



**Mandel Group  
Delafield Street Apartments**

**Traffic Impact Analysis Study**

**Prepared for:**

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# Mandel Group - Delafield Street Apartments

## Traffic Impact Analysis Study

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# Chapter 1: Introduction and Executive Summary

## Part A: Purpose of Report and Study Objectives

The City of Waukesha requested a traffic impact analysis (TIA) study be conducted for the proposed Mandel Group development located along the west side of Delafield Street, just north of Madison Street, in the City of Waukesha, WI. The proposed development is expected to include apartment units along with several in-house amenities for its residents. The following report summarizes the development study area, the existing/base, future no-build, base full-build, and future full-build traffic volumes, the proposed driveway access points, the expected traffic operations at the study intersections, and anticipated parking demand generated by the development.

## Part B: Executive Summary

The executive summary includes the study area, a description of the proposed development, the study scenarios/access, trip generation, traffic operations analysis, parking generation, and recommendations.

### B1. Proposed Development

Mandel Group proposes to construct a residential development, in the northwest corner of the Delafield Street, Madison Street, and North Street intersection in the City of Waukesha, WI. The development, named the Delafield Street Apartments, is planned to be constructed at the site of the former Waukesha City Hall and encompasses the city tax parcels 1305459, 1305460, 1305461, and 1306990. The development is expected to consist of two four-story buildings with 221 apartment units along with several in-house amenities for its residents as well as underground and surface parking.

Three site plan alternatives have been proposed for the development, with the proposed access points constituting the primary difference between the alternatives. The proposed apartment buildings within the development are identical for all three alternatives.

- Site Plan A: Single Driveway Scenario
  - North development driveway (Delafield Street)
    - To be used by all vehicles entering and exiting the development site
- Site Plan B: Two Driveway Scenario
  - North development driveway (Delafield Street)
    - To be used by all surface parking vehicles and underground parking vehicles within the north apartment building
  - South development driveway (Delafield Street)
    - To be used by only underground parking vehicles within the south apartment building
    - Due to the proximity of the driveway to the Delafield Street, Madison Street, and North Street intersection, the driveway is recommended to operate as a right-in/right-out
- Site Plan C: Three Driveway Scenario
  - North development driveway (Delafield Street)
    - To be used by all surface parking vehicles and underground parking vehicles within the north apartment building

- South development driveway (Delafield Street)
  - To be used by only underground parking vehicles within the south apartment building
  - Due to the proximity of the driveway to the Delafield Street, Madison Street, and North Street intersection, the driveway is recommended to operate as a right-in/right-out
- Madison Street development driveway
  - To be used by only underground parking vehicles within the south apartment building
  - Due to the proximity of the driveway to the Delafield Street, Madison Street, and North Street intersection, the driveway is recommended to operate as a right-in/right-out

## B2. Study Area

The study area limits are along the Delafield Street corridor and consist of the following existing study intersections:

- Delafield Street/Spring Street and Summit Avenue
- Delafield Street and Buena Vista Avenue
- Delafield Street, Madison Street, and North Street

## B3. Existing Traffic Volumes

Intersection turning movement counts were collected at the intersection of Delafield Street, Summit Avenue, and Spring Street as well as the intersection of Delafield Street and Buena Vista Avenue from 6:00 AM – 9:00 AM and 2:00 PM – 6:00 PM on Thursday, January 18, 2024. Additional intersection turning movement counts were collected at the intersection of Delafield Street, Madison Street, and North Street from 6:00 AM – 9:00 AM and 2:00 PM – 6:00 PM on Tuesday, February 6, 2024.

The peak hour periods identified in the balanced data include the weekday AM peak hour of 7:15 AM to 8:15 AM and the weekday PM peak hour of 3:45 PM to 4:45 PM.

## B4. Trip Generation

Data published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* – 11<sup>th</sup> Edition was used to estimate the number of total weekday and weekday AM and PM peak hour trips expected to be generated by the proposed Delafield Street Apartments development. No off-site developments impacting traffic within the study area were identified, therefore, no off-site trip generation was conducted for this study.

The proposed development is expected to generate the following new trips:

- Total Weekday (In/Out): 745 veh / 745 veh
- Weekday AM Peak Hour (In/Out): 20 veh / 70 veh
- Weekday PM Peak Hour (In/Out): 70 veh / 45 veh

For all study scenarios, the trip distribution used to assign new development trips to the study area was estimated based on existing traffic patterns.

## B5. Traffic Operations Analysis

Intersection operations for traffic signal control and stop control at the study intersections were analyzed using Synchro 12 software. The results presented within the report are based on HCM 7 equations and methodologies. It should be noted that due to the unique, five-leg configuration, the intersection of

Delafield Street, Madison Street, and North Street was analyzed using HCM 2000 equations and methodologies. Level of service (LOS) 'D' as defined in HCM 7 was used as the threshold for acceptable peak hour intersection operating conditions or maintaining the existing LOS when below LOS 'D'.

Under the 2025 base year and 2035 horizon year background scenarios, all vehicular traffic movements at the study intersections are expected to operate at an acceptable level of service, except for the following:

- 2025 Base Year Background Scenario
  - AM Peak
    - EB LT at Delafield Street, Madison Street and North Street – LOS E
  - PM Peak
    - EB LT at Delafield Street, Madison Street and North Street – LOS E
- 2035 Horizon Year Background Scenario
  - AM Peak
    - EB LT at Delafield Street, Madison Street and North Street – LOS E
    - Shared WBT/WBR at Delafield Street, Madison Street and North Street – LOS E
  - PM Peak
    - EB LT at Delafield Street, Madison Street and North Street – LOS E
    - Shared WBT/WBR at Delafield Street, Madison Street and North Street – LOS E
    - Shared SWBL/SWBT/SWBR at Delafield Street, Madison Street and North Street – LOS E

Three site plan alternatives, featuring different site access points, were considered for the 2025 base year and 2035 horizon year build scenarios. Under both the 2025 base year and the 2035 horizon year build year scenarios, the Delafield Street intersections at Summit Avenue and Buena Vista Avenue are expected to operate with all movements at LOS 'D' or better.

Under the 2025 base year build scenario for all access alternatives, the Delafield Street, Madison Street, and North Street intersection is expected to see a drop from LOS 'D' to LOS 'E' for the westbound North Street shared through/right-turn movement and the Delafield Street approach. These movements can be improved to LOS 'D' if two seconds of green time is taken away from the northbound/southbound Madison Street approaches and given to the movements at LOS 'E'.

Under the 2035 horizon year build scenario for all access alternatives, the Delafield Street, Madison Street, and North Street intersection is expected to operate with several movements at LOS 'E', which is consistent with the 2035 horizon year background scenario. The exception is that the overall LOS is expected to drop from LOS 'D' in the background scenario to LOS 'E' in the build scenario. Minor signal timing adjustments were evaluated during the weekday PM peak hour, but they did not result in reducing the overall LOS 'E' to LOS 'D'. Geometric changes are expected to be necessary to address the overall LOS 'E', but the feasibility to accommodate such improvements is limited.

Several movements at the Delafield Street, Madison Street, and North Street intersection are expected to experience periods where the 95<sup>th</sup> percentile traffic volume flows exceed the capacity, in which case the 95<sup>th</sup> percentile queues may be longer than what is calculated. The remaining 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Madison Street, and North Street are expected to fit within the available storage area.

Based on the maximum expected 95<sup>th</sup> percentile queue of 225 feet for the south-westbound left-turn movement at the intersection of Delafield Street, Madison Street, and North Street, the reduction in the existing storage length for this movement to accommodate the north proposed development driveway is not expected to lead to significant reductions in operational performance along Delafield Street.

In addition, considering the maximum 95<sup>th</sup> percentile queue of 225 feet expected for the south-westbound left-turn movement at the Delafield Street, Madison Street, and North Street intersection, as well as the location of the south proposed development driveway, it is recommended that the south proposed



development driveway operate under right-in/right-out only access to prevent potential issues associated with left-turning vehicles to and from the driveway. The same right-in/right-out access design is recommended for the Madison Street driveway because of the proximity of the adjacent intersection.

#### B6. Parking Generation

Data published in the *ITE Parking Generation Manual – 6<sup>th</sup> Edition* was used to identify the expected parking demand that would be generated by the proposed development. The estimated parking demand for the proposed development is a total of 273 parking stalls to be provided in order to accommodate the typical weekday peak demand. This includes 142 stalls needed for the north building and 131 stalls needed for the south building.

Site Plan A and Site Plan B are expected to include 259 covered stalls and 38 surface stalls for a total of 297 parking spaces. Site Plan C is expected to include 254 covered stalls and 38 surface stalls for a total of 292 parking spaces. The covered stalls include 153 stalls in the north building and 101 or 106 stalls in the south building, depending on the site access plan. The provided covered stalls in the north building will accommodate the peak demand for the north building, but the provided covered stalls in the south building will not accommodate all of the demand for the south building. A portion of the south parking demand will need to be accommodated by the surface parking lot, which can only be accessed by the north driveway.

#### B7. Recommendations

With the addition of the proposed development, it was determined that no improvements are necessary at the intersection of Delafield Street, Summit Avenue, and Spring Street or the intersection of Delafield Street and Buena Vista Avenue, as both intersections are expected to operate with acceptable levels of service in the year 2035.

Under the 2025 base year build scenario for all alternatives, a signal timing adjustment will be required at the intersection of Delafield Street, Madison Street, and North Street to maintain an expected LOS 'E' condition for the eastbound left-turn movement and LOS 'D' condition for all other movements.

Under the 2035 horizon year build scenario for all alternatives, the intersection of Delafield Street, Madison Street, and North Street is expected to continue to operate with select movements at LOS 'E', consistent with the 2035 background scenario, but is expected to experience an overall LOS drop from LOS 'D' to LOS 'E'. It is recommended that the City monitor the future operations at the intersection of Delafield Street, Madison Street, and North Street and consider making signal timing adjustments as necessary.

Under all site plans, it is recommended that a northbound left-turn lane on Delafield Street be provided at the north driveway. This left-turn lane should provide 50 feet of storage and a 96-foot taper.

All three site plans present feasible access designs for the proposed development. From the perspective of access management and queue length influence area, as well as parking accessibility, Site Plan A presents a more desirable access design. It allows for all movements from a single access point located outside of the queue storage area for adjacent intersections and reduces the need for vehicles to travel indirect routes.

It has been discussed that Site Plan B and Site Plan C allow for flexibility in the internal site design that addresses major grading concerns. Site Plan B and Site Plan C provide for very similar traffic operations as Site Plan A and it is recommended that if implemented, the south driveway be limited to right-in/right-out only access. The proximity of the south driveway access point to the Delafield Street, Madison Street, and North Street intersection results in queues extending through this access point, suggesting that left turns into and out of this driveway be prohibited. It is also recommended that the Madison Street driveway included in Site Plan C also be designed as a right-in/right-out, given the proximity of the adjacent intersection. Site Plan C results in slightly less indirect routing of traffic when compared to Site Plan B.

## Chapter 2: Proposed Development

### Part A: On-Site Development

#### A1. Development Description and Site Location

Mandel Group proposes to construct a residential development in the northwest corner of the Delafield Street, Madison Street, and North Street intersection in the City of Waukesha, WI. The development, named the Delafield Street Apartments, is planned to be constructed at the site of the former Waukesha City Hall and encompasses the city tax parcels 1305459, 1305460, 1305461, and 1306990. The development is expected to consist of two four-story buildings with underground and surface parking. A site location map can be seen in **Exhibit 2-1**.

#### A2. Land Use and Intensity

The proposed development is expected to be located directly across from the Waukesha City Hall and Water Utility buildings along Delafield Street. Nearby developments include general businesses to the south/east (Walgreens Jimmy Johns, Waukesha State Bank, etc.), multi-family housing and apartments to the southwest, and residential neighborhoods to the north/northwest of the proposed development area.

The proposed development is expected to include two, four-story buildings, which will house 221 apartment units and will contain amenities such as a club room, fitness center, dog run, pet wash, and outdoor courtyard for its apartment residents. On-site parking accommodations will be provided through underground and surface parking.

#### A3. Proposed Site Plan

Three site plan alternatives have been proposed for the development with the number of access points as the primary difference between them. The proposed number of apartment buildings within the development is the same for all alternatives. The general site plan concept can be seen in **Exhibit 2-2**. This exhibit shows the three-driveway option but is also generally representative of the other site plan alternatives by removing the access points as described.

Under the first alternative, Site Plan A, access to the site is to be provided through a single driveway along Delafield Street (“North Driveway”), serving as ingress and egress for both surface and underground parking lots within both the north and south apartment buildings. The shared driveway is anticipated to be located approximately 250 feet south of the Delafield Street and Buena Vista Avenue intersection or approximately 425 feet north of the Delafield Street, Madison Street, and North Street intersection.

Under the second alternative, Site Plan B, a second driveway would be provided in addition to the one included in Site Plan A. This second driveway would also be along Delafield Street, located approximately 520 feet south of the Delafield Street and Buena Vista Avenue intersection, or approximately 165 feet north of the Delafield Street, Madison Street, and North Street intersection. The second driveway would provide access to underground parking for residents within the south apartment building while the driveway described in Site Plan A would provide access for all surface parking vehicles as well as underground parking for residents within the north building. The underground parking for residents within the south apartment building would not be able to access the driveway previously described in Site Plan A. Due to its proximity to the Delafield Street, Madison Street, and North Street intersection, it is proposed that the south driveway operate with right-in/right-out access only.

Under the third alternative, Site Plan C, a third driveway would be provided in addition to the two included in Site Plan B. This third driveway would be located on Madison Street, approximately 120 feet northwest of the Madison Street intersection with the Delafield Street and North Street. The third driveway would provide access to underground parking for residents within the south apartment building, similar to the south driveway located on Delafield Street. Due to its proximity to the Delafield Street, Madison Street,

and North Street intersection, it is proposed that the Madison Street driveway operate with right-in/right-out access only.

Site Plan B and Site Plan C were developed for its significant benefits to site grading and improved building configuration.

#### A4. Development Phasing and Timing

The proposed development is expected to be constructed under a single phase with completion in 2025. For the purposes of this study, the base year is defined as 2025 and the horizon year as 2035. Analyses within the TIA report evaluate the base and horizon years of traffic.

### Part B: Study Area

#### B1. Influence Area

The primary influence area for traffic traveling to and from the development is expected to be along Delafield Street, between the intersection of Delafield Street, Summit Avenue, and Spring Street and the intersection of Delafield Street, Madison Street, and North Street. Additional impacts will be expected on Madison Street at the proposed third driveway location.

#### B2. Area of Significant Impact

The following existing intersections were identified as study intersections to be analyzed within the report and are shown in the **Exhibit 2-1** site location map.

- Delafield Street/Spring Street and Summit Avenue
- Delafield Street and Buena Vista Avenue
- Delafield Street, Madison Street, and North Street

In addition, the following proposed intersections were identified as study intersections to be analyzed within the report and are also shown in the **Exhibit 2-1** site location map.

#### Site Plan A

- Delafield Street and Proposed Development North Driveway
  - Full Access
  - Minor Stop Control

#### Site Plan B

- Delafield Street and Proposed Development North Driveway
  - Full Access
  - Minor Stop Control
- Delafield Street and Proposed Development South Driveway
  - Right-In/Right-Out
  - Minor Stop Control

#### Site Plan C

- Delafield Street and Proposed Development North Driveway
  - Full Access
  - Minor Stop Control

- Delafield Street and Proposed Development South Driveway
  - Right-In/Right-Out
  - Minor Stop Control
  
- Madison Street and Proposed Development Madison Street Driveway
  - Right-In/Right-Out
  - Minor Stop Control

## Part C: Off-Site Land Use and Development

No off-site or future developments that could potentially impact the proposed development or study area were identified. Therefore, no off-site trip generation or off-site distribution is included within the TIA report.

## Part D: Site Accessibility

### D1. Study Area Roadways

Within the study area, Delafield Street is a two-lane, undivided roadway with a posted speed limit of 25 mph. Between North Street/Madison Street and Buena Vista Avenue, Delafield Street runs in the north/south direction. A short segment of widened roadway is provided along the west side of Delafield Street in front of the previous City Hall building that features 30-minute parking. A similar 30-minute parking segment is provided along the east side of Delafield Street in this same area. Between Buena Vista Avenue and Spring Street/Summit Avenue, the roadway runs in the northwest/southeast direction with parking allowed on both sides of the corridor. At the intersection of Delafield Street, Summit Avenue, and Spring Street, the Delafield Street alignment makes a 90 degree turn and runs north/south, north of the intersection.

Within the study area, North Street is a two-lane undivided roadway, running in the northeast/southwest direction, with a posted speed limit of 25 mph. For the purposes of this study, North Street was defined as an east/west roadway. On-street parking is allowed in both directions, south of Delafield Street/Madison Street. On-street parking is not allowed anywhere else along North Street within the study area.

Within the study area, Madison Street is an undivided roadway, running in the northwest/southeast direction, with a posted speed limit of 25 mph. North of North Street, the roadway is a two-lane cross section, but transitions to four lanes south of North Street. For the purposes of this study, Madison Street was defined as a north/south roadway. On-street parking is allowed in the northbound direction, north of Delafield Street/North Street. On-street parking is not allowed anywhere else along Madison Street within the study area.

The intersection of Delafield Street, Madison Street, and North Street is a five-legged urban intersection that operates under traffic signal control. The existing lane configuration at the intersection is as follows:

- South-westbound Delafield Street
  - 1 Exclusive Left-Turn (Turns onto southbound Madison Street. Although advance signing states the exclusive left-turn lane is intended for Madison Street, some hard left turns onto North Street were observed in field observations.)
  - 1 Shared Left-Turn/Through/Right-Turn Lane (allows movements onto all intersection legs other than eastbound North Street)
- Northbound Madison Street
  - 1 Exclusive Left-Turn Lane (turns westbound onto North Street)
  - 1 Exclusive Through Lane
  - 1 Shared Right-Turn Lane (turns northbound onto Delafield Street or eastbound onto North Street)

- Southbound Madison Street
  - 1 Shared Left-Turn Lane (turns northbound onto Delafield Street or eastbound onto North Street)
  - 1 Exclusive Through Lane
  - 1 Shared Through/Right-Turn Lane (turns westbound onto North Street)
- Westbound North Street
  - 1 Exclusive Channelized Right-Turn Lane under yield control (turns northbound onto Delafield Street)
  - 1 Shared Through/Right-Turn Lane (turns northbound onto Madison Street)
  - 1 Exclusive Left-Turn Lane (turns southbound onto Madison Street)
- Eastbound North Street
  - 1 Shared Left-Turn Lane (turns northbound onto Delafield Street or Madison Street)
  - 1 Shared Through/Right-Turn Lane (turns southbound onto Madison Street)

Within the study area, Buena Vista Avenue is a two-lane, undivided roadway, running in the northeast/southwest direction, with a posted speed limit of 25 mph. On-street parking is allowed along the north side of Buena Vista Avenue between Delafield Street and Barstow Street.

The intersection of Delafield Street and Buena Vista Avenue intersection is a three-legged, urban intersection, with the Buena Vista Avenue operating under stop control. The existing lane configuration at the intersection is as follows:

- Northbound Delafield Street
  - 1 Exclusive Through Lane
  - 1 Exclusive Right-Turn Lane
- Southbound Delafield Street
  - 1 Shared Left-Turn/Through Lane
- Westbound Buena Vista Avenue
  - 1 Exclusive Left-Turn Lane
  - 1 Exclusive Right-Turn Lane

Within the study area, Summit Avenue is a two-lane, undivided roadway, running in the east/west direction, with a posted speed limit of 25 mph. To the east of Spring Street, Summit Avenue becomes Delafield Street. On-street parking is not allowed along Summit Avenue within the study area.

Within the study area, Spring Street is a two-lane, undivided roadway, running in the north/south direction. As a local roadway, the speed limit is assumed to be 25 mph; however, it should be noted that a 15-mph speed limit sign when children are present is posted along Spring Street, just south of Delafield Street, due to the presence of Horeb Spring Park. On-street parking is not allowed along Spring Street, within the study area.

Randall Street intersects Spring Street, approximately 125 feet south of Delafield Street. Bidwell Avenue intersects Delafield Street, approximately 75 feet north of Summit Avenue. Based on field observations during traffic data collection efforts, the impact of Randall Street and Bidwell Avenue on the study intersection was assumed to be negligible.

The intersection of Delafield Street, Summit Avenue, and Spring Street is a four-legged, urban intersection, that operates under traffic signal control. The existing lane configuration at the intersection is as follows:

- Westbound Delafield Street
  - 1 Exclusive Left-Turn Lane
  - 1 Exclusive Through Lane
  - 1 Exclusive Right-Turn Lane

- Eastbound Summit Avenue
  - 1 Exclusive Left-Turn Lane
  - 1 Shared Through/Right-Turn Lane
- Northbound Spring Street
  - 1 Shared Left-Turn/Through/Right-Turn Lane
- Southbound Delafield Street
  - 1 Exclusive Left-Turn Lane
  - 1 Share Through/Right-Turn Lane

#### D2. Study Area Pedestrian and Bicycle Accommodations

Within the study area, sidewalk is provided for pedestrian use along both sides of the Delafield Street corridor. Sidewalk is also present on the approach legs at each of the study intersections. Although no bicycle accommodations are present within the study area, Waukesha County identifies the Delafield Street corridor as an urban escape route, indicating the corridor as a viable connection between cities for bicyclists to utilize.

#### D3. Transit Accommodations

Waukesha Metro Transit Routes 8 and 7/8 Weeknight/Weekend are regularly scheduled transit routes that run along Delafield Street. The routes feature a bus stop in the northbound direction along Delafield Street, approximately 90 feet south of Buena Vista Avenue. This location places the bus stop within the northbound right-turn lane at the intersection of Delafield Street and Buena Vista Avenue. The routes also feature a bus stop in the southbound direction, approximately 10 feet north of Buena Vista Avenue.

Waukesha Metro Transit Routes 7 and 7/8 Weeknight/Weekend are regularly scheduled transit routes that run along Madison Street.

## Chapter 3: Analysis of Existing Conditions

### Part A: Traffic Volumes

#### A1. Existing/Base Year Background Traffic Volumes

Intersection turning movement counts were collected at the intersection of Delafield Street, Summit Avenue, and Spring Street as well as the intersection of Delafield Street and Buena Vista Avenue from 6:00 AM – 9:00 AM and 2:00 PM – 6:00 PM on Thursday, January 18, 2024. Additional intersection turning movement counts were collected at the intersection of Delafield Street, Madison Street, and North Street from 6:00 AM – 9:00 AM and 2:00 PM – 6:00 PM on Tuesday, February 6, 2024.

The turning movement counts were adjusted to create a balanced set of existing weekday AM and PM peak hour traffic volumes. Based on the balanced traffic volumes, the weekday AM peak hour occurs from 7:15 AM to 8:15 AM and the weekday PM peak hour occurs from 3:45 PM to 4:45 PM.

For the purposes of this study, the existing traffic volumes collected in 2024 were assumed to be representative of the background volumes anticipated in 2025 and are therefore referred to as the 2025 base year background volumes for the remainder of this document. The 2025 base year background volumes are shown in **Exhibit 3-1** and reflect the balanced Weekday AM and PM peak hours at the study intersections. Detailed count data for each intersection is included in **Attachment A**.

### Part B: Capacity/Level of Service

#### B1: Methodology

Intersection operation is typically quantified based on its level of service (LOS) during peak traffic volume periods. The LOS is determined based on the average amount of delay experienced by each vehicle entering an intersection during the study period and is categorized by grades of 'A' through 'F'. **Table 1** provides a brief summary of the different intersection LOS.

For the purpose of this study, LOS 'D' as defined in the Highway Capacity Manual (HCM) 7th Edition is used as the threshold for acceptable peak hour intersection operating conditions or maintaining the existing LOS when below LOS 'D'.

The 95<sup>th</sup> percentile queue is also included in the operations summary as an additional performance measure. The 95<sup>th</sup> percentile queue (sometimes referred to as the "maximum probable queue") represents the distance from the stop bar at which 95% of all queues for a given movement within the analysis time period are expected to be contained. In other words, there is only a 5% probability that the 95<sup>th</sup> percentile queue length will be exceeded during the analysis period.

Intersection operations for traffic signal control and stop control at the study intersections were analyzed using Synchro 12 software. The results presented within this report are based on HCM 7 equations and methodologies. It should be noted that HCM 2000 equations and methodologies were applied to the intersection of Delafield Street, Madison Street, and North Street due to the fact that the more recent editions of the HCM do not feature methodologies for analyzing a five-legged intersection.

**Table 1: Intersection Level of Service Description**

Alpha LOS	Signalized (sec/veh)	Unsignalized Delay (sec/veh)	Description
A	≤ 10	≤ 10	No Congestion: Very few vehicles experience delay.
B	> 10 - 20	> 10 - 15	Minimal Congestion: Some vehicles experience delay but many travel through intersection without stopping.
C	> 20 - 35	> 15 - 25	Minor Congestion: Many vehicles experience delay but some travel through intersection without stopping.
D	> 35 - 55	> 25 - 35	Moderate Congestion: Most vehicles experience delay.
E	> 55 - 80	> 35 - 50	Severe Congestion: Most vehicles experience significant delay. Volumes nearing capacity.
F	> 80 Or V/C >1.0	> 50 Or V/C >1.0	Extreme Congestion: Nearly all vehicles experience significant delay. Volume may be higher than capacity. Potential gridlock.

The HCM operations analysis output summaries provided by Synchro are included in **Attachment B**.

B2: 2025 Base Year Background

2025 base year background weekday AM and PM peak hour traffic operations at the study intersections are summarized in **Table 2**. As shown in the table, all peak hour traffic movements at the study intersections under the existing geometry and signal timing parameters operate at LOS 'D' or better, with the exception of the eastbound left-turn at the intersection of Delafield Street, Madison Street, and North Street intersection, which operates at LOS 'E' during both the AM and PM peak hours.

**Table 2: 2025 Base Year Background Peak Hour Traffic Operations**

Intersection	Peak Hour	Traffic Control	MOE	Movement													OVERALL	
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWBL		SWBT
Summit Ave. & Spring St. & Delafield St.	AM Peak	Signal	LOS	B	B	B	B	B	B	B	B	B	A	A	-	-	-	B
			Delay (sec)	13.0	11.7	13.0	11.6	10.4	16.1	10.3	7.7	-	-	-	11.6			
			Queue (ft)	25'	125'	25'	100'	50'	50'	50'	25'	-	-	-	--			
	PM Peak	Signal	LOS	B	B	B	B	B	B	B	B	A	A	-	-	-	B	
			Delay (sec)	14.4	13.0	14.8	12.6	11.1	16.2	10.2	7.5	-	-	-	12.2			
			Queue (ft)	25'	150'	25'	125'	50'	50'	50'	25'	-	-	-	--			
				Movement													OVERALL	
Buena Vista Ave. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	-	C	-	A	-	A	A	A	-	-	-	-	A
			Delay (sec)	-	-	-	15.1	-	10.0	-	0.0	0.0	8.1	-	-	-	-	2.8
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	-	A
			Delay (sec)	-	-	-	17.5	-	10.7	-	0.0	0.0	8.1	-	-	-	-	2.8
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	--
				Movement													OVERALL	
North St. & Madison St. & Delafield St.	AM Peak	Signal	LOS	E	B	B	D	C	C	C	C	D	D	C	C	D	D	
			Delay (sec)	62.6	10.9	10.6	45.6	30.5	32.1	24.3	32.1	41.5	34.4	39.9				
			Queue (ft)	*125'	50'	25'	*450'	25'	100'	125'	75'	*150'	100'	--				
	PM Peak	Signal	LOS	E	B	B	D	D	D	C	D	D	D	D				
			Delay (sec)	57.5	11.0	10.9	50.3	36.7	40.7	29.5	37.8	44.7	54.2	46.3				
			Queue (ft)	*150'	25'	25'	*625'	25'	150'	175'	50'	150'	*200'	--				

\* 95th percentile volume exceeds capacity, queue may be longer



Maximum 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Summit Avenue, and Spring Street, and the intersection of Delafield Street and Buena Vista Avenue fit within the available storage area.

Several existing movements at the intersection of Delafield Street, Madison Street, and North Street intersection experience conditions where the traffic volume exceeds the capacity at the 95<sup>th</sup> percentile flows, in which case the 95<sup>th</sup> percentile queues may be longer than what is calculated. These movements, and the calculated 95<sup>th</sup> percentile queues are as follows:

- AM Peak
  - EBL: 125-foot queue
  - Shared WBT/WBR: 450-foot queue
  - Shared SBT/SBR: 150-foot queue
- PM Peak
  - EBL: 150-foot queue
  - Shared WBT/WBR: 625-foot queue
  - Shared SWBL/SWBT/SWBR: 200-foot queue

The remaining 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Madison Street, and North Street are expected to fit within the available storage area.

## Chapter 4: Projected Traffic

### Part A: Background Traffic Forecasting

Historical traffic count data obtained from the Wisconsin Department of Transportation (WisDOT) suggests that minimal growth has occurred along the study corridor in recent years. For the purposes of this study, a 0.5% annual growth rate was applied to the Delafield Street corridor to reflect a minimal growth rate. The 2035 horizon year background volumes were forecast based on the 2025 base year background volumes and the 0.5% annual growth rate. The 2035 Horizon Year Background traffic volumes are shown in **Exhibit 4-1**.

### Part B: On-Site and Off-Site Development Traffic Forecasting

#### B1. Trip Generation

Data published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* – 11<sup>th</sup> Edition was used to estimate the number of total weekday and weekday AM and PM peak hour trips expected to be generated by the proposed Delafield Street Apartments development. It should be noted that no off-site developments impacting traffic within the study area were identified, therefore, no off-site trip generation was conducted for this study.

The following section summarizes the proposed on-site trip generation under a complete buildout. The on-site trip generation table can be seen in **Table 3**.

The apartments within the proposed development are expected to include 221 dwelling units. The 221 dwelling units are expected to generate 90 new trips (20 in, 70 out) during the weekday AM peak hour and 115 trips (70 in, 45 out) during the weekday PM peak hour.

**Table 3: On-Site Trip Generation**

Land Use	ITE Classification	ITE Code	Size	Unit	Weekday Trips			AM Peak Hour Trips			PM Peak Hour Trips		
					In	Out	Total	In	Out	Total	In	Out	Total
Residential	Multifamily Low-Rise	220	221	DU	50%	50%	ITE Rate	24%	76%	ITE Rate	63%	37%	ITE Rate
					745	745	1,490	20	70	90	70	45	115
<b>Total New Vehicle Trips</b>					745	745	1,490	20	70	90	70	45	115

DU – Dwelling Units

#### B2. Mode Split

It was assumed that 100% of the trips generated by the development using the ITE equations will be vehicular trips.

#### B3. Pass-By and Linked-Trip Traffic Estimation

##### Pass-By Trips

Pass-by trips are trips where vehicles already on the roadway adjacent to the development site make an intermediate stop within the development site before continuing onto their intended destination. Given the proposed development provides living spaces and in-house amenities only for its residents, no pass-by trips were considered for the development.

## Linked Trips

Linked trips are trips that originate from a single point of origin but have multiple destination points within a proposed development. With only one destination within the proposed development, the potential for linked trips is not possible, and therefore, not anticipated for the study.

### B4. Trip Distribution

The trip distribution used to assign new development trips to the study area was estimated based on existing traffic patterns throughout the study area. The expected access restrictions, as well as the distribution of available parking, were also taken into consideration when developing the trip distribution. The expected trip distribution for the development trips for Site Plan A, Site Plan B, and Site Plan C are shown in **Exhibit 4-2A**, **Exhibit 4-2B**, and **Exhibit 4-2C**, respectively.

Throughout the report, exhibits ending in “A” refer to Site Plan A, exhibits ending in “B” refer to Site Plan B, and exhibits ending in “C” refer to Site Plan C. Exhibits not listed with either letter are applicable to all site plans.

### B5. Trip Assignment

New development trips were assigned to the study area roadway networks based on the trip distributions previously identified for the three site plans. These new development trips are shown in **Exhibit 4-3A**, **Exhibit 4-3B**, and **Exhibit 4-3C**.

## Part C: Build Traffic

### Site Plan A

The 2025 base year build volumes, as shown in **Exhibit 4-4A**, are the summation of the 2025 base year background volumes in **Exhibit 3-1** and the trip assignment volumes in **Exhibit 4-3A**. These volumes represent the total traffic within the study area after the proposed development is fully open under Site Plan A.

The 2035 horizon year build volumes, as shown in **Exhibit 4-5A**, are the summation of the 2035 horizon year background volumes in **Exhibit 4-1** and the trip assignment volumes in **Exhibit 4-3A**. These volumes represent the total traffic within the study area 10 years after the proposed development is fully open under Site Plan A.

### Site Plan B

The 2025 base year build volumes, as shown in **Exhibit 4-4B**, are the summation of the 2025 base year background volumes in **Exhibit 3-1** and the trip assignment volumes in **Exhibit 4-3B**. These volumes represent the total traffic within the study area after the proposed development is fully open under Site Plan B.

The 2035 horizon year build volumes, as shown in **Exhibit 4-5B**, are the summation of the 2035 horizon year background volumes in **Exhibit 4-1** and the trip assignment volumes in **Exhibit 4-3B**. These volumes represent the total traffic within the study area 10 years after the proposed development is fully open under Site Plan B.

### Site Plan C

The 2025 base year build volumes, as shown in **Exhibit 4-4C**, are the summation of the 2025 base year background volumes in **Exhibit 3-1** and the trip assignment volumes in **Exhibit 4-3C**. These volumes represent the total traffic within the study area after the proposed development is fully open under Site Plan C.

The 2035 horizon year build volumes, as shown in **Exhibit 4-5C**, are the summation of the 2035 horizon year background volumes in **Exhibit 4-1** and the trip assignment volumes in **Exhibit 4-3C**. These volumes represent the total traffic within the study area 10 years after the proposed development is fully open under Site Plan C.

## Chapter 5: Traffic and Improvement Analysis

### Part A: Site Access

#### North Driveway

The north driveway access point to the development site is applicable to all site plans. However, it should be noted that under Site Plan A, the driveway is accessible to both surface and underground parking lots for both the north and south apartment buildings, while under Site Plan B and Site Plan C, the driveway only provides access to surface and underground parking lots for the north apartment building. The driveway is expected to be constructed along Delafield Street approximately 250 feet south of the Delafield Street and Buena Vista Avenue intersection or approximately 425 feet north of the Delafield Street, Madison Street, and North Street intersection. It is recommended that the new driveway include restriping of Delafield Street to provide a 50-foot storage lane for northbound left-turns into the development. The taper length for this new turn lane should be 96 feet, or an 8:1 taper rate based on a 12-foot turn lane. To accommodate the northbound left-turn lane without impacting the existing roadway geometry, the southbound left-turn lane approaching the intersection of Delafield Street, Madison Street, and North Street will need to be shortened by approximately 200 feet. Given the existing 500-foot storage length, the modification would leave approximately 300 feet of storage in addition to the taper length.

#### South Driveway

The south driveway access point to the development site is applicable to Site Plan B and Site Plan C. The driveway under this alternative is to be located along Delafield Street approximately 520 feet south of the Delafield Street and Buena Vista Avenue intersection or approximately 165 feet north of the Delafield Street, Madison Street, and North Street intersection. To mitigate operational and safety issues, the driveway was assumed to operate under right-in/right-out only access to prevent potential issues associated with left-turning vehicles to and from the driveway.

#### Madison Street Driveway

The Madison Street driveway access point to the development site is applicable to only Site Plan C. The driveway under this alternative is to be located along Madison Street approximately 120 feet northwest of the Madison Street intersection with Delafield Street and North Street. To mitigate operational and safety issues, the driveway was assumed to operate under right-in/right-out only access to prevent potential issues associated with left-turning vehicles to and from the driveway.

### Part B: Capacity/Level of Service Analysis

#### 2035 Horizon Year Background

2035 horizon year background weekday AM and PM peak hour traffic operations at the study intersections are summarized in **Table 4**. As shown in the table, all peak hour traffic movements at the study intersections under the existing geometry and signal timing parameters are expected to operate at LOS 'D' or better, with the exception of the eastbound left-turn and the shared westbound through/right-turn during both the AM and PM peak hours, as well as the shared south westbound left-turn/through/right-turn during the PM peak hour at the intersection of Delafield Street, Madison Street, and North Street intersection. Each of these movements are expected to operate at LOS 'E'.

Maximum 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Summit Avenue, and Spring Street, and the intersection of Delafield Street and Buena Vista Avenue are expected to fit within the available storage area.

Several movements at the Delafield Street, Madison Street, and North Street intersection are expected to experience periods where the 95<sup>th</sup> percentile traffic volume flows exceed the capacity, in which case the 95<sup>th</sup> percentile queues may be longer than what is calculated. These movements, and the calculated 95<sup>th</sup> percentile queues are as follows:

- AM Peak
  - EBL: 150-foot queue
  - Shared WBT/WBR: 500-foot queue
  - Shared SBT/SBR: 175-foot queue
- PM Peak
  - EBL: 175-foot queue
  - Shared WBT/WBR: 650-foot queue
  - Shared SWBL/SWBT/SWBR: 200-foot queue

The remaining 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Madison Street, and North Street are expected to fit with the available storage area.

**Table 4: 2035 Horizon Year Background Peak Hour Traffic Operations**

Intersection	Peak Hour	Traffic Control	MOE	Movement												OVERALL		
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		SWBL	SWBT
Summit Ave. & Spring St. & Delafield St.	AM Peak	Signal	LOS	B	B	B	B	B	B	B	B	B	A	-	-	-	B	
			Delay (sec)	13.3	11.9	13.3	11.8	10.5	16.2	10.3	7.6	-	-	-	11.7			
			Queue (ft)	25'	125'	25'	125'	50'	50'	50'	25'	-	-	-	--			
	PM Peak	Signal	LOS	B	B	B	B	B	B	B	A	-	-	-	B			
			Delay (sec)	14.8	13.2	15.2	12.9	11.2	16.2	10.2	7.5	-	-	-	12.4			
			Queue (ft)	25'	150'	25'	150'	50'	50'	50'	25'	-	-	-	--			
				Movement												OVERALL		
Buena Vista Ave. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	-	A
			Delay (sec)	-	-	-	15.7	-	10.1	-	0.0	0.0	8.2	-	-	-	-	2.9
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	-	A
			Delay (sec)	-	-	-	18.9	-	10.9	-	0.0	0.0	8.2	-	-	-	-	2.9
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	--
				Movement												OVERALL		
North St. & Madison St. & Delafield St.	AM Peak	Signal	LOS	E	B	B	E	C	C	C	C	D	-	-	C	D		
			Delay (sec)	65.5	10.8	10.5	55.5	30.6	32.4	24.4	32.2	45.1	-	-	34.9	44.5		
			Queue (ft)	*150'	50'	25'	*500'	25'	100'	125'	75'	*175'	-	-	100'	--		
	PM Peak	Signal	LOS	E	B	B	E	D	D	C	D	D	-	-	E	D		
			Delay (sec)	60.1	11.2	11.0	63.1	36.6	41.2	29.5	37.7	45.6	-	-	58.8	52.1		
			Queue (ft)	*175'	25'	25'	*650'	25'	150'	175'	50'	150'	-	-	*200'	--		

\* 95<sup>th</sup> percentile volume exceeds capacity, queue may be longer

2025 Base Year Build – Site Plan A: Single Driveway Scenario

The 2025 base year build single driveway scenario, weekday AM and PM peak hour traffic operations at the study intersections are summarized in **Table 5**. Under this scenario, the addition of the proposed north development driveway creates an additional intersection to be analyzed along Delafield Street. As shown in the table, all peak hour traffic movements at the study intersections under the existing geometry and signal timing parameters are expected to continue to operate at a LOS 'D' or better, or the same as observed under the 2025 base year background volumes when the LOS was worse than LOS 'D', with the exception of the shared westbound through/right-turn lane and the shared south westbound left-turn/through/right-turn at the intersection of Delafield Street, Madison Street, and North Street. Both of these movements are expected to worsen from LOS 'D' to LOS 'E', during the PM peak hour.

Maximum 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Summit Avenue, and Spring Street, and the intersection of Delafield Street and Buena Vista Avenue are expected to fit within the available storage area.

Several existing movements at the Delafield Street, Madison Street, and North Street intersection experience periods where the 95<sup>th</sup> percentile traffic volume flows are expected to exceed the capacity, in which case the 95<sup>th</sup> percentile queues may be longer than what is calculated. These movements, and the calculated 95<sup>th</sup> percentile queues are as follows:

- AM Peak
  - EBL: 150-foot queue
  - Shared WBT/WBR: 450-foot queue
  - Shared SBT/SBR: 150-foot queue
  - Shared SWBL/SWBT/SWBR: 125-foot queue
- PM Peak
  - EBL: 175-foot queue
  - Shared WBT/WBR: 625-foot queue
  - Shared SWBL/SWBT/SWBR: 200-foot queue

**Table 5: 2025 Base Year Build Peak Hour Traffic Operations – Single Driveway Scenario**

Intersection	Peak Hour	Traffic Control	MOE	Movement												OVERALL			
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		SWBL	SWBT	SWBR
Summit Ave. & Spring St. & Delafield St.	AM Peak	Signal	LOS	B	B	B	B	B	B	B	B	B	A	-	-	-	B		
			Delay (sec)	13.5	11.7	13.1	11.9	10.4	16.1	10.3	7.7	-	-	-	-	-	-	11.7	
			Queue (ft)	25'	125'	25'	125'	50'	50'	50'	25'	-	-	-	-	-	-	-	--
	PM Peak	Signal	LOS	B	B	B	B	B	B	B	B	A	-	-	-	-	B		
			Delay (sec)	14.7	13.4	15.4	12.8	11.2	16.2	10.2	7.5	-	-	-	-	-	-	12.4	
			Queue (ft)	25'	150'	25'	125'	50'	50'	50'	25'	-	-	-	-	-	-	-	--
				Movement												OVERALL			
Buena Vista Ave. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	A		
			Delay (sec)	-	-	-	16.0	-	10.2	-	0.0	0.0	8.2	-	-	-	-	2.8	
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	-	A	
			Delay (sec)	-	-	-	18.9	-	10.9	-	0.0	0.0	8.2	-	-	-	-	-	2.8
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	-	--
				Movement												OVERALL			
North St. & Madison St. & Delafield St.	AM Peak	Signal	LOS	E	B	B	D	C	C	C	C	D	D	D	D	D	D		
			Delay (sec)	65.5	10.8	10.5	45.6	30.6	32.2	24.4	32.2	42.0	37.0	37.0	40.5				
			Queue (ft)	*150'	50'	25'	*450'	25'	100'	125'	75'	*150'	*125'	--					
	PM Peak	Signal	LOS	E	B	B	E	D	D	C	D	D	E	D					
			Delay (sec)	63.6	11.1	11.0	55.0	36.7	40.7	29.7	37.8	44.7	60.5	49.7					
			Queue (ft)	*175'	25'	25'	*625'	25'	150'	175'	50'	150'	*200'	--					
				Movement												OVERALL			
North Drwy. & Delafield St.	AM Peak	Minor Stop	LOS	B	-	-	-	A	A	-	-	A	-	-	-	-	A		
			Delay (sec)	11.6	-	-	-	7.8	0.0	-	-	0.0	-	-	-	-	1.6		
			Queue (ft)	25'	-	-	-	25'	0'	-	-	0'	-	-	-	-	--		
	PM Peak	Minor Stop	LOS	B	-	-	-	A	A	-	-	A	-	-	-	-	A		
			Delay (sec)	13.1	-	-	-	8.2	0.0	-	-	0.0	-	-	-	-	1.2		
			Queue (ft)	25'	-	-	-	25'	0'	-	-	0'	-	-	-	-	--		

\* 95th percentile volume exceeds capacity, queue may be longer

The remaining 95th percentile queues at the intersection of Delafield Street, Madison Street, and North Street are expected to fit within the available storage area. Based on the maximum expected 95th percentile queue of 200 feet for the south-westbound approach at the intersection of Delafield Street, Madison Street, and North Street, the reduction in the existing storage length for this movement to accommodate the north proposed development driveway is not expected to lead to significant reductions in operational performance along Delafield Street.

Improving the additional LOS 'E' movements at the intersection of Delafield Street, Madison Street, and North Street would require an adjustment in signal timings. The northbound/southbound approaches of Madison Street are the only approaches operating with all movements at LOS 'D' or better. If two seconds of green time is taken from the northbound/southbound Madison Street approaches and given as one

second to the westbound North Street through phase and one second to the south westbound Delafield Street approach, all movements are expected to operate at a similar LOS as the background condition in 2025, as shown in **Table 6**.

**Table 6: 2025 Base Year Build Peak Hour Traffic Operations – Single Driveway Scenario - Improved**

			Movement													OVERALL	
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWBL		SWBT
North St. & Madison St.	AM Peak	Signal	LOS														
		Delay (sec)															
		Queue (ft)															
& Delafield St.	PM Peak	Signal	LOS	E	B	B	D	D	D	C	D	D		D		D	
		Delay (sec)	70.7	11.0	10.8	50.7	37.6	43.4	30.0	38.7	50.3		53.0		48.2		
		Queue (ft)	*175'	25'	25'	*600'	25'	*150'	175'	50'	*175'		*200'		--		

2025 Base Year Build - Site Plan B: Two Driveway Scenario

The 2025 base year build two driveway scenario, weekday AM and PM peak hour traffic operations at the study intersections are summarized in **Table 7**. Under this scenario, the addition of the proposed north and south development driveways creates two additional intersections to be analyzed along Delafield Street. As shown in the table, all peak hour traffic movements at the study intersections under the existing geometry and signal timing parameters are expected to continue to operate at a LOS 'D' or better, or the same as observed under the 2025 base year background volumes when the LOS was worse than LOS 'D', with the exception of the shared westbound through/right-turn lane and the shared south westbound left-turn/through/right-turn at the intersection of Delafield Street, Madison Street, and North Street. Both of these movements are expected to worsen from LOS 'D' to LOS 'E', during the PM peak hour.

Maximum 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Summit Avenue, and Spring Street, and the intersection of Delafield Street and Buena Vista Avenue are expected to fit within the available storage area.

Several movements at the Delafield Street, Madison Street, and North Street intersection are expected to experience periods where the 95<sup>th</sup> percentile traffic volume flows are expected to exceed the capacity, in which case the 95<sup>th</sup> percentile queues may be longer than what is calculated. These movements, and the calculated 95<sup>th</sup> percentile queues area as follows:

- AM Peak
  - EBL: 150-foot queue
  - Shared WBT/WBR: 450-foot queue
  - Shared SBT/SBR: 150-foot queue
- PM Peak
  - EBL: 175-foot queue
  - Shared WBT/WBR: 625-foot queue
  - Shared SWBL/SWBT/SWBR: 225-foot queue

The remaining 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Madison Street, and North Street are expected to fit with the available storage area. Based on the maximum expected 95<sup>th</sup> percentile queue of 225 feet for the south-westbound approach at the intersection of Delafield Street, Madison Street, and North Street, the reduction in the existing storage length for this movement to accommodate the north proposed development driveway is not expected to lead to significant reductions in operational performance along Delafield Street.

It is recommended that the south proposed development driveway operate under right-in/right-out only access to prevent potential issues associated with left-turning vehicles to and from the driveway.

**Table 7: 2025 Base Year Build Peak Hour Traffic Operations – Two Driveway Scenario**

Intersection	Peak Hour	Traffic Control	MOE	Movement												OVERALL			
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		SWBL	SWBT	SWBR
Summit Ave. & Spring St. & Delafield St.	AM Peak	Signal	LOS	B	B	B	B	B	B	B	B	B	A	-	-	-	B		
			Delay (sec)	13.6	12.0	13.4	12.0	10.6	16.1	10.2	7.6	-	-	-	-	-	-	11.9	
			Queue (ft)	25'	125'	25'	125'	50'	50'	50'	25'	25'	-	-	-	-	-	-	--
	PM Peak	Signal	LOS	B	B	B	B	B	B	B	B	A	-	-	-	-	B		
			Delay (sec)	15.0	13.7	15.8	13.1	11.4	16.2	10.0	7.4	-	-	-	-	-	-	12.7	
			Queue (ft)	25'	150'	25'	150'	50'	50'	50'	25'	25'	-	-	-	-	-	-	--
Buena Vista Ave. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	A		
			Delay (sec)	-	-	-	15.8	-	10.1	-	0.0	0.0	8.2	-	-	-	-	2.8	
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	-	A	
			Delay (sec)	-	-	-	19.0	-	10.8	-	0.0	0.0	8.2	-	-	-	-	-	2.7
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	-	--
North St. & Madison St. & Delafield St.	AM Peak	Signal	LOS	E	B	B	D	C	C	C	C	D	-	-	D	D			
			Delay (sec)	65.5	10.8	10.5	45.6	30.6	32.2	24.4	32.2	42.0	-	-	38.2	-	40.7		
			Queue (ft)	*150'	50'	25'	*450'	25'	100'	125'	75'	*150'	-	-	125'	-	--		
	PM Peak	Signal	LOS	E	B	B	E	D	D	C	D	D	-	-	E	D			
			Delay (sec)	64.8	11.2	11.0	56.8	36.7	41.3	29.5	37.8	44.7	-	-	61.4	-	50.7		
			Queue (ft)	*175'	25'	25'	*625'	25'	150'	175'	50'	150'	-	-	*225'	-	--		
North Drwy. & Delafield St.	AM Peak	Minor Stop	LOS	B	-	-	-	A	A	-	-	A	-	-	-	A			
			Delay (sec)	11.4	-	-	-	7.8	0.0	-	-	0.0	-	-	-	-	1.2		
			Queue (ft)	25'	-	-	-	25'	0'	-	-	0'	-	-	-	-	--		
	PM Peak	Minor Stop	LOS	B	-	-	-	A	A	-	-	A	-	-	-	A			
			Delay (sec)	13.1	-	-	-	8.2	0.0	-	-	0.0	-	-	-	-	0.9		
			Queue (ft)	25'	-	-	-	25'	0'	-	-	0'	-	-	-	-	--		
South Drwy. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	A	-	-	-	-	A	-	-	-	-	A			
			Delay (sec)	-	-	9.7	-	-	-	-	0.0	-	-	0.0	-	-	-	0.4	
			Queue (ft)	-	-	25'	-	-	-	-	0'	-	-	0'	-	-	-	--	
	PM Peak	Minor Stop	LOS	-	-	B	-	-	-	-	A	-	-	A	-	-	A		
			Delay (sec)	-	-	10.5	-	-	-	-	0.0	-	-	0.0	-	-	-	0.2	
			Queue (ft)	-	-	25'	-	-	-	-	0'	-	-	0'	-	-	-	--	

Improving the additional LOS 'E' movements at the intersection of Delafield Street, Madison Street, and North Street would require an adjustment in signal timings. The northbound/southbound approaches of Madison Street are the only approaches operating with all movements at LOS 'D' or better. If two seconds of green time is taken from the northbound/southbound Madison Street approaches and given as one second to the westbound North Street through phase and one second to the south westbound Delafield Street approach, all movements are expected to operate at a similar LOS as the background condition in 2025, as shown in **Table 8**.

