



Traffic Impact Study for Clayton Park School

Nova Scotia Department of Transportation & Infrastructure Renewal

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Prepared By:

Katie Hazzard, P.Eng.

Reviewed By:

Don Good, P.Eng.

EXP

1133 Regent Street

Fredericton, NB

t: +1.506.452.9000

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1 Introduction

Exp was retained by the Nova Scotia Department of Transportation & Infrastructure Renewal to complete a Traffic Impact Study (TIS) for a new Pre-Primary to Grade 9 (PP-9) school being proposed in Clayton Park on Radcliffe Drive, a subdivision loop from Lacewood Drive to Dunbrack Street in Halifax, NS.

The proposed school has a projected enrollment of 800 students (640 PP/elementary students and 160 junior/middle school students). The projected total net square footage (NSF) from the initial design of the proposed school is 64,369, with a gross-up factor of 1.55 resulting in a NSF of 99,772. The proposed school has two accesses off Radcliffe Drive. The access to the north is for the staff and visitor parking area. The access furthest south is a bus loop for the 5 proposed buses that will access the school.

The proposed site plan is shown in **Figure 1**. A larger size plan is also provided in **Appendix 1**.

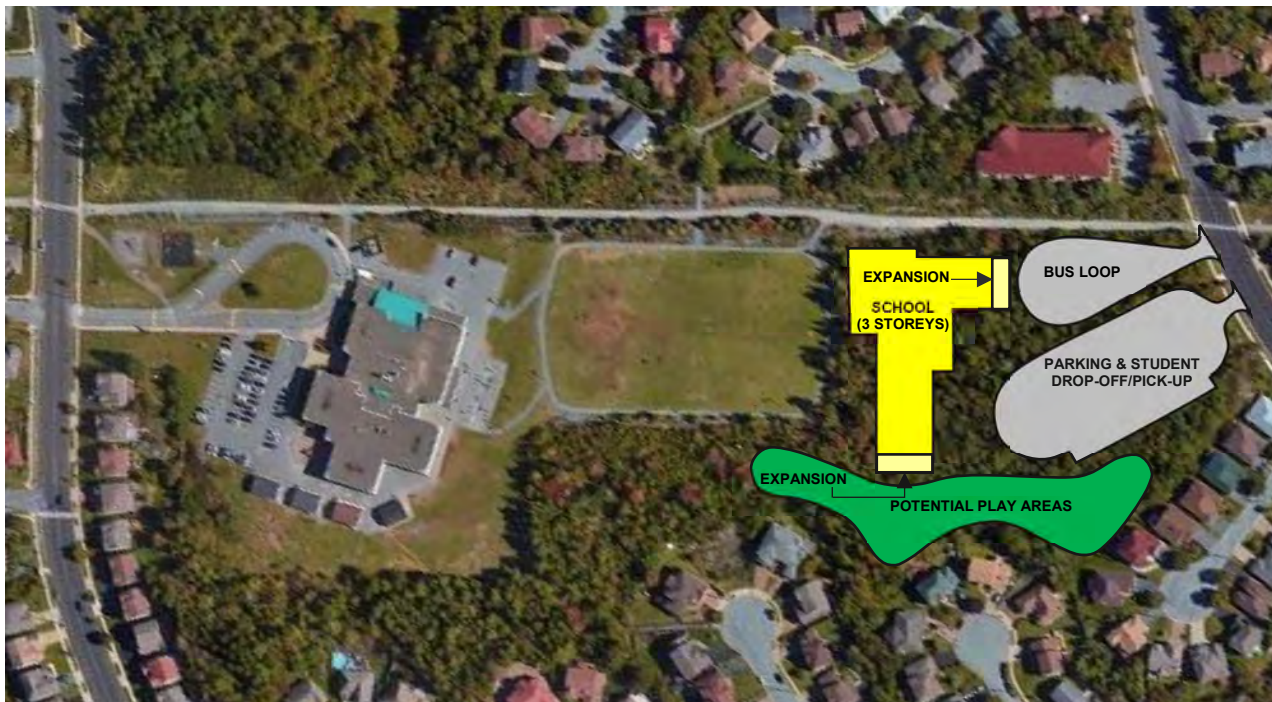


Figure 1: Proposed Development Site Plan

1.1 Approach

To assess the traffic impacts that the proposed Clayton PP-9 School will have on the Study Area roadway network and intersections, an analysis was conducted with the existing and future traffic volumes “without the development” in place (**Chapter 2**) and these results were then compared with the traffic operation results “with the development” in place (**Chapter 3**).

The proposed school is planned to open in 2023. A horizon year of 2023 (opening year) as well as 2028 (five years after the development opens) was used for the analysis. The levels of service and vehicles delays at the various intersections and driveways, along with any infrastructure deficiencies, were assessed to determine whether any improvements will be required to accommodate existing and future background traffic or the proposed development, or a combination of both. Note that any future expansion of the school was not considered in terms of traffic or parking, as it was assumed it would be outside the horizon period of 2028.

The following work activities were undertaken to address the above project objectives:

1. The existing (2017) Study Area AM and PM peak hour traffic volumes provided by HRM were expanded to represent the existing 2021 and 2023 and 2028 horizon year volumes without the site development in place. This provided the basis for comparing the impacts associated with the site development. Summary tables for traffic volumes within the Study Area are provided for existing (2017) and post development scenarios.
2. The two signalized intersections within the Study Area were evaluated using Synchro 11 software, and a detailed understanding of AM and PM peak hour traffic operating conditions was developed in terms of delays, level of service (LOS), volume to capacity (v/c) ratios, and intersection approach queueing under horizon year conditions without the site development in place. Any deficiencies were identified.
3. Any roadway improvements that are required to meet future demand without the site development were determined and recommendations made.
4. On-site data collection for existing Park West School was conducted (AM and PM peak hours), including school buses and vehicles entering and exiting the site, as well as any curbside student pickup/drop-off along Langbrae Drive.
5. The number of trips projected to be generated by the proposed development during peak travel periods was estimated based on Institute of Transportation Engineers trip rates and compared to the data collected at the similar local school (Park West School).
6. The generated traffic was assigned to the Study Area based on existing traffic distributions throughout the Study Area and info provided by HRM relating to school catchment area. The traffic assignment percentages were reviewed by the NS Department of Transportation & Infrastructure Renewal before proceeding.
7. Collision history within the Study Area was reviewed, using data provided by HRM. The collision records were evaluated for obvious trends, and commentary was provided relating to the potential for increased traffic from the school to exacerbate any noted issues.
8. The horizon year AM and PM peak hour traffic conditions with the development in place were evaluated and any deficiencies identified.
9. Any roadway, and active transportation improvements that are required to meet future demand with the development in place were determined and recommendations made.
10. Sight distances were reviewed at proposed access points. The number of parking stalls required on-site was estimated.
11. An estimate of student pedestrian volumes to/from the school was made, deficiencies in the pedestrian network were identified, and required improvements identified.
12. A draft report was prepared and submitted for review and comment. A final report will be prepared to address comments from the draft report review.

1.2 Study Area

The study area for the TIS includes Radcliffe Drive as well as the following intersections and their approaches:

1. Radcliffe Drive/Dunbrack Street (signalized).
2. Radcliffe Drive/Lacewood Drive (signalized).
3. Proposed Clayton School Access Points.

The Study Area with the corresponding intersections are shown in **Figure 2** below.

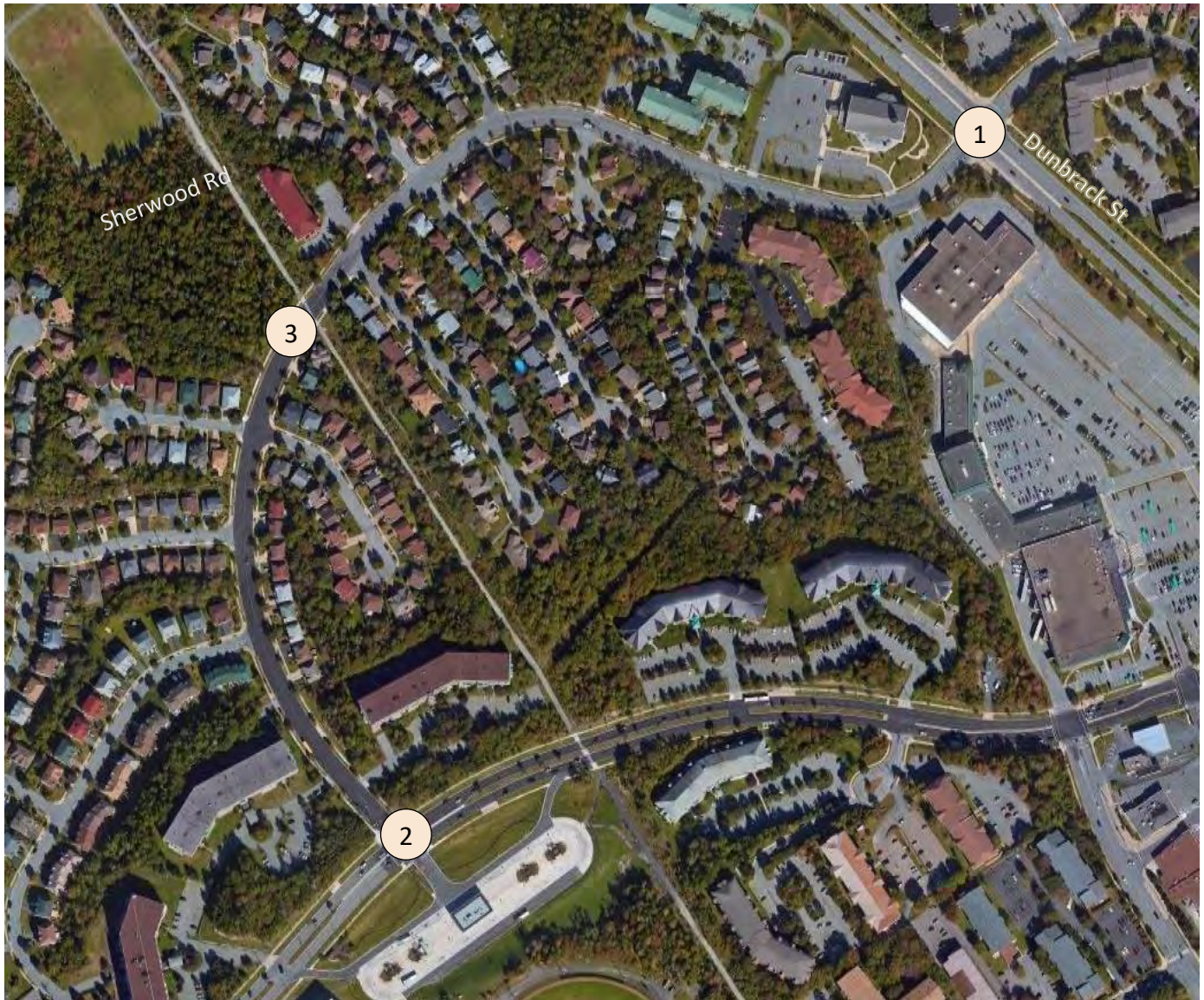


Figure 2: Study Area

1.3 Traffic Analyses Methodology

Key measures used in the analysis of intersection operations include average vehicle delays, level of service (LOS), and volume to capacity (v/c) ratios. The LOS criteria for both signalized and stop sign-controlled intersections are provided in **Table 1** below.

Usually LOS D or better is considered acceptable in urban areas before improvements are considered, although some communities accept LOS E. The methodology from the HCM 6th edition was used in the evaluation of unsignalized intersections. Analyses of signalized intersections were completed using the Synchro Control Delay (Percentile Method).

Table 1: Level of Service Criteria for Intersections

LOS	LOS Description	Signalized Intersections Control Delay (sec/veh)	Stop Controlled Intersections Control Delay (sec/veh)
A	Very low delay; most vehicles do not stop (Excellent)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (Very Good)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping (Good)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (Satisfactory)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay (Acceptable)	between 55.0 and 80.0	between 35.0 and 50.0
F	Considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (Unacceptable)	greater than 80.0	greater than 50.0

2 Existing and Future Conditions Without Development

2.1 Traffic Volumes

Traffic volume data from 2017 were provided by HRM for the two (2) signalized intersections within the Study Area. The 2017 traffic volumes were adjusted to estimate existing 2021 traffic volumes using an annual growth rate of 0.5%.

It was recognized that the peak PM period of the proposed school would occur around the dismissal time of 2:45 pm, which does not align with the peak PM period of the adjacent road network, which occurs around 4:30 pm to 5:30 pm. Traffic counts are only available for the peak AM (7 am to 9 am), Noon (11 am to 1 pm), and PM (4 pm to 6 pm) periods. It was suggested by HRM that we use the Noon peak hour counts as the background traffic for the PM peak period of the study so that the traffic volumes more closely align with the peak PM period for school related traffic (estimated to be between 2:30 pm to 3:30 pm). **This is an approximation only, and it is important to note that the background traffic during the PM peak is not for the 2:30 to 3:30 timeframe. For the remainder of the report, the term “PM peak” will refer to the PM peak of the school and will assume the Noon peak hour background traffic is representative of the 2:30 to 3:30 time frame.**

The estimated existing 2021 AM and PM peak hour volumes for the Study Area intersections are shown in **Figure 3** below.

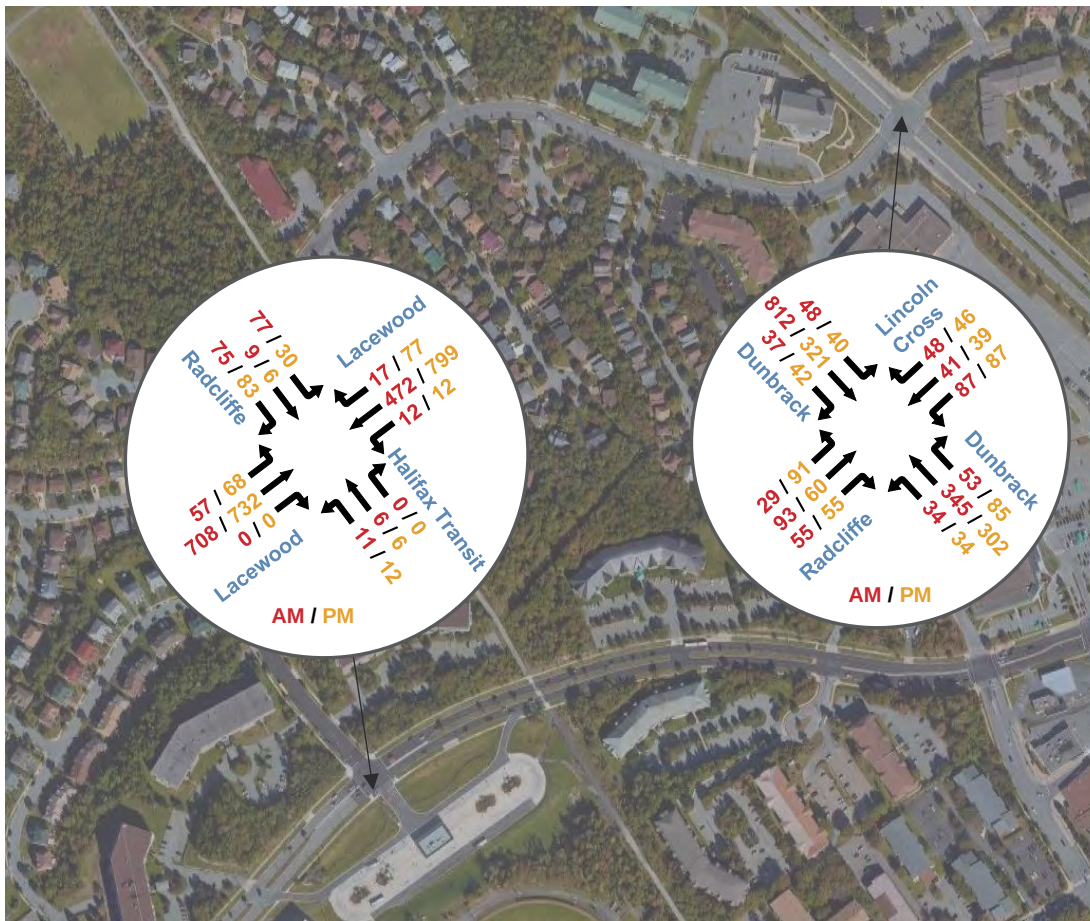


Figure 3: Summary of 2021 Traffic Volumes

2.2 Horizon Period

It is anticipated that the proposed development will be in operation by 2023. A horizon year of 2023 as well as 2028 (5 years after the proposed school is in operation) was used in accordance with the Nova Scotia Guidelines for traffic impact studies.

An overall background traffic growth of 0.5%/year was determined to be a suitable rate to use for the Study Area, as the surrounding area is predominantly built out. This growth rate was applied to all movements except for movements associated with the existing Halifax Transit Terminal.

The future background traffic volumes (without the development) were projected for 2023 and 2028 conditions and were inputted into the traffic model. The AM and PM peak hour volumes for the 2023 and 2028 horizon years are shown below in **Figure 4** and **Figure 5**, respectively.



Figure 4: Summary of Projected 2023 Background Traffic Volumes

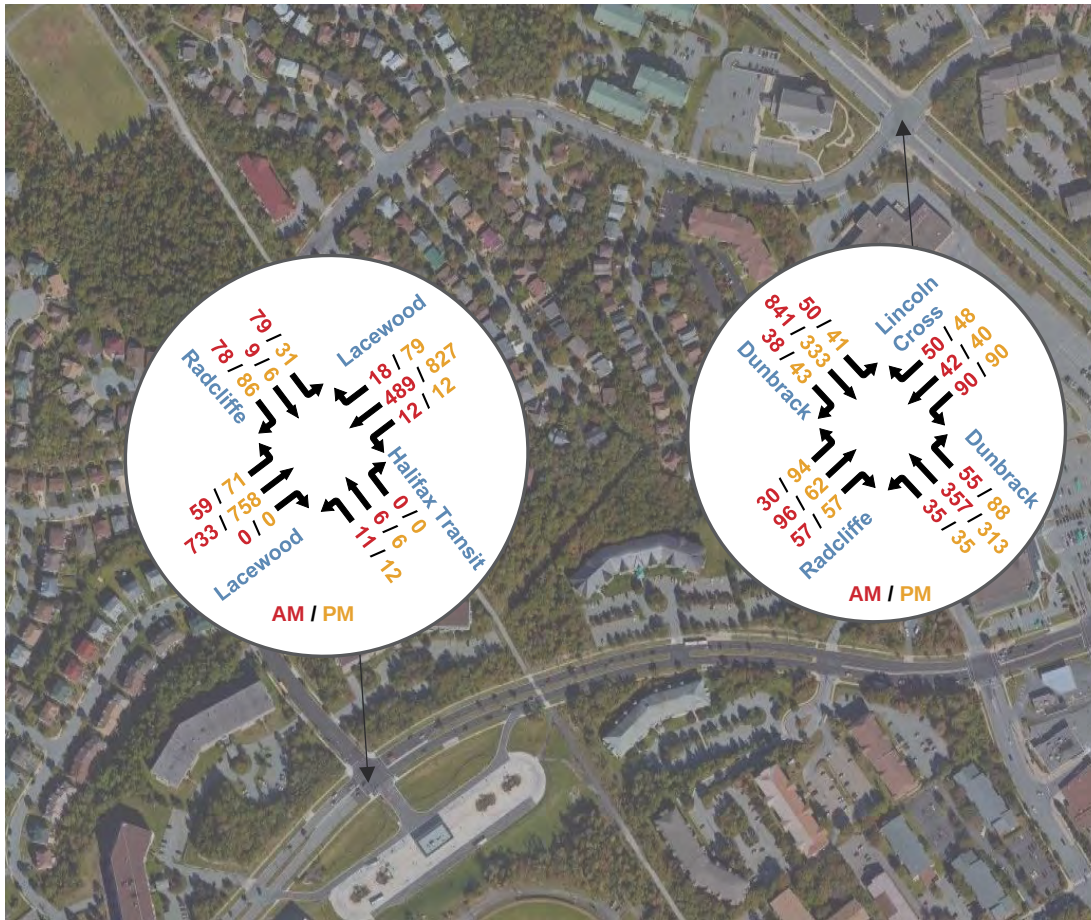


Figure 5 - Summary of Projected 2028 Background Traffic Volumes

2.3 Traffic Operations

The traffic operational conditions for the various scenarios were evaluated using Synchro 11 traffic analysis software. The existing signal timings were used for the analysis of the existing traffic operations. Signal timings were optimized for the analysis of future traffic conditions without development. Key operational measures include volume to capacity (v/c) ratios, vehicle delays (s/veh), level of service (LOS) and 95th percentile queues. The results for each intersection turning movements under existing, 2023, and 2028 background traffic conditions are summarized in the **Table 2**. Movements highlighted in yellow indicate that they are approaching capacity or are at LOS E. Movements highlighted in red indicate that they are operating above capacity or at a poor LOS F. The detailed Synchro reports are provided in **Appendix 2**.

