



# TRAFFIC IMPACT ASSESSMENT

## PROPOSED CHILD CARE CENTER

Proposed Child Care Center  
Map 303, Parcels 46 & 47  
700-712 Union Street  
Town of Franklin  
Norfolk County, Massachusetts

Prepared For:  
Primrose School Franchising Company

Date: June 22, 2022  
SE&D Job No. BOS-210005



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## INTRODUCTION

This Traffic Impact Assessment was prepared to investigate the potential impacts of the proposed child care center on the adjacent roadway network. The subject property is located along the easterly side of Union Street in the Town of Franklin, Norfolk County, Massachusetts. The site location is shown on appended **Figure I**.

The subject property is designated as Map 303, Parcels 46 & 47 as depicted on the Town of Franklin GIS Tax Accessor Interactive Map. The site has approximately 360 feet of frontage along Union Street and approximately 268 feet of frontage along Spruce Pond Road. The existing site is enclosed with fencing and occupied by various playground equipment and sporting facilities, and undeveloped grassland in connection with the Boston Sports Club. Vehicular access is not presently provided to the subject property. Under the proposed development program, a 13,525-square-foot child care center would be constructed. Access is proposed via one (1) full movement driveway along Union Street.

## METHODOLOGY

Stonefield Engineering & Design, LLC has prepared this Traffic Impact Assessment in accordance with the recommended guidelines and practices outlined by the Institute of Transportation Engineers (ITE) within Transportation Impact Analyses for Site Development. A detailed field investigation was performed to assess the existing conditions of the adjacent roadway network. A data collection effort was completed to identify the existing traffic volumes at the study intersections to serve as a base for the traffic analyses. Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using the Highway Capacity Manual, 6<sup>th</sup> Edition (HCM), HCM 2000, and the Synchro II Software for all study conditions to assess the roadway operations.

For an unsignalized intersection, Level of Service (LOS) A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 80 seconds per vehicle. The Technical Appendix contains the Highway Capacity Analysis Detail Sheets for the study intersections analyzed in this assessment. The traffic signal timing utilized within the signalized analysis is based on timing directives provided by the Massachusetts Department of Transportation (MassDOT) and contained within the Traffic Impact Assessment prepared by Vanasse & Associates, Inc., dated October 2021, for the proposed warehouse building located proximate to the subject site at 585 King Street.

## 2022 EXISTING CONDITION

### 2022 EXISTING ROADWAY CONDITIONS

The proposed child care center is located along the easterly side of Union Street in the Town of Franklin, Norfolk County, Massachusetts. The subject property is designated as Map 303, Parcels 46 & 47 as depicted on the Town of Franklin GIS Tax Accessor Interactive Map. The site has approximately 360 feet of frontage along Union Street and approximately 268 feet of frontage along Spruce Pond Road. Land uses in the area are predominantly commercial, residential, and institutional.

Union Street is classified as a local roadway to the south of King Street and an urban minor arterial roadway to the north of King Street, has a general north-south orientation, and is under the jurisdiction of the Town of Franklin. Along the site frontage, the roadway carries approximately 1,154 vehicles daily, provides one (1) lane of travel in each direction, and has a posted speed limit of 30 mph. Along the site frontage, curb and sidewalk are provided along the westerly side of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is not permitted along either side of the roadway. Union Street provides north-south connection between Beaver Street and the southerly roadway extent to the south of King Street for predominantly residential and commercial uses along its length.

King Street is classified as an urban minor arterial roadway, with a general northeast-southwest orientation, and is under the jurisdiction of the Town of Franklin. The roadway carries approximately 19,268 vehicles daily, provides one (1) lane of travel in each direction to the east of Union Street and two (2) lanes of travel in each direction to the west of Union Street, and has a posted speed limit of 35 mph within the site vicinity. To the east of Union Street curb and sidewalk are provided along both sides of the roadway, and to the west of Union Street curb and sidewalk are provided along the southerly side of the roadway. Shoulders are generally provided along both sides of the roadway and on-street parking is not permitted along either side of the roadway. King Street provides connection to thoroughfares such as State Route 140 and Interstate 495 and consists of predominantly residential and commercial uses along its length.

Union Street and King Street intersect to form a signalized four (4)-leg intersection. The eastbound approach of King Street provides one (1) exclusive left-turn lane, one (1) exclusive through lane, and one (1) exclusive right-turn lane and the westbound approach of King Street provides one (1) shared left-turn/through lane and one (1) shared through/right-turn lane. The northbound approach of Union Street provides one (1) exclusive left-turn lane and one (1) shared through/right-turn lane and the southbound approach of Union Street provides one (1) shared left-turn/through lane and one (1) exclusive right-turn lane. Crosswalks, pedestrian signals, and pedestrian ramps are provided across all legs of the intersection.

## 2022 EXISTING TRANSIT SERVICE

The subject site is located approximately 1.5 miles from the Massachusetts Bay Transportation Authority (MBTA) Franklin/Foxboro Commuter Rail Line, however there are no fixed public transit facilities located within the immediate vicinity of the site. Please note that the Greater Attleboro-Taunton Regional Transit Authority (GATRA) offers a program known as “GATRA GO United” which operates as a microtransit service, allowing riders within a set service area to request same-day vehicle service. Additionally, GATRA provides a demand response service (“Dial-a-Ride”) which serves eligible seniors and persons with disabilities residing in the Town of Franklin.

## 2022 EXISTING TRAFFIC VOLUMES

Turning movement counts and automatic traffic recorder counts were obtained from the aforementioned Traffic Impact Assessment prepared by Vanasse & Associates. The turning movement counts were collected during the typical weekday morning and weekday evening time periods to evaluate existing traffic conditions and identify the specific hours when traffic activity on the adjacent roadways is at a maximum and could be potentially impacted by the development of the site. Turning movement counts were collected at the intersection of Union Street and King Street on Wednesday, May 26, 2021 from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m. The study time periods were chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed development. The traffic volume data was collected and analyzed to identify the design peak hour in accordance with HCM and ITE guidelines. Automatic traffic recorder counts were collected along King Street northeast of Constitution Boulevard on Wednesday, May 26 through Thursday, May 27, 2021 to record typical weekday traffic patterns over a continuous period.

Based on the review of the count data, the weekday morning peak hour occurred from 8:00 a.m. to 9:00 a.m. and the weekday evening peak hour occurred from 4:30 p.m. to 5:30 p.m. Please note that a count of pedestrians and bicycles was included as part of the manual turning movement counts at the study intersection during the study time periods. During the weekday morning and weekday evening peak hours, minimal pedestrian and bicycle volumes were observed at the study intersection. The Technical Appendix contains a summary of the turning movement count data and automatic traffic recorder data.

Please note that in connection with the COVID-19 pandemic and directives issued by the Massachusetts governor, the Traffic Impact Assessment prepared by Vanasse & Associates provides details on the calibration measures completed in accordance with “Guidance on Traffic Counting Data,” published by MassDOT in April 2020, to account for the decrease in typical traffic patterns along the study network at the time of the counts. The 2021 calibrated traffic volumes presented within the aforementioned Traffic Impact Assessment were

conservatively grown by 1.0% for one (1) year to project the 2022 Existing Traffic Volumes. The 2022 Existing weekday morning and weekday evening peak-hour volumes are summarized on appended **Figure 2**.

### 2022 EXISTING LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was conducted for the 2022 Existing Condition during the weekday morning and weekday evening peak hours at the study intersection. Under the 2022 Existing Condition, the signalized intersection of Union Street and King Street is calculated to operate at overall Level of Service C during the weekday morning and weekday evening peak hours, and the turning movements at the study intersection are calculated to operate at Level of Service D or better during the study peak hours.

### MOTOR VEHICLE COLLISION ANALYSIS

In order to assess the safety of the intersection of Union Street and King Street, three (3) years of motor vehicle collision data were obtained from the MassDOT Crash Query and Visualization web application. Data for the time period spanning from March 1, 2017 to March 1, 2020 which is unaffected by COVID-19, was queried. Please note that the queried motor vehicle collision data sufficiently accounts for the 95<sup>th</sup> percentile queue lengths calculated at the study intersection. **Table I** provides a summary of the manner and severity of the motor vehicle collisions reported at or near the study intersection.

**TABLE I – MOTOR VEHICLE COLLISION ANALYSIS SUMMARY**

Location	Collision Type	Number of Collisions	Collisions Resulting in Injury	Collisions Resulting in Fatality
Intersection of Union Street & King Street	Angle	6	1	0
	Rear-end	2	0	0
	Sideswipe, same direction	2	0	0
	Head on	1	0	0
	<b>Total</b>	<b>11</b>	<b>1</b>	<b>0</b>

As shown in **Table I**, a total 11 collisions were reported at the study intersection over the 36-month period; this equates to approximately one (1) collision every three (3) months. It is important to note that zero (0) fatalities occurred as a result of the reported motor vehicle collisions in the study network. It should also be noted that zero (0) accidents involved pedestrian or bicycle interactions.

Based on historical data published by MassDOT and turning movement counts collected at the study location, the intersection of Union Street and King Street experienced approximately 22.3 million entering vehicles over the 3-year study period and has a calculated collision rate of 0.49 collisions per million entering vehicles. According to average accident rate data published by the MassDOT for District 3, where the subject site is located, a typical signalized intersection has an average crash rate of 0.89 per million entering vehicles.

It should be noted that based on a review of the MassDOT “Top Crash Locations” interactive crash cluster map, the study area does not contain any vehicle, pedestrian, or bicycle crash clusters. A MassDOT Collision Diagram for the study intersection is contained within the Technical Appendix. Crash rates at the study location are not anticipated to be adversely impacted due to the proposed development.

## **2029 NO-BUILD CONDITION**

### **BACKGROUND GROWTH**

The 2022 Existing Condition traffic volume data was grown to a future horizon year of 2029 in accordance with MassDOT Traffic Impact Assessment guidelines. In accordance with industry guidelines, the existing traffic volumes at the study intersections were increased by 1.0% annually for seven (7) years to generate the 2029 Base Traffic Volumes. These volumes are summarized on appended **Figure 3**. The 1.0% background growth rate is a conservative growth rate based on historical traffic growth trends in the study region.

### **OTHER PLANNED DEVELOPMENT PROJECTS**

To evaluate the future traffic conditions, it is important to consider the potential site-generated traffic of other projects that could influence the traffic volume at the study intersections. Other planned development projects include those that are either in the entitlement process or have recently been approved for building permits in proximity to the proposed development. Based on consultations with the Town of Franklin Planning Department the following developments are anticipated to impact traffic volumes within the study area:

- ◆ 585 King Street – Proposed 293,600-square-foot warehouse building to be constructed along King Street approximately 0.5 miles southwest of the subject site. The site-generated trips associated with the proposed development were routed through the study network during the weekday morning and weekday evening peak hours based on the site-generated trip distributions provided within the aforementioned Traffic Impact Assessment prepared by Vanasse & Associates.
- ◆ 725 Union Street – 100-room hotel building located across from the subject site on the westerly side of Union Street, currently under construction. Based on a review of the Trip Generation Assessment Report prepared by Vanasse & Associates, Inc., dated March 12, 2018, the development is expected to generate 45 trips (27 entering, 18 exiting) during the weekday morning peak hour and 49 trips (25 entering and 24 exiting) during the weekday evening peak hour. The site-generated trips were routed through the study network based on the existing traffic patterns along the adjacent roadways and the access management plan of the site.

Appended **Figure 4** illustrates the site-generated traffic associated with the other planned development projects assigned to the study area network.



## 2029 NO-BUILD TRAFFIC VOLUMES

The site-generated trips associated with the other planned development projects were added to the 2029 Base Traffic Volumes to calculate the 2029 No-Build Traffic Volumes for the weekday morning and weekday evening peak hours. These volumes are summarized on appended **Figure 5**.

## 2029 NO-BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2029 No-Build Condition during the weekday morning and weekday evening peak hours at the study intersection. Under the 2029 No-Build Condition, the signalized intersection of Union Street and King Street is calculated to operate generally consistent with the findings of the 2022 Existing Condition during the weekday morning and weekday evening peak hours. Please note that the southbound left/through movement at the study intersection exceeds the Level of Service D-E threshold during the weekday evening peak hour. The turning movements at the study intersection are otherwise calculated to operate generally consistent with the findings of the 2022 Existing Condition during the study peak hours.

## **2029 BUILD CONDITION**

The site-generated traffic volume of the proposed child care center was estimated to identify the potential impacts of the project. For the purpose of this analysis, a complete project “build out” is assumed within seven (7) years of the preparation of this study.

## TRIP GENERATION

Trip generation projections for the proposed child care center were prepared utilizing ITE's Trip Generation Manual, 11<sup>th</sup> Edition. Trip generation rates associated with Land Use 565 “Day Care Center” were cited for the 13,525-square-foot child care center. **Table 2** provides the weekday morning and weekday evening trip generation volumes associated with the proposed development.

**TABLE 2 – PROPOSED TRIP GENERATION**

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
13,525 SF Day Care Center <i>ITE Land Use 565</i>	79	70	149	70	80	150

As stated within Chapter 10 of ITE's Trip Generation Handbook, 3<sup>rd</sup> Edition, there are instances when the total number of trips generated by a site is different from the amount of new traffic added to the street system by the generator. Child care centers may be located on or adjacent to busy streets to provide a more

convenient pick-up and drop-off location for parents/guardians commuting to and from work. Therefore, the proposed development would be expected to attract a portion of its trips from the traffic passing through the study intersection on the way from an origin to an ultimate destination. These trips do not add new traffic to the adjacent roadway system and are referred to as “pass-by” trips.

Based upon the published ITE data for Land Use 565 “Day Care Center,” 44% of the site-generated traffic during the weekday evening peak hour is comprised of pass-by traffic. Please note that ITE does not publish pass-by rates during the weekday morning peak hour, however it is reasonable to assume that a similar percentage of pass-by trips would be generated during the weekday morning peak hour. Therefore to provide a comprehensive analysis, a pass-by rate of 44% has been applied to the weekday morning peak hour and weekday evening peak hours to estimate the anticipated pass-by traffic associated with the proposed child care center. **Table 3** shows the site generated traffic for the proposed development after applying the appropriate trip reductions to account for pass-by traffic.

**TABLE 3 – PROPOSED TRIP GENERATION – NEW & PASS-BY TRIPS**

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
“New” Trips	49	40	89	40	50	90
“Pass-By” Trips	30	30	60	30	30	60
<b>Total</b>	<b>79</b>	<b>70</b>	<b>149</b>	<b>70</b>	<b>80</b>	<b>150</b>

At the study intersection, the calculated number of pass-by trips is shown as a negative number at the through movement as the vehicles are temporarily diverted from the through travel stream into and out of the site access point. As shown in **Table 3**, the site is anticipated to generate 89 new trips during the weekday morning peak hour and 90 new trips during the weekday evening peak hour. Based on Transportation Impact Analysis for Site Development published by ITE, a trip increase of less than 100 vehicle trips would likely not change the level of service of the adjacent roadway system or appreciably increase the volume-to-capacity ratio of an intersection approach. As such, the proposed development is not anticipated to significantly impact the operations of the adjacent roadway network.

#### TRIP ASSIGNMENT/DISTRIBUTION

The trips generated by the proposed development were distributed according to the existing travel pattern along the adjacent roadways and the access management plan of the site. The “New” Site-Generated Traffic Volumes are illustrated on **Figure 6** and the “Pass-By” Site-Generated Traffic Volumes expected to access the site are depicted on **Figure 7**.

**2029 BUILD TRAFFIC VOLUMES**

The site-generated trips were added to the 2029 No-Build Traffic Volumes to calculate the 2029 Build Traffic Volumes and are shown on appended **Figure 8**.

**2029 BUILD LOS/CAPACITY ANALYSIS**

A Level of Service and Volume/Capacity analysis was also conducted for the 2029 Build Condition during the weekday morning and weekday evening peak hours at the study intersection and proposed site driveway. **Tables 4** through **6** compare the 2022 Existing, 2029 No-Build, and 2029 Build Conditions Level of Service and delay values.

Under the 2029 Build Condition, the signalized intersection of Union Street and King Street is calculated to operate generally consistent with the findings of the 2029 No-Build Condition during the weekday morning and weekday evening peak hours. As such, the proposed development is not anticipated to have a significant adverse impact on the operations of the adjacent roadway network.

Under the 2029 Build Condition, the turning movements at the site driveway are calculated to operate at Level of Service B or better during the weekday morning peak hour and Level of Service A during the weekday evening peak hour. The calculated 95<sup>th</sup> percentile queue lengths would be accommodated in the proposed driveway throat length without adversely impacting on-site circulation.

**COMPARATIVE LEVEL OF SERVICE (DELAY) TABLES****UNION STREET & KING STREET**

EB (Eastbound) and WB (Westbound) approaches are the King Street approaches  
NB (Northbound) and SB (Southbound) approaches are the Union Street approaches  
X (n) = Level of Service (seconds of delay)

**TABLE 4 – WEEKDAY MORNING PEAK HOUR**

<b>Lane Group</b>	<b>2022 Existing</b>	<b>2029 No-Build</b>	<b>2029 Build</b>
EB Left	D (40.9)	D (40.9)	D (40.9)
EB Through	A (9.9)	B (10.5)	B (11.6)
EB Right	A (6.8)	A (7.1)	A (8.1)
WB Left/Through/Right	B (18.6)	B (19.9)	C (22.1)
NB Left	C (28.8)	C (29.1)	C (28.5)
NB Through/Right	C (26.6)	C (26.5)	C (25.2)
SB Left/Through	D (44.9)	D (47.8)	D (46.9)
SB Right	C (28.6)	C (28.3)	C (27.4)
<b>Intersection</b>	<b>C (20.7)</b>	<b>C (21.3)</b>	<b>C (22.3)</b>

**TABLE 5 – WEEKDAY EVENING PEAK HOUR**

<b>Lane Group</b>	<b>2022 Existing</b>	<b>2029 No-Build</b>	<b>2029 Build</b>
EB Left	D (40.5)	D (41.0)	D (41.0)
EB Through	B (10.3)	B (10.8)	B (11.0)
EB Right	A (6.4)	A (6.4)	A (6.7)
WB Left/Through/Right	B (24.2)	B (26.1)	B (28.2)
NB Left	C (29.4)	C (30.3)	C (32.6)
NB Through/Right	C (27.1)	C (27.3)	C (27.3)
SB Left/Through	D (48.2)	E (55.7)	E (67.5)
SB Right	C (23.9)	C (24.3)	C (24.3)
<b>Intersection</b>	<b>C (23.0)</b>	<b>C (24.2)</b>	<b>C (25.8)</b>

**UNION STREET & SITE DRIVEWAY**

WB (Westbound) approach is the site driveway approach

NB (Southbound) approach is the Union Street approach

X (n) = Level of Service (seconds of delay)

**TABLE 6 – 2029 BUILD CONDITION**

<b>Lane Group</b>	<b>Weekday Morning Peak Hour</b>	<b>Weekday Evening Peak Hour</b>
WB Left/Right	B (10)	A (9.8)
SB Left	A (7.9)	A (7.8)

**SITE CIRCULATION/PARKING SUPPLY**

A review was conducted of the proposed child care center using the Site Plan prepared by Stonefield Engineering & Design, dated June 22, 2022. In completing this review, particular attention was focused on the site access, circulation, and parking supply.