**Table 8: 2025 Base Year Build Peak Hour Traffic Operations – Two Driveway Scenario - Improved**

Intersection	Peak Hour	Traffic Control	MOE	Movement												OVERALL	
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		SWBL
North St. & Madison St. & Delafield St.	PM Peak	Signal	LOS	E	B	B	D	D	D	C	D	D	-	-	D	D	
			Delay (sec)	75.2	11.0	10.9	51.8	37.6	44.6	29.7	38.8	50.3	-	-	53.6	-	49.2
			Queue (ft)	*175'	25'	25'	*600'	25'	*150'	175'	50'	*175'	-	-	*200'	-	--

2025 Base Year Build – Site Plan C: Three Driveway Scenario

The 2025 base year build three driveway scenario, weekday AM and PM peak hour traffic operations at the study intersections are summarized in **Table 11**. Under this scenario, the addition of the proposed Madison Street driveway creates a total of three driveways to be analyzed along with the study



intersections. As shown in the table, all peak hour traffic movements at the study intersections under the existing geometry and signal timing parameters are expected to continue to operate at a LOS 'D' or better, or the same as observed under the 2025 base year background volumes when the LOS was worse than LOS 'D', with the exception of the shared westbound through/right-turn lane and the shared south westbound left-turn/through/right-turn at the intersection of Delafield Street, Madison Street, and North Street. Both of these movements are expected to worsen from LOS 'D' to LOS 'E', during the PM peak hour.

**Table 9: 2025 Base Year Build Peak Hour Traffic Operations – Three Driveway Scenario**

Intersection	Peak Hour	Traffic Control	MOE	Movement												OVERALL		
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		SWBL	SWBT
Summit Ave. & Spring St. & Delafield St.	AM Peak	Signal	LOS	B	B	B	B	B	B	B	B	B	A	-	-	-	B	
			Delay (sec)	13.6	12.0	13.4	12.0	10.6	16.1	10.2	7.6	-	-	-	11.9			
			Queue (ft)	25'	125'	25'	125'	50'	50'	50'	25'	-	-	-	--			
	PM Peak	Signal	LOS	B	B	B	B	B	B	B	A	-	-	-	B			
			Delay (sec)	14.9	13.6	15.7	13.0	11.3	16.2	10.1	7.5	-	-	-	12.6			
			Queue (ft)	25'	150'	25'	125'	50'	50'	50'	25'	-	-	-	--			
Buena Vista Ave. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	A	
			Delay (sec)	-	-	-	15.8	-	10.1	-	0.0	0.0	8.2	-	-	-	-	2.8
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	A	
			Delay (sec)	-	-	-	18.8	-	10.8	-	0.0	0.0	8.2	-	-	-	-	2.8
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	--
North St. & Madison St. & Delafield St.	AM Peak	Signal	LOS	E	B	B	B	D	C	C	C	C	D	-	-	D	D	
			Delay (sec)	65.5	10.8	10.5	45.6	30.6	32.2	24.4	32.2	42.0	-	-	37.0	40.5		
			Queue (ft)	*150'	50'	25'	*450'	25'	100'	125'	75'	*150'	-	-	125'	--		
	PM Peak	Signal	LOS	E	B	B	E	D	D	C	D	D	-	-	E	D		
			Delay (sec)	64.8	11.1	11.0	56.1	36.7	41.3	29.5	37.8	44.7	-	-	60.5	50.2		
			Queue (ft)	*175'	25'	25'	*625'	25'	150'	175'	50'	150'	-	-	*200'	--		
North Drwy. & Delafield St.	AM Peak	Minor Stop	LOS	B	-	-	-	-	A	A	-	-	A	-	-	-	A	
			Delay (sec)	11.4	-	-	-	-	7.8	0.0	-	-	0.0	-	-	-	-	1.2
			Queue (ft)	25'	-	-	-	-	25'	0'	-	-	0'	-	-	-	-	--
	PM Peak	Minor Stop	LOS	B	-	-	-	-	A	A	-	-	A	-	-	-	A	
			Delay (sec)	13.0	-	-	-	-	8.2	0.0	-	-	0.0	-	-	-	-	0.9
			Queue (ft)	25'	-	-	-	-	25'	0'	-	-	0'	-	-	-	-	--
South Drwy. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	A	-	-	-	-	A	-	-	A	-	-	A	
			Delay (sec)	-	-	9.7	-	-	-	-	0.0	-	-	0.0	-	-	-	0.2
			Queue (ft)	-	-	25'	-	-	-	-	0'	-	-	0'	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	B	-	-	-	-	A	-	-	A	-	-	A	
			Delay (sec)	-	-	10.5	-	-	-	-	0.0	-	-	0.0	-	-	-	0.2
			Queue (ft)	-	-	25'	-	-	-	-	0'	-	-	0'	-	-	-	--
Madison St. Drwy. & Madison St.	AM Peak	Minor Stop	LOS	-	-	-	-	-	A	-	A	-	A	-	-	-	A	
			Delay (sec)	-	-	-	-	-	9.8	-	0.0	-	0.0	-	-	-	-	0.2
			Queue (ft)	-	-	-	-	-	25'	-	0'	-	0'	-	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	-	-	-	A	-	A	-	A	-	-	-	A	
			Delay (sec)	-	-	-	-	-	9.6	-	0.0	-	0.0	-	-	-	-	0.1
			Queue (ft)	-	-	-	-	-	25'	-	0'	-	0'	-	-	-	-	--

\* 95th percentile volume exceeds capacity, queue may be longer

Maximum 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Summit Avenue, and Spring Street, and the intersection of Delafield Street and Buena Vista Avenue are expected to fit within the available storage area.

Several movements at the Delafield Street, Madison Street, and North Street intersection are expected to experience periods where the 95<sup>th</sup> percentile traffic volume flows are expected to exceed the capacity, in

which case the 95<sup>th</sup> percentile queues may be longer than what is calculated. These movements, and the calculated 95<sup>th</sup> percentile queues are as follows:

- AM Peak
  - EBL: 150-foot queue
  - Shared WBT/WBR: 450-foot queue
  - Shared SBT/SBR: 150-foot queue
- PM Peak
  - EBL: 175-foot queue
  - Shared WBT/WBR: 625-foot queue
  - Shared SWBL/SWBT/SWBR: 200-foot queue

The remaining 95th percentile queues at the intersection of Delafield Street, Madison Street, and North Street are expected to fit with the available storage area. Based on the maximum expected 95th percentile queue of 200 feet for the south-westbound approach at the intersection of Delafield Street, Madison Street, and North Street, the reduction in the existing storage length for this movement to accommodate the north proposed development driveway is not expected to lead to significant reductions in operational performance along Delafield Street.

It is recommended that the south proposed development driveway, as well as the Madison Street proposed development driveway operate under right-in/right-out only access to prevent potential issues associated with left-turning vehicles to and from the driveway.

Improving the additional LOS 'E' movements at the intersection of Delafield Street, Madison Street, and North Street would require an adjustment in signal timings. The northbound/southbound approaches of Madison Street are the only approaches operating with all movements at LOS 'D' or better. If two seconds of green time is taken from the northbound/southbound Madison Street approaches and given as one second to the westbound North Street through phase and one second to the south westbound Delafield Street approach, all movements are expected to operate at a similar LOS as the background condition in 2025, as shown in **Table 10**.

**Table 10: 2025 Base Year Build Peak Hour Traffic Operations – Three Driveway Scenario - Improved**

			Movement													OVERALL		
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWBL		SWBT	SWBR
North St. & Madison St. & Delafield St.	PM Peak	Signal																
		LOS	E	B	B	D	D	D	C	D	D				D			D
		Delay (sec)	75.2	11.0	10.8	51.2	37.6	44.6	29.8	38.8	50.3				53.0			48.9
		Queue (ft)	*175'	25'	25'	*600'	25'	*150'	175'	50'	*175'				*200'			--

2035 Horizon Year Build – Site Plan A: Single Driveway Scenario

The 2035 horizon year build single driveway scenario, weekday AM and PM peak hour traffic operations at the study intersections are summarized in **Table 11**. Under this scenario, the addition of the proposed north development driveway creates an additional intersection along Delafield Street to be analyzed. As shown in the table, all peak hour traffic movements at the study intersections under the existing geometry and signal timing parameters are expected to continue to operate at a LOS 'D' or better, or the same as expected under the 2035 horizon year background volumes when the LOS was worse than LOS 'D', with the exception of the overall LOS at the intersection of Delafield Street, Madison Street, and North Street. The overall LOS is expected to worsen from LOS 'D' to LOS 'E', during the PM peak hour.

Minor signal timing adjustments were evaluated during the weekday PM peak hour, but they did not result in reducing the overall LOS 'E' to LOS 'D'. Geometric changes are expected to be necessary to address the overall LOS 'E', but the feasibility to accommodate such improvements is limited.

**Table 11: 2035 Horizon Year Build Peak Hour Traffic Operations – Single Driveway Scenario**

Intersection	Peak Hour	Traffic Control	MOE	Movement												OVERALL				
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		SWBL	SWBT	SWBR	
Summit Ave. & Spring St. & Delafield St.	AM Peak	Signal	LOS	B	B	B	B	B	B	B	B	B	A	-	-	-	B			
			Delay (sec)	13.9	12.0	13.4	12.1	10.5	16.2	10.3	7.6	-	-	-	-	-	-	11.9		
			Queue (ft)	25'	125'	25'	125'	50'	50'	50'	25'	25'	-	-	-	-	-	-	--	
	PM Peak	Signal	LOS	B	B	B	B	B	B	B	B	A	-	-	-	-	B			
			Delay (sec)	15.1	13.7	15.8	13.1	11.3	16.3	10.2	7.5	-	-	-	-	-	-	12.6		
			Queue (ft)	25'	175'	25'	150'	50'	50'	75'	50'	-	-	-	-	-	-	-	--	
				Movement												OVERALL				
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWBL	SWBT	SWBR		
Buena Vista Ave. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	-	A		
			Delay (sec)	-	-	-	16.6	-	10.3	-	0.0	0.0	8.3	-	-	-	-	-	2.9	
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	-	-	A	
			Delay (sec)	-	-	-	20.5	-	11.1	-	0.0	0.0	8.3	-	-	-	-	-	-	2.9
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	-	-	-
				Movement												OVERALL				
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWBL	SWBT	SWBR		
North St. & Madison St. & Delafield St.	AM Peak	Signal	LOS	D	B	B	E	C	C	C	C	D	-	-	-	D	D			
			Delay (sec)	47.8	10.8	10.5	67.4	30.6	32.4	24.5	32.2	45.1	-	-	-	-	38.1	47.4		
			Queue (ft)	*150'	50'	25'	*500'	25'	100'	125'	75'	*175'	-	-	-	-	*125'	-	--	
	PM Peak	Signal	LOS	E	B	B	E	D	D	C	D	D	-	-	-	E	E			
			Delay (sec)	65.4	11.3	11.2	70.8	36.6	41.2	29.6	37.7	45.6	-	-	-	65.3	56.3			
			Queue (ft)	*175'	25'	25'	*675'	25'	150'	200'	50'	150'	-	-	-	*225'	-	--		
				Movement												OVERALL				
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWBL	SWBT	SWBR		
North Drwy. & Delafield St.	AM Peak	Minor Stop	LOS	B	-	-	-	A	A	-	-	A	-	-	-	-	A			
			Delay (sec)	11.8	-	-	-	7.8	0.0	-	-	0.0	-	-	-	-	-	1.6		
			Queue (ft)	25'	-	-	-	25'	0'	-	-	0'	-	-	-	-	-	-	--	
	PM Peak	Minor Stop	LOS	B	-	-	-	A	A	-	-	A	-	-	-	-	-	A		
			Delay (sec)	13.5	-	-	-	8.2	0.0	-	-	0.0	-	-	-	-	-	-	1.2	
			Queue (ft)	25'	-	-	-	25'	0'	-	-	0'	-	-	-	-	-	-	--	

\* 95th percentile volume exceeds capacity, queue may be longer

Maximum 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Summit Avenue, and Spring Street, and the intersection of Delafield Street and Buena Vista Avenue are expected to fit within the available storage area.

Several movements at the Delafield Street, Madison Street, and North Street intersection are expected to experience periods where the 95<sup>th</sup> percentile traffic volume flows exceed the capacity, in which case the 95<sup>th</sup> percentile queues may be longer than what is calculated. These movements, and the calculated 95<sup>th</sup> percentile queues are as follows:

- AM Peak
  - EBL: 150-foot queue
  - Shared WBT/WBR: 500-foot queue
  - Shared SBT/SBR: 175-foot queue
  - Shared SWBL/SWBT/SWBR: 125-foot queue
- PM Peak
  - EBL: 175-foot queue
  - Shared WBT/WBR: 675-foot queue
  - Shared SWBL/SWBT/SWBR: 225-foot queue

The remaining 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Madison Street, and North Street are expected to fit with the available storage area. Based on the maximum expected 95<sup>th</sup> percentile queue of 225 feet for the south-westbound approach at the intersection of Delafield Street, Madison Street, and North Street, the reduction in the existing storage length for this movement to accommodate the north proposed development driveway is not expected to lead to significant reductions in operational performance along Delafield Street.

2035 Horizon Year Build – Site Plan B: Two Driveway Scenario

The 2035 horizon year build two driveway scenario, weekday AM and PM peak hour traffic operations at the study intersections are summarized in **Table 12**. Under this scenario, the addition of the proposed north and south development driveways creates two additional intersections to be analyzed along Delafield Street. As shown in the table, all peak hour traffic movements at the study intersections under the existing geometry and signal timing parameters are expected to continue to operate at LOS ‘D’ or better, or the same as expected under the 2035 horizon year background volumes when the LOS was worse than LOS ‘D’, with the exception of the overall LOS at the intersection of Delafield Street, Madison Street, and North Street. The overall LOS is expected to worsen from LOS ‘D’ to LOS ‘E’, during the PM peak hour.

**Table 12: 2035 Horizon Year Build Peak Hour Traffic Operations – Two Driveway Scenario**

Intersection	Peak Hour	Traffic Control	MOE	Movement												OVERALL			
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		SWBL	SWBT	SWBR
Summit Ave. & Spring St. & Delafield St.	AM Peak	Signal	LOS	B	B	B	B	B	B	B	B	B	A	-	-	-	B		
			Delay (sec)	13.9	12.2	13.7	12.2	10.7	16.2	10.2	7.5	-	-	-	-	-	-	12.0	
			Queue (ft)	25'	125'	25'	125'	50'	50'	50'	25'	-	-	-	-	-	-	-	--
	PM Peak	Signal	LOS	B	B	B	B	B	B	B	B	A	-	-	-	-	B		
			Delay (sec)	15.4	14.0	16.2	13.4	11.5	16.3	10.0	7.4	-	-	-	-	-	-	12.9	
			Queue (ft)	25'	175'	25'	150'	50'	50'	75'	50'	-	-	-	-	-	-	-	--
Buena Vista Ave. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	A		
			Delay (sec)	-	-	-	16.4	-	10.2	-	0.0	0.0	8.3	-	-	-	-	2.9	
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A	A	-	-	-	-	A	
			Delay (sec)	-	-	-	20.7	-	11.0	-	0.0	0.0	8.2	-	-	-	-	-	2.9
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'	-	-	-	-	-	--
North St. & Madison St. & Delafield St.	AM Peak	Signal	LOS	D	B	B	E	C	C	C	C	D	-	-	-	D	D		
			Delay (sec)	47.8	10.8	10.5	67.4	30.6	32.4	24.5	32.2	45.1	-	-	-	39.7	-	47.6	
			Queue (ft)	*150'	50'	25'	*500'	25'	100'	125'	75'	*175'	-	-	-	*150'	-	--	
	PM Peak	Signal	LOS	E	B	B	E	D	C	D	C	D	-	-	-	E	E		
			Delay (sec)	69.3	11.3	11.2	71.8	36.6	42.0	29.4	37.7	45.6	-	-	-	67.5	-	57.6	
			Queue (ft)	*200'	25'	25'	*675'	25'	150'	175'	50'	150'	-	-	-	*225'	-	--	
North Drwy. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	-	-	-	-	A	A	-	-	A	-	-	-	A	
			Delay (sec)	-	-	-	-	-	7.8	0.0	-	-	0.0	-	-	-	-	1.2	
			Queue (ft)	-	-	-	-	-	25'	0'	-	-	0'	-	-	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	-	-	-	-	A	A	-	-	A	-	-	-	A	
			Delay (sec)	-	-	-	-	-	8.3	0.0	-	-	0.0	-	-	-	-	0.8	
			Queue (ft)	-	-	-	-	-	25'	0'	-	-	0'	-	-	-	-	-	--
South Drwy. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	A	-	-	-	-	A	-	-	A	-	-	-	A	
			Delay (sec)	-	-	9.8	-	-	-	-	0.0	-	-	0.0	-	-	-	-	0.4
			Queue (ft)	-	-	25'	-	-	-	-	0'	-	-	0'	-	-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	B	-	-	-	-	A	-	-	A	-	-	-	A	
			Delay (sec)	-	-	10.7	-	-	-	-	0.0	-	-	0.0	-	-	-	-	0.2
			Queue (ft)	-	-	25'	-	-	-	-	0'	-	-	0'	-	-	-	-	--

\* 95th percentile volume exceeds capacity, queue may be longer

Minor signal timing adjustments were evaluated during the weekday PM peak hour, but they did not result in reducing the overall LOS ‘E’ to LOS ‘D’. Geometric changes are expected to be necessary to address the overall LOS ‘E’, but the feasibility to accommodate such improvements is limited.

Maximum 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Summit Avenue, and Spring Street, and the intersection of Delafield Street and Buena Vista Avenue are expected to fit within the available storage area.

Several movements at the Delafield Street, Madison Street, and North Street intersection are expected to experience periods where the 95<sup>th</sup> percentile traffic volume flows exceed the capacity, in which case the 95<sup>th</sup> percentile queues may be longer than what is calculated. These movements, and the calculated 95<sup>th</sup> percentile queues are as follows:

- AM Peak
  - EBL: 150-foot queue
  - Shared WBT/WBR: 500-foot queue
  - Shared SBT/SBR: 175-foot queue
  - Shared SWBL/SWBT/SWBR: 150-foot queue
- PM Peak
  - EBL: 200-foot queue
  - Shared WBT/WBR: 675-foot queue
  - Shared SWBL/SWBT/SWBR: 225-foot queue

The remaining 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Madison Street, and North Street are expected to fit with the available storage area. Based on the maximum expected 95<sup>th</sup> percentile queue of 225 feet for the south-westbound left-turn movement at the intersection of Delafield Street, Madison Street, and North Street, the reduction in the existing storage length for this movement to accommodate the north proposed development driveway is not expected to lead to significant reductions in operational performance along Delafield Street.

It is recommended that the south proposed development driveway operate under right-in/right-out only access to prevent potential issues associated with left-turning vehicles to and from the driveway.

#### 2035 Horizon Year Build – Site Plan C: Three Driveway Scenario

The 2035 horizon year build three driveway scenario, weekday AM and PM peak hour traffic operations at the study intersections are summarized in **Table 13**. Under this scenario, the addition of the proposed Madison Street driveway creates a total of three access points to be analyzed in addition to the study intersections. As shown in the table, all peak hour traffic movements at the study intersections under the existing geometry and signal timing parameters are expected to continue to operate at LOS 'D' or better, or the same as expected under the 2035 horizon year background volumes when the LOS was worse than LOS 'D', with the exception of the overall LOS at the intersection of Delafield Street, Madison Street, and North Street. The overall LOS is expected to worsen from LOS 'D' to LOS 'E', during the PM peak hour.

Minor signal timing adjustments were evaluated during the weekday PM peak hour, but they did not result in reducing the overall LOS 'E' to LOS 'D'. Geometric changes are expected to be necessary to address the overall LOS 'E', but the feasibility to accommodate such improvements is limited.

Maximum 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Summit Avenue, and Spring Street, and the intersection of Delafield Street and Buena Vista Avenue are expected to fit within the available storage area.

Several movements at the Delafield Street, Madison Street, and North Street intersection are expected to experience periods where the 95<sup>th</sup> percentile traffic volume flows exceed the capacity, in which case the 95<sup>th</sup> percentile queues may be longer than what is calculated. These movements, and the calculated 95<sup>th</sup> percentile queues are as follows:

- AM Peak
  - EBL: 150-foot queue
  - Shared WBT/WBR: 500-foot queue
  - Shared SBT/SBR: 175-foot queue
  - Shared SWBL/SWBT/SWBR: 125-foot queue

- PM Peak
  - EBL: 200-foot queue
  - Shared WBT/WBR: 675-foot queue
  - Shared SWBL/SWBT/SWBR: 225-foot queue

**Table 13: 2035 Horizon Year Build Peak Hour Traffic Operations – Three Driveway Scenario**

Intersection	Peak Hour	Traffic Control	MOE	Movement													OVERALL	
				EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SWBL		SWBT
Summit Ave. & Spring St. & Delafield St.	AM Peak	Signal	LOS	B	B	B	B	B				B	A		-	-	-	B
			Delay (sec)	13.9	12.2	13.7	12.2	10.7			16.2	10.2	7.5		-	-	-	12.0
			Queue (ft)	25'	125'	25'	125'	50'			50'	50'	25'		-	-	-	--
	PM Peak	Signal	LOS	B	B	B	B	B				B	A		-	-	-	B
			Delay (sec)	15.2	13.8	16.0	13.2	11.3			16.3	10.1	7.5		-	-	-	12.7
			Queue (ft)	25'	175'	25'	150'	50'			50'	75'	50'		-	-	-	--
Buena Vista Ave. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A		A	-	-	-	A
			Delay (sec)	-	-	-	16.4	-	10.2	-	0.0	0.0	8.3		-	-	-	2.9
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'		-	-	-	--
	PM Peak	Minor Stop	LOS	-	-	-	C	-	B	-	A	A		A	-	-	-	A
			Delay (sec)	-	-	-	20.4	-	11.0	-	0.0	0.0	8.2		-	-	-	2.9
			Queue (ft)	-	-	-	25'	-	25'	-	0'	0'	25'		-	-	-	--
North St. & Madison St. & Delafield St.	AM Peak	Signal	LOS	D	B	B	E		C	C	C		C	D			D	D
			Delay (sec)	47.8	10.8	10.5	67.4		30.6	32.4	24.5	32.2	45.1				38.1	47.4
			Queue (ft)	*150'	50'	25'	*500'		25'	100'	125'	75'	*175'				*125'	--
	PM Peak	Signal	LOS	E	B	B	E		D	D	C		D	D			E	E
			Delay (sec)	69.3	11.3	11.2	71.8		36.6	42.0	29.4	37.7	45.6				65.3	57.1
			Queue (ft)	*200'	25'	25'	*675'		25'	150'	175'	50'	150'				*225'	--
North Drwy. & Delafield St.	AM Peak	Minor Stop	LOS	B					A	A			A				A	
			Delay (sec)	11.6					7.8	0.0			0.0				1.2	
			Queue (ft)	25'					25'	0'			0'				--	
	PM Peak	Minor Stop	LOS	B					A	A			A				A	
			Delay (sec)	13.3					8.2	0.0			0.0				0.8	
			Queue (ft)	25'					25'	0'			0'				--	
South Drwy. & Delafield St.	AM Peak	Minor Stop	LOS	-	-	A				A			A				A	
			Delay (sec)	-	-	9.7				0.0			0.0				0.2	
			Queue (ft)	-	-	25'				0'			0'				--	
	PM Peak	Minor Stop	LOS	-	-	B				A			A				A	
			Delay (sec)	-	-	10.6				0.0			0.0				0.2	
			Queue (ft)	-	-	25'				0'			0'				--	
Madison St. Drwy. & Madison St.	AM Peak	Minor Stop	LOS	-	-	-			A			A					A	
			Delay (sec)	-	-	-			9.9		0.0		0.0				0.2	
			Queue (ft)	-	-	-			25'		0'		0'				--	
	PM Peak	Minor Stop	LOS	-	-	-			A			A					A	
			Delay (sec)	-	-	-			9.7		0.0		0.0				0.1	
			Queue (ft)	-	-	-			25'		0'		0'				--	

\* 95th percentile volume exceeds capacity, queue may be longer

The remaining 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Madison Street, and North Street are expected to fit with the available storage area. Based on the maximum expected 95<sup>th</sup> percentile queue of 225 feet for the south-westbound left-turn movement at the intersection of Delafield Street, Madison Street, and North Street, the reduction in the existing storage length for this movement to accommodate the north proposed development driveway is not expected to lead to significant reductions in operational performance along Delafield Street. It is recommended that the south proposed development driveway as well as the Madison Street proposed driveway operate under right-in/right-out only access to prevent potential issues associated with left-turning vehicles to and from the driveway.

## Chapter 6: Parking Analysis

### Part A: Parking Demand

Data published in the *ITE Parking Generation Manual – 6<sup>th</sup> Edition* was used to estimate the expected peak parking demand that would be generated by the proposed development. The expected parking demand was estimated separately for the two individual buildings.

The parking generation estimate was based on the weekday parking demand for the ITE “Multifamily Housing Low-Rise” land use, which features data based on 143 studies nationwide. The Saturday and Sunday data was also reviewed; however, the weekday data was determined to result in the highest, and therefore most conservative, estimates.

Based on the ITE data, a total of 273 parking stalls are expected to be necessary to accommodate the peak parking demand associated with the entire development, on a typical weekday. Of these 273 total parking stalls, 142 are expected to be necessary for the north development building, while 131 are expected to be necessary for the south development building, during peak periods of a typical weekday. The expected weekday peak parking demand is summarized in **Table 14**.

**Table 14: Parking Generation Summary**

Development Building	ITE Classification	ITE Code	Size	Unit	Weekday Peak Parking Demand
North Building	Multifamily Low-Rise	220	115	DU	142
South Building	Multifamily Low-Rise	220	106	DU	131
<b>Total Peak Parking Demand</b>					<b>273</b>

### Part B: Parking Supply

Under all development access scenarios, 38 surface parking stalls will be provided, along with 153 covered parking stalls within the north building. The number of covered parking stalls within the south building differs depending on the development access scenario. Site Plan A and Site Plan B will provide 106 covered parking stalls in the south building. Site Plan C will provide 101 covered parking stalls in the south building. **Table 15** provides a parking stall summary for each of the access scenarios.

**Table 15: Parking Supply Summary**

Stall Type	Site Plan A Single Driveway	Site Plan B Two Driveways	Site Plan C Three Driveways
North Building Covered Stalls	153	153	153
South Building Covered Stalls	106	106	101
Surface Parking Stalls	38	38	38
<b>Total Stalls</b>	<b>297</b>	<b>297</b>	<b>292</b>

Occupancy rates for the two parking garages and the surface lot may vary depending on assigned parking and parking restrictions enforced by apartment management, as well as the distribution of residents and visitors during peak parking demand periods. Depending on the access scenario, peak parking demand occupancy rates are expected to range between 92 to 94 percent.

Under the Single Driveway Scenario in Site Plan A, all 297 parking stalls will be accessible through the single driveway access point provided along Delafield Street. Based on the expected peak parking period demand of 142 stalls associated with the north building, the 153 parking stalls in the north parking garage are expected to be 93 percent occupied. Based on the expected peak parking period demand of 131 stalls associated with the south building, the 101 parking stalls in the south parking garage are expected to be 100 percent occupied. Assuming the south parking garage is completely occupied, a peak parking period demand of 30 stalls would still remain, resulting in the 38 parking stalls in the surface lot being 79 percent occupied.

Under the Two Driveway Scenario in Site Plan B, the north parking garage and surface lot will be accessible through the north driveway, providing access to 191 of the total parking stalls. The south parking garage will be accessible through the south driveway, providing access to 106 of the total parking stalls. The parking occupancy rates for this scenario are expected to be similar to those expected for the Single Driveway Scenario. Because the south parking garage is expected to be fully occupied, some vehicles generated by the south building will need to use the surface parking lot, which is only accessible through the north driveway. Due to the access control associated with each driveway and the inability for vehicles to cross between the northern and southern parking areas, the excess south building vehicles will have to route around the block to access the north driveway.

The Three Driveway Scenario in Site Plan C is expected to operate similarly to Site Plan B, with the only difference being the total number of covered parking stalls provided in the south building.



## Chapter 7: Conclusions and Recommendations

### Part A: Conclusions

#### Traffic Operations Analysis

Intersection operations for traffic signal control and stop control at the study intersections were analyzed using Synchro 12 software. The results presented within the report are based on HCM 7 equations and methodologies. It should be noted that due to the unique, five-leg configuration, the intersection of Delafield Street, Madison Street, and North Street was analyzed using HCM 2000 equations and methodologies. Level of service (LOS) 'D' as defined in HCM 7 was used as the threshold for acceptable peak hour intersection operating conditions or maintaining the existing LOS when below LOS 'D'.

Under the 2025 base year and 2035 horizon year background scenarios, all vehicular traffic movements at the study intersections are expected to operate at an acceptable level of service, except for the following:

- 2025 Base Year Background Scenario
  - AM Peak
    - EB LT at Delafield Street, Madison Street and North Street – LOS E
  - PM Peak
    - EB LT at Delafield Street, Madison Street and North Street – LOS E
- 2035 Horizon Year Background Scenario
  - AM Peak
    - EB LT at Delafield Street, Madison Street and North Street – LOS E
    - Shared WBT/WBR at Delafield Street, Madison Street and North Street – LOS E
  - PM Peak
    - EB LT at Delafield Street, Madison Street and North Street – LOS E
    - Shared WBT/WBR at Delafield Street, Madison Street and North Street – LOS E
    - Shared SWBL/SWBT/SWBR at Delafield Street, Madison Street and North Street – LOS E

Three site plan alternatives, featuring different site access points, were considered for the 2025 base year and 2035 horizon year build scenarios. Under both the 2025 base year and the 2035 horizon year build year scenarios, the Delafield Street intersections at Summit Avenue and Buena Vista Avenue are expected to operate with all movements at LOS 'D' or better.

Under the 2025 base year build scenario for all access alternatives, the Delafield Street, Madison Street, and North Street intersection is expected to see a drop from LOS 'D' to LOS 'E' for the westbound North Street shared through/right-turn movement and the Delafield Street approach. These movements can be improved to LOS 'D' if two seconds of green time is taken away from the northbound/southbound Madison Street approaches and given to the movements at LOS 'E'.

Under the 2035 horizon year build scenario for all access alternatives, the Delafield Street, Madison Street, and North Street intersection is expected to operate with several movements at LOS 'E', which is consistent with the 2035 horizon year background scenario. The exception is that the overall LOS is expected to drop from LOS 'D' in the background scenario to LOS 'E' in the build scenario. Minor signal timing adjustments were evaluated during the weekday PM peak hour, but they did not result in reducing the overall LOS 'E' to LOS 'D'. Geometric changes are expected to be necessary to address the overall LOS 'E', but the feasibility to accommodate such improvements is limited.

Several movements at the Delafield Street, Madison Street, and North Street intersection are expected to experience periods where the 95<sup>th</sup> percentile traffic volume flows exceed the capacity, in which case the 95<sup>th</sup> percentile queues may be longer than what is calculated. The remaining 95<sup>th</sup> percentile queues at the intersection of Delafield Street, Madison Street, and North Street are expected to fit within the available storage area.

Based on the maximum expected 95th percentile queue of 225 feet for the south-westbound left-turn movement at the intersection of Delafield Street, Madison Street, and North Street, the reduction in the existing storage length for this movement to accommodate the north proposed development driveway is not expected to lead to significant reductions in operational performance along Delafield Street.

In addition, considering the maximum 95th percentile queue of 225 feet expected for the south-westbound left-turn movement at the Delafield Street, Madison Street, and North Street intersection, as well as the location of the south proposed development driveway, it is recommended that the south proposed development driveway operate under right-in/right-out only access to prevent potential issues associated with left-turning vehicles to and from the driveway. The same right-in/right-out access design is recommended for the Madison Street driveway because of the proximity of the adjacent intersection.

### **Parking Generation**

Data published in the *ITE Parking Generation Manual – 6th Edition* was used to identify the expected parking demand that would be generated by the proposed development. The estimated parking demand for the proposed development is a total of 273 parking stalls to be provided in order to accommodate the typical weekday peak demand. This includes 142 stalls needed for the north building and 131 stalls needed for the south building.

Site Plan A and Site Plan B are expected to include 259 covered stalls and 38 surface stalls for a total of 297 parking spaces. Site Plan C is expected to include 254 covered stalls and 38 surface stalls for a total of 292 parking spaces. The covered stalls include 153 stalls in the north building and 101 or 106 stalls in the south building, depending on the site access plan. The provided covered stalls in the north building will accommodate the peak demand for the north building, but the provided covered stalls in the south building will not accommodate all of the demand for the south building. A portion of the south parking demand will need to be accommodated by the surface parking lot, which can only be accessed by the north driveway.

### **Part B: Recommendations**

With the addition of the proposed development, it was determined that no improvements are necessary at the intersection of Delafield Street, Summit Avenue, and Spring Street or the intersection of Delafield Street and Buena Vista Avenue, as both intersections are expected to operate with acceptable levels of service in the year 2035.

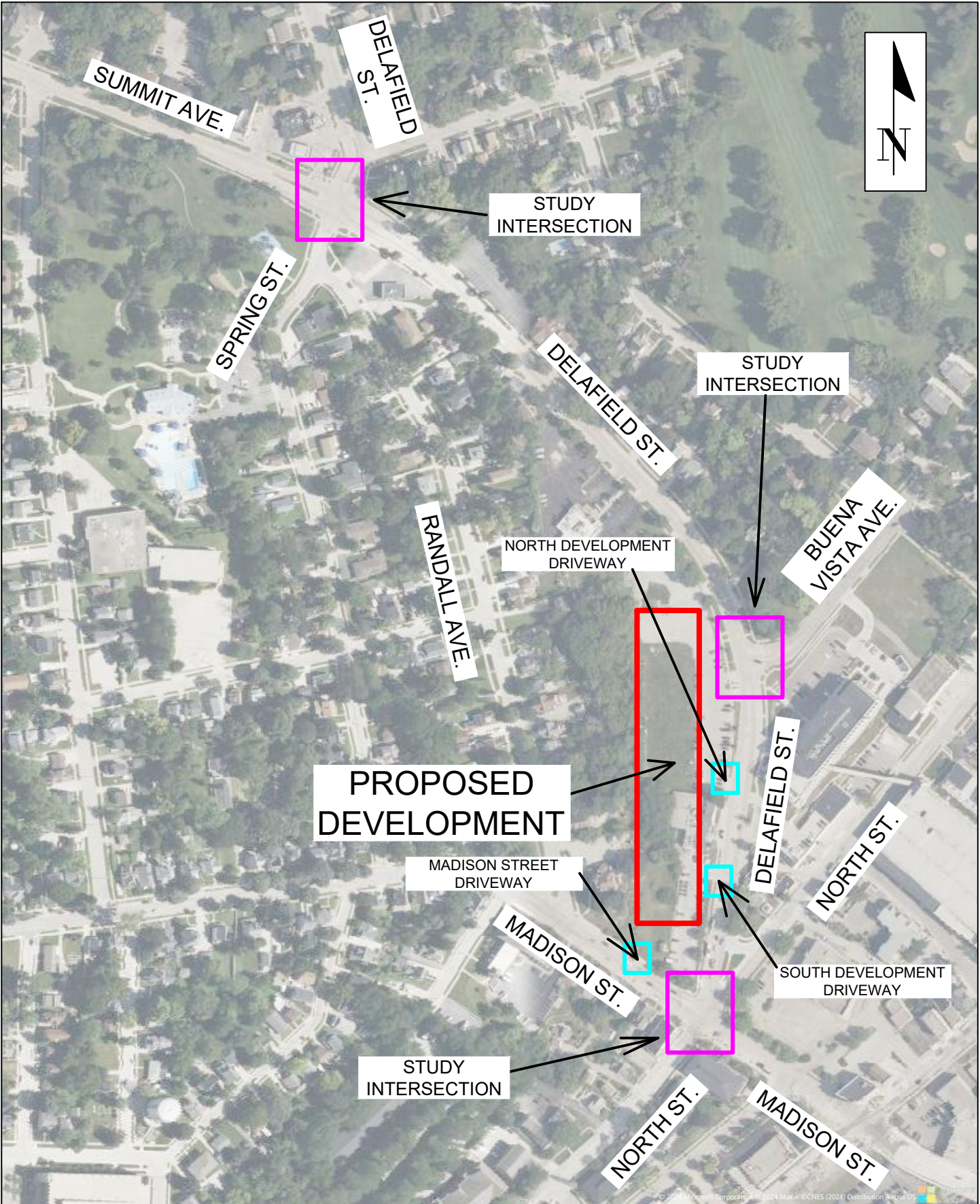
Under the 2025 base year build scenario for all alternatives, a signal timing adjustment will be required at the intersection of Delafield Street, Madison Street, and North Street to maintain an expected LOS 'E' condition for the eastbound left-turn movement and LOS 'D' condition for all other movements.

Under the 2035 horizon year build scenario for all alternatives, the intersection of Delafield Street, Madison Street, and North Street is expected to continue to operate with select movements at LOS 'E', consistent with the 2035 background scenario, but is expected to experience an overall LOS drop from LOS 'D' to LOS 'E'. It is recommended that the City monitor the future operations at the intersection of Delafield Street, Madison Street, and North Street and consider making signal timing adjustments as necessary.

Under all site plans, it is recommended that a northbound left-turn lane on Delafield Street be provided at the north driveway. This left-turn lane should provide 50 feet of storage and a 96-foot taper.

All three site plans present feasible access designs for the proposed development. From the perspective of access management and queue length influence area, as well as parking accessibility, Site Plan A presents a more desirable access design. It allows for all movements from a single access point located outside of the queue storage area for adjacent intersections and reduces the need for vehicles to travel indirect routes.

It has been discussed that Site Plan B and Site Plan C allow for flexibility in the internal site design that addresses major grading concerns. Site Plan B and Site Plan C provide for very similar traffic operations as Site Plan A and it is recommended that if implemented, the south driveway be limited to right-in/right-out only access. The proximity of the south driveway access point to the Delafield Street, Madison Street, and North Street intersection results in queues extending through this access point, suggesting that left turns into and out of this driveway be prohibited. It is also recommended that the Madison Street driveway included in Site Plan C also be designed as a right-in/right-out, given the proximity of the adjacent intersection. Site Plan C results in slightly less indirect routing of traffic when compared to Site Plan B.



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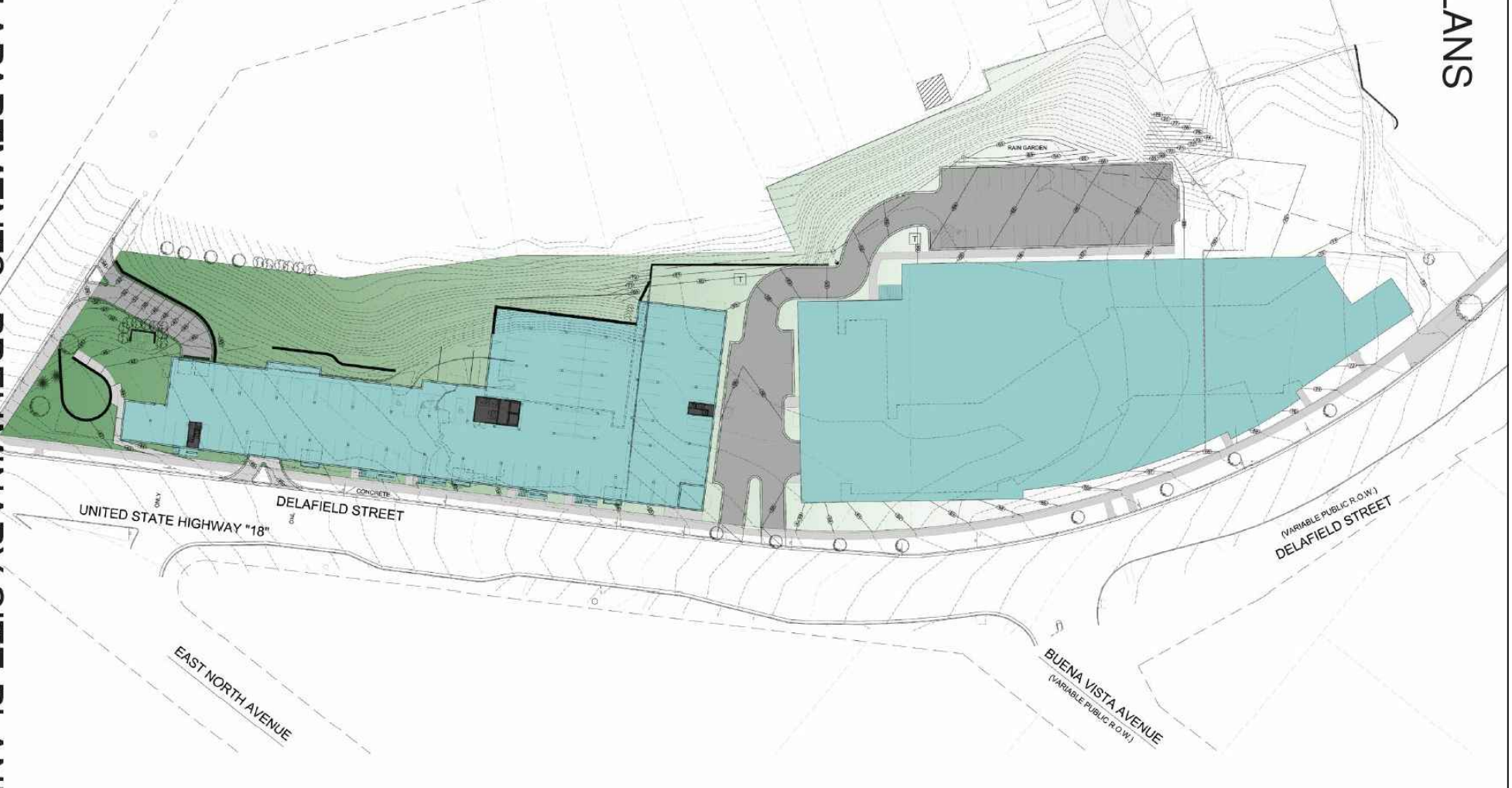
MANDEL GROUP  
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WAUKESHA, WISCONSIN

EXHIBIT 2-1:  
SITE LOCATION MAP



ANS

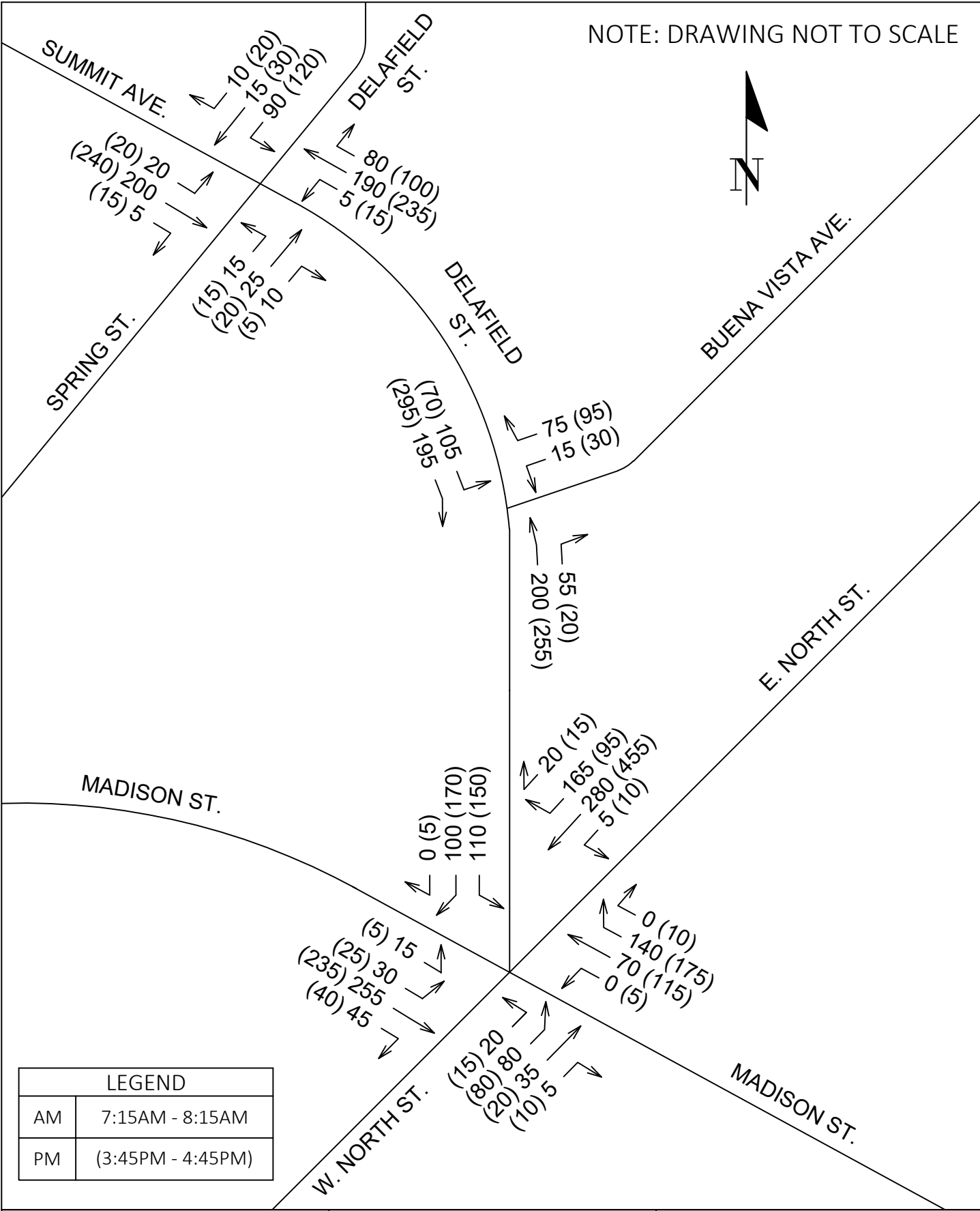
APARTMENTS: PRELIMINARY SITE PLAN



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EXHIBIT 2-2:  
SITE PLAN

NOTE: DRAWING NOT TO SCALE



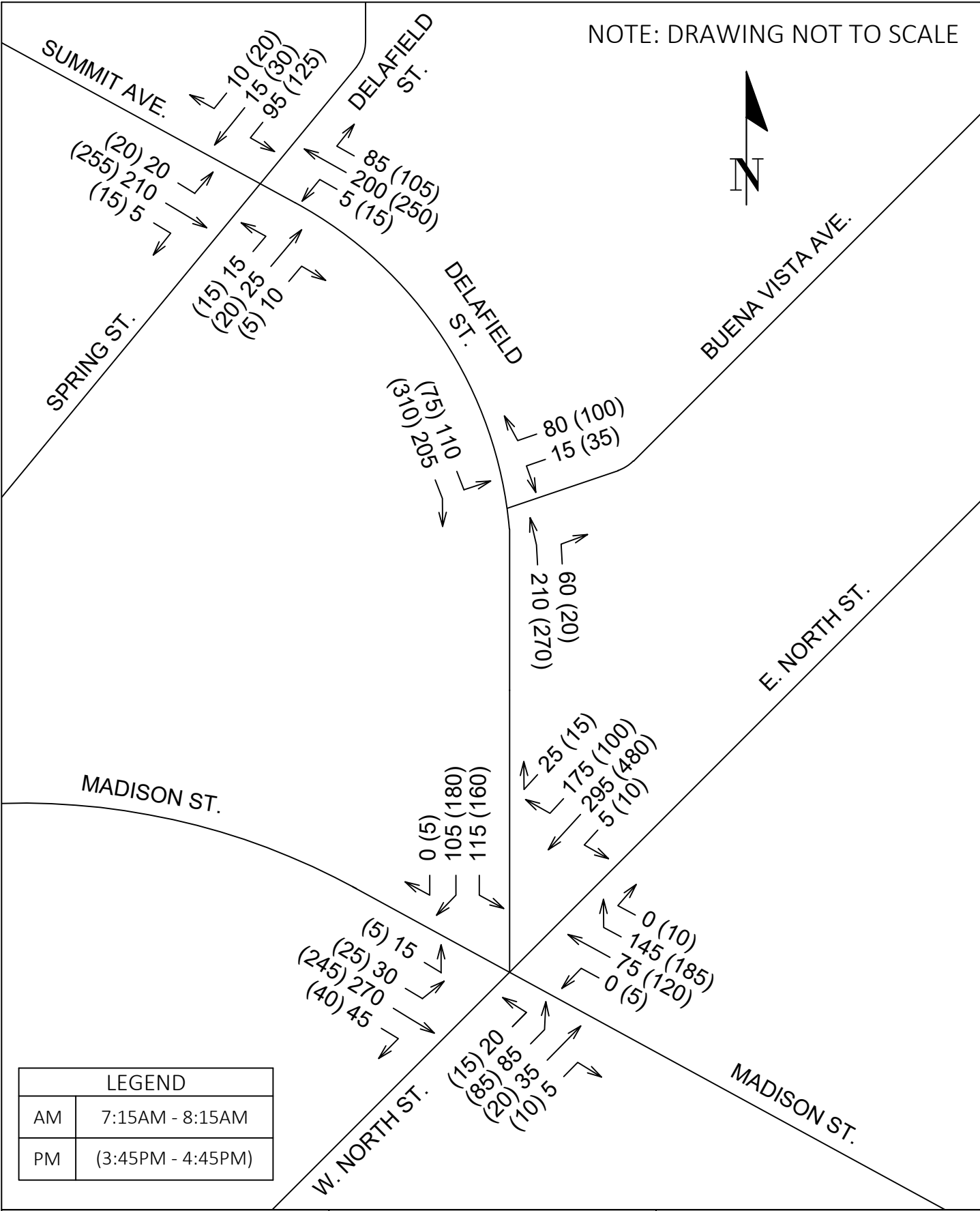
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PM	(3:45PM - 4:45PM)



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EXHIBIT 3-1:  
2025 BASE YEAR BACKGROUND  
VOLUMES

NOTE: DRAWING NOT TO SCALE



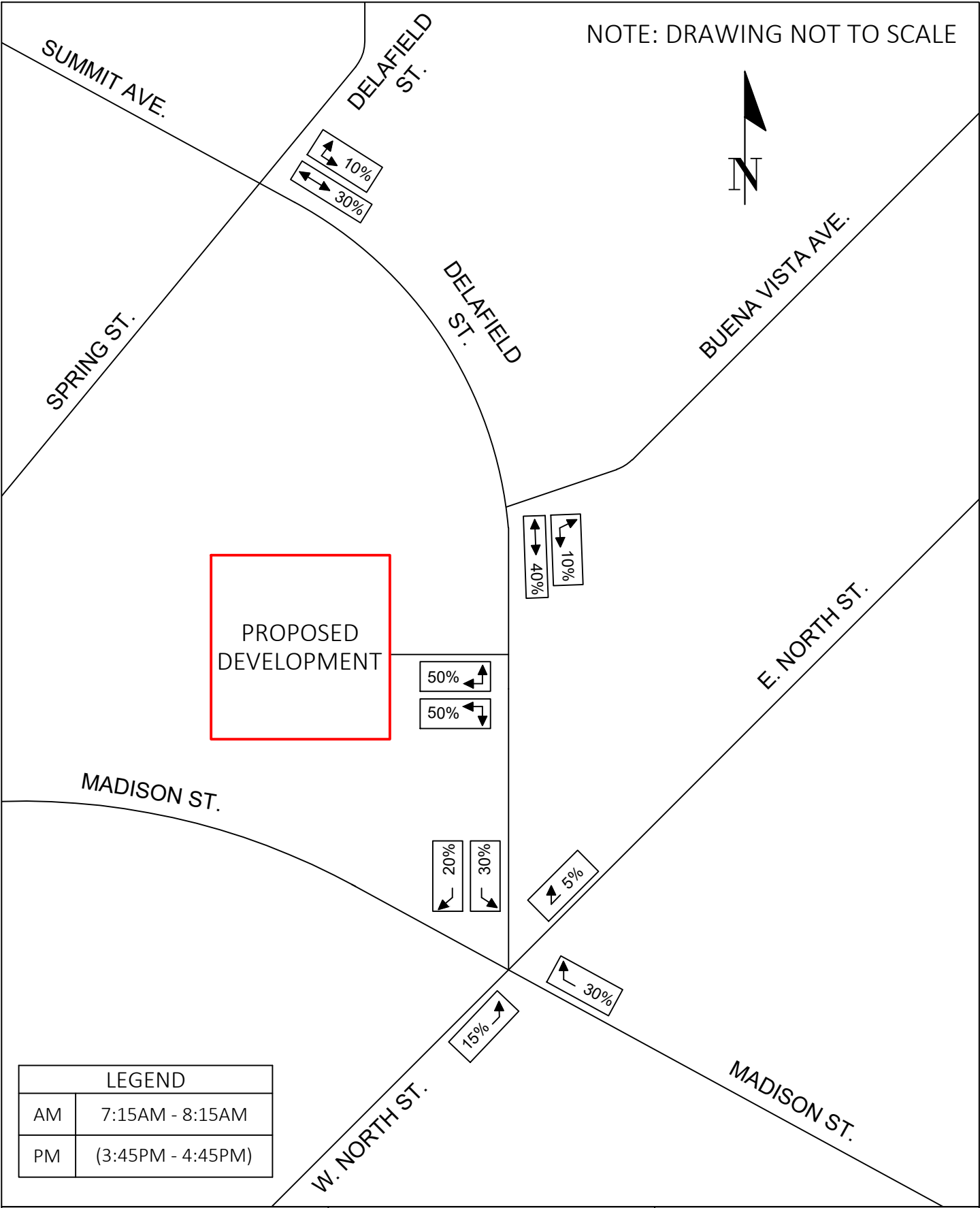
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PM	(3:45PM - 4:45PM)