The **Dunbrack St/Radcliffe Dr/Lincoln Cross** intersection was modelled with fully actuated traffic signals. The northbound and southbound approaches (Dunbrack Street) were modelled with a separate left turn lane, a through lane, and a shared through/right turn lane. The eastbound (Radcliffe Drive) and westbound (Lincoln Cross) approaches were modelled with a separate left turn lane and a shared through/right turn lane.

The **Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal** intersection was modelled with fully actuated traffic signals. The eastbound and westbound (Lacewood Drive) approaches were modelled with a separate left turn lane, a separate through lane, and a shared through/right turn lane. The northbound (Halifax Transit Terminal) and southbound (Radcliffe Drive) approaches were modelled with a separate left turn and a shared through/right turn lane. Note that all movements associated with the Halifax Transit Terminal are restricted to buses only.

Table 2: Operational Analysis of Existing Intersections Without Development

Year	Traffic Control	Overall LOS & Delay (sec/veh)	Overall LOS & Delay	Criteria												
Dunbrack St/Radcliffe Dr/Lincoln Cross - Without Development																
					Raddcliffe Dr			Lincoln Cross			Dunbrack St			Dunbrack St		
2021		AM Peak	A 9.2	V/C	0.09	0.33	Shared	0.3	0.2	Shared	0.12	0.21	Shared	0.1	0.45	Shared
				Delays	15.5	13.9		18.1	9.8		8.4	6.7		7.6	8.6	
				LOS	B	B		B	A		A	A		A	A	
				Queue	8 m	22 m		18 m	12 m		6 m	18 m		7 m	43 m	
		PM Peak	A 8.2	V/C	0.24	0.21	Shared	0.23	0.16	Shared	0.08	0.27	Shared	0.1	0.25	Shared
				Delays	11.3	6.9		11.3	6.3		8.6	7.6		8.8	8	
				LOS	B	A		B	A		A	A		A	A	
				Queue	12 m	10 m		12 m	8 m		5 m	15 m		6 m	15 m	
2023		AM Peak	A 9.1	V/C	0.09	0.32	Shared	0.29	0.19	Shared	0.12	0.22	Shared	0.1	0.46	Shared
				Delays	15.2	14.3		17.7	9.6		8.1	6.5		7.3	8.4	
				LOS	B	B		B	A		A	A		A	A	
				Queue	8 m	22 m		17 m	12 m		6 m	17 m		7 m	41 m	
		PM Peak	A 8.3	V/C	0.21	0.19	Shared	0.21	0.14	Shared	0.09	0.31	Shared	0.1	0.29	Shared
				Delays	10.9	6.6		10.9	6.2		8.7	7.9		8.8	8.3	
				LOS	B	A		B	A		A	A		A	A	
				Queue	12 m	10 m		12 m	8 m		5 m	15 m		6 m	15 m	
2028		AM Peak	A 9.2	V/C	0.09	0.33	Shared	0.3	0.2	Shared	0.13	0.22	Shared	0.1	0.47	Shared
				Delays	15.4	14.9		18	9.7		8.3	6.5		7.4	8.5	
				LOS	B	B		B	A		A	A		A	A	
				Queue	8 m	23 m		18 m	12 m		6 m	17 m		7 m	42 m	
		PM Peak	A 8.3	V/C	0.22	0.19	Shared	0.22	0.15	Shared	0.09	0.31	Shared	0.11	0.29	Shared
				Delays	11.1	6.7		11.2	6.2		8.7	7.9		8.9	8.3	
				LOS	B	A		B	A		A	A		A	A	
				Queue	12 m	10 m		12 m	8 m		5 m	16 m		6 m	16 m	
Radcliffe Dr/Lacewood Dr - Without Development																
					Lacewood Dr			Lacewood Dr			Halifax Transit Terminal			Radcliffe Dr		
2021		AM Peak	B 10.7	V/C	0.09	0.39	Shared	0.02	0.33	Shared	0.03	0.01	Shared	0.21	0.19	Shared
				Delays	4.9	9.4		4.8	12.6		17.5	17.2		18.9	7.5	
				LOS	A	A		A	B		B	B		B	A	
				Queue	6 m	48 m		2 m	33 m		5 m	3 m		18 m	10 m	
		PM Peak	B 10.3	V/C	0.14	0.34	Shared	0.14	0.34	Shared	0.04	0.02	Shared	0.11	0.24	Shared
				Delays	3.9	7.1		3.9	7.1		22	21.7		22.7	8.9	
				LOS	A	A		A	A		C	C		C	A	
				Queue	5 m	44 m		5 m	44 m		5 m	4 m		10 m	11 m	
2023		AM Peak	B 10.5	V/C	0.09	0.39	Shared	0.02	0.33	Shared	0.03	0.01	Shared	0.23	0.19	Shared
				Delays	4.8	9.2		4.5	12.1		17.5	17.3		19.1	7.6	
				LOS	A	A		A	B		B	B		B	A	
				Queue	6 m	48 m		2 m	32 m		5 m	3 m		18 m	10 m	
		PM Peak	A 9.9	V/C	0.14	0.36	Shared	0.02	0.5	Shared	0.04	0.02	Shared	0.11	0.23	Shared
				Delays	4.1	7.7		3.4	11.7		20.7	20.2		21.4	8.5	
				LOS	A	A		A	B		C	C		C	A	
				Queue	5 m	45 m		2 m	56 m		5 m	3 m		9 m	11 m	
2028		AM Peak	B 10.6	V/C	0.12	0.41	Shared	0.02	0.33	Shared	0.03	0.01	Shared	0.23	0.19	Shared
				Delays	5	9.4		4.6	12.2		17.6	17.3		19.2	7.5	
				LOS	A	A		A	B		B	B		B	A	
				Queue	7 m	52 m		2 m	33 m		5 m	3 m		18 m	11 m	
		PM Peak	A 9.9	V/C	0.14	0.37	Shared	0.02	0.51	Shared	0.04	0.02	Shared	0.11	0.24	Shared
				Delays	4.1	7.8		3.4	11.9		20.7	20.2		21.5	8.5	
				LOS	A	A		A	B		C	C		C	A	
				Queue	6 m	47 m		2 m	58 m		5 m	3 m		9 m	11 m	

2.3.1 Intersection No.1 – Dunbrack St/Radcliffe Dr/Lincoln Cross

Results for the **Dunbrack St/Radcliffe Dr/Lincoln Cross** intersection (Table 2) indicate that under existing conditions the intersection is operating at an overall excellent LOS A during both peak periods. All individual movements are operating at a very good LOS B or better, with a v/c ratio of 0.45 or less, indicating that there is sufficient capacity. All the 95th percentile queue lengths are within the available turning lane storage lengths.

No operational deficiencies currently exist during the AM and PM peak period for the Dunbrack St/Radcliffe Dr/Lincoln Cross intersection.

With the estimated background traffic growth at 0.5%/year, marginal changes are projected for the Dunbrack St/Radcliffe Dr/Lincoln Cross intersection by the 2023 and 2028 horizon years without the development in place.

No operational deficiencies are projected for the Dunbrack St/Radcliffe Dr/Lincoln Cross intersection by the 2023 and 2028 horizon years without the development in place.

2.3.2 Intersection No.2 – Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal

Results for the **Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal** intersection (Table 2) indicate that under existing conditions the intersection is operating at an overall LOS B during both peak periods. All individual movements are operating at LOS C or better, with a v/c ratio of 0.39 or less, indicating that there is sufficient capacity. All 95th percentile queue lengths are within the available turning lane storage.

No operational deficiencies currently exist during the AM and PM peak period for the Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal intersection.

With the estimated background traffic growth at 0.5%/year, marginal changes are projected for the Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal intersection by the 2023 and 2028 horizon years without the development in place. All 95th percentile queue lengths are projected to be within the available turning lane storage by the 2023 and 2028 horizon years, with the exception of the westbound (Lacewood Drive) through movement, which is projected to exceed the available left turn storage length during the PM peak period by approximately 15 m. This would result in the through queue blocking left turning vehicles from accessing the left turning lane during the peak PM period.

No operational deficiencies are projected for the Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal intersection by the 2023 and 2028 horizon years without the development in place. The through queue on the westbound (Lacewood Drive) approach is projected to exceed the left turn storage length by approximately 15 m, resulting in the through queue blocking left turning vehicles from the left turn storage lane at times during the PM peak period. It is recommended to monitor the queues on this approach and adjust the signal timings as necessary. It is notable that the left turning traffic for this movement is associated with transit buses only accessing the Halifax Transit Terminal and is a very low volume (12 buses during the PM peak period).

3 Future Conditions with Proposed Development

3.1 Trip Generation

The amount of traffic that will be generated by the proposed school was estimated using trip generation rates published by the Institute of Transportation Engineers (ITE). These rates are documented in the TripGen 10 software and are based on the 10th edition of the *Trip Generation Manual*. For school trips, the rates are based on the number of students (divided between elementary aged students and middle school aged students). The proposed school is projected to have a student enrollment of 640 students in elementary grades and 160 students in middle school grades, for a total of 800 students. Results from the Trip Generation are shown in **Table 3**.

Note that values in the table for the PM peak period are for the PM Peak Hour of School Generated Traffic (i.e. traffic associated with the peak school period, not the peak of the adjacent street traffic). As mentioned in the

previous section, this traffic will be applied to the background traffic during the Noon peak hour to estimate the impact of the PM peak school traffic on the road network.

The total traffic generated by a development is typically comprised of new trips, internal trips (for mixed-use developments), diverted trips, and pass-by trips. For a school development, all trips are assumed to be new trips to the area.

Table 3 – Trip Generation Rates for Proposed School

Development	# of Students	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Elementary School ITE Land Use #520	640	232	197	429	98	120	218
Middle School ITE Land Use #522	160	50	43	93	26	30	56
TOTAL	800	282	240	522	124	150	274

EXP also conducted a site visit to determine the number of trips associated with Park West School during peak school AM and PM hours. The site visit was conducted on March 2, 2021 from 7:45 am to 8:45 am and 2:30 pm to 3:30 pm. Park West School is comparable in size, grade level, and number of students as the proposed Clayton Park School. The details from the site visit are as follows:

- EXP staff completed manual traffic counts of school-related traffic entering and exiting the Park West School for the AM Peak (7:45 am to 8:45 am) and PM Peak (2:30 pm to 3:30 pm).
- The counts included staff/buses entering and exiting the Park West School access on Langbrae Drive as well as vehicles dropping students off along Langbrae Drive (i.e. drop-offs and pick-ups on Langbrae Drive were distinguished by EXP staff as traffic associated with the school and counted as vehicles entering/exiting the access, even though these vehicles are not allowed to actually use the access to the school).
- Vehicles and buses were counted separately.
- Park West School was contacted to determine the number of students in attendance on the day of the site visit.

Full results of vehicle traffic patterns and volumes as well as notes from the site visit are shown in **Table 4**. A summary of total trips is shown in **Table 5**.

Table 4 – Site Visit Results for Vehicle Volumes and Patterns for Park West School

AM Peak Hour				PM Peak Hour			
Entered then Exited	Entered then Parked	Buses (entered then exited)	Drop-Off	Entered then Exited	Exited from Parked Car	Buses (entered then exited)	Pick-Up
33	47	3	113	15	50	1	66
Notes: • HRM Crossing Guard on site at Langbrae Drive crosswalk from 8:00 am – 8:30 am and 2:30 pm – 3:00 pm • School buses in count are Type A only • Student attendance on March 2, 2021 – 791 students							

Table 5 – Summary of Trip Rates from Park West School

AM Peak Hour			PM Peak Hour		
IN	OUT	TOTAL	IN	OUT	TOTAL
196	149	345	82	132	214

Values from the site visit were compared to those from the ITE Trip Generation. The ITE published rates are comparable in splits between in/out vehicles for the two peak periods but are higher than the observed trips from Park West School.

Because of the ideal placement of Park West School in the community and it being a walking school, it is expected that vehicle trip rates would be lower than those published in ITE. Park West School, as mentioned previously, is comparable to the proposed Clayton Park School in size, grade range, and physical location. For this reason, it is reasonable to expect trip generations for the new school to be closer to those observed for Park West School. To be conservative, trip rates from Park West School were increased by a factor of 5% and used as the trip generation estimate for the proposed Clayton Park School. Trip generation rates for Clayton Park School used in this study are shown in **Table 5**, below.

Table 6 – Trip Generation Rates of Proposed Clayton Park School Used in Study

AM Peak Hour			PM Peak Hour		
IN	OUT	TOTAL	IN	OUT	TOTAL
206	156	362	86	139	225

3.2 Trip Distribution and Trip Assignment

The projected vehicle trips generated by the development were distributed to the Study Area intersections based on the traditional trip assignment approach using existing vehicle traffic patterns at the two Study Area intersections, as well as by reviewing traffic patterns for vehicles at Dunbrack St/Langbrae Dr (adjacent to Park West School) turning onto Langbrae Drive (which would likely be traffic associated with Park West School) and the existing catchment area for Park West School. In general, it was found that trips would be distributed as follows:

- To/From North (Dunbrack Street): 20% (AM), 15% (PM)
- To/From South (Dunbrack Street): 20% (AM), 15% (PM)
- To/From East (Lincoln Cross): 20% (AM), 15% (PM)
- To/From East (Lacewood Drive): 10% (AM), 30% (PM)
- To/From West (Lacewood Drive): 30% (AM), 25% (PM)

Trip assignment distribution assumptions are shown on the map below in **Figure 6**. The volumes associated with the trip assignment for traffic generated by the development are shown in **Figure 7**.



Figure 6 – Trip Assignment Distributions



Figure 7 – Trip Assignment for Proposed Clayton Park School

3.3 Future Traffic Volumes

Synchro AM and PM peak hour traffic models were updated to analyze each intersection for the two horizon years. The projected future traffic volumes for the Study Area with development (background and generated traffic) are shown in **Figure 8** and **Figure 9** on the following page for the 2023 and 2028 horizon years, respectively.

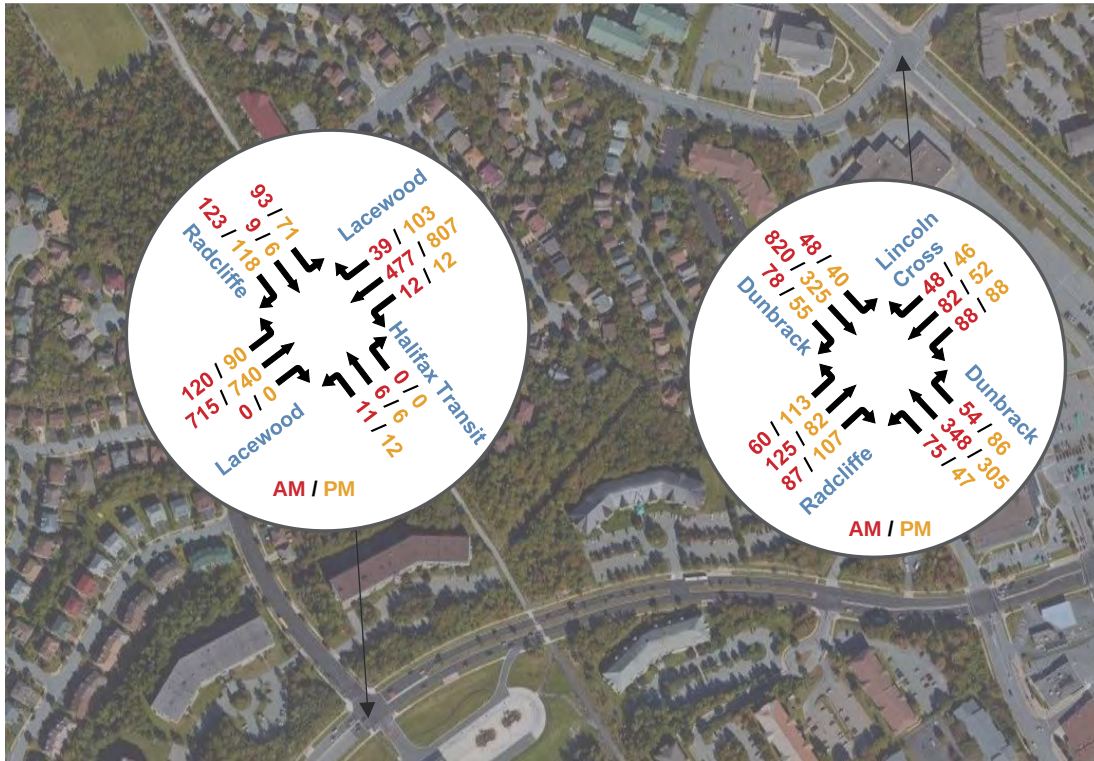


Figure 8 – Future 2023 Traffic Volumes with Development

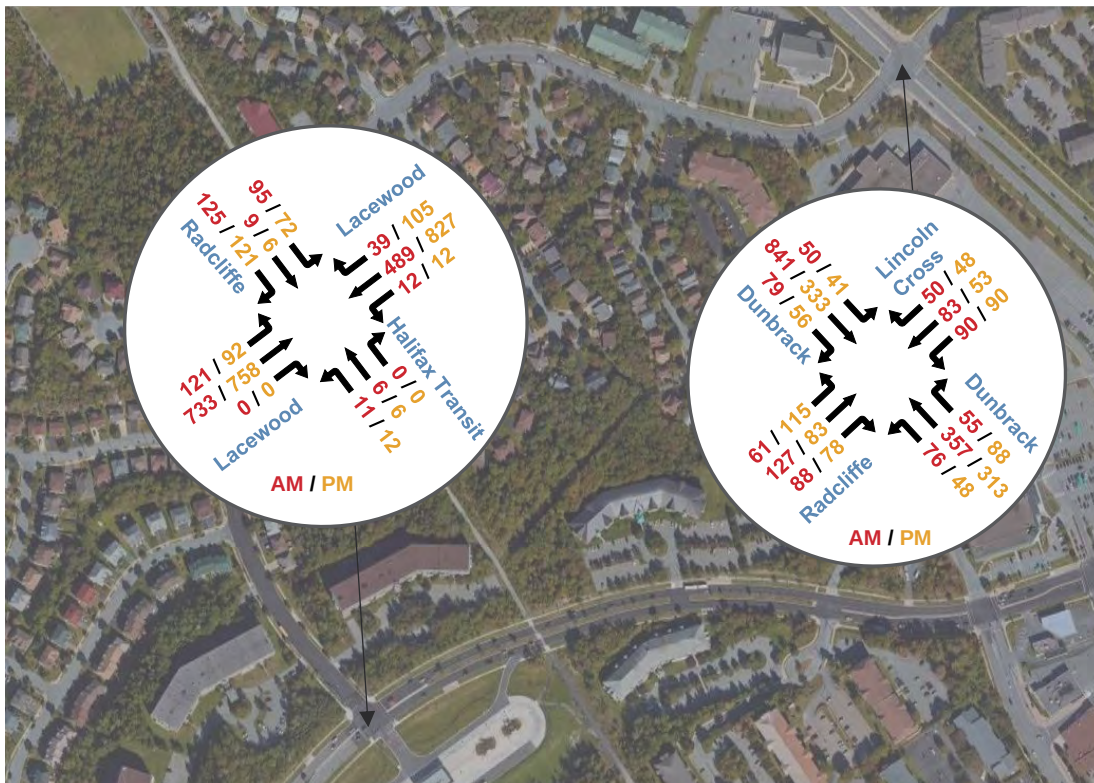


Figure 9 - Future 2028 Traffic Volumes with Development

3.4 Future Traffic Operations with the Proposed Development

Based on the projected traffic volumes with the proposed development in place, operational analyses were conducted at the two Study Area intersections for both horizon years. The two proposed access intersections on Radcliffe Dr. were also analyzed with stop sign control on the access approaches and free-flow conditions on Radcliffe Dr. Results are shown in **Table 7** and **Table 8** for the signalized intersections and access intersections, respectively. The detailed Synchro reports are provided in **Appendix 3**. Note that the traffic analysis with development did not consider any future expansion of the school, as it was assumed it would be outside the horizon period of 2028.

