599	591	96	410	227	413	539	254
Lane Group Flow (vph)	216	1349	18	294	1632	603	98	418	232	421	550	259
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2	2	1	6	6	3	8	8	7	4	4
Permitted Phases	5	2	2	1	6	6	3	8	8	7	4	4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase	5	2	2	1	6	6	3	8	8	7	4	4
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	34.3	34.3	11.0	34.3	34.3	11.0	34.7	34.7	11.0	34.7	34.7
Total Split (s)	17.0	45.0	45.0	11.0	39.0	39.0	29.0	35.0	35.0	29.0	35.0	35.0
Total Split (%)	14.2%	37.5%	37.5%	9.2%	32.5%	32.5%	24.2%	29.2%	29.2%	24.2%	29.2%	29.2%
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	1.0	1.6	1.6	1.0	1.6	1.6	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	5.3	4.0	5.3	5.3	4.0	5.7	5.7	4.0	5.7	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
v/c Ratio	0.59	0.81	0.03	0.84	0.87	0.70	0.36	0.66	0.63	0.97	0.46	0.46
Control Delay	57.6	41.6	0.1	29.2	31.6	14.2	28.2	53.9	21.4	68.8	38.4	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	41.6	0.1	29.2	31.6	14.2	28.2	53.9	21.4	68.8	38.4	7.0
Queue Length 50th (m)	26.7	111.7	0.0	47.3	149.0	94.9	15.5	36.5	12.9	85.1	42.1	0.0
Queue Length 95th (m)	38.5	131.0	0.0	m34.1	m111.7	m46.6	25.8	46.6	38.3	#135.3	53.2	20.8
Internal Link Dist (m)	156.1 488.7											
Turn Bay Length (m)	100.0	70.0	110.0	75.0	100.0	100.0	75.0	95.0	75.0	95.0	213.2	115.0
Base Capacity (vph)	395	1656	581	349	1879	856	500	1139	519	432	1184	560
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.81	0.03	0.84	0.87	0.70	0.20	0.37	0.45	0.97	0.46	0.46
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green												
Natural Cycle: 95												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Volume shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



HCM Signalized Intersection Capacity Analysis
 4: Clark Boulevard & Derry Road

Future Total (PM)
 2032 Scenario 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2132	58	43	2183	24	211	10	134	80	7
Future Volume (vph)	36	2132	58	43	2183	24	211	10	134	80	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3525	1770	3533	1770	1603	1770	1603	1770	1595	1770
Flt Permitted	0.06	1.00	0.05	1.00	0.52	1.00	0.52	1.00	0.59	1.00	0.59
Satd. Flow (perm)	105	3525	99	3533	99	3533	977	1603	1100	1595	1100
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	2317	63	47	2373	26	229	11	146	87	8
RTOR Reduction (vph)	0	2	0	0	1	0	0	68	0	0	6
Lane Group Flow (vph)	39	2378	0	47	2398	0	229	89	0	87	186
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2			1	6			8			4
Permitted Phases	2			6				8			4
Actuated Green, G (s)	71.0	71.0	79.8	79.8	79.8	29.2	29.2	29.2	29.2	29.2	29.2
Effective Green, g (s)	71.0	71.0	79.8	79.8	79.8	29.2	29.2	29.2	29.2	29.2	29.2
Actuated g/C Ratio	0.59	0.59	0.66	0.66	0.66	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	62	2085	132	2349	237	390	237	390	267	388	0.12
v/s Ratio Prot		c0.67		0.01	c0.68		0.22	c0.23		0.08	0.12
v/s Ratio Perm		0.63	1.14	0.36	1.02	0.36	0.97	0.23	0.33	0.48	0.33
Uniform Delay, d1	15.9	24.5	28.5	20.1	44.9	36.4	44.9	36.4	37.3	38.9	38.9
Progression Factor	1.50	1.39	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	63.9	1.6	24.1	48.5	0.3	48.5	0.3	0.7	0.9	0.9
Delay (s)	28.1	97.9	30.1	44.2	93.4	36.7	93.4	36.7	38.0	39.8	39.8
Level of Service	C	F	C	D	D	F	D	D	D	D	D
Approach Delay (s)		96.7		43.9		70.3		70.3		39.3	
Approach LOS		F		D		E		E		D	

Intersection Summary

HCM 2000 Control Delay	68.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c. Critical Lane Group

12-14-2023
 BA Group
 Synchro 11 Report

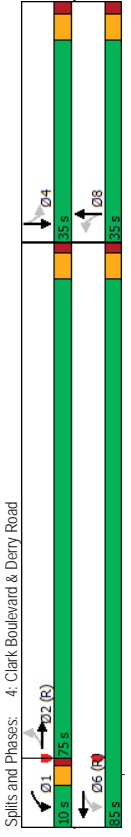
Queues
 4: Clark Boulevard & Derry Road

Future Total (PM)
 2032 Scenario 5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2132	58	43	2183	24	211	10	134	80	7
Future Volume (vph)	36	2132	58	43	2183	24	211	10	134	80	7
Lane Group Flow (vph)	39	2380	47	2399	229	157	87	192			
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2			1	6			8			4
Permitted Phases	2			6				8			4
Detector Phase	2			1	6			8			4
Switch Phase	2			2				2			2
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	C-Min	None	None	None	None
v/s Ratio	0.63	1.13	0.31	0.31	1.02	0.97	0.34	0.33	0.49	0.49	0.49
Control Delay	39.4	90.1	12.0	45.0	95.9	18.8	41.4	42.2			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.4	90.1	12.0	45.0	95.9	18.8	41.4	42.2			
Queue Length 50th (m)	8.1	-364.0	3.6	-332.8	56.3	13.2	17.8	39.3			
Queue Length 95th (m)	m7.7	m232.8	7.6	#376.2	#108.1	32.5	33.7	63.3			
Internal Link Dist (m)		336.0		475.1		56.4		313.3			
Turn Bay Length (m)		70.0		70.0		40.0		40.0			
Base Capacity (vph)	62	2111	150	2349	238	459	268	395			
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	1.13	0.31	0.31	1.02	0.96	0.34	0.32	0.49	0.49	0.49

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
- Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis
 5: Fifth Line & Clark Boulevard

Future Total (PM)
 2032 Scenario 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4	
Traffic Volume (vph)	44	15	10	39	11	63	4	475	9	12	467	16	
Future Volume (vph)	44	15	10	39	11	63	4	475	9	12	467	16	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1749	1770	1625	1770	1625	1770	1857	1770	1857	1770	1854	
Flt Permitted	0.70	1.00	0.74	1.00	0.42	1.00	0.42	1.00	0.42	1.00	0.42	1.00	
Satd. Flow (perm)	1313	1749	1378	1625	786	1857	786	1857	784	1854	1313	1854	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	48	16	11	42	12	68	4	516	10	13	508	17	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	48	18	0	42	26	0	4	525	0	13	524	0	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	2		6		6		8		8		4		
Permitted Phases	2		6		6		8		8		4		
Actuated Green, G (s)	7.7	7.7	7.7	7.7	7.7	7.7	19.8	19.8	19.8	19.8	19.8	19.8	
Effective Green, g (s)	7.7	7.7	7.7	7.7	7.7	7.7	19.8	19.8	19.8	19.8	19.8	19.8	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.51	0.51	0.51	0.51	0.51	0.51	
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	262	349	275	325	404	955	404	955	403	953	403	953	
v/s Ratio Prot	0.01		0.02		0.02		0.28		0.28		0.28		
v/s Ratio Perm	0.04		0.03		0.03		0.01		0.02		0.02		
v/c Ratio	0.18	0.05	0.15	0.08	0.15	0.08	0.01	0.55	0.03	0.55	0.03	0.55	
Uniform Delay, d1	12.8	12.4	12.7	12.5	4.6	6.3	4.6	6.3	4.6	6.3	4.6	6.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.1	0.3	0.1	0.0	0.7	0.0	0.7	0.0	0.7	0.0	0.7	
Delay (s)	13.1	12.5	13.0	12.6	4.6	7.0	4.6	7.0	4.7	7.0	4.7	7.0	
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A	
Approach Delay (s)	12.9		12.7		12.7		7.0		6.9		6.9		
Approach LOS	B		B		B		A		A		A		
Intersection Summary													
HCM 2000 Control Delay	7.9											HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45												
Actuated Cycle Length (s)	38.5											Sum of lost time (s)	11.0
Intersection Capacity Utilization	43.8%											ICU Level of Service	A
Analysis Period (min)	15												
c Critical Lane Group													

Queues
 5: Fifth Line & Clark Boulevard

Future Total (PM)
 2032 Scenario 5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	44	15	10	39	11	63	4	475	9	12	467	16
Future Volume (vph)	44	15	10	39	11	63	4	475	9	12	467	16
Lane Group Flow (vph)	48	27	42	80	4	526	13	525	0	13	524	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2		6		6		8		8		4	
Permitted Phases	2		6		6		8		8		4	
Detector Phase	2		6		6		8		8		4	
Switch Phase	2		6		6		8		8		4	
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	70.8%	70.8%	70.8%	70.8%	70.8%	70.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag												
Lead-Lag Optimize?	None											
Recall Mode	None											
v/c Ratio	0.13	0.06	0.11	0.16	0.16	0.01	0.50	0.03	0.50	0.03	0.50	0.50
Control Delay	12.9	9.7	12.6	6.1	5.5	9.4	5.9	9.4	5.9	9.4	5.9	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	9.7	12.6	6.1	5.5	9.4	5.9	9.4	5.9	9.4	5.9	9.4
Queue Length 50th (m)	2.2	0.7	1.9	0.5	0.1	24.4	0.5	24.3	0.5	24.3	0.5	24.3
Queue Length 95th (m)	9.1	5.3	8.3	8.2	1.1	45.4	2.2	45.2	2.2	45.2	2.2	45.2
Internal Link Dist (m)	204.0		86.5		86.5		156.9		372.1		372.1	
Turn Bay Length (m)	35.0		35.0		35.0		35.0		35.0		35.0	
Base Capacity (vph)	1058	1412	1111	1322	786	1857	784	1853	784	1853	784	1853
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.02	0.04	0.06	0.01	0.28	0.02	0.28	0.02	0.28	0.02	0.28
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 37.3												
Natural Cycle: 70												
Control Type: Actuated-Uncoordinated												
Spills and Phases: 5: Fifth Line & Clark Boulevard												

HCM Unsignalized Intersection Capacity Analysis
 10: Clark Boulevard & Anatolia Building 1 North Access/Anatolia Building 2 North Access Scenario 5

HCM Unsignalized Intersection Capacity Analysis
 9: Sixth Line & Anatolia Building 3 East Access Scenario 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	40	0	7	4	0	36	1	279	1	9	91	8
Future Volume (Veh/h)	40	0	7	4	0	36	1	279	1	9	91	8
Sign Control	Stop	0%	Free	Stop	0%	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	0	8	4	0	39	1	303	1	10	99	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												80
dx platoon unblocked												
VC conflicting volume	468	430	104	437	434	304	108			304		
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	468	430	104	437	434	304	108			304		
IC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
IC, 2 stage (s)												
IF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	100	99	99	100	95	100			99		
CM capacity (veh/h)	475	514	951	522	511	736	1483			1257		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volumes Total	51	43	305	118								
Volume Left	43	4	1	10								
Volume Right	8	39	1	9								
cSH	516	709	1483	1257								
Volumes to Capacity	0.10	0.06	0.00	0.01								
Queue Length 95th (m)	2.6	1.5	0.0	0.2								
Control Delay (s)	12.7	10.4	0.0	0.7								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.7	10.4	0.0	0.7								
Approach LOS	B	B	A	A								
Intersection Summary												
Average Delay	2.3											
Intersection Capacity Utilization	31.0%											
ICU Level of Service	A											
Analysis Period (min)	15											

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	22	4	2	403	361	8
Future Volume (Veh/h)	22	4	2	403	361	8
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	4	2	438	392	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						236
dx platoon unblocked						
VC conflicting volume	620	200	401			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	620	200	401			
IC, single (s)	6.8	6.9	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	94	100	100			
CM capacity (veh/h)	420	807	1154			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volumes Total	28	148	292	261	140	
Volume Left	24	2	0	0	0	
Volume Right	4	0	0	0	9	
cSH	450	1154	1700	1700	1700	
Volumes to Capacity	0.06	0.00	0.17	0.15	0.08	
Queue Length 95th (m)	1.6	0.0	0.0	0.0	0.0	
Control Delay (s)	13.5	0.1	0.0	0.0	0.0	
Lane LOS	B	A	A	A	A	
Approach Delay (s)	13.5	0.0	0.0	0.0	0.0	
Approach LOS	B	A	A	A	A	
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	22.5%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 12: Clark Boulevard & Anatolia Building 1 South Access

Future Total (PM)
 2032 Scenario 5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W					
Traffic Volume (veh/h)	130	12	4	119	42	48
Future Volume (Veh/h)	130	12	4	119	42	48
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	13	4	129	46	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	209	72	98			
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	209	72	98			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	82	99	100			
CM capacity (veh/h)	777	990	1495			
Direction, Lane #	EB 1	NB 1	SB 1			
Volumes Total	154	133	98			
Volume Left	141	4	0			
Volume Right	13	0	52			
cSH	792	1495	1700			
Volumes to Capacity	0.19	0.00	0.06			
Queue Length 95th (m)	5.7	0.1	0.0			
Control Delay (s)	10.6	0.2	0.0			
Lane LOS	B	A	A			
Approach Delay (s)	10.6	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		4.3				
Intersection Capacity Utilization		24.1%				ICU Level of Service A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
 11: Clark Boulevard & Anatolia Building 2 South Access

Future Total (PM)
 2032 Scenario 5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					
Traffic Volume (veh/h)	6	36	245	4	18	84
Future Volume (Veh/h)	6	36	245	4	18	84
Sign Control	Stop		Free	Free	Free	Free
Grade	0%		0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	39	266	4	20	91
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None	None	None	None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	399	268		270		
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	399	268		270		
IC, single (s)	6.4	6.2		4.1		
IC, 2 stage (s)						
IF (s)	3.5	3.3		2.2		
p0 queue free %	99	95		98		
CM capacity (veh/h)	597	771		1293		
Direction, Lane #	WB 1	NB 1	SB 1			
Volumes Total	46	270	111			
Volume Left	7	0	20			
Volume Right	39	4	0			
cSH	738	1700	1293			
Volumes to Capacity	0.06	0.16	0.02			
Queue Length 95th (m)	1.6	0.0	0.4			
Control Delay (s)	10.2	0.0	1.5			
Lane LOS	B	A	A			
Approach Delay (s)	10.2	0.0	1.5			
Approach LOS	B					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			29.9%			ICU Level of Service A
Analysis Period (min)			15			

2032 Scenario 6 (Sensitivity) Future Background (AM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	164	2201	153	17	763	41	76	173	30	46	142
Traffic Volume (vph)	164	2201	153	17	763	41	76	173	30	46	142
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	6.2	4.0	6.2	4.0	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost time (s)	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.93	1.00
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1763	4710	1805	4371	1805	3504	1805	3504	1258	3307	1258
Flt Permitted	0.29	1.00	0.06	1.00	0.06	1.00	0.46	1.00	0.61	1.00	0.61
Satd. Flow (perm)	542	4710	107	4371	883	3504	883	3504	806	3307	806
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	174	2341	163	18	812	44	81	184	32	49	151
RTOR Reduction (vph)	0	5	0	4	0	4	0	15	0	0	124
Lane Group Flow (vph)	174	2499	0	18	852	0	81	201	0	49	170
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	6	8	8	8	8	4	4
Permitted Phases	2	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	83.8	77.0	74.1	71.3	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Effective Green, g (s)	83.8	77.0	74.1	71.3	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Actuated g/C Ratio	0.75	0.69	0.67	0.64	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	502	3267	114	2807	116	464	106	437	0.06	0.06	0.05
v/s Ratio Prot	c0.03	c0.53	0.00	0.19	0.06	0.06	0.06	0.06	0.06	0.06	0.05
v/s Ratio Perm	0.23	0.76	0.16	0.30	0.70	0.43	0.46	0.39	0.46	0.39	0.39
Uniform Delay, d1	3.9	11.1	9.0	8.8	46.0	44.3	44.5	44.0	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.8	0.7	0.3	16.8	0.7	3.2	0.6	0.7	3.2	0.6
Delay (s)	4.4	12.9	9.6	9.1	62.8	45.0	47.7	44.6	1.7	4.7	1.6
Level of Service	A	B	A	A	E	D	D	D	D	D	D
Approach Delay (s)	12.3	9.1	9.1	9.1	49.8	45.1	45.1	45.1	45.1	45.1	45.1
Approach LOS	B	B	A	A	D	D	D	D	D	D	D
Intersection Summary											
HCM 2000 Control Delay	17.0 HCM 2000 Level of Service B										
HCM 2000 Volume to Capacity ratio	0.75										
Actuated Cycle Length (s)	111.0 Sum of lost time (s) 16.5										
Intersection Capacity Utilization	87.4% ICU Level of Service E										
Analysis Period (min)	15										
c Critical Lane Group											

2032 Scenario 6 (Sensitivity) Future Background (AM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	164	2201	17	763	76	173	46	142	142	142	142
Traffic Volume (vph)	164	2201	17	763	76	173	46	142	142	142	142
Future Volume (vph)	174	2504	18	856	81	216	49	294	294	294	294
Ideal Flow (vphpl)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost time (s)	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.93	1.00
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1763	4710	1805	4371	1805	3504	1805	3504	1258	3307	1258
Flt Permitted	0.29	1.00	0.06	1.00	0.06	1.00	0.46	1.00	0.61	1.00	0.61
Satd. Flow (perm)	542	4710	107	4371	883	3504	883	3504	806	3307	806
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	174	2341	163	18	812	44	81	184	32	49	151
RTOR Reduction (vph)	0	5	0	4	0	4	0	15	0	0	124
Lane Group Flow (vph)	174	2499	0	18	852	0	81	201	0	49	170
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	6	8	8	8	8	4	4
Permitted Phases	2	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	83.8	77.0	74.1	71.3	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Effective Green, g (s)	83.8	77.0	74.1	71.3	14.7	14.7	14.7	14.7	14.7	14.7	14.7
Actuated g/C Ratio	0.75	0.69	0.67	0.64	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	502	3267	114	2807	116	464	106	437	0.06	0.06	0.05
v/s Ratio Prot	c0.03	c0.53	0.00	0.19	0.06	0.06	0.06	0.06	0.06	0.06	0.05
v/s Ratio Perm	0.23	0.76	0.16	0.30	0.70	0.43	0.46	0.39	0.46	0.39	0.39
Uniform Delay, d1	3.9	11.1	9.0	8.8	46.0	44.3	44.5	44.0	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.8	0.7	0.3	16.8	0.7	3.2	0.6	0.7	3.2	0.6
Delay (s)	4.4	12.9	9.6	9.1	62.8	45.0	47.7	44.6	1.7	4.7	1.6
Level of Service	A	B	A	A	E	D	D	D	D	D	D
Approach Delay (s)	12.3	9.1	9.1	9.1	49.8	45.1	45.1	45.1	45.1	45.1	45.1
Approach LOS	B	B	A	A	D	D	D	D	D	D	D
Intersection Summary											
HCM 2000 Control Delay	17.0 HCM 2000 Level of Service B										
HCM 2000 Volume to Capacity ratio	0.75										
Actuated Cycle Length (s)	111.0 Sum of lost time (s) 16.5										
Intersection Capacity Utilization	87.4% ICU Level of Service E										
Analysis Period (min)	15										
c Critical Lane Group											