Access is proposed via one (1) full-movement driveway along Union Street. The 24-foot wide driveway will be located on the southerly portion of the property. The 13,525-square-foot building to operate as a child care center will be constructed on the northwestern portion of the property. The primary building entrance will be located along the westerly building façade and an outdoor playground will be located along the easterly building façade. The accessory parking lot will be located along the southerly building façade and on the southerly portion of the property and two (2)-way vehicular circulation will be supported on site via 24-foot-wide drive aisles.

The available sight lines for the proposed driveway along Union Street were evaluated in accordance with the American Association of State Highway and Transportation Officials (AASHTO) standards for a design speed of 35 mph. Based on the AASHTO standards, an intersection sight distance of 390 feet is required at the site driveway. The available sight lines at the proposed driveway exceed the minimum intersection sight distance requirements and therefore the driveway is not anticipated to operate with safety constraints.

Regarding the parking requirements for the proposed development, the Town of Franklin Zoning Ordinance does not have a specific requirement for child care centers. The site would provide 50 total parking spaces, inclusive of two (2) ADA-accessible parking stalls. The proposed spaces would be nine (9) feet wide by 19 feet deep in accordance with the Town of Franklin Ordinance and industry standards.

The proposed parking supply was evaluated with respect to data published within the ITE's Parking Generation, 5<sup>th</sup> Edition, for Land Use 565 "Day Care Center." Specifically, parking generation rates for General Urban/Suburban locations were utilized. The average parking demand rate during the peak weekday period for Land Use 565 "Day Care Center" is 2.45 vehicles per 1,000 square feet of gross floor area. For the proposed 13,525-square-foot child care center, this equates to 34 parking spaces. As such, the proposed parking supply of 50 spaces would be sufficient to support the parking demand of the site.

## CONCLUSIONS

This report was prepared to examine the potential traffic impact of the proposed child care center. The analysis findings, which have been based on industry-standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network. The site driveway and on-site layout have been designed to provide for effective access to and from the subject property, and the parking supply would be sufficient to support this project.

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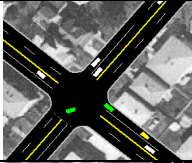




## **TECHNICAL APPENDIX**

**LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA**

## LEVEL OF SERVICE /AVERAGE CONTROL DELAY CRITERIA

The ability of a roadway to effectively accommodate traffic demand is determined through an assessment of the volume-to-capacity ratio, delay and Level of Service of the lane group and/or intersection. The volume-to-capacity ratio is the ratio of traffic flow rate to capacity for a given transportation facility. As defined within the Highway Capacity Manual 2010 (HCM 2010), intersection delay is the total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility, divided by the volume departing from the corresponding cross section of the facility. Level of service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

For an unsignalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle and LOS F denotes operations with delay in excess of 80 seconds per vehicle.

	Level Of Service (LOS)	Signalized Delay Range (average control delay in sec/veh)	Unsignalized Delay Range (average control delay in sec/veh)
	A	$\leq 10$	$\leq 10$
	B	$> 10$ and $\leq 20$	$> 10$ and $\leq 15$
	C	$> 20$ and $\leq 35$	$> 15$ and $\leq 25$
	D	$> 35$ and $\leq 55$	$> 25$ and $\leq 35$
	E	$> 55$ and $\leq 80$	$> 35$ and $\leq 50$
	F	$> 80$	$> 50$

Source: Highway Capacity Manual 2010



## **TURNING MOVEMENT COUNT DATA**

# 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

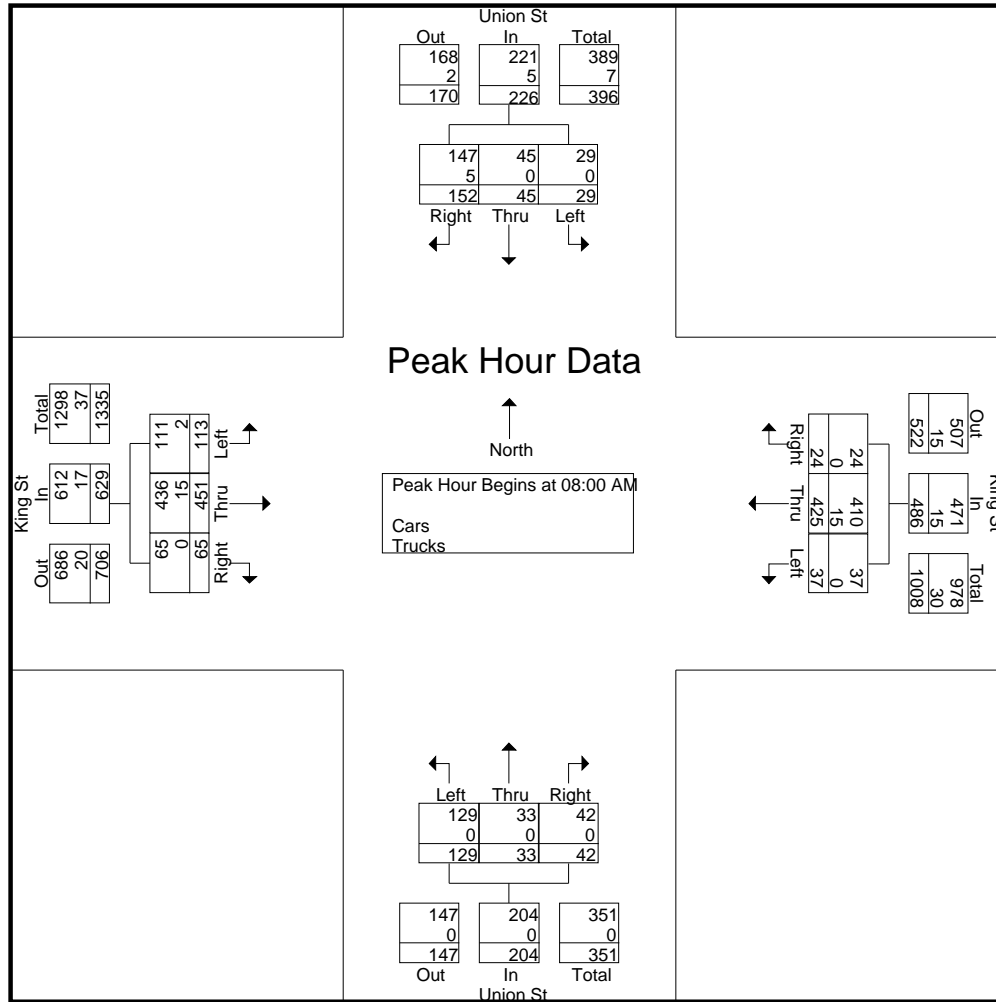
	Union St From North			King St From East			Union St From South			King St From West			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	4	9	37	8	113	3	22	4	10	32	104	5	351
07:15 AM	7	12	37	5	108	5	28	8	12	26	132	9	389
07:30 AM	14	7	44	9	107	5	37	8	12	26	136	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

	Union St From North				King St From East				Union St From South				King St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

**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 : 2

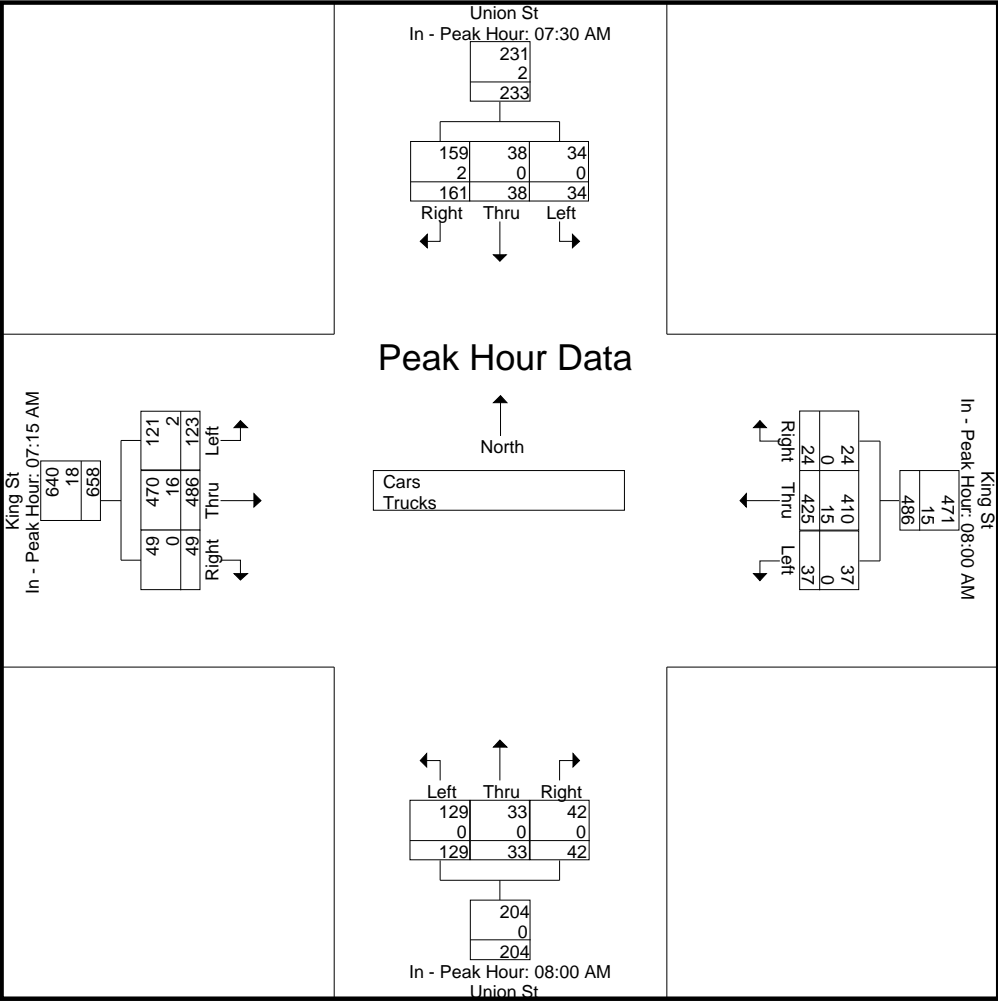


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:30 AM				08:00 AM				08:00 AM				07:15 AM			
+0 mins.	<b>14</b>	7	<b>44</b>	65	8	103	7	118	21	7	9	37	26	132	9	167
+15 mins.	5	7	34	46	8	102	<b>8</b>	118	35	<b>9</b>	<b>13</b>	<b>57</b>	26	<b>136</b>	12	<b>174</b>
+30 mins.	6	9	39	54	10	105	5	120	36	8	12	56	35	102	<b>17</b>	154
+45 mins.	9	<b>15</b>	44	<b>68</b>	<b>11</b>	<b>115</b>	4	<b>130</b>	<b>37</b>	9	8	54	<b>36</b>	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 3



# 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

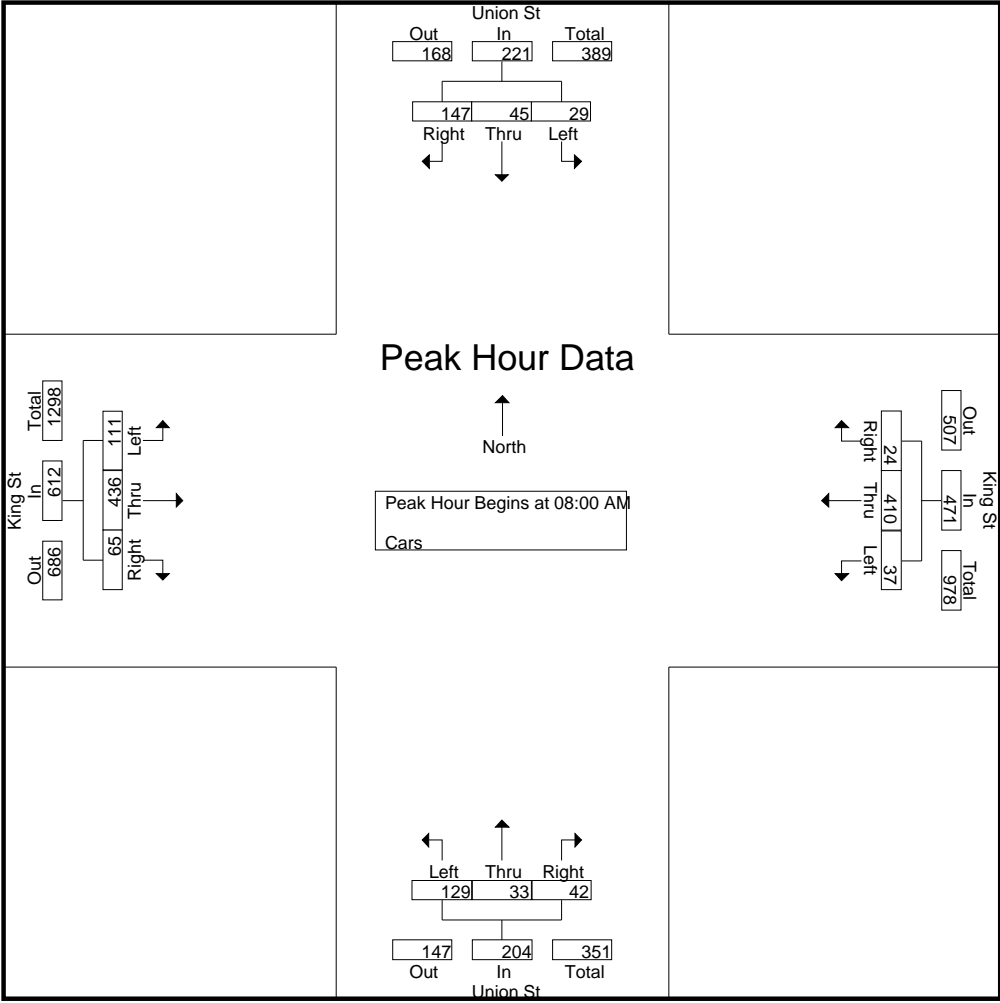
## Groups Printed- Cars

	Union St From North			King St From East			Union St From South			King St From West			Int. Total
Start Time	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	

	Union St From North				King St From East				Union St From South				King St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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	<b>36</b>	114	11	161	365
08:15 AM	9	<b>15</b>	<b>43</b>	<b>67</b>	8	99	<b>8</b>	115	35	<b>9</b>	<b>13</b>	<b>57</b>	27	101	11	139	378
08:30 AM	4	13	31	48	10	102	5	117	36	8	12	56	20	100	<b>23</b>	143	364
08:45 AM	<b>10</b>	8	34	52	<b>11</b>	<b>111</b>	4	<b>126</b>	<b>37</b>	9	8	54	28	<b>121</b>	20	<b>169</b>	<b>401</b>
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

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

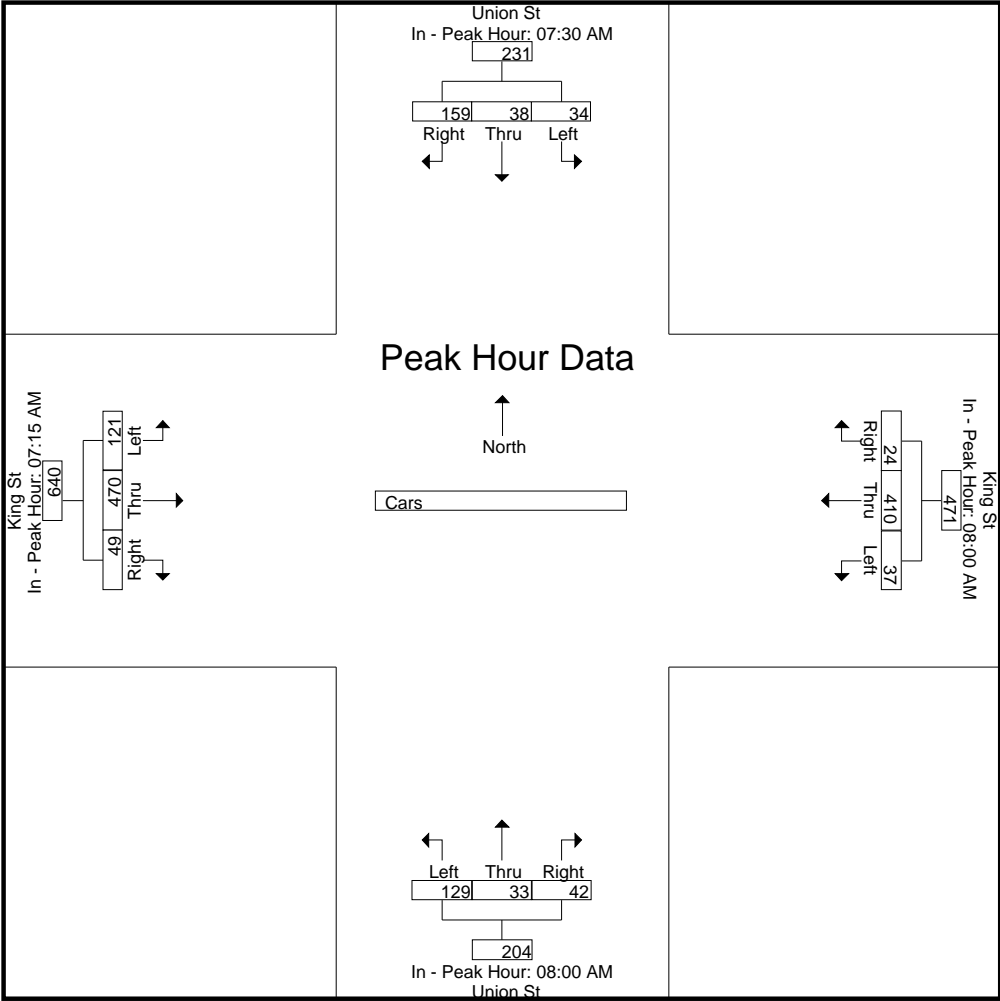


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
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# 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