Table 7: Operational Analysis Results – with Development

Year	Traffic Control	Overall LOS & Delay (sec/veh)	Overall LOS & Delay	Criteria												
Dunbrack St/Radcliffe Dr/Lincoln Cross - With Development																
					Radcliffe Dr			Lincoln Cross			Dunbrack St			Dunbrack St		
2023		AM Peak	B 11.8	V/C	0.22	0.51	Shared	0.35	0.31	Shared	0.38	0.27	Shared	0.12	0.6	Shared
				Delays	18	17.5		20.4	13.5		14.6	7.6		8	10.7	
				LOS	B	B		C	B		B	A		A	A	
				Queue	14 m	34 m		19 m	20 m		14 m	19 m		7 m	48 m	
		PM Peak	A 8.4	V/C	0.29	0.32	Shared	0.24	0.17	Shared	0.12	0.27	Shared	0.1	0.26	Shared
				Delays	11.7	6.4		11.4	6.7		9.6	8		9.4	8.4	
				LOS	B	A		B	A		A	A		A	A	
				Queue	15 m	14 m		12 m	9 m		7 m	16 m		6 m	17 m	
2028		AM Peak	B 11.9	V/C	0.23	0.52	Shared	0.37	0.32	Shared	0.39	0.27	Shared	0.12	0.59	Shared
				Delays	19	18.9		21.7	14.2		14.7	7.4		7.9	10.5	
				LOS	B	B		C	B		B	A		A	B	
				Queue	14 m	34 m		20 m	20 m		15 m	20 m		8 m	50 m	
		PM Peak	A 8.6	V/C	0.29	0.27	Shared	0.24	0.18	Shared	0.12	0.28	Shared	0.11	0.27	Shared
				Delays	11.8	6.9		11.3	6.7		9.6	8		9.5	8.4	
				LOS	B	A		B	A		A	A		A	A	
				Queue	15 m	13 m		12 m	10 m		7 m	17 m		7 m	17 m	
Radcliffe Dr/Lacewood Dr - With Development																
					Lacewood Dr			Lacewood Dr			Halifax Transit Terminal			Radcliffe Dr		
2023		AM Peak	B 10.8	V/C	0.2	0.37	Shared	0.02	0.36	Shared	0.04	0.01	Shared	0.27	0.28	Shared
				Delays	5.7	9.3		4.8	13.5		17.1	16.7		19.6	6.6	
				LOS	A	A		A	B		B	B		B	A	
				Queue	11 m	50 m		2 m	34 m		4 m	3 m		20 m	12 m	
		PM Peak	B 11.3	V/C	0.2	0.35	Shared	0.02	0.55	Shared	0.05	0.02	Shared	0.25	0.3	Shared
				Delays	5.1	8.3		4.2	14.1		19.4	18.8		22.3	7.4	
				LOS	A	A		A	B		B	B		C	A	
				Queue	8 m	49 m		2 m	63 m		5 m	3 m		17 m	12 m	
2028		AM Peak	B 10.9	V/C	0.21	0.38	Shared	0.02	0.37	Shared	0.04	0.01	Shared	0.28	0.28	Shared
				Delays	5.7	9.4		4.8	13.5		17.2	16.8		19.9	6.6	
				LOS	A	A		A	B		B	B		B	A	
				Queue	11 m	51 m		2 m	35 m		4 m	3 m		21 m	12 m	
		PM Peak	B 11.4	V/C	0.2	0.36	Shared	0.02	0.56	Shared	0.05	0.02	Shared	0.26	0.31	Shared
				Delays	5.2	8.3		4.2	14.2		19.4	18.8		22.5	7.4	
				LOS	A	A		A	B		B	B		C	A	
				Queue	8 m	51 m		2 m	65 m		5 m	3 m		17 m	12 m	

Table 8: Operational Analysis Results – with Development (Accesses)

Year	Traffic Control	Overall LOS & Delay (sec/veh)	Overall LOS & Delay	Criteria														
Radcliffe Dr. Staff/Visitor Parking Access - With Development																		
					Access		Radcliffe Dr		Radcliffe Dr									
2023		AM Peak	A 5.2	V/C	0.28	Shared	Shared	0.06	Free Flow	Shared								
				Delays	13.4			3.1										
				LOS	B			A										
				Queue	9 m			2 m										
		PM Peak	A 3.8	V/C	0.22	Shared	Shared	0.04	Free Flow	Shared								
				Delays	11.7			1.7										
				LOS	B			A										
				Queue	6 m			1 m										
2028		AM Peak	A 4.6	V/C	0.31	Shared	Shared	0.07	Free Flow	Shared								
				Delays	14.7			2.9										
				LOS	B			A										
				Queue	10 m			2 m										
		PM Peak	A 3.7	V/C	0.22	Shared	Shared	0.04	Free Flow	Shared								
				Delays	11.8			1.6										
				LOS	B			A										
				Queue	6 m			1 m										
				Radcliffe Dr. Bus Access - With Development														
				2023				AM Peak			A 0.1	V/C	0.01	Shared	Shared	0	Free Flow	Shared
												Delays	11.1			0.1		
												LOS	B			A		
Queue	1 m	1 m																
PM Peak	A 0.2	V/C	0.01			Shared	Shared	0	Free Flow	Shared								
		Delays	10.3					0.1										
		LOS	B					A										
		Queue	1 m					1 m										
2028		AM Peak	A 0.1	V/C	0.01	Shared	Shared	0	Free Flow	Shared								
				Delays	11.1			0.1										
				LOS	B			A										
				Queue	1 m			1 m										
		PM Peak	A 0.2	V/C	0.01	Shared	Shared	0	Free Flow	Shared								
				Delays	10.4			0.1										
				LOS	B			A										
				Queue	1 m			1 m										

95th Percentile volume exceeds capacity, queue may be longer

3.4.1 Intersection No.1 – Dunbrack St/Radcliffe Dr/Lincoln Cross

Results for the **Dunbrack St/Radcliffe Dr/Lincoln Cross** intersection indicate that for the 2023 and 2028 horizon years with the development in place, the intersection is projected to operate at a very good overall LOS B or better during both peak periods. All individual movements are projected to operate at a good LOS C or better, with a v/c ratio of 0.60 or less, indicating that there is sufficient capacity. All the 95th percentile queue lengths are projected to be within the available turning lane storage lengths.

No operational deficiencies are projected during the AM and PM peak period for the Dunbrack St/Radcliffe Dr/Lincoln Cross intersection by the 2023 or 2028 horizon year with the development in place.

3.4.2 Intersection No.2 – Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal

Results for the **Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal** intersection indicate that for the 2023 and 2028 horizon years with the development in place, the intersection is projected to operate at an overall LOS B during both peak periods. All individual movements are projected to operate at LOS C or better, with a v/c ratio of 0.56 or less, indicating that there is sufficient capacity. All 95th percentile queue lengths are projected to be within the available turning lane storage with the exception of the westbound (Lacewood Drive) through movement, which is projected to exceed the available left turn storage length during the PM peak period by approximately 20 m. This would result in the through queue blocking left turning vehicles from accessing the left turning lane during the peak PM period.

No operational deficiencies are projected during the AM and PM peak period for the Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal intersection by the 2023 or 2028 horizon year with the development in place. The through queue on the westbound (Lacewood Drive) approach is projected to exceed the left turn storage length by approximately 20 m, resulting in the through queue blocking left turning vehicles from the left turn storage lane at times during the PM peak period. Note that this movement is projected to exceed the left turn storage length by approximately 15 m by the 2028 horizon year without the development in place.

It is recommended to monitor the westbound approach and adjust signal timings if required to accommodate queue lengths. It is also notable that this queue already exceeds the available left turn storage length under existing conditions without the development in place. It is also notable that left turning traffic on this approach is buses only accessing the Halifax Transit Terminal and is a very low volume (12 buses during the PM peak period).

3.4.3 Intersection No. 3 & 4 – Radcliffe Dr/Accesses

Results for the two access intersections on Radcliffe Drive indicate that for the 2023 and 2028 horizon years with the development in place, the access intersections are projected to operate at an overall LOS A during both peak periods. All individual movements are projected to operate at LOS B or better, with a v/c ratio of 0.31 or better, indicating that there is sufficient capacity.

No operational deficiencies are projected during the AM and PM peak period for the Radcliffe Dr/Staff and Visitor Parking Access intersection or the Radcliffe Dr/Bus Access intersection by the 2023 or 2028 horizon year with the development in place.

4 Additional Considerations

4.1 Access Review

The sight lines were evaluated at the two proposed Clayton Park School accesses based on what the Transportation Association of Canada recommends for stopping sight distance and turning sight distance. The evaluations for sight lines were done using a posted speed limit of 50 km/h. For a two-lane road with a posted speed limit of 50 km/h, 85 m of stopping sight distance and 130 m of turning sight distance should be available for full access driveways.

The amount of available stopping sight distance and turning sight distance at the two proposed access points were measured in the field. For the proposed access to the north on Radcliffe Drive, the stopping sight distance was measured to be 139 m in the southbound direction and 146 m in the northbound direction; the turning sight distance was measured to be 154 m in the southbound direction and 146 m in the northbound direction.

For the proposed access to the south on Radcliffe Drive, the stopping sight distance was measured to be 124 m in the southbound direction and 149 m in the northbound direction; the turning sight distance was measured to be 139 m in the southbound direction and 149 m in the northbound direction. Figures showing measurement details can be found in **Appendix 4**.

The sight lines for the two proposed accesses on Radcliffe Drive were found to be adequate based on a 50 km/h posted speed limit (or less). To ensure that both stopping sight distance and turning sight distance are not impacted, there should not be any on-street parking within the sight lines during school operating hours (Monday – Friday, 8 am – 4 pm).

4.2 Pedestrian Volumes and Active Transportation Facilities

4.2.1 Pedestrian Volumes

An estimate of student pedestrian volumes to/from the proposed school was determined based on existing child pedestrian volumes on the surrounding road network associated with the existing Park West School.

During the site visit on March 2, 2021 (detailed in **Section 3**), EXP staff identified three (3) locations around Park West School where they observed a high volume of students walking to/from school.

EXP staff conducted three site visits on March 9-11, 2021 to manually count pedestrians to/from the existing Park West School during the AM (7:45 am to 8:45 am) peak period at these three identified locations with high student pedestrian activity. The locations where pedestrian volumes were counted are shown in Figure 10, and listed as follows:

1. Mainland North Linear Parkway Trail from north (Langbrae Drive crosswalk) and Langbrae Drive from east.
2. Mainland North Linear Parkway Trail from south (including side accesses and Radcliffe Drive crosswalk).
3. Langbrae Drive from west (intersection of Parkland Dr/Langbrae Dr).

Note that a number of child pedestrians on Parkland Drive (north) were observed crossing Langbrae Drive and continuing south on Parkland Drive. It was assumed that these child pedestrians were accessing Park West School through the cul-de-sacs on Lancaster Drive and using the back trail to the school.

Park West School was contacted to determine the number of students in attendance during the site visits. The number of students in attendance on the site visit dates are as follows:

- March 9 – 788 students
- March 10 – 792 students
- March 11 – 785 students

It is notable that the initial site visit from **Section 3** identified approximately 115 vehicles and three buses dropping children off at school (with varying number of children per vehicle). It was observed during this site visit that there were generally one or two students per vehicle being dropped off at school. Taking an average, it is assumed that approximately 175 students (or an average of 1.5 students per vehicle) were dropped off during the AM peak hour period. Park West School provided EXP with additional information that the three buses only service a total of 12 special needs students that attend their school.

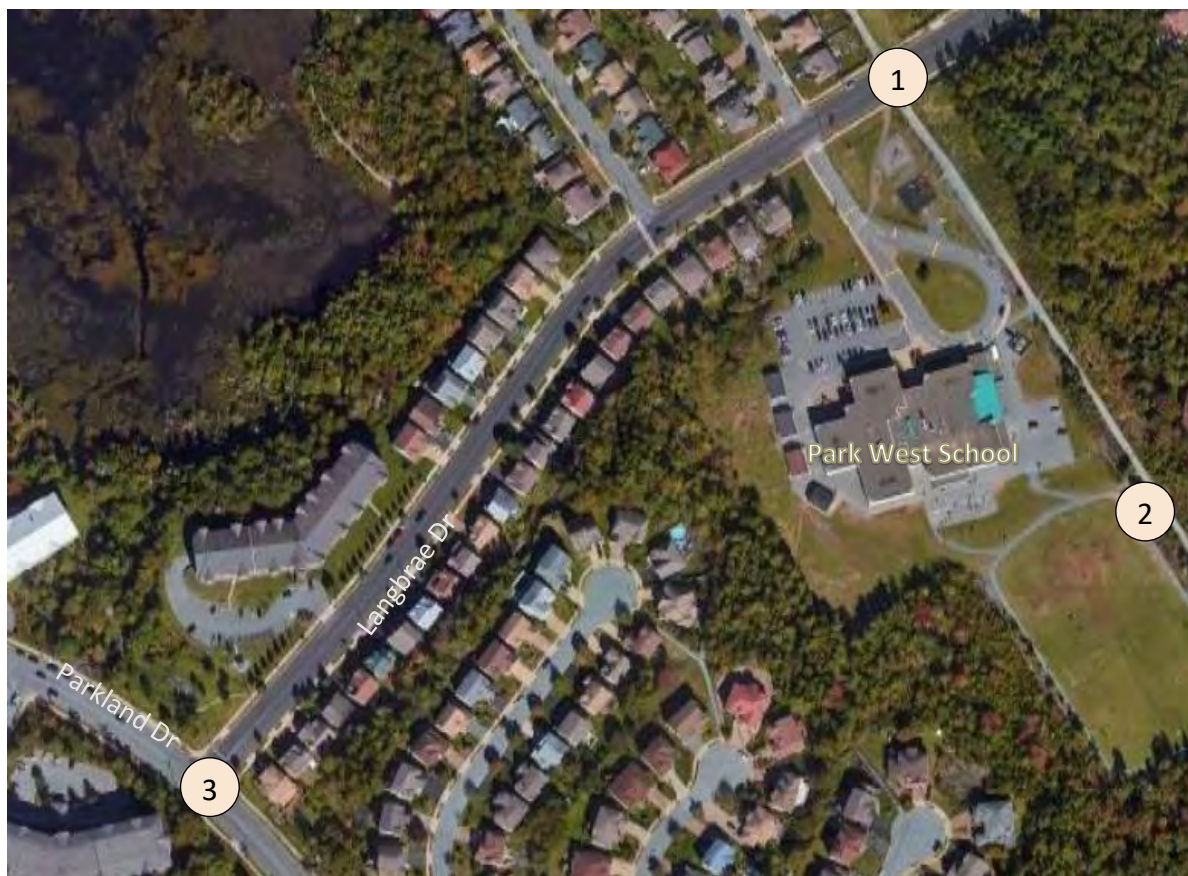


Figure 10 – Pedestrian Count Locations

Results from the site visit observing peak AM hourly pedestrian volumes are shown in **Table 9**. Detailed notes from the site visit are available in **Appendix 5**.

Table 9 – Site Visit Results for Peak AM Hourly Pedestrian Volumes and Patterns at Park West School

From									
Trail (North)		Langbrae Dr (East)		Trail (South)		Langbrae Dr (West)		Parkland Dr (Side Accesses West)	
Child	Adult	Child	Adult	Child	Adult	Child	Adult	Child	Adult
66	22	75	23	70	14	65	19	33	N/A
Notes: HRM Crossing Guard on site at Langbrae Drive crosswalk from 8:00 am – 8:30 am									

Results from the site visits indicate that there was a total of 309 student pedestrians walking to Park West School during the AM peak hour period. It is assumed that the student pedestrian volumes observed walking to the Park West School during the AM peak period would also walk home during the PM peak period. It is notable that this is an estimate only of student pedestrian volumes for Park West School, as observations were made over three days for a one-hour period at only three locations and, therefore, some pathways to school may have been missed.

Based on the site observations that estimated there were approximately 175 students dropped off at the school by vehicle, 309 students walking to school, and 12 students bused to school during the AM peak period, this translates

to approximately 60% of students walking to school, 35% of students being dropped off by vehicle to school, and 5% of students being bused to school during the AM peak hour period.

Park West School, as mentioned previously, is comparable to the proposed Clayton Park School in size, grade range, and physical location. For this reason, it is reasonable to expect that student pedestrian rates to/from the new school will be comparable to those observed for Park West School.

It is projected that student pedestrian volumes to/from the proposed Clayton Park School would be comparable to Park West School, at an estimated 60% of the student population. The proposed school has a projected enrollment of 800 students. It is, therefore, estimated that Clayton Park School could expect to have approximately 480 student pedestrians walking to/from the school.

