

**Portions of Bedford West Sub-Area 10  
(PIDs 00289223 & 00289207)**

**Traffic Impact Study**

Draft Report

March 2023

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## Project Summary

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**Project Name**

Portions of Bedford West Sub-Area 10 (PIDs 00289223 & 00289207)  
Traffic Impact Study

**Project No.**

232012

**Report Version**

Draft Report

**Date**

March 2023

**Client:**

Clayton Developments  
200-90 Western Parkway  
Bedford, NS B4B 2J3

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# 1 Introduction

## 1.1 Overview

Harbourside Transportation Consultants has completed this traffic impact study in support of the development application (Case 24602) by Clayton Developments Limited for a residential development on a portion of the lands within the area known as Bedford West Sub-Area 10 in Bedford, Nova Scotia.

The Bedford West Sub-Area 10 area is located on Kearney Lake Road immediately west of the Highway 102 and Kearney Lake Road interchange. Conceptually-proposed development in Sub-Area 10 will include 1,136 residential dwelling units, 15,000 square feet of neighbourhood type commercial and 16,000 square feet of recreational community centre.

The *Bedford West Sub-Area 10 Traffic Impact Study*<sup>1</sup> was previously completed to quantify the transportation impacts of the entire Sub-Area 10 development. The study identified existing operational problems at the Kearney Lake Road interchange and projected that with background traffic growth alone, the southbound off-ramp will exceed capacity during both peak hours by 2031. The study concluded that improvements are required at the Highway 102 and Kearney Lake Road interchange to accommodate background traffic growth and the full build out of the Bedford West Sub Area 10 development. The study recommended that the two signalized intersections be converted to roundabouts to accommodate long-term growth at the interchange.

Design work is underway for the upgrades to the Kearney Lake Road interchange including the realignment of a portion of Highway 102 north of interchange, replacement of the bridge structure, roundabouts ramp terminals and an active transportation connection through the interchange. Construction is planned to begin after 2025. Figure 1 illustrates the proposed improvements<sup>2</sup>.

The Nova Scotia Department of Public Works (NSPW) has previously indicated that a maximum of 400 units can be constructed before upgrades to the Kearney Lake Road interchange. It should be noted that NSPW has the ability to exceed this number at their discretion. This traffic impact study reflects the development application for the portions of Bedford West Sub-Area 10 located on PIDs 00289223 and 00289207.

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<sup>1</sup> Harbourside Transportation Consultants. *Bedford West Sub-Area 10 Traffic Impact Study*, November 2019.

<sup>2</sup> Alta Planning + Design & Harbourside Transportation Consultants. *Kearney Lake Road Interchange Design Recommendations*, June 2021.

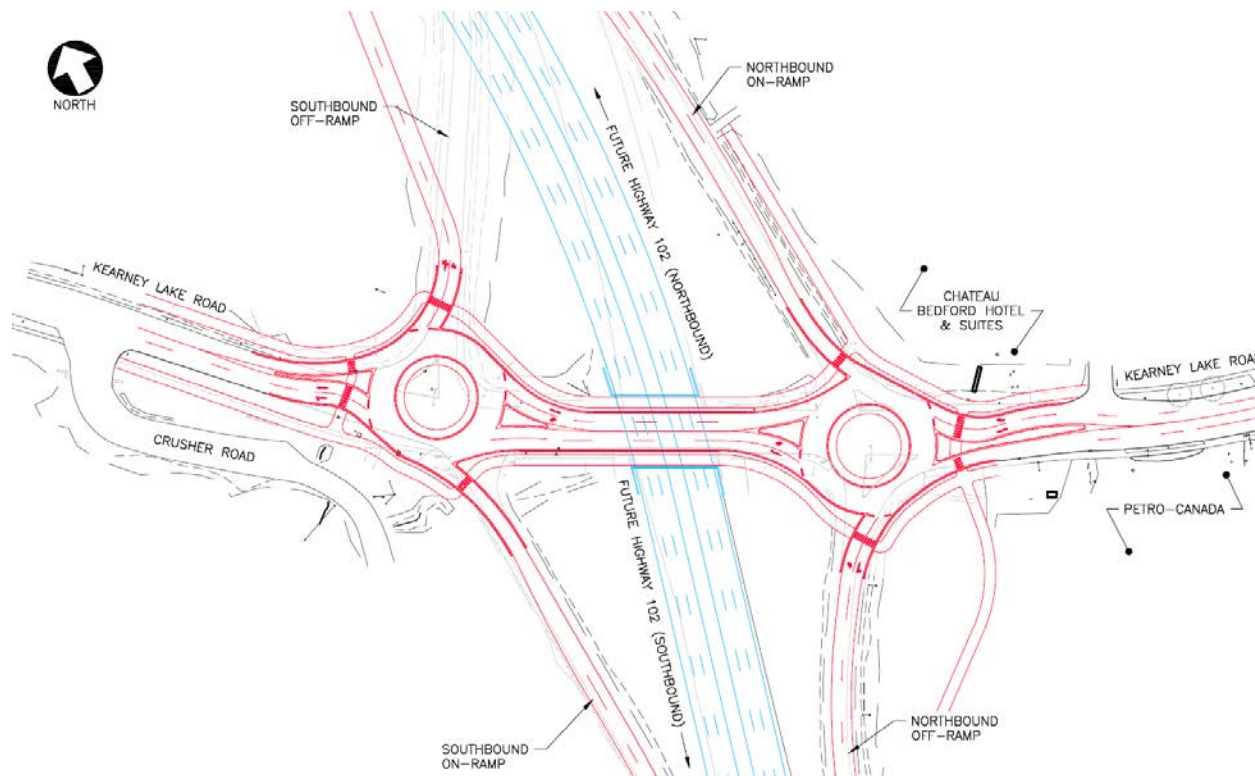


Figure 1: Kearney Lake Road/Highway 102 Interchange Upgrade Concept Plan

## 1.2 Study Scope

The study generally follows the Halifax Regional Municipality (HRM) Guidelines for the Preparation of Transportation Impact Studies<sup>3</sup>. The scope of the study includes:

- ▶ Assessment of the current traffic conditions within the study area;
- ▶ Estimates of background traffic growth;
- ▶ Estimates of additional traffic generated by the subject site;
- ▶ Analyses of the impact of the future traffic on the study area road network; and
- ▶ Recommendations necessary to mitigate the site generated traffic in a satisfactory manner.

<sup>3</sup> Halifax Regional Municipality. *Guidelines for the Preparation of Transportation Impact Studies*, 8<sup>th</sup> revision, September 2007.



### 1.3 Study Area

The subject site is located on Kearney Lake Road west of the Highway 102 interchange. The study area encompasses the segment of Kearney Lake Road between Larry Uteck Boulevard and the Highway 102 interchange. Figure 2 illustrates the site location and study area.

The study area includes four intersections:

1. Kearney Lake Road & Highway 102 NB Ramps (signalized).
2. Kearney Lake Road & Highway 102 SB Ramps (signalized);
3. Kearney Lake Road & Hamshaw Drive (unsignalized); and
4. Kearney Lake Road & Larry Uteck Boulevard (signalized).

## 2 Existing Conditions

### 2.1 Road Network

The roadways of interest within the study area include:

- ▶ **Kearney Lake Road:** a major collector roadway that runs northwest-southeast between Larry Uteck Boulevard and the Bedford Highway and connects to Highway 102 and Dunbrack Street west of the Highway 102 interchange. Kearney Lake Road has one travel lane in each direction and a posted speed limit varying between 50-60 km/h.
- ▶ **Larry Uteck Boulevard:** an arterial roadway that runs northwest-southeast between Hammonds Plains Road and the Bedford Highway and connects to Highway 102 and Kearney Lake Road. In the vicinity of Kearney Lake Road, Larry Uteck Boulevard has one travel lane in each direction and a posted speed limit of 60 km/h.
- ▶ **Hamshaw Drive:** a local roadway located off of Kearney Lake Road in the vicinity of the development. Hamshaw Drive is the only point of access to a residential area and Kearney Lake beach. Hamshaw Drive has one travel lane in each direction and a posted speed limit of 50 km/h.



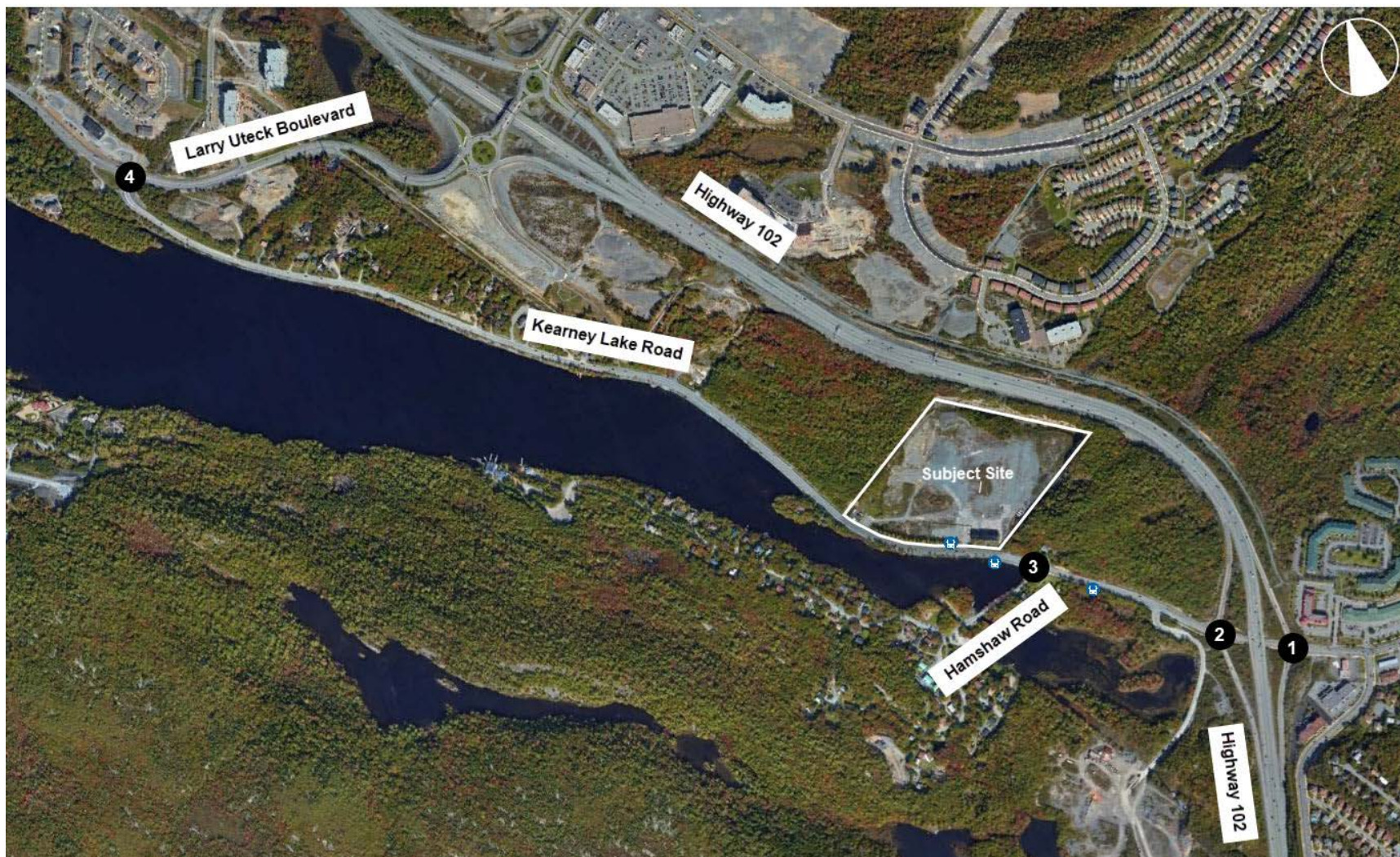


Figure 2: Site Location





## **2.2 Walking and Cycling**

There are currently no sidewalks on Kearney Lake Road between Larry Uteck Boulevard and Hamshaw Drive. Sidewalks are provided on the south side of Kearney Lake Road from Hamshaw Drive through the Highway 102 interchange. There is a multi-use path on the north side of Larry Uteck Boulevard between Amesbury Gate and Nine Mile Drive east of the Highway 102 interchange.

On-street bike lanes run on both sides of Kearney Lake Road between Larry Uteck Boulevard and the Highway 102 interchange, the bike lanes do not extend through the Highway 102 interchange. There are on-street bike lanes on both sides of Larry Uteck Boulevard between Belle Street and Kearney Lake Road.

Crosswalks are provided on all legs of the signalized intersection of Larry Uteck Boulevard and Kearney Lake Road. There are no crosswalks across Kearney Lake Road between Larry Uteck Boulevard and Parkland Drive (east of the Highway 102 interchange). At the Highway 102 interchange, crosswalks are on provided on the south legs of the signalized intersections across the highway ramps.

## **2.3 Transit**

Kearney Lake Road is serviced by Halifax Transit Route 433 Tantallon. Bus stops in each direction are located along the frontage of the subject site: Bus Stop 7021 (Kearney Lake Road after Hamshaw Drive) for the westbound direction and Bus Stop 7030 (Kearney Lake Road before Hamshaw Drive) for the eastbound direction.

## **2.4 Traffic Volumes**

Turning movement counts for the weekday morning (AM) and afternoon (PM) peak hours collected at the study intersections on Tuesday October 26, 2021 were used for the study. The traffic counts were adjusted using HRM's average annual weekday traffic (AAWT) conversion factors to account for day-of-week and month of data collection. Appendix A contains the traffic count data.

Figure A - 1 in Appendix A illustrates the base year weekday AM and PM peak hour traffic volumes at the study area intersections.



### 3 Proposed Development

#### 3.1 Site Description

The proposed development will consist of a mix of mid-rise and high-rise residential buildings. The proposed development includes a total of 667 residential units. The development will be built out in two phases:

- ▶ Phase 1 (2023-2025): 525 units; and
- ▶ Phase 2 (2026-2030): 142 units.

The first phase will be constructed prior to upgrades to the Kearney Lake Road interchange and the second phase will be constructed as the interchange upgrades take place.

Vehicle access to the development will be provided through two access points on Kearney Lake Road. Figure 3 illustrates the site concept plan.



Figure 3: Site Concept Plan



### 3.2 Site-Generated Traffic Forecast

The traffic forecast for the proposed development was estimated using the traditional four-step model: trip generation, modal choice, trip distribution and traffic assignment. Traffic projections were developed for the weekday AM and PM peak hours of adjacent street traffic.

#### 3.2.1 Trip Generation and Modal Choice

The Institute of Transportation Engineers (ITE) *Trip Generation Manual*<sup>4</sup> was used to estimate the vehicle trip generation for the existing site land uses. The following land use codes were used:

- 221 Multifamily Housing (Mid-Rise) - Not Close to Rail Transit, General Urban/Suburban, and;
- 222 Multifamily Housing (High-Rise) - Not Close to Rail Transit, General Urban/Suburban.

ITE defines mid-rise as a building that has between four and ten floors, and high-rise as a building with more than ten floors. Table 1 summarizes the trip generation rate equations and directional distributions for the land use codes.

Table 1: Trip Generation Rates

Land Use	AM Peak Hour			PM Peak Hour		
	Rate	Entering	Exiting	Rate	Entering	Exiting
221 Multifamily Housing (Mid-Rise)	$T=0.44(X)-11.61$	23%	77%	$T=0.39(X)-0.34$	61%	39%
222 Multifamily Housing (High-Rise)	$T=0.22(X)+18.85$	26%	74%	$T=0.26(X)+23.12$	62%	38%

Table 2 summarizes the weekday AM and PM peak hour trip generation estimates for the site. On a typical weekday, the site is forecast to generate of 185 vehicle trips in the AM peak hour (47 trips entering and 138 trips exiting) and 215 vehicle trips in the PM peak hour (133 trips entering and 82 trips exiting).

While the *Bedford West Sub Area 10 Traffic Impact Study* included a modal split reduction of 7.5% to account for transit and active transportation trips, to remain conservative no reduction was made to account for modal choice in this study. There is currently only one transit route servicing the area and the active transportation connection through the Highway 102 interchange will not be completed until the second phase of this development.

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<sup>4</sup> Institute of Transportation Engineers. *Trip Generation Manual*, 11<sup>th</sup> edition, September 2021.



Table 2: Trip Generation Estimates for Full Build-Out

Phase	Land Use	Units	AM Peak Hour			PM Peak Hour		
			Total	Entering	Exiting	Total	Entering	Exiting
1	222 Multifamily Housing (High-Rise)	525	134	35	99	160	99	61
2	221 Multifamily Housing (Mid-Rise)	142	51	12	39	55	34	21
Total Trips			185	47	138	215	133	82

### 3.2.2 Trip Distribution and Assignment

The site generated vehicle trips were assigned and distributed to the road network based on the trip distribution assumptions from the *Bedford West Sub Area 10 Traffic Impact Study*. Table 3 summarizes the trip distribution assumptions and Figure 4 illustrates the distribution.

Figure A – 2 in Appendix A illustrates the site-generated traffic for the weekday AM and PM peak hours at the study area intersections.

Table 3: Trip Distribution and Assignment

Origin/Destination		Residential
North	Highway 102	39%
South	Highway 102	41%
East	Kearney Lake Road	4.5%
	Larry Uteck Boulevard	7.5%
West	Larry Uteck Boulevard	8%



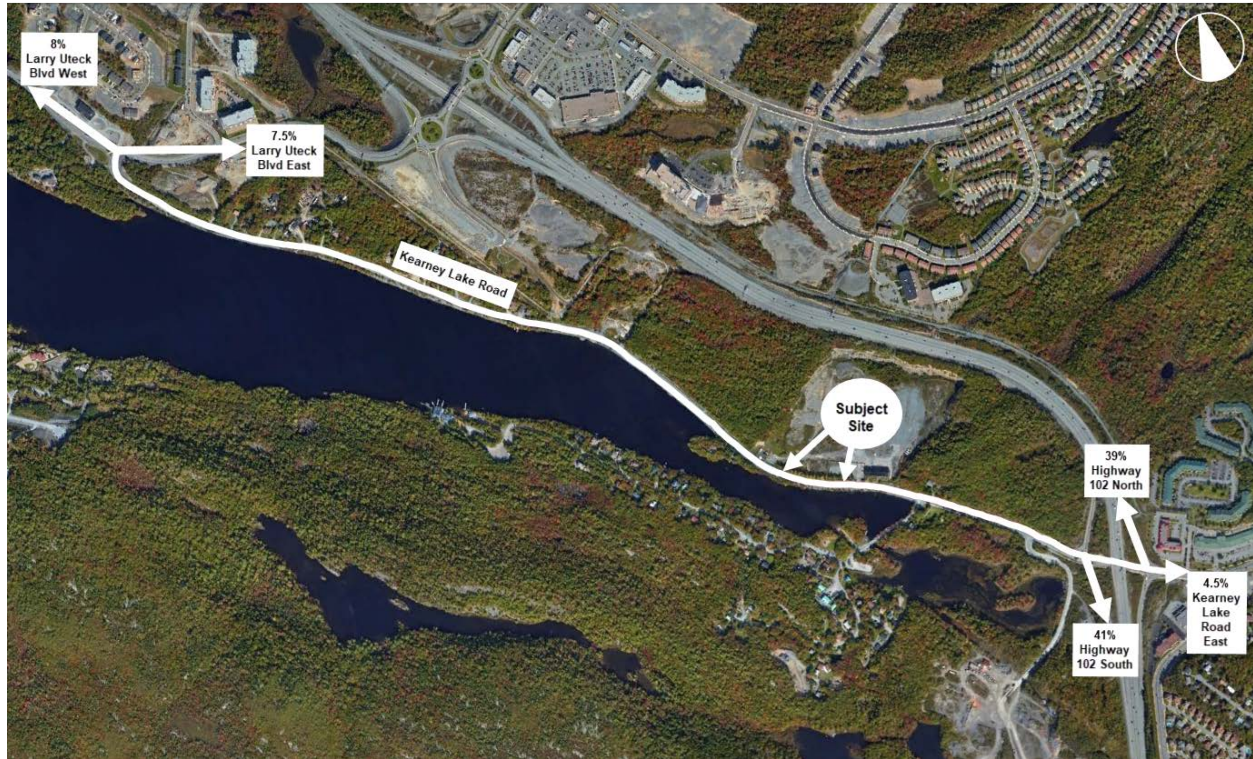


Figure 4: Trip Distribution

### 3.2.3 Phase 1 Increase from 400 units to 525 units

NSPW has previously indicated that a maximum of 400 units can be constructed before upgrades to the Kearney Lake Road interchange, NSPW has the ability to exceed this number at their discretion.

The proposed phasing plan includes 525 units in Phase 1. Allowing an additional 125 units in Phase 1 would allow the construction of the four high-rise buildings (D, E, F and G) first which results significant efficiencies during construction.

Limiting Phase 1 to 400 units would result in the construction of two high-rise buildings (D and E) and the three mid-rise buildings (A, B and C) first. The 400 units would include 250 high-rise units and 142 mid-rise units. Table 4 summarizes the weekday AM and PM peak hour trip generation estimates for the 400 units. 400 units with a mixture of high-rise and mid-rise units is forecast to generate of 129 vehicle trips in the AM peak hour (32 trips entering and 97 trips exiting) and 146 vehicle trips in the PM peak hour (90 trips entering and 56 trips exiting).





Table 4: Trip Generation Estimates

Land Use	Units	AM Peak Hour			PM Peak Hour		
		Total	Entering	Exiting	Total	Entering	Exiting
222 Multifamily Housing (High-Rise)	250	134	35	99	160	99	61
221 Multifamily Housing (Mid-Rise)	150	51	12	39	55	34	21
Total Trips		129	32	97	146	90	56

Based on ITE trip generation data, a mid-rise unit generates an average of 0.37 trips during the AM peak hour and 0.39 trips during the PM peak hour, while a high-rise unit generates an average of 0.27 trips during the AM peak hour and 0.32 trips during the PM peak hour. While the proposed phasing increases the number of units, all units are high-rise units which have lower trip generation rates.

The trip generation estimates for the 525 high-rise units were compared to the trip generation estimates for 400 units with a mixture of high-rise and mid-rise units. The comparison is detailed in Table 5. The comparison indicates that the additional 125 units translate into an additional 5 vehicle trips in the AM peak hour (3 trips entering and 2 trips exiting) and 14 vehicle trips in the PM peak hour (9 trips entering and 5 trips exiting).

The increase of 5 to 15 vehicles per hour during the peak hours associated with the additional 125 units is insignificant and expected to have a negligible impact on overall traffic volumes and operations.

Table 5: Comparison of Trip Generation for 400 and 525 units in Phase 1

Land Use Units	AM Peak Hour			PM Peak Hour		
	Total	Entering	Exiting	Total	Entering	Exiting
400 units (250 high-rise/142 mid-rise)	129	32	97	146	90	56
525 high-rise units	134	35	99	160	99	61
Total Trips	5	3	2	14	9	5



## **4 Traffic Volume Forecast**

Two horizon years, two years (2025) and seven years (2030) from the date of the study were assessed to estimate the impact of the proposed development on the study area intersections.

### **4.1 Background (2025)**

The 2025 background traffic volumes are estimated to consist of increased non-site traffic (generalized background traffic growth). The base year traffic volumes were factored using a growth rate of 1.2% per year to reflect generalized traffic growth. Figure A – 3 in Appendix A illustrates the 2025 background traffic volumes for the weekday AM and PM peak hours.

### **4.2 Total Phase 1 (2025)**

The 2025 total traffic volumes are estimated to consist of the 2025 background volumes and the traffic generated by Phase 1 (525 units) of the subject site. Figure A - 4 in Appendix A illustrates the total Phase 1 traffic volumes for the weekday AM and PM peak hours.

### **4.3 Background (2030)**

The 2030 background traffic volumes are estimated to consist of increased non-site traffic (generalized background traffic growth at 1.2% per year) and Phase 1 of the subject site. Figure A - 5 in Appendix A illustrates the 2030 background traffic volumes for the weekday AM and PM peak hours.

### **4.4 Total Phase 2 (2030)**

The 2030 total Phase 2 traffic volumes are estimated to consist of the 2030 background volumes (generalized background traffic growth and traffic generated by Phase 1) and the traffic generated by Phase 2 (142 units) of the subject site. Figure A - 6 in Appendix A illustrates the total Phase 2 traffic volumes for the weekday AM and PM peak hours.



## 5 Traffic Operations

Synchro Studio (Version 11) was used to determine traffic operations at the study area intersections. Operations at an intersection can be evaluated using a number of performance measures, including level of service (LOS), delay, volume-to-capacity ratio (v/c) and vehicle queuing.

LOS is a qualitative measure used to describe the level of performance of an intersection in terms of traffic movement. LOS for intersections is defined in terms of delay, which is a measure of driver discomfort, frustration and increased travel time. The quality of traffic movement is divided into six levels ranging from A to F. LOS A represents the best quality of traffic where there are essentially free flow conditions, and LOS F represents the worst quality of traffic where the level of congestion is considered unacceptable to most drivers.

Table 6 summarizes the level of service criteria for intersections in terms of average control delay per vehicle, where control delay is additional travel time experienced by a motor vehicle attributable to the presence of traffic control (unsignalized or signalized intersection) and conflicting traffic.

Table 6: Level of Service Criteria

LOS	Description	Signalized Delay	Unsignalized Delay
A	No congestion; most vehicles do not stop.	≤ 10 sec/veh	≤ 10 sec/veh
B	Very light congestion; some vehicles stop.	10-20 sec/veh	10-15 sec/veh
C	Light congestion; most vehicles stop.	20-35 sec/veh	15-25 sec/veh
D	Noticeable congestion; vehicles must sometimes wait through more than one red light. No long-standing queues.	35-55 sec/veh	25-35 sec/veh
E	Congestion; vehicles must sometimes wait through more than one red light. Long-standing queues are formed.	55-80 sec/veh	35-50 sec/veh
F	Severe congestion; demand exceeds the capacity of the approach/intersection.	≥ 80 sec/veh	≥ 50 sec/veh

The volume-to-capacity (v/c) ratio is a measure of how the peak hour traffic volume on an approach to an intersection compares to the theoretical maximum volume that could be accommodated on that intersection approach. As the v/c ratio approaches 1.0, the movement has reduced ability to accommodate any additional volume of traffic.

The 95<sup>th</sup> percentile (95<sup>th</sup>%) queue is the estimated length, in metres, of the vehicles queued on an intersection approach which is only exceeded five percent of the time. The storage length of a passenger vehicle is approximately 7.6 metres, for example, a 95<sup>th</sup>% queue of 38 metres on any particular approach indicates that less than five times of out 100 there may be more than five vehicles stopped on that approach. The 95<sup>th</sup>% queue is typically used to determine if sufficient vehicle storage is available.



The criteria outlined in *Guidelines for the Preparation of Transportation Impact Studies* were used to identify critical movements:

- ▶ the overall volume-to-capacity ratio of an intersection exceeds 0.85;
- ▶ the volume-to-capacity ratio of an individual through movement or shared through/turning movement exceeds 0.85;
- ▶ the volume-to-capacity ratio of an exclusive turning movement exceeds 1.0;
- ▶ an exclusive turning movement generates queues which exceed the available turning lane storage space; or
- ▶ average delay for any particular movement exceeds what is typically acceptable.

### 5.1 Base Year (2023) Operations

Traffic operations at the study area intersections were evaluated using the existing lane configuration, traffic control and base year traffic volumes. Table 7 and Table 8 summarize the results of the analysis for the AM and PM peak hours. Appendix B contains the supporting detailed Synchro reports.

The following critical movements are identified:

- ▶ **Kearney Lake Road and Highway 102 NB Ramps:** The SimTraffic queuing analysis indicates that 95<sup>th</sup> percentile queue length for the eastbound movements (Kearney Lake Road) exceeds the storage length between the two signalized intersections during both peak hours.
- ▶ **Kearney Lake Road and Highway 102 SB Ramps:** The shared southbound left and through movement (Highway 102 Off-Ramp) operates at LOS F during both peak hours. The volume-to-capacity ratio for this movement exceeds 1.0 during both peak hours. The overall intersection operates at LOS F during the AM peak hour and LOS E during the PM peak hour.

The SimTraffic queuing analysis indicates that 95<sup>th</sup> percentile queue length for the off-ramp will extend to within 100 metres of the off-ramp gore area during both peak hours.



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Table 7: Base Year (2023) Operations – AM Peak Hour

Base Year (2023)		Weekday AM Peak Hour									
		Synchro							SimTraffic		
Intersection	Move ment	Volume (vph)	Approach Delay (s/veh)	Approach LOS	Delay (s/veh)	LOS	v/c	95th% Queue (m)	Delay (s/veh)	LOS	95th% Queue (m)
1: Kearney Lake Road & Highway 102 NB Ramps		1825	15.5	B					12.3	B	
Kearney Lake Road	EBL	13	10.8	B	0.2	A	0.03	0.0	12.9	B	128.0
	EBT	859			11.1	B	0.64	8.3	10.8	B	52.7
Kearney Lake Road	WBT	297	18.9	B	37.7	D	0.35	49.7	26.6	C	49.1
	WBR	514			6.7	A	0.64	29.3	4.3	A	0.0
Highway 102 NB Off-Ramp	NBL	51	23.7	C	23.7	C	0.49	33.6	47.1	D	32.6
	NBT	0							0.0	A	
	NBR	91							4.6	A	
2: Kearney Lake Road & Highway 102 SB Ramps		1362	82.0	F					40.2	D	
Kearney Lake Road	EBT	379	41.8	D	53.5	D	0.78	144.8	33.8	C	102.0
	EBR	130			6.6	A	0.25	15.7	5.1	A	28.1
Kearney Lake Road	WBL	124	3.4	A	1.9	A	0.21	2.2	44.7	D	48.0
	WBT	224			4.1	A	0.25	3.4	23.3	C	72.3
Highway 102 SB Off-Ramp	SBL	493	176.5	F	181.8	F	1.28	106.2	61.0	E	237.0
	SBT	3			87.7	F					
	SBR	9			0.0	A	0.01	0.0	41.1	D	
3: Kearney Lake Road & Hamshaw Drive		748	1.2	A					2.4	A	
Kearney Lake Road	EBT	472	0.0	A	0.0	A	-	-	1.2	A	0.0
	EBR	3			0.0	A	-	-	0.5	A	
Kearney Lake Road	WBL	17	0.8	A	8.6	A	0.03	0.8	7.6	A	13.5
	WBT	216			0.0	A	-	-	4.1	A	
Hamshaw Drive	NBL	3	13.5	B	13.5	B	0.13	3.0	13.6	B	16.5
	NBR	37							4.6	A	
4: Larry Uteck Boulevard & Kearney Lake Road		1710	11.2	B					8.7	A	
Larry Uteck Boulevard	EBL	5	8.9	A	7.4	A	0.01	1.6	14.7	B	6.1
	EBT	577			13.7	B	0.65	83.8	9.1	A	47.8
	EBR	434			2.5	A	0.45	11.6	3.9	A	0.0
Larry Uteck Boulevard	WBL	32	10.5	B	8.7	A	0.11	6.3	19.2	B	14.9
	WBT	406			10.7	B	0.47	54.1	7.7	A	41.3
	WBR	15			25.7	C	0.57	38.5	4.4	A	
Kearney Lake Road	NBL	175	22.6	C					8.6	A	0.10
	NBT	5			17.9	B	21.6				
	NBR	33			8.0	A					
Driveway	SBL	23	17.1	B	17.6	B	0.08	7.6	13.0	B	12.4
	SBT	3			14.8	B	0.01	2.5	13.5	B	7.1
	SBR	2			7.2	A					





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Table 8: Base Year (2023) Operations – PM Peak Hour

Base Year (2023)		Weekday PM Peak Hour									
		Synchro							SimTraffic		
Intersection	Move ment	Volume (vph)	Approach Delay (s/veh)	Approach LOS	Delay (s/veh)	LOS	v/c	95th% Queue (m)	Delay (s/veh)	LOS	95th% Queue (m)
1: Kearney Lake Road & Highway 102 NB Ramps		2181	15.8	B					16.2	B	
Kearney Lake Road	EBL	34	4.6	A	0.2	A	0.06	0.0	14.6	B	122.3
	EBT	728			4.9	A	0.56	0.0	12.0	B	51.7
Kearney Lake Road	WBT	357	14.4	B	44.2	D	0.39	64.7	29.5	C	65.1
	WBR	770			1.3	A	0.55	0.0	7.6	A	34.0
Highway 102 NB Off-Ramp	NBL	111	47.6	D	47.6	D	0.77	99.4	59.8	E	
	NBT	0							0.0	A	100.1
	NBR	181							16.1	B	
2: Kearney Lake Road & Highway 102 SB Ramps		1407	76.9	E					33.5	C	
Kearney Lake Road	EBT	287	39.8	D	54.7	D	0.68	114.0	30.5	C	76.2
	EBR	146			7.2	A	0.29	17.6	4.9	A	20.5
Kearney Lake Road	WBL	123	2.9	A	1.1	A	0.18	1.1	40.8	D	46.9
	WBT	345			3.6	A	0.27	2.4	27.7	C	102.4
Highway 102 SB Off-Ramp	SBL	475	172.2	F	182.7	F	1.27	281.2	46.8	D	200.8
	SBT	2							43.5	D	
	SBR	29			0.0	A	0.02	0.0	20.2	C	38.5
3: Kearney Lake Road & Hamshaw Drive		823	1.2	A					3.4	A	
Kearney Lake Road	EBT	409	0.0	A	0.0	A	-	-	1.1	A	0.7
	EBR	8			0.0	A	-	-	0.6	A	
Kearney Lake Road	WBL	30	1.1	A	8.6	A	0.05	1.5	7.4	A	73.4
	WBT	344			0.0	A	-	-	5.7	A	
Hamshaw Drive	NBL	8	13.3	B	13.3	B	0.10	2.3	11.5	B	14.1
	NBR	24							3.9	A	
4: Larry Uteck Boulevard & Kearney Lake Road		2050	17.0	B					12.6	B	
Larry Uteck Boulevard	EBL	6	13.6	B	7.3	A	0.02	1.9	22.0	C	8.5
	EBT	727			18.5	B	0.78	117.3	12.0	B	73.5
	EBR	300			1.9	A	0.32	9.0	3.3	A	0.0
Larry Uteck Boulevard	WBL	43	14.5	B	11.7	B	0.24	8.8	28.2	C	18.6
	WBT	585			14.6	B	0.67	89.6	10.2	B	62.3
	WBR	36							6.9	A	
Kearney Lake Road	NBL	245	34.2	C	38.1	D	0.74	76.1	26.9	C	41.3
	NBT	12			11.7	B	0.10	9.4	20.7	C	45.7
	NBR	31							14.2	B	
Driveway	SBL	53	22.2	C	22.7	C	0.17	16.8	20.3	C	20.2
	SBT	10							18.5	B	
	SBR	2			20.2	C	0.03	5.5	9.7	A	9.3



## 5.2 Background (2025) Operations

Traffic operations at the study area intersections were evaluated using the existing lane configuration, traffic control and future two-year horizon background traffic volumes. Signal timings at the Highway 102 interchange ramp intersections were optimized to mitigate existing capacity issues.

Table 9 and Table 10 summarize the results of the analysis for the AM and PM peak hours. Appendix C contains the supporting detailed Synchro reports.

The following critical movements are identified:

- **Kearney Lake Road and Highway 102 NB Ramps:** The westbound through movement (Kearney Lake Road) is expected to operate at LOS E during both peak hours. The volume-to-capacity ratio for this movement will remain below the HRM threshold of 0.85 for individual through movements.

The SimTraffic queuing analysis indicates that the 95<sup>th</sup> percentile queue length for the eastbound movements (Kearney Lake Road) is expected to exceed the storage length between the two signalized intersections during the AM peak hour.

- **Kearney Lake Road and Highway 102 SB Ramps:** The eastbound through movement (Kearney Lake Road) is expected to operate at LOS E during the AM peak hour. The volume-to-capacity ratio for this movement will remain below the HRM threshold of 0.85 for individual through movements. The shared southbound left and through movement (Highway 102 Off-Ramp) is expected to operate at LOS E during both peak hours. The volume-to-capacity ratio for this movement will improve to below 1.0 during both peak hours, but continue to exceed the HRM threshold of 0.85 for shared movements. The overall intersection is expected to operate at LOS D or better during both peak hours.

The SimTraffic queuing analysis indicates that the 95<sup>th</sup> percentile queue length at the off-ramp will extend to within 100 metres of the off-ramp gore area during the AM peak hour.



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Table 9: Background (2025) Operations – AM Peak Hour

Background (2025)		Weekday AM Peak Hour													
		Synchro							SimTraffic						
Intersection	Move ment	Volume (vph)	Approach Delay (s/veh)	Approach LOS	Delay (s/veh)	LOS	v/c	95th% Queue (m)	Delay (s/veh)	LOS	95th% Queue (m)				
1: Kearney Lake Road & Highway 102 NB Ramps		1873	16.4	B					13.2	B					
Kearney Lake Road	EBL	14	2.5	A	0.1	A	0.03	0.0	11.7	B	117.0				
	EBT	880			2.6	A	0.63	0.0	10.2	B	52.7				
Kearney Lake Road	WBT	305	28.3	C	56.1	E	0.54	62.4	33.8	C	55.3				
	WBR	527			10.3	B	0.74	36.9	4.5	A	5.8				
Highway 102 NB Off-Ramp	NBL	53	31.5	C	31.5	C	0.58	40.9	45.7	D	28.7				
	NBT	0							0.0	A					
	NBR	94							4.2	A					
2: Kearney Lake Road & Highway 102 SB Ramps		1399	40.2	D					33.3	C					
Kearney Lake Road	EBT	389	44.1	D	56.6	E	0.77	156.6	25.5	C	94.3				
	EBR	134			6.6	A	0.26	16.0	4.9	A	29.3				
Kearney Lake Road	WBL	127	6.6	A	3.6	A	0.30	3.3	44.0	D	51.5				
	WBT	230			8.0	A	0.31	5.2	21.6	C	71.2				
Highway 102 SB Off-Ramp	SBL	505	60.9	E	62.9	E	0.92	95.3	49.9	D	204.6				
	SBT	4			0.0	A	0.01	0.0	38.6	D	29.2				
	SBR	10							35.2	D					
3: Kearney Lake Road & Hamshaw Drive		770	1.3	A					2.6	A					
Kearney Lake Road	EBT	484	0.0	A	0.0	A	-	-	1.2	A	0.0				
	EBR	4			0.0	A	-	-	0.8	A					
Kearney Lake Road	WBL	18	0.8	A	8.7	A	0.03	0.8	8.4	A	43.6				
	WBT	222			0.0	A	-	-	4.7	A					
Hamshaw Drive	NBL	4	14.2	B	14.2	B	0.15	3.8	12.1	B	16.4				
	NBR	38							4.2	A					
4: Larry Uteck Boulevard & Kearney Lake Road		1758	11.4	B					8.9	A					
Larry Uteck Boulevard	EBL	6	8.9	A	7.3	A	0.02	2.0	14.9	B	5.3				
	EBT	591			13.8	B	0.66	86.3	9.6	A	49.8				
	EBR	445			2.4	A	0.45	11.6	4.0	A	0.0				
Larry Uteck Boulevard	WBL	33	10.5	B	8.6	A	0.12	6.4	17.5	B	16.0				
	WBT	416			10.7	B	0.48	55.8	7.8	A	42.0				
	WBR	16			27.0	C	0.59	41.1	5.7	A					
Kearney Lake Road	NBL	180	23.8	C					18.9	B	34.0				
	NBT	6							12.1	B	21.0				
	NBR	34							8.0	A					
Driveway	SBL	24	17.6	B	18.3	B	0.08	8.1	14.5	B	13.0				
	SBT	4			15.0	B	0.02	3.1	16.2	B	7.5				
	SBR	3							4.4	A					



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Table 10: Background (2025) Operations – PM Peak Hour

Background (2025)		Weekday PM Peak Hour									
		Synchro							SimTraffic		
Intersection	Move ment	Volume (vph)	Approach Delay (s/veh)	Approach LOS	Delay (s/veh)	LOS	v/c	95th% Queue (m)	Delay (s/veh)	LOS	95th% Queue (m)
1: Kearney Lake Road & Highway 102 NB Ramps		2236	19.0	B					16.4	B	
Kearney Lake Road	EBL	35	1.8	A	0.2	A	0.05	0.0	10.5	B	97.6
	EBT	746			2.0	A	0.57	0.0	9.8	A	50.7
Kearney Lake Road	WBT	366	21.3	C	66.6	E	0.72	78.2	39.2	D	86.5
	WBR	789			1.4	A	0.56	0.0	8.6	A	37.5
Highway 102 NB Off-Ramp	NBL	114	52.0	D	52.0	D	0.81	112.9	52.4	D	83.2
	NBT	0							0.0	A	
	NBR	186							11.7	B	
2: Kearney Lake Road & Highway 102 SB Ramps		1444	33.9	C					22.2	C	
Kearney Lake Road	EBT	294	38.6	D	53.1	D	0.67	116.6	21.1	C	65.1
	EBR	150			7.1	A	0.29	17.5	4.6	A	21.3
Kearney Lake Road	WBL	126	5.3	A	1.9	A	0.25	1.7	32.0	C	42.2
	WBT	354			6.7	A	0.34	113.0	19.7	B	89.3
Highway 102 SB Off-Ramp	SBL	487	54.0	D	57.4	E	0.87	201.7	28.8	C	129.7
	SBT	3			0.0	A	0.02	0.0	23.0	C	25.0
	SBR	30							7.2	A	
3: Kearney Lake Road & Hamshaw Drive		846	1.2	A					3.6	A	
Kearney Lake Road	EBT	419	0.0	A	0.0	A	-	-	1.1	A	0.0
	EBR	9			0.0	A	-	-	0.9	A	
Kearney Lake Road	WBL	31	1.1	A	8.6	A	0.05	1.5	8.4	A	74.6
	WBT	353			0.0	A	-	-	5.9	A	
Hamshaw Drive	NBL	9	13.7	B	13.7	B	0.11	3.0	10.4	B	14.0
	NBR	25							4.0	A	
4: Larry Uteck Boulevard & Kearney Lake Road		2107	17.7	B					13.3	B	
Larry Uteck Boulevard	EBL	7	14.2	B	7.4	A	0.03	2.1	21.4	C	8.2
	EBT	745			19.4	B	0.80	122.8	12.4	B	75.0
	EBR	308			1.9	A	0.33	9.1	3.4	A	0.0
Larry Uteck Boulevard	WBL	45	15.0	B	12.8	B	0.27	9.6	27.6	C	19.7
	WBT	600			15.1	B	0.69	93.2	11.1	B	66.6
	WBR	37							8.0	A	
Kearney Lake Road	NBL	251	35.1	D	39.2	D	0.75	78.8	28.9	C	41.7
	NBT	13			11.9	B	0.11	9.8	21.5	C	54.0
	NBR	32							15.1	B	
Driveway	SBL	55	22.4	C	23.0	C	0.17	17.3	21.4	C	20.8
	SBT	11			19.9	B	0.03	5.9	21.4	C	11.6
	SBR	3							8.0	A	



### 5.3 Total Phase 1 (2025) Operations: 525 units

Traffic operations at the study area intersections were evaluated using the future total Phase 1 traffic volumes. Signal timings at the Highway 102 interchange ramp intersections were optimized. The two site access points were modelled as unsignalized intersections with stop control on the development driveways and single lane approaches. No left turn storage lanes were included on Kearney Lake Road, left turn lane warrants are discussed in Section 6.2.