Intersections

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
1: Sixth Line & Derry Road	164	2201	17	763	76	173	46	142	142	142	142
Future Background (AM)	174	2504	18	856	81	216	49	294	294	294	294
Protected Phases	5	2	1	6	6	8	8	8	8	4	4
Detector Phase	5	2	1	6	6	8	8	8	8	4	4
Switch Phase	5	2	1	6	6	8	8	8	8	4	4
Minimum Initial (s)	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Total Split (s)	11.0	67.0	11.0	67.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (%)	9.9%	60.4%	9.9%	60.4%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None
v/c Ratio	0.34	0.74	0.10	0.30	0.69	0.45	0.46	0.52	0.46	0.52	0.46
Control Delay	5.5	13.3	5.2	9.7	74.3	43.0	57.0	25.3	57.0	25.3	57.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	13.3	5.2	9.7	74.3	43.0	57.0	25.3	57.0	25.3	57.0
Queue Length 50th (m)	7.9	89.0	0.8	27.8	18.0	22.4	10.5	16.8	10.5	16.8	16.8
Queue Length 95th (m)	17.9	194.0	3.1	45.6	33.4	32.4	22.2	28.7	22.2	28.7	28.7
Internal Link Dist (m)	475.1	256.2	211.8	201.7	120.0	100.0	45.0	30.0	45.0	30.0	30.0
Turn Bay Length (m)	511	3372	183	2809	212	856	194	904	212	856	194
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.74	0.10	0.30	0.38	0.25	0.25	0.33	0.25	0.33	0.33

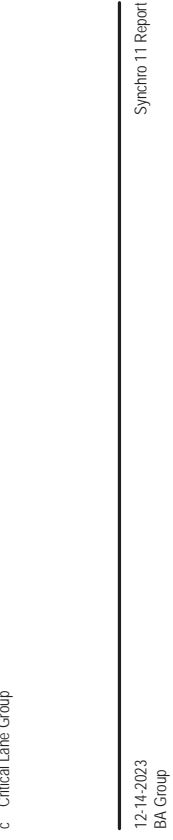
Cycle Length: 111
 Actuated Cycle Length: 111
 Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated



HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road
 2032 Scenario 6 (Sensitivity)

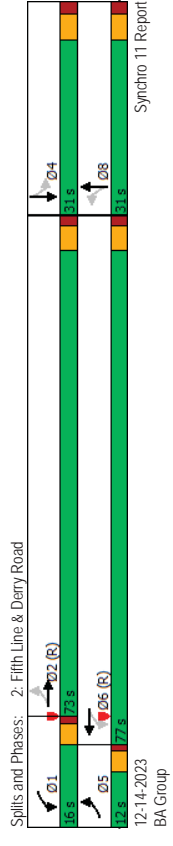
Future Background (AM)
 2032 Scenario 6 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	92	2238	104	193	753	261	100	289	106	109	72	32
Traffic Volume (vph)	92	2238	104	193	753	261	100	289	106	109	72	32
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost time (s)	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.96	1.00	0.96	1.00	0.96	1.00	0.96	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	4809	1587	4529	1698	3207	1501	3253	1501	3253	1501	3253
Flt Permitted	0.24	1.00	0.06	1.00	0.68	1.00	0.36	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	401	4809	94	4529	94	4529	1219	3207	567	3253	567	3253
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	98	2381	111	205	801	278	106	307	113	116	77	34
RTOR Reduction (vph)	0	4	0	0	52	0	0	31	0	0	0	27
Lane Group Flow (vph)	98	2488	0	205	1027	0	106	389	0	116	84	0
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	2
Turn Type	pm+pl	NA	pm+pl	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	5	2	2	1	6	6	8	8	4	4	4	4
Permitted Phases	74.9	67.3	83.3	71.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7
Effective Green, G (s)	74.9	67.3	83.3	71.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7
Actuated g/C Ratio	0.62	0.56	0.69	0.60	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	326	2697	214	2706	261	686	121	696	121	696	121	696
v/s Ratio Prot	0.02	0.52	c0.10	0.23	0.09	0.12	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	0.17	c0.57	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
v/c Ratio	0.30	0.92	0.96	0.38	0.41	0.57	0.46	0.12	0.38	0.41	0.12	0.12
Uniform Delay, d1	9.1	24.0	39.6	12.6	40.6	42.2	46.6	38.0	46.6	38.0	38.0	38.0
Progression Factor	0.51	0.48	1.14	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	4.9	48.7	0.4	1.0	1.1	68.1	0.1	68.1	0.1	0.1	0.1
Delay (s)	5.0	16.3	93.7	12.1	41.6	43.2	114.7	38.1	114.7	38.1	38.1	38.1
Level of Service	A	B	F	B	D	D	F	D	F	D	F	D
Approach Delay (s)	15.9	25.1	42.9	25.1	42.9	42.9	77.3	42.9	77.3	42.9	77.3	77.3
Approach LOS	B	B	C	C	D	D	E	D	E	D	E	E
Intersection Summary												
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	0.98	C										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	93.2%	15.0										
Analysis Period (min)	15	F										
c Critical Lane Group												



Future Background (AM)
 2032 Scenario 6 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	92	2238	104	193	753	261	100	289	106	109	72	32
Traffic Volume (vph)	92	2238	104	193	753	261	100	289	106	109	72	32
Future Volume (vph)	92	2238	104	193	753	261	100	289	106	109	72	32
Lane Group Flow (vph)	98	2492	205	1079	106	420	116	111	111	111	111	111
Turn Type	pm+pl	NA	pm+pl	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	5	2	2	1	6	6	8	8	4	4	4	4
Permitted Phases	74.9	67.3	83.3	71.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7
Effective Green, G (s)	74.9	67.3	83.3	71.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7
Actuated g/C Ratio	0.62	0.56	0.69	0.60	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	326	2697	214	2706	261	686	121	696	121	696	121	696
v/s Ratio Prot	0.02	0.52	c0.10	0.23	0.09	0.12	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	0.17	c0.57	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
v/c Ratio	0.30	0.92	0.96	0.38	0.41	0.57	0.46	0.12	0.38	0.41	0.12	0.12
Uniform Delay, d1	9.1	24.0	39.6	12.6	40.6	42.2	46.6	38.0	46.6	38.0	38.0	38.0
Progression Factor	0.51	0.48	1.14	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	4.9	48.7	0.4	1.0	1.1	68.1	0.1	68.1	0.1	0.1	0.1
Delay (s)	5.0	16.3	93.7	12.1	41.6	43.2	114.7	38.1	114.7	38.1	38.1	38.1
Level of Service	A	B	F	B	D	D	F	D	F	D	F	D
Approach Delay (s)	15.9	25.1	42.9	25.1	42.9	42.9	77.3	42.9	77.3	42.9	77.3	77.3
Approach LOS	B	B	C	C	D	D	E	D	E	D	E	E
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 110												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



HCM Signalized Intersection Capacity Analysis
 4: Clark Boulevard & Derry Road

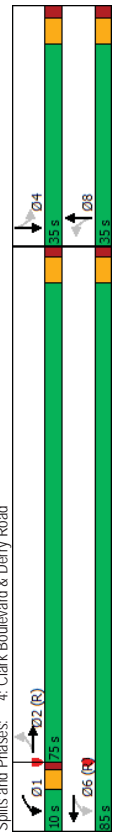
Future Background (AM)
 2032 Scenario 6 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	91	2411	0	0	962	91	0	7	0	26	10
Traffic Volume (vph)	91	2411	0	0	962	91	0	7	0	26	10
Future Volume (vph)	91	2411	0	0	962	91	0	7	0	26	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.88	1.00	0.88
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	1770	5085	5019	1770	5019	1770	1863	1770	1636	1770	1636
Flt Permitted	0.23	1.00	1.00	0.23	1.00	0.75	1.00	0.75	1.00	0.75	1.00
Satd. Flow (perm)	437	5085	5019	437	5019	1402	1636	1402	1636	1402	1636
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	2621	0	0	1046	99	0	8	0	28	11
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	0	0	44
Lane Group Flow (vph)	99	2621	0	0	1141	0	0	8	0	28	14
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	6	1	6	8	8	8	8	4	4
Permitted Phases	2	6	8	6	8	8	8	8	8	4	4
Actuated Green, G (s)	100.8	100.8	100.8	100.8	100.8	8.2	8.2	8.2	8.2	8.2	8.2
Effective Green, g (s)	100.8	100.8	100.8	100.8	100.8	8.2	8.2	8.2	8.2	8.2	8.2
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.84	0.07	0.07	0.07	0.07	0.07	0.07
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	367	4271	4215	367	4215	127	95	111	95	111	111
v/s Ratio Prot	c0.52	0.23	0.23	c0.52	0.23	0.00	0.00	0.01	0.00	0.01	0.01
v/s Ratio Perm	0.23	0.27	0.27	0.23	0.27	0.06	0.06	0.13	0.06	0.13	0.13
Uniform Delay, d1	2.0	3.2	3.2	2.0	3.2	52.3	52.3	52.5	52.3	52.5	52.5
Progression Factor	2.06	3.11	3.11	2.06	3.11	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3	0.3	0.8	0.3	0.2	0.2	0.5	0.2	0.5	0.5
Delay (s)	4.9	10.2	10.2	4.9	10.2	52.5	52.5	54.9	52.5	54.9	54.9
Level of Service	A	B	B	A	B	D	D	D	D	D	D
Approach Delay (s)	10.0	2.1	2.1	10.0	2.1	52.5	52.5	53.7	52.5	53.7	53.7
Approach LOS	A	A	A	A	A	D	D	D	D	D	D
Intersection Summary											
HCM 2000 Control Delay	8.8 HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	0.61										
Actuated Cycle Length (s)	120.0 Sum of lost time (s)										
Intersection Capacity Utilization	72.4% ICU Level of Service										
Analysis Period (min)	15										
c Critical Lane Group											

Queues
 4: Clark Boulevard & Derry Road

Future Background (AM)
 2032 Scenario 6 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	91	2411	0	0	962	91	0	7	0	26	10
Traffic Volume (vph)	91	2411	0	0	962	91	0	7	0	26	10
Future Volume (vph)	91	2411	0	0	962	91	0	7	0	26	10
Lane Group Flow (vph)	99	2621	1145	8	28	58	NA	NA	NA	Perm	NA
Turn Type	Perm	NA	NA	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	6	8	4	4	4	4	4	1	1
Detector Phase	2	2	6	8	4	4	4	4	4	4	4
Switch Phase	2	2	6	8	4	4	4	4	4	4	4
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	34.3	34.3	34.3	34.3	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	75.0	75.0	75.0	75.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	62.5%	62.5%	62.5%	62.5%	62.5%	62.5%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.6	1.6	1.6	1.6	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio	0.26	0.60	0.27	0.27	0.05	0.24	0.32	0.32	0.32	0.32	0.32
Control Delay	6.1	10.8	2.2	2.2	51.1	56.5	23.8	23.8	23.8	23.8	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	10.8	2.2	2.2	51.1	56.5	23.8	23.8	23.8	23.8	23.8
Queue Length 50th (m)	7.5	230.4	17.5	17.5	1.9	6.6	2.6	2.6	2.6	2.6	2.6
Queue Length 95th (m)	m10.7	m199.2	22.1	22.1	7.0	16.4	16.0	16.0	16.0	16.0	16.0
Internal Link Dist (m)	336.0 475.1 56.4 313.3										
Turn Bay Length (m)	70.0 40.0										
Base Capacity (vph)	376	4365	4312	454	454	342	434	434	434	434	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.60	0.27	0.27	0.02	0.08	0.13	0.13	0.13	0.13	0.13
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green											
Natural Cycle: 100											
Control Type: Actuated-Coordinated											
m Volume for 95th percentile queue is metered by upstream signal.											



Splits and Phases: 4: Clark Boulevard & Derry Road
 12-14-2023
 BA Group

Synchro 11 Report
 12-14-2023
 BA Group

2032 Scenario 6 (Sensitivity)

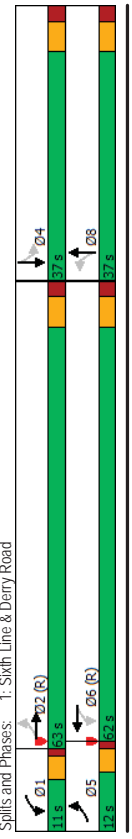
Future Background (PM)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	4	4	1	4	4	1	4	4	1	4	4
Traffic Volume (vph)	171	1881	85	31	1855	25	201	166	33	137	226	147
Future Volume (vph)	171	1881	85	31	1855	25	201	166	33	137	226	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	4724	1805	4434	1805	4434	1805	3492	1805	4434	1805	3356
Flt Permitted	0.07	1.00	0.07	1.00	0.44	1.00	0.44	1.00	0.62	1.00	0.62	1.00
Satd. Flow (perm)	123	4724	135	4434	840	3492	840	3492	820	3356	820	3356
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	182	2001	90	33	1973	27	214	177	35	146	240	156
RTOR Reduction (vph)	0	4	0	0	1	0	0	15	0	0	92	0
Lane Group Flow (vph)	182	2087	0	33	1999	0	214	197	0	146	304	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pt	NA	pm+pt	NA	NA	NA	NA	NA	NA	Perm	NA	NA
Protected Phases	5	2		1	6		8		8		4	
Permitted Phases	2			6			8		8		4	
Actuated Green, G (s)	68.9	60.7	60.6	56.4	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6
Effective Green, g (s)	68.9	60.7	60.6	56.4	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6
Actuated g/C Ratio	0.62	0.55	0.55	0.51	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	201	2583	136	2252	224	931	218	894				
v/s Ratio Prot	<0.07	0.44	0.01	0.45			0.06					0.09
v/s Ratio Perm	0.49		0.12		0.25		0.18					0.18
v/c Ratio	0.91	0.81	0.24	0.89	0.96	0.21	0.67	0.34				0.34
Uniform Delay, d1	29.2	20.4	15.4	24.5	40.0	31.6	36.3	32.8				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	38.0	2.8	0.9	5.7	47.2	0.1	7.6	0.2				
Delay (s)	67.3	23.3	16.3	30.1	87.3	31.7	43.9	33.0				
Level of Service	E	C	B	C	F	C	D	C				
Approach Delay (s)	26.8		29.9		59.6		36.0					
Approach LOS	C		C		E		D					
Intersection Summary												
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	0.94	C										
Actuated Cycle Length (s)	111.0	Sum of lost time (s)										
Intersection Capacity Utilization	87.0%	ICU Level of Service										
Analysis Period (min)	15	E										
c Critical Lane Group												

2032 Scenario 6 (Sensitivity)

Future Background (PM)

EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	4	4	1	4	1	4	4	1	4	4	
Traffic Volume (vph)	171	1881	31	1855	201	166	33	137	226	147		
Future Volume (vph)	171	1881	31	1855	201	166	33	137	226	147		
Lane Group Flow (vph)	182	2091	33	2000	214	212	146	396				
Total Lost Time (s)	5	2	1	6	8	8	4					
Lane Util. Factor	1.00	0.99	1.00	0.91	1.00	0.98	1.00	0.94				
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00				
Satd. Flow (prot)	1763	4724	1805	4434	1805	4434	1805	3356				
Flt Permitted	0.07	1.00	0.07	1.00	0.44	1.00	0.62	1.00				
Satd. Flow (perm)	123	4724	135	4434	840	3492	820	3356				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94				
Adj. Flow (vph)	182	2001	90	1973	27	214	177	35				
RTOR Reduction (vph)	0	4	0	1	0	0	15	0				
Lane Group Flow (vph)	182	2087	0	33	1999	0	214	197				
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%				
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0				
Turn Type	pm+pt	NA	pm+pt	NA	NA	NA	NA	NA				
Protected Phases	5	2		1	6		8					
Permitted Phases	2			6			8					
Actuated Green, G (s)	68.9	60.7	60.6	56.4	29.6	29.6	29.6	29.6				
Effective Green, g (s)	68.9	60.7	60.6	56.4	29.6	29.6	29.6	29.6				
Actuated g/C Ratio	0.62	0.55	0.55	0.51	0.27	0.27	0.27	0.27				
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	201	2583	136	2252	224	931	218	894				
v/s Ratio Prot	<0.07	0.44	0.01	0.45			0.06					
v/s Ratio Perm	0.49		0.12		0.25		0.18					
v/c Ratio	0.91	0.81	0.24	0.89	0.96	0.21	0.67	0.34				
Uniform Delay, d1	29.2	20.4	15.4	24.5	40.0	31.6	36.3	32.8				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	38.0	2.8	0.9	5.7	47.2	0.1	7.6	0.2				
Delay (s)	67.3	23.3	16.3	30.1	87.3	31.7	43.9	33.0				
Level of Service	E	C	B	C	F	C	D	C				
Approach Delay (s)	26.8		29.9		59.6		36.0					
Approach LOS	C		C		E		D					
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 90												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
Spills and Phases: 1- Sixth Line & Derry Road												

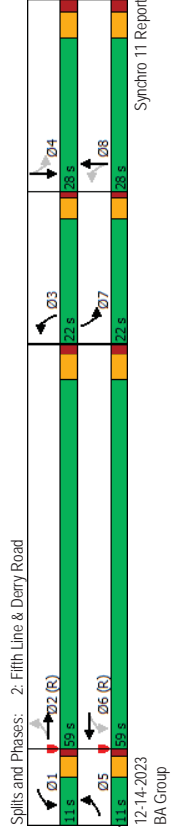


2032 Scenario 6 (Sensitivity)
 Future Background (PM)
 HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	43	1776	86	99	1997	118	233	74	209	311	304	80
Future Volume (vph)	43	1776	86	99	1997	118	233	74	209	311	304	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	4808	1587	4808	1698	3052	1501	3340	1501	3340	1501	3340
Flt Permitted	0.07	1.00	0.07	1.00	0.32	1.00	0.40	1.00	0.40	1.00	0.40	1.00
Satd. Flow (perm)	117	4808	112	4808	568	3052	637	3340	637	3340	637	3340
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	1889	91	105	2124	126	248	79	222	331	323	85
RTOR Reduction (vph)	0	4	0	0	5	0	118	0	118	0	0	20
Lane Group Flow (vph)	46	1976	0	105	2245	0	248	183	0	331	388	0
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4	7	4
Permitted Phases	2	6	6	6	9	8	8	8	8	8	8	8
Actuated Green, G (s)	63.1	57.4	67.7	59.7	34.3	17.6	36.9	18.9	36.9	18.9	36.9	18.9
Effective Green, g (s)	63.1	57.4	67.7	59.7	34.3	17.6	36.9	18.9	36.9	18.9	36.9	18.9
Actuated g/C Ratio	0.53	0.48	0.56	0.50	0.29	0.15	0.31	0.16	0.31	0.16	0.31	0.16
Clearance Times (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	4.0	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	131	2299	161	2391	319	447	325	526	325	526	325	526
v/s Ratio Prot	0.02	0.41	c0.04	c0.47	0.11	0.06	c0.15	0.12	c0.16	0.12	c0.16	0.12
v/s Ratio Perm	0.17	0.32	0.32	0.32	0.11	0.06	c0.16	0.12	c0.16	0.12	c0.16	0.12
v/c Ratio	0.35	0.86	0.65	0.94	0.78	0.41	1.02	0.74	1.02	0.74	1.02	0.74
Uniform Delay, d1	22.5	27.7	21.7	28.4	36.1	46.5	38.6	48.2	38.6	48.2	38.6	48.2
Progression Factor	1.74	0.80	1.38	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	3.1	7.3	7.2	11.3	0.6	54.7	5.3	11.3	0.6	54.7	5.3
Delay (s)	40.3	25.2	37.2	36.7	47.4	47.1	93.3	53.5	47.4	47.1	93.3	53.5
Level of Service	D	C	D	D	D	D	F	D	D	D	F	D
Approach Delay (s)	25.5	36.7	47.2	47.2	47.2	47.2	71.3	47.2	47.2	47.2	71.3	47.2
Approach LOS	C	C	D	D	D	D	E	D	D	D	E	D
Intersection Summary												
HCM 2000 Control Delay	38.2 HCM 2000 Level of Service D											
HCM 2000 Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 19.0											
Intersection Capacity Utilization	88.9% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												

2032 Scenario 6 (Sensitivity)
 Future Background (PM)
 2: Fifth Line & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	43	1776	86	99	1997	118	233	74	209	311	304	80
Future Volume (vph)	43	1776	86	99	1997	118	233	74	209	311	304	80
Lane Group Flow (vph)	46	1980	105	2250	248	301	331	388	301	331	388	304
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4	7	4
Detector Phase	5	2	2	1	6	3	8	7	4	4	7	4
Switch Phase	7	20.0	7.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0	7.0	10.0
Minimum Initial (s)	11.0	34.3	11.0	34.3	11.0	34.7	11.0	34.7	11.0	34.7	11.0	34.7
Minimum Split (s)	11.0	59.0	11.0	59.0	22.0	28.0	22.0	28.0	22.0	28.0	22.0	28.0
Total Split (s)	9.2%	49.2%	9.2%	49.2%	18.3%	23.3%	18.3%	23.3%	18.3%	23.3%	18.3%	23.3%
Total Spill (%)	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7
Yellow Time (s)	1.0	1.6	1.0	1.6	1.0	1.6	1.0	1.6	1.0	1.6	1.0	1.6
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	4.0	5.7
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	4.0	5.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.30	0.86	0.65	0.93	0.76	0.53	0.99	0.75	0.99	0.75	0.99	0.75
Control Delay	24.6	26.2	42.1	36.5	45.2	27.9	83.5	54.2	27.9	83.5	54.2	27.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.6	26.2	42.1	36.5	45.2	27.9	83.5	54.2	27.9	83.5	54.2	27.9
Queue Length 50th (m)	3.9	89.2	15.8	198.6	46.0	19.1	67.2	48.4	19.1	67.2	48.4	19.1
Queue Length 95th (m)	m8.4	109.0	m#36.6	#246.0	66.9	32.7	#105.2	64.4	32.7	#105.2	64.4	32.7
Internal Link Dist (m)	170.5 124.7 340.6 275.9											
Turn Bay Length (m)	100.0 90.0 70.0 50.0											
Base Capacity (vph)	152	2301	162	2428	345	679	333	640	333	640	333	640
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.86	0.65	0.93	0.72	0.44	0.99	0.64	0.99	0.64	0.99	0.64
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 135												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
m Volume for 95th percentile queue is metered by upstream signal.												