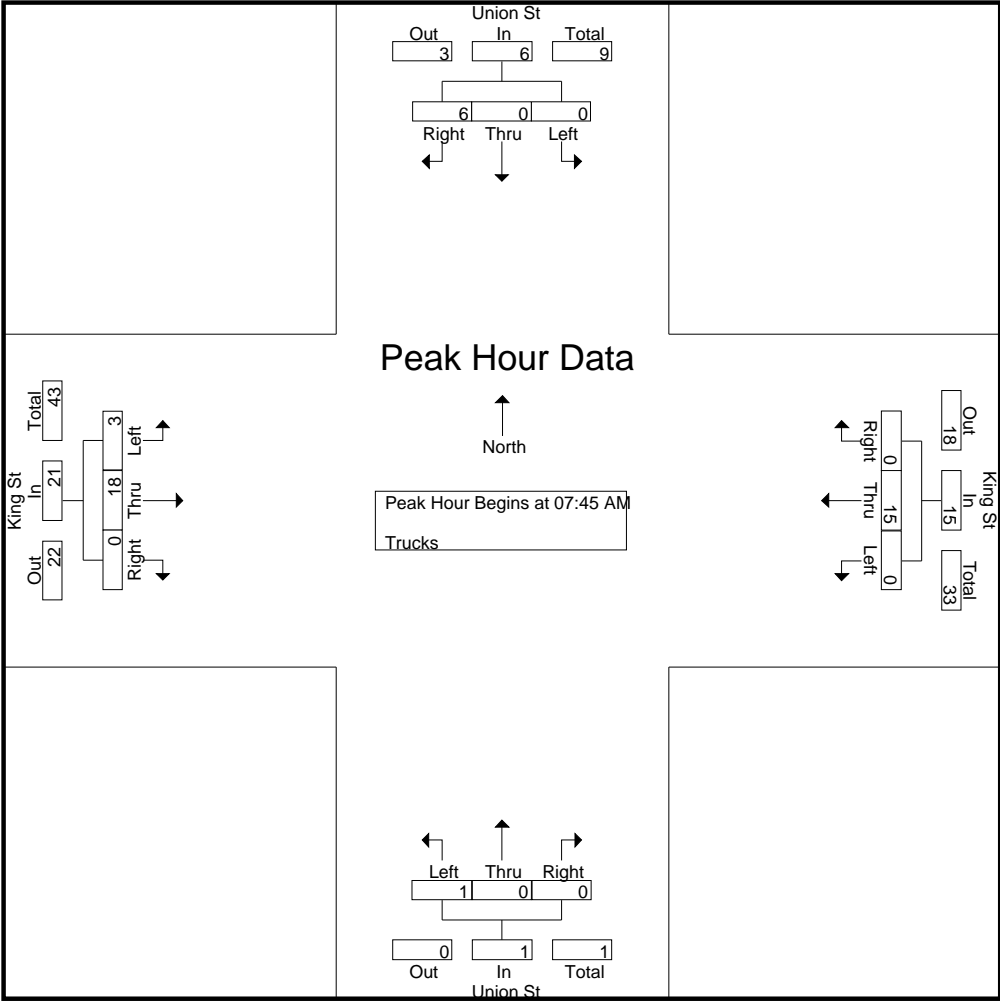
	Union St From North			King St From East			Union St From South			King St From West			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	1	0	2	1	1	0	0	0	2	0	7
07:15 AM	0	0	0	0	3	0	0	0	0	0	3	0	6
07:30 AM	0	0	0	0	3	1	0	0	0	0	3	0	7
07:45 AM	0	0	1	0	4	0	1	0	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	

	Union St From North				King St From East				Union St From South				King St From West				Int. Total
Start Time	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		100	0	0		14.3	85.7	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 8

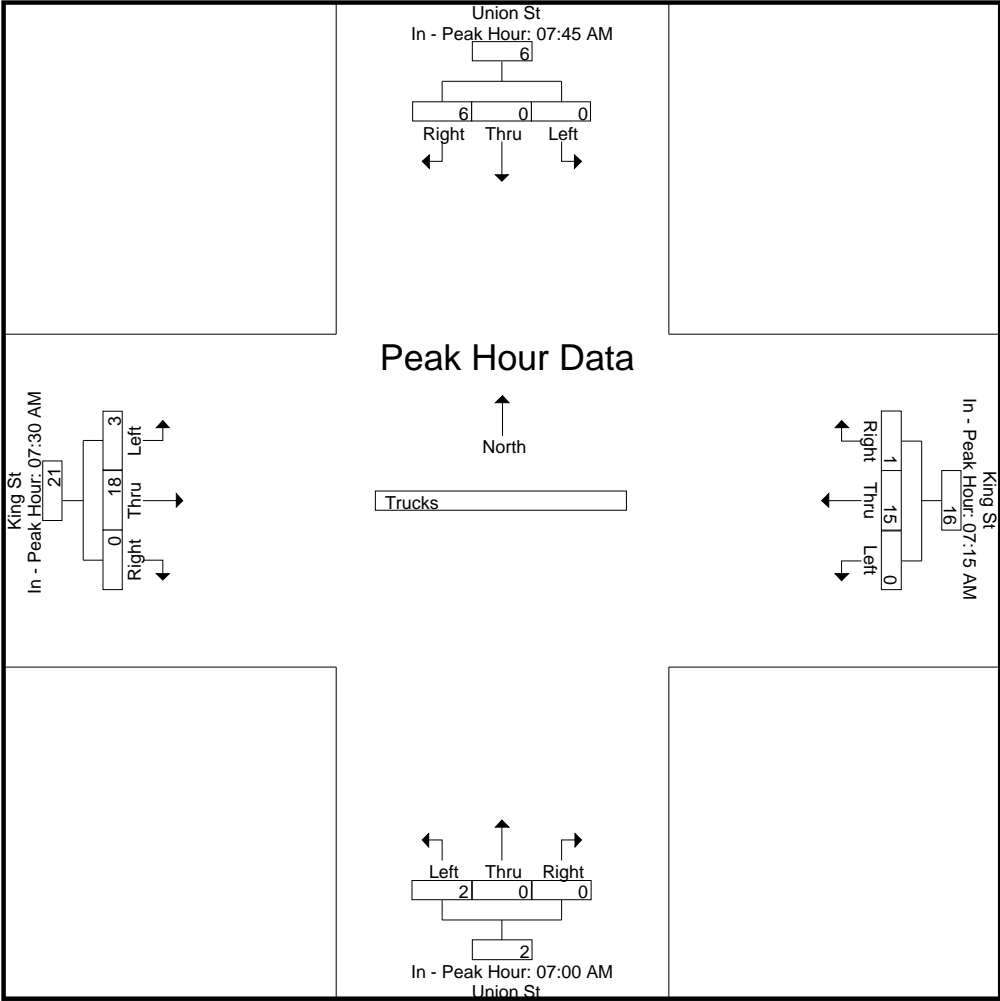


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 9



# 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

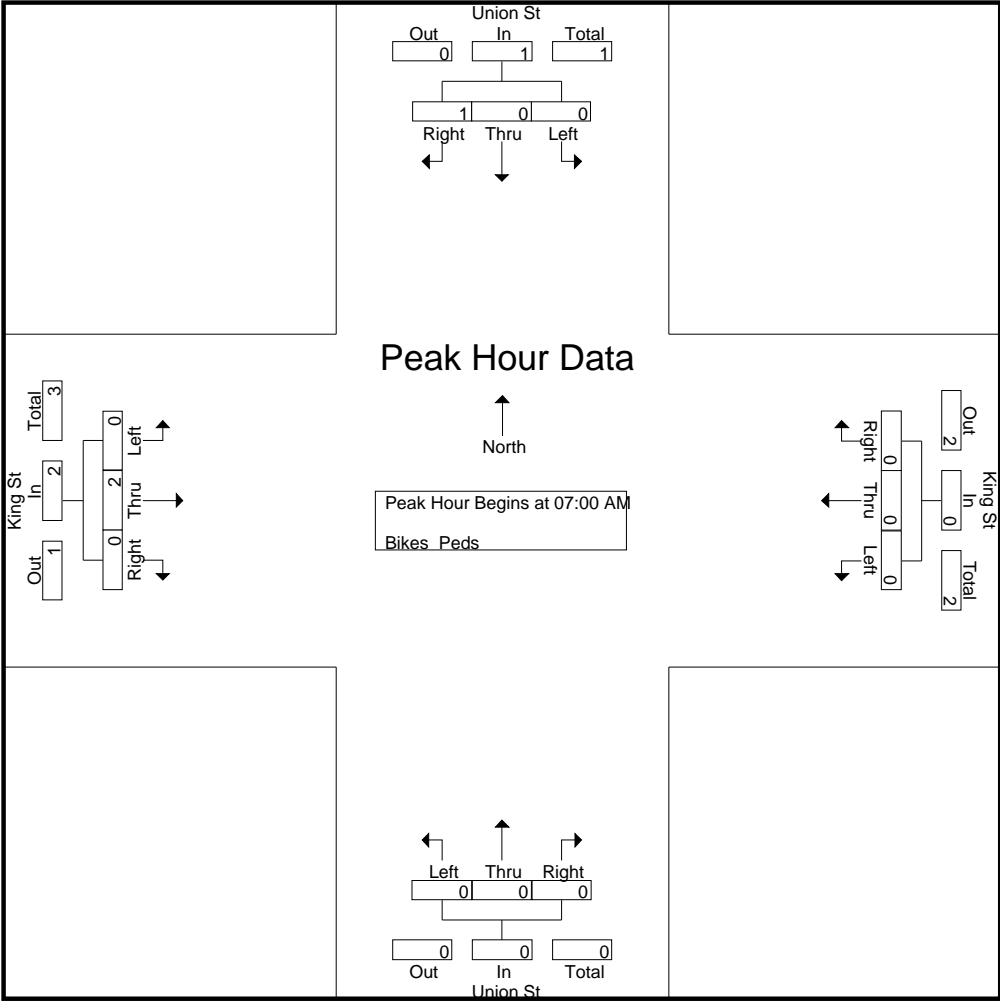
## Groups Printed- Bikes Peds

	Union St From North				King St From East				Union St From South				King St From West				Exclu. Total	Inclu. Total	Int. Total
Start Time	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	

	Union St From North				King St From East				Union St From South				King St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
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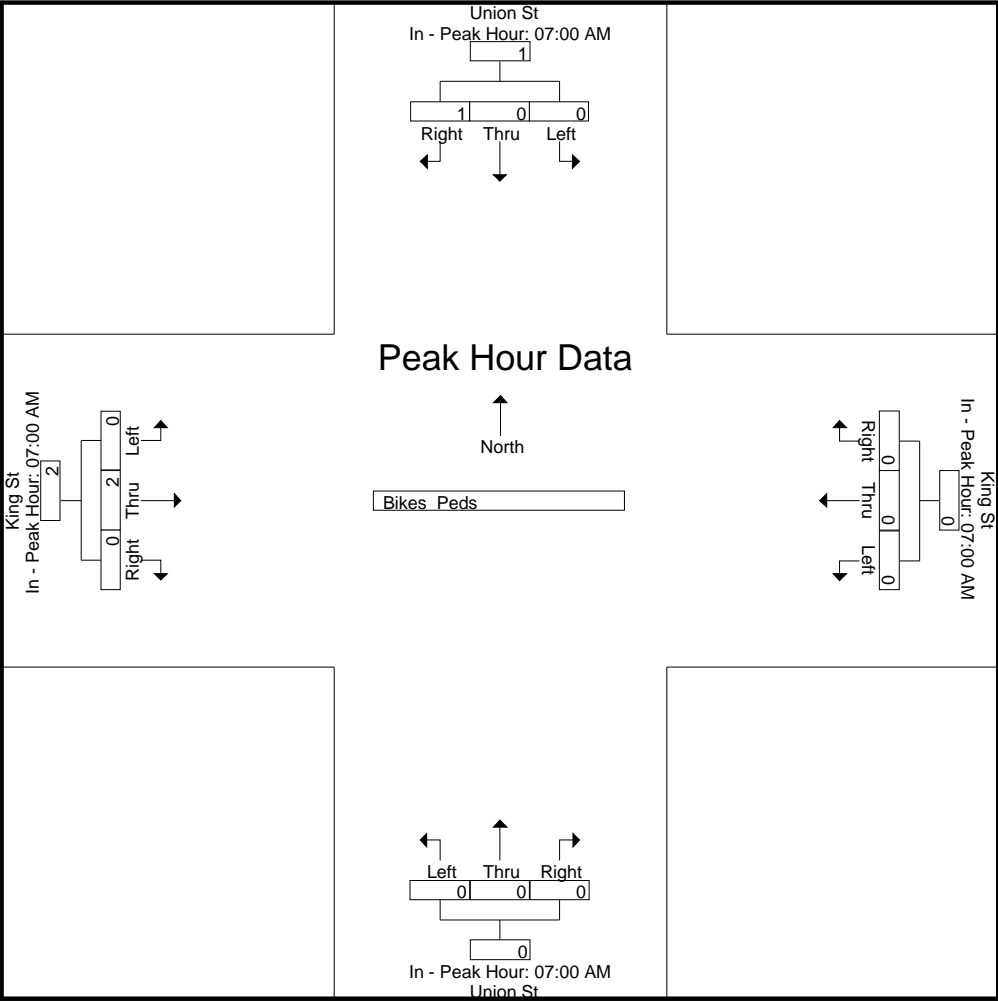


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
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# Accurate Counts

978-664-2565

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

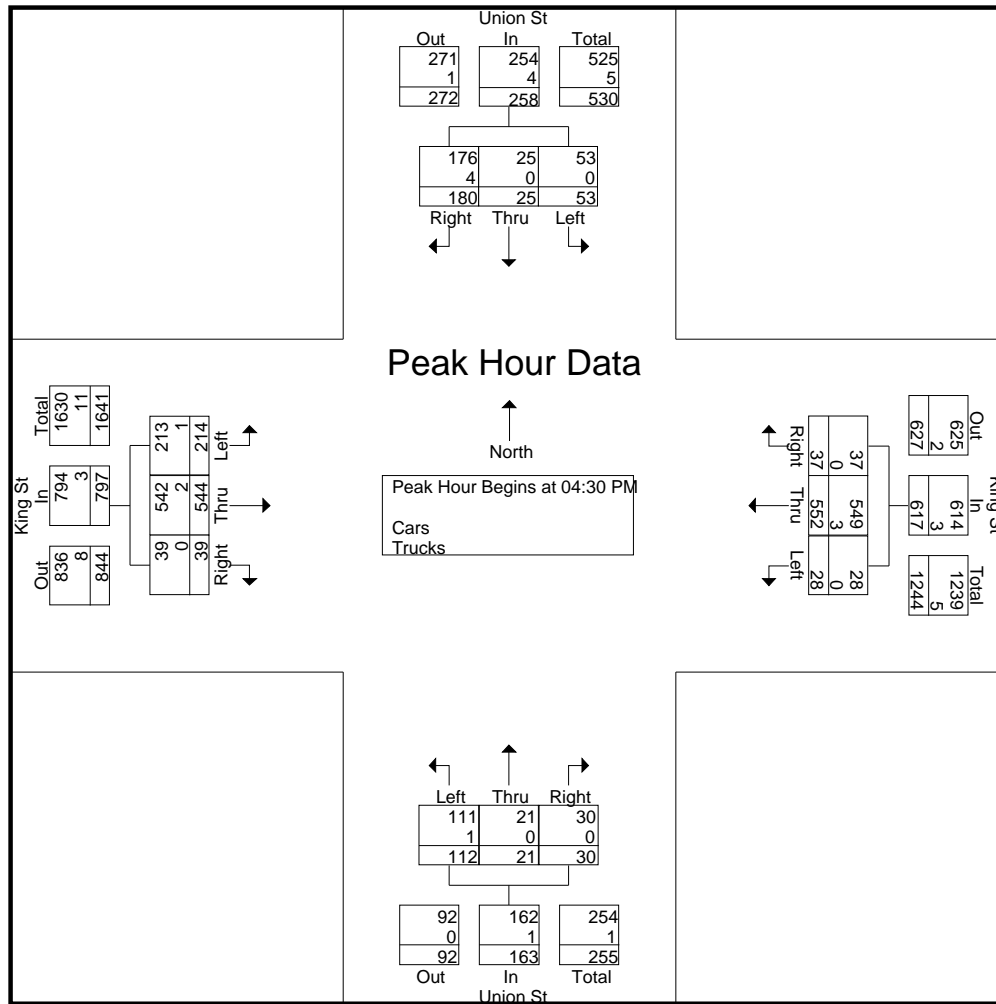
File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 1

## Groups Printed- Cars - Trucks

	Union St From North			King St From East			Union St From South			King St From West			Int. Total
Start Time	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

	Union St From North				King St From East				Union St From South				King St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

