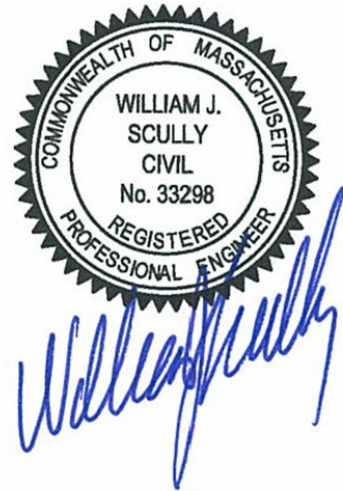


MEMORANDUM

To: JT Walsh Corp.
11 Saddle Way
Walpole, MA 02081

From: William J, Scully, P.E.
Peyton Graham

Date: January 2, 2024



***Subject: Uncas Avenue Extension Residential Development
Traffic Assessment
Franklin, Massachusetts***

INTRODUCTION

The purpose of this memorandum is to review the traffic access regarding the proposed development located at Uncas Avenue in the Town of Franklin, Massachusetts just east of King Street. The development site is located along Uncas Avenue where the subdivision road, Uncas Avenue Extension, breaks off from Uncas Avenue, as shown in **Figure 1** (see after page 7 for figures). A sidewalk will be provided along one side of the Extension connecting to the existing sidewalk that exists on Uncas Avenue. The currently approved subdivision defines nine (9) lots and the alternative sites plan can be found in **Appendix A**. It is our understanding that the nine (9) duplexes building option has been approved and the alternative development program would consist of nine (9) triplexes. The study scope was reviewed with the Town staff and traffic peer review consultant before proceeding.

STUDY AREA

The traffic assessment focused on Uncas Avenue which is a north-south, two-lane undivided roadway without a posted speed limit. It is classified as a Local Road and is under the jurisdiction of the Town of Franklin. A short segment of a five (5) foot sidewalk is located along the west side from East Central Street to Ledge Street. With the exception of Devita's Market at East Central, the land uses along Uncas Avenue and some of the connecting streets are made up of residential uses along Uncas Avenue including a small apartment building just to the north of the project site. Uncas Avenue intersects with East Central Street at Devita's Market and about 100 feet east of King Street forming a T-type intersection under STOP control. East Central Street (Route 140), in the project area, is a two-lane undivided Urban Principal Arterial Roadway with a posted speed limit of 40 miles per hour (MPH) although the travel speeds are much lower on the approaches to the traffic signal. From East Street to Lewis Street, East Central Street (Route 140) is under the jurisdiction of the Town of Franklin. Five (5) foot sidewalk facilities are located on both sides and are in good condition. The MBTA commuter rail station is located to the west, less than a mile from the proposed development. Land uses along East Central Street in the project area consist primarily of commercial uses including banks, coffee shops, restaurants, supermarkets, and other uses. Residential uses also are located along the street including the rental units under construction at 230 East Central and 330 East Central Street that is in the midst of leasing.

DATA COLLECTION

A new automatic traffic recorder (ATR) count was conducted on Wednesday, December 12, 2023, along Hill Avenue, south of Ledge Street to obtain travel speeds as well as providing volume information within the neighborhood area that could be affected by the project traffic. This street was selected for the observation as it was noted by the public for potential through travel connecting to Lewis Street and potentially Summer Street. The posted speed limit on Hill Avenue was noted to be 25 MPH. The collected data showed that the average travel speed was measured to be 20 MPH while the 85th percentile speed was observed to be approximately 25 MPH depending on the travel direction. Both the average travel speed and 85th percentile speed are at or below the posted speed limit showing high compliance with the desired speeds. The average daily traffic volume observed on Hill Avenue was measured to be approximately 100 vehicles per day (VPD) (total of both directions) which in general, would classify Hill Avenue as a low volume.

Existing traffic volumes at the study intersection of East Central Street at King Street were based upon previously collected¹ turning movement counts (TMCs) for a Turn Lane Evaluation at Chestnut Street. Traffic volumes were collected on Thursday, December 1, 2022, and were grown by a factor of 1.0 percent (1.0%) to reflect volumes in 2023.

A short sample count (30 minute duration) was conducted at East Central Street at Uncas Avenue during the morning peak period to provide a basis for estimating traffic volume patterns entering and exiting Uncas Avenue. The data was expanded using the traffic data from the traffic signal. The PM peak conditions were estimated using the AM levels and reversing patterns. General observations made during this short sample count showed very low volumes exiting or entering Uncas Avenue with a portion of that volume related the Devita's Market parking lot to patronize the shop.

Figure 2 presents the existing turning movement volumes at the study intersections during the AM and PM peak hour. The data collected is included in **Appendix B**.

FUTURE NO-BUILD CONDITIONS

Future No-Build traffic conditions are defined as the expected traffic conditions on the roadway network in the year 2030 without the construction of the proposed development. Future No-Build traffic volumes used in the analysis are the sum of the existing traffic, vicinity development traffic, and additional traffic generated by the general overall background growth in the Town that could affect the project area. In working out the scope for No-Build and Build with the Town's peer review consultant, the assumptions noted below were assumed part of the future No-Build while the two Build options (duplexes and triplexes) were examined separately although the duplex option could be built but it was requested not to include it as part of the No-Build.

Traffic growth on the transportation network was determined based upon (a) historic growth trends at nearby MassDOT traffic count stations and population census data from the year 2010 and 2020. An annual growth of 1.0 percent (1.0%) was selected as a reasonable background growth rate and will be

¹ Beta Group, Chestnut Street Left Turn Evaluation, East Central Street (Route 140) at King Street/Chestnut Street, prepared for Town of Franklin, May 2023.

applied annually to the Existing (2023) traffic volumes in developing Future (2030) No-Build Conditions. The growth calculations are contained in **Appendix C**.

Based on the information provided by the Town, two (2) vicinity developments were included in the analysis. Traffic generation associated with these two developments were taken directly from their respective studies^{2,3} completed during the local review process.

- Taj Estates of Franklin – 104 multifamily residential units located at 330 East Central Street, which is west of the site.
- Taj Estates of Franklin II – 35 residential units and 900 square feet (SF) of office space located at 230 East Central Street, which is west of the site.

Figure 3 and **Figure 4** present the vehicle trip assignments from those two vicinity developments and **Figure 5** presents the overall Future No-Build traffic volume conditions on East Central Street between King Street and Uncas Avenue.

TRAFFIC GENERATION

The proposed development project's site generated trips were estimated using the trip generation models published by the Institute of Transportation Engineers (ITE) for Land Use Code (LUC) 215 (Single-Family Attached Housing) documented in the ITE *Trip Generation Manual, 11th Edition*. The development was evaluated for each Build scenarios:

- Build A - nine (9) triplexes (27 units)
- Build B - nine (9) duplexes (18 units)

Multimodal factors, internal captures, or pass-by trip reduction were not applied to the trip generation estimated for the proposed development. It is noted, however, that with multiple commercial businesses in close proximity to the proposed development and the town center and train station a short walk from the project, the project is situated in a location that could in fact result in a high proportion of walk trips for all trip purposes. As such, the estimates presented below in **Table 1** could be somewhat conservative with lower vehicle traffic generation actually experienced.

A summary of the daily and weekday peak hour estimates is included in **Table 1**. As shown, the proposed development of nine (9) triplexes (27 units) is expected to general a total of 156 net new vehicles on a typical weekday, eight (8) net new vehicle trips (2 entering and 6 exiting) during the AM peak hour, and 12 net new vehicle trips (7 entering and 5 exiting) during the PM peak hour. The development of nine (9) duplexes (18 units) is expected to general a total of 88 net new vehicles on a typical weekday, four (4) net new vehicle trips (1 entering and 3 exiting) during the AM peak hour, and seven (7) net new vehicle trips (4 entering and 3 exiting) during the PM peak hour. The trip generation calculations are provided in **Appendix D**. The proposed development project, evaluated as either

² Vanasse and Associates, Inc., Transportation Impact Assessment, Central Square Mixed-Use Development, 340 East Central Street, Franklin, MA prepared for 340 East Central Street, LLC, May 2020.

³ Vanasse and Associates, Inc., Transportation Impact Assessment, Taj Estates of Franklin II, 230 East Central Street, Franklin, MA, January 19, 2022.

triplexes or duplexes, can be characterized as a low traffic generator, generating less than 15 trips during each of the AM and PM peak hours.

Comparing the two alternative Build options, increasing the number of units from 18 to 27 will result in fairly small increases in traffic including over the average weekday, from 88 to 156; AM peak hour from 4 to 8 vehicle trips; PM peak hour from 7 to 12 vehicle trips. During the peak hours without assuming any adjustment due to walk trips, the increase in trips between the duplex and triplex buildouts would be between 4 and 5 vehicle trips during the peak hours and not likely noticeable.

**Table 1. Summary of Site Generated Trip Generation
Build A vs. Build B Options**

Scenario	Land Use	ITE Code	Size	Weekday	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Build A	Single Family Attached Housing	215	27 dwelling units	156	2	6	8	7	5	12
Build B	Single Family Attached Housing	215	18 dwelling units	88	1	3	4	4	3	7

TRIP DISTRIBUTION

The distribution and assignment of site related traffic was estimated. For the development's general traffic, the trip distribution estimate was based on the US Census Bureau's Journey to Work and consistent with the previously cited traffic studies. The trip distribution along the roadway network for the AM and PM peak hours are forecast to be the following.

- 40% coming to/from the west (East Central Street (Route 140))
- 30% coming to/from the east (East Central Street (Route 140))
- 25% coming to/from the south (King Street)
- 5% coming to/from the north (Chestnut Street)

Figure 6 presents the peak hour trip distribution for the 2030 Build A and 2030 Build B Conditions. Trip assignments for Build A and B are shown in **Figure 7** and **Figure 8**.

As shown in the estimated trip patterns, it has been assumed that those project related residents driving towards I-495 would utilize Ledge Street to Hill Street to Crocker Street and then Summer Street to reach King Street avoiding the left turn exit from Uncas Avenue onto East Central Street during the peak hours. Based on the estimate of trip generation and the above patterns, this would result in an estimated 1 to 2 vehicle trips during the peak hours under either Build option. Residents returning home from that direction (I-495) would tend to remain on King Street, turn right on East Central Street, and then turn right onto Uncas Street.

FUTURE BUILD CONDITIONS

Future Build traffic conditions are defined as the expected traffic conditions on the roadway network in the year 2030 after the opening of the project. The total traffic volume considered in the analysis for this project are the sum of the background growth related to traffic volumes unrelated to this specific project, and the expected site-generate traffic volumes. **Figure 9** and **Figure 10** present the future total turning movement volumes at the study intersections for 2030 Build A Conditions and 2030 Build B Conditions. Volume Development worksheets are included in **Appendix E**.

ANALYSIS

Intersection capacity analyses were performed for Existing, 2030 Future No-Build, and 2030 Future Build traffic volumes for the study area intersections. The analyses were performed using the Synchro Software Package (Version 11), which utilizes methodologies contained in the *Highway Capacity Manual (6th Edition)* for signalized and unsignalized intersections. For intersections with timing configurations that are incompatible with *HCM 6th Edition*, the built-in Synchro analysis methodology is used. According to the *HCM 6th Edition*, capacity is defined as the maximum number of vehicles that can pass over a particular road segment or through a particular intersection within a fixed time duration. The analyses is described qualitatively by Level of Service (LOS) to indicate the operating characteristics of a road segment or intersection. LOS is defined as a qualitative measure that describes operational conditions and motorist perceptions within a traffic stream and relates to the level of delay experienced. The *HCM 6th Edition* defines six levels of service, LOS A through LOS F, with A being the best and F being the worst. Typically, a LOS "D" or better at signalized and unsignalized intersections is preferred, although lower levels are tolerated during peak travel hours. The ranges of delay for each level of service are shown in **Table 2**.

Table 2. Level of Service Range of Delay		
Level of Service (LOS)	Delay per Vehicle (seconds per vehicle)	
	Signalized Intersections	Unsignalized Intersections
A	≤ 10	≤ 10
B	10 -20	10 -15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	≥ 80	≥ 50

Intersection Capacity Analysis Summary

A summary of the intersection capacity analysis for the weekday AM and PM peak hours for the Existing Conditions, 2030 Future No-Build Conditions, and 2030 Future Conditions and can be found in **Table 3** and **Table 4**. The intersection analysis worksheets are contained in **Appendix F**.

The key findings of the intersection capacity analysis as it pertains to the proposed project are as follows:

- The project adds a small amount of traffic to the system under either the duplex or triplex options but does not result in significant changes in vehicle delays or operations at the two intersections studied.
- The analysis has shown that under either the Build A and Build B Conditions, operations remain similar to No-Build Conditions for both the AM and PM peak hours.
- The Uncas Avenue exiting movement is anticipated to operate at LOS C under both Build options during the AM peak hour and LOS E during the PM peak hour,

Table 3. AM Peak Hour Intersection Capacity Analysis

Intersection	Traffic Control	Movement	Existing Conditions		No Build (2030)		Build A (2030)		Build B (2030)	
			LOS (Delay)	95th % Queue Lengths (feet)	LOS (Delay)	95th % Queue Lengths (feet)	LOS (Delay)	95th % Queue Lengths (feet)	LOS (Delay)	95th % Queue Lengths (feet)
East Central Street (Route 140) & King Street/Chestnut Street	Signalized	EBL	B (10.4)	50	B (10.7)	50	B (10.7)	50	B (10.7)	50
		EBT	C (30.6)	290	C (31.7)	320	C (31.7)	320	C (31.7)	320
		WBL	B (14.4)	110	B (16.8)	125	B (16.8)	125	B (16.8)	125
		WBT	C (21.8)	255	C (23.3)	300	C (23.2)	305	C (23.2)	300
		NBT	C (27.4)	230	C (28.3)	250	C (28.4)	250	C (28.3)	250
		NBR	A (5.5)	80	A (5.7)	90	A (5.7)	90	A (5.7)	90
		SBT	C (28.9)	240	C (29.4)	260	C (29.4)	260	C (29.4)	260
		Intersection	C (22.0)	-	C (22.8)	-	C (22.9)	-	C (22.8)	-
East Central Street (Route 140) & Uncas Avenue	One-Way Stop Control	NB Exit	C (17.8)	25	C (19.1)	25	C (20.5)	25	C (20.0)	25
		WBL	A (0.0)	-	A (0.0)	-	A (9.1)	-	A (0.0)	-

CONCLUSIONS

The analysis of traffic with respect to the development of two (2) build scenarios at Uncas Avenue was completed following standard practice. The key findings of this traffic assessment are as follows:

- There will be negligible differences in additional peak hour traffic between the duplex or triplex Build options with both resulting in small amounts of new traffic.

Table 4. PM Peak Hour Intersection Capacity Analysis

Intersection	Traffic Control	Movement	Existing Conditions		No Build (2030)		Build A (2030)		Build B (2030)	
			LOS (Delay)	95th % Queue Lengths (feet)	LOS (Delay)	95th % Queue Lengths (feet)	LOS (Delay)	95th % Queue Lengths (feet)	LOS (Delay)	95th % Queue Lengths (feet)
East Central Street (Route 140) & King Street/Chestnut Street	Signalized	EBL	B (16.3)	80	B (17.2)	85	B (17.2)	85	B (17.2)	85
		EBT	D (38.1)	380	D (36.6)	425	D (36.6)	430	D (36.6)	430
		WBL	F (100.0)	#390	F (154.4)	#460	F (156.0)	#460	F (156.0)	#460
		WBT	D (35.1)	390	D (36.5)	450	D (36.5)	450	D (36.5)	450
		NBT	C (30.9)	290	D (35.2)	320	D (35.4)	320	D (35.3)	320
		NBR	A (7.6)	115	A (8.5)	135	A (8.6)	135	A (8.6)	135
		SBT	D (39.2)	#515	E (62.6)	#580	E (63.8)	#580	E (63.1)	#580
		Intersection	D (40.2)	-	D (53.5)	-	D (53.9)	-	D (53.8)	-
East Central Street (Route 140) & Uncas Avenue	One-Way Stop Control	NB Exit	E (46.5)	25	F (57.3)	25	E (46.1)	25	E (36.6)	25
		WBL	A (9.6)	-	A (9.8)	-	A (9.9)	-	A (9.8)	-

- The exiting movements from Uncas Avenue operate similarly under Existing, No Build, and Build Conditions during the peak hours with a small improvement calculated during the PM peak hour due to the increase in right turn exit movements. There is virtually no difference between the two (2) Build scenarios in terms of traffic operations.
- The project will result in minimal changes in operating conditions and average vehicle delays at the intersection of East Central Street (Route 140) & King Street/Chestnut Street
- It is anticipated based on the analysis that only a small amount of site traffic would tend to utilize the adjoining neighborhood streets such as Hill Avenue, Lewis Street and Crocker Avenue to reach the major streets.
- The project includes a sidewalk that will connect to the existing network and thereby encourage safe pedestrian movement from the site to East Central and the nearby land uses.

In conclusion, the proposed project will have minimal impact on the operating conditions of the surrounding roadways and intersections. Furthermore, the 27 unit triplex option that provides more housing opportunities, will have similar impacts on traffic as the previously approved duplex option.