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EXHIBIT 4-1:  
2035 HORIZON YEAR BACKGROUND  
VOLUMES

NOTE: DRAWING NOT TO SCALE



PROPOSED DEVELOPMENT

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PM	(3:45PM - 4:45PM)

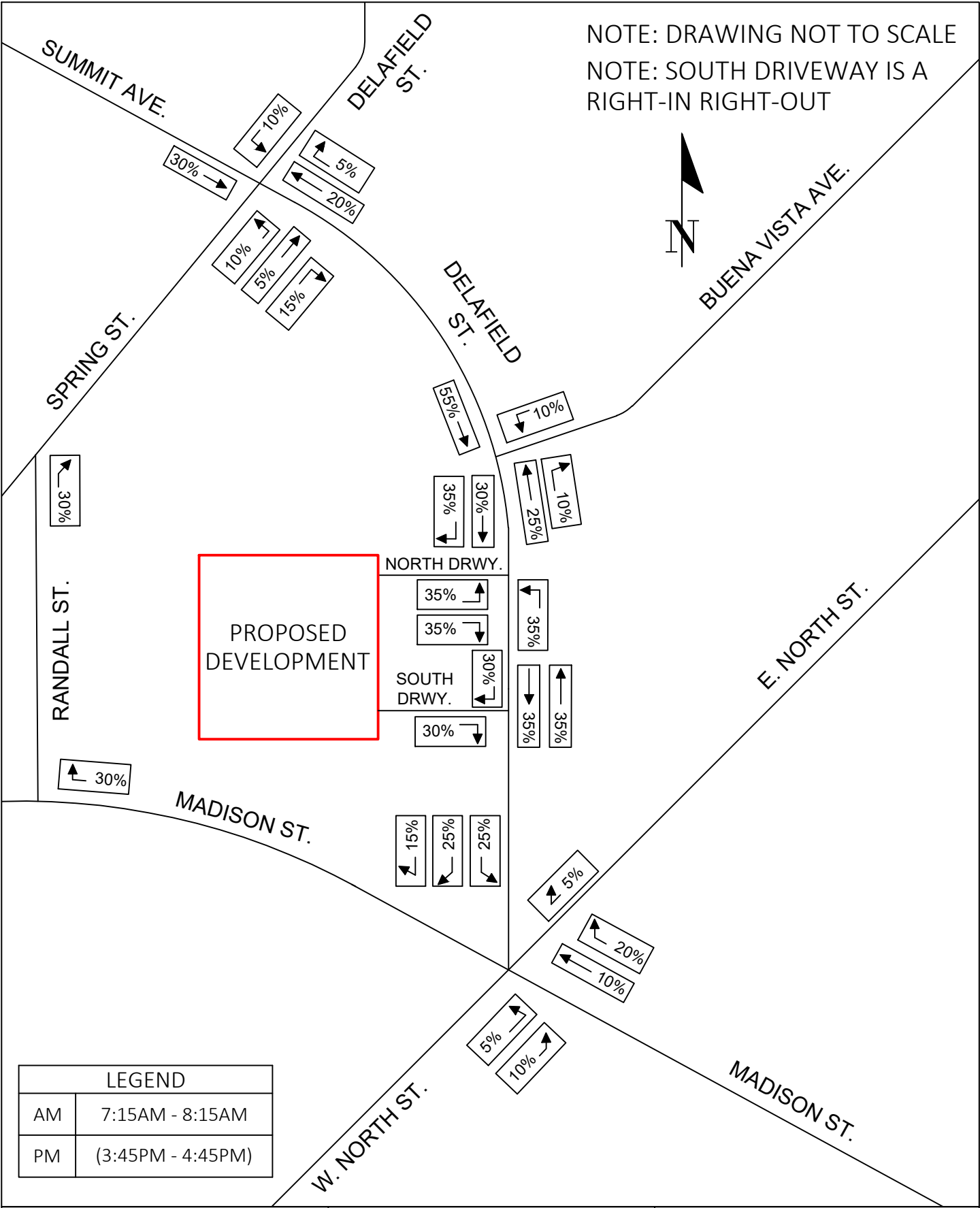


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EXHIBIT 4-2A:  
TRIP DISTRIBUTION -  
SINGLE DRIVEWAY SCENARIO



NOTE: DRAWING NOT TO SCALE  
 NOTE: SOUTH DRIVEWAY IS A RIGHT-IN RIGHT-OUT



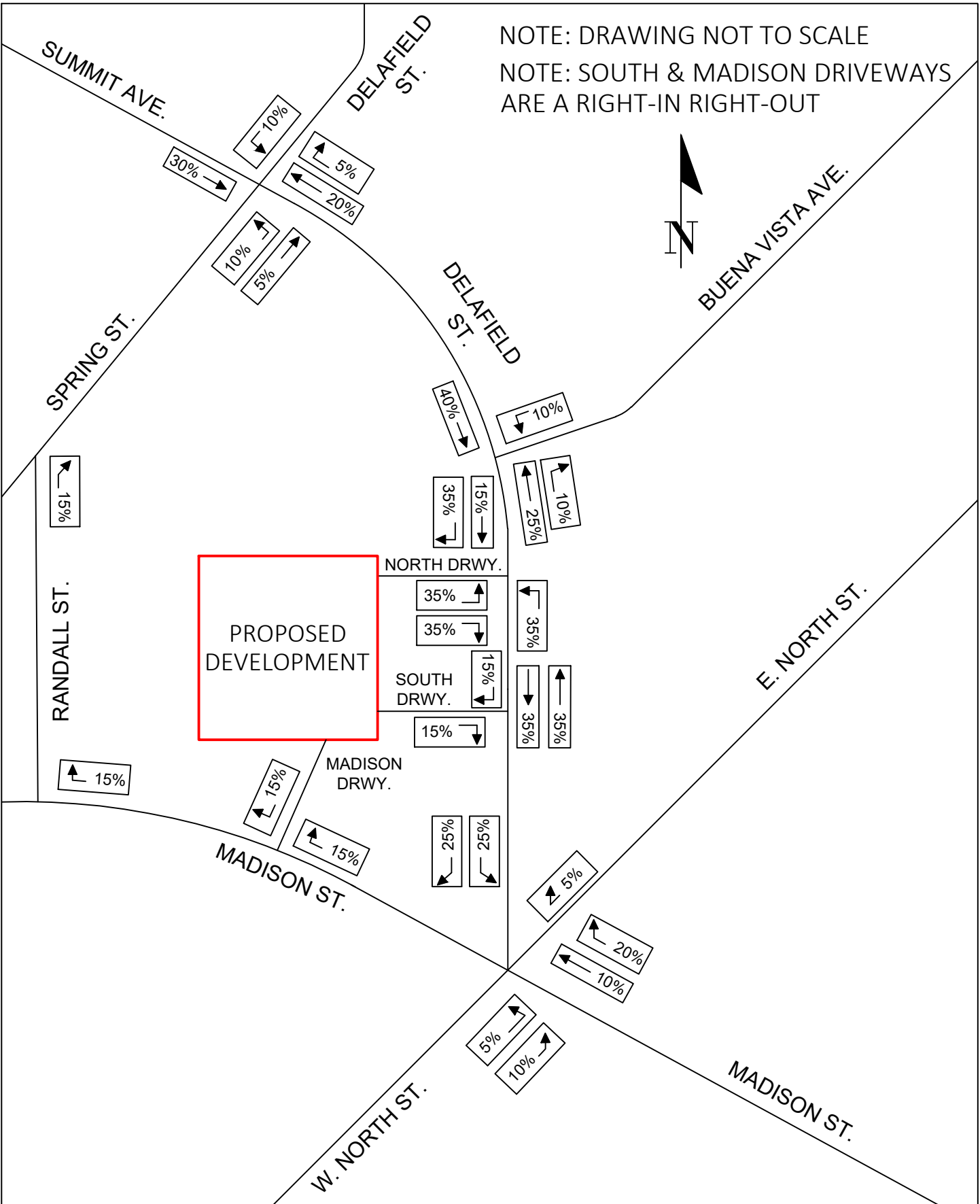
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PM	(3:45PM - 4:45PM)



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EXHIBIT 4-2B:  
 TRIP DISTRIBUTION -  
 TWO DRIVEWAY SCENARIO

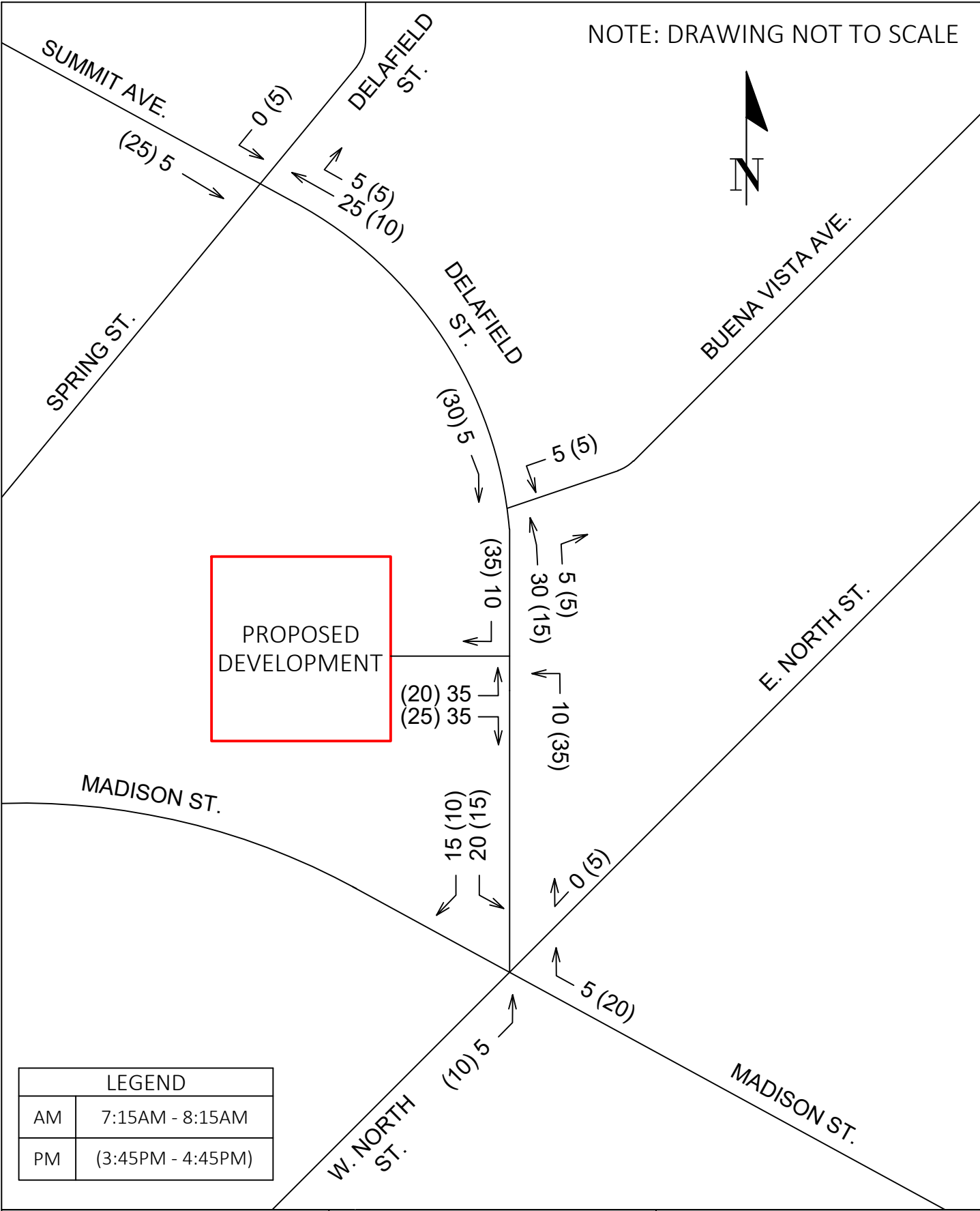
NOTE: DRAWING NOT TO SCALE  
 NOTE: SOUTH & MADISON DRIVEWAYS ARE A RIGHT-IN RIGHT-OUT



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EXHIBIT 4-2C:  
 TRIP DISTRIBUTION -  
 THREE DRIVEWAY SCENARIO

NOTE: DRAWING NOT TO SCALE



PROPOSED DEVELOPMENT

LEGEND	
AM	7:15AM - 8:15AM
PM	(3:45PM - 4:45PM)



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EXHIBIT 4-3A:  
NEW DEVELOPMENT TRIPS -  
SINGLE DRIVEWAY SCENARIO

NOTE: DRAWING NOT TO SCALE  
 NOTE: SOUTH DRIVEWAY IS A RIGHT-IN RIGHT-OUT



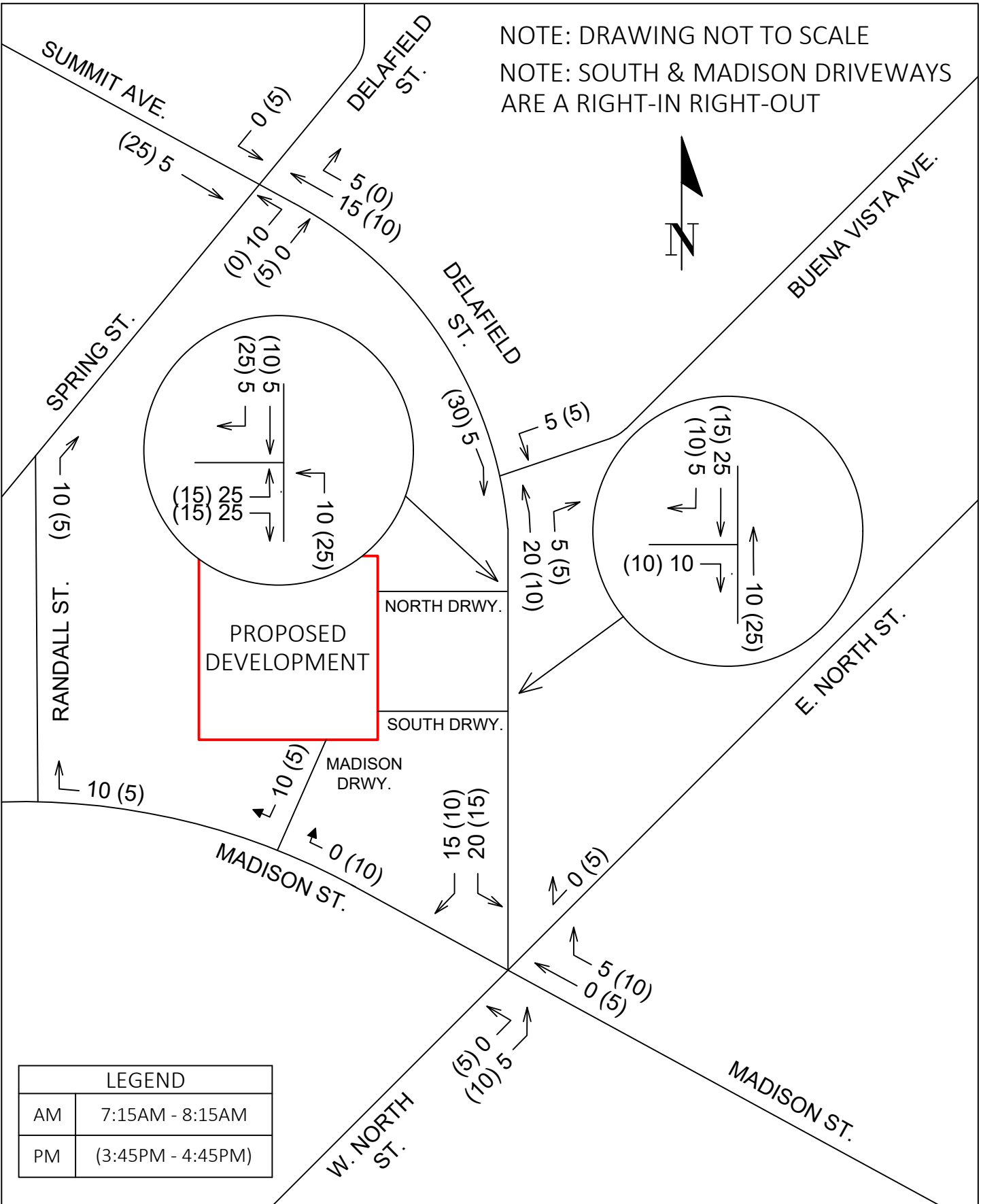
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EXHIBIT 4-3B:  
 NEW DEVELOPMENT TRIPS -  
 TWO DRIVEWAY SCENARIO

NOTE: DRAWING NOT TO SCALE  
 NOTE: SOUTH & MADISON DRIVEWAYS ARE A RIGHT-IN RIGHT-OUT



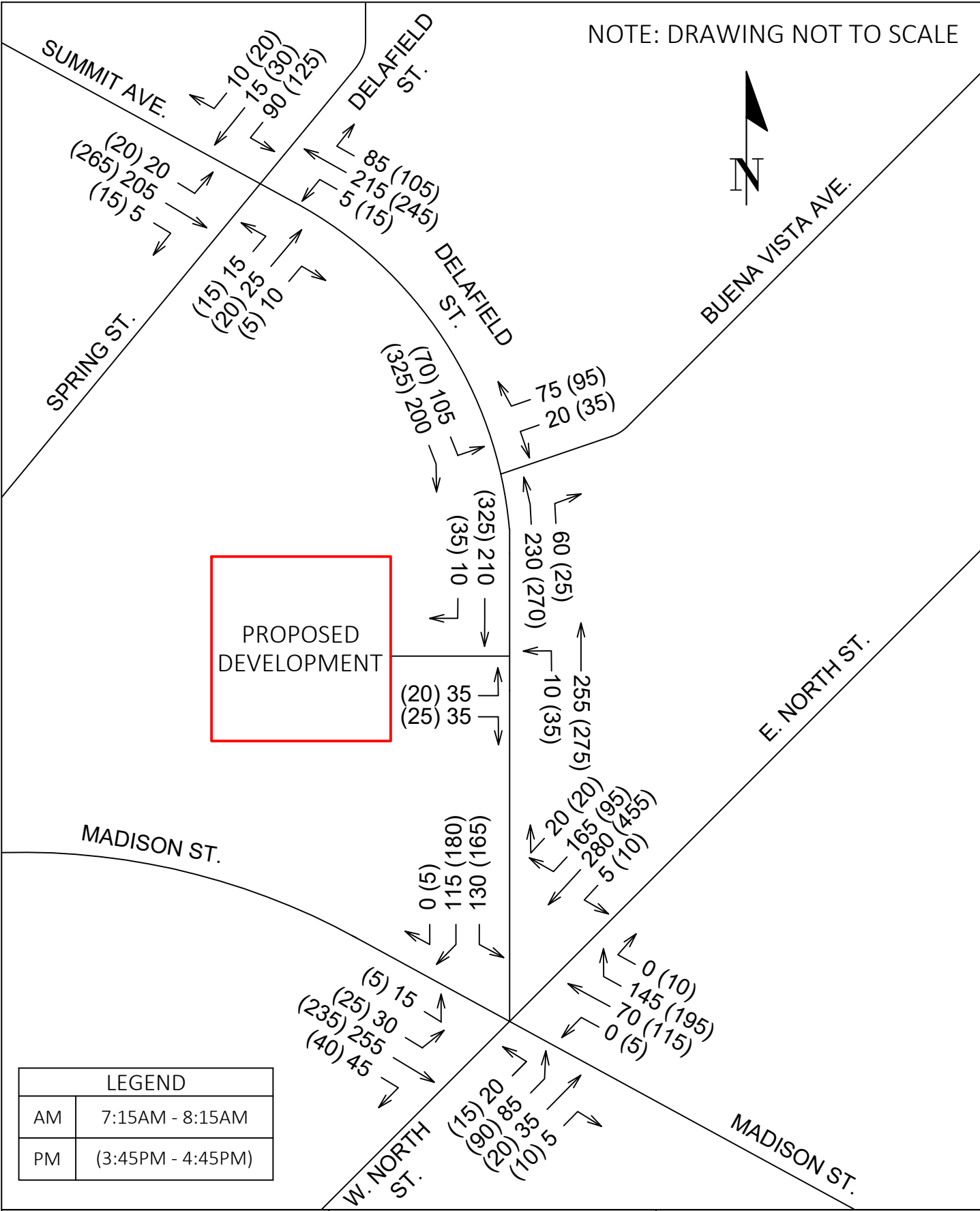
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EXHIBIT 4-3C:  
 NEW DEVELOPMENT TRIPS -  
 THREE DRIVEWAY SCENARIO

NOTE: DRAWING NOT TO SCALE



PROPOSED DEVELOPMENT

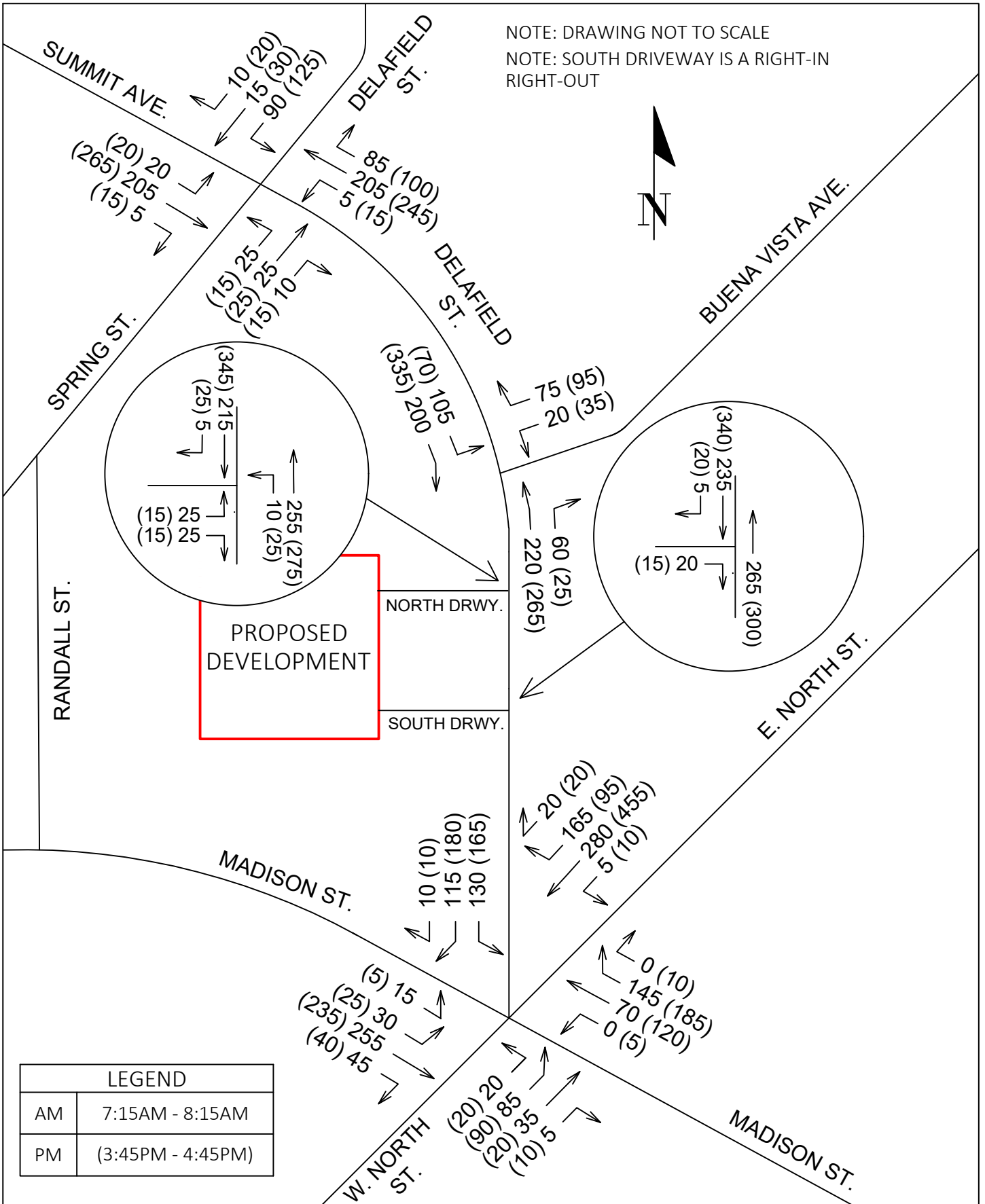
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EXHIBIT 4-4A:  
2025 BASE YEAR BUILD VOLUMES -  
SINGLE DRIVEWAY SCENARIO

NOTE: DRAWING NOT TO SCALE  
 NOTE: SOUTH DRIVEWAY IS A RIGHT-IN  
 RIGHT-OUT



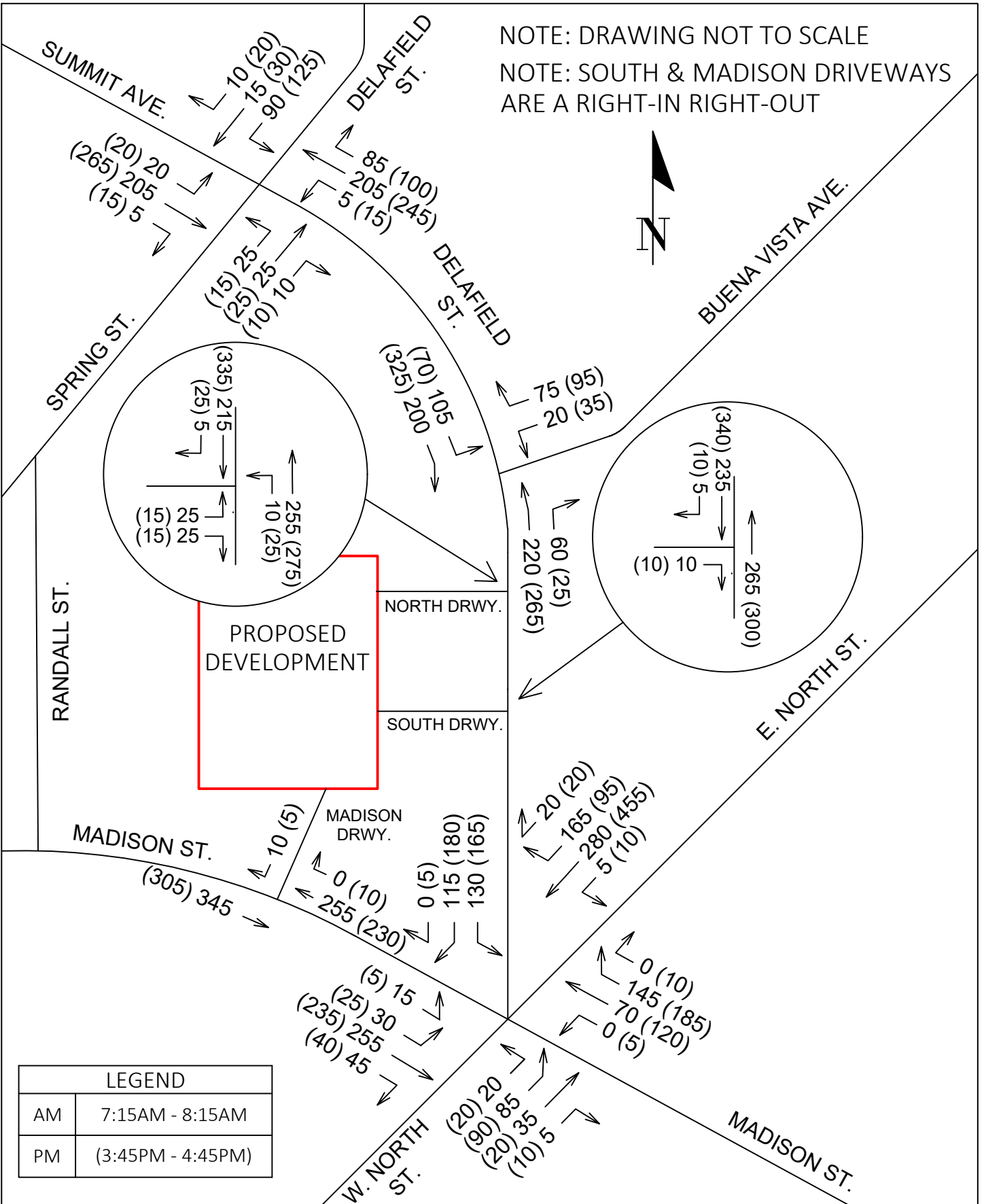
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EXHIBIT 4-4B:  
 2025 BASE YEAR BUILD VOLUMES -  
 TWO DRIVEWAY SCENARIO

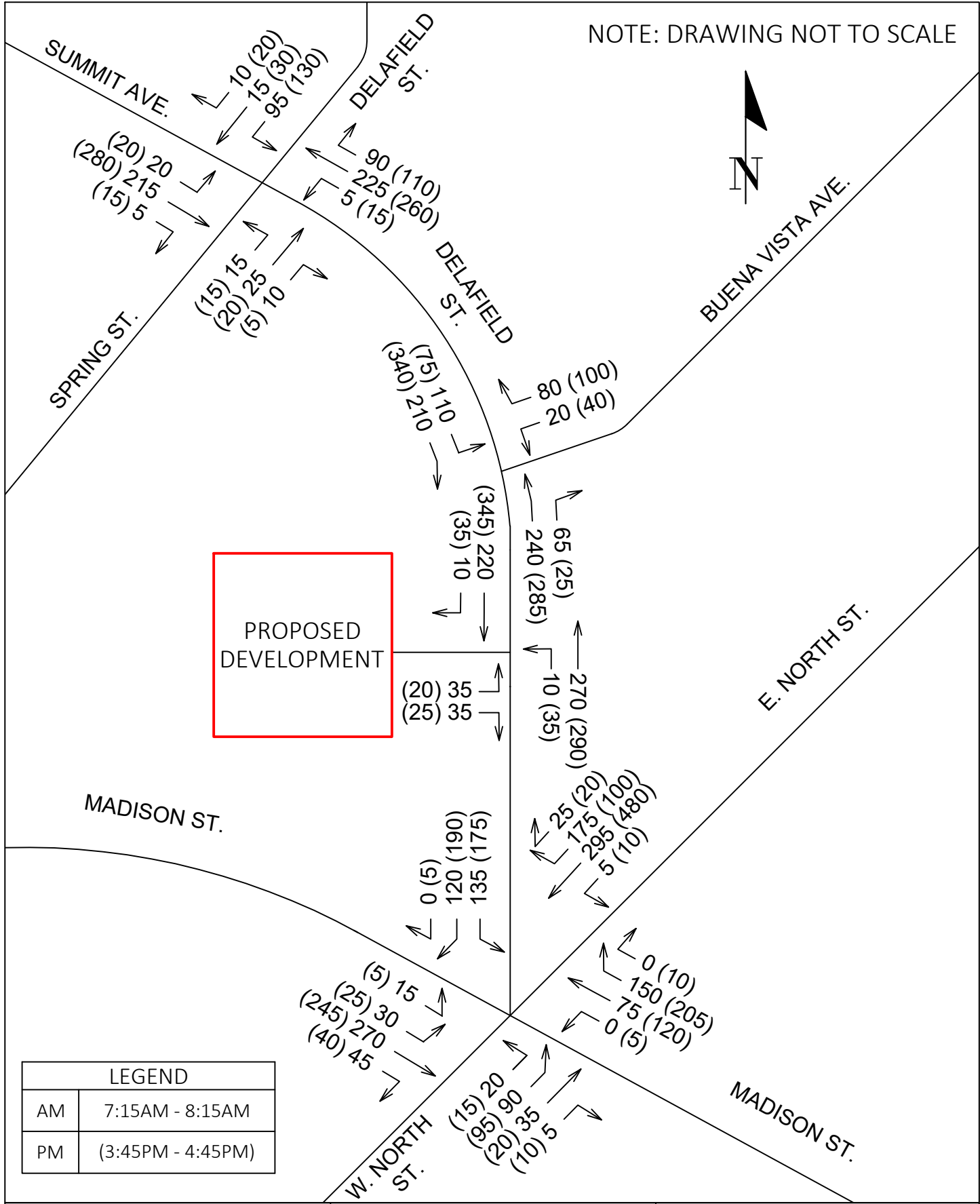
NOTE: DRAWING NOT TO SCALE  
 NOTE: SOUTH & MADISON DRIVEWAYS ARE A RIGHT-IN RIGHT-OUT



LEGEND	
AM	7:15AM - 8:15AM
PM	(3:45PM - 4:45PM)



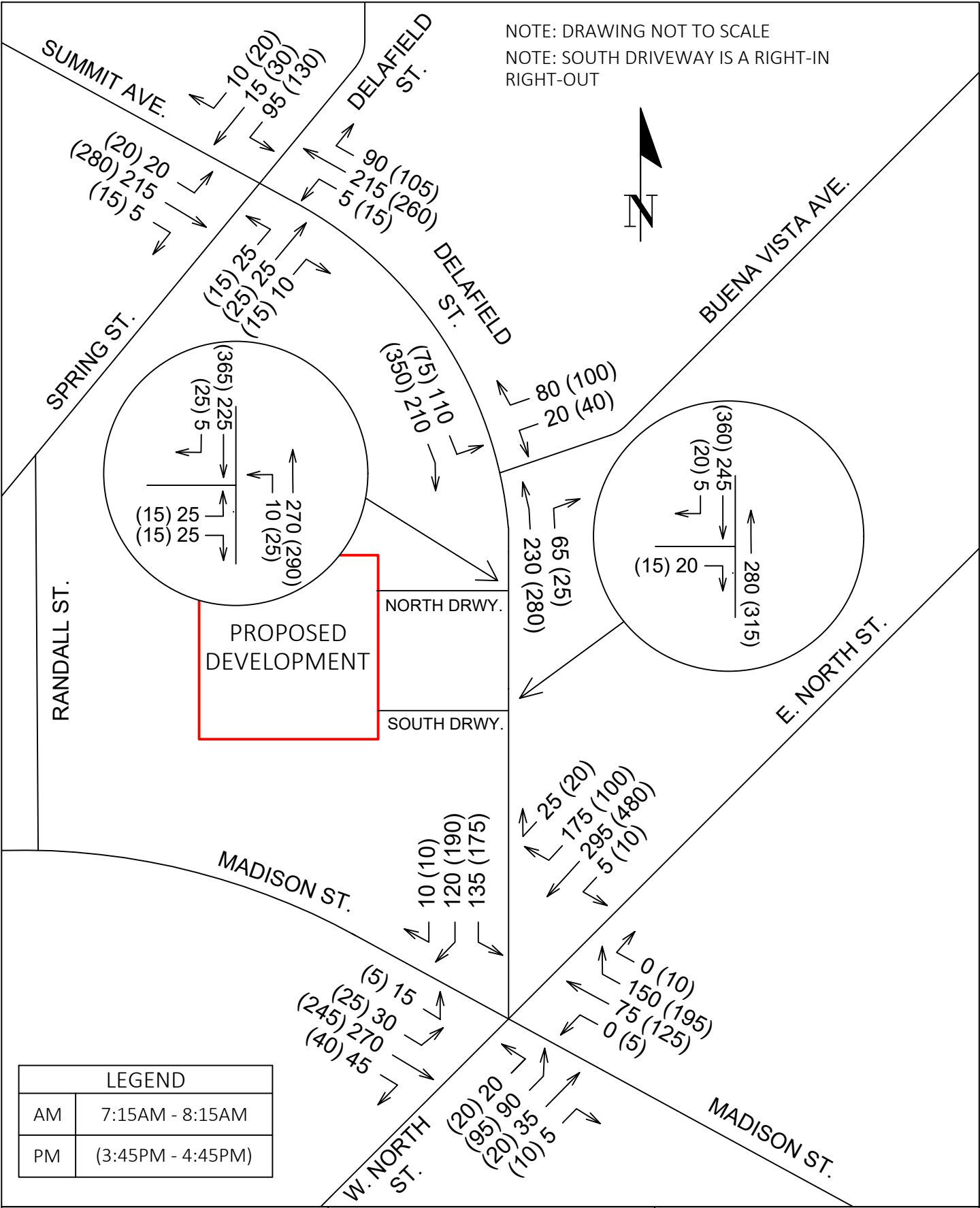
NOTE: DRAWING NOT TO SCALE



PROPOSED DEVELOPMENT

LEGEND	
AM	7:15AM - 8:15AM
PM	(3:45PM - 4:45PM)

NOTE: DRAWING NOT TO SCALE  
 NOTE: SOUTH DRIVEWAY IS A RIGHT-IN RIGHT-OUT



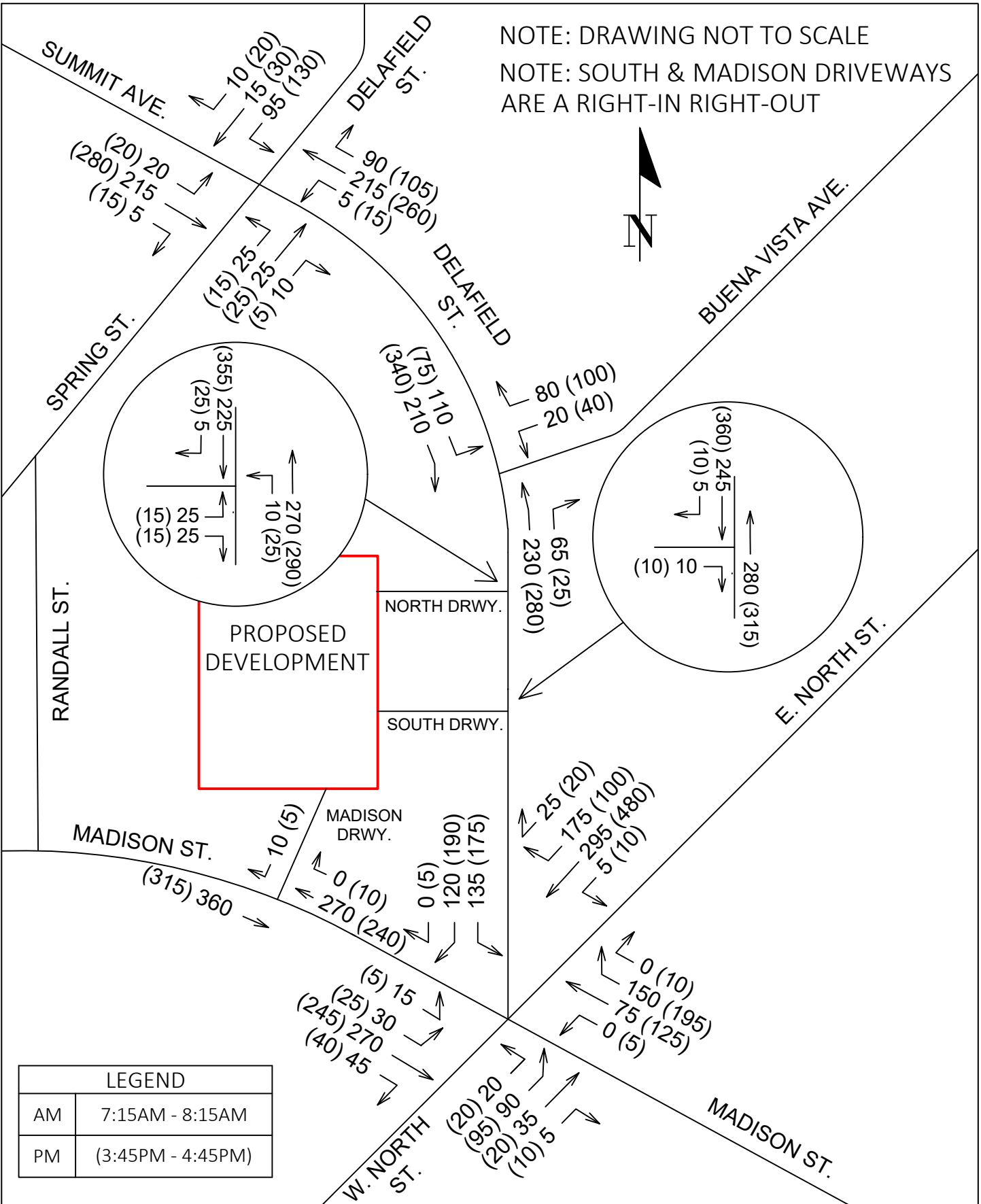
LEGEND	
AM	7:15AM - 8:15AM
PM	(3:45PM - 4:45PM)



MANDEL GROUP  
 TRAFFIC IMPACT ANALYSIS  
 WAUKESHA, WISCONSIN

EXHIBIT 4-5B:  
 2035 HORIZON YEAR BUILD VOLUMES -  
 TWO DRIVEWAY SCENARIO

NOTE: DRAWING NOT TO SCALE  
 NOTE: SOUTH & MADISON DRIVEWAYS ARE A RIGHT-IN RIGHT-OUT



LEGEND	
AM	7:15AM - 8:15AM
PM	(3:45PM - 4:45PM)



MANDEL GROUP  
 TRAFFIC IMPACT ANALYSIS  
 WAUKESHA, WISCONSIN

EXHIBIT 4-5C:  
 2035 HORIZON YEAR BUILD VOLUMES -  
 THREE DRIVEWAY SCENARIO

## **Attachment A)**

### **Intersection Turning Movement Counts**

# Intersection Traffic Volume Report

<b>Count Basics</b>		<b>Version 2023.05.03</b>		<b>Page 1 of 13</b>	
Start Date:	Thursday, January 18, 2024	Weekday	Schools in Session		
Total Number of Hours Counted:	7	Non-Holiday	No Special Events		

## Base Information, Observed (7) Hour and Estimated (24) Hour Volume Summaries

Major St: Summit Ave.  
 Minor St: Delafield St.  
 Intersection of: Summit Ave. & Delafield St.



IX\_ID:

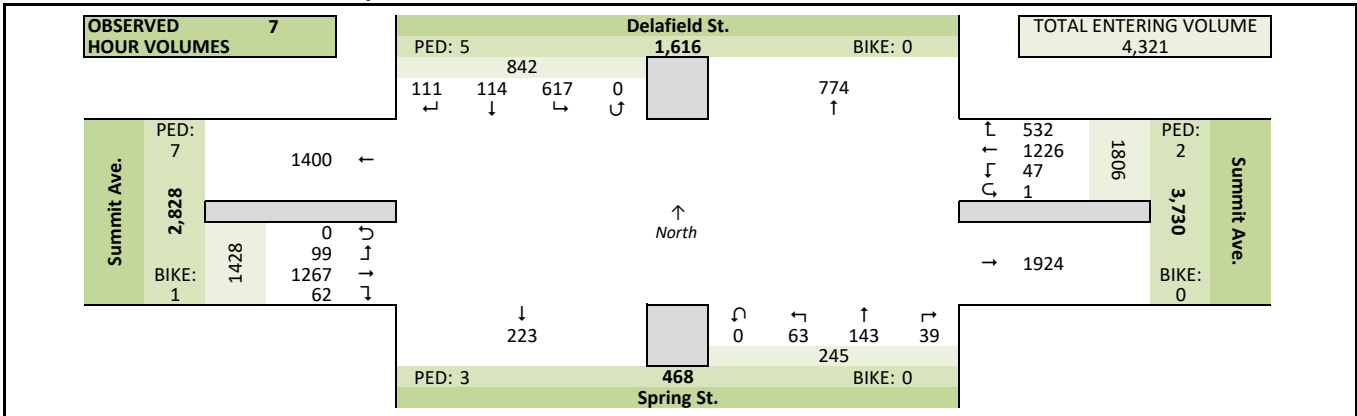
### Site Information

Municipality	City of Waukesha		
County	67 - Waukesha	WisDOT Region	SE
Traffic Control	Traffic Signal		
Roadway Names	North Direction ↑		
North Leg	Delafield St.		
East Leg	Summit Ave.		
South Leg	Spring St.		
West Leg	Summit Ave.		
Special Considerations			
Schools	In Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
	Pre-school children	None	
	Elementary school age children	None	
	Visually impaired (white cane/helper dog)	None	
	Elderly/disabled (except wheelchairs)	None	
	Wheelchairs/electric scooters	None	
Other (describe)	None	None	

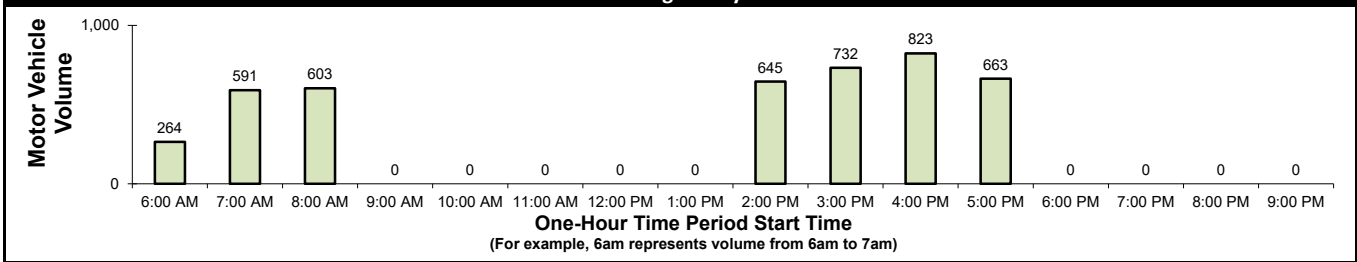
### Count Information

Hrs Counted:	06:00 AM-09:00 AM and 02:00 PM-06:00 PM		
1st Day of Count	Thursday, January 18, 2024		Weather
AM Peak Period	Thursday, January 18, 2024		Clear & Dry
Midday Peak Period	Thursday, January 18, 2024		Clear & Dry
PM Peak Period	Thursday, January 18, 2024		Clear & Dry
Calculated Peak Hours			
	AM	7:30-8:30am	MD
	PM	3:45-4:45pm	
Peak Hours Selected for Analysis			
	AM	7:15-8:15am	MD
	PM	3:45-4:45pm	
Daily/Seasonal Adjustment Group	(2) Urban Arterials & Collectors		
Count Expansion Group	(2) Urban Arterials & Collectors		
Daily/Seasonal Adjustment Factor	1.087	Count Expansion Factor	1.993
Company Name	Ayres Associates		Manual Adj.
	1.000		
Observers	AM Peak Period	Miovision Video Recording	
	Midday Peak Period	Miovision Video Recording	
	PM Peak Period	Miovision Video Recording	
Comments	2021 DOT Daily & Seasonal Factors		

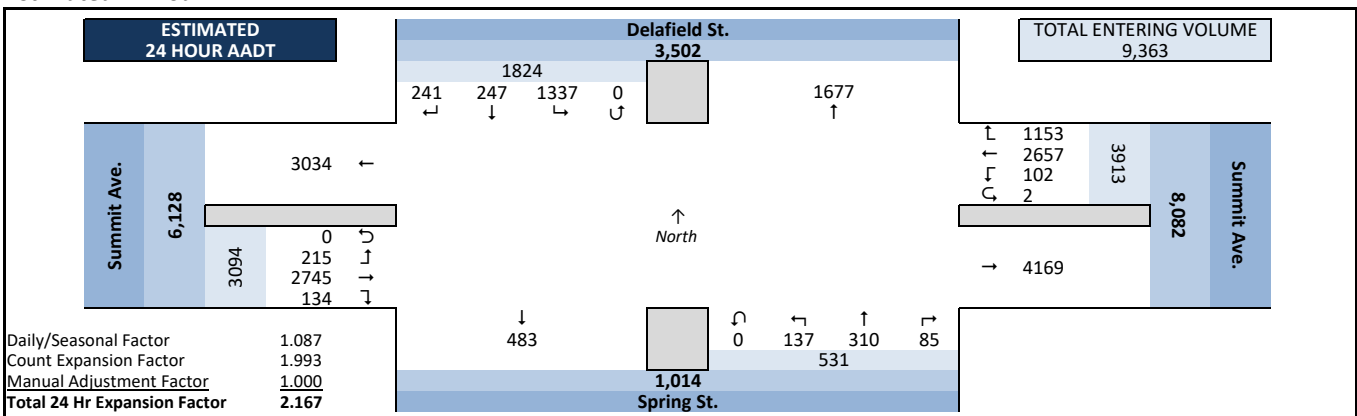
### Observed 7 Hour Volume Summary



### Total Entering Hourly Volume



### Estimated 24 Hour AADT

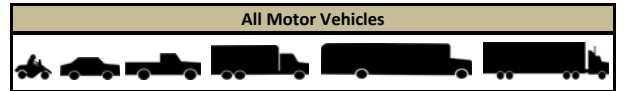


# Intersection Traffic Volume Report

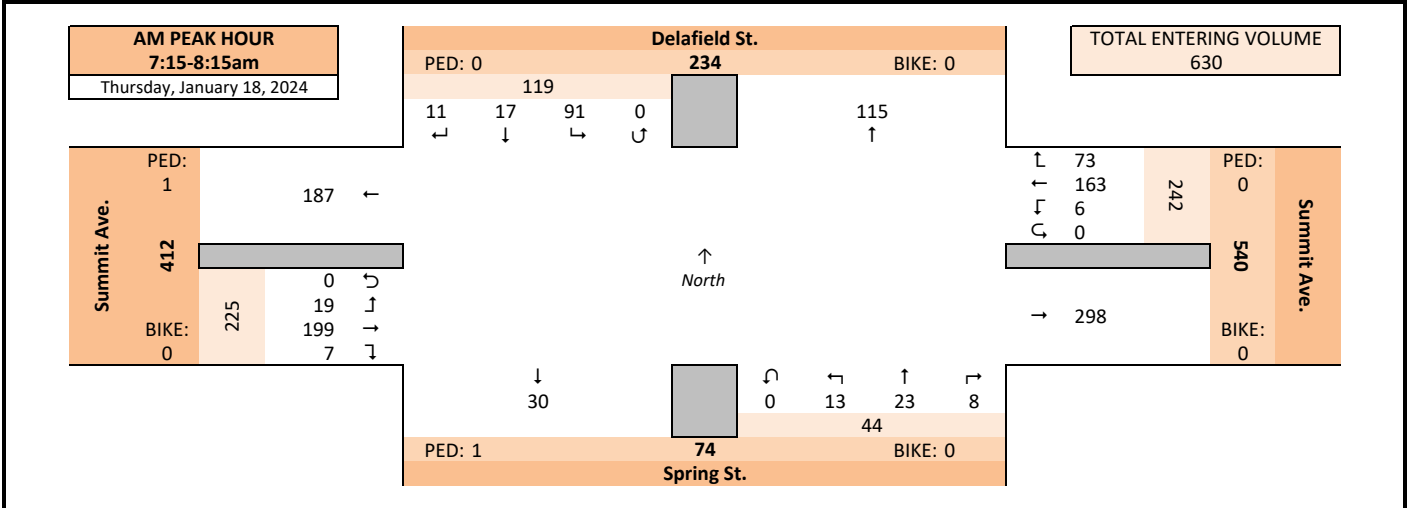
Count Basics		Page 2 of 13	
Start Date:	Thursday, January 18, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	7	Non-Holiday	No Special Events

## Peak Hour Volume Graphical Summary

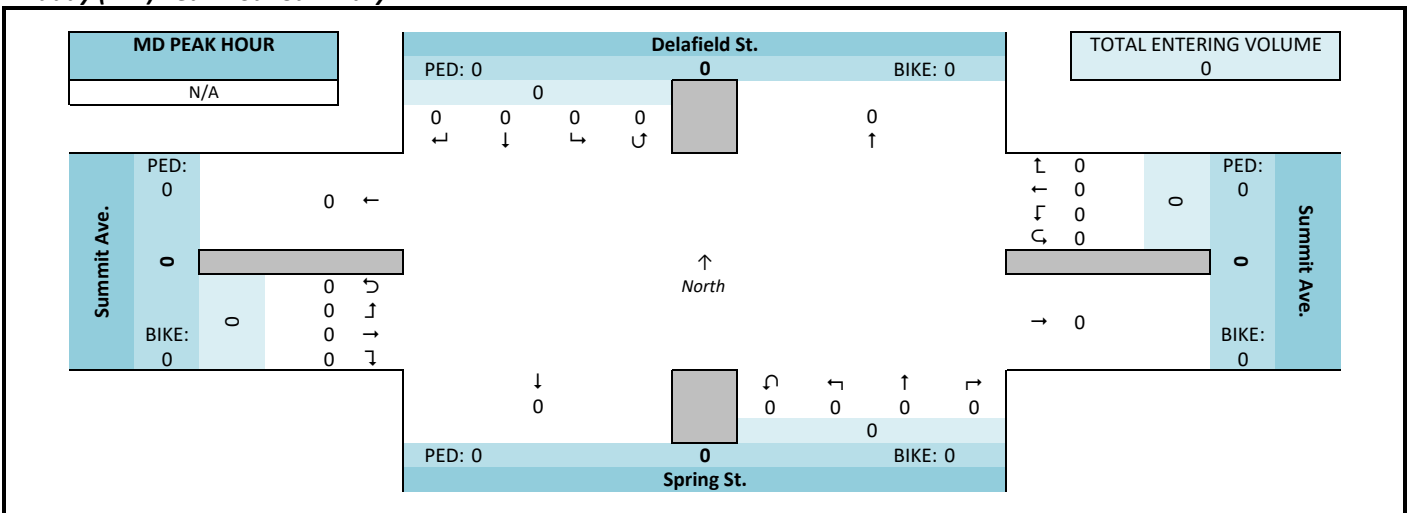
Summit Ave. & Delafield St.