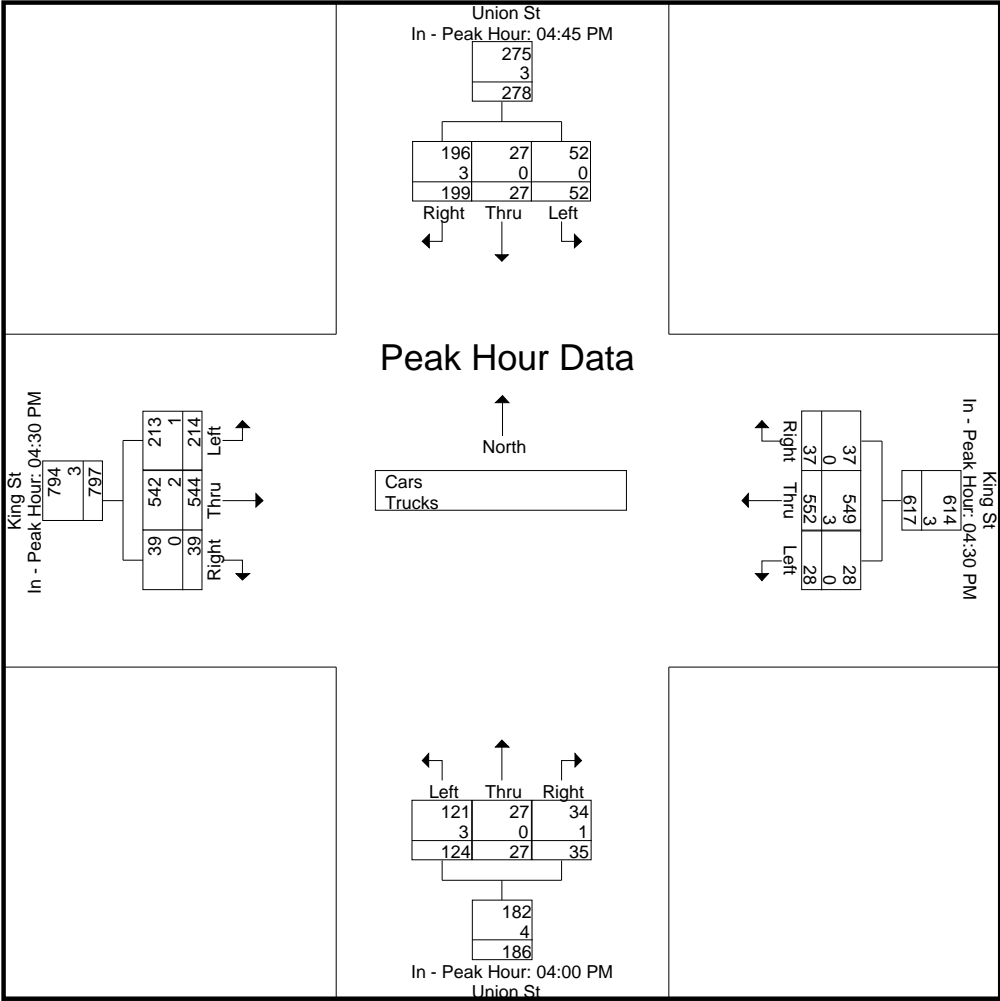


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:45 PM				04:30 PM				04:00 PM				04:30 PM			
+0 mins.	<b>16</b>	7	47	70	6	130	8	144	<b>39</b>	<b>11</b>	7	<b>57</b>	52	123	<b>13</b>	188
+15 mins.	12	3	51	66	<b>10</b>	124	8	142	25	6	<b>16</b>	47	45	130	11	186
+30 mins.	13	<b>12</b>	41	66	2	<b>151</b>	9	162	37	4	3	44	55	<b>163</b>	9	<b>227</b>
+45 mins.	11	5	<b>60</b>	<b>76</b>	10	147	<b>12</b>	<b>169</b>	23	6	9	38	<b>62</b>	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 3





# Accurate Counts

978-664-2565

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

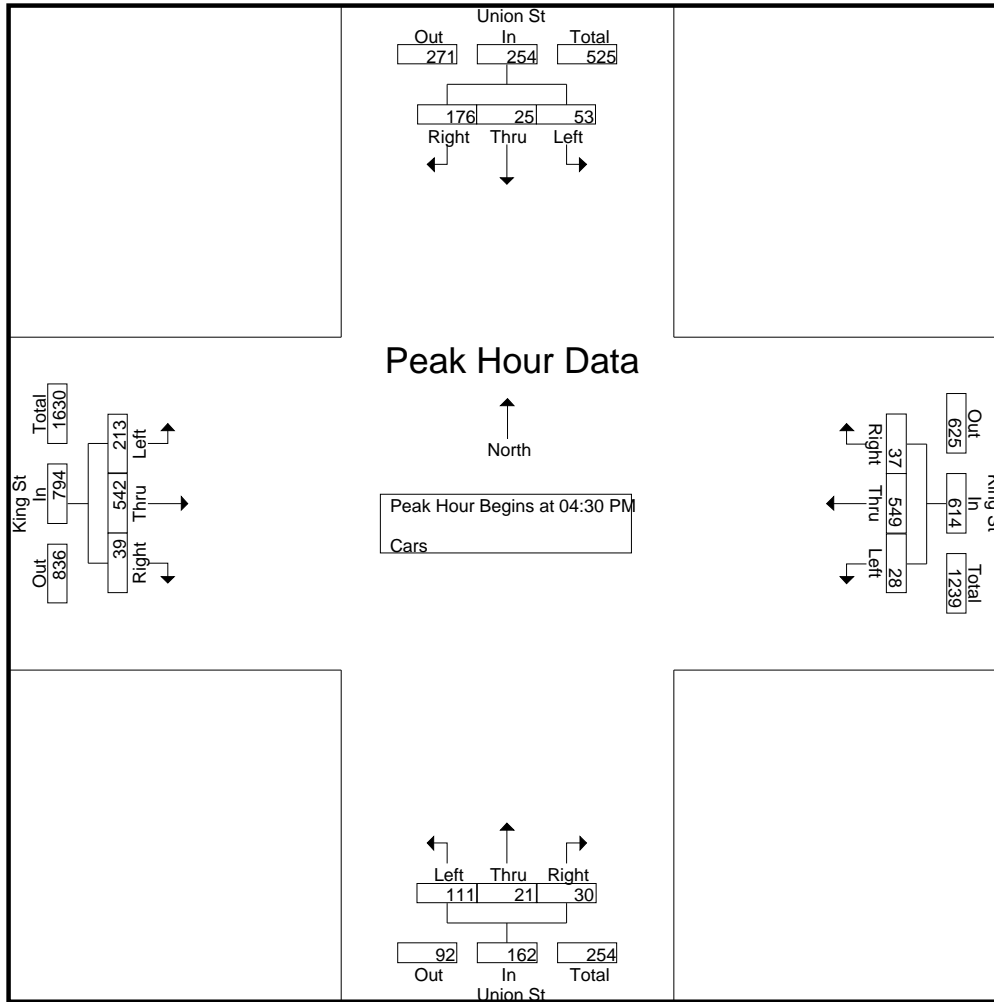
File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 4

## Groups Printed- Cars

	Union St From North			King St From East			Union St From South			King St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
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	

	Union St From North				King St From East				Union St From South				King St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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

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

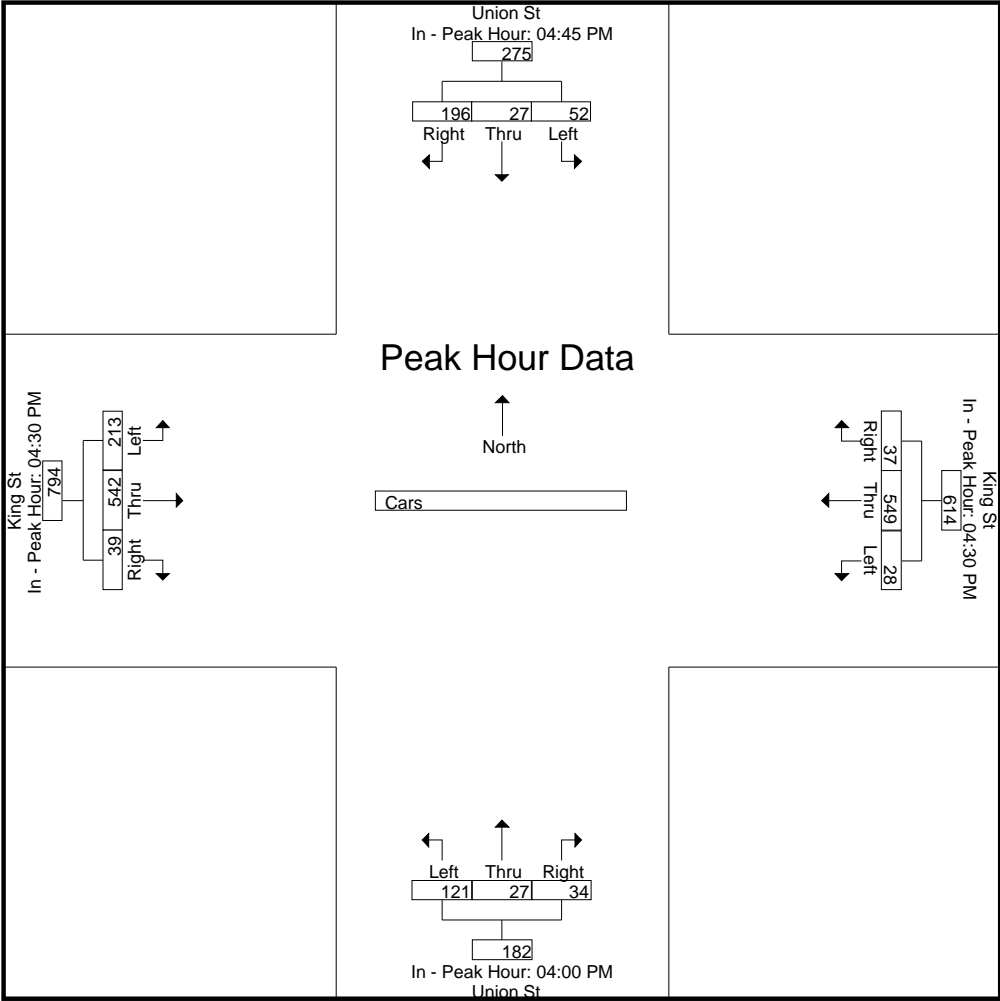


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:45 PM				04:30 PM				04:00 PM				04:30 PM			
+0 mins.	<b>16</b>	7	46	69	6	130	8	144	<b>38</b>	<b>11</b>	6	<b>55</b>	52	123	<b>13</b>	188
+15 mins.	12	3	50	65	<b>10</b>	124	8	142	24	6	<b>16</b>	46	45	129	11	185
+30 mins.	13	<b>12</b>	40	65	2	<b>151</b>	9	162	36	4	3	43	54	<b>163</b>	9	<b>226</b>
+45 mins.	11	5	<b>60</b>	<b>76</b>	10	144	<b>12</b>	<b>166</b>	23	6	9	38	<b>62</b>	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 6



# 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

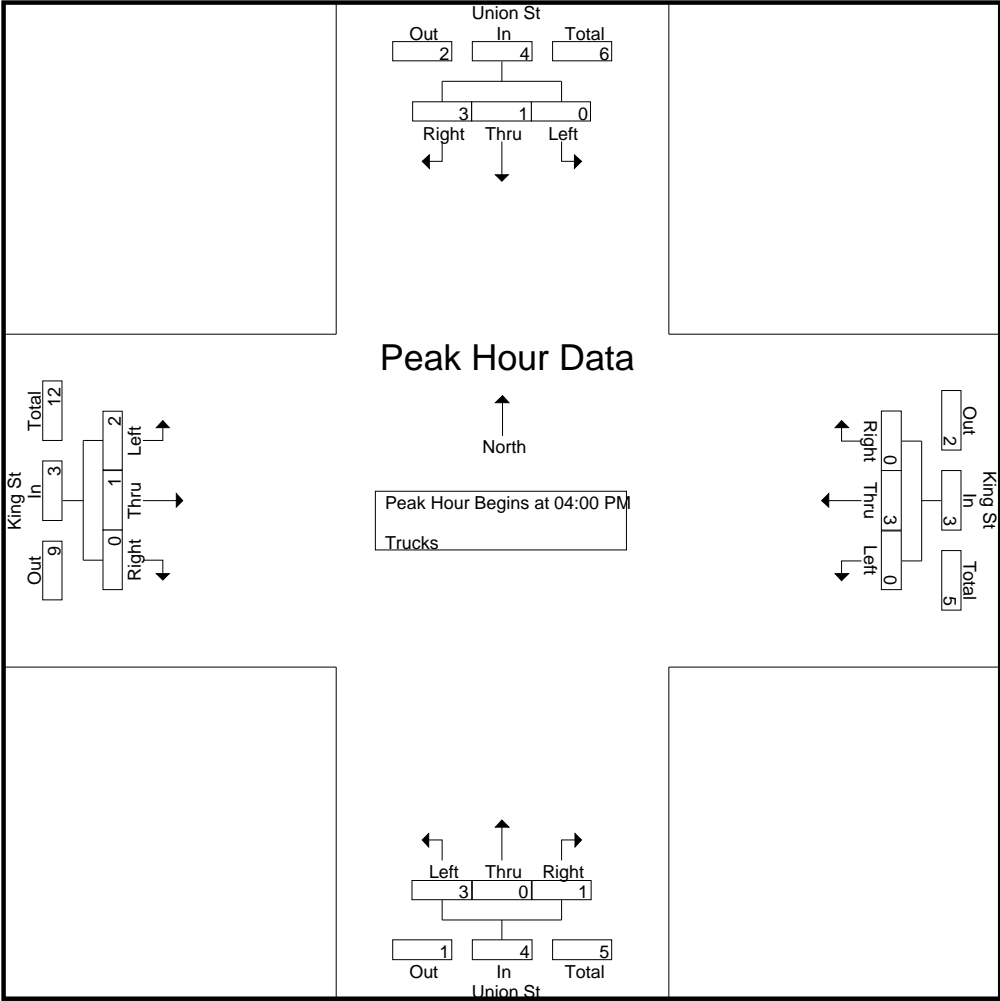
## Groups Printed- Trucks

	Union St From North			King St From East			Union St From South			King St From West			Int. Total
Start Time	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	

	Union St From North				King St From East				Union St From South				King St From West				Int. Total
Start Time	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		75	0	25		66.7	33.3	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 8

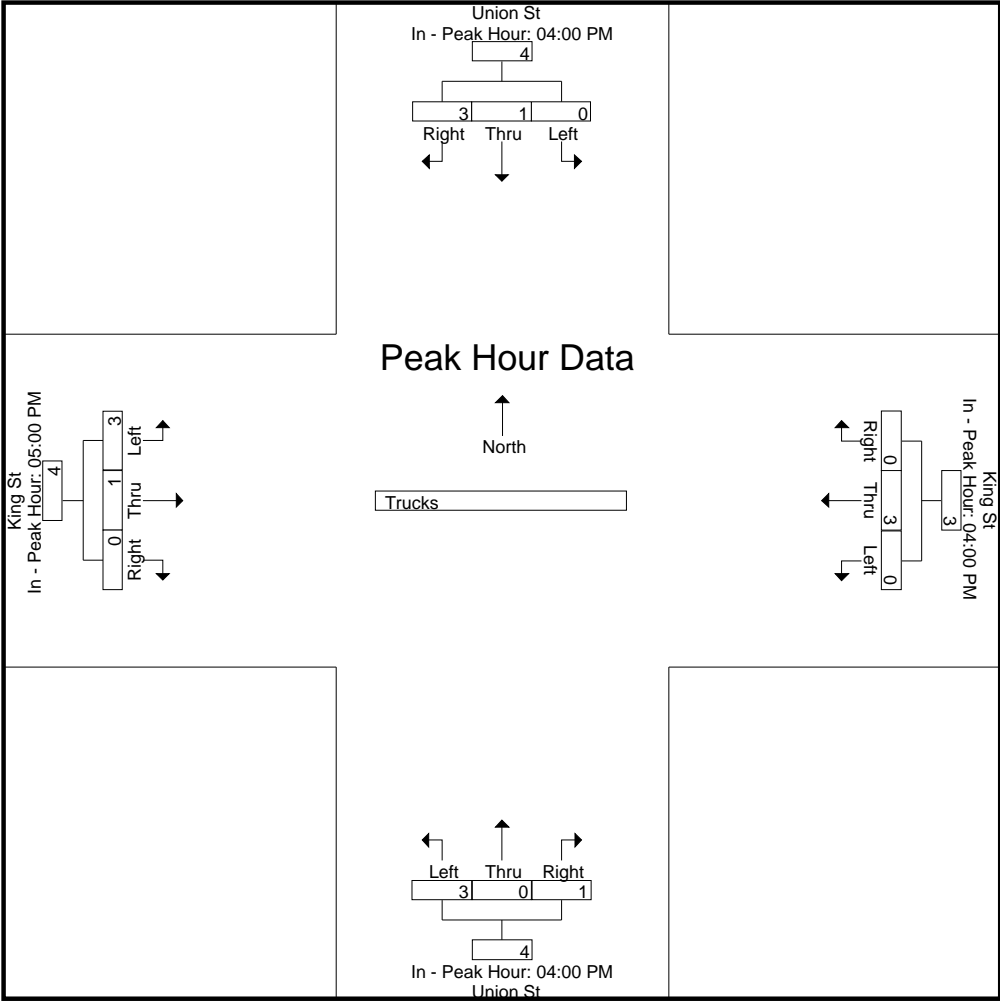


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 9



# 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

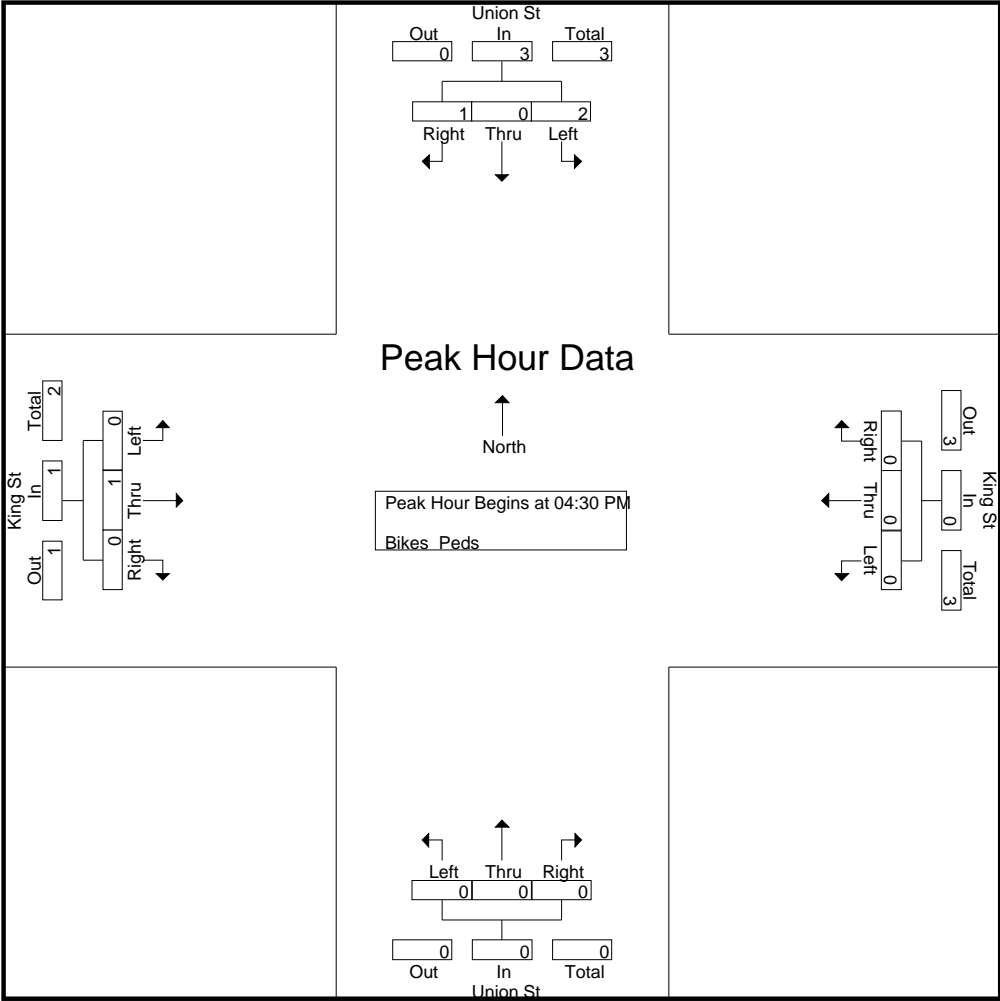
## Groups Printed- Bikes Peds

	Union St From North				King St From East				Union St From South				King St From West				Exclu. Total	Inclu. Total	Int. Total
Start Time	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	

