

Transportation Impact Assessment

Proposed Warehouse Building
585 King Street
Franklin, Massachusetts

Prepared for:

 **MARCUS PARTNERS**
Boston, Massachusetts

October 2021

Prepared by:

 **Vanasse &
Associates inc**
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Dear Reviewer:

This letter shall certify that this *Transportation Impact Assessment* has been prepared under my direct supervision and responsible charge. I am a Registered Professional Engineer (P.E.) in the Commonwealth of Massachusetts (Massachusetts P.E. No. 38871, Civil) and hold Certification as a Professional Traffic Operations Engineer (PTOE) from the Transportation Professional Certification Board, Inc. (TPCB), an independent affiliate of the Institute of Transportation Engineers (ITE) (PTOE Certificate No. 993). I am also a Fellow of the Institute of Transportation Engineers (FITE).

Sincerely,

VANASSE & ASSOCIATES, INC.



Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner

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EXECUTIVE SUMMARY

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a warehouse building to be located at 585 King Street in Franklin, Massachusetts (hereafter referred to as the “Project”). This assessment was prepared in consultation with the Town of Franklin and the Massachusetts Department of Transportation (MassDOT), and was performed in accordance with MassDOT’s *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports.

Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE),¹ the Project is expected to generate 510 vehicle trips on an average weekday (two-way volume over the operational day of the Project), consisting of 334 passenger car trips and 176 truck trips. During the weekday morning peak-hour, the Project is expected to generate 61 vehicle trips, consisting of 55 passenger car trips and 6 truck trips. During the weekday evening peak-hour, the Project is expected to generate 63 vehicle trips, consisting of 54 passenger car trips and 9 truck trips;
2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition), with all of the movements at the study area intersections shown to continue to operate at level-of-service (LOS) D or better with the addition of Project-related traffic, where an LOS of “D” or better is defined as “acceptable” traffic operations;
3. All movements at the Project site driveway intersection with King Street were shown to operate at a LOS D or better during the peak hours with minimal vehicle queuing predicted (up to 2 vehicles);
4. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections; and

¹*Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.

5. Lines of sight at the Project site driveway intersection with King Street were found to exceed or could be made to exceed the recommended minimum distance for safe operation based on the appropriate approach speed.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with implementation of the recommendations that follow.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

Project Access

Access to the Project site will be provided by way of a new driveway that will intersect the north side of King Street opposite Constitution Boulevard and will form the fourth leg of the intersection, which is presently under traffic signal control. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation, many of which are reflected on the Site Plans:

- The Project site driveway should be incorporated into the traffic signal system at the King Street/Constitution Boulevard intersection and designed to accommodate two (2) travel lanes approaching King Street, consisting of a left-turn lane and a through/right-turn lane, and a single travel lane entering the Project site separated by a raised island or double-yellow centerline. Thereafter the driveway and internal circulating drives should be a minimum of 24 feet in width where two-way traffic is to be conveyed and a minimum of 20 feet in width for one-way travel.
- The Project site driveway and internal circulating drives should be designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle and a large tractor semi-trailer combination (WB-67 design vehicle).
- King Street approaching the Project site driveway should be widened to provide a southbound right-turn lane in order to accommodate trucks slowing to enter the Project site.
- Where perpendicular parking is proposed within the employee parking areas, the drive aisle behind the parking should be a minimum of 23 feet in order to facilitate parking maneuvers.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).²

²*Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

- A sidewalk should be provided along at least one side of the Project site driveway and extend to the existing sidewalk along King Street.
- Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided at all pedestrian crossings internal to the Project site.
- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of the Project site driveway should be designed and maintained so as not to restrict lines of sight.
- Snow windrows within sight triangle areas of the Project site driveway should be promptly removed where such accumulations would impede sight lines.

Off-Site

King Street Traffic Signal System

In conjunction with the addition of the Project site driveway as the fourth leg of the King Street/Constitution Boulevard intersection and the reconstruction of the traffic signal system at the intersection, the Project proponent will design and implement an optimal traffic signal timing, phasing and coordination plan for the King Street coordinated traffic signal system inclusive of the following intersections:

- King Street/Constitution Boulevard
- King Street/I-495 Southbound Ramps
- King Street/I-495 Northbound Ramps
- King Street/Union Street

These improvements will be completed prior to the issuance of a Certificate of Occupancy for the Project subject to receipt of all necessary rights, permits and approvals.

King Street at Franklin Fire Station No. 2

In conjunction with the reconstruction of the King Street/Constitution Boulevard intersection and the associated traffic signal system to accommodate the Project, the following improvements will be completed in order to reduce the potential for vehicle queues on the King Street northeastbound approach to Constitution Boulevard to block the driveway to Franklin Fire Station No. 2:

1. “Do Not Block” pavement markings and accompanying signs will be installed on King Street across the fire station driveway; and
2. The existing flashing emergency signal that is located to the west of the fire station driveway will be replaced with traffic signal indications that will be incorporated into the traffic signal system at the King Street/Constitution Boulevard intersection and will be timed to initiate a “red” traffic signal indication at the fire station driveway for King Street traffic prior to the initiation of a “red” signal on the same approach at Constitution Boulevard. A “Stop Here On Red” sign will be installed at the stop-line on King Street to the west of the driveway.

The existing traffic signal indications on the King Street northeastbound approach to Constitution Boulevard will be replaced with optically programmed signal indications in order to

reduce the visibility of the signal indications approaching the stop-line to the west of fire station driveway.

The proposed improvements and the sequential termination of the “green” signal phase on the King Street northeastbound approach will limit the introduction of vehicles between the stop-line to the west of the fire station driveway and the stop-line at Constitution Boulevard so that the vehicle queue between the stop-lines will not block the fire station driveway. Upon pre-emption of the traffic signal system by an emergency vehicle leaving the fire station, the new traffic signal indications that are to be installed to the west of the driveway will display a “red” indication to hold traffic to the west of the driveway, with the signal indication on the King Street northeastbound approach displaying a “green” indication to clear traffic in front of the responding emergency vehicle (all other traffic signals will display a “red” indication at the intersection).

The recommended improvements at the King Street Fire Station No. 2 driveway and at the King Street/Constitution Boulevard intersection will be designed and constructed prior to the issuance of a Certificate of Occupancy for the Project subject to receipt of all necessary rights, permits and approvals.

Transportation Demand Management

Regularly scheduled, fixed-route, public transportation services are not currently provided within the study area or to the Project site. The Greater Attleboro-Taunton Regional Transit Authority (GATRA) operates an on-demand microtransit service which allows transit riders to request a vehicle to pick them up for same-day service within the Town of Franklin through the GATRA GO United program. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures should be implemented as a part of the Project:

- A transportation coordinator should be assigned for the Project to coordinate the TDM program;
- Information regarding commuting options should be posted in a central location and/or otherwise made available to employees of the Project;
- The transportation coordinator should facilitate a rideshare matching program for employees to encourage carpooling;
- A “welcome packet” should be provided to employees detailing available commuter options and will include the contact information for the transportation coordinator and information to enroll in the employee rideshare program;
- Specific amenities should be provided to discourage off-site trips, including providing a break-room equipped with a microwave and refrigerator; offering direct deposit of paychecks; allowing telecommuting or flexible work schedules; and other such measures to reduce overall traffic volumes and travel during peak-traffic-volume periods;
- Pedestrian accommodations should be incorporated within the Project site to link the employee parking areas to the warehouse building and to the existing sidewalk along King Street; and
- Secure bicycle parking should be provided at an appropriate location within the Project site.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a warehouse building to be located at 585 King Street in Franklin, Massachusetts (hereafter referred to as the “Project”). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing traffic conditions and future traffic conditions, both with and without the Project, along King Street, and at the following specific intersections: King Street at Constitution Boulevard; King Street at the Interstate 495 (I-495) southbound ramps; King Street at the I-495 northbound ramps; and King Street at Union Street.

PROJECT DESCRIPTION

The Project will entail the construction of a 293,600± square foot (sf) warehouse building to be located at 585 King Street in Franklin, Massachusetts. The Project site encompasses approximately 33.5± acres of undeveloped land that is bounded by I-495 to the north; King Street, residential properties and areas of open and wooded space to the south; I-495 and King Street to the east; and residential properties and areas of open and wooded space to the west. Figure 1 depicts the Project site location in relation to the existing roadway network.

Access to the Project site will be provided by way of a new driveway that will intersect the north side of King Street opposite Constitution Boulevard and will form the fourth leg of the intersection, which is presently under traffic signal control. The Project will require the issuance of a State Highway Access Permit from the Massachusetts Department of Transportation (MassDOT) for access to King Street, a State Highway under the jurisdiction of MassDOT.

The Project will include the construction of 298 parking spaces, 42 loading bays that can accommodate a similar number of tractor semi-trailer combinations or trailers without tractors and 51 trailer storage spaces (391 spaces total). This parking supply exceeds the requirements of Section 185-21, *Parking, Loading, and Driveway Requirements*, of the Zoning Bylaws of the Town of Franklin.³

³A minimum of 1.0 parking spaces per 1,000 sf is required for a warehouse.



Figure 1

Site Location Map



STUDY METHODOLOGY

This study was prepared in consultation with the Town of Franklin and MassDOT; was performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports; and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian and bicycle facilities; on-street parking; public transportation services; observations of traffic flow; and collection of pedestrian, bicycle and vehicle counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon was selected for analyses consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in May and June 2021. The field investigation consisted of an inventory of existing roadway geometrics; pedestrian and bicycle facilities; public transportation services; traffic volumes; and operating characteristics; as well as posted speed limits and land use information within the study area. The study area that was assessed for the Project consisted of King Street, and the following specific intersections: King Street at Constitution Boulevard; King Street at the I-495 southbound ramps; King Street at the I-495 northbound ramps; and King Street at Union Street.

The following describes the study area roadway and intersections.

ROADWAY

King Street

- Two-lane urban minor arterial roadway under Town jurisdiction southwest of Constitution Boulevard; four-lane urban minor arterial under MassDOT jurisdiction between Constitution Boulevard and the driveway to 466 King Street (approximately 315 feet southwest of Union Street); two-lane urban minor arterial roadway under Town jurisdiction northeast of the driveway to 466 King Street;
- Traverses study area in a general northeast-southwest direction between Route 140 and Washington Street;
- Provides two 12 to 14-foot wide travel lanes that are separated by a double-yellow centerline with a 2-foot wide marked shoulder provided southwest of Constitution Boulevard;
- Provides four 11 to 14-foot wide travel lanes that are separated by a double-yellow centerline with a 2 to 3-foot wide marked shoulder provided and additional turning lanes at major intersections between Constitution Boulevard and Union Street;
- Provides two 12 to 14-foot wide travel lanes that are separated by a double-yellow centerline with a 2-foot wide marked shoulder provided and additional turning lanes at major intersections northeast of Union Street;

- The posted speed limit is 40 miles per hour (mph) within the study area;
- Sidewalks are provided along both sides of the roadway southwest of Constitution Boulevard; along the south side of the roadway between Constitution Boulevard and Union Street; and along both sides of the roadway northeast of Union Street;
- Illumination is provided by way of streetlights mounted on wood poles; and
- Land use within the study area consists of the Project site, residential and commercial properties, the Franklin Fire Department Station #2, and areas of open and wooded space

INTERSECTIONS

Table 1 and Figure 2 summarize existing lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections as observed in June 2021.

Table 1
STUDY AREA INTERSECTION DESCRIPTION

Intersection	Traffic Control Type^a	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
King St./ Constitution Blvd.	TS	2 general-purpose travel lanes on King St. NEB; 2 left-turn lanes and 1 through lane on King St. SWB; 1 left-turn lane and 2 right-turn lanes on Constitution Blvd.	Yes, 2 feet	Yes, sidewalk along both sides of King St. SW of the intersection, along the south side of King St. NE of the intersection, along the east side of Constitution Blvd.; crosswalks provided across Constitution Blvd. and the King Street southwest leg; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes, shared traveled-way ^b
King St./ I-495 SB Ramps	TS	2 through lanes and 1 channelized right-turn lane on King St. NEB; 1 shared left-turn/through lane and 1 through lane on King St. SWB; 1 left-turn lane and 2 right-turn lanes on the I-495 SB off-ramp	Yes, 2 feet	Yes, sidewalk along the south side of King St.; crosswalk provided across the I-495 SB on-ramp; pedestrian traffic signal equipment and phasing (concurrent) provided	Yes, shared traveled-way along King St.
King St./ I-495 NB Ramps	TS	1 left-turn lane and 1 through lane on King St. NEB; 2 through lanes and 1 channelized right-turn lane on King St. SWB; 2 left-turn lanes and 1 right-turn lane on the I-495 NB off ramp	Yes, 2 to 3 feet	Yes, sidewalk along the south side of King St.; crosswalk provided across the I-495 SB off-ramp; pedestrian traffic signal equipment and phasing (concurrent) provided	Yes, shared traveled-way along King St.

See notes at end of table.

Table 1 (Continued)
STUDY AREA INTERSECTION DESCRIPTION

Intersection	Traffic Control Type ^a	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
King St./ Union St.	TS	1 left-turn lane, 1 through lane, and 1 right-turn lane on King St. NEB; 2 general-purpose travel lanes on King St. SWB; 1 left-turn lane and 1 shared through/right-turn lane on Union St. NWB; 1 shared left-turn/through lane and 1 right-turn lane on Union St. SEB	Yes, 1 to 3 feet	Yes, sidewalk along both sides of King St. NE of the intersection; along the south side of King St. SW of the intersection; along the east side of Union St. SE of the intersection; along the west side of Union St. NW of the intersection; crosswalks provided across all legs; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled-way

^aTS = traffic signal control.

^bCombined shoulder and travel lane width equal to or exceed 14 feet.

NEB = northeastbound; SWB = southwestbound; SEB = southeastbound; NWB = northwestbound; SB = southbound; NB = northbound; SW = southwest; NE = northeast; SE = southeast; NW = northwest.

TRAFFIC VOLUMES

In order to determine existing traffic-volume demands and flow patterns within the study area, automatic traffic recorder (ATR) counts, manual turning movement counts (TMCs) and vehicle classification counts were completed in May 2021. The ATR counts were conducted on May 26th through May 27th, 2021 (Wednesday through Thursday, inclusive) on King Street in the vicinity of the Project site in order to record weekday traffic conditions over an extended period, with weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak-period manual TMCs performed at the study intersections on May 26, 2021 (Wednesday). These time periods were selected for analysis purposes as they are representative of the peak-traffic-volume hours for both the Project and the adjacent roadway network.

Traffic-Volume Adjustments

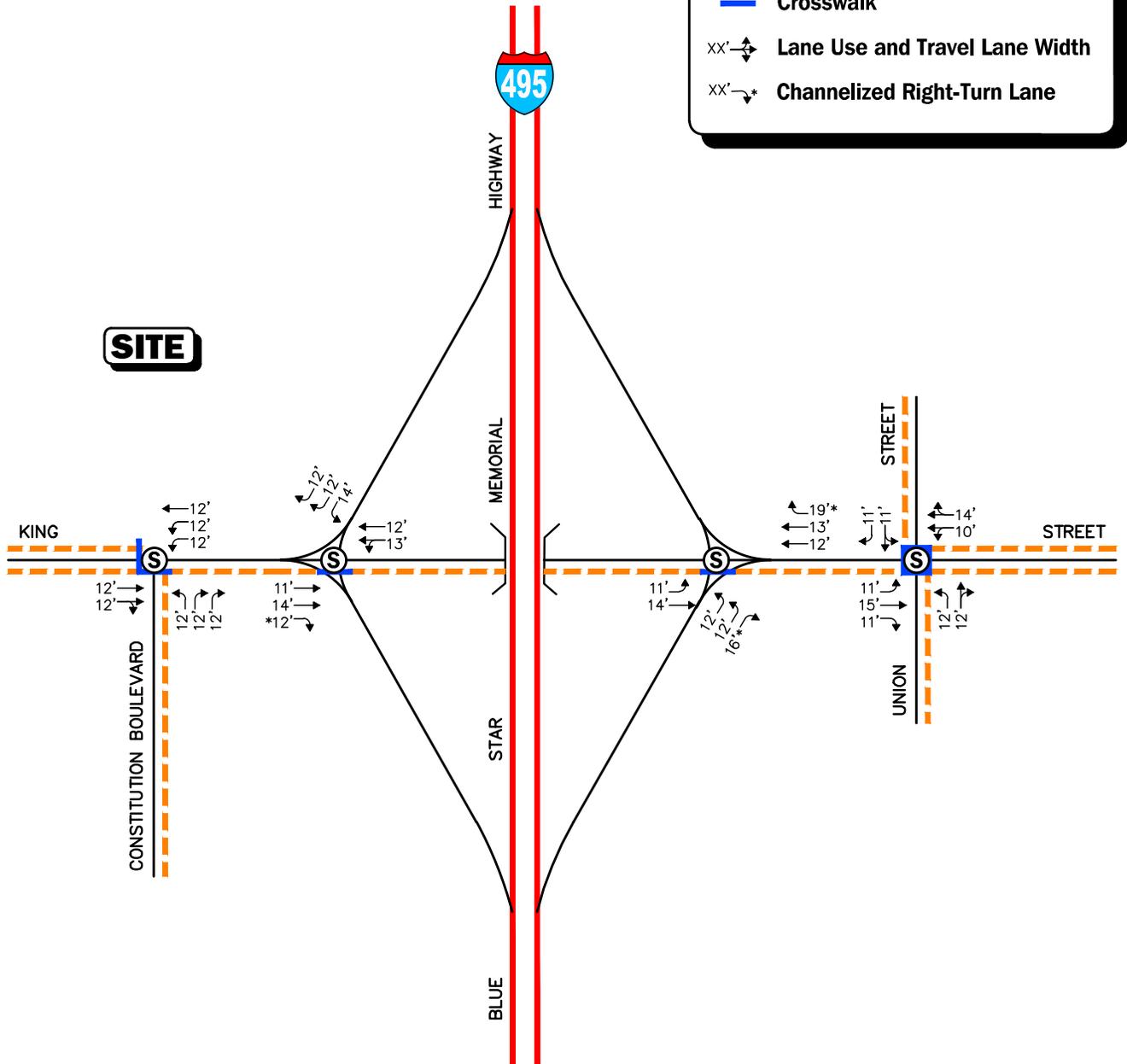
In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, traffic volume data from MassDOT Continuous Count Station No. 6125 located on I-495 in Bellingham were reviewed.⁴ Based on a review of this data it was determined that traffic volumes for the month of May are approximately 1.9 percent *above* average-month conditions. As such, no adjustment was made to the raw traffic count data as the data is representative of traffic-volume conditions that are higher than those under average-month conditions.

In order to account for the impact on traffic volumes and trip patterns resulting from the “safer-at-home” order and the phased “Reopening Massachusetts” plan that was issued by the Governor on May 18, 2020, in response to the COVID-19 pandemic, traffic-volume data collected at MassDOT Continuous Count Station No. 6125 in May 2021 was compared to May 2018 traffic volumes that were collected at the same location. The 2018 traffic volumes were expanded to 2021

⁴MassDOT Traffic Volumes for the Commonwealth of Massachusetts; 2021.

Legend:

-  Signalized Intersection
-  Sidewalk
-  Crosswalk
-  Lane Use and Travel Lane Width
-  Channelized Right-Turn Lane



 Not To Scale



Figure 2

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

by applying the traffic growth procedure detailed in the April 2020 “Guidance on Traffic Counting Data” published by MassDOT in order to allow for a comparison of the data. Based on this pre and post COVID-19 traffic data comparison, the traffic volume data that was collected as a part of this assessment were adjusted upward by 6.1 percent in order to account for the reduced traffic volumes resulting from the phased “Reopening Massachusetts” plan.

The 2021 Existing traffic volumes are summarized in Table 2, with the weekday morning and evening peak-hour traffic volumes graphically depicted on Figures 3 and 4, respectively. Note that the peak-hour traffic volumes presented in Table 2 were obtained from the TMCs and are reflected on the aforementioned figures.

**Table 2
2021 EXISTING TRAFFIC VOLUMES**

Location/Peak Hour	AWT ^a	VPH ^b	K Factor ^c	Directional Distribution ^d
<i>King Street, northeast of Constitution Boulevard:</i>	19,760	--	--	--
Weekday Morning (7:00 – 8:00 AM)	--	1,769	9.0	59.9% NEB
Weekday Evening (4:30 – 5:30 PM)	--	2,028	10.3	56.0% SWB

^aAverage weekday traffic in vehicles per day.

^bVehicles per hour.

^cPercent of daily traffic occurring during the peak hour.

^dPercent traveling in peak direction.

NEB = northeastbound; SWB = southwestbound

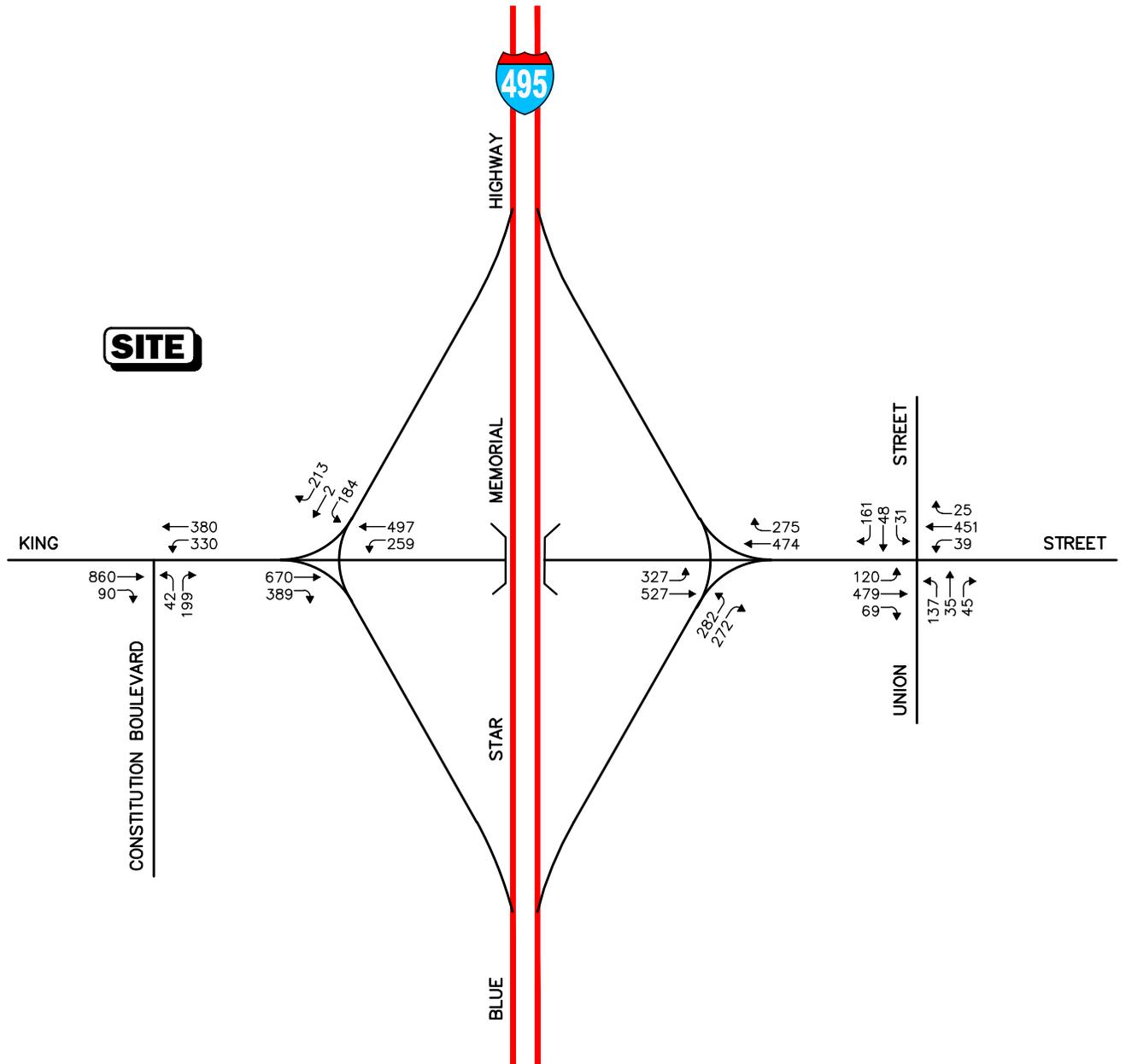
As can be seen in Table 2, King Street in the vicinity of the Project site was found to accommodate approximately 19,760 vehicles on an average weekday (two-way, 24-hour volume), with approximately 1,769 vehicles per hour (vph) during the weekday morning peak hour and 2,028 vph during the weekday evening peak hour.

PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in June 2021. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study area intersections. As detailed on Figure 2, sidewalks are provided along one or both sides of the study area roadways, with marked crosswalks provided across one or more legs of the study area intersections that are included as a part of the traffic signal system at the intersections (i.e., pedestrian traffic signal equipment and phasing are provided).

Formal bicycle facilities are not provided within the study area; however, the study area roadways generally provide sufficient width to accommodate bicycle travel in a shared traveled-way condition (i.e., bicyclists and motor vehicles sharing the traveled-way).⁵

⁵A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared traveled-way condition.

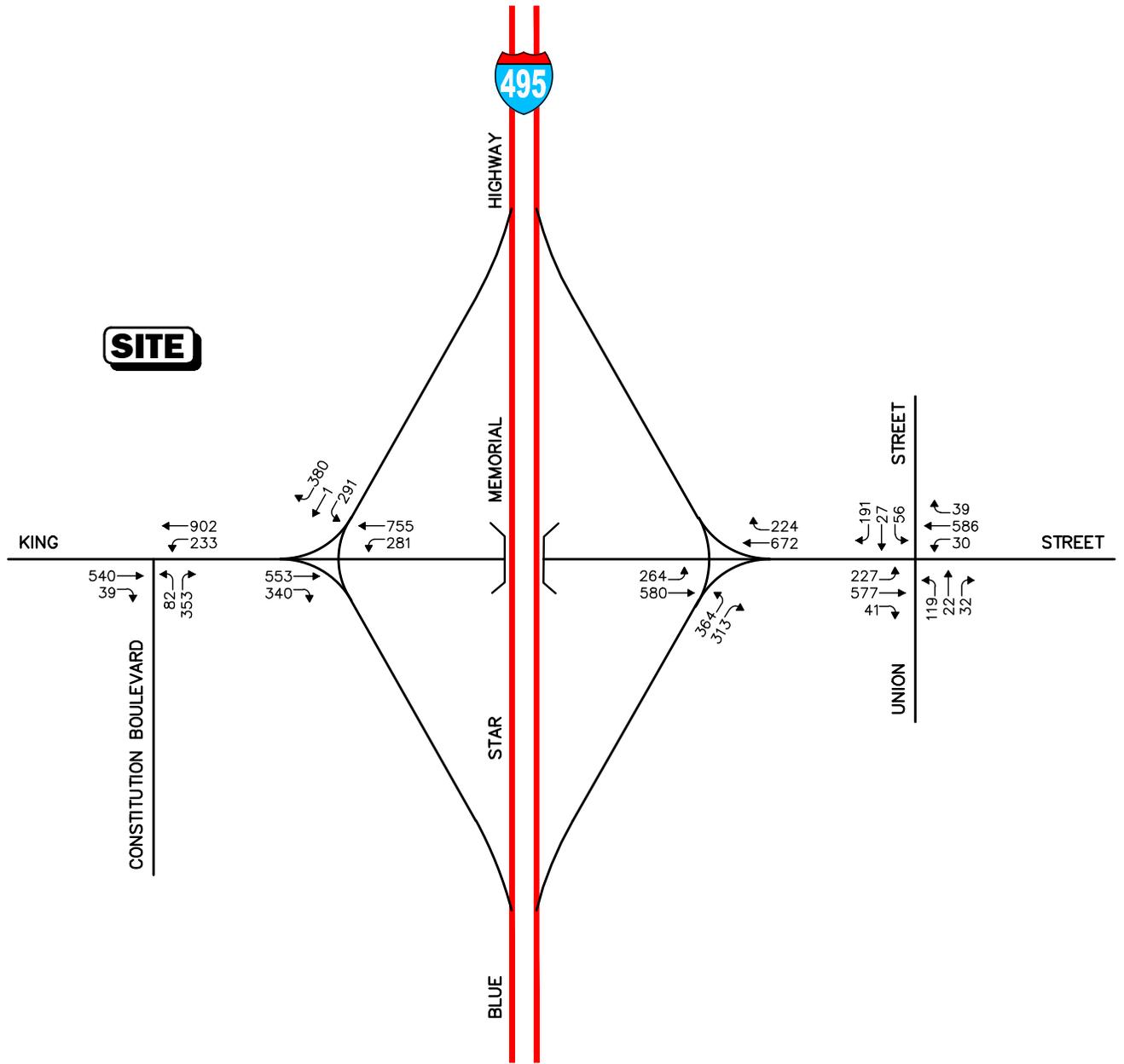


 Not To Scale



Figure 3
2021 Existing
Weekday Morning
Peak-Hour Traffic Volumes

R:\8863\8863NT1.dwg, 8/17/2021 8:13:46 AM



Not To Scale



Figure 4

2021 Existing Weekday Evening Peak-Hour Traffic Volumes

PUBLIC TRANSPORTATION

Regularly scheduled, fixed-route, public transportation services are not currently provided within the study area or to the Project site. The Greater Attleboro-Taunton Regional Transit Authority (GATRA) operates an on-demand microtransit service which allows transit riders to request a vehicle to pick them up for same-day service within the Town of Franklin through the GATRA GO United program. Additionally, GATRA provides Dial-a-Ride paratransit services to eligible persons residing within the Town of Franklin who cannot use fixed-route transit all or some of the time due to a physical, cognitive, or mental disability in compliance with the Americans with Disabilities Act (ADA).

SPOT SPEED MEASUREMENTS

Vehicle travel speed measurements were performed on King Street in the vicinity of the Project site in conjunction with the ATR counts. Table 3 summarizes the vehicle travel speed measurements.

Table 3
VEHICLE TRAVEL SPEED MEASUREMENTS

	King Street	
	Northeastbound	Southwestbound
Mean Travel Speed (mph)	26	22
85 th Percentile Speed (mph)	32	36
Posted Speed Limit (mph)	40	40

mph = miles per hour.

As can be seen in Table 3, the mean vehicle travel speed along King Street in the vicinity of the Project site was found to be 26 mph in the northeastbound direction and 22 mph southwestbound. The measured 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be 32 mph in the northeastbound direction and 36 mph southwestbound, which is 4 to 8 mph below the posted speed limit in the vicinity of the Project site (40 mph). The 85th percentile speed is used as the basis of engineering design and in the evaluation of sight distances, and is often used in establishing posted speed limits.

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2014 through 2018, inclusive) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, and is presented in Table 4.

Table 4
MOTOR VEHICLE CRASH DATA SUMMARY^a

	King St./ Constitution Blvd.	King St./ I-495 SB Ramps	King St./ I-495 NB Ramps	King St./ Union St.
Traffic Control Type: ^b	TS	TS	TS	TS
<i>Year:</i>				
2014	6	3	5	1
2015	3	8	4	4
2016	8	4	3	1
2017	3	8	10	2
<u>2018</u>	<u>4</u>	<u>7</u>	<u>1</u>	<u>3</u>
Total	24	30	23	11
Average	4.80	6.00	4.60	2.20
Rate ^c	0.55	0.57	0.47	0.28
MassDOT Crash Rate: ^d	0.78/0.89	0.78/0.89	0.78/0.89	0.78/0.89
Significant? ^e	No	No	No	No
<i>Type:</i>				
Angle	7	14	9	5
Rear-End	13	7	11	3
Head-On	1	1	0	1
Sideswipe	2	7	1	2
Fixed Object	0	1	2	0
Pedestrian/Bicycle	0	0	0	0
<u>Unknown/Other</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	24	30	23	11
<i>Conditions:</i>				
Clear	14	19	19	8
Cloudy	5	9	1	1
Rain	3	1	1	2
<u>Snow/Ice</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>0</u>
Total	24	30	23	11
<i>Lighting:</i>				
Daylight	19	23	15	4
Dawn/Dusk	1	2	3	0
Dark (Road Lit)	4	5	5	7
<u>Dark (Road Unlit)</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	24	30	23	11
<i>Day of Week:</i>				
Monday through Friday	18	27	20	10
Saturday	5	2	1	1
<u>Sunday</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>0</u>
Total	24	30	23	11
<i>Severity:</i>				
Property Damage Only	14	23	20	8
Personal Injury	9	7	2	1
Fatality	0	0	0	0
<u>Not Reported</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>2</u>
Total	24	30	23	11

^aSource: MassDOT Safety Management/Traffic Operations Unit records, 2014 through 2018.

^bTraffic Control Type: TS = traffic signal.

^cCrash rate per million vehicles entering the intersection.

^dStatewide/District crash rate.

^eThe intersection crash rate is significant if it is found to exceed the MassDOT crash rate for the MassDOT Highway Division District in which the Project is located (District 3).

As can be seen in Table 4, the study area intersections experienced an average of approximately six (6) or fewer reported motor vehicle crashes over the five-year review period and were found to have motor vehicle crash rates below both the MassDOT statewide and District averages for a signalized intersection for the MassDOT Highway Division District in which the intersections are located (District 3). The majority of the crashes were reported to have occurred on a weekday; under clear weather conditions; during daylight; and were reported as angle or rear-end type collisions that resulted in property damage only.

A review of the MassDOT statewide High Crash Location List indicated that there are no locations within the study area that are included on MassDOT's Highway Safety Improvement Program (HSIP) listing as a high crash location. In addition, no fatal motor vehicle crashes were reported to have occurred at the study area intersections over the five-year review period.

Based on a review of the MassDOT motor vehicle crash data, no discernable safety deficiencies were apparent in the vicinity of the Project site.

The detailed MassDOT Crash Rate Worksheets are provided in the Appendix.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2028, which reflects a seven-year planning horizon consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. Independent of the Project, traffic volumes on the roadway network in the year 2028 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2028 No-Build traffic volumes reflect 2028 Build traffic-volume conditions with the Project.

FUTURE TRAFFIC GROWTH

Future traffic growth is a function of the expected land development in the immediate area and the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This procedure produces a more realistic estimate of growth for local traffic; however, potential population growth and development external to the study area would not be accounted for in the resulting traffic projections.

To provide a conservative analysis framework, both procedures were used, the salient components of which are described below.

Specific Development by Others

The Town of Franklin Planning Department was consulted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on this consultation, no developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

General Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count stations located in Franklin were reviewed in order to determine general traffic growth trends in the area. This data indicates that traffic volumes have fluctuated over the 10-year period between 2009 and 2019, with an average traffic growth rate of 0.57 percent per year. In order to provide a prudent planning condition for the Project, a 1.0 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

Roadway Improvement Projects

The Town of Franklin and MassDOT were contacted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2028 within the study area. Based on these discussions, no roadway improvement projects aside from routine maintenance activities were identified to be planned within the study area at this time.

No-Build Traffic Volumes

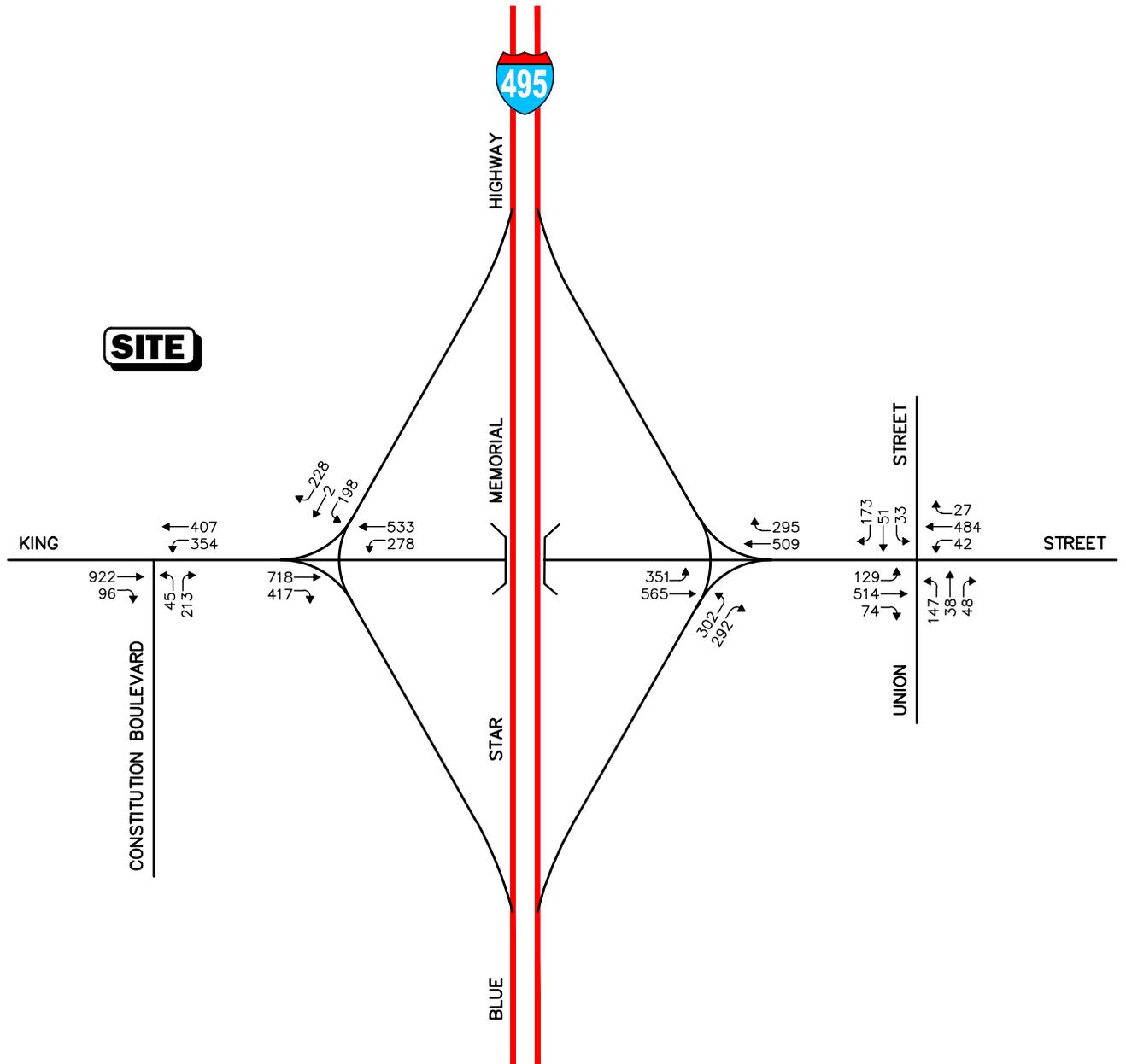
The 2028 No-Build condition peak-hour traffic-volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2021 Existing peak-hour traffic volumes. The resulting 2028 No-Build weekday morning and evening peak-hour traffic volumes are shown on Figures 5 and 6, respectively.

PROJECT-GENERATED TRAFFIC

Design year (2028 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. The following sections describe the methodology used to develop the anticipated traffic characteristics of the Project.

As proposed, the Project will entail the construction of a 293,600 sf warehouse building. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)⁶ for a similar land use as that proposed were used. ITE Land Use Code (LUC) 150, *Warehousing*, was used to develop the traffic characteristics of the Project, the results of which are summarized in Table 5.

⁶Ibid 1.

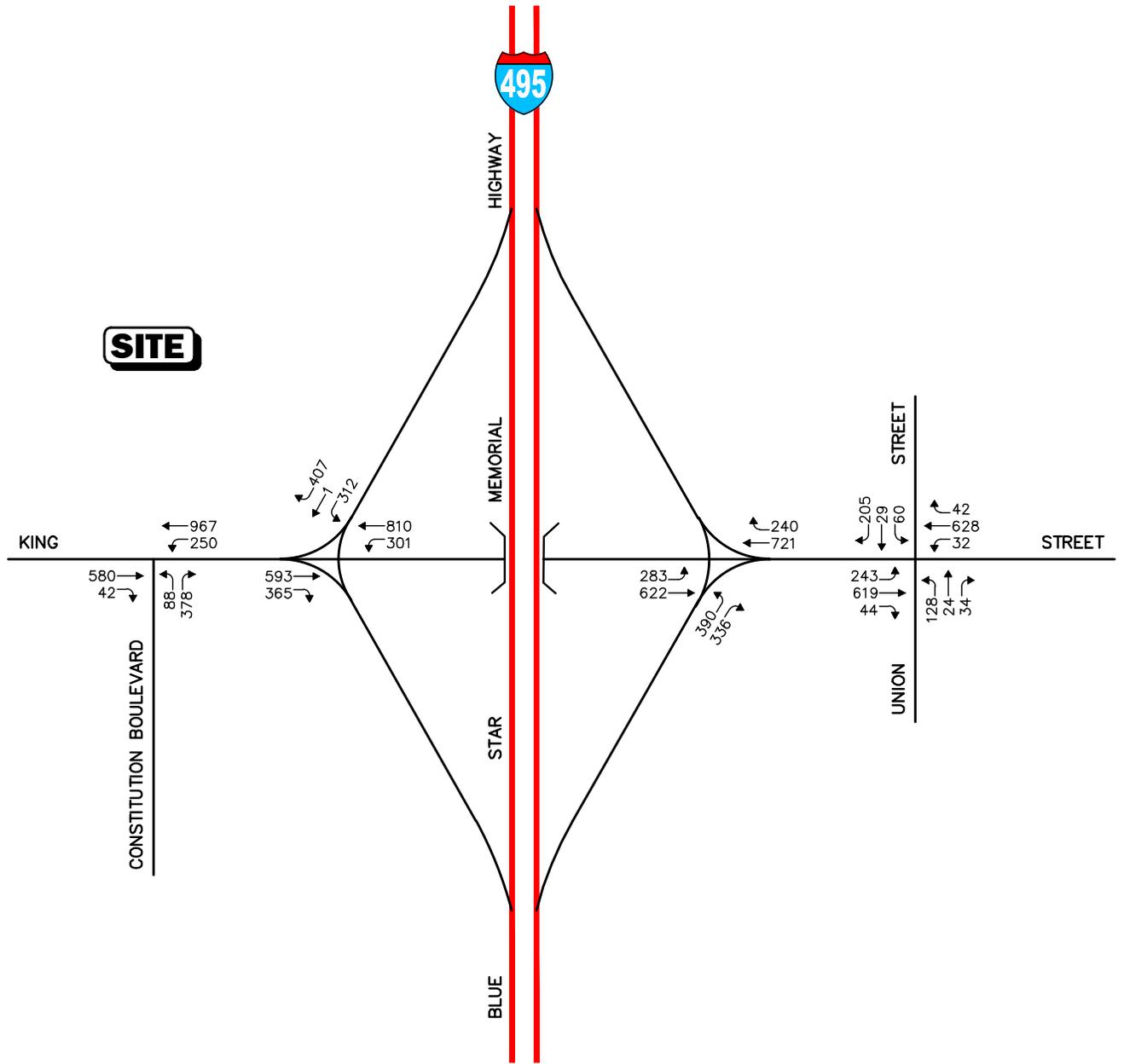


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Figure 5
2028 No-Build
Weekday Morning
Peak-Hour Traffic Volumes

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Figure 6
2028 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

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Table 5
TRIP-GENERATION SUMMARY^a

Time Period/Direction	(A) Passenger Car Trips	(B) Truck Trips	(A+B) Vehicle Trips
<i>Average Weekday Daily:</i>			
Entering	167	88	255
<u>Exiting</u>	<u>167</u>	<u>88</u>	<u>255</u>
Total	334	176	510
<i>Weekday Morning Peak Hour:</i>			
Entering	44	3	47
<u>Exiting</u>	<u>11</u>	<u>3</u>	<u>14</u>
Total	55	6	61
<i>Weekday Evening Peak Hour:</i>			
Entering	12	5	17
<u>Exiting</u>	<u>42</u>	<u>4</u>	<u>46</u>
Total	54	9	63

^aBased on ITE LUC 150, *Warehousing* (293,600 sf).

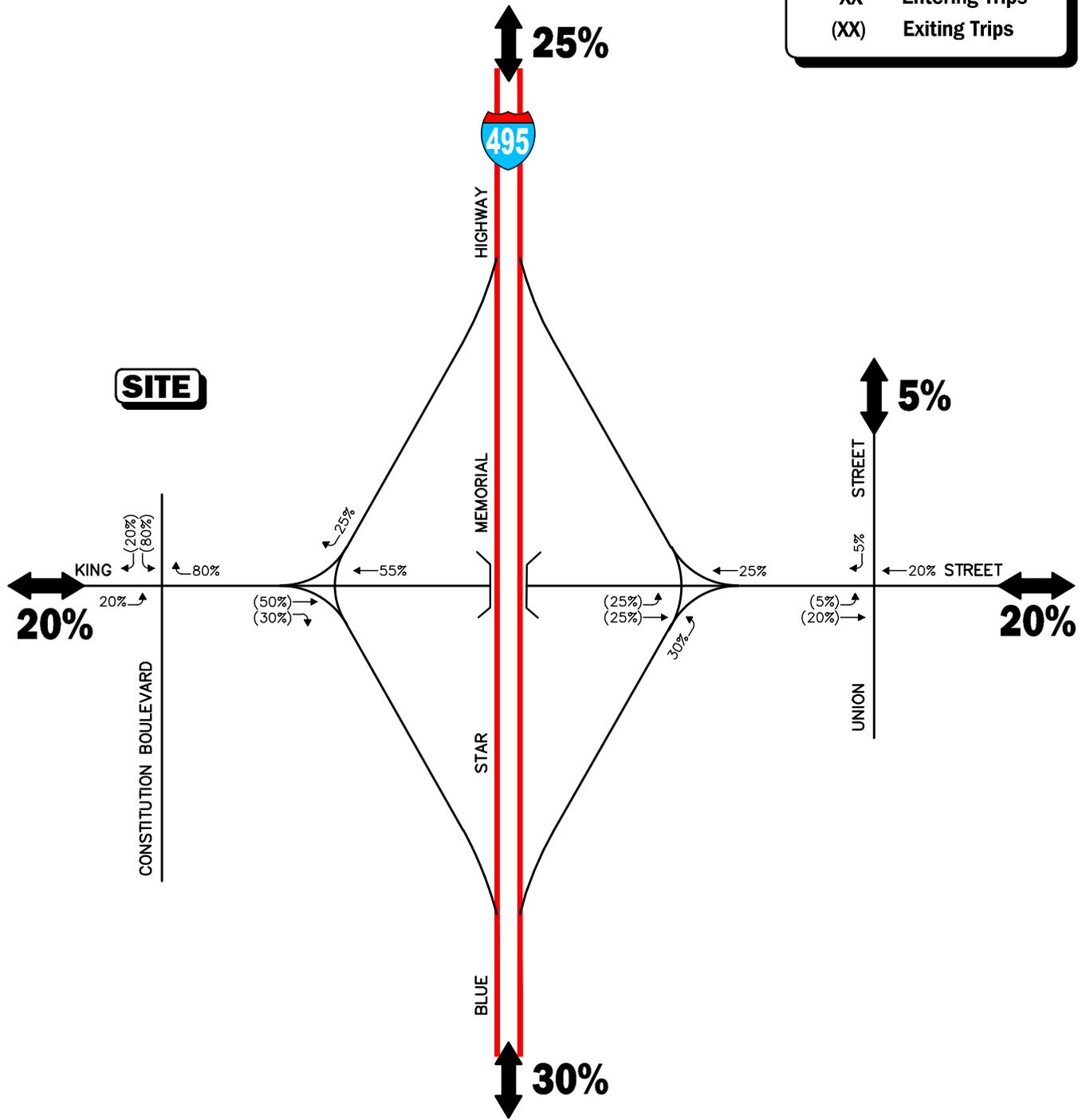
Project-Generated Traffic-Volume Summary

As can be seen in Table 5, the Project is expected to generate 510 vehicle trips on an average weekday (two-way volume over the operational day of the Project, or 255 vehicles entering and 255 exiting), consisting of 334 passenger car trips and 176 truck trips. During the weekday morning peak-hour, the Project is expected to generate 61 vehicle trips (47 vehicles entering and 14 exiting), consisting of 55 passenger car trips and 6 truck trips. During the weekday evening peak-hour, the Project is expected to generate 63 vehicle trips (17 vehicles entering and 45 exiting), consisting of 54 passenger car trips and 9 truck trips.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of generated trips to and from the Project site was developed based on a review of existing traffic patterns within the study area and the location of connections to the Interstate Highway System (IHS) given the trucking-dependent nature of the proposed use. The general trip distribution for the Project is graphically depicted on Figure 7. The additional traffic expected to be generated by the Project was assigned on the study area roadway network as shown on Figures 8 and 9 for the weekday morning and evening peak hours, respectively.

Legend:
 XX Entering Trips
 (XX) Exiting Trips



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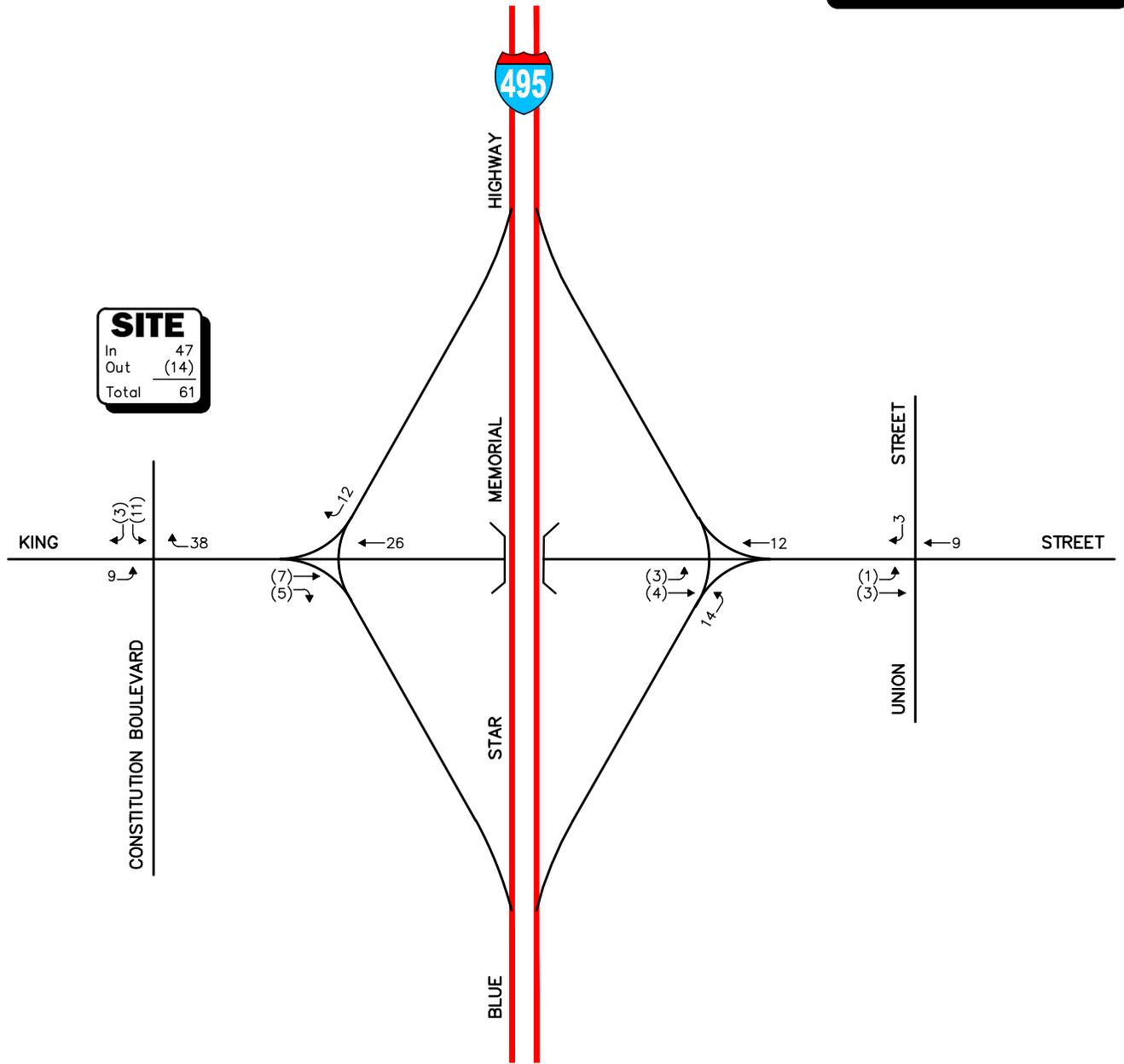
Figure 7
 Trip Distribution Map



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Legend:

- XX Entering Trips
- (XX) Exiting Trips



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Figure 8

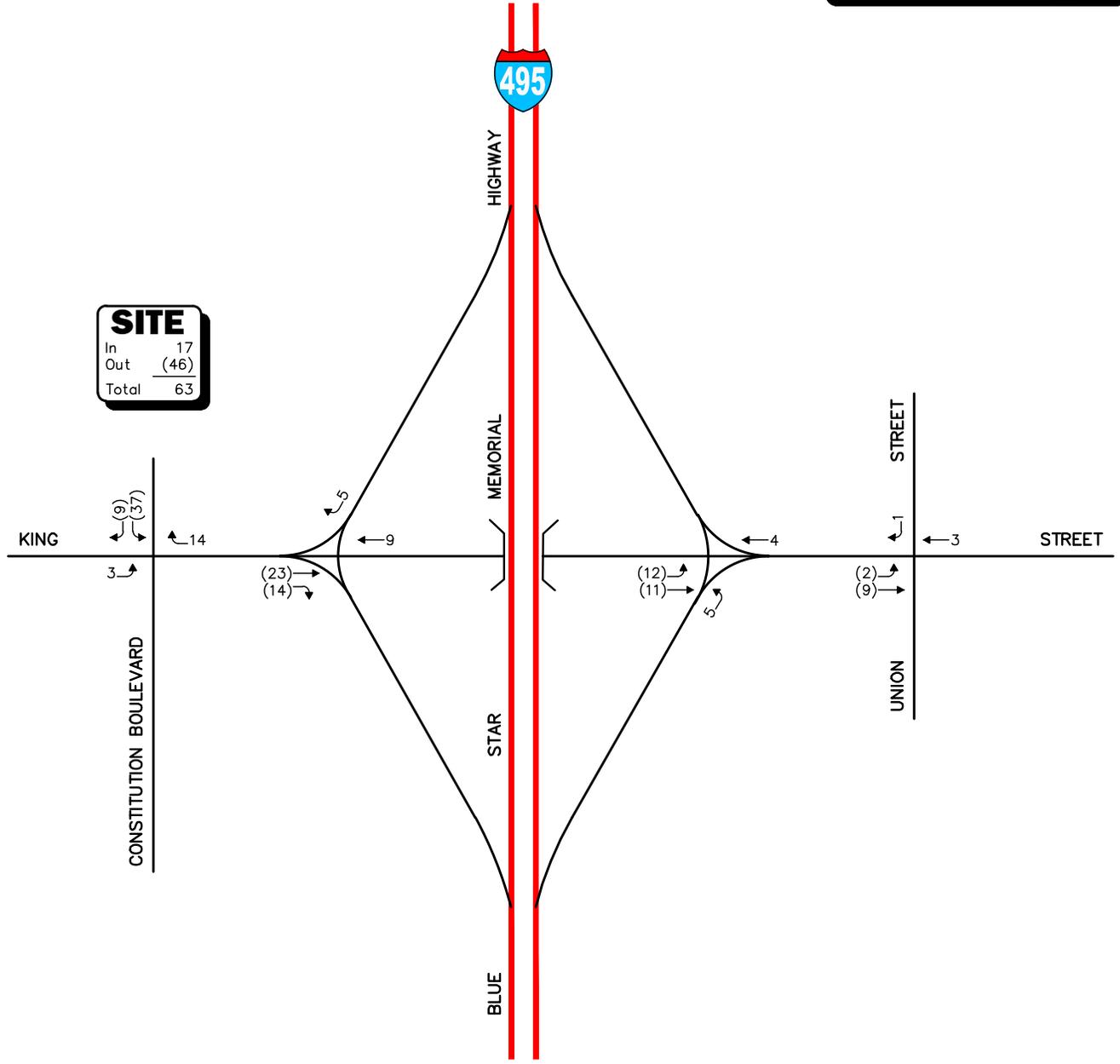


**Project-Generated
Weekday Morning
Peak-Hour Traffic Volumes**

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Legend:

- XX Entering Trips
- (XX) Exiting Trips



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Figure 9



**Project-Generated
Weekday Evening
Peak-Hour Traffic Volumes**

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FUTURE TRAFFIC VOLUMES - BUILD CONDITION

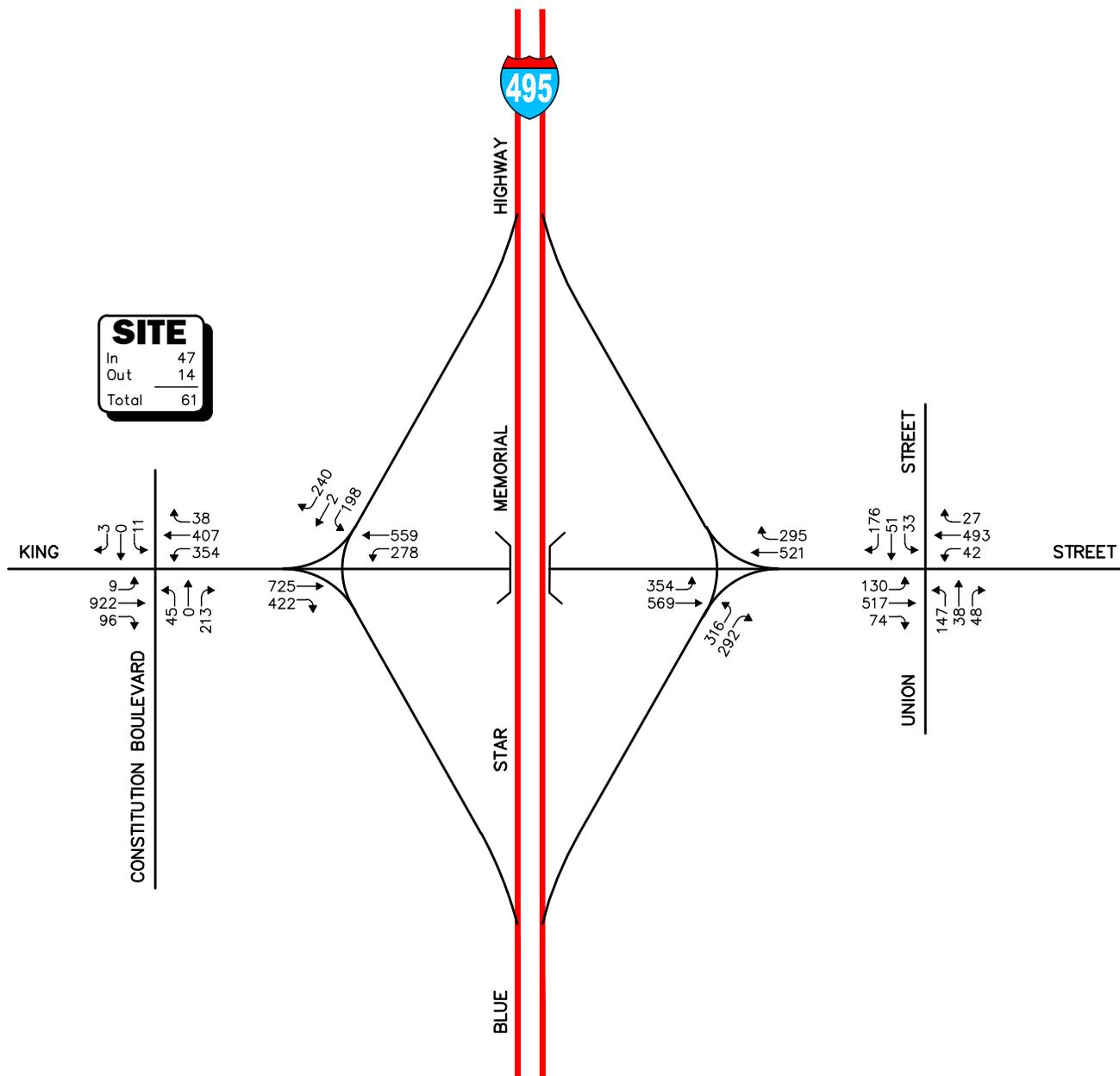
The 2028 Build condition traffic volumes consist of the 2028 No-Build traffic volumes with the additional traffic expected to be generated by the Project added to them. The 2028 Build weekday morning and evening peak-hour traffic volumes are graphically depicted on Figures 10 and 11, respectively.

A summary of peak-hour projected traffic-volume changes outside of the study area that is the subject of this assessment is shown in Table 6. These changes are a result of the construction of the Project.

**Table 6
PEAK-HOUR TRAFFIC-VOLUME INCREASES**

Location/Peak Hour	2021 Existing	2028 No-Build	2028 Build	Traffic-Volume Increase Over No-Build	Percent Increase Over No-Build
<i>King Street, northeast of Union Street:</i>					
Weekday Morning	1,071	1,148	1,160	12	1.0
Weekday Evening	1,320	1,415	1,427	12	0.8
<i>King Street, southwest of Constitution Boulevard:</i>					
Weekday Morning	1,372	1,470	1,482	12	0.8
Weekday Evening	1,563	1,677	1,689	12	0.7
<i>Union Street, northwest of King Street:</i>					
Weekday Morning	420	451	455	4	0.9
Weekday Evening	562	603	606	3	0.5
<i>I-495 northbound on-ramp:</i>					
Weekday Morning	602	646	649	3	0.5
Weekday Evening	488	523	535	12	2.3
<i>I-495 northbound off-ramp:</i>					
Weekday Morning	554	594	608	14	2.4
Weekday Evening	677	726	731	5	0.7
<i>I-495 southbound on-ramp:</i>					
Weekday Morning	650	697	701	4	0.6
Weekday Evening	622	667	681	14	2.1
<i>I-495 southbound off-ramp:</i>					
Weekday Morning	399	428	440	12	2.8
Weekday Evening	672	720	725	5	0.7

As shown in Table 6, Project-related traffic-volume increases outside of the study area relative to 2028 No-Build conditions are anticipated to range from 0.5 to 2.8 percent during the peak periods, with vehicle increases shown to range from 3 to 14 vehicles. ***When distributed over the peak hour, the predicted traffic volume increases would not result in a material impact (increase) on motorist delays or vehicle queuing outside of the immediate study area that is the subject of this assessment.***

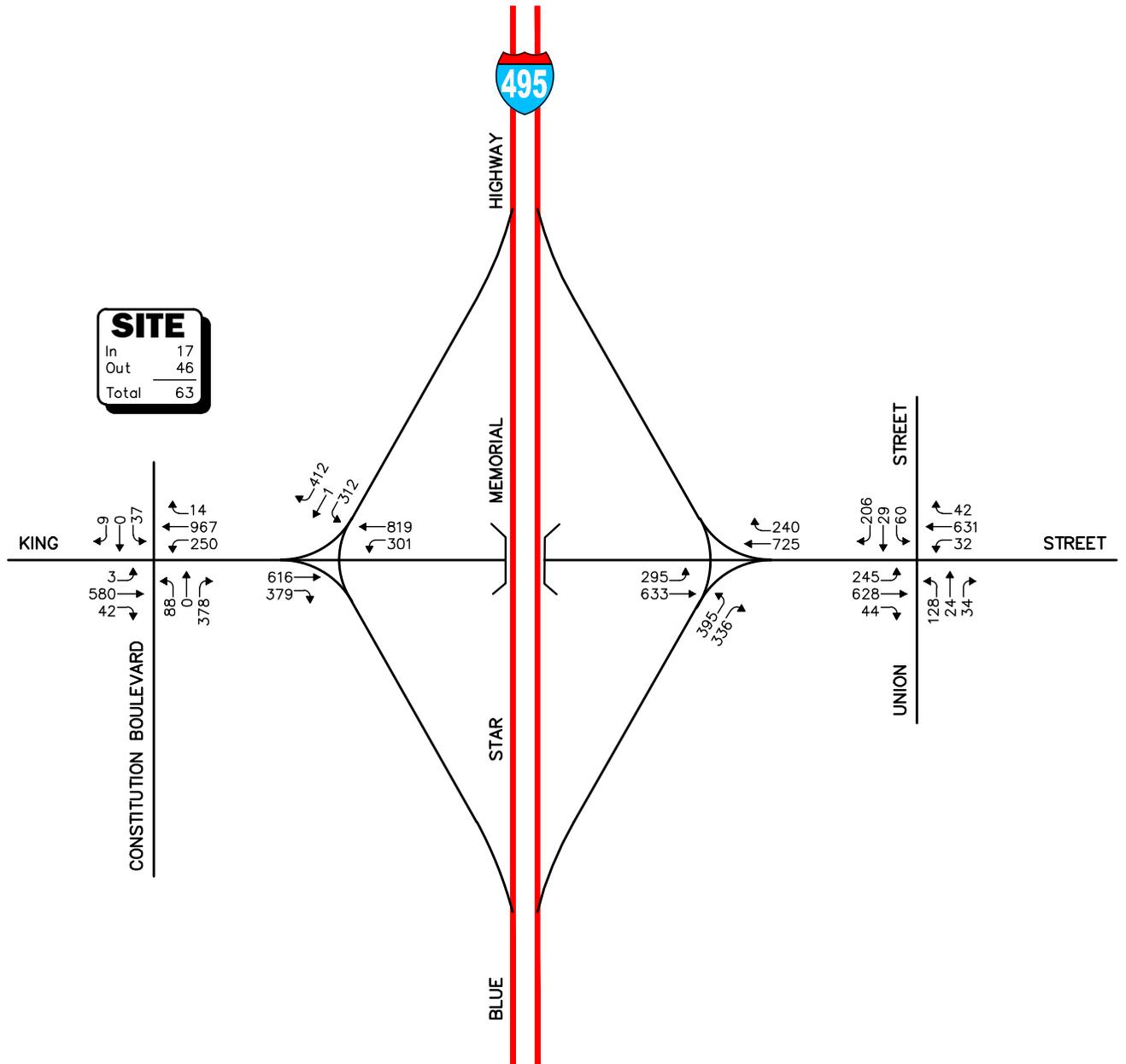


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Figure 10
2028 Build
Weekday Morning
Peak-Hour Traffic Volumes

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Figure 11

**2028 Build
Weekday Evening
Peak-Hour Traffic Volumes**

TRAFFIC OPERATIONS ANALYSIS

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity and vehicle queue analyses were conducted under Existing, No-Build, and Build traffic-volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.⁷ The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best operating conditions and LOS F representing congested or constrained operating conditions.

Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

⁷The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

Signalized Intersections

The six levels of service for signalized intersections may be described as follows:

- *LOS A* describes operations with very low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than *LOS A*.
- *LOS C* describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with oversaturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of service for signalized intersections are calculated using the operational analysis methodology of the 2000 *Highway Capacity Manual*⁸ and implemented as a part of the Synchro® 10 software as recommended by MassDOT. This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. Level-of-service designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. Table 7 summarizes the relationship between level of service and control delay. The tabulated control delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

⁸*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000.

Table 7
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS^a

Level of Service	Control (Signal) Delay per Vehicle (Seconds)
A	≤10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

^aSource: *Highway Capacity Manual*, Transportation Research Board; Washington, DC; 2000; page 16-2.

Vehicle Queue Analysis

Vehicle queue analyses are a direct measurement of an intersection’s ability to process vehicles under various traffic control and volume scenarios and lane use arrangements. The vehicle queue analysis was performed using the Synchro® intersection capacity analysis software which is based upon the methodology and procedures presented in the 2010 *Highway Capacity Manual*.⁹ The Synchro® vehicle queue analysis methodology is a simulation based model which reports the number of vehicles that experience a delay of 6 seconds or more at an intersection. For signalized intersections, Synchro® reports both the average (50th percentile) the 95th percentile vehicle queue. For unsignalized intersections, Synchro® reports the 95th percentile vehicle queue. Vehicle queue lengths are a function of the capacity of the movement under study and the volume of traffic being processed by the intersection during the analysis period. The 95th percentile vehicle queue is the vehicle queue length that will be exceeded only 5 percent of the time, or approximately 3 minutes out of 60 minutes during the peak one hour of the day (during the remaining 57 minutes, the vehicle queue length will be less than the 95th percentile queue length).

ANALYSIS RESULTS

Level-of-service and vehicle queue analyses were conducted for 2021 Existing, 2028 No-Build, and 2028 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Table 8, with the detailed analysis results presented in the Appendix.

The following is a summary of the level-of-service and vehicle queue analyses for the intersections within the study area. For context, we note that an LOS of “D” or better is generally defined as “acceptable” operating conditions. Project-related impacts at the study area intersections were identified as follows:

King Street at Constitution Boulevard. No change in level of service is predicted to occur for any movement over No-Build conditions, with Project-related impacts defined as an increase in overall

⁹*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

average motorist delay of up to 3.6 seconds and in vehicle queuing of up to four (4) vehicles. All movements exiting the Project site are predicted to operate at LOS D during both the weekday morning and evening peak hours with vehicle queues of up to three (3) vehicles predicted.