Table 11 and Table 12 summarize the results of the analysis for the AM and PM peak hours. Appendix D contains the supporting detailed Synchro reports.

The following critical movements are identified:

- **Kearney Lake Road and Highway 102 NB Ramps:** The westbound through movement (Kearney Lake Road) is expected to continue to operate at LOS E during both peak hours. The volume-to-capacity ratio for this movement is expected to remain below the HRM threshold of 0.85 for individual through movements. The northbound approach (Highway 102 Off-Ramp) is expected to deteriorate to LOS E during the PM peak hour, the volume-to-capacity ratio will exceed the HRM threshold of 0.85 for shared movements but remain below 1.0. Average delay per vehicle at the intersection is expected to increase by approximately 0.6 seconds per vehicle during the AM peak hour and approximately 2.7 seconds per vehicle during the PM peak hour.

The SimTraffic queuing analysis indicates that 95<sup>th</sup> percentile queue length for the eastbound movements (Kearney Lake Road) is expected to continue to exceed the storage length between the two signalized intersections during the AM peak hour

- **Kearney Lake Road and Highway 102 SB Ramps:** The eastbound through movement (Kearney Lake Road) is expected to continue to operate at LOS E during the AM peak hour. The volume-to-capacity ratio for this movement will remain below the HRM threshold of 0.85 for individual through movements. The shared southbound left and through movement (Highway 102 Off-Ramp) is expected to continue to operate at LOS E during both peak hours. The volume-to-capacity ratio for this movement will continue to exceed the HRM threshold of 0.85 for shared movements but remain below 1.0. Average delay per vehicle at the intersection is not expected to significantly increase during the AM peak hour and increase by approximately 1.0 second per vehicle during the PM peak hour.

The SimTraffic queuing analysis indicates that the 95<sup>th</sup> percentile queue length for the off-ramp will extend to within 100 metres of the off-ramp gore area during the AM peak hour.

Existing and background issues are expected to continue to deteriorate with the additional traffic generated by Phase 1 of the development. Phase 1 of the development is not expected to trigger any new capacity issues at Kearney Lake Road and Highway 102 interchange. Both site accesses are expected to operate at acceptable levels of service with minimal queuing.





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Table 11: Total Phase 1 (2025) Operations – AM Peak Hour

Total Phase 1 (2025)		Weekday AM Peak Hour									
		Synchro							SimTraffic		
Intersection	Move ment	Volume (vph)	Approach Delay (s/veh)	Approach LOS	Delay (s/veh)	LOS	v/c	95th% Queue (m)	Delay (s/veh)	LOS	95th% Queue (m)
1: Kearney Lake Road & Highway 102 NB Ramps		1932	17.0	B					14.9	B	
Kearney Lake Road	EBL	53	2.4	A	0.2	A	0.10	0.0	14.9	B	135.8
	EBT	884			2.6	A	0.63	0.0	12.3	B	54.8
Kearney Lake Road	WBT	307	30.0	C	59.2	E	0.58	63.8	36.4	D	60.8
	WBR	527			11.0	B	0.75	37.7	4.9	A	14.2
Highway 102 NB Off-Ramp	NBL	67	36.0	D	36.0	D	0.63	46.7	42.6	D	
	NBT	0							0.0	A	35.7
	NBR	94							4.7	A	
2: Kearney Lake Road & Highway 102 SB Ramps		1513	39.8	D					43.5	D	
Kearney Lake Road	EBT	432	42.7	D	57.1	E	0.81	173.0	27.0	C	103.0
	EBR	175			5.8	A	0.30	17.3	5.4	A	31.3
Kearney Lake Road	WBL	128	7.7	A	4.2	A	0.33	3.8	42.0	D	49.7
	WBT	246			9.2	A	0.33	6.4	18.9	B	71.3
Highway 102 SB Off-Ramp	SBL	505	60.3	E	64.8	E	0.92	96.4	82.3	F	287.9
	SBT	4			0.0	A	0.03	0.0	99.7	F	
	SBR	23							54.8	D	46.7
3: Kearney Lake Road & Hamshaw Drive		884	1.3	A					2.5	A	
Kearney Lake Road	EBT	569	0.0	A	0.0	A	-	-	0.8	A	0.0
	EBR	4			0.0	A	-	-	0.6	A	
Kearney Lake Road	WBL	18	0.8	A	9.0	A	0.03	0.8	8.3	A	73.6
	WBT	251			0.0	A	-	-	5.1	A	
Hamshaw Drive	NBL	4	15.9	C	15.9	C	0.17	4.6	10.8	B	14.5
	NBR	38							5.1	A	
4: Larry Uteck Boulevard & Kearney Lake Road		1779	11.5	B					9.3	A	
Larry Uteck Boulevard	EBL	6	9.0	A	7.3	A	0.02	2.0	13.0	B	5.8
	EBT	591			14.0	B	0.66	86.3	9.9	A	53.5
	EBR	448			2.5	A	0.46	11.6	4.1	A	7.7
Larry Uteck Boulevard	WBL	36	10.7	B	8.9	A	0.13	6.9	19.6	B	16.4
	WBT	416			10.8	B	0.48	55.8	8.1	A	45.3
	WBR	16							4.5	A	
Kearney Lake Road	NBL	188	23.6	C	27.4	C	0.60	42.8	19.4	B	36.1
	NBT	6			8.6	A	0.12	8.0	15.6	B	24.2
	NBR	41							9.6	A	
Driveway	SBL	24	17.6	B	18.3	B	0.08	8.1	13.6	B	11.9
	SBT	4			15.0	B	0.02	3.1	13.6	B	8.0
	SBR	3							5.4	A	
5: Kearney Lake Road & East Site Access		845	1.7	A					1.5	A	
Kearney Lake Road	EBL	5	0.1	A	7.8	A	0.00	0.0	2.8	A	7.1
	EBT	506			0.0	A	-	-	0.6	A	
Kearney Lake Road	WBT	232	0.0	A	0.0	A	-	-	1.4	A	0.0
	WBR	23			0.0	A	-	-	1.0	A	
East Site Access	SBL	67	17.6	C	17.6	C	0.23	6.8	9.0	A	15.0
	SBR	12							4.4	A	
6: Kearney Lake Road & West Site Access		759	0.4	A					0.9	A	
Kearney Lake Road	EBL	1	0.0	A	7.8	A	0.00	0.0	0.0	A	3.3
	EBT	494			0.0	A	-	-	0.8	A	
Kearney Lake Road	WBT	238	0.0	A	0.0	A	-	-	0.7	A	0.0
	WBR	6			0.0	A	-	-	0.3	A	
West Site Access	SBL	17	14.9	B	14.9	B	0.06	1.6	7.1	A	10.3
	SBR	3							2.0	A	



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Table 12: Total Phase 1 (2025) Operations – PM Peak Hour

Total Phase 1 (2025)		Weekday PM Peak Hour									
		Synchro							SimTraffic		
Intersection	Move ment	Volume (vph)	Approach Delay (s/veh)	Approach LOS	Delay (s/veh)	LOS	v/c	95th% Queue (m)	Delay (s/veh)	LOS	95th% Queue (m)
1: Kearney Lake Road & Highway 102 NB Ramps		2307	21.7	C					22.4	C	
Kearney Lake Road	EBL	58	1.9	A	0.3	A	0.09	0.0	12.4	B	101.8
	EBT	749			2.1	A	0.59	0.0	10.1	B	52.1
Kearney Lake Road	WBT	370	23.2	C	72.4	E	0.78	82.7	46.1	D	101.9
	WBR	789			1.4	A	0.56	0.0	9.2	A	65.3
Highway 102 NB Off-Ramp	NBL	155	60.2	E	60.2	E	0.87	140.8	79.3	E	
	NBT	0							0.0	A	160.1
	NBR	186							36.2	D	
2: Kearney Lake Road & Highway 102 SB Ramps		1579	34.8	C					22.6	C	
Kearney Lake Road	EBT	320	39.0	D	54.9	D	0.71	125.5	20.8	C	66.7
	EBR	175			6.6	A	0.33	18.4	5.1	A	23.3
Kearney Lake Road	WBL	126	6.4	A	1.9	A	0.25	1.7	32.2	C	43.7
	WBR	399			7.9	A	0.38	113.8	18.7	B	96.3
Highway 102 SB Off-Ramp	SBL	487	55.4	E	63.3	E	0.90	220.9	32.5	C	
	SBT	3							22.8	C	144.7
	SBR	69							10.3	B	48.5
3: Kearney Lake Road & Hamshaw Drive		981	1.1	A					3.9	A	
Kearney Lake Road	EBT	470	0.0	A	0.0	A	-	-	0.9	A	1.0
	EBR	9			0.0	A	-	-	0.4	A	
Kearney Lake Road	WBL	31	0.9	A	8.8	A	0.05	1.5	9.4	A	76.9
	WBT	437			0.0	A	-	-	6.5	A	
Hamshaw Drive	NBL	9	15.0	B	15.0	B	0.12	3.0	11.7	B	14.8
	NBR	25							4.9	A	
4: Larry Uteck Boulevard & Kearney Lake Road		2132	17.9	B					13.3	B	
Larry Uteck Boulevard	EBL	7	14.4	B	7.4	A	0.03	2.1	20.8	C	11.5
	EBT	745			19.7	B	0.80	122.8	12.7	B	78.9
	EBR	316			1.9	A	0.34	9.2	3.3	A	0.0
Larry Uteck Boulevard	WBL	52	15.3	B	14.3	B	0.32	11.3	29.9	C	20.7
	WBT	600			15.3	B	0.69	93.2	10.6	B	61.9
	WBR	37							6.6	A	
Kearney Lake Road	NBL	256	34.8	C	39.3	D	0.75	80.9	28.4	C	41.6
	NBT	13			11.3	B	0.12	10.2	24.0	C	57.3
	NBR	37							14.3	B	
Driveway	SBL	55	22.3	C	23.0	C	0.17	17.3	20.7	C	22.3
	SBT	11			19.9	B	0.03	5.9	21.1	C	10.5
	SBR	3							10.4	B	
5: Kearney Lake Road & East Site Access		945	1.1	A					1.5	A	
Kearney Lake Road	EBL	12	0.2	A	8.4	A	0.01	0.0	4.8	A	7.9
	EBT	438			0.0	A	-	-	0.6	A	
Kearney Lake Road	WBT	379	0.0	A	0.0	A	-	-	1.2	A	0.7
	WBR	67			0.0	A	-	-	1.2	A	
East Site Access	SBL	41	19.0	C	19.0	C	0.17	4.6	11.0	B	14.6
	SBR	8							8.3	A	
6: Kearney Lake Road & West Site Access		842	0.3	A					0.8	A	
Kearney Lake Road	EBL	3	0.1	A	8.2	A	0.00	0.0	4.5	A	2.9
	EBT	440			0.0	A	-	-	0.7	A	
Kearney Lake Road	WBT	370	0.0	A	0.0	A	-	-	0.7	A	0.0
	WBR	17			0.0	A	-	-	0.7	A	
West Site Access	SBL	10	16.0	C	16.0	C	0.04	0.8	10.5	B	9.2
	SBR	2							5.9	A	



#### **5.4 Background (2030) Operations: 525 units**

Traffic operations at the study area intersections were evaluated using the future seven-year horizon background traffic volumes. The seven-year horizon analysis assumes that the Highway 102 interchange intersections have been upgraded to roundabouts.

Table 13 and Table 14 summarize the results of the analysis for the AM and PM peak hours. Appendix E contains the supporting detailed Synchro and Arcady reports.

No critical movements are identified. The implementation of roundabouts at the Highway 102 interchange will improve operations to acceptable levels of service with no queuing issues. Average delay per vehicle will decrease significantly at both intersections.

Average delay per vehicle at the intersection of Kearney Lake Road and Highway 102 NB Ramps is expected to decrease by approximately 14 seconds per vehicle during the AM peak hour and approximately 18 seconds per vehicle during the PM peak hour.

Average delay per vehicle at the intersection of Kearney Lake Road and Highway 102 SB Ramps is expected to decrease by approximately 36 seconds per vehicle during the AM peak hour and approximately 31 seconds per vehicle during the PM peak hour.



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Table 13: Background (2030) Operations – AM Peak Hour

Background (2030)			Weekday AM Peak Hour								
		Synchro/Arcady							SimTraffic		
Intersection	Move ment	Volume (vph)	Approach Delay (s/veh)	Approach LOS	Delay (s/veh)	LOS	v/c	95th% Queue (m)	Delay (s/veh)	LOS	95th% Queue (m)
1: Kearney Lake Road & Highway 102 NB Ramps		2045	3.1	A					-	-	
Kearney Lake Road	EBL	54	2.9	A	2.9	A	0.47	11.4	-	-	-
	EBT	938									
Kearney Lake Road	WBT	325	2.9	A	2.9	A	0.44	15.2	-	-	-
	WBR	559									
Highway 102 NB Off-Ramp	NBL	70	4.6	A	4.6	A	0.19	6.1	-	-	-
	NBT	0									
	NBR	99									
2: Kearney Lake Road & Highway 102 SB Ramps		1597	3.5	A					-	-	
Kearney Lake Road	EBT	456	3.3	A	3.3	A	0.39	22.0	-	-	-
	EBR	183									
Kearney Lake Road	WBL	135	2.0	A	2.0	A	0.19	3.8	-	-	-
	WBT	260									
Highway 102 SB Off-Ramp	SBL	536	5.0	A	5.0	A	0.46	17.5	-	-	-
	SBT	4									
	SBR	23									
3: Kearney Lake Road & Hamshaw Drive		930	1.4	A					1.3	A	
Kearney Lake Road	EBT	598	0.0	A	0.0	A	-	-	1.0	A	0.0
	EBR	4			0.0	A	-	-	0.9	A	
Kearney Lake Road	WBL	19	0.8	A	9.1	A	0.04	0.8	4.7	A	14.7
	WBT	264			0.0	A	-	-	0.8	A	
Hamshaw Drive	NBL	4	16.6	C	16.6	C	0.19	5.3	10.2	B	15.6
	NBR	41							5.0	A	
4: Larry Uteck Boulevard & Kearney Lake Road		1887	12.1	B					9.9	A	
Larry Uteck Boulevard	EBL	6	9.3	A	7.2	A	0.02	2.0	21.0	C	8.2
	EBT	628			14.6	B	0.68	93.8	10.7	B	57.4
	EBR	475			2.4	A	0.47	11.6	4.3	A	6.3
Larry Uteck Boulevard	WBL	38	10.8	B	9.1	A	0.15	7.3	20.9	C	17.0
	WBT	442			11.0	B	0.50	59.3	8.2	A	44.8
	WBR	17							5.2	A	
Kearney Lake Road	NBL	199	26.0	C	30.2	C	0.64	48.0	20.9	C	36.4
	NBT	6			8.9	A	0.13	8.4	17.3	B	26.3
	NBR	43							10.2	B	
Driveway	SBL	26	18.9	B	19.7	B	0.09	8.8	15.7	B	14.6
	SBT	4			16.0	B	0.02	3.2	21.2	C	7.7
	SBR	3							6.3	A	
5: Kearney Lake Road & East Site Access		887	1.7	A					1.4	A	
Kearney Lake Road	EBL	5	0.1	A	7.8	A	0.00	0.0	4.8	A	4.5
	EBT	535			0.0	A	-	-	0.6	A	
Kearney Lake Road	WBT	245	0.0	A	0.0	A	-	-	0.3	A	0.0
	WBR	23			0.0	A	-	-	0.3	A	
East Site Access	SBL	67	18.5	C	18.5	C	0.25	6.8	10.8	B	15.6
	SBR	12							7.4	A	
6: Kearney Lake Road & West Site Access		801	0.4	A					0.9	A	
Kearney Lake Road	EBL	1	0.0	A	7.8	A	0.00	0.0	3.9	A	0.9
	EBT	523			0.0	A	-	-	0.8	A	
Kearney Lake Road	WBT	251	0.0	A	0.0	A	-	-	0.3	A	0.0
	WBR	6			0.0	A	-	-	0.4	A	
West Site Access	SBL	17	15.5	C	15.5	C	0.06	1.6	9.5	A	11.0
	SBR	3							6.6	A	



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Table 14: Background (2030) Operations – PM Peak Hour

Background (2030)		Weekday PM Peak Hour									
		Synchro/Arcady							SimTraffic		
Intersection	Move ment	Volume (vph)	Approach Delay (s/veh)	Approach LOS	Delay (s/veh)	LOS	v/c	95th% Queue (m)	Delay (s/veh)	LOS	95th% Queue (m)
1: Kearney Lake Road & Highway 102 NB Ramps		2445	3.9	A					-	-	
Kearney Lake Road	EBL	60	2.6	A	2.6	A	0.40	20.5	-	-	-
	EBT	795									
Kearney Lake Road	WBT	393	4.4	A	4.4	A	0.62	21.3	-	-	-
	WBR	838									
Highway 102 NB Off-Ramp	NBL	162	5.2	A	5.2	A	0.36	20.5	-	-	-
	NBT	0									
	NBR	197									
2: Kearney Lake Road & Highway 102 SB Ramps		1668	3.6	A					-	-	
Kearney Lake Road	EBT	338	2.8	A	2.8	A	0.31	13.7	-	-	-
	EBR	184									
Kearney Lake Road	WBL	134	2.1	A	2.1	A	0.26	10.6	-	-	-
	WBT	421									
Highway 102 SB Off-Ramp	SBL	517	5.8	A	5.8	A	0.51	13.7	-	-	-
	SBT	3									
	SBR	71									
3: Kearney Lake Road & Hamshaw Drive		1032	1.1	A					1.3	A	
Kearney Lake Road	EBT	496	0.0	A	0.0	A	-	-	0.8	A	0.0
	EBR	9			0.0	A	-	-	0.5	A	
Kearney Lake Road	WBL	33	0.9	A	8.9	A	0.06	1.5	5.0	A	21.9
	WBT	458			0.0	A	-	-	1.3	A	
Hamshaw Drive	NBL	9	15.6	C	15.6	C	0.13	3.8	10.5	B	14.0
	NBR	27							4.7	A	
4: Larry Uteck Boulevard & Kearney Lake Road		2260	19.5	B					15.0	B	
Larry Uteck Boulevard	EBL	7	15.8	B	7.4	A	0.03	2.2	31.1	C	11.3
	EBT	791			21.8	C	0.84	137.5	14.5	B	95.8
	EBR	335			1.9	A	0.35	9.4	3.6	A	0.0
Larry Uteck Boulevard	WBL	54	16.4	B	18.0	B	0.39	13.5	34.4	C	21.7
	WBT	636			16.2	B	0.72	102.9	12.1	B	74.3
	WBR	40							7.8	A	
Kearney Lake Road	NBL	272	38.8	D	44.1	D	0.80	88.2	31.7	C	42.1
	NBT	14			11.6	B	0.12	10.5	23.2	C	65.2
	NBR	39							18.0	B	
Driveway	SBL	58	23.5	C	24.2	C	0.18	17.9	22.7	C	22.8
	SBT	11			20.8	C	0.03	5.9	18.8	B	10.4
	SBR	3							10.3	B	
5: Kearney Lake Road & East Site Access		992	1.1	A					1.3	A	
Kearney Lake Road	EBL	12	0.2	A	8.4	A	0.01	0.0	3.6	A	9.9
	EBT	464			0.0	A	-	-	0.6	A	
Kearney Lake Road	WBT	400	0.0	A	0.0	A	-	-	1.2	A	0.0
	WBR	67			0.0	A	-	-	0.6	A	
East Site Access	SBL	41	20.2	C	20.2	C	0.18	5.3	10.1	B	14.1
	SBR	8							4.2	A	
6: Kearney Lake Road & West Site Access		889	0.3	A					0.8	A	
Kearney Lake Road	EBL	3	0.1	A	8.2	A	0.00	0.0	3.1	A	4.4
	EBT	466			0.0	A	-	-	0.8	A	
Kearney Lake Road	WBT	391	0.0	A	0.0	A	-	-	0.6	A	0.0
	WBR	17			0.0	A	-	-	0.4	A	
West Site Access	SBL	10	16.8	C	16.8	C	0.04	0.8	9.0	A	8.6
	SBR	2							3.6	A	





### **5.5 Total Phase 2 (2030) Operations: 667 units**

Traffic operations at the study area intersections were evaluated using the future total Phase 1 and 2 traffic volumes. The seven-year horizon analysis assumes that the Highway 102 interchange intersections have been upgraded to roundabouts.

Table 15 and Table 16 summarize the results of the analysis for the AM and PM peak hours. Appendix F contains the supporting detailed Synchro and Arcady reports.

All study intersections are expected to continue to operate at acceptable levels of service with no queuing issues. The site-generated traffic from Phase 2 of the development is not expected to have a significant impact on traffic operations at the study intersections. Average delay per vehicle at the study intersections is not expected to increase more than 0.5 seconds per vehicle during both peak hours. Both site accesses are expected to operate at acceptable levels of service with minimal queuing.



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Table 15: Total Phase 1 & 2 (2030) Operations – AM Peak Hour

Total Phase 1 & 2 (2030)		Weekday AM Peak Hour									
		Synchro/Arcady							SimTraffic		
Intersection	Move ment	Volume (vph)	Approach Delay (s/veh)	Approach LOS	Delay (s/veh)	LOS	v/c	95th% Queue (m)	Delay (s/veh)	LOS	95th% Queue (m)
1: Kearney Lake Road & Highway 102 NB Ramps		2068	3.1	A					-	-	
Kearney Lake Road	EBL	69	3.0	A	3.0	A	0.48	11.4	-	-	-
	EBT	940									
Kearney Lake Road	WBT	326	3.0	A	3.0	A	0.45	15.2	-	-	-
	WBR	559									
Highway 102 NB Off-Ramp	NBL	75	4.8	A	4.8	A	0.20	7.6	-	-	-
	NBT	0									
	NBR	99									
2: Kearney Lake Road & Highway 102 SB Ramps		1640	3.6	A					-	-	
Kearney Lake Road	EBT	473	3.4	A	3.4	A	0.41	22.0	-	-	-
	EBR	199									
Kearney Lake Road	WBL	135	2.0	A	2.0	A	0.19	3.8	-	-	-
	WBT	266									
Highway 102 SB Off-Ramp	SBL	536	5.0	A	5.0	A	0.46	16.7	-	-	-
	SBT	4									
	SBR	27									
3: Kearney Lake Road & Hamshaw Drive		973	1.4	A					1.4	A	
Kearney Lake Road	EBT	631	0.0	A	0.0	A	-	-	1.1	A	1.7
	EBR	4			0.0	A	-	-	1.1	A	
Kearney Lake Road	WBL	19	0.8	A	9.2	A	0.04	0.8	5.5	A	16.8
	WBT	274			0.0	A	-	-	0.9	A	
Hamshaw Drive	NBL	4	17.4	C	17.4	C	0.20	5.3	12.8	B	17.0
	NBR	41							5.4	A	
4: Larry Uteck Boulevard & Kearney Lake Road		1895	12.2	B					9.7	A	
Larry Uteck Boulevard	EBL	6	9.4	A	7.3	A	0.02	2.0	14.8	B	5.7
	EBT	628			14.8	B	0.69	93.8	10.5	B	57.3
	EBR	476			2.5	A	0.47	11.6	4.2	A	3.9
Larry Uteck Boulevard	WBL	39	10.9	B	9.3	A	0.15	7.4	20.7	C	16.3
	WBT	442			11.1	B	0.50	59.3	8.5	A	44.3
	WBR	17							5.0	A	
Kearney Lake Road	NBL	202	25.9	C	30.3	C	0.64	48.8	19.9	B	35.7
	NBT	6			8.8	A	0.13	8.7	15.5	B	26.9
	NBR	46							10.5	B	
Driveway	SBL	26	18.9	B	19.6	B	0.09	8.8	16.8	B	15.3
	SBT	4			16.0	B	0.02	3.2	18.4	B	7.2
	SBR	3							4.9	A	
5: Kearney Lake Road & East Site Access		933	2.0	A					1.7	A	
Kearney Lake Road	EBL	6	0.1	A	7.9	A	0.01	0.0	4.3	A	4.4
	EBT	558			0.0	A	-	-	0.8	A	
Kearney Lake Road	WBT	252	0.0	A	0.0	A	-	-	0.4	A	0.0
	WBR	26			0.0	A	-	-	0.3	A	
East Site Access	SBL	77	20.3	C	20.3	C	0.30	9.1	11.6	B	18.0
	SBR	14							8.4	A	
6: Kearney Lake Road & West Site Access		839	0.9	A					1.2	A	
Kearney Lake Road	EBL	2	0.0	A	7.8	A	0.00	0.0	7.5	A	3.2
	EBT	524			0.0	A	-	-	0.8	A	
Kearney Lake Road	WBT	253	0.0	A	0.0	A	-	-	0.4	A	0.0
	WBR	13			0.0	A	-	-	0.3	A	
West Site Access	SBL	40	16.8	C	16.8	C	0.14	4.0	10.8	B	15.2
	SBR	7							7.2	A	



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Table 16: Total Phase 1 & 2 (2030) Operations – PM Peak Hour

Total Phase 1 & 2 (2030)		Weekday PM Peak Hour									
		Synchro/Arcady							SimTraffic		
Intersection	Move ment	Volume (vph)	Approach Delay (s/veh)	Approach LOS	Delay (s/veh)	LOS	v/c	95th% Queue (m)	Delay (s/veh)	LOS	95th% Queue (m)
1: Kearney Lake Road & Highway 102 NB Ramps		2469	4.0	A					-	-	
Kearney Lake Road	EBL	68	2.6	A	2.6	A	0.41	19.8	-	-	-
	EBT	796									
Kearney Lake Road	WBT	395	4.5	A	4.5	A	0.63	22.0	-	-	-
	WBR	838									
Highway 102 NB Off-Ramp	NBL	175	5.3	A	5.3	A	0.38	22.0	-	-	-
	NBT	0									
	NBR	197									
2: Kearney Lake Road & Highway 102 SB Ramps		1713	3.7	A					-	-	
Kearney Lake Road	EBT	347	2.9	A	2.9	A	0.32	15.2	-	-	-
	EBR	192									
Kearney Lake Road	WBL	134	2.1	A	2.1	A	0.27	11.4	-	-	-
	WBT	436									
Highway 102 SB Off-Ramp	SBL	517	6.0	A	6.0	A	0.53	12.9	-	-	-
	SBT	3									
	SBR	84									
3: Kearney Lake Road & Hamshaw Drive		1077	1.1	A					1.3	A	
Kearney Lake Road	EBT	513	0.0	A	0.0	A	-	-	0.8	A	0.0
	EBR	9			0.0	A	-	-	0.6	A	
Kearney Lake Road	WBL	33	0.9	A	9.0	A	0.06	1.5	5.0	A	18.8
	WBT	486			0.0	A	-	-	1.2	A	
Hamshaw Drive	NBL	9	16.2	C	16.2	C	0.14	3.8	12.3	B	14.8
	NBR	27							4.6	A	
4: Larry Uteck Boulevard & Kearney Lake Road		2270	19.6	B					14.3	B	
Larry Uteck Boulevard	EBL	7	15.8	B	7.4	A	0.03	2.2	28.0	C	13.4
	EBT	791			21.9	C	0.84	137.5	13.6	B	86.1
	EBR	338			1.9	A	0.35	9.5	3.6	A	6.0
Larry Uteck Boulevard	WBL	57	16.5	B	19.3	B	0.42	14.5	36.4	D	23.8
	WBT	636			16.3	B	0.72	102.9	10.9	B	67.0
	WBR	40							6.9	A	
Kearney Lake Road	NBL	274	38.8	D	44.4	D	0.80	88.9	30.5	C	41.7
	NBT	14			11.3	B	0.13	10.7	26.4	C	63.2
	NBR	41							17.2	B	
Driveway	SBL	58	23.5	C	24.2	C	0.18	17.8	23.6	C	23.5
	SBT	11			20.8	C	0.03	5.9	19.3	B	10.9
	SBR	3							6.4	A	
5: Kearney Lake Road & East Site Access		1040	1.2	A					1.4	A	
Kearney Lake Road	EBL	14	0.2	A	8.6	A	0.02	0.0	3.6	A	10.2
	EBT	476			0.0	A	-	-	0.7	A	
Kearney Lake Road	WBT	420	0.0	A	0.0	A	-	-	1.2	A	0.7
	WBR	75			0.0	A	-	-	0.7	A	
East Site Access	SBL	46	21.8	C	21.8	C	0.22	6.1	10.7	B	15.6
	SBR	9							4.9	A	
6: Kearney Lake Road & West Site Access		931	0.6	A					1.0	A	
Kearney Lake Road	EBL	7	0.1	A	8.3	A	0.01	0.0	3.5	A	5.5
	EBT	468			0.0	A	-	-	0.8	A	
Kearney Lake Road	WBT	392	0.0	A	0.0	A	-	-	0.8	A	0.0
	WBR	37			0.0	A	-	-	0.4	A	
West Site Access	SBL	22	17.9	C	17.9	C	0.10	2.4	8.8	A	11.3
	SBR	5							3.5	A	



## 6 Access Review

### 6.1 Sight Distance

The proposed development includes two vehicle access points on Kearney Lake Road. A sight distance review was completed at the proposed access locations to confirm that the sight lines meet the minimum stopping and turning sight distance requirements of the *Municipal Design Guidelines (2021)*<sup>5</sup>. The guidelines specify that for major collector roadways the sight distance requirements are defined by the Transportation Association of Canada's (TAC) *Geometric Design Guide for Canadian Roads*<sup>6</sup>.

The posted speed limit changes between 50 and 60 km/h on Kearney Lake Road along the frontage of the site. It is expected that the 50 km/h speed limit will be extended along the frontage of the site to improve safety and encourage increased pedestrian activity.

A design speed of 60 km/h (posted speed + 10 km/h) was used for the sight distance review. The minimum stopping and turning sight distance requirements for a two-lane roadway with a design speed of 60 km/h are:

- ▶ Minimum stopping sight distance = 85 metres;
- ▶ Minimum turning sight distance – left-turn from stop = 130 metres; and
- ▶ Minimum turning sight distance – right-turn from stop = 110 metres.

Figure 5 illustrates the sight lines for the east access and Figure 6 illustrates the sight lines required at the west access. Both site access points will meet sight distance requirements. The departure sight triangles will need to be cleared of obstructions such as trees and vegetation.

The bus bay located east of the east site access is just outside of the sight triangle and should have minimal impact on sight distance. However, should this bus stop not include a bus bay and buses at the bus stop would intermittently obstruct sight lines from the access. This could pose a safety risk if vehicles illegally pass the stopped bus on Kearney Lake Road.

Figure 7 illustrates the stopping sight distance for the bus bay. The bus bay location will meet the minimum stopping sight distance requirement on Kearney Lake Road.

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<sup>5</sup> Halifax Regional Municipality. *Municipal Design Guidelines*, 2021.

<sup>6</sup> Transportation Association of Canada. *Geometric Design Guide for Canadian Roads*, June 2017.



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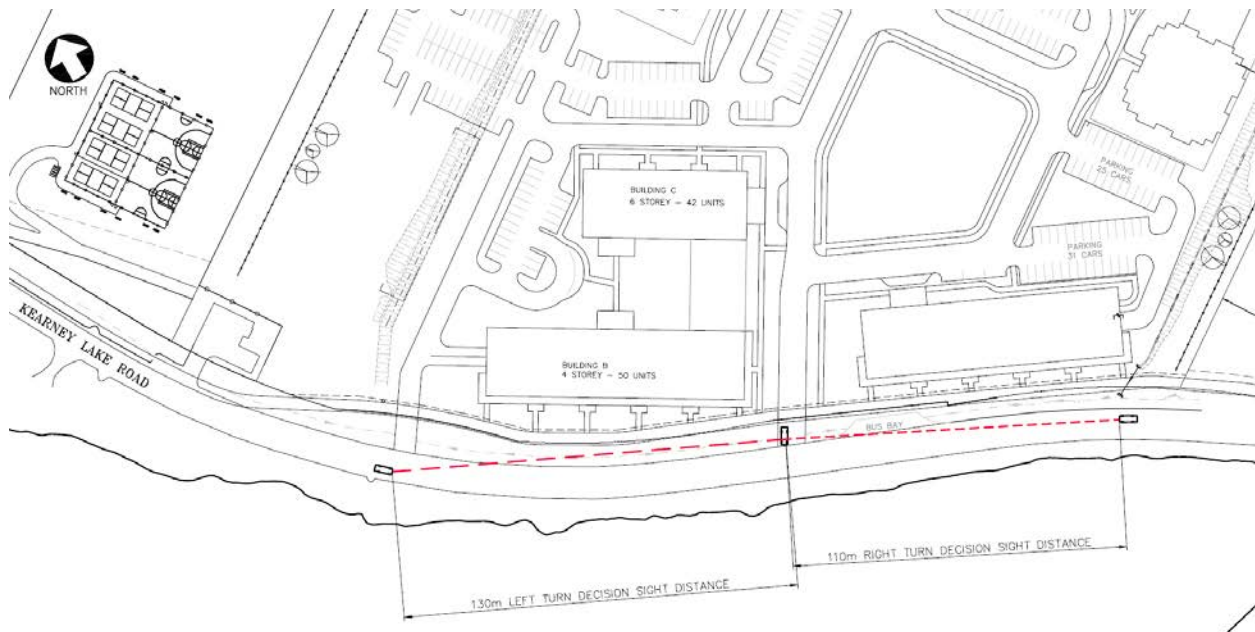


Figure 5: Sight Distance Requirements at East Access

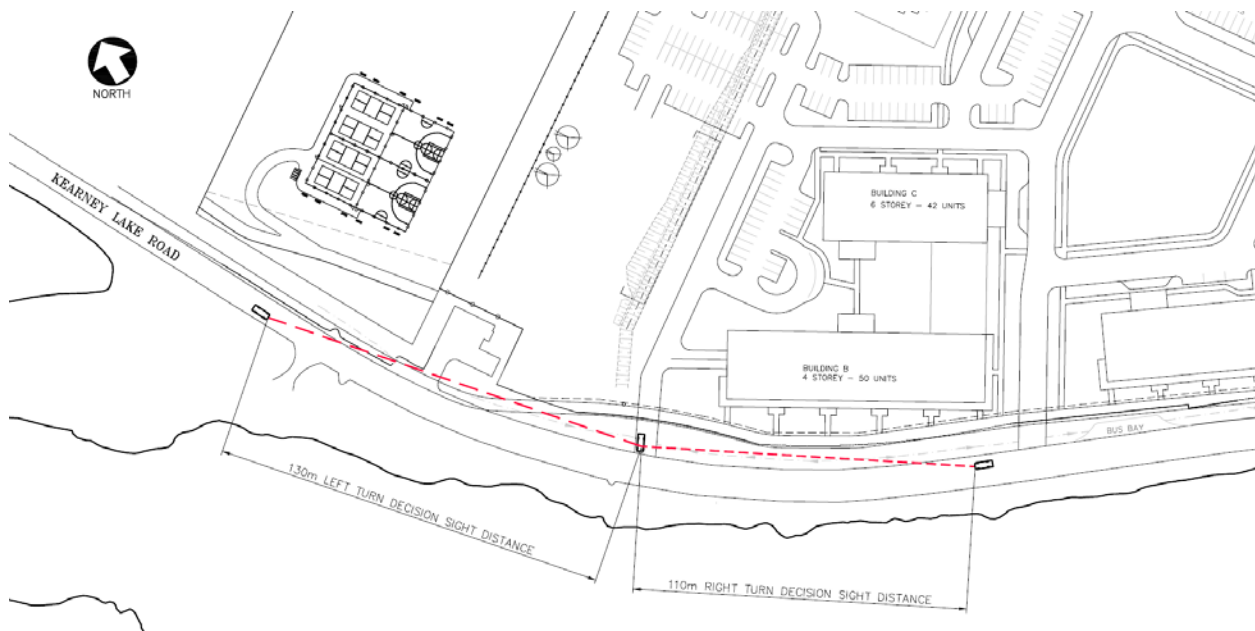


Figure 6: Sight Distance Requirements at West Access

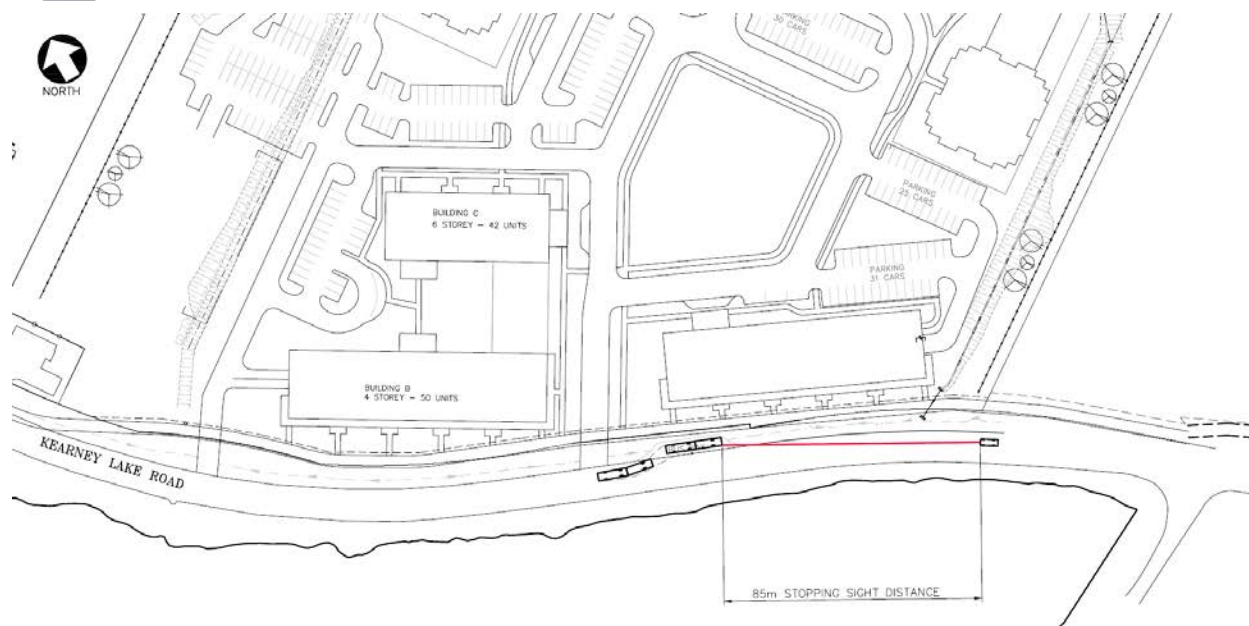


Figure 7: Stopping Sight Distance Requirement to Bus Stop

## 6.2 Left Turn Lane Warrants

The TAC *Geometric Design Guide for Canadian Roads* states that turn lanes should be considered when the number of left turning vehicles is such that it creates a hazard and reduces capacity. The requirement for a left turn lane should be based on volume and collision warrants. However, there is no further guidance in the *Geometric Design Guide for Canadian Roads* with respect to warrant parameters.

The Ministry of Transportation of Ontario (MTO) *Supplement for the TAC Geometric Design Guide for Canadian Roads*<sup>7</sup> provides guidance on the assessment of the need for left turn lanes at unsignalized intersections. The methodology uses a series of nomographs to identify if a left turn lane is warranted based on factors such as design speed, advancing volumes, left turn volume as a percentage of advancing volumes and opposing volumes. For two lane roadways, the warrant nomographs have been developed for left turning volumes as a percentage of advancing volumes, between 5% and 40% (in 5% increments) and for design speeds between 50 km/h and 110 km/h (in 10 km/h increments).

<sup>7</sup> Ministry of Transportation of Ontario. *Design Supplement for TAC Geometric Design Guide for Canadian Roads*, Appendix 9 for Chapter 9 Intersections, June 2017.





The left turn lane warrant analysis was completed for both site access points on Kearney Lake Road using the total 2030 traffic volumes. A design speed of 60 km/h was used for the left turn lane warrant analysis. The percentage of left turning traffic volume is well below 5% of the approaching volume during both the morning and afternoon peak hour at both access points. Figure 8 and Figure 9 illustrate the left turn lane warrant analysis for the east and west site accesses based on the closest applicable nomograph for 5% left turn in advancing volumes and a design speed of 60 km/h.

Based on the 5% left turn nomograph, the PM peak hour volumes at the east access would only just reach the threshold for an eastbound left turn lane to be warranted on Kearney Lake Road. Left turn volumes at this access represent approximately 1% of advancing volumes during the AM peak hour and 2.9% of advancing volumes during the PM peak hour. An eastbound left turn lane would not be warranted on Kearney Lake Road at the west access point based on AM and PM peak hour volumes.

While the MTO left turn lane warrant indicates that a left turn lane could be warranted at the east site access points based on the approaching and opposing volumes on Kearney Lake Road, the warrant for the lowest percentage of left turns (5% of advancing traffic) considers significantly higher left turn volumes than are expected to materialize at the access points. It is not common practice to install a left turn lane to accommodate low volumes of left turning traffic that are not expected to result in significant congestion or safety concerns. While it is not expressly addressed in the MTO warrant methodology, it could be argued that left turn volumes less than 5 percent of approaching volumes do not necessarily warrant further consideration as they would not be expected to result in significant congestion or safety concerns.