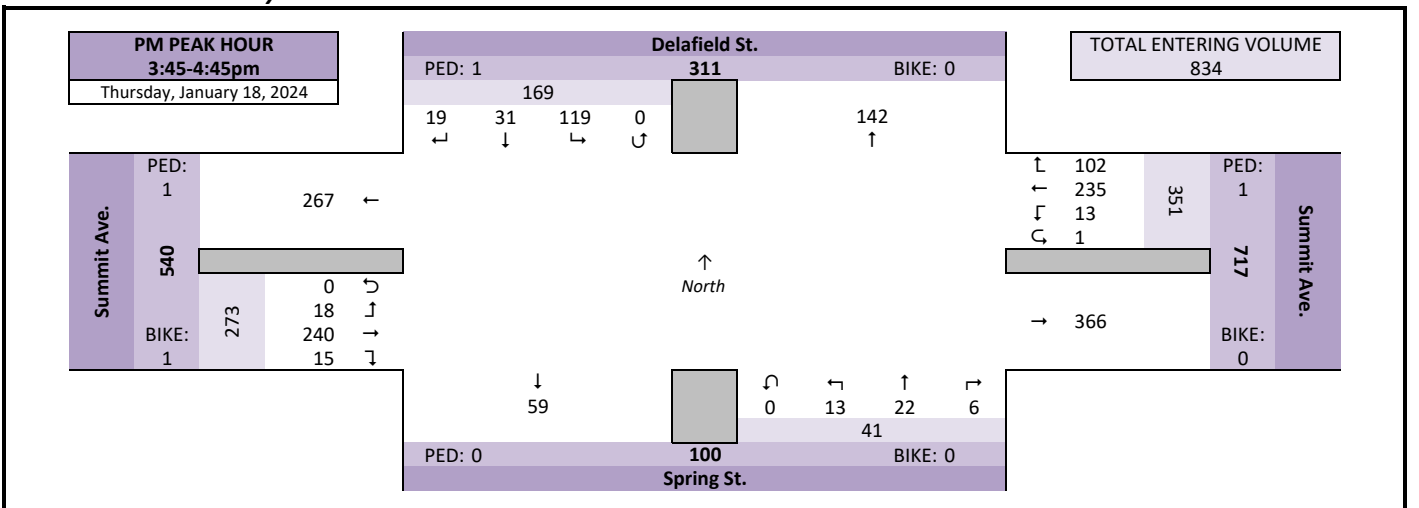
### AM Peak Hour Summary



### Midday (MD) Peak Hour Summary



### PM Peak Hour Summary

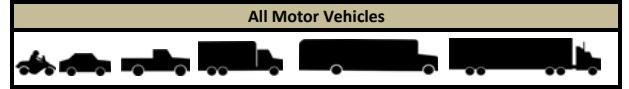


# Intersection Traffic Volume Report

<b>Count Basics</b>		Page 3 of 13	
Start Date:	Thursday, January 18, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	7	Non-Holiday	No Special Events

## Peak Hour Volume Summary

Summit Ave. & Delafield St.



## Peak Hour Volumes, Truck Percentages, and PHFs

Thursday, January 18, 2024		From North					From East					From South					From West					Totals
		Delafield St.					Summit Ave.					Spring St.					Summit Ave.					
AM Peak Hour	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
	7:15 AM	7	3	16	0	26	17	40	1	0	58	1	5	3	0	9	1	42	3	0	46	139
	7:30 AM	2	1	33	0	36	16	35	2	0	53	1	5	5	0	11	5	48	8	0	61	161
	7:45 AM	2	7	30	0	39	22	43	0	0	65	3	8	2	0	13	0	55	7	0	62	179
	8:00 AM	0	6	12	0	18	18	45	3	0	66	3	5	3	0	11	1	54	1	0	56	151
	Peak Hour Volume	11	17	91	0	119	73	163	6	0	242	8	23	13	0	44	7	199	19	0	225	630
	Rounded Hourly Volume	10	15	90	0	115	75	165	5	0	245	10	25	15	0	50	5	200	20	0	225	635
	% Single Unit Trucks	18.2	11.8	5.5	0.0	7.6	4.1	5.5	0.0	0.0	5.0	0.0	4.3	0.0	0.0	2.3	14.3	1.5	0.0	0.0	1.8	4.1
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.4	0.3
	% Trucks (Total)	18.2	11.8	5.5	0.0	7.6	5.5	5.5	0.0	0.0	5.4	0.0	4.3	0.0	0.0	2.3	14.3	2.0	0.0	0.0	2.2	4.4
	Peak Hour Factor (PHF)	0.39	0.61	0.69	0.00	0.76	0.83	0.91	0.50	0.00	0.92	0.67	0.72	0.65	0.00	0.85	0.35	0.90	0.59	0.00	0.91	0.88

N/A		From North					From East					From South					From West					Totals
		Delafield St.					Summit Ave.					Spring St.					Summit Ave.					
Midday (MD) Peak Hour	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Peak Hour Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rounded Hourly Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Thursday, January 18, 2024		From North					From East					From South					From West					Totals
		Delafield St.					Summit Ave.					Spring St.					Summit Ave.					
PM Peak Hour	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
	3:45 PM	6	10	20	0	36	19	45	2	0	66	1	5	4	0	10	6	68	6	0	80	192
	4:00 PM	8	8	34	0	50	38	57	1	0	96	4	6	3	0	13	5	58	5	0	68	227
	4:15 PM	2	5	26	0	33	25	61	4	0	90	1	8	2	0	11	3	58	1	0	62	196
	4:30 PM	3	8	39	0	50	20	72	6	1	99	0	3	4	0	7	1	56	6	0	63	219
	Peak Hour Volume	19	31	119	0	169	102	235	13	1	351	6	22	13	0	41	15	240	18	0	273	834
	Rounded Hourly Volume	20	30	120	0	170	100	235	15	0	350	5	20	15	0	40	15	240	20	0	275	835
	% Single Unit Trucks	10.5	0.0	1.7	0.0	2.4	2.9	1.7	0.0	0.0	2.0	0.0	9.1	0.0	0.0	4.9	20.0	2.1	5.6	0.0	3.3	2.6
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	% Trucks (Total)	10.5	0.0	1.7	0.0	2.4	3.9	1.7	0.0	0.0	2.3	0.0	9.1	0.0	0.0	4.9	20.0	2.1	5.6	0.0	3.3	2.8
	Peak Hour Factor (PHF)	0.59	0.77	0.76	0.00	0.84	0.67	0.82	0.54	0.25	0.89	0.37	0.69	0.81	0.00	0.79	0.62	0.88	0.75	0.00	0.85	0.92

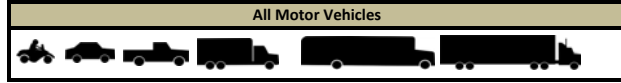
## Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists	Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			Total Ped & Bike Volume
	Delafield St.			Summit Ave.			Spring St.			Summit Ave.			
	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
<b>15-Minute Start Time</b>													
AM	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	1	0	1	1	0	1
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
	<b>Total</b>	0	0	0	0	0	0	1	0	1	1	0	1
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
	<b>Total</b>	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	1	0	1	0	0	0	0	0	0	0	0	1
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	1	0	1	0	0	0	1	1	2
	<b>Total</b>	1	0	1	1	0	1	0	0	0	1	1	2

# Intersection Traffic Volume Report

## Hourly Volume Summary - Motor Vehicle Data

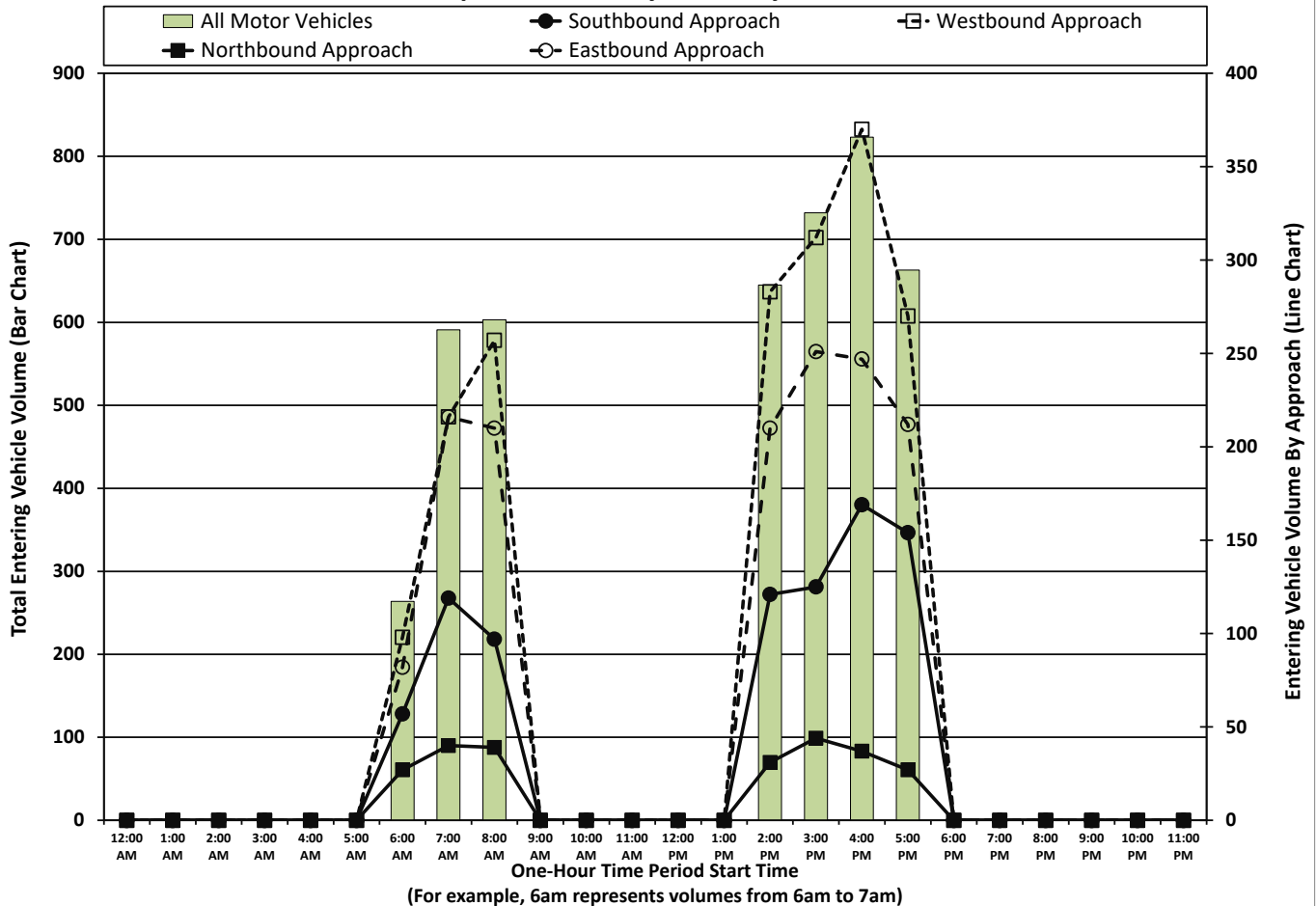
Summit Ave. & Delafield St.



### One-Hour Motor Vehicle Data

One-Hour Time Period	From North Delafield St.					From East Summit Ave.					From South Spring St.					From West Summit Ave.					Total Vehicle Volume	Directional Volume Totals	
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		E/W	N/S
	Start Time																						
Pre-AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AM	9	6	42	0	57	33	64	1	0	98	8	14	5	0	27	2	70	10	0	82	264	180	84
MD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	16	12	91	0	119	67	146	3	0	216	6	22	12	0	40	7	190	19	0	216	591	432	159
Totals	111	114	617	0	842	532	1226	47	1	1806	39	143	63	0	245	62	1267	99	0	1428	4321	3234	1087

### Graphical Summary of Hourly Volumes



















# Intersection Traffic Volume Report

<b>Count Basics</b>		<b>Version 2023.05.03</b>		<b>Page 1 of 13</b>	
Start Date:	Thursday, January 18, 2024	Weekday	Schools in Session		
Total Number of Hours Counted:	7	Non-Holiday	No Special Events		

## Base Information, Observed (7) Hour and Estimated (24) Hour Volume Summaries

Major St: Delafield St.  
 Minor St: Buena Vista Ave.  
 Intersection of: Delafield St. & Buena Vista Ave.



IX\_ID:

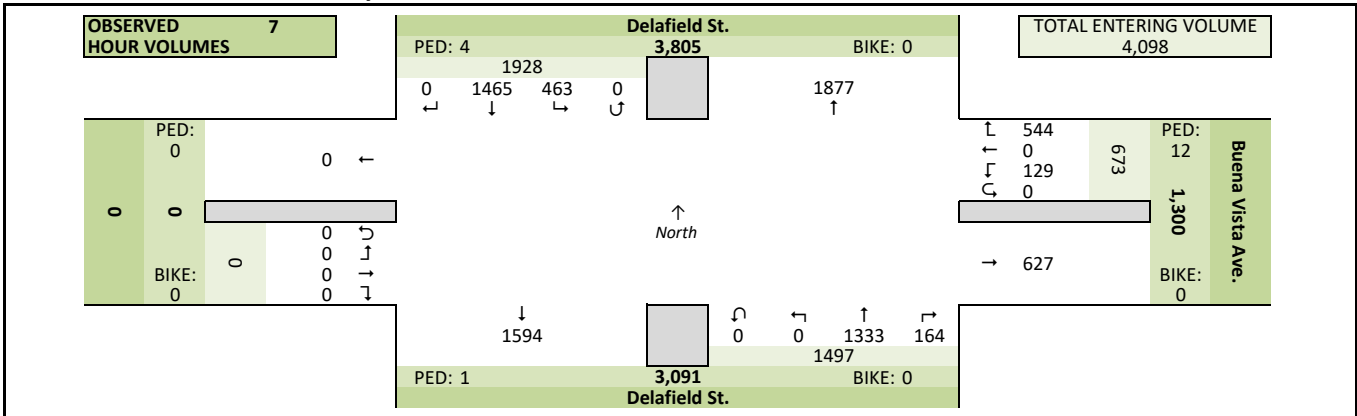
### Site Information

Municipality	City of Waukesha		
County	67 - Waukesha	WisDOT Region	SE
Traffic Control	Partial Stop Control		
Roadway Names	North Direction	↑	
North Leg	Delafield St.		
East Leg	Buena Vista Ave.		
South Leg	Delafield St.		
West Leg			
Special Considerations			
Schools	In Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
	Pre-school children	None	
	Elementary school age children	None	
	Visually impaired (white cane/helper dog)	None	
	Elderly/disabled (except wheelchairs)	None	
	Wheelchairs/electric scooters	None	
Other (describe)	None	None	

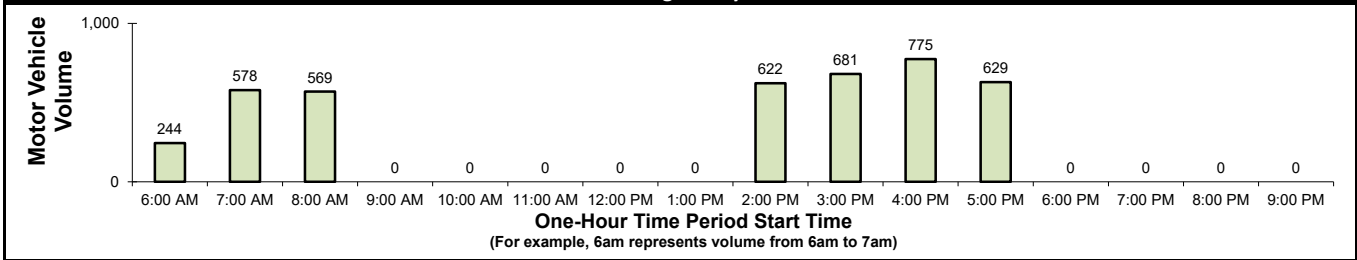
### Count Information

Hrs Counted:	06:00 AM-09:00 AM and 02:00 PM-06:00 PM		
1st Day of Count	Thursday, January 18, 2024		Weather
AM Peak Period	Thursday, January 18, 2024		Clear & Dry
Midday Peak Period	Thursday, January 18, 2024		Clear & Dry
PM Peak Period	Thursday, January 18, 2024		Clear & Dry
Calculated Peak Hours			
	AM	7:30-8:30am	MD
			PM
			4:00-5:00pm
Peak Hours Selected for Analysis			
	AM	7:15-8:15am	MD
			PM
			3:45-4:45pm
Daily/Seasonal Adjustment Group	(2) Urban Arterials & Collectors		
Count Expansion Group	(2) Urban Arterials & Collectors		
Daily/Seasonal Adjustment Factor	1.087	Count Expansion Factor	1.993
Company Name	Ayres Associates		Manual Adj.
			1.000
Observers	AM Peak Period	Miovision Video Recording	
	Midday Peak Period	Miovision Video Recording	
	PM Peak Period	Miovision Video Recording	
Comments	2021 DOT Daily & Seasonal Factors		

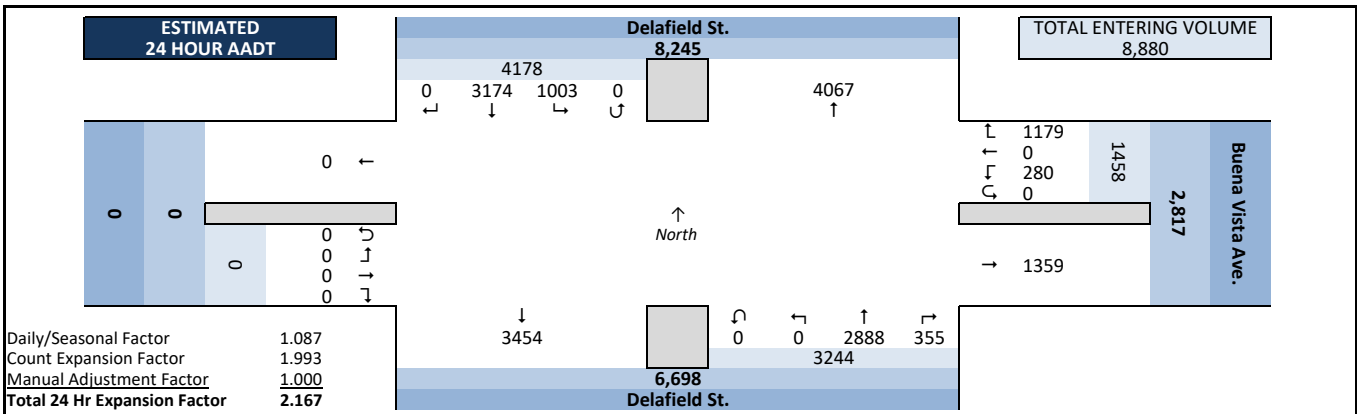
### Observed 7 Hour Volume Summary



### Total Entering Hourly Volume



### Estimated 24 Hour AADT



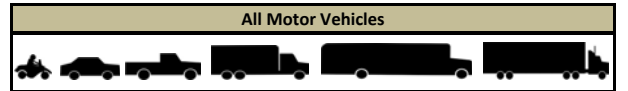


# Intersection Traffic Volume Report

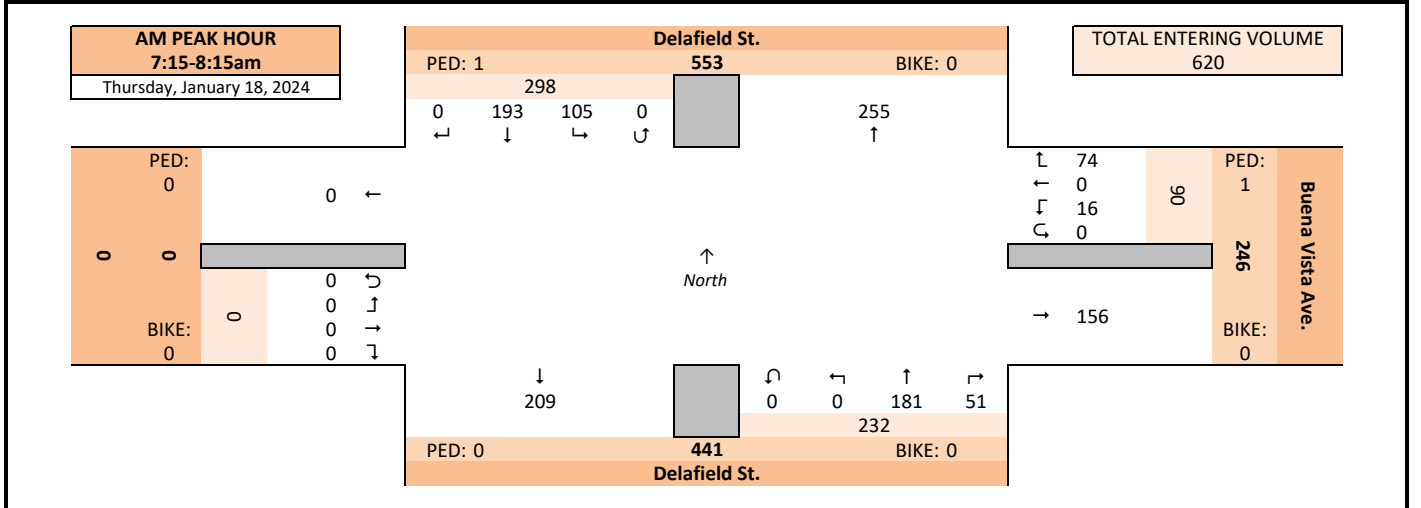
<b>Count Basics</b>		Page 2 of 13	
Start Date:	Thursday, January 18, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	7	Non-Holiday	No Special Events

## Peak Hour Volume Graphical Summary

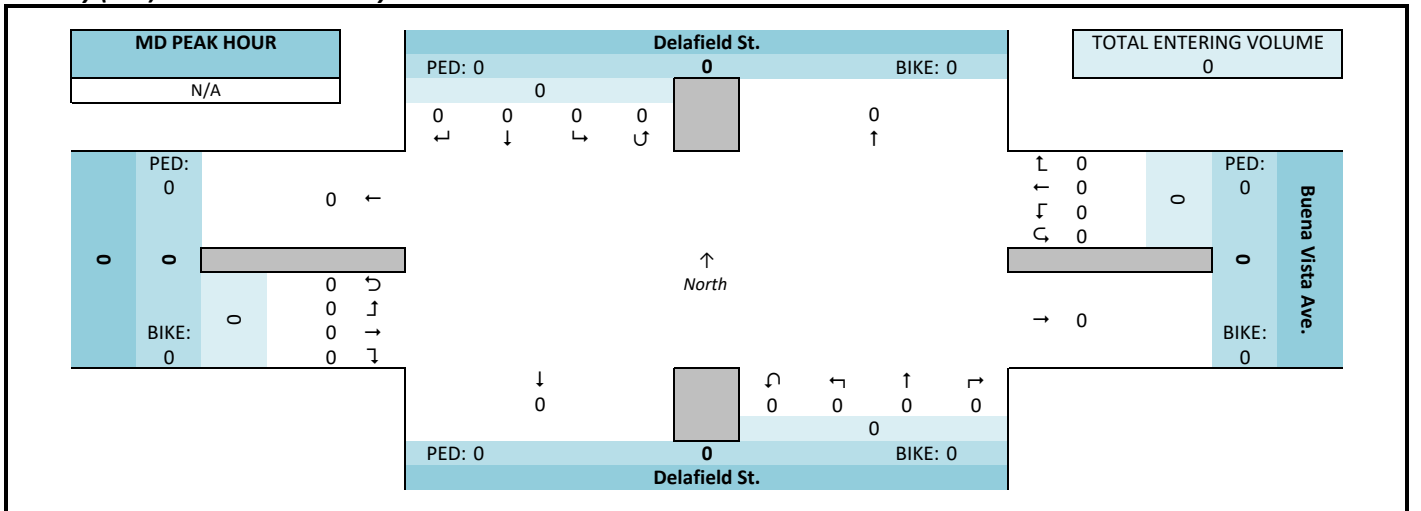
Delafield St. & Buena Vista Ave.



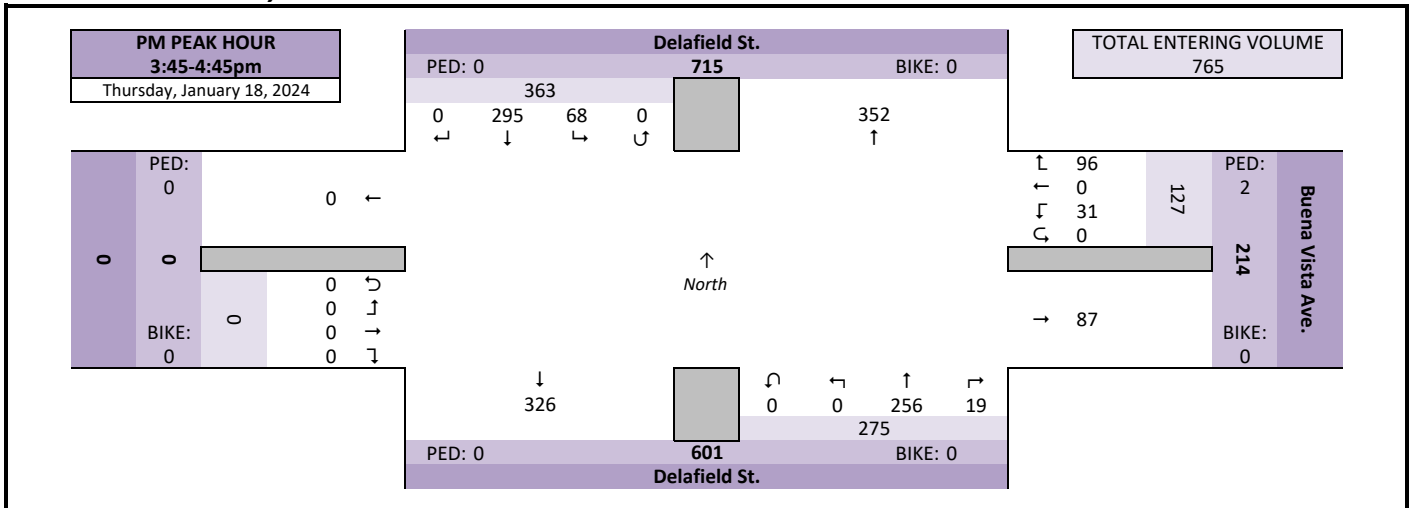
### AM Peak Hour Summary



### Midday (MD) Peak Hour Summary



### PM Peak Hour Summary

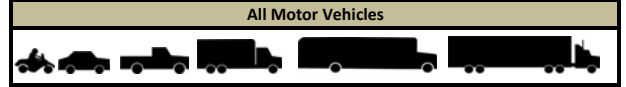


# Intersection Traffic Volume Report

<b>Count Basics</b>			<b>Page 3 of 13</b>
Start Date:	Thursday, January 18, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	7	Non-Holiday	No Special Events

## Peak Hour Volume Summary

Delafield St. & Buena Vista Ave.



### Peak Hour Volumes, Truck Percentages, and PHFs

Thursday, January 18, 2024		↓ From North					← From East					↑ From South					→ From West					Totals
		Delafield St.					Buena Vista Ave.					Delafield St.					0					
<b>AM Peak Hour</b>	<b>Start Time</b>	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
	7:15 AM	0	39	20	0	59	17	0	7	0	24	13	40	0	0	53	0	0	0	0	0	0
	7:30 AM	0	57	21	0	78	15	0	6	0	21	12	45	0	0	57	0	0	0	0	0	0
	7:45 AM	0	50	38	0	88	21	0	2	0	23	16	48	0	0	64	0	0	0	0	0	0
	8:00 AM	0	47	26	0	73	21	0	1	0	22	10	48	0	0	58	0	0	0	0	0	0
	Peak Hour Volume	0	193	105	0	298	74	0	16	0	90	51	181	0	0	232	0	0	0	0	0	0
	Rounded Hourly Volume	0	195	105	0	300	75	0	15	0	90	50	180	0	0	230	0	0	0	0	0	0
	% Single Unit Trucks	0.0	3.1	2.9	0.0	3.0	1.4	0.0	0.0	0.0	1.1	0.0	4.4	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0
	% Heavy Trucks	0.0	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
	% Trucks (Total)	0.0	3.6	2.9	0.0	3.4	1.4	0.0	0.0	0.0	1.1	0.0	5.0	0.0	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0
Peak Hour Factor (PHF)	0.00	0.85	0.69	0.00	0.85	0.88	0.00	0.57	0.00	0.94	0.80	0.94	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	

N/A		↓ From North					← From East					↑ From South					→ From West					Totals
		Delafield St.					Buena Vista Ave.					Delafield St.					0					
<b>Midday (MD) Peak Hour</b>	<b>Start Time</b>	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Peak Hour Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rounded Hourly Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Thursday, January 18, 2024		↓ From North					← From East					↑ From South					→ From West					Totals
		Delafield St.					Buena Vista Ave.					Delafield St.					0					
<b>PM Peak Hour</b>	<b>Start Time</b>	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals
	3:45 PM	0	68	19	0	87	16	0	10	0	26	6	51	0	0	57	0	0	0	0	0	0
	4:00 PM	0	76	19	0	95	23	0	3	0	26	3	73	0	0	76	0	0	0	0	0	0
	4:15 PM	0	74	11	0	85	23	0	4	0	27	3	61	0	0	64	0	0	0	0	0	0
	4:30 PM	0	77	19	0	96	34	0	14	0	48	7	71	0	0	78	0	0	0	0	0	0
	Peak Hour Volume	0	295	68	0	363	96	0	31	0	127	19	256	0	0	275	0	0	0	0	0	0
	Rounded Hourly Volume	0	295	70	0	365	95	0	30	0	125	20	255	0	0	275	0	0	0	0	0	0
	% Single Unit Trucks	0.0	2.0	2.9	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
	% Trucks (Total)	0.0	2.0	2.9	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
Peak Hour Factor (PHF)	0.00	0.96	0.89	0.00	0.95	0.71	0.00	0.55	0.00	0.66	0.68	0.88	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.00	

### Peak Hour Pedestrian and Bicyclist Volumes

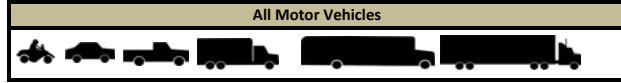
Pedestrians and Bicyclists		↔ Crossing North Approach			↕ Crossing East Approach			↔ Crossing South Approach			↕ Crossing West Approach			Total Ped & Bike Volume
		Delafield St.			Buena Vista Ave.			Delafield St.			0			
15-Minute Start Time		Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
<b>AM</b>	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	1	0	1	0	0	0	0	0	0	0	0	0	1
	8:00 AM	0	0	0	1	0	1	0	0	0	0	0	0	1
	<b>Total</b>	1	0	1	1	0	1	0	0	0	0	0	0	2
<b>MD</b>	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	<b>Total</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>PM</b>	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	1	0	1	0	0	0	0	0	0	1
	4:15 PM	0	0	0	1	0	1	0	0	0	0	0	0	1
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	<b>Total</b>	0	0	0	2	0	2	0	0	0	0	0	0	2

# Intersection Traffic Volume Report

<b>Count Basics</b>		<i>Page 4 of 13</i>	
Start Date:	Thursday, January 18, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	7	Non-Holiday	No Special Events

## Hourly Volume Summary - Motor Vehicle Data

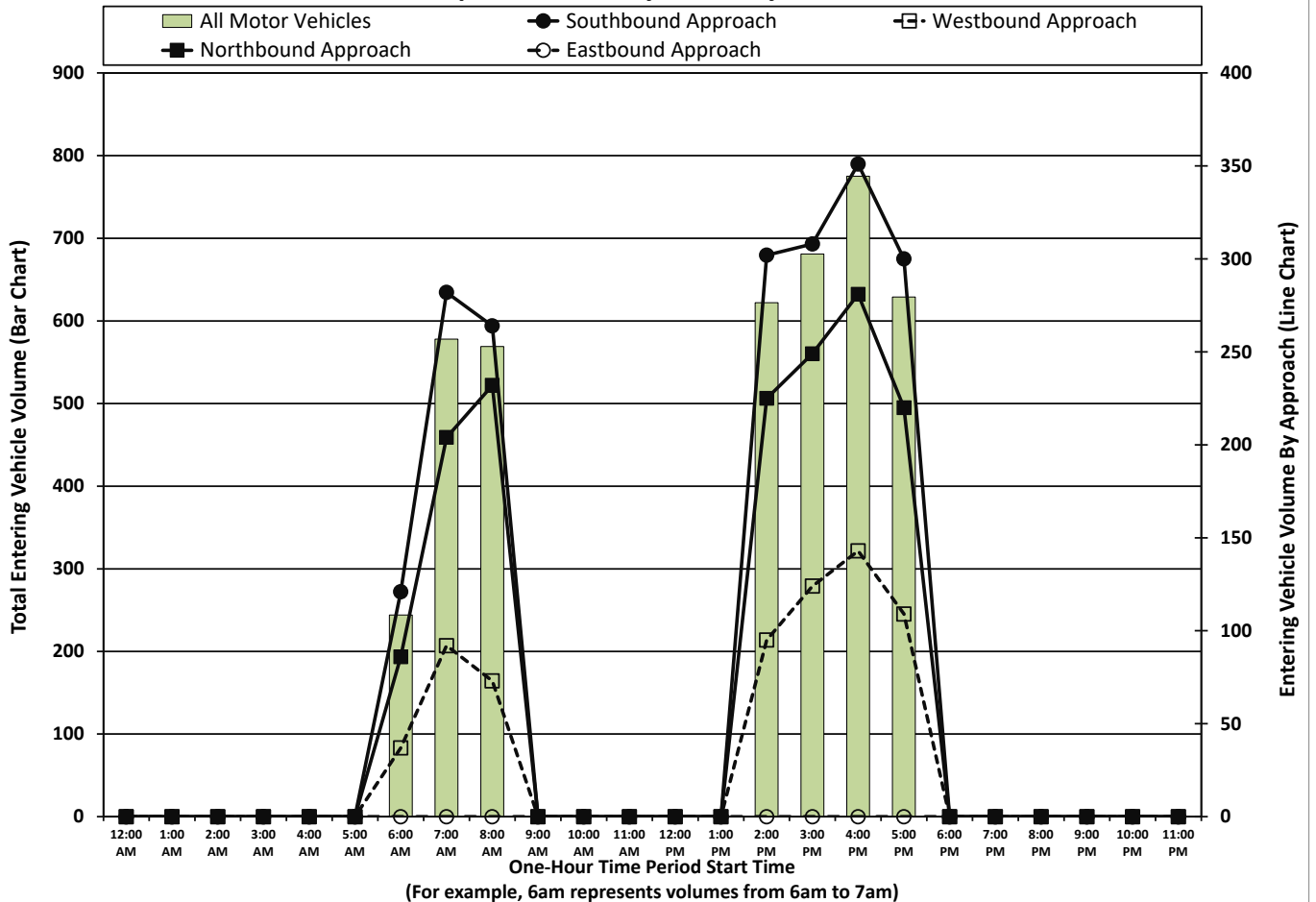
Delafield St. & Buena Vista Ave.



### One-Hour Motor Vehicle Data

One-Hour Time Period	From North Delafield St.					From East Buena Vista Ave.					From South Delafield St.					From West 0					Total Vehicle Volume	Directional Volume Totals					
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		E/W	N/S				
	Start Time																										
Pre-AM	12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	6:00 AM	0	86	35	0	121	31	0	6	0	37	12	74	0	0	86	0	0	0	0	0	244	37	207			
	7:00 AM	0	185	97	0	282	73	0	19	0	92	45	159	0	0	204	0	0	0	0	0	578	92	486			
	8:00 AM	0	191	73	0	264	66	0	7	0	73	30	202	0	0	232	0	0	0	0	0	569	73	496			
MD	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2:00 PM	0	228	74	0	302	79	0	16	0	95	19	206	0	0	225	0	0	0	0	0	622	95	527			
	3:00 PM	0	233	75	0	308	93	0	31	0	124	22	227	0	0	249	0	0	0	0	0	681	124	557			
	4:00 PM	0	294	57	0	351	112	0	31	0	143	16	265	0	0	281	0	0	0	0	0	775	143	632			
	5:00 PM	0	248	52	0	300	90	0	19	0	109	20	200	0	0	220	0	0	0	0	0	629	109	520			
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	0	1465	463	0	1928	544	0	129	0	673	164	1333	0	0	1497	0	0	0	0	0	4098	673	3425				

### Graphical Summary of Hourly Volumes

















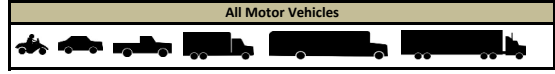




# Intersection Traffic Volume Report

## Hourly Volume Summary - Motor Vehicle Data

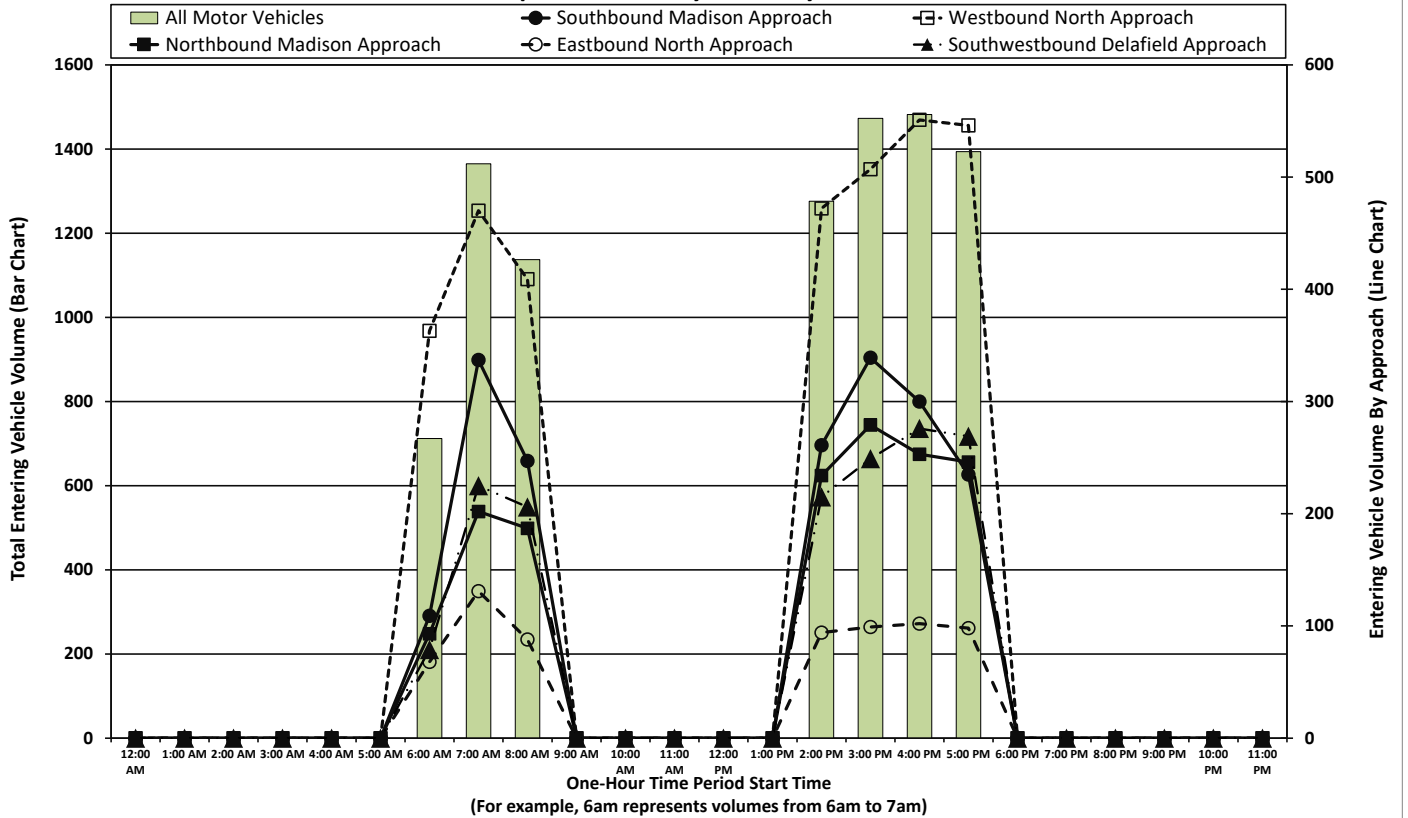
Delafield St., E. North St. & Madison St.



### One-Hour Motor Vehicle Data

One-Hour Time Period Start Time	From Northeast				From North				From East				From South				From West				Total Vehicle Volume	Directional Volume Totals						
	Delafield St.				Madison St.				E. North St.				Madison St.				E. North St.											
	RT #1 Onto Mad.	RT #2 Onto North	LT Onto Mad.	Total	RT Onto North	Thru Onto Mad.	LT #1 Onto North	LT #2 Onto Dela.	Total	RT #1 Onto Dela.	RT #2 Onto Mad.	Thru Onto North	LT Onto Mad.	Total	RT #1 Onto North	RT #2 Onto Dela.	Thru Onto Mad.	LT Onto North	Total	RT Onto Mad.				Thru Onto North	LT #1 Onto Dela.	LT #2 Onto Mad.	Total	E/W
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6:00 AM	1	41	37	79	18	80	8	3	109	8	123	232	0	363	4	50	38	1	93	3	25	31	9	68	712	431	202	
7:00 AM	6	104	115	225	44	253	27	13	337	21	169	271	9	470	2	119	78	3	202	4	36	75	16	131	1365	601	539	
8:00 AM	1	100	105	206	28	188	21	10	247	22	137	249	1	409	4	129	54	0	187	4	22	48	14	88	1137	497	434	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	10	89	116	215	32	205	21	3	261	24	104	327	17	472	10	124	97	3	234	2	18	57	17	94	1276	566	495	
3:00 PM	3	123	123	249	45	258	29	7	339	23	86	383	15	507	13	144	114	8	279	6	31	49	13	99	1473	606	618	
4:00 PM	8	135	133	276	45	228	26	1	300	14	97	428	12	551	7	120	119	7	253	7	22	51	22	102	1482	653	553	
5:00 PM	10	118	141	269	28	190	14	3	235	21	100	407	18	546	7	124	111	4	246	3	18	62	15	98	1394	644	481	
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>39</b>	<b>710</b>	<b>770</b>	<b>1519</b>	<b>240</b>	<b>1402</b>	<b>146</b>	<b>40</b>	<b>1828</b>	<b>133</b>	<b>816</b>	<b>2297</b>	<b>72</b>	<b>3318</b>	<b>47</b>	<b>810</b>	<b>611</b>	<b>26</b>	<b>1494</b>	<b>29</b>	<b>172</b>	<b>373</b>	<b>106</b>	<b>680</b>	<b>8839</b>	<b>3998</b>	<b>3322</b>	

### Graphical Summary of Hourly Volumes





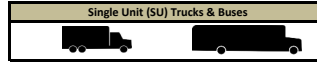


Intersection Traffic Volume Report

Count Basis Table with Start Date: Tuesday, February 6, 2024, Weekday, Schools in Session, Total Number of Hours Counted: 7, Non-Holiday, No Special Events

15-Minute Single Unit (SU) Truck & Bus Data

Delaware St., E. North St. & Madison St.



15-Minute Single Unit (SU) Truck & Bus Data

Main data table with columns for 15-Minute Time Period, Start Time, and traffic flow directions (From Northeast, From North, From East, From South, From West) with sub-columns for RT #1, RT #2, Thru, and LT for each approach. Includes a Total column and Hourly Sum column.

Peak Hour Single Unit (SU) Truck & Buses Volume Summary

Summary table for Peak Hour Single Unit (SU) Truck & Buses Volume, showing RT #1, RT #2, Thru, and LT volumes for each approach (Delaware St., Madison St., E. North St.) during AM, MD, and PM peak hours.









Intersection Traffic Volume Report

Count Basis		Page 9 of 9	
Start Date:	Tuesday, February 6, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	7	Non-Holiday	No Special Events

15-Minute Pedestrian and Bicyclist Data

Delaware St., E. North St. & Madison St.