King Street at I-495 Southbound Ramps. No change in overall level of service is predicted to occur over No-Build conditions, with Project-related impacts defined as an increase in overall average motorist delay of less than 1.0 seconds and in vehicle queuing of up to one (1) vehicle.

King Street at I-495 Northbound Ramps. No change in overall level of service is predicted to occur over No-Build conditions, with Project-related impacts defined as an increase in overall average motorist delay of less than 1.0 seconds and in vehicle queuing of up to one (1) vehicle.

King Street at Union Street. No change in level of service is predicted to occur for any movement over No-Build conditions, with Project-related impacts defined as an increase in overall average motorist delay of less than 1.0 seconds and in vehicle queuing of up to one (1) vehicle.

Table 8
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-hour/Movement	2021 Existing				2028 No-Build				2028 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th
King Street at Constitution Boulevard												
<i>Weekday Morning:</i>												
King Street EB LT/TH/RT	--	--	--	--	--	--	--	--	0.56	15.1	B	7/14
King Street EB TH/RT	0.43	9.2	A	6/10	0.48	10.6	B	7/10	--	--	--	--
King Street WB LT	0.46	6.8	A	1/2	0.50	10.5	B	2/2	0.52	13.8	B	2/3
King Street WB TH	0.32	3.3	A	2/5	0.34	3.5	A	3/5	0.37	6.4	A	3/8
King Street WB RT	--	--	--	--	--	--	--	--	0.03	3.5	A	0/0
Constitution Boulevard NB LT	0.24	41.6	D	1/3	0.26	41.8	D	1/3	--	--	--	--
Constitution Boulevard NB LT/TH	--	--	--	--	--	--	--	--	0.39	44.9	D	1/3
Constitution Boulevard NB RT	0.19	28.2	C	2/3	0.22	28.2	C	2/3	0.22	28.2	C	2/3
Project Site Driveway SB LT	--	--	--	--	--	--	--	--	0.14	46.4	D	1/1
Project Site Driveway SB TH/RT	--	--	--	--	--	--	--	--	0.00	45.3	D	0/0
Overall	--	10.0	A	--	--	11.2	B	--	--	14.8	B	--
<i>Weekday Evening:</i>												
King Street EB LT/TH/RT	--	--	--	--	--	--	--	--	0.38	14.3	B	6/8
King Street EB TH/RT	0.28	8.2	A	3/6	0.31	9.0	A	4/7	--	--	--	--
King Street WB LT	0.23	2.8	A	0/2	0.26	2.9	A	1/2	0.30	5.6	A	1/2
King Street WB TH	0.64	6.4	A	2/27	0.70	7.1	A	3/28	0.79	9.8	A	5/28
King Street WB RT	--	--	--	--	--	--	--	--	0.01	5.6	A	0/0
Constitution Boulevard NB LT	0.45	41.1	D	3/4	0.45	41.1	D	3/4	--	--	--	--
Constitution Boulevard NB LT/TH	--	--	--	--	--	--	--	--	0.63	48.4	D	3/5
Constitution Boulevard NB RT	0.33	28.9	C	2/3	0.39	28.9	C	3/3	0.39	28.9	C	3/3
Project Site Driveway SB LT	--	--	--	--	--	--	--	--	0.36	46.9	D	1/3
Project Site Driveway SB TH/RT	--	--	--	--	--	--	--	--	0.01	43.9	D	0/0
Overall	--	12.3	B	--	--	12.7	B	--	--	16.2	B	--
King Street at the I-495 Southbound Ramps												
<i>Weekday Morning:</i>												
King Street EB TH	0.27	1.7	A	1/1	0.29	2.0	A	1/1	0.29	2.0	A	1/2
King Street EB RT	0.26	0.4	A	0/0	0.28	0.4	A	0/0	0.29	0.4	A	0/0
King Street WB LT/TH	0.53	8.0	A	6/6	0.59	9.1	A	6/6	0.61	9.2	A	6/7
I-495 SB Off-Ramp SB LT/TH	0.61	39.3	D	6/7	0.65	40.5	D	6/8	0.65	40.5	D	6/8
I-495 SB Off-Ramp SB RT	0.10	32.6	C	0/1	0.10	32.6	C	0/1	0.11	32.6	C	0/1
Overall	--	10.4	B	--	--	11.0	B	--	--	11.0	B	--
<i>Weekday Evening:</i>												
King Street EB TH	0.23	5.0	A	3/4	0.25	5.9	A	3/5	0.25	5.9	A	3/5
King Street EB RT	0.23	0.3	A	0/0	0.25	0.4	A	0/0	0.26	0.4	A	0/0
King Street WB LT/TH	0.70	11.1	B	6/7	0.77	13.7	B	8/16	0.79	14.4	B	8/16
I-495 SB Off-Ramp SB LT/TH	0.72	41.5	D	7/11	0.75	42.7	D	8/12	0.75	42.7	D	8/12
I-495 SB Off-Ramp SB RT	0.14	31.2	C	0/2	0.23	31.5	C	1/3	0.25	31.7	C	1/3
Overall	--	14.6	B	--	--	16.0	B	--	--	16.0	B	--

See notes at end of table.

Table 8 (Continued)
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-hour/Movement	2021 Existing				2028 No-Build				2028 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th
King Street at the I-495 Northbound Ramps												
<i>Weekday Morning:</i>												
King Street EB LT	0.54	6.4	A	3/4	0.61	8.1	A	3/4	0.62	8.8	A	3/4
King Street EB TH	0.39	4.5	A	5/6	0.43	4.8	A	5/7	0.43	4.8	A	5/7
King Street WB TH	0.27	7.5	A	3/4	0.30	7.9	A	3/6	0.31	8.7	A	4/7
King Street WB RT	0.18	0.2	A	0/0	0.19	0.2	A	0/0	0.19	0.2	A	0/0
I-495 NB Off-Ramp NB LT	0.57	39.4	D	4/6	0.57	39.4	D	4/6	0.58	39.4	D	5/6
I-495 NB Off-Ramp NB RT	0.17	0.2	A	0/0	0.19	0.2	A	0/0	0.19	0.2	A	0/0
Overall	--	9.0	A	--	--	9.3	A	--	--	9.5	A	--
<i>Weekday Evening:</i>												
King Street EB LT	0.57	10.1	B	2/4	0.64	14.9	B	2/4	0.67	15.7	B	3/5
King Street EB TH	0.48	8.5	A	8/12	0.52	9.2	A	5/10	0.54	9.4	A	9/10
King Street WB TH	0.40	9.3	A	2/8	0.45	12.2	B	5/11	0.46	12.9	B	6/11
King Street WB RT	0.13	0.1	A	0/0	0.14	0.1	A	0/0	0.14	0.1	A	0/0
I-495 NB Off-Ramp NB LT	0.51	34.1	C	5/7	0.51	32.9	C	5/7	0.51	32.9	C	5/7
I-495 NB Off-Ramp NB RT	0.19	0.2	A	0/0	0.20	0.2	A	0/0	0.20	0.2	A	0/0
Overall	--	10.9	B	--	--	12.2	B	--	--	12.6	B	--
King Street at Union Street												
<i>Weekday Morning:</i>												
King Street EB LT	0.52	49.0	D	4/6	0.54	49.0	D	4/6	0.54	49.0	D	4/7
King Street EB TH	0.41	8.3	A	5/8	0.46	9.9	A	6/9	0.46	12.2	A	6/11
King Street EB RT	0.05	7.0	A	0/0	0.05	7.7	A	0/0	0.05	7.7	A	0/1
King Street WB LT/TH/RT	0.40	19.1	B	5/8	0.46	21.1	C	6/9	0.47	21.2	C	6/9
Union Street NB LT	0.40	28.7	C	3/5	0.41	28.7	C	3/6	0.41	28.7	C	3/6
Union Street NB TH/RT	0.11	26.4	C	1/2	0.11	26.4	C	1/2	0.11	26.4	C	1/3
Union Street SB LT/TH	0.57	46.5	D	3/4	0.53	46.5	D	3/5	0.53	46.5	D	3/5
Union Street SB RT	0.11	28.2	C	0/2	0.12	26.9	C	0/2	0.12	26.9	C	0/2
Overall	--	21.2	C	--	--	21.8	C	--	--	22.3	C	--
<i>Weekday Evening:</i>												
King Street EB LT	0.68	46.4	D	7/10	0.75	46.4	D	8/11	0.75	46.4	D	8/11
King Street EB TH	0.48	9.9	A	7/10	0.57	12.0	B	10/12	0.57	12.2	B	10/12
King Street EB RT	0.03	6.3	A	0/0	0.03	6.3	A	0/0	0.03	6.3	A	0/0
King Street WB LT/TH/RT	0.57	24.5	C	8/11	0.70	25.8	C	9/12	0.70	25.8	C	9/12
Union Street NB LT	0.37	29.5	C	3/5	0.41	30.0	C	3/5	0.41	30.1	C	3/5
Union Street NB TH/RT	0.07	27.2	C	1/2	0.07	27.4	C	1/2	0.08	27.5	C	1/2
Union Street SB LT/TH	0.59	48.0	D	2/6	0.58	52.6	D	3/6	0.66	53.2	D	3/6
Union Street SB RT	0.13	23.7	C	0/2	0.15	23.9	C	1/3	0.18	23.9	C	1/3
Overall	--	23.5	C	--	--	24.8	C	--	--	24.8	C	--

^aVolume-to-capacity ratio.

^bControl (signal) delay per vehicle in seconds.

^cLevel of service.

^dQueue length in vehicles.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the Project site driveway intersection with King Street in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)¹⁰ requirements. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, if the measured ISD is at least equal to the required SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 9 presents the measured SSD and ISD at the subject intersection.

¹⁰*A Policy on Geometric Design of Highway and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.

Table 9
SIGHT DISTANCE MEASUREMENTS^a

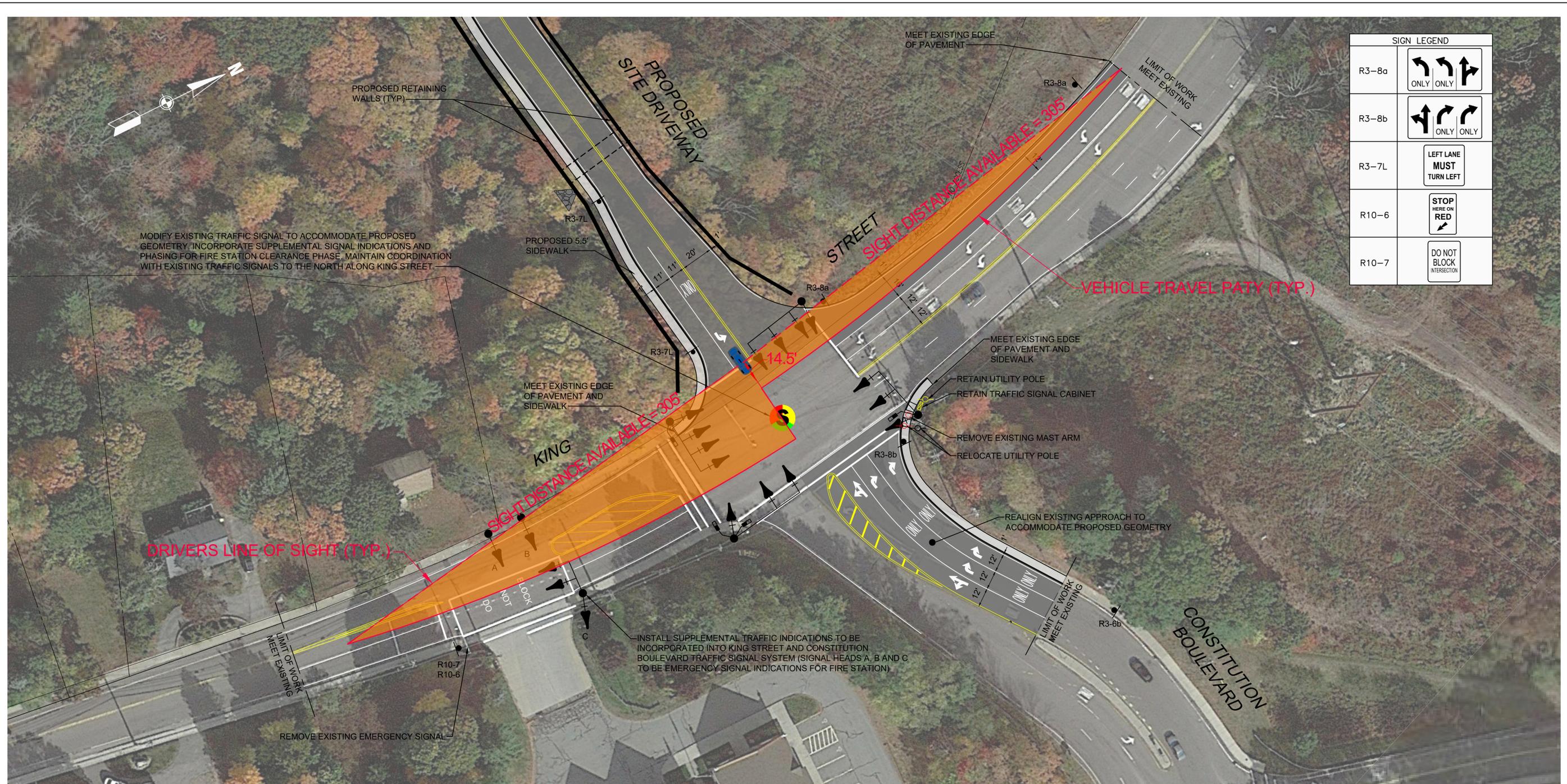
Intersection/Sight Distance Measurement	Feet		
	Required Minimum (SSD)	Desirable (ISD) ^b	Measured
<i>King Street at Constitution Boulevard and the Project Site Driveway</i>			
<i>Stopping Sight Distance:</i>			
King Street approaching from the northeast	305	--	460 ^c
King Street approaching from the southwest	305	--	373
<i>Intersection Sight Distance:</i>			
Looking to the northeast from the Project Site Driveway	305	620	460 ^c
Looking to the southwest from the Project Site Driveway	305	680	319

^aRecommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018; and based on an approach speed of 40 mph along King Street.

^bValues shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed. The critical gap for the intersection sight distance values for the Project site driveway were increased to 11.5 seconds for left-turn movements and to 10.5 seconds for right-turn movements to reflect the longer gaps that are required for combination trucks (i.e., tractor semi-trailer combinations).

^cWith the removal of vegetation located within the sight triangle area of the Project site driveway.

As can be seen in Table 9, with the removal of trees and vegetation located along the north side of King Street in conjunction with the construction of the Project, the available lines of sight at the Project site driveway intersection will exceed the recommended minimum sight distances to function in a safe manner (SSD) based on a 40 mph approach speed along King Street, which is 4 to 8 mph above the measured 85th percentile vehicle travel speed (32/36 mph) and consistent with the posted speed limit (40 mph). Figure 12 illustrates the sight triangle areas for the Project site driveway intersection with King Street.



SIGN LEGEND	
R3-8a	
R3-8b	
R3-7L	
R10-6	
R10-7	

FIGURE 12
PROJECT SITE DRIVEWAY
SIGHT TRIANGLE PLAN

PROJECT:		PROPOSED WAREHOUSE FRANKLIN, MASSACHUSETTS	
PROPOSER:		MARCUS PARTNERS BOSTON, MASSACHUSETTS	
NO.	REVISIONS	DATE	
DESIGNED BY: AJA		DATE: 10/14/2021	
DRAWN BY: JTG		SCALE: 1" = 30'	
CHECKED BY: JSD		SHEET 1 OF 1	

- NOTES: 1. THIS PLAN IS FOR REVIEW PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION.
2. BASE PLAN INFORMATION OBTAINED FROM BOHLER ENGINEERING AND GOOGLE EARTH.



CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

VAI has conducted a TIA in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a warehouse building to be located at 585 King Street in Franklin, Massachusetts. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE,¹¹ the Project is expected to generate 510 vehicle trips on an average weekday (two-way volume over the operational day of the Project), consisting of 334 passenger car trips and 176 truck trips. During the weekday morning peak-hour, the Project is expected to generate 61 vehicle trips, consisting of 55 passenger car trips and 6 truck trips. During the weekday evening peak-hour, the Project is expected to generate 63 vehicle trips, consisting of 54 passenger car trips and 9 truck trips;
2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition), with all of the movements at the study area intersections shown to continue to operate at LOS D or better with the addition of Project-related traffic, where an LOS of “D” or better is defined as “acceptable” traffic operations;
3. All movements at the Project site driveway intersection with King Street were shown to operate at a LOS D or better during the peak hours with minimal vehicle queuing predicted (up to 2 vehicles);
4. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections; and
5. Lines of sight at the Project site driveway intersection with King Street were found to exceed or could be made to exceed the recommended minimum distance for safe operation based on the appropriate approach speed.

¹¹Ibid 1.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with implementation of the recommendations that follow.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

Project Access

Access to the Project site will be provided by way of a new driveway that will intersect the north side of King Street opposite Constitution Boulevard and will form the fourth leg of the intersection, which is presently under traffic signal control. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation, many of which are reflected on the Site Plans:

- The Project site driveway should be incorporated into the traffic signal system at the King Street/Constitution Boulevard intersection and designed to accommodate two (2) travel lanes approaching King Street, consisting of a left-turn lane and a through/right-turn lane, and a single travel lane entering the Project site separated by a raised island or double-yellow centerline. Thereafter the driveway and internal circulating drives should be a minimum of 24 feet in width where two-way traffic is to be conveyed and a minimum of 20 feet in width for one-way travel.
- The Project site driveway and internal circulating drives should be designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle and a large tractor semi-trailer combination (WB-67 design vehicle).
- King Street approaching the Project site driveway should be widened to provide a southbound right-turn lane in order to accommodate trucks slowing to enter the Project site.
- Where perpendicular parking is proposed within the employee parking areas, the drive aisle behind the parking should be a minimum of 23 feet in order to facilitate parking maneuvers.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).¹²
- A sidewalk should be provided along at least one side of the Project site driveway and extend to the existing sidewalk along King Street.
- Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided at all pedestrian crossings internal to the Project site.

¹²Ibid 2.

- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of the Project site driveway should be designed and maintained so as not to restrict lines of sight.
- Snow windrows within sight triangle areas of the Project site driveway should be promptly removed where such accumulations would impede sight lines.

Figure 13 illustrates the recommended geometric and traffic control improvements at the Project site driveway intersection with King Street and Constitution Boulevard.

Off-Site

King Street Traffic Signal System

In conjunction with the addition of the Project site driveway as the fourth leg of the King Street/Constitution Boulevard intersection and the reconstruction of the traffic signal system at the intersection, the Project proponent will design and implement an optimal traffic signal timing, phasing and coordination plan for the King Street coordinated traffic signal system inclusive of the following intersections:

- King Street/Constitution Boulevard
- King Street/I-495 Southbound Ramps
- King Street/I-495 Northbound Ramps
- King Street/Union Street

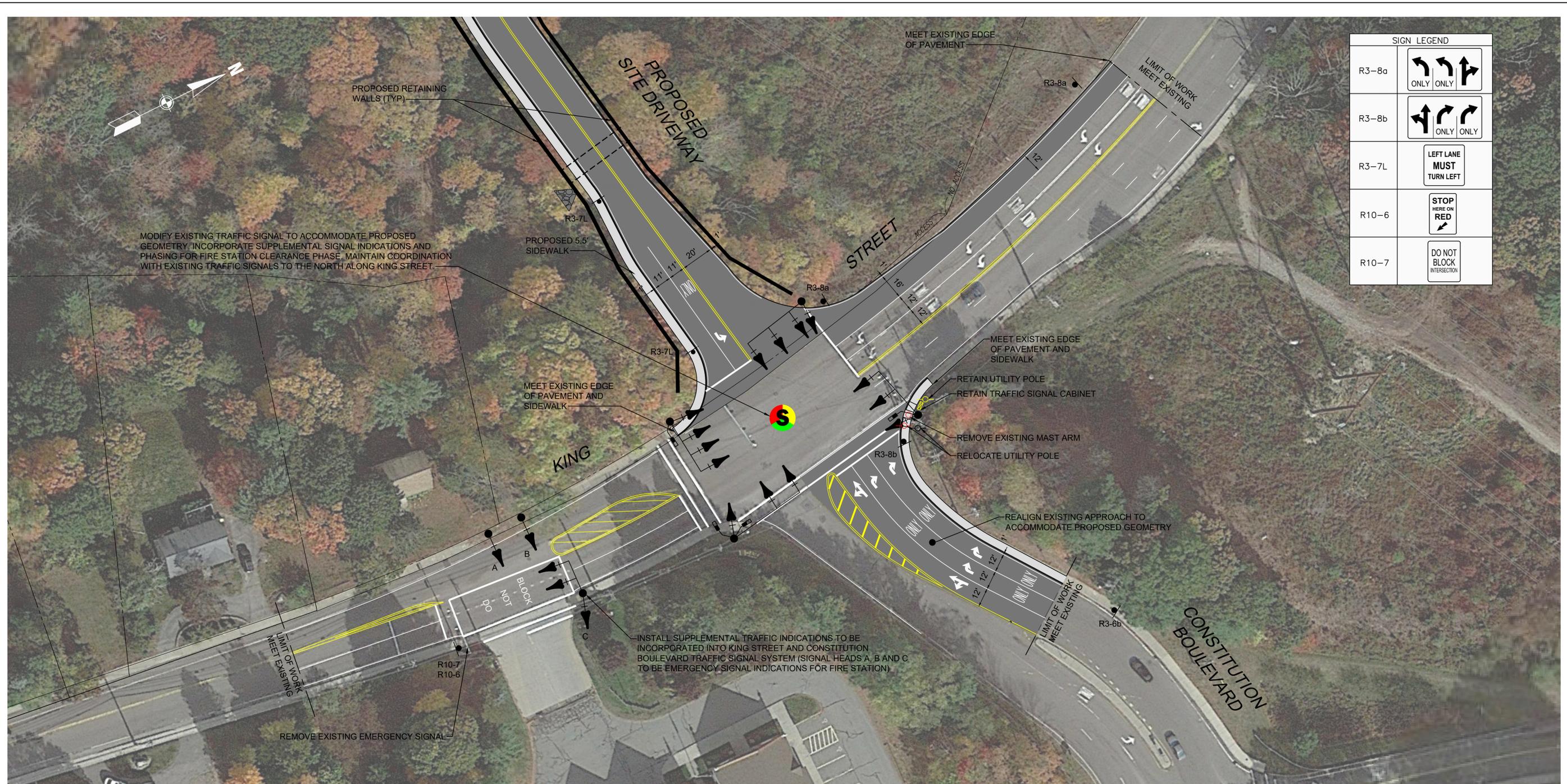
These improvements will be completed prior to the issuance of a Certificate of Occupancy for the Project subject to receipt of all necessary rights, permits and approvals.

King Street at Franklin Fire Station No. 2

In conjunction with the reconstruction of the King Street/Constitution Boulevard intersection and the associated traffic signal system to accommodate the Project, the following improvements will be completed in order to reduce the potential for vehicle queues on the King Street northeastbound approach to Constitution Boulevard to block the driveway to Franklin Fire Station No. 2 and are shown on Figure 13:

1. “Do Not Block” pavement markings and accompanying signs will be installed on King Street across the fire station driveway; and
2. The existing flashing emergency signal that is located to the west of the fire station driveway will be replaced with traffic signal indications that will be incorporated into the traffic signal system at the King Street/Constitution Boulevard intersection and will be timed to initiate a “red” traffic signal indication at the fire station driveway for King Street traffic prior to the initiation of a “red” signal on the same approach at Constitution Boulevard. A “Stop Here On Red” sign will be installed at the stop-line on King Street to the west of the driveway.

The existing traffic signal indications on the King Street northeastbound approach to Constitution Boulevard will be replaced with optically programmed signal indications in order to reduce the visibility of the signal indications approaching the stop-line to the west of fire station driveway.



SIGN LEGEND	
R3-8a	
R3-8b	
R3-7L	
R10-6	
R10-7	

FIGURE 13
CONCEPTUAL IMPROVEMENT PLAN
KING STREET AT CONSTITUTION BOULEVARD
AND THE PROJECT SITE DRIVEWAY

PROJECT:
**PROPOSED WAREHOUSE
FRANKLIN, MASSACHUSETTS**

PROPOSER:
**MARCUS PARTNERS
BOSTON, MASSACHUSETTS**

NO.	REVISIONS	DATE

Vanasse & Associates inc
Transportation Engineers & Planners
35 New England Business Center Drive - Suite 140 - Andover, MA 01810
www.rdvai.com 978-474-8800

DESIGNED BY: AJA DATE: 10/14/2021
DRAWN BY: JTG SCALE: 1" = 30'
CHECKED BY: JSD SHEET 1 OF 1

- NOTES: 1. THIS PLAN IS FOR REVIEW PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION.
2. BASE PLAN INFORMATION OBTAINED FROM BOHLER ENGINEERING AND GOOGLE EARTH.



The proposed improvements and the sequential termination of the “green” signal phase on the King Street northeastbound approach will limit the introduction of vehicles between the stop-line to the west of the fire station driveway and the stop-line at Constitution Boulevard so that the vehicle queue between the stop-lines will not block the fire station driveway. Upon pre-emption of the traffic signal system by an emergency vehicle leaving the fire station, the new traffic signal indications that are to be installed to the west of the driveway will display a “red” indication to hold traffic to the west of the driveway, with the signal indication on the King Street northeastbound approach displaying a “green” indication to clear traffic in front of the responding emergency vehicle (all other traffic signals will display a “red” indication at the intersection).

The recommended improvements at the King Street Fire Station No. 2 driveway and at the King Street/Constitution Boulevard intersection will be designed and constructed prior to the issuance of a Certificate of Occupancy for the Project subject to receipt of all necessary rights, permits and approvals.

Transportation Demand Management

Regularly scheduled, fixed-route, public transportation services are not currently provided within the study area or to the Project site. GATRA operates an on-demand microtransit service which allows transit riders to request a vehicle to pick them up for same-day service within the Town of Franklin through the GATRA GO United program. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures should be implemented as a part of the Project:

- A transportation coordinator should be assigned for the Project to coordinate the TDM program;
- Information regarding commuting options should be posted in a central location and/or otherwise made available to employees of the Project;
- The transportation coordinator should facilitate a rideshare matching program for employees to encourage carpooling;
- A “welcome packet” should be provided to employees detailing available commuter options and will include the contact information for the transportation coordinator and information to enroll in the employee rideshare program;
- Specific amenities should be provided to discourage off-site trips, including providing a break-room equipped with a microwave and refrigerator; offering direct deposit of paychecks; allowing telecommuting or flexible work schedules; and other such measures to reduce overall traffic volumes and travel during peak-traffic-volume periods;
- Pedestrian accommodations should be incorporated within the Project site to link the employee parking areas to the warehouse building and to the existing sidewalk along King Street; and
- Secure bicycle parking should be provided at an appropriate location within the Project site.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

APPENDIX

PROJECT SITE PLAN
AUTOMATIC TRAFFIC RECORDER COUNT DATA
MANUAL TURNING MOVEMENT COUNT DATA
SEASONAL ADJUSTMENT DATA
COVID-19 ADJUSTMENT DATA
VEHICLE TRAVEL SPEED DATA
MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION
MAPPING
GENERAL BACKGROUND TRAFFIC GROWTH
TRIP-GENERATION CALCULATIONS
CAPACITY ANALYSIS WORKSHEETS



PROJECT SITE PLAN



AUTOMATIC TRAFFIC RECORDER COUNT DATA



Accurate Counts
978-664-2565

88630001

Location : King Street
Location : East of Constitution Boulevard
City/State: Franklin, MA

5/26/2021 Time	EB,		Hour Totals		WB,		Hour Totals		Combined Totals	
	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	24	139			12	121				
12:15	9	147			10	124				
12:30	10	154			12	124				
12:45	7	151	50	591	5	124	39	493	89	1084
1:00	3	134			6	123				
1:15	6	116			9	121				
1:30	6	150			7	131				
1:45	13	134	28	534	5	140	27	515	55	1049
2:00	6	173			6	128				
2:15	4	155			10	171				
2:30	6	167			8	175				
2:45	5	148	21	643	7	184	31	658	52	1301
3:00	8	192			8	184				
3:15	8	199			11	186				
3:30	8	176			3	148				
3:45	11	125	35	692	12	153	34	671	69	1363
4:00	22	184			10	214				
4:15	27	148			13	209				
4:30	39	177			22	198				
4:45	52	155	140	664	36	196	81	817	221	1481
5:00	55	199			31	214				
5:15	63	155			43	219				
5:30	100	157			66	170				
5:45	118	149	336	660	78	170	218	773	554	1433
6:00	141	132			73	176				
6:15	181	124			78	168				
6:30	181	133			113	142				
6:45	188	108	691	497	131	122	395	608	1086	1105
7:00	201	87			118	137				
7:15	236	88			118	119				
7:30	210	66			119	122				
7:45	191	73	838	314	141	89	496	467	1334	781
8:00	164	79			138	105				
8:15	207	78			131	98				
8:30	158	72			130	81				
8:45	202	49	731	278	126	71	525	355	1256	633
9:00	158	31			107	66				
9:15	122	47			99	54				
9:30	136	33			94	64				
9:45	133	23	549	134	113	37	413	221	962	355
10:00	120	19			103	41				
10:15	133	20			85	33				
10:30	143	25			99	36				
10:45	141	25	537	89	118	32	405	142	942	231
11:00	137	40			110	27				
11:15	134	23			106	36				
11:30	135	22			132	23				
11:45	159	14	565	99	131	16	479	102	1044	201
Total	4521	5195			3143	5822			7664	11017
Percent	46.5%	53.5%			35.1%	64.9%			41.0%	59.0%

Accurate Counts
978-664-2565

88630001

Location : King Street
Location : East of Constitution Boulevard
City/State: Franklin, MA

5/27/2021 Time	EB,		Hour Totals		WB,		Hour Totals		Combined Totals	
	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	17	146			20	113				
12:15	5	146			11	123				
12:30	6	150			9	118				
12:45	13	151	41	593	7	126	47	480	88	1073
1:00	11	152			8	128				
1:15	7	121			9	145				
1:30	8	126			2	140				
1:45	8	162	34	561	1	128	20	541	54	1102
2:00	11	180			7	131				
2:15	3	180			5	153				
2:30	6	152			5	181				
2:45	6	165	26	677	11	204	28	669	54	1346
3:00	3	236			10	170				
3:15	3	188			6	184				
3:30	5	192			5	190				
3:45	15	155	26	771	10	182	31	726	57	1497
4:00	18	148			8	192				
4:15	26	152			22	175				
4:30	35	173			24	169				
4:45	45	139	124	612	25	167	79	703	203	1315
5:00	56	146			27	172				
5:15	76	193			35	243				
5:30	103	130			56	170				
5:45	114	149	349	618	64	194	182	779	531	1397
6:00	130	112			76	166				
6:15	174	117			96	153				
6:30	155	116			104	140				
6:45	171	89	630	434	123	112	399	571	1029	1005
7:00	193	116			122	130				
7:15	232	93			112	133				
7:30	219	77			116	90				
7:45	188	72	832	358	145	110	495	463	1327	821
8:00	174	42			133	79				
8:15	183	78			127	95				
8:30	178	76			154	85				
8:45	217	44	752	240	142	79	556	338	1308	578
9:00	135	46			112	74				
9:15	165	27			113	56				
9:30	132	30			116	68				
9:45	146	28	578	131	104	49	445	247	1023	378
10:00	129	32			99	38				
10:15	132	35			104	41				
10:30	133	15			105	32				
10:45	131	24	525	106	114	28	422	139	947	245
11:00	160	18			101	25				
11:15	152	11			105	20				
11:30	131	24			113	22				
11:45	136	7	579	60	129	27	448	94	1027	154
Total	4496	5161			3152	5750			7648	10911
Percent	46.6%	53.4%			35.4%	64.6%			41.2%	58.8%
Grand Total	9017	10356			6295	11572			15312	21928
Percent	46.5%	53.5%			35.2%	64.8%			41.1%	58.9%

ADT

ADT: 18,620

AADT: 18,620

MANUAL TURNING MOVEMENT COUNT DATA



Accurate Counts

978-664-2565

N/S Street : Constitution Boulevard
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

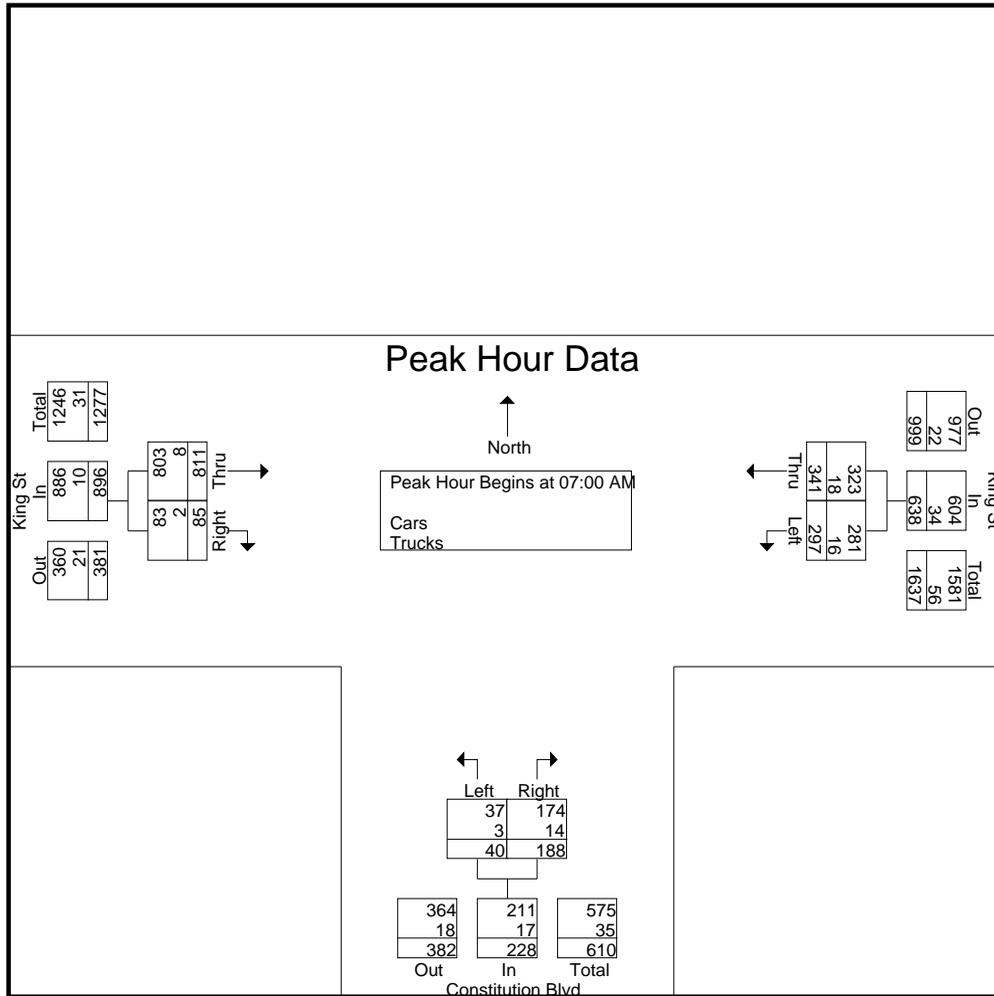
File Name : 88630001
 Site Code : 88630001
 Start Date : 5/26/2021
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	King St From East		Constitution Blvd From South			King St From West			Int. Total
	Left	Thru	Left	Right	Thru	Right			
07:00 AM	63	82	14	42	201	18	420		
07:15 AM	65	85	6	54	213	21	444		
07:30 AM	73	74	12	48	214	18	439		
07:45 AM	96	100	8	44	183	28	459		
Total	297	341	40	188	811	85	1762		
08:00 AM	70	108	4	51	146	11	390		
08:15 AM	85	100	9	49	178	14	435		
08:30 AM	49	90	12	41	146	4	342		
08:45 AM	52	111	7	44	187	15	416		
Total	256	409	32	185	657	44	1583		
Grand Total	553	750	72	373	1468	129	3345		
Apprch %	42.4	57.6	16.2	83.8	91.9	8.1			
Total %	16.5	22.4	2.2	11.2	43.9	3.9			
Cars	526	715	68	348	1435	124	3216		
% Cars	95.1	95.3	94.4	93.3	97.8	96.1	96.1		
Trucks	27	35	4	25	33	5	129		
% Trucks	4.9	4.7	5.6	6.7	2.2	3.9	3.9		

Start Time	King St From East			Constitution Blvd From South			King St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	63	82	145	14	42	56	201	18	219	420
07:15 AM	65	85	150	6	54	60	213	21	234	444
07:30 AM	73	74	147	12	48	60	214	18	232	439
07:45 AM	96	100	196	8	44	52	183	28	211	459
Total Volume	297	341	638	40	188	228	811	85	896	1762
% App. Total	46.6	53.4		17.5	82.5		90.5	9.5		
PHF	.773	.853	.814	.714	.870	.950	.947	.759	.957	.960
Cars	281	323	604	37	174	211	803	83	886	1701
% Cars	94.6	94.7	94.7	92.5	92.6	92.5	99.0	97.6	98.9	96.5
Trucks	16	18	34	3	14	17	8	2	10	61
% Trucks	5.4	5.3	5.3	7.5	7.4	7.5	1.0	2.4	1.1	3.5

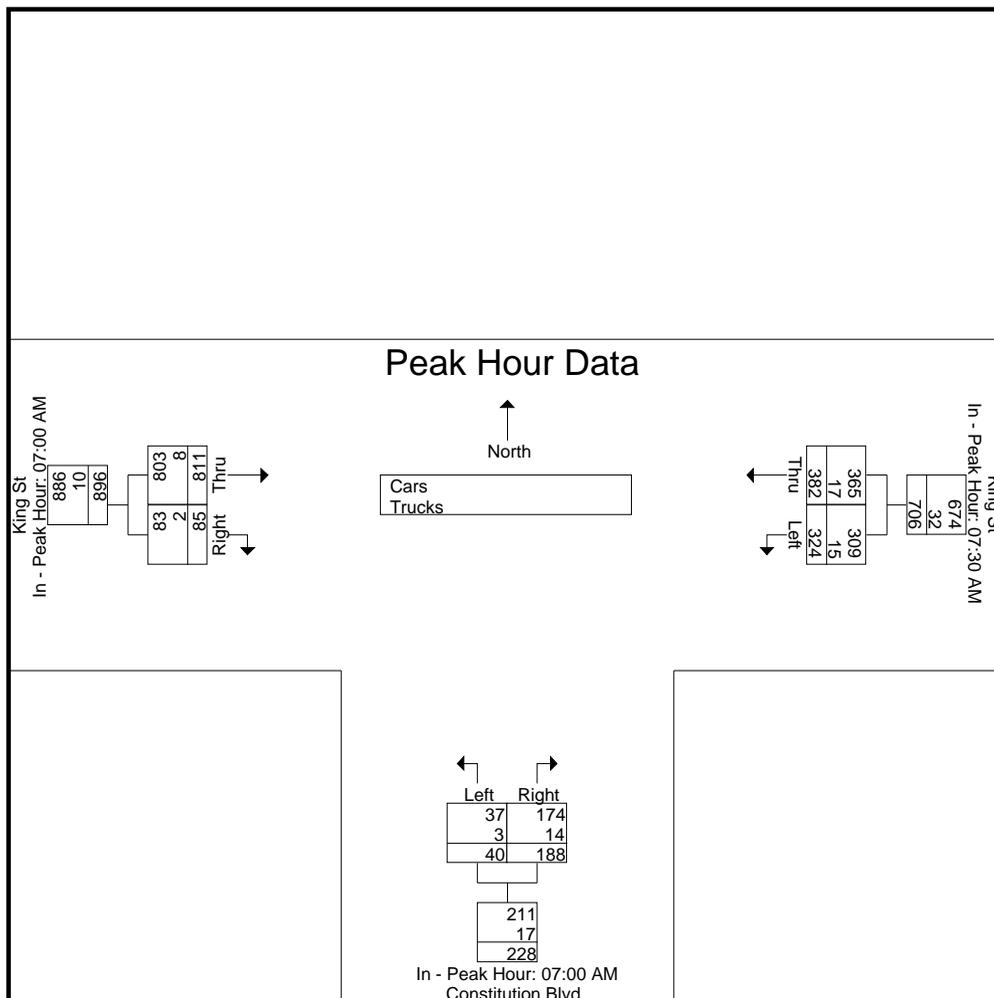
N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:00 AM			07:00 AM		
+0 mins.	73	74	147	14	42	56	201	18	219
+15 mins.	96	100	196	6	54	60	213	21	234
+30 mins.	70	108	178	12	48	60	214	18	232
+45 mins.	85	100	185	8	44	52	183	28	211
Total Volume	324	382	706	40	188	228	811	85	896
% App. Total	45.9	54.1		17.5	82.5		90.5	9.5	
PHF	.844	.884	.901	.714	.870	.950	.947	.759	.957
Cars	309	365	674	37	174	211	803	83	886
% Cars	95.4	95.5	95.5	92.5	92.6	92.5	99	97.6	98.9
Trucks	15	17	32	3	14	17	8	2	10
% Trucks	4.6	4.5	4.5	7.5	7.4	7.5	1	2.4	1.1

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

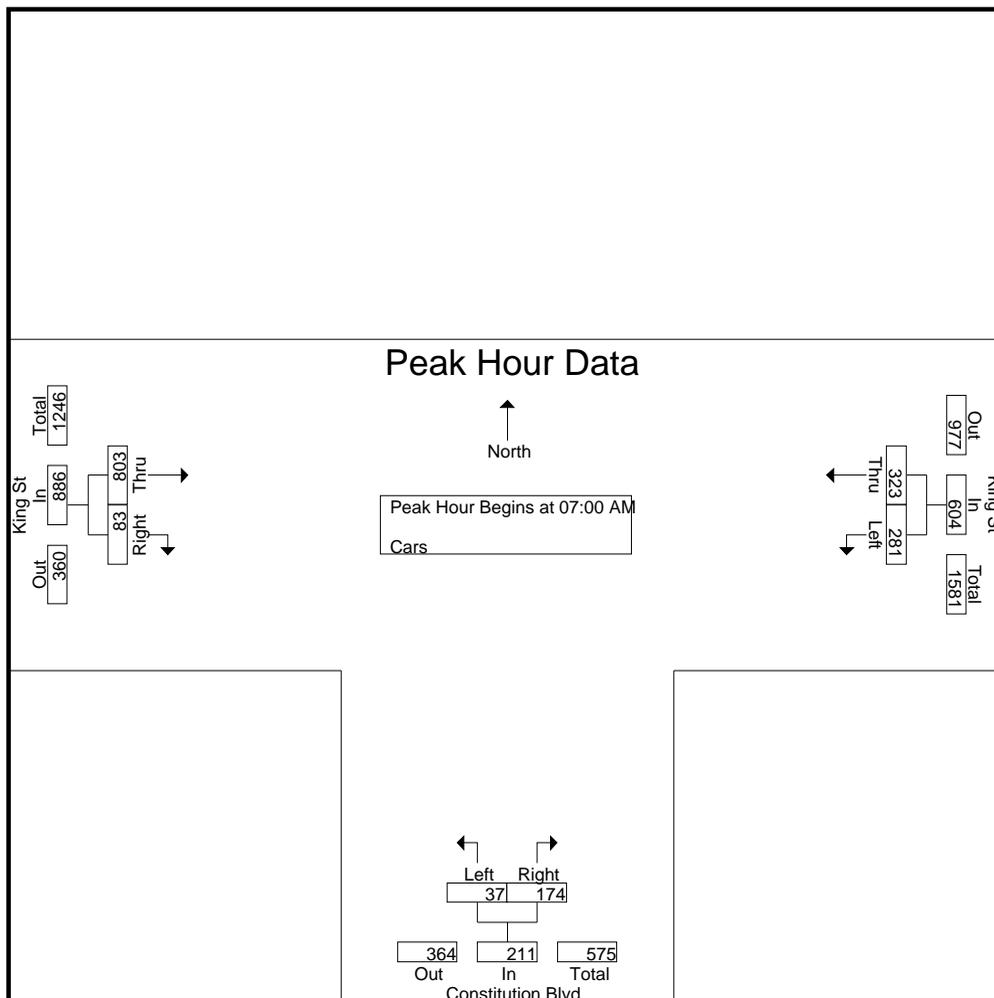
File Name : 88630001
Site Code : 88630001
Start Date : 5/26/2021
Page No : 4

Groups Printed- Cars

Start Time	King St From East		Constitution Blvd From South		King St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
07:00 AM	62	76	13	42	199	18	410
07:15 AM	61	80	6	52	211	20	430
07:30 AM	69	72	10	39	214	18	422
07:45 AM	89	95	8	41	179	27	439
Total	281	323	37	174	803	83	1701
08:00 AM	67	104	4	46	140	10	371
08:15 AM	84	94	8	46	174	13	419
08:30 AM	44	84	12	38	139	3	320
08:45 AM	50	110	7	44	179	15	405
Total	245	392	31	174	632	41	1515
Grand Total	526	715	68	348	1435	124	3216
Apprch %	42.4	57.6	16.3	83.7	92	8	
Total %	16.4	22.2	2.1	10.8	44.6	3.9	

Start Time	King St From East			Constitution Blvd From South			King St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	62	76	138	13	42	55	199	18	217	410
07:15 AM	61	80	141	6	52	58	211	20	231	430
07:30 AM	69	72	141	10	39	49	214	18	232	422
07:45 AM	89	95	184	8	41	49	179	27	206	439
Total Volume	281	323	604	37	174	211	803	83	886	1701
% App. Total	46.5	53.5		17.5	82.5		90.6	9.4		
PHF	.789	.850	.821	.712	.837	.909	.938	.769	.955	.969

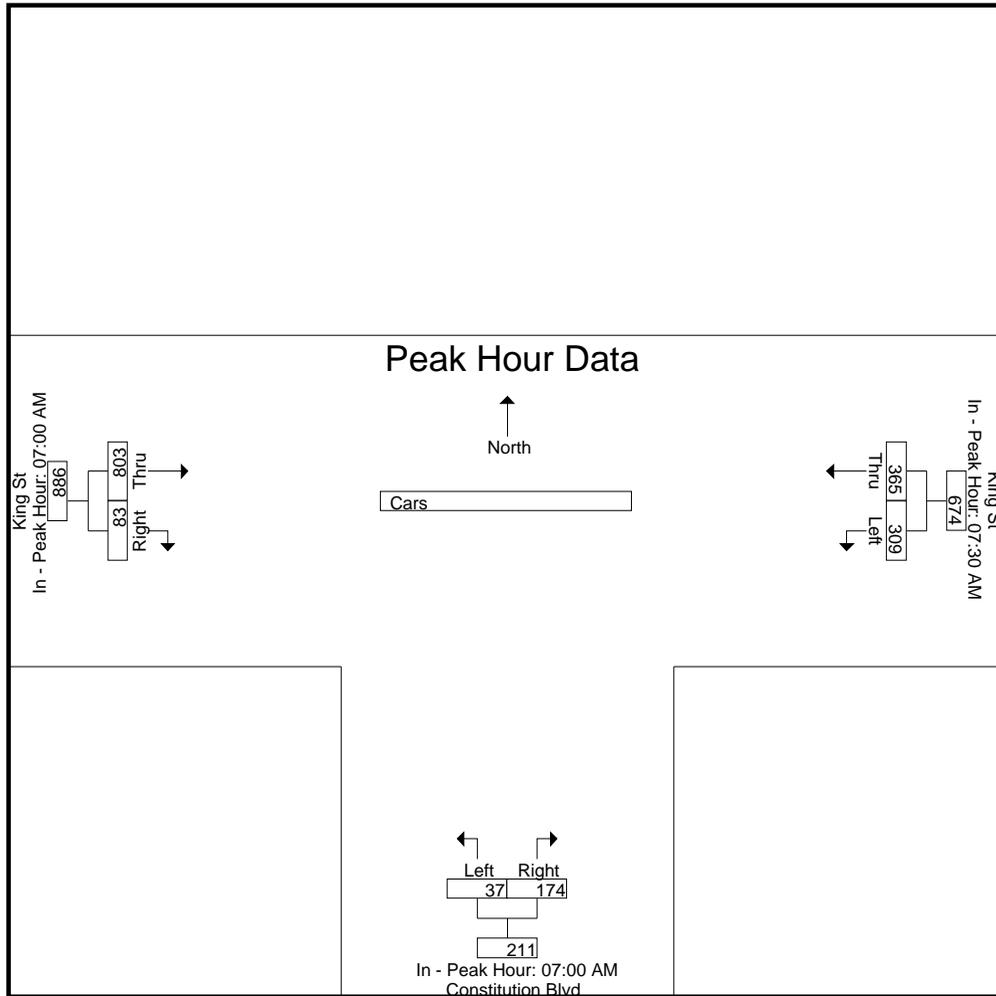
N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:00 AM			07:00 AM		
+0 mins.	69	72	141	13	42	55	199	18	217
+15 mins.	89	95	184	6	52	58	211	20	231
+30 mins.	67	104	171	10	39	49	214	18	232
+45 mins.	84	94	178	8	41	49	179	27	206
Total Volume	309	365	674	37	174	211	803	83	886
% App. Total	45.8	54.2		17.5	82.5		90.6	9.4	
PHF	.868	.877	.916	.712	.837	.909	.938	.769	.955

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Constitution Boulevard
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

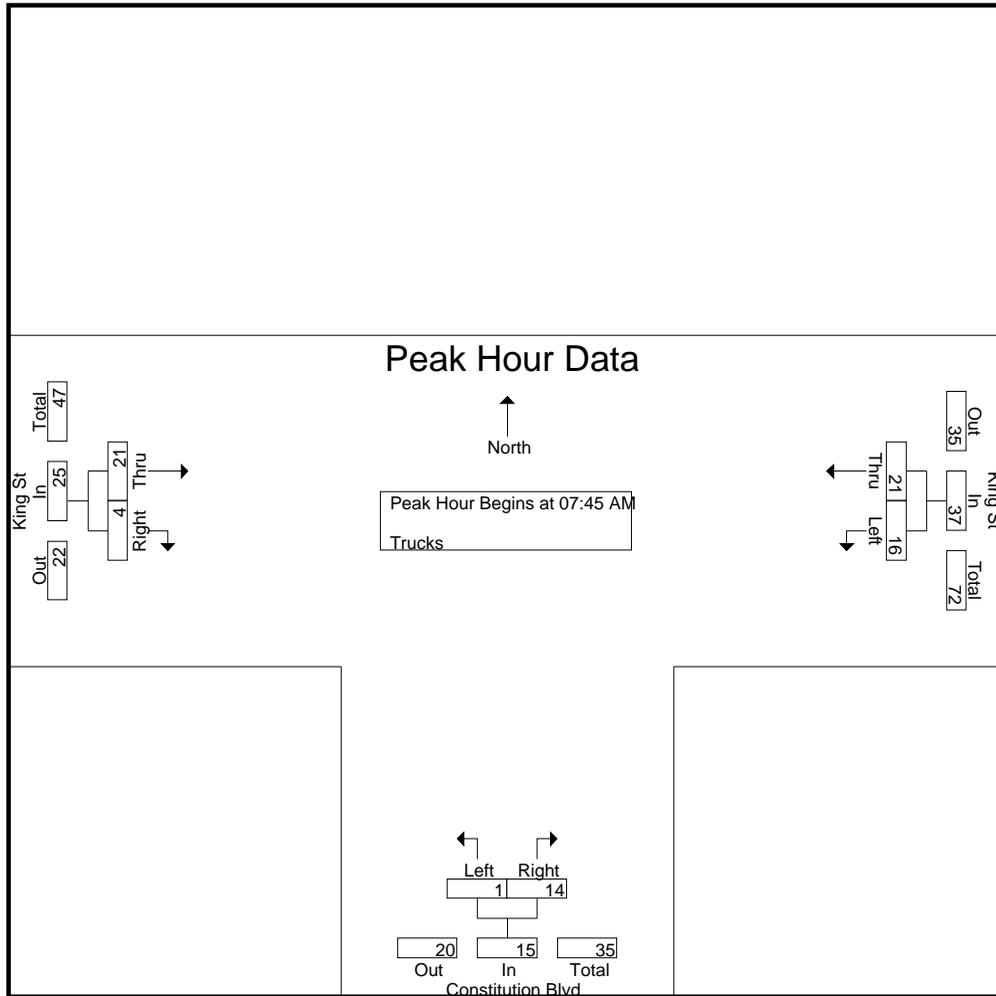
File Name : 88630001
 Site Code : 88630001
 Start Date : 5/26/2021
 Page No : 7

Groups Printed- Trucks

Start Time	King St From East		Constitution Blvd From South		King St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
07:00 AM	1	6	1	0	2	0	10
07:15 AM	4	5	0	2	2	1	14
07:30 AM	4	2	2	9	0	0	17
07:45 AM	7	5	0	3	4	1	20
Total	16	18	3	14	8	2	61
08:00 AM	3	4	0	5	6	1	19
08:15 AM	1	6	1	3	4	1	16
08:30 AM	5	6	0	3	7	1	22
08:45 AM	2	1	0	0	8	0	11
Total	11	17	1	11	25	3	68
Grand Total	27	35	4	25	33	5	129
Apprch %	43.5	56.5	13.8	86.2	86.8	13.2	
Total %	20.9	27.1	3.1	19.4	25.6	3.9	

Start Time	King St From East			Constitution Blvd From South			King St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	7	5	12	0	3	3	4	1	5	20
08:00 AM	3	4	7	0	5	5	6	1	7	19
08:15 AM	1	6	7	1	3	4	4	1	5	16
08:30 AM	5	6	11	0	3	3	7	1	8	22
Total Volume	16	21	37	1	14	15	21	4	25	77
% App. Total	43.2	56.8		6.7	93.3		84	16		
PHF	.571	.875	.771	.250	.700	.750	.750	1.00	.781	.875

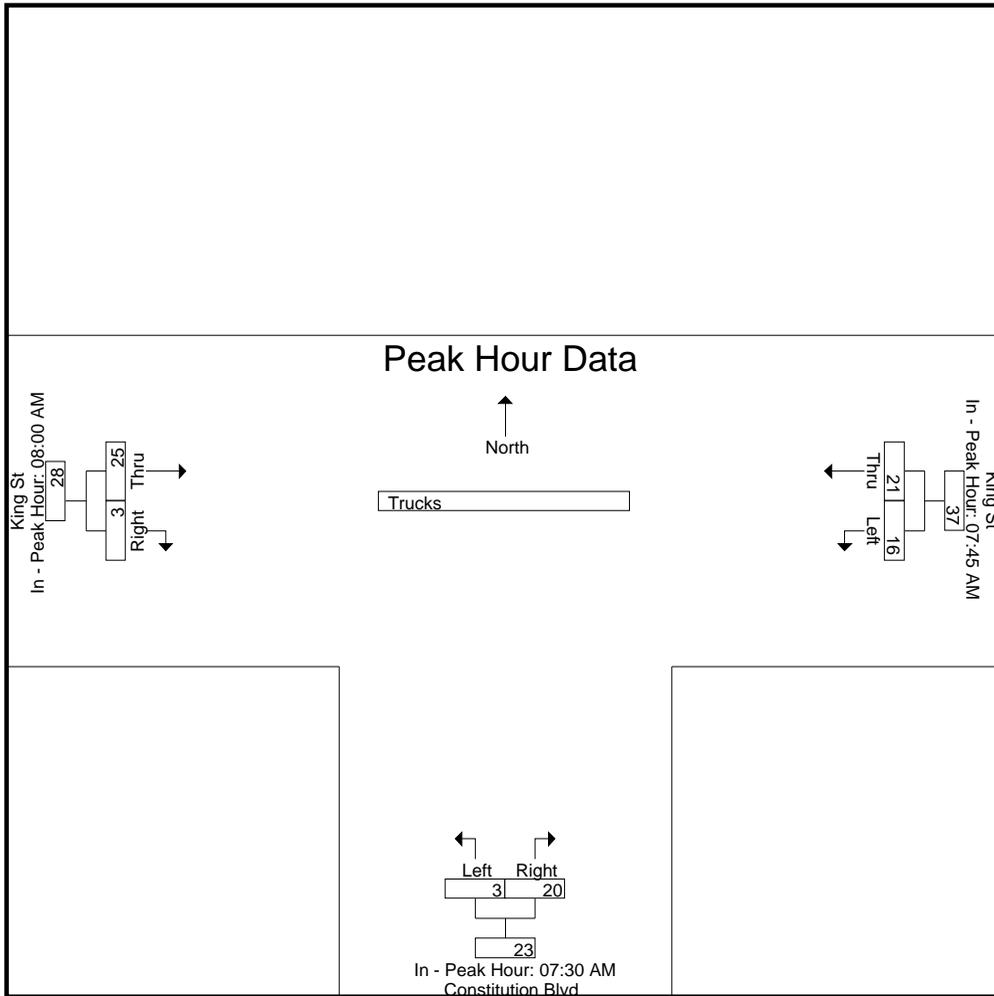
N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



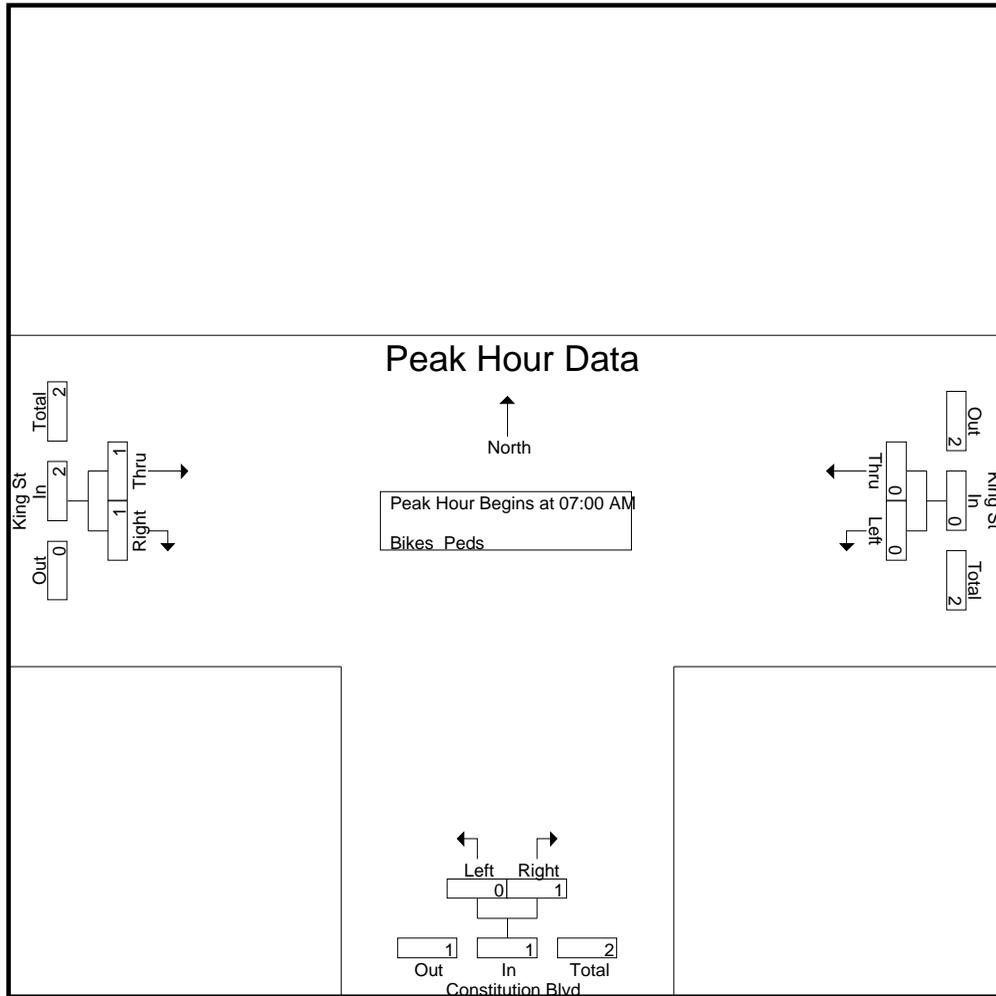
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM			07:30 AM			08:00 AM		
+0 mins.	7	5	12	2	9	11	6	1	7
+15 mins.	3	4	7	0	3	3	4	1	5
+30 mins.	1	6	7	0	5	5	7	1	8
+45 mins.	5	6	11	1	3	4	8	0	8
Total Volume	16	21	37	3	20	23	25	3	28
% App. Total	43.2	56.8		13	87		89.3	10.7	
PHF	.571	.875	.771	.375	.556	.523	.781	.750	.875

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



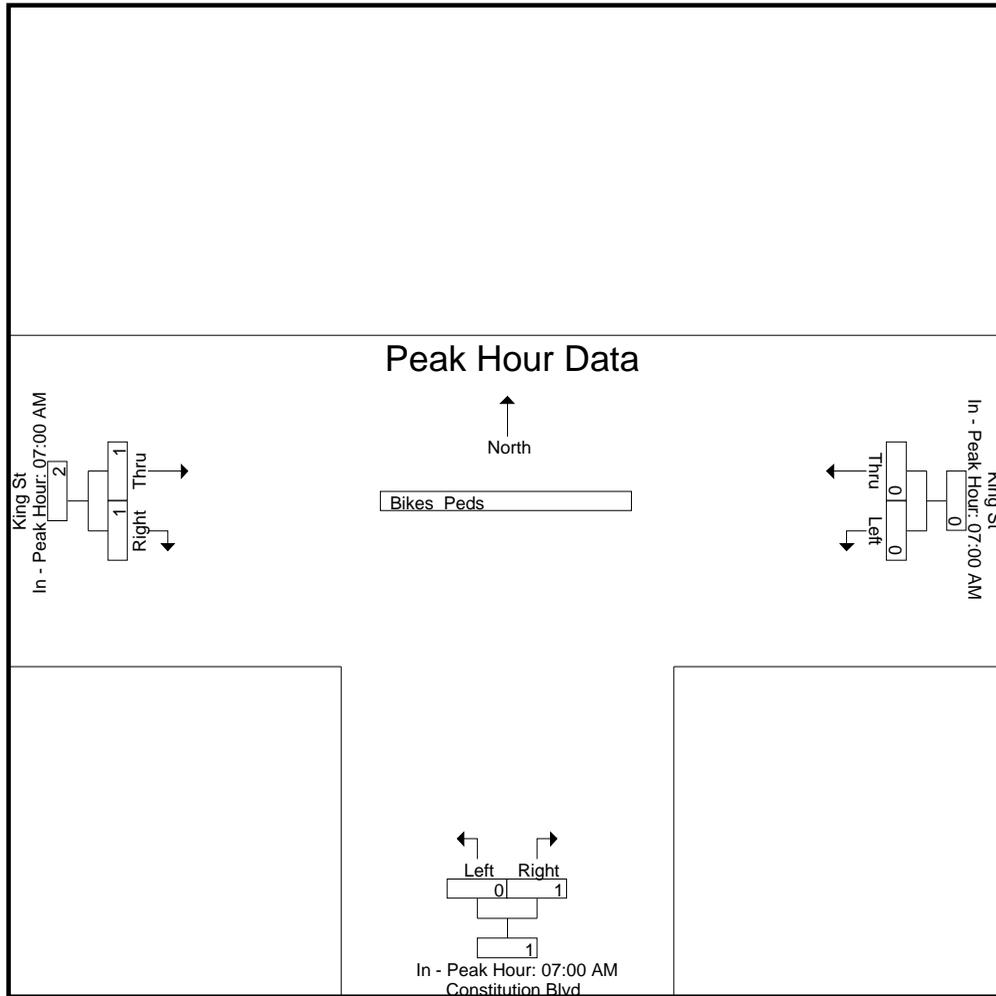
N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	0	0	0	0	0	1	1	2
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	1	1	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	1	1	1	1	2
% App. Total	0	0		0	100		50	50	
PHF	.000	.000	.000	.000	.250	.250	.250	.250	.250

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Constitution Boulevard
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

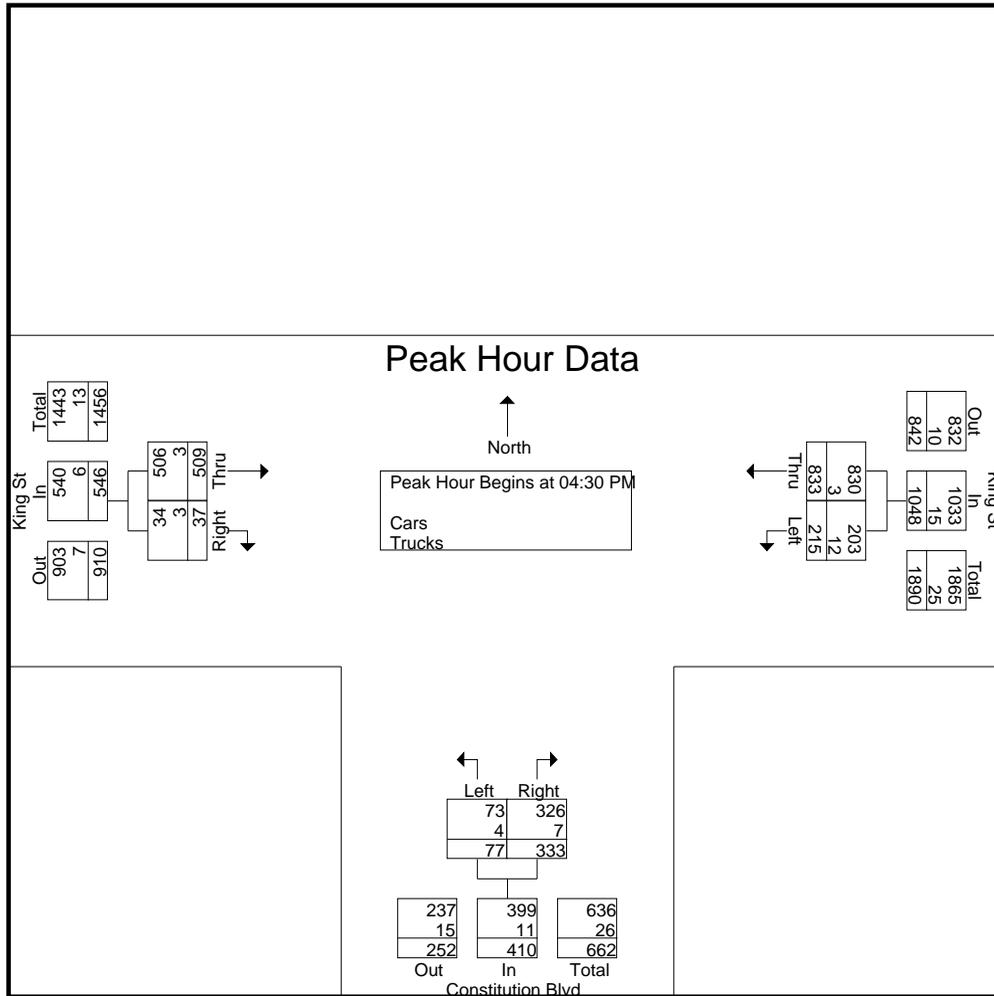
File Name : 88630001
 Site Code : 88630001
 Start Date : 5/26/2021
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	King St From East		Constitution Blvd From South			King St From West			Int. Total
	Left	Thru	Left	Right	Thru	Right			
04:00 PM	52	187	32	91	134	6	502		
04:15 PM	46	204	13	61	107	9	440		
04:30 PM	61	200	27	88	142	8	526		
04:45 PM	45	201	15	74	133	12	480		
Total	204	792	87	314	516	35	1948		
05:00 PM	53	210	20	111	121	7	522		
05:15 PM	56	222	15	60	113	10	476		
05:30 PM	37	163	11	74	115	4	404		
05:45 PM	40	158	3	50	124	5	380		
Total	186	753	49	295	473	26	1782		
Grand Total	390	1545	136	609	989	61	3730		
Apprch %	20.2	79.8	18.3	81.7	94.2	5.8			
Total %	10.5	41.4	3.6	16.3	26.5	1.6			
Cars	369	1540	131	594	978	55	3667		
% Cars	94.6	99.7	96.3	97.5	98.9	90.2	98.3		
Trucks	21	5	5	15	11	6	63		
% Trucks	5.4	0.3	3.7	2.5	1.1	9.8	1.7		

Start Time	King St From East			Constitution Blvd From South			King St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	61	200	261	27	88	115	142	8	150	526
04:45 PM	45	201	246	15	74	89	133	12	145	480
05:00 PM	53	210	263	20	111	131	121	7	128	522
05:15 PM	56	222	278	15	60	75	113	10	123	476
Total Volume	215	833	1048	77	333	410	509	37	546	2004
% App. Total	20.5	79.5		18.8	81.2		93.2	6.8		
PHF	.881	.938	.942	.713	.750	.782	.896	.771	.910	.952
Cars	203	830	1033	73	326	399	506	34	540	1972
% Cars	94.4	99.6	98.6	94.8	97.9	97.3	99.4	91.9	98.9	98.4
Trucks	12	3	15	4	7	11	3	3	6	32
% Trucks	5.6	0.4	1.4	5.2	2.1	2.7	0.6	8.1	1.1	1.6