FIGURES

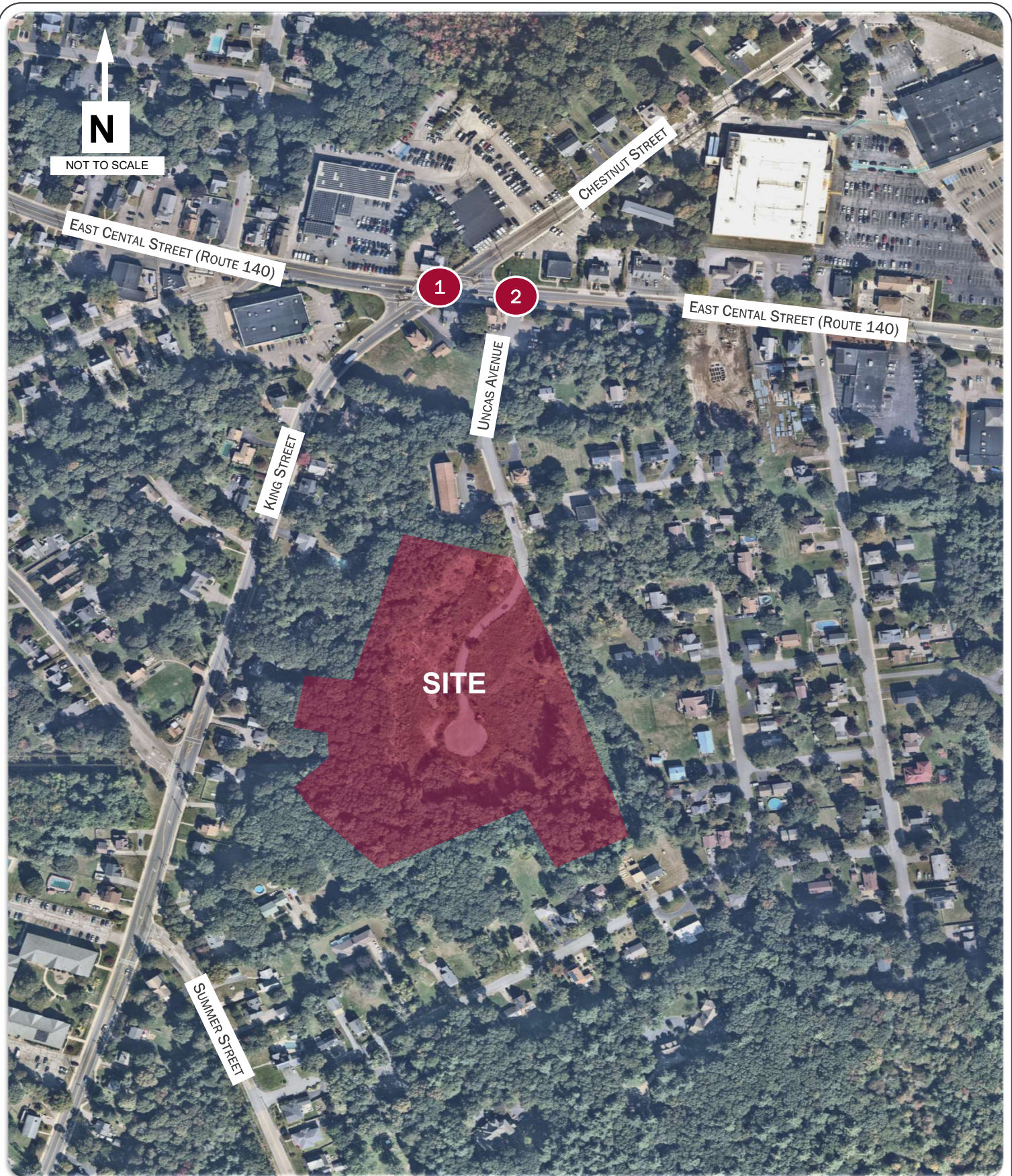


Figure 1
Site Location
Uncas Avenue Extension Residential Development Traffic
Assessment