15-Minute Pedestrian and Bicyclist Data

15-Minute Time Period	Crossing Northeast Approach			Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			15-Min Totals
	Delaware St.			Madison St.			E. North St.			Madison St.			E. North St.			
	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
Start Time																
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
8:00 AM	1	0	1	0	0	0	1	3	4	0	3	3	1	0	1	5
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	5	0	5	0	0	0	5	0	5	0	0	0	2	0	2	12
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	1	40	11	1	12	32	2	34	55	2	57	82	2	84	227

Special Pedestrians

Pedestrian Type	None	1 or 2	A Few	Several	Many	Unknown
Pre-school Children	X					
Elementary School Age Children	X					
Visually Impaired (white cane/helper dog)	X					
Elderly/Disabled (except wheelchairs)	X					
Wheelchairs/Electric Scooters	X					
Other (None)	X					

## **Attachment B)**

# **Highway Capacity Manual Analysis Outputs**

## **2025 AM – Base Year Background**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	200	5	5	190	80	15	25	10	90	15	10
Future Volume (vph)	20	200	5	5	190	80	15	25	10	90	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	2%	2%	2%	8%	8%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	233	0	6	216	56	0	56	0	102	28	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.03	0.21		0.00	0.20	0.06		0.13		0.20	0.05	
Control Delay (s/veh)	12.4	11.6		12.2	11.6	11.6		16.4		8.4	7.8	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024

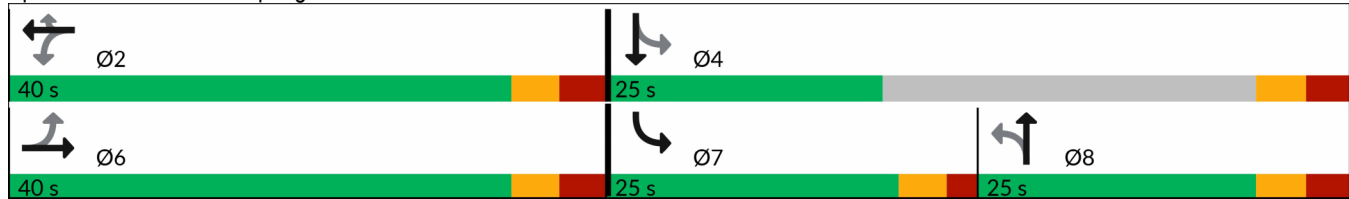


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	12.4	11.6		12.2	11.6	11.6		16.4		8.4	7.8	
Queue Length 50th (ft)	2	27		1	25	6		7		13	4	
Queue Length 95th (ft)	17	102		7	96	32		38		34	14	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	1024	1637		978	1598	1358		938		940	1588	
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	0.02	0.14		0.01	0.14	0.04		0.06		0.11	0.02	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	37.8
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	200	5	5	190	80	15	25	10	90	15	10
Future Volume (veh/h)	20	200	5	5	190	80	15	25	10	90	15	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1826	1826	1826	1870	1870	1870	1781	1781	1781
Adj Flow Rate, veh/h	23	227	6	6	216	56	17	28	11	102	17	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	8	8	8
Cap, veh/h	405	541	14	401	545	461	157	124	40	661	392	254
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.12	0.12	0.12	0.14	0.39	0.39
Sat Flow, veh/h	1106	1814	48	1119	1826	1545	333	1025	332	1697	1010	653
Grp Volume(v), veh/h	23	0	233	6	216	56	56	0	0	102	0	28
Grp Sat Flow(s),veh/h/ln	1106	0	1862	1119	1826	1545	1690	0	0	1697	0	1663
Q Serve(g_s), s	0.7	0.0	4.0	0.2	3.8	1.1	0.0	0.0	0.0	1.8	0.0	0.4
Cycle Q Clear(g_c), s	4.5	0.0	4.0	4.2	3.8	1.1	1.1	0.0	0.0	1.8	0.0	0.4
Prop In Lane	1.00		0.03	1.00		1.00	0.30		0.20	1.00		0.39
Lane Grp Cap(c), veh/h	405	0	556	401	545	461	321	0	0	661	0	646
V/C Ratio(X)	0.06	0.00	0.42	0.01	0.40	0.12	0.17	0.00	0.00	0.15	0.00	0.04
Avail Cap(c_a), veh/h	1002	0	1560	1005	1530	1295	883	0	0	1263	0	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.0	0.0	11.3	13.0	11.2	10.3	16.0	0.0	0.0	10.3	0.0	7.7
Incr Delay (d2), s/veh	0.0	0.0	0.4	0.0	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.4	0.0	1.3	0.3	0.4	0.0	0.0	0.5	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.0	0.0	11.7	13.0	11.6	10.4	16.1	0.0	0.0	10.3	0.0	7.7
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		256			278			56				130
Approach Delay, s/veh		11.8			11.4			16.1				9.8
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		21.9		18.3	10.7	11.2				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		6.2		2.4		6.5	3.8	3.1				
Green Ext Time (p_c), s		1.2		0.0		1.2	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				11.6								
HCM 7th LOS				B								



Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	15	75	200	55	105	195
Future Volume (vph)	15	75	200	55	105	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)		1		1	1	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	84	225	62	0	337
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕	↕		↖
Traffic Vol, veh/h	15	75	200	55	105	195
Future Vol, veh/h	15	75	200	55	105	195
Conflicting Peds, #/hr	0	1	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	17	84	225	62	118	219

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	681	227	0	0	288
Stage 1	226	-	-	-	-
Stage 2	455	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227
Pot Cap-1 Maneuver	416	813	-	-	1269
Stage 1	812	-	-	-	-
Stage 2	639	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	372	811	-	-	1268
Mov Cap-2 Maneuver	372	-	-	-	-
Stage 1	811	-	-	-	-
Stage 2	571	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v10.82		0	2.85
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	372	811	630	-
HCM Lane V/C Ratio	-	-	0.045	0.104	0.093	-
HCM Control Delay (s/veh)	-	-	15.1	10	8.1	0
HCM Lane LOS	-	-	C	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.3	0.3	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	80	35	5	5	280	165	20	1	70	140	15
Future Volume (vph)	20	80	35	5	5	280	165	20	1	70	140	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	1			3	3		1		1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	110	43	0	5	511	0	0	1	77	154	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Detector Phase	1	1	6		6	2			4	8	10	8
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	17.0
Total Split (s)	14.0	14.0	46.0		46.0	32.0			17.0	17.0	17.0	17.0
Total Split (%)	17.5%	17.5%	57.5%		57.5%	40.0%			21.3%	21.3%	21.3%	21.3%
Maximum Green (s)	8.0	8.0	39.0		39.0	25.0			10.0	10.0	10.0	10.0
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	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lag	Lag				Lead						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	1.5
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	1.5
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	30.0
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	0.0
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.67	0.04		0.00	0.86			0.00	0.33	0.29	
Control Delay (s/veh)		56.0	11.0		10.6	43.5			31.0	36.4	21.3	

# Lanes, Volumes, Timings

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	255	45	110	100
Future Volume (vph)	30	255	45	110	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12
Grade (%)		0%		0%	
Storage Length (ft)	75		0	500	0
Storage Lanes	1		0	1	0
Taper Length (ft)	75			100	
Right Turn on Red			No		
Link Speed (mph)		30		30	
Link Distance (ft)		492		646	
Travel Time (s)		11.2		14.7	
Confl. Peds. (#/hr)			1		
Confl. Bikes (#/hr)					
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0
Parking (#/hr)					
Mid-Block Traffic (%)		0%		0%	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	49	329	0	231	0
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Detector Phase	8	4		9	
Switch Phase					
Minimum Initial (s)	10.0	10.0		10.0	
Minimum Split (s)	17.0	17.0		17.0	
Total Split (s)	17.0	17.0		17.0	
Total Split (%)	21.3%	21.3%		21.3%	
Maximum Green (s)	10.0	10.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	
All-Red Time (s)	3.0	3.0		3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	
Total Lost Time (s)	7.0	7.0		7.0	
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	1.5	1.5		1.5	
Minimum Gap (s)	1.5	1.5		1.5	
Time Before Reduce (s)	30.0	30.0		25.0	
Time To Reduce (s)	0.0	0.0		0.0	
Recall Mode	None	None		None	
Walk Time (s)					
Flash Dont Walk (s)					
Pedestrian Calls (#/hr)					
v/c Ratio	0.30	0.77		0.58	
Control Delay (s/veh)	37.2	47.6		39.5	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

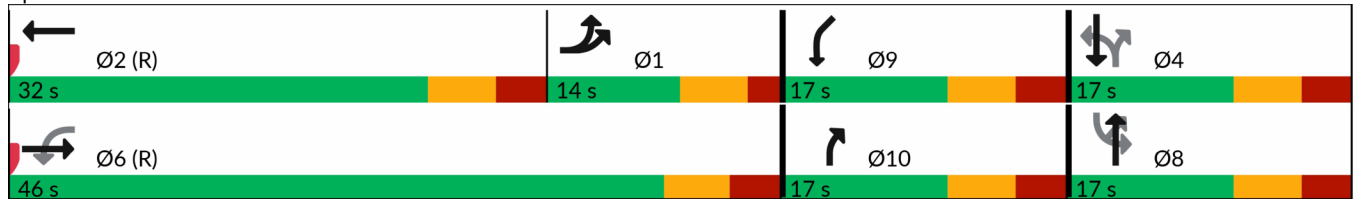


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		56.0	11.0		10.6	43.5			31.0	36.4	21.3	
Queue Length 50th (ft)		54	11		1	249			0	36	56	
Queue Length 95th (ft)		#122	27		7	#441			5	76	103	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		175	882		648	592			121	230	526	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.63	0.05		0.01	0.86			0.01	0.33	0.29	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 75 (94%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

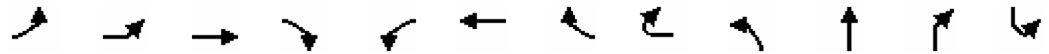
03/27/2024



Lane Group	SBL	SBT	SBR	SWL	SWR
Queue Delay	0.0	0.0		0.0	
Total Delay (s/veh)	37.2	47.6		39.5	
Queue Length 50th (ft)	23	85		57	
Queue Length 95th (ft)	55	#146		92	
Internal Link Dist (ft)		412		566	
Turn Bay Length (ft)	75			500	
Base Capacity (vph)	163	426		397	
Starvation Cap Reductn	0	0		0	
Spillback Cap Reductn	0	0		0	
Storage Cap Reductn	0	0		0	
Reduced v/c Ratio	0.30	0.77		0.58	
Intersection Summary					

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations		↔	↔		↔	↔			↔	↑	↔	
Traffic Volume (vph)	20	80	35	5	5	280	165	20	1	70	140	15
Future Volume (vph)	20	80	35	5	5	280	165	20	1	70	140	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.99	1.00	1.00	
Frt		1.00	0.98		1.00	0.94			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	1810		1733	1703			1731	1827	1553	
Flt Permitted		0.95	1.00		0.72	1.00			0.52	1.00	1.00	
Satd. Flow (perm)		1752	1810		1330	1703			964	1827	1553	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	88	38	5	5	308	181	22	1	77	154	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	110	43	0	5	511	0	0	1	77	154	0
Confl. Peds. (#/hr)	1			3	3		1		1			
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Actuated Green, G (s)		6.3	38.9		38.9	26.6			10.1	10.1	20.1	
Effective Green, g (s)		6.3	38.9		38.9	26.6			10.1	10.1	20.1	
Actuated g/C Ratio		0.08	0.49		0.49	0.33			0.13	0.13	0.25	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		137	880		646	566			121	230	526	
v/s Ratio Prot		c0.06	0.02			c0.30				0.04	0.04	
v/s Ratio Perm					0.00				0.00		0.06	
v/c Ratio		0.80	0.04		0.00	0.90			0.00	0.33	0.29	
Uniform Delay, d1		36.2	10.8		10.5	25.4			30.5	31.8	24.2	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		26.3	0.1		0.0	20.2			0.0	0.3	0.1	
Delay (s)		62.6	10.9		10.6	45.6			30.5	32.1	24.3	
Level of Service		E	B		B	D			C	C	C	
Approach Delay (s/veh)			48.1			45.3				26.9		
Approach LOS			D			D				C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay (s/veh)			39.9								D	
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			80.0							27.0		
Intersection Capacity Utilization			71.6%								C	
ICU Level of Service												
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	255	45	110	100
Future Volume (vph)	30	255	45	110	100
Ideal Flow (vphp)	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	
Lane Util. Factor	1.00	0.95		0.97	
Frbp, ped/bikes	1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	
Frt	1.00	0.97		0.92	
Flt Protected	0.95	1.00		0.97	
Satd. Flow (prot)	1736	3382		3177	
Flt Permitted	0.70	1.00		0.97	
Satd. Flow (perm)	1291	3382		3177	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	33	280	49	121	110
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	49	329	0	231	0
Confl. Peds. (#/hr)			1		
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Actuated Green, G (s)	10.1	10.1		10.0	
Effective Green, g (s)	10.1	10.1		10.0	
Actuated g/C Ratio	0.13	0.13		0.13	
Clearance Time (s)	7.0	7.0		7.0	
Vehicle Extension (s)	1.5	1.5		1.5	
Lane Grp Cap (vph)	162	426		397	
v/s Ratio Prot		c0.10		c0.07	
v/s Ratio Perm	0.04				
v/c Ratio	0.30	0.77		0.58	
Uniform Delay, d1	31.7	33.8		33.0	
Progression Factor	1.00	1.00		1.00	
Incremental Delay, d2	0.3	7.7		1.4	
Delay (s)	32.1	41.5		34.4	
Level of Service	C	D		C	
Approach Delay (s/veh)		40.3		34.4	
Approach LOS		D		C	
<b>Intersection Summary</b>					



## **2025 PM – Base Year Background**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	240	15	15	235	100	15	20	5	120	30	20
Future Volume (vph)	20	240	15	15	235	100	15	20	5	120	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30				30
Link Distance (ft)		424			323			219				200
Travel Time (s)		9.6			7.3			5.0				4.5
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	277	0	16	255	67	0	43	0	130	55	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.03	0.25		0.02	0.23	0.07		0.10		0.22	0.09	
Control Delay (s/veh)	12.4	11.8		12.3	11.6	11.6		17.1		8.7	8.3	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	12.4	11.8		12.3	11.6	11.6		17.1		8.7	8.3	
Queue Length 50th (ft)	2	33		2	30	7		6		17	7	
Queue Length 95th (ft)	18	129		14	118	38		34		45	24	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	964	1590		954	1621	1349		963		1049	1649	
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	0.02	0.17		0.02	0.16	0.05		0.04		0.12	0.03	

Intersection Summary

Area Type: Other

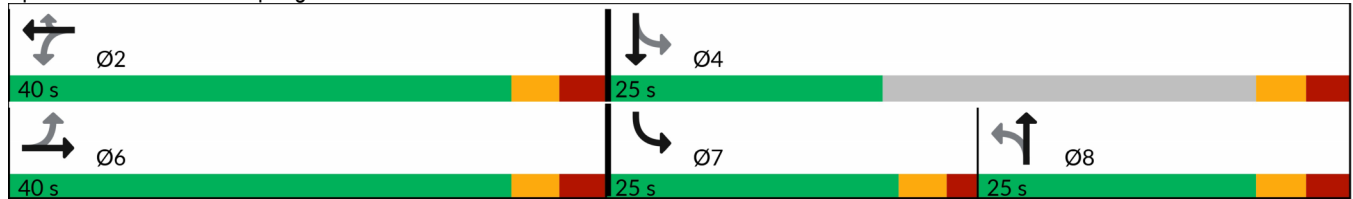
Cycle Length: 90

Actuated Cycle Length: 37.7

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	240	15	15	235	100	15	20	5	120	30	20
Future Volume (veh/h)	20	240	15	15	235	100	15	20	5	120	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1870	1870	1870	1826	1826	1826	1870	1870	1870
Adj Flow Rate, veh/h	22	261	16	16	255	67	16	22	5	130	33	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	5	5	5	2	2	2
Cap, veh/h	359	500	31	352	540	457	166	142	25	714	423	282
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.13	0.13	0.13	0.15	0.41	0.41
Sat Flow, veh/h	1048	1730	106	1101	1870	1582	365	1092	192	1781	1037	691
Grp Volume(v), veh/h	22	0	277	16	255	67	43	0	0	130	0	55
Grp Sat Flow(s),veh/h/ln	1048	0	1836	1101	1870	1582	1648	0	0	1781	0	1728
Q Serve(g_s), s	0.7	0.0	5.2	0.5	4.7	1.3	0.0	0.0	0.0	2.2	0.0	0.8
Cycle Q Clear(g_c), s	5.4	0.0	5.2	5.8	4.7	1.3	0.9	0.0	0.0	2.2	0.0	0.8
Prop In Lane	1.00		0.06	1.00		1.00	0.37		0.12	1.00		0.40
Lane Grp Cap(c), veh/h	359	0	531	352	540	457	334	0	0	714	0	704
V/C Ratio(X)	0.06	0.00	0.52	0.05	0.47	0.15	0.13	0.00	0.00	0.18	0.00	0.08
Avail Cap(c_a), veh/h	906	0	1490	928	1518	1284	834	0	0	1292	0	778
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.4	0.0	12.4	14.8	12.2	11.0	16.1	0.0	0.0	10.1	0.0	7.5
Incr Delay (d2), s/veh	0.1	0.0	0.6	0.0	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.8	0.1	1.6	0.4	0.3	0.0	0.0	0.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.4	0.0	13.0	14.8	12.6	11.1	16.2	0.0	0.0	10.2	0.0	7.5
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		299			338			43				185
Approach Delay, s/veh		13.1			12.4			16.2				9.4
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		23.2		18.3	11.5	11.7				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		7.8		2.8		7.4	4.2	2.9				
Green Ext Time (p_c), s		1.4		0.1		1.4	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				12.2								
HCM 7th LOS				B								

Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	95	255	20	70	295
Future Volume (vph)	30	95	255	20	70	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	110	297	23	0	424
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
 2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕		↙
Traffic Vol, veh/h	30	95	255	20	70	295
Future Vol, veh/h	30	95	255	20	70	295
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	110	297	23	81	343

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	804	299	0	0	322	0
Stage 1	299	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	352	741	-	-	1238	-
Stage 1	753	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	323	740	-	-	1236	-
Mov Cap-2 Maneuver	323	-	-	-	-	-
Stage 1	751	-	-	-	-	-
Stage 2	556	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.35	0	1.56
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	323	740	345	-
HCM Lane V/C Ratio	-	-	0.108	0.149	0.066	-
HCM Control Delay (s/veh)	-	-	17.5	10.7	8.1	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.5	0.2	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	15	80	20	10	10	455	95	15	5	115	175	10
Future Volume (vph)	15	80	20	10	10	455	95	15	5	115	175	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	33	0	11	629	0	0	6	128	205	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	55.0		55.0	41.0			20.0	20.0	20.0	
Total Split (%)	14.7%	14.7%	57.9%		57.9%	43.2%			21.1%	21.1%	21.1%	
Maximum Green (s)	8.0	8.0	48.0		48.0	34.0			13.0	13.0	13.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.73	0.03		0.01	0.93			0.05	0.55	0.51	
Control Delay (s/veh)		71.3	11.9		11.9	52.9			37.0	48.4	29.9	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	150	170	5
Future Volume (vph)	5	25	235	40	150	170	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	500	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			100		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			492		646		
Travel Time (s)			11.2		14.7		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	305	0	362	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	20.0	20.0	20.0		20.0		
Total Split (%)	21.1%	21.1%	21.1%		21.1%		
Maximum Green (s)	13.0	13.0	13.0		13.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.22	0.71		0.92dr		
Control Delay (s/veh)		41.0	49.9		59.2		



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

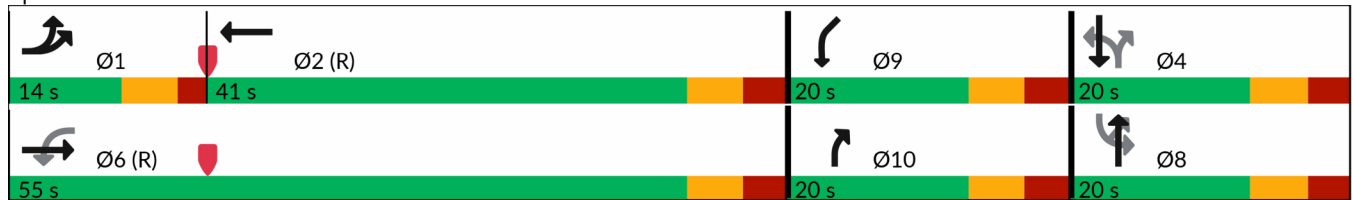


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		71.3	11.9		11.9	52.9			37.0	48.4	29.9	
Queue Length 50th (ft)		63	9		3	372			3	73	93	
Queue Length 95th (ft)		#145	24		12	#602			15	131	153	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		153	919		704	672			126	254	403	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.69	0.04		0.02	0.94			0.05	0.50	0.51	

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		41.0	49.9		59.2		
Queue Length 50th (ft)		19	93		110		
Queue Length 95th (ft)		48	137		#181		
Internal Link Dist (ft)			412		566		
Turn Bay Length (ft)		75			500		
Base Capacity (vph)		163	468		444		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.21	0.65		0.82		
Intersection Summary							

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	15	80	20	10	10	455	95	15	5	115	175	10
Future Volume (vph)	15	80	20	10	10	455	95	15	5	115	175	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00	
Frt		1.00	0.95		1.00	0.97			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1770	1758		1739	1781			1707	1863	1541	
Flt Permitted		0.95	1.00		0.73	1.00			0.51	1.00	1.00	
Satd. Flow (perm)		1770	1758		1347	1781			919	1863	1541	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	89	22	11	11	506	106	17	6	128	194	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	106	33	0	11	629	0	0	6	128	205	0
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Actuated Green, G (s)		7.8	49.7		49.7	35.9			11.8	11.8	24.3	
Effective Green, g (s)		7.8	49.7		49.7	35.9			11.8	11.8	24.3	
Actuated g/C Ratio		0.08	0.52		0.52	0.38			0.12	0.12	0.26	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		145	919		704	673			114	231	507	
v/s Ratio Prot		c0.06	0.02			c0.35				0.07	0.05	
v/s Ratio Perm					0.01				0.01		0.08	
v/c Ratio		0.73	0.03		0.01	0.93			0.05	0.55	0.40	
Uniform Delay, d1		42.5	11.0		10.8	28.4			36.6	39.1	29.3	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		15.0	0.0		0.0	21.9			0.0	1.6	0.1	
Delay (s)		57.5	11.0		10.9	50.3			36.7	40.7	29.5	
Level of Service		E	B		B	D			D	D	C	
Approach Delay (s/veh)			46.5			49.6				33.9		
Approach LOS			D			D				C		

### Intersection Summary

HCM 2000 Control Delay (s/veh)	46.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	150	170	5
Future Volume (vph)	5	25	235	40	150	170	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.94	1.00		1.00		
Frt		1.00	0.97		0.91		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1668	3424		3247		
Flt Permitted		0.67	1.00		0.97		
Satd. Flow (perm)		1185	3424		3247		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	261	44	167	189	6
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	305	0	362	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		11.8	11.8		12.5		
Effective Green, g (s)		11.8	11.8		12.5		
Actuated g/C Ratio		0.12	0.12		0.13		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		147	425		427		
v/s Ratio Prot			c0.09		c0.11		
v/s Ratio Perm		0.03					
v/c Ratio		0.23	0.71		0.92dr		
Uniform Delay, d1		37.5	39.9		40.3		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.2	4.7		13.8		
Delay (s)		37.8	44.7		54.2		
Level of Service		D	D		D		
Approach Delay (s/veh)			44.0		54.2		
Approach LOS			D		D		
<b>Intersection Summary</b>							

## **2035 AM – Horizon Year Background**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	210	5	5	200	85	15	25	10	95	15	10
Future Volume (vph)	20	210	5	5	200	85	15	25	10	95	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	2%	2%	2%	8%	8%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	245	0	6	227	60	0	56	0	108	28	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.03	0.22		0.00	0.21	0.06		0.13		0.21	0.04	
Control Delay (s/veh)	12.4	11.7		12.4	11.7	11.6		16.5		8.5	7.8	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	12.4	11.7		12.4	11.7	11.6		16.5		8.5	7.8	
Queue Length 50th (ft)	2	29		1	26	6		7		14	4	
Queue Length 95th (ft)	18	108		8	101	34		39		36	14	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	1011	1632		966	1594	1354		944		947	1582	
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	0.02	0.15		0.01	0.14	0.04		0.06		0.11	0.02	

Intersection Summary

Area Type: Other

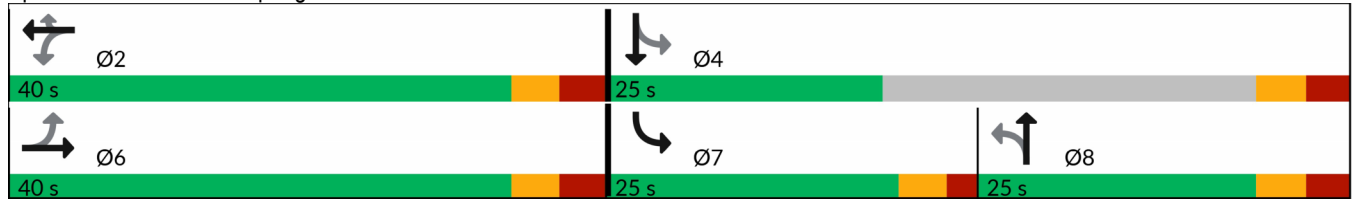
Cycle Length: 90

Actuated Cycle Length: 37.8

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	210	5	5	200	85	15	25	10	95	15	10
Future Volume (veh/h)	20	210	5	5	200	85	15	25	10	95	15	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1826	1826	1826	1870	1870	1870	1781	1781	1781
Adj Flow Rate, veh/h	23	239	6	6	227	60	17	28	11	108	17	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	8	8	8
Cap, veh/h	393	540	14	389	542	459	156	124	40	666	395	256
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.12	0.12	0.12	0.14	0.39	0.39
Sat Flow, veh/h	1091	1816	46	1107	1826	1545	333	1025	332	1697	1010	653
Grp Volume(v), veh/h	23	0	245	6	227	60	56	0	0	108	0	28
Grp Sat Flow(s),veh/h/ln	1091	0	1862	1107	1826	1545	1690	0	0	1697	0	1663
Q Serve(g_s), s	0.7	0.0	4.3	0.2	4.0	1.1	0.0	0.0	0.0	1.9	0.0	0.4
Cycle Q Clear(g_c), s	4.7	0.0	4.3	4.5	4.0	1.1	1.1	0.0	0.0	1.9	0.0	0.4
Prop In Lane	1.00		0.02	1.00		1.00	0.30		0.20	1.00		0.39
Lane Grp Cap(c), veh/h	393	0	553	389	542	459	320	0	0	666	0	650
V/C Ratio(X)	0.06	0.00	0.44	0.02	0.42	0.13	0.17	0.00	0.00	0.16	0.00	0.04
Avail Cap(c_a), veh/h	979	0	1553	984	1523	1288	879	0	0	1258	0	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.3	0.0	11.5	13.3	11.4	10.4	16.1	0.0	0.0	10.3	0.0	7.6
Incr Delay (d2), s/veh	0.0	0.0	0.4	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.5	0.0	1.4	0.3	0.4	0.0	0.0	0.6	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.3	0.0	11.9	13.3	11.8	10.5	16.2	0.0	0.0	10.3	0.0	7.6
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		268			293			56				136
Approach Delay, s/veh		12.0			11.5			16.2				9.8
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		22.1		18.3	10.9	11.2				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		6.5		2.4		6.7	3.9	3.1				
Green Ext Time (p_c), s		1.2		0.0		1.2	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				11.7								
HCM 7th LOS				B								



Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	15	80	210	60	110	205
Future Volume (vph)	15	80	210	60	110	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)		1		1	1	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	90	236	67	0	354
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 7th TWSC  
 2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕	↕		↕
Traffic Vol, veh/h	15	80	210	60	110	205
Future Vol, veh/h	15	80	210	60	110	205
Conflicting Peds, #/hr	0	1	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	17	90	236	67	124	230

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	714	238	0	0	304	0
Stage 1	237	-	-	-	-	-
Stage 2	478	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227	-
Pot Cap-1 Maneuver	398	801	-	-	1251	-
Stage 1	802	-	-	-	-	-
Stage 2	624	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	352	799	-	-	1250	-
Mov Cap-2 Maneuver	352	-	-	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	553	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v10.97		0	2.86
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	352	799	629	-
HCM Lane V/C Ratio	-	-	0.048	0.112	0.099	-
HCM Control Delay (s/veh)	-	-	15.7	10.1	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.4	0.3	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	85	35	5	5	295	175	25	1	75	145	15
Future Volume (vph)	20	85	35	5	5	295	175	25	1	75	145	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	1			3	3		1		1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	43	0	5	543	0	0	1	82	159	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Detector Phase	1	1	6		6	2			4	8	10	8
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	17.0
Total Split (s)	14.0	14.0	46.0		46.0	32.0			17.0	17.0	17.0	17.0
Total Split (%)	17.5%	17.5%	57.5%		57.5%	40.0%			21.3%	21.3%	21.3%	21.3%
Maximum Green (s)	8.0	8.0	39.0		39.0	25.0			10.0	10.0	10.0	10.0
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	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lag	Lag				Lead						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	1.5
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	1.5
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	30.0
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	0.0
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.69	0.04		0.00	0.91			0.00	0.35	0.30	
Control Delay (s/veh)		58.1	11.0		10.6	50.9			31.0	37.0	21.5	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	270	45	115	105
Future Volume (vph)	30	270	45	115	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12
Grade (%)		0%		0%	
Storage Length (ft)	75		0	500	0
Storage Lanes	1		0	1	0
Taper Length (ft)	75			100	
Right Turn on Red			No		
Link Speed (mph)		30		30	
Link Distance (ft)		492		646	
Travel Time (s)		11.2		14.7	
Confl. Peds. (#/hr)			1		
Confl. Bikes (#/hr)					
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0
Parking (#/hr)					
Mid-Block Traffic (%)		0%		0%	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	49	346	0	241	0
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Detector Phase	8	4		9	
Switch Phase					
Minimum Initial (s)	10.0	10.0		10.0	
Minimum Split (s)	17.0	17.0		17.0	
Total Split (s)	17.0	17.0		17.0	
Total Split (%)	21.3%	21.3%		21.3%	
Maximum Green (s)	10.0	10.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	
All-Red Time (s)	3.0	3.0		3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	
Total Lost Time (s)	7.0	7.0		7.0	
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	1.5	1.5		1.5	
Minimum Gap (s)	1.5	1.5		1.5	
Time Before Reduce (s)	30.0	30.0		25.0	
Time To Reduce (s)	0.0	0.0		0.0	
Recall Mode	None	None		None	
Walk Time (s)					
Flash Dont Walk (s)					
Pedestrian Calls (#/hr)					
v/c Ratio	0.30	0.81		0.60	
Control Delay (s/veh)	37.4	51.0		40.2	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

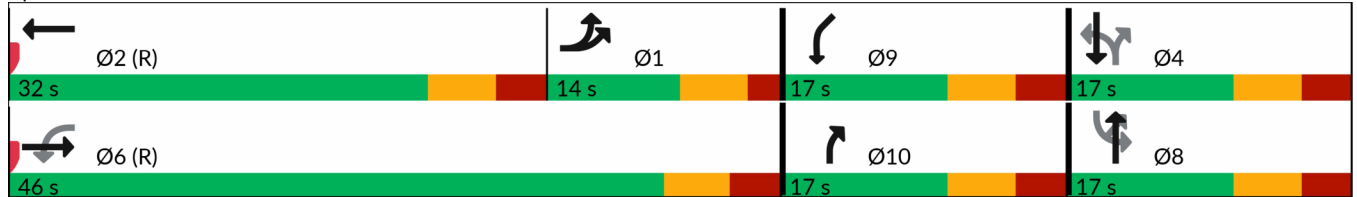


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		58.1	11.0		10.6	50.9			31.0	37.0	21.5	
Queue Length 50th (ft)		56	11		1	~280			0	38	58	
Queue Length 95th (ft)		#129	27		7	#480			5	80	106	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		175	882		648	591			113	229	525	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.66	0.05		0.01	0.92			0.01	0.36	0.30	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 75 (94%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL	SBT	SBR	SWL	SWR
Queue Delay	0.0	0.0		0.0	
Total Delay (s/veh)	37.4	51.0		40.2	
Queue Length 50th (ft)	23	90		59	
Queue Length 95th (ft)	55	#157		96	
Internal Link Dist (ft)		412		566	
Turn Bay Length (ft)	75			500	
Base Capacity (vph)	161	425		397	
Starvation Cap Reductn	0	0		0	
Spillback Cap Reductn	0	0		0	
Storage Cap Reductn	0	0		0	
Reduced v/c Ratio	0.30	0.81		0.61	

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	85	35	5	5	295	175	25	1	75	145	15
Future Volume (vph)	20	85	35	5	5	295	175	25	1	75	145	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.99	1.00	1.00	
Frt		1.00	0.98		1.00	0.93			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	1810		1733	1702			1731	1827	1553	
Flt Permitted		0.95	1.00		0.72	1.00			0.49	1.00	1.00	
Satd. Flow (perm)		1752	1810		1330	1702			904	1827	1553	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	93	38	5	5	324	192	27	1	82	159	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	115	43	0	5	543	0	0	1	82	159	0
Confl. Peds. (#/hr)	1			3	3		1		1			
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Actuated Green, G (s)		6.4	39.0		39.0	26.6			10.0	10.0	20.0	
Effective Green, g (s)		6.4	39.0		39.0	26.6			10.0	10.0	20.0	
Actuated g/C Ratio		0.08	0.49		0.49	0.33			0.13	0.13	0.25	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		140	882		648	565			113	228	524	
v/s Ratio Prot		c0.07	0.02			c0.32				0.04	0.04	
v/s Ratio Perm					0.00				0.00		0.06	
v/c Ratio		0.82	0.04		0.00	0.96			0.00	0.35	0.30	
Uniform Delay, d1		36.2	10.7		10.5	26.1			30.6	32.0	24.3	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		29.2	0.1		0.0	29.3			0.0	0.3	0.1	
Delay (s)		65.5	10.8		10.5	55.5			30.6	32.4	24.4	
Level of Service		E	B		B	E			C	C	C	
Approach Delay (s/veh)			50.6			55.1				27.1		
Approach LOS			D			E				C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay (s/veh)			44.5									D
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			80.0							27.0		
Intersection Capacity Utilization			73.6%									D
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	270	45	115	105
Future Volume (vph)	30	270	45	115	105
Ideal Flow (vphp)	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	
Lane Util. Factor	1.00	0.95		0.97	
Frbp, ped/bikes	1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	
Frt	1.00	0.97		0.92	
Flt Protected	0.95	1.00		0.97	
Satd. Flow (prot)	1736	3386		3176	
Flt Permitted	0.70	1.00		0.97	
Satd. Flow (perm)	1286	3386		3176	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	33	297	49	126	115
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	49	346	0	241	0
Confl. Peds. (#/hr)			1		
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Actuated Green, G (s)	10.0	10.0		10.0	
Effective Green, g (s)	10.0	10.0		10.0	
Actuated g/C Ratio	0.13	0.13		0.13	
Clearance Time (s)	7.0	7.0		7.0	
Vehicle Extension (s)	1.5	1.5		1.5	
Lane Grp Cap (vph)	160	423		397	
v/s Ratio Prot		c0.10		c0.08	
v/s Ratio Perm	0.04				
v/c Ratio	0.30	0.81		0.60	
Uniform Delay, d1	31.8	34.1		33.1	
Progression Factor	1.00	1.00		1.00	
Incremental Delay, d2	0.3	11.0		1.8	
Delay (s)	32.2	45.1		34.9	
Level of Service	C	D		C	
Approach Delay (s/veh)		43.5		34.9	
Approach LOS		D		C	
<b>Intersection Summary</b>					



**2035 PM – Horizon Year Background**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	255	15	15	250	105	15	20	5	125	30	20
Future Volume (vph)	20	255	15	15	250	105	15	20	5	125	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	293	0	16	272	71	0	43	0	136	55	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.34		0.03	0.31	0.09		0.11		0.25	0.09	
Control Delay (s/veh)	12.5	13.5		12.4	13.2	12.2		17.9		9.5	8.8	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	12.5	13.5		12.4	13.2	12.2		17.9		9.5	8.8	
Queue Length 50th (ft)	2	36		2	32	8		6		18	7	
Queue Length 95th (ft)	18	138		15	127	40		35		48	25	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	943	1581		935	1610	1339		866		950	1636	
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	0.02	0.19		0.02	0.17	0.05		0.05		0.14	0.03	

Intersection Summary

Area Type: Other

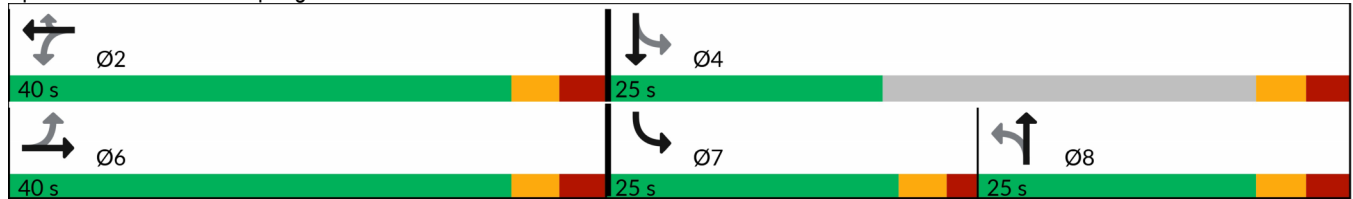
Cycle Length: 90

Actuated Cycle Length: 40.2

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	255	15	15	250	105	15	20	5	125	30	20
Future Volume (veh/h)	20	255	15	15	250	105	15	20	5	125	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1870	1870	1870	1826	1826	1826	1870	1870	1870
Adj Flow Rate, veh/h	22	277	16	16	272	71	16	22	5	136	33	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	5	5	5	2	2	2
Cap, veh/h	344	500	29	339	539	456	166	142	25	718	425	283
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.13	0.13	0.13	0.15	0.41	0.41
Sat Flow, veh/h	1028	1737	100	1085	1870	1582	364	1092	192	1781	1037	691
Grp Volume(v), veh/h	22	0	293	16	272	71	43	0	0	136	0	55
Grp Sat Flow(s),veh/h/ln	1028	0	1837	1085	1870	1582	1648	0	0	1781	0	1728
Q Serve(g_s), s	0.8	0.0	5.6	0.5	5.0	1.4	0.0	0.0	0.0	2.3	0.0	0.8
Cycle Q Clear(g_c), s	5.8	0.0	5.6	6.2	5.0	1.4	0.9	0.0	0.0	2.3	0.0	0.8
Prop In Lane	1.00		0.05	1.00		1.00	0.37		0.12	1.00		0.40
Lane Grp Cap(c), veh/h	344	0	529	339	539	456	333	0	0	718	0	708
V/C Ratio(X)	0.06	0.00	0.55	0.05	0.50	0.16	0.13	0.00	0.00	0.19	0.00	0.08
Avail Cap(c_a), veh/h	880	0	1486	904	1513	1280	832	0	0	1289	0	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.8	0.0	12.6	15.2	12.4	11.1	16.1	0.0	0.0	10.1	0.0	7.5
Incr Delay (d2), s/veh	0.1	0.0	0.7	0.0	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.0	0.1	1.8	0.4	0.3	0.0	0.0	0.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.8	0.0	13.2	15.2	12.9	11.2	16.2	0.0	0.0	10.2	0.0	7.5
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		315			359			43				191
Approach Delay, s/veh		13.4			12.7			16.2				9.4
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		23.4		18.3	11.6	11.7				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		8.2		2.8		7.8	4.3	2.9				
Green Ext Time (p_c), s		1.5		0.1		1.5	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh			12.4									
HCM 7th LOS			B									

Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	35	100	270	20	75	310
Future Volume (vph)	35	100	270	20	75	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	116	314	23	0	447
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↑	↑		↘
Traffic Vol, veh/h	35	100	270	20	75	310
Future Vol, veh/h	35	100	270	20	75	310
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	116	314	23	87	360

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	851	316	0	0	339	0
Stage 1	316	-	-	-	-	-
Stage 2	535	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	330	725	-	-	1220	-
Stage 1	739	-	-	-	-	-
Stage 2	587	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	300	723	-	-	1218	-
Mov Cap-2 Maneuver	300	-	-	-	-	-
Stage 1	738	-	-	-	-	-
Stage 2	535	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v12.99		0	1.59
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	300	723	351	-
HCM Lane V/C Ratio	-	-	0.136	0.161	0.072	-
HCM Control Delay (s/veh)	-	-	18.9	10.9	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.6	0.2	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	15	85	20	10	10	480	100	15	5	120	185	10
Future Volume (vph)	15	85	20	10	10	480	100	15	5	120	185	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	111	33	0	11	661	0	0	6	133	217	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	55.0		55.0	41.0			20.0	20.0	20.0	
Total Split (%)	14.7%	14.7%	57.9%		57.9%	43.2%			21.1%	21.1%	21.1%	
Maximum Green (s)	8.0	8.0	48.0		48.0	34.0			13.0	13.0	13.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.76	0.03		0.01	0.99			0.05	0.57	0.54	
Control Delay (s/veh)		74.2	11.9		11.9	65.3			37.2	49.0	30.5	

# Lanes, Volumes, Timings

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	245	40	160	180	5
Future Volume (vph)	5	25	245	40	160	180	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	500	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			100		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			492		646		
Travel Time (s)			11.2		14.7		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	316	0	384	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	20.0	20.0	20.0		20.0		
Total Split (%)	21.1%	21.1%	21.1%		21.1%		
Maximum Green (s)	13.0	13.0	13.0		13.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.22	0.73		0.96dr		
Control Delay (s/veh)		41.0	50.7		63.6		



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

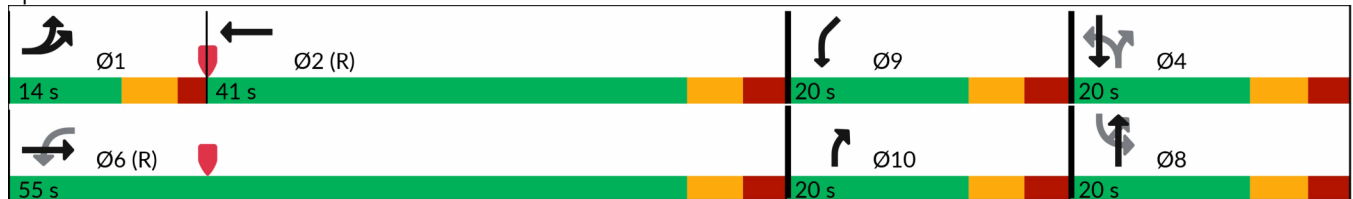


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		74.2	11.9		11.9	65.3			37.2	49.0	30.5	
Queue Length 50th (ft)		66	10		3	~433			3	76	99	
Queue Length 95th (ft)		#154	24		12	#645			15	135	162	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		153	913		700	665			121	254	404	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.73	0.04		0.02	0.99			0.05	0.52	0.54	

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St




















03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		41.0	50.7		63.6		
Queue Length 50th (ft)		19	97		118		
Queue Length 95th (ft)		48	142		#196		
Internal Link Dist (ft)			412		566		
Turn Bay Length (ft)		75			500		
Base Capacity (vph)		162	469		444		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.21	0.67		0.86		
Intersection Summary							

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

														
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2		
Lane Configurations														
Traffic Volume (vph)	15	85	20	10	10	480	100	15	5	120	185	10		
Future Volume (vph)	15	85	20	10	10	480	100	15	5	120	185	10		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0			
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00			
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97			
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00			
Frt		1.00	0.95		1.00	0.97			1.00	1.00	0.85			
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00			
Satd. Flow (prot)		1770	1758		1739	1782			1710	1863	1541			
Flt Permitted		0.95	1.00		0.73	1.00			0.49	1.00	1.00			
Satd. Flow (perm)		1770	1758		1347	1782			884	1863	1541			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Adj. Flow (vph)	17	94	22	11	11	533	111	17	6	133	206	11		
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0		
Lane Group Flow (vph)	0	111	33	0	11	661	0	0	6	133	217	0		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9		
Confl. Bikes (#/hr)							1				1	1		
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%		
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom			
Protected Phases	1	1	6			2				8	10			
Permitted Phases					6				4		4			
Actuated Green, G (s)		7.9	49.4		49.4	35.5			11.9	11.9	24.6			
Effective Green, g (s)		7.9	49.4		49.4	35.5			11.9	11.9	24.6			
Actuated g/C Ratio		0.08	0.52		0.52	0.37			0.13	0.13	0.26			
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0			
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5			
Lane Grp Cap (vph)		147	914		700	665			110	233	512			
v/s Ratio Prot		c0.06	0.02			c0.37				0.07	0.06			
v/s Ratio Perm					0.01				0.01		0.08			
v/c Ratio		0.75	0.03		0.01	0.99			0.05	0.57	0.42			
Uniform Delay, d1		42.6	11.1		11.0	29.6			36.5	39.1	29.3			
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00			
Incremental Delay, d2		17.5	0.0		0.0	33.4			0.0	2.0	0.2			
Delay (s)		60.1	11.2		11.0	63.1			36.6	41.2	29.5			
Level of Service		E	B		B	E			D	D	C			
Approach Delay (s/veh)			48.9			62.2				34.0				
Approach LOS			D			E				C				
<b>Intersection Summary</b>														
HCM 2000 Control Delay (s/veh)			52.1									HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio			0.90											
Actuated Cycle Length (s)			95.0								27.0			
Intersection Capacity Utilization			81.6%										ICU Level of Service	D
Analysis Period (min)			15											
dr Defacto Right Lane. Recode with 1 though lane as a right lane.														
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	245	40	160	180	5
Future Volume (vph)	5	25	245	40	160	180	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.94	1.00		1.00		
Frt		1.00	0.97		0.91		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1670	3428		3248		
Flt Permitted		0.67	1.00		0.97		
Satd. Flow (perm)		1181	3428		3248		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	272	44	178	200	6
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	316	0	384	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		11.9	11.9		12.7		
Effective Green, g (s)		11.9	11.9		12.7		
Actuated g/C Ratio		0.13	0.13		0.13		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		147	429		434		
v/s Ratio Prot			c0.09		c0.12		
v/s Ratio Perm		0.03					
v/c Ratio		0.23	0.73		0.96dr		
Uniform Delay, d1		37.4	40.0		40.4		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.2	5.6		18.4		
Delay (s)		37.7	45.6		58.8		
Level of Service		D	D		E		
Approach Delay (s/veh)			44.8		58.8		
Approach LOS			D		E		
<b>Intersection Summary</b>							

**2025 AM – Base Year Build:  
Single Driveway Scenario**

Lanes, Volumes, Timings  
1: Spring St & Summit Ave & Delafield St

03/27/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	205	5	5	215	85	15	25	10	90	15	10
Future Volume (vph)	20	205	5	5	215	85	15	25	10	90	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	2%	2%	2%	8%	8%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	239	0	6	244	60	0	56	0	102	28	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.03	0.21		0.00	0.22	0.06		0.14		0.20	0.05	
Control Delay (s/veh)	12.2	11.4		12.0	11.5	11.5		16.8		8.7	8.1	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	12.2	11.4		12.0	11.5	11.5		16.8		8.7	8.1	
Queue Length 50th (ft)	2	28		1	29	6		7		13	4	
Queue Length 95th (ft)	17	105		7	107	34		39		36	15	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	992	1627		968	1588	1350		932		934	1576	
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	0.02	0.15		0.01	0.15	0.04		0.06		0.11	0.02	

Intersection Summary

Area Type: Other

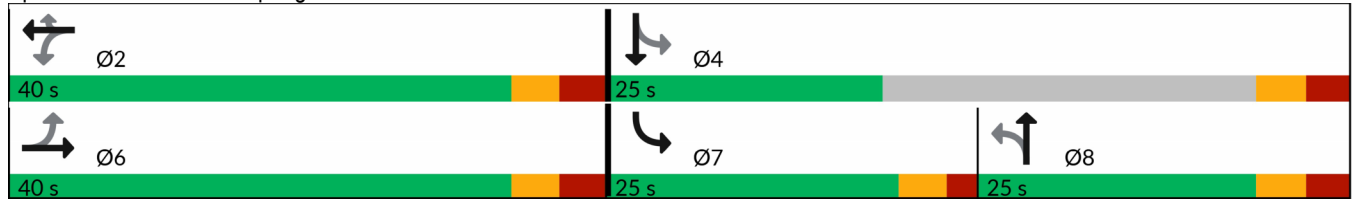
Cycle Length: 90

Actuated Cycle Length: 38.2

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	205	5	5	215	85	15	25	10	90	15	10
Future Volume (veh/h)	20	205	5	5	215	85	15	25	10	90	15	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1826	1826	1826	1870	1870	1870	1781	1781	1781
Adj Flow Rate, veh/h	23	233	6	6	244	60	17	28	11	102	17	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	8	8	8
Cap, veh/h	383	542	14	396	545	461	157	124	40	661	392	254
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.12	0.12	0.12	0.14	0.39	0.39
Sat Flow, veh/h	1074	1815	47	1113	1826	1545	333	1025	332	1697	1010	653
Grp Volume(v), veh/h	23	0	239	6	244	60	56	0	0	102	0	28
Grp Sat Flow(s),veh/h/ln	1074	0	1862	1113	1826	1545	1690	0	0	1697	0	1663
Q Serve(g_s), s	0.7	0.0	4.2	0.2	4.4	1.1	0.0	0.0	0.0	1.8	0.0	0.4
Cycle Q Clear(g_c), s	5.1	0.0	4.2	4.3	4.4	1.1	1.1	0.0	0.0	1.8	0.0	0.4
Prop In Lane	1.00		0.03	1.00		1.00	0.30		0.20	1.00		0.39
Lane Grp Cap(c), veh/h	383	0	556	396	545	461	321	0	0	661	0	646
V/C Ratio(X)	0.06	0.00	0.43	0.02	0.45	0.13	0.17	0.00	0.00	0.15	0.00	0.04
Avail Cap(c_a), veh/h	963	0	1560	997	1530	1295	883	0	0	1263	0	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	11.4	13.1	11.4	10.3	16.0	0.0	0.0	10.3	0.0	7.7
Incr Delay (d2), s/veh	0.0	0.0	0.4	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.4	0.0	1.5	0.3	0.4	0.0	0.0	0.5	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.5	0.0	11.7	13.1	11.9	10.4	16.1	0.0	0.0	10.3	0.0	7.7
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		262			310			56				130
Approach Delay, s/veh		11.9			11.6			16.1				9.8
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		21.9		18.3	10.7	11.2				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		6.4		2.4		7.1	3.8	3.1				
Green Ext Time (p_c), s		1.3		0.0		1.2	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				11.7								
HCM 7th LOS				B								



Lanes, Volumes, Timings  
2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	75	230	60	105	200
Future Volume (vph)	20	75	230	60	105	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	455		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)		1		1	1	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	84	258	67	0	343
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕		↙
Traffic Vol, veh/h	20	75	230	60	105	200
Future Vol, veh/h	20	75	230	60	105	200
Conflicting Peds, #/hr	0	1	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	22	84	258	67	118	225

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	720	260	0	0	327	0
Stage 1	259	-	-	-	-	-
Stage 2	461	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227	-
Pot Cap-1 Maneuver	395	778	-	-	1227	-
Stage 1	784	-	-	-	-	-
Stage 2	635	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	351	777	-	-	1226	-
Mov Cap-2 Maneuver	351	-	-	-	-	-
Stage 1	783	-	-	-	-	-
Stage 2	565	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.41	0	2.84
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	351	777	620	-
HCM Lane V/C Ratio	-	-	0.064	0.108	0.096	-
HCM Control Delay (s/veh)	-	-	16	10.2	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.4	0.3	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Future Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	1			3	3		1		1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	43	0	5	511	0	0	1	77	159	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Detector Phase	1	1	6		6	2			4	8	10	8
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	17.0
Total Split (s)	14.0	14.0	46.0		46.0	32.0			17.0	17.0	17.0	17.0
Total Split (%)	17.5%	17.5%	57.5%		57.5%	40.0%			21.3%	21.3%	21.3%	21.3%
Maximum Green (s)	8.0	8.0	39.0		39.0	25.0			10.0	10.0	10.0	10.0
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	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lag	Lag				Lead						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	1.5
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	1.5
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	30.0
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	0.0
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.69	0.04		0.00	0.86			0.00	0.33	0.30	
Control Delay (s/veh)		58.1	11.0		10.6	43.5			31.0	36.5	21.5	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

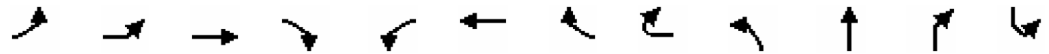


Lane Group	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	255	45	130	115
Future Volume (vph)	30	255	45	130	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12
Grade (%)		0%		0%	
Storage Length (ft)	75		0	300	0
Storage Lanes	1		0	1	0
Taper Length (ft)	75			50	
Right Turn on Red			No		
Link Speed (mph)		30		30	
Link Distance (ft)		492		533	
Travel Time (s)		11.2		12.1	
Confl. Peds. (#/hr)			1		
Confl. Bikes (#/hr)					
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0
Parking (#/hr)					
Mid-Block Traffic (%)		0%		0%	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	49	329	0	269	0
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Detector Phase	8	4		9	
Switch Phase					
Minimum Initial (s)	10.0	10.0		10.0	
Minimum Split (s)	17.0	17.0		17.0	
Total Split (s)	17.0	17.0		17.0	
Total Split (%)	21.3%	21.3%		21.3%	
Maximum Green (s)	10.0	10.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	
All-Red Time (s)	3.0	3.0		3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	
Total Lost Time (s)	7.0	7.0		7.0	
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	1.5	1.5		1.5	
Minimum Gap (s)	1.5	1.5		1.5	
Time Before Reduce (s)	30.0	30.0		25.0	
Time To Reduce (s)	0.0	0.0		0.0	
Recall Mode	None	None		None	
Walk Time (s)					
Flash Dont Walk (s)					
Pedestrian Calls (#/hr)					
v/c Ratio	0.30	0.77		0.67	
Control Delay (s/veh)	37.3	48.0		43.0	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		58.1	11.0		10.6	43.5			31.0	36.5	21.5	
Queue Length 50th (ft)		56	11		1	249			0	36	58	
Queue Length 95th (ft)		#129	27		7	#441			5	76	106	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		175	882		648	592			120	229	525	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.66	0.05		0.01	0.86			0.01	0.34	0.30	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 75 (94%), Referenced to phase 2:WBT and 6:EBWB, Start of Green

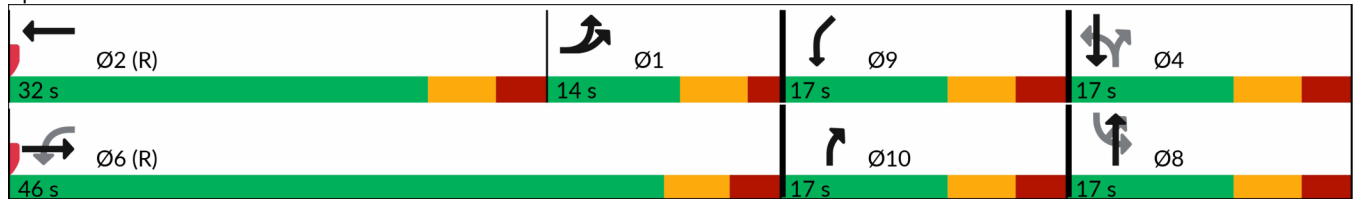
Natural Cycle: 80

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



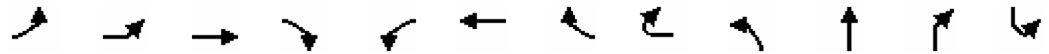
Lane Group	SBL	SBT	SBR	SWL	SWR
Queue Delay	0.0	0.0		0.0	
Total Delay (s/veh)	37.3	48.0		43.0	
Queue Length 50th (ft)	23	85		67	
Queue Length 95th (ft)	55	#146		#108	
Internal Link Dist (ft)		412		453	
Turn Bay Length (ft)	75			300	
Base Capacity (vph)	162	424		397	
Starvation Cap Reductn	0	0		0	
Spillback Cap Reductn	0	0		0	
Storage Cap Reductn	0	0		0	
Reduced v/c Ratio	0.30	0.78		0.68	

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Future Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.99	1.00	1.00	
Frt		1.00	0.98		1.00	0.94			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	1810		1733	1703			1731	1827	1553	
Flt Permitted		0.95	1.00		0.72	1.00			0.52	1.00	1.00	
Satd. Flow (perm)		1752	1810		1330	1703			962	1827	1553	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	93	38	5	5	308	181	22	1	77	159	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	115	43	0	5	511	0	0	1	77	159	0
Confl. Peds. (#/hr)	1			3	3		1		1			
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Actuated Green, G (s)		6.4	39.0		39.0	26.6			10.0	10.0	20.0	
Effective Green, g (s)		6.4	39.0		39.0	26.6			10.0	10.0	20.0	
Actuated g/C Ratio		0.08	0.49		0.49	0.33			0.13	0.13	0.25	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		140	882		648	566			120	228	524	
v/s Ratio Prot		c0.07	0.02			c0.30				0.04	0.04	
v/s Ratio Perm					0.00				0.00		0.06	
v/c Ratio		0.82	0.04		0.00	0.90			0.00	0.33	0.30	
Uniform Delay, d1		36.2	10.7		10.5	25.4			30.6	31.9	24.3	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		29.2	0.1		0.0	20.2			0.0	0.3	0.1	
Delay (s)		65.5	10.8		10.5	45.6			30.6	32.2	24.4	
Level of Service		E	B		B	D			C	C	C	
Approach Delay (s/veh)			50.6			45.3				27.0		
Approach LOS			D			D				C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay (s/veh)			40.5								HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			80.0								Sum of lost time (s)	27.0
Intersection Capacity Utilization			71.9%								ICU Level of Service	C
Analysis Period (min)			15									

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	255	45	130	115
Future Volume (vph)	30	255	45	130	115
Ideal Flow (vphp)	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	
Lane Util. Factor	1.00	0.95		0.97	
Frbp, ped/bikes	1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	
Frt	1.00	0.97		0.92	
Flt Protected	0.95	1.00		0.97	
Satd. Flow (prot)	1736	3382		3179	
Flt Permitted	0.70	1.00		0.97	
Satd. Flow (perm)	1291	3382		3179	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	33	280	49	143	126
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	49	329	0	269	0
Confl. Peds. (#/hr)			1		
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Actuated Green, G (s)	10.0	10.0		10.0	
Effective Green, g (s)	10.0	10.0		10.0	
Actuated g/C Ratio	0.13	0.13		0.13	
Clearance Time (s)	7.0	7.0		7.0	
Vehicle Extension (s)	1.5	1.5		1.5	
Lane Grp Cap (vph)	161	422		397	
v/s Ratio Prot		c0.10		c0.08	
v/s Ratio Perm	0.04				
v/c Ratio	0.30	0.77		0.67	
Uniform Delay, d1	31.8	33.9		33.4	
Progression Factor	1.00	1.00		1.00	
Incremental Delay, d2	0.3	8.0		3.5	
Delay (s)	32.2	42.0		37.0	
Level of Service	C	D		D	
Approach Delay (s/veh)		40.7		37.0	
Approach LOS		D		D	
<b>Intersection Summary</b>					



Lanes, Volumes, Timings  
4: Delafield St & Mandel Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	35	35	10	255	210	10
Future Volume (vph)	35	35	10	255	210	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	210			533	113	
Travel Time (s)	5.7			7.5	7.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	76	0	11	277	239	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 7th TWSC  
4: Delafield St & Mandel Drwy.