The traffic operations analysis which did not include left turn lanes at the site access points confirms that left turning traffic is not expected to create congestion. Safety concerns are not expected as there is sufficient stopping sight distance at both access points.

### **6.3 Traffic Signal Warrants**

The Transportation Association of Canada (TAC) Traffic Signal and Pedestrian Head Warrant Handbook<sup>8</sup> provides guidance on the assessment of the need for traffic control signals at intersections. The procedure uses a “cumulative factors methodology” to identify if traffic control signals are warranted based on factors such as geometry, operating parameters, local demographics and pedestrian and vehicular volumes and conflicts.

The signal warrant methodology assumes that there must be a certain volume of traffic on the minor street to even consider the installation of traffic signals. The minimum threshold for minor street volumes is 75 vehicles per hour (average hourly flow over the six peak hours – morning, mid-day and afternoon). Based on the AM and PM peak hour estimates the site access points are not expected to reach the minimum volume threshold to consider traffic signals.

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<sup>8</sup> Transportation Association of Canada. *Traffic Signal and Pedestrian Head Warrant Handbook*, June 2014.



## Portions of Bedford West Sub-Area 10 Traffic Impact Study

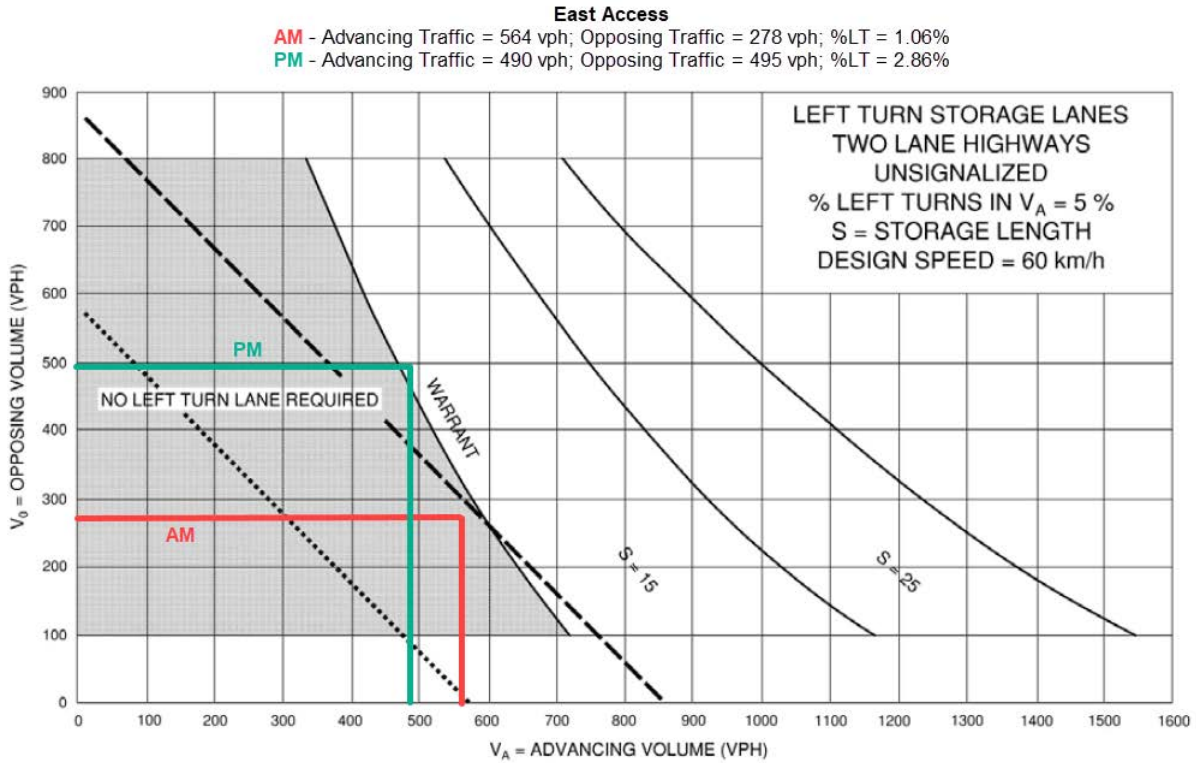


Figure 8: Left Turn Lane Warrant for East Access

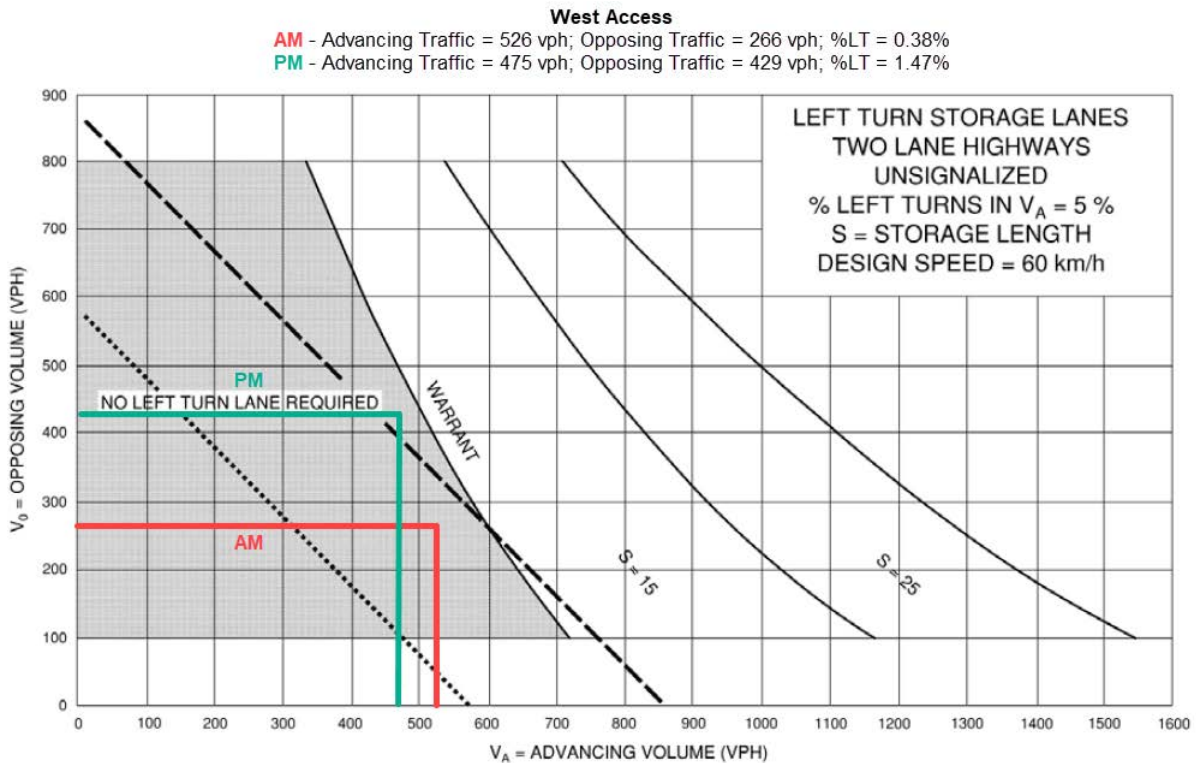


Figure 9: Left Turn Lane Warrant for West Access



## 7 Active Transportation

### 7.1 Active Transportation Greenway

The Bedford West Sub-Area 10 development will include a 4.0-metre-wide multi-use pathway (MUP) along Kearney Lake Road. The MUP will be constructed on the north-east side of Kearney Lake Road providing a connection to Hogan Court to the north-west, and to the Highway 102 interchange to the south-east. The MUP will be extended through the Highway 102 interchange as part of the proposed upgrades. The subject site will include pedestrian connections to the MUP.

### 7.2 Pedestrian Crossing Control

HRM has identified that a crosswalk on Kearney Lake Road is warranted as a result of this development. The location of the crosswalk should consider access to the bus stops on Kearney Lake Road, and access to the future parking area on Kearney Lake Road located across from Hamshaw Drive to provide parking for users of Kearney Lake Beach.

The *TAC Pedestrian Crossing Control Guide*<sup>9</sup> provides guidance on the assessment of the need for pedestrian crossing control. The guide includes a treatment selection matrix which indicates what type of treatment should be implemented at a crosswalk based on average daily traffic (ADT), speed limit and roadway cross section. The guide was used to determine the type of crossing control that will be required at the crosswalk on Kearney Lake Road near the proposed development.

Speed and volume data collected November 4<sup>th</sup> through November 11<sup>th</sup>, 2021 on Kearney Lake Road east of Hamshaw Drive recorded an ADT of 8,278 vehicles per day and an 85<sup>th</sup> percentile speed of 71 km/h (posted speed limit of 50 km/h).

On roadways with a two-lane cross section, speed limit of 50 km/h and traffic volumes between 4,500 to 9,000 vehicles per day, the recommended control treatment is a ground-mounted system (crosswalk with side-mounted signs). However for a roadway with a posted speed limit of 60 km/h, the recommended control treatment is a rectangular rapid flashing beacon (RRFB) system.

The construction of multiple residential buildings, a multi-use pathway, upgrades to bus stops and the provision of a crosswalk near the development site will transform the character of the roadway and could contribute to reducing vehicle speeds in the area. Consideration should be given to incorporating traffic calming measures at pedestrian crossings and/or providing a higher control treatment if operating speeds continue to exceed the posted speed limit.

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<sup>9</sup> Transportation Association of Canada. *Pedestrian Crossing Control Guide*, third edition, June 2018.



## 8 Transit

### 8.1.1 Bus Stop Locations

There are two bus stops located along the frontage of the subject site: westbound Bus Stop 7021 (Kearney Lake Road after Hamshaw Drive) and eastbound Bus Stop 7030 (Kearney Lake Road before Hamshaw Drive).

The location of the east site access will impact Bus Stop 7021 and require its relocation. Halifax Transit has indicated that both Bus Stop 7021 and Bus Stop 7030 should be relocated to the north-west to better capture residents from this development. Bus pads will be required at the bus stops. The locations of the bus stop will need to meet the minimum stopping sight distance requirements for a two-lane roadway with a posted speed of 60 km/h of 85 metres.

The development will be connected to the bus stops through a direct connection from the MUP to Bus Stop 7021 and through a crosswalk either at Hamshaw Drive or near the relocated stops to connect to Bus Stop 7030.

### 8.1.2 Bus Rapid Transit

HRM's *Rapid Transit Strategy*<sup>10</sup> calls for a network of bus rapid transit (BRT) and ferry routes to serve major travel routes across the region as well as the creation of supportive land uses along those routes (transit-oriented development). The planned BRT Purple Line travels on Kearney Lake Road with a stop at Kearney Lake Road and Parkland Drive. The Purple line will extend to Larry Uteck Boulevard, either via Highway 102 or Kearney Lake Road. Figure 10 illustrates the planned Purple line.

The two bus stops located along the frontage of the subject site: Bus Stop 7021 and Bus Stop 7030 could become part of the Purple line if it is extended to Larry Uteck Boulevard via Kearney Lake Road. These bus stops would need to be upgraded to BRT stations. Figure 11 illustrates an example of a standard BRT station.

Halifax Transit has requested that the site plan should include space reserved for a potential station at Bus Stop 7021 located along the site's property boundary. The space would include area large enough to accommodate an 18.5 metre long bus to a depth of at least 5 metres and is exclusive of any space required for sidewalks, pathways, and other infrastructure.

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<sup>10</sup> Halifax Regional Municipality. *Rapid Transit Strategy*, May 2020.



## Portions of Bedford West Sub-Area 10 Traffic Impact Study

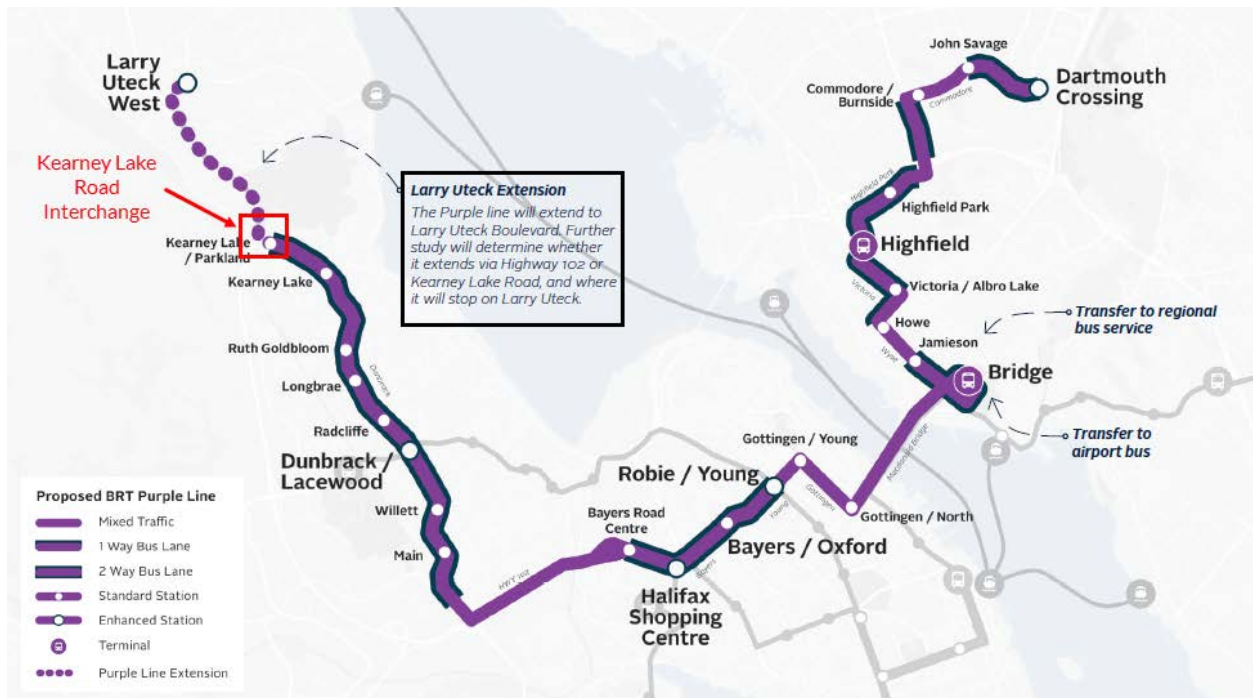


Figure 10: Proposed Extension of the BRT Purple Line

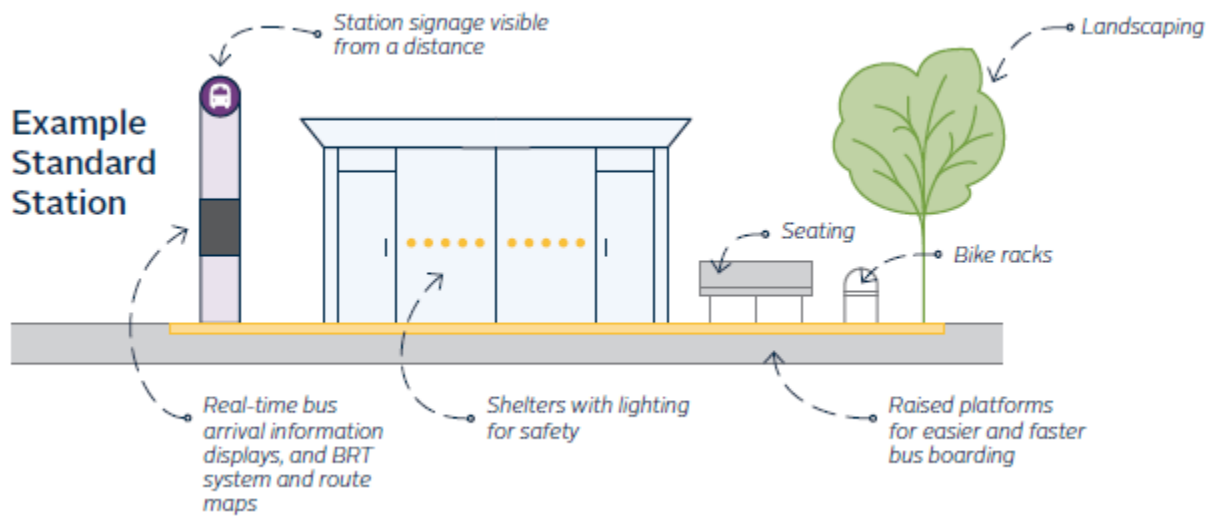


Figure 11: BRT Standard Station Design Example





## 9 Conclusions and Recommendations

### 9.1 Conclusions

Harbourside Transportation Consultants has completed this traffic impact study in support of the development application (Case 24602) by Clayton Developments Limited for a residential development on a portion of the lands within the area known as Bedford West Sub-Area 10 in Bedford, Nova Scotia.

The Bedford West Sub-Area 10 area is located on Kearney Lake Road immediately west of the Highway 102 and Kearney Lake Road interchange. The *Bedford West Sub-Area 10 Traffic Impact Study*<sup>11</sup> was previously completed to quantify the transportation impacts of the Sub-Area 10 development. The study concluded that improvements are required at the Highway 102 and Kearney Lake Road interchange to accommodate background traffic growth and the full build out of the Bedford West Sub Area 10 development. The study recommended that the two signalized intersections be converted to roundabouts to accommodate long-term growth at the interchange.

Design work is underway for the upgrades to the Kearney Lake Road interchange including the realignment of a portion of Highway 102 north of interchange, replacement of the bridge structure, roundabouts ramp terminals and an active transportation connection through the interchange. Construction is planned to begin after 2025.

This traffic impact study reflects the development application for the portions of Bedford West Sub-Area 10 located on PIDs 00289223 and 00289207. The proposed development will consist of a mix of mid-rise and high-rise residential building and contain a total of 667 residential units. On a typical weekday, the completely developed site is forecast to generate of 185 vehicle trips in the AM peak hour (47 trips entering and 138 trips exiting) and 215 vehicle trips in the PM peak hour (133 trips entering and 82 trips exiting).

The development will be built out in two phases:

- ▶ Phase 1 (2023-2025): 525 units; and
- ▶ Phase 2 (2026-2030): 142 units.

The first phase will be constructed prior to upgrades to the Kearney Lake Road interchange and the second phase will be constructed as the interchange upgrades take place.

While NSPW has previously indicated that a maximum of 400 units can be constructed before upgrades to the Kearney Lake Road interchange, NSPW has the ability to exceed this number at their discretion. The proposed phasing plan with 525 units in Phase 1 would allow the construction of the four high-rise buildings first which would result in significant efficiencies during construction. Limiting Phase 1 to 400 units would result in the construction of two high-rise buildings and the

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<sup>11</sup> Harbourside Transportation Consultants. *Bedford West Sub-Area 10 Traffic Impact Study*, November 2019.



three mid-rise buildings first. The 400 units would include 250 high-rise units and 142 mid-rise units. While the proposed phasing increases the number of units in Phase 1, all units are high-rise units. Trip generation data has shown that high-rise units generate fewer peak hour trips than mid-rise units.

The trip generation estimates indicate that the 525 high-rise units generate an additional 5 vehicle trips in the AM peak hour (3 trips entering and 2 trips exiting) and 14 vehicle trips in the PM peak hour (9 trips entering and 5 trips exiting) when compared to 400 units with a mixture of mid-rise and high-rise units. The increase of less than 15 vehicles during peak hours associated with the additional 125 units is insignificant and expected to have a negligible impact on overall traffic volumes and operations.

The following can be concluded based on the investigations carried out:

- ▶ **Base Year (2023) Operations:** There are capacity and queuing issues at the Highway 102 interchange.
- ▶ **Background (2025) Operations:** Changes to the signal timings will mitigate existing capacity issues the Highway 102 interchange.
- ▶ **Total Phase 1 (2025) Operations:** Existing and background issues are expected to continue to deteriorate with the additional traffic generated by Phase 1 of the development. The development is not expected to trigger any new capacity issues at Kearney Lake Road and Highway 102 interchange. Both site accesses are expected to operate at acceptable levels of service with minimal queuing.
- ▶ **Background (2030) Operations:** With the implementation of roundabouts at the Highway 102 interchange all intersections will operate at acceptable levels of service. Average delay per vehicle will decrease significantly at both intersections.
- ▶ **Total Phase 2 (2030) Operations:** The site-generated traffic from Phase 2 of the development is not expected to have a significant impact on traffic operations at the study intersections. Average delay per vehicle at the study intersections is not expected to change more than 0.5 seconds per vehicle during both peak hours. Both site accesses are expected to operate at acceptable levels of service with minimal queuing.
- ▶ **Sight Distance Review:** Both site access points will meet sight distance requirements. The departure sight triangles will need to be cleared of obstructions such as trees and vegetation.
- ▶ **Left Turn Lane Warrants:** While the MTO left turn lane warrant indicates that a left turn lane could be warranted at the east access point based on the PM peak hour approaching and opposing volumes on Kearney Lake Road, the warrant for the lowest percentage of left turns (5% of advancing traffic) considers significantly higher left turn volumes than are expected to materialize at the access point. It is not common practice to install a left turn lane to accommodate low volumes of left turning traffic that are not expected to result in significant congestion or safety concerns.



The traffic operations analysis confirms that left turning traffic is not expected to create congestion. Safety concerns are not expected as there is sufficient stopping sight distance at both access points.

- ▶ **Traffic Signal Warrants:** The site access points are not expected to reach the minimum threshold for minor street volumes required to consider the installation of traffic signals.
- ▶ **Active Transportation:** A 4.0-metre-wide multi-use pathway (MUP) will be constructed along Kearney Lake Road. A crosswalk on Kearney Lake Road will be required as a result of this development. The recommended crossing control treatment based on ADT volumes and the speed limit of 50 km/h is a ground mounted system (crosswalk with side-mounted signs).

However, speed data indicates that the operating speed on Kearney Lake Road is approximately 70 km/h. The recommended control treatment for a speed limit of 60 km/h is a rectangular rapid flashing beacon (RRFB) system. Development and the construction of the MUP in the area will transform the character of the roadway and could contribute to reducing vehicle speeds in the area. Consideration should be given to incorporating traffic calming measures near the pedestrian crossing and/or providing a higher control treatment such as an RRFB at the crossing if operating speeds continue to exceed the posted speed limit.

The location of the crosswalk should consider access to the bus stops on Kearney Lake Road, and access to the future parking area on Kearney Lake Road located across from Hamshaw Drive to provide parking for users of Kearney Lake Beach.

- ▶ **Transit:** The location of the east site access will impact Bus Stop 7021 and require its relocation. Halifax Transit has indicated that both Bus Stop 7021 and Bus Stop 7030 should be relocated to the north-west to better capture residents from this development. Bus pads will be required at the bus stops. The development will be connected to the bus stops through a direct connection from the MUP to Bus Stop 7021 and through a crosswalk either at Hamshaw Drive or near the relocated stops to connect to Bus Stop 7030. The two bus stops located along the frontage of the subject site could become part of the future Bus Rapid Transit (BRT) Purple Line and need to be upgraded to BRT stations. Halifax Transit has requested that the site plan should include space reserved for a potential station at Bus Stop 7021 located along the site's property boundary.



## 9.2 Recommendations

Based on the findings of the study, the following mitigation measures are recommended:

- ▶ The road authorities monitor the traffic volumes at the Highway 102 interchange and optimize the signal timings accordingly until the interchange is upgraded.
- ▶ A crosswalk with RRFB crossing control should be installed on Kearney Lake Road near the relocated bus stops or Hamshaw Drive.
- ▶ Bus Stop 7021 and Bus Stop 7030 should be relocated to the north-west to better capture residents from this development. The relocated bus stops should be upgraded to include bus pads.
- ▶ The site plan should include space reserved for a potential station at Bus Stop 7021 located along the site's property boundary.



## **Appendix A: Traffic Volume Diagrams**

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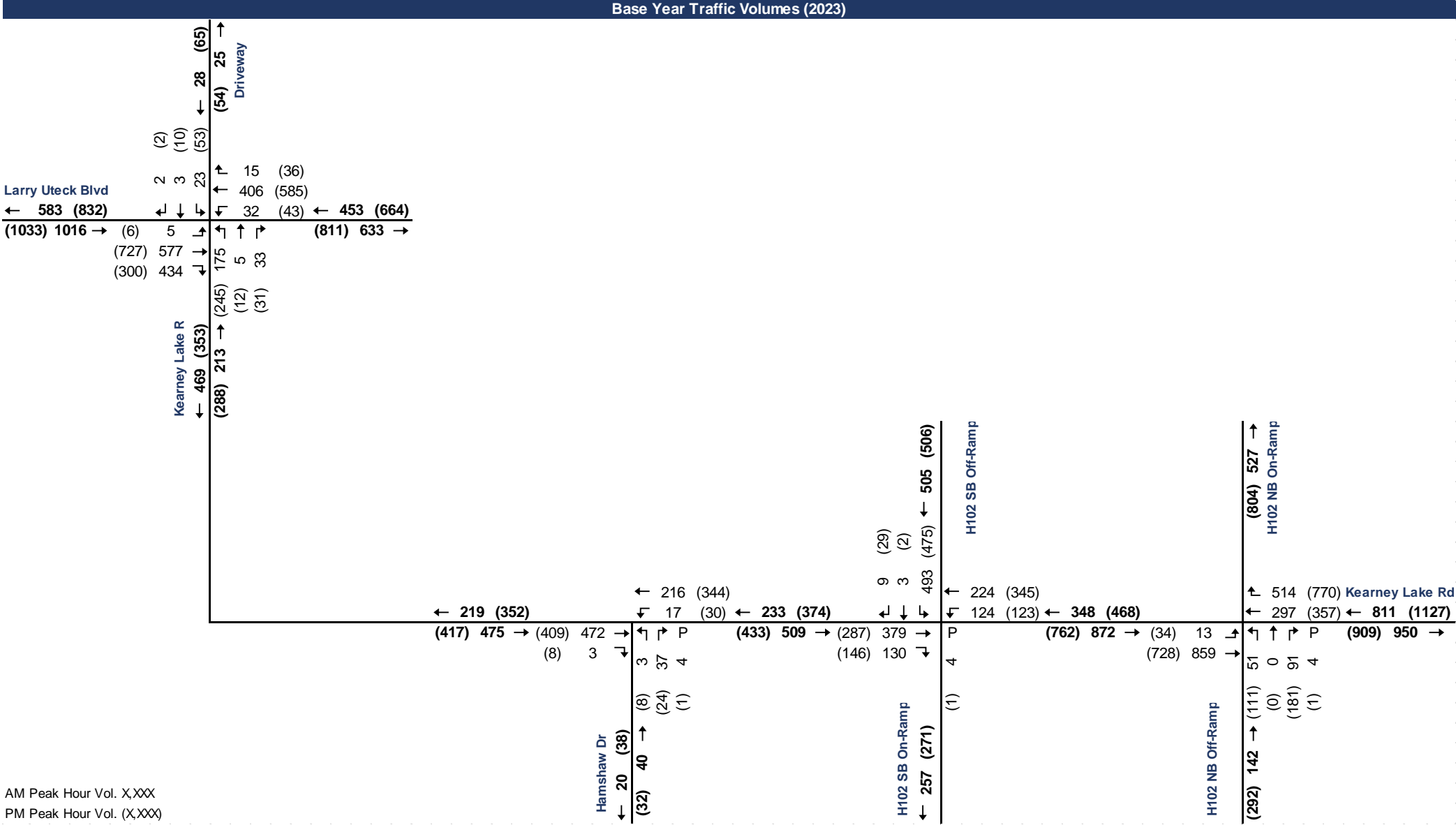


Figure A - 1: Base Year (2023) Traffic Volumes



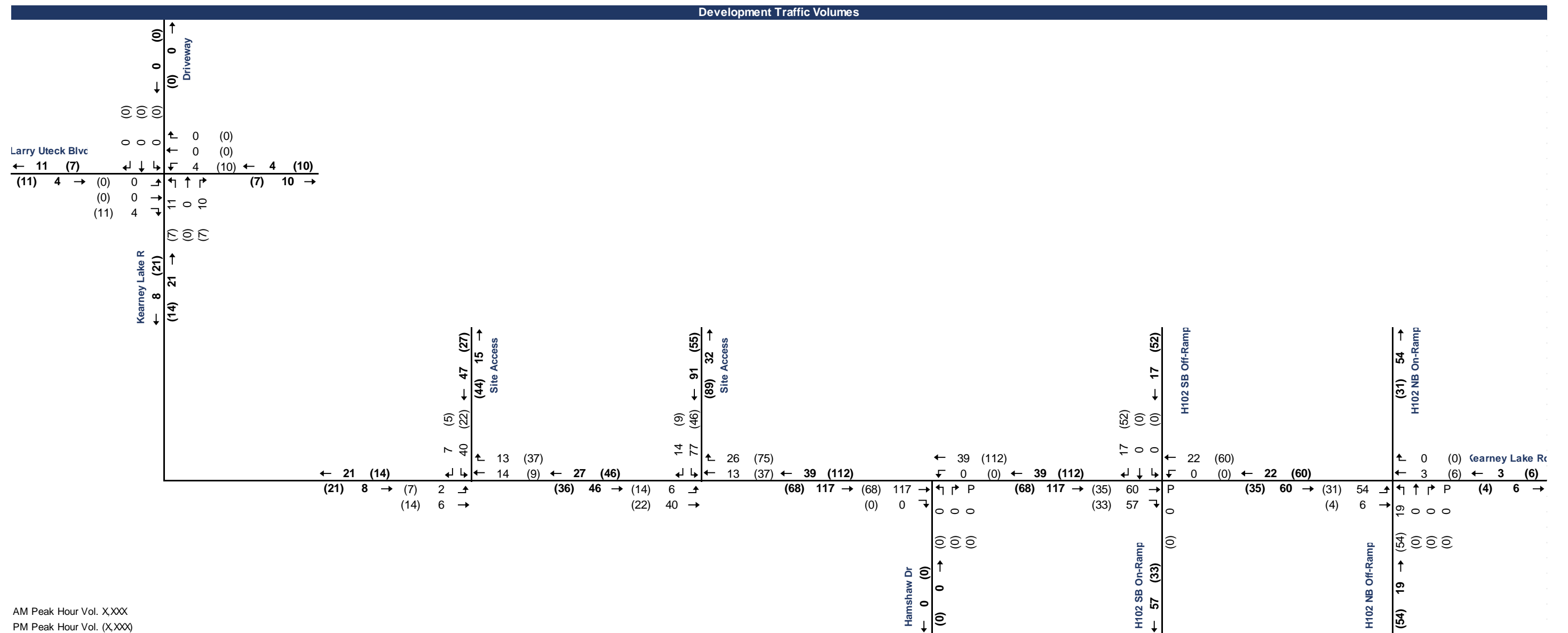


Figure A – 2: Site-Generated Traffic Volumes

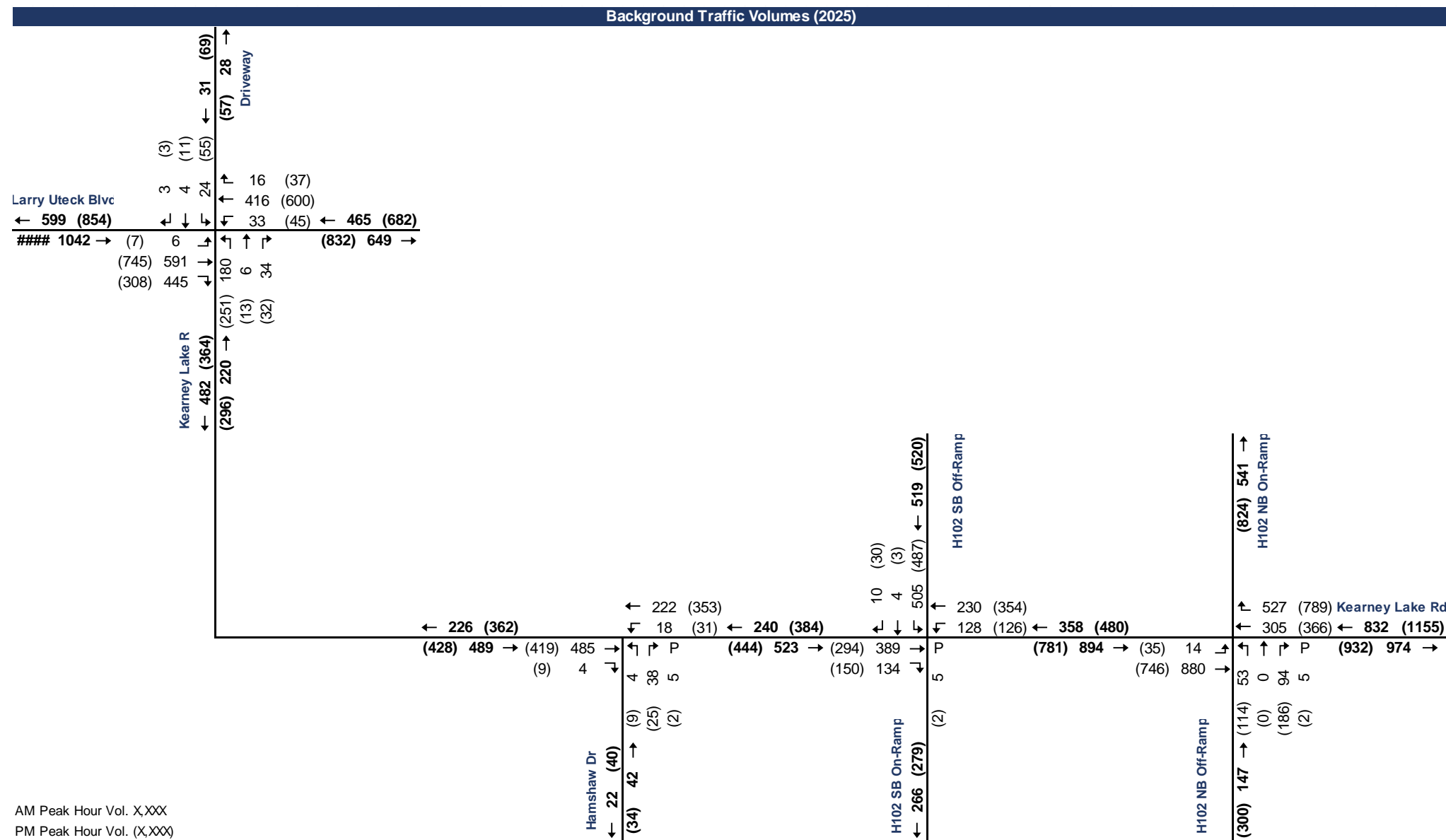


Figure A – 3: Background (2025) Traffic Volumes

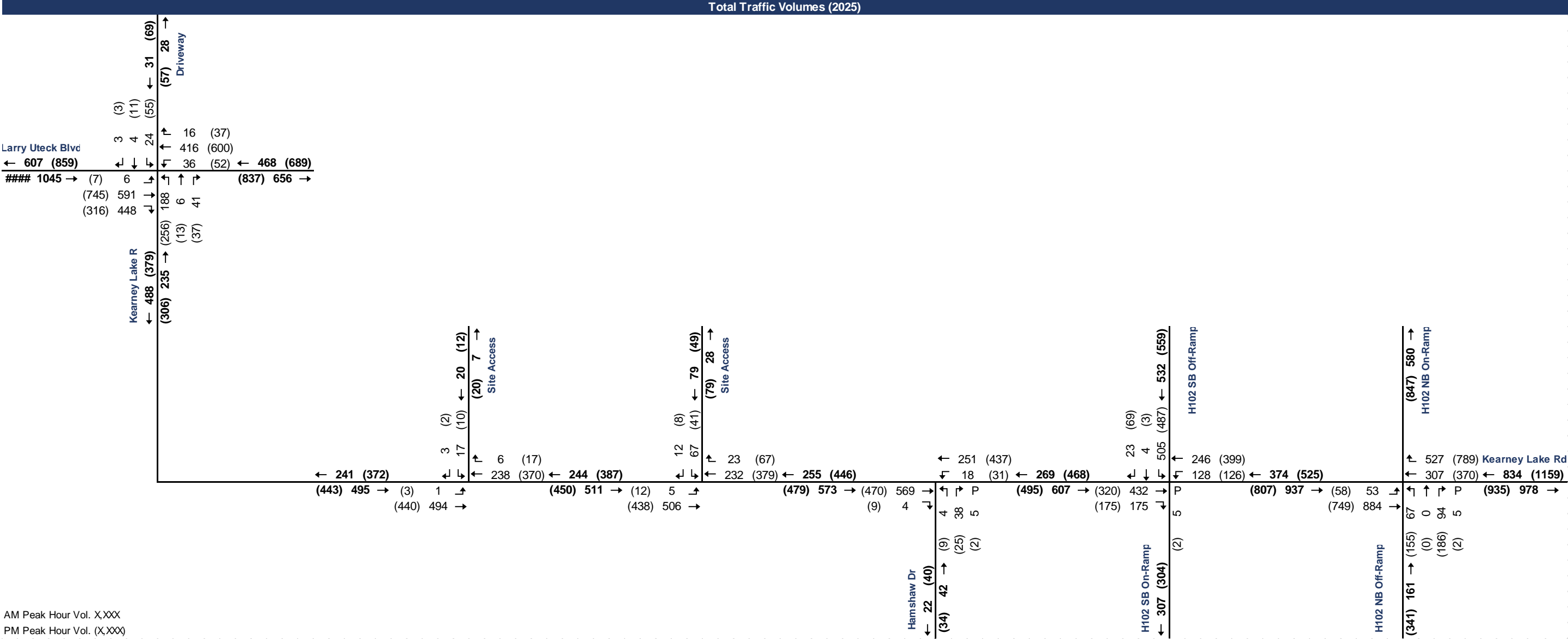
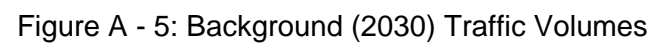
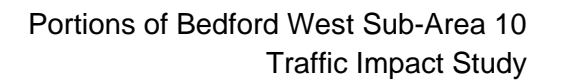


Figure A - 4: Total Phase 1 (2025) Traffic Volumes



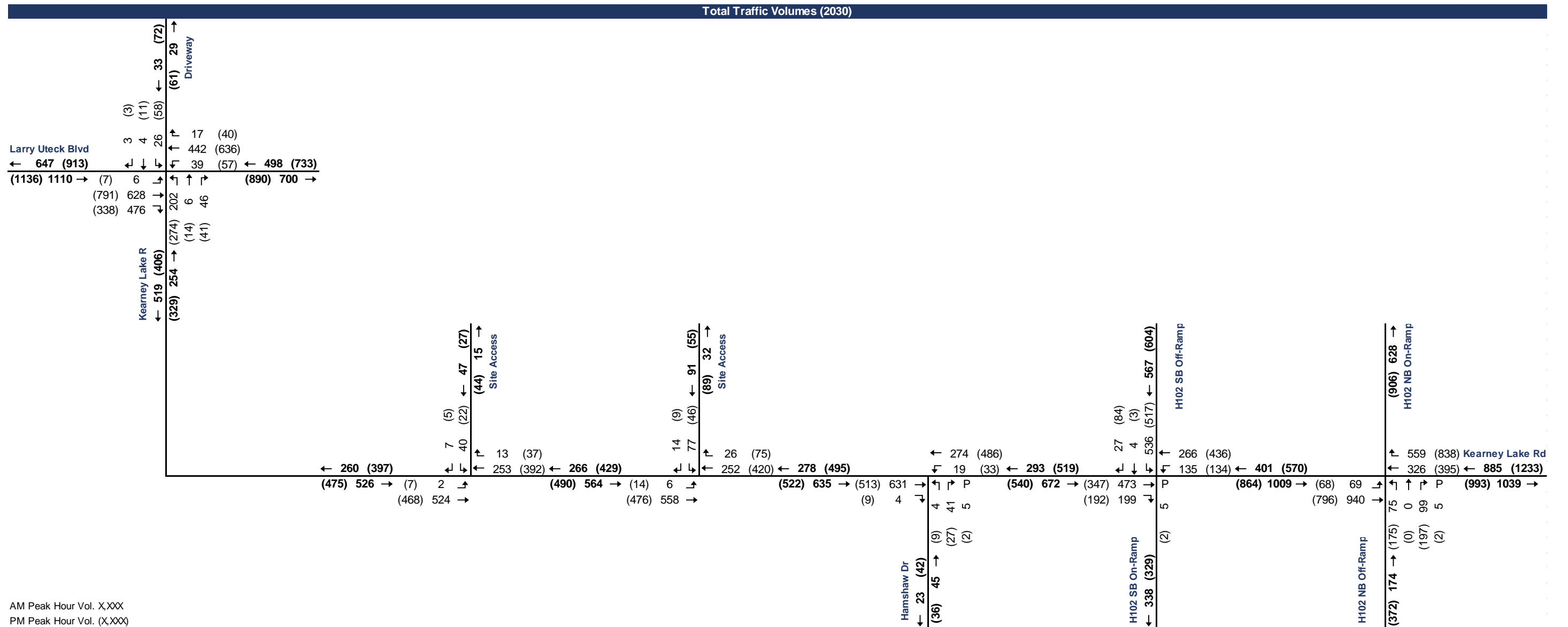


Figure A - 6: Total Phase 1 and 2 (2030) Traffic Volumes



Harbourside Transportation Consultants  
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905-405-4696

Count Name: Kearney Lake Road & Highway  
102 NB Ramps  
Site Code:  
Start Date: 10-26-2021  
Page No: 1