NOT TO SCALE

Legend

-  Study Roadway
- XX AM Peak Hour Traffic
- (XX) PM Peak Hour Traffic

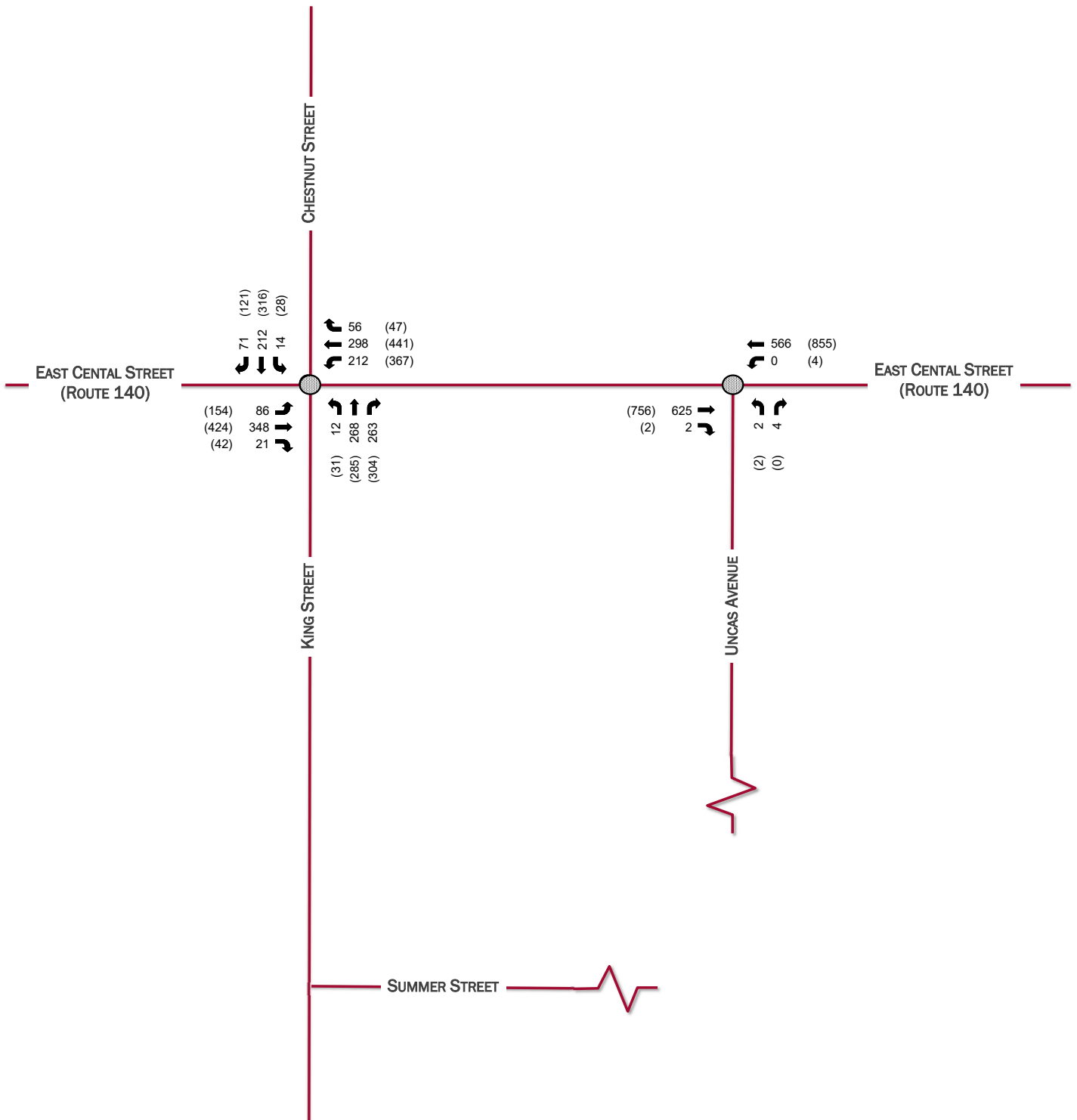


Figure 2

2023 Existing Condition Volumes

**Uncas Avenue Extension Residential Development
Traffic Assessment**



NOT TO SCALE

Legend

-  Study Roadway
- XX AM Peak Hour Traffic
- (XX) PM Peak Hour Traffic

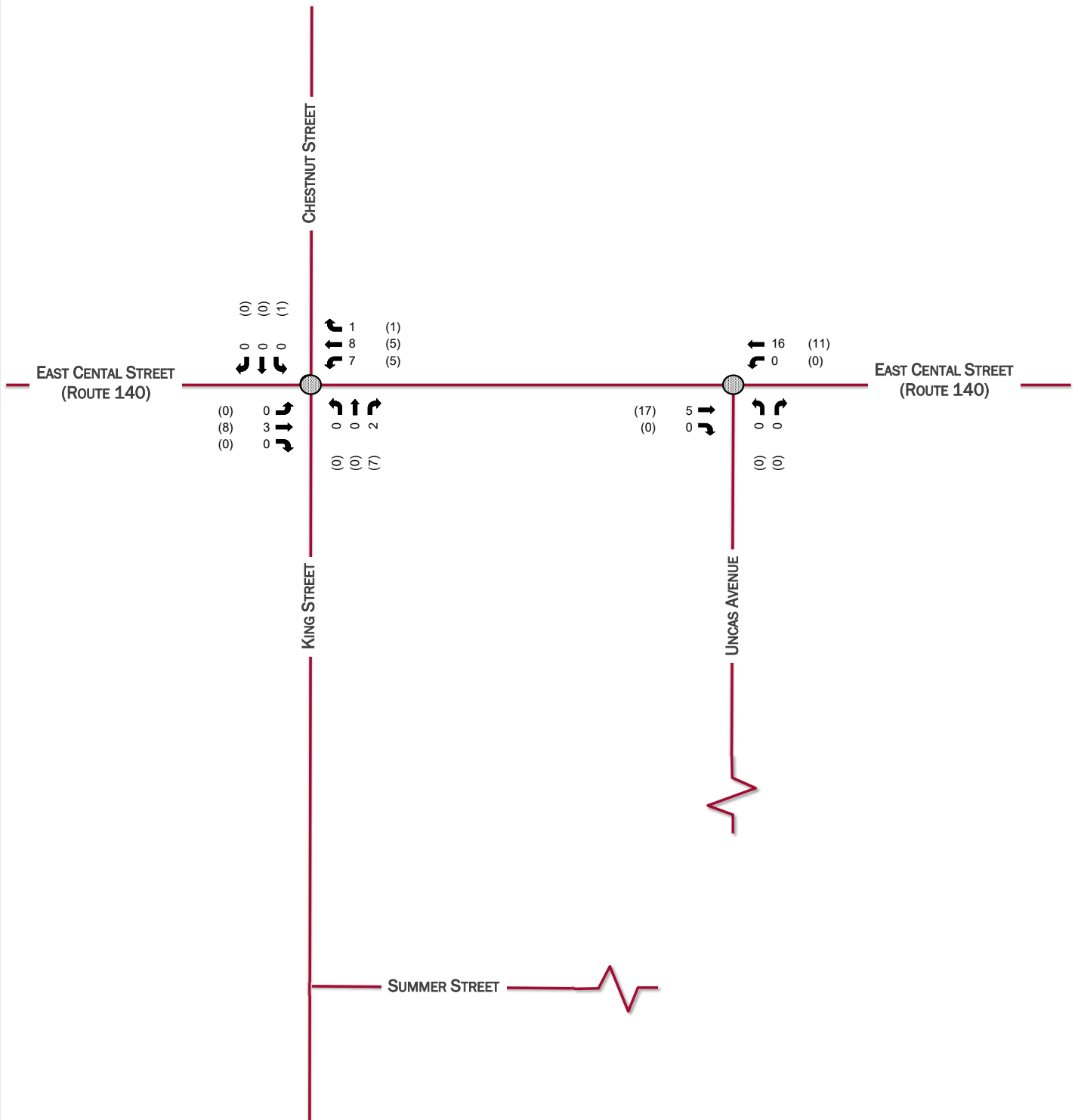


Figure 3

Taj Estates Background Trips

**Uncas Avenue Extension Residential Development
Traffic Assessment**



NOT TO SCALE

Legend

-  Study Roadway
- XX AM Peak Hour Traffic
- (XX) PM Peak Hour Traffic

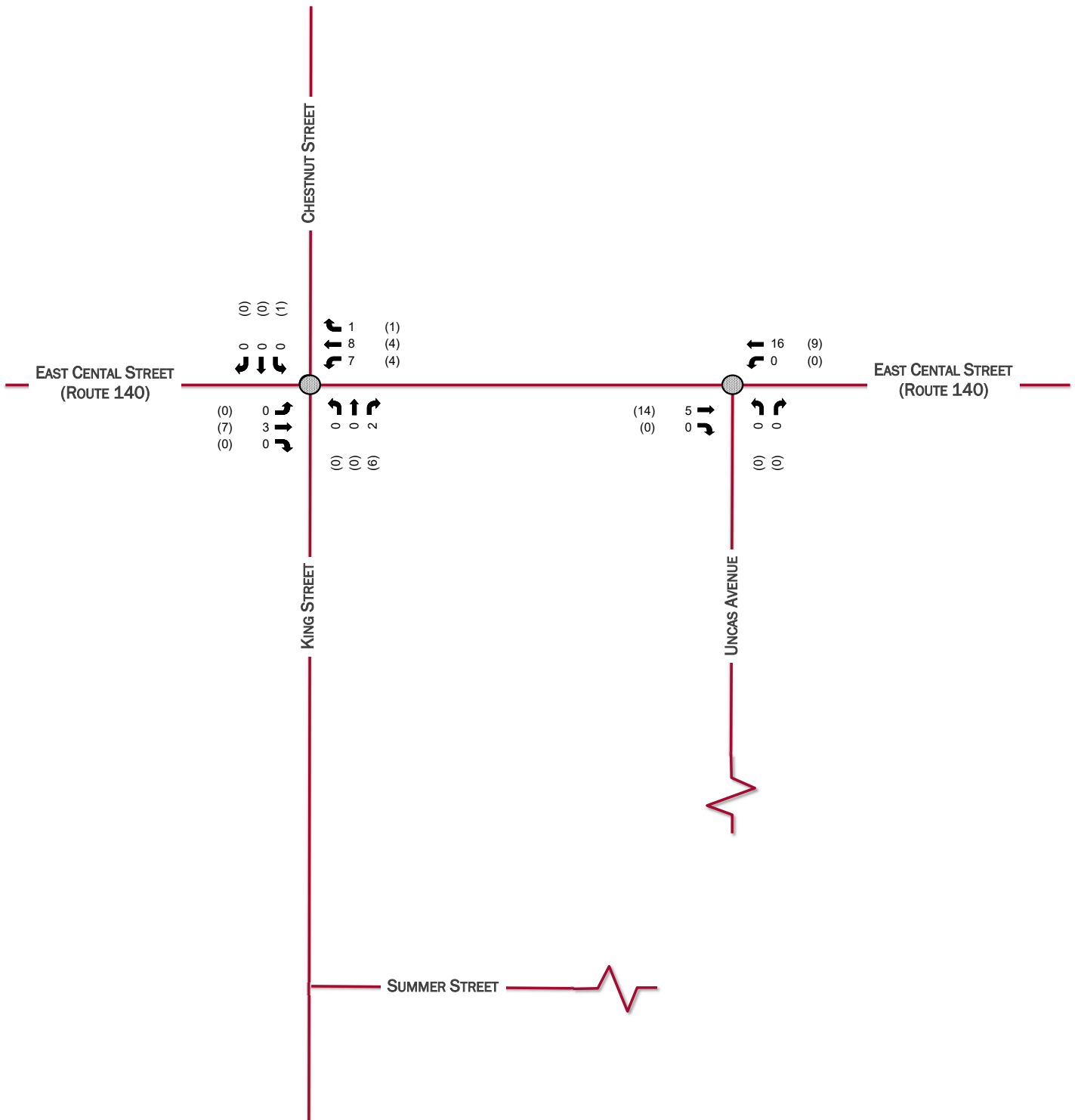


Figure 4

Taj Estates II Background Trips

Uncas Avenue Extension Residential Development
Traffic Assessment



NOT TO SCALE

Legend

- Study Roadway
- XX AM Peak Hour Traffic
- (XX) PM Peak Hour Traffic

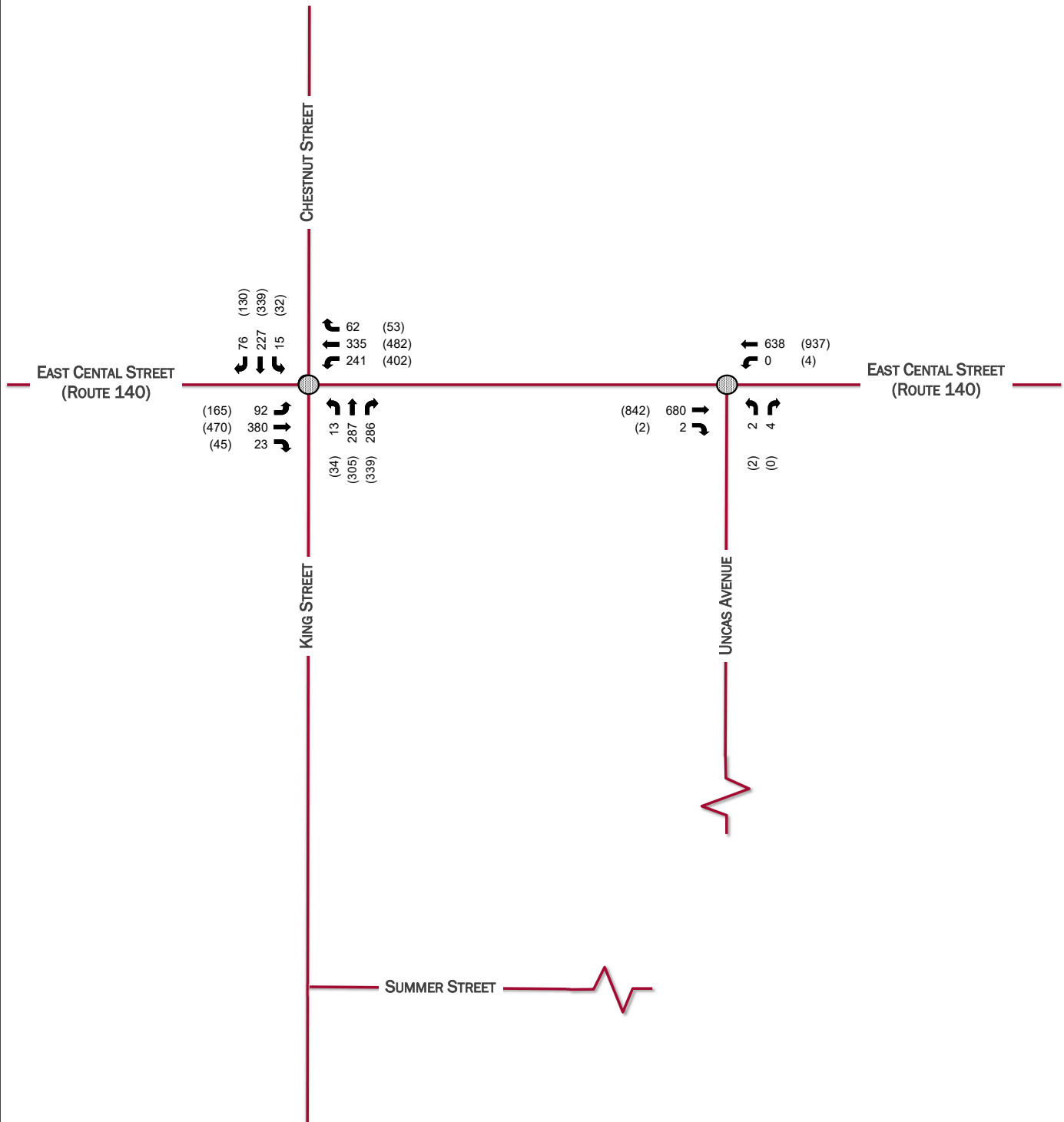


Figure 5

2030 No-Build Conditions Volumes

Uncas Avenue Extension Residential Development
Traffic Assessment



NOT TO SCALE

Legend

-  Study Roadway
- XX IN% Distribution
- (XX) OUT% Distribution

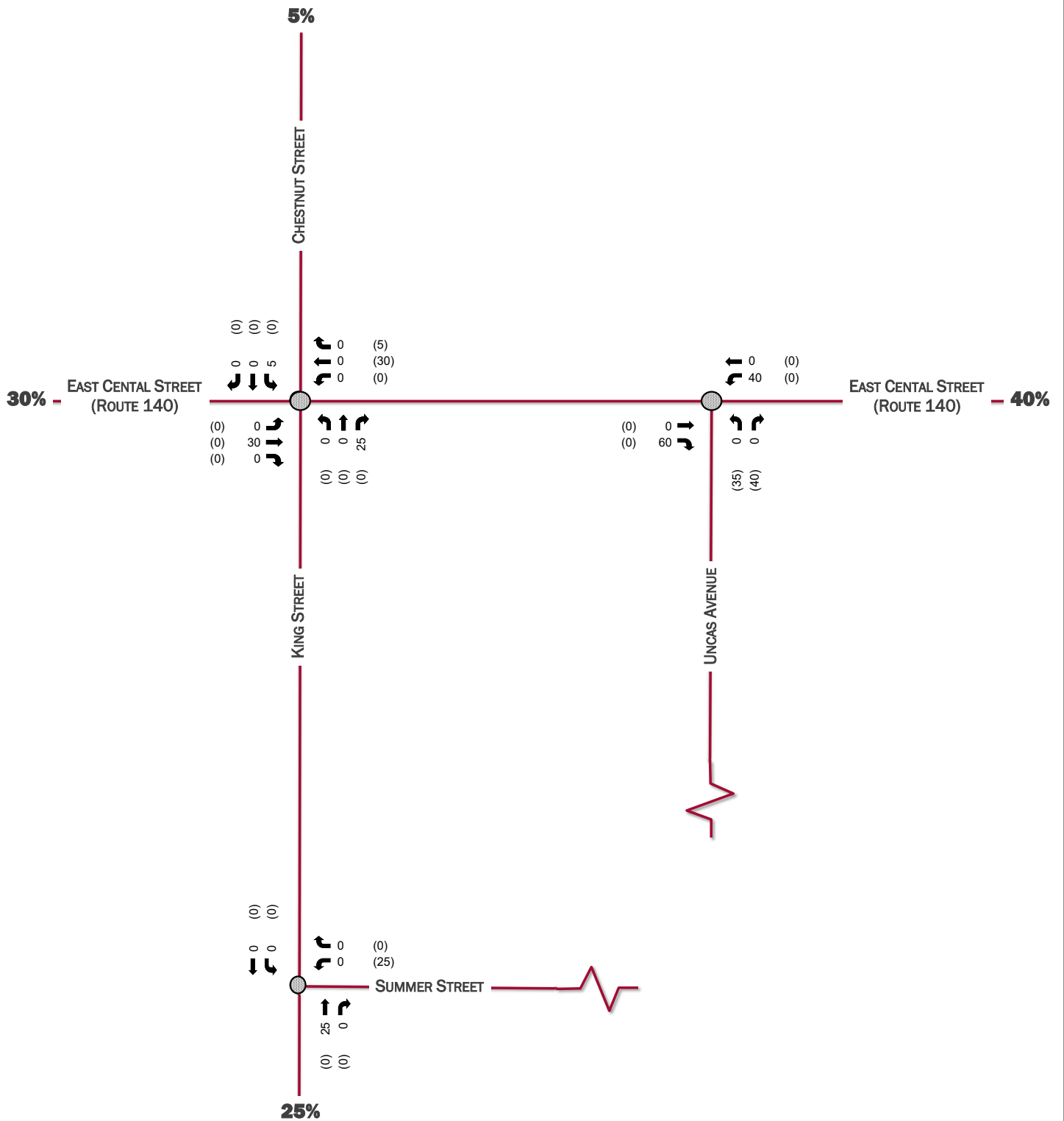


Figure 6

Peak Hour Trip Distribution

**Uncas Avenue Extension Residential Development
Traffic Assessment**



NOT TO SCALE

Legend

-  Study Roadway
- XX AM Peak Hour Trip Assignment
- (XX) PM Peak Hour Trip Assignment

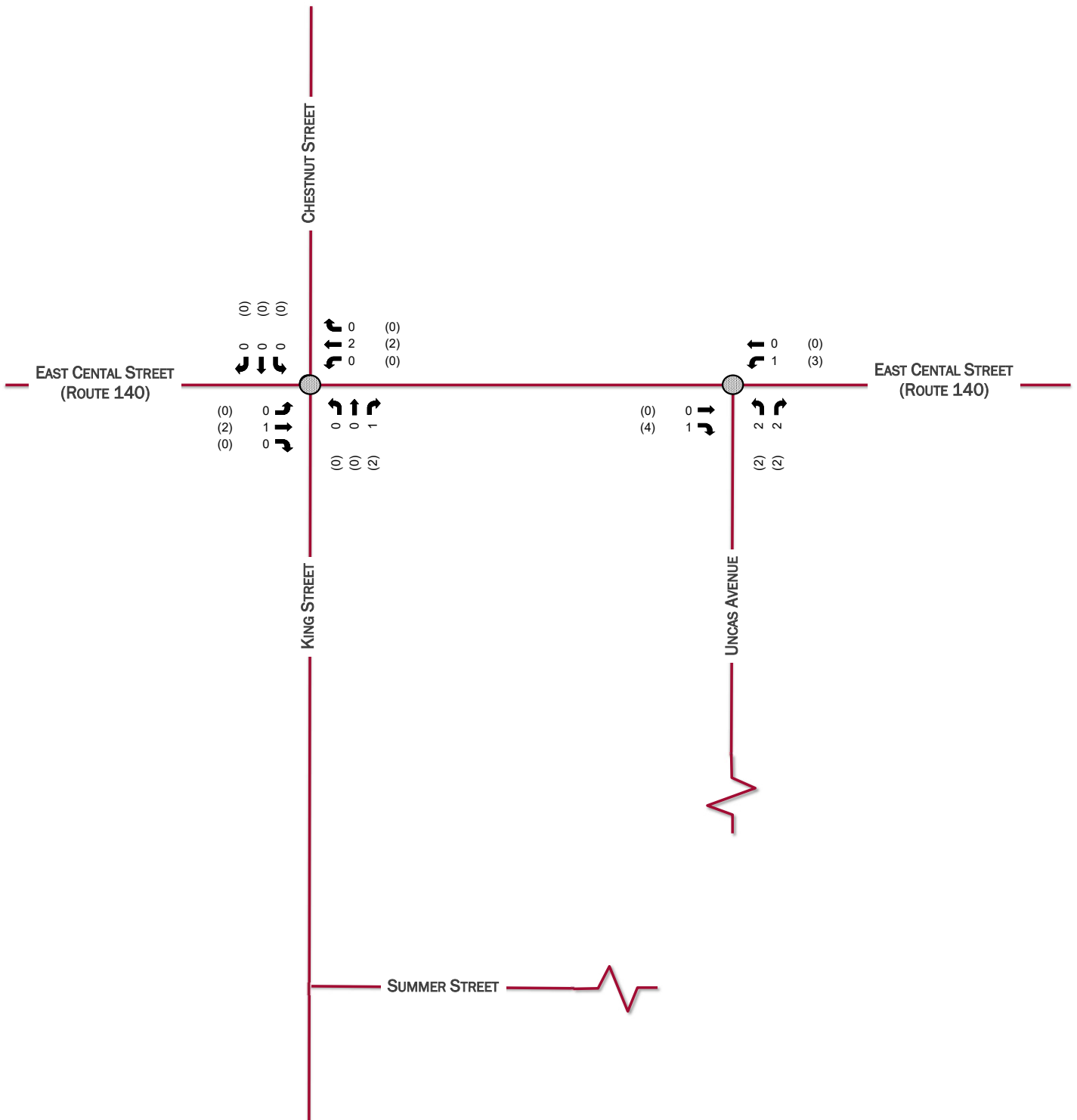


Figure 7

Peak Hour Trip Assignments - Build A

Uncas Avenue Extension Residential Development
Traffic Assessment



NOT TO SCALE

Legend

-  Study Roadway
- XX AM Peak Hour Trip Assignment
- (XX) PM Peak Hour Trip Assignment

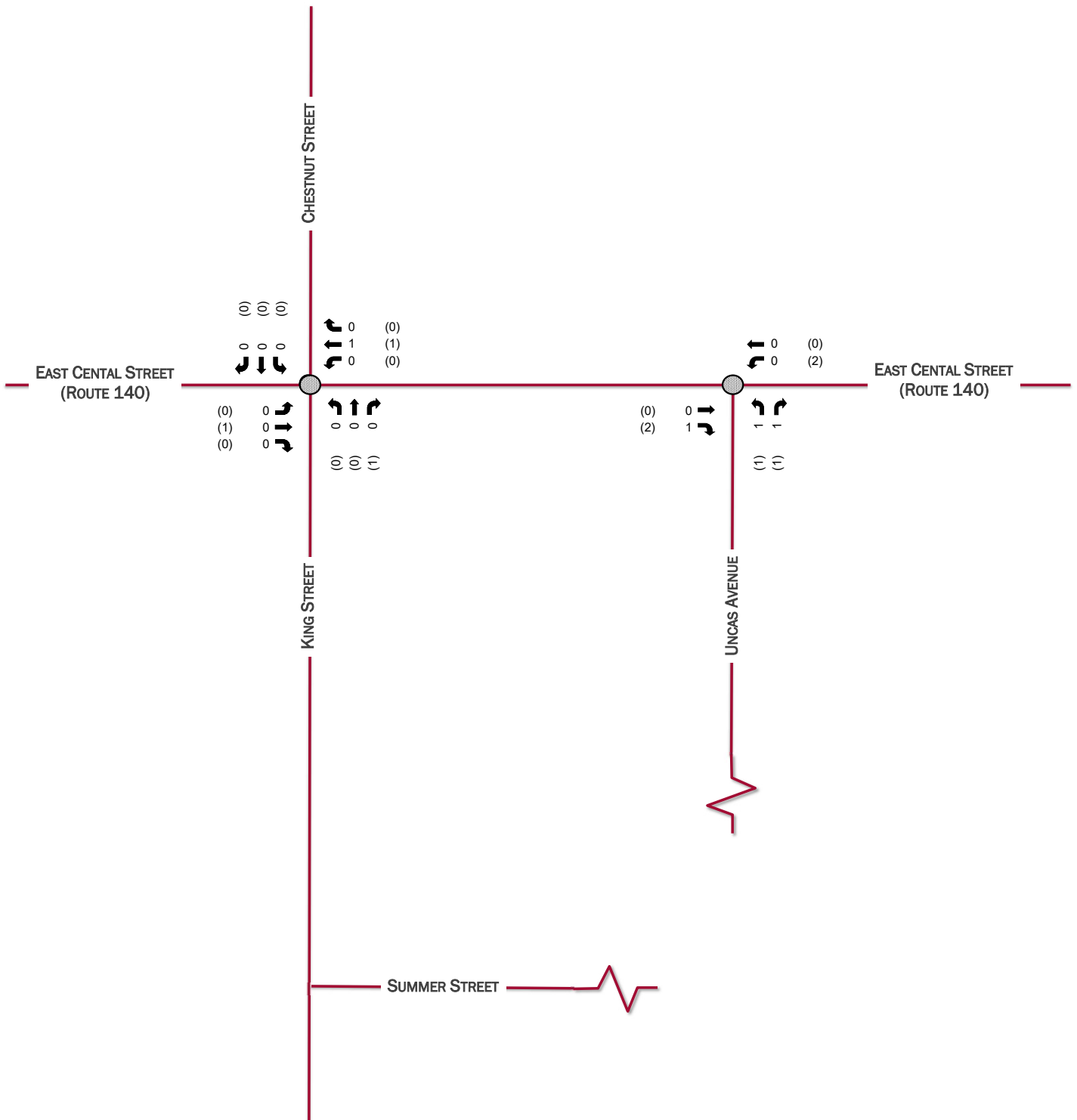


Figure 8

Peak Hour Trip Assignments - Build B

**Uncas Avenue Extension Residential Development
Traffic Assessment**



NOT TO SCALE

Legend

-  Study Roadway
- XX AM Peak Hour Vehicle Volumes
- (XX) PM Peak Hour Vehicle Volumes

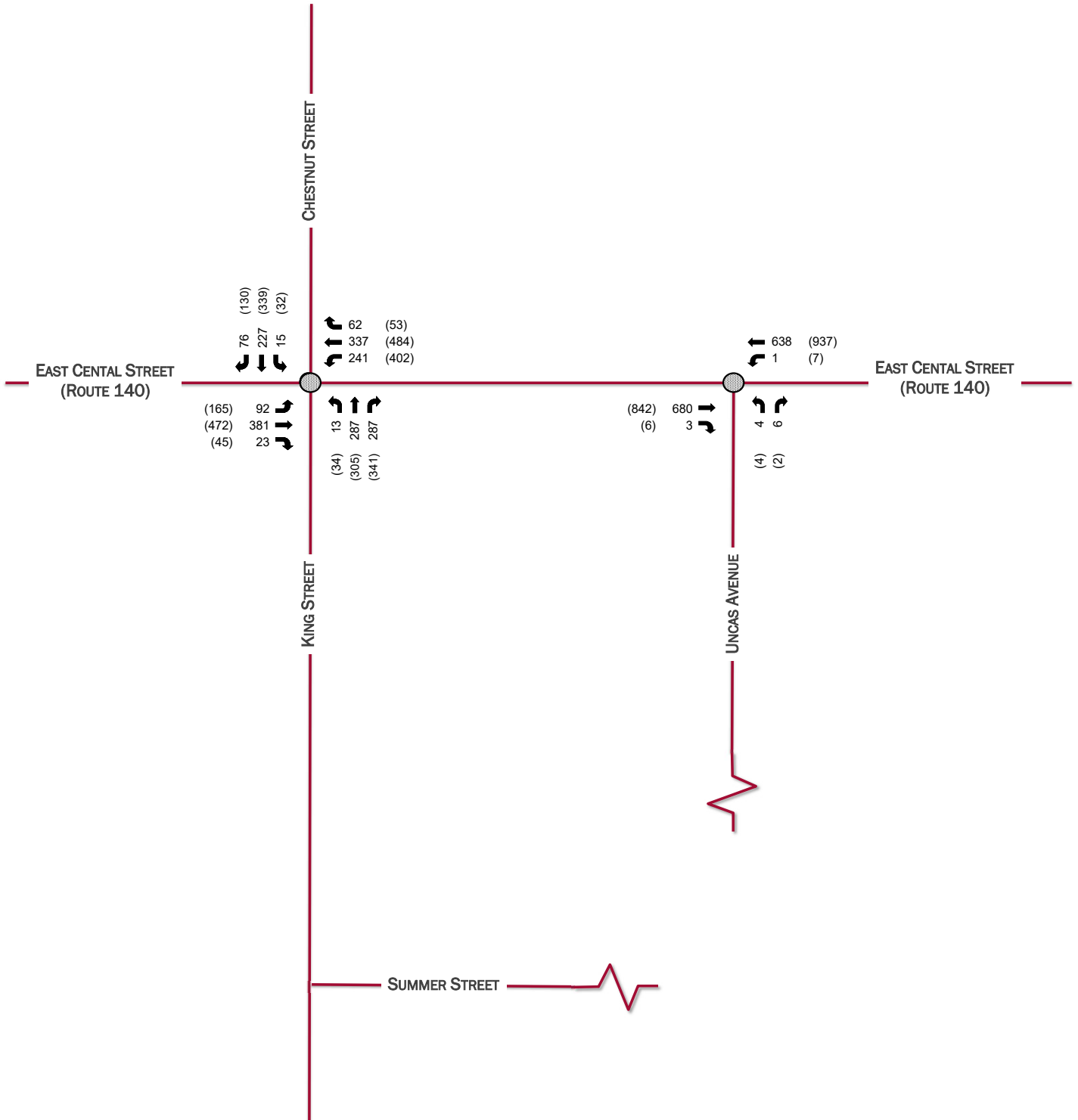


Figure 9
2030 Build A Volumes
Uncas Avenue Extension Residential Development
Traffic Assessment



NOT TO SCALE

Legend

-  Study Roadway
- XX AM Peak Hour Vehicle Volumes
- (XX) PM Peak Hour Vehicle Volumes