03/27/2024

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	35	35	10	255	210	10
Future Vol, veh/h	35	35	10	255	210	10
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	38	38	11	277	228	11

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	533	234	239	0	-	0
Stage 1	234	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.14	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.236	-	-	-
Pot Cap-1 Maneuver	508	805	1316	-	-	-
Stage 1	805	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	504	805	1316	-	-	-
Mov Cap-2 Maneuver	504	-	-	-	-	-
Stage 1	798	-	-	-	-	-
Stage 2	752	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.62	0.29	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1316	-	620	-	-
HCM Lane V/C Ratio	0.008	-	0.123	-	-
HCM Control Delay (s/veh)	7.8	-	11.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

**2025 PM – Base Year Build:  
Single Driveway Scenario**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	265	15	15	245	105	15	20	5	125	30	20
Future Volume (vph)	20	265	15	15	245	105	15	20	5	125	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	304	0	16	266	71	0	43	0	136	55	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.35		0.03	0.30	0.09		0.11		0.25	0.09	
Control Delay (s/veh)	12.4	13.5		12.4	13.0	12.2		18.2		9.7	8.9	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	12.4	13.5		12.4	13.0	12.2		18.2		9.7	8.9	
Queue Length 50th (ft)	2	37		2	32	8		6		18	7	
Queue Length 95th (ft)	18	143		14	124	40		36		49	25	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	945	1577		923	1605	1335		862		947	1630	
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	0.02	0.19		0.02	0.17	0.05		0.05		0.14	0.03	

Intersection Summary

Area Type: Other

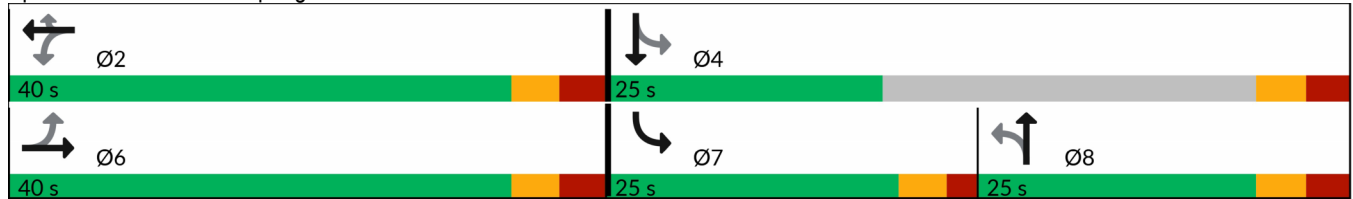
Cycle Length: 90

Actuated Cycle Length: 40.4

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	265	15	15	245	105	15	20	5	125	30	20
Future Volume (veh/h)	20	265	15	15	245	105	15	20	5	125	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1870	1870	1870	1826	1826	1826	1870	1870	1870
Adj Flow Rate, veh/h	22	288	16	16	266	71	16	22	5	136	33	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	5	5	5	2	2	2
Cap, veh/h	349	501	28	331	539	456	166	142	25	718	425	283
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.13	0.13	0.13	0.15	0.41	0.41
Sat Flow, veh/h	1034	1741	97	1074	1870	1582	364	1092	192	1781	1037	691
Grp Volume(v), veh/h	22	0	304	16	266	71	43	0	0	136	0	55
Grp Sat Flow(s),veh/h/ln	1034	0	1838	1074	1870	1582	1648	0	0	1781	0	1728
Q Serve(g_s), s	0.8	0.0	5.9	0.5	4.9	1.4	0.0	0.0	0.0	2.3	0.0	0.8
Cycle Q Clear(g_c), s	5.7	0.0	5.9	6.4	4.9	1.4	0.9	0.0	0.0	2.3	0.0	0.8
Prop In Lane	1.00		0.05	1.00		1.00	0.37		0.12	1.00		0.40
Lane Grp Cap(c), veh/h	349	0	529	331	539	456	333	0	0	718	0	708
V/C Ratio(X)	0.06	0.00	0.57	0.05	0.49	0.16	0.13	0.00	0.00	0.19	0.00	0.08
Avail Cap(c_a), veh/h	887	0	1486	890	1513	1280	832	0	0	1289	0	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.7	0.0	12.7	15.4	12.3	11.1	16.1	0.0	0.0	10.1	0.0	7.5
Incr Delay (d2), s/veh	0.1	0.0	0.7	0.0	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.1	0.1	1.7	0.4	0.3	0.0	0.0	0.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.7	0.0	13.4	15.4	12.8	11.2	16.2	0.0	0.0	10.2	0.0	7.5
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h	326		353				43		191			
Approach Delay, s/veh	13.5		12.6				16.2		9.4			
Approach LOS	B		B				B		A			
Timer - Assigned Phs	2		4		6		7		8			
Phs Duration (G+Y+Rc), s	18.3		23.4		18.3		11.6		11.7			
Change Period (Y+Rc), s	6.3		6.3		6.3		5.3		6.3			
Max Green Setting (Gmax), s	33.7		18.7		33.7		19.7		18.7			
Max Q Clear Time (g_c+I1), s	8.4		2.8		7.9		4.3		2.9			
Green Ext Time (p_c), s	1.5		0.1		1.6		0.1		0.1			
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh			12.4									
HCM 7th LOS			B									

Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	35	95	270	25	70	325
Future Volume (vph)	35	95	270	25	70	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	110	314	29	0	459
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↕	↕		↖
Traffic Vol, veh/h	35	95	270	25	70	325
Future Vol, veh/h	35	95	270	25	70	325
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	110	314	29	81	378

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	857	316	0	0	345
Stage 1	316	-	-	-	-
Stage 2	541	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	328	725	-	-	1214
Stage 1	739	-	-	-	-
Stage 2	584	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	299	723	-	-	1212
Mov Cap-2 Maneuver	299	-	-	-	-
Stage 1	738	-	-	-	-
Stage 2	534	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v13.04		0	1.45
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	299	723	319	-
HCM Lane V/C Ratio	-	-	0.136	0.153	0.067	-
HCM Control Delay (s/veh)	-	-	18.9	10.9	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.5	0.2	-



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	15	90	20	10	10	455	95	20	5	115	195	10
Future Volume (vph)	15	90	20	10	10	455	95	20	5	115	195	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	33	0	11	634	0	0	6	128	228	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	55.0		55.0	41.0			20.0	20.0	20.0	
Total Split (%)	14.7%	14.7%	57.9%		57.9%	43.2%			21.1%	21.1%	21.1%	
Maximum Green (s)	8.0	8.0	48.0		48.0	34.0			13.0	13.0	13.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.77	0.03		0.01	0.95			0.05	0.55	0.57	
Control Delay (s/veh)		75.5	11.9		11.9	57.4			37.0	48.4	31.5	

# Lanes, Volumes, Timings

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	165	180	5
Future Volume (vph)	5	25	235	40	165	180	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	300	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			50		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			492		532		
Travel Time (s)			11.2		12.1		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	305	0	389	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	20.0	20.0	20.0		20.0		
Total Split (%)	21.1%	21.1%	21.1%		21.1%		
Maximum Green (s)	13.0	13.0	13.0		13.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.22	0.71		0.95dr		
Control Delay (s/veh)		41.0	49.9		64.5		

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

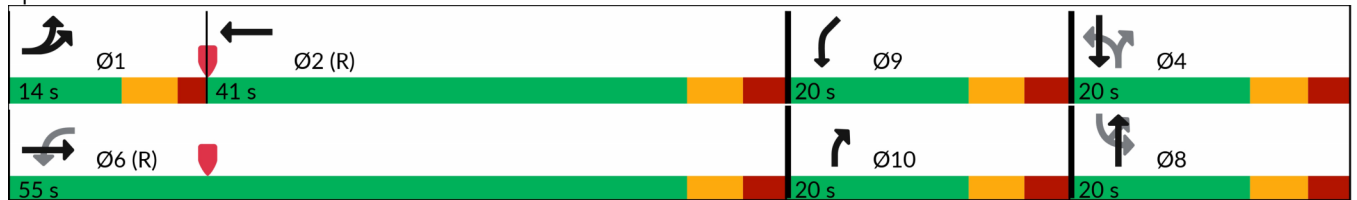


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		75.5	11.9		11.9	57.4			37.0	48.4	31.5	
Queue Length 50th (ft)		70	9		3	376			3	73	105	
Queue Length 95th (ft)		#164	24		12	#609			15	131	170	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		156	914		700	661			126	254	403	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.75	0.04		0.02	0.96			0.05	0.50	0.57	

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		41.0	49.9		64.5		
Queue Length 50th (ft)		19	93		120		
Queue Length 95th (ft)		48	137		#200		
Internal Link Dist (ft)			412		452		
Turn Bay Length (ft)		75			300		
Base Capacity (vph)		163	468		445		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.21	0.65		0.87		
Intersection Summary							

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	15	90	20	10	10	455	95	20	5	115	195	10
Future Volume (vph)	15	90	20	10	10	455	95	20	5	115	195	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00	
Frt		1.00	0.95		1.00	0.96			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1770	1758		1739	1779			1707	1863	1541	
Flt Permitted		0.95	1.00		0.73	1.00			0.51	1.00	1.00	
Satd. Flow (perm)		1770	1758		1347	1779			919	1863	1541	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	100	22	11	11	506	106	22	6	128	217	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	117	33	0	11	634	0	0	6	128	228	0
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Actuated Green, G (s)		8.1	49.5		49.5	35.4			11.8	11.8	24.5	
Effective Green, g (s)		8.1	49.5		49.5	35.4			11.8	11.8	24.5	
Actuated g/C Ratio		0.09	0.52		0.52	0.37			0.12	0.12	0.26	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		150	916		701	662			114	231	510	
v/s Ratio Prot		c0.07	0.02			c0.36				0.07	0.06	
v/s Ratio Perm					0.01				0.01		0.09	
v/c Ratio		0.78	0.03		0.01	0.95			0.05	0.55	0.44	
Uniform Delay, d1		42.5	11.1		10.9	29.0			36.6	39.1	29.5	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		21.0	0.0		0.0	26.0			0.0	1.6	0.2	
Delay (s)		63.6	11.1		11.0	55.0			36.7	40.7	29.7	
Level of Service		E	B		B	E			D	D	C	
Approach Delay (s/veh)			52.0			54.3				33.7		
Approach LOS			D			D				C		

### Intersection Summary

HCM 2000 Control Delay (s/veh)	49.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	165	180	5
Future Volume (vph)	5	25	235	40	165	180	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.94	1.00		1.00		
Frt		1.00	0.97		0.92		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1668	3424		3250		
Flt Permitted		0.67	1.00		0.97		
Satd. Flow (perm)		1185	3424		3250		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	261	44	183	200	6
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	305	0	389	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		11.8	11.8		12.7		
Effective Green, g (s)		11.8	11.8		12.7		
Actuated g/C Ratio		0.12	0.12		0.13		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		147	425		434		
v/s Ratio Prot			c0.09		c0.12		
v/s Ratio Perm		0.03					
v/c Ratio		0.23	0.71		0.95dr		
Uniform Delay, d1		37.5	39.9		40.5		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.2	4.7		20.0		
Delay (s)		37.8	44.7		60.5		
Level of Service		D	D		E		
Approach Delay (s/veh)			44.0		60.5		
Approach LOS			D		E		
<b>Intersection Summary</b>							

Lanes, Volumes, Timings  
4: Delafield St & Mandel Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	25	35	275	325	35
Future Volume (vph)	20	25	35	275	325	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	187			532	114	
Travel Time (s)	5.1			7.5	7.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	0	38	299	391	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
4: Delafield St & Mandel Drwy.

03/27/2024

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	20	25	35	275	325	35
Future Vol, veh/h	20	25	35	275	325	35
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	27	38	299	353	38

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	747	372	391	0	-	0
Stage 1	372	-	-	-	-	-
Stage 2	375	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	380	674	1167	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	368	674	1167	-	-	-
Mov Cap-2 Maneuver	368	-	-	-	-	-
Stage 1	674	-	-	-	-	-
Stage 2	695	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	13.12	0.92	0
HCM LOS	B		

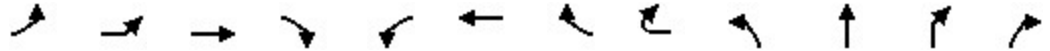
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1167	-	492	-	-
HCM Lane V/C Ratio	0.033	-	0.099	-	-
HCM Control Delay (s/veh)	8.2	-	13.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/29/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	15	90	20	10	10	455	95	20	5	115	195	10
Future Volume (vph)	15	90	20	10	10	455	95	20	5	115	195	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	117	33	0	11	634	0	0	6	128	228	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	56.0		56.0	42.0			18.0	18.0	21.0	
Total Split (%)	14.7%	14.7%	58.9%		58.9%	44.2%			18.9%	18.9%	22.1%	
Maximum Green (s)	8.0	8.0	49.0		49.0	35.0			11.0	11.0	14.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.81	0.03		0.01	0.93			0.05	0.60	0.58	
Control Delay (s/veh)		82.2	11.5		11.4	53.1			39.0	52.8	32.1	

# Lanes, Volumes, Timings

## 3: Madison St & W. North St/E. North St & Delafield St

03/29/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	165	180	5
Future Volume (vph)	5	25	235	40	165	180	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	300	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			50		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			492		532		
Travel Time (s)			11.2		12.1		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	305	0	389	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	18.0	18.0	18.0		21.0		
Total Split (%)	18.9%	18.9%	18.9%		22.1%		
Maximum Green (s)	11.0	11.0	11.0		14.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.25	0.78		0.91dr		
Control Delay (s/veh)		43.5	56.1		57.9		

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/29/2024

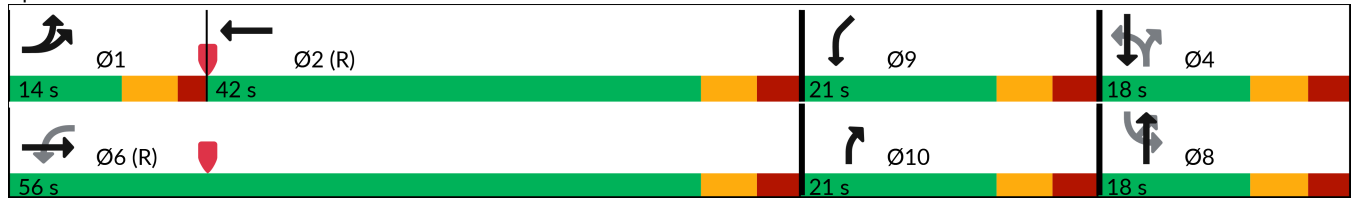


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		82.2	11.5		11.4	53.1			39.0	52.8	32.1	
Queue Length 50th (ft)		70	9		3	369			3	74	106	
Queue Length 95th (ft)		#164	24		12	#597			16	#137	174	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		149	921		705	675			103	215	403	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.79	0.04		0.02	0.94			0.06	0.60	0.57	

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

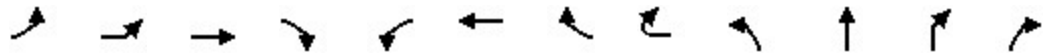
03/29/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		43.5	56.1		57.9		
Queue Length 50th (ft)		19	95		118		
Queue Length 95th (ft)		49	#156		#189		
Internal Link Dist (ft)			412		452		
Turn Bay Length (ft)		75			300		
Base Capacity (vph)		136	397		479		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.25	0.77		0.81		
Intersection Summary							

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/29/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	15	90	20	10	10	455	95	20	5	115	195	10
Future Volume (vph)	15	90	20	10	10	455	95	20	5	115	195	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00	
Frt		1.00	0.95		1.00	0.96			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1770	1758		1739	1779			1702	1863	1544	
Flt Permitted		0.95	1.00		0.73	1.00			0.50	1.00	1.00	
Satd. Flow (perm)		1770	1758		1347	1779			897	1863	1544	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	100	22	11	11	506	106	22	6	128	217	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	117	33	0	11	634	0	0	6	128	228	0
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Actuated Green, G (s)		7.7	49.8		49.8	36.1			10.8	10.8	24.2	
Effective Green, g (s)		7.7	49.8		49.8	36.1			10.8	10.8	24.2	
Actuated g/C Ratio		0.08	0.52		0.52	0.38			0.11	0.11	0.25	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		143	921		706	676			101	211	507	
v/s Ratio Prot		c0.07	0.02			c0.36				0.07	0.06	
v/s Ratio Perm					0.01				0.01		0.08	
v/c Ratio		0.81	0.03		0.01	0.93			0.05	0.60	0.44	
Uniform Delay, d1		42.9	10.9		10.8	28.3			37.5	40.0	29.7	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		27.8	0.0		0.0	22.3			0.0	3.3	0.2	
Delay (s)		70.7	11.0		10.8	50.7			37.6	43.4	30.0	
Level of Service		E	B		B	D			D	D	C	
Approach Delay (s/veh)			57.6			50.0				34.8		
Approach LOS			E			D				C		

Intersection Summary		
HCM 2000 Control Delay (s/veh)	48.2	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.88	
Actuated Cycle Length (s)	95.0	Sum of lost time (s) 27.0
Intersection Capacity Utilization	81.2%	ICU Level of Service D
Analysis Period (min)	15	

dr Defacto Right Lane. Recode with 1 though lane as a right lane.  
 c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/29/2024



Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations		↔	↕		↔		
Traffic Volume (vph)	5	25	235	40	165	180	5
Future Volume (vph)	5	25	235	40	165	180	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.93	1.00		1.00		
Frt		1.00	0.97		0.92		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1659	3421		3250		
Flt Permitted		0.67	1.00		0.97		
Satd. Flow (perm)		1179	3421		3250		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	261	44	183	200	6
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	305	0	389	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		10.8	10.8		13.4		
Effective Green, g (s)		10.8	10.8		13.4		
Actuated g/C Ratio		0.11	0.11		0.14		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		134	388		458		
v/s Ratio Prot			c0.09		c0.12		
v/s Ratio Perm		0.03					
v/c Ratio		0.25	0.78		0.91dr		
Uniform Delay, d1		38.4	40.9		39.8		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.3	9.3		13.2		
Delay (s)		38.7	50.3		53.0		
Level of Service		D	D		D		
Approach Delay (s/veh)			49.1		53.0		
Approach LOS			D		D		
<b>Intersection Summary</b>							

**2025 AM – Base Year Build:  
Two Driveway Scenario**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	205	5	5	205	85	25	25	10	90	15	10
Future Volume (vph)	20	205	5	5	205	85	25	25	10	90	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	2%	2%	2%	8%	8%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	239	0	6	233	60	0	67	0	102	28	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.28		0.01	0.28	0.08		0.22		0.18	0.04	
Control Delay (s/veh)	13.5	14.3		13.0	14.4	13.3		19.2		8.2	7.4	



Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	13.5	14.3		13.0	14.4	13.3		19.2		8.2	7.4	
Queue Length 50th (ft)	5	53		1	52	12		16		13	4	
Queue Length 95th (ft)	18	107		8	104	34		45		34	14	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	927	1505		895	1469	1249		700		840	1566	
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	0.02	0.16		0.01	0.16	0.05		0.10		0.12	0.02	

Intersection Summary

Area Type: Other

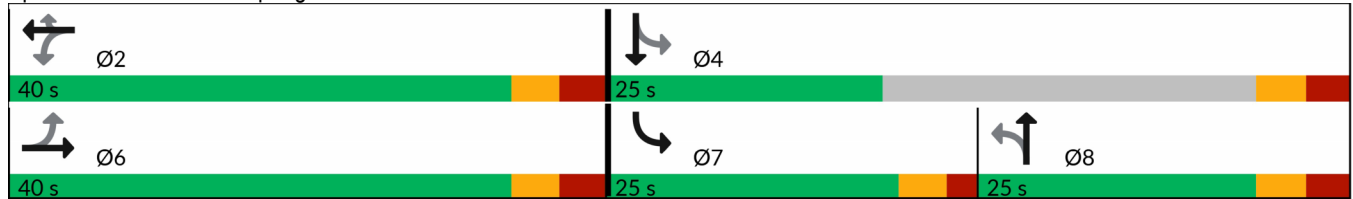
Cycle Length: 90

Actuated Cycle Length: 42.4

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	205	5	5	205	85	25	25	10	90	15	10
Future Volume (veh/h)	20	205	5	5	205	85	25	25	10	90	15	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1826	1826	1826	1870	1870	1870	1781	1781	1781
Adj Flow Rate, veh/h	23	233	6	6	233	60	28	28	11	102	17	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	8	8	8
Cap, veh/h	386	536	14	390	539	456	187	117	35	670	398	258
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.13	0.13	0.13	0.13	0.39	0.39
Sat Flow, veh/h	1085	1815	47	1113	1826	1545	478	901	271	1697	1010	653
Grp Volume(v), veh/h	23	0	239	6	233	60	67	0	0	102	0	28
Grp Sat Flow(s),veh/h/ln	1085	0	1862	1113	1826	1545	1650	0	0	1697	0	1663
Q Serve(g_s), s	0.7	0.0	4.2	0.2	4.2	1.2	0.0	0.0	0.0	1.8	0.0	0.4
Cycle Q Clear(g_c), s	4.9	0.0	4.2	4.4	4.2	1.2	1.4	0.0	0.0	1.8	0.0	0.4
Prop In Lane	1.00		0.03	1.00		1.00	0.42		0.16	1.00		0.39
Lane Grp Cap(c), veh/h	386	0	550	390	539	456	339	0	0	670	0	656
V/C Ratio(X)	0.06	0.00	0.43	0.02	0.43	0.13	0.20	0.00	0.00	0.15	0.00	0.04
Avail Cap(c_a), veh/h	965	0	1544	985	1514	1281	864	0	0	1265	0	765
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	11.6	13.4	11.6	10.5	16.0	0.0	0.0	10.2	0.0	7.6
Incr Delay (d2), s/veh	0.0	0.0	0.4	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.4	0.0	1.4	0.3	0.5	0.0	0.0	0.5	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.6	0.0	12.0	13.4	12.0	10.6	16.1	0.0	0.0	10.2	0.0	7.6
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		262			299			67				130
Approach Delay, s/veh		12.1			11.7			16.1				9.7
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		22.3		18.3	10.8	11.6				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		6.4		2.4		6.9	3.8	3.4				
Green Ext Time (p_c), s		1.3		0.0		1.2	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				11.9								
HCM 7th LOS				B								

Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	75	220	60	105	200
Future Volume (vph)	20	75	220	60	105	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	455		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)		1		1	1	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	84	247	67	0	343
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕		↙
Traffic Vol, veh/h	20	75	220	60	105	200
Future Vol, veh/h	20	75	220	60	105	200
Conflicting Peds, #/hr	0	1	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	22	84	247	67	118	225

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	709	249	0	0	316
Stage 1	248	-	-	-	-
Stage 2	461	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227
Pot Cap-1 Maneuver	401	790	-	-	1239
Stage 1	793	-	-	-	-
Stage 2	635	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	357	788	-	-	1238
Mov Cap-2 Maneuver	357	-	-	-	-
Stage 1	792	-	-	-	-
Stage 2	566	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.31	0	2.83
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	357	788	620	-
HCM Lane V/C Ratio	-	-	0.063	0.107	0.095	-
HCM Control Delay (s/veh)	-	-	15.8	10.1	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.4	0.3	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Future Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	1			3	3		1		1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	43	0	5	511	0	0	1	77	159	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Detector Phase	1	1	6		6	2			4	8	10	8
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	17.0
Total Split (s)	14.0	14.0	46.0		46.0	32.0			17.0	17.0	17.0	17.0
Total Split (%)	17.5%	17.5%	57.5%		57.5%	40.0%			21.3%	21.3%	21.3%	21.3%
Maximum Green (s)	8.0	8.0	39.0		39.0	25.0			10.0	10.0	10.0	10.0
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	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lag	Lag				Lead						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	1.5
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	1.5
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	30.0
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	0.0
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.69	0.04		0.00	0.86			0.00	0.33	0.30	
Control Delay (s/veh)		58.1	11.0		10.6	43.5			31.0	36.5	21.5	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations						
Traffic Volume (vph)	30	255	45	130	115	10
Future Volume (vph)	30	255	45	130	115	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%		0%		
Storage Length (ft)	75		0	300	0	
Storage Lanes	1		0	1	0	
Taper Length (ft)	75			50		
Right Turn on Red			No			No
Link Speed (mph)		30		30		
Link Distance (ft)		492		322		
Travel Time (s)		11.2		7.3		
Confl. Peds. (#/hr)			1			
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%		0%		
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	329	0	280	0	0
Turn Type	D.Pm	NA		Prot		
Protected Phases		4		9		
Permitted Phases	8					
Detector Phase	8	4		9		
Switch Phase						
Minimum Initial (s)	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0		17.0		
Total Split (s)	17.0	17.0		17.0		
Total Split (%)	21.3%	21.3%		21.3%		
Maximum Green (s)	10.0	10.0		10.0		
Yellow Time (s)	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0		3.0		
Lost Time Adjust (s)	0.0	0.0		0.0		
Total Lost Time (s)	7.0	7.0		7.0		
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0		0.0		
Recall Mode	None	None		None		
Walk Time (s)						
Flash Dont Walk (s)						
Pedestrian Calls (#/hr)						
v/c Ratio	0.30	0.77		0.70		
Control Delay (s/veh)	37.3	48.0		44.5		

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		58.1	11.0		10.6	43.5			31.0	36.5	21.5	
Queue Length 50th (ft)		56	11		1	249			0	36	58	
Queue Length 95th (ft)		#129	27		7	#441			5	76	106	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		175	882		648	592			120	229	525	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.66	0.05		0.01	0.86			0.01	0.34	0.30	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 75 (94%), Referenced to phase 2:WBT and 6:EBWB, Start of Green

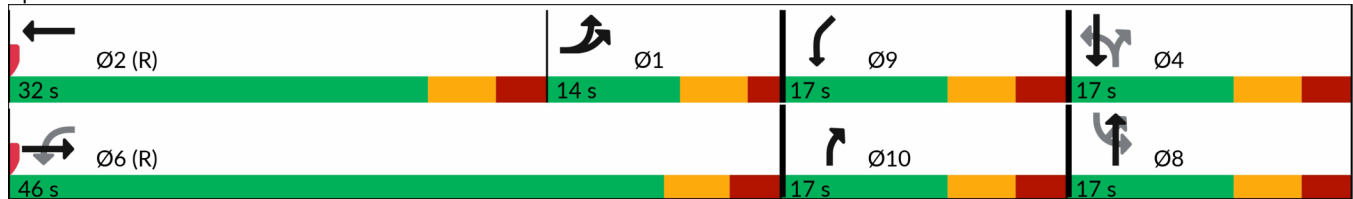
Natural Cycle: 80

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

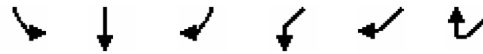
Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay	0.0	0.0		0.0		
Total Delay (s/veh)	37.3	48.0		44.5		
Queue Length 50th (ft)	23	85		70		
Queue Length 95th (ft)	55	#146		#120		
Internal Link Dist (ft)		412		242		
Turn Bay Length (ft)	75			300		
Base Capacity (vph)	162	424		396		
Starvation Cap Reductn	0	0		0		
Spillback Cap Reductn	0	0		0		
Storage Cap Reductn	0	0		0		
Reduced v/c Ratio	0.30	0.78		0.71		
Intersection Summary						



# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Future Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.99	1.00	1.00	
Frt		1.00	0.98		1.00	0.94			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	1810		1733	1703			1731	1827	1553	
Flt Permitted		0.95	1.00		0.72	1.00			0.52	1.00	1.00	
Satd. Flow (perm)		1752	1810		1330	1703			962	1827	1553	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	93	38	5	5	308	181	22	1	77	159	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	115	43	0	5	511	0	0	1	77	159	0
Confl. Peds. (#/hr)	1			3	3		1		1			
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Actuated Green, G (s)		6.4	39.0		39.0	26.6			10.0	10.0	20.0	
Effective Green, g (s)		6.4	39.0		39.0	26.6			10.0	10.0	20.0	
Actuated g/C Ratio		0.08	0.49		0.49	0.33			0.13	0.13	0.25	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		140	882		648	566			120	228	524	
v/s Ratio Prot		c0.07	0.02			c0.30				0.04	0.04	
v/s Ratio Perm					0.00				0.00		0.06	
v/c Ratio		0.82	0.04		0.00	0.90			0.00	0.33	0.30	
Uniform Delay, d1		36.2	10.7		10.5	25.4			30.6	31.9	24.3	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		29.2	0.1		0.0	20.2			0.0	0.3	0.1	
Delay (s)		65.5	10.8		10.5	45.6			30.6	32.2	24.4	
Level of Service		E	B		B	D			C	C	C	
Approach Delay (s/veh)			50.6			45.3				27.0		
Approach LOS			D			D				C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay (s/veh)			40.7								HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			80.0								Sum of lost time (s)	27.0
Intersection Capacity Utilization			71.9%								ICU Level of Service	C
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations						
Traffic Volume (vph)	30	255	45	130	115	10
Future Volume (vph)	30	255	45	130	115	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0		
Lane Util. Factor	1.00	0.95		0.97		
Frbp, ped/bikes	1.00	0.99		1.00		
Flpb, ped/bikes	1.00	1.00		1.00		
Frt	1.00	0.97		0.92		
Flt Protected	0.95	1.00		0.97		
Satd. Flow (prot)	1736	3382		3172		
Flt Permitted	0.70	1.00		0.97		
Satd. Flow (perm)	1291	3382		3172		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	33	280	49	143	126	11
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	49	329	0	280	0	0
Confl. Peds. (#/hr)			1			
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%
Turn Type	D.Pm	NA		Prot		
Protected Phases		4		9		
Permitted Phases	8					
Actuated Green, G (s)	10.0	10.0		10.0		
Effective Green, g (s)	10.0	10.0		10.0		
Actuated g/C Ratio	0.13	0.13		0.13		
Clearance Time (s)	7.0	7.0		7.0		
Vehicle Extension (s)	1.5	1.5		1.5		
Lane Grp Cap (vph)	161	422		396		
v/s Ratio Prot		c0.10		c0.09		
v/s Ratio Perm	0.04					
v/c Ratio	0.30	0.77		0.70		
Uniform Delay, d1	31.8	33.9		33.5		
Progression Factor	1.00	1.00		1.00		
Incremental Delay, d2	0.3	8.0		4.6		
Delay (s)	32.2	42.0		38.2		
Level of Service	C	D		D		
Approach Delay (s/veh)		40.7		38.2		
Approach LOS		D		D		
<b>Intersection Summary</b>						

Lanes, Volumes, Timings  
4: Delafield St & North Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	25	10	255	215	5
Future Volume (vph)	25	25	10	255	215	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	210			211	113	
Travel Time (s)	5.7			7.5	7.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	11	277	239	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
4: Delafield St & North Drwy.

03/27/2024

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	25	25	10	255	215	5
Future Vol, veh/h	25	25	10	255	215	5
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	27	27	11	277	234	5

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	535	236	239	0	-	0
Stage 1	236	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.14	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.236	-	-	-
Pot Cap-1 Maneuver	506	803	1316	-	-	-
Stage 1	803	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	502	803	1316	-	-	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	796	-	-	-	-	-
Stage 2	752	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.39	0.29	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1316	-	617	-	-
HCM Lane V/C Ratio	0.008	-	0.088	-	-
HCM Control Delay (s/veh)	7.8	-	11.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Lanes, Volumes, Timings  
5: Delafield St & South Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	20	0	265	235	5
Future Volume (vph)	0	20	0	265	235	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			30	30	
Link Distance (ft)	184			322	211	
Travel Time (s)	3.3			7.5	4.6	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	22	0	288	260	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 7th TWSC  
5: Delafield St & South Drwy.

03/27/2024

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	20	0	265	235	5
Future Vol, veh/h	0	20	0	265	235	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	0	22	0	288	255	5

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	258	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	780	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	780	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	9.74	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 780	-	-
HCM Lane V/C Ratio	- 0.028	-	-
HCM Control Delay (s/veh)	- 9.7	-	-
HCM Lane LOS	- A	-	-
HCM 95th %tile Q(veh)	- 0.1	-	-

**2025 PM – Base Year Build:  
Two Driveway Scenario**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	265	15	15	245	100	15	25	15	125	30	20
Future Volume (vph)	20	265	15	15	245	100	15	25	15	125	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	304	0	16	266	67	0	59	0	136	55	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.37		0.03	0.31	0.09		0.19		0.23	0.08	
Control Delay (s/veh)	13.5	15.2		13.4	14.6	13.4		20.4		9.0	8.4	



Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024

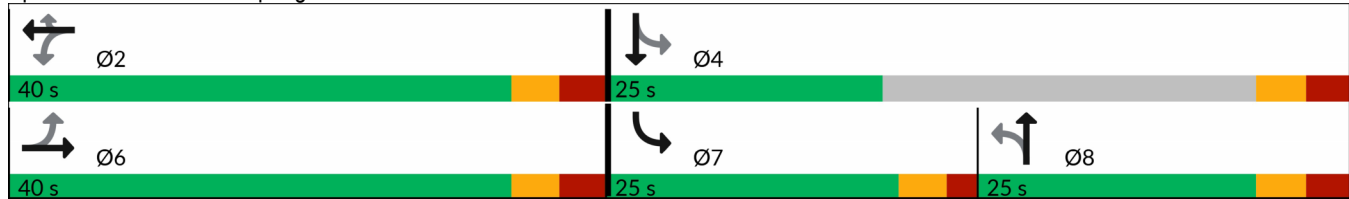


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	13.5	15.2		13.4	14.6	13.4		20.4		9.0	8.4	
Queue Length 50th (ft)	4	71		3	60	14		14		18	7	
Queue Length 95th (ft)	18	145		15	126	39		46		50	25	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	883	1474		862	1500	1248		695		896	1607	
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	0.02	0.21		0.02	0.18	0.05		0.08		0.15	0.03	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	43.3
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	265	15	15	245	100	15	25	15	125	30	20
Future Volume (veh/h)	20	265	15	15	245	100	15	25	15	125	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1870	1870	1870	1826	1826	1826	1870	1870	1870
Adj Flow Rate, veh/h	22	288	16	16	266	67	16	27	16	136	33	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	5	5	5	2	2	2
Cap, veh/h	343	495	28	324	532	450	144	132	62	727	432	288
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.14	0.14	0.14	0.15	0.42	0.42
Sat Flow, veh/h	1038	1741	97	1074	1870	1582	256	942	446	1781	1037	691
Grp Volume(v), veh/h	22	0	304	16	266	67	59	0	0	136	0	55
Grp Sat Flow(s),veh/h/ln	1038	0	1838	1074	1870	1582	1644	0	0	1781	0	1728
Q Serve(g_s), s	0.8	0.0	6.0	0.5	5.0	1.3	0.0	0.0	0.0	2.3	0.0	0.8
Cycle Q Clear(g_c), s	5.8	0.0	6.0	6.5	5.0	1.3	1.3	0.0	0.0	2.3	0.0	0.8
Prop In Lane	1.00		0.05	1.00		1.00	0.27		0.27	1.00		0.40
Lane Grp Cap(c), veh/h	343	0	523	324	532	450	338	0	0	727	0	720
V/C Ratio(X)	0.06	0.00	0.58	0.05	0.50	0.15	0.17	0.00	0.00	0.19	0.00	0.08
Avail Cap(c_a), veh/h	877	0	1469	877	1495	1264	818	0	0	1290	0	766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.0	0.0	12.9	15.7	12.6	11.3	16.1	0.0	0.0	10.0	0.0	7.4
Incr Delay (d2), s/veh	0.1	0.0	0.8	0.0	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.1	0.1	1.8	0.4	0.4	0.0	0.0	0.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.0	0.0	13.7	15.8	13.1	11.4	16.2	0.0	0.0	10.0	0.0	7.4
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		326			349			59				191
Approach Delay, s/veh		13.8			12.9			16.2				9.3
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		23.9		18.3	11.7	12.2				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		8.5		2.8		8.0	4.3	3.3				
Green Ext Time (p_c), s		1.5		0.1		1.6	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				12.7								
HCM 7th LOS				B								

Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	35	95	265	25	70	335
Future Volume (vph)	35	95	265	25	70	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	110	308	29	0	471
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕		↙
Traffic Vol, veh/h	35	95	265	25	70	335
Future Vol, veh/h	35	95	265	25	70	335
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	110	308	29	81	390

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	862	310	0	0	339
Stage 1	310	-	-	-	-
Stage 2	552	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	325	730	-	-	1220
Stage 1	744	-	-	-	-
Stage 2	577	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	297	729	-	-	1218
Mov Cap-2 Maneuver	297	-	-	-	-
Stage 1	742	-	-	-	-
Stage 2	527	-	-	-	-




















Approach	WB	NB	SB
HCM Control Delay, s/v13.03		0	1.41
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	297	729	311	-
HCM Lane V/C Ratio	-	-	0.137	0.152	0.067	-
HCM Control Delay (s/veh)	-	-	19	10.8	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.5	0.2	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Future Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	122	33	0	11	634	0	0	6	133	217	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	55.0		55.0	41.0			20.0	20.0	20.0	
Total Split (%)	14.7%	14.7%	57.9%		57.9%	43.2%			21.1%	21.1%	21.1%	
Maximum Green (s)	8.0	8.0	48.0		48.0	34.0			13.0	13.0	13.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.79	0.03		0.01	0.96			0.05	0.57	0.54	
Control Delay (s/veh)		77.4	11.9		11.9	58.7			37.0	49.4	30.5	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	165	180	10
Future Volume (vph)	5	25	235	40	165	180	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	300	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			50		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			492		331		
Travel Time (s)			11.2		7.5		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	305	0	394	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	20.0	20.0	20.0		20.0		
Total Split (%)	21.1%	21.1%	21.1%		21.1%		
Maximum Green (s)	13.0	13.0	13.0		13.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.23	0.71		0.97dr		
Control Delay (s/veh)		41.1	49.9		65.7		

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		77.4	11.9		11.9	58.7			37.0	49.4	30.5	
Queue Length 50th (ft)		73	9		3	376			3	76	99	
Queue Length 95th (ft)		#173	24		12	#609			15	135	162	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		158	913		700	657			126	254	403	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.77	0.04		0.02	0.96			0.05	0.52	0.54	

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		41.1	49.9		65.7		
Queue Length 50th (ft)		19	93		122		
Queue Length 95th (ft)		48	137		#204		
Internal Link Dist (ft)			412		251		
Turn Bay Length (ft)		75			300		
Base Capacity (vph)		162	468		444		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.21	0.65		0.89		
Intersection Summary							



HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Future Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00	
Frt		1.00	0.95		1.00	0.96			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1770	1758		1739	1779			1707	1863	1542	
Flt Permitted		0.95	1.00		0.73	1.00			0.51	1.00	1.00	
Satd. Flow (perm)		1770	1758		1347	1779			919	1863	1542	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	100	22	11	11	506	106	22	6	133	206	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	122	33	0	11	634	0	0	6	133	217	0
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Actuated Green, G (s)		8.3	49.4		49.4	35.1			11.8	11.8	24.6	
Effective Green, g (s)		8.3	49.4		49.4	35.1			11.8	11.8	24.6	
Actuated g/C Ratio		0.09	0.52		0.52	0.37			0.12	0.12	0.26	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		154	914		700	657			114	231	512	
v/s Ratio Prot		c0.07	0.02			c0.36				0.07	0.06	
v/s Ratio Perm					0.01				0.01		0.08	
v/c Ratio		0.79	0.03		0.01	0.96			0.05	0.57	0.42	
Uniform Delay, d1		42.5	11.1		11.0	29.3			36.6	39.2	29.3	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		22.3	0.0		0.0	27.5			0.0	2.1	0.2	
Delay (s)		64.8	11.2		11.0	56.8			36.7	41.3	29.5	
Level of Service		E	B		B	E			D	D	C	
Approach Delay (s/veh)			53.4			56.0				34.0		
Approach LOS			D			E				C		

Intersection Summary			
HCM 2000 Control Delay (s/veh)	50.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	165	180	10
Future Volume (vph)	5	25	235	40	165	180	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.94	1.00		1.00		
Frt		1.00	0.97		0.91		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1669	3424		3248		
Flt Permitted		0.67	1.00		0.97		
Satd. Flow (perm)		1180	3424		3248		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	261	44	183	200	11
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	305	0	394	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		11.8	11.8		12.8		
Effective Green, g (s)		11.8	11.8		12.8		
Actuated g/C Ratio		0.12	0.12		0.13		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		146	425		437		
v/s Ratio Prot			c0.09		c0.12		
v/s Ratio Perm		0.03					
v/c Ratio		0.23	0.71		0.97dr		
Uniform Delay, d1		37.5	39.9		40.4		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.2	4.7		20.9		
Delay (s)		37.8	44.7		61.4		
Level of Service		D	D		E		
Approach Delay (s/veh)			44.0		61.4		
Approach LOS			D		E		
<b>Intersection Summary</b>							

Lanes, Volumes, Timings  
4: Delafield St & North Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	15	25	275	345	25
Future Volume (vph)	15	15	25	275	345	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	181			201	114	
Travel Time (s)	5.1			7.5	7.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	32	0	27	299	402	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
4: Delafield St & North Drwy.