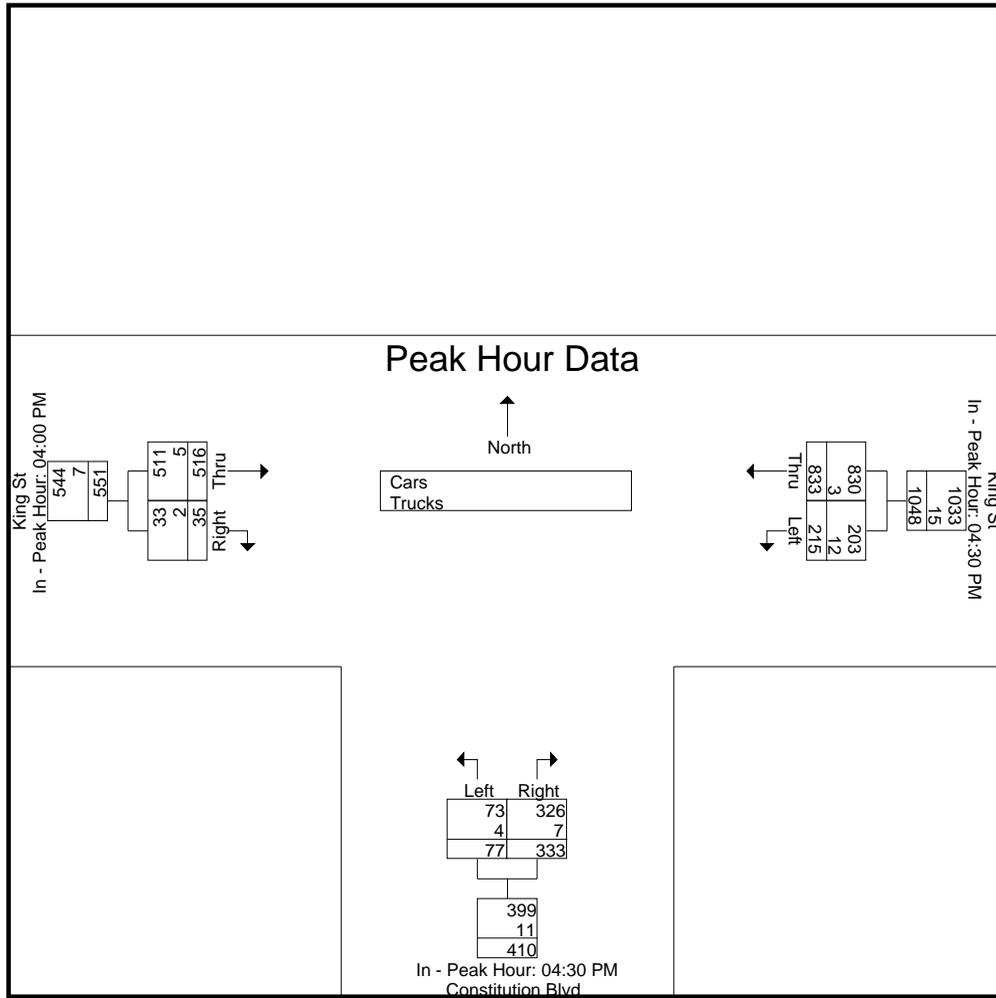
N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:00 PM		
+0 mins.	61	200	261	27	88	115	134	6	140
+15 mins.	45	201	246	15	74	89	107	9	116
+30 mins.	53	210	263	20	111	131	142	8	150
+45 mins.	56	222	278	15	60	75	133	12	145
Total Volume	215	833	1048	77	333	410	516	35	551
% App. Total	20.5	79.5		18.8	81.2		93.6	6.4	
PHF	.881	.938	.942	.713	.750	.782	.908	.729	.918
Cars	203	830	1033	73	326	399	511	33	544
% Cars	94.4	99.6	98.6	94.8	97.9	97.3	99	94.3	98.7
Trucks	12	3	15	4	7	11	5	2	7
% Trucks	5.6	0.4	1.4	5.2	2.1	2.7	1	5.7	1.3

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

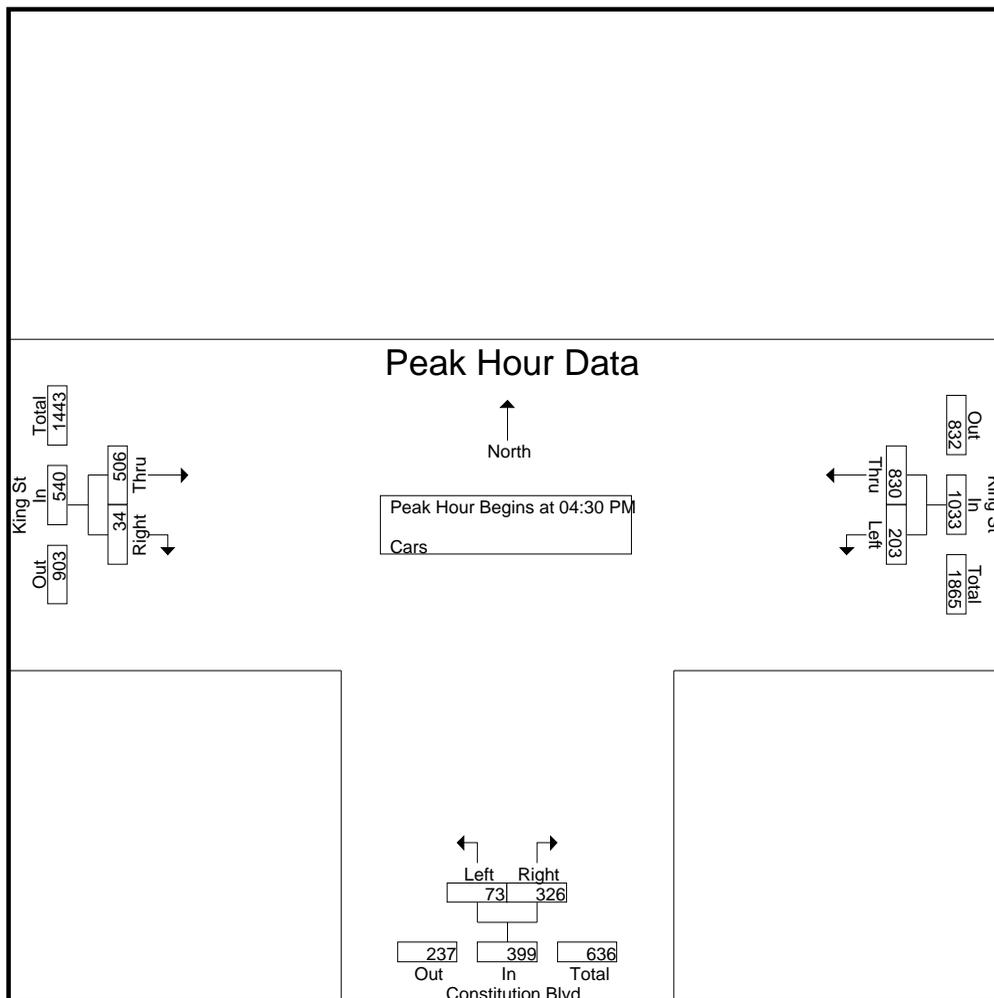
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Site Code : 88630001
Start Date : 5/26/2021
Page No : 4

Groups Printed- Cars

Start Time	King St From East		Constitution Blvd From South		King St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	51	187	32	90	132	6	498
04:15 PM	40	202	13	59	106	8	428
04:30 PM	56	198	26	87	140	8	515
04:45 PM	44	201	14	71	133	11	474
Total	191	788	85	307	511	33	1915
05:00 PM	51	209	20	108	120	7	515
05:15 PM	52	222	13	60	113	8	468
05:30 PM	36	163	10	70	112	2	393
05:45 PM	39	158	3	49	122	5	376
Total	178	752	46	287	467	22	1752
Grand Total	369	1540	131	594	978	55	3667
Apprch %	19.3	80.7	18.1	81.9	94.7	5.3	
Total %	10.1	42	3.6	16.2	26.7	1.5	

Start Time	King St From East			Constitution Blvd From South			King St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	56	198	254	26	87	113	140	8	148	515
04:45 PM	44	201	245	14	71	85	133	11	144	474
05:00 PM	51	209	260	20	108	128	120	7	127	515
05:15 PM	52	222	274	13	60	73	113	8	121	468
Total Volume	203	830	1033	73	326	399	506	34	540	1972
% App. Total	19.7	80.3		18.3	81.7		93.7	6.3		
PHF	.906	.935	.943	.702	.755	.779	.904	.773	.912	.957

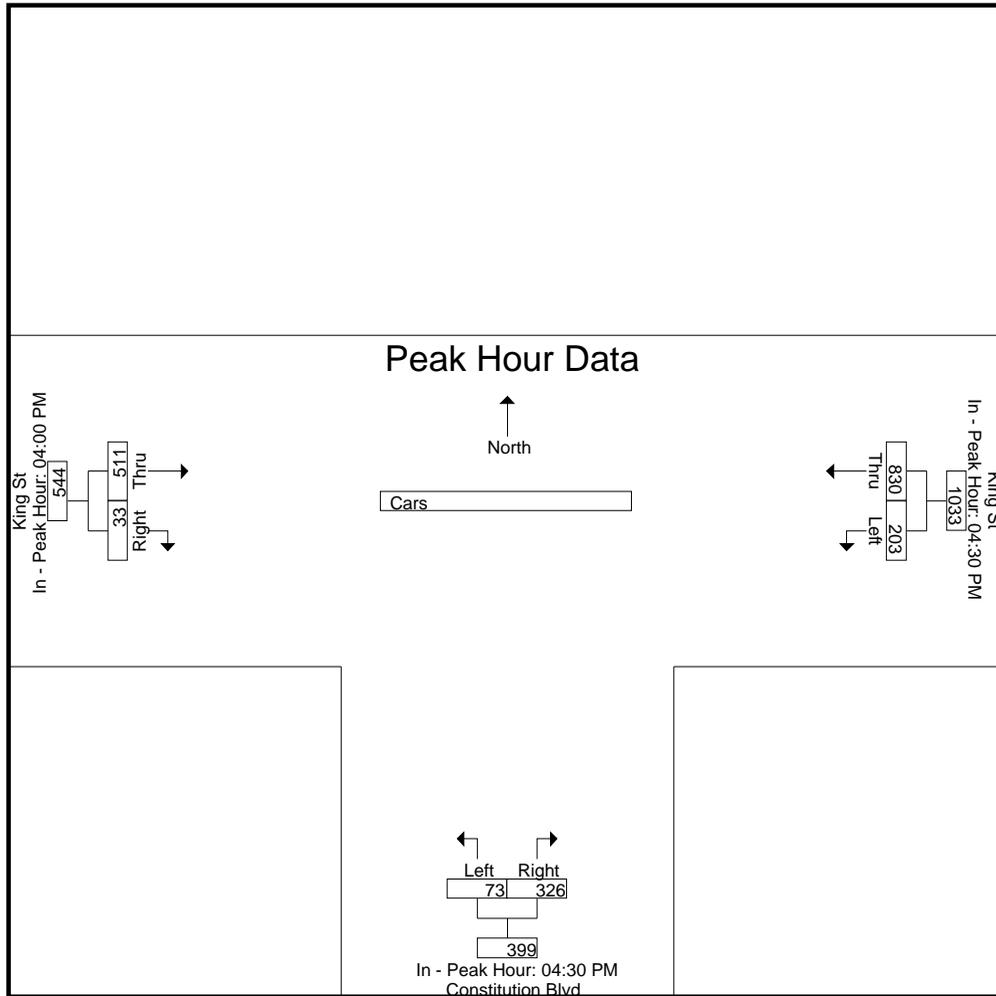
N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:00 PM		
+0 mins.	56	198	254	26	87	113	132	6	138
+15 mins.	44	201	245	14	71	85	106	8	114
+30 mins.	51	209	260	20	108	128	140	8	148
+45 mins.	52	222	274	13	60	73	133	11	144
Total Volume	203	830	1033	73	326	399	511	33	544
% App. Total	19.7	80.3		18.3	81.7		93.9	6.1	
PHF	.906	.935	.943	.702	.755	.779	.913	.750	.919

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Constitution Boulevard
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

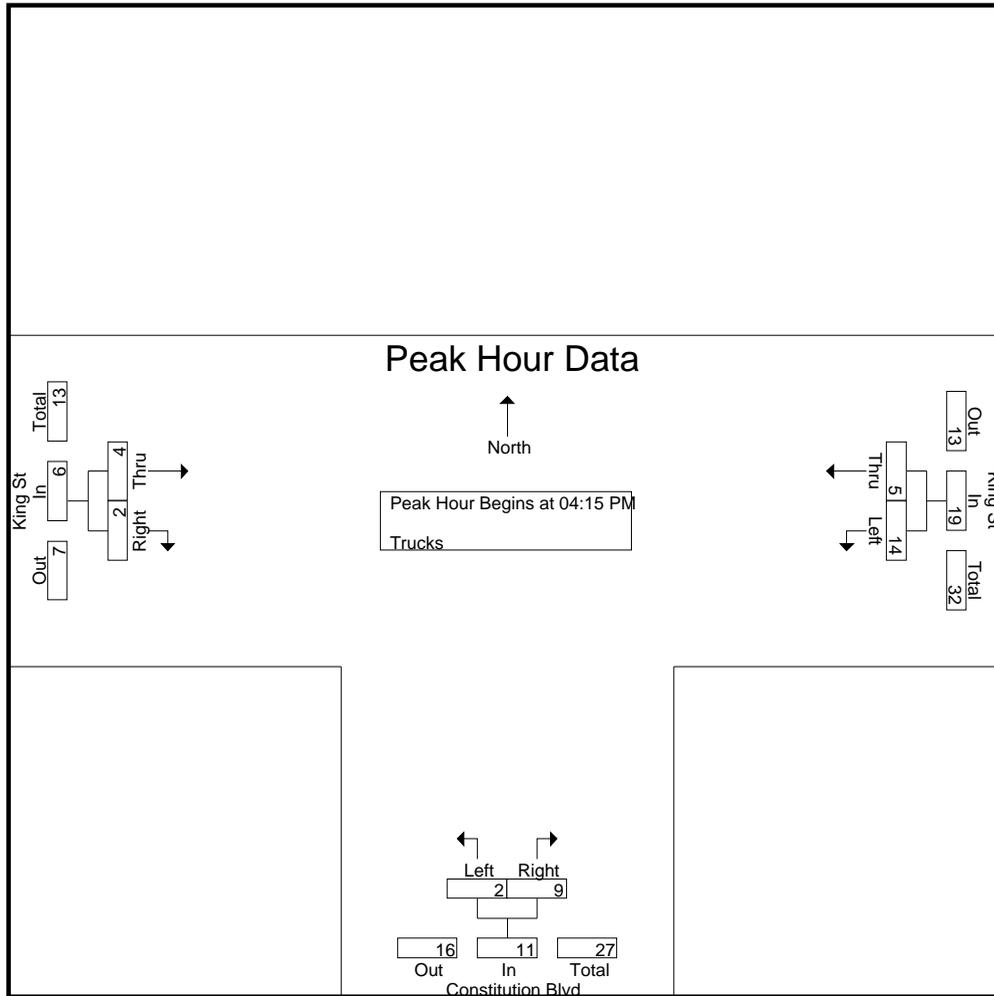
File Name : 88630001
 Site Code : 88630001
 Start Date : 5/26/2021
 Page No : 7

Groups Printed- Trucks

Start Time	King St From East		Constitution Blvd From South		King St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	1	0	0	1	2	0	4
04:15 PM	6	2	0	2	1	1	12
04:30 PM	5	2	1	1	2	0	11
04:45 PM	1	0	1	3	0	1	6
Total	13	4	2	7	5	2	33
05:00 PM	2	1	0	3	1	0	7
05:15 PM	4	0	2	0	0	2	8
05:30 PM	1	0	1	4	3	2	11
05:45 PM	1	0	0	1	2	0	4
Total	8	1	3	8	6	4	30
Grand Total	21	5	5	15	11	6	63
Apprch %	80.8	19.2	25	75	64.7	35.3	
Total %	33.3	7.9	7.9	23.8	17.5	9.5	

Start Time	King St From East			Constitution Blvd From South			King St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	6	2	8	0	2	2	1	1	2	12
04:30 PM	5	2	7	1	1	2	2	0	2	11
04:45 PM	1	0	1	1	3	4	0	1	1	6
05:00 PM	2	1	3	0	3	3	1	0	1	7
Total Volume	14	5	19	2	9	11	4	2	6	36
% App. Total	73.7	26.3		18.2	81.8		66.7	33.3		
PHF	.583	.625	.594	.500	.750	.688	.500	.500	.750	.750

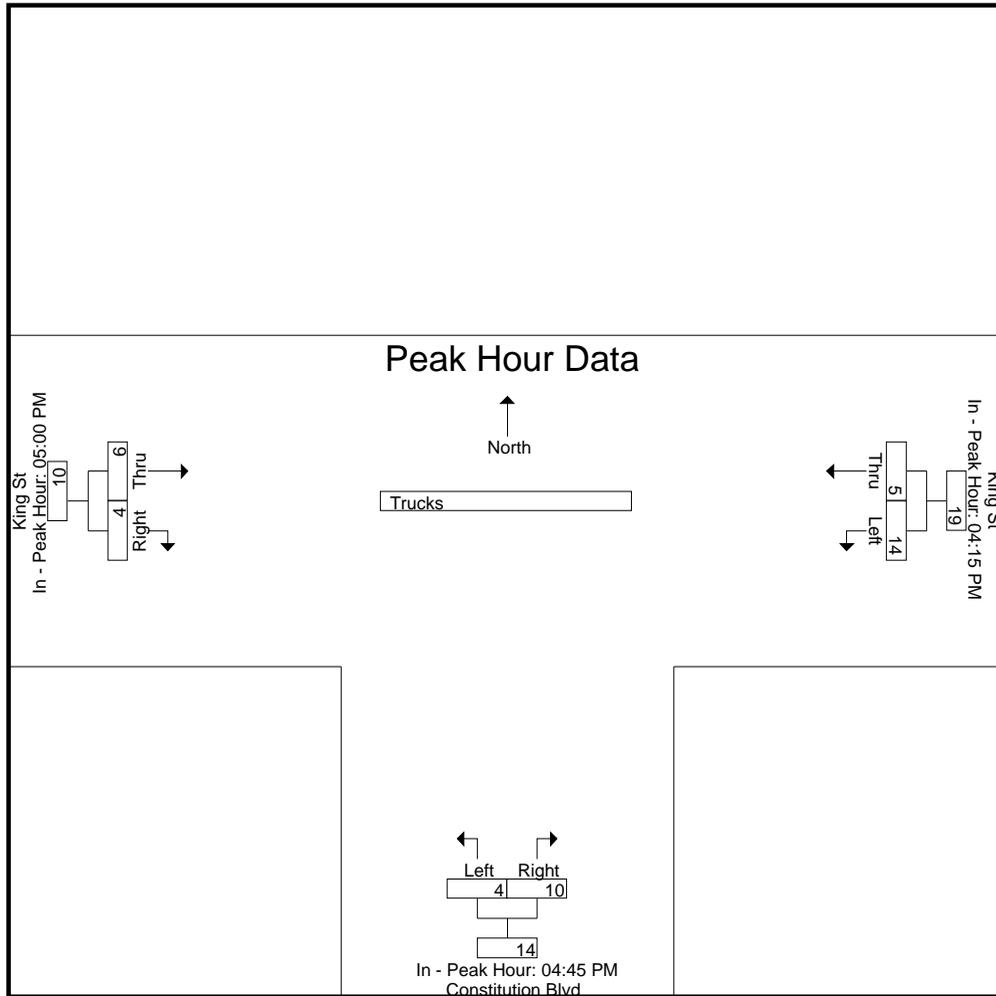
N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM			04:45 PM			05:00 PM		
+0 mins.	6	2	8	1	3	4	1	0	1
+15 mins.	5	2	7	0	3	3	0	2	2
+30 mins.	1	0	1	2	0	2	3	2	5
+45 mins.	2	1	3	1	4	5	2	0	2
Total Volume	14	5	19	4	10	14	6	4	10
% App. Total	73.7	26.3		28.6	71.4		60	40	
PHF	.583	.625	.594	.500	.625	.700	.500	.500	.500

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

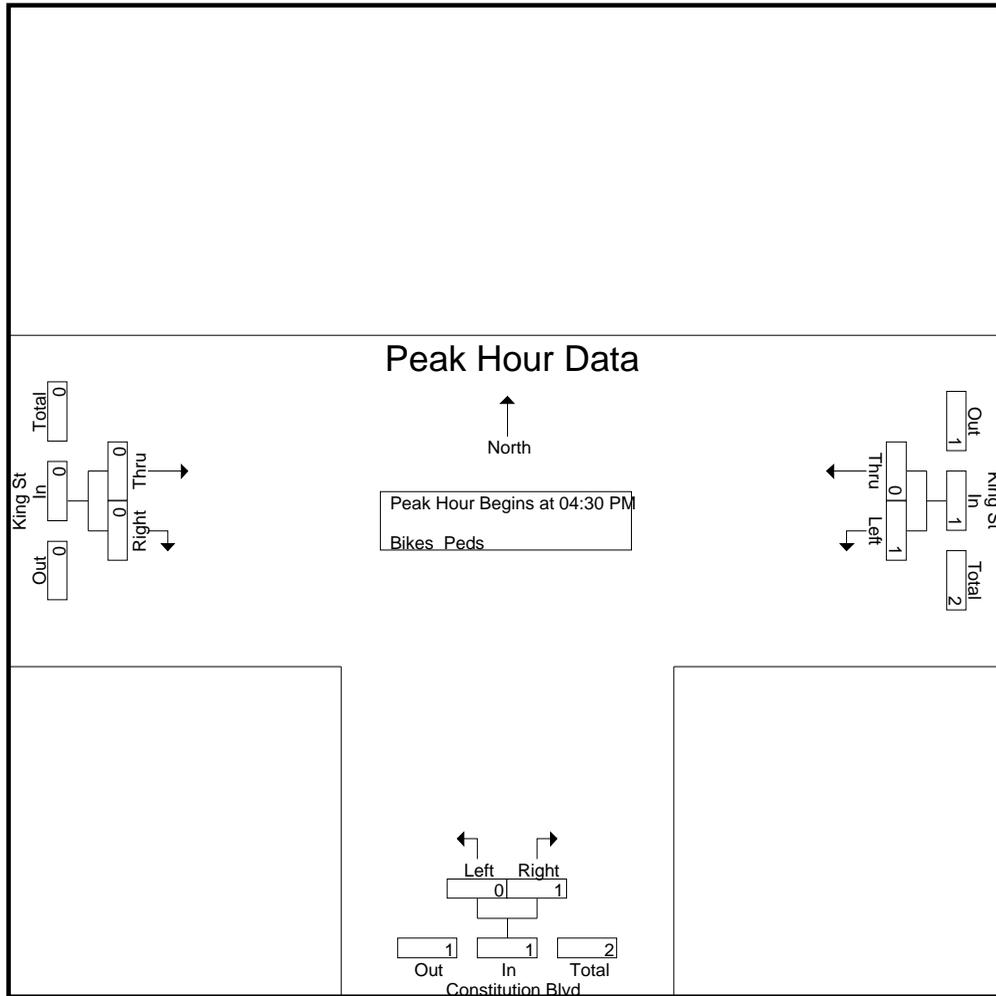
File Name : 88630001
Site Code : 88630001
Start Date : 5/26/2021
Page No : 10

Groups Printed- Bikes Peds

Start Time	King St From East			Constitution Blvd From South			King St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	1	0	0	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	1	0	0	0	0	0	0	0	0	0	1	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	1	0	0	0	0	0	0	0	0	0	1	1
Total	2	0	0	0	0	0	0	0	0	0	2	2
Grand Total	2	0	0	0	1	0	0	0	0	0	3	3
Apprch %	100	0		0	100		0	0				
Total %	66.7	0		0	33.3		0	0			100	

Start Time	King St From East			Constitution Blvd From South			King St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	0	0	0	1	1	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	1	0	1	0	0	0	0	0	0	1
Total Volume	1	0	1	0	1	1	0	0	0	2
% App. Total	100	0	100	0	100	100	0	0	0	100
PHF	.250	.000	.250	.000	.250	.250	.000	.000	.000	.500

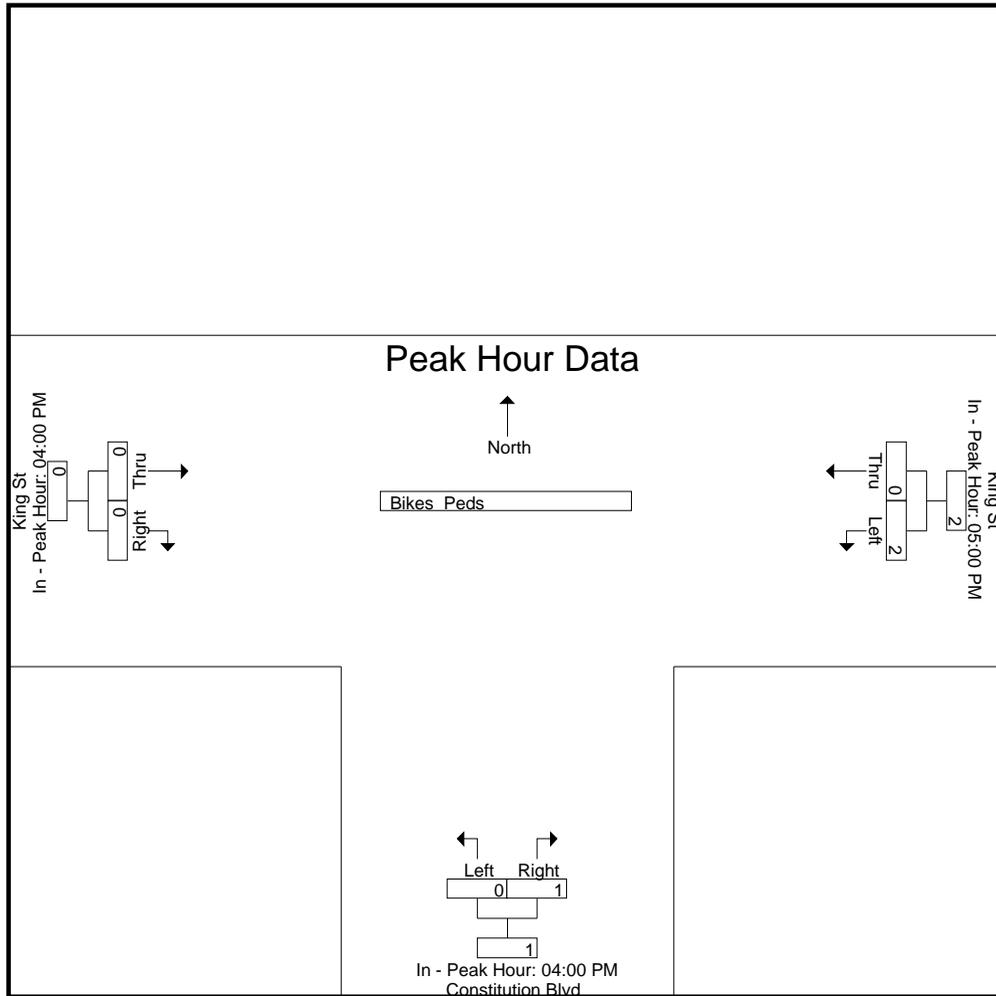
N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			04:00 PM			04:00 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	1	0	1	0	0	0	0	0	0
+30 mins.	0	0	0	0	1	1	0	0	0
+45 mins.	1	0	1	0	0	0	0	0	0
Total Volume	2	0	2	0	1	1	0	0	0
% App. Total	100	0		0	100		0	0	
PHF	.500	.000	.500	.000	.250	.250	.000	.000	.000

N/S Street : Constitution Boulevard
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Route 495 SB Ramp
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

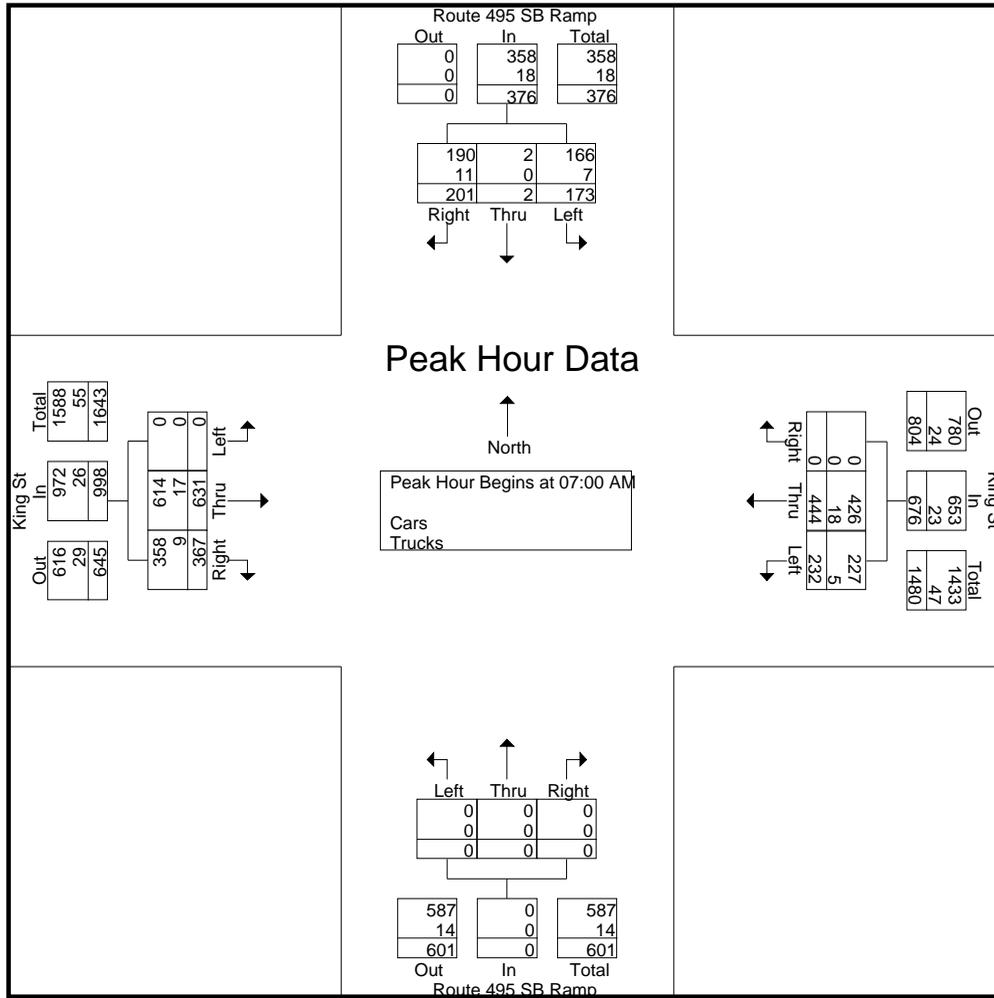
File Name : 88630002
 Site Code : 88630002
 Start Date : 5/26/2021
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Route 495 SB Ramp From North			King St From East			Route 495 SB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	36	1	45	53	99	0	0	0	0	0	163	79	476
07:15 AM	34	1	43	56	113	0	0	0	0	0	173	94	514
07:30 AM	49	0	51	74	104	0	0	0	0	0	155	102	535
07:45 AM	54	0	62	49	128	0	0	0	0	0	140	92	525
Total	173	2	201	232	444	0	0	0	0	0	631	367	2050
08:00 AM	33	0	59	52	129	0	0	0	0	0	123	69	465
08:15 AM	33	0	63	62	125	0	0	0	0	0	143	77	503
08:30 AM	44	0	53	60	86	0	0	0	0	0	134	61	438
08:45 AM	46	0	57	58	100	0	0	0	0	0	151	73	485
Total	156	0	232	232	440	0	0	0	0	0	551	280	1891
Grand Total	329	2	433	464	884	0	0	0	0	0	1182	647	3941
Apprch %	43.1	0.3	56.7	34.4	65.6	0	0	0	0	0	64.6	35.4	
Total %	8.3	0.1	11	11.8	22.4	0	0	0	0	0	30	16.4	
Cars	318	2	411	450	851	0	0	0	0	0	1141	626	3799
% Cars	96.7	100	94.9	97	96.3	0	0	0	0	0	96.5	96.8	96.4
Trucks	11	0	22	14	33	0	0	0	0	0	41	21	142
% Trucks	3.3	0	5.1	3	3.7	0	0	0	0	0	3.5	3.2	3.6

Start Time	Route 495 SB Ramp From North				King St From East				Route 495 SB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	36	1	45	82	53	99	0	152	0	0	0	0	0	163	79	242	476
07:15 AM	34	1	43	78	56	113	0	169	0	0	0	0	0	173	94	267	514
07:30 AM	49	0	51	100	74	104	0	178	0	0	0	0	0	155	102	257	535
07:45 AM	54	0	62	116	49	128	0	177	0	0	0	0	0	140	92	232	525
Total Volume	173	2	201	376	232	444	0	676	0	0	0	0	0	631	367	998	2050
% App. Total	46	0.5	53.5		34.3	65.7	0		0	0	0	0	0	63.2	36.8		
PHF	.801	.500	.810	.810	.784	.867	.000	.949	.000	.000	.000	.000	.000	.912	.900	.934	.958
Cars	166	2	190	358	227	426	0	653	0	0	0	0	0	614	358	972	1983
% Cars	96.0	100	94.5	95.2	97.8	95.9	0	96.6	0	0	0	0	0	97.3	97.5	97.4	96.7
Trucks	7	0	11	18	5	18	0	23	0	0	0	0	0	17	9	26	67
% Trucks	4.0	0	5.5	4.8	2.2	4.1	0	3.4	0	0	0	0	0	2.7	2.5	2.6	3.3

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:00 AM				07:00 AM							
+0 mins.	49	0	51	100	74	104	0	178	0	0	0	0	0	163	79	242
+15 mins.	54	0	62	116	49	128	0	177	0	0	0	0	0	173	94	267
+30 mins.	33	0	59	92	52	129	0	181	0	0	0	0	0	155	102	257
+45 mins.	33	0	63	96	62	125	0	187	0	0	0	0	0	140	92	232
Total Volume	169	0	235	404	237	486	0	723	0	0	0	0	0	631	367	998
% App. Total	41.8	0	58.2		32.8	67.2	0		0	0	0		0	63.2	36.8	
PHF	.782	.000	.933	.871	.801	.942	.000	.967	.000	.000	.000	.000	.000	.912	.900	.934
Cars	161	0	224	385	231	468	0	699	0	0	0	0	0	614	358	972
% Cars	95.3	0	95.3	95.3	97.5	96.3	0	96.7	0	0	0	0	0	97.3	97.5	97.4
Trucks	8	0	11	19	6	18	0	24	0	0	0	0	0	17	9	26
% Trucks	4.7	0	4.7	4.7	2.5	3.7	0	3.3	0	0	0	0	0	2.7	2.5	2.6

Accurate Counts
978-664-2565

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

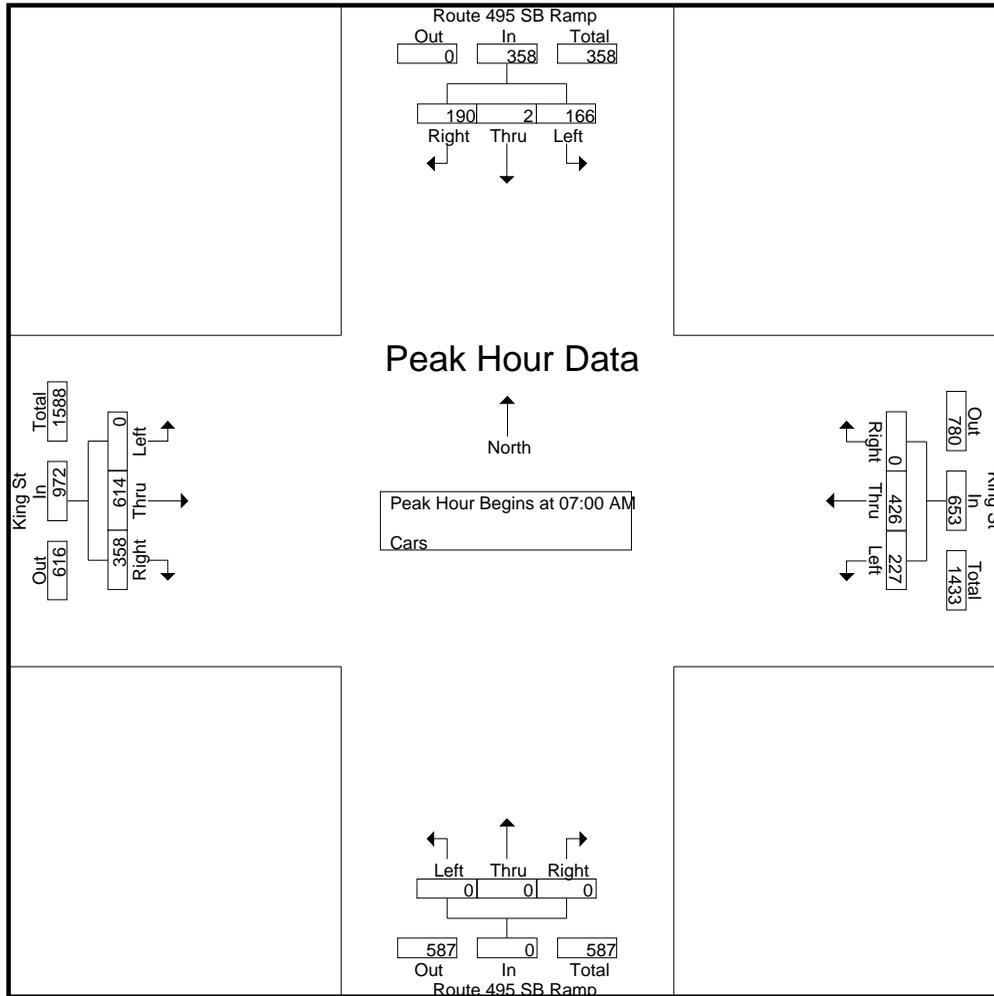
File Name : 88630002
Site Code : 88630002
Start Date : 5/26/2021
Page No : 4

Groups Printed- Cars

Start Time	Route 495 SB Ramp From North			King St From East			Route 495 SB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	35	1	43	51	96	0	0	0	0	0	162	78	466
07:15 AM	34	1	39	56	109	0	0	0	0	0	170	92	501
07:30 AM	47	0	50	72	99	0	0	0	0	0	148	98	514
07:45 AM	50	0	58	48	122	0	0	0	0	0	134	90	502
Total	166	2	190	227	426	0	0	0	0	0	614	358	1983
08:00 AM	33	0	58	52	124	0	0	0	0	0	114	65	446
08:15 AM	31	0	58	59	123	0	0	0	0	0	141	73	485
08:30 AM	43	0	48	54	82	0	0	0	0	0	129	59	415
08:45 AM	45	0	57	58	96	0	0	0	0	0	143	71	470
Total	152	0	221	223	425	0	0	0	0	0	527	268	1816
Grand Total	318	2	411	450	851	0	0	0	0	0	1141	626	3799
Apprch %	43.5	0.3	56.2	34.6	65.4	0	0	0	0	0	64.6	35.4	
Total %	8.4	0.1	10.8	11.8	22.4	0	0	0	0	0	30	16.5	

Start Time	Route 495 SB Ramp From North				King St From East				Route 495 SB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	35	1	43	79	51	96	0	147	0	0	0	0	0	162	78	240	466
07:15 AM	34	1	39	74	56	109	0	165	0	0	0	0	0	170	92	262	501
07:30 AM	47	0	50	97	72	99	0	171	0	0	0	0	0	148	98	246	514
07:45 AM	50	0	58	108	48	122	0	170	0	0	0	0	0	134	90	224	502
Total Volume	166	2	190	358	227	426	0	653	0	0	0	0	0	614	358	972	1983
% App. Total	46.4	0.6	53.1		34.8	65.2	0		0	0	0	0	0	63.2	36.8		
PHF	.830	.500	.819	.829	.788	.873	.000	.955	.000	.000	.000	.000	.000	.903	.913	.927	.964

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:00 AM				07:00 AM			
+0 mins.	47	0	50	97	72	99	0	171	0	0	0	0	0	162	78	240
+15 mins.	50	0	58	108	48	122	0	170	0	0	0	0	0	170	92	262
+30 mins.	33	0	58	91	52	124	0	176	0	0	0	0	0	148	98	246
+45 mins.	31	0	58	89	59	123	0	182	0	0	0	0	0	134	90	224
Total Volume	161	0	224	385	231	468	0	699	0	0	0	0	0	614	358	972
% App. Total	41.8	0	58.2		33	67	0		0	0	0		0	63.2	36.8	
PHF	.805	.000	.966	.891	.802	.944	.000	.960	.000	.000	.000	.000	.000	.903	.913	.927

Accurate Counts

978-664-2565

File Name : 88630002

Site Code : 88630002

Start Date : 5/26/2021

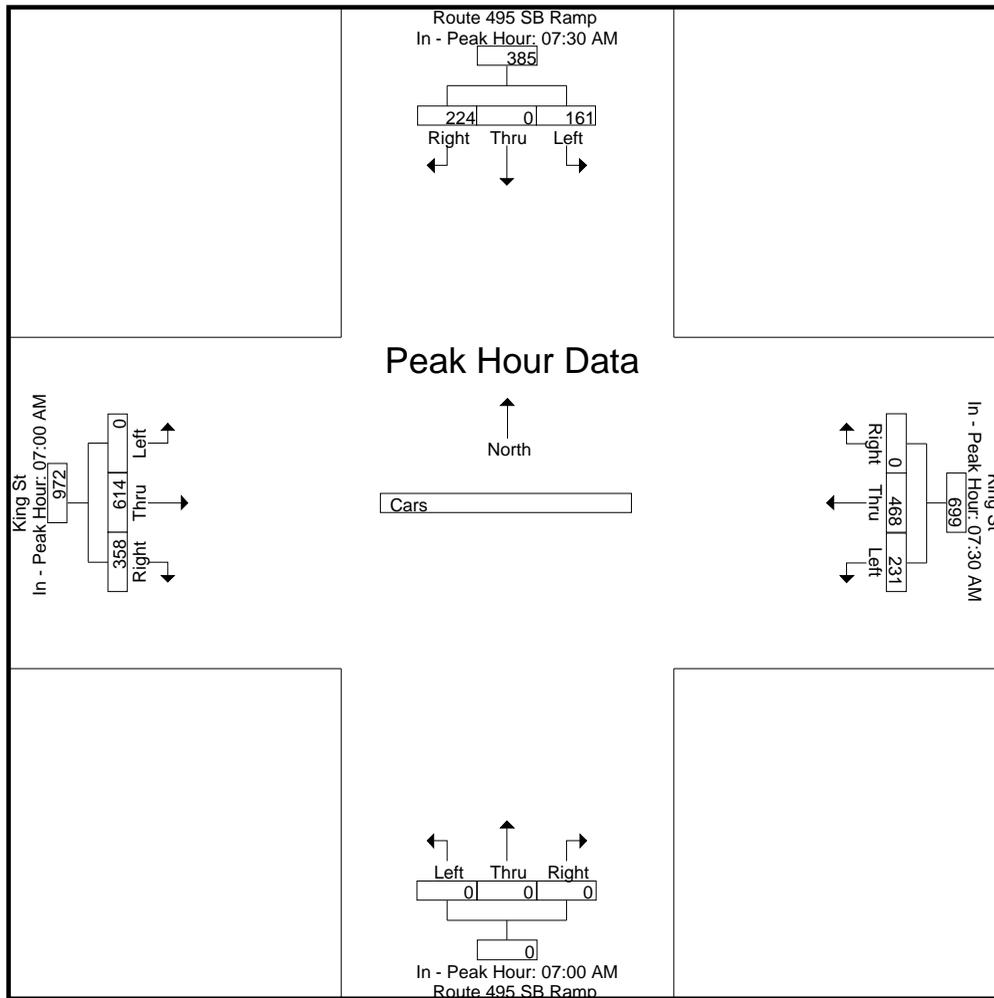
Page No : 6

N/S Street : Route 495 SB Ramp

E/W Street : King Street

City/State : Franklin, MA

Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

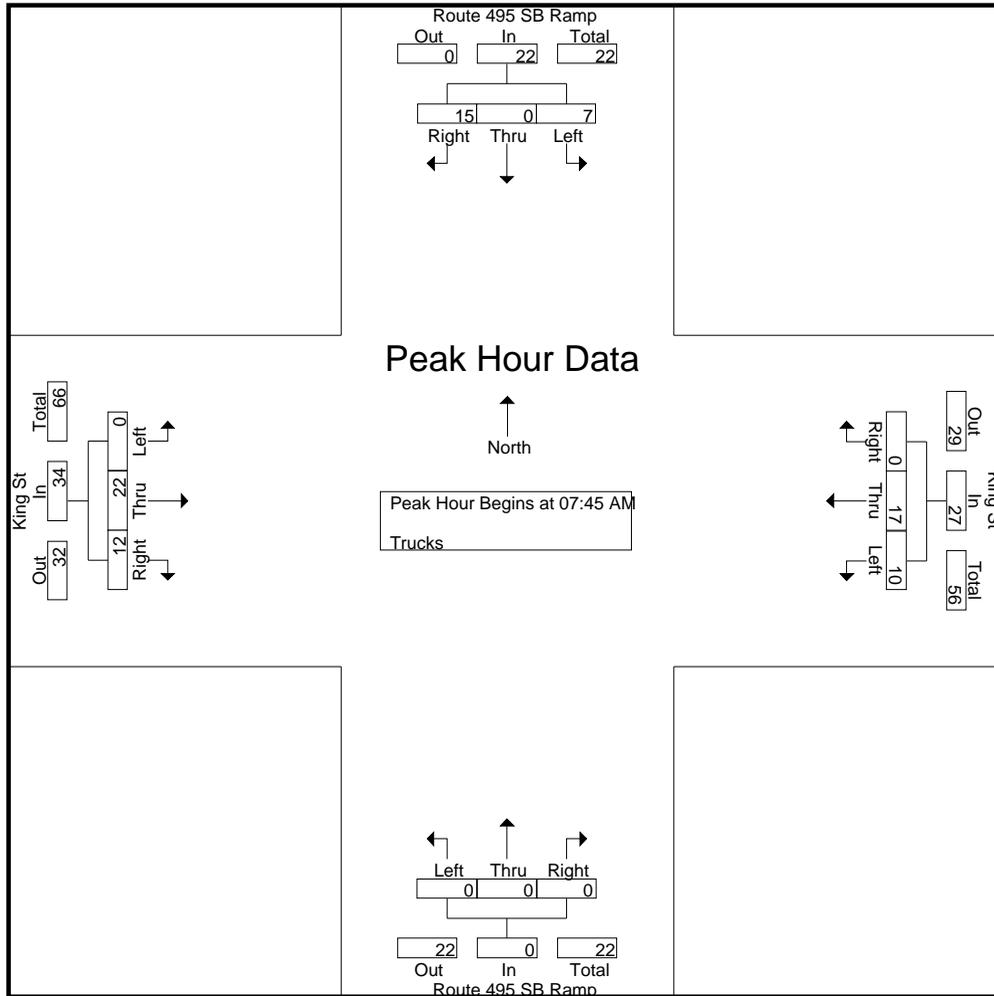
File Name : 88630002
Site Code : 88630002
Start Date : 5/26/2021
Page No : 7

Groups Printed- Trucks

Start Time	Route 495 SB Ramp From North			King St From East			Route 495 SB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	1	0	2	2	3	0	0	0	0	0	1	1	10
07:15 AM	0	0	4	0	4	0	0	0	0	0	3	2	13
07:30 AM	2	0	1	2	5	0	0	0	0	0	7	4	21
07:45 AM	4	0	4	1	6	0	0	0	0	0	6	2	23
Total	7	0	11	5	18	0	0	0	0	0	17	9	67
08:00 AM	0	0	1	0	5	0	0	0	0	0	9	4	19
08:15 AM	2	0	5	3	2	0	0	0	0	0	2	4	18
08:30 AM	1	0	5	6	4	0	0	0	0	0	5	2	23
08:45 AM	1	0	0	0	4	0	0	0	0	0	8	2	15
Total	4	0	11	9	15	0	0	0	0	0	24	12	75
Grand Total	11	0	22	14	33	0	0	0	0	0	41	21	142
Apprch %	33.3	0	66.7	29.8	70.2	0	0	0	0	0	66.1	33.9	
Total %	7.7	0	15.5	9.9	23.2	0	0	0	0	0	28.9	14.8	

Start Time	Route 495 SB Ramp From North				King St From East				Route 495 SB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	4	0	4	8	1	6	0	7	0	0	0	0	0	6	2	8	23
08:00 AM	0	0	1	1	0	5	0	5	0	0	0	0	0	9	4	13	19
08:15 AM	2	0	5	7	3	2	0	5	0	0	0	0	0	2	4	6	18
08:30 AM	1	0	5	6	6	4	0	10	0	0	0	0	0	5	2	7	23
Total Volume	7	0	15	22	10	17	0	27	0	0	0	0	0	22	12	34	83
% App. Total	31.8	0	68.2		37	63	0		0	0	0		0	64.7	35.3		
PHF	.438	.000	.750	.688	.417	.708	.000	.675	.000	.000	.000	.000	.000	.611	.750	.654	.902

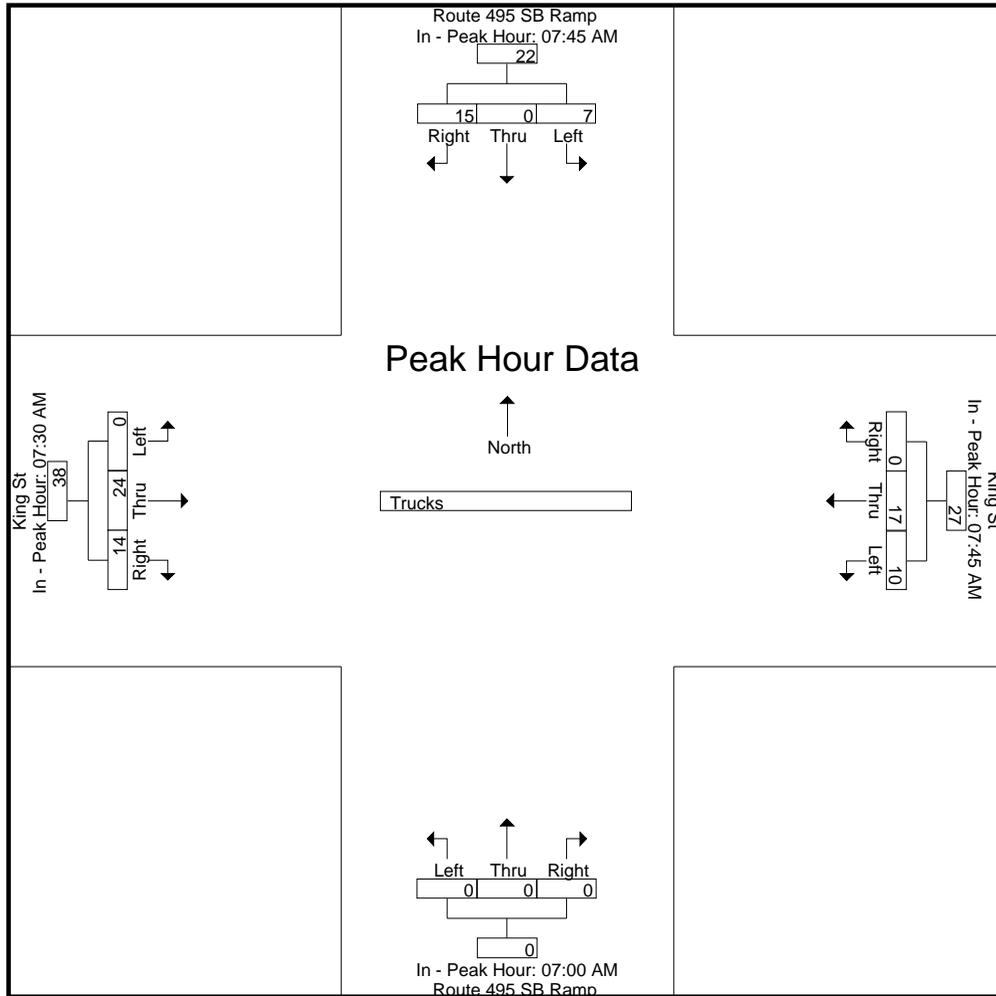
N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				07:00 AM				07:30 AM			
+0 mins.	4	0	4	8	1	6	0	7	0	0	0	0	0	7	4	11
+15 mins.	0	0	1	1	0	5	0	5	0	0	0	0	0	6	2	8
+30 mins.	2	0	5	7	3	2	0	5	0	0	0	0	0	9	4	13
+45 mins.	1	0	5	6	6	4	0	10	0	0	0	0	0	2	4	6
Total Volume	7	0	15	22	10	17	0	27	0	0	0	0	0	24	14	38
% App. Total	31.8	0	68.2		37	63	0		0	0	0		0	63.2	36.8	
PHF	.438	.000	.750	.688	.417	.708	.000	.675	.000	.000	.000	.000	.000	.667	.875	.731

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

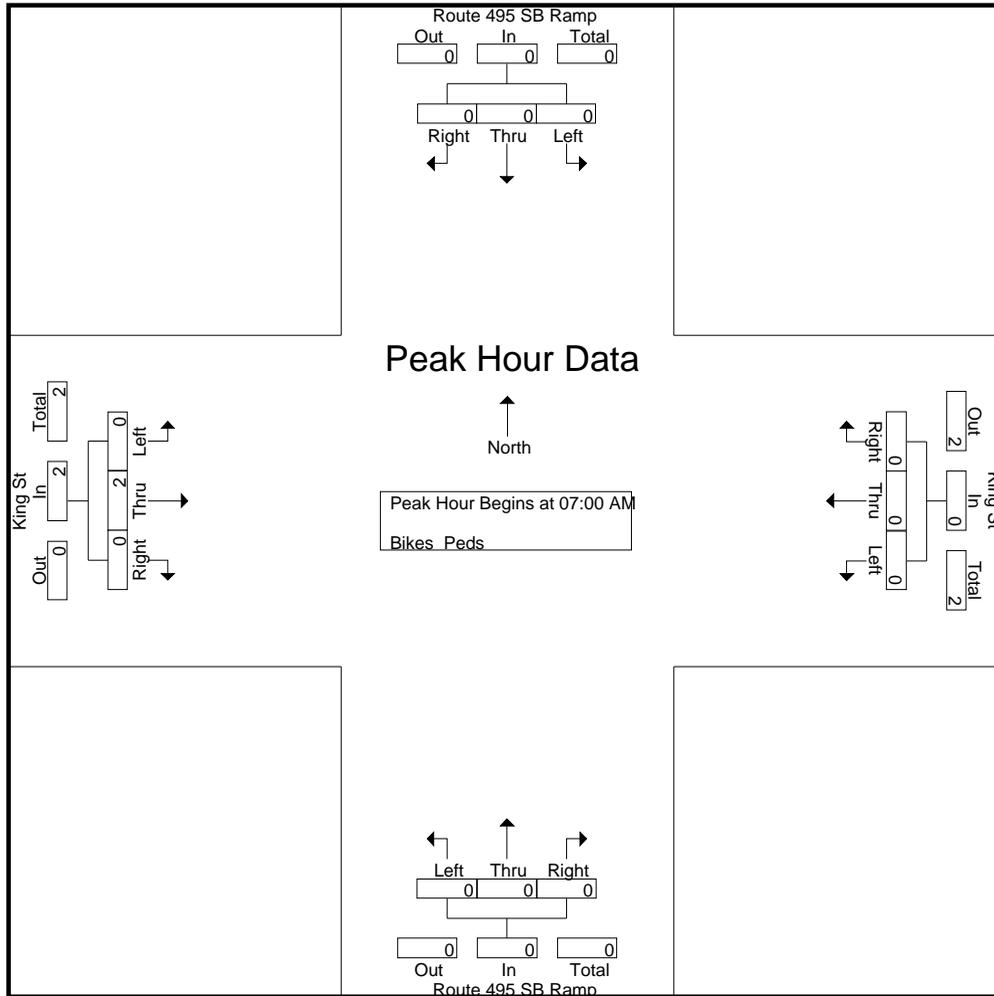
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Site Code : 88630002
Start Date : 5/26/2021
Page No : 10

Groups Printed- Bikes Peds

Start Time	Route 495 SB Ramp From North				King St From East				Route 495 SB Ramp From South				King St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	2	1	3
Grand Total	0	0	0	0	0	1	0	0	0	0	0	2	0	2	0	0	2	3	5
Apprch %	0	0	0		0	100	0		0	0	0		0	100	0				
Total %	0	0	0		0	33.3	0		0	0	0		0	66.7	0		40	60	

Start Time	Route 495 SB Ramp From North				King St From East				Route 495 SB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.000	.500	.500

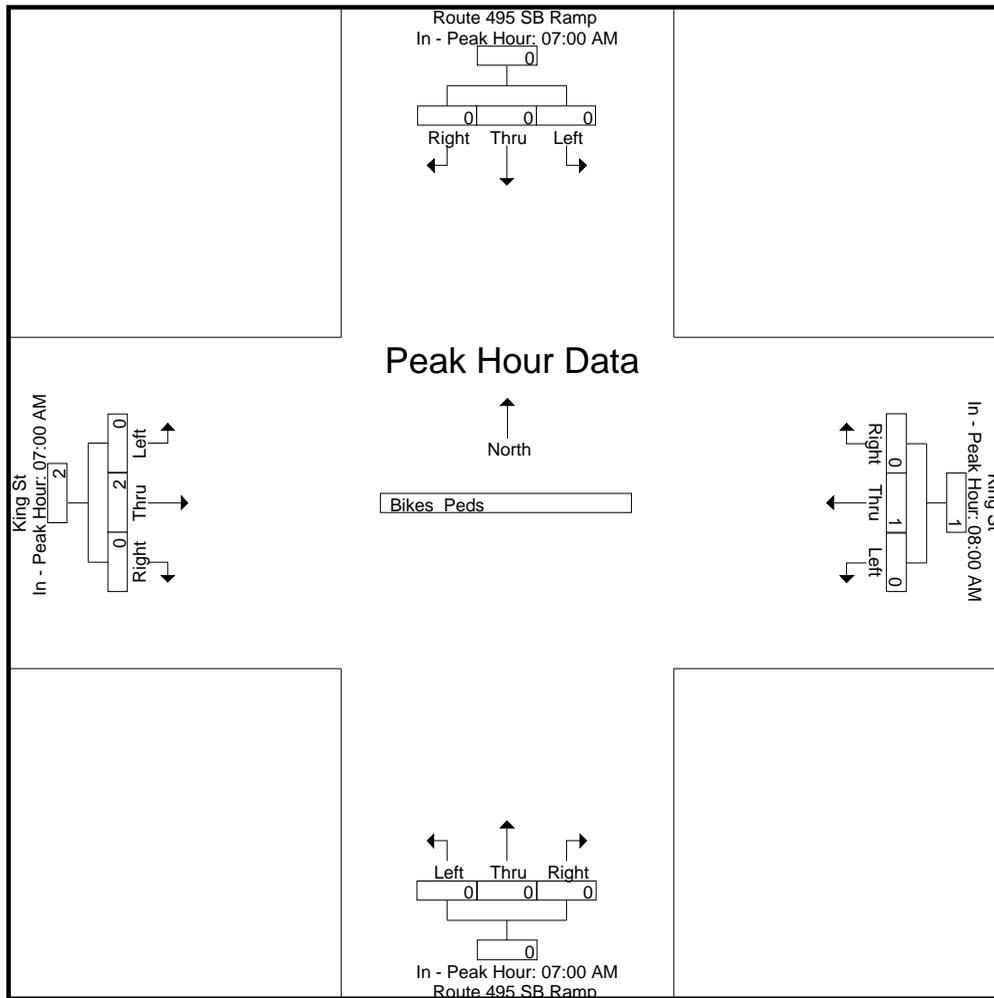
N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				08:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2
% App. Total	0	0	0	0	0	100	0	100	0	0	0	0	0	100	0	100
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.500	.000	.500

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Route 495 SB Ramp
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

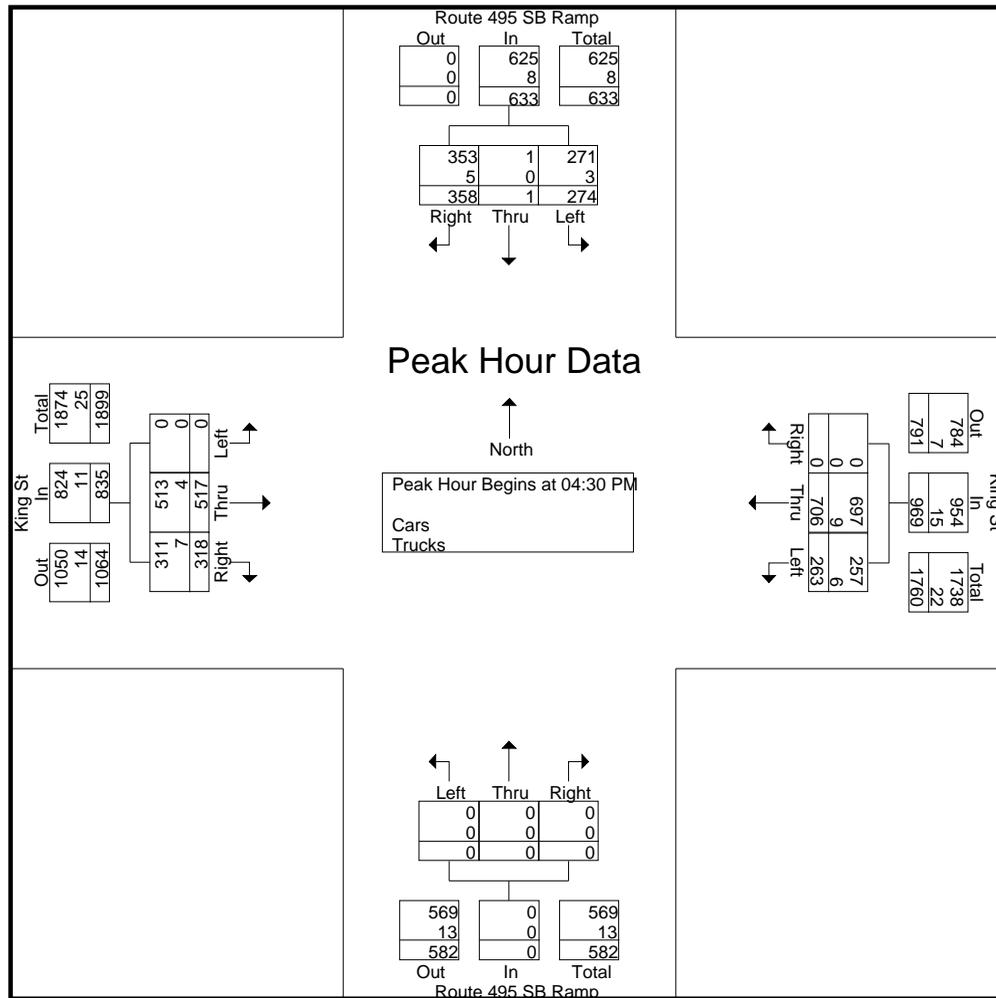
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 Site Code : 88630002
 Start Date : 5/26/2021
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Route 495 SB Ramp From North			King St From East			Route 495 SB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	50	0	73	72	175	0	0	0	0	0	148	71	589
04:15 PM	59	0	90	64	152	0	0	0	0	0	108	64	537
04:30 PM	62	0	93	61	179	0	0	0	0	0	128	100	623
04:45 PM	64	0	85	56	165	0	0	0	0	0	133	68	571
Total	235	0	341	253	671	0	0	0	0	0	517	303	2320
05:00 PM	81	1	85	79	185	0	0	0	0	0	141	85	657
05:15 PM	67	0	95	67	177	0	0	0	0	0	115	65	586
05:30 PM	67	0	66	75	151	0	0	0	0	0	113	72	544
05:45 PM	64	0	51	58	143	0	0	0	0	0	107	69	492
Total	279	1	297	279	656	0	0	0	0	0	476	291	2279
Grand Total	514	1	638	532	1327	0	0	0	0	0	993	594	4599
Apprch %	44.6	0.1	55.3	28.6	71.4	0	0	0	0	0	62.6	37.4	
Total %	11.2	0	13.9	11.6	28.9	0	0	0	0	0	21.6	12.9	
Cars	509	1	627	522	1314	0	0	0	0	0	981	579	4533
% Cars	99	100	98.3	98.1	99	0	0	0	0	0	98.8	97.5	98.6
Trucks	5	0	11	10	13	0	0	0	0	0	12	15	66
% Trucks	1	0	1.7	1.9	1	0	0	0	0	0	1.2	2.5	1.4

Start Time	Route 495 SB Ramp From North				King St From East				Route 495 SB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	62	0	93	155	61	179	0	240	0	0	0	0	0	128	100	228	623
04:45 PM	64	0	85	149	56	165	0	221	0	0	0	0	0	133	68	201	571
05:00 PM	81	1	85	167	79	185	0	264	0	0	0	0	0	141	85	226	657
05:15 PM	67	0	95	162	67	177	0	244	0	0	0	0	0	115	65	180	586
Total Volume	274	1	358	633	263	706	0	969	0	0	0	0	0	517	318	835	2437
% App. Total	43.3	0.2	56.6		27.1	72.9	0		0	0	0	0	0	61.9	38.1		
PHF	.846	.250	.942	.948	.832	.954	.000	.918	.000	.000	.000	.000	.000	.917	.795	.916	.927
Cars	271	1	353	625	257	697	0	954	0	0	0	0	0	513	311	824	2403
% Cars	98.9	100	98.6	98.7	97.7	98.7	0	98.5	0	0	0	0	0	99.2	97.8	98.7	98.6
Trucks	3	0	5	8	6	9	0	15	0	0	0	0	0	4	7	11	34
% Trucks	1.1	0	1.4	1.3	2.3	1.3	0	1.5	0	0	0	0	0	0.8	2.2	1.3	1.4

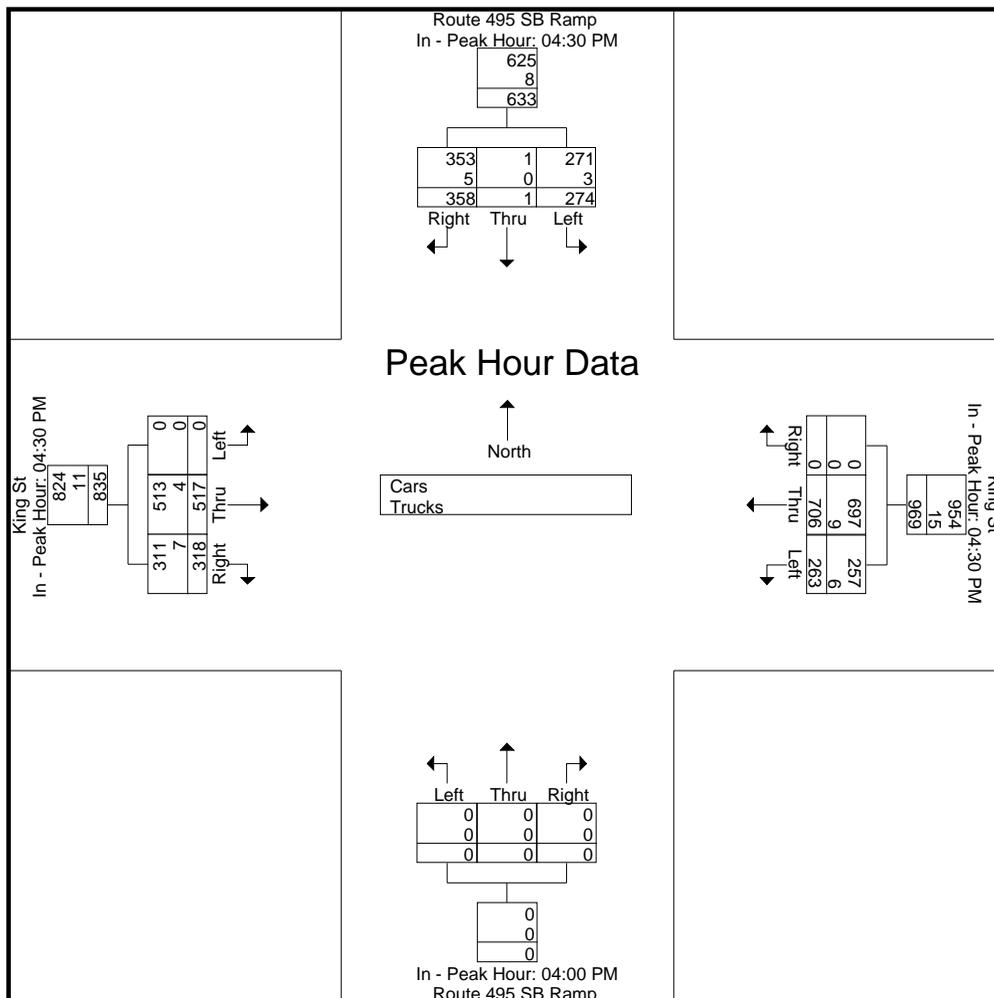
N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:00 PM				04:30 PM			
+0 mins.	62	0	93	155	61	179	0	240	0	0	0	0	0	128	100	228
+15 mins.	64	0	85	149	56	165	0	221	0	0	0	0	0	133	68	201
+30 mins.	81	1	85	167	79	185	0	264	0	0	0	0	0	141	85	226
+45 mins.	67	0	95	162	67	177	0	244	0	0	0	0	0	115	65	180
Total Volume	274	1	358	633	263	706	0	969	0	0	0	0	0	517	318	835
% App. Total	43.3	0.2	56.6		27.1	72.9	0		0	0	0	0	0	61.9	38.1	
PHF	.846	.250	.942	.948	.832	.954	.000	.918	.000	.000	.000	.000	.000	.917	.795	.916
Cars	271	1	353	625	257	697	0	954	0	0	0	0	0	513	311	824
% Cars	98.9	100	98.6	98.7	97.7	98.7	0	98.5	0	0	0	0	0	99.2	97.8	98.7
Trucks	3	0	5	8	6	9	0	15	0	0	0	0	0	4	7	11
% Trucks	1.1	0	1.4	1.3	2.3	1.3	0	1.5	0	0	0	0	0	0.8	2.2	1.3