4.2.2 Active Transportation Facilities

The existing active transportation facilities were reviewed based on projected student pedestrians who will utilize the facilities when walking to/from Clayton Park School.

The Mainland North Linear Parkway is an existing trail through the Study Area that would provide active transportation users with a facility to and from the proposed school. This facility currently intersects Langbrae Drive directly adjacent to Park West School and has a zebra crosswalk with curb extensions and RA-3 mounted signs at this crosswalk. A crossing guard is on duty at this crossing location during the AM and PM peak periods (observed during the site visit from 8:00 am to 8:30 am and 2:30 pm to 3:00 pm).

Pedestrian volumes were observed during the site visit at the existing crosswalk for the trail intersecting Radcliffe Drive (adjacent to the proposed Clayton Park School). Results for existing pedestrian volumes (i.e. without the projected volumes to/from the proposed Clayton Park School) at the Radcliffe Drive crosswalk are for the AM peak hour period and are shown in **Table 10**, below. Pedestrian volumes at this crosswalk would be expected to increase with the proposed Clayton Park School in operation.

Table 10 – Pedestrian Volumes at Existing Radcliffe Drive Crosswalk During AM Peak Period

Radcliffe Drive Crosswalk w/ Mainland North Linear Parkway Trail			
Northbound		Southbound	
Child	Adult	Child	Adult
3	15	11	7

The Transportation Association of Canada (TAC) Pedestrian Crossing Control Guide identifies candidate locations for pedestrian crossing control based on average hourly pedestrian volumes of 15 Equivalent Adult Units (EAUs) or more and vehicle volume of 1,500 veh/day or more OR if there is a requirement for system connectivity/if location is on a pedestrian desire line. **Based on this guideline, the Radcliffe Drive crosswalk is a candidate site for pedestrian crossing control based on the requirement for system connectivity with the Mainland North Linear Parkway trail.**

With the projected additional traffic generated by the school, the AADT on Radcliffe Drive is estimated to be approximately 6,100 vpd by the 2022 horizon year with Clayton Park School in operation. This was estimated using an expansion factor applied to the projected peak AM volumes on Radcliffe Drive. At the existing crosswalk for the trail at Radcliffe Drive, this facility currently has a zebra crosswalk with RA-3 mounted signs. **According to the TAC Pedestrian Crossing Control Guide, this is the acceptable pedestrian crossing type for a crosswalk with required system connectivity that is within a designated school area for a 2-lane roadway with a speed limit of 50 km/h or less and an Average Daily Traffic (ADT) of 1,500 to 4,500 or 4,500 to 9,000 vpd.**

For consistency purposes only, consideration can be given to implementing curb extensions as well as a crossing guard during school peak periods at the existing Mainland North Linear Parkway trail intersecting Radcliffe Drive to

keep school-related crosswalks associated with this trail consistent, as it is adjacent to the proposed Clayton Park School. **Note that this is for consideration only and is not required to meet the recommended TAC guideline components for this type of pedestrian crossing control.**

The latest proposed site plan does not show the delineated school area for the Clayton Park School. **It is recommended that any crosswalks that would be along a designated pathway to the new proposed school within the delineated school area should have a minimum of a zebra crosswalk with side-mounted signs (RA-3).** This is based on the TAC Pedestrian Crossing Control Guide for roads within a school area with 15 EAU (Equivalent Adult Units) or more or where there is a requirement for system connectivity.

4.3 Collision History Review

Collision history data were provided for 2007 to 2021 for Radcliffe Drive, including all midblock collisions as well as collisions at the intersections of Radcliffe Dr/Dunbrack St and Radcliffe Dr/Lacewood Dr. The collisions were separated based on midblock and intersection locations and by type of collision. Results are shown in **Table 11**.

It is important to note that these data include all collisions, and not just those that occurred during school hours (Monday to Friday, 7:30 am to 4:30 pm, September to June, and excluding holidays), as the collision history data provided did not include dates or times the collisions occurred beyond the year only. It is also important to note that direction of travel as well as specific details about pedestrian/cyclist involvement was not included in the collision data provided, so patterns associated with specific approaches at the intersections and pedestrian/cyclist involvement were not able to be identified. **More detailed collision data are required to identify trends with respect to collisions during school operating hours, with pedestrian/cyclist involvement, and those associated with specific approaches at the intersections.**

Collision data that were available indicate the majority of collisions occurring at the Study Area intersections are rear-end collisions. This type of collision typically happens at a signalized intersection when a vehicle is slowing or coming to a stop (for an amber or red light or for a pedestrian crossing) and is rear ended by a second vehicle following too closely and not anticipating a stop.

It is unclear from the limited data available what the probable causes of the rear-ended collisions at this intersection are. Some probable causes could be poor visibility of signals, inadequate signal timing, large turning volumes, unwarranted traffic signals, slippery surface, and/or inadequate pedestrian crossings at the intersection. General countermeasures for this type of collision include improving visibility of signals with advance warnings, visors/back plates, removing obstacles, implementing additional signal heads, reducing speed limits (with proper speed study), installing 12 in. signal lenses, adjusting signal timings, improving pedestrian crosswalks, reducing slippery surfaces by improving traction on the pavement, prohibiting turns, increasing curb radii, and/or improving signage at the intersection. As mentioned above, **more detailed collision data are required to identify the probable cause and to recommend the appropriate countermeasure(s) for the Study Area intersections.**

Existing signal timings at the Radcliffe Dr/Dunbrack St and Radcliffe Dr/Lacewood Dr intersections were reviewed to determine if there are any clear issues. The Flash Don't Walk (FDW) time is typically determined based on an average walking speed of 1.2 m/s and the length of the crosswalk. For areas where there is a higher volume of child pedestrians, the average walking speed should be lower, at 1.0 m/s. The FDW times at the Radcliffe Dr/Dunbrack St intersection are sufficient in all directions to accommodate child pedestrians. Based on measurements of the crossing distance on Google Maps, **it is recommended that the Radcliffe Dr/Lacewood Dr intersection signal timings be adjusted to include a FDW time of at least 17.5 seconds (as opposed to the existing 16 seconds) to accommodate child pedestrians on the northbound and southbound approaches (i.e. crossing Lacewood Dr).** The FDW time of 12 seconds for the eastbound and westbound approaches crossing Radcliffe Dr and the Halifax Transit Terminal approach are sufficient. **Note that the recommended FDW times assume that the existing yellow + all red time of 6.5 seconds will remain in place.**

Table 11 – Collision History Summary (2007 to 2021) for Radcliffe Drive

Collisions 2007-2021	Rear-End	Right Angle	Sideswipe	Hit Object	Turning Vehicle / Crossing Path	Off-Road	Head On	Other	TOTAL (2007-2021)	Collisions /Year
STUDY AREA INTERSECTIONS										
Radcliffe/Dunbrack	19	6	3	6	8	5	0	2	49	4
Radcliffe/Lacewood	12	1	4	1	7	2	0	3	30	2
RADCLIFFE MIDBLOCK										
Radcliffe/Raleigh Ct	0	0	0	0	0	1	0	0		
Radcliffe/Essex Ln	0	0	0	1	0	0	0	0		
Radcliffe/Barkton Ln	0	0	1	0	0	1	0	0		
Radcliffe/Lancaster Dr	1	0	0	0	0	0	0	0		
Radcliffe/Patton Ln	0	0	1	0	0	0	0	0		
Radcliffe/Stratfordway	1	0	0	0	0	0	0	1		
Radcliffe/Stockleigh Pl	0	0	0	0	0	0	0	1		
Radcliffe/Turnmill	0	0	0	0	0	1	0	0		
Radcliffe Drive	2	1	0	4	6	4	1	1		
TOTAL MIDBLOCK									29	2

4.4 Onsite Parking

The required amount of parking for the proposed student enrollment and number of staff for the Clayton Park School was reviewed using the Institute of Transportation Engineers (ITE) Parking Generation Handbook as well as comparing parking at Park West School, as well as other schools.

For Elementary and Middle Schools, ITE notes that factors that affect parking demand include busing policies, the availability of adequate parent pickup/drop off zones, and lack of adequate parking. Parking demand includes vehicles that are parked in designated parking spaces, not vehicles queued that are associated with pick up and drop off. It notes that it is important to collect data on the size of the building and total number of students, faculty, and employees in order to accurately measure parking demand for a site.

The ITE guide study results for Elementary Schools found a range of 0.18-0.54 vehicles per student requiring a designated parking space (with an 85th percentile of 0.36 vehicles/student). The ITE study results for Middle School/Junior High School show 0.14 vehicles per student or 1.6 vehicles per employee requiring a designated parking space.

The proposed Clayton Park School has a projected enrollment of 640 elementary-aged students and 160 junior/middle school-aged children. Using the ITE parking rates of 0.36 parking spaces per elementary school student and 0.14 parking spaces per junior/middle school student, this would result in a required **250 parking stalls for the proposed Clayton Park School to meet ITE 85th percentile rates (approximately 175 parking stalls to meet the lower end of the ITE rates).**

The ITE parking recommendations were compared to the existing parking at Park West School. **Park West School has approximately 90-100 parking spaces available for staff and visitors.** The school was contacted to determine if this is sufficient to meet parking demands. The school confirmed that they required parking for the following:

- 90 + regular staff members
- 14 + EXCEL and lunch staff on site daily (but not for the full day)
- Parking for additional support personnel from outside agencies who are onsite sporadically
- Parking for visitors (parents, etc.)

They have a total of approximately 117 staff members present at their school throughout a normal day, some of which are walkers. They also noted that during the winter months, they often lose parking spaces due to snow clearing operations. **Park West School confirmed that they do experience a shortage in parking spots.**

The Park West School website indicates that the original school was designed to accommodate 560 students (as opposed to the approximate 850 student enrollment now). Assuming the existing parking was designed for the original school and that no additional parking was added since the expansion of the school, that would result in a parking rate of 0.17 parking spots per student. For 800 students at this parking rate, a total of approximately 140 parking spots would be required.

Two other schools in Nova Scotia with a similar grade range as the proposed Clayton Park School were reviewed with respect to parking for comparison purposes: Ash Lee Jefferson Elementary School and Dartmouth South Academy. The two schools were contacted to determine if they experience any parking issues. Ash Lee Jefferson Elementary School (PP-6, 600 students) currently has 58 parking spots. The contact from Ash Lee Jefferson confirmed that their school experiences parking shortages daily. The school staff consists of 54 regular employees plus 10 lunch monitors and any other specialist or support staff that would be at the school each day.

Dartmouth South Academy (PP-9, 528 students) has 69 parking spots, including 3 accessible spots. Dartmouth South Academy estimated that an increase in the existing parking of 20% (or approximately 83 parking spots) would solve any of their parking issues. This would result in a factor of 0.16 parking spots per students. Applying this factor to parking at Clayton Park School would result in a total of approximately 125 parking spots required.

Based on the comparison of parking needs in similar schools in the surrounding area, it is recommended to implement a minimum of 125 parking stalls for staff and visitors. This recommendation is under the assumption that snow would be cleared from all parking spots during the winter.

It is also recommended to review the on-site circulation to ensure adequate availability and functionality for pickup/drop off zones. Note that the parking recommendation does not consider any future expansion of the school, as it was assumed it would be outside the horizon period of 2028.

5 Summary of Findings

Exp was retained by the Nova Scotia Department of Transportation & Infrastructure Renewal to complete a Traffic Impact Study (TIS) for a new Pre-Primary to Grade 9 (PP-9) school being proposed in Clayton Park on Radcliffe Drive, a subdivision loop from Lacewood Drive to Dunbrack Street in Halifax, NS.

The proposed school has a projected enrollment of 800 students. The projected total net square footage (NSF) from the initial design of the proposed school is 64,369, with a gross-up factor of 1.55 resulting in a NSF of 99,772. The proposed school has two accesses off Radcliffe Drive. The access to the north is for the staff and visitor parking area. The access furthest south is a bus loop for the 5 proposed buses that will access the school.

5.1 Traffic Operations without Development

To assess the traffic impacts that the proposed development could have on the roadway network and Study Area intersections, an analysis was first conducted with existing and future background traffic volumes without the development.

5.1.1 Dunbrack St/Radcliffe Dr/Lincoln Cross

The results of the traffic analyses found that at the intersection of Dunbrack St/Radcliffe Dr/Lincoln Cross:

1. **No operational deficiencies currently exist or are projected for the Dunbrack St/Radcliffe Dr/Lincoln Cross intersection by the 2023 and 2028 horizon years without the development in place.**

5.1.2 Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal

The results of the traffic analyses found that at the intersection of Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal:

1. **No operational deficiencies currently exist or are projected for the Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal intersection by the 2023 and 2028 horizon years without the development in place.**
2. **The through queue on the westbound (Lacewood Drive) approach is projected to exceed the left turn storage length by approximately 15 m, resulting in the through queue blocking left turning vehicles from the left turn storage lane at times during the PM peak period.**
3. **It is recommended to monitor the queues and adjust the signal timings as necessary. It is notable that the left turning traffic for this movement is transit buses only accessing the Halifax Transit Terminal.**

5.2 Traffic Operations with the Development

The future traffic operations with development does not consider any future expansion of the school, as it was assumed it would be outside the horizon period of 2028.

5.2.1 Dunbrack St/Radcliffe Dr/Lincoln Cross

The results of the traffic analyses found that at the intersection of Dunbrack St/Radcliffe Dr/Lincoln Cross with development:

1. **No operational deficiencies are projected during the AM and PM peak period for the Dunbrack St/Radcliffe Dr/Lincoln Cross intersection by the 2023 or 2028 horizon year with the development in place.**

5.2.2 Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal

The results show that:

1. **No operational deficiencies are projected during the AM and PM peak period for the Radcliffe Dr/Lacewood Dr/Halifax Transit Terminal intersection by the 2023 or 2028 horizon year with the development in place.**
2. **The through queue on the westbound (Lacewood Drive) approach is projected to exceed the left turn storage length by approximately 20 m, resulting in the through queue blocking left turning vehicles from the left turn storage lane at times during the PM peak period. Note that this movement is projected to exceed the left turn storage length by approximately 15 m by the 2028 horizon year without the development in place.**
3. **It is recommended to monitor the westbound approach and adjust signal timings if required to accommodate queue lengths. It is also notable that this queue already exceeds the available left turn storage length under existing conditions without the development. It is also notable that left turning traffic on this approach is buses only accessing the Halifax Transit Terminal.**

5.2.3 Radcliffe Dr/Staff and Visitor Parking Access and Radcliffe Dr/Bus Access Intersections

The results for the proposed accesses on Radcliffe Dr show:

1. **No operational deficiencies are projected during the AM and PM peak period for the Radcliffe Dr/Staff and Visitor Parking Access intersection or the Radcliffe Dr/Bus Access intersection by the 2023 or 2028 horizon year with the development in place.**

5.3 Additional Considerations

5.3.1 Access Review

The sight lines were evaluated at the two proposed Clayton Park School accesses based on what the Transportation Association of Canada recommends for stopping sight distance and turning sight distance. The evaluations for sight lines were done using a posted speed limit of 50 km/h. For a two-lane road with a posted speed limit of 50 km/h, 85 m of stopping sight distance and 130 m of turning sight distance should be available for full access driveways. **The sight lines were found to be adequate based on a 50 km/h posted speed limit (or less).**

To ensure that both stopping sight distance and turning sight distance are not impacted, there should not be any on-street parking within the sight lines during school operating hours (Monday – Friday, 8 am – 4 pm).

5.3.2 Pedestrian Volumes

An estimate of student pedestrian volumes to/from the school was determined based on existing child pedestrian volumes on the surrounding road network as well as from reviewing streets within the Study Area that are currently within the Park West School boundaries.

EXP staff identified three (3) locations around Park West School where they observed a high volume of students walking to/from school. EXP staff conducted three site visits on March 9-11, 2021 to manually count pedestrians to/from the existing Park West School during the AM (7:45 am to 8:45 am) peak period at these three identified locations with high student pedestrian activity. Park West School is comparable to the proposed Clayton Park School in size, grade range, and physical location. For this reason, it is reasonable to expect that student pedestrian rates to/from the new school to be comparable to those observed for Park West School.

It is projected that student pedestrian volumes to/from the proposed Clayton Park School would be comparable to Park West School, at an estimated 60% of the student population. The proposed school has a projected enrollment of 800 students. It is, therefore, estimated that Clayton Park School could expect to have approximately 480 student pedestrians.

5.3.3 Active Transportation Facilities

The existing active transportation facilities were reviewed based on projected student pedestrian volumes that will utilize the facilities when walking to/from Clayton Park School.

The Mainland North Linear Parkway is an existing trail through the Study Area that would provide active transportation users with a facility to and from the proposed school. This facility currently intersects Langbrae Drive directly adjacent to Park West School and has a zebra crosswalk with curb extensions and RA-3 mounted signs at this crosswalk. Pedestrian volumes were observed during the site visit for the existing crosswalk for the trail intersecting Radcliffe Drive (adjacent to the proposed Clayton Park School).

Based on the Transportation Association of Canada (TAC) Pedestrian Crossing Control Guide, **the Radcliffe Drive crosswalk is a candidate site for pedestrian crossing control based on the requirement for system connectivity with the Mainland North Linear Parkway trail.**

At the existing crosswalk for the trail at Radcliffe Drive, this facility currently has a zebra crosswalk with RA-3 mounted signs. **According to the TAC Pedestrian Crossing Control Guide, this is the acceptable pedestrian crossing type for this crosswalk with the projected increase usage for student pedestrians and the increase in traffic on Radcliffe Drive with the Clayton Park School in place.**

For consistency purposes only, consideration can be given to implementing curb extensions as well as a crossing guard during school peak periods at the existing Mainland North Linear Parkway trail intersecting Radcliffe Drive to keep school-related crosswalks associated with this trail consistent, as it is adjacent to the proposed Clayton Park School. **Note that this is not required to meet the recommended TAC guideline components for this type of pedestrian crossing control.**

The latest proposed site plan does not show the delineated school area for the Clayton Park School. **It is recommended that any crosswalks that would be along a designated pathway to the new proposed school within the delineated school area have a minimum of a zebra crosswalk with side-mounted signs (RA-3).** This is based on the TAC Pedestrian Crossing Control Guide for roads within a school area with 15 EAU (Equivalent Adult Units) or more or where there is a requirement for system connectivity.