## Turning Movement Data

Start Time	Hwy 102 NB On-Ramp Southbound		Kearney Lake Road Westbound					Hwy 102 NB Off-Ramp Northbound					Kearney Lake Road Eastbound					Int. Total
	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	0	0	85	56	0	0	141	6	0	3	1	9	133	3	0	0	136	286
7:15 AM	0	0	116	51	0	0	167	12	0	10	0	22	159	2	0	0	161	350
7:30 AM	0	0	132	59	0	0	191	16	0	7	0	23	187	2	0	0	189	403
7:45 AM	0	0	118	56	0	0	174	18	0	16	0	34	207	1	0	0	208	416
Hourly Total	0	0	451	222	0	0	673	52	0	36	1	88	686	8	0	0	694	1455
8:00 AM	0	0	138	61	0	0	199	23	0	12	0	35	231	2	0	0	233	467
8:15 AM	0	0	122	65	0	0	187	22	0	14	0	36	213	0	0	0	213	436
8:30 AM	0	0	118	75	0	0	193	19	0	11	3	30	225	3	0	0	228	451
8:45 AM	0	0	130	88	0	0	218	26	0	13	1	39	181	7	0	0	188	445
Hourly Total	0	0	508	289	0	0	797	90	0	50	4	140	850	12	0	0	862	1799
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	0	216	79	0	0	295	44	0	34	0	78	167	2	0	0	169	542
4:15 PM	0	0	190	80	0	0	270	41	0	24	1	65	190	13	0	0	203	538
4:30 PM	0	0	197	91	0	0	288	44	0	25	0	69	178	8	0	0	186	543
4:45 PM	0	0	159	92	0	0	251	50	0	26	0	76	185	10	0	0	195	522
Hourly Total	0	0	762	342	0	0	1104	179	0	109	1	288	720	33	0	0	753	2145
5:00 PM	0	0	144	83	0	0	227	49	2	22	0	73	172	4	0	0	176	476
5:15 PM	0	0	164	66	0	0	230	36	0	27	0	63	214	2	0	0	216	509
5:30 PM	0	0	163	61	0	0	224	35	0	30	1	65	153	3	0	0	156	445
5:45 PM	0	0	136	69	0	0	205	29	0	23	1	52	167	3	0	0	170	427
Hourly Total	0	0	607	279	0	0	886	149	2	102	2	253	706	12	0	0	718	1857
Grand Total	0	0	2328	1132	0	0	3460	470	2	297	8	769	2962	65	0	0	3027	7256
Approach %	-	-	67.3	32.7	0.0	-	-	61.1	0.3	38.6	-	-	97.9	2.1	0.0	-	-	-
Total %	-	0.0	32.1	15.6	0.0	-	47.7	6.5	0.0	4.1	-	10.6	40.8	0.9	0.0	-	41.7	-
Lights	-	0	2281	1087	0	-	3368	453	2	292	-	747	2904	61	0	-	2965	7080
% Lights	-	-	98.0	96.0	-	-	97.3	96.4	100.0	98.3	-	97.1	98.0	93.8	-	-	98.0	97.6
Buses	-	0	19	13	0	-	32	3	0	0	-	3	24	1	0	-	25	60
% Buses	-	-	0.8	1.1	-	-	0.9	0.6	0.0	0.0	-	0.4	0.8	1.5	-	-	0.8	0.8
Single-Unit Trucks	-	0	21	28	0	-	49	14	0	4	-	18	18	2	0	-	20	87
% Single-Unit Trucks	-	-	0.9	2.5	-	-	1.4	3.0	0.0	1.3	-	2.3	0.6	3.1	-	-	0.7	1.2
Articulated Trucks	-	0	7	1	0	-	8	0	0	1	-	1	15	1	0	-	16	25
% Articulated Trucks	-	-	0.3	0.1	-	-	0.2	0.0	0.0	0.3	-	0.1	0.5	1.5	-	-	0.5	0.3
Bicycles on Road	-	0	0	3	0	-	3	0	0	0	-	0	1	0	0	-	1	4
% Bicycles on Road	-	-	0.0	0.3	-	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	0	-	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	37.5	-	-	-	-	-	-	-

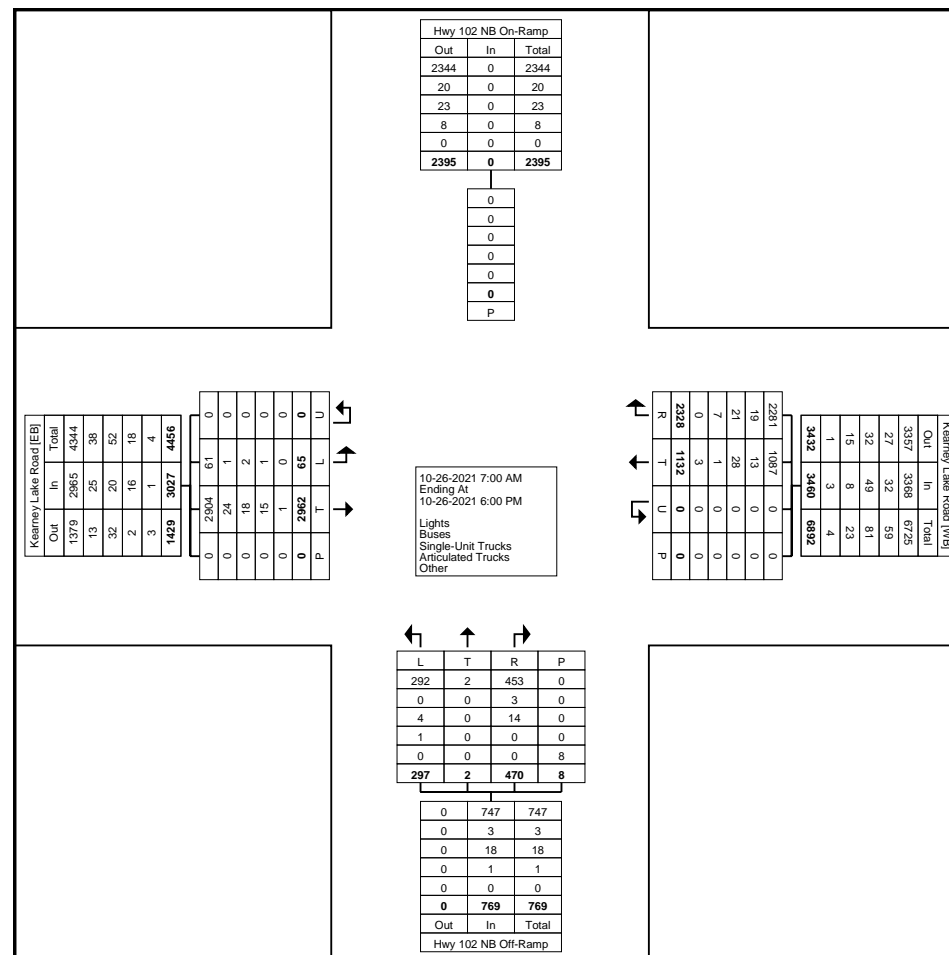


Pedestrians	0	-	-	-	0	-	-	-	5	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	62.5	-	-	-	-	-	-



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Site Code:  
Start Date: 10-26-2021  
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Turning Movement Data Plot



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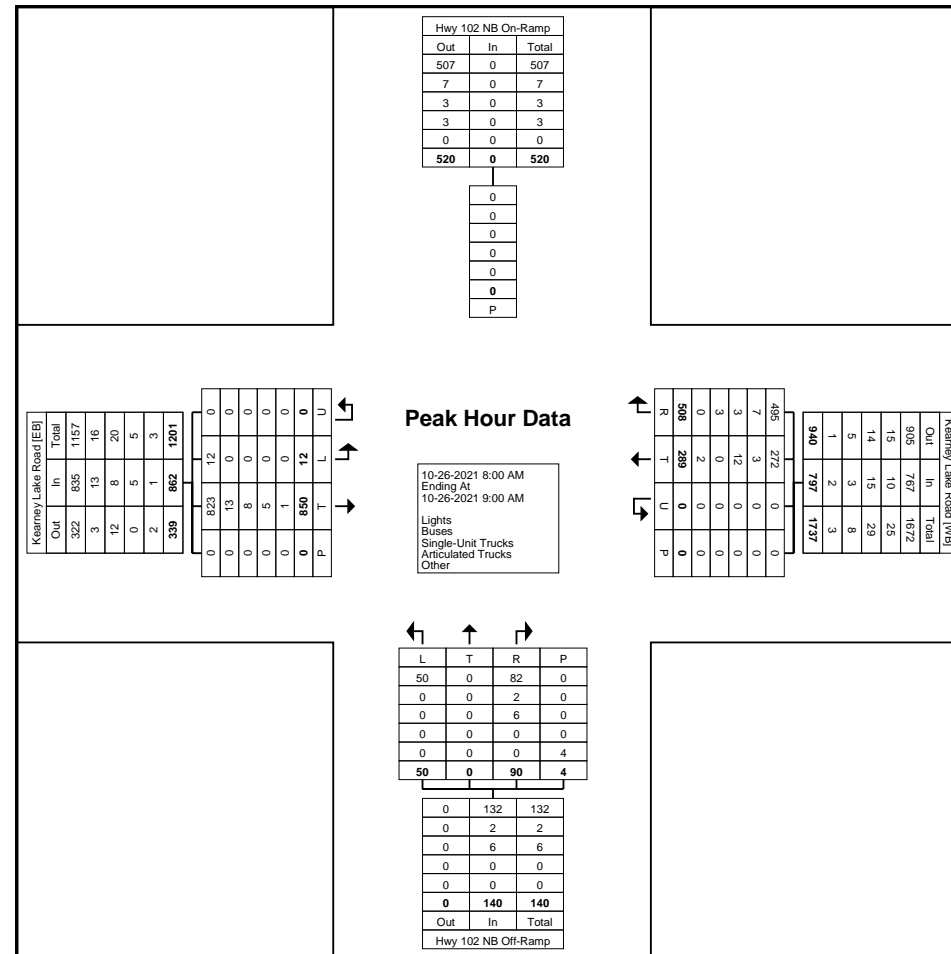
### Turning Movement Peak Hour Data (8:00 AM)

Start Time	Hwy 102 NB On-Ramp Southbound		Kearney Lake Road Westbound					Hwy 102 NB Off-Ramp Northbound					Kearney Lake Road Eastbound					Int. Total
	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	
8:00 AM	0	0	138	61	0	0	199	23	0	12	0	35	231	2	0	0	233	467
8:15 AM	0	0	122	65	0	0	187	22	0	14	0	36	213	0	0	0	213	436
8:30 AM	0	0	118	75	0	0	193	19	0	11	3	30	225	3	0	0	228	451
8:45 AM	0	0	130	88	0	0	218	26	0	13	1	39	181	7	0	0	188	445
Total	0	0	508	289	0	0	797	90	0	50	4	140	850	12	0	0	862	1799
Approach %	-	-	63.7	36.3	0.0	-	-	64.3	0.0	35.7	-	-	98.6	1.4	0.0	-	-	-
Total %	-	0.0	28.2	16.1	0.0	-	44.3	5.0	0.0	2.8	-	7.8	47.2	0.7	0.0	-	47.9	-
PHF	-	0.000	0.920	0.821	0.000	-	0.914	0.865	0.000	0.893	-	0.897	0.920	0.429	0.000	-	0.925	0.963
Lights	-	0	495	272	0	-	767	82	0	50	-	132	823	12	0	-	835	1734
% Lights	-	-	97.4	94.1	-	-	96.2	91.1	-	100.0	-	94.3	96.8	100.0	-	-	96.9	96.4
Buses	-	0	7	3	0	-	10	2	0	0	-	2	13	0	0	-	13	25
% Buses	-	-	1.4	1.0	-	-	1.3	2.2	-	0.0	-	1.4	1.5	0.0	-	-	1.5	1.4
Single-Unit Trucks	-	0	3	12	0	-	15	6	0	0	-	6	8	0	0	-	8	29
% Single-Unit Trucks	-	-	0.6	4.2	-	-	1.9	6.7	-	0.0	-	4.3	0.9	0.0	-	-	0.9	1.6
Articulated Trucks	-	0	3	0	0	-	3	0	0	0	-	0	5	0	0	-	5	8
% Articulated Trucks	-	-	0.6	0.0	-	-	0.4	0.0	-	0.0	-	0.0	0.6	0.0	-	-	0.6	0.4
Bicycles on Road	-	0	0	2	0	-	2	0	0	0	-	0	1	0	0	-	1	3
% Bicycles on Road	-	-	0.0	0.7	-	-	0.3	0.0	-	0.0	-	0.0	0.1	0.0	-	-	0.1	0.2
Bicycles on Crosswalk	0	-	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	50.0	-	-	-	-	-	-	-
Pedestrians	0	-	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	50.0	-	-	-	-	-	-	-



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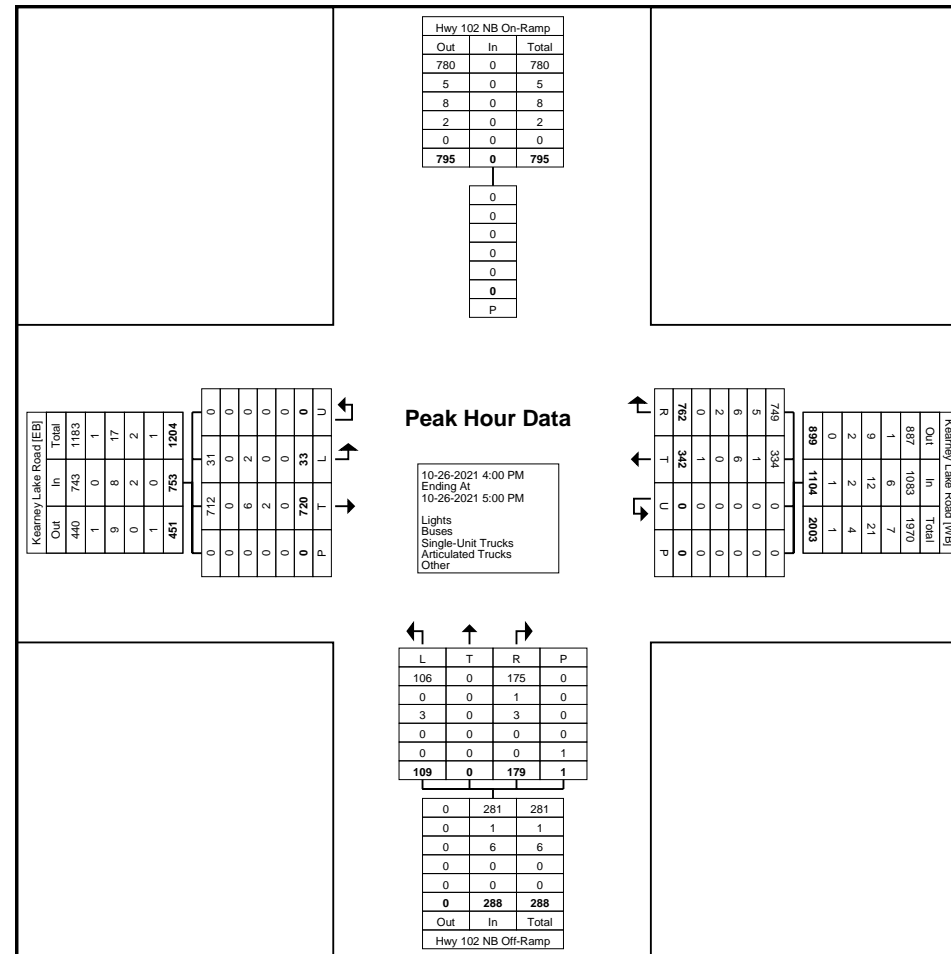
### Turning Movement Peak Hour Data (4:00 PM)

Start Time	Hwy 102 NB On-Ramp Southbound		Kearney Lake Road Westbound					Hwy 102 NB Off-Ramp Northbound					Kearney Lake Road Eastbound					Int. Total
	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	
4:00 PM	0	0	216	79	0	0	295	44	0	34	0	78	167	2	0	0	169	542
4:15 PM	0	0	190	80	0	0	270	41	0	24	1	65	190	13	0	0	203	538
4:30 PM	0	0	197	91	0	0	288	44	0	25	0	69	178	8	0	0	186	543
4:45 PM	0	0	159	92	0	0	251	50	0	26	0	76	185	10	0	0	195	522
Total	0	0	762	342	0	0	1104	179	0	109	1	288	720	33	0	0	753	2145
Approach %	-	-	69.0	31.0	0.0	-	-	62.2	0.0	37.8	-	-	95.6	4.4	0.0	-	-	-
Total %	-	0.0	35.5	15.9	0.0	-	51.5	8.3	0.0	5.1	-	13.4	33.6	1.5	0.0	-	35.1	-
PHF	-	0.000	0.882	0.929	0.000	-	0.936	0.895	0.000	0.801	-	0.923	0.947	0.635	0.000	-	0.927	0.988
Lights	-	0	749	334	0	-	1083	175	0	106	-	281	712	31	0	-	743	2107
% Lights	-	-	98.3	97.7	-	-	98.1	97.8	-	97.2	-	97.6	98.9	93.9	-	-	98.7	98.2
Buses	-	0	5	1	0	-	6	1	0	0	-	1	0	0	0	-	0	7
% Buses	-	-	0.7	0.3	-	-	0.5	0.6	-	0.0	-	0.3	0.0	0.0	-	-	0.0	0.3
Single-Unit Trucks	-	0	6	6	0	-	12	3	0	3	-	6	6	2	0	-	8	26
% Single-Unit Trucks	-	-	0.8	1.8	-	-	1.1	1.7	-	2.8	-	2.1	0.8	6.1	-	-	1.1	1.2
Articulated Trucks	-	0	2	0	0	-	2	0	0	0	-	0	2	0	0	-	2	4
% Articulated Trucks	-	-	0.3	0.0	-	-	0.2	0.0	-	0.0	-	0.0	0.3	0.0	-	-	0.3	0.2
Bicycles on Road	-	0	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Bicycles on Road	-	-	0.0	0.3	-	-	0.1	0.0	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-
Pedestrians	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-



Harbourside Transportation Consultants  
219 Waverley Road, Suite 200  
Dartmouth, Nova Scotia, Canada B2X 2C3  
905-405-4696

Count Name: Kearney Lake Road & Highway  
102 NB Ramps  
Site Code:  
Start Date: 10-26-2021  
Page No: 7



Turning Movement Peak Hour Data Plot (4:00 PM)





Harbourside Transportation Consultants  
219 Waverley Road, Suite 200  
Dartmouth, Nova Scotia, Canada B2X 2C3  
905-405-4696

Count Name: Kearney Lake Road & Highway  
102 SB Ramps  
Site Code:  
Start Date: 10-26-2021  
Page No: 1

## Turning Movement Data

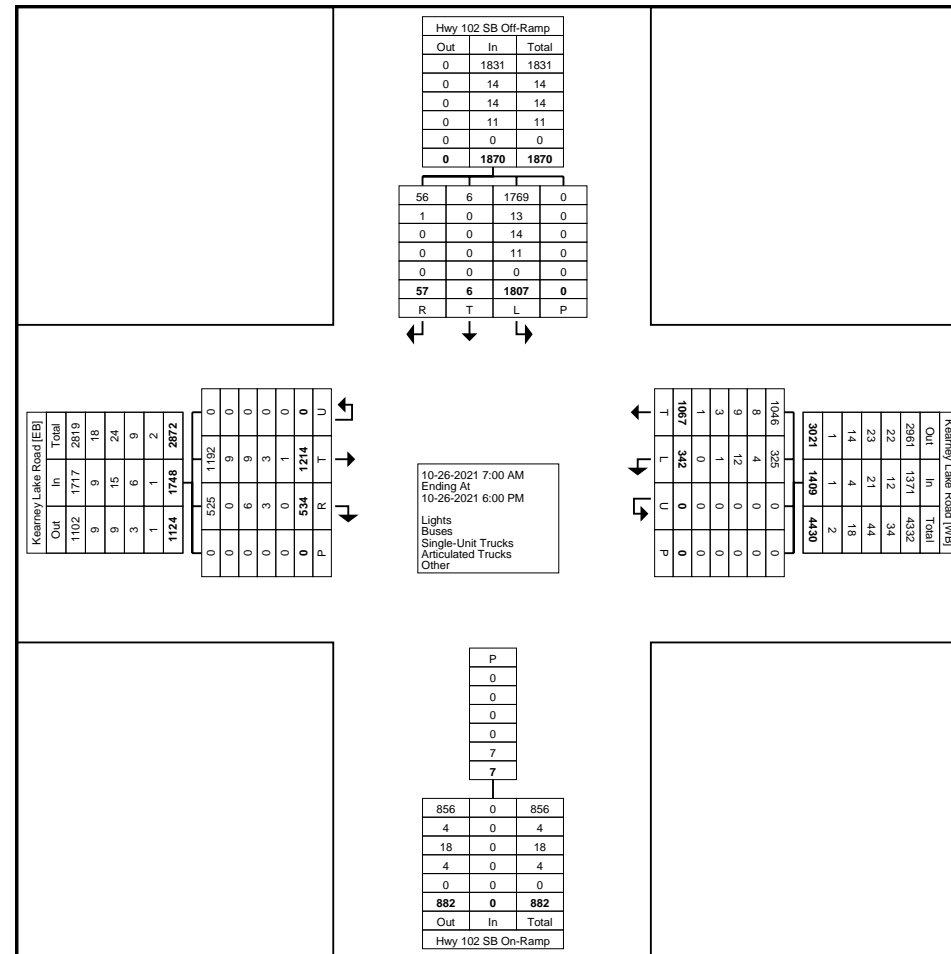
Start Time	Hwy 102 SB Off-Ramp Southbound					Kearney Lake Road Westbound					Hwy 102 SB On-Ramp Northbound		Kearney Lake Road Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	1	1	66	0	68	33	0	0	0	33	1	0	21	78	0	0	99	200
7:15 AM	0	1	100	0	101	46	0	0	0	46	0	0	32	70	0	0	102	249
7:30 AM	0	0	111	0	111	41	0	0	0	41	1	0	33	79	0	0	112	264
7:45 AM	2	0	114	0	116	56	0	0	0	56	0	0	33	98	0	0	131	303
Hourly Total	3	2	391	0	396	176	0	0	0	176	2	0	119	325	0	0	444	1016
8:00 AM	4	0	115	0	119	47	34	0	0	81	0	0	33	103	0	0	136	336
8:15 AM	0	1	124	0	125	41	33	0	0	74	0	0	32	96	0	0	128	327
8:30 AM	2	1	142	0	145	56	26	0	0	82	3	0	28	86	0	0	114	341
8:45 AM	2	0	92	0	94	77	29	0	0	106	1	0	35	79	0	0	114	314
Hourly Total	8	2	473	0	483	221	122	0	0	343	4	0	128	364	0	0	492	1318
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	10	1	109	0	120	87	35	0	0	122	1	0	30	60	0	0	90	332
4:15 PM	10	0	124	0	134	86	22	0	0	108	0	0	37	69	0	0	106	348
4:30 PM	5	0	109	0	114	83	30	0	0	113	0	0	41	86	0	0	127	354
4:45 PM	3	0	117	0	120	85	34	0	0	119	0	0	36	62	0	0	98	337
Hourly Total	28	1	459	0	488	341	121	0	0	462	1	0	144	277	0	0	421	1371
5:00 PM	4	0	133	0	137	77	31	0	0	108	0	0	32	69	0	0	101	346
5:15 PM	5	0	147	0	152	85	22	0	0	107	0	0	39	60	0	0	99	358
5:30 PM	5	0	99	0	104	85	29	0	0	114	0	0	35	49	0	0	84	302
5:45 PM	4	1	105	0	110	82	17	0	0	99	0	0	37	70	0	0	107	316
Hourly Total	18	1	484	0	503	329	99	0	0	428	0	0	143	248	0	0	391	1322
Grand Total	57	6	1807	0	1870	1067	342	0	0	1409	7	0	534	1214	0	0	1748	5027
Approach %	3.0	0.3	96.6	-	-	75.7	24.3	0.0	-	-	-	-	30.5	69.5	0.0	-	-	-
Total %	1.1	0.1	35.9	-	37.2	21.2	6.8	0.0	-	28.0	-	0.0	10.6	24.1	0.0	-	34.8	-
Lights	56	6	1769	-	1831	1046	325	0	-	1371	-	0	525	1192	0	-	1717	4919
% Lights	98.2	100.0	97.9	-	97.9	98.0	95.0	-	-	97.3	-	-	98.3	98.2	-	-	98.2	97.9
Buses	1	0	13	-	14	8	4	0	-	12	-	0	0	9	0	-	9	35
% Buses	1.8	0.0	0.7	-	0.7	0.7	1.2	-	-	0.9	-	-	0.0	0.7	-	-	0.5	0.7
Single-Unit Trucks	0	0	14	-	14	9	12	0	-	21	-	0	6	9	0	-	15	50
% Single-Unit Trucks	0.0	0.0	0.8	-	0.7	0.8	3.5	-	-	1.5	-	-	1.1	0.7	-	-	0.9	1.0
Articulated Trucks	0	0	11	-	11	3	1	0	-	4	-	0	3	3	0	-	6	21
% Articulated Trucks	0.0	0.0	0.6	-	0.6	0.3	0.3	-	-	0.3	-	-	0.6	0.2	-	-	0.3	0.4
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	-	0	0	1	0	-	1	2
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.1	0.0	-	-	0.1	-	-	0.0	0.1	-	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	3	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	42.9	-	-	-	-	-	-	-

Pedestrians	-	-	-	0	-	-	-	-	0	-	4	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	57.1	-	-	-	-	-	-	-



Harbourside Transportation Consultants  
219 Waverley Road, Suite 200  
Dartmouth, Nova Scotia, Canada B2X 2C3  
905-405-4696

Count Name: Kearney Lake Road & Highway  
102 SB Ramps  
Site Code:  
Start Date: 10-26-2021  
Page No: 3



Turning Movement Data Plot



Harbourside Transportation Consultants  
219 Waverley Road, Suite 200  
Dartmouth, Nova Scotia, Canada B2X 2C3  
905-405-4696

Count Name: Kearney Lake Road & Highway  
102 SB Ramps  
Site Code:  
Start Date: 10-26-2021  
Page No: 4

### Turning Movement Peak Hour Data (8:00 AM)

Start Time	Hwy 102 SB Off-Ramp Southbound					Kearney Lake Road Westbound					Hwy 102 SB On-Ramp Northbound		Kearney Lake Road Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
8:00 AM	4	0	115	0	119	47	34	0	0	81	0	0	33	103	0	0	136	336
8:15 AM	0	1	124	0	125	41	33	0	0	74	0	0	32	96	0	0	128	327
8:30 AM	2	1	142	0	145	56	26	0	0	82	3	0	28	86	0	0	114	341
8:45 AM	2	0	92	0	94	77	29	0	0	106	1	0	35	79	0	0	114	314
Total	8	2	473	0	483	221	122	0	0	343	4	0	128	364	0	0	492	1318
Approach %	1.7	0.4	97.9	-	-	64.4	35.6	0.0	-	-	-	-	26.0	74.0	0.0	-	-	-
Total %	0.6	0.2	35.9	-	36.6	16.8	9.3	0.0	-	26.0	-	0.0	9.7	27.6	0.0	-	37.3	-
PHF	0.500	0.500	0.833	-	0.833	0.718	0.897	0.000	-	0.809	-	0.000	0.914	0.883	0.000	-	0.904	0.966
Lights	7	2	458	-	467	215	112	0	-	327	-	0	124	351	0	-	475	1269
% Lights	87.5	100.0	96.8	-	96.7	97.3	91.8	-	-	95.3	-	-	96.9	96.4	-	-	96.5	96.3
Buses	1	0	7	-	8	3	0	0	-	3	-	0	0	6	0	-	6	17
% Buses	12.5	0.0	1.5	-	1.7	1.4	0.0	-	-	0.9	-	-	0.0	1.6	-	-	1.2	1.3
Single-Unit Trucks	0	0	6	-	6	3	10	0	-	13	-	0	4	4	0	-	8	27
% Single-Unit Trucks	0.0	0.0	1.3	-	1.2	1.4	8.2	-	-	3.8	-	-	3.1	1.1	-	-	1.6	2.0
Articulated Trucks	0	0	2	-	2	0	0	0	-	0	-	0	0	2	0	-	2	4
% Articulated Trucks	0.0	0.0	0.4	-	0.4	0.0	0.0	-	-	0.0	-	-	0.0	0.5	-	-	0.4	0.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	-	0	0	1	0	-	1	1
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	-	-	0.0	0.3	-	-	0.2	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	2	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	50.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	2	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	50.0	-	-	-	-	-	-	-



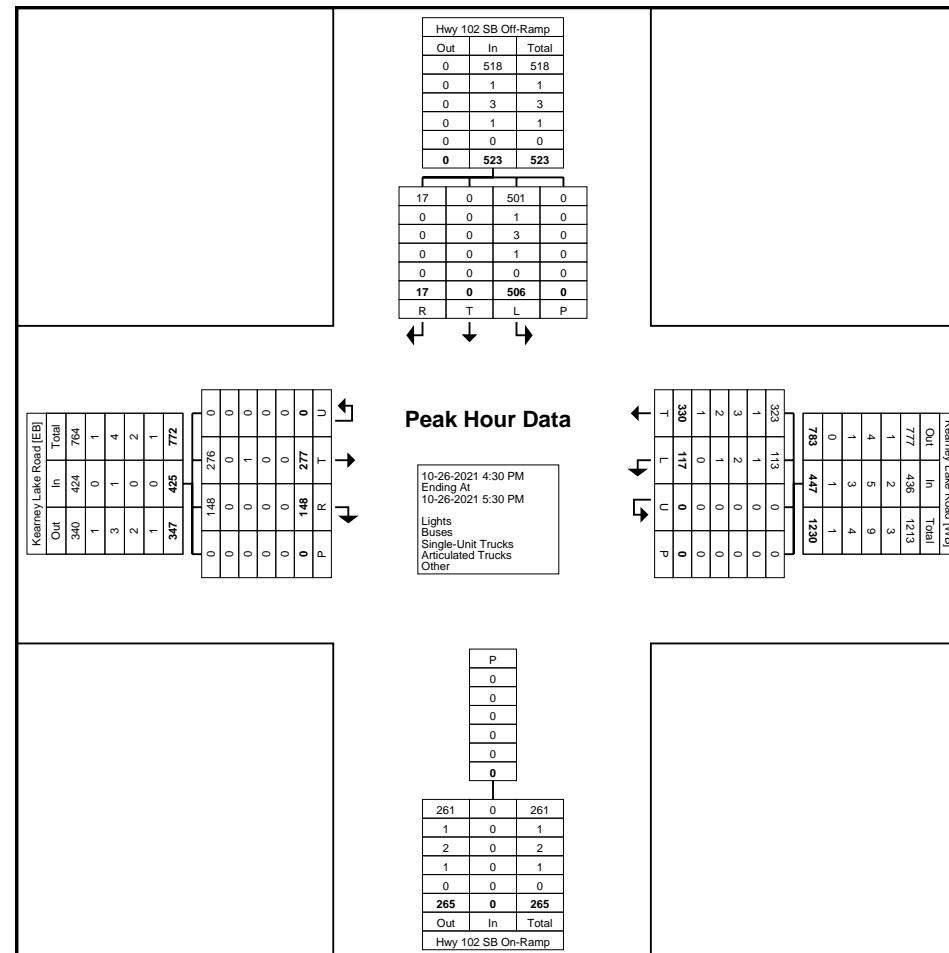
### Turning Movement Peak Hour Data (4:30 PM)

Start Time	Hwy 102 SB Off-Ramp Southbound					Kearney Lake Road Westbound					Hwy 102 SB On-Ramp Northbound		Kearney Lake Road Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
4:30 PM	5	0	109	0	114	83	30	0	0	113	0	0	41	86	0	0	127	354
4:45 PM	3	0	117	0	120	85	34	0	0	119	0	0	36	62	0	0	98	337
5:00 PM	4	0	133	0	137	77	31	0	0	108	0	0	32	69	0	0	101	346
5:15 PM	5	0	147	0	152	85	22	0	0	107	0	0	39	60	0	0	99	358
Total	17	0	506	0	523	330	117	0	0	447	0	0	148	277	0	0	425	1395
Approach %	3.3	0.0	96.7	-	-	73.8	26.2	0.0	-	-	-	-	34.8	65.2	0.0	-	-	-
Total %	1.2	0.0	36.3	-	37.5	23.7	8.4	0.0	-	32.0	-	0.0	10.6	19.9	0.0	-	30.5	-
PHF	0.850	0.000	0.861	-	0.860	0.971	0.860	0.000	-	0.939	-	0.000	0.902	0.805	0.000	-	0.837	0.974
Lights	17	0	501	-	518	323	113	0	-	436	-	0	148	276	0	-	424	1378
% Lights	100.0	-	99.0	-	99.0	97.9	96.6	-	-	97.5	-	-	100.0	99.6	-	-	99.8	98.8
Buses	0	0	1	-	1	1	1	0	-	2	-	0	0	0	0	-	0	3
% Buses	0.0	-	0.2	-	0.2	0.3	0.9	-	-	0.4	-	-	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	0	0	3	-	3	3	2	0	-	5	-	0	0	1	0	-	1	9
% Single-Unit Trucks	0.0	-	0.6	-	0.6	0.9	1.7	-	-	1.1	-	-	0.0	0.4	-	-	0.2	0.6
Articulated Trucks	0	0	1	-	1	2	1	0	-	3	-	0	0	0	0	-	0	4
% Articulated Trucks	0.0	-	0.2	-	0.2	0.6	0.9	-	-	0.7	-	-	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	-	0	0	0	0	-	0	1
% Bicycles on Road	0.0	-	0.0	-	0.0	0.3	0.0	-	-	0.2	-	-	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





Count Name: Kearney Lake Road & Highway  
102 SB Ramps  
Site Code:  
Start Date: 10-26-2021  
Page No: 7





Harbourside Transportation Consultants  
 8 Rowan Street, Suite 306  
 Terrace on the Square  
 St. John's, Newfoundland and Labrador, Canada A1B 2X1  
 709.579.6435 falla@harboursideengineering.ca

Count Name: Kearney Lake Road & Hamshaw Drive  
 Site Code:  
 Start Date: 04/10/2018  
 Page No: 1

## Turning Movement Data

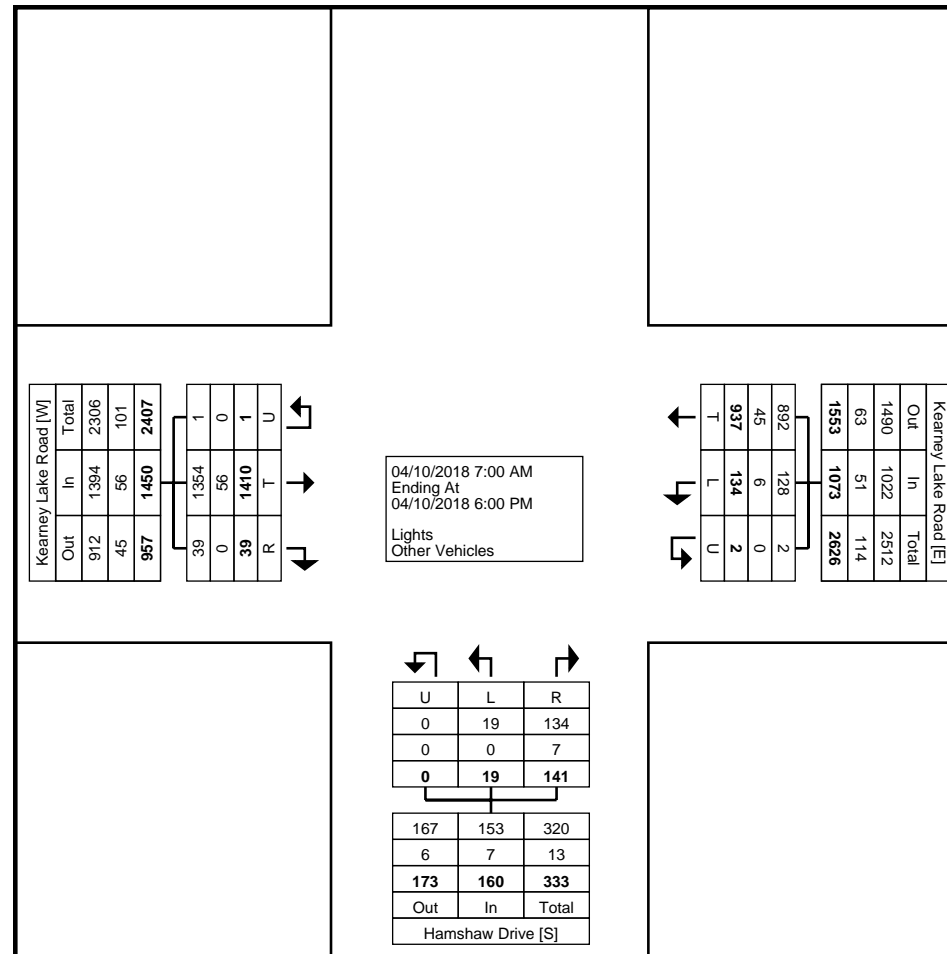
Start Time	Kearney Lake Road Westbound				Hamshaw Drive Northbound				Kearney Lake Road Eastbound				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
7:00 AM	15	3	0	18	2	2	0	4	0	81	0	81	103
7:15 AM	31	0	0	31	7	0	0	7	0	105	0	105	143
7:30 AM	18	3	0	21	9	0	0	9	1	97	0	98	128
7:45 AM	37	7	0	44	7	2	0	9	0	104	0	104	157
Hourly Total	101	13	0	114	25	4	0	29	1	387	0	388	531
8:00 AM	26	6	0	32	12	0	0	12	1	90	0	91	135
8:15 AM	30	3	1	34	2	0	0	2	0	85	0	85	121
8:30 AM	21	6	0	27	11	1	0	12	1	86	0	87	126
8:45 AM	29	15	0	44	6	0	0	6	5	58	0	63	113
Hourly Total	106	30	1	137	31	1	0	32	7	319	0	326	495
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	17	4	0	21	3	0	0	3	0	46	0	46	70
11:15 AM	30	1	0	31	4	0	0	4	2	44	0	46	81
11:30 AM	39	3	0	42	2	0	0	2	1	41	0	42	86
11:45 AM	35	4	0	39	5	0	0	5	1	42	0	43	87
Hourly Total	121	12	0	133	14	0	0	14	4	173	0	177	324
12:00 PM	36	3	0	39	5	0	0	5	2	37	0	39	83
12:15 PM	44	6	0	50	5	0	0	5	1	40	0	41	96
12:30 PM	39	6	0	45	4	0	0	4	3	34	0	37	86
12:45 PM	40	5	0	45	6	0	0	6	2	43	0	45	96
Hourly Total	159	20	0	179	20	0	0	20	8	154	0	162	361
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	64	12	0	76	8	2	0	10	1	56	0	57	143
4:15 PM	69	4	0	73	2	2	0	4	3	46	0	49	126
4:30 PM	60	6	1	67	9	2	0	11	2	58	0	60	138
4:45 PM	63	6	0	69	4	1	0	5	1	47	1	49	123
Hourly Total	256	28	1	285	23	7	0	30	7	207	1	215	530
5:00 PM	53	7	0	60	5	2	0	7	1	44	0	45	112
5:15 PM	37	9	0	46	3	1	0	4	2	39	0	41	91
5:30 PM	47	8	0	55	10	0	0	10	2	48	0	50	115
5:45 PM	57	7	0	64	10	4	0	14	7	39	0	46	124
Hourly Total	194	31	0	225	28	7	0	35	12	170	0	182	442
Grand Total	937	134	2	1073	141	19	0	160	39	1410	1	1450	2683
Approach %	87.3	12.5	0.2	-	88.1	11.9	0.0	-	2.7	97.2	0.1	-	-
Total %	34.9	5.0	0.1	40.0	5.3	0.7	0.0	6.0	1.5	52.6	0.0	54.0	-
Lights	892	128	2	1022	134	19	0	153	39	1354	1	1394	2569
% Lights	95.2	95.5	100.0	95.2	95.0	100.0	-	95.6	100.0	96.0	100.0	96.1	95.8
Other Vehicles	45	6	0	51	7	0	0	7	0	56	0	56	114

% Other Vehicles	4.8	4.5	0.0	4.8	5.0	0.0	-	4.4	0.0	4.0	0.0	3.9	4.2
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Harbourside Transportation Consultants  
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Count Name: Kearney Lake Road & Hamshaw  
Drive  
Site Code:  
Start Date: 04/10/2018  
Page No: 3



Turning Movement Data Plot



Harbourside Transportation Consultants  
 8 Rowan Street, Suite 306  
 Terrace on the Square  
 St. John's, Newfoundland and Labrador, Canada A1B 2X1  
 709.579.6435 fallaire@harboursideengineering.ca

Count Name: Kearney Lake Road & Hamshaw Drive  
 Site Code:  
 Start Date: 04/10/2018  
 Page No: 4

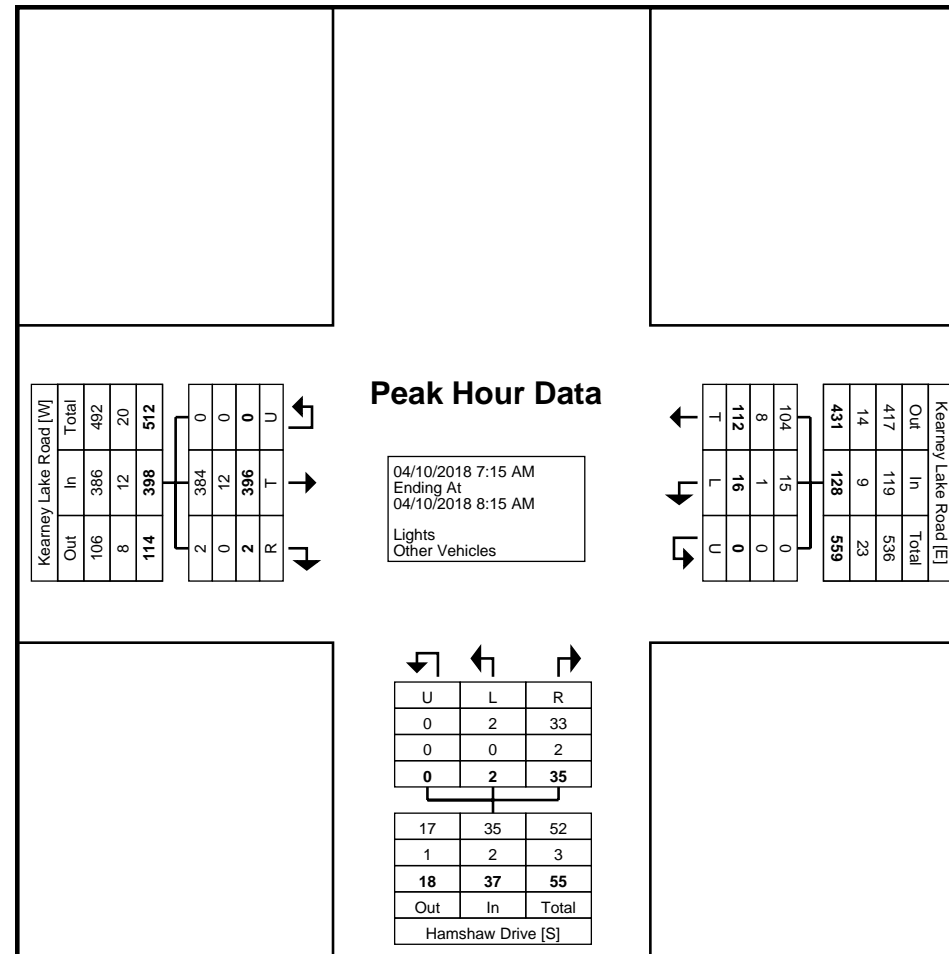
### Turning Movement Peak Hour Data (7:15 AM)