	Union St From North				King St From East				Union St From South				King St From West						
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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	0	1	3	
04:45 PM	0	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	0	
05:15 PM	0	0	1	1	0	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 11



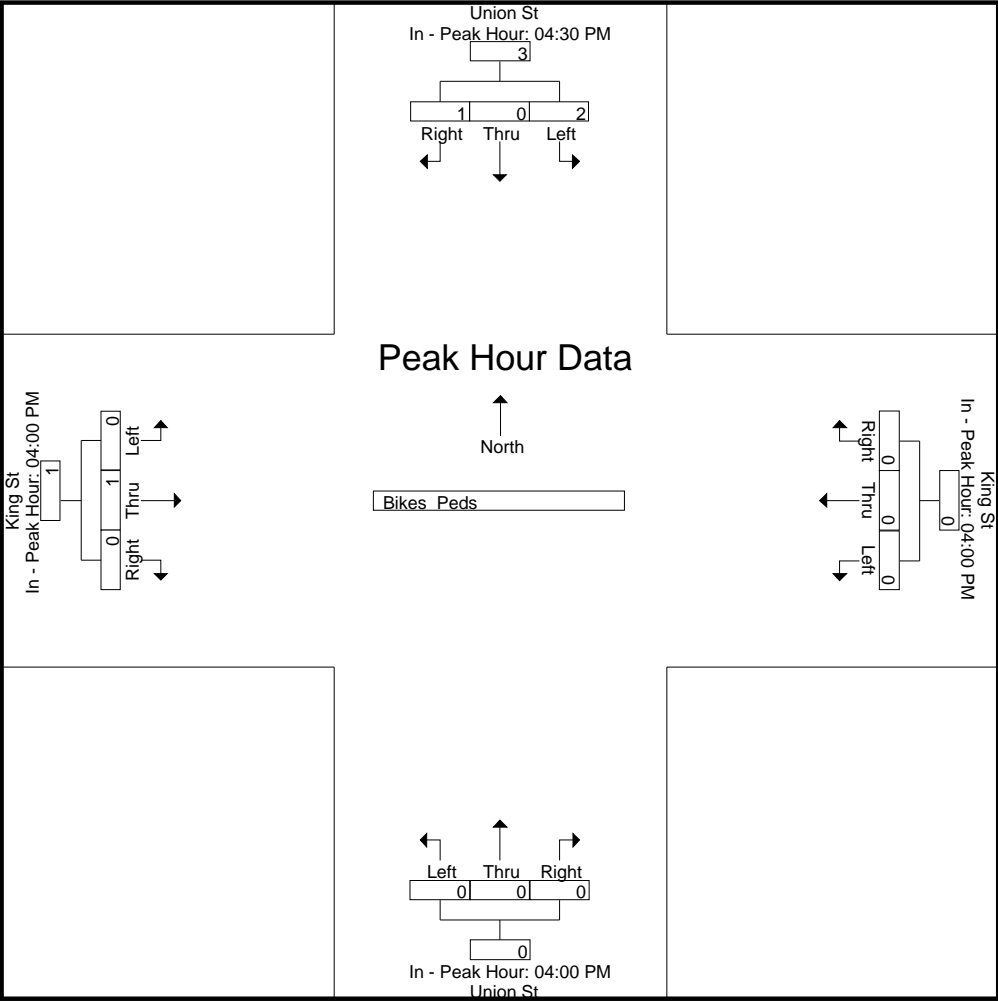
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	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

File Name : 88630004  
Site Code : 88630004  
Start Date : 5/26/2021  
Page No : 12



**AUTOMATIC TRAFFIC RECORDER COUNT DATA**

**Accurate Counts**  
978-664-2565

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

88630001

5/26/2021	EB,		Hour Totals		WB,		Hour Totals		Combined Totals	
Time	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	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	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	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	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	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	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	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	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	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	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

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

88630001

5/27/2021	EB,		Hour Totals		WB,		Hour Totals		Combined Totals	
Time	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

**Accurate Counts**  
978-664-2565

Location : King Street

88630001

Location : East of Constitution Boulevard

City/State: Franklin, MA

5/24/2021	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Week Average	
Time	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,
12:00 AM	*	*	*	*	50	39	41	47	*	*	*	*	*	*	46	43
1:00	*	*	*	*	28	27	34	20	*	*	*	*	*	*	31	24
2:00	*	*	*	*	21	31	26	28	*	*	*	*	*	*	24	30
3:00	*	*	*	*	35	34	26	31	*	*	*	*	*	*	30	32
4:00	*	*	*	*	140	81	124	79	*	*	*	*	*	*	132	80
5:00	*	*	*	*	336	218	349	182	*	*	*	*	*	*	342	200
6:00	*	*	*	*	691	395	630	399	*	*	*	*	*	*	660	397
7:00	*	*	*	*	838	496	832	495	*	*	*	*	*	*	835	496
8:00	*	*	*	*	731	525	752	556	*	*	*	*	*	*	742	540
9:00	*	*	*	*	549	413	578	445	*	*	*	*	*	*	564	429
10:00	*	*	*	*	537	405	525	422	*	*	*	*	*	*	531	414
11:00	*	*	*	*	565	479	579	448	*	*	*	*	*	*	572	464
12:00 PM	*	*	*	*	591	493	593	480	*	*	*	*	*	*	592	486
1:00	*	*	*	*	534	515	561	541	*	*	*	*	*	*	548	528
2:00	*	*	*	*	643	658	677	669	*	*	*	*	*	*	660	664
3:00	*	*	*	*	692	671	771	726	*	*	*	*	*	*	732	698
4:00	*	*	*	*	664	817	612	703	*	*	*	*	*	*	638	760
5:00	*	*	*	*	660	773	618	779	*	*	*	*	*	*	639	776
6:00	*	*	*	*	497	608	434	571	*	*	*	*	*	*	466	590
7:00	*	*	*	*	314	467	358	463	*	*	*	*	*	*	336	465
8:00	*	*	*	*	278	355	240	338	*	*	*	*	*	*	259	346
9:00	*	*	*	*	134	221	131	247	*	*	*	*	*	*	132	234
10:00	*	*	*	*	89	142	106	139	*	*	*	*	*	*	98	140
11:00	*	*	*	*	99	102	60	94	*	*	*	*	*	*	80	98
Total	0	0	0	0	9716	8965	9657	8902	0	0	0	0	0	0	9689	8934
Day	0		0		18681		18559		0		0		0		18623	
AM Peak					7:00	8:00	7:00	8:00							7:00	8:00
Volume					838	525	832	556							835	540
PM Peak					3:00	4:00	3:00	5:00							3:00	5:00
Volume					692	817	771	779							732	776
Comb Total	0		0		18681		18559		0		0		0		18623	
ADT	ADT: 18,620		AADT: 18,620													

**MOTOR VEHICLE COLLISION DIAGRAM**

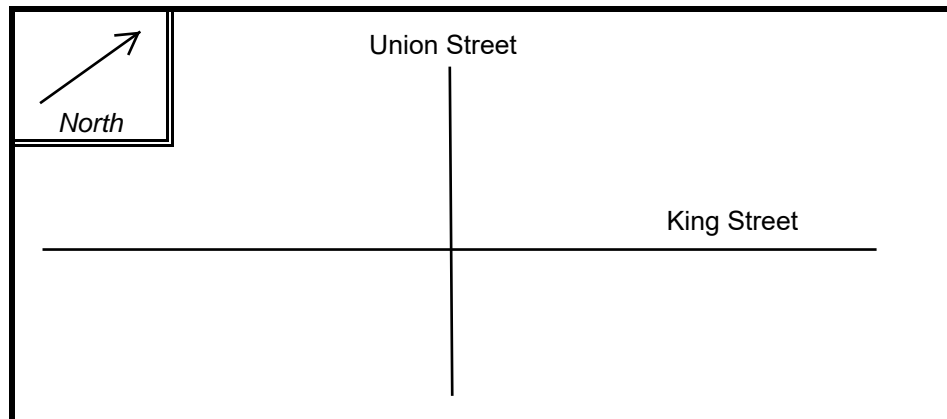
## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Town of Franklin COUNT DATE : 05/06/2021  
 DISTRICT : 3 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 :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (AM/PM) :	797	617	163	258		1835

" K " FACTOR :

9%

INTERSECTION ADT ( V ) = TOTAL DAILY  
 APPROACH VOLUME :

20,389

TOTAL # OF CRASHES :

11

# OF  
 YEARS :

3

AVERAGE # OF  
 CRASHES PER YEAR ( A ) :

3.67

**CRASH RATE CALCULATION :**

0.49

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

Comments : \_\_\_\_\_

Project Title & Date: Proposed Child Care Center 06/06/2022

**ITE TRIP GENERATION MANUAL, 11<sup>TH</sup> EDITION**



# Day Care Center

## (565)

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: 89

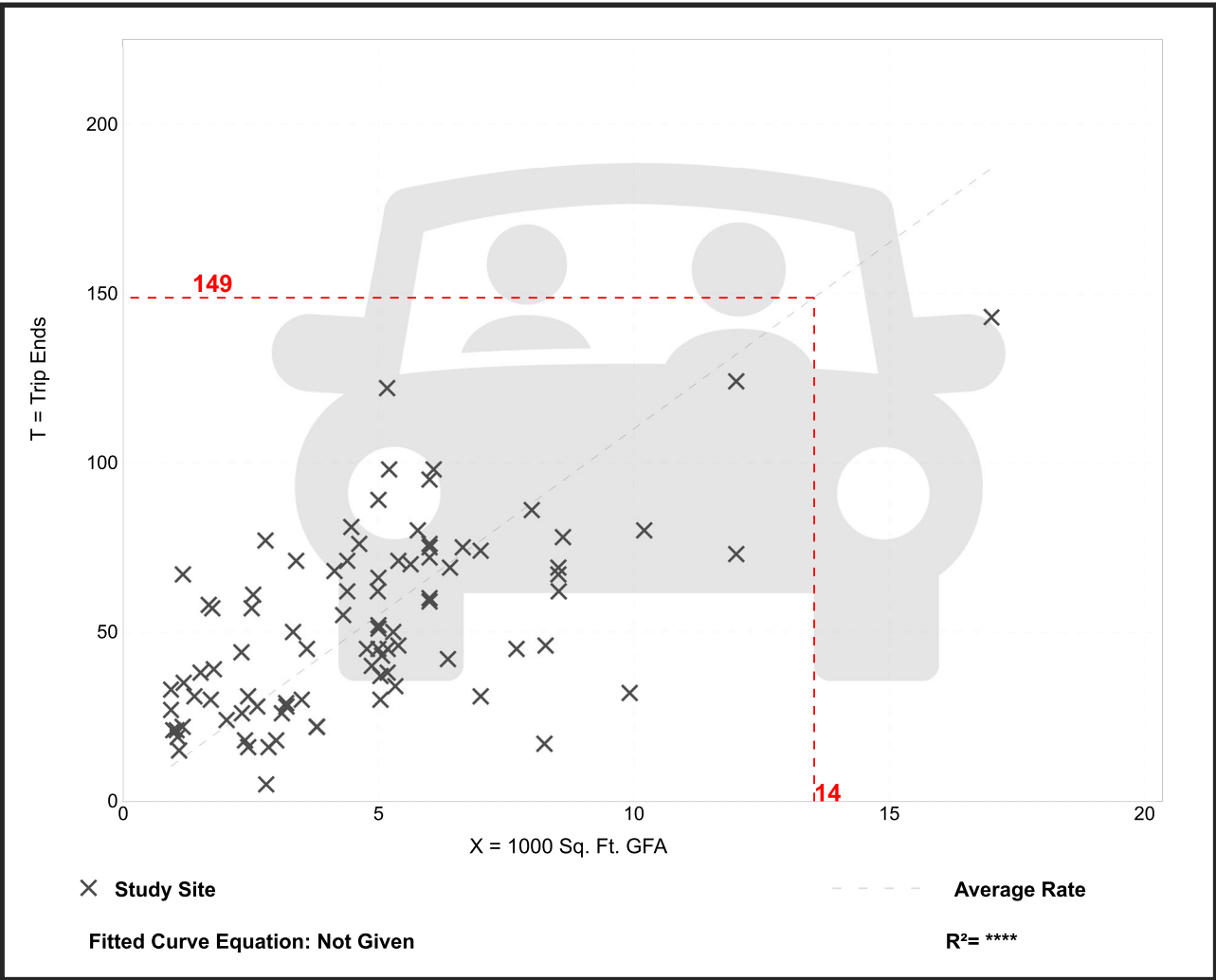
Avg. 1000 Sq. Ft. GFA: 5

Directional Distribution: 53% entering, 47% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
11.00	1.79 - 57.02	6.08

### Data Plot and Equation



# Day Care Center

## (565)

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: 90

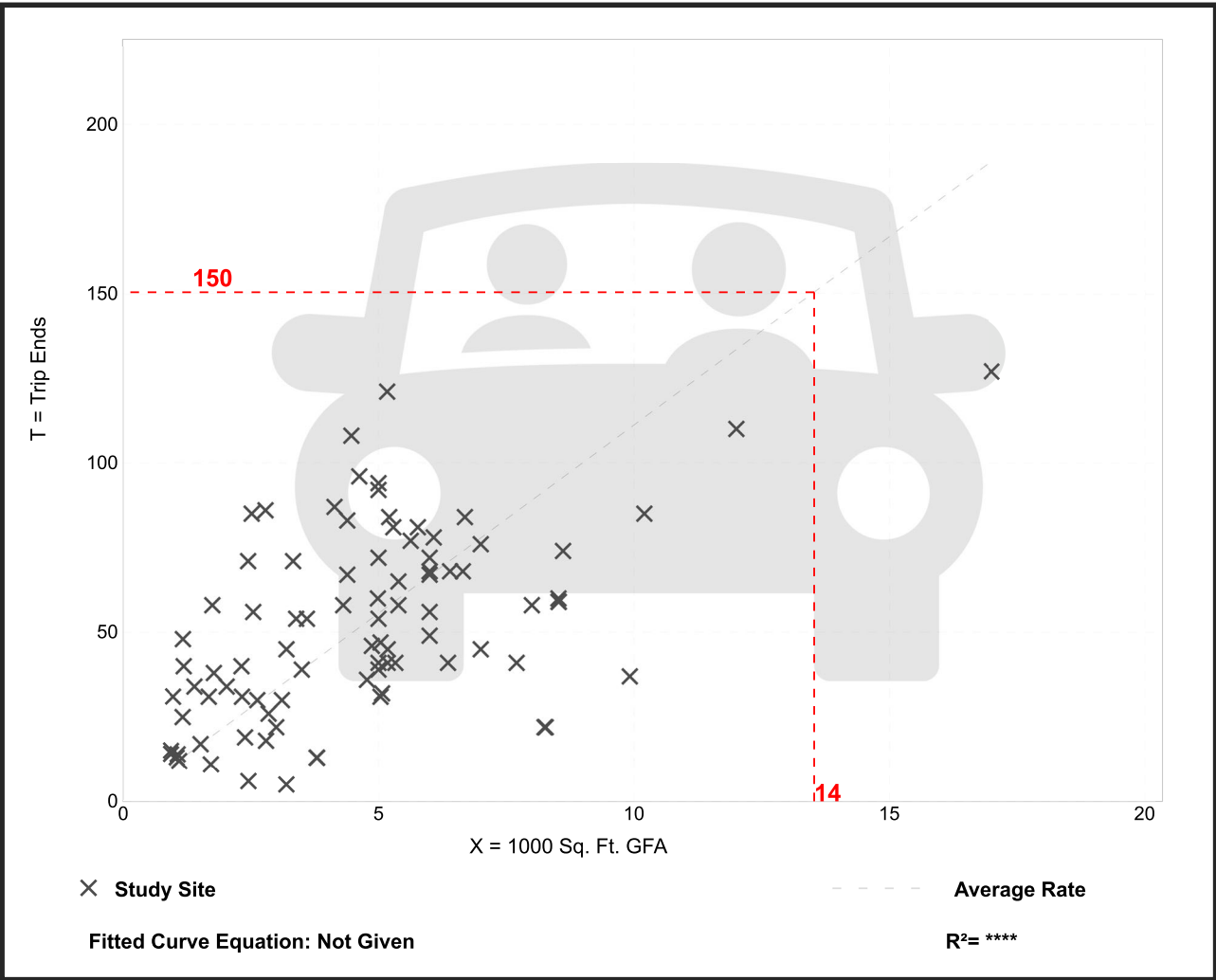
Avg. 1000 Sq. Ft. GFA: 5

Directional Distribution: 47% entering, 53% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
11.12	1.56 - 40.85	6.28

### Data Plot and Equation



Vehicle Pass-By Rates by Land Use									
Source: ITE <i>Trip Generation Manual</i> , 11th Edition									
Land Use Code	565								
Land Use	Day Care Center								
Setting	General Urban/Suburban								
Time Period	Weekday PM Peak Period								
# Data Sites	1								
Average Pass-By Rate	44%								
	Pass-By Characteristics for Individual Sites								
	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak Hour Volume	
GFA (000)					Primary (%)	Diverted (%)	Total (%)		Source
7.2	Pennsylvania	1990	—	44	24	32	56	—	23