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Route 495 SB Ramp
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

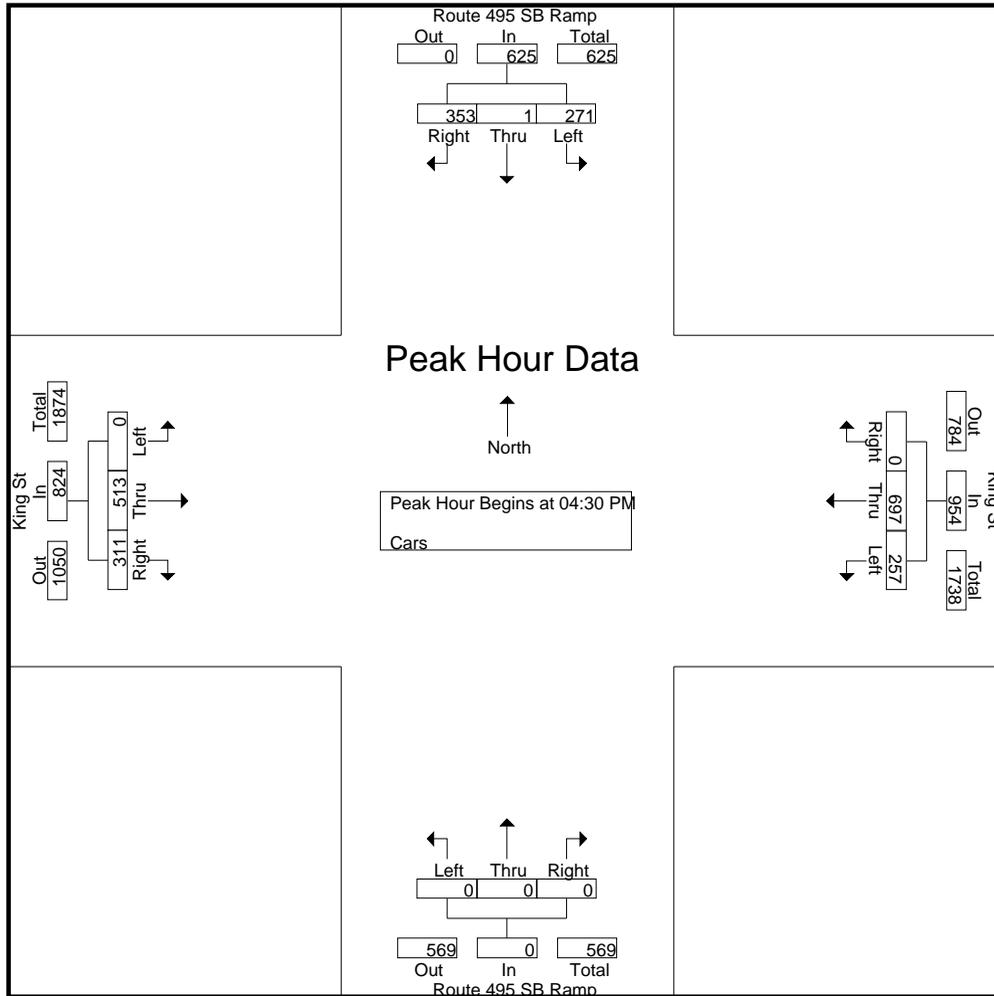
File Name : 88630002
 Site Code : 88630002
 Start Date : 5/26/2021
 Page No : 4

Groups Printed- Cars

Start Time	Route 495 SB Ramp From North			King St From East			Route 495 SB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	49	0	73	70	174	0	0	0	0	0	147	69	582
04:15 PM	58	0	86	63	149	0	0	0	0	0	106	63	525
04:30 PM	62	0	92	59	173	0	0	0	0	0	127	99	612
04:45 PM	63	0	84	55	165	0	0	0	0	0	132	65	564
Total	232	0	335	247	661	0	0	0	0	0	512	296	2283
05:00 PM	79	1	84	78	184	0	0	0	0	0	139	82	647
05:15 PM	67	0	93	65	175	0	0	0	0	0	115	65	580
05:30 PM	67	0	64	74	151	0	0	0	0	0	109	69	534
05:45 PM	64	0	51	58	143	0	0	0	0	0	106	67	489
Total	277	1	292	275	653	0	0	0	0	0	469	283	2250
Grand Total	509	1	627	522	1314	0	0	0	0	0	981	579	4533
Apprch %	44.8	0.1	55.1	28.4	71.6	0	0	0	0	0	62.9	37.1	
Total %	11.2	0	13.8	11.5	29	0	0	0	0	0	21.6	12.8	

Start Time	Route 495 SB Ramp From North				King St From East				Route 495 SB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	62	0	92	154	59	173	0	232	0	0	0	0	0	127	99	226	612
04:45 PM	63	0	84	147	55	165	0	220	0	0	0	0	0	132	65	197	564
05:00 PM	79	1	84	164	78	184	0	262	0	0	0	0	0	139	82	221	647
05:15 PM	67	0	93	160	65	175	0	240	0	0	0	0	0	115	65	180	580
Total Volume	271	1	353	625	257	697	0	954	0	0	0	0	0	513	311	824	2403
% App. Total	43.4	0.2	56.5		26.9	73.1	0		0	0	0	0	0	62.3	37.7		
PHF	.858	.250	.949	.953	.824	.947	.000	.910	.000	.000	.000	.000	.000	.923	.785	.912	.929

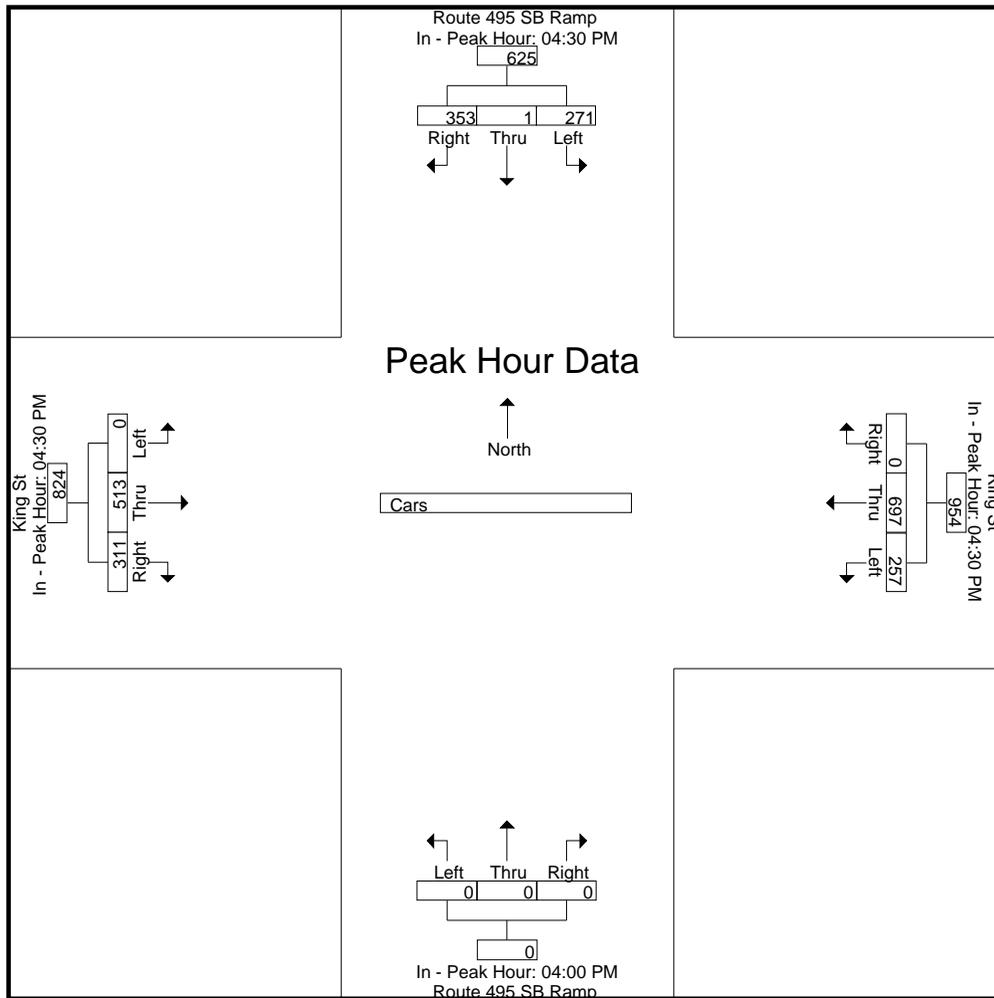
N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:00 PM				04:30 PM			
+0 mins.	62	0	92	154	59	173	0	232	0	0	0	0	0	127	99	226
+15 mins.	63	0	84	147	55	165	0	220	0	0	0	0	0	132	65	197
+30 mins.	79	1	84	164	78	184	0	262	0	0	0	0	0	139	82	221
+45 mins.	67	0	93	160	65	175	0	240	0	0	0	0	0	115	65	180
Total Volume	271	1	353	625	257	697	0	954	0	0	0	0	0	513	311	824
% App. Total	43.4	0.2	56.5		26.9	73.1	0		0	0	0		0	62.3	37.7	
PHF	.858	.250	.949	.953	.824	.947	.000	.910	.000	.000	.000	.000	.000	.923	.785	.912

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Route 495 SB Ramp
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

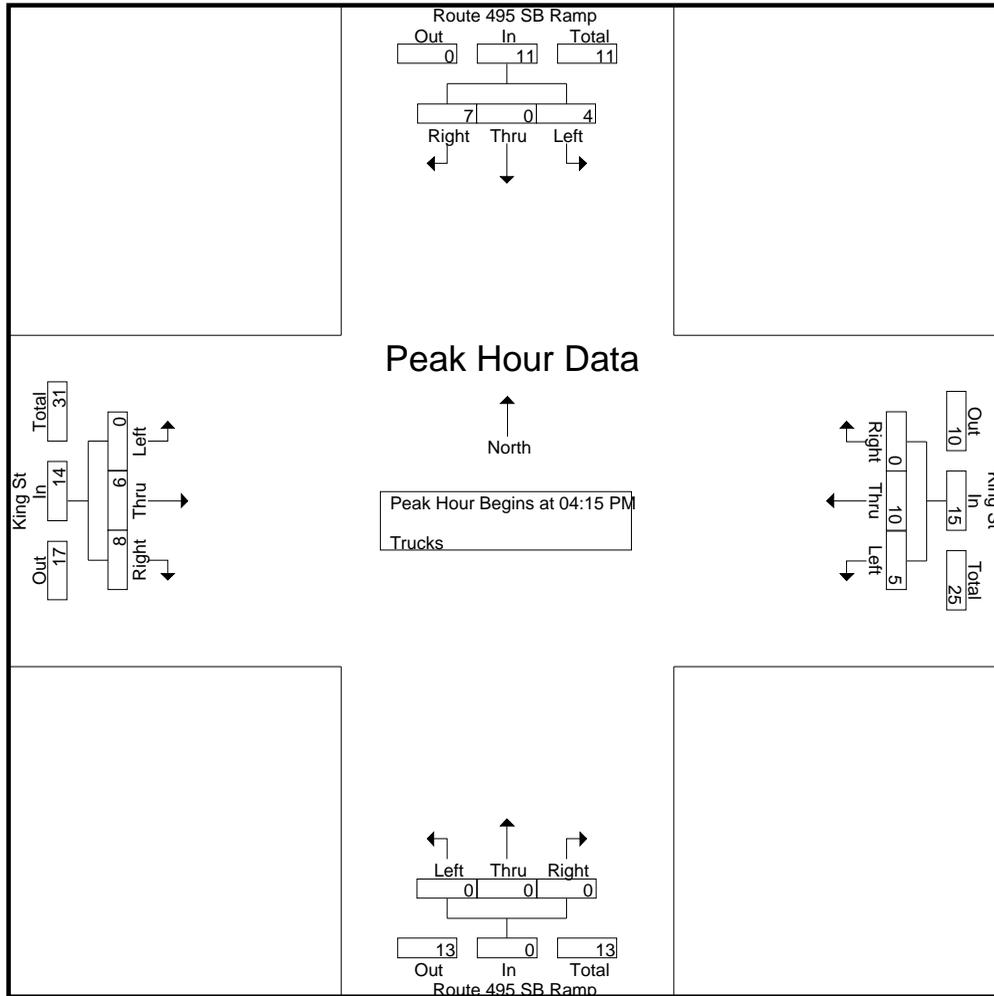
File Name : 88630002
 Site Code : 88630002
 Start Date : 5/26/2021
 Page No : 7

Groups Printed- Trucks

Start Time	Route 495 SB Ramp From North			King St From East			Route 495 SB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	1	0	0	2	1	0	0	0	0	0	1	2	7
04:15 PM	1	0	4	1	3	0	0	0	0	0	2	1	12
04:30 PM	0	0	1	2	6	0	0	0	0	0	1	1	11
04:45 PM	1	0	1	1	0	0	0	0	0	0	1	3	7
Total	3	0	6	6	10	0	0	0	0	0	5	7	37
05:00 PM	2	0	1	1	1	0	0	0	0	0	2	3	10
05:15 PM	0	0	2	2	2	0	0	0	0	0	0	0	6
05:30 PM	0	0	2	1	0	0	0	0	0	0	4	3	10
05:45 PM	0	0	0	0	0	0	0	0	0	0	1	2	3
Total	2	0	5	4	3	0	0	0	0	0	7	8	29
Grand Total	5	0	11	10	13	0	0	0	0	0	12	15	66
Apprch %	31.2	0	68.8	43.5	56.5	0	0	0	0	0	44.4	55.6	
Total %	7.6	0	16.7	15.2	19.7	0	0	0	0	0	18.2	22.7	

Start Time	Route 495 SB Ramp From North				King St From East				Route 495 SB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	1	0	4	5	1	3	0	4	0	0	0	0	0	2	1	3	12
04:30 PM	0	0	1	1	2	6	0	8	0	0	0	0	0	1	1	2	11
04:45 PM	1	0	1	2	1	0	0	1	0	0	0	0	0	1	3	4	7
05:00 PM	2	0	1	3	1	1	0	2	0	0	0	0	0	2	3	5	10
Total Volume	4	0	7	11	5	10	0	15	0	0	0	0	0	6	8	14	40
% App. Total	36.4	0	63.6		33.3	66.7	0		0	0	0		0	42.9	57.1		
PHF	.500	.000	.438	.550	.625	.417	.000	.469	.000	.000	.000	.000	.000	.750	.667	.700	.833

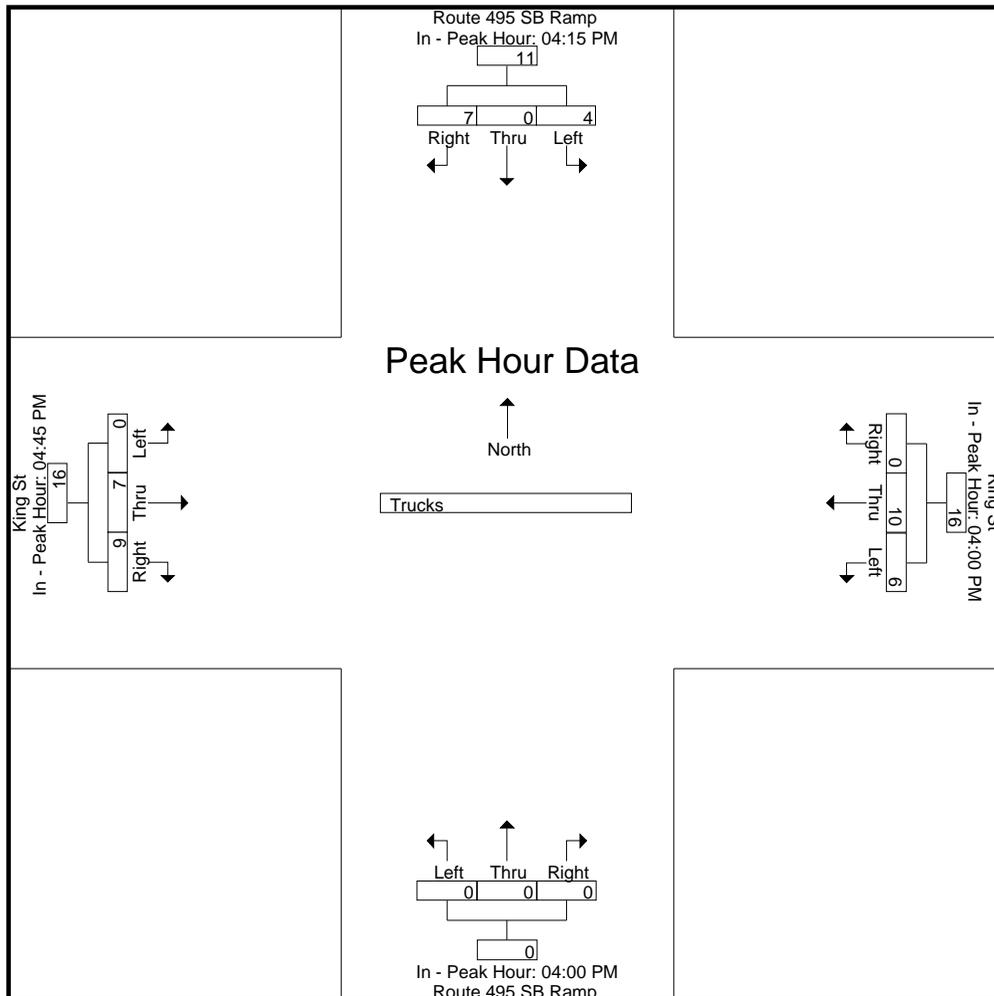
N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM				04:00 PM				04:00 PM				04:45 PM			
+0 mins.	1	0	4	5	2	1	0	3	0	0	0	0	0	1	3	4
+15 mins.	0	0	1	1	1	3	0	4	0	0	0	0	0	2	3	5
+30 mins.	1	0	1	2	2	6	0	8	0	0	0	0	0	0	0	0
+45 mins.	2	0	1	3	1	0	0	1	0	0	0	0	0	4	3	7
Total Volume	4	0	7	11	6	10	0	16	0	0	0	0	0	7	9	16
% App. Total	36.4	0	63.6		37.5	62.5	0		0	0	0		0	43.8	56.2	
PHF	.500	.000	.438	.550	.750	.417	.000	.500	.000	.000	.000	.000	.000	.438	.750	.571

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

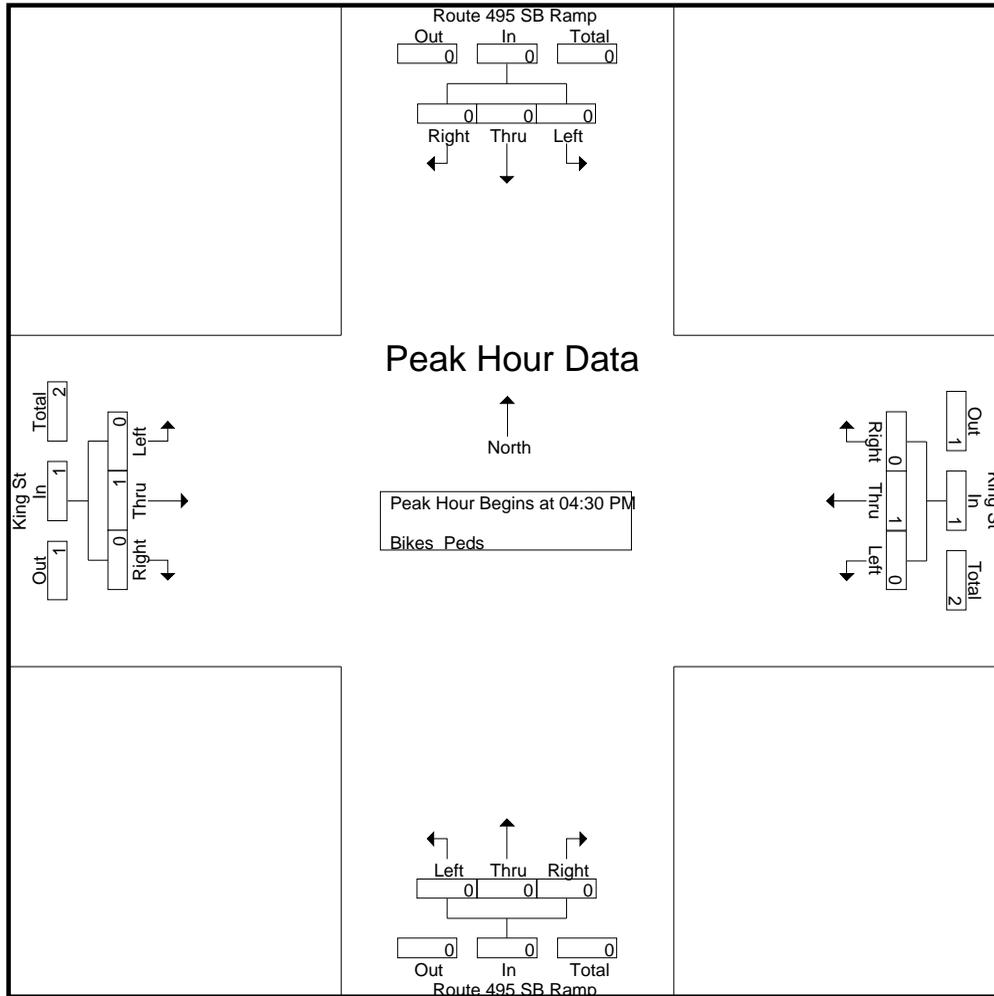
File Name : 88630002
Site Code : 88630002
Start Date : 5/26/2021
Page No : 10

Groups Printed- Bikes Peds

Start Time	Route 495 SB Ramp From North				King St From East				Route 495 SB Ramp From South				King St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2
Grand Total	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	3	3
Apprch %	0	0	0		0	100	0		0	0	0		0	100	0				
Total %	0	0	0		0	66.7	0		0	0	0		0	33.3	0		0	100	

Start Time	Route 495 SB Ramp From North				King St From East				Route 495 SB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.500

N/S Street : Route 495 SB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1
% App. Total	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.250	.000	.250

Accurate Counts

978-664-2565

File Name : 88630002

Site Code : 88630002

Start Date : 5/26/2021

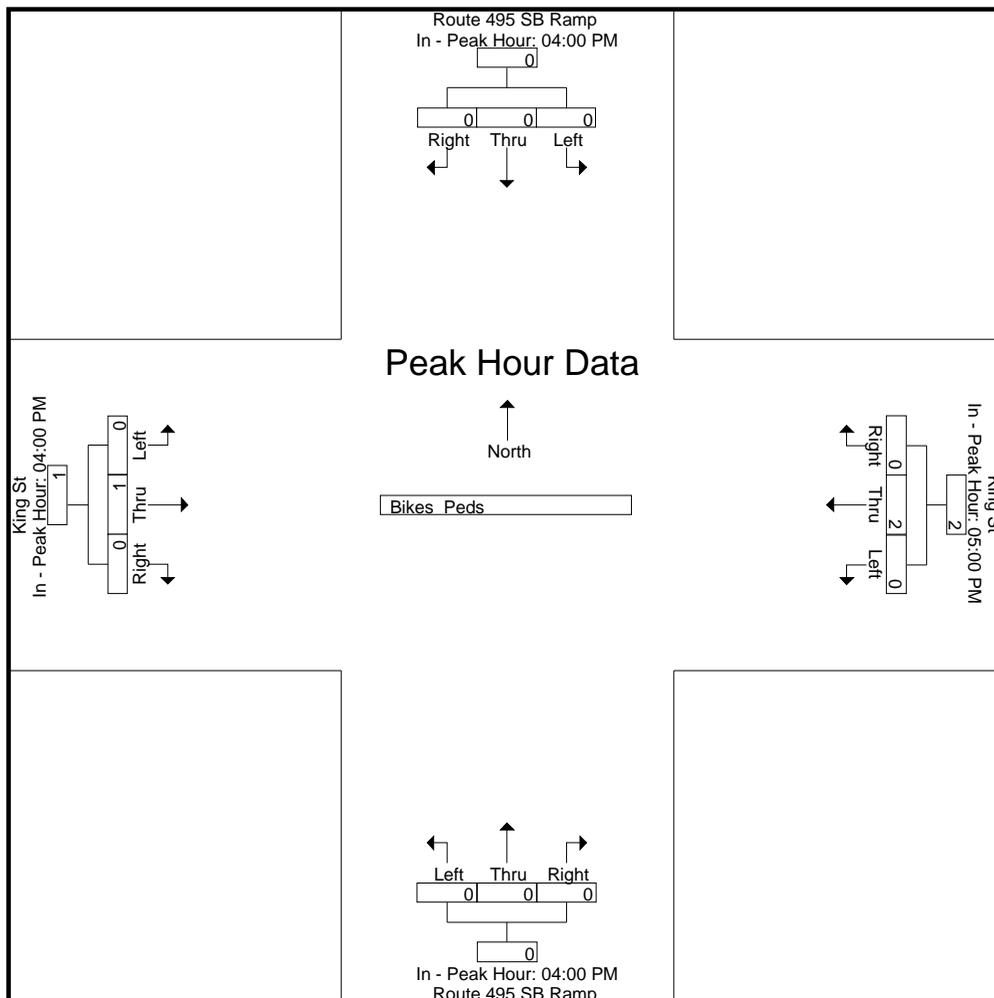
Page No : 12

N/S Street : Route 495 SB Ramp

E/W Street : King Street

City/State : Franklin, MA

Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Route 495 NB Ramp
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

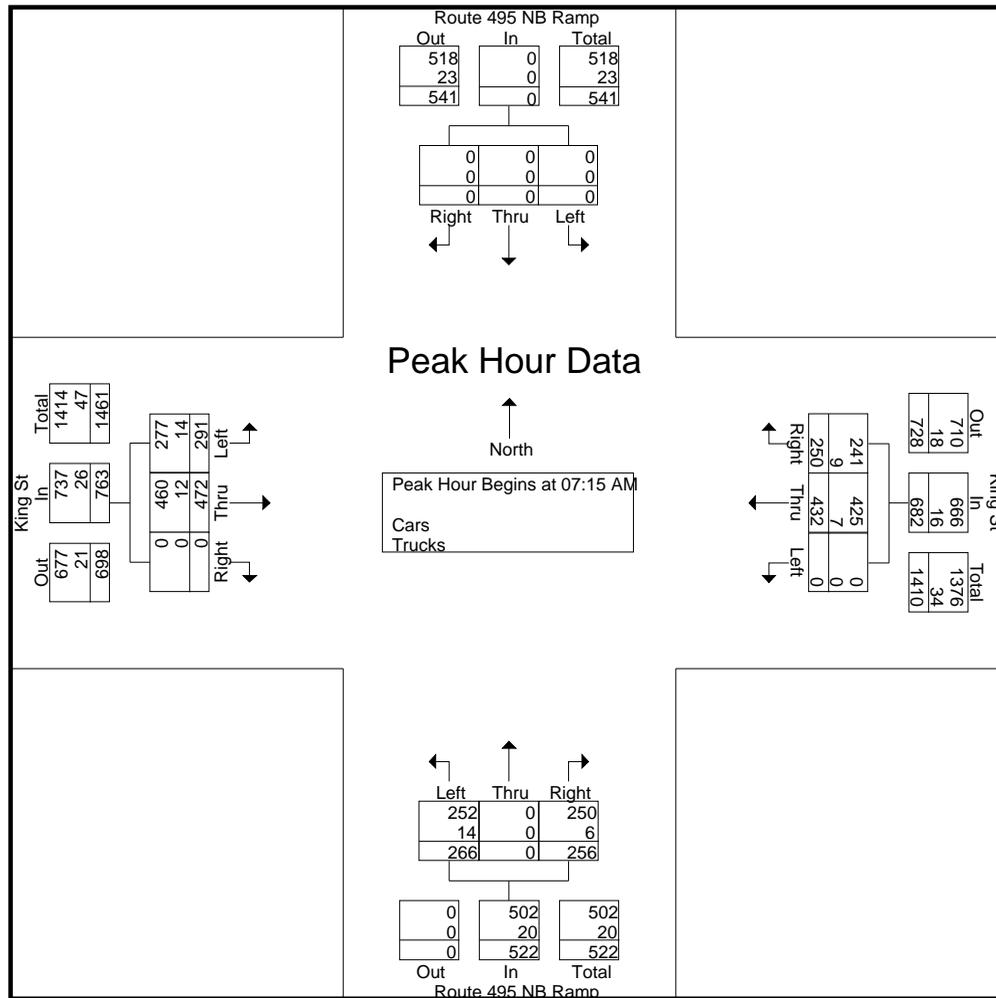
File Name : 88630003
 Site Code : 88630003
 Start Date : 5/26/2021
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Route 495 NB Ramp From North			King St From East			Route 495 NB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	0	116	59	41	0	40	74	118	0	448
07:15 AM	0	0	0	0	99	67	57	0	58	75	135	0	491
07:30 AM	0	0	0	0	120	71	66	0	63	79	125	0	524
07:45 AM	0	0	0	0	103	62	76	0	72	76	112	0	501
Total	0	0	0	0	438	259	240	0	233	304	490	0	1964
08:00 AM	0	0	0	0	110	50	67	0	63	61	100	0	451
08:15 AM	0	0	0	0	117	65	67	0	48	61	113	0	471
08:30 AM	0	0	0	0	110	66	33	0	52	70	108	0	439
08:45 AM	0	0	0	0	118	65	38	1	63	63	135	0	483
Total	0	0	0	0	455	246	205	1	226	255	456	0	1844
Grand Total	0	0	0	0	893	505	445	1	459	559	946	0	3808
Apprch %	0	0	0	0	63.9	36.1	49.2	0.1	50.7	37.1	62.9	0	
Total %	0	0	0	0	23.5	13.3	11.7	0	12.1	14.7	24.8	0	
Cars	0	0	0	0	872	492	423	1	451	539	919	0	3697
% Cars	0	0	0	0	97.6	97.4	95.1	100	98.3	96.4	97.1	0	97.1
Trucks	0	0	0	0	21	13	22	0	8	20	27	0	111
% Trucks	0	0	0	0	2.4	2.6	4.9	0	1.7	3.6	2.9	0	2.9

Start Time	Route 495 NB Ramp From North				King St From East				Route 495 NB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	99	67	166	57	0	58	115	75	135	0	210	491
07:30 AM	0	0	0	0	0	120	71	191	66	0	63	129	79	125	0	204	524
07:45 AM	0	0	0	0	0	103	62	165	76	0	72	148	76	112	0	188	501
08:00 AM	0	0	0	0	0	110	50	160	67	0	63	130	61	100	0	161	451
Total Volume	0	0	0	0	0	432	250	682	266	0	256	522	291	472	0	763	1967
% App. Total	0	0	0	0	0	63.3	36.7		51	0	49		38.1	61.9	0		
PHF	.000	.000	.000	.000	.000	.900	.880	.893	.875	.000	.889	.882	.921	.874	.000	.908	.938
Cars	0	0	0	0	0	425	241	666	252	0	250	502	277	460	0	737	1905
% Cars	0	0	0	0	0	98.4	96.4	97.7	94.7	0	97.7	96.2	95.2	97.5	0	96.6	96.8
Trucks	0	0	0	0	0	7	9	16	14	0	6	20	14	12	0	26	62
% Trucks	0	0	0	0	0	1.6	3.6	2.3	5.3	0	2.3	3.8	4.8	2.5	0	3.4	3.2

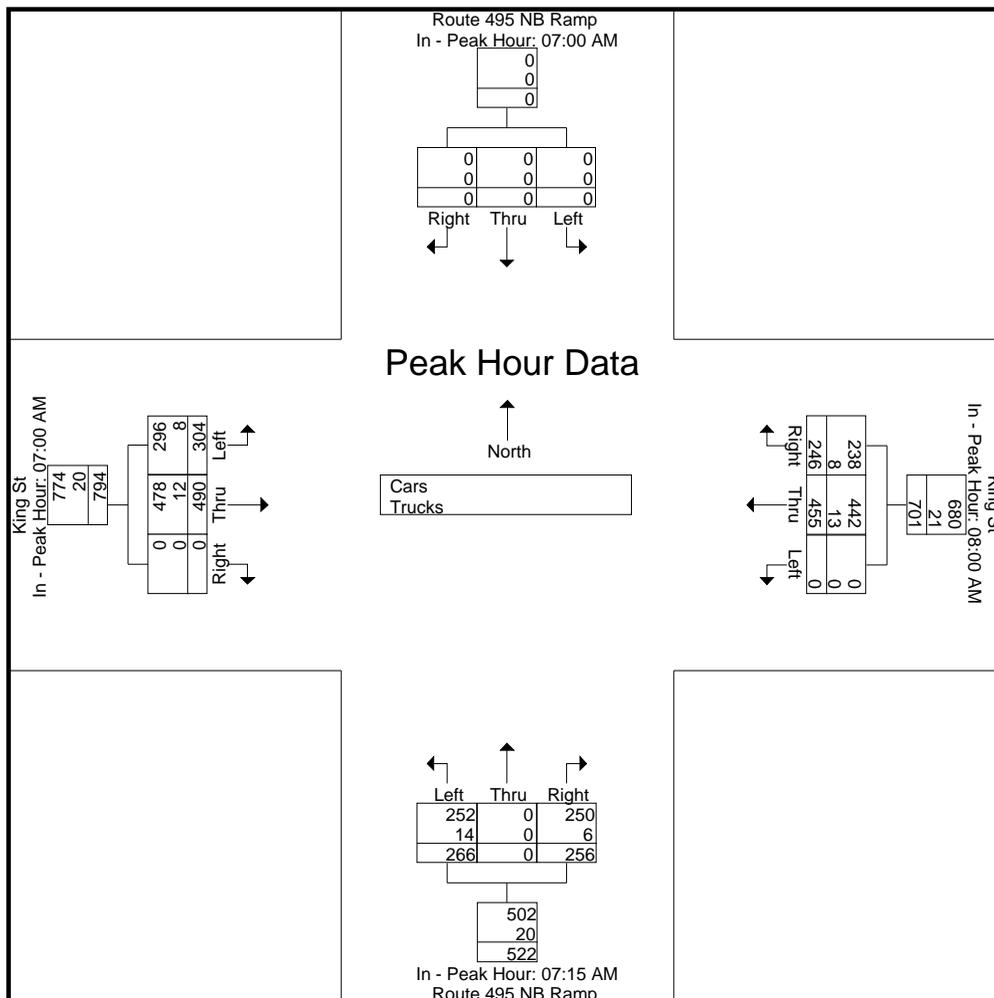
N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				08:00 AM				07:15 AM				07:00 AM			
+0 mins.	0	0	0	0	0	110	50	160	57	0	58	115	74	118	0	192
+15 mins.	0	0	0	0	0	117	65	182	66	0	63	129	75	135	0	210
+30 mins.	0	0	0	0	0	110	66	176	76	0	72	148	79	125	0	204
+45 mins.	0	0	0	0	0	118	65	183	67	0	63	130	76	112	0	188
Total Volume	0	0	0	0	0	455	246	701	266	0	256	522	304	490	0	794
% App. Total	0	0	0	0	0	64.9	35.1		51	0	49		38.3	61.7	0	
PHF	.000	.000	.000	.000	.000	.964	.932	.958	.875	.000	.889	.882	.962	.907	.000	.945
Cars	0	0	0	0	0	442	238	680	252	0	250	502	296	478	0	774
% Cars	0	0	0	0	0	97.1	96.7	97	94.7	0	97.7	96.2	97.4	97.6	0	97.5
Trucks	0	0	0	0	0	13	8	21	14	0	6	20	8	12	0	20
% Trucks	0	0	0	0	0	2.9	3.3	3	5.3	0	2.3	3.8	2.6	2.4	0	2.5

N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Route 495 NB Ramp
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

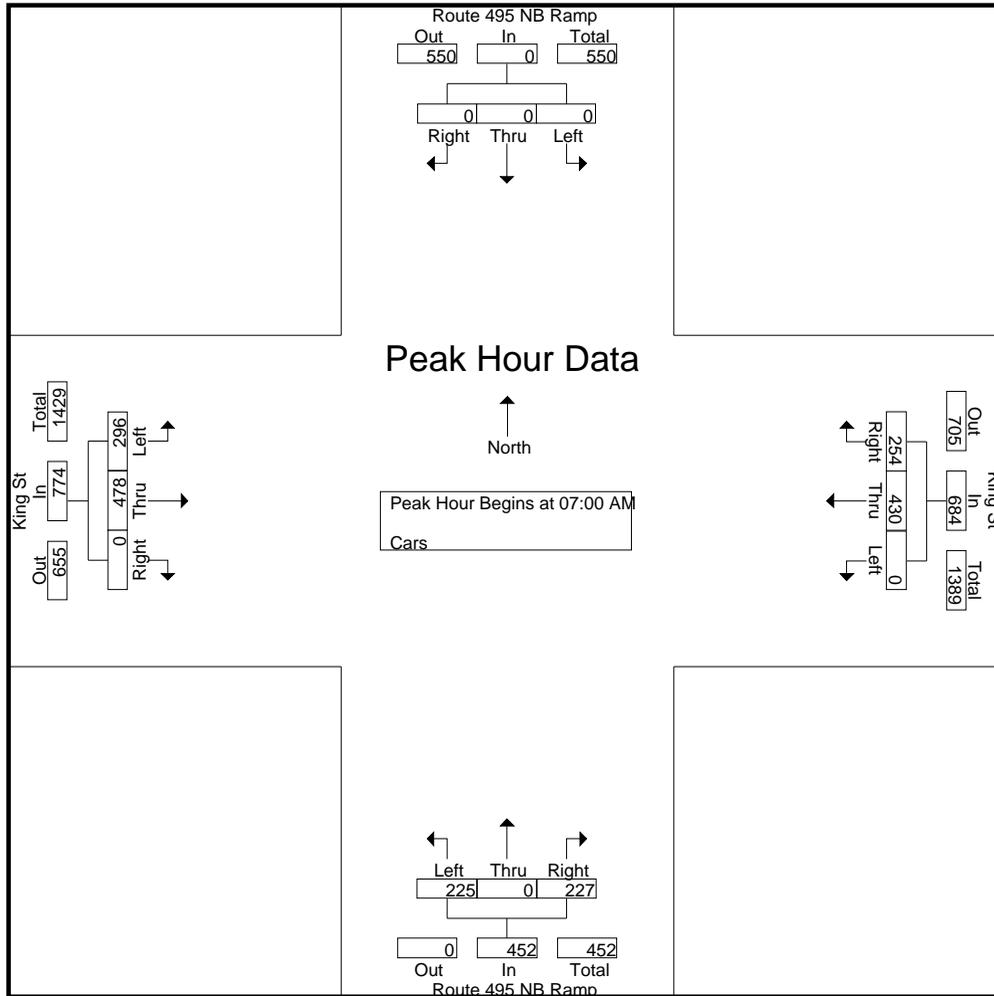
File Name : 88630003
 Site Code : 88630003
 Start Date : 5/26/2021
 Page No : 4

Groups Printed- Cars

Start Time	Route 495 NB Ramp From North			King St From East			Route 495 NB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	0	113	58	38	0	40	74	117	0	440
07:15 AM	0	0	0	0	99	65	52	0	56	74	133	0	479
07:30 AM	0	0	0	0	118	70	62	0	62	75	122	0	509
07:45 AM	0	0	0	0	100	61	73	0	69	73	106	0	482
Total	0	0	0	0	430	254	225	0	227	296	478	0	1910
08:00 AM	0	0	0	0	108	45	65	0	63	55	99	0	435
08:15 AM	0	0	0	0	112	65	67	0	47	61	109	0	461
08:30 AM	0	0	0	0	105	65	29	0	52	66	105	0	422
08:45 AM	0	0	0	0	117	63	37	1	62	61	128	0	469
Total	0	0	0	0	442	238	198	1	224	243	441	0	1787
Grand Total	0	0	0	0	872	492	423	1	451	539	919	0	3697
Apprch %	0	0	0	0	63.9	36.1	48.3	0.1	51.5	37	63	0	
Total %	0	0	0	0	23.6	13.3	11.4	0	12.2	14.6	24.9	0	

Start Time	Route 495 NB Ramp From North				King St From East				Route 495 NB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	113	58	171	38	0	40	78	74	117	0	191	440
07:15 AM	0	0	0	0	0	99	65	164	52	0	56	108	74	133	0	207	479
07:30 AM	0	0	0	0	0	118	70	188	62	0	62	124	75	122	0	197	509
07:45 AM	0	0	0	0	0	100	61	161	73	0	69	142	73	106	0	179	482
Total Volume	0	0	0	0	0	430	254	684	225	0	227	452	296	478	0	774	1910
% App. Total	0	0	0	0	0	62.9	37.1		49.8	0	50.2		38.2	61.8	0		
PHF	.000	.000	.000	.000	.000	.911	.907	.910	.771	.000	.822	.796	.987	.898	.000	.935	.938

N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:30 AM				07:00 AM			
+0 mins.	0	0	0	0	0	113	58	171	62	0	62	124	74	117	0	191
+15 mins.	0	0	0	0	0	99	65	164	73	0	69	142	74	133	0	207
+30 mins.	0	0	0	0	0	118	70	188	65	0	63	128	75	122	0	197
+45 mins.	0	0	0	0	0	100	61	161	67	0	47	114	73	106	0	179
Total Volume	0	0	0	0	0	430	254	684	267	0	241	508	296	478	0	774
% App. Total	0	0	0	0	0	62.9	37.1		52.6	0	47.4		38.2	61.8	0	
PHF	.000	.000	.000	.000	.000	.911	.907	.910	.914	.000	.873	.894	.987	.898	.000	.935

Accurate Counts

978-664-2565

File Name : 88630003

Site Code : 88630003

Start Date : 5/26/2021

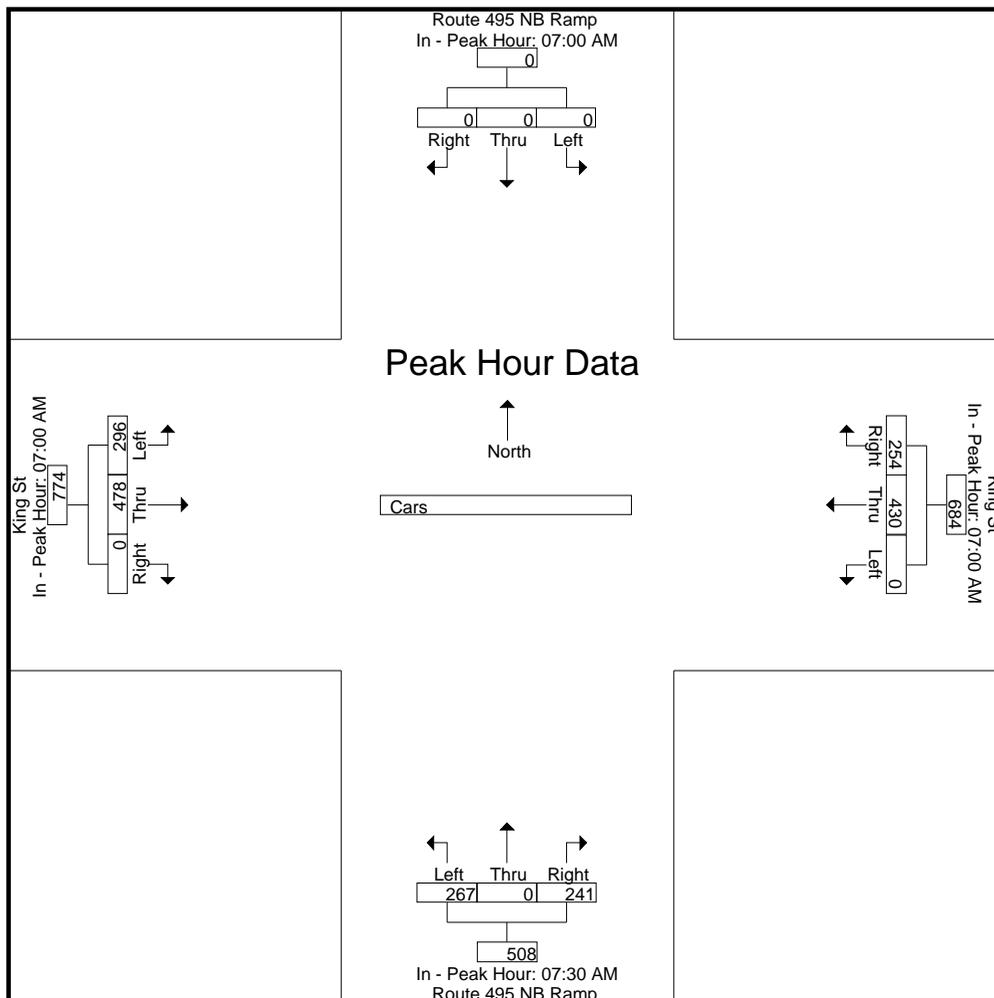
Page No : 6

N/S Street : Route 495 NB Ramp

E/W Street : King Street

City/State : Franklin, MA

Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Route 495 NB Ramp
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

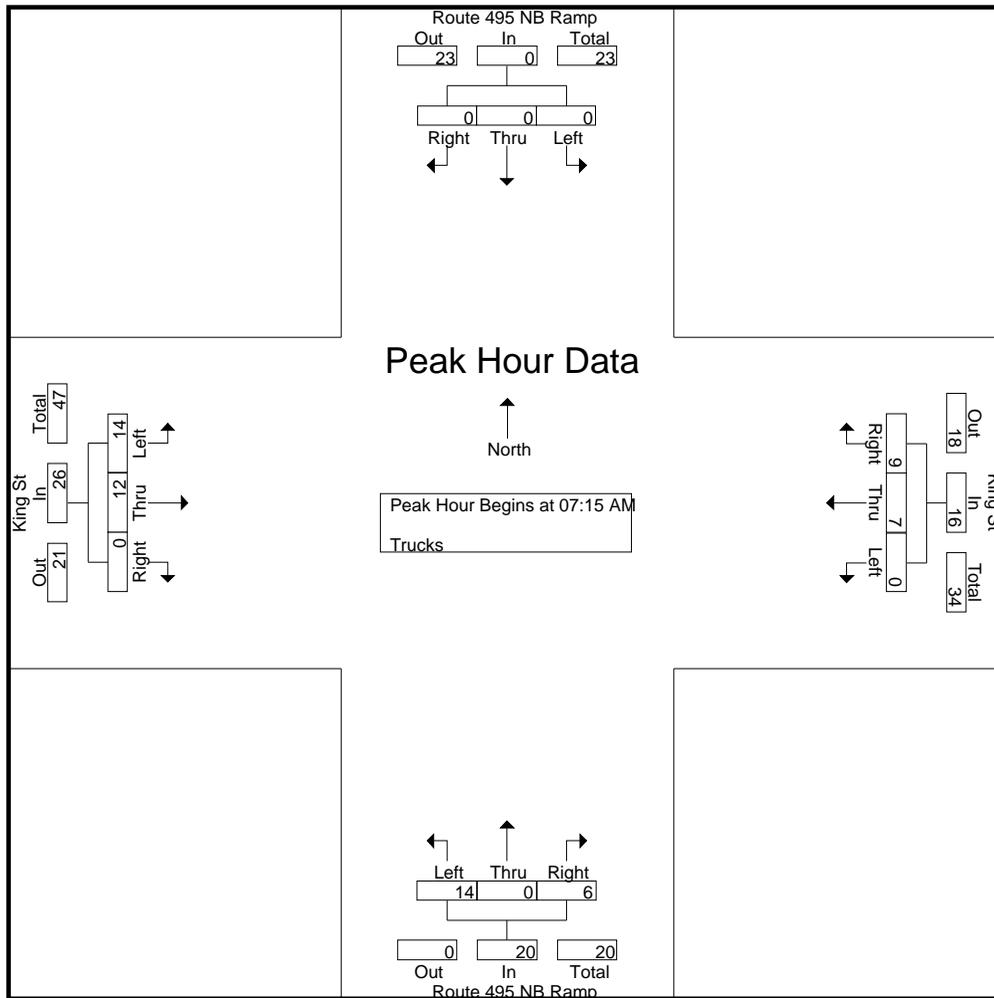
File Name : 88630003
 Site Code : 88630003
 Start Date : 5/26/2021
 Page No : 7

Groups Printed- Trucks

Start Time	Route 495 NB Ramp From North			King St From East			Route 495 NB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	0	3	1	3	0	0	0	1	0	8
07:15 AM	0	0	0	0	0	2	5	0	2	1	2	0	12
07:30 AM	0	0	0	0	2	1	4	0	1	4	3	0	15
07:45 AM	0	0	0	0	3	1	3	0	3	3	6	0	19
Total	0	0	0	0	8	5	15	0	6	8	12	0	54
08:00 AM	0	0	0	0	2	5	2	0	0	6	1	0	16
08:15 AM	0	0	0	0	5	0	0	0	1	0	4	0	10
08:30 AM	0	0	0	0	5	1	4	0	0	4	3	0	17
08:45 AM	0	0	0	0	1	2	1	0	1	2	7	0	14
Total	0	0	0	0	13	8	7	0	2	12	15	0	57
Grand Total	0	0	0	0	21	13	22	0	8	20	27	0	111
Apprch %	0	0	0	0	61.8	38.2	73.3	0	26.7	42.6	57.4	0	
Total %	0	0	0	0	18.9	11.7	19.8	0	7.2	18	24.3	0	

Start Time	Route 495 NB Ramp From North				King St From East				Route 495 NB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	0	2	2	5	0	2	7	1	2	0	3	12
07:30 AM	0	0	0	0	0	2	1	3	4	0	1	5	4	3	0	7	15
07:45 AM	0	0	0	0	0	3	1	4	3	0	3	6	3	6	0	9	19
08:00 AM	0	0	0	0	0	2	5	7	2	0	0	2	6	1	0	7	16
Total Volume	0	0	0	0	0	7	9	16	14	0	6	20	14	12	0	26	62
% App. Total	0	0	0	0	0	43.8	56.2	70	70	0	30	70	53.8	46.2	0	72.2	816
PHF	.000	.000	.000	.000	.000	.583	.450	.571	.700	.000	.500	.714	.583	.500	.000	.722	.816

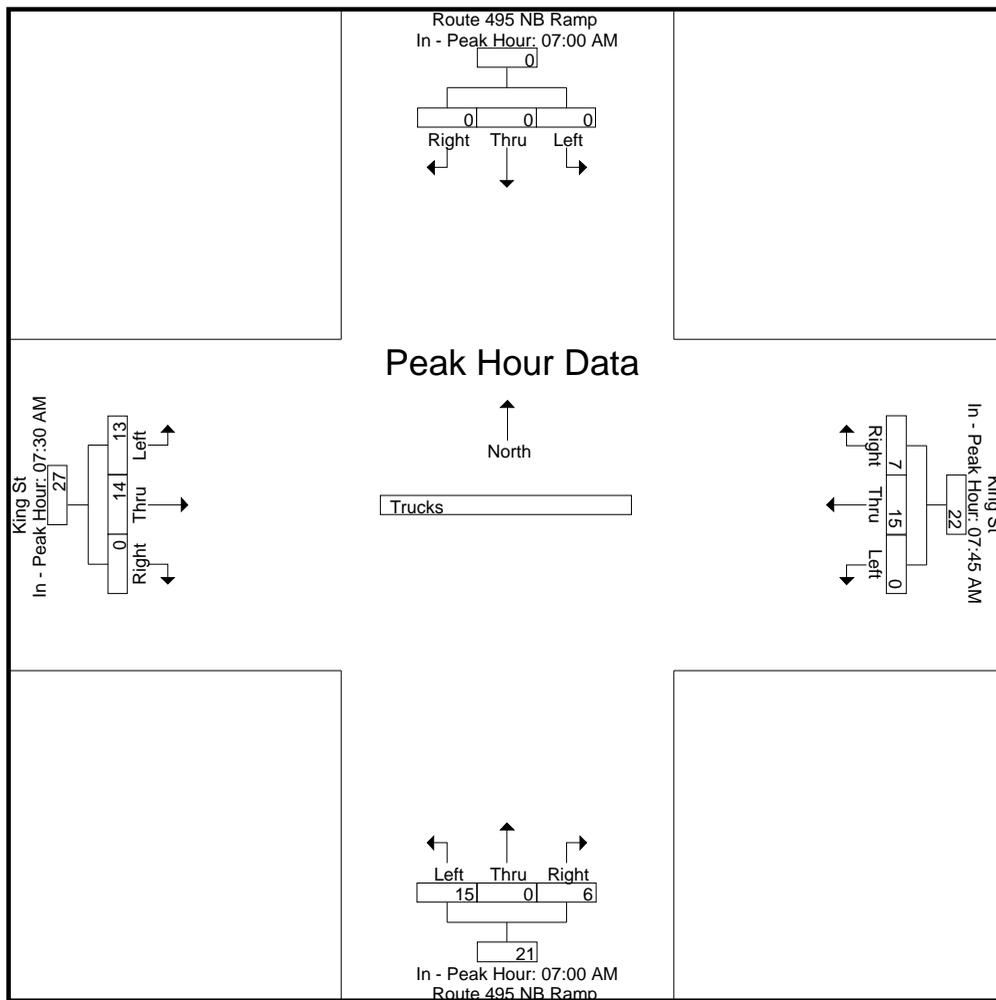
N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:45 AM				07:00 AM				07:30 AM			
+0 mins.	0	0	0	0	0	3	1	4	3	0	0	3	4	3	0	7
+15 mins.	0	0	0	0	0	2	5	7	5	0	2	7	3	6	0	9
+30 mins.	0	0	0	0	0	5	0	5	4	0	1	5	6	1	0	7
+45 mins.	0	0	0	0	0	5	1	6	3	0	3	6	0	4	0	4
Total Volume	0	0	0	0	0	15	7	22	15	0	6	21	13	14	0	27
% App. Total	0	0	0	0	0	68.2	31.8		71.4	0	28.6		48.1	51.9	0	
PHF	.000	.000	.000	.000	.000	.750	.350	.786	.750	.000	.500	.750	.542	.583	.000	.750

N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

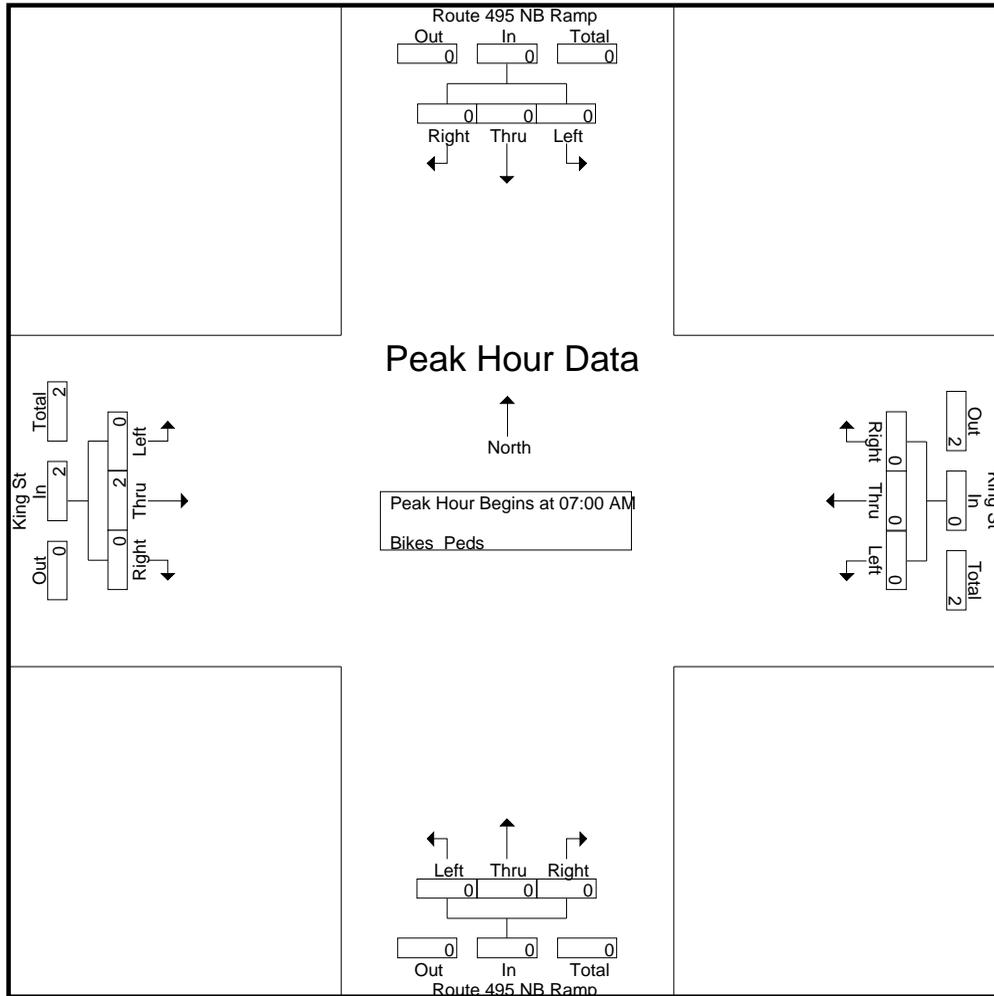
File Name : 88630003
Site Code : 88630003
Start Date : 5/26/2021
Page No : 10

Groups Printed- Bikes Peds

Start Time	Route 495 NB Ramp From North				King St From East				Route 495 NB Ramp From South				King St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
Grand Total	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	2	2	4
Apprch %	0	0	0		0	0	0		0	0	0		0	100	0				
Total %	0	0	0		0	0	0		0	0	0		0	100	0		50	50	

Start Time	Route 495 NB Ramp From North				King St From East				Route 495 NB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.000	.500	.500

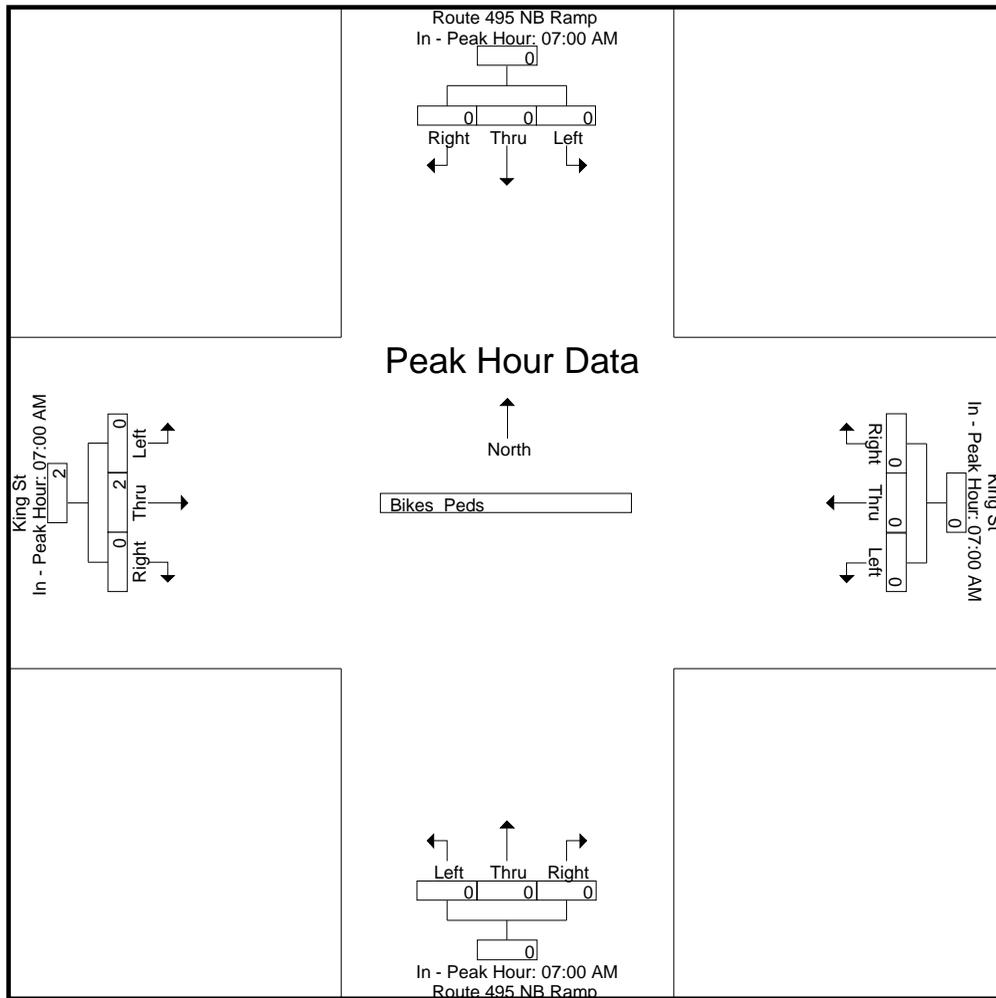
N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.000	.500

N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Route 495 NB Ramp
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

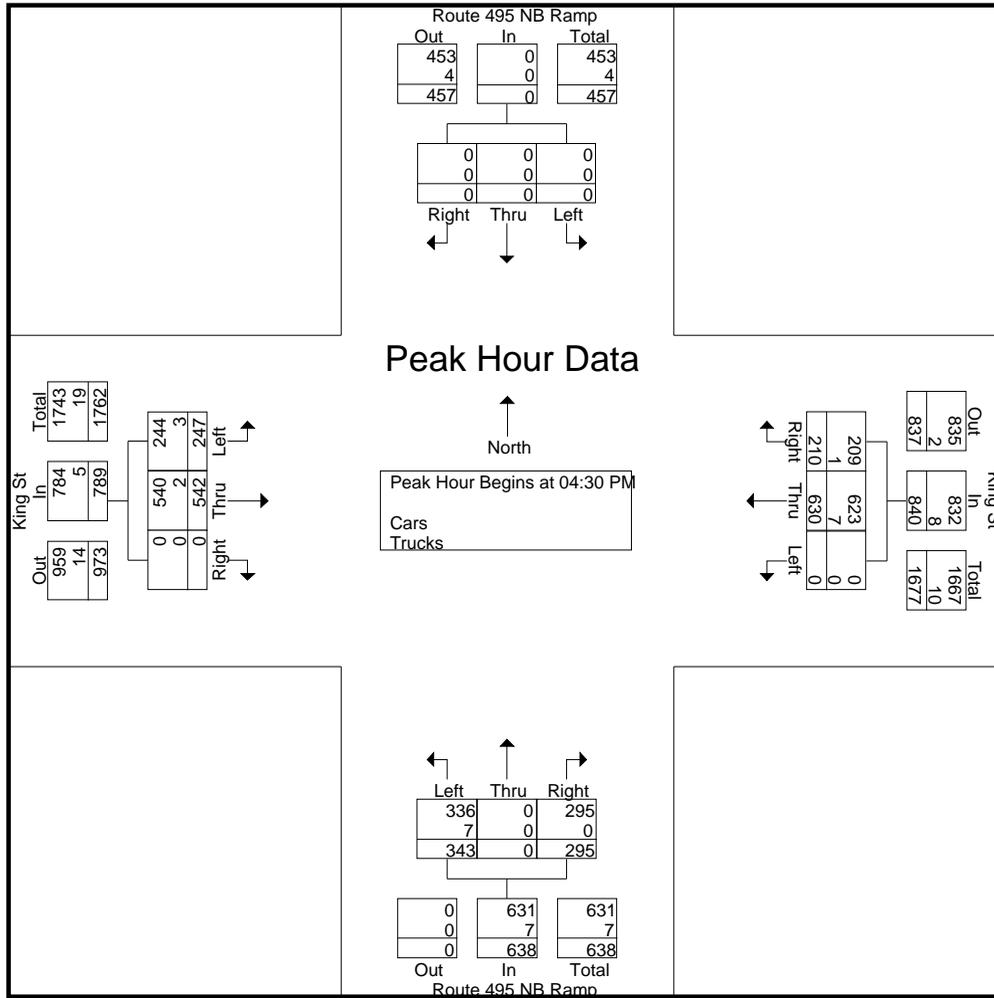
File Name : 88630003
 Site Code : 88630003
 Start Date : 5/26/2021
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Route 495 NB Ramp From North			King St From East			Route 495 NB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	0	0	164	65	84	0	95	77	128	0	613
04:15 PM	0	0	0	0	139	71	76	0	62	50	114	0	512
04:30 PM	0	0	0	0	148	54	84	0	64	62	132	0	544
04:45 PM	0	0	0	0	143	53	84	0	74	68	127	0	549
Total	0	0	0	0	594	243	328	0	295	257	501	0	2218
05:00 PM	0	0	0	0	174	52	90	0	85	67	159	0	627
05:15 PM	0	0	0	0	165	51	85	0	72	50	124	0	547
05:30 PM	0	0	0	0	153	47	65	1	59	55	128	0	508
05:45 PM	0	0	0	0	134	45	68	0	69	44	125	0	485
Total	0	0	0	0	626	195	308	1	285	216	536	0	2167
Grand Total	0	0	0	0	1220	438	636	1	580	473	1037	0	4385
Apprch %	0	0	0	0	73.6	26.4	52.3	0.1	47.7	31.3	68.7	0	
Total %	0	0	0	0	27.8	10	14.5	0	13.2	10.8	23.6	0	
Cars	0	0	0	0	1209	435	625	1	578	464	1032	0	4344
% Cars	0	0	0	0	99.1	99.3	98.3	100	99.7	98.1	99.5	0	99.1
Trucks	0	0	0	0	11	3	11	0	2	9	5	0	41
% Trucks	0	0	0	0	0.9	0.7	1.7	0	0.3	1.9	0.5	0	0.9

Start Time	Route 495 NB Ramp From North				King St From East				Route 495 NB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	148	54	202	84	0	64	148	62	132	0	194	544
04:45 PM	0	0	0	0	0	143	53	196	84	0	74	158	68	127	0	195	549
05:00 PM	0	0	0	0	0	174	52	226	90	0	85	175	67	159	0	226	627
05:15 PM	0	0	0	0	0	165	51	216	85	0	72	157	50	124	0	174	547
Total Volume	0	0	0	0	0	630	210	840	343	0	295	638	247	542	0	789	2267
% App. Total	0	0	0	0	0	75	25		53.8	0	46.2		31.3	68.7	0		
PHF	.000	.000	.000	.000	.000	.905	.972	.929	.953	.000	.868	.911	.908	.852	.000	.873	.904
Cars	0	0	0	0	0	623	209	832	336	0	295	631	244	540	0	784	2247
% Cars	0	0	0	0	0	98.9	99.5	99.0	98.0	0	100	98.9	98.8	99.6	0	99.4	99.1
Trucks	0	0	0	0	0	7	1	8	7	0	0	7	3	2	0	5	20
% Trucks	0	0	0	0	0	1.1	0.5	1.0	2.0	0	0	1.1	1.2	0.4	0	0.6	0.9