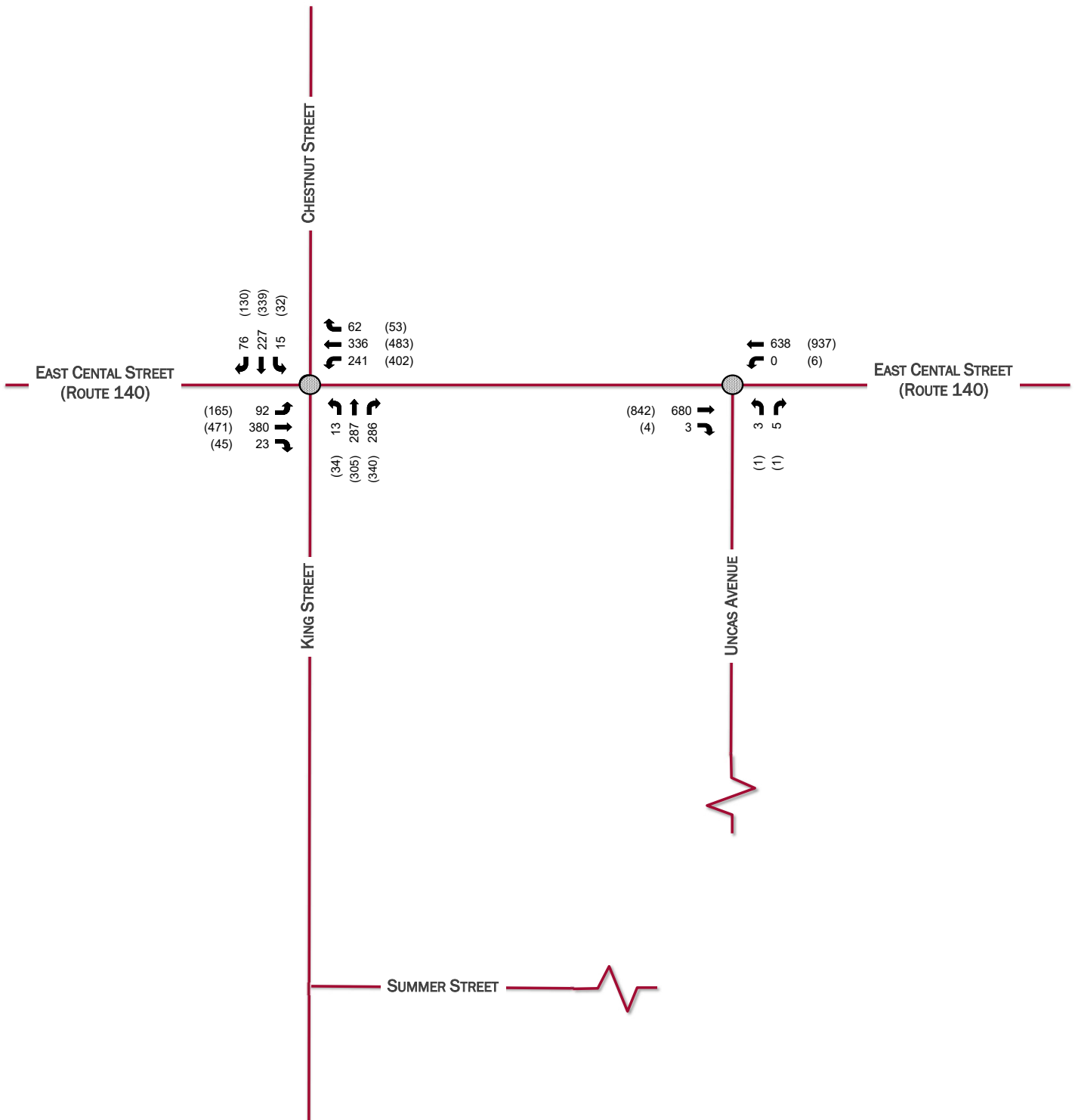


Figure 10

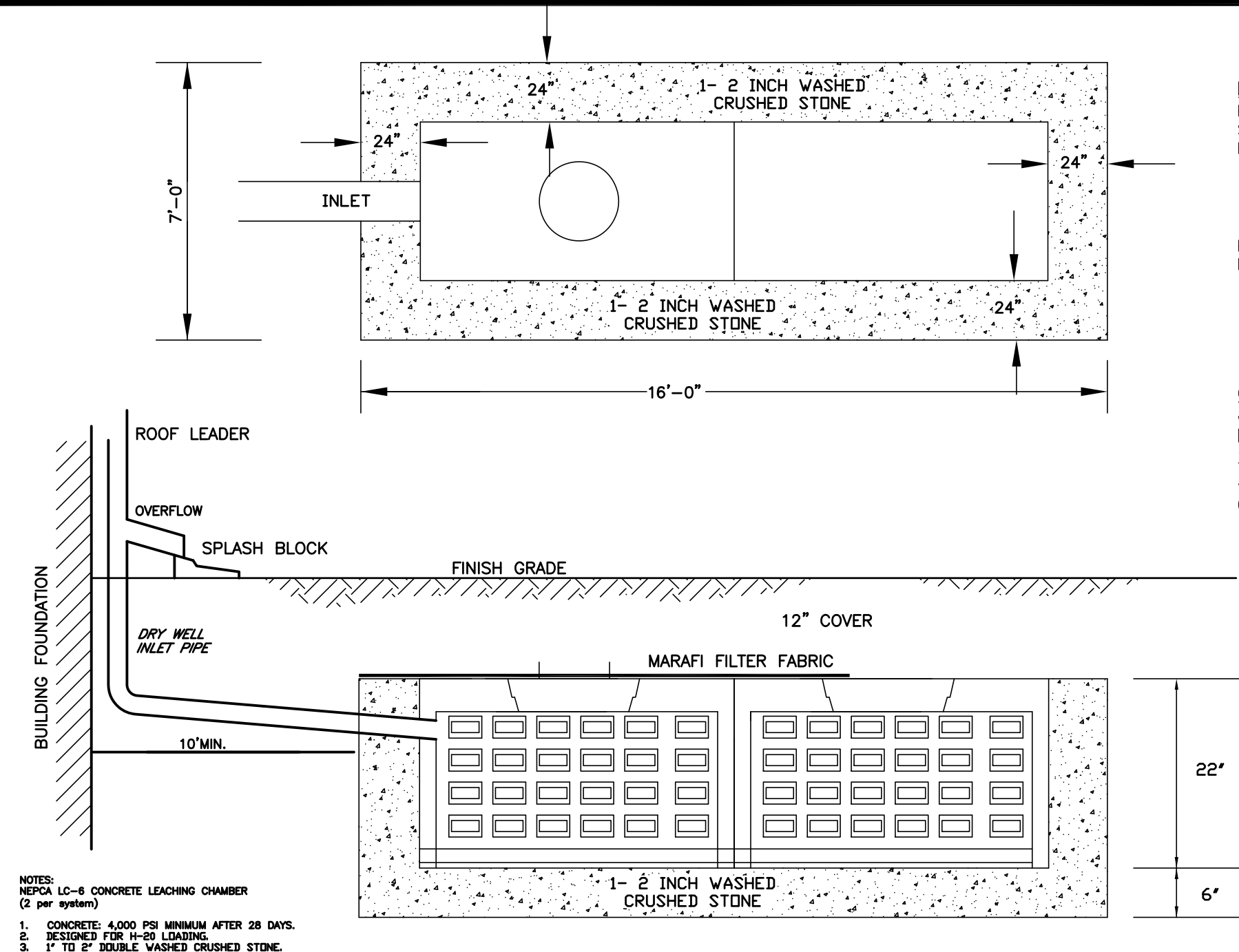
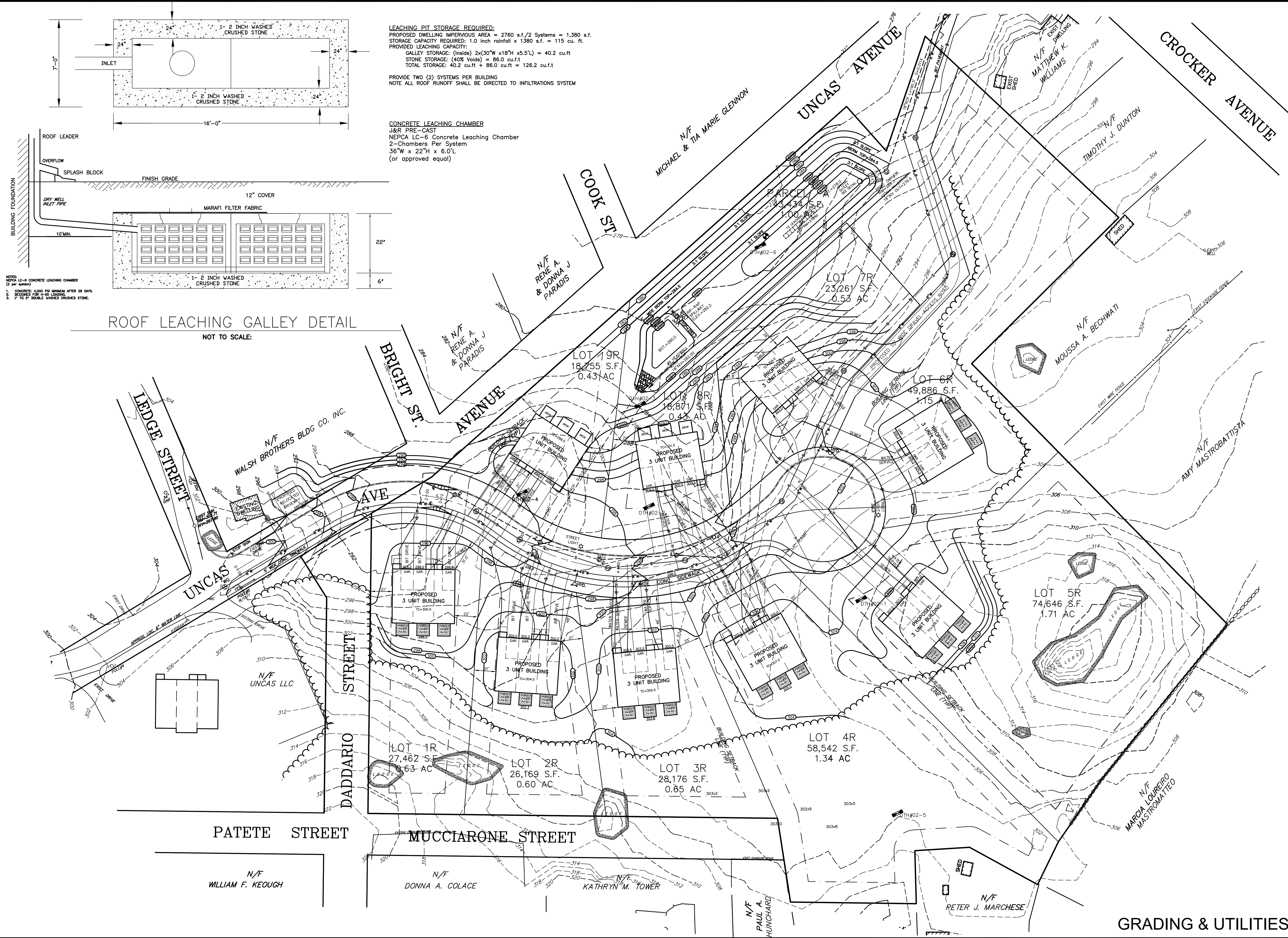
2030 Build B Volumes

Uncas Avenue Extension Residential Development
Traffic Assessment

APPENDIX

APPENDIX A

Site Plan



ROOF LEACHING GALLEY DETAIL
NOT TO SCALE:

LEACHING PIT STORAGE REQUIRED:
PROPOSED DWELLING IMPERVIOUS AREA = 2760 s.f./2 Systems = 1,380 s.f.
STORAGE CAPACITY REQUIRED: 1.0 inch rainfall x 1380 s.f. = 115 cu. ft.
PROVIDED LEACHING CAPACITY:
GALLEY STORAGE: (Inside) 2x(30"W x18"H x5.5'L) = 40.2 cu.ft
STONE STORAGE: (40% Voids) = 86.0 cu.ft
TOTAL STORAGE: 40.2 cu.ft + 86.0 cu.ft = 126.2 cu.ft

PROVIDE TWO (2) SYSTEMS PER BUILDING
NOTE ALL ROOF RUNOFF SHALL BE DIRECTED TO INFILTRATIONS SYSTEM

CONCRETE LEACHING CHAMBER
J&R PRE-CAST
NEPCA LC-6 Concrete Leaching Chamber
2-Chambers Per System
36"W x 22"H x 6.0'L
(or approved equal)

NOTES:
NEPCA LC-6 CONCRETE LEACHING CHAMBER
(2 per system)
CONCRETE ALLOW 28 DAYS MINIMUM AFTER 28 DAYS.
DESIGNED FOR 10-20 LBS. LOADING.
1" TO 2" DOUBLE WASHED CRUSHED STONE.

REVISIONS		DESCRIPTION
No.	DATE	

PROPOSED HOUSE LOCATION PLAN
DEFINITIVE SUBDIVISION
"UNCAS AVENUE EXTENSION"
FRANKLIN, MASSACHUSETTS

APPLICANT & OWNER:
WALSH BROTHERS BUILDING CO. INC.
11 SADDLE WAY
WALPOLE, MASS. 02081

GLM Engineering
Consultants, Inc.
19 EXCHANGE STREET
HOLLISTON, MA 01746
P: 508-429-1100
F: 508-429-7160
www.GLMengineering.com

JOB No.	11,528
DATE:	5/18/2023
SCALE:	1"=40'
SHEET:	2 of 2
PLAN #:	

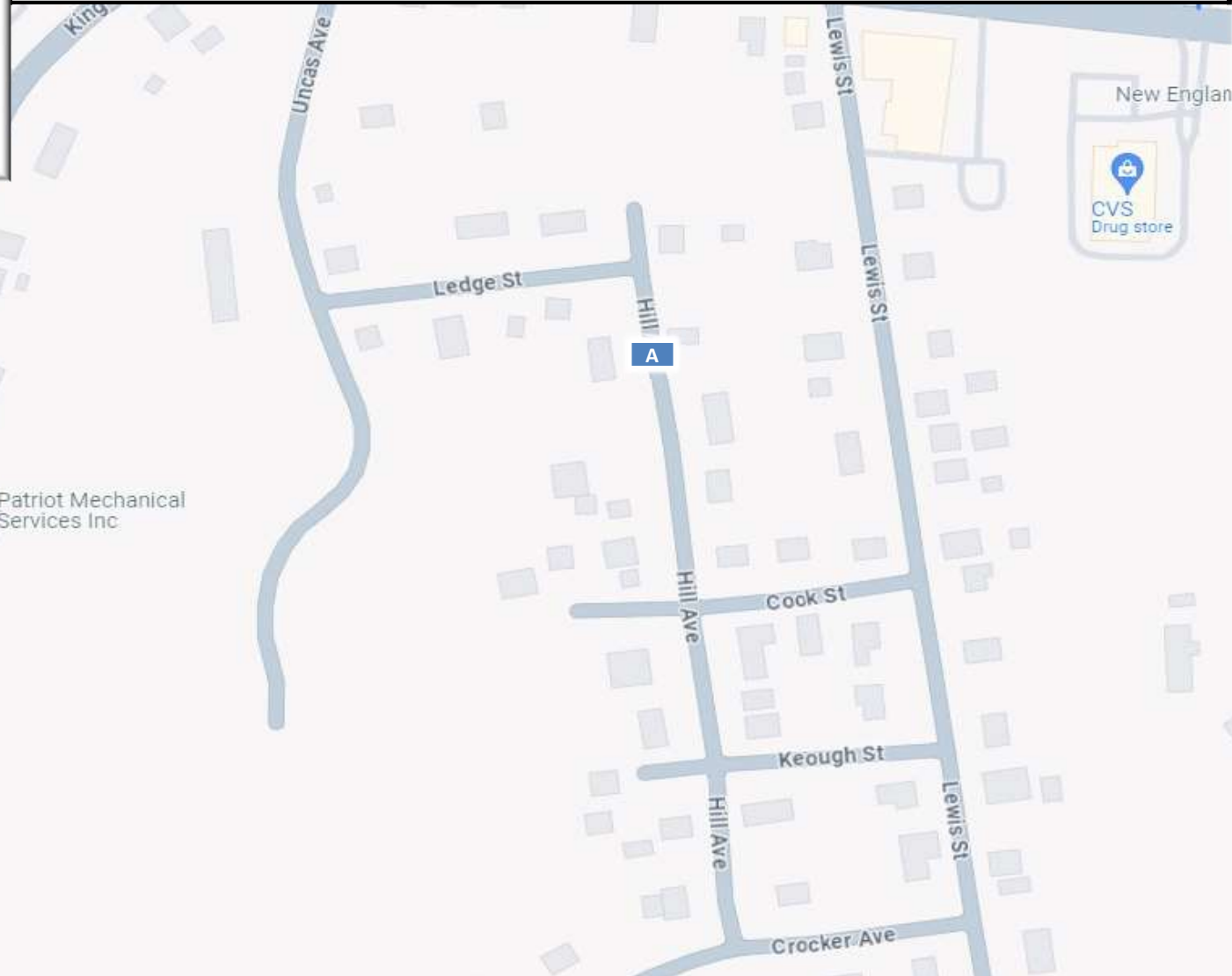
APPENDIX B

Traffic Data



Location Map: 239756 Franklin, MA

Precision Data Industries, LLC 157 Washington Street, Suite 2, Hudson, MA 01749 ph: 508-875-0100 email: datarequests@pdillc.com



- (1) 48HR VCU-ATR
- (1) Add on HR)
- (1) VCU
- (1) HR

Client:
Kimley-Horn

Engineer:
P. Graham

Site Code:
112922001

Date:
Wed 12/13/23

PDI Job #
239756

City, State:
Franklin, MA

Hill Avenue
south of Ledge Street
City, State: Franklin, MA
Client: Kimley-Horn/ P. Graham
Site Code: 112922001



PDI File #: 239756 ATR-A (Speed)

Count Date
Wednesday, December 13, 2023

Speed (60-minute)