## FIGURES

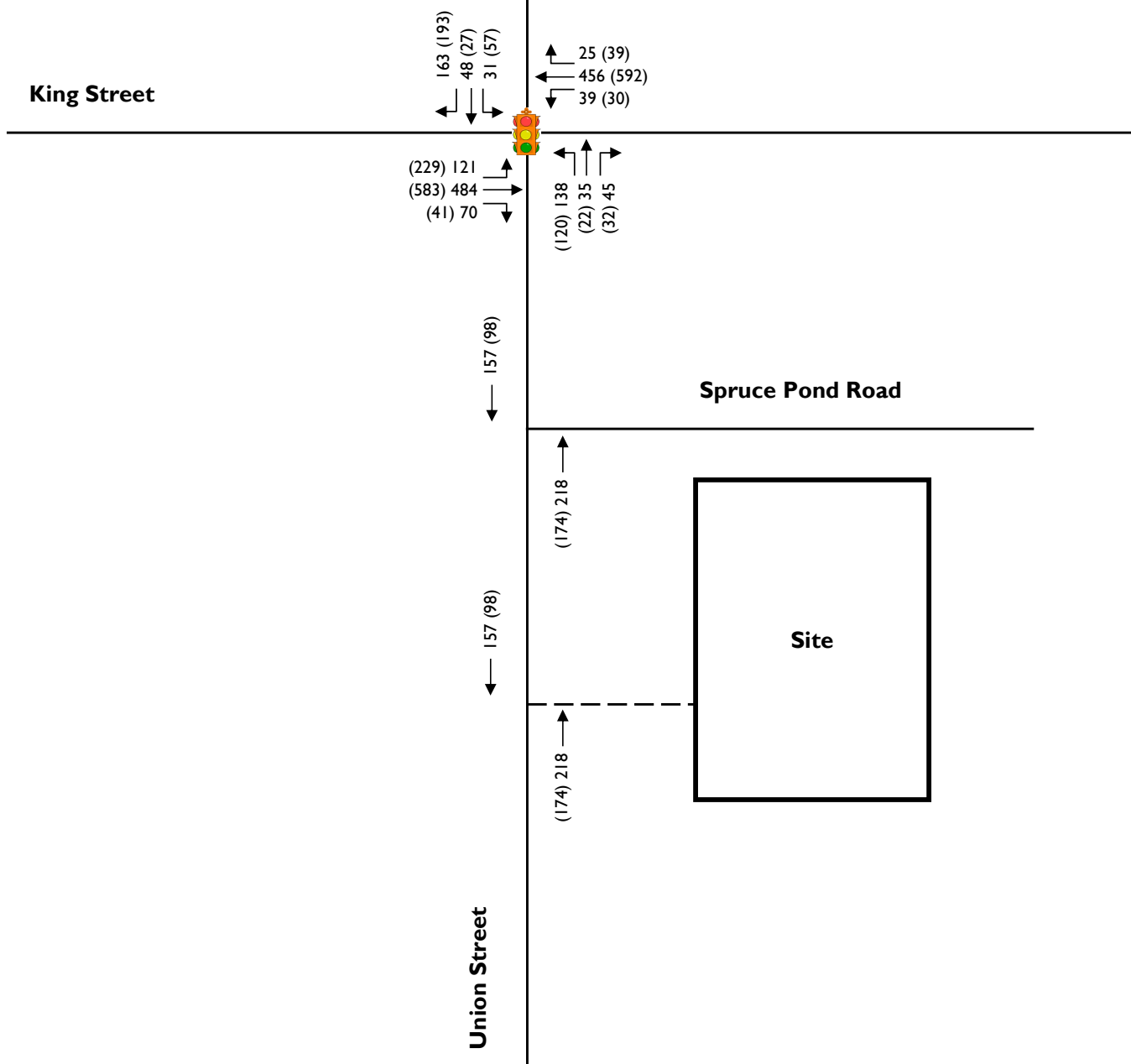




**STONEFIELD**

Proposed Child Care Center  
 700-712 Union Street  
 Town of Franklin, Norfolk County, Massachusetts  
 Traffic Impact Study

**FIGURE I**  
**Site Location Map**



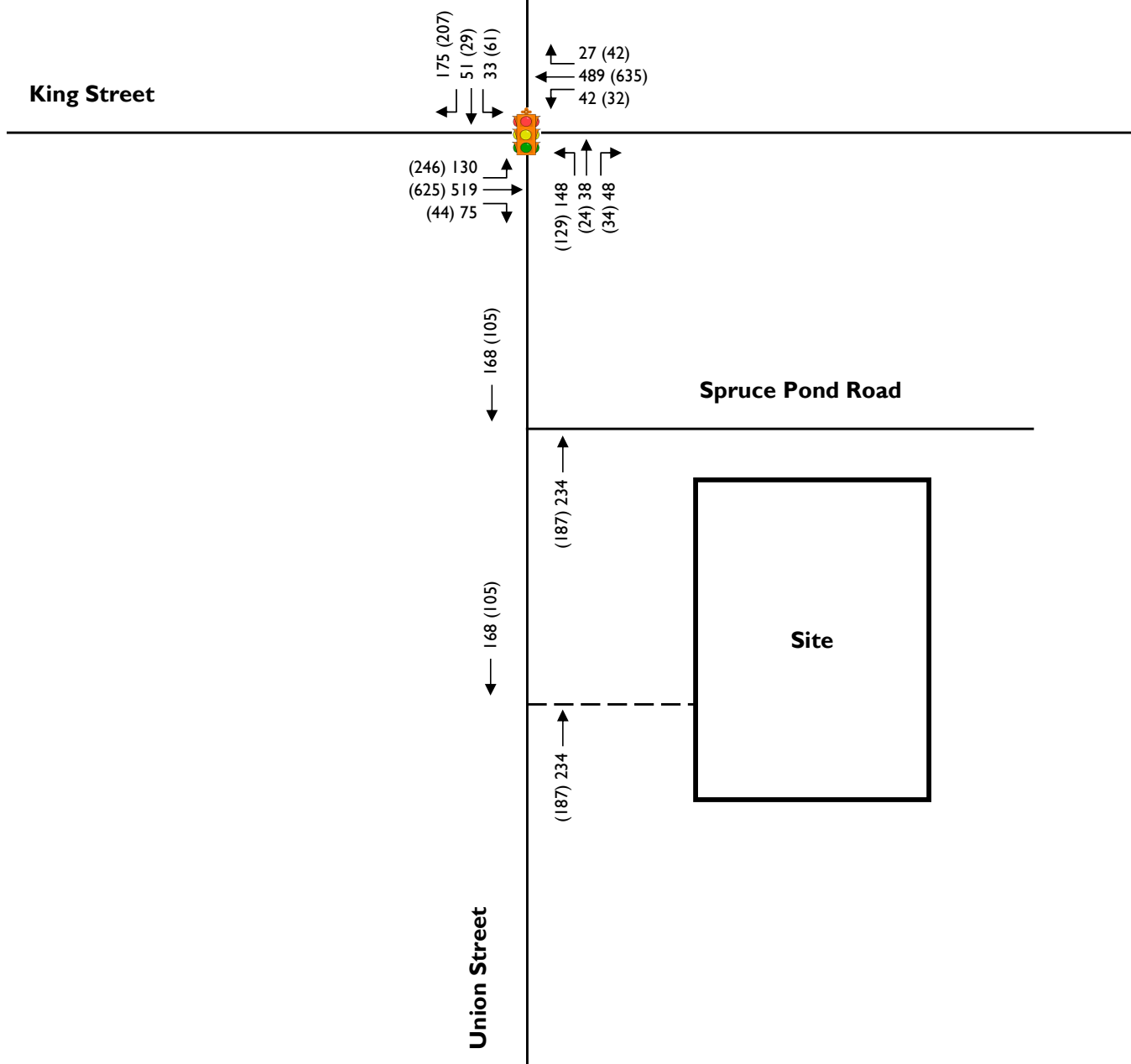
**LEGEND**

- Existing Roadway
- Proposed Driveway
- Existing Private Driveway
- AM (PM) Peak Hour Volumes
- Signalized Intersection

**STONEFIELD**

**Proposed Child Care Center**  
**700-712 Union Street**  
**Town of Franklin, Norfolk County, Massachusetts**  
**Traffic Impact Study**

**FIGURE 2**  
**2022 Existing Traffic**  
**Volumes**

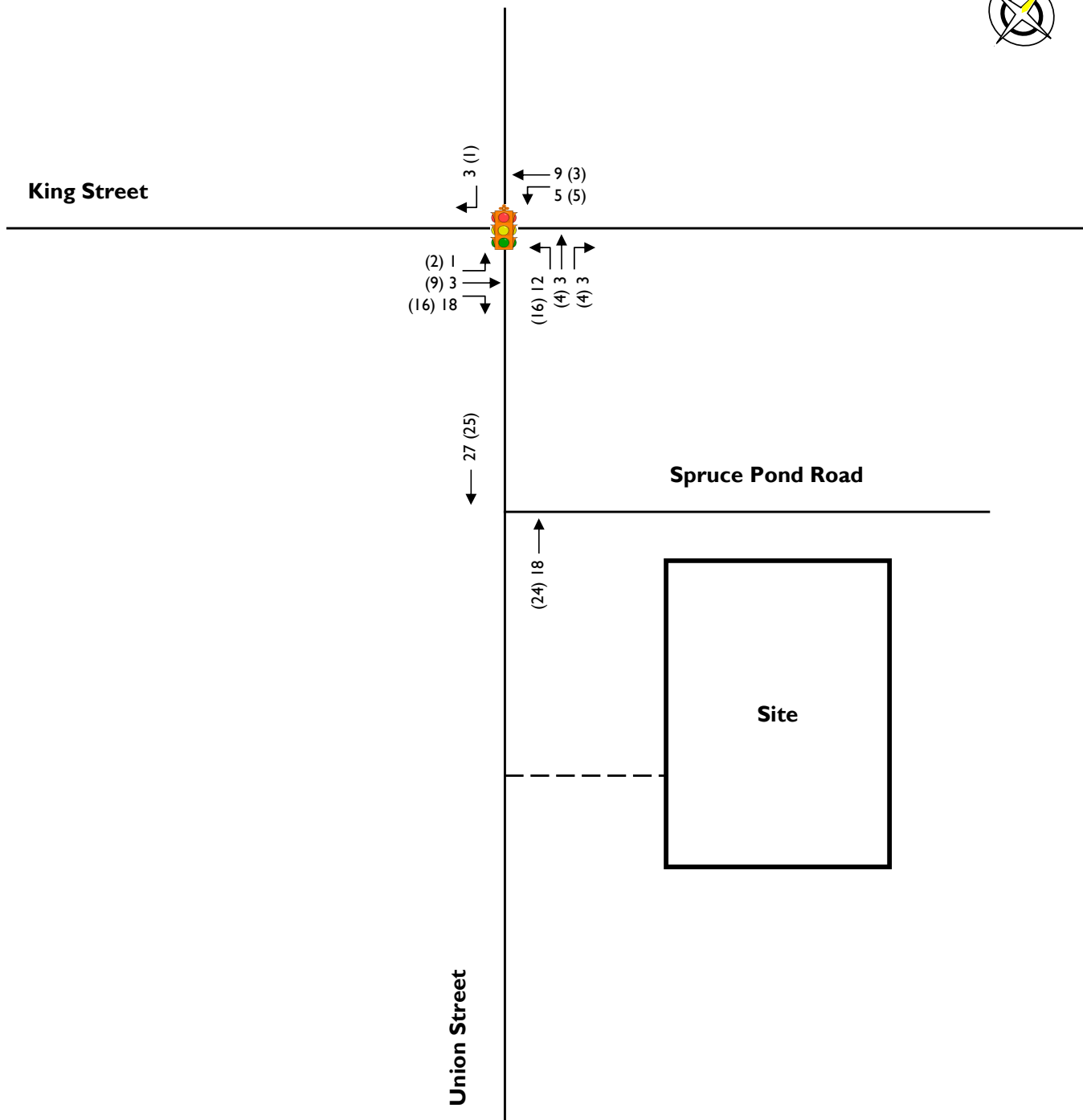


**STONEFIELD**


**Proposed Child Care Center**  
**700-712 Union Street**  
**Town of Franklin, Norfolk County, Massachusetts**  
**Traffic Impact Study**

**FIGURE 3**  
**2029 Base Traffic Volumes**





**LEGEND**

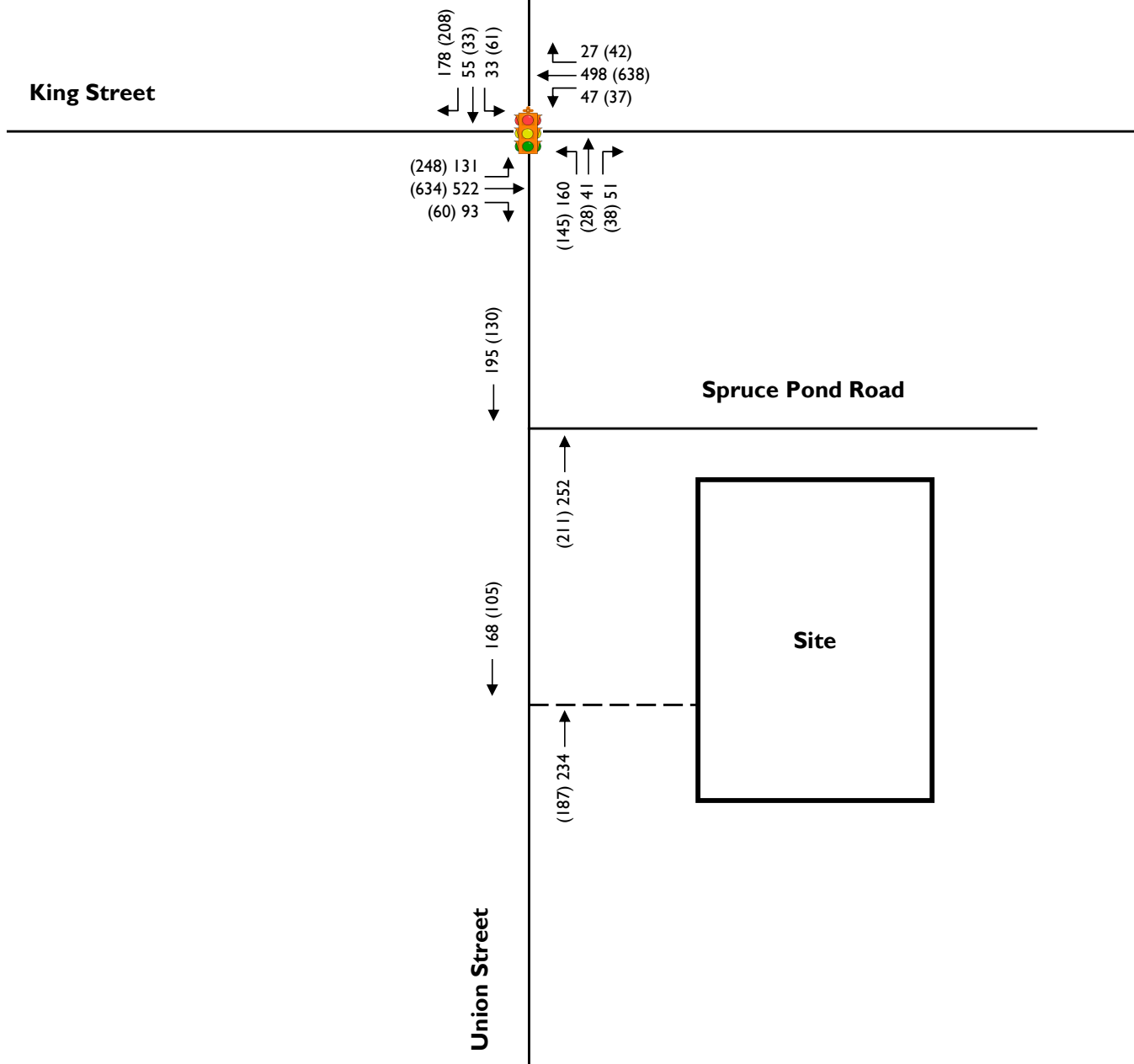
- Existing Roadway
- - - Proposed Driveway
- . . Existing Private Driveway
- ← AM (PM) Peak Hour Volumes
-  Signalized Intersection

**STONEFIELD**

**Proposed Child Care Center**  
**700-712 Union Street**  
**Town of Franklin, Norfolk County, Massachusetts**  
**Traffic Impact Study**

**FIGURE 4**  
**Other Planned Projects**  
**Future Traffic Volumes**

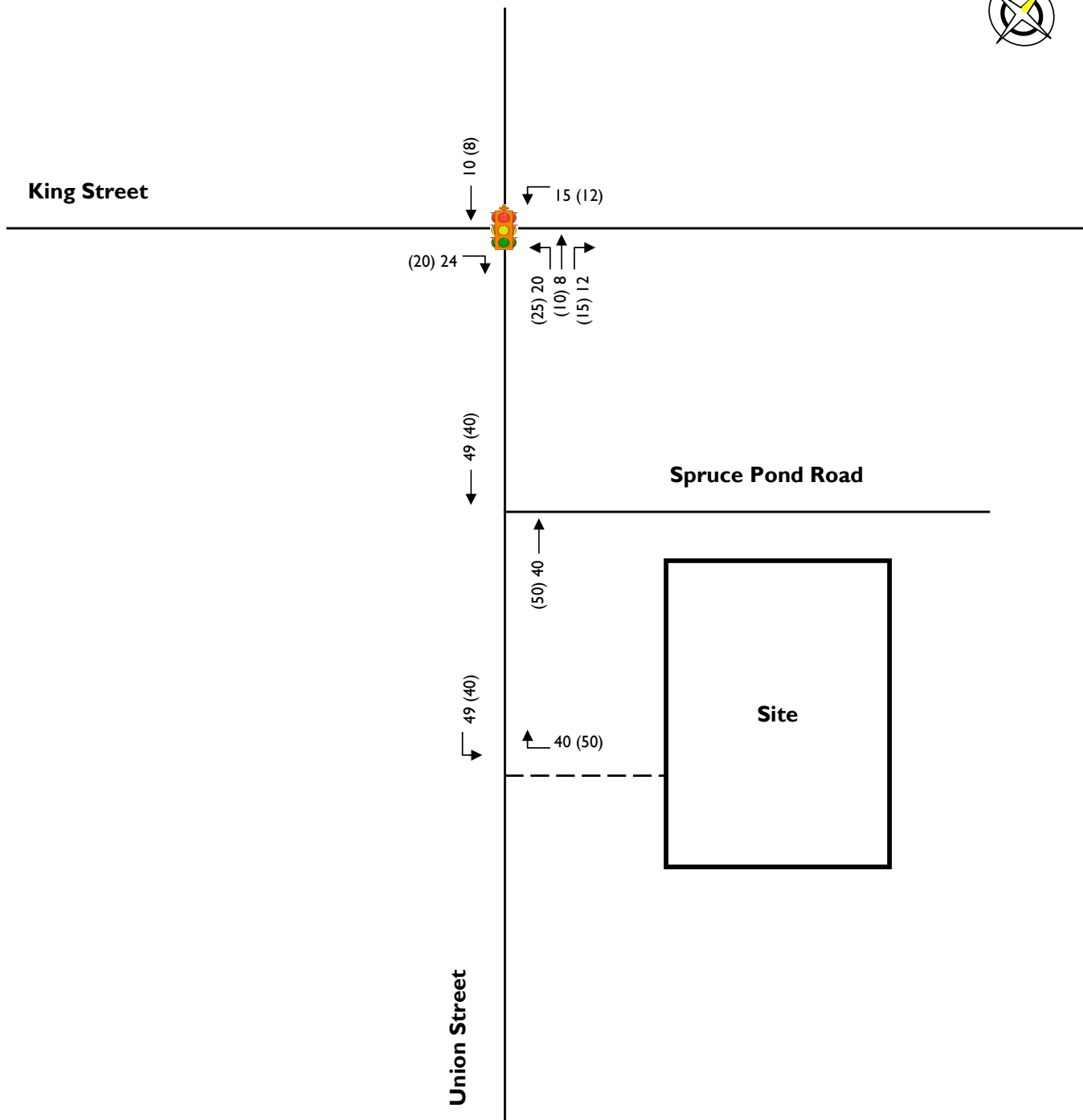





**STONEFIELD**

**Proposed Child Care Center**  
**700-712 Union Street**  
**Town of Franklin, Norfolk County, Massachusetts**  
**Traffic Impact Study**