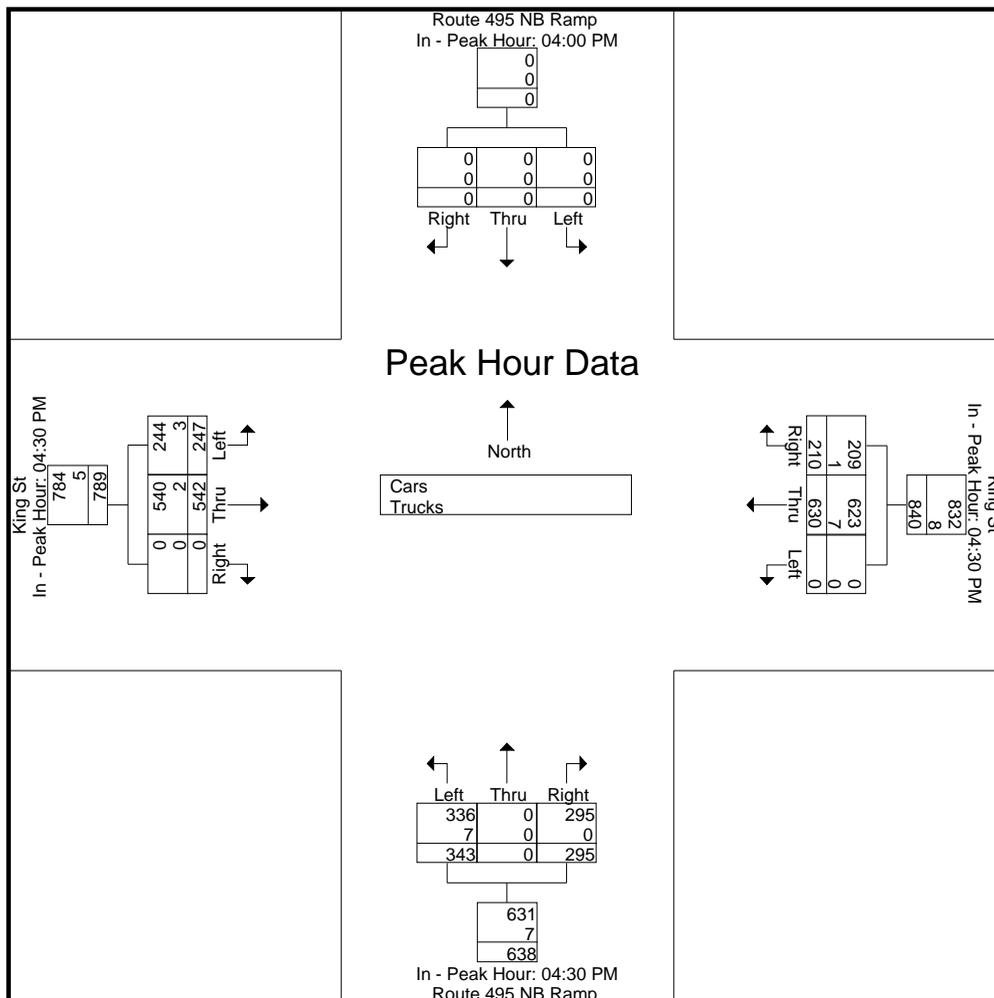
N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	148	54	202	84	0	64	148	62	132	0	194
+15 mins.	0	0	0	0	0	143	53	196	84	0	74	158	68	127	0	195
+30 mins.	0	0	0	0	0	174	52	226	90	0	85	175	67	159	0	226
+45 mins.	0	0	0	0	0	165	51	216	85	0	72	157	50	124	0	174
Total Volume	0	0	0	0	0	630	210	840	343	0	295	638	247	542	0	789
% App. Total	0	0	0	0	0	75	25		53.8	0	46.2		31.3	68.7	0	
PHF	.000	.000	.000	.000	.000	.905	.972	.929	.953	.000	.868	.911	.908	.852	.000	.873
Cars	0	0	0	0	0	623	209	832	336	0	295	631	244	540	0	784
% Cars	0	0	0	0	0	98.9	99.5	99	98	0	100	98.9	98.8	99.6	0	99.4
Trucks	0	0	0	0	0	7	1	8	7	0	0	7	3	2	0	5
% Trucks	0	0	0	0	0	1.1	0.5	1	2	0	0	1.1	1.2	0.4	0	0.6

N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Route 495 NB Ramp
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

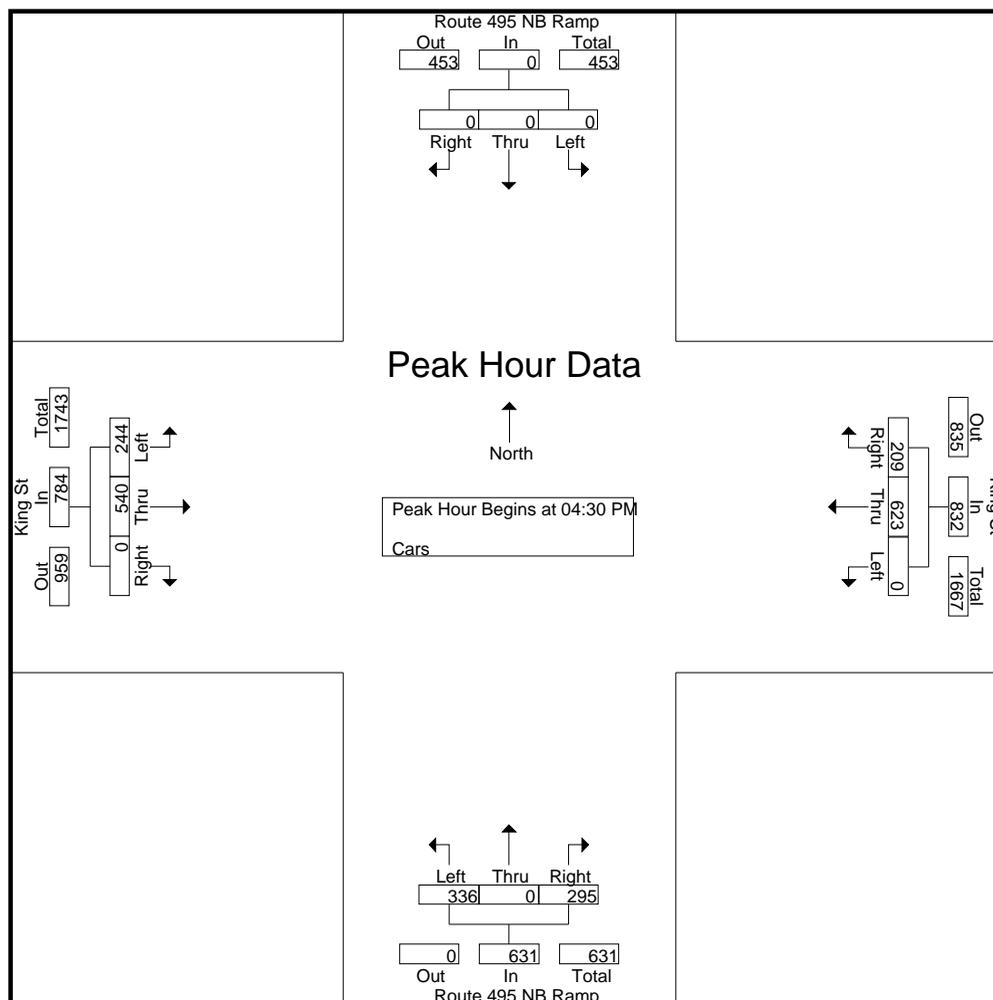
File Name : 88630003
 Site Code : 88630003
 Start Date : 5/26/2021
 Page No : 4

Groups Printed- Cars

Start Time	Route 495 NB Ramp From North			King St From East			Route 495 NB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	0	0	161	65	84	0	94	77	127	0	608
04:15 PM	0	0	0	0	138	69	72	0	62	48	113	0	502
04:30 PM	0	0	0	0	146	54	79	0	64	61	132	0	536
04:45 PM	0	0	0	0	142	53	84	0	74	67	127	0	547
Total	0	0	0	0	587	241	319	0	294	253	499	0	2193
05:00 PM	0	0	0	0	173	52	89	0	85	66	157	0	622
05:15 PM	0	0	0	0	162	50	84	0	72	50	124	0	542
05:30 PM	0	0	0	0	153	47	65	1	59	51	128	0	504
05:45 PM	0	0	0	0	134	45	68	0	68	44	124	0	483
Total	0	0	0	0	622	194	306	1	284	211	533	0	2151
Grand Total	0	0	0	0	1209	435	625	1	578	464	1032	0	4344
Apprch %	0	0	0	0	73.5	26.5	51.9	0.1	48	31	69	0	
Total %	0	0	0	0	27.8	10	14.4	0	13.3	10.7	23.8	0	

Start Time	Route 495 NB Ramp From North				King St From East				Route 495 NB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	146	54	200	79	0	64	143	61	132	0	193	536
04:45 PM	0	0	0	0	0	142	53	195	84	0	74	158	67	127	0	194	547
05:00 PM	0	0	0	0	0	173	52	225	89	0	85	174	66	157	0	223	622
05:15 PM	0	0	0	0	0	162	50	212	84	0	72	156	50	124	0	174	542
Total Volume	0	0	0	0	0	623	209	832	336	0	295	631	244	540	0	784	2247
% App. Total	0	0	0	0	0	74.9	25.1		53.2	0	46.8		31.1	68.9	0		
PHF	.000	.000	.000	.000	.000	.900	.968	.924	.944	.000	.868	.907	.910	.860	.000	.879	.903

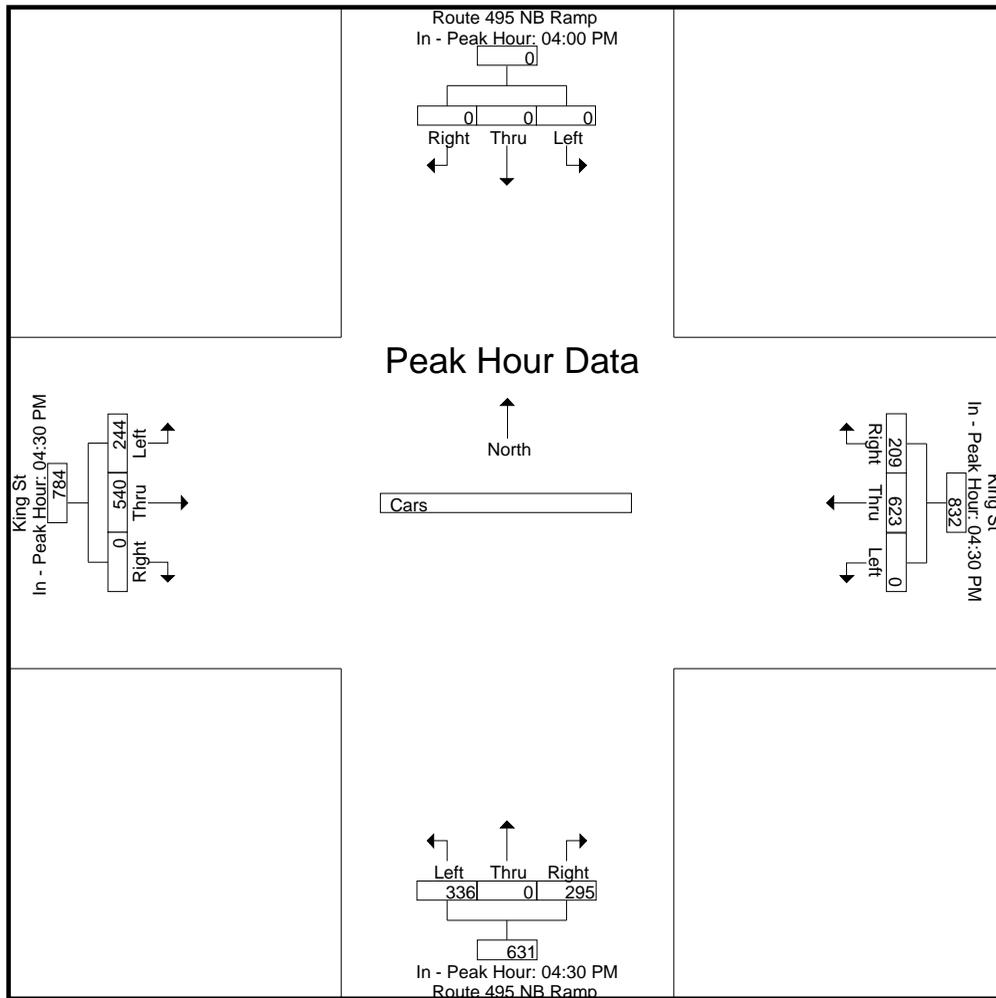
N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	146	54	200	79	0	64	143	61	132	0	193
+15 mins.	0	0	0	0	0	142	53	195	84	0	74	158	67	127	0	194
+30 mins.	0	0	0	0	0	173	52	225	89	0	85	174	66	157	0	223
+45 mins.	0	0	0	0	0	162	50	212	84	0	72	156	50	124	0	174
Total Volume	0	0	0	0	0	623	209	832	336	0	295	631	244	540	0	784
% App. Total	0	0	0	0	0	74.9	25.1		53.2	0	46.8		31.1	68.9	0	
PHF	.000	.000	.000	.000	.000	.900	.968	.924	.944	.000	.868	.907	.910	.860	.000	.879

N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Route 495 NB Ramp
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

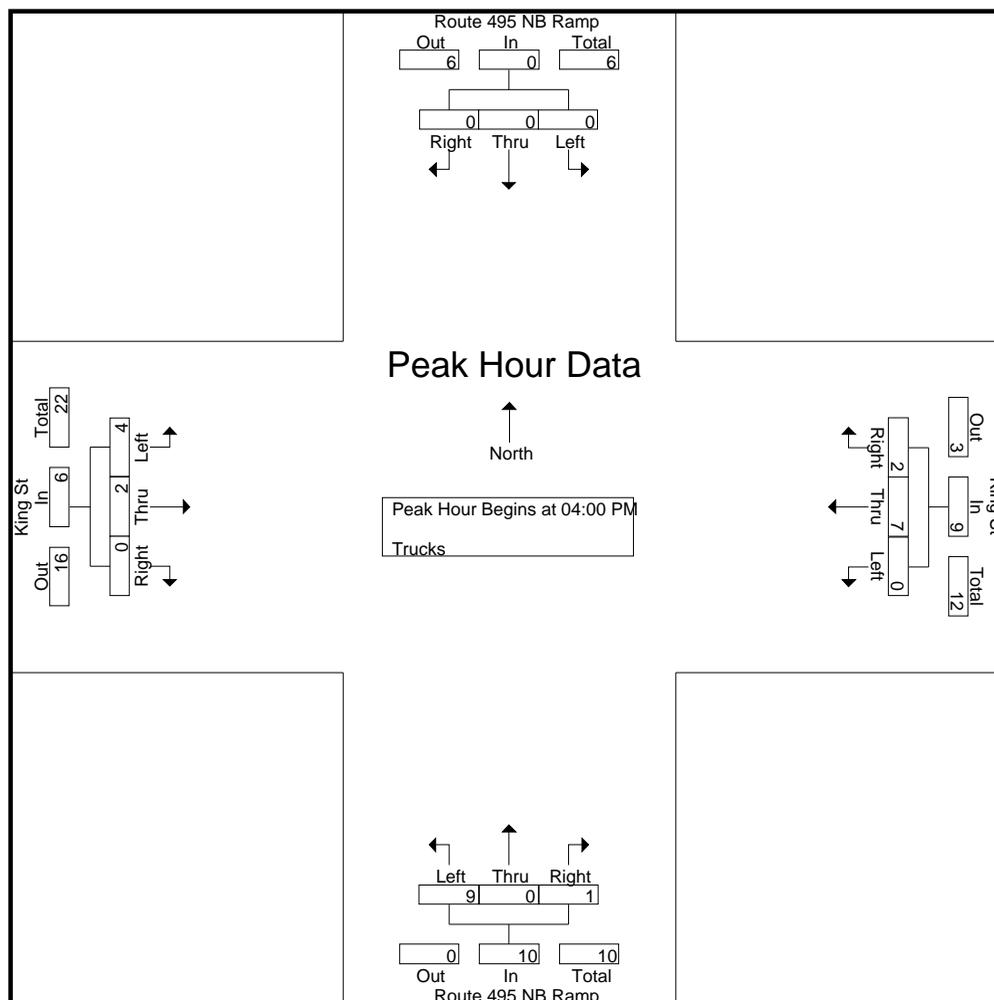
File Name : 88630003
 Site Code : 88630003
 Start Date : 5/26/2021
 Page No : 7

Groups Printed- Trucks

Start Time	Route 495 NB Ramp From North			King St From East			Route 495 NB Ramp From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	0	0	3	0	0	0	1	0	1	0	5
04:15 PM	0	0	0	0	1	2	4	0	0	2	1	0	10
04:30 PM	0	0	0	0	2	0	5	0	0	1	0	0	8
04:45 PM	0	0	0	0	1	0	0	0	0	1	0	0	2
Total	0	0	0	0	7	2	9	0	1	4	2	0	25
05:00 PM	0	0	0	0	1	0	1	0	0	1	2	0	5
05:15 PM	0	0	0	0	3	1	1	0	0	0	0	0	5
05:30 PM	0	0	0	0	0	0	0	0	0	4	0	0	4
05:45 PM	0	0	0	0	0	0	0	0	1	0	1	0	2
Total	0	0	0	0	4	1	2	0	1	5	3	0	16
Grand Total	0	0	0	0	11	3	11	0	2	9	5	0	41
Apprch %	0	0	0	0	78.6	21.4	84.6	0	15.4	64.3	35.7	0	
Total %	0	0	0	0	26.8	7.3	26.8	0	4.9	22	12.2	0	

Start Time	Route 495 NB Ramp From North				King St From East				Route 495 NB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	3	0	3	0	0	1	1	0	1	0	1	5
04:15 PM	0	0	0	0	0	1	2	3	4	0	0	4	2	1	0	3	10
04:30 PM	0	0	0	0	0	2	0	2	5	0	0	5	1	0	0	1	8
04:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	1	2
Total Volume	0	0	0	0	0	7	2	9	9	0	1	10	4	2	0	6	25
% App. Total	0	0	0	0	0	77.8	22.2	90	0	10	66.7	33.3	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.583	.250	.750	.450	.000	.250	.500	.500	.500	.000	.500	.625

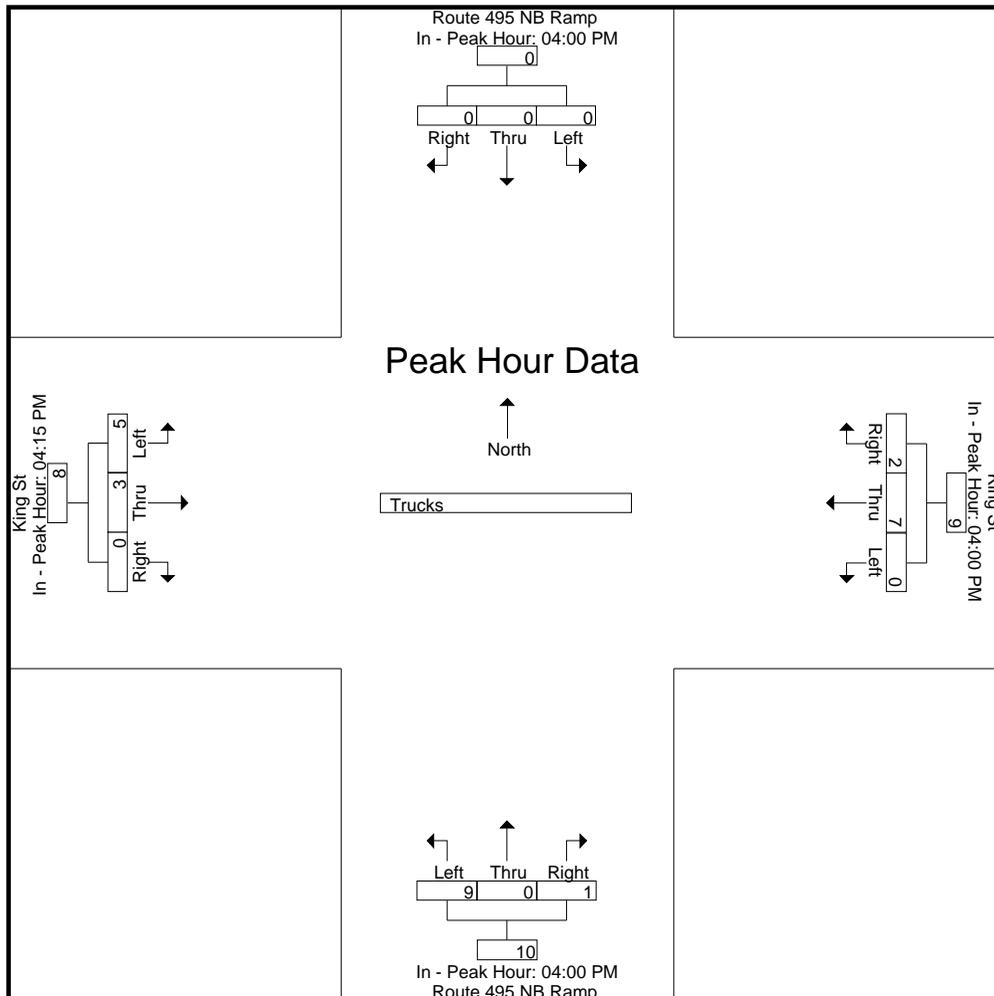
N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:15 PM			
+0 mins.	0	0	0	0	0	3	0	3	0	0	1	1	2	1	0	3
+15 mins.	0	0	0	0	0	1	2	3	4	0	0	4	1	0	0	1
+30 mins.	0	0	0	0	0	2	0	2	5	0	0	5	1	0	0	1
+45 mins.	0	0	0	0	0	1	0	1	0	0	0	0	1	2	0	3
Total Volume	0	0	0	0	0	7	2	9	9	0	1	10	5	3	0	8
% App. Total	0	0	0	0	0	77.8	22.2		90	0	10		62.5	37.5	0	
PHF	.000	.000	.000	.000	.000	.583	.250	.750	.450	.000	.250	.500	.625	.375	.000	.667

N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

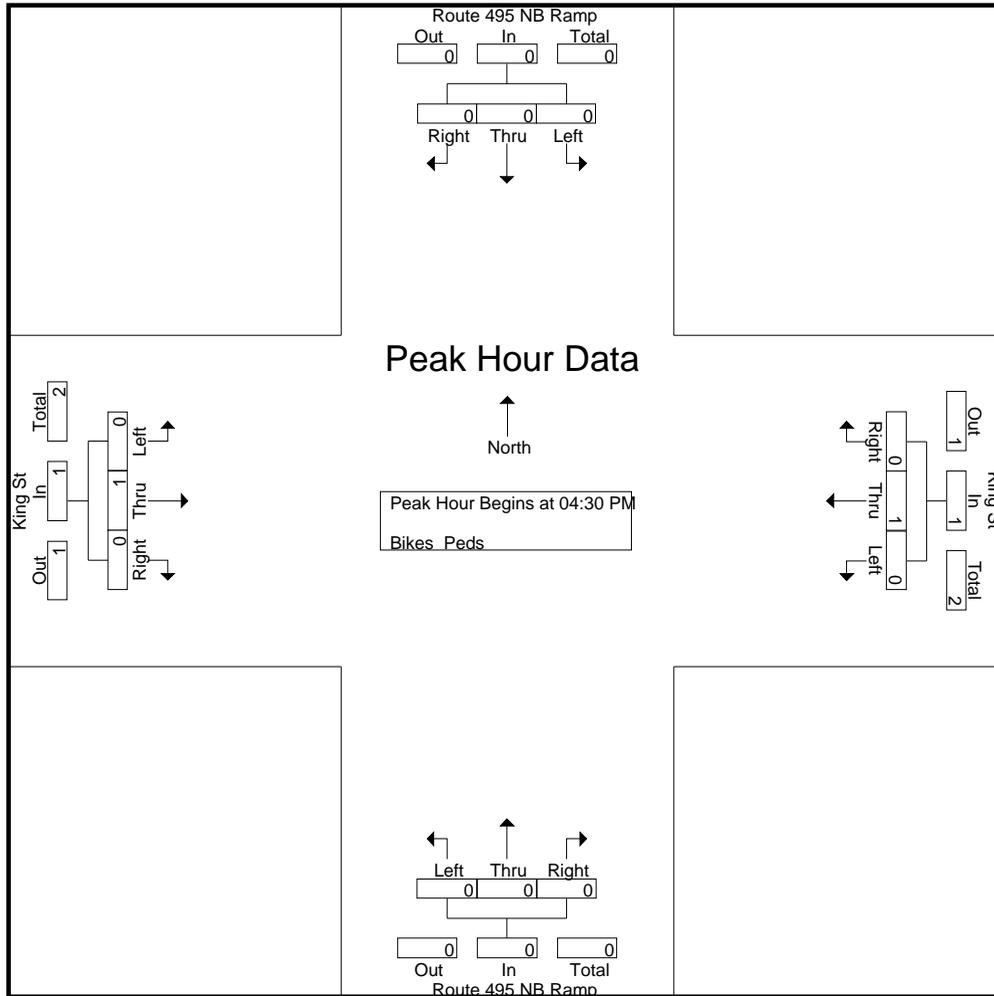
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Site Code : 88630003
Start Date : 5/26/2021
Page No : 10

Groups Printed- Bikes Peds

Start Time	Route 495 NB Ramp From North				King St From East				Route 495 NB Ramp From South				King St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
05:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	2	3
Grand Total	0	0	0	0	0	2	0	0	0	0	0	1	0	1	0	0	1	3	4
Apprch %	0	0	0		0	100	0		0	0	0		0	100	0				
Total %	0	0	0		0	66.7	0		0	0	0		0	33.3	0		25	75	

Start Time	Route 495 NB Ramp From North				King St From East				Route 495 NB Ramp From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.500

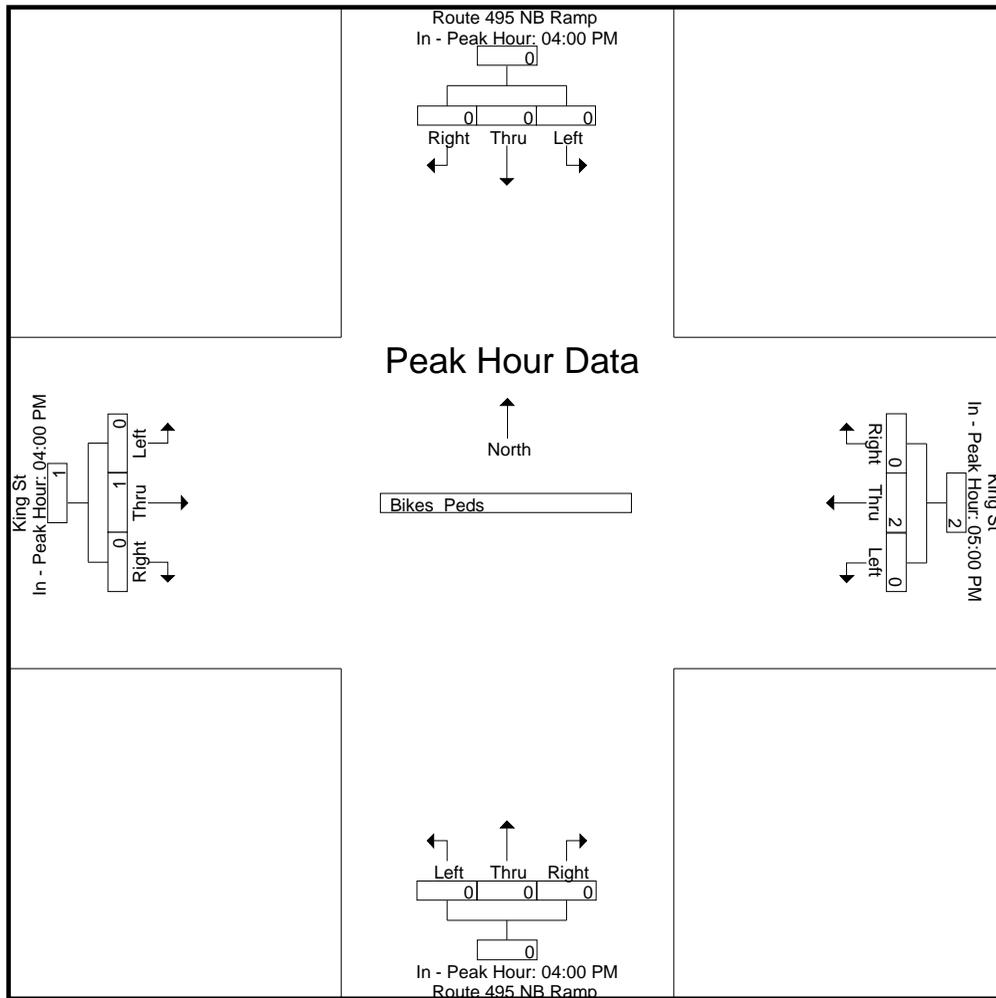
N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1
% App. Total	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.250	.000	.250

N/S Street : Route 495 NB Ramp
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

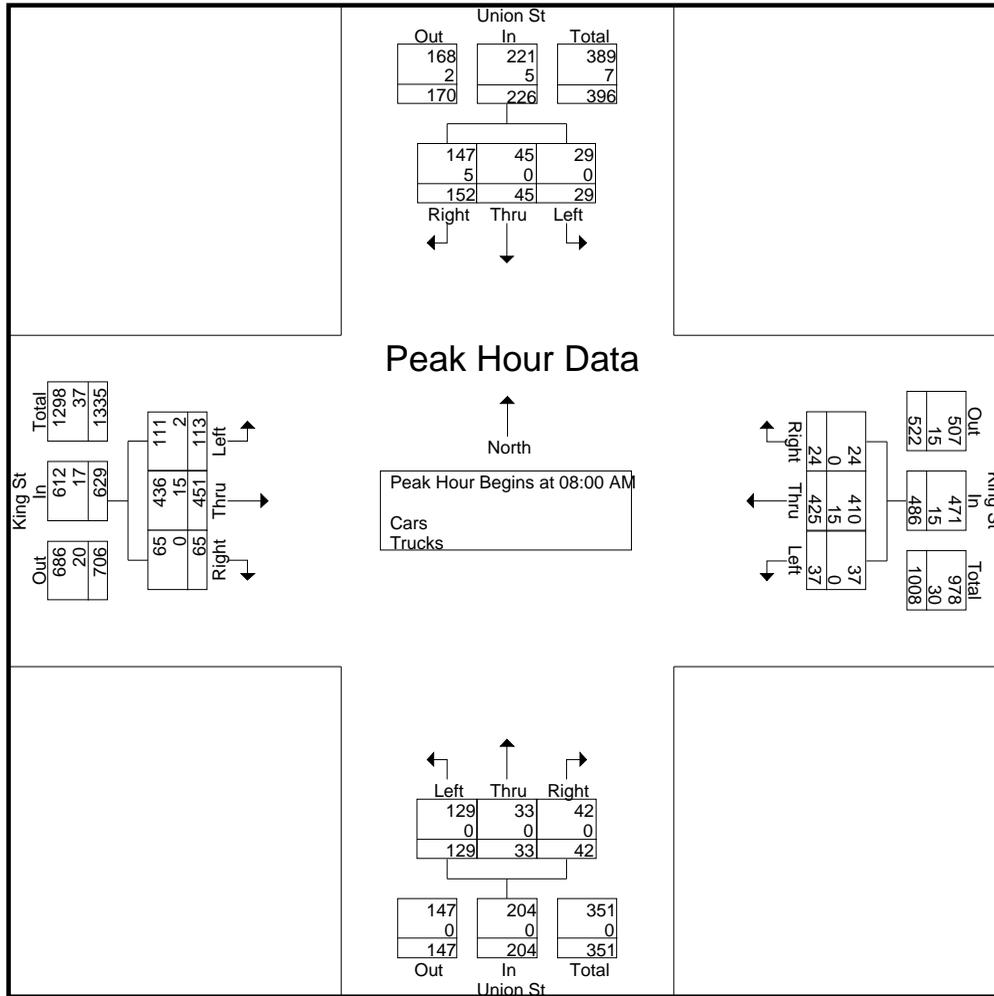
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Site Code : 88630004
Start Date : 5/26/2021
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Union St From North			King St From East			Union St From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	4	9	37	8	113	3	22	4	10	32	104	5	351
07:15 AM	7	12	37	5	108	5	28	8	12	26	132	9	389
07:30 AM	14	7	44	9	107	5	37	8	12	26	136	12	417
07:45 AM	5	7	34	13	94	4	34	8	7	35	102	17	360
Total	30	35	152	35	422	17	121	28	41	119	474	43	1517
08:00 AM	6	9	39	8	103	7	21	7	9	36	116	11	372
08:15 AM	9	15	44	8	102	8	35	9	13	28	106	11	388
08:30 AM	4	13	35	10	105	5	36	8	12	20	103	23	374
08:45 AM	10	8	34	11	115	4	37	9	8	29	126	20	411
Total	29	45	152	37	425	24	129	33	42	113	451	65	1545
Grand Total	59	80	304	72	847	41	250	61	83	232	925	108	3062
Apprch %	13.3	18.1	68.6	7.5	88.2	4.3	63.5	15.5	21.1	18.3	73.1	8.5	
Total %	1.9	2.6	9.9	2.4	27.7	1.3	8.2	2	2.7	7.6	30.2	3.5	
Cars	59	80	297	72	820	39	248	61	83	228	894	108	2989
% Cars	100	100	97.7	100	96.8	95.1	99.2	100	100	98.3	96.6	100	97.6
Trucks	0	0	7	0	27	2	2	0	0	4	31	0	73
% Trucks	0	0	2.3	0	3.2	4.9	0.8	0	0	1.7	3.4	0	2.4

Start Time	Union St From North				King St From East				Union St From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	6	9	39	54	8	103	7	118	21	7	9	37	36	116	11	163	372
08:15 AM	9	15	44	68	8	102	8	118	35	9	13	57	28	106	11	145	388
08:30 AM	4	13	35	52	10	105	5	120	36	8	12	56	20	103	23	146	374
08:45 AM	10	8	34	52	11	115	4	130	37	9	8	54	29	126	20	175	411
Total Volume	29	45	152	226	37	425	24	486	129	33	42	204	113	451	65	629	1545
% App. Total	12.8	19.9	67.3		7.6	87.4	4.9		63.2	16.2	20.6		18	71.7	10.3		
PHF	.725	.750	.864	.831	.841	.924	.750	.935	.872	.917	.808	.895	.785	.895	.707	.899	.940
Cars	29	45	147	221	37	410	24	471	129	33	42	204	111	436	65	612	1508
% Cars	100	100	96.7	97.8	100	96.5	100	96.9	100	100	100	100	98.2	96.7	100	97.3	97.6
Trucks	0	0	5	5	0	15	0	15	0	0	0	0	2	15	0	17	37
% Trucks	0	0	3.3	2.2	0	3.5	0	3.1	0	0	0	0	1.8	3.3	0	2.7	2.4

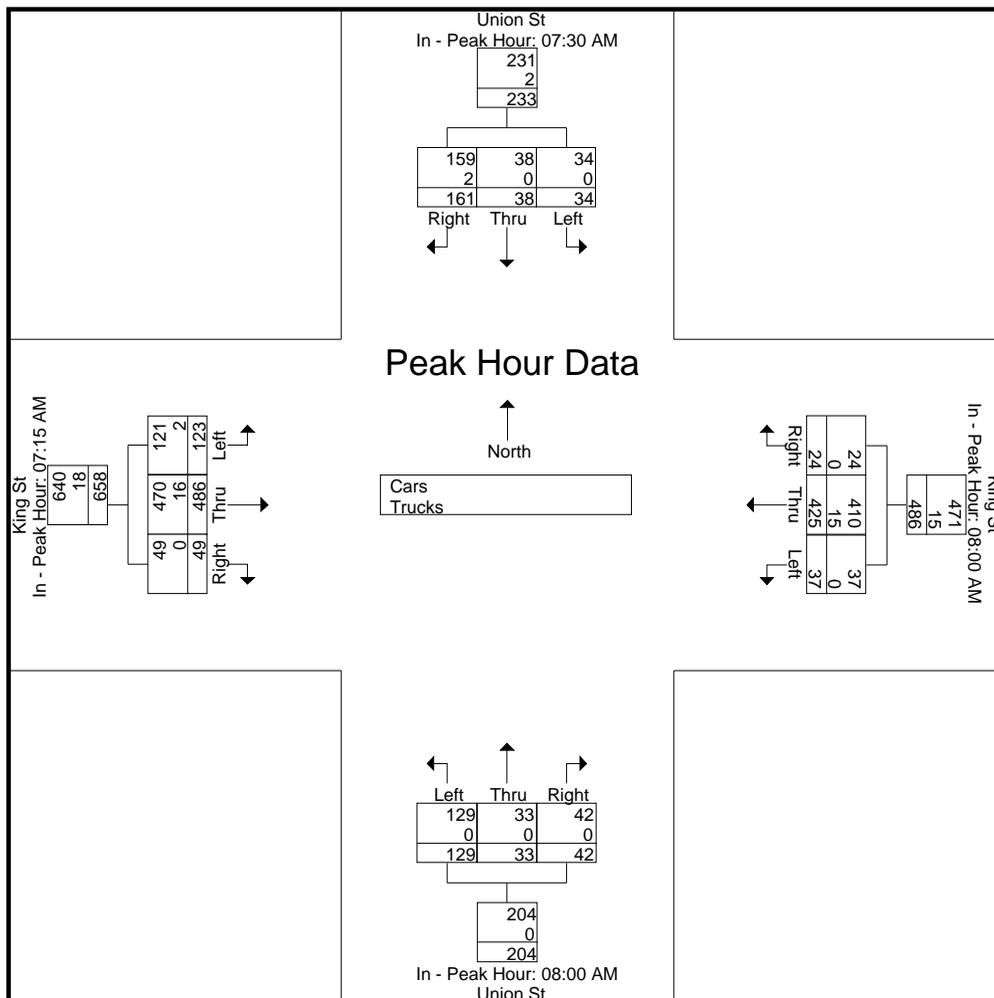
N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				08:00 AM				08:00 AM				07:15 AM			
+0 mins.	14	7	44	65	8	103	7	118	21	7	9	37	26	132	9	167
+15 mins.	5	7	34	46	8	102	8	118	35	9	13	57	26	136	12	174
+30 mins.	6	9	39	54	10	105	5	120	36	8	12	56	35	102	17	154
+45 mins.	9	15	44	68	11	115	4	130	37	9	8	54	36	116	11	163
Total Volume	34	38	161	233	37	425	24	486	129	33	42	204	123	486	49	658
% App. Total	14.6	16.3	69.1		7.6	87.4	4.9		63.2	16.2	20.6		18.7	73.9	7.4	
PHF	.607	.633	.915	.857	.841	.924	.750	.935	.872	.917	.808	.895	.854	.893	.721	.945
Cars	34	38	159	231	37	410	24	471	129	33	42	204	121	470	49	640
% Cars	100	100	98.8	99.1	100	96.5	100	96.9	100	100	100	100	98.4	96.7	100	97.3
Trucks	0	0	2	2	0	15	0	15	0	0	0	0	2	16	0	18
% Trucks	0	0	1.2	0.9	0	3.5	0	3.1	0	0	0	0	1.6	3.3	0	2.7

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Union Street
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

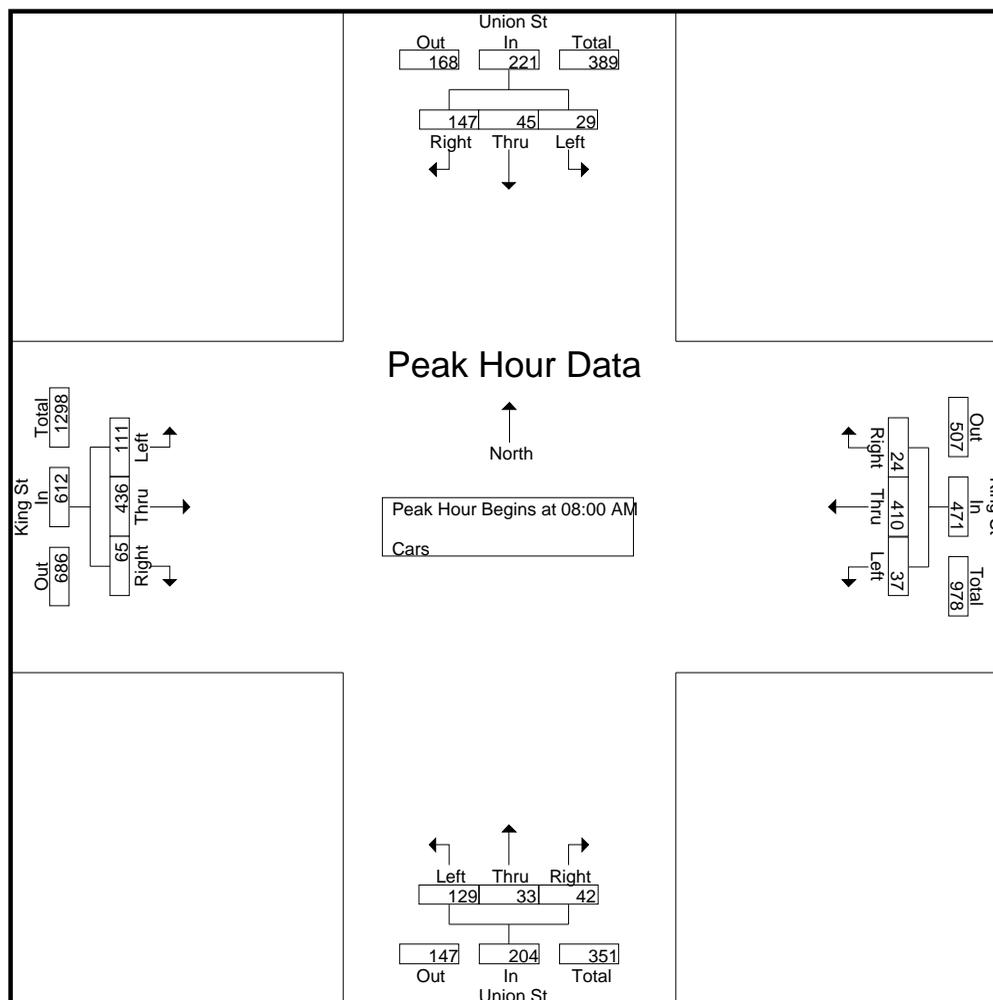
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 Site Code : 88630004
 Start Date : 5/26/2021
 Page No : 4

Groups Printed- Cars

Start Time	Union St From North			King St From East			Union St From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	4	9	36	8	111	2	21	4	10	32	102	5	344
07:15 AM	7	12	37	5	105	5	28	8	12	26	129	9	383
07:30 AM	14	7	44	9	104	4	37	8	12	26	133	12	410
07:45 AM	5	7	33	13	90	4	33	8	7	33	94	17	344
Total	30	35	150	35	410	15	119	28	41	117	458	43	1481
08:00 AM	6	9	39	8	98	7	21	7	9	36	114	11	365
08:15 AM	9	15	43	8	99	8	35	9	13	27	101	11	378
08:30 AM	4	13	31	10	102	5	36	8	12	20	100	23	364
08:45 AM	10	8	34	11	111	4	37	9	8	28	121	20	401
Total	29	45	147	37	410	24	129	33	42	111	436	65	1508
Grand Total	59	80	297	72	820	39	248	61	83	228	894	108	2989
Apprch %	13.5	18.3	68.1	7.7	88.1	4.2	63.3	15.6	21.2	18.5	72.7	8.8	
Total %	2	2.7	9.9	2.4	27.4	1.3	8.3	2	2.8	7.6	29.9	3.6	

Start Time	Union St From North				King St From East				Union St From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	6	9	39	54	8	98	7	113	21	7	9	37	36	114	11	161	365
08:15 AM	9	15	43	67	8	99	8	115	35	9	13	57	27	101	11	139	378
08:30 AM	4	13	31	48	10	102	5	117	36	8	12	56	20	100	23	143	364
08:45 AM	10	8	34	52	11	111	4	126	37	9	8	54	28	121	20	169	401
Total Volume	29	45	147	221	37	410	24	471	129	33	42	204	111	436	65	612	1508
% App. Total	13.1	20.4	66.5		7.9	87	5.1		63.2	16.2	20.6		18.1	71.2	10.6		
PHF	.725	.750	.855	.825	.841	.923	.750	.935	.872	.917	.808	.895	.771	.901	.707	.905	.940

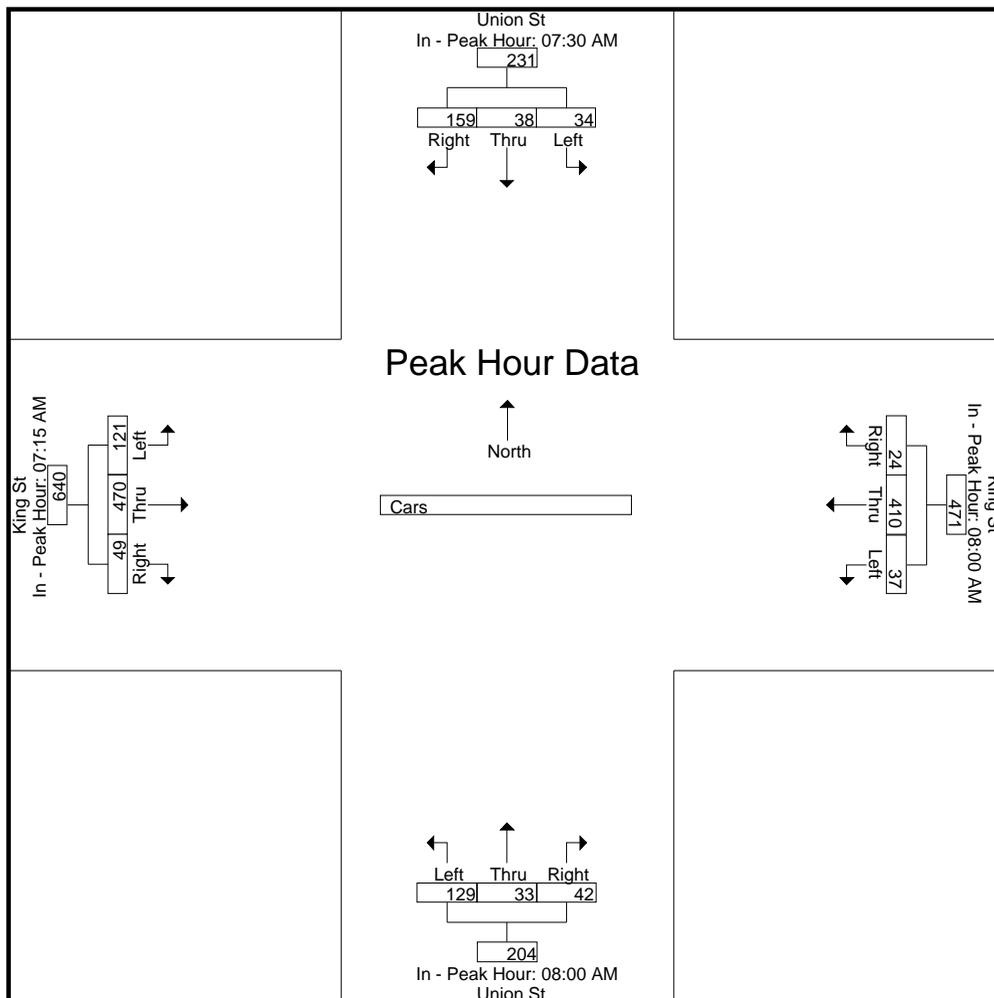
N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				08:00 AM				08:00 AM				07:15 AM			
+0 mins.	14	7	44	65	8	98	7	113	21	7	9	37	26	129	9	164
+15 mins.	5	7	33	45	8	99	8	115	35	9	13	57	26	133	12	171
+30 mins.	6	9	39	54	10	102	5	117	36	8	12	56	33	94	17	144
+45 mins.	9	15	43	67	11	111	4	126	37	9	8	54	36	114	11	161
Total Volume	34	38	159	231	37	410	24	471	129	33	42	204	121	470	49	640
% App. Total	14.7	16.5	68.8		7.9	87	5.1		63.2	16.2	20.6		18.9	73.4	7.7	
PHF	.607	.633	.903	.862	.841	.923	.750	.935	.872	.917	.808	.895	.840	.883	.721	.936

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

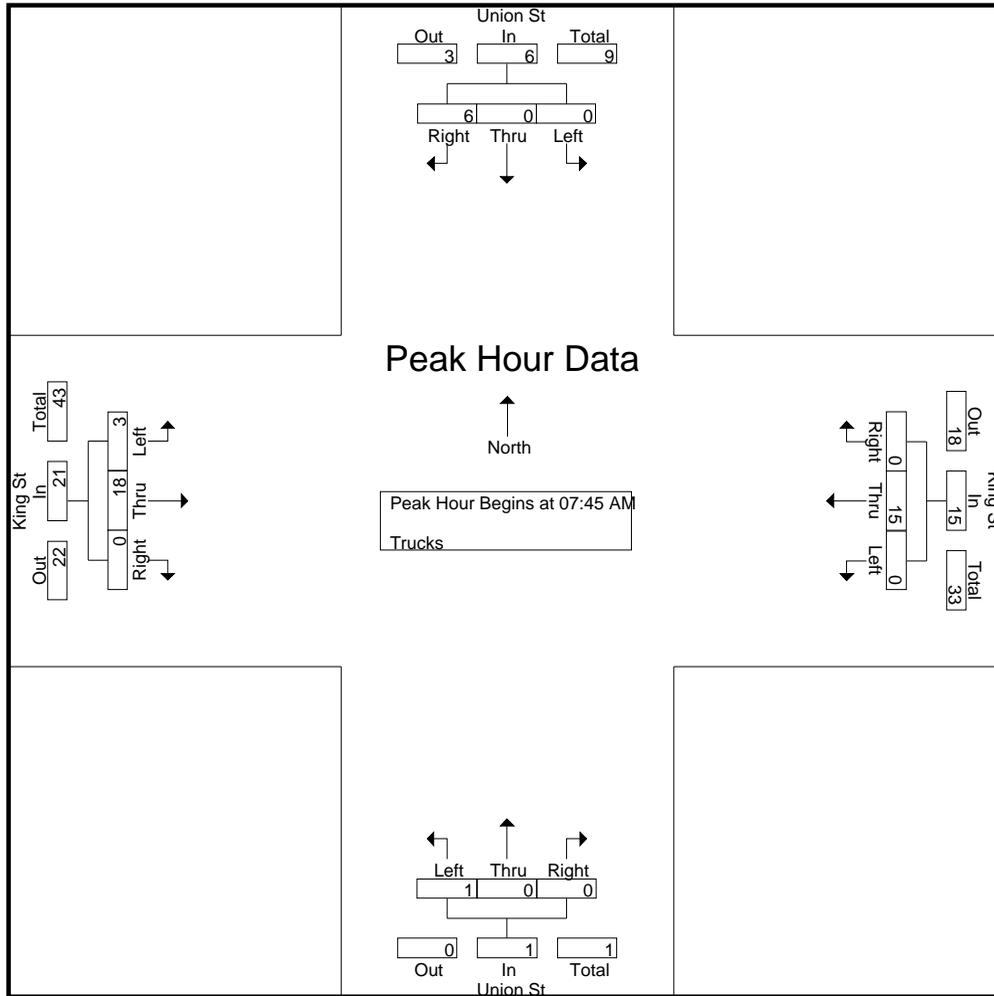
File Name : 88630004
Site Code : 88630004
Start Date : 5/26/2021
Page No : 7

Groups Printed- Trucks

Start Time	Union St From North			King St From East			Union St From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	1	0	2	1	1	0	0	0	2	0	7
07:15 AM	0	0	0	0	3	0	0	0	0	0	3	0	6
07:30 AM	0	0	0	0	3	1	0	0	0	0	3	0	7
07:45 AM	0	0	1	0	4	0	1	0	0	2	8	0	16
Total	0	0	2	0	12	2	2	0	0	2	16	0	36
08:00 AM	0	0	0	0	5	0	0	0	0	0	2	0	7
08:15 AM	0	0	1	0	3	0	0	0	0	1	5	0	10
08:30 AM	0	0	4	0	3	0	0	0	0	0	3	0	10
08:45 AM	0	0	0	0	4	0	0	0	0	1	5	0	10
Total	0	0	5	0	15	0	0	0	0	2	15	0	37
Grand Total	0	0	7	0	27	2	2	0	0	4	31	0	73
Apprch %	0	0	100	0	93.1	6.9	100	0	0	11.4	88.6	0	
Total %	0	0	9.6	0	37	2.7	2.7	0	0	5.5	42.5	0	

Start Time	Union St From North				King St From East				Union St From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	1	1	0	4	0	4	1	0	0	1	2	8	0	10	16
08:00 AM	0	0	0	0	0	5	0	5	0	0	0	0	0	2	0	2	7
08:15 AM	0	0	1	1	0	3	0	3	0	0	0	0	1	5	0	6	10
08:30 AM	0	0	4	4	0	3	0	3	0	0	0	0	0	3	0	3	10
Total Volume	0	0	6	6	0	15	0	15	1	0	0	1	3	18	0	21	43
% App. Total	0	0	100	0	100	0	0	100	0	0	0	0	14.3	85.7	0	0	0
PHF	.000	.000	.375	.375	.000	.750	.000	.750	.250	.000	.000	.250	.375	.563	.000	.525	.672

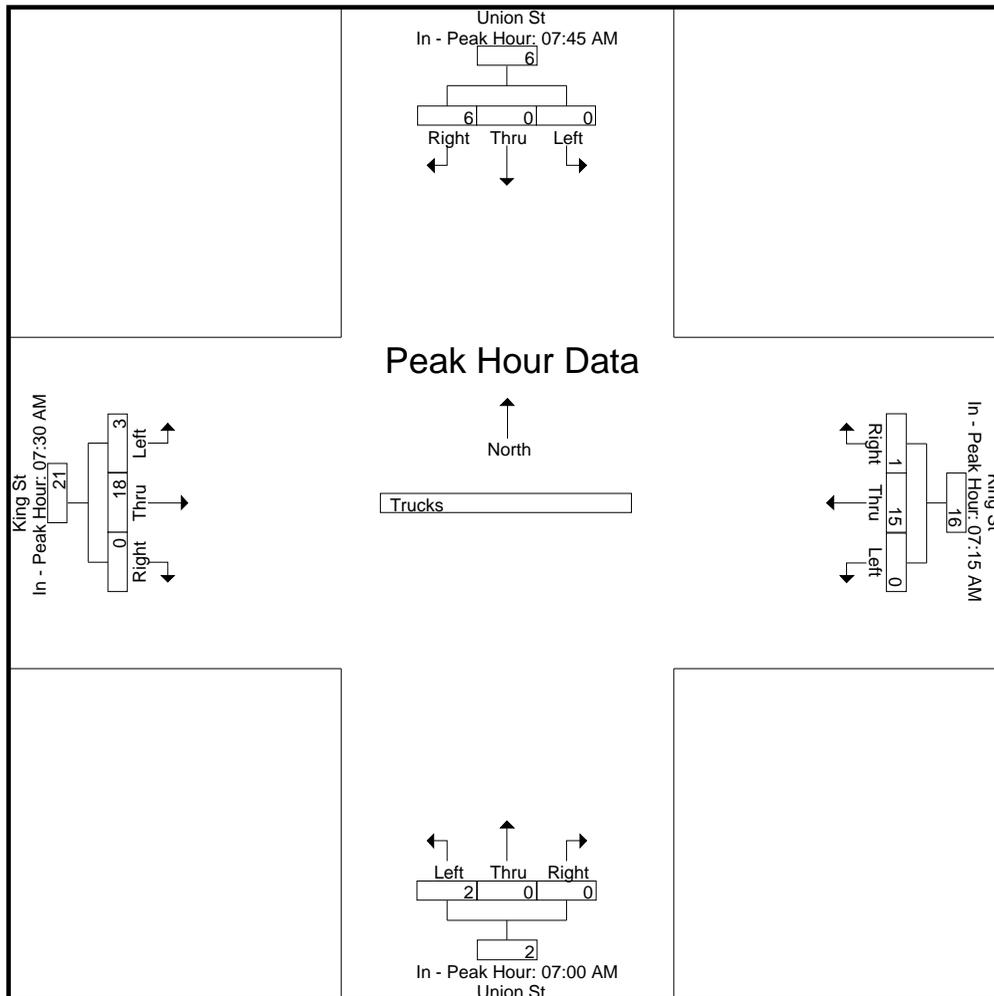
N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:15 AM				07:00 AM				07:30 AM			
+0 mins.	0	0	1	1	0	3	0	3	1	0	0	1	0	3	0	3
+15 mins.	0	0	0	0	0	3	1	4	0	0	0	0	2	8	0	10
+30 mins.	0	0	1	1	0	4	0	4	0	0	0	0	0	2	0	2
+45 mins.	0	0	4	4	0	5	0	5	1	0	0	1	1	5	0	6
Total Volume	0	0	6	6	0	15	1	16	2	0	0	2	3	18	0	21
% App. Total	0	0	100		0	93.8	6.2		100	0	0		14.3	85.7	0	
PHF	.000	.000	.375	.375	.000	.750	.250	.800	.500	.000	.000	.500	.375	.563	.000	.525

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

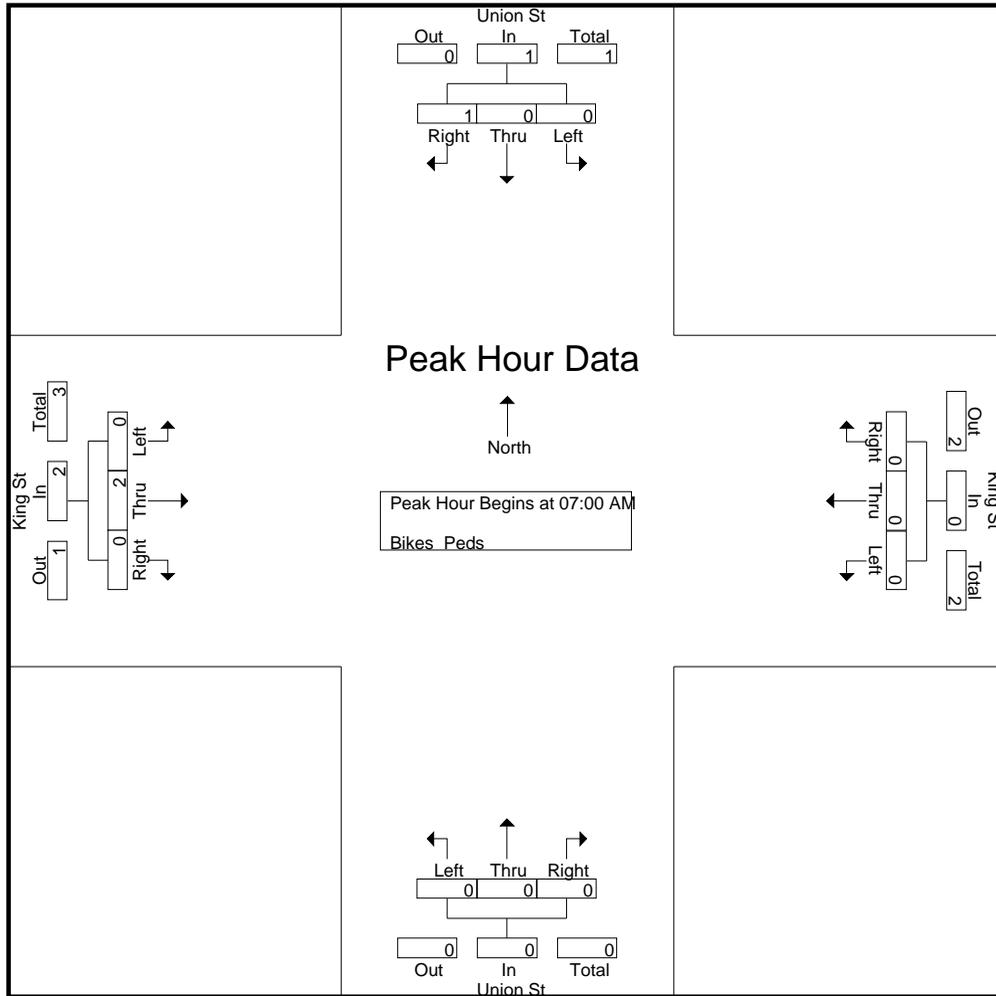
File Name : 88630004
Site Code : 88630004
Start Date : 5/26/2021
Page No : 10

Groups Printed- Bikes Peds

Start Time	Union St From North				King St From East				Union St From South				King St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	1	0	0	0	0	2	0	0	0	0	0	1	0	0	2	2	4
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	2
07:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	1	0	0	0	0	4	0	0	0	0	0	2	0	0	4	3	7
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
08:30 AM	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2	6	0	6
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	2	8	0	8
Grand Total	0	0	1	4	0	0	0	4	0	0	0	2	0	2	0	2	12	3	15
Apprch %	0	0	100		0	0	0		0	0	0		0	100	0				
Total %	0	0	33.3		0	0	0		0	0	0		0	66.7	0		80	20	

Start Time	Union St From North				King St From East				Union St From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	2
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	1	1	0	0	0	0	0	0	0	0	0	2	0	2	3
% App. Total	0	0	100		0	0	0		0	0	0		0	100	0		
PHF	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.000	.500	.375

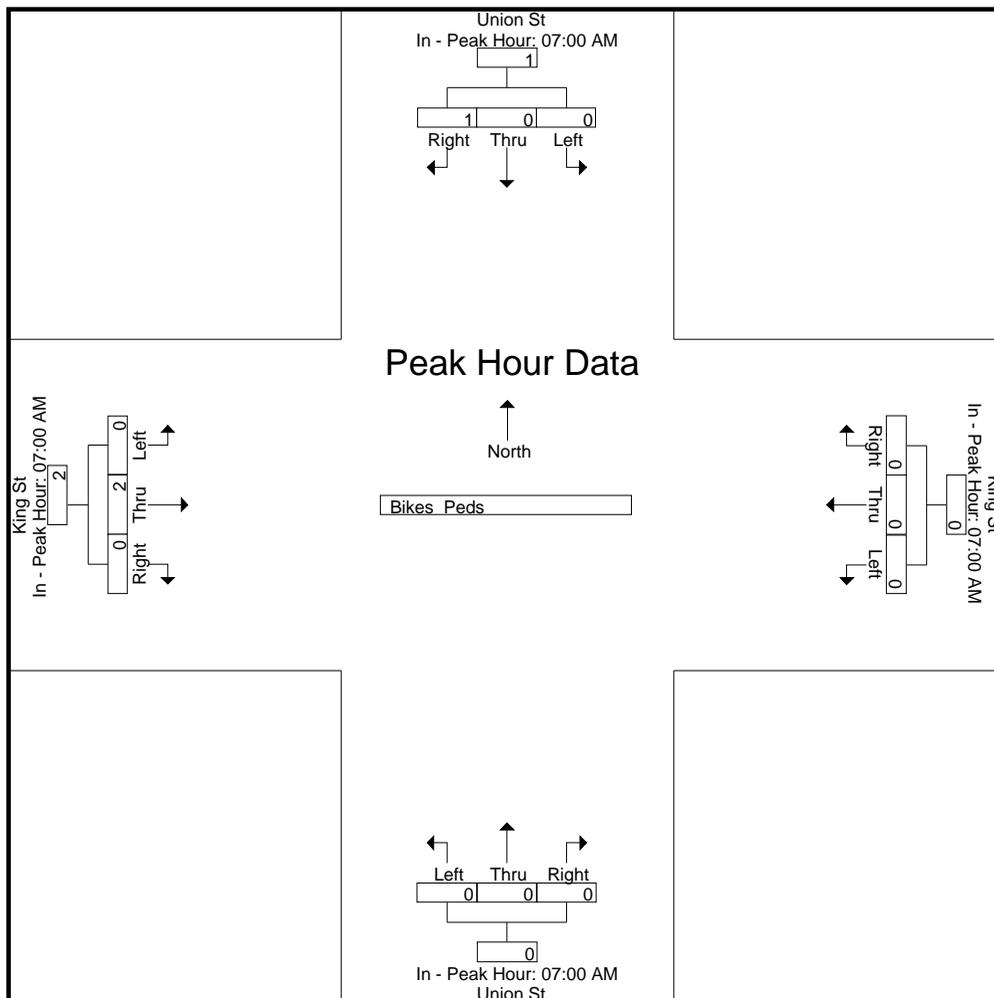
N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	1	1	0	0	0	0	0	0	0	0	0	2	0	2
% App. Total	0	0	100		0	0	0		0	0	0		0	100	0	
PHF	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.000	.500

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Union Street
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

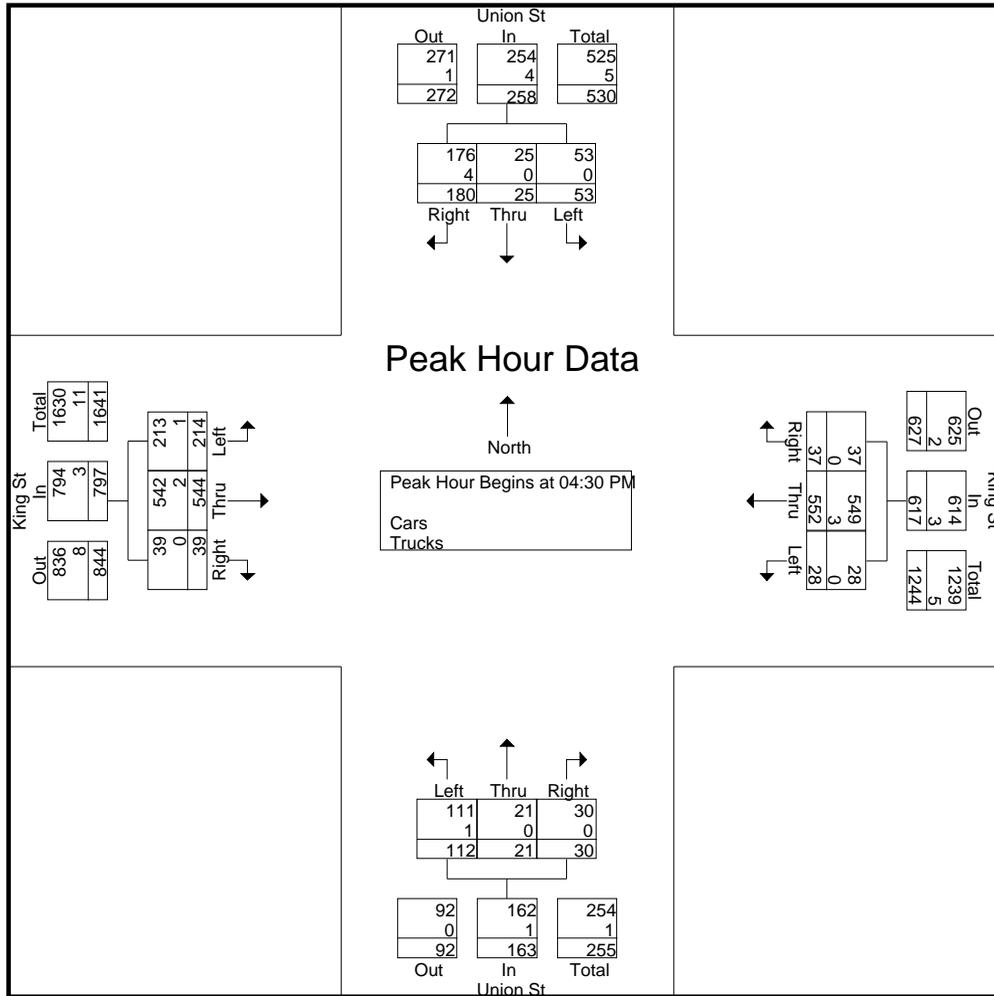
File Name : 88630004
 Site Code : 88630004
 Start Date : 5/26/2021
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Union St From North			King St From East			Union St From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	8	8	60	9	128	5	39	11	7	61	125	25	486
04:15 PM	18	7	45	4	145	14	25	6	16	49	103	13	445
04:30 PM	12	3	41	6	130	8	37	4	3	52	123	13	432
04:45 PM	16	7	47	10	124	8	23	6	9	45	130	11	436
Total	54	25	193	29	527	35	124	27	35	207	481	62	1799
05:00 PM	12	3	51	2	151	9	28	5	10	55	163	9	498
05:15 PM	13	12	41	10	147	12	24	6	8	62	128	6	469
05:30 PM	11	5	60	8	117	5	29	5	7	45	120	15	427
05:45 PM	8	3	34	7	113	10	28	4	6	58	115	14	400
Total	44	23	186	27	528	36	109	20	31	220	526	44	1794
Grand Total	98	48	379	56	1055	71	233	47	66	427	1007	106	3593
Apprch %	18.7	9.1	72.2	4.7	89.3	6	67.3	13.6	19.1	27.7	65.4	6.9	
Total %	2.7	1.3	10.5	1.6	29.4	2	6.5	1.3	1.8	11.9	28	3	
Cars	98	47	374	56	1049	71	230	47	65	422	1005	106	3570
% Cars	100	97.9	98.7	100	99.4	100	98.7	100	98.5	98.8	99.8	100	99.4
Trucks	0	1	5	0	6	0	3	0	1	5	2	0	23
% Trucks	0	2.1	1.3	0	0.6	0	1.3	0	1.5	1.2	0.2	0	0.6