HCM Signalized Intersection Capacity Analysis
4: Clark Boulevard & Derry Road

Future Background (PM)
2032 Scenario 6 (Sensitivity)

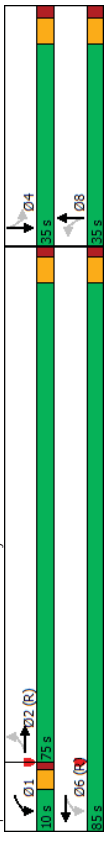
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2101	0	0	2162	24	0	10	0	80	7	169
Future Volume (vph)	36	2101	0	0	2162	24	0	10	0	80	7	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	0.86
Flt Protected	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	5077	1770	5077	1863	1770	5077	1863	1770	1595	1863
Flt Permitted	0.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	1.00
Satd. Flow (perm)	87	5085	5077	1863	5077	1863	1863	5077	1863	1398	1595	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	2284	0	0	2350	26	0	11	0	87	8	184
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	7
Lane Group Flow (vph)	39	2284	0	0	2375	0	0	11	0	87	185	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6		8					4
Permitted Phases	2			6			8					4
Actuated Green, G (s)	89.8	89.8		89.8			19.2			19.2		19.2
Effective Green, g (s)	89.8	89.8		89.8			19.2			19.2		19.2
Actuated g/C Ratio	0.75	0.75		0.75			0.16			0.16		0.16
Clearance Time (s)	5.3	5.3		5.3			5.7			5.7		5.7
Vehicle Extension (s)	3.0	3.0		3.0			3.0			3.0		3.0
Lane Grp Cap (vph)	65	3805		3799			298			223		255
v/s Ratio Prot	0.45			c0.47			0.01			c0.12		
v/s Ratio Perm	0.60	0.60		0.63			0.04			0.39		0.73
Uniform Delay, d1	6.9	6.9		7.1			42.6			45.2		47.9
Progression Factor	1.96	1.78		1.00			1.00			1.00		1.00
Incremental Delay, d2	19.2	0.4		0.8			0.1			1.1		9.9
Delay (s)	32.7	12.6		7.9			42.6			46.3		57.8
Level of Service	C	B		A			D			D		F
Approach Delay (s)		13.0		7.9			42.6			54.2		
Approach LOS		B		A			D			D		D
Intersection Summary												
HCM 2000 Control Delay	12.9 HCM 2000 Level of Service B											
HCM 2000 Volume to Capacity ratio	0.67											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) B											
Intersection Capacity Utilization	62.6% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group												



Queues
4: Clark Boulevard & Derry Road

Future Background (PM)
2032 Scenario 6 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2101	0	0	2162	24	0	10	0	80	7	169
Future Volume (vph)	36	2101	0	0	2162	24	0	10	0	80	7	169
Lane Group Flow (vph)	39	2284	0	0	2376	11	87	192	0	87	192	0
Turn Type	Perm	NA	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			2			6			4		1
Permitted Phases	2			2			6			4		4
Detector Phase	2			2			6			4		4
Switch Phase	2			2			6			4		4
Minimum Initial (s)	10.0	10.0		10.0			10.0			10.0		10.0
Minimum Split (s)	34.3	34.3		34.3			34.7			34.7		34.7
Total Split (s)	75.0	75.0		85.0			35.0			35.0		35.0
Total Spill (%)	62.5%	62.5%		70.8%			29.2%			29.2%		29.2%
Yellow Time (s)	3.7	3.7		3.7			3.7			3.7		3.7
All-Red Time (s)	1.6	1.6		1.6			2.0			2.0		2.0
Lost Time Adjust (s)	0.0	0.0		0.0			0.0			0.0		0.0
Total Lost Time (s)	5.3	5.3		5.3			5.7			5.7		5.7
Lead/Lag	Lag	Lag		Lag			Lag			Lag		Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes		Yes
Recall Mode	C-Min	C-Min		C-Min			None			None		None
v/c Ratio	0.60	0.60		0.63			0.04			0.39		0.74
Control Delay	47.0	13.9		8.6			39.4			48.8		61.9
Queue Delay	0.0	0.0		0.0			0.0			0.0		0.0
Total Delay	47.0	13.9		8.6			39.4			48.8		61.9
Queue Length 50th (m)	8.3	178.7		88.0			2.3			19.5		44.0
Queue Length 95th (m)	m9.8	m169.1		128.9			7.4			33.8		65.6
Internal Link Dist (m)		336.0		475.1			56.4			313.3		
Turn Bay Length (m)	70.0						40.0			40.0		
Base Capacity (vph)	65	3807		3800			454			341		395
Starvation Cap Reductn	0	0		0			0			0		0
Spillback Cap Reductn	0	0		0			0			0		0
Storage Cap Reductn	0	0		0			0			0		0
Reduced v/c Ratio	0.60	0.60		0.63			0.02			0.26		0.49
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 90												
Control Type: Actuated-Coordinated												
m Volume for 95th percentile queue is metered by upstream signal.												



HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road

Future Total (AM)
 2032 Scenario 6 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	165	2217	169	25	837	41	92	173	32	46	142
Traffic Volume (vph)	165	2217	169	25	837	41	92	173	32	46	142
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost time (s)	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1763	4706	1805	4378	1805	4378	1805	3498	1258	3305	3305
Flt Permitted	0.26	1.00	0.06	1.00	0.48	1.00	0.61	1.00	0.61	1.00	0.61
Satd. Flow (perm)	490	4706	109	4378	907	3498	808	3305	808	3305	3305
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	176	2359	180	27	890	44	98	184	34	49	151
RTOR Reduction (vph)	0	6	0	4	0	4	0	15	0	0	124
Lane Group Flow (vph)	176	2533	0	27	930	0	98	203	0	49	172
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1
Turn Type	pm+pt	NA	pm+pt	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	5	2	1	6	6	8	8	8	4	4	4
Permitted Phases	8	2	6	8	8	8	8	8	8	8	8
Actuated Green, G (s)	82.2	74.0	73.9	69.7	16.3	16.3	16.3	16.3	16.3	16.3	16.3
Effective Green, g (s)	82.2	74.0	73.9	69.7	16.3	16.3	16.3	16.3	16.3	16.3	16.3
Actuated g/C Ratio	0.74	0.67	0.67	0.63	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	460	3137	136	2749	133	513	118	485	0.06	0.06	0.05
v/s Ratio Prot	c0.03	c0.54	0.01	0.21	0.12	0.11	0.11	0.06	0.12	0.06	0.05
v/s Ratio Perm	0.38	0.81	0.20	0.34	0.74	0.40	0.40	0.42	0.36	0.42	0.36
Uniform Delay, d1	4.5	13.4	10.7	9.8	45.3	42.9	43.0	42.6	43.0	42.6	42.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	2.3	0.7	0.3	19.0	0.5	2.4	0.4	2.4	0.4	0.4
Delay (s)	5.1	15.7	11.5	10.1	64.3	43.4	45.4	43.1	45.4	43.1	43.1
Level of Service	A	B	B	B	E	D	D	D	D	D	D
Approach Delay (s)	15.0	10.1	10.1	10.1	49.9	43.4	43.4	43.4	43.4	43.4	43.4
Approach LOS	B	B	B	B	D	D	D	D	D	D	D

Intersection Summary	
HCM 2000 Control Delay	18.7
HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78
Actuated Cycle Length (s)	111.0
Sum of lost time (s)	16.5
Intersection Capacity Utilization	88.1%
ICU Level of Service	E
Analysis Period (min)	15

c Critical Lane Group

Queues
 1: Sixth Line & Derry Road

Future Total (AM)
 2032 Scenario 6 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	165	2217	169	25	837	41	92	173	32	46	142
Traffic Volume (vph)	165	2217	169	25	837	41	92	173	32	46	142
Future Volume (vph)	176	2539	170	27	934	46	100	190	49	296	190
Lane Group Flow (vph)	176	2539	170	27	934	46	100	190	49	296	190
Turn Type	pm+pt	NA	pm+pt	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	5	2	1	6	6	8	8	8	4	4	4
Permitted Phases	8	2	6	8	8	8	8	8	8	8	8
Detector Phase	5	2	1	6	6	8	8	8	4	4	4
Switch Phase	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Minimum Split (s)	11.0	67.0	11.0	67.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (s)	9.9%	60.4%	9.9%	60.4%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%
Total Spill (%)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Yellow Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None
v/c Ratio	0.38	0.79	0.15	0.34	0.74	0.41	0.41	0.41	0.42	0.42	0.42
Control Delay	6.6	16.9	6.4	10.8	74.7	40.5	51.7	23.5	51.7	23.5	23.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	16.9	6.4	10.8	74.7	40.5	51.7	23.5	51.7	23.5	23.5
Queue Length 50th (m)	8.8	149.4	1.2	33.2	21.7	22.0	10.3	16.4	21.7	10.3	16.4
Queue Length 95th (m)	19.8	213.0	4.4	52.1	38.4	31.4	21.6	27.7	31.4	21.6	27.7
Internal Link Dist (m)	475.1	256.2	211.8	201.7	300	300	300	300	300	300	300
Turn Bay Length (m)	120.0	100.0	100.0	100.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Base Capacity (vph)	465	3207	183	2752	217	855	194	905	194	905	905
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.79	0.15	0.34	0.45	0.25	0.25	0.25	0.25	0.25	0.25

Intersection Summary	
Cycle Length: 111	
Actuated Cycle Length: 111	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	

Spills and Phases: 1: Sixth Line & Derry Road

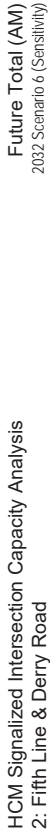
2032 Scenario 6 (Sensitivity)

Future Total (AM)

2032 Scenario 6 (Sensitivity)

2: Fifth Line & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	92	2368	104	193	799	262	100	289	106	111	72	32
Traffic Volume (vph)	92	2368	104	193	799	262	100	289	106	111	72	32
Future Volume (vph)	92	2368	104	193	799	262	100	289	106	111	72	32
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	4811	1587	4543	1698	3207	1501	3253	1501	3253	1501	3253
Flt Permitted	0.22	1.00	0.06	1.00	0.68	1.00	0.36	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	377	4811	93	4543	1219	3207	561	3253	561	3253	561	3253
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	98	2519	111	205	850	279	106	307	113	118	77	34
RTOR Reduction (vph)	0	4	0	0	49	0	0	32	0	0	0	27
Lane Group Flow (vph)	98	2626	0	205	1080	0	106	388	0	118	84	0
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	2
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	5	2	2	1	6	6	8	8	4	4	4	4
Permitted Phases	75.3	67.7	83.7	72.1	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3
Effective Green, G (s)	75.3	67.7	83.7	72.1	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3
Actuated g/C Ratio	0.63	0.56	0.70	0.60	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	314	2714	214	2729	257	676	118	685	0.02	0.55	c0.10	0.24
v/s Ratio Prot	0.02	0.55	c0.10	0.24	0.02	0.12	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	0.18	0.57	0.57	0.57	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
v/c Ratio	0.31	0.97	0.96	0.40	0.41	0.57	1.00	0.12	1.00	0.12	1.00	0.12
Uniform Delay, d1	9.0	25.1	40.5	12.5	40.9	42.5	47.4	38.4	47.4	38.4	47.4	38.4
Progression Factor	0.52	0.49	1.01	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	8.2	48.7	0.4	1.1	1.2	82.9	0.1	82.9	0.1	82.9	0.1
Delay (s)	5.0	20.6	89.4	12.2	42.0	43.7	130.2	38.4	130.2	38.4	130.2	38.4
Level of Service	A	C	F	B	D	D	F	D	F	D	F	D
Approach Delay (s)	20.1	24.1	24.1	24.1	43.4	43.4	85.7	85.7	43.4	43.4	85.7	85.7
Approach LOS	C	C	C	C	D	D	F	D	F	D	F	D
Intersection Summary												
HCM 2000 Control Delay	26.8 HCM 2000 Level of Service C											
HCM 2000 Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 15.0											
Intersection Capacity Utilization	95.7% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												



12-14-2023
BA Group

Synchro 11 Report

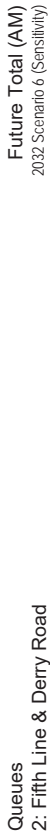
2032 Scenario 6 (Sensitivity)

Future Total (AM)

2032 Scenario 6 (Sensitivity)

2: Fifth Line & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	92	2368	104	193	799	262	100	289	106	111	72	32
Traffic Volume (vph)	92	2368	104	193	799	262	100	289	106	111	72	32
Future Volume (vph)	92	2368	104	193	799	262	100	289	106	111	72	32
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	4811	1587	4543	1698	3207	1501	3253	1501	3253	1501	3253
Flt Permitted	0.22	1.00	0.06	1.00	0.68	1.00	0.36	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	377	4811	93	4543	1219	3207	561	3253	561	3253	561	3253
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	98	2519	111	205	850	279	106	307	113	118	77	34
RTOR Reduction (vph)	0	4	0	0	49	0	0	32	0	0	0	27
Lane Group Flow (vph)	98	2626	0	205	1080	0	106	388	0	118	84	0
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	2
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	5	2	2	1	6	6	8	8	4	4	4	4
Permitted Phases	75.3	67.7	83.7	72.1	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3
Effective Green, G (s)	75.3	67.7	83.7	72.1	25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3
Actuated g/C Ratio	0.63	0.56	0.70	0.60	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	314	2714	214	2729	257	676	118	685	0.02	0.55	c0.10	0.24
v/s Ratio Prot	0.02	0.55	c0.10	0.24	0.02	0.12	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	0.18	0.57	0.57	0.57	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
v/c Ratio	0.31	0.97	0.96	0.40	0.41	0.57	1.00	0.12	1.00	0.12	1.00	0.12
Uniform Delay, d1	9.0	25.1	40.5	12.5	40.9	42.5	47.4	38.4	47.4	38.4	47.4	38.4
Progression Factor	0.52	0.49	1.01	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	8.2	48.7	0.4	1.1	1.2	82.9	0.1	82.9	0.1	82.9	0.1
Delay (s)	5.0	20.6	89.4	12.2	42.0	43.7	130.2	38.4	130.2	38.4	130.2	38.4
Level of Service	A	C	F	B	D	D	F	D	F	D	F	D
Approach Delay (s)	20.1	24.1	24.1	24.1	43.4	43.4	85.7	85.7	43.4	43.4	85.7	85.7
Approach LOS	C	C	C	C	D	D	F	D	F	D	F	D
Intersection Summary												
HCM 2000 Control Delay	26.8 HCM 2000 Level of Service C											
HCM 2000 Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 15.0											
Intersection Capacity Utilization	95.7% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												



12-14-2023
BA Group

Synchro 11 Report

2032 Scenario 6 (Sensitivity)

Future Total (AM)

4: Clark Boulevard & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	91	2425	118	87	967	91	42	7	19	26	10
Traffic Volume (vph)	91	2425	118	87	967	91	42	7	19	26	10
Future Volume (vph)	91	2425	118	87	967	91	42	7	19	26	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.99	1.00	0.99	1.00	0.89	1.00	0.88	1.00
Satd. Flow (prot)	1770	5050	1770	5020	1770	1660	1770	1660	1770	1636	1770
Flt Permitted	0.23	1.00	0.04	1.00	0.72	1.00	0.72	1.00	0.74	1.00	0.74
Satd. Flow (perm)	437	5050	81	5020	1340	1660	1375	1636	1375	1636	1375
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	2636	128	95	1051	99	46	8	21	28	11
RTOR Reduction (vph)	0	3	0	0	5	0	0	19	0	0	43
Lane Group Flow (vph)	99	2761	0	95	1146	0	46	10	0	28	15
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2			1	6		8		8		4
Permitted Phases	2			6			8		8		4
Actuated Green, G (s)	87.9	87.9	100.0	100.0	100.0	90	9.0	9.0	9.0	9.0	9.0
Effective Green, g (s)	87.9	87.9	100.0	100.0	100.0	9.0	9.0	9.0	9.0	9.0	9.0
Actuated g/C Ratio	0.73	0.73	0.83	0.83	0.83	0.08	0.08	0.08	0.08	0.08	0.08
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	320	3699	181	4183	100	124	103	122	103	122	103
v/s Ratio Prot	c0.55		c0.04	0.23		c0.03	0.02		0.02		0.01
v/s Ratio Perm	0.31	0.75	0.52	0.27	0.46	0.08	0.27	0.12	0.27	0.12	0.02
Uniform Delay, d1	5.6	9.5	22.4	2.2	53.2	51.6	52.4	51.8	52.4	51.8	51.8
Progression Factor	2.02	2.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.6	2.7	0.2	3.3	0.3	1.4	0.4	1.4	0.4	0.4
Delay (s)	12.2	19.8	25.1	2.3	56.5	51.9	53.8	52.2	53.8	52.2	52.2
Level of Service	B	B	C	A	E	D	D	D	D	D	D
Approach Delay (s)	19.5		4.1		54.7		52.8		52.8		52.8
Approach LOS	B		A		D		D		D		D
Intersection Summary											
HCM 2000 Control Delay	16.3 HCM 2000 Level of Service B										
HCM 2000 Volume to Capacity ratio	0.70										
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 15.0										
Intersection Capacity Utilization	76.0% ICU Level of Service D										
Analysis Period (min)	15										
c Critical Lane Group											

Splits and Phases: 4: Clark Boulevard & Derry Road

2032 Scenario 6 (Sensitivity)

Future Total (AM)

4: Clark Boulevard & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	91	2425	118	87	967	91	42	7	19	26	10
Traffic Volume (vph)	91	2425	118	87	967	91	42	7	19	26	10
Future Volume (vph)	91	2425	118	87	967	91	42	7	19	26	10
Lane Group Flow (vph)	99	2764	95	1150	46	29	28	28	28	28	58
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2			1	6		8		8		4
Permitted Phases	2			6			8		8		4
Detector Phase	2			1	6		8		8		4
Switch Phase	2			1	6		8		8		4
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.30	0.74	0.52	0.27	0.38	0.17	0.22	0.30	0.22	0.30	0.30
Control Delay	16.2	21.7	26.5	2.4	59.9	26.7	54.3	22.4	54.3	22.4	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	21.7	26.5	2.4	59.9	26.7	54.3	22.4	54.3	22.4	22.4
Queue Length 50th (m)	15.2	211.8	5.9	17.6	11.0	1.9	6.6	2.6	6.6	2.6	2.6
Queue Length 95th (m)	m20.6	m225.4	24.4	26.3	23.0	11.3	15.9	15.6	15.6	15.6	15.6
Internal Link Dist (m)	336.0		475.1		56.4		313.3		313.3		313.3
Turn Bay Length (m)	70.0		70.0		40.0		40.0		40.0		40.0
Base Capacity (vph)	325	3750	183	4277	326	421	335	434	335	434	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.74	0.52	0.27	0.14	0.07	0.08	0.13	0.08	0.13	0.13
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green											
Natural Cycle: 110											
Control Type: Actuated-Coordinated											
m Volume for 95th percentile queue is metered by upstream signal.											