**FIGURE 5**  
**2029 No-Build Traffic**  
**Volumes**



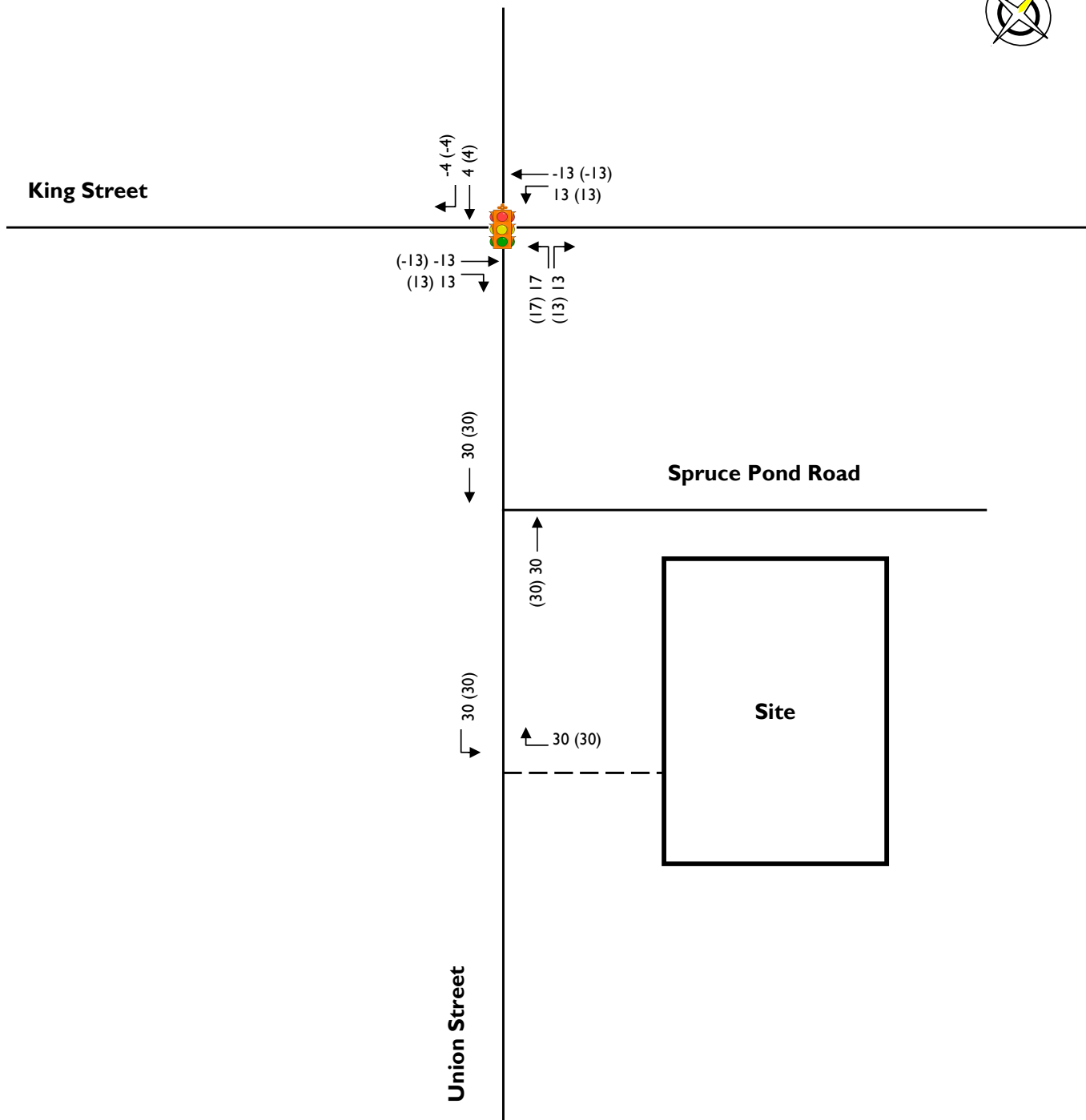
**LEGEND**

- Existing Roadway
- - - Proposed Driveway
- . . Existing Private Driveway
- ← AM (PM) Peak Hour Volumes
-  Signalized Intersection


**STONEFIELD**

**Proposed Child Care Center**  
**700-712 Union Street**  
**Town of Franklin, Norfolk County, Massachusetts**  
**Traffic Impact Study**

**FIGURE 6**  
**"New" Site-Generated**  
**Traffic Volumes**



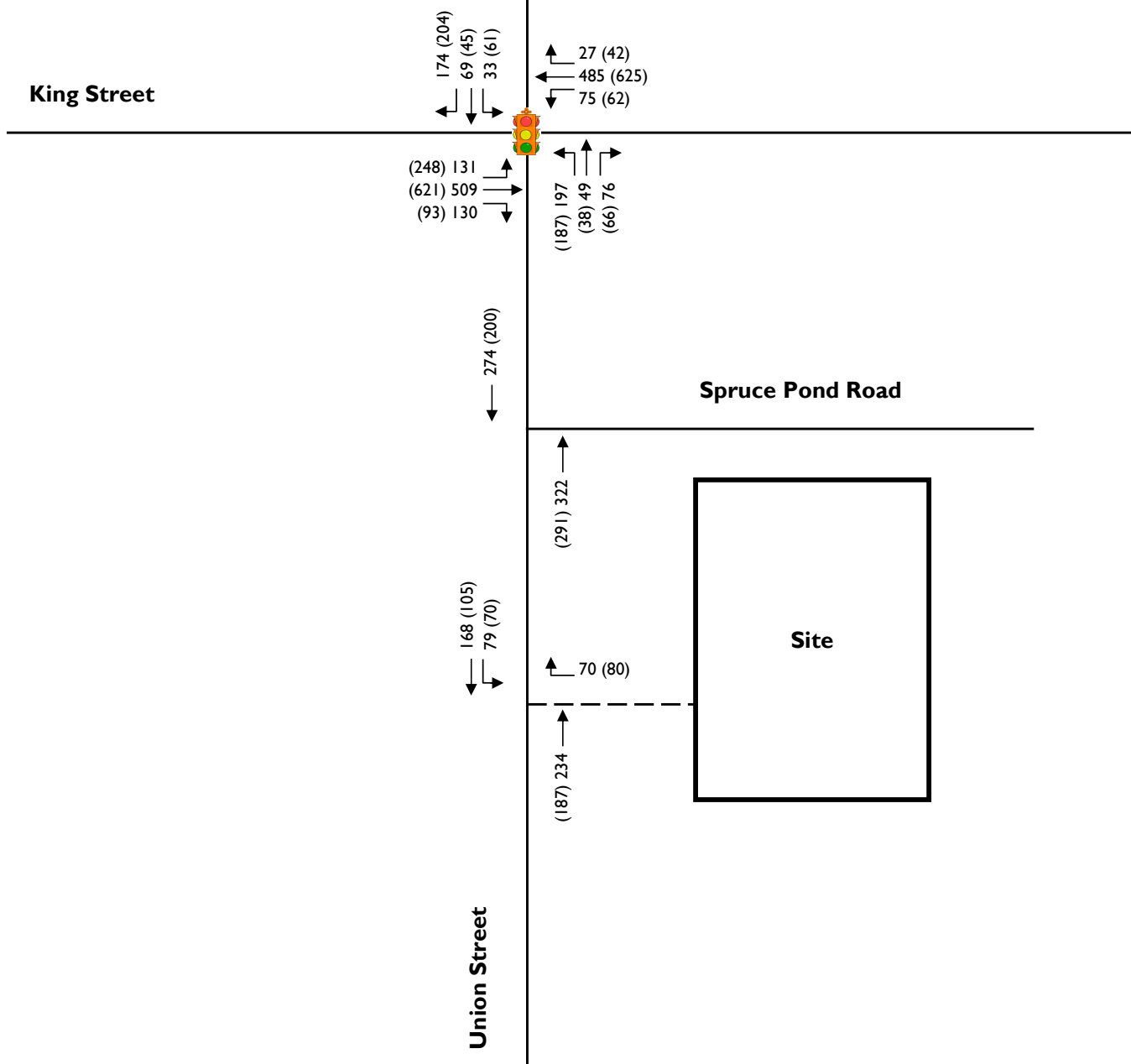
**LEGEND**

- Existing Roadway
- - - Proposed Driveway
- . . Existing Private Driveway
- ← AM (PM) Peak Hour Volumes
-  Signalized Intersection

**STONEFIELD**

**Proposed Child Care Center**  
**700-712 Union Street**  
**Town of Franklin, Norfolk County, Massachusetts**  
**Traffic Impact Study**

**FIGURE 7**  
**"Pass-By" Site-Generated**  
**Traffic Volumes**



**LEGEND**

- Existing Roadway
- Proposed Driveway
- Existing Private Driveway
- AM (PM) Peak Hour Volumes
- Signalized Intersection

**STONEFIELD**

**Proposed Child Care Center**  
**700-712 Union Street**  
**Town of Franklin, Norfolk County, Massachusetts**  
**Traffic Impact Study**























**FIGURE 8**  
**2029 Build Traffic Volumes**

## **HIGHWAY CAPACITY ANALYSIS DETAIL SHEETS**

# HCM Signalized Intersection Capacity Analysis

## 3: Union Street & King Street























2022 Existing Condition  
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	484	70	39	456	25	138	35	45	31	48	163
Future Volume (vph)	121	484	70	39	456	25	138	35	45	31	48	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	11	11	12	12	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	1968	1561		3479		1805	1739			1801	1516
Flt Permitted	0.95	1.00	1.00		0.88		0.49	1.00			0.83	1.00
Satd. Flow (perm)	1711	1968	1561		3086		938	1739			1532	1516
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	129	515	74	41	485	27	147	37	48	33	51	173
RTOR Reduction (vph)	0	0	27	0	3	0	0	34	0	0	0	129
Lane Group Flow (vph)	129	515	47	0	550	0	147	51	0	0	84	44
Heavy Vehicles (%)	2%	3%	0%	0%	3%	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)	12.8	61.8	61.8		43.0		26.2	26.2			8.7	21.5
Effective Green, g (s)	14.8	63.8	63.8		45.0		28.2	28.2			10.7	25.5
Actuated g/C Ratio	0.15	0.64	0.64		0.45		0.28	0.28			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)	253	1255	995		1388		381	490			163	447
v/s Ratio Prot	c0.08	c0.26					c0.05	0.03				0.01
v/s Ratio Perm			0.03		0.18		0.06				c0.05	0.01
v/c Ratio	0.51	0.41	0.05		0.40		0.39	0.10			0.52	0.10
Uniform Delay, d1	39.3	8.9	6.8		18.4		28.2	26.5			42.2	28.5
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.6	1.0	0.1		0.2		0.7	0.1			2.7	0.1
Delay (s)	40.9	9.9	6.8		18.6		28.8	26.6			44.9	28.6
Level of Service	D	A	A		B		C	C			D	C
Approach Delay (s)		15.1			18.6			28.0			33.9	
Approach LOS		B			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			20.7									
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			64.3%									
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 3: Union Street & King Street























2022 Existing Condition  
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	229	583	41	30	592	39	120	22	32	57	27	193
Future Volume (vph)	229	583	41	30	592	39	120	22	32	57	27	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	11	11	12	12	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	2027	1561		3538		1787	1731			1776	1531
Flt Permitted	0.95	1.00	1.00		0.90		0.48	1.00			0.76	1.00
Satd. Flow (perm)	1745	2027	1561		3198		901	1731			1395	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	249	634	45	33	643	42	130	24	35	62	29	210
RTOR Reduction (vph)	0	0	16	0	4	0	0	25	0	0	0	135
Lane Group Flow (vph)	249	634	29	0	714	0	130	34	0	0	91	75
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)	19.4	62.8	62.8		37.4		25.2	25.2			9.1	28.5
Effective Green, g (s)	21.4	64.8	64.8		39.4		27.2	27.2			11.1	32.5
Actuated g/C Ratio	0.21	0.65	0.65		0.39		0.27	0.27			0.11	0.32
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)	373	1313	1011		1260		352	470			154	558
v/s Ratio Prot	c0.14	0.31					c0.04	0.02				0.03
v/s Ratio Perm			0.02		c0.22		0.06				c0.07	0.02
v/c Ratio	0.67	0.48	0.03		0.57		0.37	0.07			0.59	0.13
Uniform Delay, d1	36.0	9.0	6.3		23.6		28.7	27.0			42.3	23.8
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	4.5	1.3	0.1		0.6		0.7	0.1			6.0	0.1
Delay (s)	40.5	10.3	6.4		24.2		29.4	27.1			48.2	23.9
Level of Service	D	B	A		C		C	C			D	C
Approach Delay (s)		18.2			24.2			28.7			31.3	
Approach LOS		B			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			23.0									
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			72.5%									
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 3: Union Street & King Street

2029 No-Build Condition  
Weekday Morning Peak Hour























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	522	93	47	498	27	160	41	51	33	55	178
Future Volume (vph)	131	522	93	47	498	27	160	41	51	33	55	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	11	11	12	12	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	1968	1561		3479		1805	1743			1803	1516
Flt Permitted	0.95	1.00	1.00		0.87		0.46	1.00			0.84	1.00
Satd. Flow (perm)	1711	1968	1561		3022		876	1743			1536	1516
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	139	555	99	50	530	29	170	44	54	35	59	189
RTOR Reduction (vph)	0	0	36	0	3	0	0	39	0	0	0	140
Lane Group Flow (vph)	139	555	63	0	606	0	170	59	0	0	94	49
Heavy Vehicles (%)	2%	3%	0%	0%	3%	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)	13.4	61.4	61.4		42.0		26.6	26.6			8.6	22.0
Effective Green, g (s)	15.4	63.4	63.4		44.0		28.6	28.6			10.6	26.0
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)	263	1247	989		1329		380	498			162	454
v/s Ratio Prot	c0.08	c0.28					c0.06	0.03				0.02
v/s Ratio Perm			0.04		0.20		0.07			c0.06		0.02
v/c Ratio	0.53	0.45	0.06		0.46		0.45	0.12		0.58		0.11
Uniform Delay, d1	39.0	9.3	7.0		19.6		28.3	26.4		42.6		28.2
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	1.9	1.2	0.1		0.2		0.8	0.1		5.2		0.1
Delay (s)	40.9	10.5	7.1		19.9		29.1	26.5		47.8		28.3
Level of Service	D	B	A		B		C	C		D		C
Approach Delay (s)		15.4			19.9			28.2		34.8		
Approach LOS		B			B			C		C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay			21.3									
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			69.0%									
Analysis Period (min)			15									
c Critical Lane Group												



# HCM Signalized Intersection Capacity Analysis

## 3: Union Street & King Street























2029 No-Build Condition  
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	248	634	60	37	638	42	145	28	38	61	33	208
Future Volume (vph)	248	634	60	37	638	42	145	28	38	61	33	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	11	11	12	12	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	2027	1561		3537		1787	1735			1779	1531
Flt Permitted	0.95	1.00	1.00		0.89		0.44	1.00			0.76	1.00
Satd. Flow (perm)	1745	2027	1561		3140		822	1735			1399	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	270	689	65	40	693	46	158	30	41	66	36	226
RTOR Reduction (vph)	0	0	23	0	4	0	0	30	0	0	0	110
Lane Group Flow (vph)	270	689	42	0	775	0	158	41	0	0	102	116
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)	20.3	62.9	62.9		36.6		25.1	25.1			8.6	28.9
Effective Green, g (s)	22.3	64.9	64.9		38.6		27.1	27.1			10.6	32.9
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)	389	1315	1013		1212		343	470			148	564
v/s Ratio Prot	c0.15	0.34					c0.06	0.02				0.05
v/s Ratio Perm			0.03		c0.25		0.07				c0.07	0.03
v/c Ratio	0.69	0.52	0.04		0.64		0.46	0.09			0.69	0.21
Uniform Delay, d1	35.7	9.3	6.3		25.0		29.3	27.2			43.1	24.1
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	5.3	1.5	0.1		1.1		1.0	0.1			12.6	0.2
Delay (s)	41.0	10.8	6.4		26.1		30.3	27.3			55.7	24.3
Level of Service	D	B	A		C		C	C			E	C
Approach Delay (s)		18.5			26.1			29.4			34.1	
Approach LOS		B			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			24.2									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			78.1%									
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis




## 3: Union Street & King Street

2029 Build Condition  
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	509	130	75	485	27	197	49	76	33	69	174
Future Volume (vph)	131	509	130	75	485	27	197	49	76	33	69	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	11	11	12	12	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		0.99		0.95	1.00			0.98	1.00
Satd. Flow (prot)	1711	1968	1561		3476		1805	1726			1807	1516
Flt Permitted	0.95	1.00	1.00		0.81		0.44	1.00			0.84	1.00
Satd. Flow (perm)	1711	1968	1561		2828		841	1726			1550	1516
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	139	541	138	80	516	29	210	52	81	35	73	185
RTOR Reduction (vph)	0	0	54	0	3	0	0	55	0	0	0	135
Lane Group Flow (vph)	139	541	84	0	622	0	210	78	0	0	108	50
Heavy Vehicles (%)	2%	3%	0%	0%	3%	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)	13.4	59.2	59.2		39.8		28.8	28.8			9.8	23.2
Effective Green, g (s)	15.4	61.2	61.2		41.8		30.8	30.8			11.8	27.2
Actuated g/C Ratio	0.15	0.61	0.61		0.42		0.31	0.31			0.12	0.27
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)	263	1204	955		1182		403	531			182	472
v/s Ratio Prot	c0.08	0.27					c0.08	0.04				0.02
v/s Ratio Perm			0.05		c0.22		c0.08				0.07	0.02
v/c Ratio	0.53	0.45	0.09		0.53		0.52	0.15			0.59	0.11
Uniform Delay, d1	39.0	10.4	8.0		21.7		27.3	25.1			41.8	27.3
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.9	1.2	0.2		0.4		1.2	0.1			5.1	0.1
Delay (s)	40.9	11.6	8.1		22.1		28.5	25.2			46.9	27.4
Level of Service	D	B	A		C		C	C			D	C
Approach Delay (s)		16.0			22.1			27.2			34.6	
Approach LOS		B			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			22.3									
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			73.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC  
6: Union Street