NB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
7:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	2	19.0	19.0
8:00 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	2	14.0	14.0
9:00 AM	2	0	1	0	0	0	0	0	0	0	0	0	0	3	18.0	14.3
10:00 AM	2	2	1	2	0	0	0	0	0	0	0	0	0	7	27.0	18.6
11:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	21.0	21.0
12:00 PM	1	1	1	1	0	0	0	0	0	0	0	0	0	4	22.8	18.8
1:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18.0	18.0
2:00 PM	0	1	1	1	0	0	0	0	0	0	0	0	0	3	24.2	21.3
3:00 PM	1	0	2	1	0	0	0	0	0	0	0	0	0	4	23.9	19.8
4:00 PM	0	2	2	1	0	0	0	0	0	0	0	0	0	5	25.6	21.6
5:00 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	2	25.4	24.0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
7:00 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	2	25.1	23.0
8:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	1	25.0	25.0
9:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18.0	18.0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Total	8	10	11	9	0	0	0	0	0	0	0	0	0	38	26.0	19.5
Percent	21.05%	26.32%	28.95%	23.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			

AM Peak	8:00 AM	7:00 AM	9:00 AM	10:00 AM											10:00 AM
Volume	2	2	1	2	0	0	0	0	0	0	0	0	0	0	7

PM Peak	12:00 PM	4:00 PM	3:00 PM	12:00 PM											4:00 PM
Volume	1	2	2	1	0	0	0	0	0	0	0	0	0	0	5

15th Percentile:	14.0 MPH	Average Speed:	19.5 MPH	Posted Speed Limit:	20 MPH
50th Percentile:	20.0 MPH	10 MPH Pace:	12 to 21 MPH	Number of Vehicles > 20 MPH:	14
85th Percentile:	26.0 MPH	Number in Pace:	25	Percent of Vehicles > 20 MPH:	36.8%
95th Percentile:	27.0 MPH	Percent in Pace:	65.8%		

Hill Avenue
south of Ledge Street
City, State: Franklin, MA
Client: Kimley-Horn/ P. Graham
Site Code: 112922001



PDI File #: 239756 ATR-A (Speed)

Count Date
Wednesday, December 13, 2023

Speed (60-minute)

SB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
5:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	17.0	17.0
6:00 AM	0	2	0	1	0	0	0	0	0	0	0	0	0	3	25.0	20.7
7:00 AM	0	3	2	1	0	1	0	0	0	0	0	0	0	7	26.2	23.0
8:00 AM	0	1	2	0	0	0	0	0	0	0	0	0	0	3	21.7	20.7
9:00 AM	2	4	2	2	0	0	0	0	0	0	0	0	0	10	25.2	18.9
10:00 AM	0	3	2	0	0	0	0	0	0	0	0	0	0	5	20.4	18.2
11:00 AM	1	3	2	0	0	0	0	0	0	0	0	0	0	6	21.0	18.3
12:00 PM	0	3	1	1	1	0	0	0	0	0	0	0	0	6	28.5	22.3
1:00 PM	0	1	2	1	0	0	0	0	0	0	0	0	0	4	26.3	23.0
2:00 PM	0	6	4	2	1	0	0	0	0	0	0	0	0	13	25.6	21.4
3:00 PM	2	1	9	1	0	1	0	0	0	0	0	0	0	14	24.1	21.3
4:00 PM	1	2	1	0	0	0	0	0	0	0	0	0	0	4	19.7	17.3
5:00 PM	0	3	2	0	0	0	0	0	0	0	0	0	0	5	20.0	17.8
6:00 PM	0	1	2	1	0	0	0	0	0	0	0	0	0	4	24.6	22.3
7:00 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	2	19.9	19.5
8:00 PM	0	1	0	2	0	0	0	0	0	0	0	0	0	3	26.4	22.3
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Total	6	36	32	12	2	2	0	0	0	0	0	0	0	90	25.0	20.5
Percent	6.67%	40.00%	35.56%	13.33%	2.22%	2.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			

AM Peak	9:00 AM	9:00 AM	7:00 AM	9:00 AM		7:00 AM								9:00 AM		
Volume	2	4	2	2	0	1	0	0	0	0	0	0	0	10		
PM Peak	3:00 PM	2:00 PM	3:00 PM	2:00 PM	12:00 PM	3:00 PM								3:00 PM		
Volume	2	6	9	2	1	1	0	0	0	0	0	0	0	14		

15th Percentile:	16.0 MPH	Average Speed:	20.5 MPH	Posted Speed Limit:	20 MPH
50th Percentile:	20.0 MPH	10 MPH Pace:	16 to 25 MPH	Number of Vehicles > 20 MPH:	38
85th Percentile:	25.0 MPH	Number in Pace:	69	Percent of Vehicles > 20 MPH:	42.2%
95th Percentile:	28.6 MPH	Percent in Pace:	76.7%		

Hill Avenue
south of Ledge Street
City, State: Franklin, MA
Client: Kimley-Horn/ P. Graham
Site Code: 112922001



PDI File #: 239756 ATR-A (Speed)

Count Date
Wednesday, December 13, 2023

Speed (60-minute)																
Combined NB and SB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
5:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	17.0	17.0
6:00 AM	0	2	0	1	0	0	0	0	0	0	0	0	0	3	25.0	20.7
7:00 AM	0	5	2	1	0	1	0	0	0	0	0	0	0	9	24.8	22.1
8:00 AM	2	1	2	0	0	0	0	0	0	0	0	0	0	5	21.4	18.0
9:00 AM	4	4	3	2	0	0	0	0	0	0	0	0	0	13	22.4	17.8
10:00 AM	2	5	3	2	0	0	0	0	0	0	0	0	0	12	23.1	18.4
11:00 AM	1	3	3	0	0	0	0	0	0	0	0	0	0	7	21.3	18.7
12:00 PM	1	4	2	2	1	0	0	0	0	0	0	0	0	10	27.0	20.9
1:00 PM	0	2	2	1	0	0	0	0	0	0	0	0	0	5	25.4	22.0
2:00 PM	0	7	5	3	1	0	0	0	0	0	0	0	0	16	25.8	21.4
3:00 PM	3	1	11	2	0	1	0	0	0	0	0	0	0	18	24.5	20.9
4:00 PM	1	4	3	1	0	0	0	0	0	0	0	0	0	9	23.4	19.7
5:00 PM	0	3	3	1	0	0	0	0	0	0	0	0	0	7	22.4	19.6
6:00 PM	0	1	2	1	0	0	0	0	0	0	0	0	0	4	24.6	22.3
7:00 PM	0	1	2	1	0	0	0	0	0	0	0	0	0	4	23.3	21.3
8:00 PM	0	1	0	3	0	0	0	0	0	0	0	0	0	4	26.1	23.0
9:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18.0	18.0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Total	14	46	43	21	2	2	0	0	0	0	0	0	0	128	25.0	20.2
Percent	10.94%	35.94%	33.59%	16.41%	1.56%	1.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			

AM Peak	9:00 AM	7:00 AM	9:00 AM	9:00 AM		7:00 AM								9:00 AM		
Volume	4	5	3	2	0	1	0	0	0	0	0	0	0	13		
PM Peak	3:00 PM	2:00 PM	3:00 PM	2:00 PM	12:00 PM	3:00 PM								3:00 PM		
Volume	3	7	11	3	1	1	0	0	0	0	0	0	0	18		

15th Percentile:	16.0 MPH	Average Speed:	20.2 MPH	Posted Speed Limit:	20 MPH
50th Percentile:	20.0 MPH	10 MPH Pace:	16 to 25 MPH	Number of Vehicles > 20 MPH:	52
85th Percentile:	25.0 MPH	Number in Pace:	91	Percent of Vehicles > 20 MPH:	40.6%
95th Percentile:	28.0 MPH	Percent in Pace:	71.1%		

Hill Avenue
south of Ledge Street
City, State: Franklin, MA
Client: Kimley-Horn/ P. Graham
Site Code: 112922001



PDI File #: 239756 ATR-A (Speed)

Count Date
Thursday, December 14, 2023

Speed (60-minute)

NB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
5:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18.0	18.0
6:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	1	29.0	29.0
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18.0	18.0
8:00 AM	0	1	1	0	0	0	0	0	0	0	0	0	0	2	21.3	19.5
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
10:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	16.0	16.0
11:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	15.0	15.0
12:00 PM	0	2	0	1	0	0	0	0	0	0	0	0	0	3	24.6	20.3
1:00 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	2	24.6	23.5
2:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18.0	18.0
3:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	24.0	24.0
4:00 PM	0	1	1	0	1	0	0	0	0	0	0	0	0	3	28.0	23.7
5:00 PM	1	2	0	1	0	0	0	0	0	0	0	0	0	4	22.0	17.3
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
7:00 PM	0	1	2	0	0	0	0	0	0	0	0	0	0	3	20.0	19.7
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
9:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18.0	18.0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Total	1	13	6	4	1	0	0	0	0	0	0	0	0	25	25.4	20.1
Percent	4.00%	52.00%	24.00%	16.00%	4.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			

AM Peak	5:00 AM	8:00 AM	6:00 AM	8:00 AM
Volume	0	1	1	2

PM Peak	5:00 PM	12:00 PM	7:00 PM	12:00 PM	4:00 PM	5:00 PM
Volume	1	2	2	1	1	4

15th Percentile:	15.6 MPH	Average Speed:	20.1 MPH	Posted Speed Limit:	20 MPH
50th Percentile:	19.0 MPH	10 MPH Pace:	15 to 24 MPH	Number of Vehicles > 20 MPH:	9
85th Percentile:	25.4 MPH	Number in Pace:	19	Percent of Vehicles > 20 MPH:	36.0%
95th Percentile:	28.6 MPH	Percent in Pace:	76.0%		

Hill Avenue
south of Ledge Street
City, State: Franklin, MA
Client: Kimley-Horn/ P. Graham
Site Code: 112922001



PDI File #: 239756 ATR-A (Speed)

Count Date
Thursday, December 14, 2023

Speed (60-minute)

SB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
5:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	19.0	19.0
6:00 AM	1	1	1	1	0	0	0	0	0	0	0	0	0	4	24.7	19.8
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	19.0	19.0
8:00 AM	0	1	1	0	0	0	0	0	0	0	0	0	0	2	21.6	20.5
9:00 AM	0	1	1	2	0	0	0	0	0	0	0	0	0	4	25.6	22.8
10:00 AM	0	1	7	0	0	0	0	0	0	0	0	0	0	8	22.0	20.9
11:00 AM	0	2	1	0	0	0	0	0	0	0	0	0	0	3	19.8	18.3
12:00 PM	0	1	1	2	0	0	0	0	0	0	0	0	0	4	26.1	23.8
1:00 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	4	27.1	22.0
2:00 PM	2	1	1	0	1	0	0	0	0	0	0	0	0	5	25.8	19.0
3:00 PM	0	0	2	3	0	0	0	0	0	0	0	0	0	5	27.2	25.4
4:00 PM	1	4	2	2	0	0	0	0	0	0	0	0	0	9	24.6	19.4
5:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	2	24.7	21.5
6:00 PM	1	2	0	0	0	0	0	0	0	0	0	0	0	3	17.8	16.0
7:00 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	2	23.4	22.0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
10:00 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	2	36.1	34.0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Total	5	19	19	13	2	1	0	0	0	0	0	0	0	59	26.0	21.3
Percent	8.47%	32.20%	32.20%	22.03%	3.39%	1.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			

AM Peak	6:00 AM	11:00 AM	10:00 AM	9:00 AM											10:00 AM	
Volume	1	2	7	2	0	0	0	0	0	0	0	0	0	0	8	
PM Peak	2:00 PM	4:00 PM	3:00 PM	3:00 PM	2:00 PM	10:00 PM									4:00 PM	
Volume	2	4	2	3	1	1	0	0	0	0	0	0	0	0	9	

15th Percentile:	16.0 MPH	Average Speed:	21.3 MPH	Posted Speed Limit:	20 MPH
50th Percentile:	21.0 MPH	10 MPH Pace:	16 to 25 MPH	Number of Vehicles > 20 MPH:	31
85th Percentile:	26.0 MPH	Number in Pace:	40	Percent of Vehicles > 20 MPH:	52.5%
95th Percentile:	29.2 MPH	Percent in Pace:	67.8%		

Hill Avenue
south of Ledge Street
City, State: Franklin, MA
Client: Kimley-Horn/ P. Graham
Site Code: 112922001



PDI File #: 239756 ATR-A (Speed)

Count Date
Thursday, December 14, 2023

Speed (60-minute)																
Combined NB and SB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
5:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	2	18.9	18.5
6:00 AM	1	1	1	2	0	0	0	0	0	0	0	0	0	5	27.2	21.6
7:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	2	18.9	18.5
8:00 AM	0	2	2	0	0	0	0	0	0	0	0	0	0	4	22.0	20.0
9:00 AM	0	1	1	2	0	0	0	0	0	0	0	0	0	4	25.6	22.8
10:00 AM	0	2	7	0	0	0	0	0	0	0	0	0	0	9	21.8	20.3
11:00 AM	0	3	1	0	0	0	0	0	0	0	0	0	0	4	19.2	17.5
12:00 PM	0	3	1	3	0	0	0	0	0	0	0	0	0	7	27.0	22.3
1:00 PM	0	2	1	3	0	0	0	0	0	0	0	0	0	6	26.5	22.5
2:00 PM	2	2	1	0	1	0	0	0	0	0	0	0	0	6	24.0	18.8
3:00 PM	0	0	3	3	0	0	0	0	0	0	0	0	0	6	26.8	25.2
4:00 PM	1	5	3	2	1	0	0	0	0	0	0	0	0	12	26.4	20.5
5:00 PM	1	3	0	2	0	0	0	0	0	0	0	0	0	6	26.0	18.7
6:00 PM	1	2	0	0	0	0	0	0	0	0	0	0	0	3	17.8	16.0
7:00 PM	0	1	4	0	0	0	0	0	0	0	0	0	0	5	21.6	20.6
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
9:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	18.0	18.0
10:00 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	2	36.1	34.0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Total	6	32	25	17	3	1	0	0	0	0	0	0	0	84	26.0	20.9
Percent	7.14%	38.10%	29.76%	20.24%	3.57%	1.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			

AM Peak	6:00 AM	11:00 AM	10:00 AM	6:00 AM										10:00 AM		
Volume	1	3	7	2	0	0	0	0	0	0	0	0	0	9		
PM Peak	2:00 PM	4:00 PM	7:00 PM	12:00 PM	2:00 PM	10:00 PM								4:00 PM		
Volume	2	5	4	3	1	1	0	0	0	0	0	0	0	12		

15th Percentile:	16.0 MPH	Average Speed:	20.9 MPH	Posted Speed Limit:	20 MPH
50th Percentile:	20.0 MPH	10 MPH Pace:	15 to 24 MPH	Number of Vehicles > 20 MPH:	40
85th Percentile:	26.0 MPH	Number in Pace:	57	Percent of Vehicles > 20 MPH:	47.6%
95th Percentile:	29.0 MPH	Percent in Pace:	67.9%		

Hill Avenue
south of Ledge Street
City, State: Franklin, MA
Client: Kimley-Horn/ P. Graham
Site Code: 112922001



PDI File #: 239756 ATR-A

Count Date: Wednesday, December 13, 2023
Direction: NB

AM	Bicycles	Motorcycle	Cars & Light Goods	Buses	Single Unit Heavy	Multi Unit Heavy	Total
12:00 AM	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	1	0	1
8:30 AM	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	0	1	2
9:00 AM	0	0	1	0	1	0	2
9:15 AM	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0
10:00 AM	0	0	1	0	0	0	1
10:15 AM	0	0	1	0	0	0	1
10:30 AM	0	0	0	0	0	0	0
10:45 AM	0	0	4	0	0	0	4
11:00 AM	0	0	0	0	0	0	0
11:15 AM	0	0	1	0	0	0	1
11:30 AM	0	0	1	0	0	0	1
11:45 AM	0	0	0	0	0	0	0

AM Total	0	0	10	0	2	1	13
Percentage	0.00%	0.00%	76.92%	0.00%	15.38%	7.69%	

AM Peak	12:00 AM	12:00 AM	10:00 AM	12:00 AM	8:15 AM	8:00 AM	10:00 AM
Volume	0	0	6	0	2	1	6

PM	Bicycles	Motorcycle	Cars & Light Goods	Buses	Single Unit Heavy	Multi Unit Heavy	Total
12:00 PM	0	0	0	0	0	0	0
12:15 PM	0	0	1	0	0	0	1
12:30 PM	0	0	2	0	0	0	2
12:45 PM	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	1	0	1
1:15 PM	0	0	0	0	1	0	1
1:30 PM	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0
2:00 PM	0	0	1	0	0	0	1
2:15 PM	0	0	2	0	0	0	2
2:30 PM	0	0	1	0	0	0	1
2:45 PM	0	0	1	0	0	0	1
3:00 PM	0	0	1	0	0	0	1
3:15 PM	0	0	0	0	0	0	0
3:30 PM	0	0	1	0	0	0	1
3:45 PM	0	1	0	0	0	0	1
4:00 PM	0	0	2	0	0	0	2
4:15 PM	0	0	1	0	0	0	1
4:30 PM	0	0	2	0	0	0	2
4:45 PM	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0
5:30 PM	0	0	1	0	0	0	1
5:45 PM	0	0	1	0	0	0	1
6:00 PM	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0
7:30 PM	0	0	2	0	0	0	2
7:45 PM	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0
8:15 PM	0	0	1	0	0	0	1
8:30 PM	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0
9:15 PM	0	0	1	0	0	0	1
9:30 PM	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0
11:30 PM	0	0	0	0	0	0	0
11:45 PM	0	0	0	0	0	0	0

PM Total	0	1	21	0	2	0	24
Percentage	0.00%	4.17%	87.50%	0.00%	8.33%	0.00%	

PM Peak	12:00 PM	3:00 PM	2:00 PM	12:00 PM	12:30 PM	12:00 PM	3:45 PM
Volume	0	1	5	0	2	0	6