Splits and Phases: 4: Clark Boulevard & Derry Road

HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road

Future Total (PM)
 2032 Scenario 6 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	173	1944	98	34	1880	25	218	166	41	137	226	149
Future Volume (vph)	173	1944	98	34	1880	25	218	166	41	137	226	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	4721	1805	4434	1805	4434	1805	3468	1258	3354	1258	3354
Flt Permitted	0.07	1.00	0.07	1.00	0.07	1.00	0.45	1.00	0.61	1.00	0.61	1.00
Satd. Flow (perm)	126	4721	138	4434	138	4434	849	3468	813	3354	813	3354
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	184	2068	104	36	2000	27	232	177	44	146	240	159
RTOR Reduction (vph)	0	5	0	0	1	0	0	19	0	0	90	0
Lane Group Flow (vph)	184	2167	0	36	2026	0	232	202	0	146	309	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	1	6	8	8	4	4	4	4
Permitted Phases	2	2	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	67.0	59.0	59.4	55.2	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3
Effective Green, g (s)	67.0	59.0	59.4	55.2	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3
Actuated g/C Ratio	0.60	0.53	0.54	0.50	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	194	2509	136	2205	239	977	229	977	229	945	229	945
v/s Ratio Prot	0.07	0.46	0.01	0.46	0.01	0.46	0.06	0.06	0.06	0.09	0.09	0.09
v/s Ratio Perm	0.60	0.46	0.01	0.46	0.01	0.46	0.06	0.06	0.06	0.09	0.09	0.09
v/c Ratio	0.95	0.86	0.26	0.92	0.26	0.92	0.27	0.21	0.21	0.21	0.21	0.21
Uniform Delay, d1	29.8	22.5	17.2	25.8	39.4	30.4	34.9	31.5	34.9	31.5	31.5	31.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	49.3	4.3	1.0	7.6	49.8	0.1	5.7	0.2	5.7	0.2	0.2	0.2
Delay (s)	79.2	26.8	18.2	33.5	89.2	30.5	40.6	31.7	40.6	31.7	31.7	31.7
Level of Service	E	C	B	C	F	C	D	C	D	C	C	C
Approach Delay (s)	30.9	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2
Approach LOS	C	C	C	C	C	C	E	C	E	C	C	C
Intersection Summary												
HCM 2000 Control Delay	34.6 HCM 2000 Level of Service C											
HCM 2000 Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	111.0 Sum of lost time (s) 16.5											
Intersection Capacity Utilization	88.6% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												



Queues
 1: Sixth Line & Derry Road

Future Total (PM)
 2032 Scenario 6 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	173	1944	98	34	1880	25	218	166	41	137
Future Volume (vph)	173	1944	98	34	1880	25	218	166	41	137
Lane Group Flow (vph)	184	2172	36	2027	232	221	146	399	NA	NA
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	1	6	8	8	4	4
Permitted Phases	2	2	2	2	2	2	2	2	2	2
Detector Phase	5	2	1	6	1	6	8	8	4	4
Switch Phase	5	2	1	6	1	6	8	8	4	4
Minimum Initial (s)	7.0	25.0	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3
Total Split (s)	12.0	63.0	11.0	62.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	10.8%	56.8%	9.9%	55.9%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
v/c Ratio	0.94	0.84	0.20	0.92	0.20	0.92	0.22	0.22	0.22	0.22
Control Delay	78.1	25.7	10.4	33.7	93.1	27.6	49.9	23.0	49.9	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	25.7	10.4	33.7	93.1	27.6	49.9	23.0	49.9	23.0
Queue Length 50th (m)	25.8	157.1	2.9	149.4	52.7	17.8	29.4	26.0	29.4	26.0
Queue Length 95th (m)	71.3	182.5	6.8	175.4	105.0	28.2	57.4	40.4	57.4	40.4
Internal Link Dist (m)	475.1	182.5	256.2	211.8	201.7	201.7	201.7	201.7	201.7	201.7
Turn Bay Length (m)	120.0	100.0	100.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Base Capacity (vph)	195	2584	184	2229	238	995	228	1033	228	1033
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.84	0.20	0.91	0.20	0.91	0.22	0.22	0.22	0.22
Intersection Summary										
Cycle Length: 111										
Actuated Cycle Length: 111										
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBTL, Start of Green										
Natural Cycle: 90										
Control Type: Actuated-Coordinated										
# 95th percentile volume exceeds capacity, queue may be longer.										
Queue shown is maximum after two cycles.										

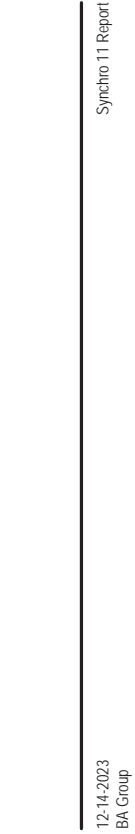


2032 Scenario 6 (Sensitivity)

Future Total (PM)

2: Fifth Line & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	43	1829	86	99	2142	121	233	75	209	312	304	80
Future Volume (vph)	43	1829	86	99	2142	121	233	75	209	312	304	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	4809	1587	4811	1698	3053	1501	3340	1501	3340	1501	3340
Flt Permitted	0.07	1.00	0.07	1.00	0.32	1.00	0.40	1.00	0.40	1.00	0.40	1.00
Satd. Flow (perm)	117	4809	112	4811	568	3053	635	3340	635	3340	635	3340
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	1946	91	105	2279	129	248	80	222	332	323	85
RTOR Reduction (vph)	0	4	0	0	5	0	118	0	0	0	20	0
Lane Group Flow (vph)	46	2033	0	105	2403	0	248	184	0	332	388	0
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	3	8	7	4				
Permitted Phases	2		6		8		4					
Actuated Green, G (s)	63.1	57.4	67.7	59.7	34.3	17.6	36.9	18.9				
Effective Green, g (s)	63.1	57.4	67.7	59.7	34.3	17.6	36.9	18.9				
Actuated g/C Ratio	0.53	0.48	0.56	0.50	0.29	0.15	0.31	0.16				
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	131	2300	161	2393	319	447	325	526				
v/s Ratio Prot	0.02	0.42	c0.04	c0.50	0.11	0.06	c0.15	0.12				
v/s Ratio Perm	0.17		0.32		0.11		c0.16					
v/c Ratio	0.35	0.88	0.65	1.00	0.78	0.41	1.02	0.74				
Uniform Delay, d1	25.0	28.3	22.2	30.1	36.1	46.5	38.6	48.2				
Progression Factor	1.69	0.81	1.26	1.08	1.00	1.00	1.00	1.00				
Incremental Delay, d2	1.1	3.6	7.1	17.1	11.3	0.6	55.5	5.3				
Delay (s)	43.2	26.5	35.0	49.6	47.4	47.1	94.1	53.5				
Level of Service	D	C	D	D	D	D	F	D				
Approach Delay (s)	26.9		49.0		47.2		71.8					
Approach LOS	C		D		D		E					
Intersection Summary												
HCM 2000 Control Delay	43.9 HCM 2000 Level of Service D											
HCM 2000 Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	19.0											
Intersection Capacity Utilization	91.9% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												



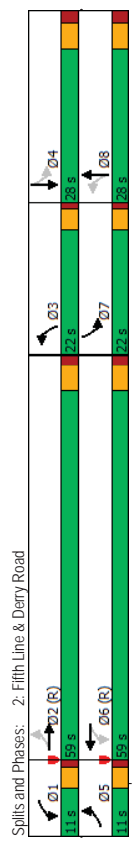
12-14-2023
BA Group
Synchro 11 Report

2032 Scenario 6 (Sensitivity)

Future Total (PM)

2: Fifth Line & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	43	1829	86	99	2142	121	233	75	209	312	304	80
Future Volume (vph)	43	1829	86	99	2142	121	233	75	209	312	304	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1600	4809	1587	4811	1698	3053	1501	3340	1501	3340	1501	3340
Flt Permitted	0.07	1.00	0.07	1.00	0.32	1.00	0.40	1.00	0.40	1.00	0.40	1.00
Satd. Flow (perm)	117	4809	112	4811	568	3053	635	3340	635	3340	635	3340
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	1946	91	105	2279	129	248	80	222	332	323	85
RTOR Reduction (vph)	0	4	0	0	5	0	118	0	0	0	20	0
Lane Group Flow (vph)	46	2033	0	105	2403	0	248	184	0	332	388	0
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%	14%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1	2
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	3	8	7	4				
Permitted Phases	2		6		8		4					
Actuated Green, G (s)	63.1	57.4	67.7	59.7	34.3	17.6	36.9	18.9				
Effective Green, g (s)	63.1	57.4	67.7	59.7	34.3	17.6	36.9	18.9				
Actuated g/C Ratio	0.53	0.48	0.56	0.50	0.29	0.15	0.31	0.16				
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Lane Grp Cap (vph)	131	2300	161	2393	319	447	325	526				
v/s Ratio Prot	0.02	0.42	c0.04	c0.50	0.11	0.06	c0.15	0.12				
v/s Ratio Perm	0.17		0.32		0.11		c0.16					
v/c Ratio	0.35	0.88	0.65	1.00	0.78	0.41	1.02	0.74				
Uniform Delay, d1	25.0	28.3	22.2	30.1	36.1	46.5	38.6	48.2				
Progression Factor	1.69	0.81	1.26	1.08	1.00	1.00	1.00	1.00				
Incremental Delay, d2	1.1	3.6	7.1	17.1	11.3	0.6	55.5	5.3				
Delay (s)	43.2	26.5	35.0	49.6	47.4	47.1	94.1	53.5				
Level of Service	D	C	D	D	D	D	F	D				
Approach Delay (s)	26.9		49.0		47.2		71.8					
Approach LOS	C		D		D		E					
Intersection Summary												
HCM 2000 Control Delay	43.9 HCM 2000 Level of Service D											
HCM 2000 Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	19.0											
Intersection Capacity Utilization	91.9% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												



12-14-2023
BA Group
Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
4: Clark Boulevard & Derry Road

Future Total (PM)
2032 Scenario 6 (Sensitivity)

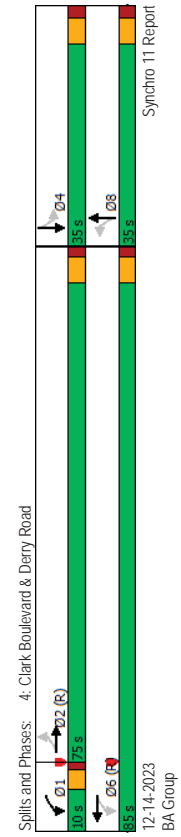
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2106	49	28	2178	24	132	10	73	80	7
Future Volume (vph)	36	2106	49	28	2178	24	132	10	73	80	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5068	1770	5077	1770	1617	1770	1617	1770	1595	1770
Flt Permitted	0.05	1.00	0.05	1.00	0.05	1.00	0.46	1.00	0.70	1.00	1.00
Satd. Flow (perm)	94	5068	89	5077	89	5077	863	1617	1301	1595	1301
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	2289	53	30	2367	26	143	11	79	87	8
RTOR Reduction (vph)	0	2	0	0	1	0	0	65	0	0	7
Lane Group Flow (vph)	39	2340	0	30	2392	0	143	25	0	87	185
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	1	6	8	8	8	8	4	4	4
Permitted Phases	2	6	6	8	8	8	8	8	4	4	4
Actual Green, G (s)	79.3	79.3	87.0	87.0	87.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	79.3	79.3	87.0	87.0	87.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.66	0.66	0.72	0.72	0.72	0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	62	3349	116	3680	158	296	238	292	238	292	292
v/s Ratio Prot	c0.46	0.01	c0.47	0.18	c0.17	c0.17	0.02	0.02	0.07	0.07	0.12
v/s Ratio Perm	0.42	0.63	0.70	0.26	0.65	0.91	0.09	0.09	0.37	0.64	0.64
Uniform Delay, d1	11.8	12.8	11.2	8.6	48.0	40.7	42.9	45.3	42.9	45.3	45.3
Progression Factor	1.64	1.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.0	0.6	1.2	0.9	44.6	0.1	1.0	4.5	1.0	4.5	4.5
Delay (s)	40.3	21.8	12.4	9.5	92.6	40.8	43.8	49.8	43.8	49.8	49.8
Level of Service	D	C	B	A	F	D	D	D	D	D	D
Approach Delay (s)	22.1	9.5	72.6	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9
Approach LOS	C	A	E	D	D	D	D	D	D	D	D
Intersection Summary											
HCM 2000 Control Delay	19.9										
HCM 2000 Volume to Capacity ratio	0.75										
Actuated Cycle Length (s)	120.0										
Intersection Capacity Utilization	75.7%										
Analysis Period (min)	15										
c Critical Lane Group	15										

12-14-2023
BA Group
Synchro 11 Report

Queues
4: Clark Boulevard & Derry Road

Future Total (PM)
2032 Scenario 6 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	36	2106	49	28	2178	24	132	10	73	80	7
Future Volume (vph)	36	2106	49	28	2178	24	132	10	73	80	7
Lane Group Flow (vph)	39	2342	0	2993	143	90	87	192	90	87	192
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	1	6	8	8	8	8	4	4	4
Detector Phase	2	2	1	6	8	8	8	8	4	4	4
Switch Phase	2	2	1	6	8	8	8	8	4	4	4
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.63	0.69	0.20	0.65	0.91	0.25	0.37	0.64	0.64	0.64	0.64
Control Delay	56.8	23.6	8.6	10.5	97.4	12.0	45.3	52.4	45.3	52.4	52.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	23.6	8.6	10.5	97.4	12.0	45.3	52.4	45.3	52.4	52.4
Queue Length 50th (m)	9.3	207.5	1.8	102.4	34.8	2.2	18.9	42.3	18.9	42.3	42.3
Queue Length 95th (m)	m9.9	m191.5	5.4	143.0	#62.3	15.6	32.9	63.3	32.9	63.3	63.3
Internal Link Dist (m)	336.0	475.1	56.4	313.3	313.3	313.3	313.3	313.3	313.3	313.3	313.3
Turn Bay Length (m)	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Base Capacity (vph)	62	3418	150	3678	210	454	317	395	317	395	395
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.69	0.20	0.65	0.68	0.20	0.27	0.49	0.27	0.49	0.49
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green											
Natural Cycle: 90											
Control Type: Actuated-Coordinated											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											



12-14-2023
BA Group
Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road

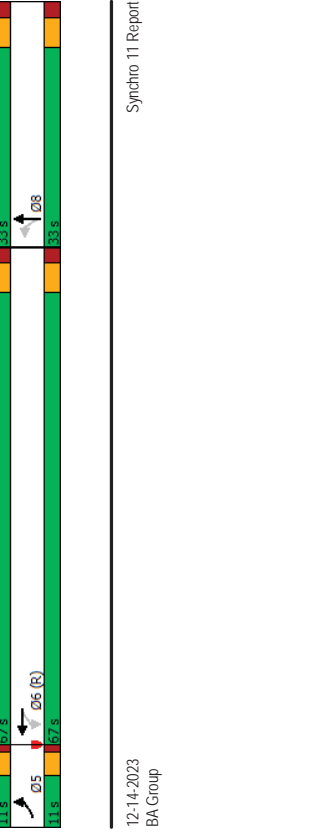
Queues
 1: Sixth Line & Derry Road

Future Background (AM)
 2032 Scenario 7 (Sensitivity)

Future Background (AM)
 2032 Scenario 7 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	164	2214	153	17	849	41	89	173	30	46
Traffic Volume (vph)	164	2214	153	17	849	41	89	173	30	46
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost Time (s)	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.93
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	4710	1805	4379	1805	3504	1258	3304		
Flt Permitted	0.26	1.00	0.06	1.00	0.47	1.00	0.61	1.00		
Satd. Flow (perm)	482	4710	109	4379	900	3504	812	3304		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	174	2355	163	18	903	44	95	184	32	49
RTOR Reduction (vph)	0	5	0	0	4	0	0	15	0	0
Lane Group Flow (vph)	174	2513	0	18	943	0	95	201	0	49
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	NA	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	8	4	4
Permitted Phases	2	82.4	75.6	72.7	69.9	16.1	16.1	16.1	16.1	16.1
Effective Green, G (s)	82.4	75.6	72.7	69.9	16.1	16.1	16.1	16.1	16.1	16.1
Actuated g/C Ratio	0.74	0.68	0.65	0.63	0.15	0.15	0.15	0.15	0.15	0.15
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	455	3207	114	2757	130	508	117	479		
v/s Ratio Prot	c0.03	c0.53	0.00	0.22		0.06				
v/s Ratio Perm	0.25	0.38	0.78	0.16	0.34	c0.11	0.73	0.40	0.42	0.36
Uniform Delay, d1	4.5	12.1	9.9	9.7	45.4	43.0	43.2	42.8		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.5	2.0	0.7	0.3	18.9	0.5	2.4	0.5		
Delay (s)	5.0	14.1	10.5	10.0	64.3	43.6	45.6	43.3		
Level of Service	A	B	B	B	B	E	D	D		
Approach Delay (s)	13.5	10.0				49.9	43.6			
Approach LOS	B	B	B	B	B	D	D			
Intersection Summary										
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service								
HCM 2000 Volume to Capacity ratio	0.77	B								
Actuated Cycle Length (s)	111.0	Sum of lost time (s)								
Intersection Capacity Utilization	87.7%	ICU Level of Service								
Analysis Period (min)	15	E								
c Critical Lane Group										

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	164	2214	17	849	17	849	89	173	46	142
Traffic Volume (vph)	164	2214	17	849	17	849	89	173	46	142
Future Volume (vph)	174	2518	18	947	18	947	95	216	49	297
Lane Group Flow (vph)	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	8	4	4
Permitted Phases	2	6	6	8	8	8	8	8	4	4
Detector Phase	5	2	1	6	6	8	8	8	4	4
Switch Phase	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3
Minimum Split (s)	11.0	67.0	11.0	67.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (s)	9.9%	60.4%	9.9%	60.4%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%
Total Spill (%)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Yellow Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
v/c Ratio	0.38	0.76	0.10	0.34	0.73	0.41	0.42	0.49		
Control Delay	6.5	14.7	5.7	10.8	74.6	41.0	52.3	23.7		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	6.5	14.7	5.7	10.8	74.6	41.0	52.3	23.7		
Queue Length 50th (m)	8.6	97.3	0.8	33.5	21.1	22.0	10.3	16.5		
Queue Length 95th (m)	19.4	207.0	3.3	53.1	37.2	31.6	21.6	27.8		
Internal Link Dist (m)	475.1		256.2		211.8		201.7			
Turn Bay Length (m)	120.0	100.0		45.0		30.0				
Base Capacity (vph)	463	3315	184	2763	216	856	195	905		
Starvation Cap Reductn	0	0	0	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0	0	0	0		
Reduced v/c Ratio	0.38	0.76	0.10	0.34	0.44	0.25	0.25	0.33		
Intersection Summary										
Cycle Length: 111										
Actuated Cycle Length: 111										
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green										
Natural Cycle: 100										
Control Type: Actuated-Coordinated										



2: Fifth Line & Derry Road

Future Background (AM) 2032 Scenario 7 (Sensitivity)