Start Time	Kearney Lake Road Westbound				Hamshaw Drive Northbound				Kearney Lake Road Eastbound				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
7:15 AM	31	0	0	31	7	0	0	7	0	105	0	105	143
7:30 AM	18	3	0	21	9	0	0	9	1	97	0	98	128
7:45 AM	37	7	0	44	7	2	0	9	0	104	0	104	157
8:00 AM	26	6	0	32	12	0	0	12	1	90	0	91	135
Total	112	16	0	128	35	2	0	37	2	396	0	398	563
Approach %	87.5	12.5	0.0	-	94.6	5.4	0.0	-	0.5	99.5	0.0	-	-
Total %	19.9	2.8	0.0	22.7	6.2	0.4	0.0	6.6	0.4	70.3	0.0	70.7	-
PHF	0.757	0.571	0.000	0.727	0.729	0.250	0.000	0.771	0.500	0.943	0.000	0.948	0.896
Lights	104	15	0	119	33	2	0	35	2	384	0	386	540
% Lights	92.9	93.8	-	93.0	94.3	100.0	-	94.6	100.0	97.0	-	97.0	95.9
Other Vehicles	8	1	0	9	2	0	0	2	0	12	0	12	23
% Other Vehicles	7.1	6.3	-	7.0	5.7	0.0	-	5.4	0.0	3.0	-	3.0	4.1



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Terrace on the Square  
St. John's, Newfoundland and Labrador, Canada A1B 2X1  
709.579.6435 fallaire@harboursideengineering.ca

Count Name: Kearney Lake Road & Hamshaw  
Drive  
Site Code:  
Start Date: 04/10/2018  
Page No: 5



Turning Movement Peak Hour Data Plot (7:15 AM)





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 709.579.6435 falla@harboursideengineering.ca

Count Name: Kearney Lake Road & Hamshaw  
 Drive  
 Site Code:  
 Start Date: 04/10/2018  
 Page No: 6

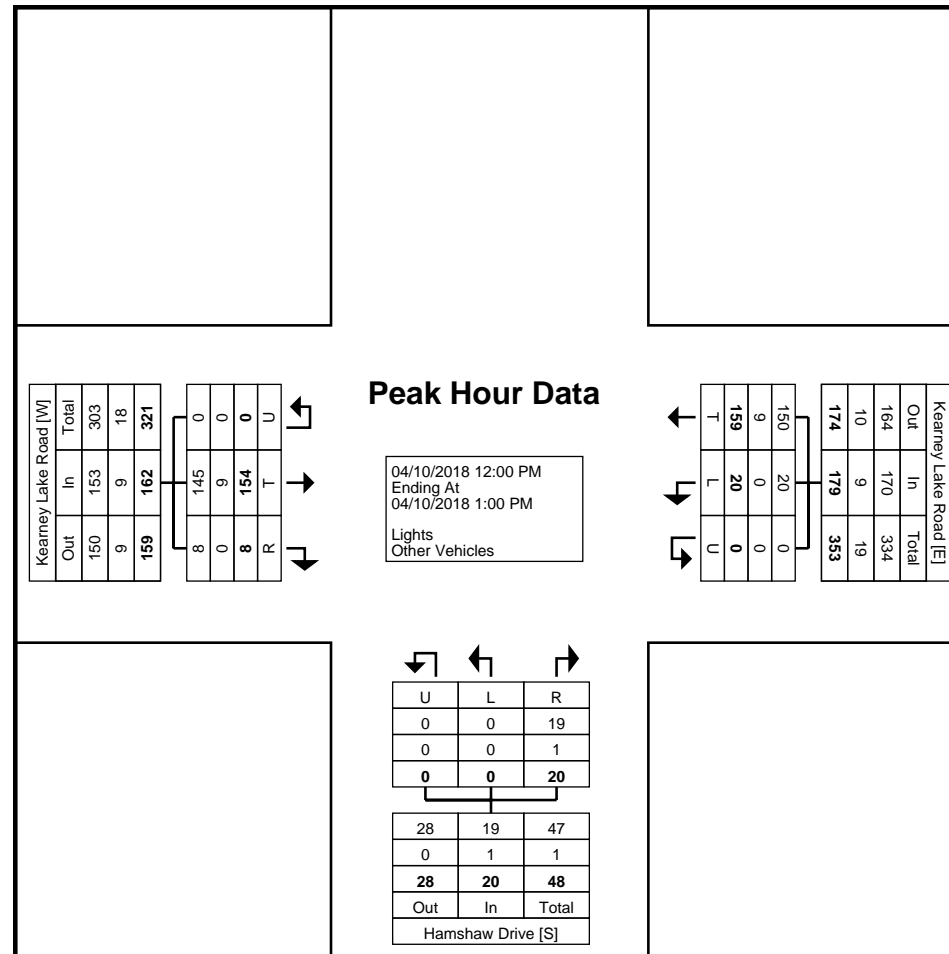
### Turning Movement Peak Hour Data (12:00 PM)

Start Time	Kearney Lake Road Westbound				Hamshaw Drive Northbound				Kearney Lake Road Eastbound				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
12:00 PM	36	3	0	39	5	0	0	5	2	37	0	39	83
12:15 PM	44	6	0	50	5	0	0	5	1	40	0	41	96
12:30 PM	39	6	0	45	4	0	0	4	3	34	0	37	86
12:45 PM	40	5	0	45	6	0	0	6	2	43	0	45	96
Total	159	20	0	179	20	0	0	20	8	154	0	162	361
Approach %	88.8	11.2	0.0	-	100.0	0.0	0.0	-	4.9	95.1	0.0	-	-
Total %	44.0	5.5	0.0	49.6	5.5	0.0	0.0	5.5	2.2	42.7	0.0	44.9	-
PHF	0.903	0.833	0.000	0.895	0.833	0.000	0.000	0.833	0.667	0.895	0.000	0.900	0.940
Lights	150	20	0	170	19	0	0	19	8	145	0	153	342
% Lights	94.3	100.0	-	95.0	95.0	-	-	95.0	100.0	94.2	-	94.4	94.7
Other Vehicles	9	0	0	9	1	0	0	1	0	9	0	9	19
% Other Vehicles	5.7	0.0	-	5.0	5.0	-	-	5.0	0.0	5.8	-	5.6	5.3



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Count Name: Kearney Lake Road & Hamshaw  
Drive  
Site Code:  
Start Date: 04/10/2018  
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



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 709.579.6435 fallaire@harboursideengineering.ca

Count Name: Kearney Lake Road & Hamshaw Drive  
 Site Code:  
 Start Date: 04/10/2018  
 Page No: 8

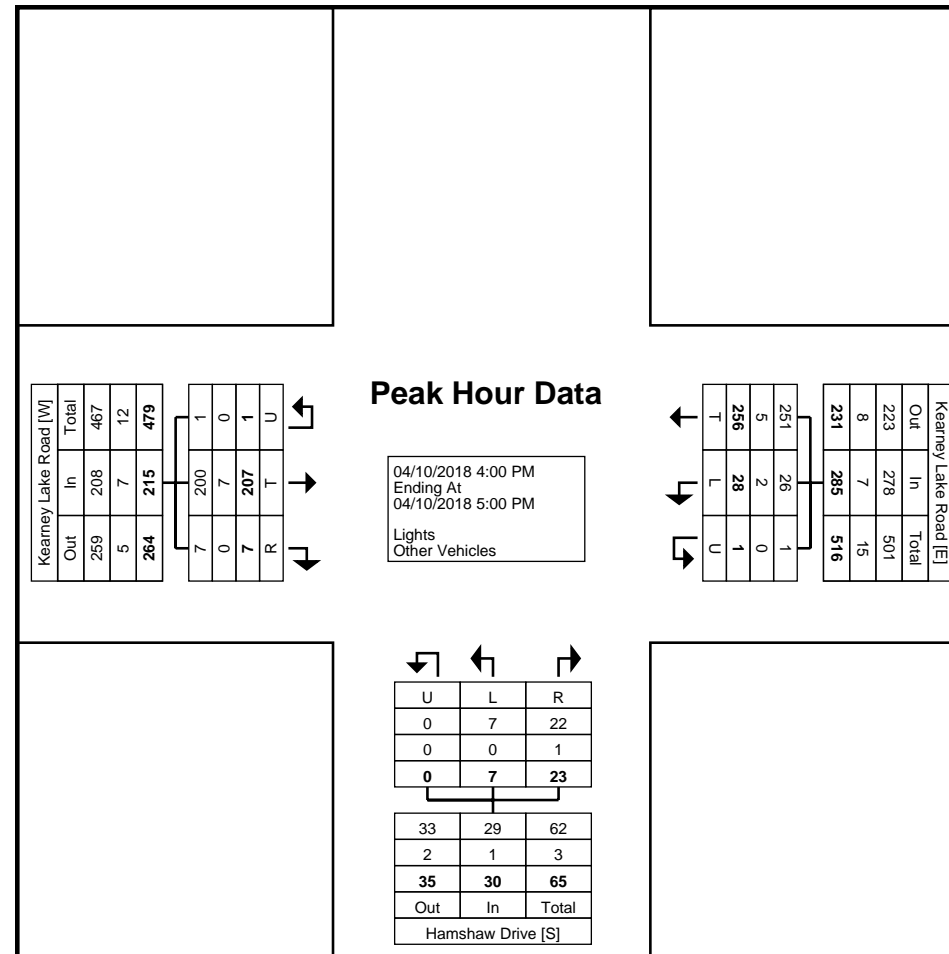
### Turning Movement Peak Hour Data (4:00 PM)

Start Time	Kearney Lake Road Westbound				Hamshaw Drive Northbound				Kearney Lake Road Eastbound				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
4:00 PM	64	12	0	76	8	2	0	10	1	56	0	57	143
4:15 PM	69	4	0	73	2	2	0	4	3	46	0	49	126
4:30 PM	60	6	1	67	9	2	0	11	2	58	0	60	138
4:45 PM	63	6	0	69	4	1	0	5	1	47	1	49	123
Total	256	28	1	285	23	7	0	30	7	207	1	215	530
Approach %	89.8	9.8	0.4	-	76.7	23.3	0.0	-	3.3	96.3	0.5	-	-
Total %	48.3	5.3	0.2	53.8	4.3	1.3	0.0	5.7	1.3	39.1	0.2	40.6	-
PHF	0.928	0.583	0.250	0.938	0.639	0.875	0.000	0.682	0.583	0.892	0.250	0.896	0.927
Lights	251	26	1	278	22	7	0	29	7	200	1	208	515
% Lights	98.0	92.9	100.0	97.5	95.7	100.0	-	96.7	100.0	96.6	100.0	96.7	97.2
Other Vehicles	5	2	0	7	1	0	0	1	0	7	0	7	15
% Other Vehicles	2.0	7.1	0.0	2.5	4.3	0.0	-	3.3	0.0	3.4	0.0	3.3	2.8



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Count Name: Kearney Lake Road & Hamshaw  
Drive  
Site Code:  
Start Date: 04/10/2018  
Page No: 9



Turning Movement Peak Hour Data Plot (4:00 PM)



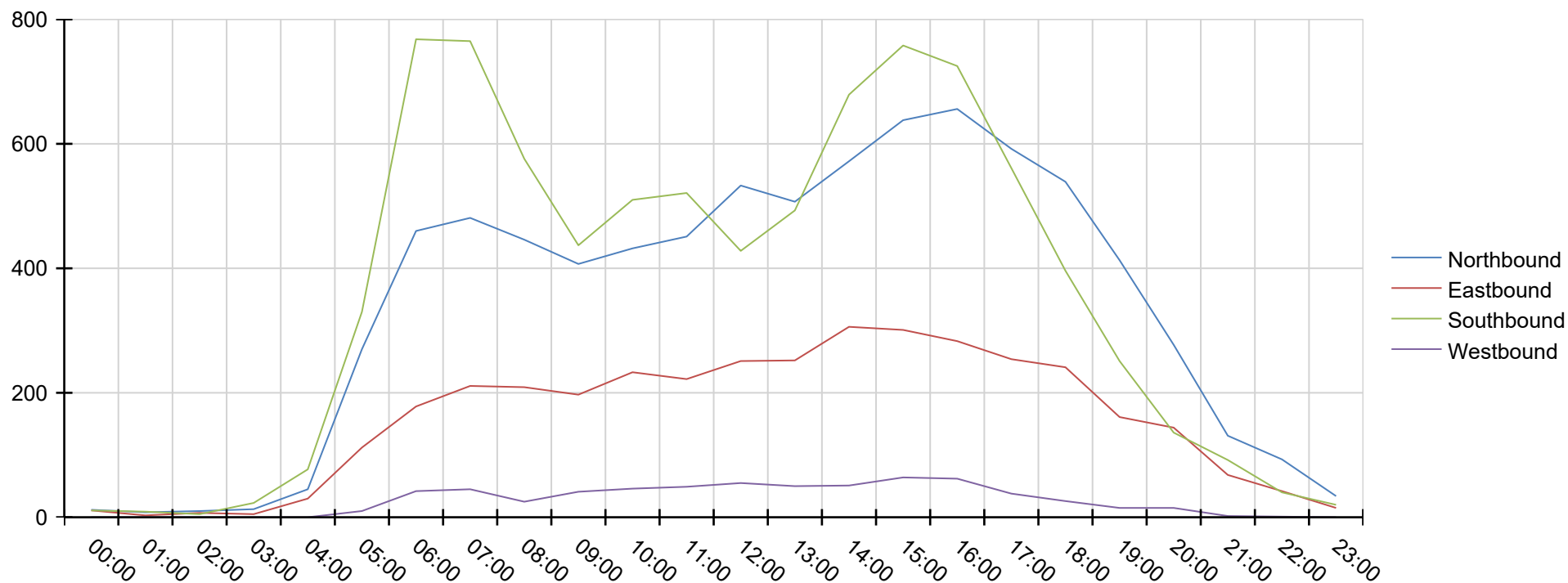
Harbourside Transportation Consultants  
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Count Name: Kearney Lake Road & Hamshaw  
Drive  
Site Code:  
Start Date: 04/10/2018  
Page No: 10

**Intersection** Larry Uteck Blv & Kearney Lake Rd

**Date** 10/26/2021

	Right	Through	Left	UTurn	Total
Northbound	310	7258	451	1	8020
Eastbound	399	117	3220		3736
Southbound	3	8480	127	1	8611
Westbound	27	56	554		637
<b>Total</b>	<b>739</b>	<b>15911</b>	<b>4352</b>	<b>2</b>	<b>21004</b>





# Turning Movement Counts

**Intersection** Larry Uteck Blv & Kearney Lake Rd

**Date** 10/26/2021

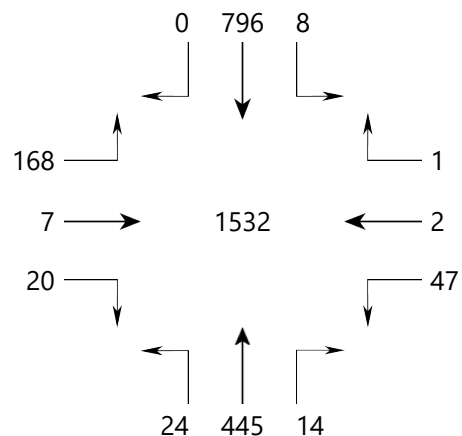
	Northbound				Eastbound			Southbound				Westbound		
	R	T	L	U	R	T	L	R	T	L	U	R	T	L
00:00	1	11			1	1	9		11					
01:00		7	1		1		2		9					
02:00		9	1		1		6		4	1				
03:00	3	9	1		1	1	3		22	1				
04:00	3	37	5		2	1	27		73	4				
05:00	4	262	4		3	8	101		315	15			4	6
06:00	11	430	19		15	11	152		755	13			2	40
07:00	21	433	26	1	26	2	183		762	3		2	2	41
08:00	14	401	31		32	4	173	1	571	4		1	2	22
09:00	25	356	26		21	3	173		433	4		2	1	38
10:00	25	380	27		27	3	203		505	5		2	3	41
11:00	18	405	28		41	10	171		514	7		4	2	43
12:00	36	460	37		22	5	224		422	6		4	4	47
13:00	26	453	28		23	3	226		492	1		2	4	44
14:00	26	510	36		32	7	267	2	673	4		1	4	46
15:00	25	573	40		39	8	254		750	8		3	5	56
16:00	35	579	42		30	11	242		719	5	1	1	9	52
17:00	13	555	24		35	10	209		547	14		3	3	32
18:00	11	496	32		20	11	210		381	15		1	4	21
19:00	10	385	18		9	6	146		246	5		1	3	11
20:00		261	16		8	6	130		133	3			4	11
21:00		125	6		6	2	60		87	5				2
22:00	2	89	2		4	2	36		39	1				1
23:00	1	32	1			2	13		17	3				
Total	310	7258	451	1	399	117	3220	3	8480	127	1	27	56	554

**Intersection** Larry Uteck Blv & Kearney Lake Rd

**Date** 10/26/2021

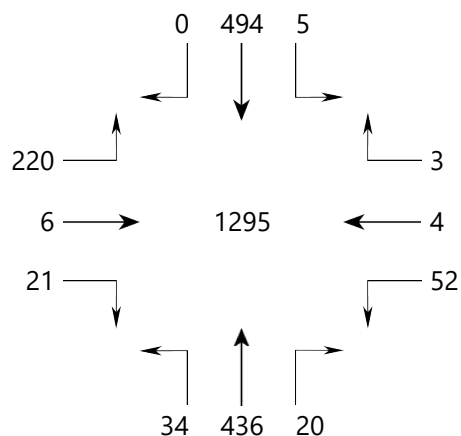
### AM PEAK HOUR VOLUME (0:00-10:45)

FROM 06:15 TO 07:15



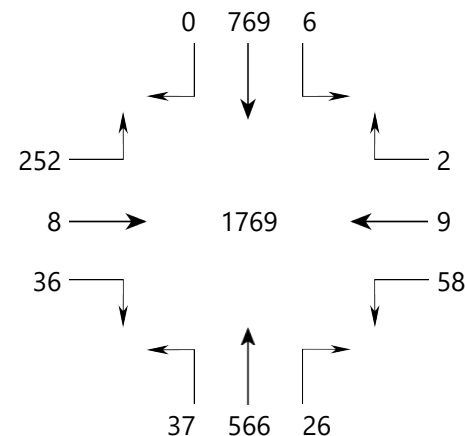
### MID-DAY PEAK HOUR VOLUME (11:00-14:00)

FROM 12:45 TO 13:45



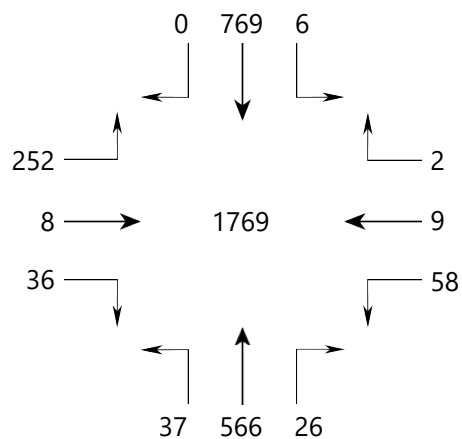
### PM PEAK HOUR VOLUME (14:15-23:45)

FROM 15:15 TO 16:15



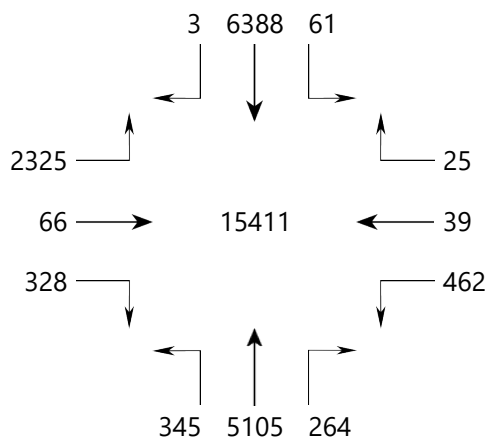
### OVERALL PEAK HOUR VOLUME

FROM 15:15 TO 16:15



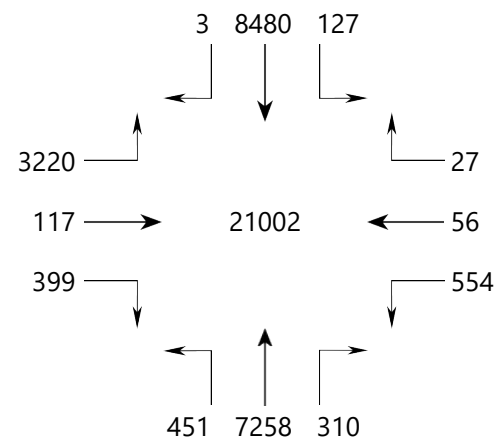
### DAYTIME TOTAL VOLUME

FROM 07:00 TO 18:00



### SELECTED TIME VOLUME

FROM 00:00 TO 23:59





For Project:	6F Kearney Lake Rd					
Project Notes:	Between Hamshaw Drive & Highway 102					
Location/Name:	Westbound					
Report Generated:	2022-01-26	12:31				
Speed Intervals	1 km/h					
Time Intervals	Instant					
Traffic Report From	2021-11-04	00:00:00	through	2021-11-10	23:59:59	
85th Percentile Speed	72 km/h					
85th Percentile Vehicles	22858					
Max Speed	112 km/h	on	2021-11-07	03:57:07		
Total Vehicles	26892					
AADT:	3841					

Volumes - weekly counts

Time	5 Day	7 Day
Average Daily	3957	3841
AM Peak	11:00 204	231
PM Peak	06:00 376	342

Speed

Speed Limit:	50
85th Percentile Speed:	72
Average Speed:	62.63

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	3471	3514	3467	3497	3736	3529	3060
% over limit	89.2	90.6	86.7	90.3	90.1	92.1	93.5
Avg Speeder	64.4	65.1	63.3	64.5	64.5	65.5	65.7

Class Counts

	Number	%
VEH_SM	122	0.5
VEH_MED	26152	97.2
VEH_LG	618	2.3
[VEH_SM=motorcycle,	VEH_MED = sedan,	VEH_LG = truck]

For Project:	6F Kearney Lake Rd				
Project Notes:	Between Hamshaw Drive & Highway 102				
Location/Name:	Eastbound				
Report Generated:	2022-01-26	12:31			
Speed Intervals	1 km/h				
Time Intervals	Instant				
Traffic Report From	2021-11-04	00:00:00	through	2021-11-10	23:59:59
85th Percentile Speed	70 km/h				
85th Percentile Vehicles	26399				
Max Speed	130 km/h	on	2021-11-08	12:55:12	
Total Vehicles	31058				
AADT:	4436				

Volumes - weekly counts

Time	5 Day	7 Day
Average Daily	4605	4436
AM Peak	08:00 417	335
PM Peak	05:00 379	353

Speed

Speed Limit:	50
85th Percentile Speed:	70
Average Speed:	61.08

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	4065	4050	3797	4245	4367	3796	3166
% over limit	89.1	88.7	89.7	89.6	88.6	84.7	89.3
Avg Speeder	63.2	62.6	62.9	62.8	63.2	64.0	64.0

Class Counts

	Number	%
VEH_SM	358	1.2
VEH_MED	30014	96.6
VEH_LG	686	2.2
[VEH_SM=motorcycle,	VEH_MED = sedan,	VEH_LG = truck]

For Project:	6F Kearney Lake Rd				
Project Notes:	Between Hamshaw Drive & Highway 102				
Location/Name:	Merged				
Report Generated:	2022-01-26	12:29			
Speed Intervals	1 km/h				
Time Intervals	Instant				
Traffic Report From	2021-11-04	00:00:00	through	2021-11-10	23:59:59
85th Percentile Speed	71 km/h				
85th Percentile Vehicles	49258				
Max Speed	130 km/h	on	2021-11-08	12:55:12	
Total Vehicles	57950				
AADT:	8278				

Volumes - weekly counts

Time	5 Day	7 Day
Average Daily	8563	8278
AM Peak	08:00 610	534
PM Peak	05:00 733	695

Speed

Speed Limit:	50
85th Percentile Speed:	71
Average Speed:	61.8

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	7536	7564	7264	7742	8103	7325	6226
% over limit	89.2	89.6	88.2	89.9	89.3	88.1	91.3
Avg Speeder	63.7	63.8	63.1	63.6	63.8	64.7	64.8

Class Counts

	Number	%
VEH_SM	480	0.8
VEH_MED	56166	96.9
VEH_LG	1304	2.3
[VEH_SM=motorcycle,	VEH_MED = sedan,	VEH_LG = truck]



## **Appendix B: Base Year Operations Synchro Reports**


















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# Lanes, Volumes, Timings

Base Year

1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	859	0	0	297	514	51	0	91	0	0	0
Future Volume (vph)	13	859	0	0	297	514	51	0	91	0	0	0
Satd. Flow (prot)	1789	1865	0	0	3444	1585	0	1617	0	0	0	0
Flt Permitted	0.449							0.983				
Satd. Flow (perm)	846	1865	0	0	3444	1585	0	1617	0	0	0	0
Satd. Flow (RTOR)						559		110				
Lane Group Flow (vph)	30	934	0	0	362	559	0	162	0	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Split	NA				
Protected Phases	5	5 6			6		8 16	8 16				
Permitted Phases	5 6					6						
Total Split (s)	29.0				44.5	44.5						
Total Lost Time (s)	4.0				4.5	4.5						
Act Effect Green (s)	100.6	104.6			40.0	40.0		19.2				
Actuated g/C Ratio	0.76	0.79			0.30	0.30		0.14				
v/c Ratio	0.03	0.64			0.35	0.64		0.49				
Control Delay	0.2	1.8			37.7	6.7		23.7				
Queue Delay	0.0	9.3			0.0	0.0		0.0				
Total Delay	0.2	11.1			37.7	6.7		23.7				
LOS	A	B			D	A		C				
Approach Delay		10.8			18.9			23.7				
Approach LOS		B			B			C				
Queue Length 50th (m)	0.0	11.1			38.2	0.0		12.2				
Queue Length 95th (m)	m0.0	m8.3			49.7	29.3		33.6				
Internal Link Dist (m)		122.5			253.7			333.0			241.0	
Turn Bay Length (m)						80.0						
Base Capacity (vph)	1066	1468			1037	868		393				
Starvation Cap Reductn	0	503			0	0		0				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.03	0.97			0.35	0.64		0.41				

## Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 132.8

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.28

Intersection Signal Delay: 15.5

Intersection LOS: B

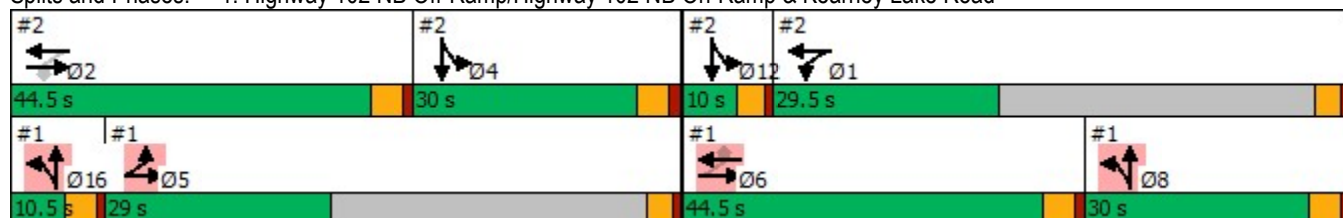
Intersection Capacity Utilization 91.0%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road





















# Lanes, Volumes, Timings

Base Year

## 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	379	130	124	224	0	0	0	0	493	3	9
Future Volume (vph)	0	379	130	124	224	0	0	0	0	493	3	9
Satd. Flow (prot)	0	1847	1585	1690	1865	0	0	0	0	0	1778	1445
Flt Permitted				0.196							0.953	
Satd. Flow (perm)	0	1847	1534	349	1865	0	0	0	0	0	1778	1445
Satd. Flow (RTOR)			143									179
Lane Group Flow (vph)	0	431	143	138	311	0	0	0	0	0	600	18
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Free
Protected Phases		2		1	1 2					4 12	4 12	
Permitted Phases			2	1 2								Free
Total Split (s)		44.5	44.5	29.5								
Total Lost Time (s)		4.5	4.5	4.5								
Act Effect Green (s)		40.0	40.0	83.8	88.3						35.0	132.8
Actuated g/C Ratio		0.30	0.30	0.63	0.66						0.26	1.00
v/c Ratio		0.78	0.25	0.21	0.25						1.28	0.01
Control Delay		53.5	6.6	1.9	3.4						181.8	0.0
Queue Delay		0.0	0.0	0.0	0.7						0.0	0.0
Total Delay		53.5	6.6	1.9	4.1						181.8	0.0
LOS		D	A	A	A						F	A
Approach Delay		41.8			3.4						176.5	
Approach LOS		D			A						F	
Queue Length 50th (m)		100.9	0.0	1.7	4.0						~194.5	0.0
Queue Length 95th (m)		144.8	15.7	2.2	3.4						106.2	0.0
Internal Link Dist (m)		371.8			122.5			172.2			265.4	
Turn Bay Length (m)			150.0									70.0
Base Capacity (vph)		556	562	838	1239						469	1445
Starvation Cap Reductn		0	0	0	616						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.78	0.25	0.16	0.50						1.28	0.01

### Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 132.8

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.28

Intersection Signal Delay: 82.0

Intersection LOS: F

Intersection Capacity Utilization 91.0%

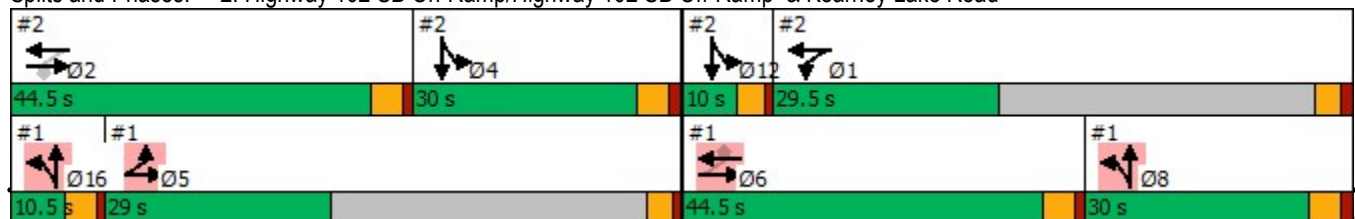
ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

### Splits and Phases: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road



Harbourside Transportation Consultants




Synchro 11 Report

232012

Page 2

HCM 6th TWSC  
3: Hamshaw Drive & Kearney Lake Road























Base Year  
AM Peak Hour

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	472	3	17	216	3	37
Future Vol, veh/h	472	3	17	216	3	37
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	50	57	76	25	73
Heavy Vehicles, %	3	2	6	7	2	6
Mvmt Flow	502	6	30	284	12	51
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	512	0	853	509
Stage 1	-	-	-	-	509	-
Stage 2	-	-	-	-	344	-
Critical Hdwy	-	-	4.16	-	6.42	6.26
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.354
Pot Cap-1 Maneuver	-	-	1033	-	330	556
Stage 1	-	-	-	-	604	-
Stage 2	-	-	-	-	718	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1029	-	317	554
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	693	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.8		13.5		
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	485	-	-	1029	-	
HCM Lane V/C Ratio	0.129	-	-	0.029	-	
HCM Control Delay (s)	13.5	-	-	8.6	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-	

# Lanes, Volumes, Timings

## 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Base Year  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	577	434	32	406	15	175	5	33	23	3	2
Future Volume (vph)	5	577	434	32	406	15	175	5	33	23	3	2
Satd. Flow (prot)	1789	1883	1601	1789	1874	0	1789	1635	0	1789	1770	0
Flt Permitted	0.466			0.322			0.754			0.730		
Satd. Flow (perm)	878	1883	1601	606	1874	0	1420	1635	0	1375	1770	0
Satd. Flow (RTOR)			472		4			36			2	
Lane Group Flow (vph)	5	627	472	35	457	0	190	41	0	25	5	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	56.8	56.8	56.8	56.8	56.8		26.0	26.0		26.0	26.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		6.0	6.0		6.0	6.0	
Act Effect Green (s)	27.3	27.3	27.3	27.3	27.3		12.5	12.5		12.5	12.5	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52		0.24	0.24		0.24	0.24	
v/c Ratio	0.01	0.65	0.45	0.11	0.47		0.57	0.10		0.08	0.01	
Control Delay	7.4	13.7	2.5	8.7	10.7		25.7	8.6		17.6	14.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.4	13.7	2.5	8.7	10.7		25.7	8.6		17.6	14.8	
LOS	A	B	A	A	B		C	A		B	B	
Approach Delay		8.9			10.5			22.6			17.1	
Approach LOS		A			B			C			B	
Queue Length 50th (m)	0.2	36.7	0.0	1.5	23.4		13.7	0.3		1.6	0.2	
Queue Length 95th (m)	1.6	83.8	11.6	6.3	54.1		38.5	6.7		7.6	2.5	
Internal Link Dist (m)		283.3			325.5			358.1			14.5	
Turn Bay Length (m)	35.0		250.0	160.0			30.0					
Base Capacity (vph)	806	1729	1509	556	1721		553	658		535	690	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.36	0.31	0.06	0.27		0.34	0.06		0.05	0.01	

### Intersection Summary

Cycle Length: 82.8

Actuated Cycle Length: 53

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 11.2

Intersection LOS: B

Intersection Capacity Utilization 57.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard





### 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.1	0.4	0.0	0.0	0.6
Denied Del/Veh (s)	0.0	0.2	0.8	3.1	0.2	0.2	1.1
Total Delay (hr)	0.0	2.6	2.2	0.6	0.7	0.1	6.4
Total Del/Veh (s)	12.9	10.8	26.6	4.3	47.1	4.6	12.3
Stop Delay (hr)	0.0	1.3	1.8	0.0	0.7	0.0	3.8
Stop Del/Veh (s)	7.7	5.3	22.0	0.0	43.0	0.8	7.4

### 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.4
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	9.7	35.0	14.6	3.6
Total Delay (hr)	3.7	0.2	1.6	1.5	8.4	0.0	0.1	15.5
Total Del/Veh (s)	33.8	5.1	44.7	23.3	61.0	87.7	41.1	40.2
Stop Delay (hr)	2.9	0.1	1.4	1.2	7.1	0.0	0.1	12.9
Stop Del/Veh (s)	26.9	3.5	41.0	17.8	51.5	68.9	31.8	33.3

### 3: Hamshaw Drive & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.4	0.2	0.0	0.0	0.2	0.1	0.2
Total Delay (hr)	0.2	0.0	0.0	0.3	0.0	0.0	0.5
Total Del/Veh (s)	1.2	0.5	7.6	4.1	13.6	4.6	2.4
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.0	0.0	1.7	0.2	11.0	4.3	0.4

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.3	0.4	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	3.0	1.7	3.2	3.3	0.4	0.5	3.4	0.5	0.5	0.1	0.1	0.1
Total Delay (hr)	0.0	1.5	0.5	0.2	0.9	0.0	0.9	0.0	0.1	0.1	0.0	0.0
Total Del/Veh (s)	14.7	9.1	3.9	19.2	7.7	4.4	18.4	17.9	8.0	13.0	13.5	7.2
Stop Delay (hr)	0.0	0.6	0.0	0.1	0.4	0.0	0.7	0.0	0.1	0.1	0.0	0.0
Stop Del/Veh (s)	10.6	3.7	0.0	17.1	3.3	2.2	14.7	13.3	6.8	11.7	11.2	7.1

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	All
Denied Delay (hr)	0.9
Denied Del/Veh (s)	1.9
Total Delay (hr)	4.1
Total Del/Veh (s)	8.7
Stop Delay (hr)	2.0
Stop Del/Veh (s)	4.3

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Total Network Performance

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Denied Delay (hr)	2.9
Denied Del/Veh (s)	2.8
Total Delay (hr)	30.7
Total Del/Veh (s)	29.1
Stop Delay (hr)	19.4
Stop Del/Veh (s)	18.4

Intersection: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	NB
Directions Served	L	T	T	T	LTR
Maximum Queue (m)	129.4	42.6	46.8	57.5	48.5
Average Queue (m)	39.9	23.9	16.9	26.5	13.9
95th Queue (m)	128.0	52.7	36.0	49.1	32.6
Link Distance (m)	126.1		269.3	269.3	346.2
Upstream Blk Time (%)	2				
Queuing Penalty (veh)	19				
Storage Bay Dist (m)		35.0			
Storage Blk Time (%)	0	9			
Queuing Penalty (veh)	0	2			

Intersection: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	R	L	T	LT	R
Maximum Queue (m)	118.1	35.8	54.2	81.7	268.8	69.8
Average Queue (m)	61.6	11.7	25.8	32.3	105.7	4.2
95th Queue (m)	102.0	28.1	48.0	72.3	237.0	32.9
Link Distance (m)	378.9		126.1	126.1	278.2	
Upstream Blk Time (%)					6	
Queuing Penalty (veh)					0	
Storage Bay Dist (m)		150.0				70.0
Storage Blk Time (%)	0				24	0
Queuing Penalty (veh)	0				3	0

Intersection: 3: Hamshaw Drive & Kearney Lake Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	19.7	20.5
Average Queue (m)	3.0	7.3
95th Queue (m)	13.5	16.5
Link Distance (m)	378.9	188.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	TR	L	TR	L	TR
Maximum Queue (m)	14.7	54.6	17.9	49.4	35.7	35.5	15.7	8.6
Average Queue (m)	0.8	29.0	6.2	23.6	20.0	7.0	4.3	1.6
95th Queue (m)	6.1	47.8	14.9	41.3	33.1	21.6	12.4	7.1
Link Distance (m)		295.4		338.9		371.8	26.6	26.6
Upstream Blk Time (%)							0	
Queuing Penalty (veh)							0	
Storage Bay Dist (m)	35.0		160.0		30.0			
Storage Blk Time (%)		2			2	0		
Queuing Penalty (veh)		10			1	0		

Network Summary


















Network wide Queuing Penalty: 34

# Lanes, Volumes, Timings

Base Year

1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	728	0	0	357	770	111	0	181	0	0	0
Future Volume (vph)	34	728	0	0	357	770	111	0	181	0	0	0
Satd. Flow (prot)	1722	1883	0	0	3579	1601	0	1691	0	0	0	0
Flt Permitted	0.411							0.980				
Satd. Flow (perm)	745	1883	0	0	3579	1601	0	1691	0	0	0	0
Satd. Flow (RTOR)						875		110				
Lane Group Flow (vph)	53	766	0	0	384	875	0	340	0	0	0	0
Turn Type	pm+pt	NA			NA	Free	Split	NA				
Protected Phases	5	5 6			6		8 16	8 16				
Permitted Phases	5 6					Free						
Total Split (s)	29.0				44.5							
Total Lost Time (s)	4.0				4.5							
Act Effect Green (s)	100.6	104.7			40.1	144.2		30.5				
Actuated g/C Ratio	0.70	0.73			0.28	1.00		0.21				
v/c Ratio	0.06	0.56			0.39	0.55		0.77				
Control Delay	0.2	1.4			44.2	1.3		47.6				
Queue Delay	0.0	3.5			0.0	0.0		0.0				
Total Delay	0.2	4.9			44.2	1.3		47.6				
LOS	A	A			D	A		D				
Approach Delay		4.6			14.4			47.6				
Approach LOS		A			B			D				
Queue Length 50th (m)	0.0	4.5			47.7	0.0		63.6				
Queue Length 95th (m)	m0.0	m0.0			64.7	0.0		99.4				
Internal Link Dist (m)		122.5			253.7			333.0			241.0	
Turn Bay Length (m)						80.0						
Base Capacity (vph)	927	1366			994	1601		447				
Starvation Cap Reductn	0	491			0	0		0				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.06	0.88			0.39	0.55		0.76				

## Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 144.2

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.27

Intersection Signal Delay: 15.8

Intersection LOS: B

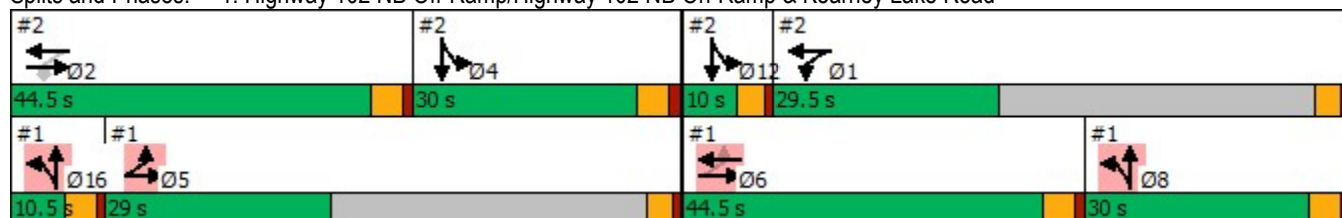
Intersection Capacity Utilization 71.9%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road





















# Lanes, Volumes, Timings

Base Year

## 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	287	146	123	345	0	0	0	0	475	2	29
Future Volume (vph)	0	287	146	123	345	0	0	0	0	475	2	29
Satd. Flow (prot)	0	1883	1601	1772	1883	0	0	0	0	0	1795	1601
Flt Permitted				0.262							0.953	
Satd. Flow (perm)	0	1883	1564	488	1883	0	0	0	0	0	1795	1601
Satd. Flow (RTOR)			162									179
Lane Group Flow (vph)	0	354	162	143	356	0	0	0	0	0	554	34
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Free
Protected Phases		2		1	1 2					4 12	4 12	
Permitted Phases			2	1 2								Free
Total Split (s)		44.5	44.5	29.5								
Total Lost Time (s)		4.5	4.5	4.5								
Act Effect Green (s)		40.1	40.1	95.1	99.6						35.1	144.2
Actuated g/C Ratio		0.28	0.28	0.66	0.69						0.24	1.00
v/c Ratio		0.68	0.29	0.18	0.27						1.27	0.02
Control Delay		54.7	7.2	1.1	2.6						182.7	0.0
Queue Delay		0.0	0.0	0.0	1.0						0.0	0.0
Total Delay		54.7	7.2	1.1	3.6						182.7	0.0
LOS		D	A	A	A						F	A
Approach Delay		39.8			2.9						172.2	
Approach LOS		D			A						F	
Queue Length 50th (m)		92.0	0.0	1.0	2.6						~203.2	0.0
Queue Length 95th (m)		114.0	17.6	m1.1	2.4						#281.2	0.0
Internal Link Dist (m)		371.8			122.5			172.2			265.4	
Turn Bay Length (m)			150.0									70.0
Base Capacity (vph)		522	551	865	1297						436	1601
Starvation Cap Reductn		0	0	0	681						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.68	0.29	0.17	0.58						1.27	0.02

### Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 144.2

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.27

Intersection Signal Delay: 76.9

Intersection LOS: E

Intersection Capacity Utilization 71.9%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

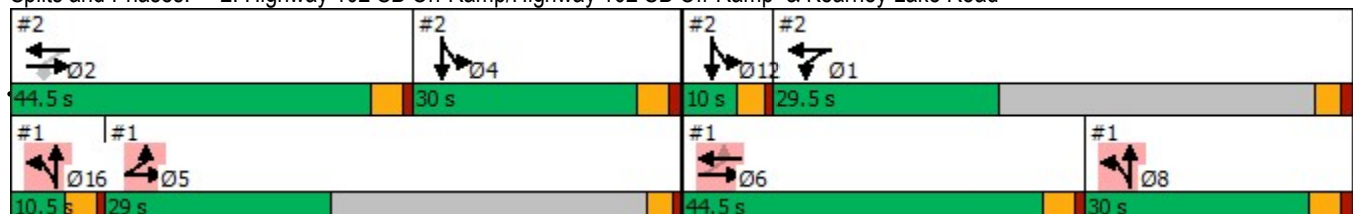
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.