5.3.4 Collision History Review

Collision history data was provided for 2007 to 2021 for Radcliffe Drive, including all midblock collisions as well as collisions at the intersections of Radcliffe Dr/Dunbrack St and Radcliffe Dr/Lacewood Dr. The collisions were separated based on midblock and intersection locations and by type of collision. Results of the collision analysis show the following:

1. Collision data that was available indicates that the majority of collisions occurring at the Study Area intersections are rear-end collisions. This type of collision typically happens at a signalized intersection when a vehicle is slowing or coming to a stop (for an amber or red light or for a pedestrian crossing) and is rear ended by a second vehicle following too closely and not anticipating a stop.
2. Some probable causes of rear-end collisions could be poor visibility of signals, inadequate signal timing, large turning volumes, unwarranted traffic signals, slippery surface, and/or inadequate pedestrian crossings at the intersection.
3. General countermeasures for this type of collision include improving visibility of signals with advance warnings, visors/back plates, removing obstacles, implementing additional signal heads, reducing speed limits (with proper speed study), installing 12 in. signal lenses, adjusting signal timings, improving pedestrian crosswalks, reducing slippery surfaces by improving traction on the pavement, prohibiting turns, increasing curb radii, and/or improving signage at the intersection.
4. Due to lack of information in the collision data available on dates and times the collisions occurred (beyond the year only), whether or not pedestrian(s) and/or cyclist(s) were involved, as well as the direction of travel/approach collisions occurred on, specific patterns were not able to be identified with respect to probable causes of collisions within the Study Area. **More detailed collision data is required to identify the probable cause and to recommend the appropriate countermeasure(s) for the Study Area intersections.**
5. Existing signal timings at the Radcliffe Dr/Dunbrack St and Radcliffe Dr/Lacewood Dr intersections were reviewed to determine if there are any clear issues.
6. Based on measurements of the crossing distance on Google Maps, **it is recommended that the Radcliffe Dr/Lacewood Dr intersection signal timings be adjusted to include a FDW time of at least 17.5 seconds (as opposed to the existing 16 seconds) to accommodate child pedestrians on the northbound and southbound approaches (i.e. crossing Lacewood Dr). The FDW time of 12 seconds for the eastbound and westbound approaches crossing Radcliffe Dr and the Halifax Transit Terminal approach are sufficient. Note that the recommended FDW times assume that the existing yellow + all red time of 6.5 seconds will remain in place.**

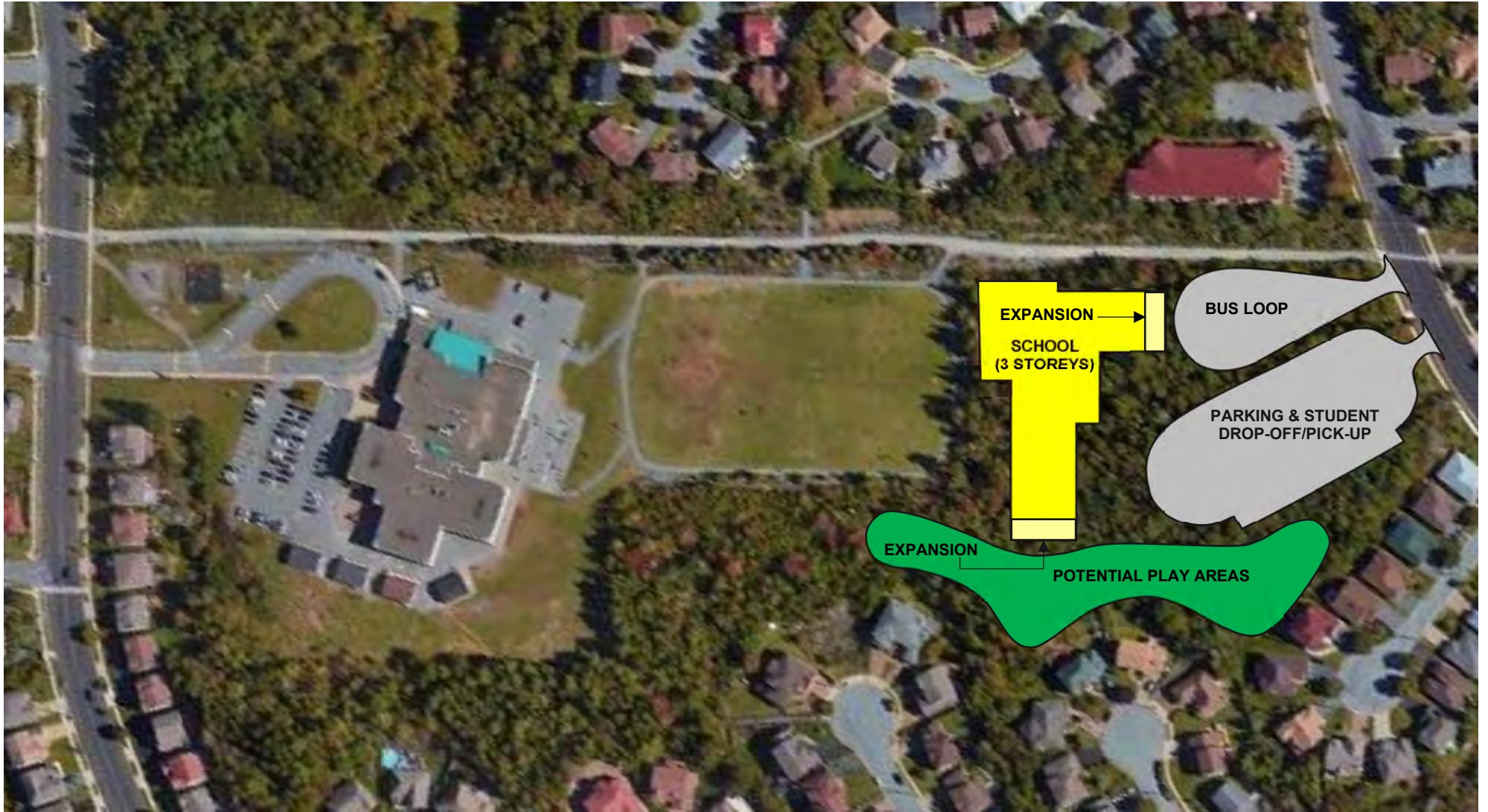
5.3.5 Onsite Parking

The required amount of parking for the proposed student enrollment and number of staff for the Clayton Park School was reviewed using the Institute of Transportation Engineers (ITE) Parking Generation Handbook as well as comparing parking requirements at Park West School and Dartmouth South Academy.

Based on the comparison of parking needs in similar schools in the surrounding area, it is recommended to implement a minimum of 125 parking stalls for staff and visitors. This recommendation is under the assumption that snow would be cleared from all parking spots during the winter.

It is also recommended to review the on-site circulation to ensure adequate availability and functionality for pickup/drop off zones. Note that the parking recommendation does not consider any future expansion of the school, as it was assumed it would be outside the horizon period of 2028.

Appendix 1 – Proposed Site Plan



Appendix 2 – Synchro Detailed Reports – Without Development

2021 Conditions (AM and PM Peak)

2022 Conditions (AM and PM Peak)

2030 Conditions (AM and PM Peak)

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	77	9	75	11	6	0	57	708	0	12	472	17
Future Volume (vph)	77	9	75	11	6	0	57	708	0	12	472	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	25.0		0.0	0.0		0.0	50.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.866									0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1631	0	1789	1883	0	1789	3579	0	1789	3561	0
Flt Permitted	0.753			0.697			0.390			0.360		
Satd. Flow (perm)	1418	1631	0	1313	1883	0	735	3579	0	678	3561	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82									4	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		262.2			86.1			163.5			109.0	
Travel Time (s)		19.7			6.5			12.3			8.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	84	10	82	12	7	0	62	770	0	13	513	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	92	0	12	7	0	62	770	0	13	531	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	10.0		2.0	10.0		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	29.5	29.5		29.5	29.5		11.0	25.6		11.0	25.6	
Total Split (s)	45.0	45.0		45.0	45.0		12.0	45.0		15.0	45.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		11.4%	42.9%		14.3%	42.9%	
Maximum Green (s)	38.5	38.5		38.5	38.5		8.0	38.4		11.0	38.4	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.0	4.1		4.0	4.1	
All-Red Time (s)	2.4	2.4		2.4	2.4		0.0	2.5		0.0	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

AM - Existing

Synchro 11 Report
Page 1

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5		4.0	6.6		4.0	6.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	10.5	10.5		10.5	10.5		22.7	22.0		21.0	18.0	
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.58	0.56		0.53	0.46	
v/c Ratio	0.22	0.19		0.03	0.01		0.09	0.39		0.02	0.33	
Control Delay	18.9	7.5		17.5	17.2		4.9	9.4		4.8	12.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.9	7.5		17.5	17.2		4.9	9.4		4.8	12.6	
LOS	B	A		B	B		A	A		A	B	
Approach Delay		13.0			17.3			9.0			12.4	
Approach LOS		B			B			A			B	
Queue Length 50th (m)	5.6	0.6		0.8	0.4		1.7	16.7		0.4	18.1	
Queue Length 95th (m)	17.8	10.4		4.5	3.3		5.8	48.4		2.0	33.0	
Internal Link Dist (m)		238.2			62.1			139.5			85.0	
Turn Bay Length (m)	25.0						50.0			40.0		
Base Capacity (vph)	1229	1425		1138	1632		698	3098		803	3213	
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	0.07	0.06		0.01	0.00		0.09	0.25		0.02	0.17	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 39.4

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.7

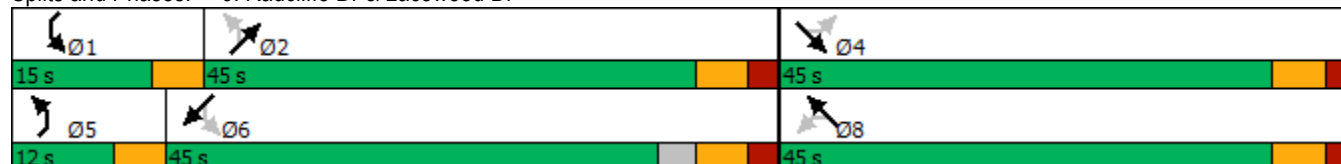
Intersection LOS: B

Intersection Capacity Utilization 50.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Radcliffe Dr & Lacewood Dr



Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	48	812	37	34	345	53	29	93	55	87	41	48
Future Volume (vph)	48	812	37	34	345	53	29	93	55	87	41	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	65.0		0.0	65.0		0.0	45.0		0.0	56.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.993			0.980			0.944			0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3553	0	1789	3507	0	1789	1778	0	1789	1733	0
Flt Permitted	0.500			0.288			0.694			0.655		
Satd. Flow (perm)	942	3553	0	542	3507	0	1307	1778	0	1234	1733	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			24			41			52	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		222.2			224.1			165.0			110.6	
Travel Time (s)		16.7			16.8			12.4			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	52	883	40	37	375	58	32	101	60	95	45	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	923	0	37	433	0	32	161	0	95	97	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	30.2	30.2		30.2	30.2		43.0	43.0		43.0	43.0	
Total Split (s)	45.0	45.0		45.0	45.0		45.0	45.0		45.0	45.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	38.8	38.8		38.8	38.8		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.6	4.6		4.6	4.6		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

AM - Existing

Synchro 11 Report
Page 3

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.2	6.2		6.2	6.2		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	22.8	22.8		22.8	22.8		10.3	10.3		10.3	10.3	
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.26	0.26		0.26	0.26	
v/c Ratio	0.10	0.45		0.12	0.21		0.09	0.33		0.30	0.20	
Control Delay	7.6	8.6		8.4	6.7		15.5	13.9		18.1	9.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.6	8.6		8.4	6.7		15.5	13.9		18.1	9.8	
LOS	A	A		A	A		B	B		B	A	
Approach Delay		8.5			6.8			14.2			13.9	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	1.9	22.3		1.4	8.3		1.8	7.0		5.6	2.5	
Queue Length 95th (m)	7.0	42.8		6.0	17.7		7.7	22.2		18.0	12.4	
Internal Link Dist (m)		198.2			200.1			141.0			86.6	
Turn Bay Length (m)	65.0			65.0			45.0			56.0		
Base Capacity (vph)	844	3184		485	3145		1158	1580		1093	1541	
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	0.06	0.29		0.08	0.14		0.03	0.10		0.09	0.06	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 39.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 9.2

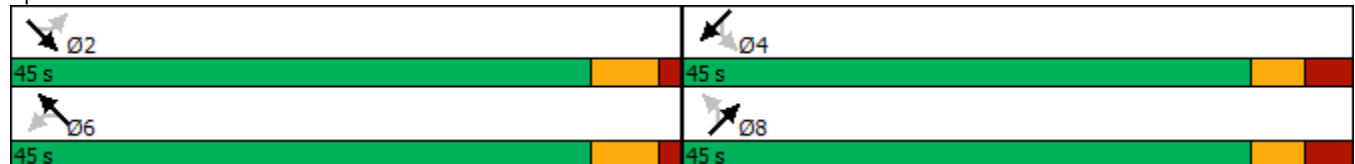
Intersection LOS: A

Intersection Capacity Utilization 65.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: Radcliffe Dr/Lincoln Cross & Dunbrack St



Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	77	9	76	11	6	0	58	715	0	12	477	18
Future Volume (vph)	77	9	76	11	6	0	58	715	0	12	477	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	25.0		0.0	0.0		0.0	50.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.866									0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1631	0	1789	1883	0	1789	3579	0	1789	3557	0
Flt Permitted	0.753			0.697			0.392			0.357		
Satd. Flow (perm)	1418	1631	0	1313	1883	0	738	3579	0	672	3557	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		83									6	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		262.2			86.1			163.5			109.0	
Travel Time (s)		19.7			6.5			12.3			8.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	84	10	83	12	7	0	63	777	0	13	518	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	93	0	12	7	0	63	777	0	13	538	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	10.0		2.0	10.0		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	29.5	29.5		29.5	29.5		11.0	25.6		11.0	25.6	
Total Split (s)	29.5	29.5		29.5	29.5		11.0	29.5		11.0	29.5	
Total Split (%)	42.1%	42.1%		42.1%	42.1%		15.7%	42.1%		15.7%	42.1%	
Maximum Green (s)	23.0	23.0		23.0	23.0		7.0	22.9		7.0	22.9	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.0	4.1		4.0	4.1	
All-Red Time (s)	2.4	2.4		2.4	2.4		0.0	2.5		0.0	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5		4.0	6.6		4.0	6.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	10.3	10.3		10.3	10.3		22.3	21.8		20.9	18.0	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.57	0.56		0.54	0.46	
v/c Ratio	0.23	0.19		0.03	0.01		0.09	0.39		0.02	0.33	
Control Delay	19.1	7.6		17.5	17.3		4.8	9.2		4.5	12.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.1	7.6		17.5	17.3		4.8	9.2		4.5	12.1	
LOS	B	A		B	B		A	A		A	B	
Approach Delay		13.0			17.5			8.9			11.9	
Approach LOS		B			B			A			B	
Queue Length 50th (m)	5.6	0.6		0.8	0.4		1.7	16.7		0.4	18.1	
Queue Length 95th (m)	18.1	10.4		4.5	3.3		5.7	48.0		1.9	31.7	
Internal Link Dist (m)		238.2			62.1			139.5			85.0	
Turn Bay Length (m)	25.0						50.0			40.0		
Base Capacity (vph)	887	1052		822	1179		665	2254		619	2223	
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	0.09	0.09		0.01	0.01		0.09	0.34		0.02	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 39

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.5

Intersection LOS: B

Intersection Capacity Utilization 50.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Radcliffe Dr & Lacewood Dr

 Ø1	 Ø2	 Ø4
11 s	29.5 s	29.5 s
 Ø5	 Ø6	 Ø8
11 s	29.5 s	29.5 s

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	48	820	37	34	348	54	29	94	56	88	41	48
Future Volume (vph)	48	820	37	34	348	54	29	94	56	88	41	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	65.0		0.0	65.0		0.0	45.0		0.0	56.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.980			0.944			0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3557	0	1789	3507	0	1789	1778	0	1789	1733	0
Flt Permitted	0.498			0.285			0.694			0.654		
Satd. Flow (perm)	938	3557	0	537	3507	0	1307	1778	0	1232	1733	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			25			33			52	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		222.2			224.1			165.0			110.6	
Travel Time (s)		16.7			16.8			12.4			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	52	891	40	37	378	59	32	102	61	96	45	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	931	0	37	437	0	32	163	0	96	97	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	30.2	30.2		30.2	30.2		43.0	43.0		43.0	43.0	
Total Split (s)	32.0	32.0		32.0	32.0		43.0	43.0		43.0	43.0	
Total Split (%)	42.7%	42.7%		42.7%	42.7%		57.3%	57.3%		57.3%	57.3%	
Maximum Green (s)	25.8	25.8		25.8	25.8		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.6	4.6		4.6	4.6		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.2	6.2		6.2	6.2		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	21.7	21.7		21.7	21.7		10.2	10.2		10.2	10.2	
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.27	0.27		0.27	0.27	
v/c Ratio	0.10	0.46		0.12	0.22		0.09	0.32		0.29	0.19	
Control Delay	7.3	8.4		8.1	6.5		15.2	14.3		17.7	9.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.3	8.4		8.1	6.5		15.2	14.3		17.7	9.6	
LOS	A	A		A	A		B	B		B	A	
Approach Delay		8.3			6.7			14.5			13.7	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	1.9	22.5		1.4	8.4		1.8	7.5		5.6	2.5	
Queue Length 95th (m)	6.7	40.5		5.7	16.8		7.5	22.3		17.3	12.1	
Internal Link Dist (m)		198.2			200.1			141.0			86.6	
Turn Bay Length (m)	65.0			65.0			45.0			56.0		
Base Capacity (vph)	641	2433		366	2404		1143	1559		1077	1522	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.38		0.10	0.18		0.03	0.10		0.09	0.06	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 37.9

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 9.1

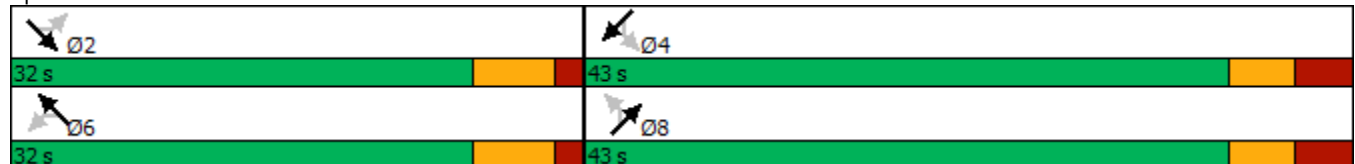
Intersection LOS: A

Intersection Capacity Utilization 65.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: Radcliffe Dr/Lincoln Cross & Dunbrack St



Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	79	9	78	11	6	0	71	758	0	12	489	18
Future Volume (vph)	79	9	78	11	6	0	71	758	0	12	489	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	25.0		0.0	0.0		0.0	50.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.866									0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1631	0	1789	1883	0	1789	3579	0	1789	3561	0
Flt Permitted	0.753			0.695			0.387			0.341		
Satd. Flow (perm)	1418	1631	0	1309	1883	0	729	3579	0	642	3561	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		85									6	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		262.2			86.1			163.5			109.0	
Travel Time (s)		19.7			6.5			12.3			8.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	86	10	85	12	7	0	77	824	0	13	532	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	95	0	12	7	0	77	824	0	13	552	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	10.0		2.0	10.0		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	29.5	29.5		29.5	29.5		11.0	25.6		11.0	25.6	
Total Split (s)	29.5	29.5		29.5	29.5		11.0	29.5		11.0	29.5	
Total Split (%)	42.1%	42.1%		42.1%	42.1%		15.7%	42.1%		15.7%	42.1%	
Maximum Green (s)	23.0	23.0		23.0	23.0		7.0	22.9		7.0	22.9	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.0	4.1		4.0	4.1	
All-Red Time (s)	2.4	2.4		2.4	2.4		0.0	2.5		0.0	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5		4.0	6.6		4.0	6.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	10.3	10.3		10.3	10.3		22.6	22.0		21.2	18.2	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.58	0.56		0.54	0.46	
v/c Ratio	0.23	0.19		0.03	0.01		0.12	0.41		0.02	0.33	
Control Delay	19.2	7.5		17.6	17.3		5.0	9.4		4.6	12.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.2	7.5		17.6	17.3		5.0	9.4		4.6	12.2	
LOS	B	A		B	B		A	A		A	B	
Approach Delay		13.1			17.5			9.1			12.0	
Approach LOS		B			B			A			B	
Queue Length 50th (m)	5.8	0.7		0.8	0.4		2.1	18.1		0.4	18.7	
Queue Length 95th (m)	18.4	10.5		4.5	3.3		6.7	51.6		1.9	32.7	
Internal Link Dist (m)		238.2			62.1			139.5			85.0	
Turn Bay Length (m)	25.0						50.0			40.0		
Base Capacity (vph)	883	1047		815	1172		661	2245		609	2213	
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	0.10	0.09		0.01	0.01		0.12	0.37		0.02	0.25	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 39.3