Day Total	0	1	31	0	4	1	37
Percentage	0.00%	2.70%	83.78%	0.00%	10.81%	2.70%	

Hill Avenue
south of Ledge Street
City, State: Franklin, MA
Client: Kimley-Horn/ P. Graham
Site Code: 112922001



PDI File #: 239756 ATR-A

Count Date: Thursday, December 14, 2023
Direction: NB

AM	Bicycles	Motorcycle	Cars & Light Goods	Buses	Single Unit Heavy	Multi Unit Heavy	Total
12:00 AM	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0
5:00 AM	0	0	1	0	0	0	1
5:15 AM	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0
6:30 AM	0	0	1	0	0	0	1
6:45 AM	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0
7:45 AM	0	0	1	0	0	0	1
8:00 AM	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0
8:30 AM	0	0	1	0	0	0	1
8:45 AM	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0
9:45 AM	0	0	1	0	0	0	1
10:00 AM	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0
11:30 AM	0	0	1	0	0	0	1
11:45 AM	0	0	0	0	0	0	0

AM Total	0	0	6	0	0	0	6
Percentage	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	

AM Peak	12:00 AM	12:00 AM	7:45 AM	12:00 AM	12:00 AM	12:00 AM	7:45 AM
Volume	0	0	2	0	0	0	2

PM	Bicycles	Motorcycle	Cars & Light Goods	Buses	Single Unit Heavy	Multi Unit Heavy	Total
12:00 PM	0	0	1	0	0	0	1
12:15 PM	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0
12:45 PM	0	0	1	0	0	0	1
1:00 PM	0	0	0	0	0	0	0
1:15 PM	0	0	1	0	0	0	1
1:30 PM	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0
2:00 PM	0	0	1	0	0	0	1
2:15 PM	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0
3:30 PM	0	0	2	0	0	0	2
3:45 PM	0	0	1	0	0	0	1
4:00 PM	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	1
4:45 PM	0	0	1	0	0	0	1
5:00 PM	0	0	2	0	0	0	2
5:15 PM	0	0	0	0	0	0	0
5:30 PM	0	0	1	0	0	0	1
5:45 PM	0	0	1	0	0	0	1
6:00 PM	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0
7:30 PM	0	0	1	0	0	0	1
7:45 PM	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0
9:30 PM	0	0	1	0	0	0	1
9:45 PM	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0
11:30 PM	0	0	0	0	0	0	0
11:45 PM	0	0	0	0	0	0	0

PM Total	0	0	15	0	0	0	15
Percentage	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	

PM Peak	12:00 PM	12:00 PM	4:15 PM	12:00 PM	12:00 PM	12:00 PM	4:15 PM
Volume	0	0	4	0	0	0	4

Day Total	0	0	21	0	0	0	21
Percentage	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	

Hill Avenue
south of Ledge Street
City, State: Franklin, MA
Client: Kimley-Horn/ P. Graham
Site Code: 112922001



PDI File #: 239756 ATR-A

Count Date: Wednesday, December 13, 2023
Direction: SB

AM	Bicycles	Motorcycle	Cars & Light Goods	Buses	Single Unit Heavy	Multi Unit Heavy	Total
12:00 AM	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0
6:15 AM	0	0	1	0	0	0	1
6:30 AM	0	0	0	0	0	0	0
6:45 AM	0	0	2	0	0	0	2
7:00 AM	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0
7:30 AM	0	0	2	0	0	0	2
7:45 AM	0	0	2	0	0	0	2
8:00 AM	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0
8:30 AM	0	0	2	0	0	0	2
8:45 AM	0	0	1	0	1	0	2
9:00 AM	0	0	2	0	0	0	2
9:15 AM	0	0	3	0	1	0	4
9:30 AM	0	0	1	0	1	0	2
9:45 AM	0	0	1	0	0	0	1
10:00 AM	0	0	2	0	0	0	2
10:15 AM	0	0	2	0	0	0	2
10:30 AM	0	0	0	0	0	0	0
10:45 AM	0	0	2	0	0	0	2
11:00 AM	0	0	0	0	0	0	0
11:15 AM	0	0	3	0	0	0	3
11:30 AM	0	0	1	0	1	0	2
11:45 AM	0	0	2	0	0	0	2

AM Total	0	0	29	0	4	0	33
Percentage	0.00%	0.00%	87.88%	0.00%	12.12%	0.00%	

AM Peak	12:00 AM	12:00 AM	8:30 AM	12:00 AM	8:45 AM	12:00 AM	8:30 AM
Volume	0	0	8	0	3	0	10

PM	Bicycles	Motorcycle	Cars & Light Goods	Buses	Single Unit Heavy	Multi Unit Heavy	Total
12:00 PM	0	0	0	0	0	0	0
12:15 PM	0	0	1	0	0	0	1
12:30 PM	0	0	2	0	0	0	2
12:45 PM	0	0	1	0	0	0	1
1:00 PM	0	0	2	0	1	0	3
1:15 PM	0	0	1	0	0	0	1
1:30 PM	0	0	1	0	0	0	1
1:45 PM	0	0	0	0	0	0	0
2:00 PM	0	0	1	0	0	0	1
2:15 PM	0	0	4	0	0	0	4
2:30 PM	0	0	5	0	0	0	5
2:45 PM	0	0	2	0	0	0	2
3:00 PM	0	0	2	0	1	0	3
3:15 PM	0	0	4	0	1	0	5
3:30 PM	0	0	3	0	0	0	3
3:45 PM	0	1	1	0	0	0	2
4:00 PM	0	0	2	0	0	0	2
4:15 PM	0	0	1	0	0	0	1
4:30 PM	0	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	1
5:00 PM	0	0	0	0	0	0	0
5:15 PM	0	0	1	0	0	0	1
5:30 PM	0	0	0	0	0	0	0
5:45 PM	0	0	2	0	0	0	2
6:00 PM	0	0	1	0	0	0	1
6:15 PM	0	0	1	0	0	0	1
6:30 PM	0	0	0	0	0	0	0
6:45 PM	0	0	1	0	0	0	1
7:00 PM	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0
7:30 PM	0	0	2	0	0	0	2
7:45 PM	0	0	0	0	0	0	0
8:00 PM	0	0	1	0	0	0	1
8:15 PM	0	0	1	0	0	0	1
8:30 PM	0	0	1	0	0	0	1
8:45 PM	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0
10:30 PM	0	0	0	0	0	0	0
10:45 PM	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0
11:30 PM	0	0	0	0	0	0	0
11:45 PM	0	0	0	0	0	0	0

PM Total	0	1	45	0	3	0	49
Percentage	0.00%	2.04%	91.84%	0.00%	6.12%	0.00%	

PM Peak	12:00 PM	3:00 PM	2:15 PM	12:00 PM	2:30 PM	12:00 PM	2:30 PM
Volume	0	1	13	0	2	0	15

Day Total	0	1	74	0	7	0	82
Percentage	0.00%	1.22%	90.24%	0.00%	8.54%	0.00%	

Hill Avenue
south of Ledge Street
City, State: Franklin, MA
Client: Kimley-Horn/ P. Graham
Site Code: 112922001



PDI File #: 239756 ATR-A

Count Date: Thursday, December 14, 2023
Direction: SB

AM	Bicycles	Motorcycle	Cars & Light Goods	Buses	Single Unit Heavy	Multi Unit Heavy	Total
12:00 AM	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0
1:15 AM	0	0	0	0	0	0	0
1:30 AM	0	0	0	0	0	0	0
1:45 AM	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0
2:15 AM	0	0	0	0	0	0	0
2:30 AM	0	0	0	0	0	0	0
2:45 AM	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0
3:15 AM	0	0	0	0	0	0	0
3:30 AM	0	0	0	0	0	0	0
3:45 AM	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0
4:15 AM	0	0	0	0	0	0	0
4:30 AM	0	0	0	0	0	0	0
4:45 AM	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0
5:15 AM	0	0	0	0	0	0	0
5:30 AM	0	0	0	0	0	0	0
5:45 AM	0	0	0	0	0	0	0
6:00 AM	0	0	1	0	0	0	1
6:15 AM	0	0	1	0	0	0	1
6:30 AM	0	0	0	0	0	0	0
6:45 AM	0	0	2	0	0	0	2
7:00 AM	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0
7:30 AM	0	0	1	0	0	0	1
7:45 AM	0	0	1	0	0	0	1
8:00 AM	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0
9:30 AM	0	0	1	0	0	0	1
9:45 AM	0	0	2	0	0	0	2
10:00 AM	0	0	1	0	0	0	1
10:15 AM	0	0	0	0	0	0	0
10:30 AM	0	0	3	0	1	0	4
10:45 AM	0	0	1	0	0	0	1
11:00 AM	0	0	1	0	0	0	1
11:15 AM	0	0	0	0	0	0	0
11:30 AM	0	0	1	0	0	0	1
11:45 AM	0	0	1	0	1	0	2

AM Total	0	0	17	0	2	0	19
Percentage	0.00%	0.00%	89.47%	0.00%	10.53%	0.00%	

AM Peak	12:00 AM	12:00 AM	9:45 AM	12:00 AM	9:45 AM	12:00 AM	9:45 AM
Volume	0	0	6	0	1	0	7

PM	Bicycles	Motorcycle	Cars & Light Goods	Buses	Single Unit Heavy	Multi Unit Heavy	Total
12:00 PM	0	0	3	0	0	0	3
12:15 PM	0	0	0	0	0	0	0
12:30 PM	0	0	1	0	0	0	1
12:45 PM	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0
1:15 PM	0	0	1	0	0	0	1
1:30 PM	0	0	2	0	0	0	2
1:45 PM	0	0	2	0	0	0	2
2:00 PM	0	0	2	0	0	0	2
2:15 PM	0	0	1	0	0	0	1
2:30 PM	0	0	1	0	0	0	1
2:45 PM	0	0	1	0	0	0	1
3:00 PM	0	0	2	0	0	0	2
3:15 PM	0	0	1	0	0	0	1
3:30 PM	0	0	2	0	0	0	2
3:45 PM	0	0	1	0	0	0	1
4:00 PM	0	0	1	0	0	0	1
4:15 PM	0	0	3	0	1	0	4
4:30 PM	0	0	1	0	0	0	1
4:45 PM	0	0	4	0	0	0	4
5:00 PM	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0
6:30 PM	0	0	1	0	0	0	1
6:45 PM	0	0	1	0	0	0	1
7:00 PM	0	0	1	0	0	0	1
7:15 PM	0	0	0	0	0	0	0
7:30 PM	0	0	1	0	0	0	1
7:45 PM	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0
8:15 PM	0	0	0	0	0	0	0
8:30 PM	0	0	0	0	0	0	0
8:45 PM	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0
9:15 PM	0	0	0	0	0	0	0
9:30 PM	0	0	0	0	0	0	0
9:45 PM	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0
10:15 PM	0	0	0	0	0	0	0
10:30 PM	0	0	1	0	0	0	1
10:45 PM	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0
11:15 PM	0	0	0	0	0	0	0
11:30 PM	0	0	0	0	0	0	0
11:45 PM	0	0	0	0	0	0	0

PM Total	0	0	34	0	1	0	35
Percentage	0.00%	0.00%	97.14%	0.00%	2.86%	0.00%	

PM Peak	12:00 PM	12:00 PM	4:00 PM	12:00 PM	3:30 PM	12:00 PM	4:00 PM
Volume	0	0	9	0	1	0	10

Day Total	0	0	51	0	3	0	54
Percentage	0.00%	0.00%	94.44%	0.00%	5.56%	0.00%	



PRECISION
DATA
INDUSTRIES, LLC

157 Washington Street, Suite 2
Hudson, MA 01749
508-875-0100, datarequests@ndillc.com

Direction: NB

[illegible]



PRECISION
DATA
INDUSTRIES, LLC

157 Washington Street, Suite 2
Hudson, MA 01749
508-875-0100, datarequests@ndillc.com

Weekly Report

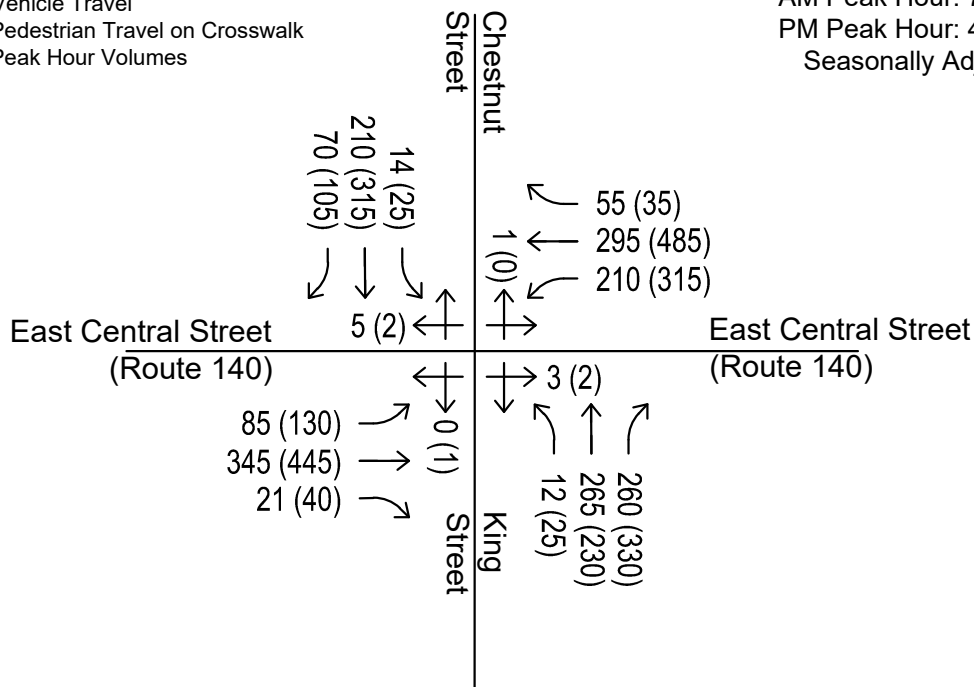
[illegible]



Legend:

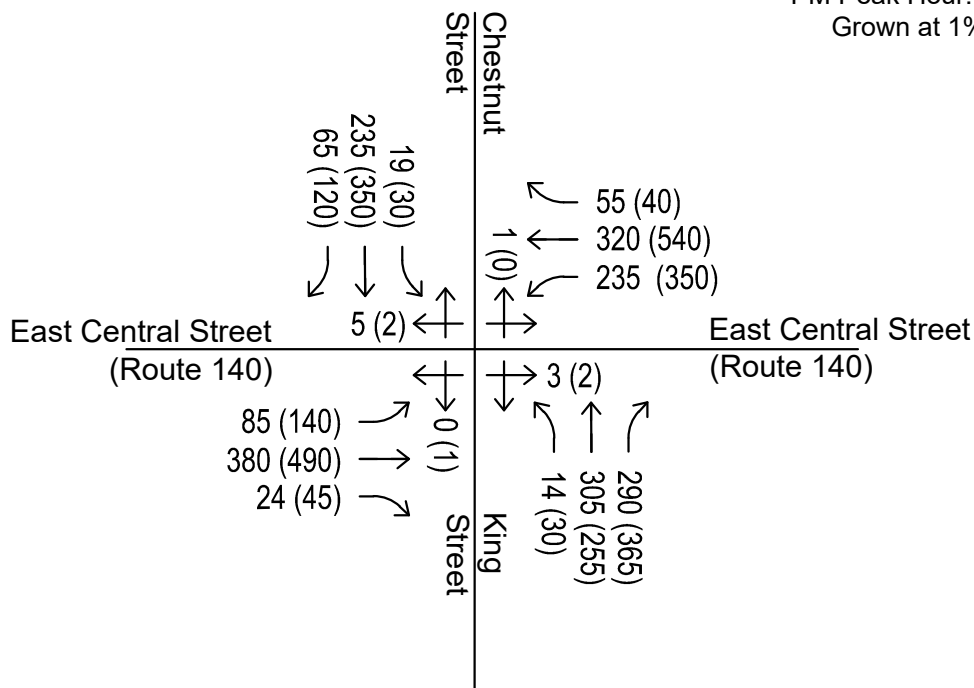
- Vehicle Travel
- ↔ Pedestrian Travel on Crosswalk
- AM (PM) Peak Hour Volumes

Count Date: Thursday, December 1st, 2022
 AM Peak Hour: 7:45-8:45 AM
 PM Peak Hour: 4:30-5:30 PM
 Seasonally Adjusted by 4%



Existing (2022) AM and PM Volumes

AM Peak Hour: 7:45-8:45 AM
 PM Peak Hour: 4:30-5:30 PM
 Grown at 1% for 10 Years



Future (2032) AM and PM Volumes

Not To Scale



**Chestnut Street Left
 Turn Lane
 Evaluation**
 Franklin, MA

Figure 2
 Existing (2022) and
 Future (2032) Peak Hour
 Turning Movement Volumes

APPENDIX C

Growth Rate

Project Name:	Uncas Avenue	Data Source:	US Census
Project Number:	112922001	Local District:	3

The table below summarizes traffic count data from US Census traffic count maps. The locations chosen are in the general vicinity of the project site. Five years worth of data was evaluated and the growth averaged over the five year period.

A growth rate of 1% is proposed for the site.

Municipality	2010	2020	Average Annual Growth
Franklin	31,635	33,261	0.5%
Bellingham	16,332	16,945	0.4%
Wrentham	10,955	12,178	1.1%
Average Annual Growth Rate			0.7%

Current Year	
Project Year	2023
Synchro Growth Factor	2030
Growth Years	1.05

APPENDIX D

Trip Generation

Project Name: Uncas Avenue
Project Scenario: Build A

Peak Period 1: AM
Peak Period 2: PM

Trip Generation										
Land Use	Amount	Units	ITE Code	Daily One-Way Trips	AM Peak Hour One-Way Trips			PM Peak Hour One-Way Trips		
					IN	OUT	TOTAL			
Single Family Attaached	27	DU	215	156	2	6	8	7	5	12
Total Trips:				156	2	6	8	7	5	12

Trip generation based on ITE's Trip Generation Manual, 11th Edition.
Pass-by trips based on ITE's Trip Generation Handbook, 3rd Edition.