### Splits and Phases: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road



# HCM 6th TWSC

## 3: Hamshaw Drive & Kearney Lake Road























Base Year  
PM Peak Hour

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	409	8	30	344	8	24
Future Vol, veh/h	409	8	30	344	8	24
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	58	58	93	88	64
Heavy Vehicles, %	3	2	7	2	2	4
Mvmt Flow	460	14	52	370	9	38
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	475	0	942	468
Stage 1	-	-	-	-	468	-
Stage 2	-	-	-	-	474	-
Critical Hdwy	-	-	4.17	-	6.42	6.24
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.263	-	3.518	3.336
Pot Cap-1 Maneuver	-	-	1061	-	292	591
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1060	-	274	590
Mov Cap-2 Maneuver	-	-	-	-	274	-
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	587	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	1.1		13.3		
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	482	-	-	1060	-	
HCM Lane V/C Ratio	0.097	-	-	0.049	-	
HCM Control Delay (s)	13.3	-	-	8.6	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-	

# Lanes, Volumes, Timings

## 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Base Year  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	727	300	43	585	36	245	12	31	53	10	2
Future Volume (vph)	6	727	300	43	585	36	245	12	31	53	10	2
Satd. Flow (prot)	1789	1883	1601	1789	1866	0	1789	1678	0	1789	1840	0
Flt Permitted	0.280			0.195			0.749			0.726		
Satd. Flow (perm)	527	1883	1601	367	1866	0	1411	1678	0	1367	1840	0
Satd. Flow (RTOR)			326		7			34			2	
Lane Group Flow (vph)	7	790	326	47	675	0	266	47	0	58	13	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	56.8	56.8	56.8	56.8	56.8		26.0	26.0		26.0	26.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		6.0	6.0		6.0	6.0	
Act Effect Green (s)	34.4	34.4	34.4	34.4	34.4		16.5	16.5		16.5	16.5	
Actuated g/C Ratio	0.54	0.54	0.54	0.54	0.54		0.26	0.26		0.26	0.26	
v/c Ratio	0.02	0.78	0.32	0.24	0.67		0.74	0.10		0.17	0.03	
Control Delay	7.3	18.5	1.9	11.7	14.6		38.1	11.7		22.7	20.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.3	18.5	1.9	11.7	14.6		38.1	11.7		22.7	20.2	
LOS	A	B	A	B	B		D	B		C	C	
Approach Delay		13.6			14.5			34.2			22.2	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	0.4	70.8	0.0	2.8	54.3		27.6	1.1		5.1	0.9	
Queue Length 95th (m)	1.9	117.3	9.0	8.8	89.6		#76.1	9.4		16.8	5.5	
Internal Link Dist (m)		283.3			325.5			358.1			14.5	
Turn Bay Length (m)	35.0		250.0	160.0			30.0					
Base Capacity (vph)	422	1510	1348	294	1497		457	566		443	597	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.52	0.24	0.16	0.45		0.58	0.08		0.13	0.02	

### Intersection Summary

Cycle Length: 82.8

Actuated Cycle Length: 64.2

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 17.0

Intersection LOS: B

Intersection Capacity Utilization 69.2%

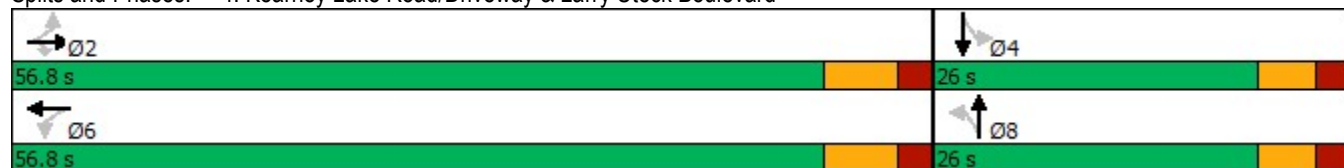
ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard





### 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.1	0.6	0.0	0.0	0.8
Denied Del/Veh (s)	0.1	0.2	1.2	3.0	0.3	0.3	1.4
Total Delay (hr)	0.1	2.5	2.9	1.6	1.9	0.8	9.9
Total Del/Veh (s)	14.6	12.0	29.5	7.6	59.8	16.1	16.2
Stop Delay (hr)	0.1	1.3	2.3	0.1	1.7	0.6	6.0
Stop Del/Veh (s)	9.8	6.2	23.1	0.4	53.0	10.8	9.8

### 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	2.3	0.6	4.0	0.8
Total Delay (hr)	2.5	0.2	1.4	2.7	6.2	0.0	0.2	13.2
Total Del/Veh (s)	30.5	4.9	40.8	27.7	46.8	43.5	20.2	33.5
Stop Delay (hr)	2.0	0.1	1.3	2.0	5.1	0.0	0.1	10.7
Stop Del/Veh (s)	25.0	3.5	37.1	20.8	38.4	28.5	13.1	27.1

### 3: Hamshaw Drive & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.3	0.3	0.1	0.0	0.2	0.1	0.2
Total Delay (hr)	0.1	0.0	0.1	0.5	0.0	0.0	0.8
Total Del/Veh (s)	1.1	0.6	7.4	5.7	11.5	3.9	3.4
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.0	0.0	1.3	0.4	9.2	3.6	0.4

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.3	0.3	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	3.4	1.6	3.1	3.2	0.6	0.7	3.4	0.6	0.6	0.1	0.1	0.1
Total Delay (hr)	0.0	2.4	0.3	0.3	1.7	0.1	1.9	0.1	0.1	0.3	0.1	0.0
Total Del/Veh (s)	22.0	12.0	3.3	28.2	10.2	6.9	26.9	20.7	14.2	20.3	18.5	9.7
Stop Delay (hr)	0.0	1.0	0.0	0.3	0.7	0.0	1.5	0.1	0.1	0.3	0.0	0.0
Stop Del/Veh (s)	16.7	5.1	0.0	25.8	4.4	3.7	22.4	14.8	11.8	19.0	16.0	9.6

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	All
Denied Delay (hr)	1.0
Denied Del/Veh (s)	1.7
Total Delay (hr)	7.2
Total Del/Veh (s)	12.6
Stop Delay (hr)	4.2
Stop Del/Veh (s)	7.2

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Total Network Performance

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Denied Delay (hr)	2.2
Denied Del/Veh (s)	1.8
Total Delay (hr)	36.9
Total Del/Veh (s)	29.2
Stop Delay (hr)	22.2
Stop Del/Veh (s)	17.5

Intersection: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	LTR
Maximum Queue (m)	128.3	42.6	48.7	77.9	63.6	112.5
Average Queue (m)	40.1	27.7	16.4	37.1	4.8	42.7
95th Queue (m)	122.3	51.7	37.2	65.1	34.0	100.1
Link Distance (m)	126.1		269.3	269.3		346.2
Upstream Blk Time (%)	1					
Queuing Penalty (veh)	8					
Storage Bay Dist (m)		35.0			80.0	
Storage Blk Time (%)	0	10		0	0	
Queuing Penalty (veh)	0	4		1	0	

Intersection: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	R	L	T	LT	R
Maximum Queue (m)	90.4	25.9	57.1	105.4	235.6	77.3
Average Queue (m)	45.2	11.7	23.7	52.8	88.0	5.5
95th Queue (m)	76.2	20.5	46.9	102.4	200.8	38.5
Link Distance (m)	378.9		126.1	126.1	278.2	
Upstream Blk Time (%)				0	2	
Queuing Penalty (veh)				0	0	
Storage Bay Dist (m)		150.0				70.0
Storage Blk Time (%)					17	0
Queuing Penalty (veh)					5	0

Intersection: 3: Hamshaw Drive & Kearney Lake Road

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	0.7	138.1	16.1
Average Queue (m)	0.0	8.5	6.3
95th Queue (m)	0.7	73.4	14.1
Link Distance (m)	420.5	378.9	188.9
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	TR	L	TR	L	TR
Maximum Queue (m)	15.0	85.6	21.2	78.7	37.3	67.5	23.9	10.7
Average Queue (m)	1.4	43.6	8.6	36.4	29.4	14.2	9.6	2.7
95th Queue (m)	8.5	73.5	18.6	62.3	41.3	45.7	20.2	9.3
Link Distance (m)		295.4		338.9		371.8	26.6	26.6
Upstream Blk Time (%)							0	
Queuing Penalty (veh)							0	
Storage Bay Dist (m)	35.0		160.0		30.0			
Storage Blk Time (%)		9			12	0		
Queuing Penalty (veh)		26			5	0		

Network Summary

Network wide Queuing Penalty: 50



## **Appendix C: Background (2025) Operations Synchro Reports**


















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# Lanes, Volumes, Timings

Background (2025)

## 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	880	0	0	305	527	53	0	94	0	0	0
Future Volume (vph)	14	880	0	0	305	527	53	0	94	0	0	0
Satd. Flow (prot)	1789	1865	0	0	3444	1585	0	1617	0	0	0	0
Flt Permitted	0.355							0.982				
Satd. Flow (perm)	669	1865	0	0	3444	1585	0	1617	0	0	0	0
Satd. Flow (RTOR)						573		110				
Lane Group Flow (vph)	33	957	0	0	372	573	0	168	0	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Split	NA				
Protected Phases	5	5 6			6		8 16	8 16				
Permitted Phases	5 6					6						
Total Split (s)	92.5				34.0	34.0						
Total Lost Time (s)	4.0				4.5	4.5						
Act Effect Green (s)	116.0	120.0			29.5	29.5		17.5				
Actuated g/C Ratio	0.79	0.82			0.20	0.20		0.12				
v/c Ratio	0.03	0.63			0.54	0.74		0.58				
Control Delay	0.1	1.0			56.1	10.3		31.5				
Queue Delay	0.0	1.7			0.0	0.0		0.0				
Total Delay	0.1	2.6			56.1	10.3		31.5				
LOS	A	A			E	B		C				
Approach Delay		2.5			28.3			31.5				
Approach LOS		A			C			C				
Queue Length 50th (m)	0.0	0.0			52.5	0.0		15.9				
Queue Length 95th (m)	0.0	m0.0			62.4	36.9		40.9				
Internal Link Dist (m)		122.5			253.7			333.0			241.0	
Turn Bay Length (m)						80.0						
Base Capacity (vph)	1212	1521			694	777		289				
Starvation Cap Reductn	0	371			0	0		0				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.03	0.83			0.54	0.74		0.58				

### Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 146.5

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 16.4

Intersection LOS: B

Intersection Capacity Utilization 93.0%

ICU Level of Service F

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

#2  50 s	#2  53 s	#2  10 s	#2  36 s
#1  10.5 s	#1  92.5 s	#1  34 s	#1  12 s

# Lanes, Volumes, Timings

Background (2025)

## 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑						↖	↗
Traffic Volume (vph)	0	389	134	127	230	0	0	0	0	505	4	10
Future Volume (vph)	0	389	134	127	230	0	0	0	0	505	4	10
Satd. Flow (prot)	0	1847	1585	1690	1865	0	0	0	0	0	1778	1445
Flt Permitted				0.191							0.953	
Satd. Flow (perm)	0	1847	1530	340	1865	0	0	0	0	0	1778	1445
Satd. Flow (RTOR)			147									179
Lane Group Flow (vph)	0	442	147	141	319	0	0	0	0	0	616	20
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Free
Protected Phases		2		1	1 2					4 12	4 12	
Permitted Phases			2	1 2								Free
Total Split (s)		50.0	50.0	36.0								
Total Lost Time (s)		4.5	4.5	4.5								
Act Effect Green (s)		45.5	45.5	77.1	81.6						55.4	146.5
Actuated g/C Ratio		0.31	0.31	0.53	0.56						0.38	1.00
v/c Ratio		0.77	0.26	0.30	0.31						0.92	0.01
Control Delay		56.6	6.6	3.6	5.7						62.9	0.0
Queue Delay		0.0	0.0	0.0	2.3						0.0	0.0
Total Delay		56.6	6.6	3.6	8.0						62.9	0.0
LOS		E	A	A	A						E	A
Approach Delay		44.1			6.6						60.9	
Approach LOS		D			A						E	
Queue Length 50th (m)		119.6	0.0	2.8	6.1						169.3	0.0
Queue Length 95th (m)		156.6	16.0	3.3	5.2						95.3	0.0
Internal Link Dist (m)		371.8			122.5			172.2			265.4	
Turn Bay Length (m)			150.0									70.0
Base Capacity (vph)		574	576	469	1038						667	1445
Starvation Cap Reductn		0	0	0	574						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.77	0.26	0.30	0.69						0.92	0.01

### Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 146.5

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 40.2

Intersection LOS: D

Intersection Capacity Utilization 93.0%

ICU Level of Service F

Analysis Period (min) 15




Splits and Phases: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

#2 ↔ Ø2 50 s	#2 ↖ Ø4 53 s	#2 ↖ Ø12 10 s	#2 ↗ Ø1 36 s
#1 ↖ Ø16 10.5 s	#1 ↗ Ø5 92.5 s	#1 ↔ Ø6 34 s	#1 ↖ Ø8 12 s

# HCM 6th TWSC

## 3: Hamshaw Drive & Kearney Lake Road























Background (2025)  
AM Peak Hour

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	484	4	18	222	4	38
Future Vol, veh/h	484	4	18	222	4	38
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	50	57	76	25	73
Heavy Vehicles, %	3	2	6	7	2	6
Mvmt Flow	515	8	32	292	16	52
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	528	0	880	524
Stage 1	-	-	-	-	524	-
Stage 2	-	-	-	-	356	-
Critical Hdwy	-	-	4.16	-	6.42	6.26
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.354
Pot Cap-1 Maneuver	-	-	1019	-	318	545
Stage 1	-	-	-	-	594	-
Stage 2	-	-	-	-	709	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1014	-	304	542
Mov Cap-2 Maneuver	-	-	-	-	304	-
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	682	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.8		14.2	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	458	-	-	1014	-	
HCM Lane V/C Ratio	0.149	-	-	0.031	-	
HCM Control Delay (s)	14.2	-	-	8.7	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-	



## 4: Kearney Lake Road/Driveway &amp; Larry Uteck Boulevard

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	591	445	33	416	16	180	6	34	24	4	3
Future Volume (vph)	6	591	445	33	416	16	180	6	34	24	4	3
Satd. Flow (prot)	1789	1883	1601	1789	1874	0	1789	1646	0	1789	1763	0
Flt Permitted	0.455			0.311			0.753			0.728		
Satd. Flow (perm)	857	1883	1601	586	1874	0	1418	1646	0	1371	1763	0
Satd. Flow (RTOR)			484		4			37			3	
Lane Group Flow (vph)	7	642	484	36	469	0	196	44	0	26	7	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	56.8	56.8	56.8	56.8	56.8		26.0	26.0		26.0	26.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		6.0	6.0		6.0	6.0	
Act Effect Green (s)	28.3	28.3	28.3	28.3	28.3		12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52		0.24	0.24		0.24	0.24	
v/c Ratio	0.02	0.66	0.45	0.12	0.48		0.59	0.11		0.08	0.02	
Control Delay	7.3	13.8	2.4	8.6	10.7		27.0	9.1		18.3	15.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.3	13.8	2.4	8.6	10.7		27.0	9.1		18.3	15.0	
LOS	A	B	A	A	B		C	A		B	B	
Approach Delay		8.9			10.5			23.8			17.6	
Approach LOS		A			B			C			B	
Queue Length 50th (m)	0.3	38.7	0.0	1.5	24.6		14.6	0.5		1.7	0.3	
Queue Length 95th (m)	2.0	86.3	11.6	6.4	55.8		41.1	7.4		8.1	3.1	
Internal Link Dist (m)		283.3			325.5			358.1			14.5	
Turn Bay Length (m)	35.0		250.0	160.0			30.0					
Base Capacity (vph)	780	1713	1500	533	1706		539	649		521	672	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.37	0.32	0.07	0.27		0.36	0.07		0.05	0.01	

## Intersection Summary

Cycle Length: 82.8

Actuated Cycle Length: 54.3

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 11.4



Intersection LOS: B

Intersection Capacity Utilization 58.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Kearney Lake Road/Driveway &amp; Larry Uteck Boulevard

 Ø2	 Ø4
56.8 s	26 s
 Ø6	 Ø8
56.8 s	26 s

### 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.1	0.1	0.4	0.0	0.0	0.6
Denied Del/Veh (s)	0.0	0.2	0.8	3.0	0.2	0.2	1.1
Total Delay (hr)	0.0	2.5	2.9	0.7	0.7	0.1	6.9
Total Del/Veh (s)	11.7	10.2	33.8	4.5	45.7	4.2	13.2
Stop Delay (hr)	0.0	1.2	2.4	0.0	0.6	0.0	4.3
Stop Del/Veh (s)	7.0	4.8	28.5	0.0	41.8	0.4	8.2

### 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.4
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	2.5	5.0	9.3	1.0
Total Delay (hr)	2.9	0.2	1.6	1.5	7.0	0.0	0.1	13.3
Total Del/Veh (s)	25.5	4.9	44.0	21.6	49.9	38.6	35.2	33.3
Stop Delay (hr)	2.2	0.1	1.4	1.0	5.7	0.0	0.1	10.6
Stop Del/Veh (s)	19.4	3.2	39.9	15.2	40.7	27.9	25.8	26.6

### 3: Hamshaw Drive & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.4	0.3	0.0	0.0	0.2	0.1	0.2
Total Delay (hr)	0.2	0.0	0.0	0.3	0.0	0.0	0.6
Total Del/Veh (s)	1.2	0.8	8.4	4.7	12.1	4.2	2.6
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.0	0.0	2.3	0.4	9.7	4.0	0.4

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.3	0.4	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	3.7	1.8	3.2	3.3	0.4	0.5	3.5	0.4	0.5	0.1	0.1	0.1
Total Delay (hr)	0.0	1.6	0.5	0.2	0.9	0.0	1.0	0.0	0.1	0.1	0.0	0.0
Total Del/Veh (s)	14.9	9.6	4.0	17.5	7.8	5.7	18.9	12.1	8.0	14.5	16.2	4.4
Stop Delay (hr)	0.0	0.7	0.0	0.1	0.4	0.0	0.8	0.0	0.1	0.1	0.0	0.0
Stop Del/Veh (s)	10.8	4.0	0.0	15.3	3.4	3.4	15.2	7.8	6.4	13.3	13.7	4.3

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	All
Denied Delay (hr)	1.0
Denied Del/Veh (s)	1.9
Total Delay (hr)	4.4
Total Del/Veh (s)	8.9
Stop Delay (hr)	2.2
Stop Del/Veh (s)	4.5

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Total Network Performance

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Denied Delay (hr)	2.0
Denied Del/Veh (s)	1.8
Total Delay (hr)	29.4
Total Del/Veh (s)	27.0
Stop Delay (hr)	17.7
Stop Del/Veh (s)	16.3

Intersection: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	LTR
Maximum Queue (m)	129.4	42.6	54.0	64.7	8.0	39.6
Average Queue (m)	33.9	24.8	21.2	30.6	0.3	13.7
95th Queue (m)	117.0	52.7	43.7	55.3	5.8	28.7
Link Distance (m)	126.1		269.3	269.3		346.2
Upstream Blk Time (%)	2					
Queuing Penalty (veh)	17					
Storage Bay Dist (m)		35.0			80.0	
Storage Blk Time (%)	0	9		0		
Queuing Penalty (veh)	0	1		0		

Intersection: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	R	L	T	LT	R
Maximum Queue (m)	110.7	38.3	62.0	87.5	244.2	46.5
Average Queue (m)	55.9	12.0	27.5	36.0	97.0	3.3
95th Queue (m)	94.3	29.3	51.5	71.2	204.6	29.2
Link Distance (m)	378.9		126.1	126.1	278.2	
Upstream Blk Time (%)					2	
Queuing Penalty (veh)					0	
Storage Bay Dist (m)		150.0				70.0
Storage Blk Time (%)	0				21	0
Queuing Penalty (veh)	0				3	0

Intersection: 3: Hamshaw Drive & Kearney Lake Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	69.4	20.3
Average Queue (m)	4.7	7.5
95th Queue (m)	43.6	16.4
Link Distance (m)	378.9	188.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	TR	L	TR	L	TR
Maximum Queue (m)	8.8	62.8	19.5	50.1	36.0	33.6	16.0	9.4
Average Queue (m)	1.0	30.0	6.5	24.4	21.2	7.5	4.5	1.8
95th Queue (m)	5.3	49.8	16.0	42.0	34.0	21.0	13.0	7.5
Link Distance (m)		295.4		338.9		371.8	26.6	26.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	35.0		160.0		30.0			
Storage Blk Time (%)		3			3	0		
Queuing Penalty (veh)		13			1	0		


















Network Summary

Network wide Queuing Penalty: 35

# Lanes, Volumes, Timings

Background (2025)

## 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	746	0	0	366	789	114	0	186	0	0	0
Future Volume (vph)	35	746	0	0	366	789	114	0	186	0	0	0
Satd. Flow (prot)	1722	1883	0	0	3579	1601	0	1691	0	0	0	0
Flt Permitted	0.253							0.980				
Satd. Flow (perm)	459	1883	0	0	3579	1601	0	1691	0	0	0	0
Satd. Flow (RTOR)						897		110				
Lane Group Flow (vph)	55	785	0	0	394	897	0	350	0	0	0	0
Turn Type	pm+pt	NA			NA	Free	Split	NA				
Protected Phases	5	5 6			6		8 16	8 16				
Permitted Phases	5 6					Free						
Total Split (s)	86.5				26.0							
Total Lost Time (s)	4.0				4.5							
Act Effect Green (s)	99.1	103.2			21.6	141.2		29.0				
Actuated g/C Ratio	0.70	0.73			0.15	1.00		0.21				
v/c Ratio	0.05	0.57			0.72	0.56		0.81				
Control Delay	0.2	1.0			66.6	1.4		51.9				
Queue Delay	0.0	0.9			0.0	0.0		0.1				
Total Delay	0.2	2.0			66.6	1.4		52.0				
LOS	A	A			E	A		D				
Approach Delay		1.8			21.3			52.0				
Approach LOS		A			C			D				
Queue Length 50th (m)	0.0	0.0			59.4	0.0		69.2				
Queue Length 95th (m)	m0.0	0.0			78.2	0.0		#112.9				
Internal Link Dist (m)		122.5			253.7			333.0			241.0	
Turn Bay Length (m)						80.0						
Base Capacity (vph)	1071	1367			548	1601		429				
Starvation Cap Reductn	0	309			0	0		0				
Spillback Cap Reductn	0	0			0	0		1				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.05	0.74			0.72	0.56		0.82				

### Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 141.2

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 19.0

Intersection LOS: B

Intersection Capacity Utilization 73.3%

ICU Level of Service D





Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

#2 	#2 	#2 	#2 
45 s	52 s	10 s	42 s
#1 	#1 	#1 	#1 
10.5 s	86.5 s	26 s	26 s

# Lanes, Volumes, Timings

Background (2025)

## 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group												
Lane Configurations		↑	↗	↖	↑						↖	↗
Traffic Volume (vph)	0	294	150	126	354	0	0	0	0	487	3	30
Future Volume (vph)	0	294	150	126	354	0	0	0	0	487	3	30
Satd. Flow (prot)	0	1883	1601	1772	1883	0	0	0	0	0	1795	1601
Flt Permitted				0.267							0.953	
Satd. Flow (perm)	0	1883	1559	497	1883	0	0	0	0	0	1795	1601
Satd. Flow (RTOR)			167									179
Lane Group Flow (vph)	0	363	167	147	365	0	0	0	0	0	569	35
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Free
Protected Phases		2		1	1 2					4 12	4 12	
Permitted Phases			2	1 2								Free
Total Split (s)		45.0	45.0	42.0								
Total Lost Time (s)		4.5	4.5	4.5								
Act Effect Green (s)		40.8	40.8	75.8	80.3						51.3	141.2
Actuated g/C Ratio		0.29	0.29	0.54	0.57						0.36	1.00
v/c Ratio		0.67	0.29	0.25	0.34						0.87	0.02
Control Delay		53.1	7.1	1.9	4.1						57.4	0.0
Queue Delay		0.0	0.0	0.0	2.6						0.0	0.0
Total Delay		53.1	7.1	1.9	6.7						57.4	0.0
LOS		D	A	A	A						E	A
Approach Delay		38.6			5.3						54.0	
Approach LOS		D			A						D	
Queue Length 50th (m)		96.8	0.0	1.5	4.0						151.2	0.0
Queue Length 95th (m)		116.6	17.5	m1.7	m113.0						201.7	0.0
Internal Link Dist (m)		371.8			122.5			172.2			265.4	
Turn Bay Length (m)			150.0									70.0
Base Capacity (vph)		543	568	613	1065						665	1601
Starvation Cap Reductn		0	0	0	566						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.67	0.29	0.24	0.73						0.86	0.02

### Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 141.2

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 33.9

Intersection LOS: C

Intersection Capacity Utilization 73.3%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.




Splits and Phases: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

#2 ↔ Ø2	#2 ↖ Ø4	#2 ↖ Ø12	#2 ↗ Ø1
45 s	52 s	10 s	42 s
#1 ↖ Ø16	#1 ↗ Ø5	#1 ↔ Ø6	#1 ↖ Ø8
10.5 s	86.5 s	26 s	26 s

# HCM 6th TWSC

## 3: Hamshaw Drive & Kearney Lake Road

Background (2025)  
PM Peak Hour

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	419	9	31	353	9	25
Future Vol, veh/h	419	9	31	353	9	25
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	58	58	93	88	64
Heavy Vehicles, %	3	2	7	2	2	4
Mvmt Flow	471	16	53	380	10	39
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	489	0	967	481
Stage 1	-	-	-	-	481	-
Stage 2	-	-	-	-	486	-
Critical Hdwy	-	-	4.17	-	6.42	6.24
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.263	-	3.518	3.336
Pot Cap-1 Maneuver	-	-	1049	-	282	581
Stage 1	-	-	-	-	622	-
Stage 2	-	-	-	-	618	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1047	-	263	580
Mov Cap-2 Maneuver	-	-	-	-	263	-
Stage 1	-	-	-	-	621	-
Stage 2	-	-	-	-	578	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.1		13.7	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	464	-	-	1047	-	
HCM Lane V/C Ratio	0.106	-	-	0.051	-	
HCM Control Delay (s)	13.7	-	-	8.6	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-	

























# Lanes, Volumes, Timings

## 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Background (2025)

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	745	308	45	600	37	251	13	32	55	11	3
Future Volume (vph)	7	745	308	45	600	37	251	13	32	55	11	3
Satd. Flow (prot)	1789	1883	1601	1789	1866	0	1789	1682	0	1789	1827	0
Flt Permitted	0.267			0.180			0.748			0.725		
Satd. Flow (perm)	503	1883	1601	339	1866	0	1409	1682	0	1365	1827	0
Satd. Flow (RTOR)			335		7			35			3	
Lane Group Flow (vph)	8	810	335	49	692	0	273	49	0	60	15	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	56.8	56.8	56.8	56.8	56.8		26.0	26.0		26.0	26.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		6.0	6.0		6.0	6.0	
Act Effect Green (s)	35.2	35.2	35.2	35.2	35.2		17.0	17.0		17.0	17.0	
Actuated g/C Ratio	0.54	0.54	0.54	0.54	0.54		0.26	0.26		0.26	0.26	
v/c Ratio	0.03	0.80	0.33	0.27	0.69		0.75	0.11		0.17	0.03	
Control Delay	7.4	19.4	1.9	12.8	15.1		39.2	11.9		23.0	19.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.4	19.4	1.9	12.8	15.1		39.2	11.9		23.0	19.9	
LOS	A	B	A	B	B		D	B		C	B	
Approach Delay		14.2			15.0			35.1			22.4	
Approach LOS		B			B			D			C	
Queue Length 50th (m)	0.5	77.2	0.0	3.1	58.9		29.3	1.2		5.4	1.0	
Queue Length 95th (m)	2.1	122.8	9.1	9.6	93.2		#78.8	9.8		17.3	5.9	
Internal Link Dist (m)		283.3			325.5			358.1			14.5	
Turn Bay Length (m)	35.0		250.0	160.0			30.0					
Base Capacity (vph)	395	1481	1331	266	1469		447	557		432	581	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.55	0.25	0.18	0.47		0.61	0.09		0.14	0.03	

### Intersection Summary

Cycle Length: 82.8

Actuated Cycle Length: 65.4

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 17.7

Intersection LOS: B

Intersection Capacity Utilization 70.4%

























ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

											
56.8 s			26 s			56.8 s			26 s		
											
56.8 s			26 s			56.8 s			26 s		

### 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.1	0.7	0.0	0.0	0.9
Denied Del/Veh (s)	0.1	0.2	1.3	3.1	0.3	0.3	1.4
Total Delay (hr)	0.1	2.1	4.0	1.9	1.6	0.6	10.4
Total Del/Veh (s)	10.5	9.8	39.2	8.6	52.4	11.7	16.4
Stop Delay (hr)	0.1	1.0	3.2	0.1	1.4	0.4	6.2
Stop Del/Veh (s)	6.5	4.6	31.5	0.6	46.0	6.6	9.8

### 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.5	0.7	3.2	0.3
Total Delay (hr)	1.8	0.2	1.1	2.0	3.9	0.0	0.1	9.1
Total Del/Veh (s)	21.1	4.6	32.0	19.7	28.8	23.0	7.2	22.2
Stop Delay (hr)	1.4	0.1	1.0	1.2	3.0	0.0	0.0	6.7
Stop Del/Veh (s)	16.2	3.1	28.1	12.2	21.9	14.6	1.9	16.4

### 3: Hamshaw Drive & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.3	0.2	0.0	0.0	0.1	0.1	0.2
Total Delay (hr)	0.1	0.0	0.1	0.6	0.0	0.0	0.9
Total Del/Veh (s)	1.1	0.9	8.4	5.9	10.4	4.0	3.6
Stop Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Stop Del/Veh (s)	0.0	0.0	1.9	0.5	8.1	3.8	0.5

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.3	0.3	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	3.1	1.7	3.1	3.1	0.6	0.6	3.3	0.5	0.6	0.1	0.1	0.1
Total Delay (hr)	0.0	2.6	0.3	0.3	1.9	0.1	2.1	0.1	0.1	0.3	0.1	0.0
Total Del/Veh (s)	21.4	12.4	3.4	27.6	11.1	8.0	28.9	21.5	15.1	21.4	21.4	8.0
Stop Delay (hr)	0.0	1.1	0.0	0.3	0.8	0.0	1.7	0.1	0.1	0.3	0.1	0.0
Stop Del/Veh (s)	16.0	5.2	0.0	24.9	4.8	4.5	24.1	15.6	12.8	20.1	18.9	7.9

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	All
Denied Delay (hr)	1.0
Denied Del/Veh (s)	1.7
Total Delay (hr)	7.9
Total Del/Veh (s)	13.3
Stop Delay (hr)	4.5
Stop Del/Veh (s)	7.6

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Total Network Performance

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Denied Delay (hr)	2.0
Denied Del/Veh (s)	1.6
Total Delay (hr)	34.2
Total Del/Veh (s)	26.1
Stop Delay (hr)	18.8
Stop Del/Veh (s)	14.3

Intersection: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	LTR
Maximum Queue (m)	122.1	42.6	65.5	99.9	81.6	109.0
Average Queue (m)	27.7	28.1	20.8	44.1	5.4	34.5
95th Queue (m)	97.6	50.7	46.2	86.5	37.5	83.2
Link Distance (m)	126.1		269.3	269.3		346.2
Upstream Blk Time (%)	1			0		
Queuing Penalty (veh)	4			0		
Storage Bay Dist (m)		35.0			80.0	
Storage Blk Time (%)		7		0	0	
Queuing Penalty (veh)		3		3	0	

Intersection: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	R	L	T	LT	R
Maximum Queue (m)	74.3	25.2	49.1	88.9	167.6	46.5
Average Queue (m)	37.3	11.7	22.2	49.7	66.8	2.5
95th Queue (m)	65.1	21.3	42.2	89.3	129.7	25.0
Link Distance (m)	378.9		126.1	126.1	278.2	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		150.0				70.0
Storage Blk Time (%)					9	
Queuing Penalty (veh)					3	

Intersection: 3: Hamshaw Drive & Kearney Lake Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	106.2	15.9
Average Queue (m)	10.0	6.5
95th Queue (m)	74.6	14.0
Link Distance (m)	378.9	188.9
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	TR	L	TR	L	TR
Maximum Queue (m)	12.3	89.1	25.4	77.6	37.3	77.7	24.5	15.7
Average Queue (m)	1.7	45.4	9.0	39.5	29.8	17.6	10.0	3.6
95th Queue (m)	8.2	75.0	19.7	66.6	41.7	54.0	20.8	11.6
Link Distance (m)		295.4		338.9		371.8	26.6	26.6
Upstream Blk Time (%)							0	0
Queuing Penalty (veh)							0	0
Storage Bay Dist (m)	35.0		160.0		30.0			
Storage Blk Time (%)		9			15	0		
Queuing Penalty (veh)		30			7	0		

Network Summary

Network wide Queuing Penalty: 49



## **Appendix D: Total Phase 1 (2025) Operations Synchro Reports**


















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# Lanes, Volumes, Timings

Phase 1 (2025)

## 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	884	0	0	307	527	67	0	94	0	0	0
Future Volume (vph)	53	884	0	0	307	527	67	0	94	0	0	0
Satd. Flow (prot)	1789	1865	0	0	3444	1585	0	1632	0	0	0	0
Flt Permitted	0.333							0.980				
Satd. Flow (perm)	627	1865	0	0	3444	1585	0	1632	0	0	0	0
Satd. Flow (RTOR)						573		110				
Lane Group Flow (vph)	123	961	0	0	374	573	0	183	0	0	0	0
Turn Type	pm+pt	NA			NA	Perm	Split	NA				
Protected Phases	5	5 6			6		8 16	8 16				
Permitted Phases	5 6					6						
Total Split (s)	94.5				32.0	32.0						
Total Lost Time (s)	4.0				4.5	4.5						
Act Effect Green (s)	116.7	120.7			27.5	27.5		17.5				
Actuated g/C Ratio	0.79	0.82			0.19	0.19		0.12				
v/c Ratio	0.10	0.63			0.58	0.75		0.63				
Control Delay	0.2	0.9			59.1	11.0		36.0				
Queue Delay	0.0	1.7			0.1	0.0		0.0				
Total Delay	0.2	2.6			59.2	11.0		36.0				
LOS	A	A			E	B		D				
Approach Delay		2.4			30.0			36.0				
Approach LOS		A			C			D				
Queue Length 50th (m)	0.0	0.0			53.8	0.0		20.3				
Queue Length 95th (m)	0.0	m0.0			63.8	37.7		46.7				
Internal Link Dist (m)		122.5			253.7			333.0			241.0	
Turn Bay Length (m)						80.0						
Base Capacity (vph)	1215	1529			643	761		290				
Starvation Cap Reductn	0	380			0	0		0				
Spillback Cap Reductn	0	0			10	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.10	0.84			0.59	0.75		0.63				

### Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 147.2

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 17.0

Intersection LOS: B









Intersection Capacity Utilization 95.2%

ICU Level of Service F

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

#2 	#2 	#2 	#2 
53 s	52 s	10 s	34 s
#1 	#1 	#1 	#1 
10.5 s	94.5 s	32 s	12 s

# Lanes, Volumes, Timings

Phase 1 (2025)

## 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑						↖	↗
Traffic Volume (vph)	0	432	175	128	246	0	0	0	0	505	4	23
Future Volume (vph)	0	432	175	128	246	0	0	0	0	505	4	23
Satd. Flow (prot)	0	1847	1585	1690	1865	0	0	0	0	0	1778	1445
Flt Permitted				0.160							0.953	
Satd. Flow (perm)	0	1847	1530	285	1865	0	0	0	0	0	1778	1445
Satd. Flow (RTOR)			192									179
Lane Group Flow (vph)	0	491	192	142	342	0	0	0	0	0	616	46
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Free
Protected Phases		2		1	1 2					4 12	4 12	
Permitted Phases			2	1 2								Free
Total Split (s)		53.0	53.0	34.0								
Total Lost Time (s)		4.5	4.5	4.5								
Act Effect Green (s)		48.5	48.5	78.0	82.5						55.2	147.2
Actuated g/C Ratio		0.33	0.33	0.53	0.56						0.38	1.00
v/c Ratio		0.81	0.30	0.33	0.33						0.92	0.03
Control Delay		57.1	5.8	4.2	6.4						64.8	0.0
Queue Delay		0.0	0.0	0.0	2.7						0.0	0.0
Total Delay		57.1	5.8	4.2	9.2						64.8	0.0
LOS		E	A	A	A						E	A
Approach Delay		42.7			7.7						60.3	
Approach LOS		D			A						E	
Queue Length 50th (m)		133.4	0.0	3.0	86.6						171.2	0.0
Queue Length 95th (m)		173.0	17.3	3.8	6.4						96.4	0.0
Internal Link Dist (m)		371.8			122.5			172.2			265.4	
Turn Bay Length (m)			150.0									70.0
Base Capacity (vph)		608	632	432	1045						666	1445
Starvation Cap Reductn		0	0	0	575						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.81	0.30	0.33	0.73						0.92	0.03

### Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 147.2

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 39.8

Intersection LOS: D

Intersection Capacity Utilization 95.2%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

#2 ↔ Ø2	#2 ↖ Ø4	#2 ↖ Ø12	#2 ↖ Ø1
53 s	52 s	10 s	34 s
#1 ↖ Ø16	#1 ↖ Ø5	#1 ↖ Ø6	#1 ↖ Ø8
10.5 s	94.5 s	32 s	12 s






HCM 6th TWSC  
3: Hamshaw Drive & Kearney Lake Road

Phase 1 (2025)  
AM Peak Hour

Intersection

Int Delay, s/veh 1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	569	4	18	251	4	38
Future Vol, veh/h	569	4	18	251	4	38
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	50	57	76	25	73
Heavy Vehicles, %	3	2	6	7	2	6
Mvmt Flow	605	8	32	330	16	52























Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	618
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.16
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.254
Pot Cap-1 Maneuver	-	-	943
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	939
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	15.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	399	-	-	939	-
HCM Lane V/C Ratio	0.171	-	-	0.034	-
HCM Control Delay (s)	15.9	-	-	9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

Lanes, Volumes, Timings  
4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Phase 1 (2025)  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	591	448	36	416	16	188	6	41	24	4	3
Future Volume (vph)	6	591	448	36	416	16	188	6	41	24	4	3
Satd. Flow (prot)	1789	1883	1601	1789	1874	0	1789	1639	0	1789	1763	0
Flt Permitted	0.453			0.308			0.753			0.723		
Satd. Flow (perm)	853	1883	1601	580	1874	0	1418	1639	0	1362	1763	0
Satd. Flow (RTOR)			487		4			45			3	
Lane Group Flow (vph)	7	642	487	39	469	0	204	52	0	26	7	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	56.8	56.8	56.8	56.8	56.8		26.0	26.0		26.0	26.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		6.0	6.0		6.0	6.0	
Act Effect Green (s)	28.2	28.2	28.2	28.2	28.2		13.0	13.0		13.0	13.0	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52		0.24	0.24		0.24	0.24	
v/c Ratio	0.02	0.66	0.46	0.13	0.48		0.60	0.12		0.08	0.02	
Control Delay	7.3	14.0	2.5	8.9	10.8		27.4	8.6		18.3	15.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.3	14.0	2.5	8.9	10.8		27.4	8.6		18.3	15.0	
LOS	A	B	A	A	B		C	A		B	B	
Approach Delay		9.0			10.7			23.6			17.6	
Approach LOS		A			B			C			B	
Queue Length 50th (m)	0.3	39.3	0.0	1.7	25.0		15.4	0.5		1.7	0.3	
Queue Length 95th (m)	2.0	86.3	11.6	6.9	55.8		42.8	8.0		8.1	3.1	
Internal Link Dist (m)		283.3			325.5			358.1			14.5	
Turn Bay Length (m)	35.0		250.0	160.0			30.0					
Base Capacity (vph)	774	1709	1498	526	1701		537	649		516	670	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.38	0.33	0.07	0.28		0.38	0.08		0.05	0.01	

Intersection Summary

Cycle Length: 82.8

Actuated Cycle Length: 54.5

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 11.5



Intersection LOS: B

Intersection Capacity Utilization 58.9%

ICU Level of Service B




Analysis Period (min) 15

Splits and Phases: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

 Ø2	 Ø4
56.8 s	26 s
 Ø6	 Ø8
56.8 s	26 s




HCM 6th TWSC  
5: Kearney Lake Road & East Site Access

Phase 1 (2025)  
AM Peak Hour

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	506	232	23	67	12
Future Vol, veh/h	5	506	232	23	67	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	7	2	2	2
Mvmt Flow	5	550	252	25	73	13
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	277	0	-	0	825	265
Stage 1	-	-	-	-	265	-
Stage 2	-	-	-	-	560	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1286	-	-	-	342	774
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1286	-	-	-	340	774
Mov Cap-2 Maneuver	-	-	-	-	340	-
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	572	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		17.6		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1286	-	-	-	372	
HCM Lane V/C Ratio	0.004	-	-	-	0.231	
HCM Control Delay (s)	7.8	0	-	-	17.6	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.9	