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 10.6

Intersection LOS: B

Intersection Capacity Utilization 52.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Radcliffe Dr & Lacewood Dr

 Ø1	 Ø2	 Ø4
11 s	29.5 s	29.5 s
 Ø5	 Ø6	 Ø8
11 s	29.5 s	29.5 s

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	50	841	38	35	357	55	30	96	57	90	42	50
Future Volume (vph)	50	841	38	35	357	55	30	96	57	90	42	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	65.0		0.0	65.0		0.0	45.0		0.0	56.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.980			0.944			0.919	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3557	0	1789	3507	0	1789	1778	0	1789	1731	0
Flt Permitted	0.493			0.275			0.692			0.652		
Satd. Flow (perm)	929	3557	0	518	3507	0	1303	1778	0	1228	1731	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			25			30			54	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		222.2			224.1			165.0			110.6	
Travel Time (s)		16.7			16.8			12.4			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	54	914	41	38	388	60	33	104	62	98	46	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	955	0	38	448	0	33	166	0	98	100	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	30.2	30.2		30.2	30.2		43.0	43.0		43.0	43.0	
Total Split (s)	32.0	32.0		32.0	32.0		43.0	43.0		43.0	43.0	
Total Split (%)	42.7%	42.7%		42.7%	42.7%		57.3%	57.3%		57.3%	57.3%	
Maximum Green (s)	25.8	25.8		25.8	25.8		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.6	4.6		4.6	4.6		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.2	6.2		6.2	6.2		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	22.2	22.2		22.2	22.2		10.3	10.3		10.3	10.3	
Actuated g/C Ratio	0.58	0.58		0.58	0.58		0.27	0.27		0.27	0.27	
v/c Ratio	0.10	0.47		0.13	0.22		0.09	0.33		0.30	0.20	
Control Delay	7.4	8.5		8.3	6.5		15.4	14.9		18.0	9.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.4	8.5		8.3	6.5		15.4	14.9		18.0	9.7	
LOS	A	A		A	A		B	B		B	A	
Approach Delay		8.4			6.7			15.0			13.8	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	2.0	23.3		1.4	8.6		1.9	8.3		6.0	2.7	
Queue Length 95th (m)	7.0	42.3		5.9	17.4		7.6	23.2		17.8	12.2	
Internal Link Dist (m)		198.2			200.1			141.0			86.6	
Turn Bay Length (m)	65.0			65.0			45.0			56.0		
Base Capacity (vph)	627	2406		350	2378		1126	1540		1061	1503	
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	0.09	0.40		0.11	0.19		0.03	0.11		0.09	0.07	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 38.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 9.2

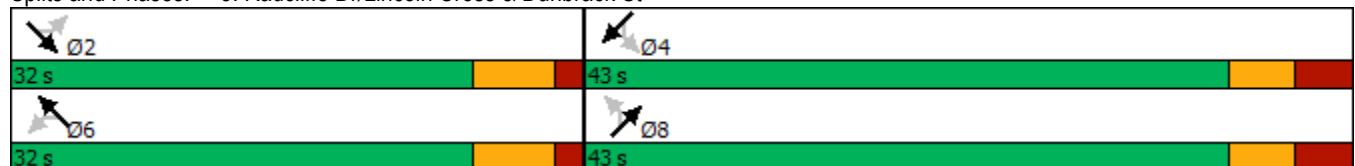
Intersection LOS: A

Intersection Capacity Utilization 66.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: Radcliffe Dr/Lincoln Cross & Dunbrack St



Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	30	6	83	12	6	0	68	732	0	12	799	77
Future Volume (vph)	30	6	83	12	6	0	68	732	0	12	799	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	25.0		0.0	0.0		0.0	50.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.861									0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1622	0	1789	1883	0	1789	3579	0	1789	3532	0
Flt Permitted	0.755			0.755			0.208			0.351		
Satd. Flow (perm)	1422	1622	0	1422	1883	0	392	3579	0	661	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90									11	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		260.8			86.1			163.5			109.0	
Travel Time (s)		19.6			6.5			12.3			8.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	33	7	90	13	7	0	74	796	0	13	868	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	97	0	13	7	0	74	796	0	13	952	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	10.0		2.0	10.0		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	29.5	29.5		29.5	29.5		11.0	25.6		11.0	25.6	
Total Split (s)	45.0	45.0		45.0	45.0		12.0	45.0		15.0	45.0	
Total Split (%)	42.9%	42.9%		42.9%	42.9%		11.4%	42.9%		14.3%	42.9%	
Maximum Green (s)	38.5	38.5		38.5	38.5		8.0	38.4		11.0	38.4	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.0	4.1		4.0	4.1	
All-Red Time (s)	2.4	2.4		2.4	2.4		0.0	2.5		0.0	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

PM - Existing

Synchro 11 Report
Page 1

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5		4.0	6.6		4.0	6.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	9.5	9.5		9.5	9.5		31.0	30.4		28.3	24.0	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.67	0.66		0.61	0.52	
v/c Ratio	0.11	0.24		0.04	0.02		0.14	0.34		0.02	0.52	
Control Delay	22.7	8.9		22.0	21.7		3.9	7.1		3.4	13.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.7	8.9		22.0	21.7		3.9	7.1		3.4	13.1	
LOS	C	A		C	C		A	A		A	B	
Approach Delay		12.4			21.9			6.8			13.0	
Approach LOS		B			C			A			B	
Queue Length 50th (m)	2.8	0.6		1.1	0.6		1.9	16.0		0.3	36.6	
Queue Length 95th (m)	9.9	11.4		5.3	3.6		5.3	44.3		1.6	57.0	
Internal Link Dist (m)		236.8			62.1			139.5			85.0	
Turn Bay Length (m)	25.0						50.0			40.0		
Base Capacity (vph)	1100	1275		1100	1457		571	2764		785	2888	
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	0.03	0.08		0.01	0.00		0.13	0.29		0.02	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 46.4

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 10.3

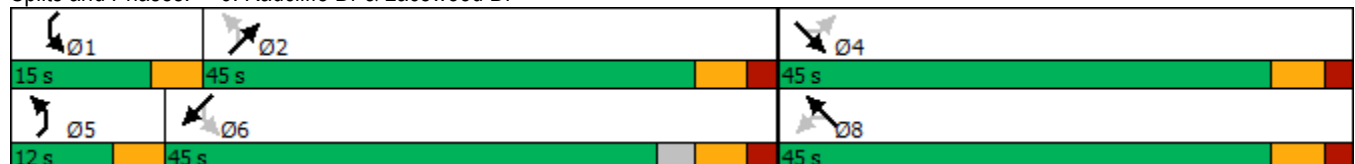
Intersection LOS: B

Intersection Capacity Utilization 53.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Radcliffe Dr & Lacewood Dr



Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	40	321	42	34	302	85	91	60	55	87	39	46
Future Volume (vph)	40	321	42	34	302	85	91	60	55	87	39	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	65.0		0.0	65.0		0.0	45.0		0.0	56.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983			0.967			0.928			0.918	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3518	0	1789	3460	0	1789	1748	0	1789	1729	0
Flt Permitted	0.506			0.519			0.697			0.677		
Satd. Flow (perm)	953	3518	0	978	3460	0	1313	1748	0	1275	1729	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			50			60			50	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		222.2			224.1			165.0			110.6	
Travel Time (s)		16.7			16.8			12.4			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	43	349	46	37	328	92	99	65	60	95	42	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	395	0	37	420	0	99	125	0	95	92	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	30.2	30.2		30.2	30.2		43.0	43.0		43.0	43.0	
Total Split (s)	45.0	45.0		45.0	45.0		45.0	45.0		45.0	45.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	38.8	38.8		38.8	38.8		38.0	38.0		38.0	38.0	
Yellow Time (s)	4.6	4.6		4.6	4.6		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

PM - Existing

Synchro 11 Report
Page 3

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.2	6.2		6.2	6.2		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	12.6	12.6		12.6	12.6		9.0	9.0		9.0	9.0	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.32	0.32		0.32	0.32	
v/c Ratio	0.10	0.25		0.08	0.27		0.24	0.21		0.23	0.16	
Control Delay	8.8	8.0		8.6	7.6		11.3	6.9		11.3	6.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.8	8.0		8.6	7.6		11.3	6.9		11.3	6.3	
LOS	A	A		A	A		B	A		B	A	
Approach Delay		8.1			7.7			8.8			8.9	
Approach LOS		A			A			A			A	
Queue Length 50th (m)	1.4	7.0		1.2	6.8		3.6	2.3		3.4	1.5	
Queue Length 95th (m)	5.8	14.7		5.1	14.8		11.8	10.2		11.5	8.0	
Internal Link Dist (m)		198.2			200.1			141.0			86.6	
Turn Bay Length (m)	65.0			65.0			45.0			56.0		
Base Capacity (vph)	953	3518		978	3460		1313	1748		1275	1729	
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	0.05	0.11		0.04	0.12		0.08	0.07		0.07	0.05	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 28

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.27

Intersection Signal Delay: 8.2

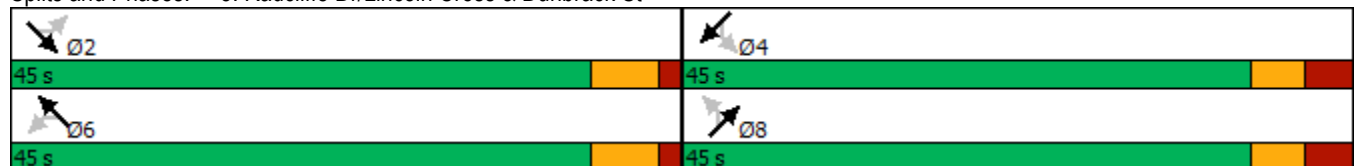
Intersection LOS: A

Intersection Capacity Utilization 44.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Radcliffe Dr/Lincoln Cross & Dunbrack St



Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	30	6	83	12	6	0	69	740	0	12	807	77
Future Volume (vph)	30	6	83	12	6	0	69	740	0	12	807	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	25.0		0.0	0.0		0.0	50.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.861									0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1622	0	1789	1883	0	1789	3579	0	1789	3532	0
Flt Permitted	0.755			0.755			0.223			0.348		
Satd. Flow (perm)	1422	1622	0	1422	1883	0	420	3579	0	655	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90									15	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		260.8			86.1			163.5			109.0	
Travel Time (s)		19.6			6.5			12.3			8.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	33	7	90	13	7	0	75	804	0	13	877	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	97	0	13	7	0	75	804	0	13	961	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	10.0		2.0	10.0		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	29.5	29.5		29.5	29.5		11.0	25.6		11.0	25.6	
Total Split (s)	29.5	29.5		29.5	29.5		11.0	29.5		11.0	29.5	
Total Split (%)	42.1%	42.1%		42.1%	42.1%		15.7%	42.1%		15.7%	42.1%	
Maximum Green (s)	23.0	23.0		23.0	23.0		7.0	22.9		7.0	22.9	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.0	4.1		4.0	4.1	
All-Red Time (s)	2.4	2.4		2.4	2.4		0.0	2.5		0.0	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5		4.0	6.6		4.0	6.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	9.1	9.1		9.1	9.1		27.5	26.7		26.2	23.1	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.64	0.62		0.61	0.54	
v/c Ratio	0.11	0.23		0.04	0.02		0.14	0.36		0.02	0.50	
Control Delay	21.4	8.5		20.7	20.2		4.1	7.7		3.4	11.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.4	8.5		20.7	20.2		4.1	7.7		3.4	11.7	
LOS	C	A		C	C		A	A		A	B	
Approach Delay		11.8			20.5			7.4			11.6	
Approach LOS		B			C			A			B	
Queue Length 50th (m)	2.8	0.6		1.1	0.6		1.9	16.3		0.3	36.1	
Queue Length 95th (m)	9.1	10.6		5.0	3.4		5.3	45.1		1.6	55.8	
Internal Link Dist (m)		236.8			62.1			139.5			85.0	
Turn Bay Length (m)	25.0						50.0			40.0		
Base Capacity (vph)	824	977		824	1091		547	2329		629	2047	
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	0.04	0.10		0.02	0.01		0.14	0.35		0.02	0.47	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 43

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 9.9

Intersection LOS: A

Intersection Capacity Utilization 53.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Radcliffe Dr & Lacewood Dr

 Ø1	 Ø2	 Ø4
11 s	29.5 s	29.5 s
 Ø5	 Ø6	 Ø8
11 s	29.5 s	29.5 s

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	40	325	42	34	305	86	92	61	56	88	39	46
Future Volume (vph)	40	325	42	34	305	86	92	61	56	88	39	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	65.0		0.0	65.0		0.0	45.0		0.0	56.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983			0.967			0.928			0.918	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3518	0	1789	3460	0	1789	1748	0	1789	1729	0
Flt Permitted	0.588			0.588			0.697			0.678		
Satd. Flow (perm)	1107	3518	0	1107	3460	0	1313	1748	0	1277	1729	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			52			61			50	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		222.2			224.1			165.0			110.6	
Travel Time (s)		16.7			16.8			12.4			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	43	353	46	37	332	93	100	66	61	96	42	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	399	0	37	425	0	100	127	0	96	92	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	30.2	30.2		30.2	30.2		43.0	43.0		43.0	43.0	
Total Split (s)	32.0	32.0		32.0	32.0		43.0	43.0		43.0	43.0	
Total Split (%)	42.7%	42.7%		42.7%	42.7%		57.3%	57.3%		57.3%	57.3%	
Maximum Green (s)	25.8	25.8		25.8	25.8		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.6	4.6		4.6	4.6		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.2	6.2		6.2	6.2		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	10.6	10.6		10.6	10.6		9.8	9.8		9.8	9.8	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.36	0.36		0.36	0.36	
v/c Ratio	0.10	0.29		0.09	0.31		0.21	0.19		0.21	0.14	
Control Delay	8.8	8.3		8.7	7.9		10.9	6.6		10.9	6.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.8	8.3		8.7	7.9		10.9	6.6		10.9	6.2	
LOS	A	A		A	A		B	A		B	A	
Approach Delay		8.4			7.9			8.5			8.6	
Approach LOS		A			A			A			A	
Queue Length 50th (m)	1.4	7.0		1.2	6.9		3.6	2.3		3.5	1.5	
Queue Length 95th (m)	5.7	15.2		5.1	15.2		11.9	10.2		11.5	7.9	
Internal Link Dist (m)		198.2			200.1			141.0			86.6	
Turn Bay Length (m)	65.0			65.0			45.0			56.0		
Base Capacity (vph)	950	3022		950	2977		1305	1738		1269	1719	
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	0.05	0.13		0.04	0.14		0.08	0.07		0.08	0.05	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 27.4

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.31

Intersection Signal Delay: 8.3

Intersection LOS: A

Intersection Capacity Utilization 44.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Radcliffe Dr/Lincoln Cross & Dunbrack St

 Ø2	 Ø4
32 s	43 s
 Ø6	 Ø8
32 s	43 s

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	31	6	81	10	5	0	69	744	0	13	836	79
Future Volume (vph)	31	6	81	10	5	0	69	744	0	13	836	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	25.0		0.0	0.0		0.0	50.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.861									0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1622	0	1789	1883	0	1789	3579	0	1789	3532	0
Flt Permitted	0.755			0.755			0.211			0.346		
Satd. Flow (perm)	1422	1622	0	1422	1883	0	397	3579	0	652	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		88									15	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		260.8			86.1			163.5			109.0	
Travel Time (s)		19.6			6.5			12.3			8.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	34	7	88	11	5	0	75	809	0	14	909	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	95	0	11	5	0	75	809	0	14	995	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	10.0		2.0	10.0		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	29.5	29.5		29.5	29.5		11.0	25.6		11.0	25.6	
Total Split (s)	29.5	29.5		29.5	29.5		11.0	29.5		11.0	29.5	
Total Split (%)	42.1%	42.1%		42.1%	42.1%		15.7%	42.1%		15.7%	42.1%	
Maximum Green (s)	23.0	23.0		23.0	23.0		7.0	22.9		7.0	22.9	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.0	4.1		4.0	4.1	
All-Red Time (s)	2.4	2.4		2.4	2.4		0.0	2.5		0.0	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5		4.0	6.6		4.0	6.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	9.0	9.0		9.0	9.0		27.9	27.1		26.6	23.5	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.64	0.62		0.61	0.54	
v/c Ratio	0.11	0.23		0.04	0.01		0.14	0.36		0.02	0.52	
Control Delay	21.5	8.6		20.6	20.2		4.1	7.7		3.5	11.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.5	8.6		20.6	20.2		4.1	7.7		3.5	11.9	
LOS	C	A		C	C		A	A		A	B	
Approach Delay		12.0			20.5			7.4			11.8	
Approach LOS		B			C			A			B	
Queue Length 50th (m)	2.9	0.6		0.9	0.4		1.9	16.4		0.4	38.0	
Queue Length 95th (m)	9.3	10.6		4.5	2.8		5.3	45.4		1.7	58.5	
Internal Link Dist (m)		236.8			62.1			139.5			85.0	
Turn Bay Length (m)	25.0						50.0			40.0		
Base Capacity (vph)	818	970		818	1082		533	2325		627	2031	
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	0.04	0.10		0.01	0.00		0.14	0.35		0.02	0.49	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 43.4

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 9.9

Intersection LOS: A

Intersection Capacity Utilization 54.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Radcliffe Dr & Lacewood Dr

 Ø1	 Ø2	 Ø4
11 s	29.5 s	29.5 s
 Ø5	 Ø6	 Ø8
11 s	29.5 s	29.5 s

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	40	325	42	34	305	86	92	61	56	88	39	46
Future Volume (vph)	40	325	42	34	305	86	92	61	56	88	39	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	65.0		0.0	65.0		0.0	45.0		0.0	56.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983			0.967			0.928			0.918	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3518	0	1789	3460	0	1789	1748	0	1789	1729	0
Flt Permitted	0.588			0.588			0.697			0.678		
Satd. Flow (perm)	1107	3518	0	1107	3460	0	1313	1748	0	1277	1729	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			52			61			50	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		222.2			224.1			165.0			110.6	
Travel Time (s)		16.7			16.8			12.4			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	43	353	46	37	332	93	100	66	61	96	42	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	399	0	37	425	0	100	127	0	96	92	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	30.2	30.2		30.2	30.2		43.0	43.0		43.0	43.0	
Total Split (s)	32.0	32.0		32.0	32.0		43.0	43.0		43.0	43.0	
Total Split (%)	42.7%	42.7%		42.7%	42.7%		57.3%	57.3%		57.3%	57.3%	
Maximum Green (s)	25.8	25.8		25.8	25.8		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.6	4.6		4.6	4.6		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