Project Name: Uncas Avenue
Project Scenario: Build B

Peak Period 1: AM
Peak Period 2: PM

Trip Generation										
Land Use	Amount	Units	ITE Code	Daily One-Way Trips	AM Peak Hour One-Way Trips			PM Peak Hour One-Way Trips		
					IN	OUT	TOTAL			
Single Family Attaached	18	DU	215	88	1	3	4	4	3	7
Total Trips:				88	1	3	4	4	3	7

Trip generation based on ITE's Trip Generation Manual, 11th Edition.
Pass-by trips based on ITE's Trip Generation Handbook, 3rd Edition.

APPENDIX E

Volume Development

Build A - Volume Development

Intersection (North/South and East/West)				Direction	Movement SYNCHRO	AutoCAD Index	Existing 2023		Existing PHF 2023		Existing HV 2023		Taj Estates II		Taj Estates		No Build 2030		Trip Distribution		Trip Assignments		Total Trips		Build Out 2030		
									AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	%IN	%OUT	AM	PM	AM	PM	AM	PM	
1	King Street/Chestnut Street	SB	SBL	14	28	0.85	0.90	14					1		1		15	32	5		0	0	0	0	15	32	
	and	(King Street/Chestnut Street)	SBT	212	316	0.85	0.90	6	1							227	339				0	0	0	0	227	339	
	East Central Street (Route 140)	SBR	SBR	71	121	0.85	0.90	9	1							76	130				0	0	0	0	76	130	
	(7:45 AM - 8:45 AM) (4:30 PM - 5:30 PM)	WB	East Central Street (Route 140)	WBL	212	367	0.95	0.93	7	1	7	4	7	5			241	402	30		0	0	0	0	241	402	
				WBT	298	441	0.95	0.93	4	2	8	4	8	5			335	482		2	2	2	2	337	484		
				WBR	56	47	0.95	0.93	6		1	1	1	1			62	53		5	0	0	0	0	62	53	
		NB	(King Street/Chestnut Street)	NBL	12	31	0.88	0.84									13	34	25		0	0	0	0	13	34	
				NBT	268	285	0.88	0.84	6	1							287	305		0	0	0	0	287	305		
				NBR	263	304	0.88	0.84	3	3	2	6	2	7			286	339		1	2	1	2	287	341		
		EB	(East Central Street (Route 140	EBL	86	154	0.86	0.91	3	1							92	165	30		0	0	0	0	92	165	
				EBT	348	424	0.86	0.91	5	2	3	7	3	8			380	470		1	2	1	2	381	472		
				EBR	21	42	0.86	0.91	10	3							23	45		0	0	0	0	23	45		
2	Uncas Avenue	SB	SBL													0	0	40		0	0	0	0	0	0		
	and	(Uncas Avenue)	SBT													0	0				0	0	0	0	0	0	
	East Central Street (Route 140)	SBR	SBR													0	0				0	0	0	0	0	0	
	(7:45 AM - 8:45 AM) (4:30 PM - 5:30 PM)	WB	East Central Street (Route 140	WBL		4										0	4	35		1	3	1	3	1	7		
				WBT	566	855	0.95	0.93	5	1	16	9	16	11			638		937	0	0	0	0	638	937		
				WBR													0		0	0	0	0	0	0	0	0	0
		NB	(Uncas Avenue)	NBL	2	2											2	2	40		2	2	2	2	4	4	
				NBT													0	0		0	0	0	0	0	0	0	0
				NBR	4												4	0		2	2	2	2	6	2		
		EB	(East Central Street (Route 140	EBL													0	0	60		0	0	0	0	0	0	
				EBT	625	756	0.86	0.88	4	2	5	14	5	17			680	842		0	0	0	0	680	842		
				EBR	2	2											2	2		1	4	1	4	3	6		

Build B - Volume Development

Intersection (North/South and East/West)					Direction		Movement SYNCHRO		AutoCAD Index		Existing 2023		Existing PHF 2023		Existing HV 2023		Taj Estates II		Taj Estates		No Build 2030		Trip Distribution		Trip Assignments		Pass-By Distribution		Pass-By Trips		Total Trips		Build Out 2030			
													AM		PM		AM		PM		AM		PM		%IN		%OUT		AM		PM		AM		PM	
1	King Street/Chestnut Street				SB	SBL	SBL	14	28	0.85	0.90	14			1			15	32	5		0	0			0	0	0	0	15	32					
	and				(King Street/Chestnut Street)	SBT	SBT	212	316	0.85	0.90	6			1			227	339			0	0			0	0	227	339							
	East Central Street (Route 140)				SBR	SBR	71	121	0.85	0.90	9			1			76	130	0			0	0			0	76	130								
	(7:45 AM - 8:45 AM) (4:30 PM - 5:30 PM)				WB	WBL	WBL	212	367	0.95	0.93	7		7	4	5		241	402	30	5	0	0			0	0	0	0	241	402					
					East Central Street (Route 140	WBT	WBT	298	441	0.95	0.93	4		2		8	4	5				335	482			1	1	0	0	1	1	336	483			
						WBR	WBR	56	47	0.95	0.93	6			1	1	1		62			53	0			0	0	0	0	0	62	53				
					(King Street/Chestnut Street)	NBL	NBL	12	31	0.88	0.84									13	34	0	0	25		0	0	0	0	0	0	13	34			
						NBT	NBT	268	285	0.88	0.84	6		1					287	305	0	0	0			0	0	0	287	305						
					(East Central Street (Route 140	NBR	NBR	263	304	0.88	0.84	3		3		2		6		7		286	339	0	1	0	0	0	1	286	340					
						EB	EBL	EBL	86	154	0.86	0.91	3		1						92	165	0	0	30		0	0	0	0	0	0	92	165		
						EBT	EBT	348	424	0.86	0.91	5		2		3		7		8		380	470	0			1	0	0	0	1	380	471			
						EBR	EBR	21	42	0.86	0.91	10		3								23	45	0			0	0	0	0	0	23	45			
	2	Uncas Avenue				SB	SBL	SBL										0	0	40		0	0			0	0	0	0	0	0					
		and				(Uncas Avenue)	SBT	SBT									0	0	0			0	0			0	0	0	0	0						
		East Central Street (Route 140)				SBR	SBR										0	0	0			0	0			0	0	0	0	0						
(7:45 AM - 8:45 AM) (4:30 PM - 5:30 PM)				WB	WBL	WBL		4								0	4	40		0	2			0	0	0	2	0	6							
				East Central Street (Route 140	WBT	WBT	566	855	0.95	0.93	5		1		16		9				16			11	638	937	0	0	0	0	638	937				
					WBR	WBR																		0	0	0	0	0	0	0	0	0	0			
				(Uncas Avenue)	NBL	NBL	2													2	0	35		1	1			0	0	1	1	3	1			
					NBT	NBT														0	0			0	0			0	0	0	0	0	0			
					NBR	NBR	4													4	0			1	1			0	0	1	1	5	1			
					EB	EBL	EBL														0	0	40		0	0			0	0	0	0	0	0		
				(East Central Street (Route 140	EBT	EBT	625	756	0.86	0.88	4		2		5		14		17		680	842			0	0			0	0	0	0	680	842		
					EBR	EBR	2	2													2	2			1	2			0	0	1	2	3	4		

APPENDIX F

Capacity Analysis

2023 Existing AM Peak Hour

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2023 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	348	21	212	298	56	12	268	263	14	212	71
Future Volume (vph)	86	348	21	212	298	56	12	268	263	14	212	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		50	130		50	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.976				0.850		0.968	
Flt Protected	0.950			0.950				0.998			0.998	
Satd. Flow (prot)	1752	1790	0	1687	1778	0	0	1793	1568	0	1714	0
Flt Permitted	0.486			0.266				0.978			0.977	
Satd. Flow (perm)	897	1790	0	472	1778	0	0	1757	1568	0	1678	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			8				182		13	
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		612			209			641			701	
Travel Time (s)		10.4			3.6			12.5			15.9	
Peak Hour Factor	0.86	0.86	0.86	0.95	0.95	0.95	0.88	0.88	0.88	0.85	0.85	0.85
Heavy Vehicles (%)	3%	5%	10%	7%	4%	6%	0%	6%	3%	14%	6%	9%
Adj. Flow (vph)	100	405	24	223	314	59	14	305	299	16	249	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	429	0	223	373	0	0	319	299	0	349	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	17.0		11.0	17.0		13.0	13.0	11.0	13.0	13.0	
Total Split (s)	17.0	47.0		17.0	47.0		37.0	37.0	17.0	37.0	37.0	
Total Split (%)	13.9%	38.5%		13.9%	38.5%		30.3%	30.3%	13.9%	30.3%	30.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Recall Mode	None	None		None	None		None	None	None	None	None	
Act Effct Green (s)	32.6	24.1		38.3	29.7			22.9	38.9		22.9	
Actuated g/C Ratio	0.44	0.33		0.52	0.40			0.31	0.53		0.31	
v/c Ratio	0.20	0.73		0.53	0.52			0.58	0.33		0.66	
Control Delay	10.4	30.6		14.4	21.8			27.4	5.5		28.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	10.4	30.6		14.4	21.8			27.4	5.5		28.9	
LOS	B	C		B	C			C	A		C	
Approach Delay		26.8			19.1			16.8			28.9	
Approach LOS		C			B			B			C	
Queue Length 50th (ft)	20	171		48	129			123	25		133	

Lanes, Volumes, Timings
1: King Street/Chestnut Street & E Central Street (Route 140)

Uncas Avenue Traffic Analysis
2023 Existing AM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	17%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2023 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	48	290		106	254			230	77		239	
Internal Link Dist (ft)		532			129			561			621	
Turn Bay Length (ft)	200			130					80			
Base Capacity (vph)	593	1071		456	1066			800	948		772	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.17	0.40		0.49	0.35			0.40	0.32		0.45	

Intersection Summary

Area Type: Other

Cycle Length: 122

Actuated Cycle Length: 73.5

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 22.0

Intersection LOS: C

Intersection Capacity Utilization 71.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: King Street/Chestnut Street & E Central Street (Route 140)

 Ø1	 Ø2	 Ø4	 Ø9
17 s	47 s	37 s	21 s
 Ø5	 Ø6	 Ø8	
17 s	47 s	37 s	

HCM 6th TWSC
2: Uncas Avenue & E Central Street (Route 140)

Uncas Avenue Traffic Analysis
2023 Existing AM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	625	2	0	566	2	4
Future Vol, veh/h	625	2	0	566	2	4
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	86	86	95	95	92	92
Heavy Vehicles, %	4	0	0	5	0	0
Mvmt Flow	727	2	0	596	2	4
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	729	0	1324	728
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	596	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	884	-	174	427
Stage 1	-	-	-	-	482	-
Stage 2	-	-	-	-	554	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	884	-	174	427
Mov Cap-2 Maneuver	-	-	-	-	174	-
Stage 1	-	-	-	-	482	-
Stage 2	-	-	-	-	554	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		17.8	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	288	-	-	884	-	
HCM Lane V/C Ratio	0.023	-	-	-	-	
HCM Control Delay (s)	17.8	-	-	0	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

2023 Existing PM Peak Hour

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2023 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	424	42	367	441	47	31	285	304	28	316	121
Future Volume (vph)	154	424	42	367	441	47	31	285	304	28	316	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		50	130		50	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.985				0.850		0.965	
Flt Protected	0.950			0.950				0.995			0.997	
Satd. Flow (prot)	1787	1837	0	1787	1838	0	0	1874	1568	0	1811	0
Flt Permitted	0.212			0.175				0.900			0.961	
Satd. Flow (perm)	399	1837	0	329	1838	0	0	1695	1568	0	1746	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			5				187		14	
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		612			209			641			701	
Travel Time (s)		10.4			3.6			12.5			15.9	
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.84	0.84	0.84	0.90	0.90	0.90
Heavy Vehicles (%)	1%	2%	3%	1%	2%	0%	0%	1%	3%	0%	1%	1%
Adj. Flow (vph)	169	466	46	395	474	51	37	339	362	31	351	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	169	512	0	395	525	0	0	376	362	0	516	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	17.0		11.0	17.0		13.0	13.0	11.0	13.0	13.0	
Total Split (s)	17.0	47.0		17.0	47.0		37.0	37.0	17.0	37.0	37.0	
Total Split (%)	13.9%	38.5%		13.9%	38.5%		30.3%	30.3%	13.9%	30.3%	30.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Recall Mode	None	None		None	None		None	None	None	None	None	
Act Effct Green (s)	40.7	30.5		44.4	32.3			32.2	49.3		32.2	
Actuated g/C Ratio	0.45	0.34		0.49	0.36			0.36	0.55		0.36	
v/c Ratio	0.50	0.82		1.10	0.79			0.62	0.38		0.81	
Control Delay	16.3	38.1		100.0	35.1			30.9	7.6		39.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	16.3	38.1		100.0	35.1			30.9	7.6		39.2	
LOS	B	D		F	D			C	A		D	
Approach Delay		32.7			63.0			19.5			39.2	
Approach LOS		C			E			B			D	
Queue Length 50th (ft)	47	259		~186	261			170	46		251	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	17%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2023 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	79	378		#390	390			289	113		#513	
Internal Link Dist (ft)		532			129			561			621	
Turn Bay Length (ft)	200			130					80			
Base Capacity (vph)	375	865		358	866			607	944		634	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.45	0.59		1.10	0.61			0.62	0.38		0.81	

Intersection Summary

Area Type: Other

Cycle Length: 122

Actuated Cycle Length: 89.9

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 40.2

Intersection LOS: D

Intersection Capacity Utilization 104.1%

ICU Level of Service G

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.

Splits and Phases: 1: King Street/Chestnut Street & E Central Street (Route 140)

 Ø1	 Ø2	 Ø4	 Ø9
17 s	47 s	37 s	21 s
 Ø5	 Ø6	 Ø8	
17 s	47 s	37 s	

HCM 6th TWSC
2: Uncas Avenue & E Central Street (Route 140)

Uncas Avenue Traffic Analysis
2023 Existing PM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	756	2	4	855	2	0
Future Vol, veh/h	756	2	4	855	2	0
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	88	88	93	93	92	92
Heavy Vehicles, %	2	0	0	1	0	2
Mvmt Flow	859	2	4	919	2	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	861	0	1787	860
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	927	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	789	-	90	356
Stage 1	-	-	-	-	418	-
Stage 2	-	-	-	-	389	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	789	-	89	356
Mov Cap-2 Maneuver	-	-	-	-	89	-
Stage 1	-	-	-	-	418	-
Stage 2	-	-	-	-	385	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		46.5	
HCM LOS					E	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	89	-	-	789	-	
HCM Lane V/C Ratio	0.024	-	-	0.005	-	
HCM Control Delay (s)	46.5	-	-	9.6	0	
HCM Lane LOS	E	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

2030 No Build AM Peak Hour

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2023 No Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	380	23	241	335	62	13	287	286	15	227	76
Future Volume (vph)	92	380	23	241	335	62	13	287	286	15	227	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		50	130		50	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.977				0.850		0.968	
Flt Protected	0.950			0.950				0.998			0.998	
Satd. Flow (prot)	1752	1788	0	1687	1780	0	0	1793	1568	0	1714	0
Flt Permitted	0.430			0.246				0.978			0.977	
Satd. Flow (perm)	793	1788	0	437	1780	0	0	1757	1568	0	1678	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			8				185		13	
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		612			209			641			701	
Travel Time (s)		10.4			3.6			12.5			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	5%	10%	7%	4%	6%	0%	6%	3%	14%	6%	9%
Adj. Flow (vph)	100	413	25	262	364	67	14	312	311	16	247	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	438	0	262	431	0	0	326	311	0	346	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	17.0		11.0	17.0		13.0	13.0	11.0	13.0	13.0	
Total Split (s)	17.0	47.0		17.0	47.0		37.0	37.0	17.0	37.0	37.0	
Total Split (%)	13.9%	38.5%		13.9%	38.5%		30.3%	30.3%	13.9%	30.3%	30.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Recall Mode	None	None		None	None		None	None	None	None	None	
Act Effct Green (s)	33.1	24.7		40.3	31.2			23.3	40.2		23.3	
Actuated g/C Ratio	0.44	0.33		0.54	0.41			0.31	0.53		0.31	
v/c Ratio	0.22	0.74		0.61	0.58			0.60	0.34		0.66	
Control Delay	10.7	31.7		16.8	23.2			28.3	5.7		29.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	10.7	31.7		16.8	23.2			28.3	5.7		29.4	
LOS	B	C		B	C			C	A		C	
Approach Delay		27.8			20.8			17.3			29.4	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	20	179		59	159			129	28		134	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	17%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2023 No Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	50	318		124	302			246	88		259	
Internal Link Dist (ft)		532			129			561			621	
Turn Bay Length (ft)	200			130					80			
Base Capacity (vph)	550	1037		441	1034			775	936		748	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.18	0.42		0.59	0.42			0.42	0.33		0.46	

Intersection Summary

Area Type: Other

Cycle Length: 122

Actuated Cycle Length: 75.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 22.8

Intersection LOS: C

Intersection Capacity Utilization 76.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: King Street/Chestnut Street & E Central Street (Route 140)

 Ø1	 Ø2	 Ø4	 Ø9
17 s	47 s	37 s	21 s
 Ø5	 Ø6	 Ø8	
17 s	47 s	37 s	

HCM 6th TWSC
2: Uncas Avenue & E Central Street (Route 140)

Uncas Avenue Traffic Analysis
2023 No Build AM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	680	2	0	638	2	4
Future Vol, veh/h	680	2	0	638	2	4
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, %	4	0	0	5	0	2
Mvmt Flow	739	2	0	693	2	4
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	741	0	1433	740
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	693	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	875	-	149	417
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	500	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	875	-	149	417
Mov Cap-2 Maneuver	-	-	-	-	149	-
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	500	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		19.1	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	261	-	-	875	-	
HCM Lane V/C Ratio	0.025	-	-	-	-	
HCM Control Delay (s)	19.1	-	-	0	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

2030 No Build PM Peak Hour

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2030 No Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	470	45	402	482	53	34	305	339	32	339	130
Future Volume (vph)	165	470	45	402	482	53	34	305	339	32	339	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		50	130		50	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.985				0.850		0.965	
Flt Protected	0.950			0.950				0.995			0.997	
Satd. Flow (prot)	1787	1837	0	1787	1838	0	0	1874	1568	0	1811	0
Flt Permitted	0.172			0.170				0.866			0.901	
Satd. Flow (perm)	324	1837	0	320	1838	0	0	1631	1568	0	1637	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			5				193		14	
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		612			209			641			701	
Travel Time (s)		10.4			3.6			12.5			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	3%	1%	2%	0%	0%	1%	3%	0%	1%	1%
Adj. Flow (vph)	179	511	49	437	524	58	37	332	368	35	368	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	560	0	437	582	0	0	369	368	0	544	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	17.0		11.0	17.0		13.0	13.0	11.0	13.0	13.0	
Total Split (s)	17.0	47.0		17.0	47.0		37.0	37.0	17.0	37.0	37.0	
Total Split (%)	13.9%	38.5%		13.9%	38.5%		30.3%	30.3%	13.9%	30.3%	30.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Recall Mode	None	None		None	None		None	None	None	None	None	
Act Effct Green (s)	46.4	35.4		48.5	36.5			32.2	49.3		32.2	
Actuated g/C Ratio	0.49	0.37		0.51	0.39			0.34	0.52		0.34	
v/c Ratio	0.55	0.81		1.25	0.82			0.67	0.41		0.96	
Control Delay	17.2	36.6		154.5	36.5			35.2	8.5		62.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	17.2	36.6		154.5	36.5			35.2	8.5		62.6	
LOS	B	D		F	D			D	A		E	
Approach Delay		31.9			87.1			21.9			62.6	
Approach LOS		C			F			C			E	
Queue Length 50th (ft)	50	294		~260	311			198	59		329	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	17%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2030 No Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	83	426		#459	450			317	132		#580	
Internal Link Dist (ft)		532			129			561			621	
Turn Bay Length (ft)	200			130					80			
Base Capacity (vph)	348	821		351	822			553	908		565	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.51	0.68		1.25	0.71			0.67	0.41		0.96	

Intersection Summary

Area Type: Other

Cycle Length: 122

Actuated Cycle Length: 94.7

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.25

Intersection Signal Delay: 53.5

Intersection LOS: D

Intersection Capacity Utilization 111.9%

ICU Level of Service H

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.