2029 Build Condition  
Weekday Morning Peak Hour

Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	70	234	0	79	168
Future Vol, veh/h	0	70	234	0	79	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	74	249	0	84	179
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	596	249	0	0	249	0
Stage 1	249	-	-	-	-	-
Stage 2	347	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	470	795	-	-	1328	-
Stage 1	797	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	437	795	-	-	1328	-
Mov Cap-2 Maneuver	437	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10	0		2.5		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 795		1328	-	
HCM Lane V/C Ratio	-	- 0.094		0.063	-	
HCM Control Delay (s)	-	- 10		7.9	0	
HCM Lane LOS	-	- B		A	A	
HCM 95th %tile Q(veh)	-	- 0.3		0.2	-	

# HCM Signalized Intersection Capacity Analysis




## 3: Union Street & King Street

2029 Build Condition  
Weekday Evening Peak Hour

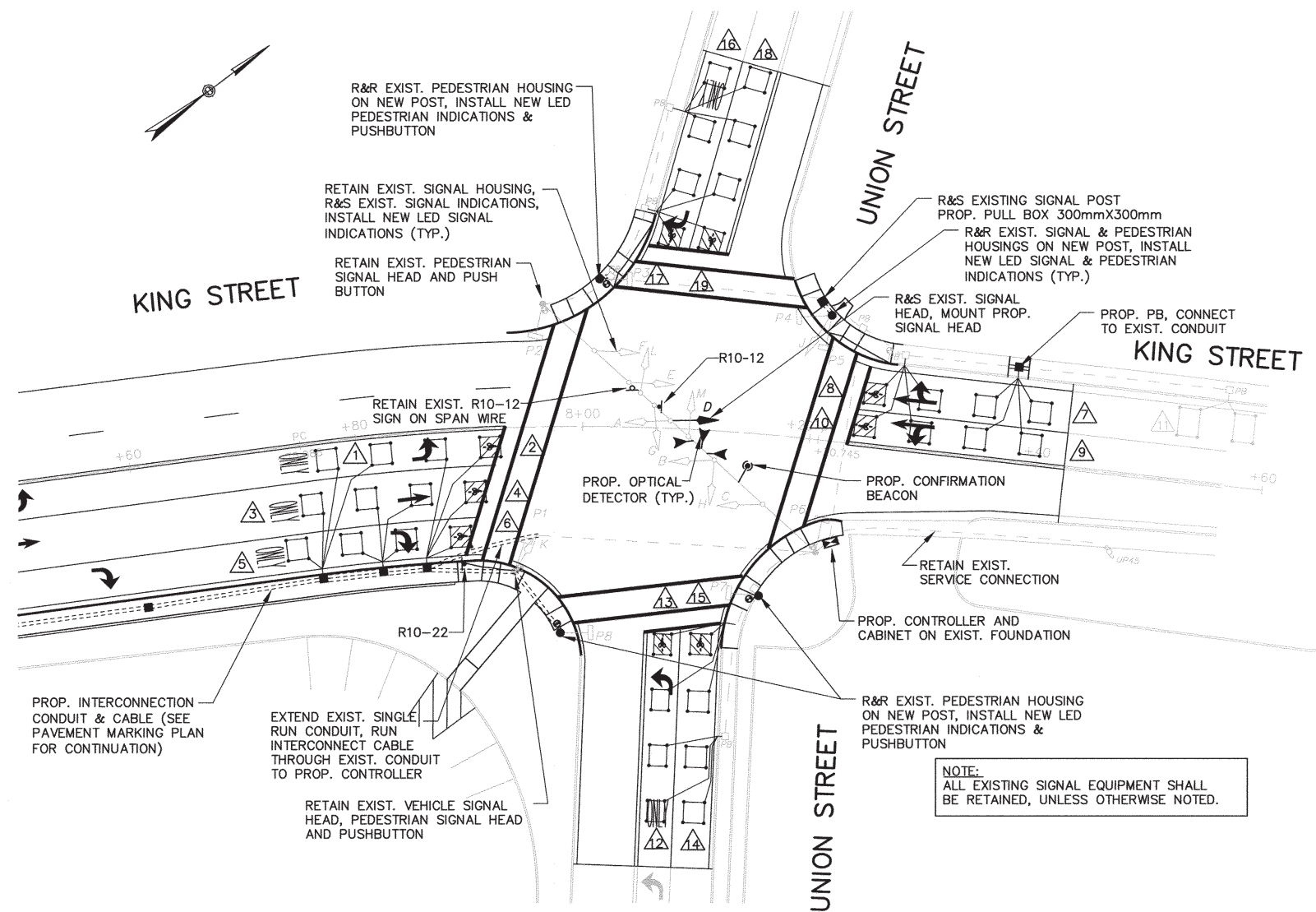
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	248	621	93	62	625	42	187	38	66	61	45	204
Future Volume (vph)	248	621	93	62	625	42	187	38	66	61	45	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	11	11	12	12	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	0.90			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	2027	1561		3533		1787	1718			1785	1531
Flt Permitted	0.95	1.00	1.00		0.83		0.40	1.00			0.76	1.00
Satd. Flow (perm)	1745	2027	1561		2945		744	1718			1395	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	270	675	101	67	679	46	203	41	72	66	49	222
RTOR Reduction (vph)	0	0	36	0	4	0	0	52	0	0	0	110
Lane Group Flow (vph)	270	675	65	0	788	0	203	61	0	0	115	112
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)	20.3	62.4	62.4		36.1		25.6	25.6			8.5	28.8
Effective Green, g (s)	22.3	64.4	64.4		38.1		27.6	27.6			10.5	32.8
Actuated g/C Ratio	0.22	0.64	0.64		0.38		0.28	0.28			0.10	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)	389	1305	1005		1122		341	474			146	563
v/s Ratio Prot	c0.15	0.33					c0.08	0.04				0.04
v/s Ratio Perm			0.04		c0.27		0.09			c0.08		0.03
v/c Ratio	0.69	0.52	0.06		0.70		0.60	0.13			0.79	0.20
Uniform Delay, d1	35.7	9.5	6.6		26.2		29.8	27.2			43.7	24.2
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	5.3	1.5	0.1		2.0		2.8	0.1			23.9	0.2
Delay (s)	41.0	11.0	6.7		28.2		32.6	27.3			67.5	24.3
Level of Service	D	B	A		C		C	C			E	C
Approach Delay (s)		18.3			28.2			30.7			39.1	
Approach LOS		B			C			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			25.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			80.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC  
6: Union Street

2029 Build Condition  
Weekday Evening Peak Hour

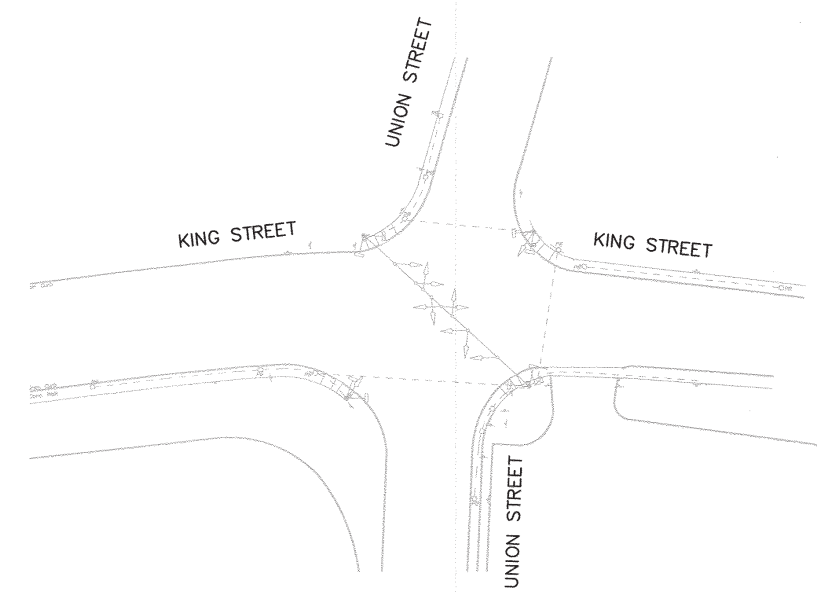
Intersection						
Int Delay, s/veh	3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	80	187	0	70	105
Future Vol, veh/h	0	80	187	0	70	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	0	87	203	0	76	114
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	469	203	0	0	203	0
Stage 1	203	-	-	-	-	-
Stage 2	266	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	556	843	-	-	1381	-
Stage 1	836	-	-	-	-	-
Stage 2	783	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	523	843	-	-	1381	-
Mov Cap-2 Maneuver	523	-	-	-	-	-
Stage 1	836	-	-	-	-	-
Stage 2	737	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.8	0		3.1		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	843		1381	-	
HCM Lane V/C Ratio	-	0.103		0.055	-	
HCM Control Delay (s)	-	9.8		7.8	0	
HCM Lane LOS	-	A		A	A	
HCM 95th %tile Q(veh)	-	0.3		0.2	-	

**TRAFFIC SIGNAL TIMING DIRECTIVE**



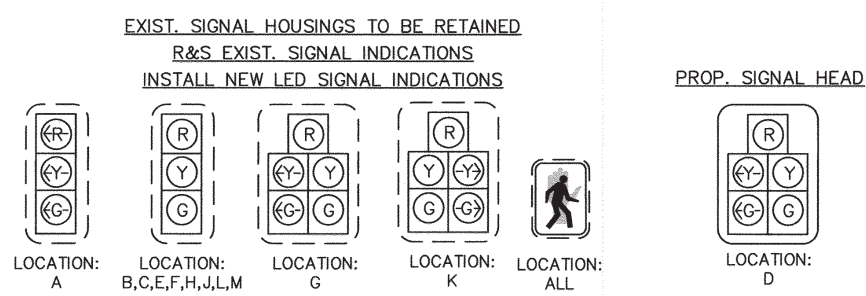
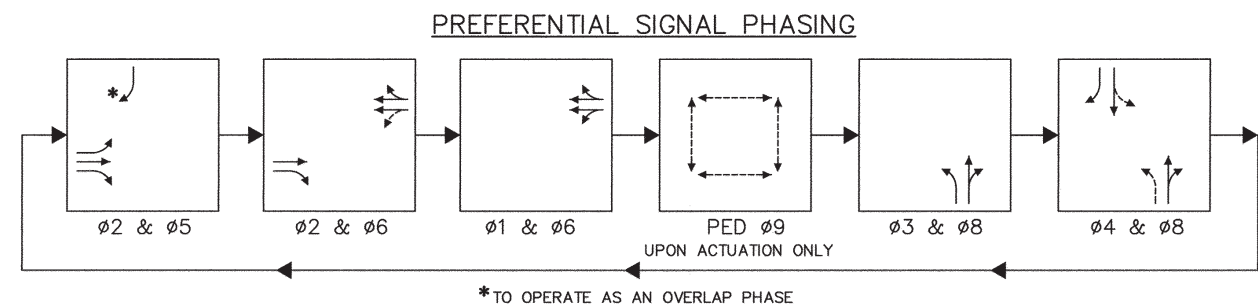
PROPOSED SIGNAL LAYOUT  
LOCATION 4

SCALE  
0 5 10 15 20 25 METERS  
(1:250)



EXISTING SIGNAL LAYOUT

SCALE  
0 10 20 30 40 50 METERS  
(1:500)



- NOTES: 1.) ALL PROPOSED SIGNAL HEADS SHALL HAVE TUNNEL VISORS & 125mm BACKPLATES.  
2.) ALL PROPOSED SIGNAL LENSES SHALL BE 300mm DIA.  
3.) ALL PROPOSED RED, AMBER AND GREEN INDICATIONS SHALL BE LED TYPE.

SIGNAL HEAD DATA  
NOT TO SCALE



TRAFFIC DATA PLAN  
LOCATION 4  
KING ST. AT UNION STREET

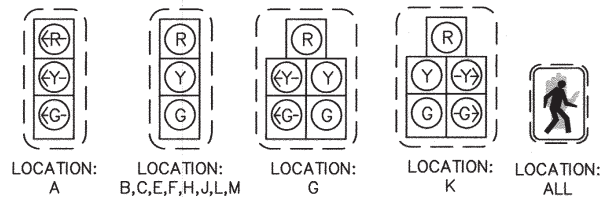
MAJOR ITEMS

QUANTITY	DESCRIPTION
1	TRAFFIC SIGNAL CONTROLLER (TS2, TYPE 1), LOCATED IN BASE-MOUNTED CABINET
3	TRAFFIC SIGNAL POST AND BASE STANDARD - 2.5m (STEEL)
1	TRAFFIC SIGNAL POST AND BASE STANDARD - 3.0m (STEEL)
11	DUAL CHANNEL LOOP DETECTOR AMPLIFIER
36	WIRE LOOP - 1.8m x 1.8m
1	SIGNAL HEAD, 5-SECTION, 300mm LENS - D
9	RED (BALL) LED SIGNAL INDICATION, 300mm LENS
9	AMBER (BALL) LED SIGNAL INDICATION, 300mm LENS
9	GREEN (BALL) LED SIGNAL INDICATION, 300mm LENS
1	RED (ARROW) LED SIGNAL INDICATION, 300mm LENS
3	AMBER (ARROW) LED SIGNAL INDICATION, 300mm LENS
3	GREEN (ARROW) LED SIGNAL INDICATION, 300mm LENS
8	PEDESTRIAN LED SIGNAL INDICATION, 300mm LENS
3	PEDESTRIAN PUSHBUTTON, INSTRUCTIONAL SIGN & SADDLE
5	PULL BOX, 300mm x 300mm
1	125mm BACKPLATE
3	PREEMPTION SYSTEM - OPTICAL DETECTOR, UNIDIRECTIONAL, SINGLE CHANNEL
1	PREEMPTION SYSTEM - CARD RACK
1	PREEMPTION SYSTEM - 4 CHANNEL PHASE SELECTOR
1	EMERGENCY PREEMPTION CONFIRMATION BEACON (WHITE)
PLUS ALL MISCELLANEOUS EQUIPMENT, LABOR AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL.	

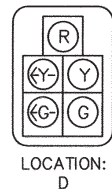
EXIST. SIGNAL HOUSINGS TO BE RETAINED

R&S EXIST. SIGNAL INDICATIONS

INSTALL NEW LED SIGNAL INDICATIONS



PROP. SIGNAL HEAD

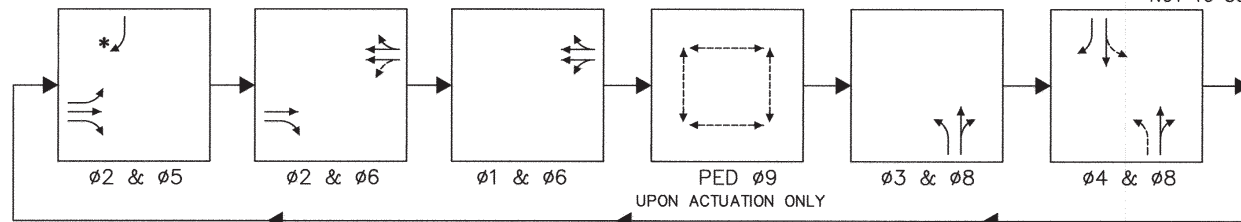


- NOTES: 1.) ALL PROPOSED SIGNAL HEADS SHALL HAVE TUNNEL VISORS & 125mm BACKPLATES.  
2.) ALL PROPOSED SIGNAL LENSES SHALL BE 300mm DIA.  
3.) ALL PROPOSED RED, AMBER, GREEN, AND PEDESTRIAN INDICATIONS SHALL BE LED TYPE.  
4.) ALL PROPOSED PEDESTRIAN SIGNAL INDICATIONS SHALL DISPLAY INTERNATIONAL SYMBOLS - HAND/PERSON WALKING.

SIGNAL HEAD DATA

NOT TO SCALE

PREFERENTIAL SIGNAL PHASING



\*TO OPERATE AS AN OVERLAP PHASE

SEQUENCE AND TIMING FOR FULLY-ACTUATED TRAFFIC SIGNAL CONTROL (COORDINATED)

SEQUENCE AND TIMING FOR FULLY-ACTUATED TRAFFIC SIGNAL CONTROL (COORDINATED)																								PREEMPTION OPERATION													FLASH OPER.							
			ø1			ø2			ø3			ø4			ø5			ø6			ø8			PED ø9			PREEMPT "A" ø2 & ø5			PREEMPT "B" ø1 & ø6			PREEMPT "C" ø4											
STREET	DIRECTION	HOUSINGS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33									
KING STREET	EB	A	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←G-	←Y-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←G-	←Y-	←R-	←R-	←R-	←R-	←R-	←R-	←FR-									
KING STREET	EB	B,C	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	FY									
KING STREET	WB	D	←G-	←Y-	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	←G-/G	←Y-/Y	R	R	R	FY									
KING STREET	WB	E,F	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	FY									
UNION STREET	NB	G	R	R	R	R	R	R	←G-	←Y-	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	FR									
UNION STREET	NB	H,J	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	FR									
UNION STREET	SB	K	R	R	R	R	R	R	R	R	R	G	Y	R	←G-/R	←Y-/Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G/G	Y/Y	R	FR								
UNION STREET	SB	L,M	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR								
PEDESTRIAN	ALL	P1-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT								
TIMING IN SECONDS																																												
MINIMUM GREEN			5			7			5			7			5			7			7																							
VEHICLE EXTENSION			3			3			3			3			3			3			3																							
MAXIMUM GREEN 1 (FREE)			15			50			15			15			30			35			30																							
MAXIMUM GREEN 2 (COORDINATED)			15			60			20			15			35			40			35																							
YELLOW CLEARANCE				4			4			4			4			4			4			4						4			4			4										
RED CLEARANCE					2			2			2			2			2			2			2					2			2			2										
WALK INTERVAL\CLEARANCE																								7	21	1																		
HOLD																																												
RECALL (SOFT)			OFF			ON			OFF			OFF			OFF			ON			OFF			OFF			-			-			-			-								
MEMORY			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			LOCK			-			-			-			-								



P:\1006\1010 - 495 SB - 1-495 Franklin\Map\1010-495 SB\1010-495 SB.dwg 03/12/2004 09:53:09 AM EET