Start Time	Union St From North				King St From East				Union St From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	12	3	41	56	6	130	8	144	37	4	3	44	52	123	13	188	432
04:45 PM	16	7	47	70	10	124	8	142	23	6	9	38	45	130	11	186	436
05:00 PM	12	3	51	66	2	151	9	162	28	5	10	43	55	163	9	227	498
05:15 PM	13	12	41	66	10	147	12	169	24	6	8	38	62	128	6	196	469
Total Volume	53	25	180	258	28	552	37	617	112	21	30	163	214	544	39	797	1835
% App. Total	20.5	9.7	69.8		4.5	89.5	6		68.7	12.9	18.4		26.9	68.3	4.9		
PHF	.828	.521	.882	.921	.700	.914	.771	.913	.757	.875	.750	.926	.863	.834	.750	.878	.921
Cars	53	25	176	254	28	549	37	614	111	21	30	162	213	542	39	794	1824
% Cars	100	100	97.8	98.4	100	99.5	100	99.5	99.1	100	100	99.4	99.5	99.6	100	99.6	99.4
Trucks	0	0	4	4	0	3	0	3	1	0	0	1	1	2	0	3	11
% Trucks	0	0	2.2	1.6	0	0.5	0	0.5	0.9	0	0	0.6	0.5	0.4	0	0.4	0.6

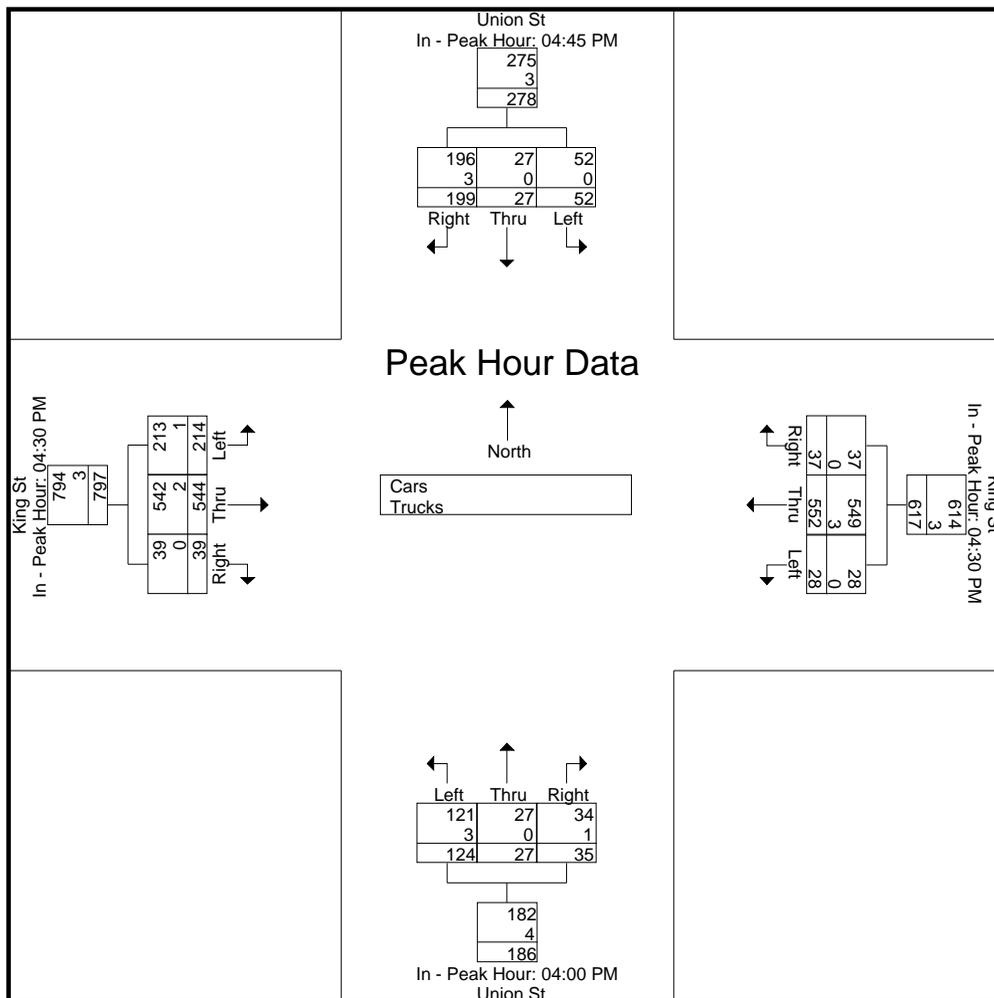
N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:30 PM				04:00 PM				04:30 PM			
+0 mins.	16	7	47	70	6	130	8	144	39	11	7	57	52	123	13	188
+15 mins.	12	3	51	66	10	124	8	142	25	6	16	47	45	130	11	186
+30 mins.	13	12	41	66	2	151	9	162	37	4	3	44	55	163	9	227
+45 mins.	11	5	60	76	10	147	12	169	23	6	9	38	62	128	6	196
Total Volume	52	27	199	278	28	552	37	617	124	27	35	186	214	544	39	797
% App. Total	18.7	9.7	71.6		4.5	89.5	6		66.7	14.5	18.8		26.9	68.3	4.9	
PHF	.813	.563	.829	.914	.700	.914	.771	.913	.795	.614	.547	.816	.863	.834	.750	.878
Cars	52	27	196	275	28	549	37	614	121	27	34	182	213	542	39	794
% Cars	100	100	98.5	98.9	100	99.5	100	99.5	97.6	100	97.1	97.8	99.5	99.6	100	99.6
Trucks	0	0	3	3	0	3	0	3	3	0	1	4	1	2	0	3
% Trucks	0	0	1.5	1.1	0	0.5	0	0.5	2.4	0	2.9	2.2	0.5	0.4	0	0.4

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts

978-664-2565

N/S Street : Union Street
 E/W Street : King Street
 City/State : Franklin, MA
 Weather : Clear

File Name : 88630004
 Site Code : 88630004
 Start Date : 5/26/2021
 Page No : 4

Groups Printed- Cars

Start Time	Union St From North			King St From East			Union St From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	8	7	59	9	126	5	38	11	6	59	125	25	478
04:15 PM	18	7	45	4	144	14	24	6	16	49	103	13	443
04:30 PM	12	3	40	6	130	8	36	4	3	52	123	13	430
04:45 PM	16	7	46	10	124	8	23	6	9	45	129	11	434
Total	54	24	190	29	524	35	121	27	34	205	480	62	1785
05:00 PM	12	3	50	2	151	9	28	5	10	54	163	9	496
05:15 PM	13	12	40	10	144	12	24	6	8	62	127	6	464
05:30 PM	11	5	60	8	117	5	29	5	7	45	120	15	427
05:45 PM	8	3	34	7	113	10	28	4	6	56	115	14	398
Total	44	23	184	27	525	36	109	20	31	217	525	44	1785
Grand Total	98	47	374	56	1049	71	230	47	65	422	1005	106	3570
Apprch %	18.9	9.1	72.1	4.8	89.2	6	67.3	13.7	19	27.5	65.6	6.9	
Total %	2.7	1.3	10.5	1.6	29.4	2	6.4	1.3	1.8	11.8	28.2	3	

Start Time	Union St From North				King St From East				Union St From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	12	3	40	55	6	130	8	144	36	4	3	43	52	123	13	188	430
04:45 PM	16	7	46	69	10	124	8	142	23	6	9	38	45	129	11	185	434
05:00 PM	12	3	50	65	2	151	9	162	28	5	10	43	54	163	9	226	496
05:15 PM	13	12	40	65	10	144	12	166	24	6	8	38	62	127	6	195	464
Total Volume	53	25	176	254	28	549	37	614	111	21	30	162	213	542	39	794	1824
% App. Total	20.9	9.8	69.3		4.6	89.4	6		68.5	13	18.5		26.8	68.3	4.9		
PHF	.828	.521	.880	.920	.700	.909	.771	.925	.771	.875	.750	.942	.859	.831	.750	.878	.919

Accurate Counts

978-664-2565

File Name : 88630004

Site Code : 88630004

Start Date : 5/26/2021

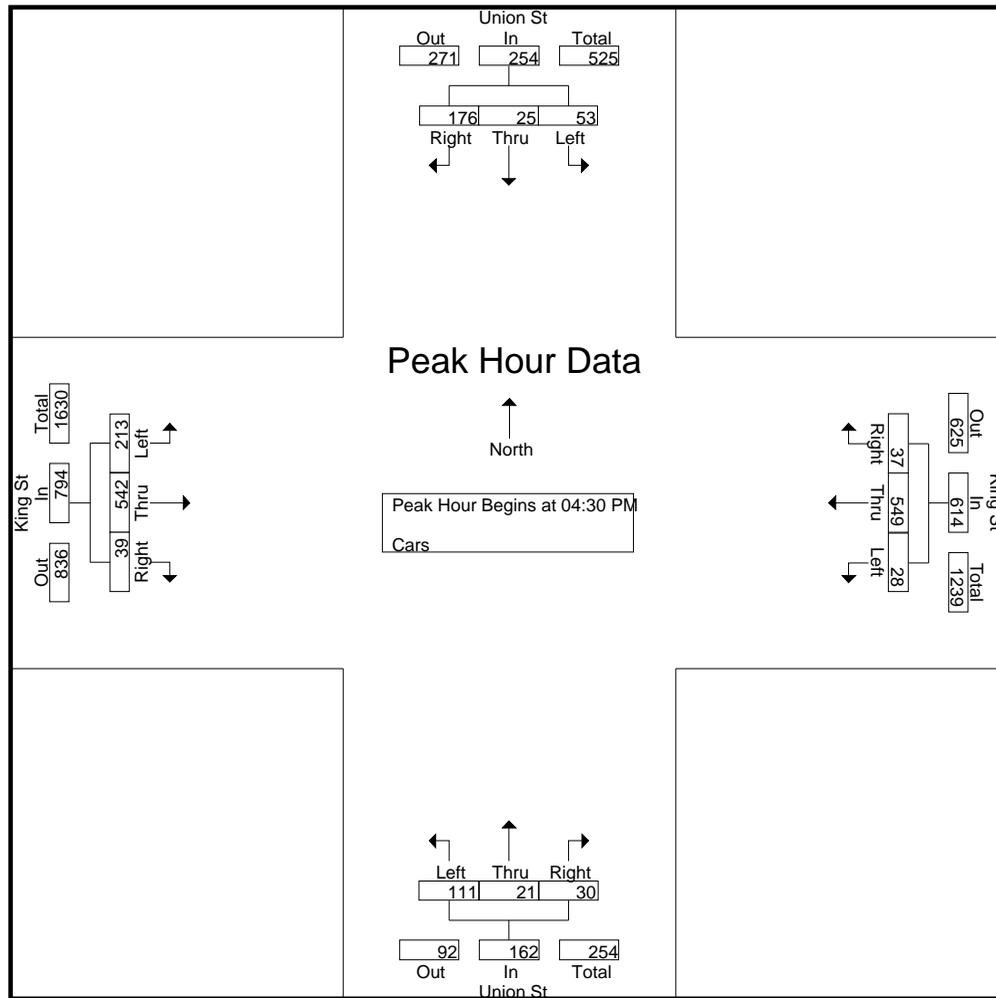
Page No : 5

N/S Street : Union Street

E/W Street : King Street

City/State : Franklin, MA

Weather : Clear

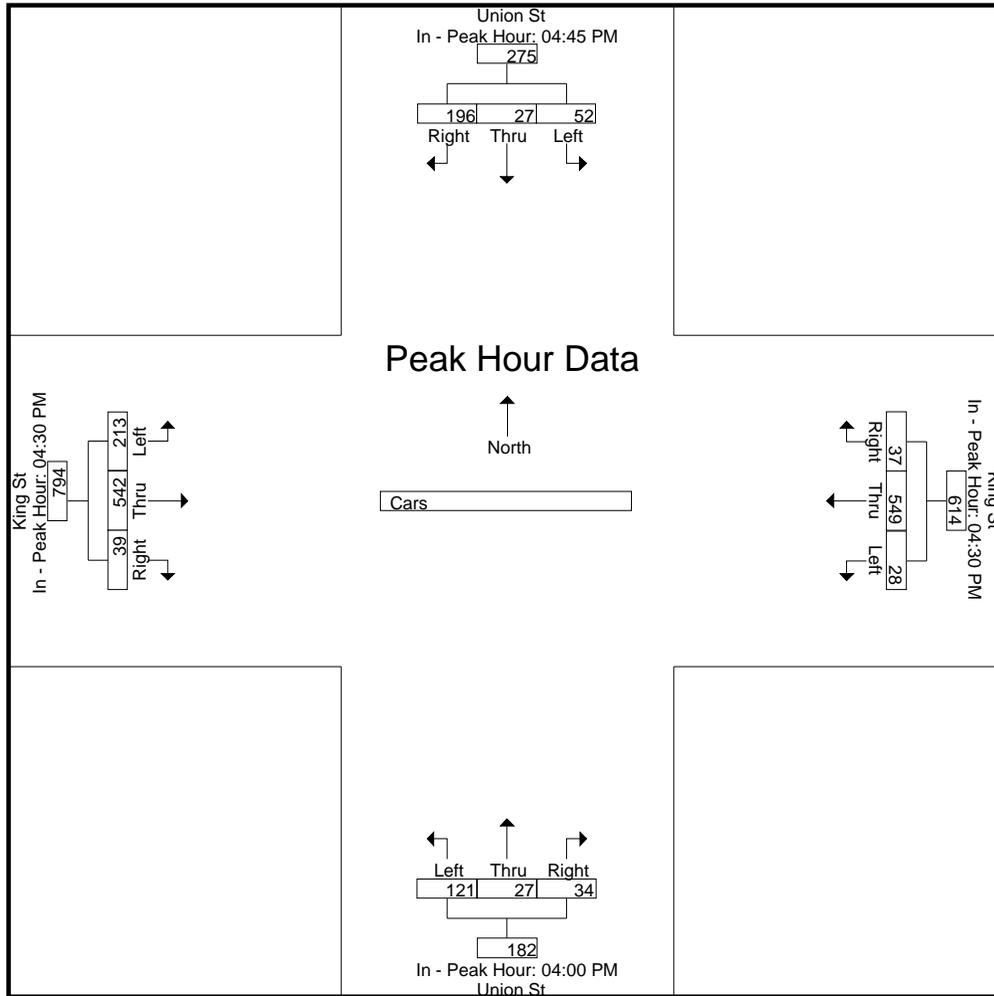


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM				04:30 PM				04:00 PM				04:30 PM			
+0 mins.	16	7	46	69	6	130	8	144	38	11	6	55	52	123	13	188
+15 mins.	12	3	50	65	10	124	8	142	24	6	16	46	45	129	11	185
+30 mins.	13	12	40	65	2	151	9	162	36	4	3	43	54	163	9	226
+45 mins.	11	5	60	76	10	144	12	166	23	6	9	38	62	127	6	195
Total Volume	52	27	196	275	28	549	37	614	121	27	34	182	213	542	39	794
% App. Total	18.9	9.8	71.3		4.6	89.4	6		66.5	14.8	18.7		26.8	68.3	4.9	
PHF	.813	.563	.817	.905	.700	.909	.771	.925	.796	.614	.531	.827	.859	.831	.750	.878

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

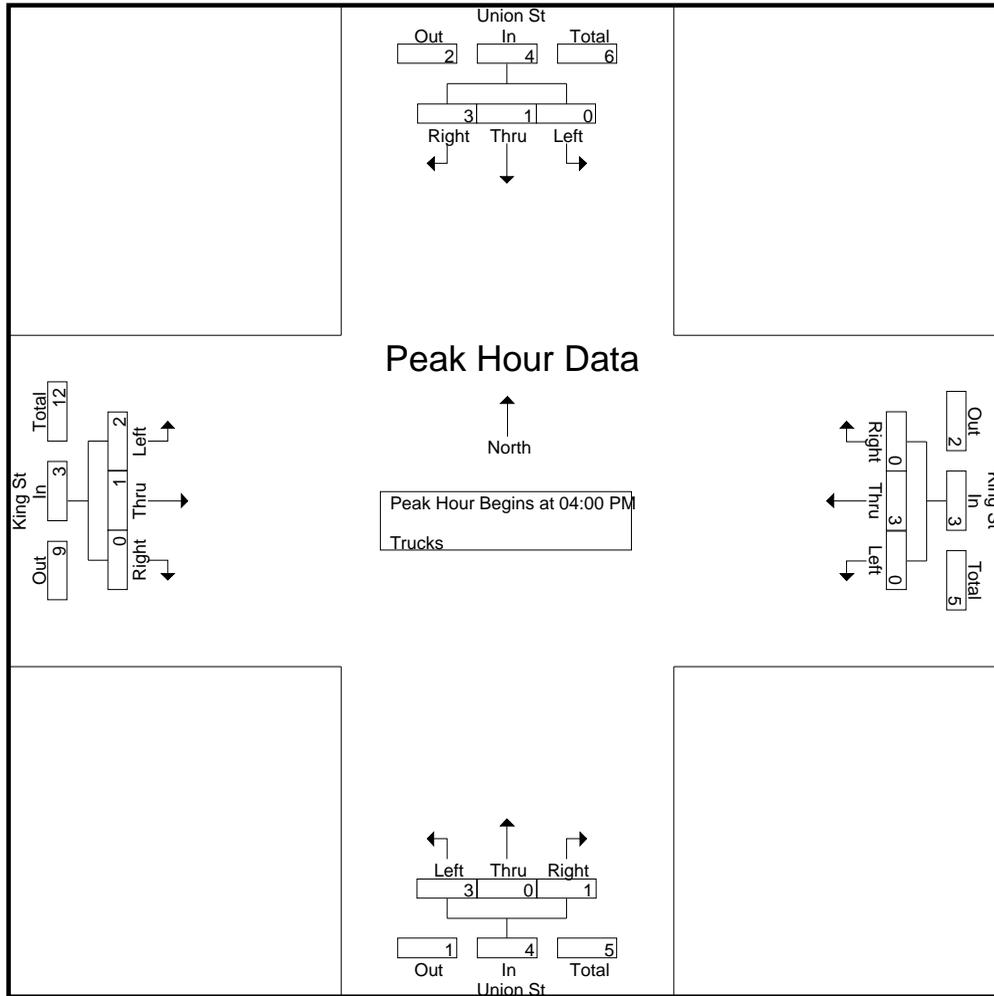
File Name : 88630004
Site Code : 88630004
Start Date : 5/26/2021
Page No : 7

Groups Printed- Trucks

Start Time	Union St From North			King St From East			Union St From South			King St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	1	1	0	2	0	1	0	1	2	0	0	8
04:15 PM	0	0	0	0	1	0	1	0	0	0	0	0	2
04:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	2
04:45 PM	0	0	1	0	0	0	0	0	0	0	1	0	2
Total	0	1	3	0	3	0	3	0	1	2	1	0	14
05:00 PM	0	0	1	0	0	0	0	0	0	1	0	0	2
05:15 PM	0	0	1	0	3	0	0	0	0	0	1	0	5
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	2	0	0	2
Total	0	0	2	0	3	0	0	0	0	3	1	0	9
Grand Total	0	1	5	0	6	0	3	0	1	5	2	0	23
Apprch %	0	16.7	83.3	0	100	0	75	0	25	71.4	28.6	0	
Total %	0	4.3	21.7	0	26.1	0	13	0	4.3	21.7	8.7	0	

Start Time	Union St From North				King St From East				Union St From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	1	1	2	0	2	0	2	1	0	1	2	2	0	0	2	8
04:15 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	2
04:30 PM	0	0	1	1	0	0	0	0	1	0	0	1	0	0	0	0	2
04:45 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	2
Total Volume	0	1	3	4	0	3	0	3	3	0	1	4	2	1	0	3	14
% App. Total	0	25	75	0	100	0	0	0	75	0	25	0	66.7	33.3	0	0	0
PHF	.000	.250	.750	.500	.000	.375	.000	.375	.750	.000	.250	.500	.250	.250	.000	.375	.438

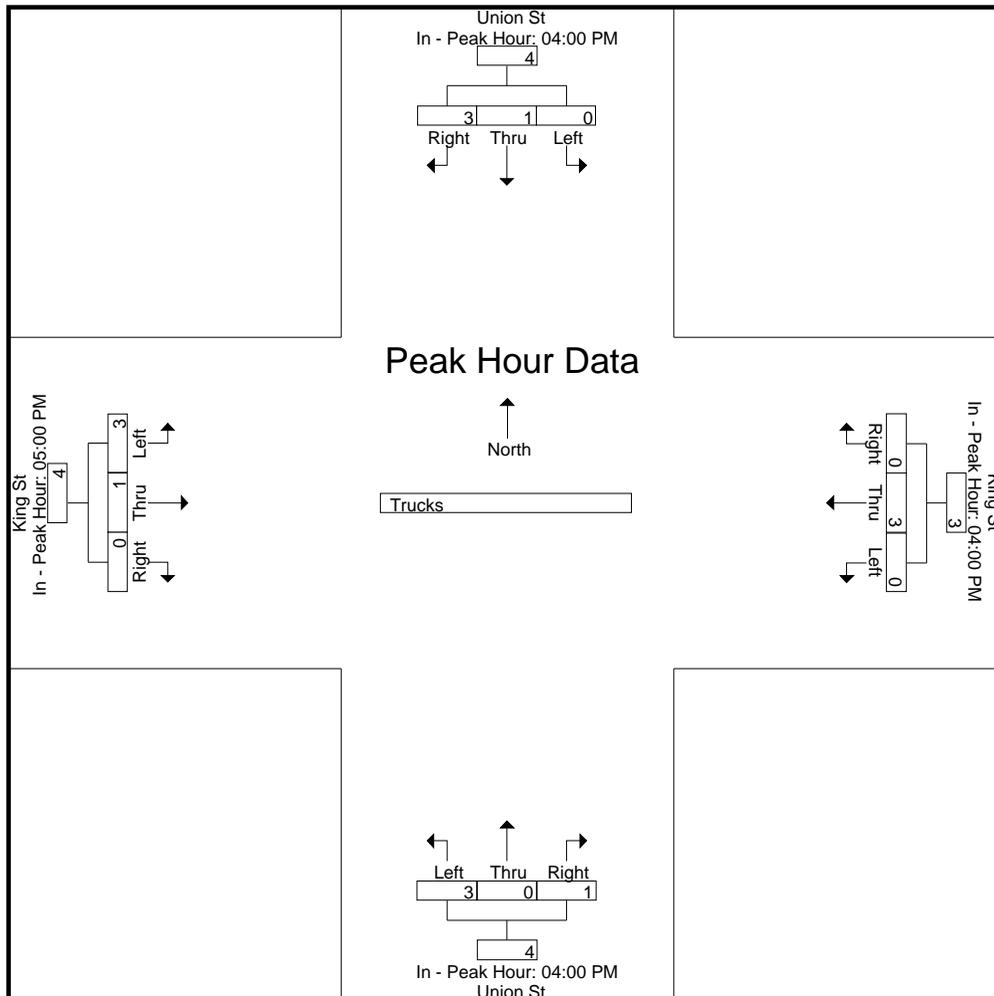
N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				05:00 PM			
+0 mins.	0	1	1	2	0	2	0	2	1	0	1	2	1	0	0	1
+15 mins.	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	1
+30 mins.	0	0	1	1	0	0	0	0	1	0	0	1	0	0	0	0
+45 mins.	0	0	1	1	0	0	0	0	0	0	0	0	2	0	0	2
Total Volume	0	1	3	4	0	3	0	3	3	0	1	4	3	1	0	4
% App. Total	0	25	75		0	100	0		75	0	25		75	25	0	
PHF	.000	.250	.750	.500	.000	.375	.000	.375	.750	.000	.250	.500	.375	.250	.000	.500

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Accurate Counts
978-664-2565

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear

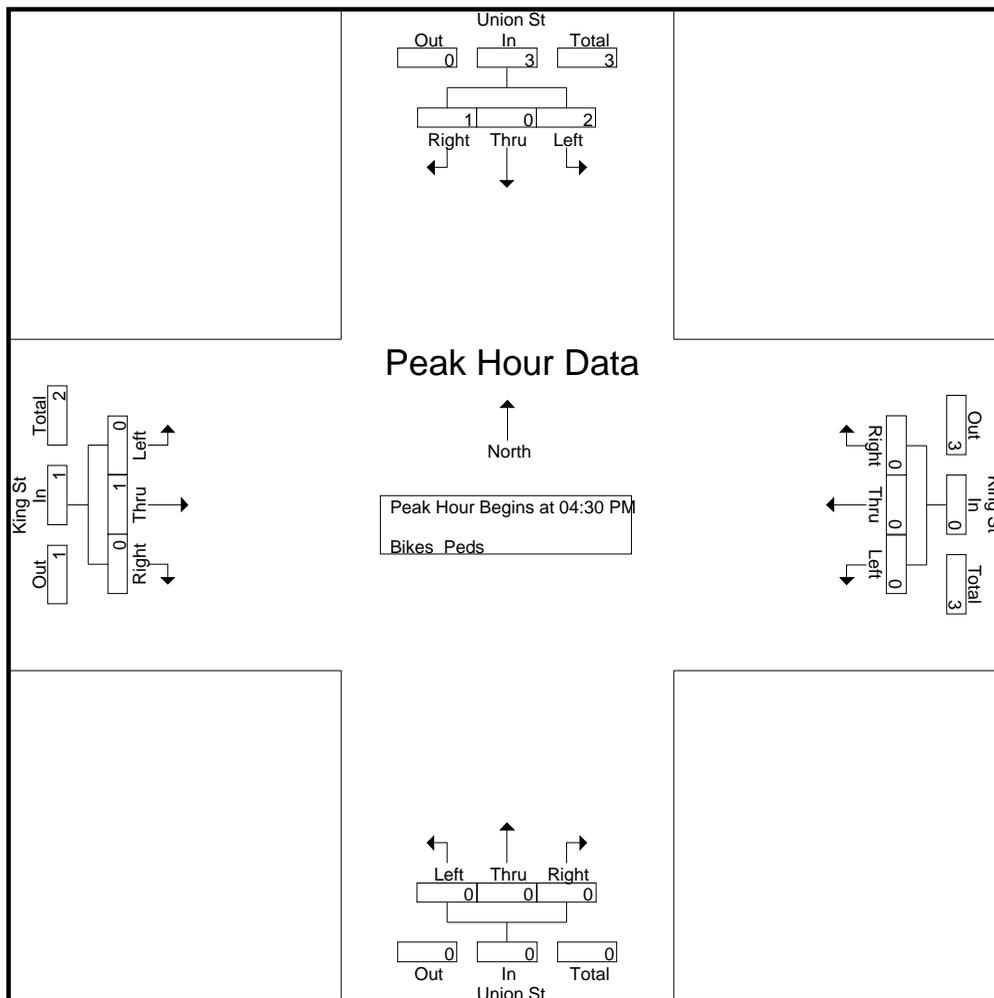
File Name : 88630004
Site Code : 88630004
Start Date : 5/26/2021
Page No : 10

Groups Printed- Bikes Peds

Start Time	Union St From North				King St From East				Union St From South				King St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	3
04:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	2	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	3	4
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	1	2	0	0	0	2	0	0	0	0	0	0	0	0	4	1	5
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
05:45 PM	0	0	0	2	0	0	0	2	0	0	0	1	0	0	0	0	5	0	5
Total	0	0	1	4	0	0	0	4	0	0	0	1	0	0	0	1	10	1	11
Grand Total	2	0	1	5	0	0	0	4	0	0	0	1	0	1	0	1	11	4	15
Apprch %	66.7	0	33.3		0	0	0		0	0	0		0	100	0				
Total %	50	0	25		0	0	0		0	0	0		0	25	0		73.3	26.7	

Start Time	Union St From North				King St From East				Union St From South				King St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	2	0	0	2	0	0	0	0	0	0	0	0	0	1	0	1	3
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	2	0	1	3	0	0	0	0	0	0	0	0	0	1	0	1	4
% App. Total	66.7	0	33.3		0	0	0		0	0	0		0	100	0		
PHF	.250	.000	.250	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.333

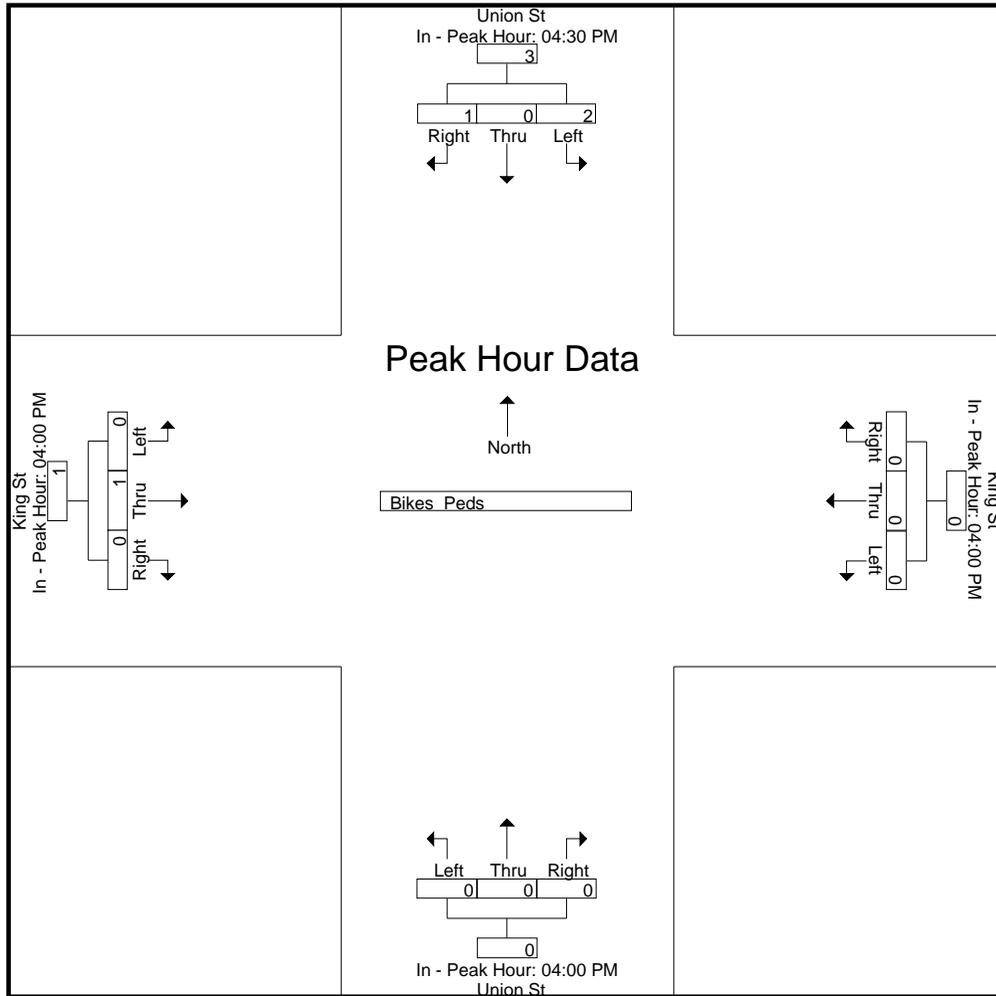
N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	2	0	1	3	0	0	0	0	0	0	0	0	0	1	0	1
% App. Total	66.7	0	33.3		0	0	0		0	0	0		0	100	0	
PHF	.250	.000	.250	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250

N/S Street : Union Street
E/W Street : King Street
City/State : Franklin, MA
Weather : Clear



SEASONAL ADJUSTMENT DATA



COVID-19 ADJUSTMENT DATA



2018 Average Count Data – Sta. 6125

May ADT: 86,293

Growth Rate (2018-2019): 0.6% [MassDOT Yearly Growth Rates]

Growth Rate (2019-2020): 0.0% [MassDOT Guidance on Traffic Count Data]

Growth Rate (2020-2021): 1.0% [Assumed]

$$86,293 \times (1.006) \times (1.000) \times (1.010) = 87,679$$

2021 Average Count Data – Sta. 6125

May ADT: 82,613

COVID Adjustment

$$\frac{87,679}{82,613} = 1.061$$

Massachusetts Highway Department

6125: Monthly Hourly Volume for May 2021

Location ID:	6125	Seasonal Factor Group:	U1-Boston
County:	Norfolk	Daily Factor Group:	
Functional Class	1	Axle Factor Group:	U1-Boston
Location:	INTERSTATE 495	Growth Factor Group:	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status	
1	539	328	240	288	407	852	2028	2778	3553	4546	5445	5834	5990	6098	5865	5911	5716	5010	4085	3286	2526	2309	1456	842	75932	Accepted	
2	566	288	218	179	190	451	1037	1727	2572	3718	5022	5811	6113	5914	5905	5617	5379	4717	3897	2813	2175	1342	799	463	66913	Accepted	
3	274	194	258	297	680	2451	5071	6118	5366	4384	4351	4258	4511	4758	5352	6658	6507	6044	3624	2734	1767	1159	743	557	78116	Accepted	
4																											
5	357	306	273	339	691	2253	4824	5911	5345	4371	4307	4575	4833	5022	5704	6995	6987	6336	4142	2632	1840	1343	862	614	80862	Accepted	
6																											
7	462	361	360	419	802	2366	4941	5818	5331	4890	5038	5557	5787	6066	7464	9254	8911	7466	5317	3710	2610	1811	1446	887	97074	Accepted	
8	608	372	293	318	395	982	1976	2783	3737	4736	5554	6424	6761	6850	6730	6712	6037	5400	4455	3744	2755	2041	1422	863	81948	Accepted	
9	519	296	238	168	220	394	913	1652	2492	4138	5524	6421	6377	6942	6400	5975	5755	5309	4726	3908	2752	1633	904	458	74114	Accepted	
10	260	226	251	309	706	2318	4918	6163	5725	4722	4520	4625	4645	4767	5495	6918	6904	6159	4059	2776	1922	1333	851	632	81204	Accepted	
11	409	342	337	423	736	2582	5392	6422	5735	4705	4623	4445	4676	4919	5680	6990	7164	6633	4491	2983	2140	1494	919	641	84881	Accepted	
12	373	333	320	347	801	2526	5251	6300	5426	4609	4489	4623	4691	4944	5921	7215	7204	6747	4429	3138	2264	1531	981	683	85146	Accepted	
13	409	354	339	422	764	2617	5314	6182	5732	4980	4844	4962	5197	5239	6268	7633	7521	6996	4778	3480	2509	1802	1112	751	90205	Accepted	
14	426	366	358	402	778	2368	5202	5951	5336	4969	5048	5643	5727	5983	7138	8366	8086	7060	5449	3804	2748	2121	1449	990	95768	Accepted	
15	583	344	300	306	456	973	2175	2952	3855	5066	5915	6078	6286	6244	5961	6080	5598	4965	4195	3320	2660	2167	1598	1093	79170	Accepted	
16	547	302	205	208	262	484	973	1806	2446	3921	5103	5605	6096	6017	5994	5873	5413	4923	4195	3242	2830	1641	1029	563	69678	Accepted	
17	309	230	259	329	735	2470	5237	6198	5716	4709	4315	4449	4827	4924	5816	6991	7169	6069	4062	3115	2272	1456	796	610	83063	Accepted	
18	402	331	343	399	792	2468	5436	6419	5797	4827	4467	4611	4673	4821	6032	7413	7253	6750	4399	3021	2113	1560	926	702	85955	Accepted	
19	446	312	339	417	819	2527	5463	6524	5793	4832	4679	4929	5031	5228	6144	7661	7433	6919	4871	3390	2460	1653	1075	732	89677	Accepted	
20	430	318	340	385	796	2577	5456	6446	5763	5005	4647	4940	4855	5296	6336	7899	7865	7284	4864	3628	2616	1805	1135	757	91443	Accepted	
21	489	340	351	404	773	2393	5040	5921	5494	5035	5466	5297	6006	6388	7268	9066	8438	7696	5779	3988	2934	2174	1551	1060	99351	Accepted	
22	655	452	341	334	481	981	2043	3039	3960	4645	5703	6148	6345	6329	6544	6053	5826	5069	4429	3749	2802	2288	2010	1215	81441	Accepted	
23	519	285	264	229	251	515	1101	1937	2855	4063	5406	6003	6070	6042	6030	5628	5147	5053	4283	3685	2736	1605	995	634	71336	Accepted	
24	308	225	259	319	750	2590	5365	6525	5837	4714	4403	4801	4815	5014	5883	7155	7155	6523	4367	3096	2248	1560	955	596	85463	Accepted	
25	383	365	316	400	766	2559	5424	6553	6081	4807	4618	4759	4893	5104	6043	7698	7446	6991	4516	3151	2278	1566	1053	667	88437	Accepted	
26	426	296	296	377	787	2538	5424	6388	5906	4955	4907	5234	4974	5201	6107	7566	7515	6896	4806	3382	2414	1572	1064	705	89736	Accepted	
27	410	328	352	434	788	2491	5316	6396	5957	5191	5143	5527	5551	6006	7204	8764	8494	7696	5655	4009	2927	2075	1378	883	98975	Accepted	
28	533	419	372	457	755	2279	5065	5801	5365	5104	5354	5951	6286	6872	7616	8483	8387	7005	5472	3964	2627	1957	1342	846	98312	Accepted	
29	572	399	289	264	344	696	1319	2138	2951	3935	4783	5644	5918	5841	5676	5220	4679	4311	3685	2966	2241	1727	1276	920	67794	Accepted	
30	540	307	230	167	195	400	757	1278	1817	2891	3973	5071	5449	5493	5260	4794	4338	3969	3447	2778	2079	1512	1044	691	58480	Accepted	
31	404	249	220	189	280	516	1023	1380	2144	3058	4465	5400	5748	6048	5564	5427	5277	4868	4198	3237	2485	1538	983	610	65311	Accepted	

May Average 82613

VEHICLE TRAVEL SPEED DATA



Accurate Counts
978-664-2565

88630001

Location : King Street
Location : East of Constitution Boulevard
City/State: Franklin, MA
Direction: EB,

5/26/2021	0 - 15	> 15 -	> 20 -	> 25 -	> 30 -	> 35 -	> 40 -	> 45 -	> 50 -	> 55 -	> 60 -	> 65 -	> 70	Total
Time	MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	MPH	
12:00 AM	0	7	19	10	10	4	0	0	0	0	0	0	0	50
1:00	0	9	3	4	6	5	0	1	0	0	0	0	0	28
2:00	3	4	1	2	3	7	0	1	0	0	0	0	0	21
3:00	8	1	2	4	10	6	2	2	0	0	0	0	0	35
4:00	4	17	13	34	31	25	10	5	1	0	0	0	0	140
5:00	10	19	63	110	74	50	10	0	0	0	0	0	0	336
6:00	9	44	133	275	196	29	5	0	0	0	0	0	0	691
7:00	21	88	181	368	152	26	1	0	0	1	0	0	0	838
8:00	22	97	201	244	145	17	5	0	0	0	0	0	0	731
9:00	9	60	125	193	119	36	7	0	0	0	0	0	0	549
10:00	15	53	147	182	104	31	5	0	0	0	0	0	0	537
11:00	18	87	161	190	91	16	2	0	0	0	0	0	0	565
12:00 PM	4	91	185	188	100	19	3	1	0	0	0	0	0	591
1:00	5	61	141	180	119	21	5	1	1	0	0	0	0	534
2:00	11	62	200	218	117	33	2	0	0	0	0	0	0	643
3:00	9	110	212	216	112	21	8	1	1	1	1	0	0	692
4:00	15	95	215	213	104	15	6	1	0	0	0	0	0	664
5:00	11	88	223	214	94	28	2	0	0	0	0	0	0	660
6:00	2	44	85	178	132	46	10	0	0	0	0	0	0	497
7:00	8	24	82	127	50	18	3	0	1	1	0	0	0	314
8:00	0	33	86	90	49	14	4	2	0	0	0	0	0	278
9:00	3	17	42	48	19	3	1	1	0	0	0	0	0	134
10:00	0	12	28	24	14	7	4	0	0	0	0	0	0	89
11:00	2	19	49	16	7	6	0	0	0	0	0	0	0	99
Total	189	1142	2597	3328	1858	483	95	16	4	3	1	0	0	9716

Percentile	15th	50th	85th	95th
Speed	20.4	26.6	32.2	35.9
Mean Speed (Average)	26.3			
10 MPH Pace Speed	20-29			
Number in Pace	5881			
Percent in Pace	60.5%			
Number > 40 MPH	119			
Percent > 40 MPH	1.2%			

Accurate Counts
978-664-2565

88630001

Location : King Street
Location : East of Constitution Boulevard
City/State: Franklin, MA
Direction: EB,

5/27/2021 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	6	16	8	9	1	0	1	0	0	0	0	0	41
1:00	7	6	3	10	3	3	2	0	0	0	0	0	0	34
2:00	3	3	5	1	7	5	1	1	0	0	0	0	0	26
3:00	2	4	2	2	7	5	3	0	0	1	0	0	0	26
4:00	5	11	18	34	33	12	10	1	0	0	0	0	0	124
5:00	7	19	50	97	113	49	11	3	0	0	0	0	0	349
6:00	4	46	138	239	143	46	12	1	1	0	0	0	0	630
7:00	21	90	243	339	108	27	4	0	0	0	0	0	0	832
8:00	14	81	193	303	130	27	4	0	0	0	0	0	0	752
9:00	9	58	162	213	103	30	3	0	0	0	0	0	0	578
10:00	14	68	99	179	125	32	8	0	0	0	0	0	0	525
11:00	2	79	167	189	115	20	6	0	1	0	0	0	0	579
12:00 PM	7	76	188	210	85	20	6	1	0	0	0	0	0	593
1:00	8	58	160	191	121	19	4	0	0	0	0	0	0	561
2:00	6	83	240	218	107	20	1	0	2	0	0	0	0	677
3:00	15	106	263	229	144	14	0	0	0	0	0	0	0	771
4:00	9	102	184	185	114	14	3	1	0	0	0	0	0	612
5:00	21	108	167	188	106	28	0	0	0	0	0	0	0	618
6:00	8	32	113	124	110	36	10	1	0	0	0	0	0	434
7:00	3	27	91	103	98	29	5	0	0	1	0	1	0	358
8:00	1	15	56	98	50	15	2	0	0	2	0	0	1	240
9:00	2	13	29	38	31	16	2	0	0	0	0	0	0	131
10:00	2	12	26	28	28	10	0	0	0	0	0	0	0	106
11:00	1	17	17	14	6	4	0	1	0	0	0	0	0	60
Total	171	1120	2630	3240	1896	482	97	11	4	4	0	1	1	9657

Percentile	15th	50th	85th	95th
Speed	20.4	26.6	32.2	35.3
Mean Speed (Average)	26.4			
10 MPH Pace Speed	20-29			
Number in Pace	5828			
Percent in Pace	60.4%			
Number > 40 MPH	118			
Percent > 40 MPH	1.2%			

Grand Total	360	2262	5227	6568	3754	965	192	27	8	7	1	1	1	19373
Stats														
Percentile				15th	50th	85th	95th							
Speed				20.4	26.6	32.2	35.9							
Mean Speed (Average)				26.3										
10 MPH Pace Speed				20-29										
Number in Pace				11709										
Percent in Pace				60.4%										
Number > 40 MPH				237										
Percent > 40 MPH				1.2%										

Accurate Counts
978-664-2565

88630001

Location : King Street
Location : East of Constitution Boulevard
City/State: Franklin, MA
Direction: WB,

5/26/2021	0 - 15	> 15 -	> 20 -	> 25 -	> 30 -	> 35 -	> 40 -	> 45 -	> 50 -	> 55 -	> 60 -	> 65 -	> 70	Total
Time	MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	MPH	
12:00 AM	10	1	0	5	8	9	5	0	1	0	0	0	0	39
1:00	7	4	4	2	6	2	1	1	0	0	0	0	0	27
2:00	8	4	0	7	4	4	1	2	1	0	0	0	0	31
3:00	14	4	3	4	4	3	2	0	0	0	0	0	0	34
4:00	21	11	3	4	10	15	13	4	0	0	0	0	0	81
5:00	79	47	18	10	14	22	23	5	0	0	0	0	0	218
6:00	155	102	32	33	22	38	8	3	2	0	0	0	0	395
7:00	212	84	48	37	54	51	9	1	0	0	0	0	0	496
8:00	220	119	58	38	36	35	15	2	1	1	0	0	0	525
9:00	139	59	45	43	49	52	22	3	0	0	1	0	0	413
10:00	151	69	46	27	50	40	16	6	0	0	0	0	0	405
11:00	161	86	50	44	62	58	12	5	0	0	0	0	1	479
12:00 PM	176	109	50	39	57	35	18	7	2	0	0	0	0	493
1:00	144	99	59	50	65	82	14	2	0	0	0	0	0	515
2:00	200	103	87	78	101	61	22	4	1	0	0	1	0	658
3:00	193	98	87	120	120	42	8	1	1	0	1	0	0	671
4:00	198	136	150	159	91	71	11	1	0	0	0	0	0	817
5:00	184	92	121	152	120	76	27	1	0	0	0	0	0	773
6:00	141	65	59	67	123	109	34	8	2	0	0	0	0	608
7:00	120	77	43	52	70	75	26	3	0	1	0	0	0	467
8:00	97	39	37	27	70	63	21	1	0	0	0	0	0	355
9:00	51	22	16	27	49	43	12	0	0	1	0	0	0	221
10:00	24	10	9	19	28	37	13	2	0	0	0	0	0	142
11:00	22	15	4	7	16	25	10	2	0	0	1	0	0	102
Total	2727	1455	1029	1051	1229	1048	343	64	11	3	3	1	1	8965

Percentile	15th	50th	85th	95th
Speed	11.1	21.6	35.3	39.7
Mean Speed (Average)	21.9			
10 MPH Pace Speed	15-24			
Number in Pace	2481			
Percent in Pace	27.7%			
Number > 40 MPH	426			
Percent > 40 MPH	4.8%			

Accurate Counts
978-664-2565

Location : King Street
Location : East of Constitution Boulevard
City/State: Franklin, MA
Direction: WB,

88630001

5/27/2021 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	7	3	2	3	12	10	8	0	2	0	0	0	0	47
1:00	2	9	1	0	3	2	2	1	0	0	0	0	0	20
2:00	10	5	0	2	4	2	4	1	0	0	0	0	0	28
3:00	8	6	5	2	3	5	2	0	0	0	0	0	0	31
4:00	27	16	4	2	4	12	12	2	0	0	0	0	0	79
5:00	52	36	15	13	20	23	16	7	0	0	0	0	0	182
6:00	148	79	43	47	24	36	17	4	0	0	0	1	0	399
7:00	175	99	59	40	54	51	14	1	2	0	0	0	0	495
8:00	188	94	46	59	93	64	9	3	0	0	0	0	0	556
9:00	141	63	56	32	71	57	20	4	0	0	1	0	0	445
10:00	128	76	29	32	53	76	26	2	0	0	0	0	0	422
11:00	149	76	53	28	50	66	21	4	0	1	0	0	0	448
12:00 PM	175	100	33	49	51	51	17	3	0	0	1	0	0	480
1:00	150	98	73	45	65	73	29	5	2	0	1	0	0	541
2:00	191	90	109	114	82	54	27	2	0	0	0	0	0	669
3:00	175	106	134	125	104	64	15	3	0	0	0	0	0	726
4:00	203	95	112	114	101	58	19	1	0	0	0	0	0	703
5:00	182	115	121	136	146	56	19	2	1	1	0	0	0	779
6:00	135	63	90	63	85	85	45	3	2	0	0	0	0	571
7:00	109	69	45	32	82	86	31	8	1	0	0	0	0	463
8:00	89	38	19	20	55	75	35	3	1	2	0	1	0	338
9:00	60	16	20	15	54	59	15	5	1	1	0	0	1	247
10:00	38	18	9	12	31	23	6	2	0	0	0	0	0	139
11:00	25	13	3	6	8	24	12	1	2	0	0	0	0	94
Total	2567	1383	1081	991	1255	1112	421	67	14	5	3	2	1	8902

Percentile	15th	50th	85th	95th
Speed	11.7	22.3	35.9	40.3
Mean Speed (Average)	22.5			
10 MPH Pace Speed	15-24			
Number in Pace	2459			
Percent in Pace	27.6%			
Number > 40 MPH	513			
Percent > 40 MPH	5.8%			

Grand Total	5294	2838	2110	2042	2484	2160	764	131	25	8	6	3	2	17867
Stats														
Percentile				15th	50th	85th	95th							
Speed				11.1	22.3	35.9	40.3							
Mean Speed (Average)				22.2										
10 MPH Pace Speed				15-24										
Number in Pace				4941										
Percent in Pace				27.7%										
Number > 40 MPH				939										
Percent > 40 MPH				5.3%										

Accurate Counts
978-664-2565

Location : King Street
Location : East of Constitution Boulevard
City/State: Franklin, MA
Direction: Combined

88630001

5/26/2021	0 - 15	> 15 -	> 20 -	> 25 -	> 30 -	> 35 -	> 40 -	> 45 -	> 50 -	> 55 -	> 60 -	> 65 -	> 70	Total
Time	MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	MPH	
12:00 AM	10	8	19	15	18	13	5	0	1	0	0	0	0	89
1:00	7	13	7	6	12	7	1	2	0	0	0	0	0	55
2:00	11	8	1	9	7	11	1	3	1	0	0	0	0	52
3:00	22	5	5	8	14	9	4	2	0	0	0	0	0	69
4:00	25	28	16	38	41	40	23	9	1	0	0	0	0	221
5:00	89	66	81	120	88	72	33	5	0	0	0	0	0	554
6:00	164	146	165	308	218	67	13	3	2	0	0	0	0	1086
7:00	233	172	229	405	206	77	10	1	0	1	0	0	0	1334
8:00	242	216	259	282	181	52	20	2	1	1	0	0	0	1256
9:00	148	119	170	236	168	88	29	3	0	0	1	0	0	962
10:00	166	122	193	209	154	71	21	6	0	0	0	0	0	942
11:00	179	173	211	234	153	74	14	5	0	0	0	0	1	1044
12:00 PM	180	200	235	227	157	54	21	8	2	0	0	0	0	1084
1:00	149	160	200	230	184	103	19	3	1	0	0	0	0	1049
2:00	211	165	287	296	218	94	24	4	1	0	0	1	0	1301
3:00	202	208	299	336	232	63	16	2	2	1	2	0	0	1363
4:00	213	231	365	372	195	86	17	2	0	0	0	0	0	1481
5:00	195	180	344	366	214	104	29	1	0	0	0	0	0	1433
6:00	143	109	144	245	255	155	44	8	2	0	0	0	0	1105
7:00	128	101	125	179	120	93	29	3	1	2	0	0	0	781
8:00	97	72	123	117	119	77	25	3	0	0	0	0	0	633
9:00	54	39	58	75	68	46	13	1	0	1	0	0	0	355
10:00	24	22	37	43	42	44	17	2	0	0	0	0	0	231
11:00	24	34	53	23	23	31	10	2	0	0	1	0	0	201
Total	2916	2597	3626	4379	3087	1531	438	80	15	6	4	1	1	18681

Percentile	15th	50th	85th	95th
Speed	14.8	25.4	33.5	37.8
Mean Speed (Average)	24.2			
10 MPH Pace Speed	20-29			
Number in Pace	7969			
Percent in Pace	42.7%			
Number > 40 MPH	545			
Percent > 40 MPH	2.9%			

MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAPPING



INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Franklin COUNT DATE : May-21
 DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : King Street
 MINOR STREET(S) : Constitution Boulevard

**INTERSECTION
 DIAGRAM**
 (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	WB			
PEAK HOURLY VOLUMES (PM) :	579	1,135	435			2,149

" K " FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES PER YEAR (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Warehouse

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Franklin COUNT DATE : May-21

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : King Street

MINOR STREET(S) : I-495 Southbound Ramps

**INTERSECTION
 DIAGRAM
 (Label Approaches)**



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NEB	SWB	SEB			
PEAK HOURLY VOLUMES (PM) :	893	1,036	672			2,601

" K " FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES PER YEAR (A) :

CRASH RATE CALCULATION :

0.57

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Warehouse

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Franklin COUNT DATE : May-21
 DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : King Street
 MINOR STREET(S) : I-495 Northbound Ramps

**INTERSECTION
 DIAGRAM
 (Label Approaches)**



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NEB	SWB	NWB			
PEAK HOURLY VOLUMES (PM) :	844	896	677			2,417

" K " FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES PER YEAR (A) :

CRASH RATE CALCULATION :

0.47

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Warehouse

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Franklin COUNT DATE : May-21

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : King Street

MINOR STREET(S) : Union Street

**INTERSECTION
 DIAGRAM
 (Label Approaches)**



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NEB	SWB	NWB	SEB		
PEAK HOURLY VOLUMES (PM) :	845	655	173	274		1,947

" K " FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES PER YEAR (A) :

CRASH RATE CALCULATION :

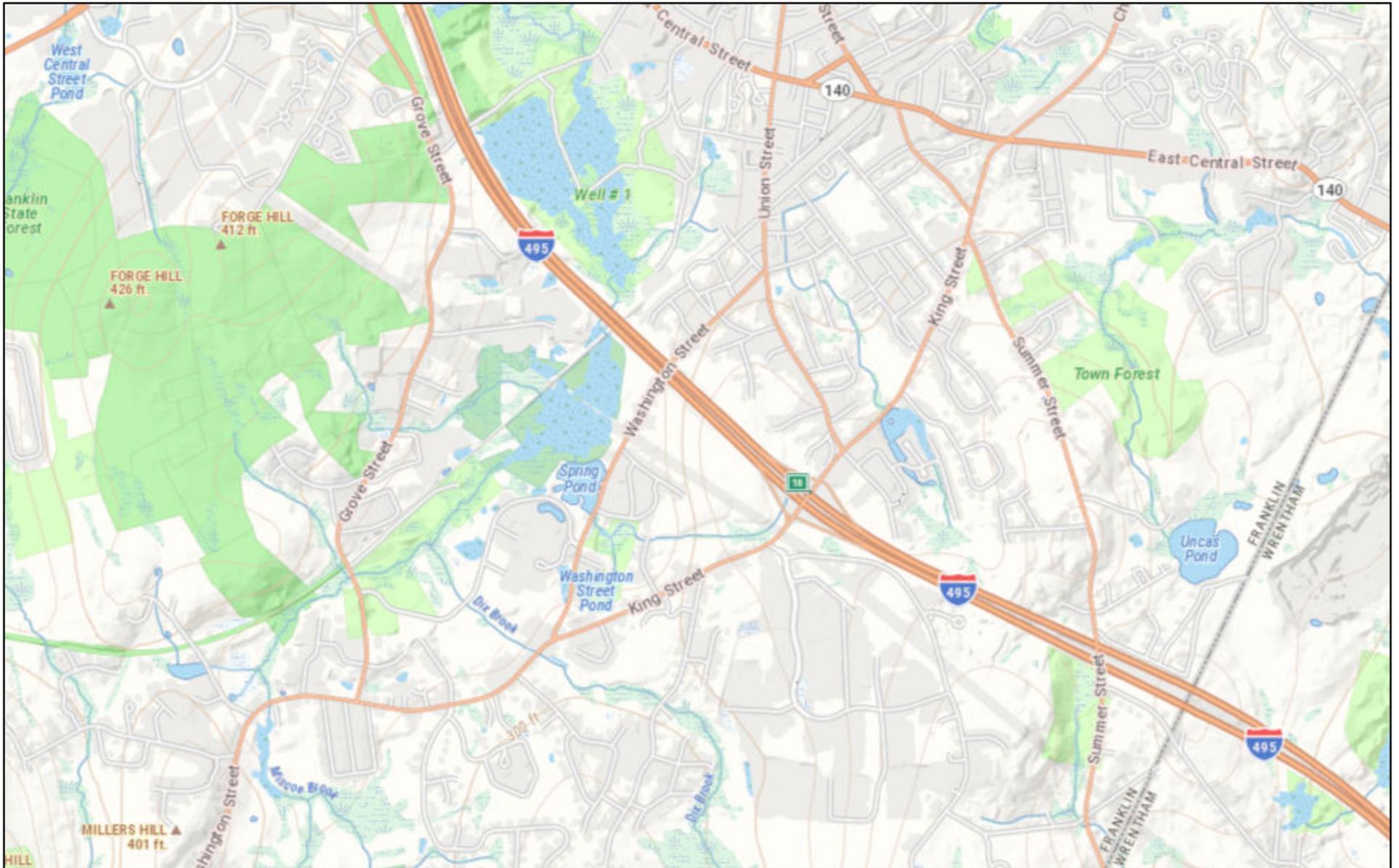
0.28

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

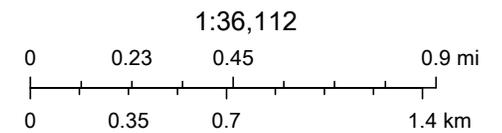
Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Warehouse

MassDOT Top Crash Locations



8/13/2021, 2:04:45 PM



MassGIS

MassDOT
MassGIS |

GENERAL BACKGROUND TRAFFIC GROWTH



General Background Traffic Growth - Daily Traffic Volumes

CITY/TOWN	ROUTE/STREET	LOCATION	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Annual Growth Rate
Franklin	Route 140	West of Beaver Street	20,620	20,846	20,217	20,697	20,719	20,109	20,330		21,200	21,264		0.15%
Franklin	Interstate 495	South of Route 140	72,318	72,712		80,371	77,245	83,722	88,584	87,263	87,001	83,551	89,222	1.96%
Franklin	Pleasant Street	at Norfolk Town Line	11,900	11,828	11,816	10,232	10,302	10,621	9,519	10,109	10,281	11,724	11,677	-0.41%
														0.57%

TRIP-GENERATION CALCULATIONS



Warehousing (150)

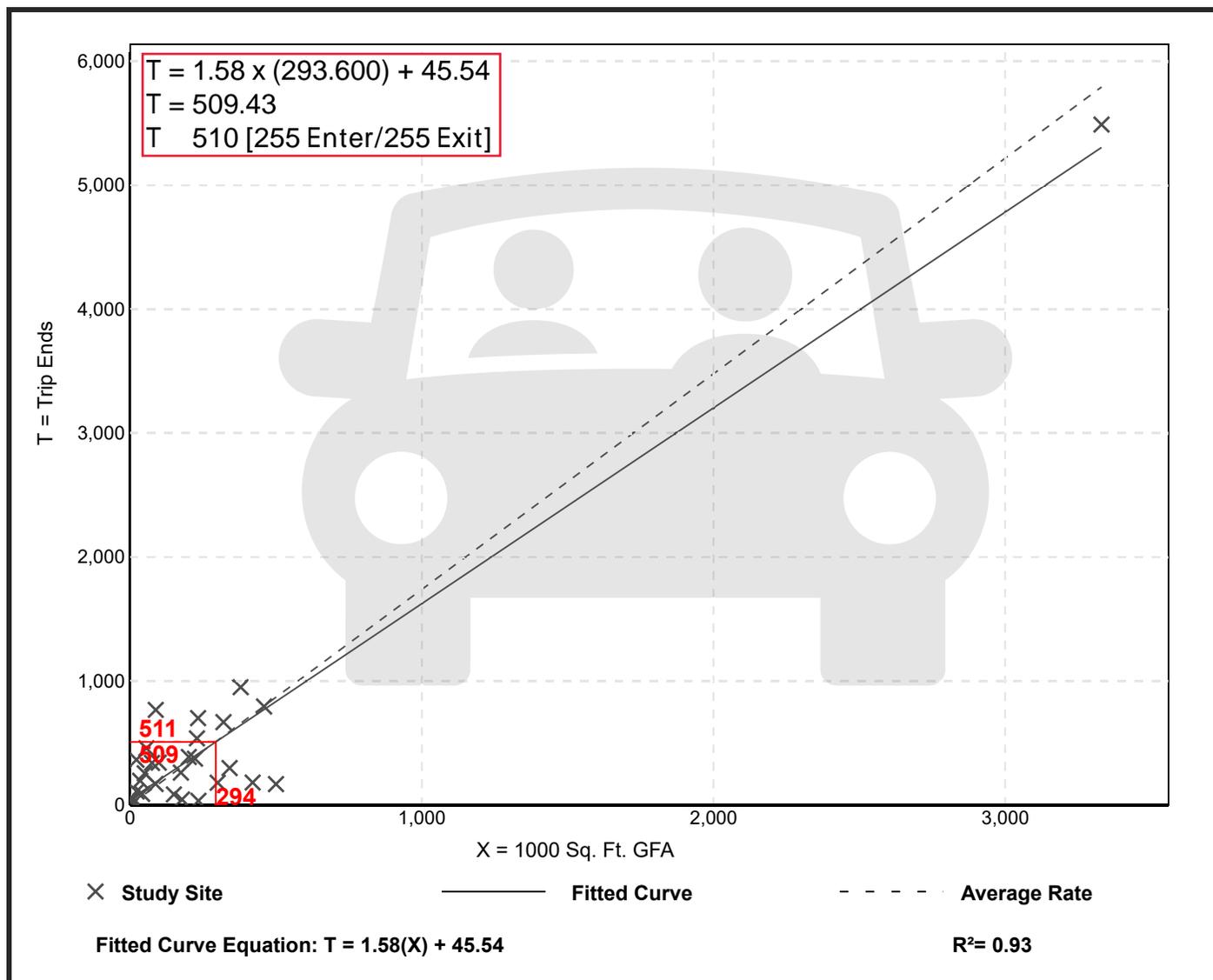
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
 Number of Studies: 29
 Avg. 1000 Sq. Ft. GFA: 285
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.74	0.15 - 16.93	1.55

Data Plot and Equation



Warehousing (150)

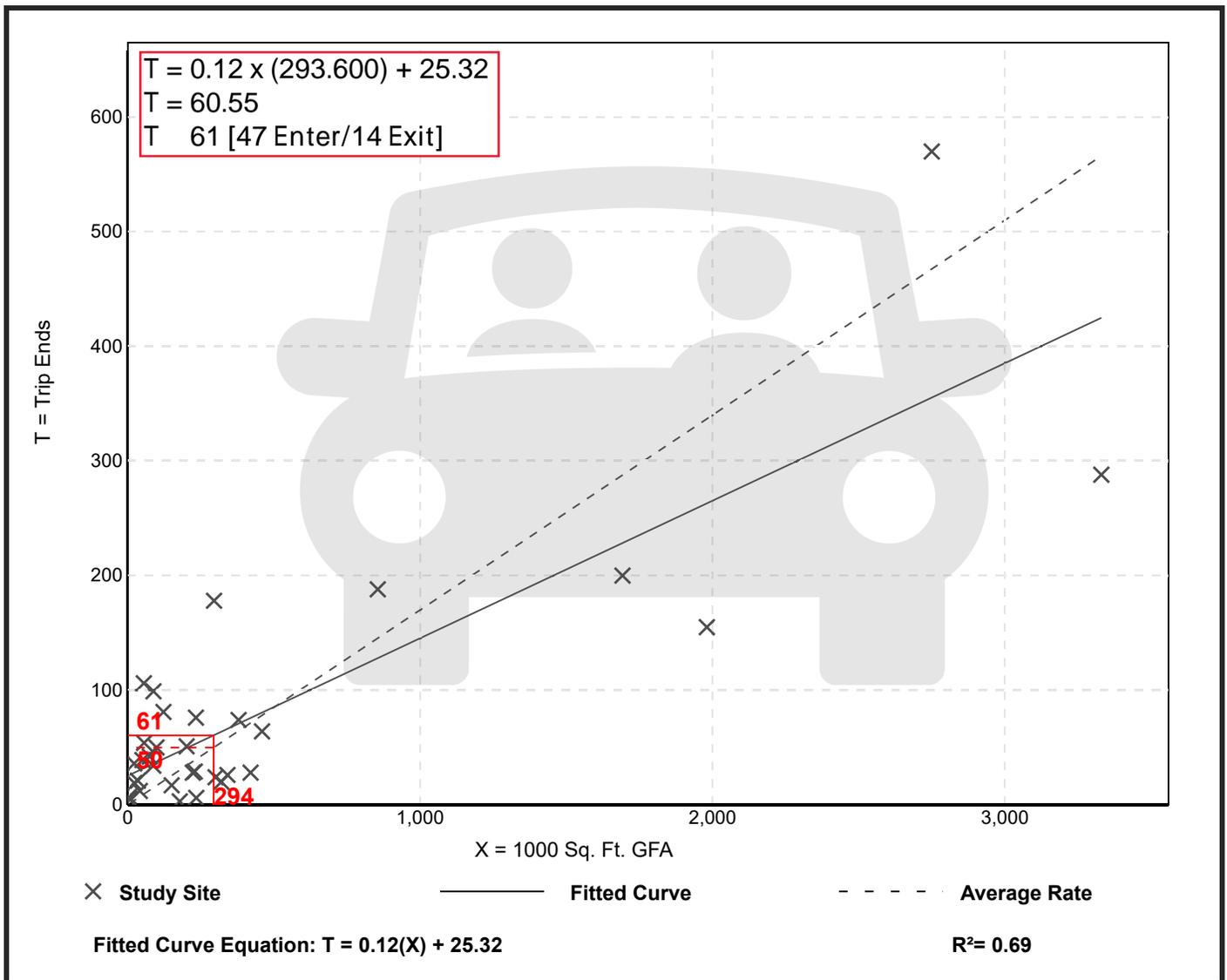
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban
 Number of Studies: 34
 Avg. 1000 Sq. Ft. GFA: 451
 Directional Distribution: 77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.17	0.02 - 1.93	0.20

Data Plot and Equation



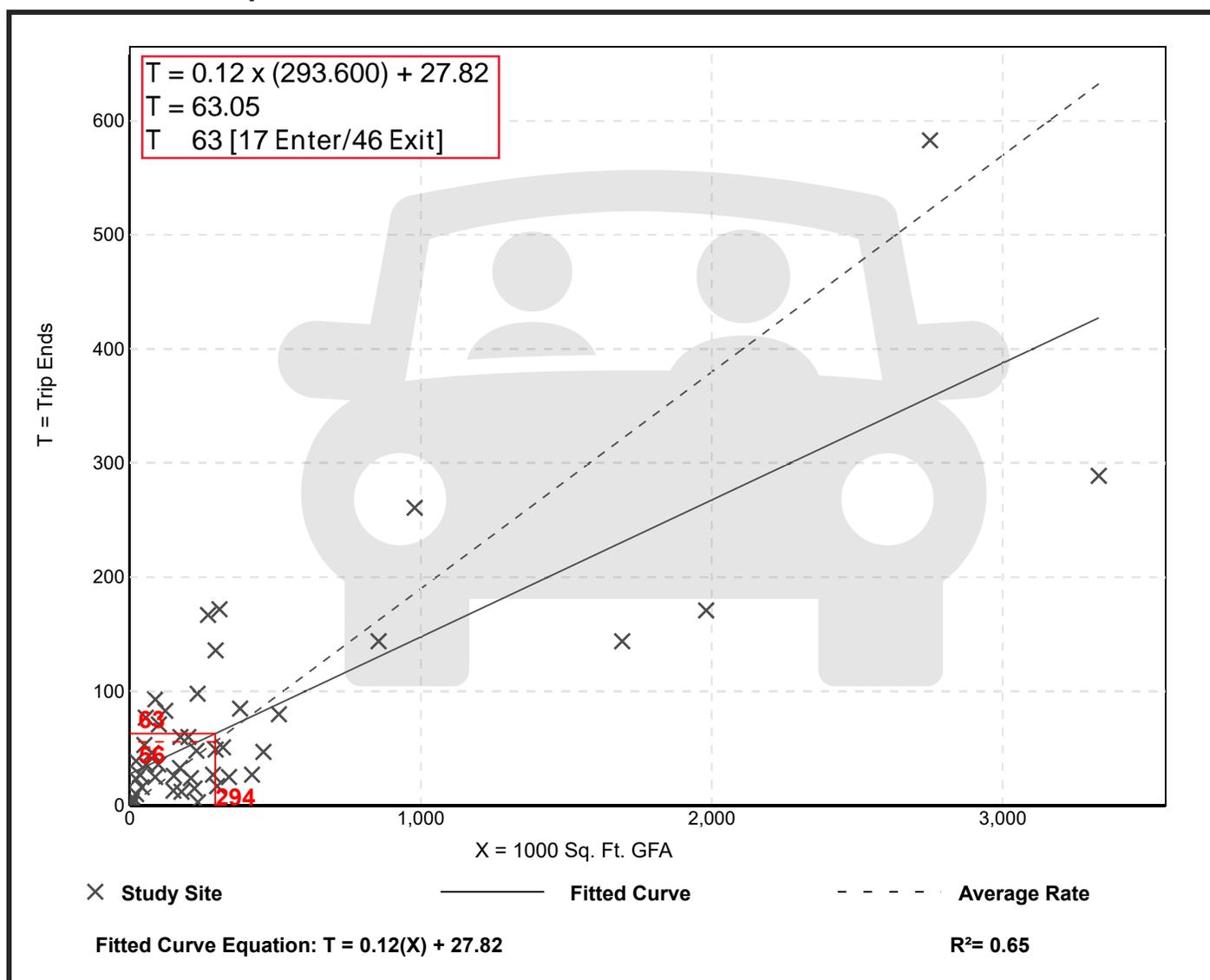
Warehousing (150)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 47
 Avg. 1000 Sq. Ft. GFA: 400
 Directional Distribution: 27% entering, 73% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.19	0.01 - 1.80	0.18