03/25/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.2	6.2		6.2	6.2		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	10.6	10.6		10.6	10.6		9.8	9.8		9.8	9.8	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.36	0.36		0.36	0.36	
v/c Ratio	0.10	0.29		0.09	0.31		0.21	0.19		0.21	0.14	
Control Delay	8.8	8.3		8.7	7.9		10.9	6.6		10.9	6.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.8	8.3		8.7	7.9		10.9	6.6		10.9	6.2	
LOS	A	A		A	A		B	A		B	A	
Approach Delay		8.4			7.9			8.5			8.6	
Approach LOS		A			A			A			A	
Queue Length 50th (m)	1.4	7.0		1.2	6.9		3.6	2.3		3.5	1.5	
Queue Length 95th (m)	5.7	15.2		5.1	15.2		11.9	10.2		11.5	7.9	
Internal Link Dist (m)		198.2			200.1			141.0			86.6	
Turn Bay Length (m)	65.0			65.0			45.0			56.0		
Base Capacity (vph)	950	3022		950	2977		1305	1738		1269	1719	
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	0.05	0.13		0.04	0.14		0.08	0.07		0.08	0.05	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 27.4

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.31

Intersection Signal Delay: 8.3

Intersection LOS: A

Intersection Capacity Utilization 44.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Radcliffe Dr/Lincoln Cross & Dunbrack St

			
32 s		43 s	
			
32 s		43 s	

Appendix 3 – Synchro Detailed Reports – With Proposed Development

2023 Conditions (AM and PM Peak)

2028 Conditions (AM and PM Peak)

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

04/15/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	93	9	123	11	6	0	120	715	0	12	477	39
Future Volume (vph)	93	9	123	11	6	0	120	715	0	12	477	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	25.0		0.0	0.0		0.0	50.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.860									0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1620	0	1789	1883	0	1789	3579	0	1789	3539	0
Flt Permitted	0.753			0.665			0.356			0.357		
Satd. Flow (perm)	1418	1620	0	1252	1883	0	671	3579	0	672	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		134									12	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		262.2			86.1			163.5			109.0	
Travel Time (s)		19.7			6.5			12.3			8.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	101	10	134	12	7	0	130	777	0	13	518	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	144	0	12	7	0	130	777	0	13	560	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	10.0		2.0	10.0		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		11.0	25.6		11.0	25.6	
Total Split (s)	31.0	31.0		31.0	31.0		11.0	28.0		11.0	28.0	
Total Split (%)	44.3%	44.3%		44.3%	44.3%		15.7%	40.0%		15.7%	40.0%	
Maximum Green (s)	24.5	24.5		24.5	24.5		7.0	21.4		7.0	21.4	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.0	4.1		4.0	4.1	
All-Red Time (s)	2.4	2.4		2.4	2.4		0.0	2.5		0.0	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

04/15/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5		4.0	6.6		4.0	6.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	17.5	17.5		17.5	17.5			12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	10.8	10.8		10.8	10.8		24.5	24.1		22.3	18.0	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.59	0.58		0.54	0.43	
v/c Ratio	0.27	0.28		0.04	0.01		0.20	0.37		0.02	0.36	
Control Delay	19.6	6.6		17.1	16.7		5.7	9.3		4.8	13.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.6	6.6		17.1	16.7		5.7	9.3		4.8	13.5	
LOS	B	A		B	B		A	A		A	B	
Approach Delay		12.0			16.9			8.8			13.3	
Approach LOS		B			B			A			B	
Queue Length 50th (m)	6.9	0.7		0.8	0.4		3.9	17.4		0.4	19.2	
Queue Length 95th (m)	20.4	12.3		4.4	3.2		10.7	49.5		2.1	33.8	
Internal Link Dist (m)		238.2			62.1			139.5			85.0	
Turn Bay Length (m)	25.0						50.0			40.0		
Base Capacity (vph)	868	1043		766	1152		641	2082		606	1987	
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	0.12	0.14		0.02	0.01		0.20	0.37		0.02	0.28	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 41.4

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 10.8

Intersection LOS: B

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Radcliffe Dr & Lacewood Dr

 Ø1	 Ø2	 Ø4
11 s	28 s	31 s
 Ø5	 Ø6	 Ø8
11 s	28 s	31 s

Lanes, Volumes, Timings
8: Radcliffe Dr/Lincoln Cross & Dunbrack St

04/15/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	48	820	78	75	348	54	60	125	87	88	82	48
Future Volume (vph)	48	820	78	75	348	54	60	125	87	88	82	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	65.0		0.0	65.0		0.0	45.0		0.0	56.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.980			0.938			0.945	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3532	0	1789	3507	0	1789	1767	0	1789	1780	0
Flt Permitted	0.498			0.246			0.667			0.615		
Satd. Flow (perm)	938	3532	0	463	3507	0	1256	1767	0	1158	1780	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			25			49			48	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		222.2			224.1			165.0			110.6	
Travel Time (s)		16.7			16.8			12.4			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	52	891	85	82	378	59	65	136	95	96	89	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	976	0	82	437	0	65	231	0	96	141	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	30.2	30.2		30.2	30.2		43.0	43.0		43.0	43.0	
Total Split (s)	37.0	37.0		37.0	37.0		43.0	43.0		43.0	43.0	
Total Split (%)	46.3%	46.3%		46.3%	46.3%		53.8%	53.8%		53.8%	53.8%	
Maximum Green (s)	30.8	30.8		30.8	30.8		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.6	4.6		4.6	4.6		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

04/15/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.2	6.2		6.2	6.2		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	21.1	21.1		21.1	21.1		10.9	10.9		10.9	10.9	
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.24	0.24		0.24	0.24	
v/c Ratio	0.12	0.60		0.38	0.27		0.22	0.51		0.35	0.31	
Control Delay	8.0	10.7		14.6	7.6		18.0	17.5		20.4	13.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.0	10.7		14.6	7.6		18.0	17.5		20.4	13.5	
LOS	A	B		B	A		B	B		C	B	
Approach Delay		10.6			8.7			17.6			16.3	
Approach LOS		B			A			B			B	
Queue Length 50th (m)	2.1	26.5		3.8	9.4		4.0	11.9		6.1	5.7	
Queue Length 95th (m)	7.3	48.0		14.1	18.8		13.8	33.5		19.3	19.7	
Internal Link Dist (m)		198.2			200.1			141.0			86.6	
Turn Bay Length (m)	65.0			65.0			45.0			56.0		
Base Capacity (vph)	659	2487		325	2473		1011	1431		932	1442	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.39		0.25	0.18		0.06	0.16		0.10	0.10	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 45.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 11.8

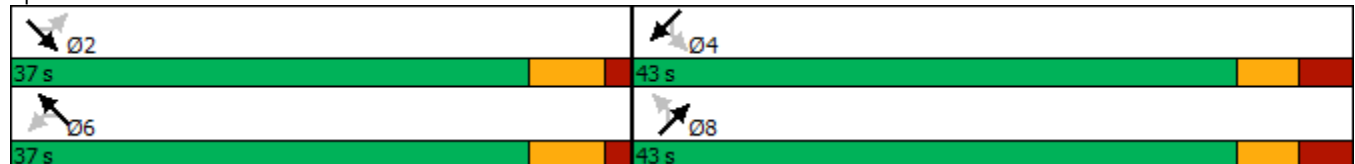
Intersection LOS: B

Intersection Capacity Utilization 70.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: Radcliffe Dr/Lincoln Cross & Dunbrack St



Lanes, Volumes, Timings

13: Staff/Visitor Parking & Radcliffe Dr

04/15/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	93	63	83	153	153	0
Future Volume (vph)	93	63	83	153	153	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.946					
Flt Protected	0.971			0.983		
Satd. Flow (prot)	1730	0	0	1851	1883	0
Flt Permitted	0.971			0.983		
Satd. Flow (perm)	1730	0	0	1851	1883	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	81.8			41.6	219.8	
Travel Time (s)	6.1			3.1	16.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	101	68	90	166	166	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	169	0	0	256	166	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 39.7%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings
15: Radcliffe Dr & Bus Access

04/15/2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	2	2	262	216	3
Future Volume (vph)	3	2	2	262	216	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.946				0.998	
Flt Protected	0.971					
Satd. Flow (prot)	1730	0	0	1883	1880	0
Flt Permitted	0.971					
Satd. Flow (perm)	1730	0	0	1883	1880	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	74.4			108.6	41.6	
Travel Time (s)	5.6			8.1	3.1	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	3	2	2	285	235	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	287	238	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	25.4%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
13: Staff/Visitor Parking & Radcliffe Dr

03/25/2021

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	93	63	83	153	153	0
Future Vol, veh/h	93	63	83	153	153	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	68	90	166	166	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	512	166	166	0	-	0
Stage 1	166	-	-	-	-	-
Stage 2	346	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	522	878	1412	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	716	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	485	878	1412	-	-	-
Mov Cap-2 Maneuver	485	-	-	-	-	-
Stage 1	803	-	-	-	-	-
Stage 2	716	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13.5	2.7		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1412	-	592	-	-	
HCM Lane V/C Ratio	0.064	-	0.286	-	-	
HCM Control Delay (s)	7.7	0	13.5	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	1.2	-	-	

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	2	2	262	216	3
Future Vol, veh/h	3	2	2	262	216	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	2	2	285	235	3

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	526	237	238
Stage 1	237	-	-
Stage 2	289	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	512	802	1329
Stage 1	802	-	-
Stage 2	760	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	511	802	1329
Mov Cap-2 Maneuver	511	-	-
Stage 1	800	-	-
Stage 2	760	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1329	-	598	-	-
HCM Lane V/C Ratio	0.002	-	0.009	-	-
HCM Control Delay (s)	7.7	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	95	9	125	11	6	0	121	733	0	12	489	39
Future Volume (vph)	95	9	125	11	6	0	121	733	0	12	489	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	25.0		0.0	0.0		0.0	50.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.860									0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1620	0	1789	1883	0	1789	3579	0	1789	3539	0
Flt Permitted	0.753			0.664			0.353			0.350		
Satd. Flow (perm)	1418	1620	0	1251	1883	0	665	3579	0	659	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		136									12	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		262.2			86.1			163.5			109.0	
Travel Time (s)		19.7			6.5			12.3			8.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	103	10	136	12	7	0	132	797	0	13	532	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	146	0	12	7	0	132	797	0	13	574	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	10.0		2.0	10.0		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		11.0	25.6		11.0	25.6	
Total Split (s)	31.0	31.0		31.0	31.0		11.0	28.0		11.0	28.0	
Total Split (%)	44.3%	44.3%		44.3%	44.3%		15.7%	40.0%		15.7%	40.0%	
Maximum Green (s)	24.5	24.5		24.5	24.5		7.0	21.4		7.0	21.4	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.0	4.1		4.0	4.1	
All-Red Time (s)	2.4	2.4		2.4	2.4		0.0	2.5		0.0	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5		4.0	6.6		4.0	6.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	17.5	17.5		17.5	17.5			12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	10.9	10.9		10.9	10.9		24.8	24.4		22.6	18.3	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.59	0.58		0.54	0.44	
v/c Ratio	0.28	0.28		0.04	0.01		0.21	0.38		0.02	0.37	
Control Delay	19.9	6.6		17.2	16.8		5.7	9.4		4.8	13.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.9	6.6		17.2	16.8		5.7	9.4		4.8	13.5	
LOS	B	A		B	B		A	A		A	B	
Approach Delay		12.1			17.1			8.9			13.3	
Approach LOS		B			B			A			B	
Queue Length 50th (m)	7.1	0.7		0.8	0.5		4.0	18.0		0.4	19.9	
Queue Length 95th (m)	20.7	12.4		4.4	3.2		10.9	51.1		2.0	34.9	
Internal Link Dist (m)		238.2			62.1			139.5			85.0	
Turn Bay Length (m)	25.0						50.0			40.0		
Base Capacity (vph)	861	1037		760	1144		639	2090		602	1973	
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	0.12	0.14		0.02	0.01		0.21	0.38		0.02	0.29	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 41.8

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.38

Intersection Signal Delay: 10.9

Intersection LOS: B

Intersection Capacity Utilization 52.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Radcliffe Dr & Lacewood Dr

 Ø1	 Ø2	 Ø4
11 s	28 s	31 s
 Ø5	 Ø6	 Ø8
11 s	28 s	31 s

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	50	841	79	76	357	55	61	127	88	90	83	50
Future Volume (vph)	50	841	79	76	357	55	61	127	88	90	83	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	65.0		0.0	65.0		0.0	45.0		0.0	56.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.980			0.938			0.944	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3532	0	1789	3507	0	1789	1767	0	1789	1778	0
Flt Permitted	0.493			0.238			0.665			0.613		
Satd. Flow (perm)	929	3532	0	448	3507	0	1252	1767	0	1155	1778	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			25			45			49	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		222.2			224.1			165.0			110.6	
Travel Time (s)		16.7			16.8			12.4			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	54	914	86	83	388	60	66	138	96	98	90	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	1000	0	83	448	0	66	234	0	98	144	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	30.2	30.2		30.2	30.2		43.0	43.0		43.0	43.0	
Total Split (s)	37.0	37.0		37.0	37.0		43.0	43.0		43.0	43.0	
Total Split (%)	46.3%	46.3%		46.3%	46.3%		53.8%	53.8%		53.8%	53.8%	
Maximum Green (s)	30.8	30.8		30.8	30.8		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.6	4.6		4.6	4.6		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.2	6.2		6.2	6.2		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	22.8	22.8		22.8	22.8		11.1	11.1		11.1	11.1	
Actuated g/C Ratio	0.48	0.48		0.48	0.48		0.23	0.23		0.23	0.23	
v/c Ratio	0.12	0.59		0.39	0.27		0.23	0.52		0.37	0.32	
Control Delay	7.9	10.5		14.7	7.4		19.0	18.9		21.7	14.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.9	10.5		14.7	7.4		19.0	18.9		21.7	14.2	
LOS	A	B		B	A		B	B		C	B	
Approach Delay		10.4			8.6			18.9			17.2	
Approach LOS		B			A			B			B	
Queue Length 50th (m)	2.2	28.1		4.0	9.8		4.6	13.9		7.0	6.6	
Queue Length 95th (m)	7.6	50.2		14.7	19.5		13.9	34.2		19.6	20.0	
Internal Link Dist (m)		198.2			200.1			141.0			86.6	
Turn Bay Length (m)	65.0			65.0			45.0			56.0		
Base Capacity (vph)	628	2394		303	2381		970	1380		895	1389	
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	0.09	0.42		0.27	0.19		0.07	0.17		0.11	0.10	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 47.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 11.9

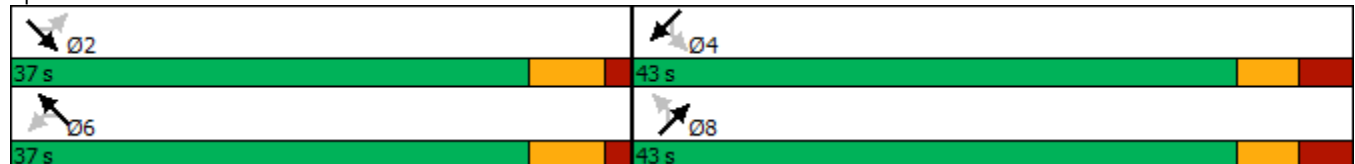
Intersection LOS: B

Intersection Capacity Utilization 71.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: Radcliffe Dr/Lincoln Cross & Dunbrack St



Lanes, Volumes, Timings

13: Staff/Visitor Parking & Radcliffe Dr

04/21/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	93	63	83	183	157	82
Future Volume (vph)	93	63	83	183	157	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.946				0.954	
Flt Protected	0.971			0.985		
Satd. Flow (prot)	1730	0	0	1855	1797	0
Flt Permitted	0.971			0.985		
Satd. Flow (perm)	1730	0	0	1855	1797	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	81.8			41.6	219.8	
Travel Time (s)	6.1			3.1	16.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	101	68	90	199	171	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	169	0	0	289	260	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 46.5%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings
15: Radcliffe Dr & Bus Access

04/21/2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	2	2	266	220	3
Future Volume (vph)	3	2	2	266	220	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.946				0.998	
Flt Protected	0.971					
Satd. Flow (prot)	1730	0	0	1883	1880	0
Flt Permitted	0.971					
Satd. Flow (perm)	1730	0	0	1883	1880	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	74.4			108.6	41.6	
Travel Time (s)	5.6			8.1	3.1	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	3	2	2	289	239	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	291	242	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	25.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
13: Staff/Visitor Parking & Radcliffe Dr

03/25/2021

Intersection

Int Delay, s/veh 4.5

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations 

Traffic Vol, veh/h 93 63 83 183 157 82

Future Vol, veh/h 93 63 83 183 157 82

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - - 0 0 -

Grade, % 0 - - 0 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 2 2 2 2 2 2

Mvmt Flow 101 68 90 199 171 89

Major/Minor Minor2 Major1 Major2

Conflicting Flow All 595 216 260 0 - 0

Stage 1 216 - - - - -

Stage 2 379 - - - - -

Critical Hdwy 6.42 6.22 4.12 - - -

Critical Hdwy Stg 1 5.42 - - - - -

Critical Hdwy Stg 2 5.42 - - - - -

Follow-up Hdwy 3.518 3.318 2.218 - - -

Pot Cap-1 Maneuver 467 824 1304 - - -

Stage 1 820 - - - - -

Stage 2 692 - - - - -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 431 824 1304 - - -

Mov Cap-2 Maneuver 431 - - - - -

Stage 1 756 - - - - -

Stage 2 692 - - - - -

Approach EB NB SB

HCM Control Delay, s 14.8 2.5 0

HCM LOS B

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h) 1304 - 534 - -

HCM Lane V/C Ratio 0.069 - 0.318 - -

HCM Control Delay (s) 8 0 14.8 - -

HCM Lane LOS A A B - -

HCM 95th %tile Q(veh) 0.2 - 1.4 - -

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	2	2	266	220	3
Future Vol, veh/h	3	2	2	266	220	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	2	2	289	239	3
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	534	241	242	0	-	0
Stage 1	241	-	-	-	-	-
Stage 2	293	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	507	798	1324	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	506	798	1324	-	-	-
Mov Cap-2 Maneuver	506	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.1	0.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1324	-	593	-	-	
HCM Lane V/C Ratio	0.002	-	0.009	-	-	
HCM Control Delay (s)	7.7	0	11.1	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Lanes, Volumes, Timings

1: Staff/Visitor Parking & Radcliffe Dr

04/21/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	63	76	47	209	115	39
Future Volume (vph)	63	76	47	209	115	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.926				0.966	
Flt Protected	0.978			0.991		
Satd. Flow (prot)	1706	0	0	1866	1819	0
Flt Permitted	0.978			0.991		
Satd. Flow (perm)	1706	0	0	1866	1819	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	81.8			41.6	219.8	
Travel Time (s)	6.1			3.1	16.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	68	83	51	227	125	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	151	0	0	278	167	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.2%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