2: Fifth Line & Derry Road

Future Background (AM) 2032 Scenario 7 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	92	2318	163	193	769	261	100	289	113	110	71
Traffic Volume (vph)	92	2318	163	193	769	261	100	289	113	110	71
Future Volume (vph)	92	2318	163	193	769	261	100	289	113	110	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1600	4794	1587	4535	1698	3203	1501	3250	1501	3250	1501
Flt Permitted	0.23	1.00	0.06	1.00	0.68	1.00	0.35	1.00	0.35	1.00	0.35
Satd. Flow (perm)	393	4794	93	4535	1220	3203	549	3250	549	3250	549
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	98	2466	173	205	818	278	106	307	120	117	76
RTOR Reduction (vph)	0	7	0	0	51	0	0	34	0	0	27
Lane Group Flow (vph)	98	2632	0	205	1045	0	106	393	0	117	83
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt
Protected Phases	5	2	2	1	6	6	8	8	4	4	4
Permitted Phases	2	5	2	6	2	5	2	5	2	5	2
Effective Green, G (s)	75.3	67.7	83.7	72.1	25.3	25.3	25.3	25.3	25.3	25.3	25.3
Effective Green, g (s)	75.3	67.7	83.7	72.1	25.3	25.3	25.3	25.3	25.3	25.3	25.3
Actuated g/C Ratio	0.63	0.56	0.70	0.60	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	323	2704	214	2724	257	675	115	685	60.21	60.21	60.21
v/s Ratio Prot	0.02	0.55	c0.10	0.23	0.12	0.12	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	0.17	0.57	0.57	0.57	0.09	0.09	0.09	0.09	0.09	0.09	0.09
v/c Ratio	0.30	0.97	0.96	0.38	0.41	0.58	1.02	0.12	1.02	0.12	0.12
Uniform Delay, d1	9.0	25.3	40.6	12.4	40.9	42.6	47.4	38.3	47.4	38.3	47.4
Progression Factor	0.56	0.49	1.01	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	8.6	48.7	0.4	1.1	1.3	88.7	0.1	88.7	0.1	88.7
Delay (s)	5.3	21.1	89.7	12.3	42.0	43.9	136.0	38.4	136.0	38.4	136.0
Level of Service	A	C	F	B	D	D	F	D	F	D	F
Approach Delay (s)	20.6	20.6	24.5	24.5	43.5	43.5	88.7	88.7	43.5	43.5	88.7
Approach LOS	C	C	C	C	D	D	F	F	D	D	F

Intersection Summary	
HCM 2000 Control Delay	27.4
HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.99
Actuated Cycle Length (s)	120.0
Sum of lost time (s)	15.0
Intersection Capacity Utilization	96.3%
ICU Level of Service	F
Analysis Period (min)	15

c Critical Lane Group

12-14-2023
BA Group

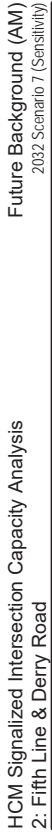
Synchro 11 Report

2: Fifth Line & Derry Road

Future Background (AM) 2032 Scenario 7 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	92	2318	163	193	769	261	100	289	113	110	71
Traffic Volume (vph)	92	2318	163	193	769	261	100	289	113	110	71
Future Volume (vph)	92	2318	163	193	769	261	100	289	113	110	71
Lane Group Flow (vph)	98	2639	205	1096	106	427	117	110	110	110	110
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt
Protected Phases	5	2	2	1	6	6	8	8	4	4	4
Detector Phase	5	2	2	1	6	6	8	8	4	4	4
Switch Phase	5	2	2	1	6	6	8	8	4	4	4
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	34.3	11.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	12.0	73.0	16.0	77.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	10.0%	60.8%	13.3%	64.2%	25.8%	25.8%	25.8%	25.8%	25.8%	25.8%	25.8%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0	5.3	4.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None
v/c Ratio	0.30	0.97	0.95	0.39	0.41	0.60	1.02	0.15	1.02	0.15	0.15
Control Delay	4.8	22.1	82.9	10.9	46.6	42.4	136.6	27.2	136.6	27.2	136.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	22.1	82.9	10.9	46.6	42.4	136.6	27.2	136.6	27.2	136.6
Queue Length 50th (m)	4.2	57.4	35.9	41.7	22.9	45.6	-29.6	8.0	45.6	-29.6	8.0
Queue Length 95th (m)	m#5	#94.2	#85.4	50.2	41.4	63.4	#69.7	16.3	63.4	#69.7	16.3
Internal Link Dist (m)	170.5	124.7	170.5	124.7	340.6	340.6	275.9	275.9	340.6	340.6	275.9
Turn Bay Length (m)	100.0	90.0	100.0	90.0	70.0	70.0	50.0	50.0	70.0	70.0	50.0
Base Capacity (vph)	332	2710	215	2776	257	709	115	712	709	115	712
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.97	0.95	0.39	0.41	0.60	1.02	0.15	1.02	0.15	0.15

Intersection Summary	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Splits and Phases: 2: Fifth Line & Derry Road

HCM Signalized Intersection Capacity Analysis
 4: Clark Boulevard & Derry Road

Future Background (AM)
 2032 Scenario 7 (Sensitivity)

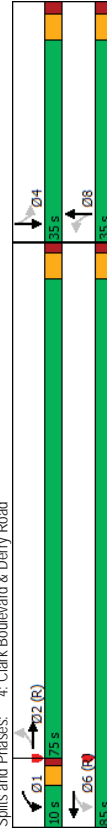
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	91	2415	45	102	962	91	16	7	10	26	10	43
Traffic Volume (vph)	91	2415	45	102	962	91	16	7	10	26	10	43
Future Volume (vph)	91	2415	45	102	962	91	16	7	10	26	10	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	0.99	1.00	0.91	1.00	0.91	1.00	0.88	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5071	1770	5019	1770	1701	1701	1701	1701	1770	1636	1770
Flt Permitted	0.24	1.00	0.04	1.00	0.72	1.00	1.00	0.75	1.00	0.75	1.00	1.00
Satd. Flow (perm)	439	5071	81	5019	1340	1701	1388	1636	1388	1636	1636	1388
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	2625	49	111	1046	99	17	8	11	28	11	47
RTOR Reduction (vph)	0	1	0	0	4	0	0	10	0	0	0	44
Lane Group Flow (vph)	99	2673	0	111	1141	0	17	9	0	28	14	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6			8			4	
Permitted Phases	2			6				8			4	
Actuated Green, G (s)	87.6	87.6	100.8	100.8	100.8	8.2	8.2	8.2	8.2	8.2	8.2	8.2
Effective Green, g (s)	87.6	87.6	100.8	100.8	100.8	8.2	8.2	8.2	8.2	8.2	8.2	8.2
Actuated g/C Ratio	0.73	0.73	0.84	0.84	0.84	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	320	3701	197	4215	91	116	94	111	94	111	111	111
v/s Ratio Prot	c0.53		c0.04	0.23		0.01		c0.02				
v/s Ratio Perm	0.23		0.43			0.01						
v/c Ratio	0.31	0.72	0.56	0.27	0.19	0.08	0.30	0.13	0.08	0.30	0.13	0.13
Uniform Delay, d1	5.7	9.3	25.8	2.0	52.8	52.4	53.2	52.5	52.4	53.2	52.5	52.5
Progression Factor	2.04	2.11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.4	3.7	0.2	1.0	0.3	1.8	0.5	0.3	1.8	0.5	0.5
Delay (s)	12.4	19.9	29.4	2.1	53.8	52.6	54.9	53.1	52.6	54.9	53.1	53.1
Level of Service	B	B	C	A	D	D	D	D	D	D	D	D
Approach Delay (s)	19.7		4.6		53.2			53.7				
Approach LOS	B		A		D			D				D
Intersection Summary												
HCM 2000 Control Delay	16.1											B
HCM 2000 Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	120.0											15.0
Intersection Capacity Utilization	74.1%											D
Analysis Period (min)	15											
c Critical Lane Group												

12-14-2023
 BA Group
 Synchro 11 Report

Queues
 4: Clark Boulevard & Derry Road

Future Background (AM)
 2032 Scenario 7 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	91	2415	102	962	16	7	10	26	10	43	
Traffic Volume (vph)	91	2415	102	962	16	7	10	26	10	43	
Future Volume (vph)	91	2415	102	962	16	7	10	26	10	43	
Lane Group Flow (vph)	99	2674	111	1145	17	9	28	58	14	0	
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	2			1	6			8		4	
Permitted Phases	2			6				8		4	
Detector Phase	2			2				2		2	
Switch Phase	2			2				2		2	
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	
v/c Ratio	0.30	0.71	0.56	0.27	0.15	0.12	0.24	0.32	0.15	0.32	
Control Delay	16.1	21.6	29.8	2.2	54.1	33.9	56.5	23.7	2.2	54.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.1	21.6	29.8	2.2	54.1	33.9	56.5	23.7	2.2	54.1	
Queue Length 50th (m)	15.8	205.7	9.9	17.5	4.0	1.9	6.6	2.6	1.9	6.6	
Queue Length 95th (m)	m20.0	m217.1	28.8	22.3	11.6	9.6	16.4	16.0	9.6	16.4	
Internal Link Dist (m)	336.0		475.1		56.4		313.3				
Turn Bay Length (m)	70.0		70.0		40.0		40.0				
Base Capacity (vph)	325	3751	199	4311	326	423	338	434	326	423	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.30	0.71	0.56	0.27	0.05	0.04	0.08	0.13	0.05	0.13	
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green											
Natural Cycle: 100											
Control Type: Actuated-Coordinated											
m Volume for 95th percentile queue is metered by upstream signal.											



12-14-2023
 BA Group
 Synchro 11 Report

HCM Signalized Intersection Capacity Analysis
 1: Sixth Line & Derry Road

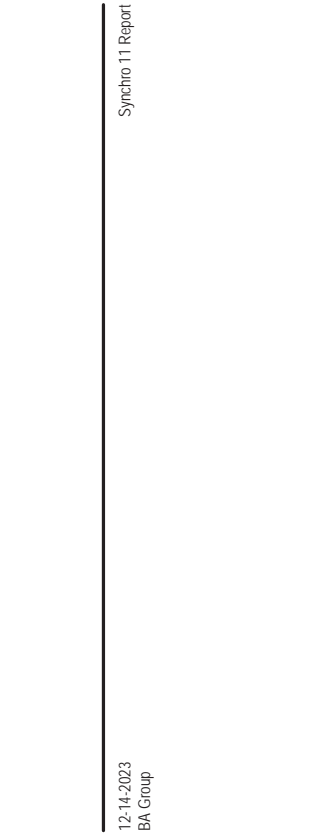
Queues
 1: Sixth Line & Derry Road

Future Background (PM)
 2032 Scenario 7 (Sensitivity)

Future Background (PM)
 2032 Scenario 7 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Traffic Volume (vph)	174	1954	96	31	1874	25	201	166	33	137	226	147	
Future Volume (vph)	174	1954	96	31	1874	25	201	166	33	137	226	147	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1763	4722	1805	4434	1805	4434	1805	3492	1805	4434	1805	3356	
Flt Permitted	0.07	1.00	0.07	1.00	0.07	1.00	0.44	1.00	0.44	1.00	0.62	1.00	
Satd. Flow (perm)	123	4722	135	4434	135	4434	840	3492	840	3492	820	3356	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	185	2079	102	33	1994	27	214	177	35	146	240	156	
RTOR Reduction (vph)	0	5	0	0	1	0	0	15	0	0	92	0	
Lane Group Flow (vph)	185	2176	0	33	2020	0	214	197	0	146	304	0	
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	0%	5%	40%	1%	
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	0	1	6	1	
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	5	2	1	6	1	6	8	8	8	4	4	4	
Permitted Phases	2	2	6	6	6	6	8	8	8	4	4	4	
Actuated Green, G (s)	68.9	60.7	60.5	56.3	60.5	56.3	29.6	29.6	29.6	29.6	29.6	29.6	
Effective Green, g (s)	68.9	60.7	60.5	56.3	60.5	56.3	29.6	29.6	29.6	29.6	29.6	29.6	
Actuated g/C Ratio	0.62	0.55	0.55	0.51	0.55	0.51	0.27	0.27	0.27	0.27	0.27	0.27	
Clearance Time (s)	4.0	6.2	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	203	2582	136	2248	136	2248	224	931	218	894	218	894	
v/s Ratio Prot	0.07	0.46	0.01	0.46	0.01	0.46	0.06	0.06	0.06	0.06	0.06	0.09	
v/s Ratio Perm	0.49	0.46	0.12	0.46	0.12	0.46	0.25	0.25	0.25	0.18	0.18	0.18	
v/c Ratio	0.91	0.84	0.24	0.90	0.24	0.90	0.96	0.21	0.67	0.34	0.67	0.34	
Uniform Delay, d1	29.7	21.1	16.1	24.8	16.1	24.8	40.0	31.6	36.3	32.8	32.8	32.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	39.3	3.6	0.9	6.2	0.9	6.2	47.2	0.1	7.6	0.2	7.6	0.2	
Delay (s)	69.0	24.7	17.1	31.0	17.1	31.0	87.3	31.7	43.9	33.1	43.9	33.1	
Level of Service	E	C	B	C	B	C	F	C	D	D	C	C	
Approach Delay (s)	28.2	30.8	30.8	30.8	30.8	30.8	59.6	36.0	36.0	36.0	36.0	36.0	
Approach LOS	C	C	C	C	C	C	E	D	D	D	D	D	
Intersection Summary													
HCM 2000 Control Delay	32.4											HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95												
Actuated Cycle Length (s)	111.0											Sum of lost time (s)	16.5
Intersection Capacity Utilization	87.5%											ICU Level of Service	E
Analysis Period (min)	15												
c - Critical Lane Group													

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	174	1954	31	1874	201	166	33	137	226	137	226	226
Future Volume (vph)	174	1954	31	1874	201	166	33	137	226	137	226	226
Lane Group Flow (vph)	185	2181	33	2021	214	212	146	396	396	146	396	396
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	1	6	8	8	8	4	4	4
Permitted Phases	2	2	6	6	6	6	8	8	8	4	4	4
Detector Phase	5	2	1	6	1	6	8	8	8	4	4	4
Switch Phase	5	2	1	6	1	6	8	8	8	4	4	4
Minimum Initial (s)	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Total Split (s)	12.0	63.0	11.0	62.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Spill (%)	10.8%	56.8%	9.9%	55.9%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
v/c Ratio	0.92	0.82	0.18	0.90	0.90	0.96	0.22	0.67	0.40	0.67	0.40	0.40
Control Delay	71.2	24.4	10.1	31.5	91.4	29.0	52.6	23.5	23.5	23.5	23.5	23.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.2	24.4	10.1	31.5	91.4	29.0	52.6	23.5	23.5	23.5	23.5	23.5
Queue Length 50th (m)	26.7	158.3	2.6	148.5	47.4	17.6	29.3	25.6	25.6	25.6	25.6	25.6
Queue Length 95th (m)	72.8	183.8	6.4	174.4	95.1	27.8	56.9	40.1	40.1	40.1	40.1	40.1
Internal Link Dist (m)	475.1	256.2	475.1	256.2	211.8	211.8	201.7	201.7	201.7	201.7	201.7	201.7
Turn Bay Length (m)	120.0	100.0	100.0	45.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0
Base Capacity (vph)	202	2655	185	2251	232	979	226	1018	1018	226	1018	1018
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.82	0.18	0.90	0.90	0.92	0.22	0.65	0.39	0.65	0.39	0.39
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green												
Natural Cycle: 90												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.												
Spills and Phases: 1 - Sixth Line & Derry Road												



HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road

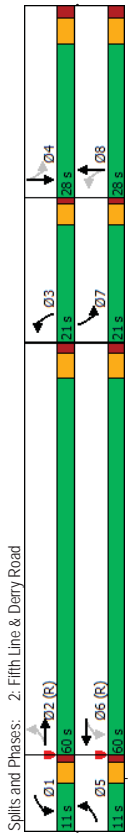
Future Background (PM)
 2032 Scenario 7 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	43	1792	96	104	2075	119	302	74	215	311	304
Future Volume (vph)	43	1792	96	104	2075	119	302	74	215	311	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1600	4804	1587	4810	1698	3050	1501	3340	1501	3340	1501
Flt Permitted	0.07	1.00	0.07	1.00	0.29	1.00	0.43	1.00	0.43	1.00	0.43
Satd. Flow (perm)	118	4804	112	4810	523	3050	685	3340	685	3340	685
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	1906	102	111	2207	127	321	79	229	331	323
RTOR Reduction (vph)	0	5	0	0	5	0	115	0	0	0	20
Lane Group Flow (vph)	46	2003	0	111	2329	0	321	193	0	331	388
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	NA
Protected Phases	5	2	2	1	6	3	8	7	4	4	4
Permitted Phases	2	6	6	6	6	6	6	6	6	6	6
Effective Green, G (s)	62.8	57.1	67.8	59.6	35.7	18.7	35.7	18.7	35.7	18.7	35.7
Effective Green, g (s)	62.8	57.1	67.8	59.6	35.7	18.7	35.7	18.7	35.7	18.7	35.7
Actuated g/C Ratio	0.52	0.48	0.56	0.50	0.30	0.16	0.30	0.16	0.30	0.16	0.30
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	132	2285	164	2388	322	475	319	520	319	520	319
v/s Ratio Prot	0.02	0.42	c0.05	c0.48	0.14	0.06	c0.15	0.12	c0.15	0.12	c0.15
v/s Ratio Perm	0.17	0.34	0.34	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
v/c Ratio	0.35	0.88	0.68	0.98	0.22	0.41	0.41	0.41	0.41	0.41	0.41
Uniform Delay, d1	23.9	28.3	22.3	29.5	38.3	45.7	39.5	48.4	39.5	48.4	39.5
Progression Factor	1.70	0.77	1.29	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	3.4	8.5	11.6	49.0	0.6	60.5	5.8	60.5	5.8	60.5
Delay (s)	41.7	25.1	37.2	41.5	87.2	46.2	99.9	54.1	99.9	54.1	99.9
Level of Service	D	C	D	D	F	D	F	D	F	D	F
Approach Delay (s)	25.5	41.3	67.2	67.2	67.2	67.2	67.2	67.2	67.2	67.2	67.2
Approach LOS	C	C	D	D	E	E	E	E	E	E	E
Intersection Summary											
HCM 2000 Control Delay	42.8	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity ratio	1.00	D									
Actuated Cycle Length (s)	120.0	Sum of lost time (s)									
Intersection Capacity Utilization	92.1%	19.0									
Analysis Period (min)	15	F									
c Critical Lane Group											

Queues
 2: Fifth Line & Derry Road

Future Background (PM)
 2032 Scenario 7 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	4	4	4	4	4	4	4	4	4	4	
Traffic Volume (vph)	43	1792	104	2075	119	302	74	215	311	304	
Future Volume (vph)	43	1792	104	2075	119	302	74	215	311	304	
Lane Group Flow (vph)	46	2008	111	2334	321	308	331	308	331	408	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	
Protected Phases	5	2	2	1	6	3	8	7	4	4	
Permitted Phases	2	6	6	6	6	6	6	6	6	6	
Detector Phase	5	2	2	1	6	3	8	7	4	4	
Switch Phase											
Minimum Initial (s)	7.0	20.0	7.0	20.0	7.0	10.0	10.0	7.0	10.0	10.0	
Minimum Split (s)	11.0	34.3	11.0	34.3	11.0	34.7	11.0	34.7	11.0	34.7	
Total Split (s)	11.0	60.0	11.0	60.0	21.0	28.0	21.0	28.0	21.0	28.0	
Total Split (%)	9.2%	50.0%	9.2%	50.0%	17.5%	23.3%	17.5%	23.3%	17.5%	23.3%	
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7	
All-Red Time (s)	1.0	1.6	1.0	1.6	1.0	2.0	1.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.3	4.0	5.3	4.0	5.7	4.0	5.7	4.0	5.7	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	
v/c Ratio	0.30	0.88	0.67	0.96	0.98	0.52	1.01	0.76	0.98	0.76	
Control Delay	23.4	25.9	42.7	40.0	77.7	28.3	87.4	54.7	87.4	54.7	
Total Delay	23.4	25.9	42.7	40.0	77.7	28.3	87.4	54.7	87.4	54.7	
Queue Length 50th (m)	3.5	88.4	16.2	-212.1	63.5	20.2	68.2	48.4	68.2	48.4	
Queue Length 95th (m)	m/7.5	108.3	m#40.9	#288.5	#106.6	34.1	#103.4	64.4	#103.4	64.4	
Internal Link Dist (m)	170.5	124.7	170.5	124.7	340.6	275.9	340.6	275.9	340.6	275.9	
Turn Bay Length (m)	100.0	90.0	100.0	90.0	70.0	50.0	70.0	50.0	70.0	50.0	
Base Capacity (vph)	152	2287	165	2424	329	677	329	640	677	640	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.30	0.88	0.67	0.96	0.98	0.45	1.01	0.64	0.98	0.64	
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle: 135											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											