Splits and Phases: 1: King Street/Chestnut Street & E Central Street (Route 140)

 Ø1	 Ø2	 Ø4	 Ø9
17 s	47 s	37 s	21 s
 Ø5	 Ø6	 Ø8	
17 s	47 s	37 s	

HCM 6th TWSC
2: Uncas Avenue & E Central Street (Route 140)

Uncas Avenue Traffic Analysis
2030 No Build PM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	842	2	4	937	2	0
Future Vol, veh/h	842	2	4	937	2	0
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	0	0	1	0	0
Mvmt Flow	915	2	4	1018	2	0
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	917	0	1942	916
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	1026	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	752	-	72	333
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	349	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	752	-	71	333
Mov Cap-2 Maneuver	-	-	-	-	71	-
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	345	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		57.3		
HCM LOS	F					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	71	-	-	752	-	
HCM Lane V/C Ratio	0.031	-	-	0.006	-	
HCM Control Delay (s)	57.3	-	-	9.8	0	
HCM Lane LOS	F	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

2030 Build A AM Peak Hour

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2030 Build A - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	381	23	241	337	62	13	287	287	15	227	76
Future Volume (vph)	92	381	23	241	337	62	13	287	287	15	227	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		50	130		50	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.977				0.850		0.968	
Flt Protected	0.950			0.950				0.998			0.998	
Satd. Flow (prot)	1752	1788	0	1687	1780	0	0	1793	1568	0	1714	0
Flt Permitted	0.430			0.245				0.978			0.977	
Satd. Flow (perm)	793	1788	0	435	1780	0	0	1757	1568	0	1678	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			8				186		13	
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		612			209			1743			701	
Travel Time (s)		10.4			3.6			34.0			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	5%	10%	7%	4%	6%	0%	6%	3%	14%	6%	9%
Adj. Flow (vph)	100	414	25	262	366	67	14	312	312	16	247	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	439	0	262	433	0	0	326	312	0	346	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	17.0		11.0	17.0		13.0	13.0	11.0	13.0	13.0	
Total Split (s)	17.0	47.0		17.0	47.0		37.0	37.0	17.0	37.0	37.0	
Total Split (%)	13.9%	38.5%		13.9%	38.5%		30.3%	30.3%	13.9%	30.3%	30.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Recall Mode	None	None		None	None		None	None	None	None	None	
Act Effct Green (s)	33.2	24.8		40.4	31.3			23.2	40.2		23.2	
Actuated g/C Ratio	0.44	0.33		0.54	0.42			0.31	0.53		0.31	
v/c Ratio	0.22	0.74		0.61	0.58			0.60	0.34		0.66	
Control Delay	10.7	31.7		16.8	23.2			28.4	5.7		29.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	10.7	31.7		16.8	23.2			28.4	5.7		29.4	
LOS	B	C		B	C			C	A		C	
Approach Delay		27.8			20.8			17.3			29.4	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	20	179		59	160			129	28		134	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	17%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lanes, Volumes, Timings

1: King Street/Chestnut Street & E Central Street (Route 140)

Uncas Avenue Traffic Analysis

2030 Build A - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	50	319		124	303			246	89		260	
Internal Link Dist (ft)		532			129			1663			621	
Turn Bay Length (ft)	200			130					80			
Base Capacity (vph)	550	1035		440	1033			774	935		746	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.18	0.42		0.60	0.42			0.42	0.33		0.46	

Intersection Summary

Area Type: Other

Cycle Length: 122

Actuated Cycle Length: 75.4

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 22.9

Intersection LOS: C

Intersection Capacity Utilization 76.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: King Street/Chestnut Street & E Central Street (Route 140)

 Ø1	 Ø2	 Ø4	 Ø9
17 s	47 s	37 s	21 s
 Ø5	 Ø6	 Ø8	
17 s	47 s	37 s	

HCM 6th TWSC
2: Uncas Avenue & E Central Street (Route 140)

Uncas Avenue Traffic Analysis
2030 Build A - AM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	680	3	1	638	4	6
Future Vol, veh/h	680	3	1	638	4	6
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, %	4	0	0	5	0	0
Mvmt Flow	739	3	1	693	4	7
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	742	0	1436	741
Stage 1	-	-	-	-	741	-
Stage 2	-	-	-	-	695	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	874	-	149	420
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	499	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	874	-	149	420
Mov Cap-2 Maneuver	-	-	-	-	149	-
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	498	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		20.5	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	243	-	-	874	-	
HCM Lane V/C Ratio	0.045	-	-	0.001	-	
HCM Control Delay (s)	20.5	-	-	9.1	0	
HCM Lane LOS	C	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

2030 Build A PM Peak Hour

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2030 Build A - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	472	45	402	484	53	34	305	341	32	339	130
Future Volume (vph)	165	472	45	402	484	53	34	305	341	32	339	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		50	130		50	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.985				0.850		0.965	
Flt Protected	0.950			0.950				0.995			0.997	
Satd. Flow (prot)	1787	1837	0	1787	1838	0	0	1874	1568	0	1811	0
Flt Permitted	0.172			0.169				0.865			0.899	
Satd. Flow (perm)	324	1837	0	318	1838	0	0	1629	1568	0	1633	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			5				195		14	
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		612			209			1743			701	
Travel Time (s)		10.4			3.6			34.0			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	3%	1%	2%	0%	0%	1%	3%	0%	1%	1%
Adj. Flow (vph)	179	513	49	437	526	58	37	332	371	35	368	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	562	0	437	584	0	0	369	371	0	544	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	17.0		11.0	17.0		13.0	13.0	11.0	13.0	13.0	
Total Split (s)	17.0	47.0		17.0	47.0		37.0	37.0	17.0	37.0	37.0	
Total Split (%)	13.9%	38.5%		13.9%	38.5%		30.3%	30.3%	13.9%	30.3%	30.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Recall Mode	None	None		None	None		None	None	None	None	None	
Act Effct Green (s)	46.6	35.6		48.7	36.7			32.2	49.3		32.2	
Actuated g/C Ratio	0.49	0.38		0.51	0.39			0.34	0.52		0.34	
v/c Ratio	0.55	0.81		1.25	0.82			0.67	0.41		0.97	
Control Delay	17.2	36.6		156.0	36.5			35.4	8.6		63.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	17.2	36.6		156.0	36.5			35.4	8.6		63.8	
LOS	B	D		F	D			D	A		E	
Approach Delay		31.9			87.7			21.9			63.8	
Approach LOS		C			F			C			E	
Queue Length 50th (ft)	50	296		~262	312			200	60		~334	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	17%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lanes, Volumes, Timings

1: King Street/Chestnut Street & E Central Street (Route 140)

Uncas Avenue Traffic Analysis

2030 Build A - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	83	429		#461	452			318	134		#581	
Internal Link Dist (ft)		532			129			1663			621	
Turn Bay Length (ft)	200			130					80			
Base Capacity (vph)	348	819		350	820			552	907		562	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.51	0.69		1.25	0.71			0.67	0.41		0.97	

Intersection Summary

Area Type: Other

Cycle Length: 122

Actuated Cycle Length: 94.9

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.25

Intersection Signal Delay: 53.9

Intersection LOS: D

Intersection Capacity Utilization 112.0%

ICU Level of Service H

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.

Splits and Phases: 1: King Street/Chestnut Street & E Central Street (Route 140)

 Ø1	 Ø2	 Ø4	 Ø9
17 s	47 s	37 s	21 s
 Ø5	 Ø6	 Ø8	
17 s	47 s	37 s	

HCM 6th TWSC
2: Uncas Avenue & E Central Street (Route 140)

Uncas Avenue Traffic Analysis
2030 Build A - PM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	842	6	8	937	4	2
Future Vol, veh/h	842	6	8	937	4	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	0	0	1	0	0
Mvmt Flow	915	7	9	1018	4	2
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	922	0	1955	919
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	1036	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	749	-	71	332
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	345	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	749	-	69	332
Mov Cap-2 Maneuver	-	-	-	-	69	-
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	335	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		46.1	
HCM LOS					E	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	94	-	-	749	-	
HCM Lane V/C Ratio	0.069	-	-	0.012	-	
HCM Control Delay (s)	46.1	-	-	9.9	0	
HCM Lane LOS	E	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0	-	

2030 Build B AM Peak Hour

Lanes, Volumes, Timings

1: King Street/Chestnut Street & E Central Street (Route 140)

Uncas Avenue Traffic Analysis

2030 Build B - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	380	23	241	336	62	13	287	286	15	227	76
Future Volume (vph)	92	380	23	241	336	62	13	287	286	15	227	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		50	130		50	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.977				0.850		0.968	
Flt Protected	0.950			0.950				0.998			0.998	
Satd. Flow (prot)	1752	1788	0	1687	1780	0	0	1793	1568	0	1714	0
Flt Permitted	0.429			0.246				0.978			0.977	
Satd. Flow (perm)	791	1788	0	437	1780	0	0	1757	1568	0	1678	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			8				185		13	
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		612			209			1743			701	
Travel Time (s)		10.4			3.6			34.0			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	5%	10%	7%	4%	6%	0%	6%	3%	14%	6%	9%
Adj. Flow (vph)	100	413	25	262	365	67	14	312	311	16	247	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	438	0	262	432	0	0	326	311	0	346	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	17.0		11.0	17.0		13.0	13.0	11.0	13.0	13.0	
Total Split (s)	17.0	47.0		17.0	47.0		37.0	37.0	17.0	37.0	37.0	
Total Split (%)	13.9%	38.5%		13.9%	38.5%		30.3%	30.3%	13.9%	30.3%	30.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Recall Mode	None	None		None	None		None	None	None	None	None	
Act Effct Green (s)	33.1	24.7		40.3	31.2			23.3	40.2		23.3	
Actuated g/C Ratio	0.44	0.33		0.54	0.41			0.31	0.53		0.31	
v/c Ratio	0.22	0.74		0.61	0.58			0.60	0.34		0.66	
Control Delay	10.7	31.7		16.8	23.2			28.3	5.7		29.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	10.7	31.7		16.8	23.2			28.3	5.7		29.4	
LOS	B	C		B	C			C	A		C	
Approach Delay		27.8			20.8			17.3			29.4	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	20	179		59	159			129	28		134	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	17%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lanes, Volumes, Timings

1: King Street/Chestnut Street & E Central Street (Route 140)

Uncas Avenue Traffic Analysis

2030 Build B - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	50	318		124	302			246	88		259	
Internal Link Dist (ft)		532			129			1663			621	
Turn Bay Length (ft)	200			130					80			
Base Capacity (vph)	549	1037		441	1034			775	936		748	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.18	0.42		0.59	0.42			0.42	0.33		0.46	

Intersection Summary

Area Type: Other

Cycle Length: 122

Actuated Cycle Length: 75.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 22.8

Intersection LOS: C

Intersection Capacity Utilization 76.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: King Street/Chestnut Street & E Central Street (Route 140)

 Ø1	 Ø2	 Ø4	 Ø9
17 s	47 s	37 s	21 s
 Ø5	 Ø6	 Ø8	
17 s	47 s	37 s	

HCM 6th TWSC
2: Uncas Avenue & E Central Street (Route 140)

Uncas Avenue Traffic Analysis
2030 Build B - AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	680	3	0	638	3	5
Future Vol, veh/h	680	3	0	638	3	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, %	4	0	0	5	0	2
Mvmt Flow	739	3	0	693	3	5
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	742	0	1434	741
Stage 1	-	-	-	-	741	-
Stage 2	-	-	-	-	693	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	874	-	149	416
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	500	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	874	-	149	416
Mov Cap-2 Maneuver	-	-	-	-	149	-
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	500	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		20	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	249	-	-	874	-	
HCM Lane V/C Ratio	0.035	-	-	-	-	
HCM Control Delay (s)	20	-	-	0	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

2030 Build B PM Peak Hour

Lanes, Volumes, Timings

Uncas Avenue Traffic Analysis

1: King Street/Chestnut Street & E Central Street (Route 140)

2030 Build B - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	471	45	402	483	53	34	305	340	32	339	130
Future Volume (vph)	165	471	45	402	483	53	34	305	340	32	339	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		50	130		50	0		80	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.985				0.850		0.965	
Flt Protected	0.950			0.950				0.995			0.997	
Satd. Flow (prot)	1787	1837	0	1787	1838	0	0	1874	1568	0	1811	0
Flt Permitted	0.172			0.169				0.866			0.900	
Satd. Flow (perm)	324	1837	0	318	1838	0	0	1631	1568	0	1635	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			5				194		14	
Link Speed (mph)		40			40			35			30	
Link Distance (ft)		612			209			1743			701	
Travel Time (s)		10.4			3.6			34.0			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	3%	1%	2%	0%	0%	1%	3%	0%	1%	1%
Adj. Flow (vph)	179	512	49	437	525	58	37	332	370	35	368	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	561	0	437	583	0	0	369	370	0	544	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		
Detector Phase	5	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	6.0	12.0		6.0	12.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	17.0		11.0	17.0		13.0	13.0	11.0	13.0	13.0	
Total Split (s)	17.0	47.0		17.0	47.0		37.0	37.0	17.0	37.0	37.0	
Total Split (%)	13.9%	38.5%		13.9%	38.5%		30.3%	30.3%	13.9%	30.3%	30.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Recall Mode	None	None		None	None		None	None	None	None	None	
Act Effct Green (s)	46.5	35.5		48.6	36.6			32.2	49.3		32.2	
Actuated g/C Ratio	0.49	0.37		0.51	0.39			0.34	0.52		0.34	
v/c Ratio	0.55	0.81		1.25	0.82			0.67	0.41		0.96	
Control Delay	17.2	36.6		156.0	36.5			35.3	8.6		63.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	17.2	36.6		156.0	36.5			35.3	8.6		63.1	
LOS	B	D		F	D			D	A		E	
Approach Delay		31.9			87.7			21.9			63.1	
Approach LOS		C			F			C			E	
Queue Length 50th (ft)	50	295		~262	312			199	59		~331	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	21.0
Total Split (s)	21.0
Total Split (%)	17%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lanes, Volumes, Timings

1: King Street/Chestnut Street & E Central Street (Route 140)

Uncas Avenue Traffic Analysis

2030 Build B - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	83	428		#461	451			317	133		#581	
Internal Link Dist (ft)		532			129			1663			621	
Turn Bay Length (ft)	200			130					80			
Base Capacity (vph)	348	820		350	821			553	907		564	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.51	0.68		1.25	0.71			0.67	0.41		0.96	

Intersection Summary

Area Type: Other

Cycle Length: 122

Actuated Cycle Length: 94.8

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.25

Intersection Signal Delay: 53.8

Intersection LOS: D

Intersection Capacity Utilization 111.9%

ICU Level of Service H

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.

Splits and Phases: 1: King Street/Chestnut Street & E Central Street (Route 140)

 Ø1	 Ø2	 Ø4	 Ø9
17 s	47 s	37 s	21 s
 Ø5	 Ø6	 Ø8	
17 s	47 s	37 s	

HCM 6th TWSC
2: Uncas Avenue & E Central Street (Route 140)

Uncas Avenue Traffic Analysis
2030 Build B - PM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	842	4	6	937	1	1
Future Vol, veh/h	842	4	6	937	1	1
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	0	0	1	0	0
Mvmt Flow	915	4	7	1018	1	1

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	919
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	751
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	751
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	36.6
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	116	-	-	751	-
HCM Lane V/C Ratio	0.019	-	-	0.009	-
HCM Control Delay (s)	36.6	-	-	9.8	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