Data Plot and Equation



Warehousing (150)

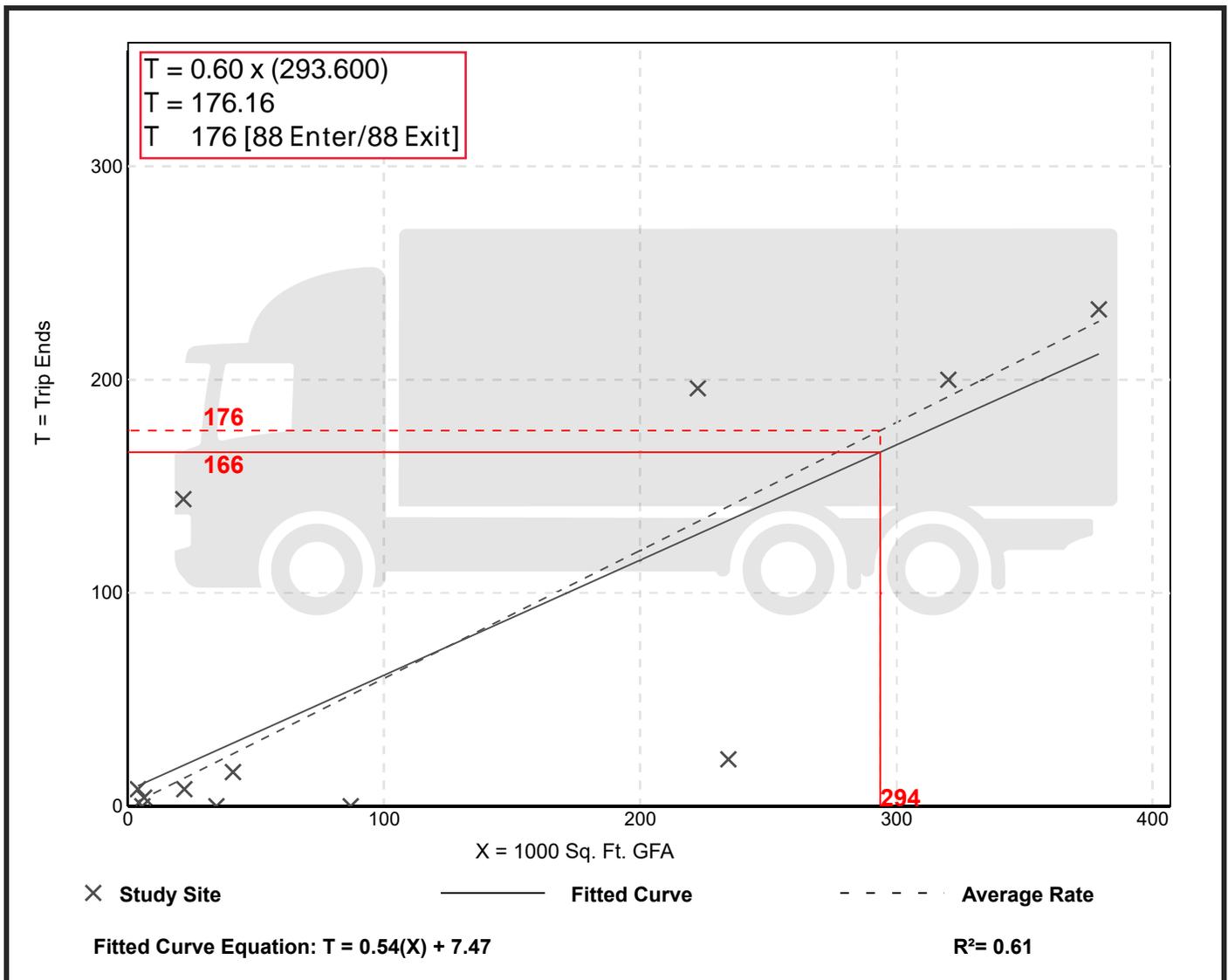
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 12
Avg. 1000 Sq. Ft. GFA: 115
Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.60	0.00 - 6.66	0.86

Data Plot and Equation



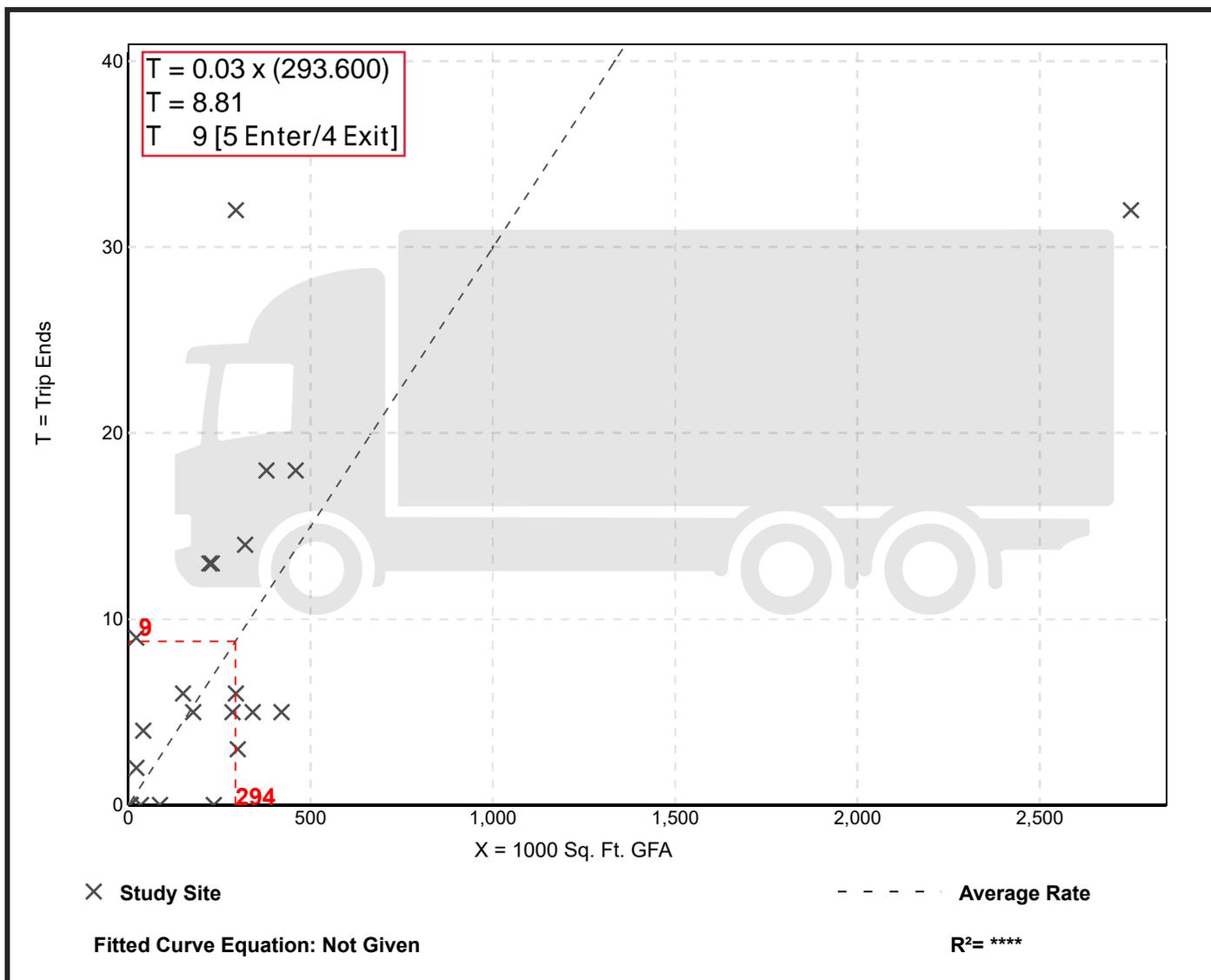
Warehousing (150)

Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 23
 Avg. 1000 Sq. Ft. GFA: 308
 Directional Distribution: 52% entering, 48% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.03	0.00 - 0.42	0.03

Data Plot and Equation



CAPACITY ANALYSIS WORKSHEETS

King Street at Constitution Boulevard
King Street at the I-495 Southbound Ramps
King Street at the I-495 Northbound Ramps
King Street at Union Street



King Street at Constitution Boulevard



2021 Existing Weekday Morning Peak Hour
1: Constitution Boulevard & King Street

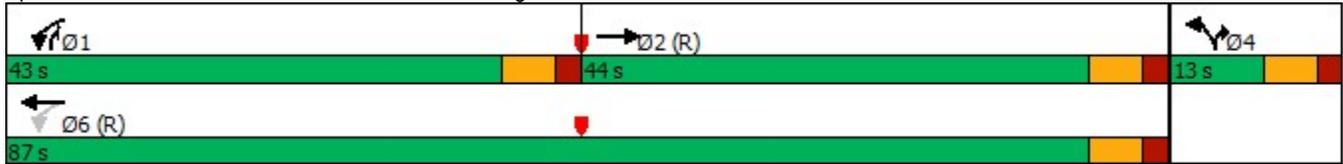
	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖↗	↑	↖	↗↗
Traffic Volume (vph)	860	90	330	380	42	199
Future Volume (vph)	860	90	330	380	42	199
Lane Util. Factor	0.95	0.95	0.97	1.00	1.00	0.88
Frt	0.986					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3521	0	3335	1810	1671	2656
Flt Permitted			0.221		0.950	
Satd. Flow (perm)	3521	0	776	1810	1671	2656
Satd. Flow (RTOR)	13					95
Adj. Flow (vph)	896	94	407	469	44	209
Lane Group Flow (vph)	990	0	407	469	44	209
Turn Type	NA		pm+pt	NA	Prot	pt+ov
Protected Phases	2		1	6	4	4 1
Permitted Phases			6			
Detector Phase	2		1	6	4	4 1
Switch Phase						
Minimum Initial (s)	7.0		7.0	7.0	7.0	
Minimum Split (s)	13.0		13.0	13.0	13.0	
Total Split (s)	44.0		43.0	87.0	13.0	
Total Split (%)	44.0%		43.0%	87.0%	13.0%	
Maximum Green (s)	38.0		37.0	81.0	7.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0		0.0	-2.0	-2.0	
Total Lost Time (s)	4.0		6.0	4.0	4.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Min		None	C-Min	None	
v/c Ratio	0.43		0.46	0.32	0.24	0.26
Control Delay	9.8		5.3	3.6	43.5	15.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	9.8		5.3	3.6	43.5	15.1
Queue Length 50th (ft)	139		26	49	26	31
Queue Length 95th (ft)	233		53	113	58	56
Internal Link Dist (ft)	220			495	220	
Turn Bay Length (ft)						
Base Capacity (vph)	2289		1561	1502	181	1473
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.43		0.26	0.31	0.24	0.14
Intersection Summary						
Cycle Length: 100						
Actuated Cycle Length: 100						
Offset: 8 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green						
Natural Cycle: 45						

2021 Existing Weekday Morning Peak Hour

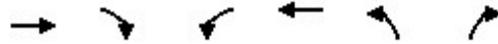
1: Constitution Boulevard & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 1: Constitution Boulevard & King Street



2021 Existing Weekday Morning Peak Hour
1: Constitution Boulevard & King Street



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖↗	↑	↖	↗↗
Traffic Volume (vph)	860	90	330	380	42	199
Future Volume (vph)	860	90	330	380	42	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		6.0	4.0	4.0	4.0
Lane Util. Factor	0.95		0.97	1.00	1.00	0.88
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3520		3335	1810	1671	2656
Flt Permitted	1.00		0.22	1.00	0.95	1.00
Satd. Flow (perm)	3520		776	1810	1671	2656
Peak-hour factor, PHF	0.96	0.96	0.81	0.81	0.95	0.95
Adj. Flow (vph)	896	94	407	469	44	209
RTOR Reduction (vph)	5	0	0	0	0	69
Lane Group Flow (vph)	985	0	407	469	44	140
Heavy Vehicles (%)	1%	2%	5%	5%	8%	7%
Turn Type	NA		pm+pt	NA	Prot	pt+ov
Protected Phases	2		1	6	4	4 1
Permitted Phases			6			
Actuated Green, G (s)	62.9		79.2	79.2	8.8	25.1
Effective Green, g (s)	64.9		79.2	81.2	10.8	27.1
Actuated g/C Ratio	0.65		0.79	0.81	0.11	0.27
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2284		878	1469	180	719
v/s Ratio Prot	0.28		c0.05	0.26	c0.03	0.05
v/s Ratio Perm			c0.32			
v/c Ratio	0.43		0.46	0.32	0.24	0.19
Uniform Delay, d1	8.6		4.7	2.4	40.9	28.0
Progression Factor	1.00		1.38	1.15	1.00	1.00
Incremental Delay, d2	0.6		0.4	0.5	0.7	0.1
Delay (s)	9.2		6.8	3.3	41.6	28.2
Level of Service	A		A	A	D	C
Approach Delay (s)	9.2			4.9	30.5	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2021 Existing Weekday Evening Peak Hour
1: Constitution Boulevard & King Street

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖↗	↑	↖	↗↗
Traffic Volume (vph)	540	39	233	902	82	353
Future Volume (vph)	540	39	233	902	82	353
Lane Util. Factor	0.95	0.95	0.97	1.00	1.00	0.88
Fr _t	0.990					0.850
Fl _t Protected			0.950		0.950	
Satd. Flow (prot)	3522	0	3303	1900	1719	2787
Fl _t Permitted			0.349		0.950	
Satd. Flow (perm)	3522	0	1214	1900	1719	2787
Satd. Flow (RTOR)	9					273
Adj. Flow (vph)	593	43	248	960	105	453
Lane Group Flow (vph)	636	0	248	960	105	453
Turn Type	NA		pm+pt	NA	Prot	pt+ov
Protected Phases	2		1	6	4	4 1
Permitted Phases			6			
Detector Phase	2		1	6	4	4 1
Switch Phase						
Minimum Initial (s)	7.0		7.0	7.0	7.0	
Minimum Split (s)	13.0		13.0	13.0	13.0	
Total Split (s)	44.0		26.0	70.0	30.0	
Total Split (%)	44.0%		26.0%	70.0%	30.0%	
Maximum Green (s)	38.0		20.0	64.0	24.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0		0.0	-2.0	-2.0	
Total Lost Time (s)	4.0		6.0	4.0	4.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Min		None	C-Min	None	
v/c Ratio	0.28		0.23	0.64	0.45	0.47
Control Delay	8.8		2.9	7.4	45.0	12.1
Queue Delay	0.0		0.0	0.4	0.0	0.0
Total Delay	8.8		2.9	7.8	45.0	12.1
Queue Length 50th (ft)	80		5	40	63	51
Queue Length 95th (ft)	141		m31	665	93	61
Internal Link Dist (ft)	220			495	220	
Turn Bay Length (ft)						
Base Capacity (vph)	2260		1345	1489	446	1269
Starvation Cap Reductn	0		0	169	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.28		0.18	0.73	0.24	0.36
Intersection Summary						
Cycle Length: 100						
Actuated Cycle Length: 100						
Offset: 73 (73%), Referenced to phase 2:EBT and 6:WBTL, Start of Green						
Natural Cycle: 55						

2021 Existing Weekday Evening Peak Hour

1: Constitution Boulevard & King Street

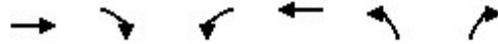
Control Type: Actuated-Coordinated

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

Splits and Phases: 1: Constitution Boulevard & King Street



2021 Existing Weekday Evening Peak Hour
1: Constitution Boulevard & King Street

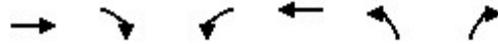


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖↗	↑	↖	↗↗
Traffic Volume (vph)	540	39	233	902	82	353
Future Volume (vph)	540	39	233	902	82	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		6.0	4.0	4.0	4.0
Lane Util. Factor	0.95		0.97	1.00	1.00	0.88
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3522		3303	1900	1719	2787
Flt Permitted	1.00		0.35	1.00	0.95	1.00
Satd. Flow (perm)	3522		1213	1900	1719	2787
Peak-hour factor, PHF	0.91	0.91	0.94	0.94	0.78	0.78
Adj. Flow (vph)	593	43	248	960	105	453
RTOR Reduction (vph)	3	0	0	0	0	197
Lane Group Flow (vph)	633	0	248	960	105	256
Heavy Vehicles (%)	1%	8%	6%	0%	5%	2%
Turn Type	NA		pm+pt	NA	Prot	pt+ov
Protected Phases	2		1	6	4	4 1
Permitted Phases			6			
Actuated Green, G (s)	62.1		76.4	76.4	11.6	25.9
Effective Green, g (s)	64.1		76.4	78.4	13.6	27.9
Actuated g/C Ratio	0.64		0.76	0.78	0.14	0.28
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2257		1100	1489	233	777
v/s Ratio Prot	0.18		0.02	c0.51	c0.06	0.09
v/s Ratio Perm			0.15			
v/c Ratio	0.28		0.23	0.64	0.45	0.33
Uniform Delay, d1	7.9		3.6	4.7	39.8	28.6
Progression Factor	1.00		0.74	0.99	1.00	1.00
Incremental Delay, d2	0.3		0.1	1.7	1.4	0.3
Delay (s)	8.2		2.8	6.4	41.1	28.9
Level of Service	A		A	A	D	C
Approach Delay (s)	8.2			5.7	31.2	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

2028 No Build Weekday Morning Peak Hour
 1: Constitution Boulevard & King Street



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↶↷	↑	↶	↷↷
Traffic Volume (vph)	922	96	354	407	45	213
Future Volume (vph)	922	96	354	407	45	213
Lane Util. Factor	0.95	0.95	0.97	1.00	1.00	0.88
Fr _t	0.986					0.850
Fl _t Protected			0.950		0.950	
Satd. Flow (prot)	3521	0	3335	1810	1671	2656
Fl _t Permitted			0.195		0.950	
Satd. Flow (perm)	3521	0	685	1810	1671	2656
Satd. Flow (RTOR)	13					76
Adj. Flow (vph)	960	100	437	502	47	224
Lane Group Flow (vph)	1060	0	437	502	47	224
Turn Type	NA		pm+pt	NA	Prot	pt+ov
Protected Phases	2		1	6	4	4 1
Permitted Phases			6			
Detector Phase	2		1	6	4	4 1
Switch Phase						
Minimum Initial (s)	7.0		7.0	7.0	7.0	
Minimum Split (s)	13.0		13.0	13.0	13.0	
Total Split (s)	44.0		43.0	87.0	13.0	
Total Split (%)	44.0%		43.0%	87.0%	13.0%	
Maximum Green (s)	38.0		37.0	81.0	7.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0		0.0	-2.0	-2.0	
Total Lost Time (s)	4.0		6.0	4.0	4.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Min		None	C-Min	None	
v/c Ratio	0.48		0.50	0.34	0.26	0.27
Control Delay	11.2		6.4	3.6	44.8	17.6
Queue Delay	0.0		0.0	0.2	0.0	0.0
Total Delay	11.2		6.4	3.9	44.8	17.6
Queue Length 50th (ft)	169		36	65	28	40
Queue Length 95th (ft)	250		51	120	64	68
Internal Link Dist (ft)	220			495	220	
Turn Bay Length (ft)						
Base Capacity (vph)	2220		1523	1502	178	1461
Starvation Cap Reductn	0		0	409	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.48		0.29	0.46	0.26	0.15

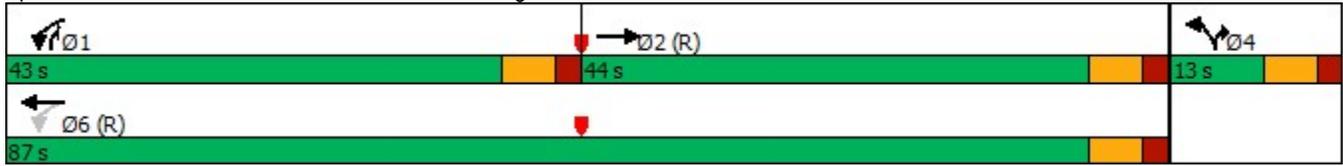
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 8 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 50

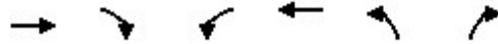
2028 No Build Weekday Morning Peak Hour 1: Constitution Boulevard & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 1: Constitution Boulevard & King Street



2028 No Build Weekday Morning Peak Hour
1: Constitution Boulevard & King Street

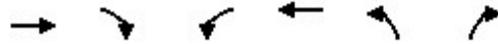


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖↗	↑	↖	↗↗
Traffic Volume (vph)	922	96	354	407	45	213
Future Volume (vph)	922	96	354	407	45	213
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		6.0	4.0	4.0	4.0
Lane Util. Factor	0.95		0.97	1.00	1.00	0.88
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3520		3335	1810	1671	2656
Flt Permitted	1.00		0.19	1.00	0.95	1.00
Satd. Flow (perm)	3520		683	1810	1671	2656
Peak-hour factor, PHF	0.96	0.96	0.81	0.81	0.95	0.95
Adj. Flow (vph)	960	100	437	502	47	224
RTOR Reduction (vph)	5	0	0	0	0	54
Lane Group Flow (vph)	1055	0	437	502	47	170
Heavy Vehicles (%)	1%	2%	5%	5%	8%	7%
Turn Type	NA		pm+pt	NA	Prot	pt+ov
Protected Phases	2		1	6	4	4
Permitted Phases			6			
Actuated Green, G (s)	60.9		79.3	79.3	8.7	27.1
Effective Green, g (s)	62.9		79.3	81.3	10.7	29.1
Actuated g/C Ratio	0.63		0.79	0.81	0.11	0.29
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2214		870	1471	178	772
v/s Ratio Prot	0.30		c0.06	0.28	c0.03	0.06
v/s Ratio Perm			c0.34			
v/c Ratio	0.48		0.50	0.34	0.26	0.22
Uniform Delay, d1	9.8		5.7	2.4	41.0	26.9
Progression Factor	1.00		1.77	1.19	1.00	1.00
Incremental Delay, d2	0.7		0.4	0.6	0.8	0.1
Delay (s)	10.6		10.5	3.5	41.8	27.0
Level of Service	B		B	A	D	C
Approach Delay (s)	10.6			6.7	29.6	
Approach LOS	B			A	C	

Intersection Summary

HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

2028 No Build Weekday Evening Peak Hour
 1: Constitution Boulevard & King Street



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘↘	↑	↘	↗↗
Traffic Volume (vph)	580	42	250	967	88	378
Future Volume (vph)	580	42	250	967	88	378
Lane Util. Factor	0.95	0.95	0.97	1.00	1.00	0.88
Frt	0.990					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3522	0	3303	1900	1719	2787
Flt Permitted			0.325		0.950	
Satd. Flow (perm)	3522	0	1130	1900	1719	2787
Satd. Flow (RTOR)	9					235
Adj. Flow (vph)	637	46	266	1029	113	485
Lane Group Flow (vph)	683	0	266	1029	113	485
Turn Type	NA		pm+pt	NA	Prot	pt+ov
Protected Phases	2		1	6	4	4 1
Permitted Phases			6			
Detector Phase	2		1	6	4	4 1
Switch Phase						
Minimum Initial (s)	7.0		7.0	7.0	7.0	
Minimum Split (s)	13.0		13.0	13.0	13.0	
Total Split (s)	44.0		26.0	70.0	30.0	
Total Split (%)	44.0%		26.0%	70.0%	30.0%	
Maximum Green (s)	38.0		20.0	64.0	24.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0		0.0	-2.0	-2.0	
Total Lost Time (s)	4.0		6.0	4.0	4.0	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Min		None	C-Min	None	
v/c Ratio	0.31		0.26	0.70	0.45	0.49
Control Delay	9.8		3.0	8.3	43.8	15.4
Queue Delay	0.0		0.0	0.7	0.0	0.0
Total Delay	9.8		3.0	9.1	43.8	15.4
Queue Length 50th (ft)	92		9	66	67	71
Queue Length 95th (ft)	164		m34	696	96	78
Internal Link Dist (ft)	220			495	220	
Turn Bay Length (ft)						
Base Capacity (vph)	2212		1286	1470	446	1271
Starvation Cap Reductn	0		0	172	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.31		0.21	0.79	0.25	0.38

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 73 (73%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 60

2028 No Build Weekday Evening Peak Hour

1: Constitution Boulevard & King Street

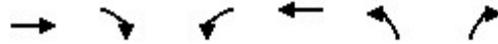
Control Type: Actuated-Coordinated

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

Splits and Phases: 1: Constitution Boulevard & King Street



2028 No Build Weekday Evening Peak Hour
1: Constitution Boulevard & King Street

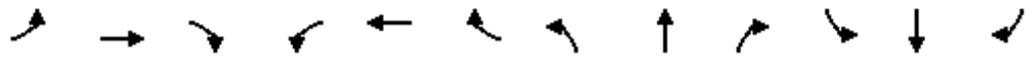


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖↗	↑	↖	↗↗
Traffic Volume (vph)	580	42	250	967	88	378
Future Volume (vph)	580	42	250	967	88	378
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		6.0	4.0	4.0	4.0
Lane Util. Factor	0.95		0.97	1.00	1.00	0.88
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3522		3303	1900	1719	2787
Flt Permitted	1.00		0.33	1.00	0.95	1.00
Satd. Flow (perm)	3522		1132	1900	1719	2787
Peak-hour factor, PHF	0.91	0.91	0.94	0.94	0.78	0.78
Adj. Flow (vph)	637	46	266	1029	113	485
RTOR Reduction (vph)	3	0	0	0	0	166
Lane Group Flow (vph)	680	0	266	1029	113	319
Heavy Vehicles (%)	1%	8%	6%	0%	5%	2%
Turn Type	NA		pm+pt	NA	Prot	pt+ov
Protected Phases	2		1	6	4	4 1
Permitted Phases			6			
Actuated Green, G (s)	60.7		75.4	75.4	12.6	27.3
Effective Green, g (s)	62.7		75.4	77.4	14.6	29.3
Actuated g/C Ratio	0.63		0.75	0.77	0.15	0.29
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2208		1042	1470	250	816
v/s Ratio Prot	0.19		0.02	c0.54	c0.07	0.11
v/s Ratio Perm			0.17			
v/c Ratio	0.31		0.26	0.70	0.45	0.39
Uniform Delay, d1	8.6		4.1	5.6	39.0	28.2
Progression Factor	1.00		0.69	0.90	1.00	1.00
Incremental Delay, d2	0.4		0.1	2.1	1.3	0.3
Delay (s)	9.0		2.9	7.1	40.3	28.5
Level of Service	A		A	A	D	C
Approach Delay (s)	9.0			6.3	30.8	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

2028 Build Weekday Morning Peak Hour
 1: Constitution Boulevard/Project Site Driveway & King Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔		↔↔	↑	↗		↑	↗↗	↘	↘	
Traffic Volume (vph)	9	922	96	354	407	38	45	0	213	11	0	3
Future Volume (vph)	9	922	96	354	407	38	45	0	213	11	0	3
Lane Util. Factor	0.95	0.95	0.95	0.97	1.00	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Fr't		0.986				0.850			0.850		0.850	
Flt Protected				0.950				0.950		0.950		
Satd. Flow (prot)	0	3521	0	3335	1810	1583	0	1671	2656	1770	1583	0
Flt Permitted		0.950		0.180				0.756		0.950		
Satd. Flow (perm)	0	3345	0	632	1810	1583	0	1330	2656	1770	1583	0
Satd. Flow (RTOR)		12				98			224		445	
Adj. Flow (vph)	10	960	100	437	502	41	47	0	224	12	0	3
Lane Group Flow (vph)	0	1070	0	437	502	41	0	47	224	12	3	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	pt+ov	Split	NA	
Protected Phases		2		1	6			8	8 1	4	4	
Permitted Phases	2			6		6	8					
Detector Phase	2	2		1	6	6	8	8	8 1	4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	5.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	11.0	11.0		13.0	13.0	
Total Split (s)	37.0	37.0		37.0	74.0	74.0	13.0	13.0		13.0	13.0	
Total Split (%)	37.0%	37.0%		37.0%	74.0%	74.0%	13.0%	13.0%		13.0%	13.0%	
Maximum Green (s)	31.0	31.0		31.0	68.0	68.0	7.0	7.0		7.0	7.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
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)		-2.0		-2.0	-2.0	-2.0		-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		None	C-Min	C-Min	None	None		None	None	
v/c Ratio		0.53		0.51	0.36	0.03		0.39	0.26	0.08	0.01	
Control Delay		14.9		8.2	6.0	0.7		52.6	4.2	43.0	0.0	
Queue Delay		0.0		0.0	0.3	0.0		0.0	0.0	0.0	0.0	
Total Delay		14.9		8.2	6.3	0.7		52.6	4.2	43.0	0.0	
Queue Length 50th (ft)		165		29	49	0		28	0	7	0	
Queue Length 95th (ft)		344		75	190	m2		67	28	25	0	
Internal Link Dist (ft)		220			495			220			220	
Turn Bay Length (ft)				240		240						
Base Capacity (vph)		2013		1382	1405	1251		125	1333	159	547	
Starvation Cap Reductn		0		0	378	0		0	0	0	0	
Spillback Cap Reductn		0		0	0	0		0	0	0	0	
Storage Cap Reductn		0		0	0	0		0	0	0	0	
Reduced v/c Ratio		0.53		0.32	0.49	0.03		0.38	0.17	0.08	0.01	

Intersection Summary

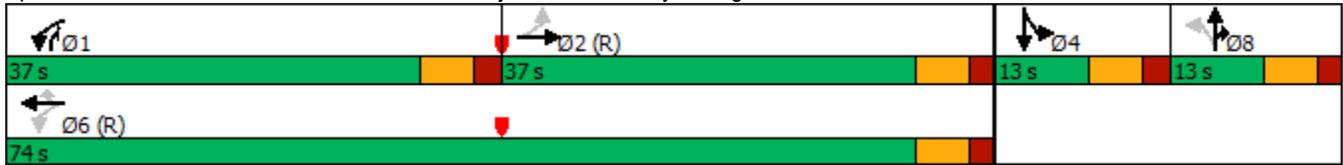
Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 8 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 60

2028 Build Weekday Morning Peak Hour
 1: Constitution Boulevard/Project Site Driveway & King Street

Control Type: Actuated-Coordinated

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

Splits and Phases: 1: Constitution Boulevard/Project Site Driveway & King Street



2028 Build Weekday Morning Peak Hour
 1: Constitution Boulevard/Project Site Driveway & King Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	9	922	96	354	407	38	45	0	213	11	0	3	
Future Volume (vph)	9	922	96	354	407	38	45	0	213	11	0	3	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0		
Lane Util. Factor		0.95		0.97	1.00	1.00		1.00	0.88	1.00	1.00		
Frt		0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.85		
Flt Protected		1.00		0.95	1.00	1.00		0.95	1.00	0.95	1.00		
Satd. Flow (prot)		3519		3335	1810	1583		1671	2656	1770	1583		
Flt Permitted		0.95		0.18	1.00	1.00		0.76	1.00	0.95	1.00		
Satd. Flow (perm)		3344		631	1810	1583		1330	2656	1770	1583		
Peak-hour factor, PHF	0.92	0.96	0.96	0.81	0.81	0.92	0.95	0.92	0.95	0.92	0.92	0.92	
Adj. Flow (vph)	10	960	100	437	502	41	47	0	224	12	0	3	
RTOR Reduction (vph)	0	5	0	0	0	11	0	0	164	0	3	0	
Lane Group Flow (vph)	0	1065	0	437	502	30	0	47	60	12	0	0	
Heavy Vehicles (%)	2%	1%	2%	5%	5%	2%	8%	2%	7%	2%	2%	2%	
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	pt+ov	Split	NA		
Protected Phases		2		1	6			8	8 1	4	4		
Permitted Phases	2			6		6	8						
Actuated Green, G (s)		54.5		72.1	72.1	72.1		7.1	24.7	2.8	2.8		
Effective Green, g (s)		56.5		74.1	74.1	74.1		9.1	26.7	4.8	4.8		
Actuated g/C Ratio		0.56		0.74	0.74	0.74		0.09	0.27	0.05	0.05		
Clearance Time (s)		6.0		6.0	6.0	6.0		6.0		6.0	6.0		
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0		3.0	3.0		
Lane Grp Cap (vph)		1889		835	1341	1173		121	709	84	75		
v/s Ratio Prot				c0.07	0.28				0.02	c0.01	0.00		
v/s Ratio Perm		c0.32		0.32		0.02		c0.04					
v/c Ratio		0.56		0.52	0.37	0.03		0.39	0.08	0.14	0.00		
Uniform Delay, d1		13.9		7.5	4.6	3.4		42.8	27.5	45.6	45.3		
Progression Factor		1.00		1.76	1.22	1.00		1.00	1.00	1.00	1.00		
Incremental Delay, d2		1.2		0.5	0.7	0.0		2.1	0.1	0.8	0.0		
Delay (s)		15.1		13.8	6.4	3.5		44.9	27.5	46.4	45.3		
Level of Service		B		B	A	A		D	C	D	D		
Approach Delay (s)		15.1			9.5			30.5			46.2		
Approach LOS		B			A			C			D		
Intersection Summary													
HCM 2000 Control Delay			14.8		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.52										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					16.0			
Intersection Capacity Utilization			69.4%		ICU Level of Service					C			
Analysis Period (min)			15										
c Critical Lane Group													

2028 Build Weekday Evening Peak Hour
 1: Constitution Boulevard/Project Site Driveway & King Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	580	42	250	967	14	88	0	378	37	0	9
Future Volume (vph)	3	580	42	250	967	14	88	0	378	37	0	9
Lane Util. Factor	0.95	0.95	0.95	0.97	1.00	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Fr't		0.990				0.850			0.850		0.850	
Flt Protected				0.950				0.950		0.950		
Satd. Flow (prot)	0	3522	0	3303	1900	1583	0	1719	2787	1770	1583	0
Flt Permitted		0.952		0.297				0.751		0.950		
Satd. Flow (perm)	0	3353	0	1033	1900	1583	0	1359	2787	1770	1583	0
Satd. Flow (RTOR)		9				98			367		174	
Adj. Flow (vph)	3	637	46	266	1029	15	113	0	485	40	0	10
Lane Group Flow (vph)	0	686	0	266	1029	15	0	113	485	40	10	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	pt+ov	Split	NA	
Protected Phases		2		1	6			8	8 1	4	4	
Permitted Phases	2			6		6	8					
Detector Phase	2	2		1	6	6	8	8	8 1	4	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	5.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	11.0	11.0		13.0	13.0	
Total Split (s)	44.0	44.0		26.0	70.0	70.0	17.0	17.0		13.0	13.0	
Total Split (%)	44.0%	44.0%		26.0%	70.0%	70.0%	17.0%	17.0%		13.0%	13.0%	
Maximum Green (s)	38.0	38.0		20.0	64.0	64.0	11.0	11.0		7.0	7.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
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)		-2.0		0.0	-2.0	0.0		-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0		6.0	4.0	6.0		4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		None	C-Min	C-Min	None	None		None	None	
v/c Ratio		0.37		0.29	0.76	0.01		0.63	0.46	0.25	0.03	
Control Delay		14.5		5.3	9.9	0.0		58.1	8.5	46.5	0.2	
Queue Delay		0.0		0.0	0.7	0.0		0.0	0.0	0.0	0.0	
Total Delay		14.5		5.3	10.6	0.0		58.1	8.5	46.5	0.2	
Queue Length 50th (ft)		144		15	128	0		68	30	24	0	
Queue Length 95th (ft)		191		m32	508	m0		109	47	57	0	
Internal Link Dist (ft)		220			495			220			220	
Turn Bay Length (ft)				240		240						
Base Capacity (vph)		1869		1166	1358	1130		186	1309	161	302	
Starvation Cap Reductn		0		0	106	0		0	0	0	0	
Spillback Cap Reductn		0		0	0	0		0	0	0	0	
Storage Cap Reductn		0		0	0	0		0	0	0	0	
Reduced v/c Ratio		0.37		0.23	0.82	0.01		0.61	0.37	0.25	0.03	
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 37 (37%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 70												

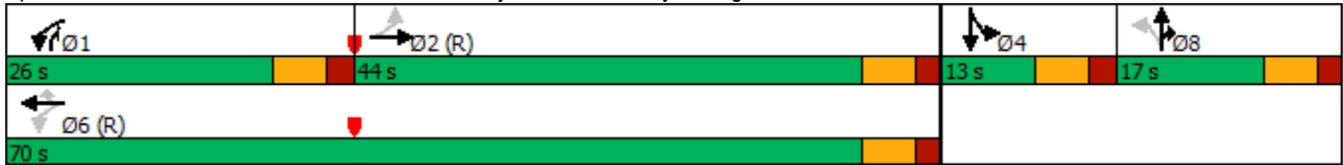
2028 Build Weekday Evening Peak Hour

1: Constitution Boulevard/Project Site Driveway & King Street

Control Type: Actuated-Coordinated

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

Splits and Phases: 1: Constitution Boulevard/Project Site Driveway & King Street



2028 Build Weekday Evening Peak Hour
 1: Constitution Boulevard/Project Site Driveway & King Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	3	580	42	250	967	14	88	0	378	37	0	9	
Future Volume (vph)	3	580	42	250	967	14	88	0	378	37	0	9	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0		6.0	4.0	6.0		4.0	4.0	4.0	4.0		
Lane Util. Factor		0.95		0.97	1.00	1.00		1.00	0.88	1.00	1.00		
Frt		0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.85		
Flt Protected		1.00		0.95	1.00	1.00		0.95	1.00	0.95	1.00		
Satd. Flow (prot)		3521		3303	1900	1583		1719	2787	1770	1583		
Flt Permitted		0.95		0.30	1.00	1.00		0.75	1.00	0.95	1.00		
Satd. Flow (perm)		3352		1034	1900	1583		1359	2787	1770	1583		
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.94	0.78	0.78	0.78	0.92	0.92	0.92	
Adj. Flow (vph)	3	637	46	266	1029	15	113	0	485	40	0	10	
RTOR Reduction (vph)	0	4	0	0	0	5	0	0	263	0	9	0	
Lane Group Flow (vph)	0	682	0	266	1029	10	0	113	222	40	1	0	
Heavy Vehicles (%)	2%	1%	8%	6%	0%	2%	5%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	pt+ov	Split	NA		
Protected Phases		2		1	6			8	8 1	4	4		
Permitted Phases	2			6		6	8						
Actuated Green, G (s)		51.3		66.6	66.6	66.6		11.1	26.4	4.3	4.3		
Effective Green, g (s)		53.3		66.6	68.6	66.6		13.1	28.4	6.3	6.3		
Actuated g/C Ratio		0.53		0.67	0.69	0.67		0.13	0.28	0.06	0.06		
Clearance Time (s)		6.0		6.0	6.0	6.0		6.0		6.0	6.0		
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0		3.0	3.0		
Lane Grp Cap (vph)		1786		899	1303	1054		178	791	111	99		
v/s Ratio Prot				0.03	c0.54				0.08	c0.02	0.00		
v/s Ratio Perm		0.20		0.17		0.01		c0.08					
v/c Ratio		0.38		0.30	0.79	0.01		0.63	0.28	0.36	0.01		
Uniform Delay, d1		13.7		7.2	10.8	5.6		41.2	27.9	44.9	43.9		
Progression Factor		1.00		0.75	0.57	1.00		1.00	1.00	1.00	1.00		
Incremental Delay, d2		0.6		0.1	3.6	0.0		7.2	0.2	2.0	0.0		
Delay (s)		14.3		5.6	9.8	5.6		48.4	28.1	46.9	43.9		
Level of Service		B		A	A	A		D	C	D	D		
Approach Delay (s)		14.3			8.9			31.9			46.3		
Approach LOS		B			A			C			D		
Intersection Summary													
HCM 2000 Control Delay			16.2		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.79										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					18.0			
Intersection Capacity Utilization			89.9%		ICU Level of Service					E			
Analysis Period (min)			15										
c Critical Lane Group													

King Street at the I-495 Southbound Ramps



2021 Existing Weekday Morning Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖						↖	↗↗
Traffic Volume (vph)	0	670	389	259	497	0	0	0	0	184	2	213
Future Volume (vph)	0	670	389	259	497	0	0	0	0	184	2	213
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850									0.850
Flt Protected					0.983						0.953	
Satd. Flow (prot)	0	3739	1583	0	3435	0	0	0	0	0	1858	2707
Flt Permitted					0.593						0.953	
Satd. Flow (perm)	0	3739	1583	0	2072	0	0	0	0	0	1858	2707
Satd. Flow (RTOR)			418									263
Adj. Flow (vph)	0	720	418	273	523	0	0	0	0	227	2	263
Lane Group Flow (vph)	0	720	418	0	796	0	0	0	0	0	229	263
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Detector Phase		2		1	6					4	4	4
Switch Phase												
Minimum Initial (s)		7.0		5.0	7.0					7.0	7.0	7.0
Minimum Split (s)		16.0		11.0	16.0					13.0	13.0	13.0
Total Split (s)		42.0		29.0	71.0					29.0	29.0	29.0
Total Split (%)		42.0%		29.0%	71.0%					29.0%	29.0%	29.0%
Maximum Green (s)		33.0		23.0	62.0					23.0	23.0	23.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		5.0		2.0	5.0					2.0	2.0	2.0
Lost Time Adjust (s)		-5.0			-5.0						-2.0	-2.0
Total Lost Time (s)		4.0			4.0						4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min		None	C-Min					None	None	None
v/c Ratio		0.27	0.26		0.53						0.61	0.35
Control Delay		1.8	0.4		10.2						42.8	5.1
Queue Delay		0.0	0.0		0.0						0.0	0.0
Total Delay		1.8	0.4		10.2						42.8	5.1
Queue Length 50th (ft)		13	0		135						134	0
Queue Length 95th (ft)		21	0		154						170	21
Internal Link Dist (ft)		495			620			220			220	
Turn Bay Length (ft)			260									
Base Capacity (vph)		2686	1583		1497						472	885
Starvation Cap Reductn		0	0		0						0	0
Spillback Cap Reductn		0	0		0						0	0
Storage Cap Reductn		0	0		0						0	0
Reduced v/c Ratio		0.27	0.26		0.53						0.49	0.30

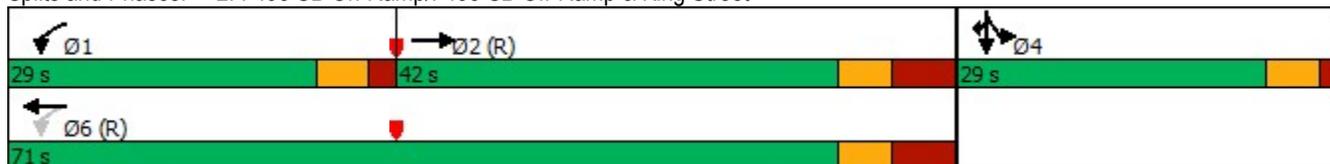
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 30 (30%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 40

2021 Existing Weekday Morning Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



2021 Existing Weekday Morning Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖						↖	↗
Traffic Volume (vph)	0	670	389	259	497	0	0	0	0	184	2	213
Future Volume (vph)	0	670	389	259	497	0	0	0	0	184	2	213
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	13	12	12	12	12	12	14	14	12
Total Lost time (s)		4.0	-1.0		4.0						4.0	4.0
Lane Util. Factor		0.95	1.00		0.95						1.00	0.88
Frt		1.00	0.85		1.00						1.00	0.85
Flt Protected		1.00	1.00		0.98						0.95	1.00
Satd. Flow (prot)		3739	1583		3435						1857	2707
Flt Permitted		1.00	1.00		0.59						0.95	1.00
Satd. Flow (perm)		3739	1583		2073						1857	2707
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.25	0.25	0.25	0.81	0.81	0.81
Adj. Flow (vph)	0	720	418	273	523	0	0	0	0	227	2	263
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	210
Lane Group Flow (vph)	0	720	418	0	796	0	0	0	0	0	229	53
Heavy Vehicles (%)	0%	3%	2%	2%	4%	0%	0%	0%	0%	4%	0%	5%
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Actuated Green, G (s)		66.8	100.0		66.8						18.2	18.2
Effective Green, g (s)		71.8	100.0		71.8						20.2	20.2
Actuated g/C Ratio		0.72	1.00		0.72						0.20	0.20
Clearance Time (s)		9.0			9.0						6.0	6.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		2684	1583		1488						375	546
v/s Ratio Prot		0.19									c0.12	0.02
v/s Ratio Perm			0.26		c0.38							
v/c Ratio		0.27	0.26		0.53						0.61	0.10
Uniform Delay, d1		4.9	0.0		6.5						36.3	32.5
Progression Factor		0.29	1.00		1.19						1.00	1.00
Incremental Delay, d2		0.2	0.4		0.4						2.9	0.1
Delay (s)		1.7	0.4		8.0						39.3	32.6
Level of Service		A	A		A						D	C
Approach Delay (s)		1.2			8.0			0.0			35.7	
Approach LOS		A			A			A			D	
Intersection Summary												
HCM 2000 Control Delay			10.4		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)				16.0			
Intersection Capacity Utilization			60.1%		ICU Level of Service				B			
Analysis Period (min)			15									

c Critical Lane Group

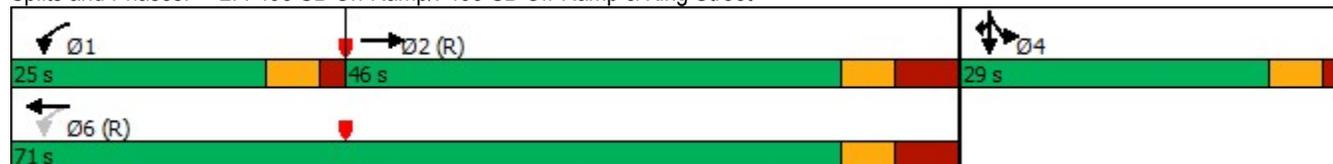
2021 Existing Weekday Evening Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖						↖	↗↗
Traffic Volume (vph)	0	553	340	281	755	0	0	0	0	291	1	380
Future Volume (vph)	0	553	340	281	755	0	0	0	0	291	1	380
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850									0.850
Flt Protected					0.987						0.953	
Satd. Flow (prot)	0	3813	1583	0	3518	0	0	0	0	0	1912	2814
Flt Permitted					0.651						0.953	
Satd. Flow (perm)	0	3813	1583	0	2321	0	0	0	0	0	1912	2814
Satd. Flow (RTOR)			370									400
Adj. Flow (vph)	0	601	370	305	821	0	0	0	0	306	1	400
Lane Group Flow (vph)	0	601	370	0	1126	0	0	0	0	0	307	400
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Detector Phase		2		1	6					4	4	4
Switch Phase												
Minimum Initial (s)		7.0		5.0	7.0					7.0	7.0	7.0
Minimum Split (s)		16.0		11.0	16.0					13.0	13.0	13.0
Total Split (s)		46.0		25.0	71.0					29.0	29.0	29.0
Total Split (%)		46.0%		25.0%	71.0%					29.0%	29.0%	29.0%
Maximum Green (s)		37.0		19.0	62.0					23.0	23.0	23.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		5.0		2.0	5.0					2.0	2.0	2.0
Lost Time Adjust (s)		-5.0			-5.0						-2.0	-2.0
Total Lost Time (s)		4.0			4.0						4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min		None	C-Min					None	None	None
v/c Ratio		0.23	0.23		0.70						0.72	0.43
Control Delay		5.3	0.3		13.3						45.5	4.6
Queue Delay		0.0	0.0		0.1						0.0	0.0
Total Delay		5.3	0.3		13.4						45.5	4.6
Queue Length 50th (ft)		56	0		153						176	0
Queue Length 95th (ft)		81	0		180						267	39
Internal Link Dist (ft)		495			620			220			220	
Turn Bay Length (ft)			260									
Base Capacity (vph)		2652	1583		1614						478	1003
Starvation Cap Reductn		0	0		0						0	0
Spillback Cap Reductn		0	0		35						0	6
Storage Cap Reductn		0	0		0						0	0
Reduced v/c Ratio		0.23	0.23		0.71						0.64	0.40
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 34 (34%), Referenced to phase 2:EBT and 6:WBTL, Start of Green												
Natural Cycle: 60												

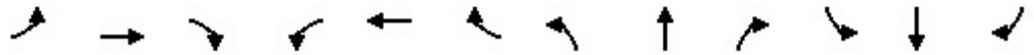
2021 Existing Weekday Evening Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



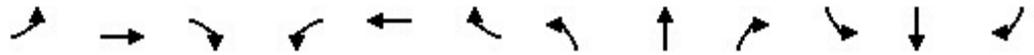
2021 Existing Weekday Evening Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖						↖	↗↗
Traffic Volume (vph)	0	553	340	281	755	0	0	0	0	291	1	380
Future Volume (vph)	0	553	340	281	755	0	0	0	0	291	1	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	13	12	12	12	12	12	14	14	12
Total Lost time (s)		4.0	-1.0		4.0						4.0	4.0
Lane Util. Factor		0.95	1.00		0.95						1.00	0.88
Frt		1.00	0.85		1.00						1.00	0.85
Flt Protected		1.00	1.00		0.99						0.95	1.00
Satd. Flow (prot)		3813	1583		3517						1911	2814
Flt Permitted		1.00	1.00		0.65						0.95	1.00
Satd. Flow (perm)		3813	1583		2320						1911	2814
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.95	0.95	0.95
Adj. Flow (vph)	0	601	370	305	821	0	0	0	0	306	1	400
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	310
Lane Group Flow (vph)	0	601	370	0	1126	0	0	0	0	0	307	90
Heavy Vehicles (%)	0%	1%	2%	2%	1%	0%	0%	0%	0%	1%	0%	1%
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Actuated Green, G (s)		64.6	100.0		64.6						20.4	20.4
Effective Green, g (s)		69.6	100.0		69.6						22.4	22.4
Actuated g/C Ratio		0.70	1.00		0.70						0.22	0.22
Clearance Time (s)		9.0			9.0						6.0	6.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		2653	1583		1614						428	630
v/s Ratio Prot		0.16									c0.16	0.03
v/s Ratio Perm			0.23		c0.49							
v/c Ratio		0.23	0.23		0.70						0.72	0.14
Uniform Delay, d1		5.5	0.0		9.0						35.9	31.1
Progression Factor		0.88	1.00		1.10						1.00	1.00
Incremental Delay, d2		0.2	0.3		1.2						5.7	0.1
Delay (s)		5.0	0.3		11.1						41.5	31.2
Level of Service		A	A		B						D	C
Approach Delay (s)		3.2			11.1			0.0			35.7	
Approach LOS		A			B			A			D	
Intersection Summary												
HCM 2000 Control Delay			14.6		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)				16.0			
Intersection Capacity Utilization			70.5%		ICU Level of Service				C			
Analysis Period (min)			15									

c Critical Lane Group

2028 No Build Weekday Morning Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖						↖	↗↗
Traffic Volume (vph)	0	718	417	278	533	0	0	0	0	198	2	228
Future Volume (vph)	0	718	417	278	533	0	0	0	0	198	2	228
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Fr _t			0.850									0.850
Fl _t Protected					0.983						0.953	
Satd. Flow (prot)	0	3739	1583	0	3435	0	0	0	0	0	1858	2707
Fl _t Permitted					0.581						0.953	
Satd. Flow (perm)	0	3739	1583	0	2030	0	0	0	0	0	1858	2707
Satd. Flow (RTOR)			448									281
Adj. Flow (vph)	0	772	448	293	561	0	0	0	0	244	2	281
Lane Group Flow (vph)	0	772	448	0	854	0	0	0	0	0	246	281
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Detector Phase		2		1	6					4	4	4
Switch Phase												
Minimum Initial (s)		7.0		5.0	7.0					7.0	7.0	7.0
Minimum Split (s)		16.0		11.0	16.0					13.0	13.0	13.0
Total Split (s)		42.0		29.0	71.0					29.0	29.0	29.0
Total Split (%)		42.0%		29.0%	71.0%					29.0%	29.0%	29.0%
Maximum Green (s)		33.0		23.0	62.0					23.0	23.0	23.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		5.0		2.0	5.0					2.0	2.0	2.0
Lost Time Adjust (s)		-5.0			-5.0						-2.0	-2.0
Total Lost Time (s)		4.0			4.0						4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min		None	C-Min					None	None	None
v/c Ratio		0.29	0.28		0.59						0.65	0.36
Control Delay		2.1	0.4		11.4						44.4	5.2
Queue Delay		0.0	0.0		0.0						0.0	0.0
Total Delay		2.1	0.4		11.4						44.4	5.2
Queue Length 50th (ft)		28	0		148						143	0
Queue Length 95th (ft)		20	0		155						189	22
Internal Link Dist (ft)		495			620			220			220	
Turn Bay Length (ft)			260									
Base Capacity (vph)		2678	1583		1454						464	887
Starvation Cap Reductn		0	0		0						0	0
Spillback Cap Reductn		0	0		0						0	0
Storage Cap Reductn		0	0		0						0	0
Reduced v/c Ratio		0.29	0.28		0.59						0.53	0.32

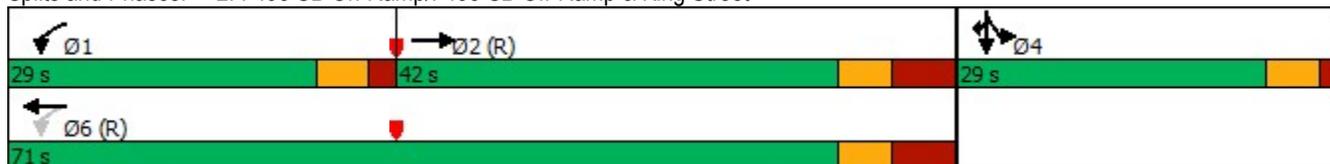
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 30 (30%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 40

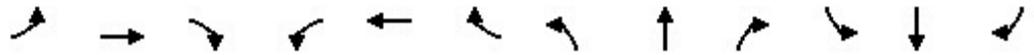
2028 No Build Weekday Morning Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



2028 No Build Weekday Morning Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street

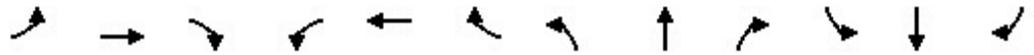


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑						↑	↑↑
Traffic Volume (vph)	0	718	417	278	533	0	0	0	0	198	2	228
Future Volume (vph)	0	718	417	278	533	0	0	0	0	198	2	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	13	12	12	12	12	12	14	14	12
Total Lost time (s)		4.0	-1.0		4.0						4.0	4.0
Lane Util. Factor		0.95	1.00		0.95						1.00	0.88
Frt		1.00	0.85		1.00						1.00	0.85
Flt Protected		1.00	1.00		0.98						0.95	1.00
Satd. Flow (prot)		3739	1583		3435						1857	2707
Flt Permitted		1.00	1.00		0.58						0.95	1.00
Satd. Flow (perm)		3739	1583		2029						1857	2707
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.25	0.25	0.25	0.81	0.81	0.81
Adj. Flow (vph)	0	772	448	293	561	0	0	0	0	244	2	281
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	224
Lane Group Flow (vph)	0	772	448	0	854	0	0	0	0	0	246	57
Heavy Vehicles (%)	0%	3%	2%	2%	4%	0%	0%	0%	0%	4%	0%	5%
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Actuated Green, G (s)		66.6	100.0		66.6						18.4	18.4
Effective Green, g (s)		71.6	100.0		71.6						20.4	20.4
Actuated g/C Ratio		0.72	1.00		0.72						0.20	0.20
Clearance Time (s)		9.0			9.0						6.0	6.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		2677	1583		1452						378	552
v/s Ratio Prot		0.21									c0.13	0.02
v/s Ratio Perm			0.28		c0.42							
v/c Ratio		0.29	0.28		0.59						0.65	0.10
Uniform Delay, d1		5.1	0.0		7.0						36.5	32.4
Progression Factor		0.34	1.00		1.22						1.00	1.00
Incremental Delay, d2		0.3	0.4		0.6						4.0	0.1
Delay (s)		2.0	0.4		9.1						40.5	32.4
Level of Service		A	A		A						D	C
Approach Delay (s)		1.4			9.1			0.0			36.2	
Approach LOS		A			A			A			D	

Intersection Summary		
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.66	
Actuated Cycle Length (s)	100.0	Sum of lost time (s) 16.0
Intersection Capacity Utilization	63.7%	ICU Level of Service B
Analysis Period (min)	15	

c Critical Lane Group

2028 No Build Weekday Evening Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



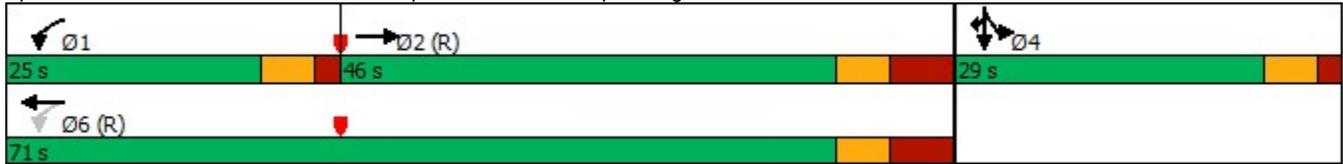
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖						↖	↗↗
Traffic Volume (vph)	0	593	365	301	810	0	0	0	0	312	1	407
Future Volume (vph)	0	593	365	301	810	0	0	0	0	312	1	407
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850									0.850
Flt Protected					0.987						0.953	
Satd. Flow (prot)	0	3813	1583	0	3518	0	0	0	0	0	1912	2814
Flt Permitted					0.637						0.953	
Satd. Flow (perm)	0	3813	1583	0	2271	0	0	0	0	0	1912	2814
Satd. Flow (RTOR)			397									360
Adj. Flow (vph)	0	645	397	327	880	0	0	0	0	328	1	428
Lane Group Flow (vph)	0	645	397	0	1207	0	0	0	0	0	329	428
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Detector Phase		2		1	6					4	4	4
Switch Phase												
Minimum Initial (s)		7.0		5.0	7.0					7.0	7.0	7.0
Minimum Split (s)		16.0		11.0	16.0					13.0	13.0	13.0
Total Split (s)		46.0		25.0	71.0					29.0	29.0	29.0
Total Split (%)		46.0%		25.0%	71.0%					29.0%	29.0%	29.0%
Maximum Green (s)		37.0		19.0	62.0					23.0	23.0	23.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		5.0		2.0	5.0					2.0	2.0	2.0
Lost Time Adjust (s)		-5.0			-5.0						-2.0	-2.0
Total Lost Time (s)		4.0			4.0						4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min		None	C-Min					None	None	None
v/c Ratio		0.25	0.25		0.77						0.75	0.46
Control Delay		6.3	0.4		16.3						46.8	7.8
Queue Delay		0.0	0.0		0.2						0.0	0.0
Total Delay		6.3	0.4		16.4						46.8	7.8
Queue Length 50th (ft)		65	0		386						190	18
Queue Length 95th (ft)		120	0		196						288	61
Internal Link Dist (ft)		495			620			220			220	
Turn Bay Length (ft)			260									
Base Capacity (vph)		2629	1583		1566						478	973
Starvation Cap Reductn		0	0		0						0	0
Spillback Cap Reductn		0	0		38						0	6
Storage Cap Reductn		0	0		0						0	0
Reduced v/c Ratio		0.25	0.25		0.79						0.69	0.44

Intersection Summary
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 34 (34%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 55

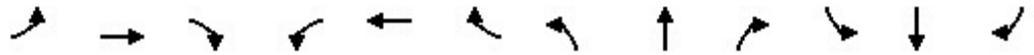
2028 No Build Weekday Evening Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



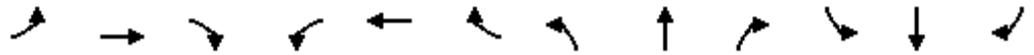
2028 No Build Weekday Evening Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑						↑	↑↑
Traffic Volume (vph)	0	593	365	301	810	0	0	0	0	312	1	407
Future Volume (vph)	0	593	365	301	810	0	0	0	0	312	1	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	13	12	12	12	12	12	14	14	12
Total Lost time (s)		4.0	-1.0		4.0						4.0	4.0
Lane Util. Factor		0.95	1.00		0.95						1.00	0.88
Frt		1.00	0.85		1.00						1.00	0.85
Flt Protected		1.00	1.00		0.99						0.95	1.00
Satd. Flow (prot)		3813	1583		3517						1911	2814
Flt Permitted		1.00	1.00		0.64						0.95	1.00
Satd. Flow (perm)		3813	1583		2270						1911	2814
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.95	0.95	0.95
Adj. Flow (vph)	0	645	397	327	880	0	0	0	0	328	1	428
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	277
Lane Group Flow (vph)	0	645	397	0	1207	0	0	0	0	0	329	151
Heavy Vehicles (%)	0%	1%	2%	2%	1%	0%	0%	0%	0%	1%	0%	1%
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Actuated Green, G (s)		64.0	100.0		64.0						21.0	21.0
Effective Green, g (s)		69.0	100.0		69.0						23.0	23.0
Actuated g/C Ratio		0.69	1.00		0.69						0.23	0.23
Clearance Time (s)		9.0			9.0						6.0	6.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		2630	1583		1566						439	647
v/s Ratio Prot		0.17									c0.17	0.05
v/s Ratio Perm			0.25		c0.53							
v/c Ratio		0.25	0.25		0.77						0.75	0.23
Uniform Delay, d1		5.8	0.0		10.3						35.8	31.3
Progression Factor		0.99	1.00		1.13						1.00	1.00
Incremental Delay, d2		0.2	0.4		2.2						6.9	0.2
Delay (s)		5.9	0.4		13.7						42.7	31.5
Level of Service		A	A		B						D	C
Approach Delay (s)		3.8			13.7			0.0			36.4	
Approach LOS		A			B			A			D	
Intersection Summary												
HCM 2000 Control Delay			16.0		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					16.0		
Intersection Capacity Utilization			74.9%		ICU Level of Service					D		
Analysis Period (min)			15									

c Critical Lane Group

2028 Build Weekday Morning Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



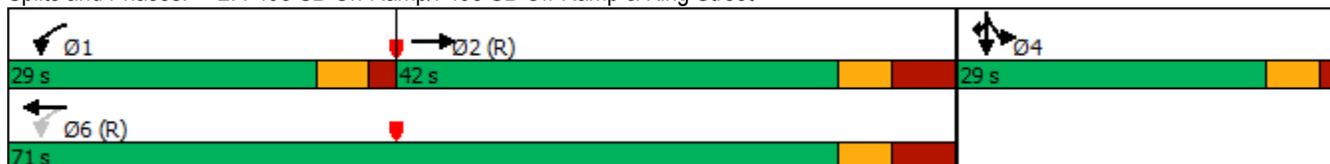
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖						↖	↗
Traffic Volume (vph)	0	725	421	278	559	0	0	0	0	198	2	240
Future Volume (vph)	0	725	421	278	559	0	0	0	0	198	2	240
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850									0.850
Flt Protected					0.984						0.953	
Satd. Flow (prot)	0	3739	1583	0	3438	0	0	0	0	0	1858	2707
Flt Permitted					0.582						0.953	
Satd. Flow (perm)	0	3739	1583	0	2033	0	0	0	0	0	1858	2707
Satd. Flow (RTOR)			452									296
Adj. Flow (vph)	0	780	453	293	588	0	0	0	0	244	2	296
Lane Group Flow (vph)	0	780	453	0	881	0	0	0	0	0	246	296
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Detector Phase		2		1	6					4	4	4
Switch Phase												
Minimum Initial (s)		7.0		5.0	7.0					7.0	7.0	7.0
Minimum Split (s)		16.0		11.0	16.0					13.0	13.0	13.0
Total Split (s)		42.0		29.0	71.0					29.0	29.0	29.0
Total Split (%)		42.0%		29.0%	71.0%					29.0%	29.0%	29.0%
Maximum Green (s)		33.0		23.0	62.0					23.0	23.0	23.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		5.0		2.0	5.0					2.0	2.0	2.0
Lost Time Adjust (s)		-5.0			-5.0						-2.0	-2.0
Total Lost Time (s)		4.0			4.0						4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min		None	C-Min					None	None	None
v/c Ratio		0.29	0.29		0.61						0.65	0.37
Control Delay		1.7	0.4		11.6						44.0	5.1
Queue Delay		0.0	0.0		0.0						0.0	0.0
Total Delay		1.7	0.4		11.6						44.0	5.1
Queue Length 50th (ft)		16	0		155						143	0
Queue Length 95th (ft)		37	0		163						189	22
Internal Link Dist (ft)		495			620			220			220	
Turn Bay Length (ft)			260									
Base Capacity (vph)		2672	1583		1453						464	898
Starvation Cap Reductn		0	0		0						0	0
Spillback Cap Reductn		0	0		0						0	0
Storage Cap Reductn		0	0		0						0	0
Reduced v/c Ratio		0.29	0.29		0.61						0.53	0.33

Intersection Summary
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 30 (30%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 40

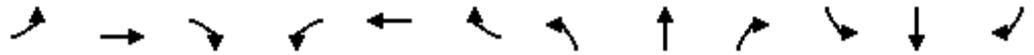
2028 Build Weekday Morning Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



2028 Build Weekday Morning Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street

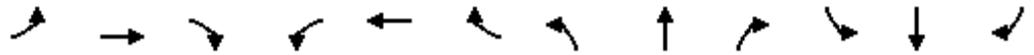


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑						↑	↑↑
Traffic Volume (vph)	0	725	421	278	559	0	0	0	0	198	2	240
Future Volume (vph)	0	725	421	278	559	0	0	0	0	198	2	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	13	12	12	12	12	12	14	14	12
Total Lost time (s)		4.0	-1.0		4.0						4.0	4.0
Lane Util. Factor		0.95	1.00		0.95						1.00	0.88
Frt		1.00	0.85		1.00						1.00	0.85
Flt Protected		1.00	1.00		0.98						0.95	1.00
Satd. Flow (prot)		3739	1583		3436						1857	2707
Flt Permitted		1.00	1.00		0.58						0.95	1.00
Satd. Flow (perm)		3739	1583		2032						1857	2707
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.25	0.25	0.25	0.81	0.81	0.81
Adj. Flow (vph)	0	780	453	293	588	0	0	0	0	244	2	296
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	235
Lane Group Flow (vph)	0	780	453	0	881	0	0	0	0	0	246	61
Heavy Vehicles (%)	0%	3%	2%	2%	4%	0%	0%	0%	0%	4%	0%	5%
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Actuated Green, G (s)		66.5	100.0		66.5						18.5	18.5
Effective Green, g (s)		71.5	100.0		71.5						20.5	20.5
Actuated g/C Ratio		0.72	1.00		0.72						0.20	0.20
Clearance Time (s)		9.0			9.0						6.0	6.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		2673	1583		1452						380	554
v/s Ratio Prot		0.21									c0.13	0.02
v/s Ratio Perm			0.29		c0.43							
v/c Ratio		0.29	0.29		0.61						0.65	0.11
Uniform Delay, d1		5.1	0.0		7.2						36.4	32.3
Progression Factor		0.26	1.00		1.19						1.00	1.00
Incremental Delay, d2		0.3	0.4		0.7						3.8	0.1
Delay (s)		1.6	0.4		9.2						40.2	32.4
Level of Service		A	A		A						D	C
Approach Delay (s)		1.2			9.2			0.0			36.0	
Approach LOS		A			A			A			D	

Intersection Summary		
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.67	
Actuated Cycle Length (s)	100.0	Sum of lost time (s) 16.0
Intersection Capacity Utilization	64.6%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

2028 Build Weekday Evening Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖						↖	↗
Traffic Volume (vph)	0	616	379	301	819	0	0	0	0	312	1	412
Future Volume (vph)	0	616	379	301	819	0	0	0	0	312	1	412
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt			0.850									0.850
Flt Protected					0.987						0.953	
Satd. Flow (prot)	0	3813	1583	0	3518	0	0	0	0	0	1912	2814
Flt Permitted					0.630						0.953	
Satd. Flow (perm)	0	3813	1583	0	2246	0	0	0	0	0	1912	2814
Satd. Flow (RTOR)			412									354
Adj. Flow (vph)	0	670	412	327	890	0	0	0	0	328	1	434
Lane Group Flow (vph)	0	670	412	0	1217	0	0	0	0	0	329	434
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Detector Phase		2		1	6					4	4	4
Switch Phase												
Minimum Initial (s)		7.0		5.0	7.0					7.0	7.0	7.0
Minimum Split (s)		16.0		11.0	16.0					13.0	13.0	13.0
Total Split (s)		46.0		25.0	71.0					29.0	29.0	29.0
Total Split (%)		46.0%		25.0%	71.0%					29.0%	29.0%	29.0%
Maximum Green (s)		37.0		19.0	62.0					23.0	23.0	23.0
Yellow Time (s)		4.0		4.0	4.0					4.0	4.0	4.0
All-Red Time (s)		5.0		2.0	5.0					2.0	2.0	2.0
Lost Time Adjust (s)		-5.0			-5.0						-2.0	-2.0
Total Lost Time (s)		4.0			4.0						4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		C-Min		None	C-Min					None	None	None
v/c Ratio		0.25	0.26		0.79						0.75	0.47
Control Delay		4.7	0.4		17.1						46.8	8.5
Queue Delay		0.0	0.0		0.2						0.0	0.0
Total Delay		4.7	0.4		17.3						46.8	8.5
Queue Length 50th (ft)		56	0		164						190	22
Queue Length 95th (ft)		57	0		242						288	65
Internal Link Dist (ft)		495			620			220			220	
Turn Bay Length (ft)			260									
Base Capacity (vph)		2629	1583		1549						478	969
Starvation Cap Reductn		0	0		0						0	0
Spillback Cap Reductn		0	0		34						0	5
Storage Cap Reductn		0	0		0						0	0
Reduced v/c Ratio		0.25	0.26		0.80						0.69	0.45