HCM 6th TWSC  
6: Kearney Lake Road & West Site Access

Phase 1 (2025)  
AM Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	494	238	6	17	3
Future Vol, veh/h	1	494	238	6	17	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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, %	0	3	7	2	2	2
Mvmt Flow	1	537	259	7	18	3
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	266	0	-	0	802	263
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	539	-
Critical Hdwy	4.1	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.2	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1310	-	-	-	353	776
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	585	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1310	-	-	-	353	776
Mov Cap-2 Maneuver	-	-	-	-	353	-
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	585	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		14.9		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1310	-	-	-	384	
HCM Lane V/C Ratio	0.001	-	-	-	0.057	
HCM Control Delay (s)	7.8	0	-	-	14.9	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

### 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.1	0.4	0.0	0.0	0.5
Denied Del/Veh (s)	0.0	0.1	0.8	3.0	0.2	0.2	1.0
Total Delay (hr)	0.2	3.1	3.1	0.7	0.8	0.1	8.1
Total Del/Veh (s)	14.9	12.3	36.4	4.9	42.6	4.7	14.9
Stop Delay (hr)	0.1	1.5	2.7	0.0	0.8	0.0	5.1
Stop Del/Veh (s)	9.9	6.2	30.8	0.2	38.6	0.8	9.4

### 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	3.5	0.0	0.2	3.7
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	24.5	6.5	33.9	8.7
Total Delay (hr)	3.3	0.3	1.5	1.4	11.8	0.1	0.4	18.7
Total Del/Veh (s)	27.0	5.4	42.0	18.9	82.3	99.7	54.8	43.5
Stop Delay (hr)	2.5	0.2	1.4	0.9	10.0	0.1	0.3	15.4
Stop Del/Veh (s)	20.4	3.4	38.1	12.8	69.8	86.2	42.8	35.6

### 3: Hamshaw Drive & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.1	0.0	0.0	0.4	0.0	0.1	0.6
Total Del/Veh (s)	0.8	0.6	8.3	5.1	10.8	5.1	2.5
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Stop Del/Veh (s)	0.1	0.1	2.3	0.6	8.3	4.9	0.5

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.3	0.4	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	3.3	1.8	3.2	3.4	0.4	0.4	3.5	0.4	0.6	0.1	0.1	0.1
Total Delay (hr)	0.0	1.6	0.5	0.2	1.0	0.0	1.0	0.0	0.1	0.1	0.0	0.0
Total Del/Veh (s)	13.0	9.9	4.1	19.6	8.1	4.5	19.4	15.6	9.6	13.6	13.6	5.4
Stop Delay (hr)	0.0	0.7	0.0	0.2	0.4	0.0	0.8	0.0	0.1	0.1	0.0	0.0
Stop Del/Veh (s)	8.4	4.3	0.1	17.4	3.7	2.5	15.6	11.0	8.1	12.4	11.4	5.3

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	All
Denied Delay (hr)	1.0
Denied Del/Veh (s)	2.0
Total Delay (hr)	4.6
Total Del/Veh (s)	9.3
Stop Delay (hr)	2.4
Stop Del/Veh (s)	4.8

### 5: Kearney Lake Road & East Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.1	0.1	0.0	0.2	0.0	0.4
Total Del/Veh (s)	2.8	0.6	1.4	1.0	9.0	4.4	1.5
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Stop Del/Veh (s)	0.8	0.0	0.0	0.0	7.0	4.0	0.6

### 6: Kearney Lake Road & West Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)		0.4	0.0	0.0	0.1	0.1	0.3
Total Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.2
Total Del/Veh (s)		0.8	0.7	0.3	7.1	2.0	0.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)		0.0	0.0	0.0	5.3	2.1	0.1

### Total Network Performance

Denied Delay (hr)	5.3
Denied Del/Veh (s)	4.8
Total Delay (hr)	37.0
Total Del/Veh (s)	32.7
Stop Delay (hr)	24.0
Stop Del/Veh (s)	21.1

Intersection: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	LTR
Maximum Queue (m)	129.2	42.6	54.3	71.5	30.8	47.6
Average Queue (m)	49.9	29.3	21.3	33.9	0.9	16.3
95th Queue (m)	135.8	54.8	44.3	60.8	14.2	35.7
Link Distance (m)	126.1		269.3	269.3		346.2
Upstream Blk Time (%)	3					
Queuing Penalty (veh)	25					
Storage Bay Dist (m)		35.0			80.0	
Storage Blk Time (%)	0	11		0	0	
Queuing Penalty (veh)	0	7		1	0	

Intersection: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	R	L	T	LT	R
Maximum Queue (m)	117.5	53.3	59.6	85.0	273.3	77.2
Average Queue (m)	60.3	13.6	26.2	32.9	135.9	8.0
95th Queue (m)	103.0	31.3	49.7	71.3	287.9	46.7
Link Distance (m)	378.9		126.1	126.1	278.2	
Upstream Blk Time (%)					13	
Queuing Penalty (veh)					0	
Storage Bay Dist (m)		150.0				70.0
Storage Blk Time (%)	0	0			31	0
Queuing Penalty (veh)	0	0			9	0

Intersection: 3: Hamshaw Drive & Kearney Lake Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	103.2	18.1
Average Queue (m)	8.3	6.8
95th Queue (m)	73.6	14.5
Link Distance (m)	378.9	188.6
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	TR
Maximum Queue (m)	8.7	63.4	8.8	20.5	57.4	36.4	35.6	13.8	10.2
Average Queue (m)	1.1	31.7	0.4	6.7	25.2	22.4	8.9	4.2	1.9
95th Queue (m)	5.8	53.5	7.7	16.4	45.3	36.1	24.2	11.9	8.0
Link Distance (m)		295.4			338.9		371.8	26.6	26.6
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	35.0		250.0	160.0		30.0			
Storage Blk Time (%)		4				4			
Queuing Penalty (veh)		17				2			

Intersection: 5: Kearney Lake Road & East Site Access

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	12.8	18.0
Average Queue (m)	0.6	8.0
95th Queue (m)	7.1	15.0
Link Distance (m)	113.2	104.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Kearney Lake Road & West Site Access

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	4.4	10.3
Average Queue (m)	0.2	3.8
95th Queue (m)	3.3	10.3
Link Distance (m)	312.0	129.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary


















Network wide Queuing Penalty: 62



# Lanes, Volumes, Timings

Phase 1 (2025)

1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	749	0	0	370	789	155	0	186	0	0	0
Future Volume (vph)	58	749	0	0	370	789	155	0	186	0	0	0
Satd. Flow (prot)	1722	1883	0	0	3579	1601	0	1701	0	0	0	0
Flt Permitted	0.220							0.976				
Satd. Flow (perm)	399	1883	0	0	3579	1601	0	1701	0	0	0	0
Satd. Flow (RTOR)						897		110				
Lane Group Flow (vph)	91	788	0	0	398	897	0	401	0	0	0	0
Turn Type	pm+pt	NA			NA	Free	Split	NA				
Protected Phases	5	5 6			6		8 16	8 16				
Permitted Phases	5 6					Free						
Total Split (s)	85.5				25.0							
Total Lost Time (s)	4.0				4.5							
Act Effct Green (s)	99.6	103.6			20.6	144.7		32.1				
Actuated g/C Ratio	0.69	0.72			0.14	1.00		0.22				
v/c Ratio	0.09	0.59			0.78	0.56		0.87				
Control Delay	0.3	1.0			72.4	1.4		58.9				
Queue Delay	0.0	1.1			0.0	0.0		1.2				
Total Delay	0.3	2.1			72.4	1.4		60.2				
LOS	A	A			E	A		E				
Approach Delay		1.9			23.2			60.2				
Approach LOS		A			C			E				
Queue Length 50th (m)	0.0	0.0			60.9	0.0		86.2				
Queue Length 95th (m)	m0.0	m0.0			#82.7	0.0		#140.8				
Internal Link Dist (m)		122.5			253.7			333.0			241.0	
Turn Bay Length (m)						80.0						
Base Capacity (vph)	1025	1342			508	1601		462				
Starvation Cap Reductn	0	314			0	0		0				
Spillback Cap Reductn	0	0			0	0		10				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.09	0.77			0.78	0.56		0.89				

## Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 144.7

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 21.7

Intersection LOS: C

Intersection Capacity Utilization 75.7%

ICU Level of Service D

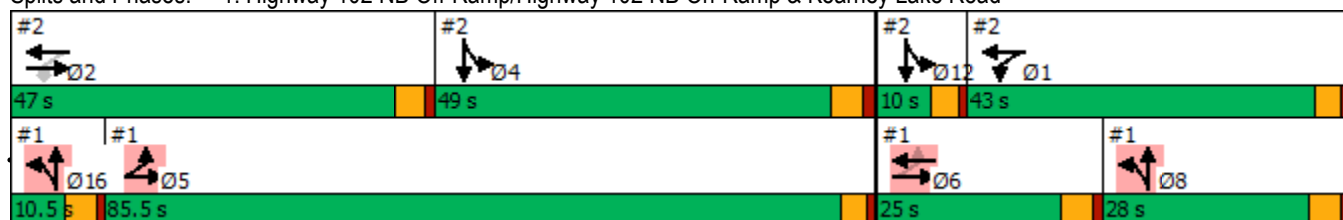
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road



# Lanes, Volumes, Timings

Phase 1 (2025)

## 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group												
Lane Configurations		↑	↑	↑	↑						↑	↑
Traffic Volume (vph)	0	320	175	126	399	0	0	0	0	487	3	69
Future Volume (vph)	0	320	175	126	399	0	0	0	0	487	3	69
Satd. Flow (prot)	0	1883	1601	1772	1883	0	0	0	0	0	1795	1601
Flt Permitted				0.228							0.953	
Satd. Flow (perm)	0	1883	1559	425	1883	0	0	0	0	0	1795	1601
Satd. Flow (RTOR)			194									179
Lane Group Flow (vph)	0	395	194	147	411	0	0	0	0	0	569	81
Turn Type		NA	Perm	pm+pt	NA					Split	NA	Free
Protected Phases		2		1	1 2					4 12	4 12	
Permitted Phases			2	1 2								Free
Total Split (s)		47.0	47.0	43.0								
Total Lost Time (s)		4.5	4.5	4.5								
Act Effect Green (s)		42.6	42.6	79.7	84.2						50.9	144.7
Actuated g/C Ratio		0.29	0.29	0.55	0.58						0.35	1.00
v/c Ratio		0.71	0.33	0.25	0.38						0.90	0.05
Control Delay		54.9	6.6	1.9	4.4						63.3	0.1
Queue Delay		0.0	0.0	0.0	3.5						0.0	0.0
Total Delay		54.9	6.6	1.9	7.9						63.3	0.1
LOS		D	A	A	A						E	A
Approach Delay		39.0			6.4						55.4	
Approach LOS		D			A						E	
Queue Length 50th (m)		106.0	0.0	1.6	90.8						156.5	0.0
Queue Length 95th (m)		125.5	18.4	m1.7	m113.8						#220.9	0.0
Internal Link Dist (m)		371.8			122.5			172.2			265.4	
Turn Bay Length (m)			150.0									70.0
Base Capacity (vph)		554	596	596	1096						631	1601
Starvation Cap Reductn		0	0	0	578						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.71	0.33	0.25	0.79						0.90	0.05

### Intersection Summary

Cycle Length: 149

Actuated Cycle Length: 144.7

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 34.8

Intersection LOS: C

Intersection Capacity Utilization 75.7%

ICU Level of Service D

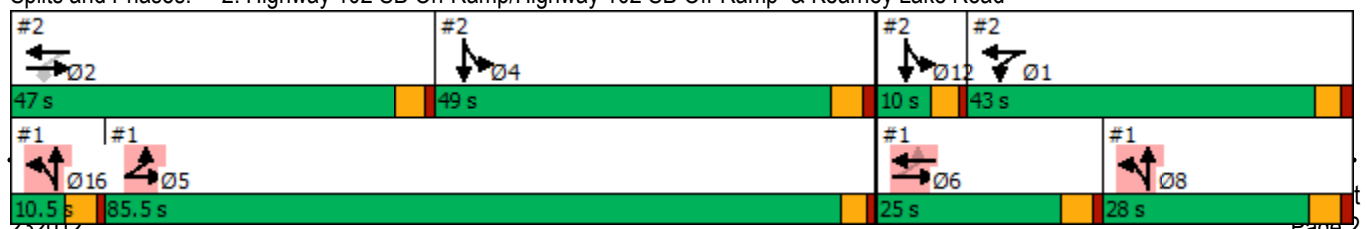
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.




m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

























HCM 6th TWSC  
3: Hamshaw Drive & Kearney Lake Road

Phase 1 (2025)  
PM Peak Hour

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	470	9	31	437	9	25
Future Vol, veh/h	470	9	31	437	9	25
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	58	58	93	88	64
Heavy Vehicles, %	3	2	7	2	2	4
Mvmt Flow	528	16	53	470	10	39
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	546	0	1114	538
Stage 1	-	-	-	-	538	-
Stage 2	-	-	-	-	576	-
Critical Hdwy	-	-	4.17	-	6.42	6.24
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.263	-	3.518	3.336
Pot Cap-1 Maneuver	-	-	999	-	230	539
Stage 1	-	-	-	-	585	-
Stage 2	-	-	-	-	562	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	997	-	213	538
Mov Cap-2 Maneuver	-	-	-	-	213	-
Stage 1	-	-	-	-	584	-
Stage 2	-	-	-	-	522	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.9		15	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	409	-	-	997	-	
HCM Lane V/C Ratio	0.121	-	-	0.054	-	
HCM Control Delay (s)	15	-	-	8.8	0	
HCM Lane LOS	C	-	-	A	A	
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-	

Lanes, Volumes, Timings  
4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Phase 1 (2025)  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	745	316	52	600	37	256	13	37	55	11	3
Future Volume (vph)	7	745	316	52	600	37	256	13	37	55	11	3
Satd. Flow (prot)	1789	1883	1601	1789	1866	0	1789	1674	0	1789	1827	0
Flt Permitted	0.265			0.178			0.748			0.722		
Satd. Flow (perm)	499	1883	1601	335	1866	0	1409	1674	0	1360	1827	0
Satd. Flow (RTOR)			343		7			40			3	
Lane Group Flow (vph)	8	810	343	57	692	0	278	54	0	60	15	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	56.8	56.8	56.8	56.8	56.8		26.0	26.0		26.0	26.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		6.0	6.0		6.0	6.0	
Act Effect Green (s)	35.2	35.2	35.2	35.2	35.2		17.3	17.3		17.3	17.3	
Actuated g/C Ratio	0.54	0.54	0.54	0.54	0.54		0.26	0.26		0.26	0.26	
v/c Ratio	0.03	0.80	0.34	0.32	0.69		0.75	0.12		0.17	0.03	
Control Delay	7.4	19.7	1.9	14.3	15.3		39.3	11.3		23.0	19.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.4	19.7	1.9	14.3	15.3		39.3	11.3		23.0	19.9	
LOS	A	B	A	B	B		D	B		C	B	
Approach Delay		14.4			15.3			34.8			22.3	
Approach LOS		B			B			C			C	
Queue Length 50th (m)	0.5	78.8	0.0	3.8	60.1		29.9	1.2		5.4	1.0	
Queue Length 95th (m)	2.1	122.8	9.2	11.3	93.2		#80.9	10.2		17.3	5.9	
Internal Link Dist (m)		283.3			325.5			358.1			14.5	
Turn Bay Length (m)	35.0		250.0	160.0			30.0					
Base Capacity (vph)	390	1474	1328	262	1462		444	555		429	578	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.55	0.26	0.22	0.47		0.63	0.10		0.14	0.03	

Intersection Summary

Cycle Length: 82.8

Actuated Cycle Length: 65.7

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 17.9

Intersection LOS: B

Intersection Capacity Utilization 74.7%





ICU Level of Service D

Analysis Period (min) 15

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




Queue shown is maximum after two cycles.

Splits and Phases: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

 Ø2	 Ø4
56.8 s	26 s
 Ø6	 Ø8
56.8 s	26 s




HCM 6th TWSC  
5: Kearney Lake Road & East Site Access

Phase 1 (2025)  
PM Peak Hour

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	438	379	67	41	8
Future Vol, veh/h	12	438	379	67	41	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	2	2	2	2
Mvmt Flow	13	476	412	73	45	9
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	485	0	-	0	951	449
Stage 1	-	-	-	-	449	-
Stage 2	-	-	-	-	502	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1078	-	-	-	288	610
Stage 1	-	-	-	-	643	-
Stage 2	-	-	-	-	608	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1078	-	-	-	283	610
Mov Cap-2 Maneuver	-	-	-	-	283	-
Stage 1	-	-	-	-	633	-
Stage 2	-	-	-	-	608	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.2	0		19		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1078	-	-	-	310	
HCM Lane V/C Ratio	0.012	-	-	-	0.172	
HCM Control Delay (s)	8.4	0	-	-	19	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.6	

HCM 6th TWSC  
6: Kearney Lake Road & West Site Access

Phase 1 (2025)  
PM Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	440	370	17	10	2
Future Vol, veh/h	3	440	370	17	10	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	2	2	2	2
Mvmt Flow	3	478	402	18	11	2
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	420	0	-	0	895	411
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	484	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1139	-	-	-	311	641
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	620	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1139	-	-	-	310	641
Mov Cap-2 Maneuver	-	-	-	-	310	-
Stage 1	-	-	-	-	666	-
Stage 2	-	-	-	-	620	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		16		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1139	-	-	-	339	
HCM Lane V/C Ratio	0.003	-	-	-	0.038	
HCM Control Delay (s)	8.2	0	-	-	16	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

### 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.1	0.6	0.0	0.0	0.9
Denied Del/Veh (s)	0.2	0.2	1.2	3.0	0.4	0.3	1.3
Total Delay (hr)	0.2	2.2	4.9	2.0	3.4	1.9	14.6
Total Del/Veh (s)	12.4	10.1	46.1	9.2	79.3	36.2	22.4
Stop Delay (hr)	0.1	1.0	4.0	0.2	3.0	1.5	10.0
Stop Del/Veh (s)	8.2	4.7	37.8	0.9	70.6	29.3	15.3

### 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.7	0.6	3.4	0.4
Total Delay (hr)	1.9	0.3	1.2	2.2	4.5	0.0	0.2	10.2
Total Del/Veh (s)	20.8	5.1	32.2	18.7	32.5	22.8	10.3	22.6
Stop Delay (hr)	1.4	0.2	1.0	1.3	3.5	0.0	0.1	7.5
Stop Del/Veh (s)	15.9	3.3	28.3	11.1	25.0	13.1	4.0	16.6

### 3: Hamshaw Drive & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.1	0.0	0.1	0.8	0.0	0.0	1.1
Total Del/Veh (s)	0.9	0.4	9.4	6.5	11.7	4.9	3.9
Stop Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.2
Stop Del/Veh (s)	0.1	0.0	2.4	0.8	9.5	4.6	0.7

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.3	0.3	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	2.7	1.6	3.1	3.1	0.7	0.6	3.3	0.6	0.7	0.3	0.1	0.4
Total Delay (hr)	0.0	2.7	0.3	0.4	1.8	0.1	2.1	0.1	0.1	0.3	0.1	0.0
Total Del/Veh (s)	20.8	12.7	3.3	29.9	10.6	6.6	28.4	24.0	14.3	20.7	21.1	10.4
Stop Delay (hr)	0.0	1.2	0.0	0.4	0.8	0.0	1.7	0.1	0.1	0.3	0.1	0.0
Stop Del/Veh (s)	15.7	5.5	0.0	27.3	4.6	3.1	23.6	17.3	11.9	19.4	18.6	10.4

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	All
Denied Delay (hr)	1.0
Denied Del/Veh (s)	1.7
Total Delay (hr)	7.9
Total Del/Veh (s)	13.3
Stop Delay (hr)	4.6
Stop Del/Veh (s)	7.7

### 5: Kearney Lake Road & East Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.1	0.1	0.0	0.1	0.0	0.4
Total Del/Veh (s)	4.8	0.6	1.2	1.2	11.0	8.3	1.5
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Stop Del/Veh (s)	1.3	0.0	0.0	0.0	7.3	4.6	0.4

### 6: Kearney Lake Road & West Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.4	0.3	0.0	0.0	0.1	0.1	0.2
Total Delay (hr)	0.0	0.1	0.1	0.0	0.0	0.0	0.2
Total Del/Veh (s)	4.5	0.7	0.7	0.7	10.5	5.9	0.8
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.8	0.0	0.0	0.0	7.0	2.7	0.1

### Total Network Performance

Denied Delay (hr)			2.1				
Denied Del/Veh (s)			1.6				
Total Delay (hr)			40.4				
Total Del/Veh (s)			29.8				
Stop Delay (hr)			23.8				
Stop Del/Veh (s)			17.6				



Intersection: 1: Highway 102 NB Off-Ramp/Highway 102 NB On-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	LTR
Maximum Queue (m)	124.8	42.6	93.4	148.7	87.6	167.5
Average Queue (m)	33.4	30.1	23.3	53.9	14.3	68.0
95th Queue (m)	101.8	52.1	62.0	101.9	65.3	160.1
Link Distance (m)	126.1		269.3	269.3		346.2
Upstream Blk Time (%)	0		0	0		
Queuing Penalty (veh)	2		0	0		
Storage Bay Dist (m)		35.0			80.0	
Storage Blk Time (%)	0	9		2	0	
Queuing Penalty (veh)	0	5		13	1	

Intersection: 2: Highway 102 SB On-Ramp/Highway 102 SB Off-Ramp & Kearney Lake Road

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	R	L	T	LT	R
Maximum Queue (m)	79.9	27.4	52.6	93.2	177.4	77.4
Average Queue (m)	37.5	13.5	23.7	55.1	74.2	8.5
95th Queue (m)	66.7	23.3	43.7	96.3	144.7	48.5
Link Distance (m)	378.9		126.1	126.1	278.2	
Upstream Blk Time (%)					0	
Queuing Penalty (veh)					0	
Storage Bay Dist (m)		150.0				70.0
Storage Blk Time (%)					11	0
Queuing Penalty (veh)					8	0

Intersection: 3: Hamshaw Drive & Kearney Lake Road

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	1.3	152.1	18.1
Average Queue (m)	0.0	10.8	6.4
95th Queue (m)	1.0	76.9	14.8
Link Distance (m)	139.5	378.9	188.6
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	TR	L	TR	L	TR
Maximum Queue (m)	22.6	94.6	23.8	72.2	37.3	74.6	27.5	13.1
Average Queue (m)	2.0	47.0	9.7	37.1	30.6	19.2	10.4	3.0
95th Queue (m)	11.5	78.9	20.7	61.9	41.6	57.3	22.3	10.5
Link Distance (m)		295.4		338.9		371.8	26.6	26.6
Upstream Blk Time (%)							1	0
Queuing Penalty (veh)							0	0
Storage Bay Dist (m)	35.0		160.0		30.0			
Storage Blk Time (%)		10			16	0		
Queuing Penalty (veh)		33			8	0		

Intersection: 5: Kearney Lake Road & East Site Access

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	16.3	0.7	19.5
Average Queue (m)	1.2	0.0	7.0
95th Queue (m)	7.9	0.7	14.6
Link Distance (m)	113.2	139.5	104.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Kearney Lake Road & West Site Access

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	8.7	10.4
Average Queue (m)	0.3	2.8
95th Queue (m)	2.9	9.2
Link Distance (m)	312.0	129.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 70






## **Appendix E: Background (2030) Operations Synchro/Arcady Reports**

# HCM 6th TWSC

## 3: Hamshaw Drive & Kearney Lake Road























Background (2030)

AM Peak Hour

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	598	4	19	264	4	41
Future Vol, veh/h	598	4	19	264	4	41
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	50	57	76	25	73
Heavy Vehicles, %	3	2	6	7	2	6
Mvmt Flow	636	8	33	347	16	56
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	649	0	1058	645
Stage 1	-	-	-	-	645	-
Stage 2	-	-	-	-	413	-
Critical Hdwy	-	-	4.16	-	6.42	6.26
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.254	-	3.518	3.354
Pot Cap-1 Maneuver	-	-	918	-	249	465
Stage 1	-	-	-	-	522	-
Stage 2	-	-	-	-	668	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	914	-	237	463
Mov Cap-2 Maneuver	-	-	-	-	237	-
Stage 1	-	-	-	-	519	-
Stage 2	-	-	-	-	638	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.8		16.6	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	382	-	-	914	-	
HCM Lane V/C Ratio	0.189	-	-	0.036	-	
HCM Control Delay (s)	16.6	-	-	9.1	0	
HCM Lane LOS	C	-	-	A	A	
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-	

## 4: Kearney Lake Road/Driveway &amp; Larry Uteck Boulevard

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	628	475	38	442	17	199	6	43	26	4	3
Future Volume (vph)	6	628	475	38	442	17	199	6	43	26	4	3
Satd. Flow (prot)	1789	1883	1601	1789	1874	0	1789	1637	0	1789	1763	0
Flt Permitted	0.428			0.280			0.753			0.722		
Satd. Flow (perm)	806	1883	1601	527	1874	0	1418	1637	0	1360	1763	0
Satd. Flow (RTOR)			516		4			47			3	
Lane Group Flow (vph)	7	683	516	41	498	0	216	54	0	28	7	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	56.8	56.8	56.8	56.8	56.8		26.0	26.0		26.0	26.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		6.0	6.0		6.0	6.0	
Act Effect Green (s)	30.4	30.4	30.4	30.4	30.4		13.7	13.7		13.7	13.7	
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.24	0.24		0.24	0.24	
v/c Ratio	0.02	0.68	0.47	0.15	0.50		0.64	0.13		0.09	0.02	
Control Delay	7.2	14.6	2.4	9.1	11.0		30.2	8.9		19.7	16.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.2	14.6	2.4	9.1	11.0		30.2	8.9		19.7	16.0	
LOS	A	B	A	A	B		C	A		B	B	
Approach Delay		9.3			10.8			26.0			18.9	
Approach LOS		A			B			C			B	
Queue Length 50th (m)	0.3	45.5	0.0	1.9	28.6		18.1	0.5		2.1	0.3	
Queue Length 95th (m)	2.0	93.8	11.6	7.3	59.3		48.0	8.4		8.8	3.2	
Internal Link Dist (m)		283.3			325.5			358.1			14.5	
Turn Bay Length (m)	35.0		250.0	160.0			30.0					
Base Capacity (vph)	707	1652	1467	462	1644		512	621		491	638	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.41	0.35	0.09	0.30		0.42	0.09		0.06	0.01	

## Intersection Summary

Cycle Length: 82.8

Actuated Cycle Length: 57.4

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 12.1



Intersection LOS: B

Intersection Capacity Utilization 61.4%

ICU Level of Service B




Analysis Period (min) 15

Splits and Phases: 4: Kearney Lake Road/Driveway &amp; Larry Uteck Boulevard

 Ø2	 Ø4
56.8 s	26 s
 Ø6	 Ø8
56.8 s	26 s




HCM 6th TWSC  
5: Kearney Lake Road & East Site Access

Background (2030)  
AM Peak Hour

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	535	245	23	67	12
Future Vol, veh/h	5	535	245	23	67	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	7	2	2	2
Mvmt Flow	5	582	266	25	73	13
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	291	0	-	0	871	279
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	592	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1271	-	-	-	322	760
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	553	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1271	-	-	-	320	760
Mov Cap-2 Maneuver	-	-	-	-	320	-
Stage 1	-	-	-	-	763	-
Stage 2	-	-	-	-	553	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		18.5		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1271	-	-	-	351	
HCM Lane V/C Ratio	0.004	-	-	-	0.245	
HCM Control Delay (s)	7.8	0	-	-	18.5	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.9	

HCM 6th TWSC  
6: Kearney Lake Road & West Site Access

Background (2030)  
AM Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	523	251	6	17	3
Future Vol, veh/h	1	523	251	6	17	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	7	2	2	2
Mvmt Flow	1	568	273	7	18	3
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	280	0	-	0	847	277
Stage 1	-	-	-	-	277	-
Stage 2	-	-	-	-	570	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1283	-	-	-	332	762
Stage 1	-	-	-	-	770	-
Stage 2	-	-	-	-	566	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1283	-	-	-	332	762
Mov Cap-2 Maneuver	-	-	-	-	332	-
Stage 1	-	-	-	-	769	-
Stage 2	-	-	-	-	566	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		15.5		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1283	-	-	-	363	
HCM Lane V/C Ratio	0.001	-	-	-	0.06	
HCM Control Delay (s)	7.8	0	-	-	15.5	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

### 3: Hamshaw Drive & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.3	0.3	0.1	0.1	0.1
Total Delay (hr)	0.2	0.0	0.0	0.1	0.0	0.1	0.3
Total Del/Veh (s)	1.0	0.9	4.7	0.8	10.2	5.0	1.3
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Stop Del/Veh (s)	0.1	0.1	2.3	0.1	8.0	4.8	0.4

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.4	0.4	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	3.7	2.1	3.4	3.3	0.5	0.5	3.5	0.6	0.6	0.1	0.1	0.1
Total Delay (hr)	0.0	1.9	0.6	0.2	1.0	0.0	1.2	0.0	0.1	0.1	0.0	0.0
Total Del/Veh (s)	21.0	10.7	4.3	20.9	8.2	5.2	20.9	17.3	10.2	15.7	21.2	6.3
Stop Delay (hr)	0.0	0.8	0.0	0.2	0.4	0.0	1.0	0.0	0.1	0.1	0.0	0.0
Stop Del/Veh (s)	16.8	4.4	0.0	18.6	3.6	3.0	16.9	11.4	8.6	14.5	18.6	6.4

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	All
Denied Delay (hr)	1.1
Denied Del/Veh (s)	2.1
Total Delay (hr)	5.2
Total Del/Veh (s)	9.9
Stop Delay (hr)	2.7
Stop Del/Veh (s)	5.1

### 5: Kearney Lake Road & East Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.1	0.0	0.0	0.2	0.0	0.4
Total Del/Veh (s)	4.8	0.6	0.3	0.3	10.8	7.4	1.4
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Stop Del/Veh (s)	0.9	0.0	0.0	0.0	6.9	3.6	0.6



## 6: Kearney Lake Road & West Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.1	0.4	0.0	0.0	0.1	0.1	0.3
Total Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.2
Total Del/Veh (s)	3.9	0.8	0.3	0.4	9.5	6.6	0.9
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	0.7	0.0	0.0	0.0	6.0	2.8	0.1

## Total Network Performance

Denied Delay (hr)	1.2
Denied Del/Veh (s)	1.5
Total Delay (hr)	8.5
Total Del/Veh (s)	10.4
Stop Delay (hr)	3.2
Stop Del/Veh (s)	3.9

Intersection: 3: Hamshaw Drive & Kearney Lake Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	23.2	19.4
Average Queue (m)	3.7	7.5
95th Queue (m)	14.7	15.6
Link Distance (m)	263.5	188.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	TR
Maximum Queue (m)	12.9	68.5	8.5	21.5	53.4	36.4	40.7	19.9	10.2
Average Queue (m)	1.5	34.7	0.3	7.6	25.5	23.5	9.4	5.2	1.8
95th Queue (m)	8.2	57.4	6.3	17.0	44.8	36.4	26.3	14.6	7.7
Link Distance (m)		295.4			338.9		371.8	26.6	26.6
Upstream Blk Time (%)								0	
Queuing Penalty (veh)								0	
Storage Bay Dist (m)	35.0		250.0	160.0		30.0			
Storage Blk Time (%)		5				5	0		
Queuing Penalty (veh)		25				2	0		

Intersection: 5: Kearney Lake Road & East Site Access

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	9.2	19.2
Average Queue (m)	0.5	8.7
95th Queue (m)	4.5	15.6
Link Distance (m)	113.2	104.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Intersection: 6: Kearney Lake Road & West Site Access

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Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	0.9	13.0
Average Queue (m)	0.0	3.8
95th Queue (m)	0.9	11.0
Link Distance (m)	311.7	129.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Network Summary




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Network wide Queuing Penalty: 27

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

















HCM 6th TWSC  
3: Hamshaw Drive & Kearney Lake Road

Background (2030)  
PM Peak Hour

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	496	9	33	458	9	27
Future Vol, veh/h	496	9	33	458	9	27
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	58	58	93	88	64
Heavy Vehicles, %	3	2	7	2	2	4
Mvmt Flow	557	16	57	492	10	42
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	575	0	1173	567
Stage 1	-	-	-	-	567	-
Stage 2	-	-	-	-	606	-
Critical Hdwy	-	-	4.17	-	6.42	6.24
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.263	-	3.518	3.336
Pot Cap-1 Maneuver	-	-	974	-	212	519
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	972	-	194	518
Mov Cap-2 Maneuver	-	-	-	-	194	-
Stage 1	-	-	-	-	567	-
Stage 2	-	-	-	-	501	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.9		15.6		
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	391	-	-	972	-	
HCM Lane V/C Ratio	0.134	-	-	0.059	-	
HCM Control Delay (s)	15.6	-	-	8.9	0	
HCM Lane LOS	C	-	-	A	A	
HCM 95th %tile Q(veh)	0.5	-	-	0.2	-	

## 4: Kearney Lake Road/Driveway &amp; Larry Uteck Boulevard

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	791	335	54	636	40	272	14	39	58	11	3
Future Volume (vph)	7	791	335	54	636	40	272	14	39	58	11	3
Satd. Flow (prot)	1789	1883	1601	1789	1866	0	1789	1674	0	1789	1827	0
Flt Permitted	0.237			0.147			0.748			0.720		
Satd. Flow (perm)	446	1883	1601	277	1866	0	1409	1674	0	1356	1827	0
Satd. Flow (RTOR)			364		7			42			3	
Lane Group Flow (vph)	8	860	364	59	734	0	296	57	0	63	15	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	56.8	56.8	56.8	56.8	56.8		26.0	26.0		26.0	26.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		6.0	6.0		6.0	6.0	
Act Effect Green (s)	37.6	37.6	37.6	37.6	37.6		18.2	18.2		18.2	18.2	
Actuated g/C Ratio	0.54	0.54	0.54	0.54	0.54		0.26	0.26		0.26	0.26	
v/c Ratio	0.03	0.84	0.35	0.39	0.72		0.80	0.12		0.18	0.03	
Control Delay	7.4	21.8	1.9	18.0	16.2		44.1	11.6		24.2	20.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.4	21.8	1.9	18.0	16.2		44.1	11.6		24.2	20.8	
LOS	A	C	A	B	B		D	B		C	C	
Approach Delay		15.8			16.4			38.8			23.5	
Approach LOS		B			B			D			C	
Queue Length 50th (m)	0.5	89.6	0.0	4.3	67.6		35.5	1.4		6.3	1.1	
Queue Length 95th (m)	2.2	137.5	9.4	13.5	102.9		#88.2	10.5		17.9	5.9	
Internal Link Dist (m)		283.3			325.5			358.1			14.5	
Turn Bay Length (m)	35.0		250.0	160.0			30.0					
Base Capacity (vph)	333	1408	1288	207	1397		421	530		405	548	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.61	0.28	0.29	0.53		0.70	0.11		0.16	0.03	

## Intersection Summary

Cycle Length: 82.8

Actuated Cycle Length: 69

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 19.5

Intersection LOS: B

Intersection Capacity Utilization 77.3%





ICU Level of Service D




Analysis Period (min) 15




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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Kearney Lake Road/Driveway &amp; Larry Uteck Boulevard

 Ø2	 Ø4
56.8 s	26 s
 Ø6	 Ø8
56.8 s	26 s

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	464	400	67	41	8
Future Vol, veh/h	12	464	400	67	41	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	2	2	2	2
Mvmt Flow	13	504	435	73	45	9
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	508	0	-	0	1002	472
Stage 1	-	-	-	-	472	-
Stage 2	-	-	-	-	530	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1057	-	-	-	269	592
Stage 1	-	-	-	-	628	-
Stage 2	-	-	-	-	590	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1057	-	-	-	264	592
Mov Cap-2 Maneuver	-	-	-	-	264	-
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	590	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.2	0		20.2		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1057	-	-	-	290	
HCM Lane V/C Ratio	0.012	-	-	-	0.184	
HCM Control Delay (s)	8.4	0	-	-	20.2	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.7	

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	466	391	17	10	2
Future Vol, veh/h	3	466	391	17	10	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	2	2	2	2
Mvmt Flow	3	507	425	18	11	2
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	443	0	-	0	947	434
Stage 1	-	-	-	-	434	-
Stage 2	-	-	-	-	513	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1117	-	-	-	290	622
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	601	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1117	-	-	-	289	622
Mov Cap-2 Maneuver	-	-	-	-	289	-
Stage 1	-	-	-	-	650	-
Stage 2	-	-	-	-	601	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		16.8		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1117	-	-	-	317	
HCM Lane V/C Ratio	0.003	-	-	-	0.041	
HCM Control Delay (s)	8.2	0	-	-	16.8	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

### 3: Hamshaw Drive & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.0	0.4	0.4	0.1	0.1	0.2
Total Delay (hr)	0.1	0.0	0.0	0.2	0.0	0.0	0.4
Total Del/Veh (s)	0.8	0.5	5.0	1.3	10.5	4.7	1.3
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.1	0.1	2.2	0.2	8.2	4.7	0.4

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.4	0.3	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	3.3	1.9	3.2	3.1	0.7	0.6	3.3	0.7	0.7	0.2	0.1	0.1
Total Delay (hr)	0.1	3.2	0.3	0.5	2.1	0.1	2.4	0.1	0.2	0.4	0.1	0.0
Total Del/Veh (s)	31.1	14.5	3.6	34.4	12.1	7.8	31.7	23.2	18.0	22.7	18.8	10.3
Stop Delay (hr)	0.1	1.4	0.0	0.4	0.9	0.1	2.0	0.1	0.2	0.3	0.0	0.0
Stop Del/Veh (s)	25.9	6.2	0.0	31.6	5.2	4.0	26.6	16.6	15.1	21.4	16.1	10.2

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	All
Denied Delay (hr)	1.2
Denied Del/Veh (s)	1.8
Total Delay (hr)	9.5
Total Del/Veh (s)	15.0
Stop Delay (hr)	5.5
Stop Del/Veh (s)	8.7

### 5: Kearney Lake Road & East Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.1	0.1	0.0	0.1	0.0	0.4
Total Del/Veh (s)	3.6	0.6	1.2	0.6	10.1	4.2	1.3
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Stop Del/Veh (s)	1.6	0.0	0.0	0.0	8.1	4.2	0.4



## 6: Kearney Lake Road & West Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.4	0.0	0.0	0.1	0.1	0.2
Total Delay (hr)	0.0	0.1	0.1	0.0	0.0	0.0	0.2
Total Del/Veh (s)	3.1	0.8	0.6	0.4	9.0	3.6	0.8
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	1.0	0.0	0.0	0.0	7.3	3.7	0.1

## Total Network Performance

Denied Delay (hr)	1.3
Denied Del/Veh (s)	1.4
Total Delay (hr)	13.1
Total Del/Veh (s)	14.0
Stop Delay (hr)	5.9
Stop Del/Veh (s)	6.3

Intersection: 3: Hamshaw Drive & Kearney Lake Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	35.0	17.3
Average Queue (m)	5.9	6.3
95th Queue (m)	21.9	14.0
Link Distance (m)	263.5	188.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	L	TR	L	TR	L	TR
Maximum Queue (m)	22.9	114.1	26.3	92.0	37.3	82.3	27.2	12.7
Average Queue (m)	2.3	53.4	10.2	43.0	31.1	23.5	10.6	3.1
95th Queue (m)	11.3	95.8	21.7	74.3	42.1	65.2	22.8	10.4
Link Distance (m)		295.4		338.9		371.8	26.6	26.6
Upstream Blk Time (%)							1	
Queuing Penalty (veh)							0	
Storage Bay Dist (m)	35.0		160.0		30.0			
Storage Blk Time (%)		13			20	0		
Queuing Penalty (veh)		44			11	0		

Intersection: 5: Kearney Lake Road & East Site Access

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	16.4	15.7
Average Queue (m)	1.9	7.0
95th Queue (m)	9.9	14.1
Link Distance (m)	113.2	104.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Intersection: 6: Kearney Lake Road & West Site Access

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Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	9.2	9.9
Average Queue (m)	0.5	2.5
95th Queue (m)	4.4	8.6
Link Distance (m)	311.7	129.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Network Summary

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Network wide Queuing Penalty: 55

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Junctions 10											
ARCADY 10 - Roundabout Module											
Version: 10.0.4.1693											
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**Filename:** 232012 KLR & Hwy 102 Interchange.j10

**Path:** X:\Harbourside Transportation Consultants\Projects\232012 Bedford West Sub Area 10 TIS\02 Analysis\Synchro-Arcady\Arcady

**Report generation date:** 2023-03-30 9:41:42 AM

»Proposed Roundabout Configuration - Background (2030), AM Peak Hour

»Proposed Roundabout Configuration - Background (2030), PM Peak Hour

### Summary of intersection performance

	AM Peak Hour						PM Peak Hour					
	Q95 (PCE)	Delay (s)	V/C	LOS	Int Del (s)	Int LOS	Q95 (PCE)	Delay (s)	V/C	LOS	Int Del (s)	Int LOS
Proposed Roundabout Configuration - Background (2030)												
1 - H102 NB Ramps - 1 - Kearney Lake Road (WB)	2.0	2.93	0.44	A	3.08	A	2.8	4.40	0.62	A	3.88	A
1 - H102 NB Ramps - 3 - Kearney Lake Road (EB)	1.5	2.94	0.47	A			2.7	2.58	0.40	A		
1 - H102 NB Ramps - 4 - Highway 102 Off-Ramp (NB)	0.8	4.63	0.19	A			2.7	5.19	0.36	A		
2 - H102 SB Ramps - 1 - Kearney Lake Road (WB)	0.5	1.95	0.19	A	3.54	A	1.4	2.09	0.26	A	3.62	A
2 - H102 SB Ramps - 2 - Highway 102 Off-Ramp (SB)	2.3	4.95	0.46	A			1.8	5.76	0.51	A		
2 - H102 SB Ramps - 3 - Kearney Lake Road (EB)	2.9	3.30	0.39	A			1.8	2.82	0.31	A		

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of Av. delay per arriving vehicle. Int LOS and Int Del are demand-weighted Av.s.