HCM Signalized Intersection Capacity Analysis

4: Clark Boulevard & Derry Road

Future Background (PM)
2032 Scenario 7 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	3	3	3	1	1	1	1	1	1	1	1
Traffic Volume (vph)	36	2127	9	15	2167	24	79	10	61	80	7
Future Volume (vph)	36	2127	9	15	2167	24	79	10	61	80	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
FRT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.87	1.00	0.86	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5082	1770	5077	1770	1623	1770	1623	1770	1595	1920
Flt Permitted	0.05	1.00	0.05	1.00	0.43	1.00	0.71	1.00	0.71	1.00	0.92
Satd. Flow (perm)	93	5082	85	5077	795	1623	1317	1595	1317	1595	1920
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	2312	10	16	2355	26	86	11	66	87	8
RTOR Reduction (vph)	0	0	0	0	1	0	0	55	0	0	7
Lane Group Flow (vph)	39	2322	0	16	2380	0	86	22	0	87	185
Turn Type	Perm	NA	pm-pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2			1	6			8			4
Permitted Phases	2			6			8			4	
Actuated Green, G (s)	83.3	83.3	89.8	89.8	89.8	19.2	19.2	19.2	19.2	19.2	19.2
Effective Green, g (s)	83.3	83.3	89.8	89.8	89.8	19.2	19.2	19.2	19.2	19.2	19.2
Actuated g/C Ratio	0.69	0.69	0.75	0.75	0.75	0.16	0.16	0.16	0.16	0.16	0.16
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	64	3527	98	3799	127	259	210	255	210	255	255
v/s Ratio Prot	0.42	c0.46	0.00	c0.47	0.12	0.01	0.07	c0.12	0.07	c0.12	0.07
v/s Ratio Perm	0.61	0.66	0.16	0.63	0.68	0.08	0.41	0.73	0.41	0.73	0.73
Uniform Delay, d1	9.7	10.3	8.6	7.2	47.5	42.9	45.3	47.9	45.3	47.9	47.9
Progression Factor	1.60	1.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.3	0.5	0.8	0.8	13.4	0.1	1.3	9.9	1.3	9.9	9.9
Delay (s)	34.8	16.6	9.3	7.9	60.9	43.0	46.7	57.8	46.7	57.8	57.8
Level of Service	C	B	A	A	E	D	D	F	D	F	F
Approach Delay (s)	16.9		8.0		52.5				54.3		
Approach LOS	B		A		D				D		

Intersection Summary

HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues

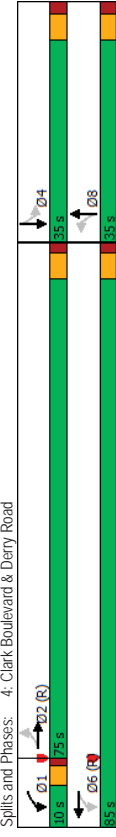
4: Clark Boulevard & Derry Road

Future Background (PM)
2032 Scenario 7 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Configurations	3	3	3	1	1	1	1	1	1	1
Traffic Volume (vph)	36	2127	9	15	2167	24	79	10	80	7
Future Volume (vph)	36	2127	9	15	2167	24	79	10	80	7
Lane Group Flow (vph)	39	2322	0	16	2381	86	77	87	87	192
Turn Type	Perm	NA	pm-pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6			8		4
Permitted Phases	2			6			8		4	
Detector Phase	2			2			2		2	
Switch Phase	2			2			2		2	
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None
v/c Ratio	0.59	0.64	0.11	0.63	0.68	0.25	0.41	0.74	0.41	0.74
Control Delay	48.1	17.2	6.1	8.7	72.2	14.2	49.9	61.9	49.9	61.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.1	17.2	6.1	8.7	72.2	14.2	49.9	61.9	49.9	61.9
Queue Length 50th (m)	8.3	180.8	0.8	88.4	20.3	2.3	19.6	44.0	19.6	44.0
Queue Length 95th (m)	m9.9	m188.7	3.2	129.3	36.9	15.1	34.0	65.6	34.0	65.6
Internal Link Dist (m)	336.0	70.0	70.0	475.1	56.4	56.4	313.3	56.4	313.3	313.3
Turn Bay Length (m)	70.0		70.0		400		400		400	
Base Capacity (vph)	66	3630	150	3800	194	445	321	395	321	395
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.64	0.11	0.63	0.44	0.17	0.27	0.49	0.27	0.49

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis

1: Sixth Line & Derry Road

Future Total (AM)
2032 Scenario 7 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	5	4	4	5	4	4	5	4	4	5	4
Traffic Volume (vph)	165	2230	169	25	923	41	105	173	32	46	142
Future Volume (vph)	165	2230	169	25	923	41	105	173	32	46	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1763	4706	1805	4385	1805	4385	3498	3498	1258	3302	3302
Flt Permitted	0.23	1.00	0.06	1.00	0.48	1.00	0.61	1.00	0.61	1.00	0.61
Satd. Flow (perm)	434	4706	111	4385	920	3498	813	3302	813	3302	813
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	176	2372	180	27	982	44	112	184	34	49	151
RTOR Reduction (vph)	0	6	0	0	4	0	0	15	0	0	124
Lane Group Flow (vph)	176	2546	0	27	1022	0	112	203	0	49	175
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1
Turn Type	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	6	8	8	8	8	4	4
Permitted Phases	2	8	8	2	8	8	8	8	8	4	4
Actuated Green, G (s)	80.8	72.6	72.8	68.6	17.7	17.7	17.7	17.7	17.7	17.7	17.7
Effective Green, g (s)	80.8	72.6	72.8	68.6	17.7	17.7	17.7	17.7	17.7	17.7	17.7
Actuated g/C Ratio	0.73	0.65	0.66	0.62	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	414	3077	136	2710	146	557	129	526	129	526	526
v/s Ratio Prot	c0.03	c0.54	0.01	0.23	0.12	0.06	0.06	0.05	0.06	0.06	0.05
v/s Ratio Perm	0.28	0.83	0.20	0.38	0.77	0.36	0.38	0.33	0.38	0.33	0.33
Uniform Delay, d1	5.1	14.5	11.8	10.6	44.7	41.6	41.7	41.4	41.7	41.4	41.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	2.7	0.7	0.4	21.1	0.4	1.9	0.4	1.9	0.4	0.4
Delay (s)	5.8	17.2	12.5	11.0	65.8	42.0	43.6	41.8	43.6	41.8	41.8
Level of Service	A	B	B	B	E	D	D	D	D	D	D
Approach Delay (s)	16.5	11.0	11.0	11.0	50.1	42.0	42.0	42.0	42.0	42.0	42.0
Approach LOS	B	B	B	B	D	D	D	D	D	D	D
Intersection Summary											
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service									
HCM 2000 Volume to Capacity ratio	0.80	B									
Actuated Cycle Length (s)	111.0	Sum of lost time (s)									
Intersection Capacity Utilization	88.4%	16.5									
Analysis Period (min)	15	E									

c Critical Lane Group

Queues

1: Sixth Line & Derry Road

Future Total (AM)
2032 Scenario 7 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	5	4	4	5	4	4	5	4	4	5	4
Traffic Volume (vph)	165	2230	169	25	923	41	105	173	32	46	142
Future Volume (vph)	165	2230	169	25	923	41	105	173	32	46	142
Lane Group Flow (vph)	176	2552	27	1026	112	218	49	299	NA	Perm	NA
Turn Type	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6	6	8	8	8	8	4	4
Permitted Phases	2	8	8	2	8	8	8	8	8	4	4
Detector Phase	5	2	1	6	6	8	8	8	8	4	4
Switch Phase	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Initial (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Minimum Split (s)	11.0	67.0	11.0	67.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (s)	9.9%	60.4%	9.9%	60.4%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%	29.7%
Total Split (%)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Yellow Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None
v/c Ratio	0.42	0.81	0.15	0.38	0.77	0.38	0.38	0.38	0.38	0.38	0.46
Control Delay	7.9	18.4	6.8	11.7	74.9	38.8	48.0	22.1	48.0	22.1	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	18.4	6.8	11.7	74.9	38.8	48.0	22.1	48.0	22.1	22.1
Queue Length 50th (m)	9.5	158.2	1.3	39.4	24.8	21.6	10.1	16.1	21.6	10.1	16.1
Queue Length 95th (m)	21.3	#2453	4.7	58.3	42.3	30.7	21.0	27.1	42.3	30.7	27.1
Internal Link Dist (m)	475.1	475.1	256.2	211.8	201.7	201.7	201.7	201.7	201.7	201.7	201.7
Turn Bay Length (m)	120.0	100.0	100.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Base Capacity (vph)	417	3150	184	2717	221	855	195	906	195	906	906
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.81	0.15	0.38	0.51	0.25	0.25	0.25	0.25	0.25	0.33
Intersection Summary											
Cycle Length: 111											
Actuated Cycle Length: 111											
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBT, Start of Green											
Natural Cycle: 100											
Control Type: Actuated-Coordinated											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											

Spills and Phases: 1: Sixth Line & Derry Road



HCM Signalized Intersection Capacity Analysis
 2: Fifth Line & Derry Road

Future Total (AM)
 2032 Scenario 7 (Sensitivity)

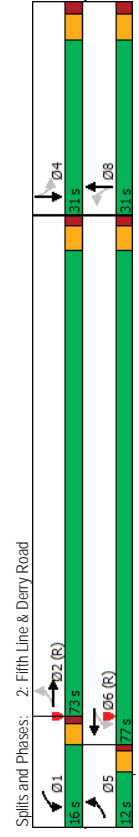
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	92	2448	163	193	815	262	100	289	113	112	71
Traffic Volume (vph)	92	2448	163	193	815	262	100	289	113	112	71
Future Volume (vph)	92	2448	163	193	815	262	100	289	113	112	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.96	1.00	0.95	1.00	0.95	1.00
FRT Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1600	4796	1587	4548	1698	3203	1501	3250	1501	3250	1501
FRT Permitted	0.22	1.00	0.06	1.00	0.68	1.00	0.35	1.00	0.35	1.00	0.35
Satd. Flow (perm)	368	4796	93	4548	1220	3203	549	3250	549	3250	549
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	98	2604	173	205	867	279	106	307	120	119	76
RTOR Reduction (vph)	0	6	0	0	48	0	0	34	0	0	27
Lane Group Flow (vph)	98	2771	0	205	1098	0	106	393	0	119	83
Heavy Vehicles (%)	11%	2%	2%	11%	3%	18%	5%	9%	3%	14%	2%
Bus Blockages (#/hr)	4	36	2	6	22	22	3	3	2	13	1
Turn Type	pm+pt	NA	pm+pt	NA	NA	Perm	NA	NA	Perm	NA	NA
Protected Phases	5	2	2	1	6	6	8	8	4	4	4
Permitted Phases	75.3	67.7	83.7	72.1	25.3	25.3	25.3	25.3	25.3	25.3	25.3
Effective Green, G (s)	75.3	67.7	83.7	72.1	25.3	25.3	25.3	25.3	25.3	25.3	25.3
Actuated g/C Ratio	0.63	0.56	0.70	0.60	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Clearance Time (s)	4.0	5.3	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	308	2705	214	2732	257	675	115	685	115	685	115
v/s Ratio Prot	0.02	c0.58	c0.10	0.24	0.12	0.12	0.03				
v/s Ratio Perm	0.18	0.57	0.57	0.09	0.09	0.09	0.022				
v/c Ratio	0.32	1.02	0.96	0.40	0.41	0.58	1.03	0.12			
Uniform Delay, d1	9.0	26.1	41.6	12.6	40.9	42.6	47.4	38.3			
Progression Factor	0.57	0.52	1.02	0.92	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.3	19.5	48.7	0.4	1.1	1.3	93.6	0.1			
Delay (s)	5.5	33.0	90.9	12.0	42.0	43.9	140.9	38.4			
Level of Service	A	C	F	B	D	D	F	D			
Approach Delay (s)	32.0	23.9	43.5	43.5	43.5	43.5	91.7	43.5			
Approach LOS	C	C	C	C	D	D	F	F			
Intersection Summary											
HCM 2000 Control Delay	33.8										
HCM 2000 Level of Service	C										
HCM 2000 Volume to Capacity ratio	1.02										
Actuated Cycle Length (s)	120.0										
Sum of lost time (s)	15.0										
Intersection Capacity Utilization	98.8%										
ICU Level of Service	F										
Analysis Period (min)	15										
c Critical Lane Group											

12-14-2023
 BA Group
 Synchro 11 Report

Queues
 2: Fifth Line & Derry Road

Future Total (AM)
 2032 Scenario 7 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	92	2448	163	193	815	262	100	289	113	112	
Traffic Volume (vph)	92	2448	163	193	815	262	100	289	113	112	
Future Volume (vph)	92	2448	163	193	815	262	100	289	113	112	
Lane Group Flow (vph)	98	2777	205	1146	106	427	119	110			
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	5	2	2	1	6	6	8	8	4	4	
Permitted Phases	2	6	6	8	8	8	4	4			
Detector Phase	5	2	2	1	6	6	8	8	4	4	
Switch Phase	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Initial (s)	11.0	34.3	11.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	
Minimum Split (s)	12.0	73.0	16.0	77.0	31.0	31.0	31.0	31.0	31.0	31.0	
Total Split (s)	10.0%	60.8%	13.3%	64.2%	25.8%	25.8%	25.8%	25.8%	25.8%	25.8%	
Total Split (%)	3.0	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
Yellow Time (s)	1.0	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lost Time Adjust (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	
Total Lost Time (s)	4.0	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None	None	
v/c Ratio	0.31	1.02	0.95	0.41	0.41	0.60	1.03	0.15			
Control Delay	4.8	34.4	83.0	10.8	46.6	42.4	140.8	27.2			
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Total Delay	4.8	34.4	83.0	10.8	46.6	42.4	140.8	27.2			
Queue Length 50th (m)	4.2	-273.2	36.2	42.8	22.9	45.6	-31.5	8.0			
Queue Length 95th (m)	m#4.6 m#293.4 #84.8 50.9 41.4 63.4 #70.7 16.3										
Internal Link Dist (m)	170.5 124.7 340.6 275.9										
Turn Bay Length (m)	100.0 90.0 70.0 50.0										
Base Capacity (vph)	318	2712	215	2780	257	709	115	712			
Starvation Cap Reductn	0	0	0	0	0	0	0	0			
Spillback Cap Reductn	0	0	0	0	0	0	0	0			
Storage Cap Reductn	0	0	0	0	0	0	0	0			
Reduced v/c Ratio	0.31	1.02	0.95	0.41	0.41	0.60	1.03	0.15			
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle: 140											
Control Type: Actuated-Coordinated											
- Volume exceeds capacity, queue is theoretically infinite.											
Queue shown is maximum after two cycles.											
# 95th percentile volume exceeds capacity, queue may be longer.											
Queue shown is maximum after two cycles.											
m Volume for 95th percentile queue is metered by upstream signal.											



2032 Scenario 7 (Sensitivity) Future Total (AM)

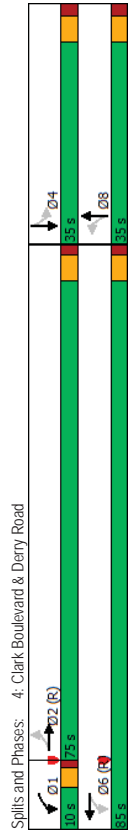
4: Clark Boulevard & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	91	2429	163	189	967	91	58	7	29	26	10	43
Traffic Volume (vph)	91	2429	163	189	967	91	58	7	29	26	10	43
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost Time (s)	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.88	1.00	0.88	1.00	0.88
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5037	1770	5020	1770	1639	1770	1639	1770	1636	1770	1636
Flt Permitted	0.23	1.00	0.05	1.00	0.72	1.00	0.72	1.00	0.73	1.00	0.73	1.00
Satd. Flow (perm)	437	5037	97	5020	1340	1639	1340	1639	1362	1636	1362	1636
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	2640	177	205	1051	99	63	8	32	28	11	47
RTOR Reduction (vph)	0	6	0	0	5	0	0	29	0	0	43	0
Lane Group Flow (vph)	99	2811	0	205	1145	0	63	11	0	28	15	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6				8			4
Permitted Phases	2			6					8			4
Actuated Green, G (s)	73.0	73.0	99.0	99.0	99.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Effective Green, g (s)	73.0	73.0	99.0	99.0	99.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Actuated g/C Ratio	0.61	0.61	0.82	0.82	0.82	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Clearance Time (s)	5.3	5.3	4.0	5.3	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	265	3064	386	4141	386	4141	111	136	113	136	113	136
v/s Ratio Prot	c0.56		c0.10	0.23				0.01				0.01
v/s Ratio Perm	0.23		0.34		0.34		c0.05		0.02			0.02
v/c Ratio	0.37	0.92	0.53	0.28	0.57	0.08	0.25	0.11	0.25	0.11	0.25	0.11
Uniform Delay, d1	11.9	20.8	33.4	2.4	52.9	50.7	51.5	50.9	51.5	50.9	51.5	50.9
Progression Factor	1.81	1.69	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	1.6	1.4	0.2	6.5	0.2	1.2	0.4	1.2	0.4	1.2	0.4
Delay (s)	22.7	36.9	34.8	2.5	59.4	51.0	52.6	51.2	52.6	51.2	52.6	51.2
Level of Service	C	D	C	A	E	D	D	D	D	D	D	D
Approach Delay (s)	36.5		7.4		56.2		51.7		51.7		51.7	
Approach LOS	D		A		E		D		E		D	
Intersection Summary												
HCM 2000 Control Delay	28.4											
HCM 2000 Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	83.4%											
Analysis Period (min)	15											
c Critical Lane Group	E											

2032 Scenario 7 (Sensitivity) Future Total (AM)

4: Clark Boulevard & Derry Road

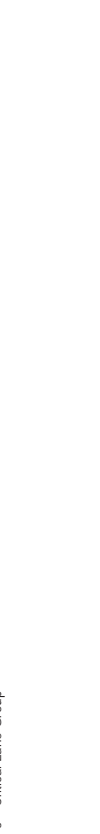
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	91	2429	189	967	91	58	7	29	26	10	43	
Traffic Volume (vph)	91	2429	189	967	91	58	7	29	26	10	43	
Future Volume (vph)	99	2817	205	1150	63	40	28	58				
Lane Group Flow (vph)	Perm	NA	pm+pt	INA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2			6					8			4
Detector Phase	2			6					8			4
Switch Phase	2			2			1	6	8	8	4	4
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead									
Lead-Lag Optimize?	Yes	Yes	Yes									
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None	None
v/c Ratio	0.37	0.90	0.53	0.27	0.47	0.21	0.21	0.21	0.21	0.21	0.21	0.28
Control Delay	28.5	35.8	30.7	2.7	62.2	22.4	52.2	21.2	22.4	21.2	22.4	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.5	35.8	30.7	2.7	62.2	22.4	52.2	21.2	22.4	21.2	22.4	21.2
Queue Length 50th (m)	18.9	222.6	29.1	18.8	15.1	1.8	6.6	2.6	1.8	1.8	6.6	2.6
Queue Length 95th (m)	m20.1	m218.7	56.8	29.5	29.3	12.4	15.6	15.2	12.4	15.6	15.2	15.2
Internal Link Dist (m)	336.0		475.1			56.4			56.4			313.3
Turn Bay Length (m)	70.0		70.0			40.0			40.0			40.0
Base Capacity (vph)	270	3118	388	4236	326	424	332	434	326	424	332	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.90	0.53	0.27	0.19	0.09	0.08	0.13	0.19	0.08	0.13	0.13
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green												
Natural Cycle: 120												
Control Type: Actuated-Coordinated												
m Volume for 95th percentile queue is metered by upstream signal.												