2: Radcliffe Dr & Bus Access

04/21/2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	3	3	256	191	2
Future Volume (vph)	2	3	3	256	191	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919				0.999	
Flt Protected	0.980			0.999		
Satd. Flow (prot)	1696	0	0	1882	1882	0
Flt Permitted	0.980			0.999		
Satd. Flow (perm)	1696	0	0	1882	1882	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	74.4			106.9	41.6	
Travel Time (s)	5.6			8.0	3.1	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	2	3	3	278	208	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	281	210	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	25.9%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	71	6	118	12	6	0	90	740	0	12	807	103
Future Volume (vph)	71	6	118	12	6	0	90	740	0	12	807	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	25.0		0.0	0.0		0.0	50.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.858									0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1616	0	1789	1883	0	1789	3579	0	1789	3518	0
Flt Permitted	0.753			0.671			0.195			0.348		
Satd. Flow (perm)	1418	1616	0	1264	1883	0	367	3579	0	655	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		128									20	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		260.8			86.1			163.5			109.0	
Travel Time (s)		19.6			6.5			12.3			8.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	77	7	128	13	7	0	98	804	0	13	877	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	135	0	13	7	0	98	804	0	13	989	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	10.0		2.0	10.0		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		11.0	25.6		11.0	25.6	
Total Split (s)	31.0	31.0		31.0	31.0		11.0	28.0		11.0	28.0	
Total Split (%)	44.3%	44.3%		44.3%	44.3%		15.7%	40.0%		15.7%	40.0%	
Maximum Green (s)	24.5	24.5		24.5	24.5		7.0	21.4		7.0	21.4	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.0	4.1		4.0	4.1	
All-Red Time (s)	2.4	2.4		2.4	2.4		0.0	2.5		0.0	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5		4.0	6.6		4.0	6.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	17.5	17.5		17.5	17.5			12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	10.0	10.0		10.0	10.0		30.3	29.5		28.2	23.7	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.65	0.63		0.61	0.51	
v/c Ratio	0.25	0.30		0.05	0.02		0.20	0.35		0.02	0.55	
Control Delay	22.3	7.4		19.4	18.8		5.1	8.3		4.2	14.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.3	7.4		19.4	18.8		5.1	8.3		4.2	14.1	
LOS	C	A		B	B		A	A		A	B	
Approach Delay		12.8			19.2			7.9			13.9	
Approach LOS		B			B			A			B	
Queue Length 50th (m)	6.8	0.6		1.1	0.6		2.8	17.6		0.4	39.2	
Queue Length 95th (m)	16.5	11.8		4.7	3.3		7.8	49.4		1.9	63.4	
Internal Link Dist (m)		236.8			62.1			139.5			85.0	
Turn Bay Length (m)	25.0						50.0			40.0		
Base Capacity (vph)	799	967		712	1061		502	2267		606	1831	
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	0.10	0.14		0.02	0.01		0.20	0.35		0.02	0.54	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 46.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.3

Intersection LOS: B

Intersection Capacity Utilization 56.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: Radcliffe Dr & Lacewood Dr

 Ø1	 Ø2	 Ø4
11 s	28 s	31 s
 Ø5	 Ø6	 Ø8
11 s	28 s	31 s

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	40	325	55	47	305	86	113	82	107	88	52	46
Future Volume (vph)	40	325	55	47	305	86	113	82	107	88	52	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	65.0		0.0	65.0		0.0	45.0		0.0	56.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.978			0.967			0.915			0.930	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3500	0	1789	3460	0	1789	1723	0	1789	1752	0
Flt Permitted	0.504			0.510			0.688			0.629		
Satd. Flow (perm)	949	3500	0	961	3460	0	1296	1723	0	1185	1752	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			52			116			50	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		222.2			224.1			165.0			110.6	
Travel Time (s)		16.7			16.8			12.4			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	43	353	60	51	332	93	123	89	116	96	57	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	413	0	51	425	0	123	205	0	96	107	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	30.2	30.2		30.2	30.2		43.0	43.0		43.0	43.0	
Total Split (s)	32.0	32.0		32.0	32.0		43.0	43.0		43.0	43.0	
Total Split (%)	42.7%	42.7%		42.7%	42.7%		57.3%	57.3%		57.3%	57.3%	
Maximum Green (s)	25.8	25.8		25.8	25.8		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.6	4.6		4.6	4.6		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.2	6.2		6.2	6.2		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	13.0	13.0		13.0	13.0		9.7	9.7		9.7	9.7	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.33	0.33		0.33	0.33	
v/c Ratio	0.10	0.26		0.12	0.27		0.29	0.32		0.24	0.17	
Control Delay	9.4	8.4		9.6	8.0		11.7	6.4		11.4	6.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.4	8.4		9.6	8.0		11.7	6.4		11.4	6.7	
LOS	A	A		A	A		B	A		B	A	
Approach Delay		8.4			8.1			8.4			8.9	
Approach LOS		A			A			A			A	
Queue Length 50th (m)	1.5	7.5		1.8	7.2		4.8	3.3		3.7	2.1	
Queue Length 95th (m)	6.3	16.6		7.1	16.3		14.5	13.8		11.9	9.3	
Internal Link Dist (m)		198.2			200.1			141.0			86.6	
Turn Bay Length (m)	65.0			65.0			45.0			56.0		
Base Capacity (vph)	792	2928		802	2898		1278	1700		1168	1728	
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	0.05	0.14		0.06	0.15		0.10	0.12		0.08	0.06	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 29

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 8.4

Intersection LOS: A

Intersection Capacity Utilization 55.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: Radcliffe Dr/Lincoln Cross & Dunbrack St

			
32 s		43 s	
			
32 s		43 s	

HCM 6th TWSC
1: Staff/Visitor Parking & Radcliffe Dr

03/25/2021

Intersection

Int Delay, s/veh 3.6

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations 

Traffic Vol, veh/h 63 76 47 209 115 39

Future Vol, veh/h 63 76 47 209 115 39

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - - 0 0 -

Grade, % 0 - - 0 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 2 2 2 2 2 2

Mvmt Flow 68 83 51 227 125 42

Major/Minor Minor2 Major1 Major2

Conflicting Flow All 475 146 167 0 - 0

Stage 1 146 - - - - -

Stage 2 329 - - - - -

Critical Hdwy 6.42 6.22 4.12 - - -

Critical Hdwy Stg 1 5.42 - - - - -

Critical Hdwy Stg 2 5.42 - - - - -

Follow-up Hdwy 3.518 3.318 2.218 - - -

Pot Cap-1 Maneuver 548 901 1411 - - -

Stage 1 881 - - - - -

Stage 2 729 - - - - -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 526 901 1411 - - -

Mov Cap-2 Maneuver 526 - - - - -

Stage 1 845 - - - - -

Stage 2 729 - - - - -

Approach EB NB SB

HCM Control Delay, s 11.8 1.4 0

HCM LOS B

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h) 1411 - 681 - -

HCM Lane V/C Ratio 0.036 - 0.222 - -

HCM Control Delay (s) 7.6 0 11.8 - -

HCM Lane LOS A A B - -

HCM 95th %tile Q(veh) 0.1 - 0.8 - -

HCM 6th TWSC
2: Radcliffe Dr & Bus Access

03/25/2021

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	3	3	256	191	2
Future Vol, veh/h	2	3	3	256	191	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	3	3	278	208	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	493	209	210	0	-	0
Stage 1	209	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	535	831	1361	-	-	-
Stage 1	826	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	533	831	1361	-	-	-
Mov Cap-2 Maneuver	533	-	-	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.3	0.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1361	-	679	-	-	
HCM Lane V/C Ratio	0.002	-	0.008	-	-	
HCM Control Delay (s)	7.7	0	10.3	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Lanes, Volumes, Timings

1: Staff/Visitor Parking & Radcliffe Dr

04/21/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	63	76	47	213	118	39
Future Volume (vph)	63	76	47	213	118	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.926				0.967	
Flt Protected	0.978			0.991		
Satd. Flow (prot)	1706	0	0	1866	1821	0
Flt Permitted	0.978			0.991		
Satd. Flow (perm)	1706	0	0	1866	1821	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	81.8			41.6	219.8	
Travel Time (s)	6.1			3.1	16.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	68	83	51	232	128	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	151	0	0	283	170	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type: Other						
Control Type: Unsignalized						
Intersection Capacity Utilization 40.5% ICU Level of Service A						
Analysis Period (min) 15						

Lanes, Volumes, Timings

2: Radcliffe Dr & Bus Access

04/21/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	3	3	260	194	2
Future Volume (vph)	2	3	3	260	194	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	0.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919				0.999	
Flt Protected	0.980			0.999		
Satd. Flow (prot)	1696	0	0	1882	1882	0
Flt Permitted	0.980			0.999		
Satd. Flow (perm)	1696	0	0	1882	1882	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	74.4			106.9	41.6	
Travel Time (s)	5.6			8.0	3.1	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	2	3	3	283	211	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	286	213	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 26.1%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings
6: Radcliffe Dr & Lacewood Dr

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	72	6	121	12	6	0	92	758	0	12	827	105
Future Volume (vph)	72	6	121	12	6	0	92	758	0	12	827	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	25.0		0.0	0.0		0.0	50.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.858									0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1616	0	1789	1883	0	1789	3579	0	1789	3518	0
Flt Permitted	0.753			0.668			0.187			0.341		
Satd. Flow (perm)	1418	1616	0	1258	1883	0	352	3579	0	642	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		132									20	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		260.8			86.1			163.5			109.0	
Travel Time (s)		19.6			6.5			12.3			8.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	78	7	132	13	7	0	100	824	0	13	899	114
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	139	0	13	7	0	100	824	0	13	1013	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	10.0		2.0	10.0		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	31.0	31.0		31.0	31.0		11.0	25.6		11.0	25.6	
Total Split (s)	31.0	31.0		31.0	31.0		11.0	28.0		11.0	28.0	
Total Split (%)	44.3%	44.3%		44.3%	44.3%		15.7%	40.0%		15.7%	40.0%	
Maximum Green (s)	24.5	24.5		24.5	24.5		7.0	21.4		7.0	21.4	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.0	4.1		4.0	4.1	
All-Red Time (s)	2.4	2.4		2.4	2.4		0.0	2.5		0.0	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

6: Radcliffe Dr & Lacewood Dr

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.5	6.5		6.5	6.5		4.0	6.6		4.0	6.6	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	17.5	17.5		17.5	17.5			12.0			12.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	9.9	9.9		9.9	9.9		30.7	29.8		28.6	24.0	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.65	0.63		0.61	0.51	
v/c Ratio	0.26	0.31		0.05	0.02		0.20	0.36		0.02	0.56	
Control Delay	22.5	7.4		19.4	18.8		5.2	8.3		4.2	14.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.5	7.4		19.4	18.8		5.2	8.3		4.2	14.2	
LOS	C	A		B	B		A	A		A	B	
Approach Delay		12.9			19.2			8.0			14.1	
Approach LOS		B			B			A			B	
Queue Length 50th (m)	6.9	0.6		1.1	0.6		2.9	18.1		0.4	40.6	
Queue Length 95th (m)	16.6	12.0		4.7	3.3		7.9	50.7		1.9	65.4	
Internal Link Dist (m)		236.8			62.1			139.5			85.0	
Turn Bay Length (m)	25.0						50.0			40.0		
Base Capacity (vph)	796	966		706	1058		490	2272		599	1825	
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	0.10	0.14		0.02	0.01		0.20	0.36		0.02	0.56	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 47

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 11.4

Intersection LOS: B

Intersection Capacity Utilization 56.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: Radcliffe Dr & Lacewood Dr

 Ø1	 Ø2	 Ø4
11 s	28 s	31 s
 Ø5	 Ø6	 Ø8
11 s	28 s	31 s

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	41	333	56	48	313	88	115	83	78	90	53	48
Future Volume (vph)	41	333	56	48	313	88	115	83	78	90	53	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	65.0		0.0	65.0		0.0	45.0		0.0	56.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.978			0.967			0.927			0.929	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3500	0	1789	3460	0	1789	1746	0	1789	1750	0
Flt Permitted	0.499			0.505			0.686			0.647		
Satd. Flow (perm)	940	3500	0	951	3460	0	1292	1746	0	1219	1750	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			53			85			52	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		222.2			224.1			165.0			110.6	
Travel Time (s)		16.7			16.8			12.4			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	45	362	61	52	340	96	125	90	85	98	58	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	423	0	52	436	0	125	175	0	98	110	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	30.2	30.2		30.2	30.2		43.0	43.0		43.0	43.0	
Total Split (s)	32.0	32.0		32.0	32.0		43.0	43.0		43.0	43.0	
Total Split (%)	42.7%	42.7%		42.7%	42.7%		57.3%	57.3%		57.3%	57.3%	
Maximum Green (s)	25.8	25.8		25.8	25.8		36.0	36.0		36.0	36.0	
Yellow Time (s)	4.6	4.6		4.6	4.6		3.7	3.7		3.7	3.7	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lanes, Volumes, Timings

8: Radcliffe Dr/Lincoln Cross & Dunbrack St

04/21/2021

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Total Lost Time (s)	6.2	6.2		6.2	6.2		7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	13.1	13.1		13.1	13.1		9.8	9.8		9.8	9.8	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.34	0.34		0.34	0.34	
v/c Ratio	0.11	0.27		0.12	0.28		0.29	0.27		0.24	0.18	
Control Delay	9.5	8.4		9.6	8.0		11.8	6.9		11.3	6.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.5	8.4		9.6	8.0		11.8	6.9		11.3	6.7	
LOS	A	A		A	A		B	A		B	A	
Approach Delay		8.5			8.2			9.0			8.9	
Approach LOS		A			A			A			A	
Queue Length 50th (m)	1.6	7.7		1.8	7.5		5.0	3.4		3.8	2.2	
Queue Length 95th (m)	6.6	17.2		7.3	17.0		14.8	13.2		12.2	9.6	
Internal Link Dist (m)		198.2			200.1			141.0			86.6	
Turn Bay Length (m)	65.0			65.0			45.0			56.0		
Base Capacity (vph)	780	2912		789	2883		1271	1720		1200	1723	
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	0.06	0.15		0.07	0.15		0.10	0.10		0.08	0.06	

Intersection Summary

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 29.2

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.29

Intersection Signal Delay: 8.6

Intersection LOS: A

Intersection Capacity Utilization 54.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Radcliffe Dr/Lincoln Cross & Dunbrack St

 Ø2	 Ø4
32 s	43 s
 Ø6	 Ø8
32 s	43 s

Intersection						
Int Delay, s/veh	3.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	63	76	47	213	118	39
Future Vol, veh/h	63	76	47	213	118	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	83	51	232	128	42
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	483	149	170	0	-	0
Stage 1	149	-	-	-	-	-
Stage 2	334	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	542	898	1407	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	519	898	1407	-	-	-
Mov Cap-2 Maneuver	519	-	-	-	-	-
Stage 1	842	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.9	1.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1407	-	675	-	-	
HCM Lane V/C Ratio	0.036	-	0.224	-	-	
HCM Control Delay (s)	7.7	0	11.9	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.9	-	-	

HCM 6th TWSC
2: Radcliffe Dr & Bus Access

03/25/2021

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	3	3	260	194	2
Future Vol, veh/h	2	3	3	260	194	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	3	3	283	211	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	501	212	213	0	-	0
Stage 1	212	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	530	828	1357	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	528	828	1357	-	-	-
Mov Cap-2 Maneuver	528	-	-	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.4	0.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1357	-	675	-	-	
HCM Lane V/C Ratio	0.002	-	0.008	-	-	
HCM Control Delay (s)	7.7	0	10.4	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Appendix 4 – Access Review Site Visit Notes



NORTH TARGET-
LOOKING FROM NORTH



STOP
139m

INTER.
154.2m

NORTH TARGET
PROP PARKING
ENTRANCE

145.7m
STOP &
INTER.



NORTH TARGET-
LOOKING FROM SOUTH



SOUTH TARGET-
LOOKING FROM NORTH

STOP
124m

INTER.
139m

SOUTH TARGET BUS
PROP LOOP ENTRANCE

149m
STOP &
INTER.



SOUTH TARGET-
LOOKING FROM SOUTH

Appendix 5 – Pedestrian Site Visit Notes

9-Mar

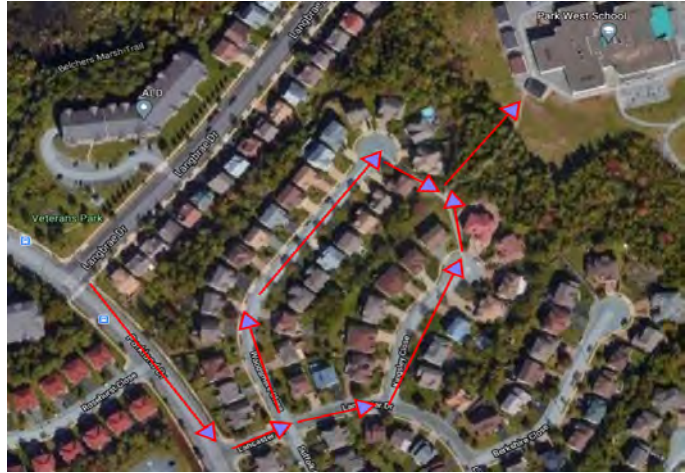
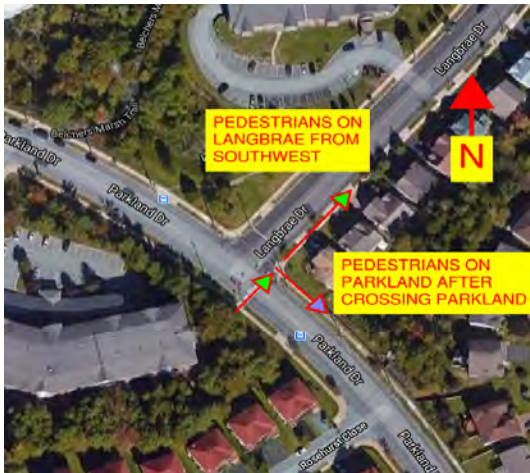
	NE TRAIL		NW LANGBRAE	
	STUDENT	ADULT	STUDENT	ADULT
8:00-8:15	12	3	16	4
8:15-8:30	49	17	56	18
8:30-8:45	5	2	3	1
8:45-9:00				



10-Mar

	LANGBRAE		PARKLAND*	
	STUDENT	ADULT	STUDENT	ADULT
7:45-8:00	1			
8:00-8:15	32	10	17	*
8:15-8:30	28	8	14	*
8:30-8:45	4	1	2	*

*STUDENTS WERE NOT USING LANGBRAE AFTER CROSSING PARKLAND.
SUSPECT THEY WERE GOING EAST AND USING CUL-DE-SACS
NO ADULTS WERE NOTICED IN THESE GROUPS.



11-Mar

	SOUTHEAST		NORTHWEST		SIDE ACCESS	
	STUDENT	ADULT	STUDENT	ADULT	STUDENT	ADULT
7:45-8:00	1	2	0	0	0	0
8:00-8:15	0	6	4	0	26	2
8:15-8:30	2	3	7	6	31	3
8:30-8:45	0	4	0	1	2	2