### File summary

#### File Description

<b>Title</b>	Kearney Lake Road Interchange
<b>Location</b>	Bedford, NS
<b>Site number</b>	-
<b>Date</b>	2023-02-10
<b>Version</b>	1
<b>Status</b>	Proposed Roundabouts
<b>Identifier</b>	-
<b>Client</b>	-
<b>Jobnumber</b>	232012
<b>Analyst</b>	Harbourside Transportation Consultants
<b>Description</b>	

### Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Av. delay units	Total delay units	Rate of delay units
m	kph	Veh	PCE	perHour	s	-Min	perMin

## Analysis Options

Vehicle length (m)	Calculate Q Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	V/C Threshold	Av. Delay threshold (s)	Q threshold (PCE)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
7.00	✓					0.85	35.00	14.00		500

## Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Background (2030)	AM Peak Hour	ONE HOUR	08:00	09:30	15	✓
D2	Background (2030)	PM Peak Hour	ONE HOUR	16:00	17:30	15	✓
D3	Total (2030)	AM Peak Hour	ONE HOUR	08:00	09:30	15	✓
D4	Total (2030)	PM Peak Hour	ONE HOUR	16:00	17:30	15	✓

## Analysis Set Details

ID	Name	Include in report	Use specific Demand Set(s)	Specific Demand Set(s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	Proposed Roundabout Configuration	✓	✓	D1,D2	100.000	100.000

# Proposed Roundabout Configuration - Background (2030), AM Peak Hour

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Q percentiles may be unreliable if the mean queue in any time segment is very low or very high.

## Intersection Network

### Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Int Del (s)	Int LOS
1	H102 NB Ramps	Standard Roundabout		1, 2, 3, 4	3.08	A
2	H102 SB Ramps	Standard Roundabout		1, 2, 3, 4	3.54	A

### Intersection Network

Driving side	Lighting	Network delay (s)	Network LOS
Right	Normal/unknown	3.28	A

## Legs

### Legs

Intersection	Leg	Name	Description	No yield line
1 - H102 NB Ramps	1	Kearney Lake Road (WB)		
	2	Highway 102 NB On-Ramp		
	3	Kearney Lake Road (EB)		
	4	Highway 102 Off-Ramp (NB)		
2 - H102 SB Ramps	1	Kearney Lake Road (WB)		
	2	Highway 102 Off-Ramp (SB)		
	3	Kearney Lake Road (EB)		
	4	Highway 102 SB On-Ramp		

### Roundabout Geometry

Intersection	Leg	V (m)	E (m)	I' (m)	R (m)	D (m)	PHI (deg)	Entry only	Exit only
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)	7.00	8.00	10.0	30.0	60.0	30.0		
	2 - Highway 102 NB On-Ramp								✓
	3 - Kearney Lake Road (EB)	7.00	8.00	10.0	30.0	60.0	30.0		
	4 - Highway 102 Off-Ramp (NB)	3.50	8.00	10.0	30.0	60.0	30.0		
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	7.00	8.00	10.0	30.0	60.0	30.0		
	2 - Highway 102 Off-Ramp (SB)	3.50	8.00	10.0	30.0	60.0	30.0		
	3 - Kearney Lake Road (EB)	7.00	8.00	10.0	30.0	60.0	30.0		
	4 - Highway 102 SB On-Ramp								✓

## Slope / Intercept / Capacity

### Roundabout Slope and Intercept used in model

Intersection	Leg	Final slope	Final intercept (PCE/hr)
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)	0.681	2389
	2 - Highway 102 NB On-Ramp		
	3 - Kearney Lake Road (EB)	0.681	2389
	4 - Highway 102 Off-Ramp (NB)	0.552	1646
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	0.681	2389
	2 - Highway 102 Off-Ramp (SB)	0.552	1646
	3 - Kearney Lake Road (EB)	0.681	2389
	4 - Highway 102 SB On-Ramp		

The slope and intercept shown above include any corrections and adjustments.

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Background (2030)	AM Peak Hour	ONE HOUR	08:00	09:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck %s	2.00

### Linked Leg Data

Intersection	Leg	Feeding Intersection	Feeding Leg	Link Type	Flow source	Uniform flow (Veh/hr)	Flow multiplier (%)	Internal storage space (PCE)
1 - H102 NB Ramps	3 - Kearney Lake Road (EB)	2	1	Q limited	Exit flow only	0	100.00	15.00
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	1	3	Q limited	Exit flow only	0	100.00	15.00

### Demand overview (Traffic)

Intersection	Leg	Linked leg	Profile type	Use O-D data	Av. Demand (Veh/hr)	Scaling Factor (%)
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)		ONE HOUR	✓	884	100.000
	2 - Highway 102 NB On-Ramp					
	3 - Kearney Lake Road (EB)	✓				
	4 - Highway 102 Off-Ramp (NB)		ONE HOUR	✓	169	100.000
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	✓				
	2 - Highway 102 Off-Ramp (SB)		ONE HOUR	✓	563	100.000
	3 - Kearney Lake Road (EB)		ONE HOUR	✓	639	100.000
	4 - Highway 102 SB On-Ramp					

## Origin-Destination Data

### Demand (Veh/hr)

2 - H102 SB Ramps		To				
	From		1 - Kearney Lake Road (WB)	2 - Highway 102 Off-Ramp (SB)	3 - Kearney Lake Road (EB)	4 - Highway 102 SB On-Ramp
		1 - Kearney Lake Road (WB)	0	0	260	135
		2 - Highway 102 Off-Ramp (SB)	536	0	23	4
		3 - Kearney Lake Road (EB)	456	0	0	183
		4 - Highway 102 SB On-Ramp	0	0	0	0

### Demand (Veh/hr)

#### 1 - H102 NB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 NB On-Ramp	3 - Kearney Lake Road (EB)	4 - Highway 102 Off-Ramp (NB)
From	1 - Kearney Lake Road (WB)	0	559	325	0
	2 - Highway 102 NB On-Ramp	0	0	0	0
	3 - Kearney Lake Road (EB)	938	54	0	0
	4 - Highway 102 Off-Ramp (NB)	99	0	70	0

## Vehicle Mix

### Truck %s

#### 2 - H102 SB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 Off-Ramp (SB)	3 - Kearney Lake Road (EB)	4 - Highway 102 SB On-Ramp
From	1 - Kearney Lake Road (WB)	2	2	3	8
	2 - Highway 102 Off-Ramp (SB)	3	2	13	2
	3 - Kearney Lake Road (EB)	4	2	2	3
	4 - Highway 102 SB On-Ramp	2	2	2	2

### Truck %s

#### 1 - H102 NB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 NB On-Ramp	3 - Kearney Lake Road (EB)	4 - Highway 102 Off-Ramp (NB)
From	1 - Kearney Lake Road (WB)	2	3	6	2
	2 - Highway 102 NB On-Ramp	2	2	2	2
	3 - Kearney Lake Road (EB)	3	2	2	2
	4 - Highway 102 Off-Ramp (NB)	9	2	2	2

## Results

### Results Summary for whole modelled period

Intersection	Leg	Max V/C	Max Delay (s)	Max Q (PCE)	Max Q95 (PCE)	Max LOS	Av. Demand (PCE/hr)	Total Intersection Arrivals (PCE)
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)	0.44	2.93	0.8	2.0	A	844	1267
	2 - Highway 102 NB On-Ramp							
	3 - Kearney Lake Road (EB)	0.47	2.94	0.9	1.5	A	941	1412
	4 - Highway 102 Off-Ramp (NB)	0.19	4.63	0.3	0.8	A	165	247
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	0.19	1.95	0.2	0.5	A	381	572
	2 - Highway 102 Off-Ramp (SB)	0.46	4.95	0.9	2.3	A	534	801
	3 - Kearney Lake Road (EB)	0.39	3.30	0.7	2.9	A	608	912
	4 - Highway 102 SB On-Ramp							



# Proposed Roundabout Configuration - Background (2030), PM Peak Hour

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Q percentiles may be unreliable if the mean queue in any time segment is very low or very high.

## Intersection Network

### Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Int Del (s)	Int LOS
1	H102 NB Ramps	Standard Roundabout		1, 2, 3, 4	3.88	A
2	H102 SB Ramps	Standard Roundabout		1, 2, 3, 4	3.62	A

### Intersection Network

Driving side	Lighting	Network delay (s)	Network LOS
Right	Normal/unknown	3.77	A

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	Background (2030)	PM Peak Hour	ONE HOUR	16:00	17:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck %s	2.00

### Linked Leg Data

Intersection	Leg	Feeding Intersection	Feeding Leg	Link Type	Flow source	Uniform flow (Veh/hr)	Flow multiplier (%)	Internal storage space (PCE)
1 - H102 NB Ramps	3 - Kearney Lake Road (EB)	2	1	Q limited	Exit flow only	0	100.00	15.00
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	1	3	Q limited	Exit flow only	0	100.00	15.00

### Demand overview (Traffic)

Intersection	Leg	Linked leg	Profile type	Use O-D data	Av. Demand (Veh/hr)	Scaling Factor (%)
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)		ONE HOUR	✓	1231	100.000
	2 - Highway 102 NB On-Ramp					
	3 - Kearney Lake Road (EB)	✓				
	4 - Highway 102 Off-Ramp (NB)		ONE HOUR	✓	359	100.000
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	✓				
	2 - Highway 102 Off-Ramp (SB)		ONE HOUR	✓	591	100.000
	3 - Kearney Lake Road (EB)		ONE HOUR	✓	522	100.000
	4 - Highway 102 SB On-Ramp					

## Origin-Destination Data

### Demand (Veh/hr)

#### 2 - H102 SB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 Off-Ramp (SB)	3 - Kearney Lake Road (EB)	4 - Highway 102 SB On-Ramp
From	1 - Kearney Lake Road (WB)	0	0	421	134
	2 - Highway 102 Off-Ramp (SB)	517	0	71	3
	3 - Kearney Lake Road (EB)	338	0	0	184
	4 - Highway 102 SB On-Ramp	0	0	0	0

### Demand (Veh/hr)

#### 1 - H102 NB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 NB On-Ramp	3 - Kearney Lake Road (EB)	4 - Highway 102 Off-Ramp (NB)
From	1 - Kearney Lake Road (WB)	0	838	393	0
	2 - Highway 102 NB On-Ramp	0	0	0	0
	3 - Kearney Lake Road (EB)	795	60	0	0
	4 - Highway 102 Off-Ramp (NB)	197	0	162	0

## Vehicle Mix

### Truck %s

#### 2 - H102 SB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 Off-Ramp (SB)	3 - Kearney Lake Road (EB)	4 - Highway 102 SB On-Ramp
From	1 - Kearney Lake Road (WB)	2	2	2	3
	2 - Highway 102 Off-Ramp (SB)	2	2	2	2
	3 - Kearney Lake Road (EB)	2	2	2	2
	4 - Highway 102 SB On-Ramp	2	2	2	2

### Truck %s

#### 1 - H102 NB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 NB On-Ramp	3 - Kearney Lake Road (EB)	4 - Highway 102 Off-Ramp (NB)
From	1 - Kearney Lake Road (WB)	2	2	2	2
	2 - Highway 102 NB On-Ramp	2	2	2	2
	3 - Kearney Lake Road (EB)	2	6	2	2
	4 - Highway 102 Off-Ramp (NB)	2	2	3	2

## Results

### Results Summary for whole modelled period

Intersection	Leg	Max V/C	Max Delay (s)	Max Q (PCE)	Max Q95 (PCE)	Max LOS	Av. Demand (PCE/hr)	Total Intersection Arrivals (PCE)
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)	0.62	4.40	1.7	2.8	A	1152	1728
	2 - Highway 102 NB On-Ramp							
	3 - Kearney Lake Road (EB)	0.40	2.58	0.7	2.7	A	800	1200
	4 - Highway 102 Off-Ramp (NB)	0.36	5.19	0.6	2.7	A	337	506
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	0.26	2.09	0.4	1.4	A	521	781
	2 - Highway 102 Off-Ramp (SB)	0.51	5.76	1.1	1.8	A	553	830
	3 - Kearney Lake Road (EB)	0.31	2.82	0.5	1.8	A	489	733
	4 - Highway 102 SB On-Ramp							






## **Appendix F: Total Phase 2 (2030) Operations Synchro/Arcady Reports**

HCM 6th TWSC  
3: Hamshaw Drive & Kearney Lake Road

Phase 1 & 2 (2030)  
AM Peak Hour

Intersection























Int Delay, s/veh 1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	631	4	19	274	4	41
Future Vol, veh/h	631	4	19	274	4	41
Conflicting Peds, #/hr	0	5	5	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	50	57	76	25	73
Heavy Vehicles, %	3	2	6	7	2	6
Mvmt Flow	671	8	33	361	16	56

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	684
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.16
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.254
Pot Cap-1 Maneuver	-	-	891
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	887
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	17.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	362	-	-	887	-
HCM Lane V/C Ratio	0.199	-	-	0.038	-
HCM Control Delay (s)	17.4	-	-	9.2	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	628	476	39	442	17	202	6	46	26	4	3
Future Volume (vph)	6	628	476	39	442	17	202	6	46	26	4	3
Satd. Flow (prot)	1789	1883	1601	1789	1874	0	1789	1635	0	1789	1763	0
Flt Permitted	0.427			0.279			0.753			0.720		
Satd. Flow (perm)	804	1883	1601	525	1874	0	1418	1635	0	1356	1763	0
Satd. Flow (RTOR)			517		4			50			3	
Lane Group Flow (vph)	7	683	517	42	498	0	220	57	0	28	7	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	56.8	56.8	56.8	56.8	56.8		26.0	26.0		26.0	26.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		6.0	6.0		6.0	6.0	
Act Effect Green (s)	30.3	30.3	30.3	30.3	30.3		13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.24	0.24		0.24	0.24	
v/c Ratio	0.02	0.69	0.47	0.15	0.50		0.64	0.13		0.09	0.02	
Control Delay	7.3	14.8	2.5	9.3	11.1		30.3	8.8		19.6	16.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.3	14.8	2.5	9.3	11.1		30.3	8.8		19.6	16.0	
LOS	A	B	A	A	B		C	A		B	B	
Approach Delay		9.4			10.9			25.9			18.9	
Approach LOS		A			B			C			B	
Queue Length 50th (m)	0.3	45.9	0.0	2.0	28.8		18.6	0.5		2.1	0.3	
Queue Length 95th (m)	2.0	93.8	11.6	7.4	59.3		48.8	8.7		8.8	3.2	
Internal Link Dist (m)		283.3			325.5			358.1			14.5	
Turn Bay Length (m)	35.0		250.0	160.0			30.0					
Base Capacity (vph)	704	1648	1466	459	1641		511	622		489	638	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.41	0.35	0.09	0.30		0.43	0.09		0.06	0.01	

## Intersection Summary

Cycle Length: 82.8

Actuated Cycle Length: 57.4

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 12.2



Intersection LOS: B

Intersection Capacity Utilization 61.6%

ICU Level of Service B




Analysis Period (min) 15

Splits and Phases: 4: Kearney Lake Road/Driveway &amp; Larry Uteck Boulevard

 Ø2	 Ø4
56.8 s	26 s
 Ø6	 Ø8
56.8 s	26 s




HCM 6th TWSC  
5: Kearney Lake Road & East Site Access

Phase 1 & 2 (2030)  
AM Peak Hour

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	558	252	26	77	14
Future Vol, veh/h	6	558	252	26	77	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	7	2	2	2
Mvmt Flow	7	607	274	28	84	15
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	302	0	-	0	909	288
Stage 1	-	-	-	-	288	-
Stage 2	-	-	-	-	621	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1259	-	-	-	305	751
Stage 1	-	-	-	-	761	-
Stage 2	-	-	-	-	536	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1259	-	-	-	303	751
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	536	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		20.3		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1259	-	-	-	334	
HCM Lane V/C Ratio	0.005	-	-	-	0.296	
HCM Control Delay (s)	7.9	0	-	-	20.3	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	1.2	

HCM 6th TWSC  
6: Kearney Lake Road & West Site Access

Phase 1 & 2 (2030)  
AM Peak Hour

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	524	253	13	40	7
Future Vol, veh/h	2	524	253	13	40	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	7	2	2	2
Mvmt Flow	2	570	275	14	43	8
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	289	0	-	0	856	282
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	574	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1273	-	-	-	328	757
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	563	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1273	-	-	-	327	757
Mov Cap-2 Maneuver	-	-	-	-	327	-
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	563	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		16.8		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1273	-	-	-	357	
HCM Lane V/C Ratio	0.002	-	-	-	0.143	
HCM Control Delay (s)	7.8	0	-	-	16.8	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.5	

### 3: Hamshaw Drive & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.4	0.3	0.1	0.1	0.1
Total Delay (hr)	0.2	0.0	0.0	0.1	0.0	0.1	0.4
Total Del/Veh (s)	1.1	1.1	5.5	0.9	12.8	5.4	1.4
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Stop Del/Veh (s)	0.1	0.2	2.9	0.2	10.5	5.1	0.4

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.3	0.4	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	3.5	2.0	3.3	3.3	0.5	0.4	3.4	0.6	0.6	0.1	0.1	0.1
Total Delay (hr)	0.0	1.8	0.6	0.2	1.0	0.0	1.1	0.0	0.1	0.1	0.0	0.0
Total Del/Veh (s)	14.8	10.5	4.2	20.7	8.5	5.0	19.9	15.5	10.5	16.8	18.4	4.9
Stop Delay (hr)	0.0	0.8	0.0	0.2	0.5	0.0	0.9	0.0	0.1	0.1	0.0	0.0
Stop Del/Veh (s)	10.6	4.4	0.0	18.4	3.8	2.8	16.0	11.3	8.8	15.6	16.0	4.8

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	All
Denied Delay (hr)	1.1
Denied Del/Veh (s)	2.0
Total Delay (hr)	5.2
Total Del/Veh (s)	9.7
Stop Delay (hr)	2.7
Stop Del/Veh (s)	5.0

### 5: Kearney Lake Road & East Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.2	0.0
Total Delay (hr)	0.0	0.1	0.0	0.0	0.3	0.0	0.4
Total Del/Veh (s)	4.3	0.8	0.4	0.3	11.6	8.4	1.7
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Stop Del/Veh (s)	0.7	0.1	0.0	0.0	7.7	4.2	0.7



### 6: Kearney Lake Road & West Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.8	0.4	0.0	0.0	0.1	0.1	0.3
Total Delay (hr)	0.0	0.1	0.0	0.0	0.1	0.0	0.3
Total Del/Veh (s)	7.5	0.8	0.4	0.3	10.8	7.2	1.2
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Stop Del/Veh (s)	2.0	0.0	0.0	0.0	7.1	3.4	0.4

### Total Network Performance

Denied Delay (hr)	1.2
Denied Del/Veh (s)	1.4
Total Delay (hr)	8.6
Total Del/Veh (s)	10.4
Stop Delay (hr)	3.2
Stop Del/Veh (s)	3.9

Intersection: 3: Hamshaw Drive & Kearney Lake Road

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	2.1	25.7	22.2
Average Queue (m)	0.1	4.3	7.9
95th Queue (m)	1.7	16.8	17.0
Link Distance (m)	139.9	263.5	188.9
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	TR
Maximum Queue (m)	12.3	71.2	3.8	20.2	57.3	36.6	40.9	20.2	9.3
Average Queue (m)	1.1	34.3	0.1	7.8	25.8	22.9	9.3	6.0	1.6
95th Queue (m)	5.7	57.3	3.9	16.3	44.3	35.7	26.9	15.3	7.2
Link Distance (m)		295.4			338.9		371.8	26.6	26.6
Upstream Blk Time (%)								0	
Queuing Penalty (veh)								0	
Storage Bay Dist (m)	35.0		250.0	160.0		30.0			
Storage Blk Time (%)		5				4	0		
Queuing Penalty (veh)		23				2	0		

Intersection: 5: Kearney Lake Road & East Site Access

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	7.7	24.3
Average Queue (m)	0.5	9.6
95th Queue (m)	4.4	18.0
Link Distance (m)	113.2	104.7
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Intersection: 6: Kearney Lake Road & West Site Access

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Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	5.0	20.0
Average Queue (m)	0.2	7.1
95th Queue (m)	3.2	15.2
Link Distance (m)	311.4	129.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Network Summary




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Network wide Queuing Penalty: 25

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Intersection

Int Delay, s/veh 1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	513	9	33	486	9	27
Future Vol, veh/h	513	9	33	486	9	27
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	58	58	93	88	64
Heavy Vehicles, %	3	2	7	2	2	4
Mvmt Flow	576	16	57	523	10	42























Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	594
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.17
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.263
Pot Cap-1 Maneuver	-	-	958
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	956
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	16.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	374	-	-	956	-
HCM Lane V/C Ratio	0.14	-	-	0.06	-
HCM Control Delay (s)	16.2	-	-	9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.2	-

Lanes, Volumes, Timings  
4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Phase 1 & 2 (2030)  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	791	338	57	636	40	274	14	41	58	11	3
Future Volume (vph)	7	791	338	57	636	40	274	14	41	58	11	3
Satd. Flow (prot)	1789	1883	1601	1789	1866	0	1789	1671	0	1789	1827	0
Flt Permitted	0.236			0.145			0.748			0.718		
Satd. Flow (perm)	444	1883	1601	273	1866	0	1409	1671	0	1352	1827	0
Satd. Flow (RTOR)			367		7			45			3	
Lane Group Flow (vph)	8	860	367	62	734	0	298	60	0	63	15	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	56.8	56.8	56.8	56.8	56.8		26.0	26.0		26.0	26.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		6.0	6.0		6.0	6.0	
Act Effect Green (s)	37.6	37.6	37.6	37.6	37.6		18.3	18.3		18.3	18.3	
Actuated g/C Ratio	0.54	0.54	0.54	0.54	0.54		0.26	0.26		0.26	0.26	
v/c Ratio	0.03	0.84	0.35	0.42	0.72		0.80	0.13		0.18	0.03	
Control Delay	7.4	21.9	1.9	19.3	16.3		44.4	11.3		24.2	20.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.4	21.9	1.9	19.3	16.3		44.4	11.3		24.2	20.8	
LOS	A	C	A	B	B		D	B		C	C	
Approach Delay		15.8			16.5			38.8			23.5	
Approach LOS		B			B			D			C	
Queue Length 50th (m)	0.5	89.6	0.0	4.5	67.6		35.8	1.5		6.3	1.1	
Queue Length 95th (m)	2.2	137.5	9.5	14.5	102.9		#88.9	10.7		17.8	5.9	
Internal Link Dist (m)		283.3			325.5			358.1			14.5	
Turn Bay Length (m)	35.0		250.0	160.0			30.0					
Base Capacity (vph)	331	1407	1289	203	1396		421	531		404	548	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.61	0.28	0.31	0.53		0.71	0.11		0.16	0.03	

Intersection Summary

Cycle Length: 82.8

Actuated Cycle Length: 69.1

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 19.6

Intersection LOS: B

Intersection Capacity Utilization 79.9%





ICU Level of Service D




Analysis Period (min) 15

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

Queue shown is maximum after two cycles.




Splits and Phases: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

 Ø2	 Ø4
56.8 s	26 s
 Ø6	 Ø8
56.8 s	26 s

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	476	420	75	46	9
Future Vol, veh/h	14	476	420	75	46	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	2	2	2	2
Mvmt Flow	15	517	457	82	50	10
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	539	0	-	0	1045	498
Stage 1	-	-	-	-	498	-
Stage 2	-	-	-	-	547	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1029	-	-	-	253	572
Stage 1	-	-	-	-	611	-
Stage 2	-	-	-	-	580	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1029	-	-	-	248	572
Mov Cap-2 Maneuver	-	-	-	-	248	-
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	580	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.2	0		21.8		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1029	-	-	-	273	
HCM Lane V/C Ratio	0.015	-	-	-	0.219	
HCM Control Delay (s)	8.6	0	-	-	21.8	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.8	

HCM 6th TWSC  
6: Kearney Lake Road & West Site Access

Phase 1 & 2 (2030)  
PM Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	468	392	37	22	5
Future Vol, veh/h	7	468	392	37	22	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	3	2	2	2	2
Mvmt Flow	8	509	426	40	24	5

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	466	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1095	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1095	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1095	-	-	-	308
HCM Lane V/C Ratio	0.007	-	-	-	0.095
HCM Control Delay (s)	8.3	0	-	-	17.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

### 3: Hamshaw Drive & Kearney Lake Road Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.0	0.4	0.4	0.1	0.1	0.2
Total Delay (hr)	0.1	0.0	0.0	0.2	0.0	0.0	0.4
Total Del/Veh (s)	0.8	0.6	5.0	1.2	12.3	4.6	1.3
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Stop Del/Veh (s)	0.1	0.1	2.1	0.1	10.0	4.3	0.3

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.4	0.3	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	3.5	2.0	3.3	3.1	0.7	0.7	3.3	0.6	0.7	0.2	0.1	0.1
Total Delay (hr)	0.1	3.0	0.4	0.6	1.9	0.1	2.3	0.1	0.2	0.4	0.1	0.0
Total Del/Veh (s)	28.0	13.6	3.6	36.4	10.9	6.9	30.5	26.4	17.2	23.6	19.3	6.4
Stop Delay (hr)	0.0	1.3	0.0	0.5	0.8	0.0	1.9	0.1	0.2	0.4	0.1	0.0
Stop Del/Veh (s)	22.6	5.9	0.0	33.6	4.6	3.4	25.5	19.8	14.3	22.3	16.7	6.3

### 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard Performance by movement

Movement	All
Denied Delay (hr)	1.2
Denied Del/Veh (s)	1.9
Total Delay (hr)	9.0
Total Del/Veh (s)	14.3
Stop Delay (hr)	5.3
Stop Del/Veh (s)	8.4

### 5: Kearney Lake Road & East Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.1	0.1	0.0	0.1	0.0	0.4
Total Del/Veh (s)	3.6	0.7	1.2	0.7	10.7	4.9	1.4
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Stop Del/Veh (s)	1.6	0.1	0.0	0.0	8.7	4.8	0.5



## 6: Kearney Lake Road & West Site Access Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.4	0.4	0.0	0.0	0.1	0.1	0.2
Total Delay (hr)	0.0	0.1	0.1	0.0	0.0	0.0	0.3
Total Del/Veh (s)	3.5	0.8	0.8	0.4	8.8	3.5	1.0
Stop Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stop Del/Veh (s)	1.0	0.0	0.0	0.0	7.1	3.5	0.2

## Total Network Performance

Denied Delay (hr)	1.3
Denied Del/Veh (s)	1.4
Total Delay (hr)	12.8
Total Del/Veh (s)	13.4
Stop Delay (hr)	5.8
Stop Del/Veh (s)	6.0

Intersection: 3: Hamshaw Drive & Kearney Lake Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	29.9	17.0
Average Queue (m)	5.5	6.6
95th Queue (m)	18.8	14.8
Link Distance (m)	263.5	188.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Kearney Lake Road/Driveway & Larry Uteck Boulevard

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	TR
Maximum Queue (m)	26.7	103.1	8.1	29.4	81.1	37.3	78.6	29.4	12.7
Average Queue (m)	2.4	51.1	0.3	11.6	39.7	30.8	23.0	10.8	3.4
95th Queue (m)	13.4	86.1	6.0	23.8	67.0	41.7	63.2	23.5	10.9
Link Distance (m)		295.4			338.9		371.8	26.6	26.6
Upstream Blk Time (%)								1	
Queuing Penalty (veh)								0	
Storage Bay Dist (m)	35.0		250.0	160.0		30.0			
Storage Blk Time (%)		12				18	0		
Queuing Penalty (veh)		42				10	0		

Intersection: 5: Kearney Lake Road & East Site Access

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	18.0	0.7	20.8
Average Queue (m)	2.1	0.0	7.8
95th Queue (m)	10.2	0.7	15.6
Link Distance (m)	113.2	139.9	104.7
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

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Intersection: 6: Kearney Lake Road & West Site Access

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Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	11.7	11.7
Average Queue (m)	0.8	4.8
95th Queue (m)	5.5	11.3
Link Distance (m)	311.4	129.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

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Network Summary

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Network wide Queuing Penalty: 52

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Junctions 10											
ARCADY 10 - Roundabout Module											
Version: 10.0.4.1693											
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**Report generation date:** 2023-03-30 9:44:36 AM

»Proposed Roundabout Configuration - Phase 1 & 2 (2030), AM Peak Hour

»Proposed Roundabout Configuration - Phase 1 & 2 (2030), PM Peak Hour

### Summary of intersection performance

	AM Peak Hour						PM Peak Hour					
	Q95 (PCE)	Delay (s)	V/C	LOS	Int Del (s)	Int LOS	Q95 (PCE)	Delay (s)	V/C	LOS	Int Del (s)	Int LOS
Proposed Roundabout Configuration - Phase 1 & 2 (2030)												
1 - H102 NB Ramps - 1 - Kearney Lake Road (WB)	2.0	2.96	0.45	A	3.13	A	2.9	4.50	0.63	A	3.96	A
1 - H102 NB Ramps - 3 - Kearney Lake Road (EB)	1.5	2.99	0.48	A			2.6	2.60	0.41	A		
1 - H102 NB Ramps - 4 - Highway 102 Off-Ramp (NB)	1.0	4.72	0.20	A			2.9	5.34	0.38	A		
2 - H102 SB Ramps - 1 - Kearney Lake Road (WB)	0.5	1.96	0.19	A	3.60	A	1.5	2.11	0.27	A	3.71	A
2 - H102 SB Ramps - 2 - Highway 102 Off-Ramp (SB)	2.2	5.01	0.46	A			1.7	5.99	0.53	A		
2 - H102 SB Ramps - 3 - Kearney Lake Road (EB)	2.9	3.41	0.41	A			2.0	2.86	0.32	A		

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of Av. delay per arriving vehicle. Int LOS and Int Del are demand-weighted Av.s.

### File summary

#### File Description

<b>Title</b>	Kearney Lake Road Interchange
<b>Location</b>	Bedford, NS
<b>Site number</b>	-
<b>Date</b>	2023-02-10
<b>Version</b>	1
<b>Status</b>	Proposed Roundabouts
<b>Identifier</b>	-
<b>Client</b>	-
<b>Jobnumber</b>	232012
<b>Analyst</b>	Harbourside Transportation Consultants
<b>Description</b>	

### Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Av. delay units	Total delay units	Rate of delay units
m	kph	Veh	PCE	perHour	s	-Min	perMin

## Analysis Options

Vehicle length (m)	Calculate Q Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	V/C Threshold	Av. Delay threshold (s)	Q threshold (PCE)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
7.00	✓					0.85	35.00	14.00		500

## Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Background (2030)	AM Peak Hour	ONE HOUR	08:00	09:30	15	✓
D2	Background (2030)	PM Peak Hour	ONE HOUR	16:00	17:30	15	✓
D3	Phase 1 & 2 (2030)	AM Peak Hour	ONE HOUR	08:00	09:30	15	✓
D4	Phase 1 & 2 (2030)	PM Peak Hour	ONE HOUR	16:00	17:30	15	✓

## Analysis Set Details

ID	Name	Include in report	Use specific Demand Set(s)	Specific Demand Set(s)	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	Proposed Roundabout Configuration	✓	✓	D3,D4	100.000	100.000

# Proposed Roundabout Configuration - Phase 1 & 2 (2030), AM Peak Hour

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Q percentiles may be unreliable if the mean queue in any time segment is very low or very high.

## Intersection Network

### Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Int Del (s)	Int LOS
1	H102 NB Ramps	Standard Roundabout		1, 2, 3, 4	3.13	A
2	H102 SB Ramps	Standard Roundabout		1, 2, 3, 4	3.60	A

### Intersection Network

Driving side	Lighting	Network delay (s)	Network LOS
Right	Normal/unknown	3.34	A

## Legs

### Legs

Intersection	Leg	Name	Description	No yield line
1 - H102 NB Ramps	1	Kearney Lake Road (WB)		
	2	Highway 102 NB On-Ramp		
	3	Kearney Lake Road (EB)		
	4	Highway 102 Off-Ramp (NB)		
2 - H102 SB Ramps	1	Kearney Lake Road (WB)		
	2	Highway 102 Off-Ramp (SB)		
	3	Kearney Lake Road (EB)		
	4	Highway 102 SB On-Ramp		

### Roundabout Geometry

Intersection	Leg	V (m)	E (m)	I' (m)	R (m)	D (m)	PHI (deg)	Entry only	Exit only
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)	7.00	8.00	10.0	30.0	60.0	30.0		
	2 - Highway 102 NB On-Ramp								✓
	3 - Kearney Lake Road (EB)	7.00	8.00	10.0	30.0	60.0	30.0		
	4 - Highway 102 Off-Ramp (NB)	3.50	8.00	10.0	30.0	60.0	30.0		
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	7.00	8.00	10.0	30.0	60.0	30.0		
	2 - Highway 102 Off-Ramp (SB)	3.50	8.00	10.0	30.0	60.0	30.0		
	3 - Kearney Lake Road (EB)	7.00	8.00	10.0	30.0	60.0	30.0		
	4 - Highway 102 SB On-Ramp								✓

## Slope / Intercept / Capacity

### Roundabout Slope and Intercept used in model

Intersection	Leg	Final slope	Final intercept (PCE/hr)
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)	0.681	2389
	2 - Highway 102 NB On-Ramp		
	3 - Kearney Lake Road (EB)	0.681	2389
	4 - Highway 102 Off-Ramp (NB)	0.552	1646
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	0.681	2389
	2 - Highway 102 Off-Ramp (SB)	0.552	1646
	3 - Kearney Lake Road (EB)	0.681	2389
	4 - Highway 102 SB On-Ramp		

The slope and intercept shown above include any corrections and adjustments.

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	Phase 1 & 2 (2030)	AM Peak Hour	ONE HOUR	08:00	09:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck %s	2.00

### Linked Leg Data

Intersection	Leg	Feeding Intersection	Feeding Leg	Link Type	Flow source	Uniform flow (Veh/hr)	Flow multiplier (%)	Internal storage space (PCE)
1 - H102 NB Ramps	3 - Kearney Lake Road (EB)	2	1	Q limited	Exit flow only	0	100.00	15.00
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	1	3	Q limited	Exit flow only	0	100.00	15.00

### Demand overview (Traffic)

Intersection	Leg	Linked leg	Profile type	Use O-D data	Av. Demand (Veh/hr)	Scaling Factor (%)
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)		ONE HOUR	✓	885	100.000
	2 - Highway 102 NB On-Ramp					
	3 - Kearney Lake Road (EB)	✓				
	4 - Highway 102 Off-Ramp (NB)		ONE HOUR	✓	174	100.000
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	✓				
	2 - Highway 102 Off-Ramp (SB)		ONE HOUR	✓	567	100.000
	3 - Kearney Lake Road (EB)		ONE HOUR	✓	672	100.000
	4 - Highway 102 SB On-Ramp					

## Origin-Destination Data

### Demand (Veh/hr)

		To			
		1 - Kearney Lake Road (WB)	2 - Highway 102 Off-Ramp (SB)	3 - Kearney Lake Road (EB)	4 - Highway 102 SB On-Ramp
2 - H102 SB Ramps	From				
	1 - Kearney Lake Road (WB)	0	0	266	135
	2 - Highway 102 Off-Ramp (SB)	536	0	27	4
	3 - Kearney Lake Road (EB)	473	0	0	199
	4 - Highway 102 SB On-Ramp	0	0	0	0

### Demand (Veh/hr)

#### 1 - H102 NB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 NB On-Ramp	3 - Kearney Lake Road (EB)	4 - Highway 102 Off-Ramp (NB)
From	1 - Kearney Lake Road (WB)	0	559	326	0
	2 - Highway 102 NB On-Ramp	0	0	0	0
	3 - Kearney Lake Road (EB)	940	69	0	0
	4 - Highway 102 Off-Ramp (NB)	99	0	75	0

## Vehicle Mix

### Truck %s

#### 2 - H102 SB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 Off-Ramp (SB)	3 - Kearney Lake Road (EB)	4 - Highway 102 SB On-Ramp
From	1 - Kearney Lake Road (WB)	2	2	3	8
	2 - Highway 102 Off-Ramp (SB)	3	2	13	2
	3 - Kearney Lake Road (EB)	4	2	2	3
	4 - Highway 102 SB On-Ramp	2	2	2	2

### Truck %s

#### 1 - H102 NB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 NB On-Ramp	3 - Kearney Lake Road (EB)	4 - Highway 102 Off-Ramp (NB)
From	1 - Kearney Lake Road (WB)	2	3	6	2
	2 - Highway 102 NB On-Ramp	2	2	2	2
	3 - Kearney Lake Road (EB)	3	2	2	2
	4 - Highway 102 Off-Ramp (NB)	9	2	2	2

## Results

### Results Summary for whole modelled period

Intersection	Leg	Max V/C	Max Delay (s)	Max Q (PCE)	Max Q95 (PCE)	Max LOS	Av. Demand (PCE/hr)	Total Intersection Arrivals (PCE)
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)	0.45	2.96	0.8	2.0	A	845	1268
	2 - Highway 102 NB On-Ramp							
	3 - Kearney Lake Road (EB)	0.48	2.99	1.0	1.5	A	958	1436
	4 - Highway 102 Off-Ramp (NB)	0.20	4.72	0.3	1.0	A	169	254
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	0.19	1.96	0.3	0.5	A	387	581
	2 - Highway 102 Off-Ramp (SB)	0.46	5.01	0.9	2.2	A	538	808
	3 - Kearney Lake Road (EB)	0.41	3.41	0.7	2.9	A	639	959
	4 - Highway 102 SB On-Ramp							



# Proposed Roundabout Configuration - Phase 1 & 2 (2030), PM Peak Hour

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Q percentiles may be unreliable if the mean queue in any time segment is very low or very high.

## Intersection Network

### Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Int Del (s)	Int LOS
1	H102 NB Ramps	Standard Roundabout		1, 2, 3, 4	3.96	A
2	H102 SB Ramps	Standard Roundabout		1, 2, 3, 4	3.71	A

### Intersection Network

Driving side	Lighting	Network delay (s)	Network LOS
Right	Normal/unknown	3.86	A

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	Phase 1 & 2 (2030)	PM Peak Hour	ONE HOUR	16:00	17:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck %s	2.00

### Linked Leg Data

Intersection	Leg	Feeding Intersection	Feeding Leg	Link Type	Flow source	Uniform flow (Veh/hr)	Flow multiplier (%)	Internal storage space (PCE)
1 - H102 NB Ramps	3 - Kearney Lake Road (EB)	2	1	Q limited	Exit flow only	0	100.00	15.00
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	1	3	Q limited	Exit flow only	0	100.00	15.00

### Demand overview (Traffic)

Intersection	Leg	Linked leg	Profile type	Use O-D data	Av. Demand (Veh/hr)	Scaling Factor (%)
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)		ONE HOUR	✓	1233	100.000
	2 - Highway 102 NB On-Ramp					
	3 - Kearney Lake Road (EB)	✓				
	4 - Highway 102 Off-Ramp (NB)		ONE HOUR	✓	372	100.000
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	✓				
	2 - Highway 102 Off-Ramp (SB)		ONE HOUR	✓	604	100.000
	3 - Kearney Lake Road (EB)		ONE HOUR	✓	539	100.000
	4 - Highway 102 SB On-Ramp					

## Origin-Destination Data

### Demand (Veh/hr)

#### 2 - H102 SB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 Off-Ramp (SB)	3 - Kearney Lake Road (EB)	4 - Highway 102 SB On-Ramp
From	1 - Kearney Lake Road (WB)	0	0	436	134
	2 - Highway 102 Off-Ramp (SB)	517	0	84	3
	3 - Kearney Lake Road (EB)	347	0	0	192
	4 - Highway 102 SB On-Ramp	0	0	0	0

### Demand (Veh/hr)

#### 1 - H102 NB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 NB On-Ramp	3 - Kearney Lake Road (EB)	4 - Highway 102 Off-Ramp (NB)
From	1 - Kearney Lake Road (WB)	0	838	395	0
	2 - Highway 102 NB On-Ramp	0	0	0	0
	3 - Kearney Lake Road (EB)	796	68	0	0
	4 - Highway 102 Off-Ramp (NB)	197	0	175	0

## Vehicle Mix

### Truck %s

#### 2 - H102 SB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 Off-Ramp (SB)	3 - Kearney Lake Road (EB)	4 - Highway 102 SB On-Ramp
From	1 - Kearney Lake Road (WB)	2	2	2	3
	2 - Highway 102 Off-Ramp (SB)	2	2	2	2
	3 - Kearney Lake Road (EB)	2	2	2	2
	4 - Highway 102 SB On-Ramp	2	2	2	2

### Truck %s

#### 1 - H102 NB Ramps

	To				
		1 - Kearney Lake Road (WB)	2 - Highway 102 NB On-Ramp	3 - Kearney Lake Road (EB)	4 - Highway 102 Off-Ramp (NB)
From	1 - Kearney Lake Road (WB)	2	2	2	2
	2 - Highway 102 NB On-Ramp	2	2	2	2
	3 - Kearney Lake Road (EB)	2	6	2	2
	4 - Highway 102 Off-Ramp (NB)	2	2	3	2

## Results

### Results Summary for whole modelled period

Intersection	Leg	Max V/C	Max Delay (s)	Max Q (PCE)	Max Q95 (PCE)	Max LOS	Av. Demand (PCE/hr)	Total Intersection Arrivals (PCE)
1 - H102 NB Ramps	1 - Kearney Lake Road (WB)	0.63	4.50	1.7	2.9	A	1154	1731
	2 - Highway 102 NB On-Ramp							
	3 - Kearney Lake Road (EB)	0.41	2.60	0.7	2.6	A	808	1212
	4 - Highway 102 Off-Ramp (NB)	0.38	5.34	0.6	2.9	A	350	525
2 - H102 SB Ramps	1 - Kearney Lake Road (WB)	0.27	2.11	0.4	1.5	A	535	802
	2 - Highway 102 Off-Ramp (SB)	0.53	5.99	1.1	1.7	A	565	848
	3 - Kearney Lake Road (EB)	0.32	2.86	0.5	2.0	A	504	757
	4 - Highway 102 SB On-Ramp							