1: Sixth Line & Derry Road

Future Total (PM)
2032 Scenario 7 (Sensitivity)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	176	2017	109	34	1899	25	218	166	41	137	226	149
Future Volume (vph)	176	2017	109	34	1899	25	218	166	41	137	226	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	4719	1805	4435	1805	3468	1805	3468	1258	3354	1258	3354
Flt Permitted	0.07	1.00	0.07	1.00	0.45	1.00	0.61	1.00	0.61	1.00	0.61	1.00
Satd. Flow (perm)	126	4719	139	4435	852	3468	813	3354	813	3354	813	3354
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	187	2146	116	36	2020	27	232	177	44	146	240	159
RTOR Reduction (vph)	0	5	0	0	1	0	0	19	0	0	89	0
Lane Group Flow (vph)	187	2257	0	36	2046	0	232	202	0	146	310	0
Heavy Vehicles (%)	2%	2%	1%	0%	8%	33%	0%	0%	5%	40%	1%	1%
Bus Blockages (#/hr)	1	49	2	0	54	2	0	0	1	6	1	2
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	8	8	8	8	4
Permitted Phases	2	6	8	8	8	8	8	8	8	8	8	4
Actuated Green, G (s)	66.8	58.7	59.0	54.8	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6
Effective Green, g (s)	66.8	58.7	59.0	54.8	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6
Actuated g/C Ratio	0.60	0.53	0.53	0.49	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	195	2495	136	2189	242	987	231	954	231	954	231	954
v/s Ratio Prot	c0.07	0.48	0.01	0.46	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
v/s Ratio Perm	c0.50	0.90	0.26	0.93	0.96	0.20	0.63	0.32	0.63	0.32	0.63	0.32
Uniform Delay, d1	30.3	23.6	18.4	26.4	39.1	30.2	34.6	31.3	34.6	31.3	34.6	31.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	52.0	6.0	1.0	9.0	45.8	0.1	5.5	0.2	5.5	0.2	5.5	0.2
Delay (s)	82.3	29.6	19.4	35.4	84.9	30.3	40.2	31.5	40.2	31.5	40.2	31.5
Level of Service	F	C	B	D	F	C	D	C	D	C	D	C
Approach Delay (s)		33.6		35.1		58.2		33.8		58.2		33.8
Approach LOS		C		D		E		C		E		C
Intersection Summary												
HCM 2000 Control Delay		36.2		HCM 2000 Level of Service		D		D		D		D
HCM 2000 Volume to Capacity ratio		0.98										
Actuated Cycle Length (s)		111.0		Sum of lost time (s)		16.5		16.5		16.5		16.5
Intersection Capacity Utilization		89.3%		ICU Level of Service		E		E		E		E
Analysis Period (min)		15										
c Critical Lane Group												



1: Sixth Line & Derry Road

Future Total (PM)
2032 Scenario 7 (Sensitivity)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	176	2017	109	34	1899	25	218	166	41	137	226	149
Future Volume (vph)	176	2017	109	34	1899	25	218	166	41	137	226	149
Lane Group Flow (vph)	187	2262	36	2047	232	221	146	399	NA	Perm	NA	NA
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6	6	8	8	8	8	8	8	4
Permitted Phases	2	6	8	8	8	8	8	8	8	8	8	4
Detector Phase	5	2	1	6	6	8	8	8	8	8	8	4
Switch Phase	5	2	1	6	6	8	8	8	8	8	8	4
Minimum Initial (s)	7.0	25.0	7.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	31.2	11.0	31.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Total Split (s)	12.0	63.0	11.0	62.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	10.8%	56.8%	9.9%	55.9%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.2	1.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.2	4.0	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min	None	C-Min
v/c Ratio	0.96	0.88	0.19	0.93	0.96	0.22	0.63	0.38	0.63	0.38	0.63	0.38
Control Delay	81.4	28.0	10.4	35.6	89.2	27.5	49.3	22.9	49.3	22.9	49.3	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.4	28.0	10.4	35.6	89.2	27.5	49.3	22.9	49.3	22.9	49.3	22.9
Queue Length 50th (m)	26.6	169.5	2.9	152.1	52.7	17.8	29.4	26.0	29.4	26.0	29.4	26.0
Queue Length 95th (m)	75.2	200.4	6.8	178.6	104.8	28.2	57.4	40.4	57.4	40.4	57.4	40.4
Internal Link Dist (m)	475.1	256.2	475.1	256.2	211.8	211.8	211.8	211.8	211.8	211.8	211.8	211.8
Turn Bay Length (m)	120.0	100.0	100.0	45.0	45.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Base Capacity (vph)	195	2566	185	2230	242	1006	231	1044	231	1044	231	1044
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.88	0.19	0.92	0.96	0.22	0.63	0.38	0.63	0.38	0.63	0.38
Intersection Summary												
Cycle Length: 111												
Actuated Cycle Length: 111												
Offset: 0 (0%), Referenced to phase 2EBTL and 6:WBTL, Start of Green												
Natural Cycle: 90												
Control Type: Actuated-Coordinated												
# 95th percentile volume exceeds capacity, queue may be longer.												
Queue shown is maximum after two cycles.												
Spills and Phases: 1- Sixth Line & Derry Road												



2032 Scenario 7 (Sensitivity)

Future Total (PM)

HCM Signalized Intersection Capacity Analysis

4: Clark Boulevard & Derry Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	36	2132	58	43	2183	24	211	10	134	80	7
Traffic Volume (vph)	36	2132	58	43	2183	24	211	10	134	80	7
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.3	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7
Total Lost time (s)	1.00	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	0.86	1.00	0.86
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	5065	1770	5077	1770	1603	1770	1603	1770	1595	1770
Flt Permitted	0.06	1.00	0.05	1.00	0.53	1.00	0.53	1.00	0.59	1.00	0.59
Satd. Flow (perm)	106	5065	100	5077	987	1603	987	1603	1106	1595	1106
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	2317	63	47	2373	26	229	11	146	87	8
RTOR Reduction (vph)	0	2	0	0	1	0	0	68	0	0	6
Lane Group Flow (vph)	39	2378	0	47	2398	0	229	90	0	87	186
Turn Type	Perm	NA	NA	pm+pt	NA	Perm	NA	NA	Perm	NA	NA
Protected Phases	2			1	6			8			4
Permitted Phases	2			6				8			4
Actuated Green, G (s)	70.2	70.2	79.0	79.0	79.0	30.0	30.0	30.0	30.0	30.0	30.0
Effective Green, g (s)	70.2	70.2	79.0	79.0	79.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio	0.59	0.59	0.66	0.66	0.66	0.25	0.25	0.25	0.25	0.25	0.25
Clearance Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	62	2963	132	3342	246	400	276	398	276	398	398
v/s Ratio Prot	c0.47		0.01	c0.47		0.06		0.12		0.08	
v/s Ratio Perm	0.37		0.22		c0.23		0.08		0.08		0.12
v/c Ratio	0.63	0.80	0.36	0.72	0.93	0.22	0.32	0.47	0.32	0.47	0.47
Uniform Delay, d1	16.4	19.5	17.7	13.3	44.0	35.7	36.6	38.2	36.6	38.2	38.2
Progression Factor	1.52	1.53	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.1	1.1	1.6	1.4	38.9	0.3	0.7	0.9	0.7	0.9	0.9
Delay (s)	44.9	30.9	19.4	14.6	82.9	36.0	37.3	39.1	37.3	39.1	39.1
Level of Service	D	C	B	B	F	D	D	D	D	D	D
Approach Delay (s)	31.1		14.7		63.8		38.5		38.5		38.5
Approach LOS	C		B		E		D		D		D

Intersection Summary

HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

12-14-2023
BA Group
Synchro 11 Report

2032 Scenario 7 (Sensitivity)

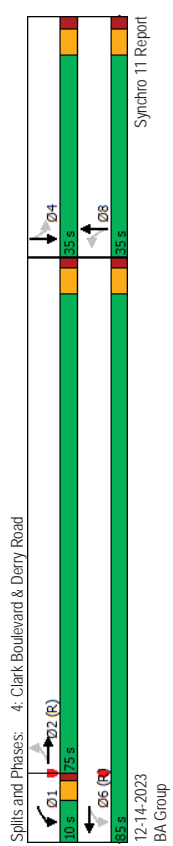
Future Total (PM)

4: Clark Boulevard & Derry Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	36	2132	43	2183	211	10	80	7	169	169	169
Traffic Volume (vph)	36	2132	43	2183	211	10	80	7	169	169	169
Future Volume (vph)	39	2380	47	2399	229	157	87	192	192	192	192
Lane Group Flow (vph)	39	2380	47	2399	229	157	87	192	192	192	192
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2			1	6			8			4
Permitted Phases	2			6				8			4
Detector Phase	2			2				2			2
Switch Phase	2			2				2			2
Minimum Initial (s)	10.0	10.0	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	34.3	34.3	10.0	34.3	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Total Split (s)	75.0	75.0	10.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	62.5%	62.5%	8.3%	70.8%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
Yellow Time (s)	3.7	3.7	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.6	1.6	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	4.0	5.3	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None
v/c Ratio	0.63	0.79	0.31	0.72	0.93	0.34	0.32	0.48	0.32	0.48	0.48
Control Delay	55.2	31.0	12.1	14.8	88.8	18.6	40.6	41.3	40.6	41.3	41.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.2	31.0	12.1	14.8	88.8	18.6	40.6	41.3	40.6	41.3	41.3
Queue Length 50th (m)	7.9	181.4	3.6	128.0	56.0	13.1	17.7	39.1	17.7	39.1	39.1
Queue Length 95th (m)	m#9.7	m#195.3	7.6	143.7	#107.6	32.5	33.7	63.3	33.7	63.3	63.3
Internal Link Dist (m)	336.0		475.1		56.4		313.3		56.4		313.3
Turn Bay Length (m)	70.0		70.0		40.0		40.0		40.0		40.0
Base Capacity (vph)	63	3033	151	3375	247	469	277	406	277	406	406
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.78	0.31	0.71	0.93	0.33	0.31	0.47	0.33	0.47	0.47

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2EBTL and 6WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

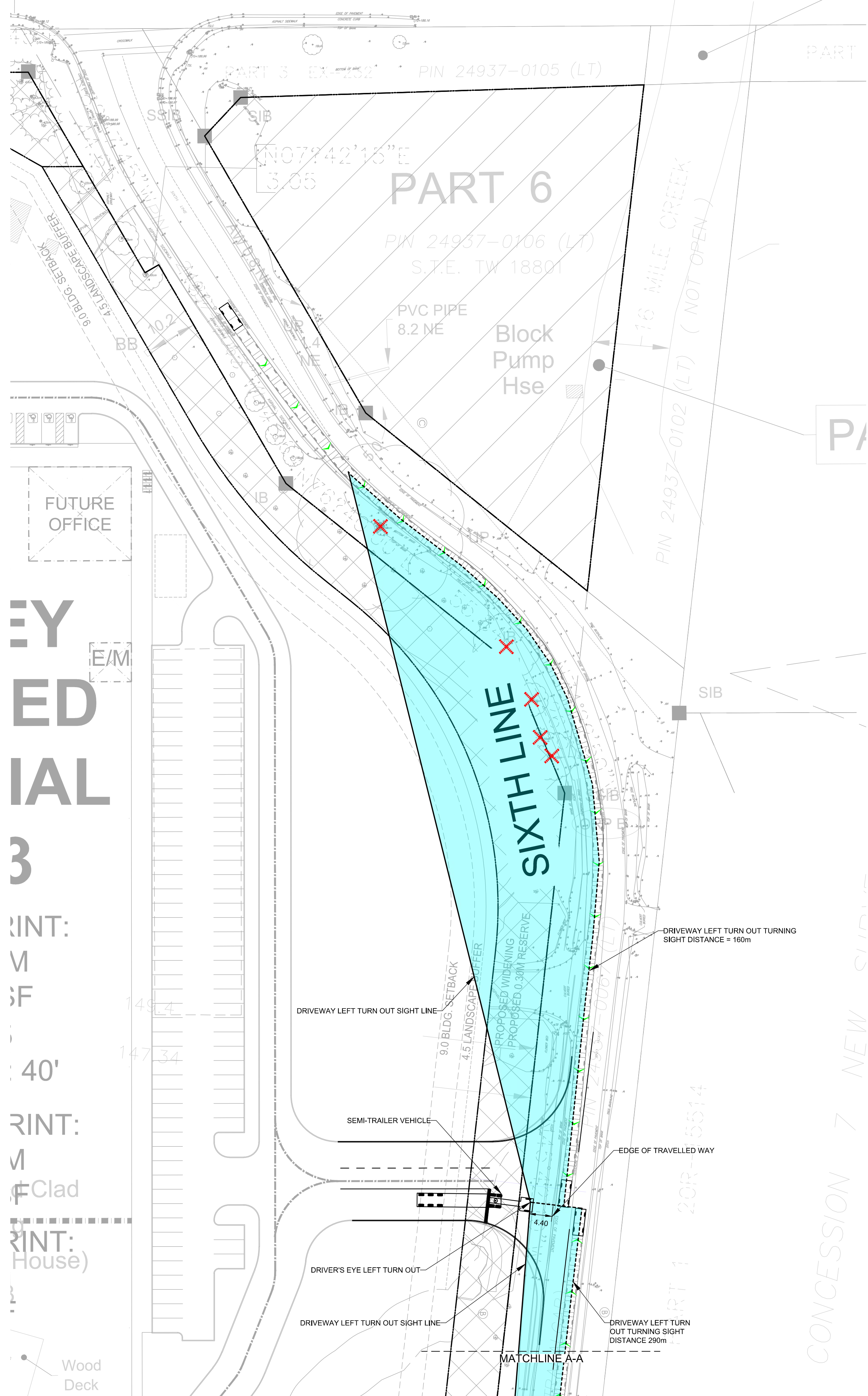
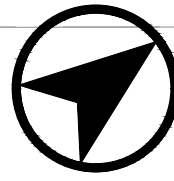


12-14-2023
BA Group
Synchro 11 Report

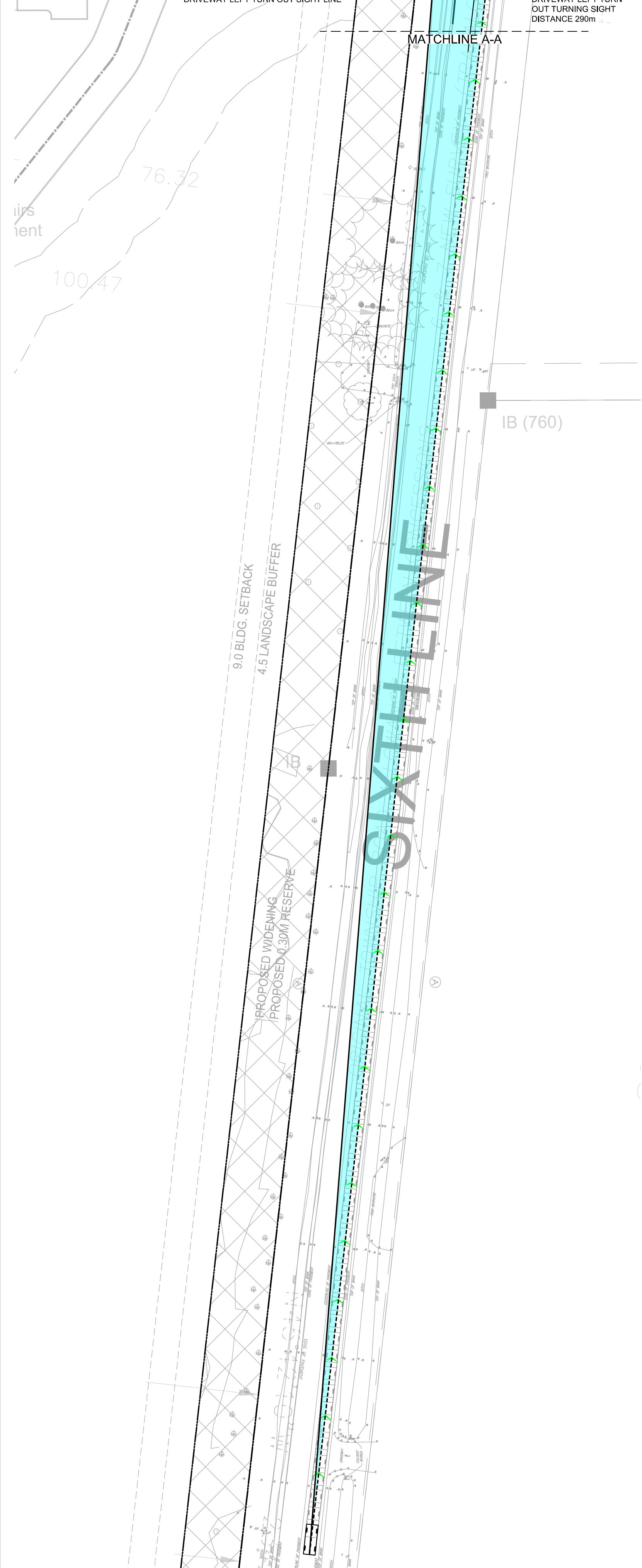
Appendix K: Sight Distance Figures

LEFT SIGHT LINE

DERRY ROAD



RIGHT SIGHT LINE



Geometric Design Guide for Canadian Roads
Chapter 9 – Intersections

Table 9.9.3: Time Gap for Case B1, Left Turn from Stop

Design Vehicle	Time Gap (t_g) at Design Speed of Major Road
Passenger car	7.5
Single-unit truck	9.5
Combination truck (WB 19 and WB 20)	11.5
Longer truck	To be established by road authority

Notes: Time gaps are for a stopped vehicle to turn left onto a two-lane highway with no median and with grades of 3% or less. The table values should be adjusted as follows:

- For multi-lane highways: For left turns onto two-lane highways with more than two lanes, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.
- For minor approach grades: If the approach grade is an upgrade that exceeds 3%, add 0.2 s for each percent grade for left turns.
- Some road authorities use higher values for certain specialized vehicles (e.g., Alberta uses 22 s for very long log trucks).

The intersection sight distance along the major road (distance b in Figure 9.9.2) is determined by:

$$ISD = 0.278 V_{major} t_g \quad (9.9.1)$$

Where:
 ISD = Intersection sight distance (length of the leg of sight triangle along the major road) (m)
 V_{major} = design speed of the major road (km/h)
 t_g = time gap for minor road vehicle to enter the major road (s)

For example, a passenger car turning left onto a two-lane major road should be provided sight distance equivalent to a time gap of 7.5 s in major-road traffic. If the design speed of the major road is 100 km/h, this corresponds to a sight distance of $0.278(100)(7.5) = 208.5$ or 210 m, rounded for design.

A passenger car turning left onto a four-lane undivided roadway will need to cross two near lanes, rather than one. This increases the recommended gap in major-road traffic from 7.5 to 8.0 s. The corresponding value of sight distance for this example would be 223 m. If the minor-road approach to such an intersection is located on a 4% upgrade, then the time gap selected for intersection sight distance design for left turns should be increased from 8.0 to 8.8 s, equivalent to an increase of 0.2 s for each percent grade.

The design values for intersection sight distance for passenger cars are shown in Table 9.9.4. Figure 9.9.4 includes design values, based on the time gaps for the design vehicles included in Table 9.9.3.

No adjustment of the recommended sight distance values for the major-road grade is generally needed because both the major- and minor-road vehicle will be on the same grade when departing from the intersection. However, if the minor-road design vehicle is a heavy truck and the intersection is located near a sag vertical curve with grades over 3%, then an adjustment to extend the recommended sight distance based on the major-road grade should be considered.