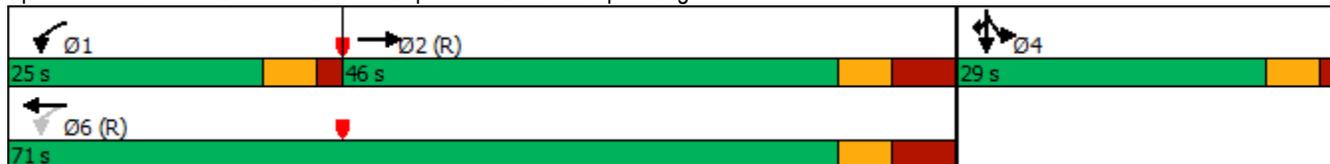
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 30 (30%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 60

2028 Build Weekday Evening Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



2028 Build Weekday Evening Peak Hour
 2: I-495 SB On-Ramp/I-495 SB Off-Ramp & King Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑						↑	↑↑
Traffic Volume (vph)	0	616	379	301	819	0	0	0	0	312	1	412
Future Volume (vph)	0	616	379	301	819	0	0	0	0	312	1	412
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	13	12	12	12	12	12	14	14	12
Total Lost time (s)		4.0	-1.0		4.0						4.0	4.0
Lane Util. Factor		0.95	1.00		0.95						1.00	0.88
Frt		1.00	0.85		1.00						1.00	0.85
Flt Protected		1.00	1.00		0.99						0.95	1.00
Satd. Flow (prot)		3813	1583		3518						1911	2814
Flt Permitted		1.00	1.00		0.63						0.95	1.00
Satd. Flow (perm)		3813	1583		2247						1911	2814
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.95	0.95	0.95
Adj. Flow (vph)	0	670	412	327	890	0	0	0	0	328	1	434
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	273
Lane Group Flow (vph)	0	670	412	0	1217	0	0	0	0	0	329	161
Heavy Vehicles (%)	0%	1%	2%	2%	1%	0%	0%	0%	0%	1%	0%	1%
Turn Type		NA	Free	pm+pt	NA					Split	NA	Prot
Protected Phases		2		1	6					4	4	4
Permitted Phases			Free	6								
Actuated Green, G (s)		64.0	100.0		64.0						21.0	21.0
Effective Green, g (s)		69.0	100.0		69.0						23.0	23.0
Actuated g/C Ratio		0.69	1.00		0.69						0.23	0.23
Clearance Time (s)		9.0			9.0						6.0	6.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		2630	1583		1550						439	647
v/s Ratio Prot		0.18									c0.17	0.06
v/s Ratio Perm			0.26		c0.54							
v/c Ratio		0.25	0.26		0.79						0.75	0.25
Uniform Delay, d1		5.8	0.0		10.5						35.8	31.4
Progression Factor		0.73	1.00		1.14						1.00	1.00
Incremental Delay, d2		0.2	0.4		2.4						6.9	0.2
Delay (s)		4.5	0.4		14.4						42.7	31.7
Level of Service		A	A		B						D	C
Approach Delay (s)		2.9			14.4			0.0			36.4	
Approach LOS		A			B			A			D	

Intersection Summary		
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.85	
Actuated Cycle Length (s)	100.0	Sum of lost time (s) 16.0
Intersection Capacity Utilization	75.7%	ICU Level of Service D
Analysis Period (min)	15	

c Critical Lane Group

King Street at the I-495 Northbound Ramps



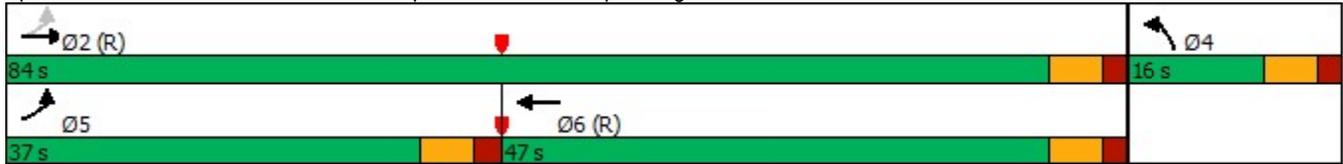
2021 Existing Weekday Morning Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	327	527	0	0	474	275	282	0	272	0	0	0
Future Volume (vph)	327	527	0	0	474	275	282	0	272	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1662	1968	0	0	3539	1760	3335	0	1794	0	0	0
Flt Permitted	0.393						0.950					
Satd. Flow (perm)	687	1968	0	0	3539	1760	3335	0	1794	0	0	0
Satd. Flow (RTOR)						198			309			
Adj. Flow (vph)	359	579	0	0	533	309	320	0	309	0	0	0
Lane Group Flow (vph)	359	579	0	0	533	309	320	0	309	0	0	0
Turn Type	pm+pt	NA			NA	Free	Prot		Free			
Protected Phases	5	2			6		4					
Permitted Phases	2					Free			Free			
Detector Phase	5	2			6		4					
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0		7.0					
Minimum Split (s)	11.0	13.0			13.0		13.0					
Total Split (s)	37.0	84.0			47.0		16.0					
Total Split (%)	37.0%	84.0%			47.0%		16.0%					
Maximum Green (s)	31.0	78.0			41.0		10.0					
Yellow Time (s)	4.0	4.0			4.0		4.0					
All-Red Time (s)	2.0	2.0			2.0		2.0					
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0					
Total Lost Time (s)	4.0	4.0			4.0		4.0					
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Recall Mode	None	C-Min			C-Min		None					
v/c Ratio	0.54	0.39			0.27	0.18	0.56		0.17			
Control Delay	8.4	4.9			8.2	0.2	41.7		0.2			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	8.4	4.9			8.2	0.2	41.7		0.2			
Queue Length 50th (ft)	73	119			70	0	97		0			
Queue Length 95th (ft)	86	154			84	0	131		0			
Internal Link Dist (ft)		620			545			220			220	
Turn Bay Length (ft)	215					100	70					
Base Capacity (vph)	837	1574			1988	1760	567		1794			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.43	0.37			0.27	0.18	0.56		0.17			
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 39 (39%), Referenced to phase 2:EBTL and 6:WBT, Start of Green												
Natural Cycle: 45												

2021 Existing Weekday Morning Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street



2021 Existing Weekday Morning Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	327	527	0	0	474	275	282	0	272	0	0	0
Future Volume (vph)	327	527	0	0	474	275	282	0	272	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	14	12	12	16	12	12	16	12	12	12
Total Lost time (s)	4.0	4.0			4.0	2.0	4.0		2.0			
Lane Util. Factor	1.00	1.00			0.95	1.00	0.97		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1662	1968			3539	1760	3335		1794			
Flt Permitted	0.39	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	687	1968			3539	1760	3335		1794			
Peak-hour factor, PHF	0.91	0.91	0.91	0.89	0.89	0.89	0.88	0.88	0.88	0.25	0.25	0.25
Adj. Flow (vph)	359	579	0	0	533	309	320	0	309	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	359	579	0	0	533	309	320	0	309	0	0	0
Heavy Vehicles (%)	5%	3%	0%	0%	2%	4%	5%	0%	2%	0%	0%	0%
Turn Type	pm+pt	NA			NA	Free	Prot		Free			
Protected Phases	5	2			6		4					
Permitted Phases	2					Free			Free			
Actuated Green, G (s)	73.0	73.0			54.2	100.0	15.0		100.0			
Effective Green, g (s)	75.0	75.0			56.2	100.0	17.0		100.0			
Actuated g/C Ratio	0.75	0.75			0.56	1.00	0.17		1.00			
Clearance Time (s)	6.0	6.0			6.0		6.0					
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Lane Grp Cap (vph)	659	1476			1988	1760	566		1794			
v/s Ratio Prot	c0.08	0.29			0.15		c0.10					
v/s Ratio Perm	c0.33					0.18			0.17			
v/c Ratio	0.54	0.39			0.27	0.18	0.57		0.17			
Uniform Delay, d1	4.6	4.4			11.3	0.0	38.1		0.0			
Progression Factor	1.20	0.85			0.64	1.00	1.00		1.00			
Incremental Delay, d2	0.9	0.8			0.3	0.2	1.3		0.2			
Delay (s)	6.4	4.5			7.5	0.2	39.4		0.2			
Level of Service	A	A			A	A	D		A			
Approach Delay (s)		5.2			4.8			20.2			0.0	
Approach LOS		A			A			C			A	
Intersection Summary												
HCM 2000 Control Delay			9.0		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					12.0		
Intersection Capacity Utilization			49.3%		ICU Level of Service					A		
Analysis Period (min)			15									

c Critical Lane Group

2021 Existing Weekday Evening Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

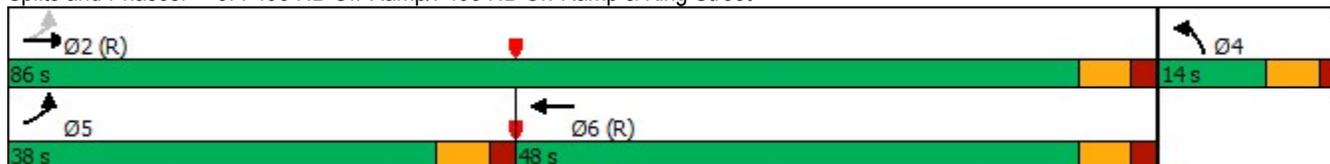
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	264	580	0	0	672	224	364	0	313	0	0	0
Future Volume (vph)	264	580	0	0	672	224	364	0	313	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1728	2027	0	0	3574	1830	3433	0	1830	0	0	0
Flt Permitted	0.287						0.950					
Satd. Flow (perm)	522	2027	0	0	3574	1830	3433	0	1830	0	0	0
Satd. Flow (RTOR)						164			344			
Adj. Flow (vph)	303	667	0	0	723	241	400	0	344	0	0	0
Lane Group Flow (vph)	303	667	0	0	723	241	400	0	344	0	0	0
Turn Type	pm+pt	NA			NA	Free	Prot		Free			
Protected Phases	5	2			6		4					
Permitted Phases	2					Free			Free			
Detector Phase	5	2			6		4					
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0		7.0					
Minimum Split (s)	11.0	13.0			13.0		13.0					
Total Split (s)	38.0	86.0			48.0		14.0					
Total Split (%)	38.0%	86.0%			48.0%		14.0%					
Maximum Green (s)	32.0	80.0			42.0		8.0					
Yellow Time (s)	4.0	4.0			4.0		4.0					
All-Red Time (s)	2.0	2.0			2.0		2.0					
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0					
Total Lost Time (s)	4.0	4.0			4.0		4.0					
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Recall Mode	None	C-Min			C-Min		None					
v/c Ratio	0.57	0.48			0.40	0.13	0.51		0.19			
Control Delay	11.1	8.6			9.6	0.1	36.4		0.2			
Queue Delay	0.0	0.1			0.0	0.0	0.0		0.0			
Total Delay	11.1	8.7			9.6	0.1	36.4		0.2			
Queue Length 50th (ft)	50	186			39	0	117		0			
Queue Length 95th (ft)	100	296			188	0	161		0			
Internal Link Dist (ft)		620			545			220			220	
Turn Bay Length (ft)	215					100	70					
Base Capacity (vph)	770	1662			1819	1830	788		1830			
Starvation Cap Reductn	0	205			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.39	0.46			0.40	0.13	0.51		0.19			
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 39 (39%), Referenced to phase 2:EBTL and 6:WBT, Start of Green												
Natural Cycle: 45												

2021 Existing Weekday Evening Peak Hour

3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street



2021 Existing Weekday Evening Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	264	580	0	0	672	224	364	0	313	0	0	0	
Future Volume (vph)	264	580	0	0	672	224	364	0	313	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	14	14	12	12	16	12	12	16	12	12	12	
Total Lost time (s)	4.0	4.0			4.0	2.0	4.0		2.0				
Lane Util. Factor	1.00	1.00			0.95	1.00	0.97		1.00				
Frt	1.00	1.00			1.00	0.85	1.00		0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (prot)	1728	2027			3574	1830	3433		1830				
Flt Permitted	0.29	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (perm)	521	2027			3574	1830	3433		1830				
Peak-hour factor, PHF	0.87	0.87	0.87	0.93	0.93	0.93	0.91	0.91	0.91	0.25	0.25	0.25	
Adj. Flow (vph)	303	667	0	0	723	241	400	0	344	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	303	667	0	0	723	241	400	0	344	0	0	0	
Heavy Vehicles (%)	1%	0%	0%	0%	1%	0%	2%	0%	0%	0%	0%	0%	
Turn Type	pm+pt	NA			NA	Free	Prot		Free				
Protected Phases	5	2			6		4						
Permitted Phases	2					Free			Free				
Actuated Green, G (s)	67.0	67.0			48.9	100.0	21.0		100.0				
Effective Green, g (s)	69.0	69.0			50.9	100.0	23.0		100.0				
Actuated g/C Ratio	0.69	0.69			0.51	1.00	0.23		1.00				
Clearance Time (s)	6.0	6.0			6.0		6.0						
Vehicle Extension (s)	3.0	3.0			3.0		3.0						
Lane Grp Cap (vph)	529	1398			1819	1830	789		1830				
v/s Ratio Prot	c0.08	0.33			0.20		c0.12						
v/s Ratio Perm	c0.31					0.13			0.19				
v/c Ratio	0.57	0.48			0.40	0.13	0.51		0.19				
Uniform Delay, d1	7.4	7.2			15.1	0.0	33.6		0.0				
Progression Factor	1.18	1.03			0.58	1.00	1.00		1.00				
Incremental Delay, d2	1.4	1.1			0.6	0.1	0.5		0.2				
Delay (s)	10.1	8.5			9.3	0.1	34.1		0.2				
Level of Service	B	A			A	A	C		A				
Approach Delay (s)		9.0			7.0			18.4			0.0		
Approach LOS		A			A			B			A		
Intersection Summary													
HCM 2000 Control Delay			10.9		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					12.0			
Intersection Capacity Utilization			53.6%		ICU Level of Service					A			
Analysis Period (min)			15										

c Critical Lane Group

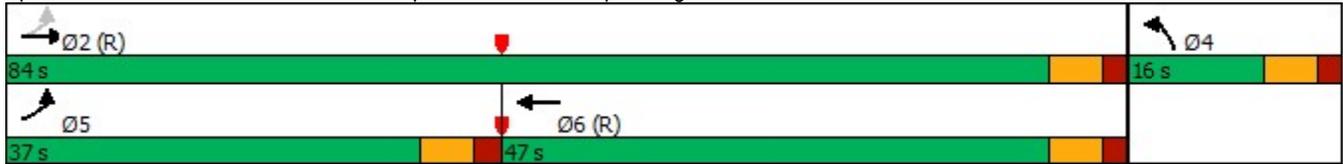
2028 No Build Weekday Morning Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	351	565	0	0	509	295	302	0	292	0	0	0
Future Volume (vph)	351	565	0	0	509	295	302	0	292	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1662	1968	0	0	3539	1760	3335	0	1794	0	0	0
Flt Permitted	0.368						0.950					
Satd. Flow (perm)	644	1968	0	0	3539	1760	3335	0	1794	0	0	0
Satd. Flow (RTOR)						198			332			
Adj. Flow (vph)	386	621	0	0	572	331	343	0	332	0	0	0
Lane Group Flow (vph)	386	621	0	0	572	331	343	0	332	0	0	0
Turn Type	pm+pt	NA			NA	Free	Prot		Free			
Protected Phases	5	2			6		4					
Permitted Phases	2					Free			Free			
Detector Phase	5	2			6		4					
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0		7.0					
Minimum Split (s)	11.0	13.0			13.0		13.0					
Total Split (s)	37.0	84.0			47.0		16.0					
Total Split (%)	37.0%	84.0%			47.0%		16.0%					
Maximum Green (s)	31.0	78.0			41.0		10.0					
Yellow Time (s)	4.0	4.0			4.0		4.0					
All-Red Time (s)	2.0	2.0			2.0		2.0					
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0					
Total Lost Time (s)	4.0	4.0			4.0		4.0					
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Recall Mode	None	C-Min			C-Min		None					
v/c Ratio	0.61	0.43			0.30	0.19	0.57		0.19			
Control Delay	10.0	5.2			8.6	0.2	41.1		0.2			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	10.0	5.2			8.6	0.2	41.1		0.2			
Queue Length 50th (ft)	74	121			75	0	103		0			
Queue Length 95th (ft)	92	158			136	0	139		0			
Internal Link Dist (ft)		620			545			220			220	
Turn Bay Length (ft)	215					100	70					
Base Capacity (vph)	812	1574			1920	1760	598		1794			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.48	0.39			0.30	0.19	0.57		0.19			
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 39 (39%), Referenced to phase 2:EBTL and 6:WBT, Start of Green												
Natural Cycle: 45												

2028 No Build Weekday Morning Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street



2028 No Build Weekday Morning Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	351	565	0	0	509	295	302	0	292	0	0	0	
Future Volume (vph)	351	565	0	0	509	295	302	0	292	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	14	14	12	12	16	12	12	16	12	12	12	
Total Lost time (s)	4.0	4.0			4.0	2.0	4.0		2.0				
Lane Util. Factor	1.00	1.00			0.95	1.00	0.97		1.00				
Frt	1.00	1.00			1.00	0.85	1.00		0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (prot)	1662	1968			3539	1760	3335		1794				
Flt Permitted	0.37	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (perm)	643	1968			3539	1760	3335		1794				
Peak-hour factor, PHF	0.91	0.91	0.91	0.89	0.89	0.89	0.88	0.88	0.88	0.25	0.25	0.25	
Adj. Flow (vph)	386	621	0	0	572	331	343	0	332	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	386	621	0	0	572	331	343	0	332	0	0	0	
Heavy Vehicles (%)	5%	3%	0%	0%	2%	4%	5%	0%	2%	0%	0%	0%	
Turn Type	pm+pt	NA			NA	Free	Prot		Free				
Protected Phases	5	2			6		4						
Permitted Phases	2					Free			Free				
Actuated Green, G (s)	72.0	72.0			52.2	100.0	16.0		100.0				
Effective Green, g (s)	74.0	74.0			54.2	100.0	18.0		100.0				
Actuated g/C Ratio	0.74	0.74			0.54	1.00	0.18		1.00				
Clearance Time (s)	6.0	6.0			6.0		6.0						
Vehicle Extension (s)	3.0	3.0			3.0		3.0						
Lane Grp Cap (vph)	636	1456			1918	1760	600		1794				
v/s Ratio Prot	c0.10	0.32			0.16		c0.10						
v/s Ratio Perm	c0.35					0.19			0.19				
v/c Ratio	0.61	0.43			0.30	0.19	0.57		0.19				
Uniform Delay, d1	5.3	4.9			12.5	0.0	37.5		0.0				
Progression Factor	1.24	0.79			0.60	1.00	1.00		1.00				
Incremental Delay, d2	1.6	0.9			0.4	0.2	1.3		0.2				
Delay (s)	8.1	4.8			7.9	0.2	38.8		0.2				
Level of Service	A	A			A	A	D		A				
Approach Delay (s)		6.1			5.1			19.8			0.0		
Approach LOS		A			A			B			A		
Intersection Summary													
HCM 2000 Control Delay			9.3		HCM 2000 Level of Service					A			
HCM 2000 Volume to Capacity ratio			0.62										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					12.0			
Intersection Capacity Utilization			52.1%		ICU Level of Service					A			
Analysis Period (min)			15										

c Critical Lane Group

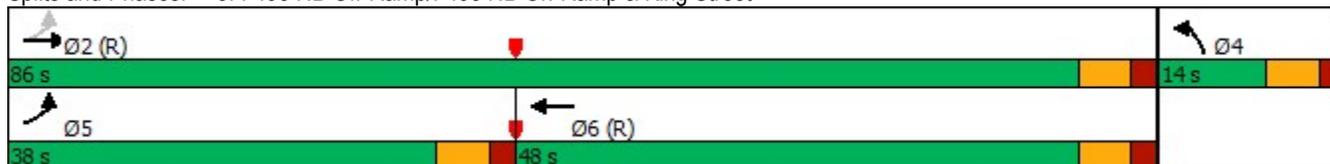
2028 No Build Weekday Evening Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	622	0	0	721	240	390	0	336	0	0	0
Future Volume (vph)	283	622	0	0	721	240	390	0	336	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1728	2027	0	0	3574	1830	3433	0	1830	0	0	0
Flt Permitted	0.253						0.950					
Satd. Flow (perm)	460	2027	0	0	3574	1830	3433	0	1830	0	0	0
Satd. Flow (RTOR)						164			369			
Adj. Flow (vph)	325	715	0	0	775	258	429	0	369	0	0	0
Lane Group Flow (vph)	325	715	0	0	775	258	429	0	369	0	0	0
Turn Type	pm+pt	NA			NA	Free	Prot		Free			
Protected Phases	5	2			6		4					
Permitted Phases	2					Free			Free			
Detector Phase	5	2			6		4					
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0		7.0					
Minimum Split (s)	11.0	13.0			13.0		13.0					
Total Split (s)	38.0	86.0			48.0		14.0					
Total Split (%)	38.0%	86.0%			48.0%		14.0%					
Maximum Green (s)	32.0	80.0			42.0		8.0					
Yellow Time (s)	4.0	4.0			4.0		4.0					
All-Red Time (s)	2.0	2.0			2.0		2.0					
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0					
Total Lost Time (s)	4.0	4.0			4.0		4.0					
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Recall Mode	None	C-Min			C-Min		None					
v/c Ratio	0.64	0.52			0.45	0.14	0.51		0.20			
Control Delay	15.0	9.2			12.5	0.1	35.3		0.2			
Queue Delay	0.0	0.1			0.0	0.0	0.0		0.0			
Total Delay	15.0	9.3			12.5	0.1	35.3		0.2			
Queue Length 50th (ft)	32	106			125	0	124		0			
Queue Length 95th (ft)	86	247			269	0	172		0			
Internal Link Dist (ft)		620			545			220			220	
Turn Bay Length (ft)	215					100	70					
Base Capacity (vph)	740	1662			1712	1830	849		1830			
Starvation Cap Reductn	0	172			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.44	0.48			0.45	0.14	0.51		0.20			
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 39 (39%), Referenced to phase 2:EBTL and 6:WBT, Start of Green												
Natural Cycle: 45												

2028 No Build Weekday Evening Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street



2028 No Build Weekday Evening Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	283	622	0	0	721	240	390	0	336	0	0	0	
Future Volume (vph)	283	622	0	0	721	240	390	0	336	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	14	14	12	12	16	12	12	16	12	12	12	
Total Lost time (s)	4.0	4.0			4.0	2.0	4.0		2.0				
Lane Util. Factor	1.00	1.00			0.95	1.00	0.97		1.00				
Frt	1.00	1.00			1.00	0.85	1.00		0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (prot)	1728	2027			3574	1830	3433		1830				
Flt Permitted	0.25	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (perm)	460	2027			3574	1830	3433		1830				
Peak-hour factor, PHF	0.87	0.87	0.87	0.93	0.93	0.93	0.91	0.91	0.91	0.25	0.25	0.25	
Adj. Flow (vph)	325	715	0	0	775	258	429	0	369	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	325	715	0	0	775	258	429	0	369	0	0	0	
Heavy Vehicles (%)	1%	0%	0%	0%	1%	0%	2%	0%	0%	0%	0%	0%	
Turn Type	pm+pt	NA			NA	Free	Prot		Free				
Protected Phases	5	2			6		4						
Permitted Phases	2					Free			Free				
Actuated Green, G (s)	65.3	65.3			45.9	100.0	22.7		100.0				
Effective Green, g (s)	67.3	67.3			47.9	100.0	24.7		100.0				
Actuated g/C Ratio	0.67	0.67			0.48	1.00	0.25		1.00				
Clearance Time (s)	6.0	6.0			6.0		6.0						
Vehicle Extension (s)	3.0	3.0			3.0		3.0						
Lane Grp Cap (vph)	504	1364			1711	1830	847		1830				
v/s Ratio Prot	c0.10	0.35			0.22		c0.12						
v/s Ratio Perm	c0.33					0.14			0.20				
v/c Ratio	0.64	0.52			0.45	0.14	0.51		0.20				
Uniform Delay, d1	8.9	8.3			17.3	0.0	32.4		0.0				
Progression Factor	1.37	0.95			0.66	1.00	1.00		1.00				
Incremental Delay, d2	2.7	1.4			0.7	0.1	0.5		0.2				
Delay (s)	14.9	9.2			12.2	0.1	32.9		0.2				
Level of Service	B	A			B	A	C		A				
Approach Delay (s)		11.0			9.2			17.8			0.0		
Approach LOS		B			A			B			A		
Intersection Summary													
HCM 2000 Control Delay			12.2		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.63										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					12.0			
Intersection Capacity Utilization			56.7%		ICU Level of Service					B			
Analysis Period (min)			15										

c Critical Lane Group

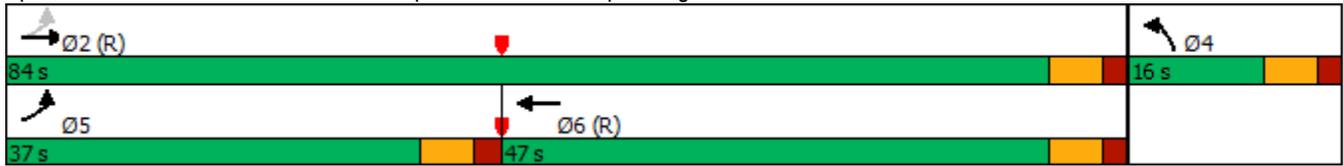
2028 Build Weekday Morning Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	354	569	0	0	521	295	316	0	292	0	0	0
Future Volume (vph)	354	569	0	0	521	295	316	0	292	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1662	1968	0	0	3539	1760	3335	0	1794	0	0	0
Flt Permitted	0.359						0.950					
Satd. Flow (perm)	628	1968	0	0	3539	1760	3335	0	1794	0	0	0
Satd. Flow (RTOR)						193			332			
Adj. Flow (vph)	389	625	0	0	585	331	359	0	332	0	0	0
Lane Group Flow (vph)	389	625	0	0	585	331	359	0	332	0	0	0
Turn Type	pm+pt	NA			NA	Free	Prot		Free			
Protected Phases	5	2			6		4					
Permitted Phases	2					Free			Free			
Detector Phase	5	2			6		4					
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0		7.0					
Minimum Split (s)	11.0	13.0			13.0		13.0					
Total Split (s)	37.0	84.0			47.0		16.0					
Total Split (%)	37.0%	84.0%			47.0%		16.0%					
Maximum Green (s)	31.0	78.0			41.0		10.0					
Yellow Time (s)	4.0	4.0			4.0		4.0					
All-Red Time (s)	2.0	2.0			2.0		2.0					
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0					
Total Lost Time (s)	4.0	4.0			4.0		4.0					
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Recall Mode	None	C-Min			C-Min		None					
v/c Ratio	0.62	0.43			0.31	0.19	0.58		0.19			
Control Delay	10.7	4.3			9.4	0.2	40.7		0.2			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	10.7	4.3			9.4	0.2	40.7		0.2			
Queue Length 50th (ft)	75	122			94	0	108		0			
Queue Length 95th (ft)	92	73			158	0	144		0			
Internal Link Dist (ft)		620			545			220			220	
Turn Bay Length (ft)	215					100	70					
Base Capacity (vph)	801	1574			1884	1760	622		1794			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.49	0.40			0.31	0.19	0.58		0.19			
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 39 (39%), Referenced to phase 2:EBTL and 6:WBT, Start of Green												
Natural Cycle: 45												

2028 Build Weekday Morning Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street



2028 Build Weekday Morning Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	354	569	0	0	521	295	316	0	292	0	0	0	
Future Volume (vph)	354	569	0	0	521	295	316	0	292	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	14	14	12	12	16	12	12	16	12	12	12	
Total Lost time (s)	4.0	4.0			4.0	2.0	4.0		2.0				
Lane Util. Factor	1.00	1.00			0.95	1.00	0.97		1.00				
Frt	1.00	1.00			1.00	0.85	1.00		0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (prot)	1662	1968			3539	1760	3335		1794				
Flt Permitted	0.36	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (perm)	627	1968			3539	1760	3335		1794				
Peak-hour factor, PHF	0.91	0.91	0.91	0.89	0.89	0.89	0.88	0.88	0.88	0.25	0.25	0.25	
Adj. Flow (vph)	389	625	0	0	585	331	359	0	332	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	389	625	0	0	585	331	359	0	332	0	0	0	
Heavy Vehicles (%)	5%	3%	0%	0%	2%	4%	5%	0%	2%	0%	0%	0%	
Turn Type	pm+pt	NA			NA	Free	Prot		Free				
Protected Phases	5	2			6		4						
Permitted Phases	2					Free			Free				
Actuated Green, G (s)	71.3	71.3			51.2	100.0	16.7		100.0				
Effective Green, g (s)	73.3	73.3			53.2	100.0	18.7		100.0				
Actuated g/C Ratio	0.73	0.73			0.53	1.00	0.19		1.00				
Clearance Time (s)	6.0	6.0			6.0		6.0						
Vehicle Extension (s)	3.0	3.0			3.0		3.0						
Lane Grp Cap (vph)	626	1442			1882	1760	623		1794				
v/s Ratio Prot	c0.10	0.32			0.17		c0.11						
v/s Ratio Perm	c0.36					0.19			0.19				
v/c Ratio	0.62	0.43			0.31	0.19	0.58		0.19				
Uniform Delay, d1	5.6	5.2			13.1	0.0	37.0		0.0				
Progression Factor	1.24	0.59			0.63	1.00	1.00		1.00				
Incremental Delay, d2	1.8	0.9			0.4	0.2	1.3		0.2				
Delay (s)	8.8	4.0			8.7	0.2	38.3		0.2				
Level of Service	A	A			A	A	D		A				
Approach Delay (s)		5.8			5.6			20.0			0.0		
Approach LOS		A			A			C			A		
Intersection Summary													
HCM 2000 Control Delay			9.5		HCM 2000 Level of Service					A			
HCM 2000 Volume to Capacity ratio			0.63										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					12.0			
Intersection Capacity Utilization			53.0%		ICU Level of Service					A			
Analysis Period (min)			15										

c Critical Lane Group

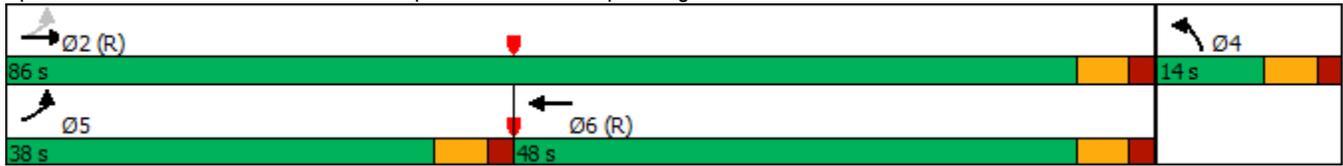
2028 Build Weekday Evening Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	633	0	0	725	240	395	0	336	0	0	0
Future Volume (vph)	295	633	0	0	725	240	395	0	336	0	0	0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1728	2027	0	0	3574	1830	3433	0	1830	0	0	0
Flt Permitted	0.247						0.950					
Satd. Flow (perm)	449	2027	0	0	3574	1830	3433	0	1830	0	0	0
Satd. Flow (RTOR)						164			369			
Adj. Flow (vph)	339	728	0	0	780	258	434	0	369	0	0	0
Lane Group Flow (vph)	339	728	0	0	780	258	434	0	369	0	0	0
Turn Type	pm+pt	NA			NA	Free	Prot		Free			
Protected Phases	5	2			6		4					
Permitted Phases	2					Free			Free			
Detector Phase	5	2			6		4					
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0		7.0					
Minimum Split (s)	11.0	13.0			13.0		13.0					
Total Split (s)	38.0	86.0			48.0		14.0					
Total Split (%)	38.0%	86.0%			48.0%		14.0%					
Maximum Green (s)	32.0	80.0			42.0		8.0					
Yellow Time (s)	4.0	4.0			4.0		4.0					
All-Red Time (s)	2.0	2.0			2.0		2.0					
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0					
Total Lost Time (s)	4.0	4.0			4.0		4.0					
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Recall Mode	None	C-Min			C-Min		None					
v/c Ratio	0.67	0.54			0.46	0.14	0.51		0.20			
Control Delay	16.2	9.4			13.1	0.1	35.4		0.2			
Queue Delay	0.0	0.1			0.0	0.0	0.0		0.0			
Total Delay	16.2	9.5			13.1	0.1	35.4		0.2			
Queue Length 50th (ft)	80	211			141	0	125		0			
Queue Length 95th (ft)	129	240			273	0	176		0			
Internal Link Dist (ft)		620			545			220			220	
Turn Bay Length (ft)	215					100	70					
Base Capacity (vph)	736	1662			1689	1830	855		1830			
Starvation Cap Reductn	0	161			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.46	0.49			0.46	0.14	0.51		0.20			
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 39 (39%), Referenced to phase 2:EBTL and 6:WBT, Start of Green												
Natural Cycle: 45												

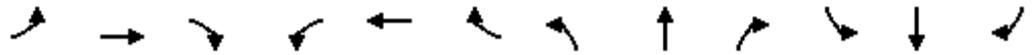
2028 Build Weekday Evening Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street



2028 Build Weekday Evening Peak Hour
 3: I-495 NB Off-Ramp/I-495 NB On-Ramp & King Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑			↑↑	↗	↘↘		↗			
Traffic Volume (vph)	295	633	0	0	725	240	395	0	336	0	0	0
Future Volume (vph)	295	633	0	0	725	240	395	0	336	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	14	12	12	16	12	12	16	12	12	12
Total Lost time (s)	4.0	4.0			4.0	2.0	4.0		2.0			
Lane Util. Factor	1.00	1.00			0.95	1.00	0.97		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1728	2027			3574	1830	3433		1830			
Flt Permitted	0.25	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	450	2027			3574	1830	3433		1830			
Peak-hour factor, PHF	0.87	0.87	0.87	0.93	0.93	0.93	0.91	0.91	0.91	0.25	0.25	0.25
Adj. Flow (vph)	339	728	0	0	780	258	434	0	369	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	339	728	0	0	780	258	434	0	369	0	0	0
Heavy Vehicles (%)	1%	0%	0%	0%	1%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA			NA	Free	Prot		Free			
Protected Phases	5	2			6		4					
Permitted Phases	2					Free			Free			
Actuated Green, G (s)	65.1	65.1			45.1	100.0	22.9		100.0			
Effective Green, g (s)	67.1	67.1			47.1	100.0	24.9		100.0			
Actuated g/C Ratio	0.67	0.67			0.47	1.00	0.25		1.00			
Clearance Time (s)	6.0	6.0			6.0		6.0					
Vehicle Extension (s)	3.0	3.0			3.0		3.0					
Lane Grp Cap (vph)	506	1360			1683	1830	854		1830			
v/s Ratio Prot	c0.11	0.36			0.22		c0.13					
v/s Ratio Perm	c0.34					0.14			0.20			
v/c Ratio	0.67	0.54			0.46	0.14	0.51		0.20			
Uniform Delay, d1	9.3	8.4			17.9	0.0	32.3		0.0			
Progression Factor	1.34	0.94			0.67	1.00	1.00		1.00			
Incremental Delay, d2	3.2	1.4			0.8	0.1	0.5		0.2			
Delay (s)	15.7	9.4			12.9	0.1	32.8		0.2			
Level of Service	B	A			B	A	C		A			
Approach Delay (s)		11.4			9.7			17.8			0.0	
Approach LOS		B			A			B			A	

Intersection Summary		
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.65	B
Actuated Cycle Length (s)	100.0	Sum of lost time (s)
Intersection Capacity Utilization	57.7%	12.0
Analysis Period (min)	15	ICU Level of Service
		B

c Critical Lane Group

King Street at Union Street



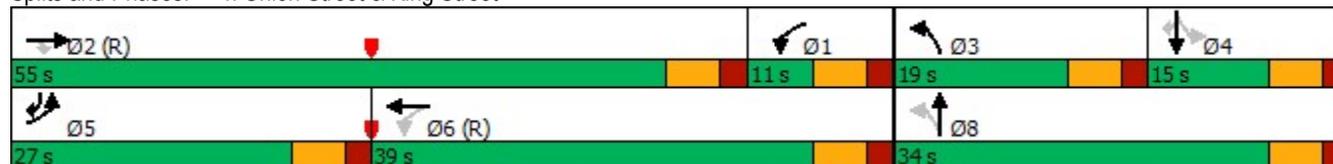
2021 Existing Weekday Morning Peak Hour
4: Union Street & King Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	479	69	39	451	25	137	35	45	31	48	161
Future Volume (vph)	120	479	69	39	451	25	137	35	45	31	48	161
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.850		0.993			0.916				0.850
Flt Protected	0.950				0.996		0.950				0.981	
Satd. Flow (prot)	1711	2029	1561	0	3450	0	1805	1740	0	0	1802	1516
Flt Permitted	0.950				0.881		0.466				0.834	
Satd. Flow (perm)	1711	2029	1561	0	3051	0	885	1740	0	0	1532	1516
Satd. Flow (RTOR)			164		6			50				194
Adj. Flow (vph)	133	532	77	41	480	27	152	39	50	37	58	194
Lane Group Flow (vph)	133	532	77	0	548	0	152	89	0	0	95	194
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6		3	8			4	5
Permitted Phases			2	6			8		4			4
Detector Phase	5	2	2	1	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0		7.0	7.0	5.0
Minimum Split (s)	11.0	13.0	13.0	11.0	13.0		11.0	13.0		13.0	13.0	11.0
Total Split (s)	27.0	55.0	55.0	11.0	39.0		19.0	34.0		15.0	15.0	27.0
Total Split (%)	27.0%	55.0%	55.0%	11.0%	39.0%		19.0%	34.0%		15.0%	15.0%	27.0%
Maximum Green (s)	21.0	49.0	49.0	5.0	33.0		13.0	28.0		9.0	9.0	21.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None		None	None	None
v/c Ratio	0.52	0.41	0.07		0.39		0.41	0.17			0.50	0.34
Control Delay	53.4	9.1	0.3		21.6		30.2	12.8			50.1	4.9
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay	53.4	9.1	0.3		21.6		30.2	12.8			50.1	4.9
Queue Length 50th (ft)	87	124	0		126		72	17			57	0
Queue Length 95th (ft)	147	199	3		196		120	51			100	34
Internal Link Dist (ft)		545			220			220			220	
Turn Bay Length (ft)	400		225				100					110
Base Capacity (vph)	393	1309	1065		1395		392	588			196	680
Starvation Cap Reductn	0	0	0		0		0	0			0	0
Spillback Cap Reductn	0	0	0		0		0	0			0	0
Storage Cap Reductn	0	0	0		0		0	0			0	0
Reduced v/c Ratio	0.34	0.41	0.07		0.39		0.39	0.15			0.48	0.29
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green												
Natural Cycle: 60												

2021 Existing Weekday Morning Peak Hour 4: Union Street & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 4: Union Street & King Street



2021 Existing Weekday Morning Peak Hour
4: Union Street & King Street

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	120	479	69	39	451	25	137	35	45	31	48	161	
Future Volume (vph)	120	479	69	39	451	25	137	35	45	31	48	161	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	15	11	10	12	14	12	12	12	11	11	11	
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	1.00			1.00	1.00	
Frt	1.00	1.00	0.85		0.99		1.00	0.92			1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			0.98	1.00	
Satd. Flow (prot)	1711	2029	1561		3449		1805	1740			1802	1516	
Flt Permitted	0.95	1.00	1.00		0.88		0.47	1.00			0.83	1.00	
Satd. Flow (perm)	1711	2029	1561		3050		885	1740			1531	1516	
Peak-hour factor, PHF	0.90	0.90	0.90	0.94	0.94	0.94	0.90	0.90	0.90	0.83	0.83	0.83	
Adj. Flow (vph)	133	532	77	41	480	27	152	39	50	37	58	194	
RTOR Reduction (vph)	0	0	28	0	3	0	0	36	0	0	0	143	
Lane Group Flow (vph)	133	532	49	0	545	0	152	53	0	0	95	51	
Heavy Vehicles (%)	2%	3%	0%	0%	4%	0%	0%	0%	0%	0%	0%	3%	
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	
Protected Phases	5	2		1	6		3	8			4	5	
Permitted Phases			2	6			8			4		4	
Actuated Green, G (s)	13.1	61.4	61.4		42.3		26.6	26.6			9.0	22.1	
Effective Green, g (s)	15.1	63.4	63.4		44.3		28.6	28.6			11.0	26.1	
Actuated g/C Ratio	0.15	0.63	0.63		0.44		0.29	0.29			0.11	0.26	
Clearance Time (s)	6.0	6.0	6.0		6.0		6.0	6.0			6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	258	1286	989		1351		378	497			168	456	
v/s Ratio Prot	c0.08	c0.26					c0.05	0.03				0.02	
v/s Ratio Perm			0.03		0.18		0.06				c0.06	0.02	
v/c Ratio	0.52	0.41	0.05		0.40		0.40	0.11			0.57	0.11	
Uniform Delay, d1	39.1	9.1	6.9		18.9		28.0	26.3			42.2	28.1	
Progression Factor	1.21	0.81	1.00		1.00		1.00	1.00			1.00	1.00	
Incremental Delay, d2	1.7	1.0	0.1		0.2		0.7	0.1			4.3	0.1	
Delay (s)	49.0	8.3	7.0		19.1		28.7	26.4			46.5	28.2	
Level of Service	D	A	A		B		C	C			D	C	
Approach Delay (s)		15.4			19.1			27.8			34.2		
Approach LOS		B			B			C			C		
Intersection Summary													
HCM 2000 Control Delay			21.2		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio			0.48										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)						18.0		
Intersection Capacity Utilization			63.9%		ICU Level of Service						B		
Analysis Period (min)			15										

c Critical Lane Group

2021 Existing Weekday Evening Peak Hour
4: Union Street & King Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	577	41	30	586	39	119	22	32	56	27	191
Future Volume (vph)	227	577	41	30	586	39	119	22	32	56	27	191
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850		0.991			0.912				0.850
Fl _t Protected	0.950				0.998		0.950				0.967	
Satd. Flow (prot)	1745	2090	1561	0	3539	0	1787	1733	0	0	1776	1531
Fl _t Permitted	0.950				0.900		0.480				0.761	
Satd. Flow (perm)	1745	2090	1561	0	3191	0	903	1733	0	0	1398	1531
Satd. Flow (RTOR)			164		7			34				202
Adj. Flow (vph)	258	656	47	33	644	43	128	24	34	61	29	208
Lane Group Flow (vph)	258	656	47	0	720	0	128	58	0	0	90	208
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6		3	8			4	5
Permitted Phases			2	6			8			4		4
Detector Phase	5	2	2	1	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0		7.0	7.0	5.0
Minimum Split (s)	11.0	13.0	13.0	11.0	13.0		11.0	13.0		13.0	13.0	11.0
Total Split (s)	32.0	59.0	59.0	11.0	38.0		17.0	30.0		13.0	13.0	32.0
Total Split (%)	32.0%	59.0%	59.0%	11.0%	38.0%		17.0%	30.0%		13.0%	13.0%	32.0%
Maximum Green (s)	26.0	53.0	53.0	5.0	32.0		11.0	24.0		7.0	7.0	26.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None		None	None	None
v/c Ratio	0.68	0.48	0.04		0.57		0.37	0.12			0.59	0.30
Control Delay	50.1	10.3	0.1		27.0		31.8	15.1			60.0	4.3
Queue Delay	0.0	0.1	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay	50.1	10.4	0.1		27.0		31.8	15.1			60.0	4.3
Queue Length 50th (ft)	171	175	0		198		60	11			53	2
Queue Length 95th (ft)	243	243	1		267		116	43			#138	45
Internal Link Dist (ft)		545			220			220			220	
Turn Bay Length (ft)	400		225				100					110
Base Capacity (vph)	488	1358	1072		1256		360	503			153	772
Starvation Cap Reductn	0	133	0		0		0	0			0	0
Spillback Cap Reductn	0	0	0		0		0	0			0	0
Storage Cap Reductn	0	0	0		0		0	0			0	0
Reduced v/c Ratio	0.53	0.54	0.04		0.57		0.36	0.12			0.59	0.27
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green												
Natural Cycle: 60												

2021 Existing Weekday Evening Peak Hour

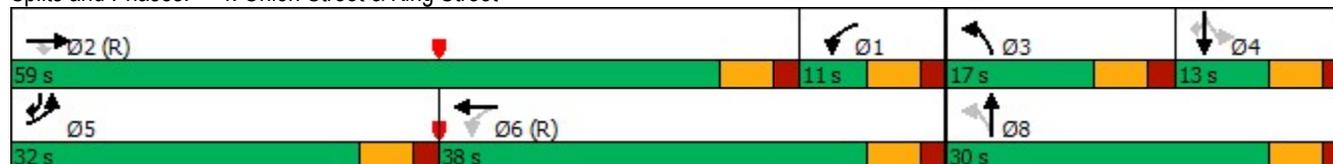
4: Union Street & King Street

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Union Street & King Street



2021 Existing Weekday Evening Peak Hour
4: Union Street & King Street

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	577	41	30	586	39	119	22	32	56	27	191
Future Volume (vph)	227	577	41	30	586	39	119	22	32	56	27	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	10	12	14	12	12	12	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85		0.99		1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1745	2090	1561		3538		1787	1733			1776	1531
Flt Permitted	0.95	1.00	1.00		0.90		0.48	1.00			0.76	1.00
Satd. Flow (perm)	1745	2090	1561		3191		904	1733			1398	1531
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	258	656	47	33	644	43	128	24	34	61	29	208
RTOR Reduction (vph)	0	0	16	0	4	0	0	25	0	0	0	136
Lane Group Flow (vph)	258	656	31	0	716	0	128	33	0	0	90	72
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%	2%
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6		3	8			4	5
Permitted Phases			2	6			8			4		4
Actuated Green, G (s)	19.8	63.0	63.0		37.2		25.0	25.0			9.0	28.8
Effective Green, g (s)	21.8	65.0	65.0		39.2		27.0	27.0			11.0	32.8
Actuated g/C Ratio	0.22	0.65	0.65		0.39		0.27	0.27			0.11	0.33
Clearance Time (s)	6.0	6.0	6.0		6.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	380	1358	1014		1250		350	467			153	563
v/s Ratio Prot	c0.15	0.31					c0.04	0.02				0.03
v/s Ratio Perm			0.02		c0.22		0.05				c0.06	0.02
v/c Ratio	0.68	0.48	0.03		0.57		0.37	0.07			0.59	0.13
Uniform Delay, d1	35.9	8.9	6.2		23.8		28.8	27.2			42.3	23.6
Progression Factor	1.17	0.98	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	4.6	1.2	0.1		0.6		0.7	0.1			5.7	0.1
Delay (s)	46.4	9.9	6.3		24.5		29.5	27.2			48.0	23.7
Level of Service	D	A	A		C		C	C			D	C
Approach Delay (s)		19.5			24.5			28.8			31.0	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			23.5		HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)			18.0				
Intersection Capacity Utilization			71.9%		ICU Level of Service			C				
Analysis Period (min)			15									

c Critical Lane Group

2028 No Build Weekday Morning Peak Hour
4: Union Street & King Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	514	74	42	484	27	147	38	48	33	51	173
Future Volume (vph)	129	514	74	42	484	27	147	38	48	33	51	173
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.850		0.993			0.916				0.850
Flt Protected	0.950				0.996		0.950				0.981	
Satd. Flow (prot)	1711	2029	1561	0	3450	0	1805	1740	0	0	1802	1516
Flt Permitted	0.950				0.871		0.474				0.831	
Satd. Flow (perm)	1711	2029	1561	0	3017	0	901	1740	0	0	1526	1516
Satd. Flow (RTOR)			164		6			53				208
Adj. Flow (vph)	143	571	82	45	515	29	163	42	53	40	61	208
Lane Group Flow (vph)	143	571	82	0	589	0	163	95	0	0	101	208
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6		3	8			4	5
Permitted Phases			2	6			8		4			4
Detector Phase	5	2	2	1	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0		7.0	7.0	5.0
Minimum Split (s)	11.0	13.0	13.0	11.0	13.0		11.0	13.0		13.0	13.0	11.0
Total Split (s)	27.0	55.0	55.0	11.0	39.0		19.0	34.0		15.0	15.0	27.0
Total Split (%)	27.0%	55.0%	55.0%	11.0%	39.0%		19.0%	34.0%		15.0%	15.0%	27.0%
Maximum Green (s)	21.0	49.0	49.0	5.0	33.0		13.0	28.0		9.0	9.0	21.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None		None	None	None
v/c Ratio	0.54	0.46	0.08		0.46		0.41	0.17			0.53	0.33
Control Delay	53.1	10.6	0.5		23.6		29.4	12.9			51.8	4.7
Queue Delay	0.0	0.1	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay	53.1	10.7	0.5		23.6		29.4	12.9			51.8	4.7
Queue Length 50th (ft)	94	136	0		142		77	18			60	0
Queue Length 95th (ft)	155	219	4		210		132	55			107	35
Internal Link Dist (ft)		545			220			220			220	
Turn Bay Length (ft)	400		225				100					110
Base Capacity (vph)	393	1253	1026		1275		411	589			195	724
Starvation Cap Reductn	0	139	0		0		0	0			0	0
Spillback Cap Reductn	0	0	0		0		0	0			0	0
Storage Cap Reductn	0	0	0		0		0	0			0	0
Reduced v/c Ratio	0.36	0.51	0.08		0.46		0.40	0.16			0.52	0.29
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green												
Natural Cycle: 60												

2028 No Build Weekday Morning Peak Hour 4: Union Street & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 4: Union Street & King Street



2028 No Build Weekday Morning Peak Hour
4: Union Street & King Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	129	514	74	42	484	27	147	38	48	33	51	173	
Future Volume (vph)	129	514	74	42	484	27	147	38	48	33	51	173	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	15	11	10	12	14	12	12	12	11	11	11	
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	1.00			1.00	1.00	
Frt	1.00	1.00	0.85		0.99		1.00	0.92			1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			0.98	1.00	
Satd. Flow (prot)	1711	2029	1561		3449		1805	1741			1801	1516	
Flt Permitted	0.95	1.00	1.00		0.87		0.47	1.00			0.83	1.00	
Satd. Flow (perm)	1711	2029	1561		3017		900	1741			1527	1516	
Peak-hour factor, PHF	0.90	0.90	0.90	0.94	0.94	0.94	0.90	0.90	0.90	0.83	0.83	0.83	
Adj. Flow (vph)	143	571	82	45	515	29	163	42	53	40	61	208	
RTOR Reduction (vph)	0	0	31	0	3	0	0	37	0	0	0	150	
Lane Group Flow (vph)	143	571	51	0	586	0	163	58	0	0	101	58	
Heavy Vehicles (%)	2%	3%	0%	0%	4%	0%	0%	0%	0%	0%	0%	3%	
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	
Protected Phases	5	2		1	6		3	8			4	5	
Permitted Phases			2	6			8			4		4	
Actuated Green, G (s)	13.6	59.7	59.7		40.1		28.3	28.3			10.5	24.1	
Effective Green, g (s)	15.6	61.7	61.7		42.1		30.3	30.3			12.5	28.1	
Actuated g/C Ratio	0.16	0.62	0.62		0.42		0.30	0.30			0.12	0.28	
Clearance Time (s)	6.0	6.0	6.0		6.0		6.0	6.0			6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	266	1251	963		1270		397	527			190	486	
v/s Ratio Prot	c0.08	c0.28					c0.06	0.03				0.02	
v/s Ratio Perm			0.03		0.19		0.07				c0.07	0.02	
v/c Ratio	0.54	0.46	0.05		0.46		0.41	0.11			0.53	0.12	
Uniform Delay, d1	38.9	10.2	7.6		20.8		26.9	25.1			41.0	26.8	
Progression Factor	1.20	0.85	1.00		1.00		1.00	1.00			1.00	1.00	
Incremental Delay, d2	2.0	1.2	0.1		0.3		0.7	0.1			2.8	0.1	
Delay (s)	48.8	9.9	7.7		21.1		27.5	25.2			43.8	26.9	
Level of Service	D	A	A		C		C	C			D	C	
Approach Delay (s)		16.6			21.1			26.7			32.4		
Approach LOS		B			C			C			C		
Intersection Summary													
HCM 2000 Control Delay			21.8		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio			0.50										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)						18.0		
Intersection Capacity Utilization			67.3%		ICU Level of Service						C		
Analysis Period (min)			15										

c Critical Lane Group

2028 No Build Weekday Evening Peak Hour
4: Union Street & King Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	243	619	44	32	628	42	128	24	34	60	29	205
Future Volume (vph)	243	619	44	32	628	42	128	24	34	60	29	205
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.991			0.912				0.850
Flt Protected	0.950				0.998		0.950				0.968	
Satd. Flow (prot)	1745	2090	1561	0	3539	0	1787	1733	0	0	1778	1531
Flt Permitted	0.950				0.895		0.454				0.760	
Satd. Flow (perm)	1745	2090	1561	0	3173	0	854	1733	0	0	1396	1531
Satd. Flow (RTOR)			164		7			37				180
Adj. Flow (vph)	276	703	50	35	690	46	138	26	37	65	32	223
Lane Group Flow (vph)	276	703	50	0	771	0	138	63	0	0	97	223
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6		3	8			4	5
Permitted Phases			2	6			8			4		4
Detector Phase	5	2	2	1	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0		7.0	7.0	5.0
Minimum Split (s)	11.0	13.0	13.0	11.0	13.0		11.0	13.0		13.0	13.0	11.0
Total Split (s)	32.0	59.0	59.0	11.0	38.0		17.0	30.0		13.0	13.0	32.0
Total Split (%)	32.0%	59.0%	59.0%	11.0%	38.0%		17.0%	30.0%		13.0%	13.0%	32.0%
Maximum Green (s)	26.0	53.0	53.0	5.0	32.0		11.0	24.0		7.0	7.0	26.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None		None	None	None
v/c Ratio	0.70	0.52	0.05		0.63		0.41	0.13			0.66	0.33
Control Delay	49.5	12.3	0.2		28.3		33.1	15.3			65.6	6.4
Queue Delay	0.0	0.2	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay	49.5	12.4	0.2		28.3		33.1	15.3			65.6	6.4
Queue Length 50th (ft)	183	250	0		214		67	12			59	17
Queue Length 95th (ft)	257	295	1		291		124	45			#150	63
Internal Link Dist (ft)		545			220			220			220	
Turn Bay Length (ft)	400		225				100					110
Base Capacity (vph)	488	1364	1076		1233		349	498			148	756
Starvation Cap Reductn	0	125	0		0		0	0			0	0
Spillback Cap Reductn	0	0	0		0		0	0			0	0
Storage Cap Reductn	0	0	0		0		0	0			0	0
Reduced v/c Ratio	0.57	0.57	0.05		0.63		0.40	0.13			0.66	0.29

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 60

2028 No Build Weekday Evening Peak Hour

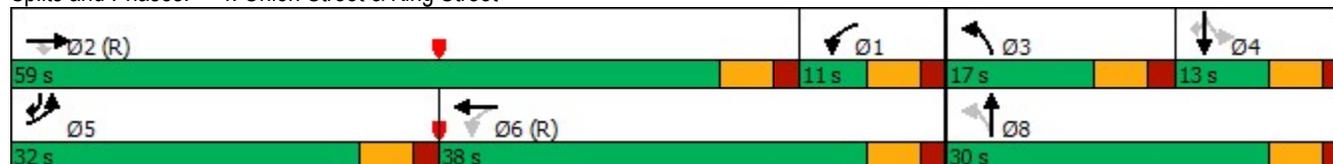
4: Union Street & King Street

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Union Street & King Street



2028 No Build Weekday Evening Peak Hour
4: Union Street & King Street

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	243	619	44	32	628	42	128	24	34	60	29	205
Future Volume (vph)	243	619	44	32	628	42	128	24	34	60	29	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	10	12	14	12	12	12	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85		0.99		1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1745	2090	1561		3538		1787	1733			1777	1531
Flt Permitted	0.95	1.00	1.00		0.89		0.45	1.00			0.76	1.00
Satd. Flow (perm)	1745	2090	1561		3173		854	1733			1396	1531
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	276	703	50	35	690	46	138	26	37	65	32	223
RTOR Reduction (vph)	0	0	17	0	4	0	0	27	0	0	0	120
Lane Group Flow (vph)	276	703	33	0	767	0	138	36	0	0	97	103
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%	2%
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6		3	8			4	5
Permitted Phases			2	6			8			4		4
Actuated Green, G (s)	20.5	63.2	63.2		36.7		24.8	24.8			8.7	29.2
Effective Green, g (s)	22.5	65.2	65.2		38.7		26.8	26.8			10.7	33.2
Actuated g/C Ratio	0.22	0.65	0.65		0.39		0.27	0.27			0.11	0.33
Clearance Time (s)	6.0	6.0	6.0		6.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	392	1362	1017		1227		341	464			149	569
v/s Ratio Prot	c0.16	0.34					c0.05	0.02				0.04
v/s Ratio Perm			0.02		c0.24		0.06				c0.07	0.03
v/c Ratio	0.70	0.52	0.03		0.62		0.40	0.08			0.65	0.18
Uniform Delay, d1	35.7	9.1	6.2		24.8		29.2	27.4			42.9	23.7
Progression Factor	1.14	1.16	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	5.4	1.3	0.1		1.0		0.8	0.1			9.8	0.2
Delay (s)	46.0	12.0	6.2		25.8		30.0	27.4			52.6	23.9
Level of Service	D	B	A		C		C	C			D	C
Approach Delay (s)		20.8			25.8			29.2			32.6	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			24.8		HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)			18.0				
Intersection Capacity Utilization			76.0%		ICU Level of Service			D				
Analysis Period (min)			15									

c Critical Lane Group

2028 Build Weekday Morning Peak Hour
4: Union Street & King Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	517	74	42	493	27	147	38	48	33	51	176
Future Volume (vph)	130	517	74	42	493	27	147	38	48	33	51	176
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.850		0.993			0.916				0.850
Flt Protected	0.950				0.996		0.950				0.981	
Satd. Flow (prot)	1711	2029	1561	0	3449	0	1805	1740	0	0	1802	1516
Flt Permitted	0.950				0.872		0.474				0.831	
Satd. Flow (perm)	1711	2029	1561	0	3020	0	901	1740	0	0	1526	1516
Satd. Flow (RTOR)			164		6			53				212
Adj. Flow (vph)	144	574	82	45	524	29	163	42	53	40	61	212
Lane Group Flow (vph)	144	574	82	0	598	0	163	95	0	0	101	212
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6		3	8			4	5
Permitted Phases			2	6			8		4			4
Detector Phase	5	2	2	1	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0		7.0	7.0	5.0
Minimum Split (s)	11.0	13.0	13.0	11.0	13.0		11.0	13.0		13.0	13.0	11.0
Total Split (s)	27.0	55.0	55.0	11.0	39.0		19.0	34.0		15.0	15.0	27.0
Total Split (%)	27.0%	55.0%	55.0%	11.0%	39.0%		19.0%	34.0%		15.0%	15.0%	27.0%
Maximum Green (s)	21.0	49.0	49.0	5.0	33.0		13.0	28.0		9.0	9.0	21.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None		None	None	None
v/c Ratio	0.54	0.46	0.08		0.47		0.41	0.17			0.53	0.34
Control Delay	50.3	13.1	1.0		23.7		29.5	13.0			51.8	4.7
Queue Delay	0.0	0.1	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay	50.3	13.2	1.0		23.7		29.5	13.0			51.8	4.7
Queue Length 50th (ft)	95	154	0		145		77	18			60	0
Queue Length 95th (ft)	156	271	8		212		132	56			107	35
Internal Link Dist (ft)		545			220			220			220	
Turn Bay Length (ft)	400		225				100					110
Base Capacity (vph)	393	1254	1027		1277		409	588			195	726
Starvation Cap Reductn	0	135	0		0		0	0			0	0
Spillback Cap Reductn	0	0	0		0		0	0			0	0
Storage Cap Reductn	0	0	0		0		0	0			0	0
Reduced v/c Ratio	0.37	0.51	0.08		0.47		0.40	0.16			0.52	0.29
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green												
Natural Cycle: 60												

2028 Build Weekday Morning Peak Hour

4: Union Street & King Street

Control Type: Actuated-Coordinated

Splits and Phases: 4: Union Street & King Street



2028 Build Weekday Morning Peak Hour
4: Union Street & King Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	130	517	74	42	493	27	147	38	48	33	51	176	
Future Volume (vph)	130	517	74	42	493	27	147	38	48	33	51	176	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	15	11	10	12	14	12	12	12	11	11	11	
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	1.00			1.00	1.00	
Frt	1.00	1.00	0.85		0.99		1.00	0.92			1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			0.98	1.00	
Satd. Flow (prot)	1711	2029	1561		3449		1805	1741			1801	1516	
Flt Permitted	0.95	1.00	1.00		0.87		0.47	1.00			0.83	1.00	
Satd. Flow (perm)	1711	2029	1561		3019		900	1741			1527	1516	
Peak-hour factor, PHF	0.90	0.90	0.90	0.94	0.94	0.94	0.90	0.90	0.90	0.83	0.83	0.83	
Adj. Flow (vph)	144	574	82	45	524	29	163	42	53	40	61	212	
RTOR Reduction (vph)	0	0	31	0	3	0	0	37	0	0	0	152	
Lane Group Flow (vph)	144	574	51	0	595	0	163	58	0	0	101	60	
Heavy Vehicles (%)	2%	3%	0%	0%	4%	0%	0%	0%	0%	0%	0%	3%	
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	
Protected Phases	5	2		1	6		3	8			4	5	
Permitted Phases			2	6			8			4		4	
Actuated Green, G (s)	13.7	59.8	59.8		40.1		28.2	28.2			10.5	24.2	
Effective Green, g (s)	15.7	61.8	61.8		42.1		30.2	30.2			12.5	28.2	
Actuated g/C Ratio	0.16	0.62	0.62		0.42		0.30	0.30			0.12	0.28	
Clearance Time (s)	6.0	6.0	6.0		6.0		6.0	6.0			6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	268	1253	964		1270		395	525			190	488	
v/s Ratio Prot	c0.08	c0.28					c0.06	0.03				0.02	
v/s Ratio Perm			0.03		0.20		0.07				c0.07	0.02	
v/c Ratio	0.54	0.46	0.05		0.47		0.41	0.11			0.53	0.12	
Uniform Delay, d1	38.8	10.2	7.5		20.9		26.9	25.2			41.0	26.7	
Progression Factor	1.13	1.09	1.00		1.00		1.00	1.00			1.00	1.00	
Incremental Delay, d2	2.0	1.2	0.1		0.3		0.7	0.1			2.8	0.1	
Delay (s)	45.8	12.2	7.6		21.2		27.6	25.3			43.8	26.8	
Level of Service	D	B	A		C		C	C			D	C	
Approach Delay (s)		17.8			21.2			26.8			32.3		
Approach LOS		B			C			C			C		
Intersection Summary													
HCM 2000 Control Delay			22.3		HCM 2000 Level of Service							C	
HCM 2000 Volume to Capacity ratio			0.50										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)						18.0		
Intersection Capacity Utilization			67.7%		ICU Level of Service						C		
Analysis Period (min)			15										

c Critical Lane Group

2028 Build Weekday Evening Peak Hour
4: Union Street & King Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	628	44	32	631	42	128	24	34	60	29	206
Future Volume (vph)	245	628	44	32	631	42	128	24	34	60	29	206
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850		0.991			0.912				0.850
Fl _t Protected	0.950				0.998		0.950				0.968	
Satd. Flow (prot)	1745	2090	1561	0	3539	0	1787	1733	0	0	1778	1531
Fl _t Permitted	0.950				0.894		0.452				0.760	
Satd. Flow (perm)	1745	2090	1561	0	3170	0	850	1733	0	0	1396	1531
Satd. Flow (RTOR)			164		7			37				179
Adj. Flow (vph)	278	714	50	35	693	46	138	26	37	65	32	224
Lane Group Flow (vph)	278	714	50	0	774	0	138	63	0	0	97	224
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6		3	8			4	5
Permitted Phases			2	6			8			4		4
Detector Phase	5	2	2	1	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	5.0	7.0	7.0	5.0	7.0		5.0	7.0		7.0	7.0	5.0
Minimum Split (s)	11.0	13.0	13.0	11.0	13.0		11.0	13.0		13.0	13.0	11.0
Total Split (s)	32.0	59.0	59.0	11.0	38.0		17.0	30.0		13.0	13.0	32.0
Total Split (%)	32.0%	59.0%	59.0%	11.0%	38.0%		17.0%	30.0%		13.0%	13.0%	32.0%
Maximum Green (s)	26.0	53.0	53.0	5.0	32.0		11.0	24.0		7.0	7.0	26.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min	C-Min	None	C-Min		None	None		None	None	None
v/c Ratio	0.71	0.52	0.05		0.63		0.41	0.13			0.66	0.33
Control Delay	48.1	10.7	0.1		28.5		33.1	15.3			65.7	6.5
Queue Delay	0.0	0.2	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay	48.1	10.8	0.1		28.5		33.1	15.3			65.7	6.5
Queue Length 50th (ft)	184	226	0		215		68	12			59	18
Queue Length 95th (ft)	259	304	0		292		124	45			#150	64
Internal Link Dist (ft)		545			220			220			220	
Turn Bay Length (ft)	400		225				100					110
Base Capacity (vph)	488	1364	1076		1230		348	497			148	755
Starvation Cap Reductn	0	129	0		0		0	0			0	0
Spillback Cap Reductn	0	0	0		0		0	0			0	0
Storage Cap Reductn	0	0	0		0		0	0			0	0
Reduced v/c Ratio	0.57	0.58	0.05		0.63		0.40	0.13			0.66	0.30
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green												
Natural Cycle: 60												

2028 Build Weekday Evening Peak Hour

4: Union Street & King Street

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Union Street & King Street



2028 Build Weekday Evening Peak Hour
4: Union Street & King Street

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	245	628	44	32	631	42	128	24	34	60	29	206	
Future Volume (vph)	245	628	44	32	631	42	128	24	34	60	29	206	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	11	15	11	10	12	14	12	12	12	11	11	11	
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00		0.95		1.00	1.00			1.00	1.00	
Frt	1.00	1.00	0.85		0.99		1.00	0.91			1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00			0.97	1.00	
Satd. Flow (prot)	1745	2090	1561		3538		1787	1733			1777	1531	
Flt Permitted	0.95	1.00	1.00		0.89		0.45	1.00			0.76	1.00	
Satd. Flow (perm)	1745	2090	1561		3170		850	1733			1396	1531	
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.93	0.93	0.93	0.92	0.92	0.92	
Adj. Flow (vph)	278	714	50	35	693	46	138	26	37	65	32	224	
RTOR Reduction (vph)	0	0	17	0	4	0	0	27	0	0	0	120	
Lane Group Flow (vph)	278	714	33	0	770	0	138	36	0	0	97	104	
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%	2%	
Turn Type	Prot	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	
Protected Phases	5	2		1	6		3	8			4	5	
Permitted Phases			2	6			8			4		4	
Actuated Green, G (s)	20.6	63.3	63.3		36.7		24.7	24.7			8.6	29.2	
Effective Green, g (s)	22.6	65.3	65.3		38.7		26.7	26.7			10.6	33.2	
Actuated g/C Ratio	0.23	0.65	0.65		0.39		0.27	0.27			0.11	0.33	
Clearance Time (s)	6.0	6.0	6.0		6.0		6.0	6.0			6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	394	1364	1019		1226		340	462			147	569	
v/s Ratio Prot	c0.16	0.34					c0.05	0.02				0.04	
v/s Ratio Perm			0.02		c0.24		0.06				c0.07	0.03	
v/c Ratio	0.71	0.52	0.03		0.63		0.41	0.08			0.66	0.18	
Uniform Delay, d1	35.6	9.1	6.1		24.8		29.3	27.4			43.0	23.8	
Progression Factor	1.10	0.98	1.00		1.00		1.00	1.00			1.00	1.00	
Incremental Delay, d2	5.4	1.4	0.1		1.0		0.8	0.1			10.2	0.2	
Delay (s)	44.5	10.4	6.2		25.8		30.1	27.5			53.2	23.9	
Level of Service	D	B	A		C		C	C			D	C	
Approach Delay (s)		19.3			25.8			29.3			32.8		
Approach LOS		B			C			C			C		
Intersection Summary													
HCM 2000 Control Delay			24.2									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.64										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	18.0
Intersection Capacity Utilization			76.5%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group