03/27/2024

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	15	15	25	275	345	25
Future Vol, veh/h	15	15	25	275	345	25
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	16	27	299	375	27

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	742	389	402	0	-	0
Stage 1	389	-	-	-	-	-
Stage 2	353	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	383	660	1156	-	-	-
Stage 1	685	-	-	-	-	-
Stage 2	711	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	374	660	1156	-	-	-
Mov Cap-2 Maneuver	374	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	711	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v13.09		0.68	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1156	-	477	-	-
HCM Lane V/C Ratio	0.023	-	0.068	-	-
HCM Control Delay (s/veh)	8.2	-	13.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Lanes, Volumes, Timings  
5: Delafield St & South Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	15	0	300	340	20
Future Volume (vph)	0	15	0	300	340	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	0	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			30	30	
Link Distance (ft)	178			331	201	
Travel Time (s)	4.1			7.5	4.6	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	0	326	392	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	15	0	300	340	20
Future Vol, veh/h	0	15	0	300	340	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	0	326	370	22

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	380	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	667	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	667	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v10.54		0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 667	-	-
HCM Lane V/C Ratio	- 0.024	-	-
HCM Control Delay (s/veh)	- 10.5	-	-
HCM Lane LOS	- B	-	-
HCM 95th %tile Q(veh)	- 0.1	-	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/29/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Future Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	122	33	0	11	634	0	0	6	133	217	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	56.0		56.0	42.0			18.0	18.0	21.0	
Total Split (%)	14.7%	14.7%	58.9%		58.9%	44.2%			18.9%	18.9%	22.1%	
Maximum Green (s)	8.0	8.0	49.0		49.0	35.0			11.0	11.0	14.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.84	0.03		0.01	0.94			0.05	0.63	0.55	
Control Delay (s/veh)		86.2	11.5		11.4	53.6			39.0	54.3	31.1	

# Lanes, Volumes, Timings

## 3: Madison St & W. North St/E. North St & Delafield St

03/29/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	165	180	10
Future Volume (vph)	5	25	235	40	165	180	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	300	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			50		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			492		331		
Travel Time (s)			11.2		7.5		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	305	0	394	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	18.0	18.0	18.0		21.0		
Total Split (%)	18.9%	18.9%	18.9%		22.1%		
Maximum Green (s)	11.0	11.0	11.0		14.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.25	0.78		0.93dr		
Control Delay (s/veh)		43.6	56.2		58.7		



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/29/2024

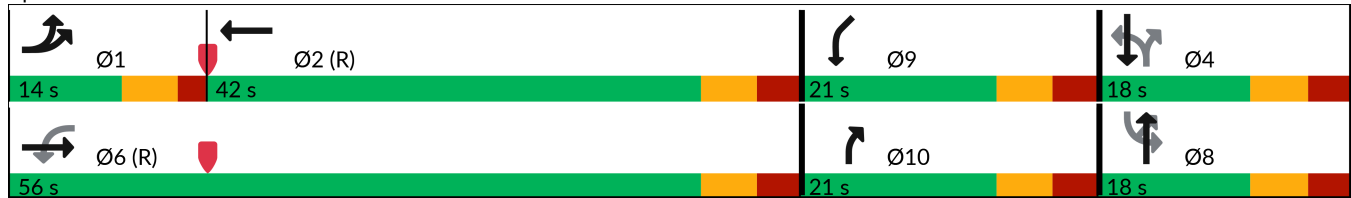


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		86.2	11.5		11.4	53.6			39.0	54.3	31.1	
Queue Length 50th (ft)		74	9		3	369			3	78	100	
Queue Length 95th (ft)		#173	24		12	#597			16	#148	165	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		149	920		705	673			103	215	403	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.82	0.04		0.02	0.94			0.06	0.62	0.54	

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/29/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		43.6	56.2		58.7		
Queue Length 50th (ft)		19	95		120		
Queue Length 95th (ft)		49	#156		#193		
Internal Link Dist (ft)			412		251		
Turn Bay Length (ft)		75			300		
Base Capacity (vph)		136	396		478		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.25	0.77		0.82		
Intersection Summary							

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

03/29/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Future Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00	
Frt		1.00	0.95		1.00	0.96			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1770	1758		1739	1779			1702	1863	1544	
Flt Permitted		0.95	1.00		0.73	1.00			0.50	1.00	1.00	
Satd. Flow (perm)		1770	1758		1347	1779			897	1863	1544	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	100	22	11	11	506	106	22	6	133	206	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	122	33	0	11	634	0	0	6	133	217	0
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Actuated Green, G (s)		7.8	49.7		49.7	35.9			10.8	10.8	24.3	
Effective Green, g (s)		7.8	49.7		49.7	35.9			10.8	10.8	24.3	
Actuated g/C Ratio		0.08	0.52		0.52	0.38			0.11	0.11	0.26	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		145	919		704	672			101	211	508	
v/s Ratio Prot		c0.07	0.02			c0.36				0.07	0.06	
v/s Ratio Perm					0.01				0.01		0.08	
v/c Ratio		0.84	0.03		0.01	0.94			0.05	0.63	0.42	
Uniform Delay, d1		42.9	11.0		10.8	28.5			37.5	40.1	29.5	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		32.2	0.0		0.0	23.3			0.0	4.4	0.2	
Delay (s)		75.2	11.0		10.9	51.8			37.6	44.6	29.7	
Level of Service		E	B		B	D			D	D	C	
Approach Delay (s/veh)			61.6			51.1				35.4		
Approach LOS			E			D				D		

### Intersection Summary

HCM 2000 Control Delay (s/veh)	49.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/29/2024























Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations		5	↑↑		555		
Traffic Volume (vph)	5	25	235	40	165	180	10
Future Volume (vph)	5	25	235	40	165	180	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.93	1.00		1.00		
Frt		1.00	0.97		0.91		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1660	3421		3248		
Flt Permitted		0.67	1.00		0.97		
Satd. Flow (perm)		1174	3421		3248		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	261	44	183	200	11
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	305	0	394	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		10.8	10.8		13.5		
Effective Green, g (s)		10.8	10.8		13.5		
Actuated g/C Ratio		0.11	0.11		0.14		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		133	388		461		
v/s Ratio Prot			c0.09		c0.12		
v/s Ratio Perm		0.03					
v/c Ratio		0.25	0.78		0.93dr		
Uniform Delay, d1		38.4	40.9		39.7		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.3	9.3		13.8		
Delay (s)		38.8	50.3		53.6		
Level of Service		D	D		D		
Approach Delay (s/veh)			49.1		53.6		
Approach LOS			D		D		
<b>Intersection Summary</b>							

**2025 AM – Base Year Build:  
Three Driveway Scenario**

Lanes, Volumes, Timings  
1: Spring St & Summit Ave & Delafield St

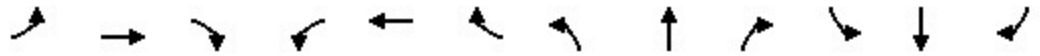
05/21/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	205	5	5	205	85	25	25	10	90	15	10
Future Volume (vph)	20	205	5	5	205	85	25	25	10	90	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	2%	2%	2%	8%	8%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	239	0	6	233	60	0	67	0	102	28	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.28		0.01	0.28	0.08		0.22		0.18	0.04	
Control Delay (s/veh)	13.5	14.3		13.0	14.4	13.3		19.2		8.2	7.4	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

05/21/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	13.5	14.3		13.0	14.4	13.3		19.2		8.2	7.4	
Queue Length 50th (ft)	5	53		1	52	12		16		13	4	
Queue Length 95th (ft)	18	107		8	104	34		45		34	14	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	927	1505		895	1469	1249		700		840	1566	
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	0.02	0.16		0.01	0.16	0.05		0.10		0.12	0.02	

Intersection Summary

Area Type: Other

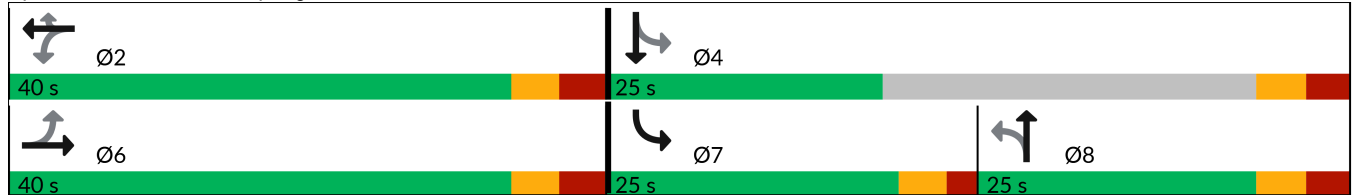
Cycle Length: 90

Actuated Cycle Length: 42.4

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

05/21/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	205	5	5	205	85	25	25	10	90	15	10
Future Volume (veh/h)	20	205	5	5	205	85	25	25	10	90	15	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1826	1826	1826	1870	1870	1870	1781	1781	1781
Adj Flow Rate, veh/h	23	233	6	6	233	60	28	28	11	102	17	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	8	8	8
Cap, veh/h	386	536	14	390	539	456	187	117	35	670	398	258
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.13	0.13	0.13	0.13	0.39	0.39
Sat Flow, veh/h	1085	1815	47	1113	1826	1545	478	901	271	1697	1010	653
Grp Volume(v), veh/h	23	0	239	6	233	60	67	0	0	102	0	28
Grp Sat Flow(s),veh/h/ln	1085	0	1862	1113	1826	1545	1650	0	0	1697	0	1663
Q Serve(g_s), s	0.7	0.0	4.2	0.2	4.2	1.2	0.0	0.0	0.0	1.8	0.0	0.4
Cycle Q Clear(g_c), s	4.9	0.0	4.2	4.4	4.2	1.2	1.4	0.0	0.0	1.8	0.0	0.4
Prop In Lane	1.00		0.03	1.00		1.00	0.42		0.16	1.00		0.39
Lane Grp Cap(c), veh/h	386	0	550	390	539	456	339	0	0	670	0	656
V/C Ratio(X)	0.06	0.00	0.43	0.02	0.43	0.13	0.20	0.00	0.00	0.15	0.00	0.04
Avail Cap(c_a), veh/h	965	0	1544	985	1514	1281	864	0	0	1265	0	765
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	11.6	13.4	11.6	10.5	16.0	0.0	0.0	10.2	0.0	7.6
Incr Delay (d2), s/veh	0.0	0.0	0.4	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.4	0.0	1.4	0.3	0.5	0.0	0.0	0.5	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.6	0.0	12.0	13.4	12.0	10.6	16.1	0.0	0.0	10.2	0.0	7.6
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		262			299			67				130
Approach Delay, s/veh		12.1			11.7			16.1				9.7
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		22.3		18.3	10.8	11.6				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		6.4		2.4		6.9	3.8	3.4				
Green Ext Time (p_c), s		1.3		0.0		1.2	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				11.9								
HCM 7th LOS				B								



Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

05/21/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	75	220	60	105	200
Future Volume (vph)	20	75	220	60	105	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	455		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)		1		1	1	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	84	247	67	0	343
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

05/21/2024

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	75	220	60	105	200
Future Vol, veh/h	20	75	220	60	105	200
Conflicting Peds, #/hr	0	1	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	22	84	247	67	118	225

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	709	249	0	0	316
Stage 1	248	-	-	-	-
Stage 2	461	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227
Pot Cap-1 Maneuver	401	790	-	-	1239
Stage 1	793	-	-	-	-
Stage 2	635	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	357	788	-	-	1238
Mov Cap-2 Maneuver	357	-	-	-	-
Stage 1	792	-	-	-	-
Stage 2	566	-	-	-	-

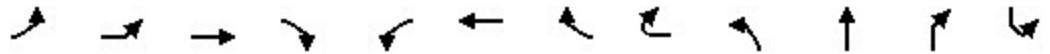
Approach	WB	NB	SB
HCM Control Delay, s/v	11.31	0	2.83
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	357	788	620	-
HCM Lane V/C Ratio	-	-	0.063	0.107	0.095	-
HCM Control Delay (s/veh)	-	-	15.8	10.1	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.4	0.3	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/21/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Future Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	1			3	3		1		1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	43	0	5	511	0	0	1	77	159	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Detector Phase	1	1	6		6	2			4	8	10	8
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	17.0
Total Split (s)	14.0	14.0	46.0		46.0	32.0			17.0	17.0	17.0	17.0
Total Split (%)	17.5%	17.5%	57.5%		57.5%	40.0%			21.3%	21.3%	21.3%	21.3%
Maximum Green (s)	8.0	8.0	39.0		39.0	25.0			10.0	10.0	10.0	10.0
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	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lag	Lag				Lead						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	1.5
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	1.5
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	30.0
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	0.0
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.69	0.04		0.00	0.86			0.00	0.33	0.30	
Control Delay (s/veh)		58.1	11.0		10.6	43.5			31.0	36.5	21.5	

# Lanes, Volumes, Timings

## 3: Madison St & W. North St/E. North St & Delafield St

05/21/2024

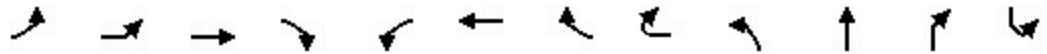


Lane Group	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	255	45	130	115
Future Volume (vph)	30	255	45	130	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12
Grade (%)		0%		0%	
Storage Length (ft)	75		0	300	0
Storage Lanes	1		0	1	0
Taper Length (ft)	75			50	
Right Turn on Red			No		
Link Speed (mph)		30		30	
Link Distance (ft)		184		322	
Travel Time (s)		4.2		7.3	
Confl. Peds. (#/hr)			1		
Confl. Bikes (#/hr)					
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0
Parking (#/hr)					
Mid-Block Traffic (%)		0%		0%	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	49	329	0	269	0
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Detector Phase	8	4		9	
Switch Phase					
Minimum Initial (s)	10.0	10.0		10.0	
Minimum Split (s)	17.0	17.0		17.0	
Total Split (s)	17.0	17.0		17.0	
Total Split (%)	21.3%	21.3%		21.3%	
Maximum Green (s)	10.0	10.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	
All-Red Time (s)	3.0	3.0		3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	
Total Lost Time (s)	7.0	7.0		7.0	
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	1.5	1.5		1.5	
Minimum Gap (s)	1.5	1.5		1.5	
Time Before Reduce (s)	30.0	30.0		25.0	
Time To Reduce (s)	0.0	0.0		0.0	
Recall Mode	None	None		None	
Walk Time (s)					
Flash Dont Walk (s)					
Pedestrian Calls (#/hr)					
v/c Ratio	0.30	0.77		0.67	
Control Delay (s/veh)	37.3	48.0		43.0	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/21/2024

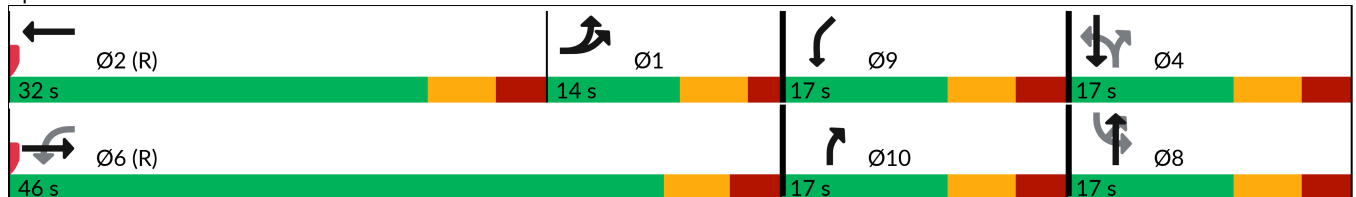


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		58.1	11.0		10.6	43.5			31.0	36.5	21.5	
Queue Length 50th (ft)		56	11		1	249			0	36	58	
Queue Length 95th (ft)		#129	27		7	#441			5	76	106	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		175	882		648	592			120	229	525	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.66	0.05		0.01	0.86			0.01	0.34	0.30	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 75 (94%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/21/2024

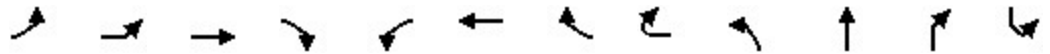


Lane Group	SBL	SBT	SBR	SWL	SWR
Queue Delay	0.0	0.0		0.0	
Total Delay (s/veh)	37.3	48.0		43.0	
Queue Length 50th (ft)	23	85		67	
Queue Length 95th (ft)	55	#146		#108	
Internal Link Dist (ft)		104		242	
Turn Bay Length (ft)	75			300	
Base Capacity (vph)	162	424		397	
Starvation Cap Reductn	0	0		0	
Spillback Cap Reductn	0	0		0	
Storage Cap Reductn	0	0		0	
Reduced v/c Ratio	0.30	0.78		0.68	
Intersection Summary					

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

05/21/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Future Volume (vph)	20	85	35	5	5	280	165	20	1	70	145	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.99	1.00	1.00	
Frt		1.00	0.98		1.00	0.94			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	1810		1733	1703			1731	1827	1553	
Flt Permitted		0.95	1.00		0.72	1.00			0.52	1.00	1.00	
Satd. Flow (perm)		1752	1810		1330	1703			962	1827	1553	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	93	38	5	5	308	181	22	1	77	159	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	115	43	0	5	511	0	0	1	77	159	0
Confl. Peds. (#/hr)	1			3	3		1		1			
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Actuated Green, G (s)		6.4	39.0		39.0	26.6			10.0	10.0	20.0	
Effective Green, g (s)		6.4	39.0		39.0	26.6			10.0	10.0	20.0	
Actuated g/C Ratio		0.08	0.49		0.49	0.33			0.13	0.13	0.25	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		140	882		648	566			120	228	524	
v/s Ratio Prot		c0.07	0.02			c0.30				0.04	0.04	
v/s Ratio Perm					0.00				0.00		0.06	
v/c Ratio		0.82	0.04		0.00	0.90			0.00	0.33	0.30	
Uniform Delay, d1		36.2	10.7		10.5	25.4			30.6	31.9	24.3	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		29.2	0.1		0.0	20.2			0.0	0.3	0.1	
Delay (s)		65.5	10.8		10.5	45.6			30.6	32.2	24.4	
Level of Service		E	B		B	D			C	C	C	
Approach Delay (s/veh)			50.6			45.3				27.0		
Approach LOS			D			D				C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay (s/veh)			40.5									D
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			80.0									27.0
Intersection Capacity Utilization			71.9%									C
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

05/21/2024



Movement	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	255	45	130	115
Future Volume (vph)	30	255	45	130	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	
Lane Util. Factor	1.00	0.95		0.97	
Frbp, ped/bikes	1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	
Frt	1.00	0.97		0.92	
Flt Protected	0.95	1.00		0.97	
Satd. Flow (prot)	1736	3382		3179	
Flt Permitted	0.70	1.00		0.97	
Satd. Flow (perm)	1291	3382		3179	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	33	280	49	143	126
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	49	329	0	269	0
Confl. Peds. (#/hr)			1		
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Actuated Green, G (s)	10.0	10.0		10.0	
Effective Green, g (s)	10.0	10.0		10.0	
Actuated g/C Ratio	0.13	0.13		0.13	
Clearance Time (s)	7.0	7.0		7.0	
Vehicle Extension (s)	1.5	1.5		1.5	
Lane Grp Cap (vph)	161	422		397	
v/s Ratio Prot		c0.10		c0.08	
v/s Ratio Perm	0.04				
v/c Ratio	0.30	0.77		0.67	
Uniform Delay, d1	31.8	33.9		33.4	
Progression Factor	1.00	1.00		1.00	
Incremental Delay, d2	0.3	8.0		3.5	
Delay (s)	32.2	42.0		37.0	
Level of Service	C	D		D	
Approach Delay (s/veh)		40.7		37.0	
Approach LOS		D		D	
<b>Intersection Summary</b>					



Lanes, Volumes, Timings  
4: Delafield St & North Drwy.

05/21/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	25	10	255	215	5
Future Volume (vph)	25	25	10	255	215	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	210			211	113	
Travel Time (s)	5.7			7.5	7.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	11	277	239	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
4: Delafield St & North Drwy.

05/21/2024

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	25	25	10	255	215	5
Future Vol, veh/h	25	25	10	255	215	5
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	27	27	11	277	234	5

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	535	236	239	0	-	0
Stage 1	236	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.14	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.236	-	-	-
Pot Cap-1 Maneuver	506	803	1316	-	-	-
Stage 1	803	-	-	-	-	-
Stage 2	752	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	502	803	1316	-	-	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	796	-	-	-	-	-
Stage 2	752	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.39	0.29	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1316	-	617	-	-
HCM Lane V/C Ratio	0.008	-	0.088	-	-
HCM Control Delay (s/veh)	7.8	-	11.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Lanes, Volumes, Timings  
5: Delafield St & South Drwy.

05/21/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	10	0	265	235	5
Future Volume (vph)	0	10	0	265	235	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			30	30	
Link Distance (ft)	184			322	211	
Travel Time (s)	3.3			7.5	4.6	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	0	288	260	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
5: Delafield St & South Drwy.

05/21/2024

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	10	0	265	235	5
Future Vol, veh/h	0	10	0	265	235	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	0	11	0	288	255	5

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	258	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	780	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	780	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	9.68	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 780	-	-
HCM Lane V/C Ratio	- 0.014	-	-
HCM Control Delay (s/veh)	- 9.7	-	-
HCM Lane LOS	- A	-	-
HCM 95th %tile Q(veh)	- 0	-	-

Lanes, Volumes, Timings  
 15: Madison St & Madison Street Driveway

05/21/2024



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑			↑
Traffic Volume (vph)	0	345	255	0	0	10
Future Volume (vph)	0	345	255	0	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	0	1
Taper Length (ft)	25				25	
Link Speed (mph)		30	30		30	
Link Distance (ft)		308	184		133	
Travel Time (s)		7.0	4.2		3.0	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	375	277	0	0	11
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
 15: Madison St & Madison Street Driveway

05/21/2024

Intersection						
Int Delay, s/veh	0.2					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑			↑
Traffic Vol, veh/h	0	345	255	0	0	10
Future Vol, veh/h	0	345	255	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	2	2
Mvmt Flow	0	375	277	0	0	11

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	- 0 - 277
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - 6.23
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - 3.319
Pot Cap-1 Maneuver	0	-	- 0 761
Stage 1	0	-	- 0 -
Stage 2	0	-	- 0 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - 761
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -





















Approach	SE	NW	SW
HCM Control Delay, s/v	0	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NWT	NWR	SETSWLn1
Capacity (veh/h)	-	-	- 761
HCM Lane V/C Ratio	-	-	- 0.014
HCM Control Delay (s/veh)	-	-	- 9.8
HCM Lane LOS	-	-	- A
HCM 95th %tile Q(veh)	-	-	- 0

**2025 PM – Base Year Build:  
Three Driveway Scenario**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

05/21/2024

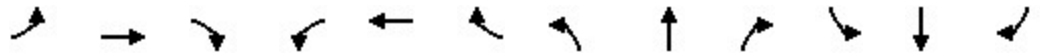
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	265	15	15	245	100	15	25	10	125	30	20
Future Volume (vph)	20	265	15	15	245	100	15	25	10	125	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	304	0	16	266	67	0	54	0	136	55	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.35		0.03	0.30	0.09		0.14		0.25	0.09	
Control Delay (s/veh)	12.4	13.5		12.4	13.0	12.1		18.4		9.7	9.0	



Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

05/21/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	12.4	13.5		12.4	13.0	12.1		18.4		9.7	9.0	
Queue Length 50th (ft)	2	37		2	32	7		7		18	7	
Queue Length 95th (ft)	18	144		15	125	39		43		50	25	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	944	1575		921	1603	1334		849		944	1628	
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	0.02	0.19		0.02	0.17	0.05		0.06		0.14	0.03	

Intersection Summary

Area Type: Other

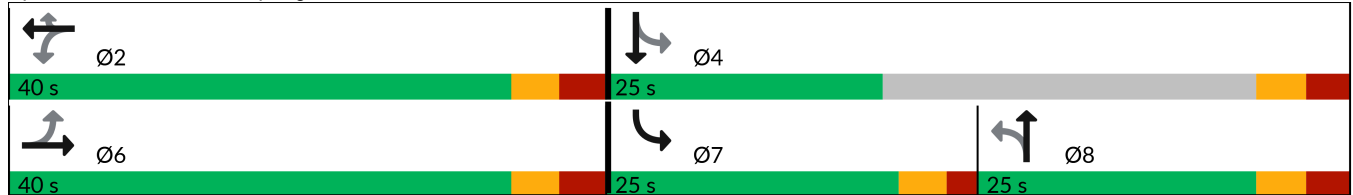
Cycle Length: 90

Actuated Cycle Length: 40.5

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

05/21/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	265	15	15	245	100	15	25	10	125	30	20
Future Volume (veh/h)	20	265	15	15	245	100	15	25	10	125	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1870	1870	1870	1826	1826	1826	1870	1870	1870
Adj Flow Rate, veh/h	22	288	16	16	266	67	16	27	11	136	33	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	5	5	5	2	2	2
Cap, veh/h	345	497	28	326	534	452	150	141	46	724	430	287
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.14	0.14	0.14	0.15	0.41	0.41
Sat Flow, veh/h	1038	1741	97	1074	1870	1582	284	1032	337	1781	1037	691
Grp Volume(v), veh/h	22	0	304	16	266	67	54	0	0	136	0	55
Grp Sat Flow(s),veh/h/ln	1038	0	1838	1074	1870	1582	1653	0	0	1781	0	1728
Q Serve(g_s), s	0.8	0.0	6.0	0.5	5.0	1.3	0.0	0.0	0.0	2.3	0.0	0.8
Cycle Q Clear(g_c), s	5.7	0.0	6.0	6.5	5.0	1.3	1.1	0.0	0.0	2.3	0.0	0.8
Prop In Lane	1.00		0.05	1.00		1.00	0.30		0.20	1.00		0.40
Lane Grp Cap(c), veh/h	345	0	525	326	534	452	338	0	0	724	0	716
V/C Ratio(X)	0.06	0.00	0.58	0.05	0.50	0.15	0.16	0.00	0.00	0.19	0.00	0.08
Avail Cap(c_a), veh/h	881	0	1474	881	1500	1269	825	0	0	1290	0	769
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	12.9	15.6	12.5	11.2	16.1	0.0	0.0	10.0	0.0	7.4
Incr Delay (d2), s/veh	0.1	0.0	0.8	0.0	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.1	0.1	1.8	0.4	0.4	0.0	0.0	0.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.9	0.0	13.6	15.7	13.0	11.3	16.2	0.0	0.0	10.1	0.0	7.5
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		326			349			54				191
Approach Delay, s/veh		13.7			12.8			16.2				9.3
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		23.7		18.3	11.7	12.1				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		8.5		2.8		8.0	4.3	3.1				
Green Ext Time (p_c), s		1.5		0.1		1.6	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				12.6								
HCM 7th LOS				B								

Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

05/21/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	35	95	265	25	70	325
Future Volume (vph)	35	95	265	25	70	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	110	308	29	0	459
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

05/21/2024

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	95	265	25	70	325
Future Vol, veh/h	35	95	265	25	70	325
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	110	308	29	81	378

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	851	310	0	0	339
Stage 1	310	-	-	-	-
Stage 2	541	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	330	730	-	-	1220
Stage 1	744	-	-	-	-
Stage 2	584	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	302	729	-	-	1218
Mov Cap-2 Maneuver	302	-	-	-	-
Stage 1	742	-	-	-	-
Stage 2	534	-	-	-	-

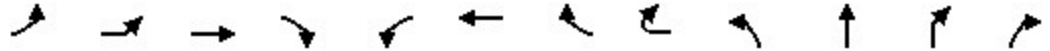
Approach	WB	NB	SB
HCM Control Delay, s/v	12.96	0	1.45
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	302	729	319	-
HCM Lane V/C Ratio	-	-	0.135	0.152	0.067	-
HCM Control Delay (s/veh)	-	-	18.8	10.8	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.5	0.2	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/21/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Future Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	122	33	0	11	634	0	0	6	133	217	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	55.0		55.0	41.0			20.0	20.0	20.0	
Total Split (%)	14.7%	14.7%	57.9%		57.9%	43.2%			21.1%	21.1%	21.1%	
Maximum Green (s)	8.0	8.0	48.0		48.0	34.0			13.0	13.0	13.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.79	0.03		0.01	0.96			0.05	0.57	0.54	
Control Delay (s/veh)		77.4	11.9		11.9	58.3			37.0	49.4	30.6	

# Lanes, Volumes, Timings

## 3: Madison St & W. North St/E. North St & Delafield St

05/21/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	165	180	5
Future Volume (vph)	5	25	235	40	165	180	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	300	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			50		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			182		331		
Travel Time (s)			4.1		7.5		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	305	0	389	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	20.0	20.0	20.0		20.0		
Total Split (%)	21.1%	21.1%	21.1%		21.1%		
Maximum Green (s)	13.0	13.0	13.0		13.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.23	0.71		0.95dr		
Control Delay (s/veh)		41.1	49.9		64.5		

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/21/2024

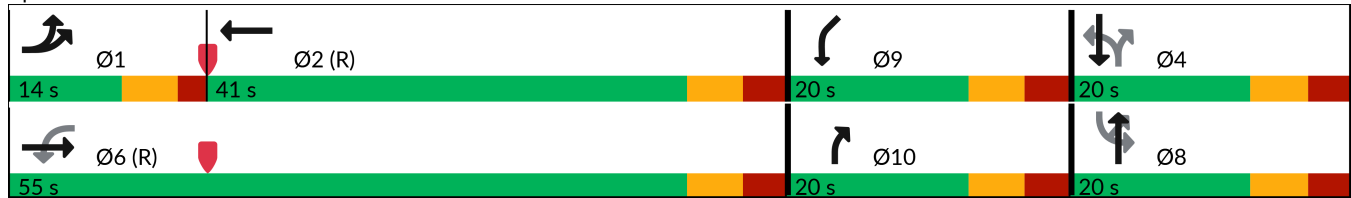


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		77.4	11.9		11.9	58.3			37.0	49.4	30.6	
Queue Length 50th (ft)		73	9		3	376			3	76	99	
Queue Length 95th (ft)		#173	24		12	#609			15	135	162	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		158	914		700	659			126	254	403	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.77	0.04		0.02	0.96			0.05	0.52	0.54	

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/21/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		41.1	49.9		64.5		
Queue Length 50th (ft)		19	93		120		
Queue Length 95th (ft)		48	137		#200		
Internal Link Dist (ft)			102		251		
Turn Bay Length (ft)		75			300		
Base Capacity (vph)		162	468		445		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.21	0.65		0.87		
Intersection Summary							



HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

05/21/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations		EBL	EBT		WBL	WBT			NBL	NBT	NBR	NBR2
Traffic Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Future Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00	
Frt		1.00	0.95		1.00	0.96			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1770	1758		1739	1779			1707	1863	1541	
Flt Permitted		0.95	1.00		0.73	1.00			0.51	1.00	1.00	
Satd. Flow (perm)		1770	1758		1347	1779			919	1863	1541	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	100	22	11	11	506	106	22	6	133	206	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	122	33	0	11	634	0	0	6	133	217	0
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Actuated Green, G (s)		8.3	49.5		49.5	35.2			11.8	11.8	24.5	
Effective Green, g (s)		8.3	49.5		49.5	35.2			11.8	11.8	24.5	
Actuated g/C Ratio		0.09	0.52		0.52	0.37			0.12	0.12	0.26	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		154	916		701	659			114	231	510	
v/s Ratio Prot		c0.07	0.02			c0.36				0.07	0.06	
v/s Ratio Perm					0.01				0.01		0.08	
v/c Ratio		0.79	0.03		0.01	0.96			0.05	0.57	0.42	
Uniform Delay, d1		42.5	11.1		10.9	29.2			36.6	39.2	29.3	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		22.3	0.0		0.0	26.8			0.0	2.1	0.2	
Delay (s)		64.8	11.1		11.0	56.1			36.7	41.3	29.5	
Level of Service		E	B		B	E			D	D	C	
Approach Delay (s/veh)			53.3			55.3				34.1		
Approach LOS			D			E				C		

Intersection Summary		
HCM 2000 Control Delay (s/veh)	50.2	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.89	
Actuated Cycle Length (s)	95.0	Sum of lost time (s) 27.0
Intersection Capacity Utilization	80.9%	ICU Level of Service D
Analysis Period (min)	15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.		
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

05/21/2024



Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	165	180	5
Future Volume (vph)	5	25	235	40	165	180	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.94	1.00		1.00		
Frt		1.00	0.97		0.92		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1669	3424		3250		
Flt Permitted		0.67	1.00		0.97		
Satd. Flow (perm)		1180	3424		3250		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	261	44	183	200	6
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	305	0	389	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		11.8	11.8		12.7		
Effective Green, g (s)		11.8	11.8		12.7		
Actuated g/C Ratio		0.12	0.12		0.13		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		146	425		434		
v/s Ratio Prot			c0.09		c0.12		
v/s Ratio Perm		0.03					
v/c Ratio		0.23	0.71		0.95dr		
Uniform Delay, d1		37.5	39.9		40.5		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.2	4.7		20.0		
Delay (s)		37.8	44.7		60.5		
Level of Service		D	D		E		
Approach Delay (s/veh)			44.0		60.5		
Approach LOS			D		E		
<b>Intersection Summary</b>							

Lanes, Volumes, Timings  
4: Delafield St & North Drwy.

05/21/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	15	25	275	335	25
Future Volume (vph)	15	15	25	275	335	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	181			201	114	
Travel Time (s)	5.1			7.5	7.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	32	0	27	299	391	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
4: Delafield St & North Drwy.

05/21/2024

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	15	15	25	275	335	25
Future Vol, veh/h	15	15	25	275	335	25
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	16	27	299	364	27

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	731	378	391	0	0
Stage 1	378	-	-	-	-
Stage 2	353	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	389	669	1167	-	-
Stage 1	693	-	-	-	-
Stage 2	711	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	380	669	1167	-	-
Mov Cap-2 Maneuver	380	-	-	-	-
Stage 1	677	-	-	-	-
Stage 2	711	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v12.97		0.68	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1167	-	485	-	-
HCM Lane V/C Ratio	0.023	-	0.067	-	-
HCM Control Delay (s/veh)	8.2	-	13	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Lanes, Volumes, Timings  
5: Delafield St & South Drwy.

05/21/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	10	0	300	340	10
Future Volume (vph)	0	10	0	300	340	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	0	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			30	30	
Link Distance (ft)	178			331	201	
Travel Time (s)	4.1			7.5	4.6	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	0	326	381	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
5: Delafield St & South Drwy.

05/21/2024

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	10	0	300	340	10
Future Vol, veh/h	0	10	0	300	340	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	0	326	370	11

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	375	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	671	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	671	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v10.45		0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 671	-	-
HCM Lane V/C Ratio	- 0.016	-	-
HCM Control Delay (s/veh)	- 10.5	-	-
HCM Lane LOS	- B	-	-
HCM 95th %tile Q(veh)	- 0	-	-

Lanes, Volumes, Timings  
 15: Madison St & Madison St Driveway

05/21/2024



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↓			↑
Traffic Volume (vph)	0	305	230	10	0	5
Future Volume (vph)	0	305	230	10	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	0	1
Taper Length (ft)	25				25	
Link Speed (mph)		30	30		30	
Link Distance (ft)		297	182		156	
Travel Time (s)		6.8	4.1		3.5	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	332	261	0	0	5
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
 15: Madison St & Madison St Driveway

05/21/2024

Intersection						
Int Delay, s/veh	0.1					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑			↑
Traffic Vol, veh/h	0	305	230	10	0	5
Future Vol, veh/h	0	305	230	10	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	332	250	11	0	5

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	-	0	-	0	255
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.319
Pot Cap-1 Maneuver	0	-	-	-	782
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	782
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	SE	NW	SW
HCM Control Delay, s/v	0	0	9.63
HCM LOS			A

Minor Lane/Major Mvmt	NWT	NWR	SETSWLn1
Capacity (veh/h)	-	-	782
HCM Lane V/C Ratio	-	-	0.007
HCM Control Delay (s/veh)	-	-	9.6
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Future Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	122	33	0	11	634	0	0	6	133	217	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	56.0		56.0	42.0			18.0	18.0	21.0	
Total Split (%)	14.7%	14.7%	58.9%		58.9%	44.2%			18.9%	18.9%	22.1%	
Maximum Green (s)	8.0	8.0	49.0		49.0	35.0			11.0	11.0	14.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.84	0.03		0.01	0.94			0.05	0.62	0.55	
Control Delay (s/veh)		86.0	11.5		11.4	53.5			39.0	54.2	31.1	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	165	180	5
Future Volume (vph)	5	25	235	40	165	180	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	300	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			50		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			192		331		
Travel Time (s)			4.4		7.5		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	305	0	389	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	18.0	18.0	18.0		21.0		
Total Split (%)	18.9%	18.9%	18.9%		22.1%		
Maximum Green (s)	11.0	11.0	11.0		14.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.25	0.78		0.91dr		
Control Delay (s/veh)		43.6	56.1		57.9		

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024

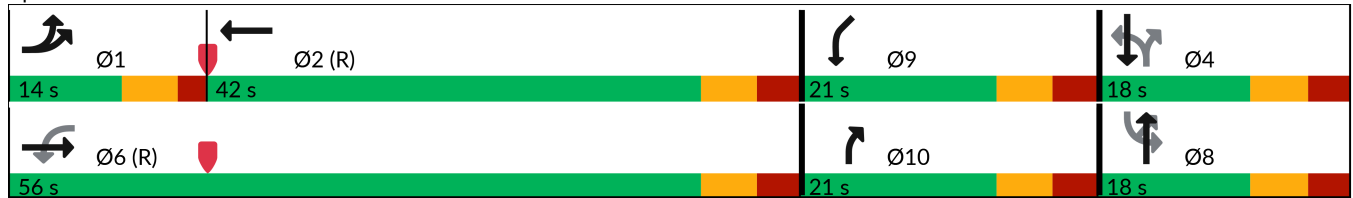


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		86.0	11.5		11.4	53.5			39.0	54.2	31.1	
Queue Length 50th (ft)		74	9		3	369			3	78	100	
Queue Length 95th (ft)		#173	24		12	#597			16	#148	165	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		149	921		705	673			103	215	403	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.82	0.04		0.02	0.94			0.06	0.62	0.54	

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024

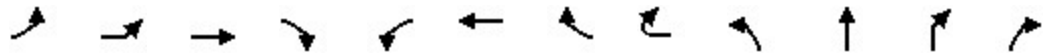


Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		43.6	56.1		57.9		
Queue Length 50th (ft)		19	95		118		
Queue Length 95th (ft)		49	#156		#189		
Internal Link Dist (ft)			112		251		
Turn Bay Length (ft)		75			300		
Base Capacity (vph)		136	397		479		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.25	0.77		0.81		
Intersection Summary							

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Future Volume (vph)	20	90	20	10	10	455	95	20	5	120	185	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00	
Frt		1.00	0.95		1.00	0.96			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1770	1758		1739	1779			1702	1863	1544	
Flt Permitted		0.95	1.00		0.73	1.00			0.50	1.00	1.00	
Satd. Flow (perm)		1770	1758		1347	1779			897	1863	1544	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	100	22	11	11	506	106	22	6	133	206	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	122	33	0	11	634	0	0	6	133	217	0
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Actuated Green, G (s)		7.8	49.8		49.8	36.0			10.8	10.8	24.2	
Effective Green, g (s)		7.8	49.8		49.8	36.0			10.8	10.8	24.2	
Actuated g/C Ratio		0.08	0.52		0.52	0.38			0.11	0.11	0.25	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		145	921		706	674			101	211	507	
v/s Ratio Prot		c0.07	0.02			c0.36				0.07	0.06	
v/s Ratio Perm					0.01				0.01		0.08	
v/c Ratio		0.84	0.03		0.01	0.94			0.05	0.63	0.42	
Uniform Delay, d1		42.9	10.9		10.8	28.4			37.5	40.1	29.6	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		32.2	0.0		0.0	22.8			0.0	4.4	0.2	
Delay (s)		75.2	11.0		10.8	51.2			37.6	44.6	29.8	
Level of Service		E	B		B	D			D	D	C	
Approach Delay (s/veh)			61.5			50.6				35.4		
Approach LOS			E			D				D		

### Intersection Summary

HCM 2000 Control Delay (s/veh)	48.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

05/22/2024























Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	235	40	165	180	5
Future Volume (vph)	5	25	235	40	165	180	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.93	1.00		1.00		
Frt		1.00	0.97		0.92		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1660	3421		3250		
Flt Permitted		0.67	1.00		0.97		
Satd. Flow (perm)		1174	3421		3250		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	261	44	183	200	6
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	305	0	389	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		10.8	10.8		13.4		
Effective Green, g (s)		10.8	10.8		13.4		
Actuated g/C Ratio		0.11	0.11		0.14		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		133	388		458		
v/s Ratio Prot			c0.09		c0.12		
v/s Ratio Perm		0.03					
v/c Ratio		0.25	0.78		0.91dr		
Uniform Delay, d1		38.4	40.9		39.8		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.3	9.3		13.2		
Delay (s)		38.8	50.3		53.0		
Level of Service		D	D		D		
Approach Delay (s/veh)			49.1		53.0		
Approach LOS			D		D		
<b>Intersection Summary</b>							

**2035 AM – Horizon Year Build:  
Single Driveway Scenario**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	215	5	5	225	90	15	25	10	95	15	10
Future Volume (vph)	20	215	5	5	225	90	15	25	10	95	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	2%	2%	2%	8%	8%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	250	0	6	256	63	0	56	0	108	28	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.03	0.22		0.00	0.24	0.06		0.13		0.21	0.05	
Control Delay (s/veh)	12.2	11.5		12.2	11.6	11.5		17.1		8.9	8.2	



Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024

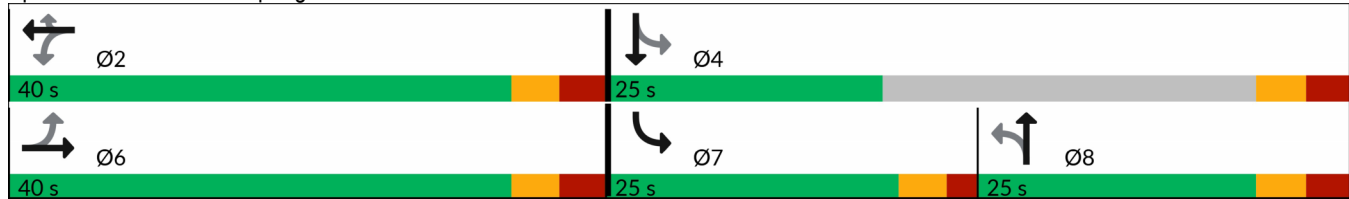


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	12.2	11.5		12.2	11.6	11.5		17.1		8.9	8.2	
Queue Length 50th (ft)	2	29		1	30	7		7		14	4	
Queue Length 95th (ft)	17	110		7	114	35		40		39	15	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	978	1619		953	1580	1343		937		941	1567	
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	0.02	0.15		0.01	0.16	0.05		0.06		0.11	0.02	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	38.4
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	215	5	5	225	90	15	25	10	95	15	10
Future Volume (veh/h)	20	215	5	5	225	90	15	25	10	95	15	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1826	1826	1826	1870	1870	1870	1781	1781	1781
Adj Flow Rate, veh/h	23	244	6	6	256	63	17	28	11	108	17	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	8	8	8
Cap, veh/h	371	540	13	385	542	459	156	124	40	666	395	256
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.12	0.12	0.12	0.14	0.39	0.39
Sat Flow, veh/h	1060	1818	45	1102	1826	1545	333	1025	332	1697	1010	653
Grp Volume(v), veh/h	23	0	250	6	256	63	56	0	0	108	0	28
Grp Sat Flow(s),veh/h/ln	1060	0	1862	1102	1826	1545	1690	0	0	1697	0	1663
Q Serve(g_s), s	0.7	0.0	4.4	0.2	4.6	1.2	0.0	0.0	0.0	1.9	0.0	0.4
Cycle Q Clear(g_c), s	5.4	0.0	4.4	4.6	4.6	1.2	1.1	0.0	0.0	1.9	0.0	0.4
Prop In Lane	1.00		0.02	1.00		1.00	0.30		0.20	1.00		0.39
Lane Grp Cap(c), veh/h	371	0	553	385	542	459	320	0	0	666	0	650
V/C Ratio(X)	0.06	0.00	0.45	0.02	0.47	0.14	0.17	0.00	0.00	0.16	0.00	0.04
Avail Cap(c_a), veh/h	941	0	1553	977	1523	1288	879	0	0	1258	0	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.8	0.0	11.5	13.4	11.6	10.4	16.1	0.0	0.0	10.3	0.0	7.6
Incr Delay (d2), s/veh	0.1	0.0	0.4	0.0	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.5	0.0	1.6	0.3	0.4	0.0	0.0	0.6	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.9	0.0	12.0	13.4	12.1	10.5	16.2	0.0	0.0	10.3	0.0	7.6
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		273			325			56				136
Approach Delay, s/veh		12.1			11.8			16.2				9.8
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		22.1		18.3	10.9	11.2				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		6.6		2.4		7.4	3.9	3.1				
Green Ext Time (p_c), s		1.4		0.0		1.3	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh			11.9									
HCM 7th LOS			B									

Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	80	240	65	110	210
Future Volume (vph)	20	80	240	65	110	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)		1		1	1	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	90	270	73	0	360
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕		↙
Traffic Vol, veh/h	20	80	240	65	110	210
Future Vol, veh/h	20	80	240	65	110	210
Conflicting Peds, #/hr	0	1	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	22	90	270	73	124	236

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	754	272	0	0	344	0
Stage 1	271	-	-	-	-	-
Stage 2	483	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227	-
Pot Cap-1 Maneuver	377	767	-	-	1210	-
Stage 1	775	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	332	766	-	-	1209	-
Mov Cap-2 Maneuver	332	-	-	-	-	-
Stage 1	774	-	-	-	-	-
Stage 2	547	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.58	0	2.86
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	332	766	619	-
HCM Lane V/C Ratio	-	-	0.068	0.117	0.102	-
HCM Control Delay (s/veh)	-	-	16.6	10.3	8.3	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.4	0.3	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Future Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	1			3	3		1		1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	121	43	0	5	543	0	0	1	82	165	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Detector Phase	1	1	6		6	2			4	8	10	8
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	17.0
Total Split (s)	14.0	14.0	46.0		46.0	32.0			17.0	17.0	17.0	17.0
Total Split (%)	17.5%	17.5%	57.5%		57.5%	40.0%			21.3%	21.3%	21.3%	21.3%
Maximum Green (s)	8.0	8.0	39.0		39.0	25.0			10.0	10.0	10.0	10.0
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	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lag	Lag				Lead						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	1.5
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	1.5
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	30.0
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	0.0
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.72	0.04		0.00	1.00			0.00	0.35	0.31	
Control Delay (s/veh)		61.1	11.0		10.6	70.4			31.0	37.0	21.7	

# Lanes, Volumes, Timings

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	270	45	135	120
Future Volume (vph)	30	270	45	135	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12
Grade (%)		0%		0%	
Storage Length (ft)	75		0	300	0
Storage Lanes	1		0	1	0
Taper Length (ft)	75			50	
Right Turn on Red			No		
Link Speed (mph)		30		30	
Link Distance (ft)		492		537	
Travel Time (s)		11.2		12.2	
Confl. Peds. (#/hr)			1		
Confl. Bikes (#/hr)					
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0
Parking (#/hr)					
Mid-Block Traffic (%)		0%		0%	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	49	346	0	280	0
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Detector Phase	8	4		9	
Switch Phase					
Minimum Initial (s)	10.0	10.0		10.0	
Minimum Split (s)	17.0	17.0		17.0	
Total Split (s)	17.0	17.0		17.0	
Total Split (%)	21.3%	21.3%		21.3%	
Maximum Green (s)	10.0	10.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	
All-Red Time (s)	3.0	3.0		3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	
Total Lost Time (s)	7.0	7.0		7.0	
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	1.5	1.5		1.5	
Minimum Gap (s)	1.5	1.5		1.5	
Time Before Reduce (s)	30.0	30.0		25.0	
Time To Reduce (s)	0.0	0.0		0.0	
Recall Mode	None	None		None	
Walk Time (s)					
Flash Dont Walk (s)					
Pedestrian Calls (#/hr)					
v/c Ratio	0.30	0.81		0.70	
Control Delay (s/veh)	37.5	51.4		44.4	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

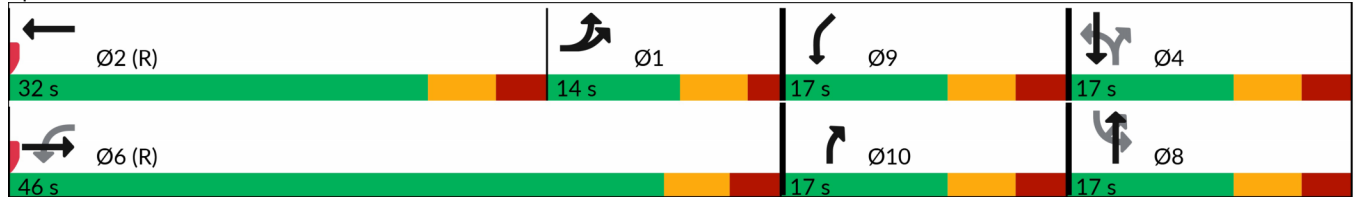


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		61.1	11.0		10.6	70.4			31.0	37.0	21.7	
Queue Length 50th (ft)		60	11		1	~280			0	38	60	
Queue Length 95th (ft)		#138	27		7	#480			5	80	110	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		175	882		648	540			113	228	524	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.69	0.05		0.01	1.01			0.01	0.36	0.31	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 75 (94%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL	SBT	SBR	SWL	SWR
Queue Delay	0.0	0.0		0.0	
Total Delay (s/veh)	37.5	51.4		44.4	
Queue Length 50th (ft)	23	90		70	
Queue Length 95th (ft)	55	#157		#120	
Internal Link Dist (ft)		412		457	
Turn Bay Length (ft)	75			300	
Base Capacity (vph)	160	423		397	
Starvation Cap Reductn	0	0		0	
Spillback Cap Reductn	0	0		0	
Storage Cap Reductn	0	0		0	
Reduced v/c Ratio	0.31	0.82		0.71	
Intersection Summary					



# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Future Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.99	1.00	1.00	
Frt		1.00	0.98		1.00	0.93			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	1810		1733	1701			1731	1827	1553	
Flt Permitted		0.95	1.00		0.72	1.00			0.49	1.00	1.00	
Satd. Flow (perm)		1752	1810		1330	1701			904	1827	1553	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	99	38	5	5	324	192	27	1	82	165	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	121	43	0	5	543	0	0	1	82	165	0
Confl. Peds. (#/hr)	1			3	3		1		1			
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Actuated Green, G (s)		7.6	39.0		39.0	25.4			10.0	10.0	20.0	
Effective Green, g (s)		7.6	39.0		39.0	25.4			10.0	10.0	20.0	
Actuated g/C Ratio		0.10	0.49		0.49	0.32			0.13	0.13	0.25	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		166	882		648	540			113	228	524	
v/s Ratio Prot		c0.07	0.02			c0.32				0.04	0.04	
v/s Ratio Perm					0.00				0.00		0.07	
v/c Ratio		0.72	0.04		0.00	1.00			0.00	0.35	0.31	
Uniform Delay, d1		35.1	10.7		10.5	27.3			30.6	32.0	24.4	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		12.6	0.1		0.0	40.1			0.0	0.3	0.1	
Delay (s)		47.8	10.8		10.5	67.4			30.6	32.4	24.5	
Level of Service		D	B		B	E			C	C	C	
Approach Delay (s/veh)			38.1			66.8				27.1		
Approach LOS			D			E				C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay (s/veh)			47.4								D	
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			80.0							27.0		
Intersection Capacity Utilization			74.0%								D	
ICU Level of Service												
Analysis Period (min)			15									

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	270	45	135	120
Future Volume (vph)	30	270	45	135	120
Ideal Flow (vphp)	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	
Lane Util. Factor	1.00	0.95		0.97	
Frbp, ped/bikes	1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	
Frt	1.00	0.97		0.92	
Flt Protected	0.95	1.00		0.97	
Satd. Flow (prot)	1736	3386		3178	
Flt Permitted	0.70	1.00		0.97	
Satd. Flow (perm)	1286	3386		3178	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	33	297	49	148	132
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	49	346	0	280	0
Confl. Peds. (#/hr)			1		
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Actuated Green, G (s)	10.0	10.0		10.0	
Effective Green, g (s)	10.0	10.0		10.0	
Actuated g/C Ratio	0.13	0.13		0.13	
Clearance Time (s)	7.0	7.0		7.0	
Vehicle Extension (s)	1.5	1.5		1.5	
Lane Grp Cap (vph)	160	423		397	
v/s Ratio Prot		c0.10		c0.09	
v/s Ratio Perm	0.04				
v/c Ratio	0.30	0.81		0.70	
Uniform Delay, d1	31.8	34.1		33.5	
Progression Factor	1.00	1.00		1.00	
Incremental Delay, d2	0.3	11.0		4.6	
Delay (s)	32.2	45.1		38.1	
Level of Service	C	D		D	
Approach Delay (s/veh)		43.5		38.1	
Approach LOS		D		D	
<b>Intersection Summary</b>					

Lanes, Volumes, Timings  
 4: Delafield St & Mandel Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	35	35	10	270	220	10
Future Volume (vph)	35	35	10	270	220	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	200			537	109	
Travel Time (s)	5.2			7.7	7.0	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	76	0	11	293	250	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
4: Delafield St & Mandel Drwy.