June 2017

67

LEFT SIGHT LINE:

POSTED SPEED = 40 km/h (ADVISORY)

DESIGN SPEED = 50 km/h

$$t_g = 11.5$$

$$ISD = 0.278 \times (V_{major}) \times t_g$$

$$ISD = 0.278 \times (50\text{km/h}) \times (11.5\text{s})$$

$$ISD = 160\text{m}$$

RIGHT SIGHT LINE:

POSTED SPEED = 70 km/h

DESIGN SPEED = 90 km/h

$$t_g = 11.5$$

$$ISD = 0.278 \times (V_{major}) \times t_g$$

$$ISD = 0.278 \times (90\text{km/h}) \times (11.5\text{s})$$

$$ISD = 290\text{m}$$

GENERAL NOTES

- TOPOGRAPHIC SURVEY BY STANTEC DATED DECEMBER 2023
- SITE PLAN BY WARE MALCOMB DATED DECEMBER 2023
- THIS DRAWING DOES NOT CONSTITUTE A REMOVALS PLAN, NOR HAS IT CONSIDERED THE OPINIONS OF A REGISTERED ARBORIST. IT ALSO MAKES NO CLAIMS REGARDING THE ACCURACY OF THE REFERENCED TOPOGRAPHIC SKETCH. ADDITIONAL TREES AND BUSHES MAY EXIST WITHIN THE REQUIRED SIGHT AREA WHICH ARE NOT INDICATED ON THIS PLAN

REMOVALS LEGEND



POSSIBLE TREE TO BE REMOVED OR TRIMMED

03 12-11-23	WGC	ISSUED FOR RESUBMISSION
02 04-04-23	WGC	ISSUED FOR SUBMISSION
01 02-03-23	WGC	ISSUED FOR INTERNAL COORDINATION
00 MM-DD-YR	INT	REVISION NOTE



BA Consulting Group Ltd.
 300 - 45 St. Clair Ave. W.
 Toronto ON M6V 1K5
 Tel: 416 961 7110
 www.bagroup.com



**6728 SIXTH LINE / DERRY ROAD
 ANATOLIA DEVELOPMENT**

**SIXTH LINE ACCESS
 SIGHT DISTANCE REVIEW
 LEFT TURN EXIT**

Date: March 16, 2023

Project No.: 8184-01

Scale: 1:500



SD-01

Appendix L: Pavement Marking and Signage Plan



TOREY PROPOSED INDUSTRIAL BLDG 1

TOTAL FOOTPRINT:
±104,659.61 SM
±1,126,546.60 SF
FFE = 191.90
CLEAR HEIGHT: 40'

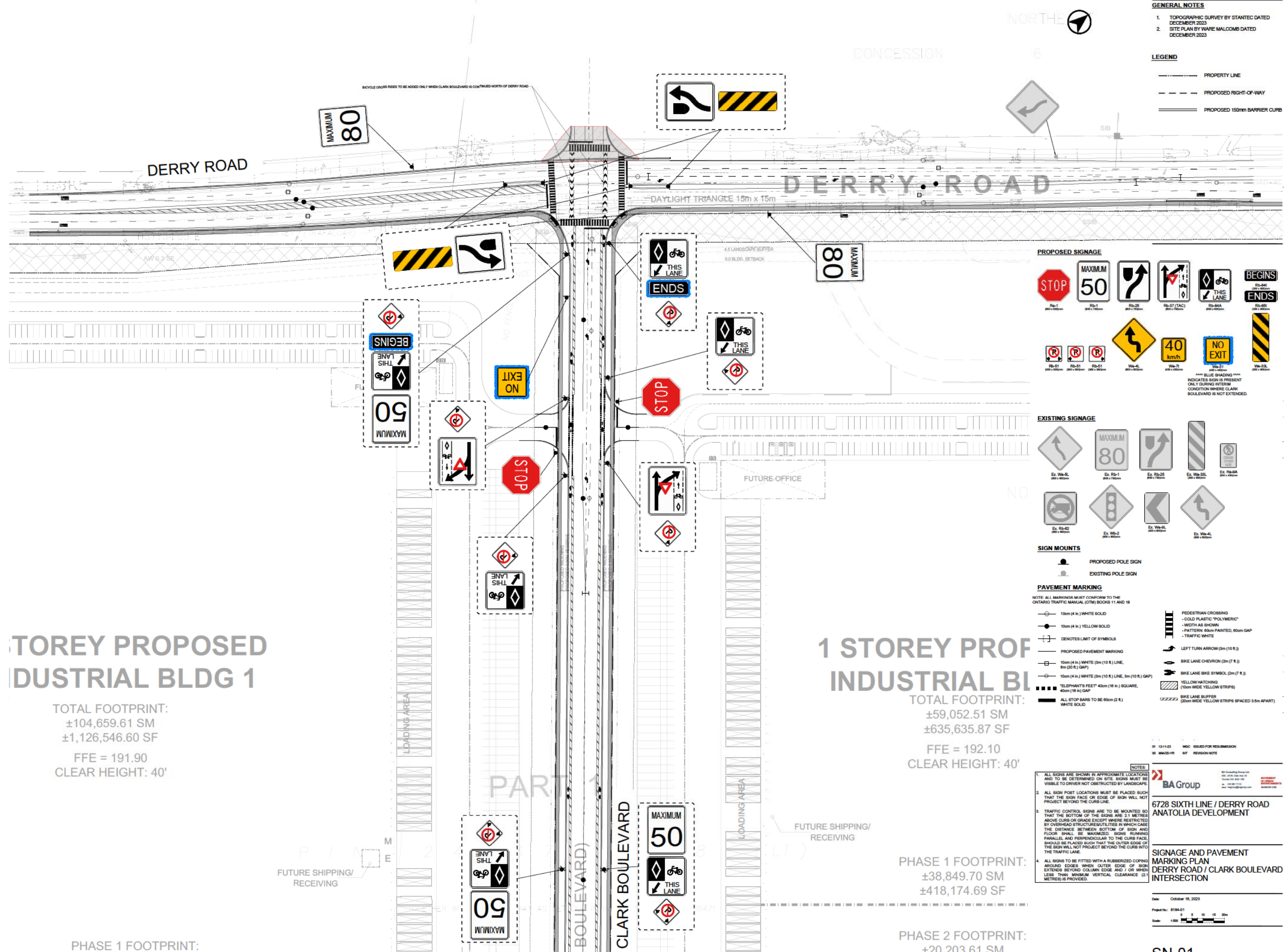
PHASE 1 FOOTPRINT:
±70,000.00 SM

1 STOREY PROF INDUSTRIAL BLDG 1

TOTAL FOOTPRINT:
±59,052.51 SM
±635,635.87 SF
FFE = 192.10
CLEAR HEIGHT: 40'

PHASE 1 FOOTPRINT:
±38,849.70 SM
±418,174.69 SF

PHASE 2 FOOTPRINT:
±20,203.61 SM



GENERAL NOTES

1. TOPOGRAPHIC SURVEY BY STANTEC DATED DECEMBER 2023
2. SITE PLAN BY WARE MALCOMB DATED DECEMBER 2023

LEGEND

- PROPERTY LINE
- - - PROPOSED RIGHT-OF-WAY
- ▬▬▬ PROPOSED 150mm BARRIER CURB

PROPOSED SIGNAGE

STOP (Rb-1)
MAXIMUM 50 (Rb-1)
MAXIMUM 80 (Rb-25)
Directional arrows (Rb-27 (TAC))
Bicycle lane signs (Rb-44A, Rb-44B)

*** BLUE SHADING ***
INDICATES SIGN IS PRESENT ONLY DURING INTERIM CONDITION WHERE CLARK BOULEVARD IS NOT EXTENDED.

EXISTING SIGNAGE

Ex. Rb-4L
Ex. Rb-1
Ex. Rb-25
Ex. Wa-3SL
Ex. Rb-4A
Ex. Rb-42
Ex. Wb-2
Ex. Wa-4L
Ex. Wa-4L

SIGN MOUNTS

PROPOSED POLE SIGN
EXISTING POLE SIGN

PAVEMENT MARKING

NOTE: ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOKS 11 AND 18

- 10cm (4 in.) WHITE SOLID
- 10cm (4 in.) YELLOW SOLID
- DENOTES LIMIT OF SYMBOLS
- PROPOSED PAVEMENT MARKING
- 10cm (4 in.) WHITE (3m (10 ft.) LINE, 6m (20 ft.) GAP)
- 10cm (4 in.) WHITE (3m (10 ft.) LINE, 3m (10 ft.) GAP)
- "ELEPHANT'S FEET" 40cm (16 in.) SQUARE, 40cm (16 in.) GAP
- ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID

PEDESTRIAN CROSSING
- COLD PLASTIC "POLYMERIC"
- WIDTH AS SHOWN
- PATTERN: 80cm PAINTED, 80cm GAP
- TRAFFIC WHITE

LEFT TURN ARROW (2m (7 ft.))
BIKE LANE CHEVRON (2m (7 ft.))
BIKE LANE BIKE SYMBOL (2m (7 ft.))
YELLOW HATCHING (150cm WIDE YELLOW STRIPS)
BIKE LANE BUFFER (20cm WIDE YELLOW STRIPS SPACED 3.5m APART)

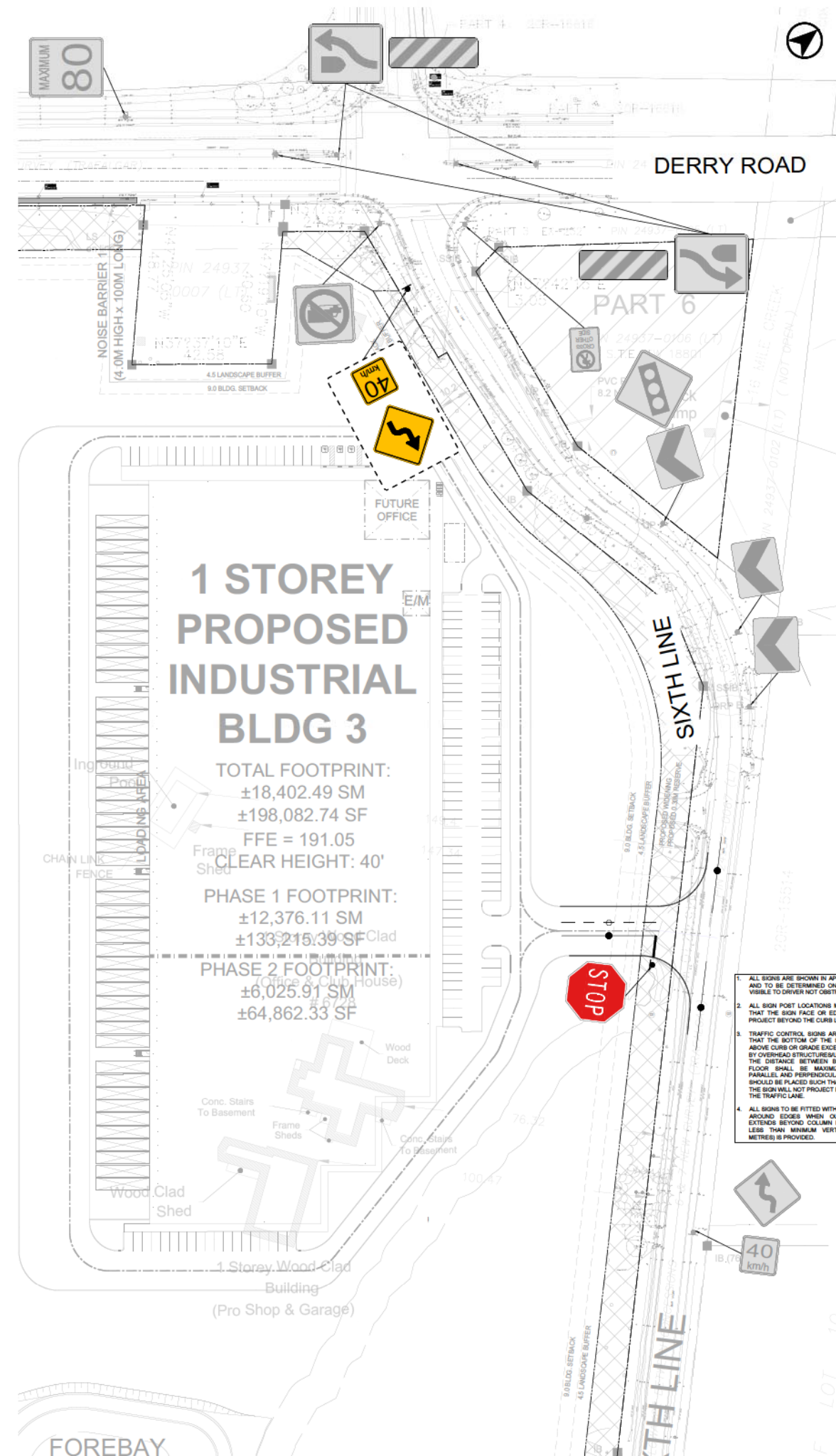
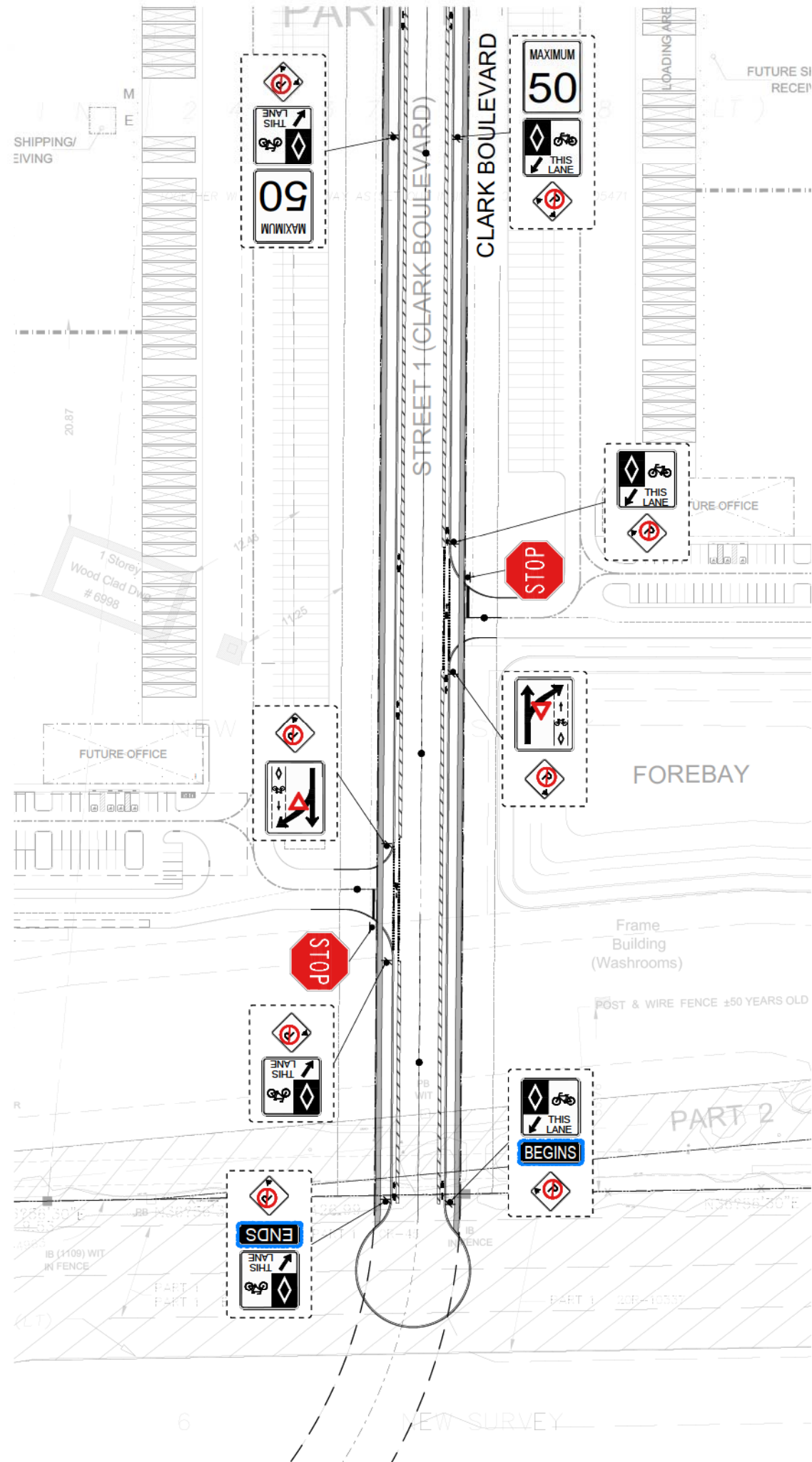
01 13-11-23 WGC ISSUED FOR RESUBMISSION
02 04-02-24 INT REVISION NOTE

BA Group

6728 SIXTH LINE / DERRY ROAD
ANATOLIA DEVELOPMENT

SIGNAGE AND PAVEMENT MARKING PLAN
DERRY ROAD / CLARK BOULEVARD INTERSECTION

Date: October 16, 2023
Project No: 8194-01
Scale: 1:500



GENERAL NOTES

- TOPOGRAPHIC SURVEY BY STANTEC DATED DECEMBER 2023
- SITE PLAN BY WARE MALCOMB DATED DECEMBER 2023

LEGEND

- PROPERTY LINE
- PROPOSED RIGHT-OF-WAY
- PROPOSED 150mm BARRIER CURB

PROPOSED SIGNAGE

STOP	MAXIMUM 50	RIGHT TURN	LEFT TURN (TAC)	THIS LANE
BEGINS	ENDS	NO EXIT	40 km/h	NO LEFT TURN

**** BLUE SHADING **** INDICATES SIGN IS PRESENT ONLY DURING INTERIM CONSTRUCTION WHERE CLARK BOULEVARD IS NOT EXTENDED.

EXISTING SIGNAGE

MAXIMUM 80	RIGHT TURN	LEFT TURN
NO LEFT TURN	NO RIGHT TURN	NO U-TURN

SIGN MOUNTS

- PROPOSED POLE SIGN
- EXISTING POLE SIGN

PAVEMENT MARKING

NOTE: ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOKS 11 AND 18

- 10cm (4 in.) WHITE SOLID
- 10cm (4 in.) YELLOW SOLID
- DENOTES LIMIT OF SYMBOLS
- PROPOSED PAVEMENT MARKING
- 10cm (4 in.) WHITE (3m (10 ft.) LINE, 6m (20 ft.) GAP)
- 10cm (4 in.) WHITE (2m (10 ft.) LINE, 3m (10 ft.) GAP)
- 40cm (16 in.) GAP
- "ELEPHANT'S FEET" 40cm (16 in.) SQUARE, 40cm (16 in.) GAP
- ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID
- PEDESTRIAN CROSSING
 - GOLD PLASTIC POLYMERIC
 - WIDTH AS SHOWN
 - PATTERN: 60cm PAINTED, 60cm GAP
 - TRAFFIC WHITE
- LEFT TURN ARROW (2m (7 ft.))
- BIKE LANE CHEVRON (2m (7 ft.))
- BIKE LANE BIVY SYMBOL (2m (7 ft.))
- YELLOW HATCHING (10cm WIDE YELLOW STRIPS)
- BIKE LANE BUFFER (20cm WIDE YELLOW STRIPS SPACED 3.5m APART)

NOTES

- ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER NOT OBSTRUCTED BY LANDSCAPE.
- ALL SIGN POST LOCATIONS MUST BE PLACED SUCH THAT THE SIGN FACE OR EDGE OF SIGN WILL NOT PROJECT BEYOND THE CURB LINE.
- TRAFFIC CONTROL SIGNS ARE TO BE MOUNTED SO THAT THE BOTTOM OF THE SIGNS ARE 2.1 METRES ABOVE CURB OR GRADE EXCEPT WHERE RESTRICTED BY OVERHEAD STRUCTURES/UTILITIES IN WHICH CASE THE DISTANCE BETWEEN BOTTOM OF SIGN AND FLOOR SHALL BE MAXIMIZED. SIGNS RUNNING PARALLEL AND PERPENDICULAR TO THE CURB FACE SHOULD BE PLACED SUCH THAT THE OUTER EDGE OF THE SIGN WILL NOT PROJECT BEYOND THE CURB INTO THE TRAFFIC LANE.
- ALL SIGNS TO BE FITTED WITH A RUBBERIZED COPING AROUND EDGES WHEN OUTER EDGE OF SIGN EXTENDS BEYOND COLUMN EDGE AND 7 CM WHEN LESS THAN MINIMUM VERTICAL CLEARANCE (2.1 METRES) IS PROVIDED.

BA Group

6728 SIXTH LINE / DERRY ROAD
ANATOLIA DEVELOPMENT

**SIGNAGE AND PAVEMENT MARKING PLAN
CONTINUATION OF CLARK AND BUILDING 3**

Date: October 16, 2023
Project No: 8194-01
Scale: 1:500