03/27/2024

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	35	35	10	270	220	10
Future Vol, veh/h	35	35	10	270	220	10
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	38	38	11	293	239	11

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	560	245	250	0	-	0
Stage 1	245	-	-	-	-	-
Stage 2	315	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.14	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.236	-	-	-
Pot Cap-1 Maneuver	490	794	1304	-	-	-
Stage 1	796	-	-	-	-	-
Stage 2	740	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	486	794	1304	-	-	-
Mov Cap-2 Maneuver	486	-	-	-	-	-
Stage 1	789	-	-	-	-	-
Stage 2	740	-	-	-	-	-





















Approach	EB	NB	SB
HCM Control Delay, s/v	11.84	0.28	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1304	-	603	-	-
HCM Lane V/C Ratio	0.008	-	0.126	-	-
HCM Control Delay (s/veh)	7.8	-	11.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

**2035 PM – Horizon Year Build:  
Single Driveway Scenario**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	280	15	15	260	110	15	20	5	130	30	20
Future Volume (vph)	20	280	15	15	260	110	15	20	5	130	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	320	0	16	283	74	0	43	0	141	55	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.36		0.03	0.31	0.10		0.11		0.26	0.09	
Control Delay (s/veh)	12.3	13.5		12.2	13.0	12.0		18.9		10.2	9.4	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	12.3	13.5		12.2	13.0	12.0		18.9		10.2	9.4	
Queue Length 50th (ft)	2	40		2	34	8		6		20	8	
Queue Length 95th (ft)	18	152		14	133	41		37		54	27	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	923	1563		902	1592	1324		852		937	1614	
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	0.02	0.20		0.02	0.18	0.06		0.05		0.15	0.03	

Intersection Summary

Area Type: Other

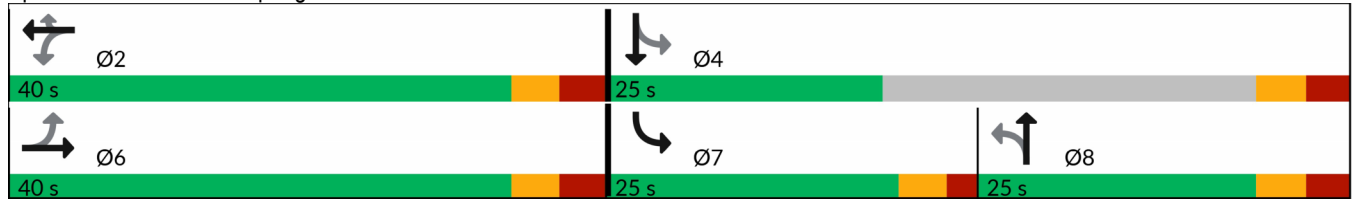
Cycle Length: 90

Actuated Cycle Length: 41.1

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	280	15	15	260	110	15	20	5	130	30	20
Future Volume (veh/h)	20	280	15	15	260	110	15	20	5	130	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1870	1870	1870	1826	1826	1826	1870	1870	1870
Adj Flow Rate, veh/h	22	304	16	16	283	74	16	22	5	141	33	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	5	5	5	2	2	2
Cap, veh/h	335	502	26	317	537	454	166	142	25	720	426	284
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.13	0.13	0.13	0.15	0.41	0.41
Sat Flow, veh/h	1015	1747	92	1059	1870	1582	364	1092	192	1781	1037	691
Grp Volume(v), veh/h	22	0	320	16	283	74	43	0	0	141	0	55
Grp Sat Flow(s),veh/h/ln	1015	0	1839	1059	1870	1582	1648	0	0	1781	0	1728
Q Serve(g_s), s	0.8	0.0	6.3	0.6	5.3	1.5	0.0	0.0	0.0	2.4	0.0	0.8
Cycle Q Clear(g_c), s	6.1	0.0	6.3	6.8	5.3	1.5	0.9	0.0	0.0	2.4	0.0	0.8
Prop In Lane	1.00		0.05	1.00		1.00	0.37		0.12	1.00		0.40
Lane Grp Cap(c), veh/h	335	0	528	317	537	454	333	0	0	720	0	710
V/C Ratio(X)	0.07	0.00	0.61	0.05	0.53	0.16	0.13	0.00	0.00	0.20	0.00	0.08
Avail Cap(c_a), veh/h	862	0	1483	867	1509	1276	829	0	0	1285	0	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.1	0.0	12.8	15.8	12.5	11.1	16.2	0.0	0.0	10.1	0.0	7.5
Incr Delay (d2), s/veh	0.1	0.0	0.8	0.0	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.2	0.1	1.9	0.4	0.3	0.0	0.0	0.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.1	0.0	13.7	15.8	13.1	11.3	16.3	0.0	0.0	10.2	0.0	7.5
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		342			373			43				196
Approach Delay, s/veh		13.8			12.9			16.3				9.4
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		23.5		18.3	11.7	11.7				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		8.8		2.8		8.3	4.4	2.9				
Green Ext Time (p_c), s		1.6		0.1		1.7	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				12.6								
HCM 7th LOS				B								



Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	40	100	285	25	75	340
Future Volume (vph)	40	100	285	25	75	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	116	331	29	0	482
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕		↙
Traffic Vol, veh/h	40	100	285	25	75	340
Future Vol, veh/h	40	100	285	25	75	340
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	116	331	29	87	395

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	903	333	0	0	362	0
Stage 1	333	-	-	-	-	-
Stage 2	570	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	308	708	-	-	1196	-
Stage 1	726	-	-	-	-	-
Stage 2	566	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	278	707	-	-	1194	-
Mov Cap-2 Maneuver	278	-	-	-	-	-
Stage 1	724	-	-	-	-	-
Stage 2	513	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.78	0	1.49
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	278	707	325	-
HCM Lane V/C Ratio	-	-	0.167	0.164	0.073	-
HCM Control Delay (s/veh)	-	-	20.5	11.1	8.3	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.6	0.2	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	15	95	20	10	10	480	100	20	5	120	205	10
Future Volume (vph)	15	95	20	10	10	480	100	20	5	120	205	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	123	33	0	11	666	0	0	6	133	239	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	55.0		55.0	41.0			20.0	20.0	20.0	
Total Split (%)	14.7%	14.7%	57.9%		57.9%	43.2%			21.1%	21.1%	21.1%	
Maximum Green (s)	8.0	8.0	48.0		48.0	34.0			13.0	13.0	13.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.79	0.03		0.01	1.02			0.05	0.57	0.59	
Control Delay (s/veh)		78.7	11.9		11.9	72.5			37.2	49.0	32.1	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	245	40	175	190	5
Future Volume (vph)	5	25	245	40	175	190	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	300	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			50		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			492		535		
Travel Time (s)			11.2		12.2		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	316	0	411	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	20.0	20.0	20.0		20.0		
Total Split (%)	21.1%	21.1%	21.1%		21.1%		
Maximum Green (s)	13.0	13.0	13.0		13.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.22	0.73		0.99dr		
Control Delay (s/veh)		41.0	50.7		69.0		

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

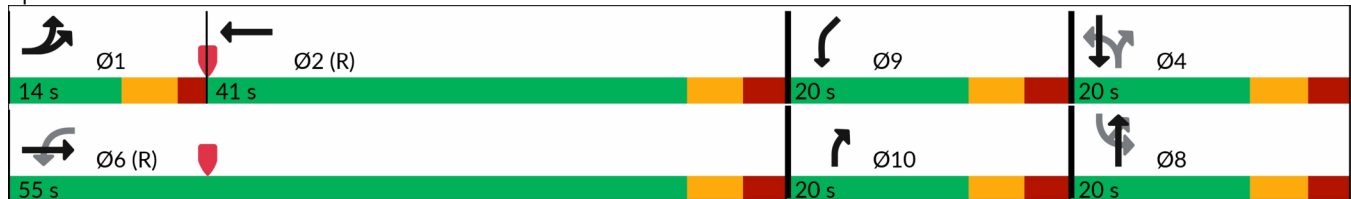


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		78.7	11.9		11.9	72.5			37.2	49.0	32.1	
Queue Length 50th (ft)		74	10		3	~439			3	76	110	
Queue Length 95th (ft)		#174	24		12	#652			15	135	179	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		157	908		695	652			121	254	404	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.78	0.04		0.02	1.02			0.05	0.52	0.59	

Intersection Summary

- Area Type: Other
- Cycle Length: 95
- Actuated Cycle Length: 95
- Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green
- Natural Cycle: 90
- Control Type: Actuated-Coordinated
- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		41.0	50.7		69.0		
Queue Length 50th (ft)		19	97		127		
Queue Length 95th (ft)		48	142		#215		
Internal Link Dist (ft)			412		455		
Turn Bay Length (ft)		75			300		
Base Capacity (vph)		162	469		445		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.21	0.67		0.92		
Intersection Summary							

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	15	95	20	10	10	480	100	20	5	120	205	10
Future Volume (vph)	15	95	20	10	10	480	100	20	5	120	205	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00	
Frt		1.00	0.95		1.00	0.97			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1770	1758		1739	1780			1710	1863	1542	
Flt Permitted		0.95	1.00		0.73	1.00			0.49	1.00	1.00	
Satd. Flow (perm)		1770	1758		1346	1780			884	1863	1542	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	106	22	11	11	533	111	22	6	133	228	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	123	33	0	11	666	0	0	6	133	239	0
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Actuated Green, G (s)		8.3	49.1		49.1	34.8			11.9	11.9	24.9	
Effective Green, g (s)		8.3	49.1		49.1	34.8			11.9	11.9	24.9	
Actuated g/C Ratio		0.09	0.52		0.52	0.37			0.13	0.13	0.26	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		154	908		695	652			110	233	517	
v/s Ratio Prot		c0.07	0.02			c0.37				0.07	0.06	
v/s Ratio Perm					0.01				0.01		0.09	
v/c Ratio		0.79	0.03		0.01	1.02			0.05	0.57	0.46	
Uniform Delay, d1		42.5	11.3		11.1	30.1			36.5	39.1	29.4	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		22.9	0.0		0.0	40.7			0.0	2.0	0.2	
Delay (s)		65.4	11.3		11.2	70.8			36.6	41.2	29.6	
Level of Service		E	B		B	E			D	D	C	
Approach Delay (s/veh)			54.0			69.9				33.8		
Approach LOS			D			E				C		

**Intersection Summary**

HCM 2000 Control Delay (s/veh)	56.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	245	40	175	190	5
Future Volume (vph)	5	25	245	40	175	190	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.94	1.00		1.00		
Frt		1.00	0.97		0.92		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1670	3428		3251		
Flt Permitted		0.67	1.00		0.97		
Satd. Flow (perm)		1181	3428		3251		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	272	44	194	211	6
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	316	0	411	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		11.9	11.9		13.0		
Effective Green, g (s)		11.9	11.9		13.0		
Actuated g/C Ratio		0.13	0.13		0.14		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		147	429		444		
v/s Ratio Prot			c0.09		c0.13		
v/s Ratio Perm		0.03					
v/c Ratio		0.23	0.73		0.99dr		
Uniform Delay, d1		37.4	40.0		40.5		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.2	5.6		24.8		
Delay (s)		37.7	45.6		65.3		
Level of Service		D	D		E		
Approach Delay (s/veh)			44.8		65.3		
Approach LOS			D		E		
<b>Intersection Summary</b>							



Lanes, Volumes, Timings

4: Delafield St

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	25	35	290	345	35
Future Volume (vph)	20	25	35	290	345	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	193			535	111	
Travel Time (s)	4.4			7.5	7.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	0	38	315	413	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	20	25	35	290	345	35
Future Vol, veh/h	20	25	35	290	345	35
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	27	38	315	375	38

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	785	394	413	0	-	0
Stage 1	394	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	361	655	1146	-	-	-
Stage 1	681	-	-	-	-	-
Stage 2	683	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	349	655	1146	-	-	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	659	-	-	-	-	-
Stage 2	683	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	13.52	0.89	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1146	-	472	-	-
HCM Lane V/C Ratio	0.033	-	0.104	-	-
HCM Control Delay (s/veh)	8.2	-	13.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

**2035 AM – Horizon Year Build:  
Two Driveway Scenario**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	215	5	5	215	90	25	25	10	95	15	10
Future Volume (vph)	20	215	5	5	215	90	25	25	10	95	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	2%	2%	2%	8%	8%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	250	0	6	244	63	0	67	0	108	28	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.29		0.01	0.29	0.09		0.22		0.19	0.04	
Control Delay (s/veh)	13.5	14.4		13.0	14.5	13.3		19.6		8.5	7.7	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024

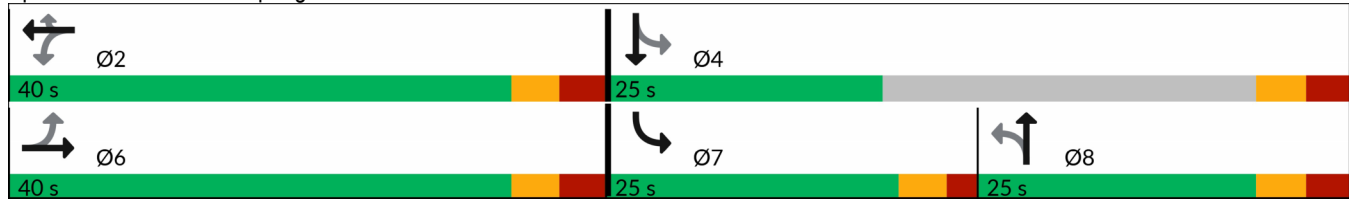


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	13.5	14.4		13.0	14.5	13.3		19.6		8.5	7.7	
Queue Length 50th (ft)	5	56		1	55	13		16		14	4	
Queue Length 95th (ft)	18	112		8	110	35		46		38	15	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	916	1501		884	1466	1245		699		841	1551	
Starvation Cap Reductn	0	0		0	0	0		0		0	0	
Spillback Cap Reductn	0	0		0	0	0		0		0	0	
Storage Cap Reductn	0	0		0	0	0		0		0	0	
Reduced v/c Ratio	0.03	0.17		0.01	0.17	0.05		0.10		0.13	0.02	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	42.8
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	215	5	5	215	90	25	25	10	95	15	10
Future Volume (veh/h)	20	215	5	5	215	90	25	25	10	95	15	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1826	1826	1826	1870	1870	1870	1781	1781	1781
Adj Flow Rate, veh/h	23	244	6	6	244	63	28	28	11	108	17	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	8	8	8
Cap, veh/h	375	534	13	380	537	454	187	116	35	675	401	260
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.13	0.13	0.13	0.14	0.40	0.40
Sat Flow, veh/h	1071	1818	45	1102	1826	1545	477	901	271	1697	1010	653
Grp Volume(v), veh/h	23	0	250	6	244	63	67	0	0	108	0	28
Grp Sat Flow(s),veh/h/ln	1071	0	1862	1102	1826	1545	1650	0	0	1697	0	1663
Q Serve(g_s), s	0.7	0.0	4.5	0.2	4.4	1.2	0.0	0.0	0.0	1.9	0.0	0.4
Cycle Q Clear(g_c), s	5.2	0.0	4.5	4.7	4.4	1.2	1.4	0.0	0.0	1.9	0.0	0.4
Prop In Lane	1.00		0.02	1.00		1.00	0.42		0.16	1.00		0.39
Lane Grp Cap(c), veh/h	375	0	547	380	537	454	338	0	0	675	0	661
V/C Ratio(X)	0.06	0.00	0.46	0.02	0.45	0.14	0.20	0.00	0.00	0.16	0.00	0.04
Avail Cap(c_a), veh/h	944	0	1537	965	1507	1275	860	0	0	1259	0	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.9	0.0	11.8	13.7	11.7	10.6	16.1	0.0	0.0	10.2	0.0	7.5
Incr Delay (d2), s/veh	0.1	0.0	0.4	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.5	0.0	1.5	0.3	0.5	0.0	0.0	0.6	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.9	0.0	12.2	13.7	12.2	10.7	16.2	0.0	0.0	10.2	0.0	7.5
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		273			313			67				136
Approach Delay, s/veh		12.3			11.9			16.2				9.7
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		22.5		18.3	10.9	11.6				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		6.7		2.4		7.2	3.9	3.4				
Green Ext Time (p_c), s		1.3		0.0		1.3	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh			12.0									
HCM 7th LOS			B									

Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	80	230	65	110	210
Future Volume (vph)	20	80	230	65	110	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)		1		1	1	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	90	258	73	0	360
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕		↙
Traffic Vol, veh/h	20	80	230	65	110	210
Future Vol, veh/h	20	80	230	65	110	210
Conflicting Peds, #/hr	0	1	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	22	90	258	73	124	236

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	743	260	0	0	332	0
Stage 1	259	-	-	-	-	-
Stage 2	483	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227	-
Pot Cap-1 Maneuver	383	778	-	-	1221	-
Stage 1	784	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	338	777	-	-	1220	-
Mov Cap-2 Maneuver	338	-	-	-	-	-
Stage 1	783	-	-	-	-	-
Stage 2	548	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.48	0	2.85
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	338	777	619	-
HCM Lane V/C Ratio	-	-	0.067	0.116	0.101	-
HCM Control Delay (s/veh)	-	-	16.4	10.2	8.3	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.4	0.3	-



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Future Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	1			3	3		1		1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	121	43	0	5	543	0	0	1	82	165	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Detector Phase	1	1	6		6	2			4	8	10	8
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	17.0
Total Split (s)	14.0	14.0	46.0		46.0	32.0			17.0	17.0	17.0	17.0
Total Split (%)	17.5%	17.5%	57.5%		57.5%	40.0%			21.3%	21.3%	21.3%	21.3%
Maximum Green (s)	8.0	8.0	39.0		39.0	25.0			10.0	10.0	10.0	10.0
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	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lag	Lag				Lead						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	1.5
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	1.5
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	30.0
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	0.0
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.72	0.04		0.00	1.00			0.00	0.35	0.31	
Control Delay (s/veh)		61.1	11.0		10.6	70.4			31.0	37.0	21.7	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

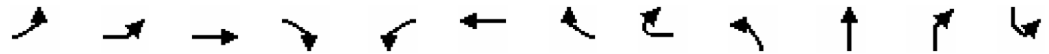


Lane Group	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations						
Traffic Volume (vph)	30	270	45	135	120	10
Future Volume (vph)	30	270	45	135	120	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%		0%		
Storage Length (ft)	75		0	300	0	
Storage Lanes	1		0	1	0	
Taper Length (ft)	75			50		
Right Turn on Red			No			No
Link Speed (mph)		30		30		
Link Distance (ft)		492		332		
Travel Time (s)		11.2		7.5		
Confl. Peds. (#/hr)			1			
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%		0%		
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	346	0	291	0	0
Turn Type	D.Pm	NA		Prot		
Protected Phases		4		9		
Permitted Phases	8					
Detector Phase	8	4		9		
Switch Phase						
Minimum Initial (s)	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0		17.0		
Total Split (s)	17.0	17.0		17.0		
Total Split (%)	21.3%	21.3%		21.3%		
Maximum Green (s)	10.0	10.0		10.0		
Yellow Time (s)	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0		3.0		
Lost Time Adjust (s)	0.0	0.0		0.0		
Total Lost Time (s)	7.0	7.0		7.0		
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0		0.0		
Recall Mode	None	None		None		
Walk Time (s)						
Flash Dont Walk (s)						
Pedestrian Calls (#/hr)						
v/c Ratio	0.30	0.81		0.73		
Control Delay (s/veh)	37.5	51.4		46.1		

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

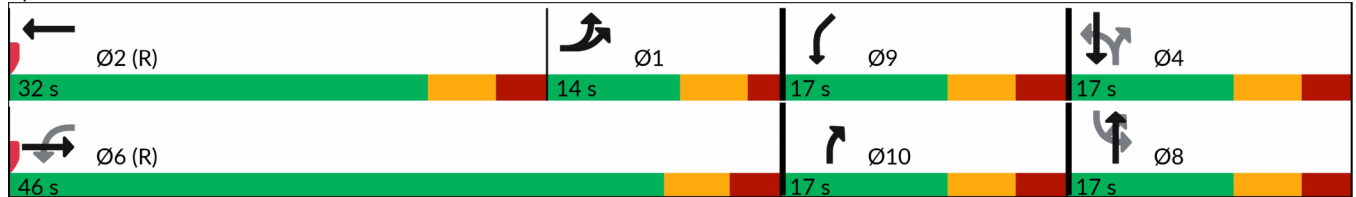


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		61.1	11.0		10.6	70.4			31.0	37.0	21.7	
Queue Length 50th (ft)		60	11		1	~280			0	38	60	
Queue Length 95th (ft)		#138	27		7	#480			5	80	110	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		175	882		648	540			113	228	524	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.69	0.05		0.01	1.01			0.01	0.36	0.31	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 75 (94%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay	0.0	0.0		0.0		
Total Delay (s/veh)	37.5	51.4		46.1		
Queue Length 50th (ft)	23	90		73		
Queue Length 95th (ft)	55	#157		#126		
Internal Link Dist (ft)		412		252		
Turn Bay Length (ft)	75			300		
Base Capacity (vph)	160	423		396		
Starvation Cap Reductn	0	0		0		
Spillback Cap Reductn	0	0		0		
Storage Cap Reductn	0	0		0		
Reduced v/c Ratio	0.31	0.82		0.73		
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Future Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.99	1.00	1.00	
Frt		1.00	0.98		1.00	0.93			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	1810		1733	1701			1731	1827	1553	
Flt Permitted		0.95	1.00		0.72	1.00			0.49	1.00	1.00	
Satd. Flow (perm)		1752	1810		1330	1701			904	1827	1553	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	99	38	5	5	324	192	27	1	82	165	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	121	43	0	5	543	0	0	1	82	165	0
Confl. Peds. (#/hr)	1			3	3		1		1			
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Actuated Green, G (s)		7.6	39.0		39.0	25.4			10.0	10.0	20.0	
Effective Green, g (s)		7.6	39.0		39.0	25.4			10.0	10.0	20.0	
Actuated g/C Ratio		0.10	0.49		0.49	0.32			0.13	0.13	0.25	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		166	882		648	540			113	228	524	
v/s Ratio Prot		c0.07	0.02			c0.32				0.04	0.04	
v/s Ratio Perm					0.00				0.00		0.07	
v/c Ratio		0.72	0.04		0.00	1.00			0.00	0.35	0.31	
Uniform Delay, d1		35.1	10.7		10.5	27.3			30.6	32.0	24.4	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		12.6	0.1		0.0	40.1			0.0	0.3	0.1	
Delay (s)		47.8	10.8		10.5	67.4			30.6	32.4	24.5	
Level of Service		D	B		B	E			C	C	C	
Approach Delay (s/veh)			38.1			66.8				27.1		
Approach LOS			D			E				C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay (s/veh)			47.6								D	
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			80.0							27.0		
Intersection Capacity Utilization			74.0%								D	
ICU Level of Service												
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations	↔	↕↕		↔↔		
Traffic Volume (vph)	30	270	45	135	120	10
Future Volume (vph)	30	270	45	135	120	10
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0		
Lane Util. Factor	1.00	0.95		0.97		
Frbp, ped/bikes	1.00	0.99		1.00		
Flpb, ped/bikes	1.00	1.00		1.00		
Frt	1.00	0.97		0.92		
Flt Protected	0.95	1.00		0.97		
Satd. Flow (prot)	1736	3386		3171		
Flt Permitted	0.70	1.00		0.97		
Satd. Flow (perm)	1286	3386		3171		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	33	297	49	148	132	11
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	49	346	0	291	0	0
Confl. Peds. (#/hr)			1			
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%
Turn Type	D.Pm	NA		Prot		
Protected Phases		4		9		
Permitted Phases	8					
Actuated Green, G (s)	10.0	10.0		10.0		
Effective Green, g (s)	10.0	10.0		10.0		
Actuated g/C Ratio	0.13	0.13		0.13		
Clearance Time (s)	7.0	7.0		7.0		
Vehicle Extension (s)	1.5	1.5		1.5		
Lane Grp Cap (vph)	160	423		396		
v/s Ratio Prot		c0.10		c0.09		
v/s Ratio Perm	0.04					
v/c Ratio	0.30	0.81		0.73		
Uniform Delay, d1	31.8	34.1		33.7		
Progression Factor	1.00	1.00		1.00		
Incremental Delay, d2	0.3	11.0		5.9		
Delay (s)	32.2	45.1		39.7		
Level of Service	C	D		D		
Approach Delay (s/veh)		43.5		39.7		
Approach LOS		D		D		
<b>Intersection Summary</b>						

Lanes, Volumes, Timings  
4: Delafield St & North Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	25	10	270	225	5
Future Volume (vph)	25	25	10	270	225	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	197			204	109	
Travel Time (s)	5.2			7.7	7.0	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	11	293	250	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
4: Delafield St & North Drwy.

03/27/2024

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	25	25	10	270	225	5
Future Vol, veh/h	25	25	10	270	225	5
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	27	27	11	293	245	5

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	563	247	250	0	-	0
Stage 1	247	-	-	-	-	-
Stage 2	315	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.14	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.236	-	-	-
Pot Cap-1 Maneuver	488	791	1304	-	-	-
Stage 1	794	-	-	-	-	-
Stage 2	740	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	484	791	1304	-	-	-
Mov Cap-2 Maneuver	484	-	-	-	-	-
Stage 1	787	-	-	-	-	-
Stage 2	740	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.59	0.28	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1304	-	600	-	-
HCM Lane V/C Ratio	0.008	-	0.091	-	-
HCM Control Delay (s/veh)	7.8	-	11.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-



Lanes, Volumes, Timings  
5: Delafield St & South Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	20	0	280	245	5
Future Volume (vph)	0	20	0	280	245	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	0	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			30	30	
Link Distance (ft)	184			332	204	
Travel Time (s)	4.1			7.5	4.6	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	22	0	304	271	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
5: Delafield St & South Drwy.

03/27/2024

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	20	0	280	245	5
Future Vol, veh/h	0	20	0	280	245	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	0	22	0	304	266	5

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	269	-	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	770	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	770	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	9.81	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 770	-	-
HCM Lane V/C Ratio	- 0.028	-	-
HCM Control Delay (s/veh)	- 9.8	-	-
HCM Lane LOS	- A	-	-
HCM 95th %tile Q(veh)	- 0.1	-	-

**2035 PM – Horizon Year Build:  
Two Driveway Scenario**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

03/27/2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	280	15	15	260	105	15	25	15	130	30	20
Future Volume (vph)	20	280	15	15	260	105	15	25	15	130	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	320	0	16	283	71	0	59	0	141	55	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.38		0.03	0.33	0.10		0.19		0.24	0.08	
Control Delay (s/veh)	13.4	15.2		13.2	14.7	13.3		21.1		9.5	8.8	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

03/27/2024

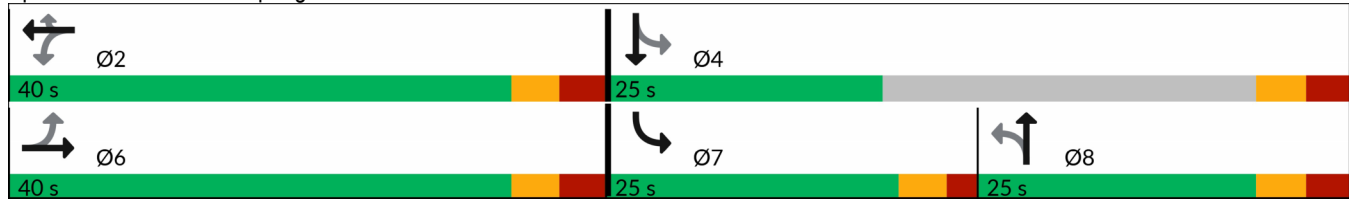


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	13.4	15.2		13.2	14.7	13.3		21.1		9.5	8.8	
Queue Length 50th (ft)	4	75		3	65	14		14		20	8	
Queue Length 95th (ft)	18	154		15	135	41		47		55	27	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	860	1457		837	1484	1234		688		889	1587	
Starvation Cap Reductn	0	0		0	0	0		0		0	0	
Spillback Cap Reductn	0	0		0	0	0		0		0	0	
Storage Cap Reductn	0	0		0	0	0		0		0	0	
Reduced v/c Ratio	0.03	0.22		0.02	0.19	0.06		0.09		0.16	0.03	

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	44
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

03/27/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	280	15	15	260	105	15	25	15	130	30	20
Future Volume (veh/h)	20	280	15	15	260	105	15	25	15	130	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1870	1870	1870	1826	1826	1826	1870	1870	1870
Adj Flow Rate, veh/h	22	304	16	16	283	71	16	27	16	141	33	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	5	5	5	2	2	2
Cap, veh/h	329	496	26	311	531	449	144	131	62	730	433	289
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.14	0.14	0.14	0.15	0.42	0.42
Sat Flow, veh/h	1018	1747	92	1059	1870	1582	256	942	446	1781	1037	691
Grp Volume(v), veh/h	22	0	320	16	283	71	59	0	0	141	0	55
Grp Sat Flow(s),veh/h/ln	1018	0	1839	1059	1870	1582	1644	0	0	1781	0	1728
Q Serve(g_s), s	0.8	0.0	6.4	0.6	5.4	1.4	0.0	0.0	0.0	2.4	0.0	0.8
Cycle Q Clear(g_c), s	6.2	0.0	6.4	6.9	5.4	1.4	1.3	0.0	0.0	2.4	0.0	0.8
Prop In Lane	1.00		0.05	1.00		1.00	0.27		0.27	1.00		0.40
Lane Grp Cap(c), veh/h	329	0	522	311	531	449	338	0	0	730	0	722
V/C Ratio(X)	0.07	0.00	0.61	0.05	0.53	0.16	0.17	0.00	0.00	0.19	0.00	0.08
Avail Cap(c_a), veh/h	852	0	1466	855	1491	1261	816	0	0	1287	0	764
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	13.1	16.1	12.8	11.3	16.2	0.0	0.0	10.0	0.0	7.4
Incr Delay (d2), s/veh	0.1	0.0	0.9	0.1	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.3	0.1	1.9	0.4	0.4	0.0	0.0	0.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.4	0.0	14.0	16.2	13.4	11.5	16.3	0.0	0.0	10.0	0.0	7.4
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		342			370			59				196
Approach Delay, s/veh		14.1			13.1			16.3				9.3
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		24.0		18.3	11.8	12.2				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		8.9		2.8		8.4	4.4	3.3				
Green Ext Time (p_c), s		1.6		0.1		1.7	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				12.9								
HCM 7th LOS				B								

Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

03/27/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	40	100	280	25	75	350
Future Volume (vph)	40	100	280	25	75	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	116	326	29	0	494
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
 2: Delafield St & Buena Vista Ave.

03/27/2024

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↕	↕		↙
Traffic Vol, veh/h	40	100	280	25	75	350
Future Vol, veh/h	40	100	280	25	75	350
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	116	326	29	87	407

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	909	328	0	0	357	0
Stage 1	328	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	305	714	-	-	1202	-
Stage 1	730	-	-	-	-	-
Stage 2	559	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	276	712	-	-	1200	-
Mov Cap-2 Maneuver	276	-	-	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	506	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.79	0	1.45
HCM LOS	B		




















Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	276	712	318	-
HCM Lane V/C Ratio	-	-	0.168	0.163	0.073	-
HCM Control Delay (s/veh)	-	-	20.7	11	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.6	0.2	-



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	95	20	10	10	480	100	20	5	125	195	10
Future Volume (vph)	20	95	20	10	10	480	100	20	5	125	195	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	128	33	0	11	666	0	0	6	139	228	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	55.0		55.0	41.0			20.0	20.0	20.0	
Total Split (%)	14.7%	14.7%	57.9%		57.9%	43.2%			21.1%	21.1%	21.1%	
Maximum Green (s)	8.0	8.0	48.0		48.0	34.0			13.0	13.0	13.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.81	0.03		0.01	1.02			0.05	0.59	0.56	
Control Delay (s/veh)		80.6	11.9		11.9	73.8			37.2	50.2	31.1	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	245	40	175	190	10
Future Volume (vph)	5	25	245	40	175	190	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	300	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			50		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			492		329		
Travel Time (s)			11.2		7.5		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	316	0	416	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	20.0	20.0	20.0		20.0		
Total Split (%)	21.1%	21.1%	21.1%		21.1%		
Maximum Green (s)	13.0	13.0	13.0		13.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.22	0.73		1.01dr		
Control Delay (s/veh)		41.0	50.7		71.4		

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024

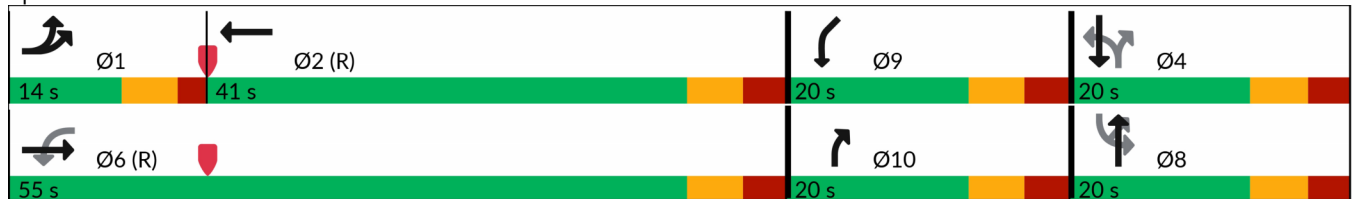


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		80.6	11.9		11.9	73.8			37.2	50.2	31.1	
Queue Length 50th (ft)		77	10		3	~439			3	80	104	
Queue Length 95th (ft)		#183	24		12	#652			15	140	170	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		158	908		695	649			121	254	404	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.81	0.04		0.02	1.03			0.05	0.55	0.56	

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		41.0	50.7		71.4		
Queue Length 50th (ft)		19	97		129		
Queue Length 95th (ft)		48	142		#220		
Internal Link Dist (ft)			412		249		
Turn Bay Length (ft)		75			300		
Base Capacity (vph)		161	469		444		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.21	0.67		0.94		
Intersection Summary							

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	95	20	10	10	480	100	20	5	125	195	10
Future Volume (vph)	20	95	20	10	10	480	100	20	5	125	195	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00	
Frt		1.00	0.95		1.00	0.97			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1770	1758		1739	1780			1710	1863	1542	
Flt Permitted		0.95	1.00		0.73	1.00			0.49	1.00	1.00	
Satd. Flow (perm)		1770	1758		1346	1780			884	1863	1542	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	106	22	11	11	533	111	22	6	139	217	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	128	33	0	11	666	0	0	6	139	228	0
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Actuated Green, G (s)		8.4	49.1		49.1	34.7			11.9	11.9	24.9	
Effective Green, g (s)		8.4	49.1		49.1	34.7			11.9	11.9	24.9	
Actuated g/C Ratio		0.09	0.52		0.52	0.37			0.13	0.13	0.26	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		156	908		695	650			110	233	517	
v/s Ratio Prot		c0.07	0.02			c0.37				0.07	0.06	
v/s Ratio Perm					0.01				0.01		0.09	
v/c Ratio		0.82	0.03		0.01	1.02			0.05	0.59	0.44	
Uniform Delay, d1		42.5	11.3		11.1	30.1			36.5	39.2	29.2	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		26.7	0.0		0.0	41.6			0.0	2.7	0.2	
Delay (s)		69.3	11.3		11.2	71.8			36.6	42.0	29.4	
Level of Service		E	B		B	E			D	D	C	
Approach Delay (s/veh)			57.4			70.8				34.2		
Approach LOS			E			E				C		

### Intersection Summary

HCM 2000 Control Delay (s/veh)	57.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

03/27/2024



Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	245	40	175	190	10
Future Volume (vph)	5	25	245	40	175	190	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.94	1.00		1.00		
Frt		1.00	0.97		0.91		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1671	3428		3249		
Flt Permitted		0.66	1.00		0.97		
Satd. Flow (perm)		1175	3428		3249		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	272	44	194	211	11
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	316	0	416	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		11.9	11.9		13.0		
Effective Green, g (s)		11.9	11.9		13.0		
Actuated g/C Ratio		0.13	0.13		0.14		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		147	429		444		
v/s Ratio Prot			c0.09		c0.13		
v/s Ratio Perm		0.03					
v/c Ratio		0.23	0.73		1.01dr		
Uniform Delay, d1		37.4	40.0		40.5		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.2	5.6		26.9		
Delay (s)		37.7	45.6		67.5		
Level of Service		D	D		E		
Approach Delay (s/veh)			44.8		67.5		
Approach LOS			D		E		
<b>Intersection Summary</b>							

Lanes, Volumes, Timings  
4: Delafield St & North Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	15	25	290	365	25
Future Volume (vph)	15	15	25	290	365	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	193			206	111	
Travel Time (s)	4.4			7.5	7.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	32	0	27	315	424	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	
Traffic Vol, veh/h	15	15	25	290	365	25
Future Vol, veh/h	15	15	25	290	365	25
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	16	27	315	397	27

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	780	410	424	0	-	0
Stage 1	410	-	-	-	-	-
Stage 2	370	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	364	641	1135	-	-	-
Stage 1	670	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	355	641	1135	-	-	-
Mov Cap-2 Maneuver	355	-	-	-	-	-
Stage 1	654	-	-	-	-	-
Stage 2	699	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	13.48	0.65	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1135	-	457	-	-
HCM Lane V/C Ratio	0.024	-	0.071	-	-
HCM Control Delay (s/veh)	8.2	-	13.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-



Lanes, Volumes, Timings  
5: Delafield St & South Drwy.

03/27/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	15	0	315	360	20
Future Volume (vph)	0	15	0	315	360	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	0	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			30	30	
Link Distance (ft)	189			329	206	
Travel Time (s)	4.3			7.5	4.6	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	0	342	413	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 7th TWSC  
5: Delafield St & South Drwy.

03/27/2024

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	15	0	315	360	20
Future Vol, veh/h	0	15	0	315	360	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	0	342	391	22

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	402	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	648	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	648	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	10.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 648	-	-
HCM Lane V/C Ratio	- 0.025	-	-
HCM Control Delay (s/veh)	- 10.7	-	-
HCM Lane LOS	- B	-	-
HCM 95th %tile Q(veh)	- 0.1	-	-

**2035 AM – Horizon Year Build:  
Three Driveway Scenario**

Lanes, Volumes, Timings  
1: Spring St & Summit Ave & Delafield St

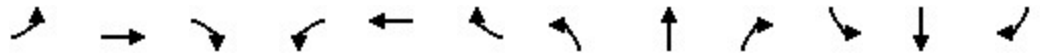
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	215	5	5	215	90	25	25	10	95	15	10
Future Volume (vph)	20	215	5	5	215	90	25	25	10	95	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)			1	1			1					1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	2%	2%	2%	8%	8%	8%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	250	0	6	244	63	0	67	0	108	28	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.29		0.01	0.29	0.09		0.22		0.19	0.04	
Control Delay (s/veh)	13.5	14.4		13.0	14.5	13.3		19.6		8.5	7.7	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

05/22/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	13.5	14.4		13.0	14.5	13.3		19.6		8.5	7.7	
Queue Length 50th (ft)	5	56		1	55	13		16		14	4	
Queue Length 95th (ft)	18	112		8	110	35		46		38	15	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	916	1501		884	1466	1245		699		841	1551	
Starvation Cap Reductn	0	0		0	0	0		0		0	0	
Spillback Cap Reductn	0	0		0	0	0		0		0	0	
Storage Cap Reductn	0	0		0	0	0		0		0	0	
Reduced v/c Ratio	0.03	0.17		0.01	0.17	0.05		0.10		0.13	0.02	

Intersection Summary

Area Type: Other

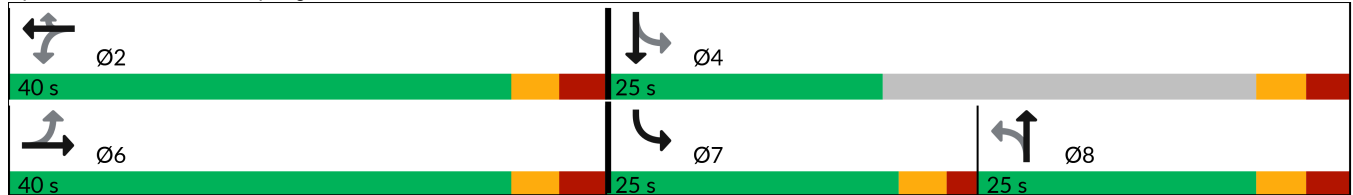
Cycle Length: 90

Actuated Cycle Length: 42.8

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

05/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	215	5	5	215	90	25	25	10	95	15	10
Future Volume (veh/h)	20	215	5	5	215	90	25	25	10	95	15	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1826	1826	1826	1870	1870	1870	1781	1781	1781
Adj Flow Rate, veh/h	23	244	6	6	244	63	28	28	11	108	17	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	5	5	5	2	2	2	8	8	8
Cap, veh/h	375	534	13	380	537	454	187	116	35	675	401	260
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.13	0.13	0.13	0.14	0.40	0.40
Sat Flow, veh/h	1071	1818	45	1102	1826	1545	477	901	271	1697	1010	653
Grp Volume(v), veh/h	23	0	250	6	244	63	67	0	0	108	0	28
Grp Sat Flow(s),veh/h/ln	1071	0	1862	1102	1826	1545	1650	0	0	1697	0	1663
Q Serve(g_s), s	0.7	0.0	4.5	0.2	4.4	1.2	0.0	0.0	0.0	1.9	0.0	0.4
Cycle Q Clear(g_c), s	5.2	0.0	4.5	4.7	4.4	1.2	1.4	0.0	0.0	1.9	0.0	0.4
Prop In Lane	1.00		0.02	1.00		1.00	0.42		0.16	1.00		0.39
Lane Grp Cap(c), veh/h	375	0	547	380	537	454	338	0	0	675	0	661
V/C Ratio(X)	0.06	0.00	0.46	0.02	0.45	0.14	0.20	0.00	0.00	0.16	0.00	0.04
Avail Cap(c_a), veh/h	944	0	1537	965	1507	1275	860	0	0	1259	0	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.9	0.0	11.8	13.7	11.7	10.6	16.1	0.0	0.0	10.2	0.0	7.5
Incr Delay (d2), s/veh	0.1	0.0	0.4	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.5	0.0	1.5	0.3	0.5	0.0	0.0	0.6	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.9	0.0	12.2	13.7	12.2	10.7	16.2	0.0	0.0	10.2	0.0	7.5
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h	273		313				67		136			
Approach Delay, s/veh	12.3		11.9				16.2		9.7			
Approach LOS	B		B				B		A			
Timer - Assigned Phs	2		4		6		7		8			
Phs Duration (G+Y+Rc), s	18.3		22.5		18.3		10.9		11.6			
Change Period (Y+Rc), s	6.3		6.3		6.3		5.3		6.3			
Max Green Setting (Gmax), s	33.7		18.7		33.7		19.7		18.7			
Max Q Clear Time (g_c+I1), s	6.7		2.4		7.2		3.9		3.4			
Green Ext Time (p_c), s	1.3		0.0		1.3		0.1		0.1			
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh			12.0									
HCM 7th LOS			B									

Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

05/22/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	80	230	65	110	210
Future Volume (vph)	20	80	230	65	110	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)		1		1	1	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	90	258	73	0	360
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

05/22/2024

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	80	230	65	110	210
Future Vol, veh/h	20	80	230	65	110	210
Conflicting Peds, #/hr	0	1	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	22	90	258	73	124	236

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	743	260	0	0	332
Stage 1	259	-	-	-	-
Stage 2	483	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227
Pot Cap-1 Maneuver	383	778	-	-	1221
Stage 1	784	-	-	-	-
Stage 2	620	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	338	777	-	-	1220
Mov Cap-2 Maneuver	338	-	-	-	-
Stage 1	783	-	-	-	-
Stage 2	548	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.48	0	2.85
HCM LOS	B		

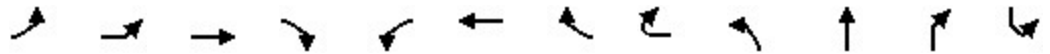
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	338	777	619	-
HCM Lane V/C Ratio	-	-	0.067	0.116	0.101	-
HCM Control Delay (s/veh)	-	-	16.4	10.2	8.3	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.4	0.3	-



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Future Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	1			3	3		1		1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	121	43	0	5	543	0	0	1	82	165	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Detector Phase	1	1	6		6	2			4	8	10	8
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	10.0
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	17.0
Total Split (s)	14.0	14.0	46.0		46.0	32.0			17.0	17.0	17.0	17.0
Total Split (%)	17.5%	17.5%	57.5%		57.5%	40.0%			21.3%	21.3%	21.3%	21.3%
Maximum Green (s)	8.0	8.0	39.0		39.0	25.0			10.0	10.0	10.0	10.0
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	3.0		3.0	3.0			3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lag	Lag				Lead						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	1.5
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	1.5
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	30.0
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	0.0
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.72	0.04		0.00	1.00			0.00	0.35	0.31	
Control Delay (s/veh)		61.1	11.0		10.6	70.4			31.0	37.0	21.7	

# Lanes, Volumes, Timings

## 3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Lane Group	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	270	45	135	120
Future Volume (vph)	30	270	45	135	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12
Grade (%)		0%		0%	
Storage Length (ft)	75		0	300	0
Storage Lanes	1		0	1	0
Taper Length (ft)	75			50	
Right Turn on Red			No		
Link Speed (mph)		30		30	
Link Distance (ft)		192		332	
Travel Time (s)		4.4		7.5	
Confl. Peds. (#/hr)			1		
Confl. Bikes (#/hr)					
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Bus Blockages (#/hr)	0	0	0	0	0
Parking (#/hr)					
Mid-Block Traffic (%)		0%		0%	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	49	346	0	280	0
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Detector Phase	8	4		9	
Switch Phase					
Minimum Initial (s)	10.0	10.0		10.0	
Minimum Split (s)	17.0	17.0		17.0	
Total Split (s)	17.0	17.0		17.0	
Total Split (%)	21.3%	21.3%		21.3%	
Maximum Green (s)	10.0	10.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	
All-Red Time (s)	3.0	3.0		3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	
Total Lost Time (s)	7.0	7.0		7.0	
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	1.5	1.5		1.5	
Minimum Gap (s)	1.5	1.5		1.5	
Time Before Reduce (s)	30.0	30.0		25.0	
Time To Reduce (s)	0.0	0.0		0.0	
Recall Mode	None	None		None	
Walk Time (s)					
Flash Dont Walk (s)					
Pedestrian Calls (#/hr)					
v/c Ratio	0.30	0.81		0.70	
Control Delay (s/veh)	37.5	51.4		44.4	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024

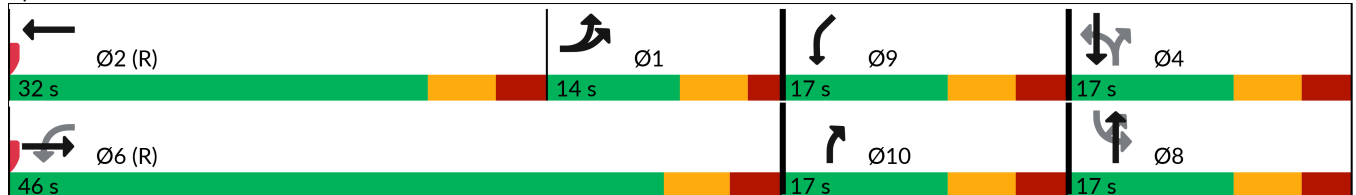


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		61.1	11.0		10.6	70.4			31.0	37.0	21.7	
Queue Length 50th (ft)		60	11		1	~280			0	38	60	
Queue Length 95th (ft)		#138	27		7	#480			5	80	110	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		175	882		648	540			113	228	524	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.69	0.05		0.01	1.01			0.01	0.36	0.31	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 80  
 Offset: 75 (94%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



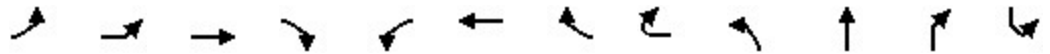
Lane Group	SBL	SBT	SBR	SWL	SWR
Queue Delay	0.0	0.0		0.0	
Total Delay (s/veh)	37.5	51.4		44.4	
Queue Length 50th (ft)	23	90		70	
Queue Length 95th (ft)	55	#157		#120	
Internal Link Dist (ft)		112		252	
Turn Bay Length (ft)	75			300	
Base Capacity (vph)	160	423		397	
Starvation Cap Reductn	0	0		0	
Spillback Cap Reductn	0	0		0	
Storage Cap Reductn	0	0		0	
Reduced v/c Ratio	0.31	0.82		0.71	

Intersection Summary

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	SBL2
Lane Configurations												
Traffic Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Future Volume (vph)	20	90	35	5	5	295	175	25	1	75	150	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.99	1.00	1.00	
Frt		1.00	0.98		1.00	0.93			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1752	1810		1733	1701			1731	1827	1553	
Flt Permitted		0.95	1.00		0.72	1.00			0.49	1.00	1.00	
Satd. Flow (perm)		1752	1810		1330	1701			904	1827	1553	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	99	38	5	5	324	192	27	1	82	165	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	121	43	0	5	543	0	0	1	82	165	0
Confl. Peds. (#/hr)	1			3	3		1		1			
Heavy Vehicles (%)	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	D.Pm
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	8
Actuated Green, G (s)		7.6	39.0		39.0	25.4			10.0	10.0	20.0	
Effective Green, g (s)		7.6	39.0		39.0	25.4			10.0	10.0	20.0	
Actuated g/C Ratio		0.10	0.49		0.49	0.32			0.13	0.13	0.25	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		166	882		648	540			113	228	524	
v/s Ratio Prot		c0.07	0.02			c0.32				0.04	0.04	
v/s Ratio Perm					0.00				0.00		0.07	
v/c Ratio		0.72	0.04		0.00	1.00			0.00	0.35	0.31	
Uniform Delay, d1		35.1	10.7		10.5	27.3			30.6	32.0	24.4	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		12.6	0.1		0.0	40.1			0.0	0.3	0.1	
Delay (s)		47.8	10.8		10.5	67.4			30.6	32.4	24.5	
Level of Service		D	B		B	E			C	C	C	
Approach Delay (s/veh)			38.1			66.8				27.1		
Approach LOS			D			E				C		
<b>Intersection Summary</b>												
HCM 2000 Control Delay (s/veh)			47.4									D
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			80.0									27.0
Intersection Capacity Utilization			74.0%									D
Analysis Period (min)			15									

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Movement	SBL	SBT	SBR	SWL	SWR
Lane Configurations					
Traffic Volume (vph)	30	270	45	135	120
Future Volume (vph)	30	270	45	135	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	
Lane Util. Factor	1.00	0.95		0.97	
Frbp, ped/bikes	1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	
Frt	1.00	0.97		0.92	
Flt Protected	0.95	1.00		0.97	
Satd. Flow (prot)	1736	3386		3178	
Flt Permitted	0.70	1.00		0.97	
Satd. Flow (perm)	1286	3386		3178	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	33	297	49	148	132
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	49	346	0	280	0
Confl. Peds. (#/hr)			1		
Heavy Vehicles (%)	4%	4%	4%	5%	5%
Turn Type	D.Pm	NA		Prot	
Protected Phases		4		9	
Permitted Phases	8				
Actuated Green, G (s)	10.0	10.0		10.0	
Effective Green, g (s)	10.0	10.0		10.0	
Actuated g/C Ratio	0.13	0.13		0.13	
Clearance Time (s)	7.0	7.0		7.0	
Vehicle Extension (s)	1.5	1.5		1.5	
Lane Grp Cap (vph)	160	423		397	
v/s Ratio Prot		c0.10		c0.09	
v/s Ratio Perm	0.04				
v/c Ratio	0.30	0.81		0.70	
Uniform Delay, d1	31.8	34.1		33.5	
Progression Factor	1.00	1.00		1.00	
Incremental Delay, d2	0.3	11.0		4.6	
Delay (s)	32.2	45.1		38.1	
Level of Service	C	D		D	
Approach Delay (s/veh)		43.5		38.1	
Approach LOS		D		D	
<b>Intersection Summary</b>					

Lanes, Volumes, Timings  
4: Delafield St & North Drwy.

05/22/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	25	10	270	225	5
Future Volume (vph)	25	25	10	270	225	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	197			204	109	
Travel Time (s)	5.2			7.7	7.0	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	11	293	250	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM 7th TWSC  
4: Delafield St & North Drwy.

05/22/2024

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	25	10	270	225	5
Future Vol, veh/h	25	25	10	270	225	5
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	27	27	11	293	245	5

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	563	247	250	0	-	0
Stage 1	247	-	-	-	-	-
Stage 2	315	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.14	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.236	-	-	-
Pot Cap-1 Maneuver	488	791	1304	-	-	-
Stage 1	794	-	-	-	-	-
Stage 2	740	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	484	791	1304	-	-	-
Mov Cap-2 Maneuver	484	-	-	-	-	-
Stage 1	787	-	-	-	-	-
Stage 2	740	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.59	0.28	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1304	-	600	-	-
HCM Lane V/C Ratio	0.008	-	0.091	-	-
HCM Control Delay (s/veh)	7.8	-	11.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-



Lanes, Volumes, Timings  
5: Delafield St & South Drwy.

05/22/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	10	0	280	245	5
Future Volume (vph)	0	10	0	280	245	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	0	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			30	30	
Link Distance (ft)	184			332	204	
Travel Time (s)	4.1			7.5	4.6	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	0	304	271	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
5: Delafield St & South Drwy.

05/22/2024

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	10	0	280	245	5
Future Vol, veh/h	0	10	0	280	245	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	4	4	3	3
Mvmt Flow	0	11	0	304	266	5

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	269	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	770	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	770	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	9.74	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	770	-	-
HCM Lane V/C Ratio	-	0.014	-	-
HCM Control Delay (s/veh)	-	9.7	-	-
HCM Lane LOS	-	A	-	-
HCM 95th %tile Q(veh)	-	0	-	-

Lanes, Volumes, Timings  
 15: Madison St & Madison St Driveway

05/22/2024



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑↓			↑↓
Traffic Volume (vph)	0	360	270	0	0	10
Future Volume (vph)	0	360	270	0	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	0	1
Taper Length (ft)	25				25	
Link Speed (mph)		30	30		30	
Link Distance (ft)		299	192		135	
Travel Time (s)		6.8	4.4		3.1	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	391	293	0	0	11
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
 15: Madison St & Madison St Driveway

05/22/2024

Intersection						
Int Delay, s/veh	0.2					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑			↑
Traffic Vol, veh/h	0	360	270	0	0	10
Future Vol, veh/h	0	360	270	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	2	2
Mvmt Flow	0	391	293	0	0	11

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





















Approach	SE	NW	SW
HCM Control Delay, s/v	0	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NWT	NWR	SETSWLn1
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s/veh)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-

**2035 PM – Horizon Year Build:  
Three Driveway Scenario**

Lanes, Volumes, Timings  
 1: Spring St & Summit Ave & Delafield St

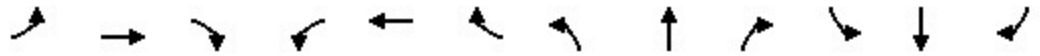
05/22/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	280	15	15	260	105	15	25	5	130	30	20
Future Volume (vph)	20	280	15	15	260	105	15	25	5	130	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		0	75		100	0		0	0		0
Storage Lanes	1		0	1		1	0		0	1		0
Taper Length (ft)	75			75			25			25		
Right Turn on Red			No			No			No			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		424			323			219			200	
Travel Time (s)		9.6			7.3			5.0			4.5	
Confl. Peds. (#/hr)	1					1	1		1	1		1
Confl. Bikes (#/hr)												1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	5%	5%	5%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	320	0	16	283	71	0	48	0	141	55	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6			2		2	8			4		
Detector Phase	6	6		2	2	2	8	8		7	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	18.3	18.3		18.3	18.3	18.3	14.3	14.3		13.3	14.3	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	25.0	25.0		25.0	25.0	
Total Split (%)	44.4%	44.4%		44.4%	44.4%	44.4%	27.8%	27.8%		27.8%	27.8%	
Maximum Green (s)	33.7	33.7		33.7	33.7	33.7	18.7	18.7		19.7	18.7	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.3	6.3		6.3	6.3	6.3		6.3		5.3	6.3	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	1.5	1.5		1.5	1.5	
Minimum Gap (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5		1.5	1.5	
Time Before Reduce (s)	19.0	19.0		19.0	19.0	19.0	25.0	25.0		25.0	25.0	
Time To Reduce (s)	11.0	11.0		11.0	11.0	11.0	0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.04	0.36		0.03	0.31	0.09		0.13		0.26	0.09	
Control Delay (s/veh)	12.3	13.5		12.2	13.0	12.0		18.9		10.2	9.4	

Lanes, Volumes, Timings

1: Spring St & Summit Ave & Delafield St

05/22/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay (s/veh)	12.3	13.5		12.2	13.0	12.0		18.9		10.2	9.4	
Queue Length 50th (ft)	2	40		2	34	8		7		20	8	
Queue Length 95th (ft)	18	152		14	133	40		40		54	27	
Internal Link Dist (ft)		344			243			139			120	
Turn Bay Length (ft)	125			75		100						
Base Capacity (vph)	922	1563		902	1591	1324		854		936	1613	
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	0.02	0.20		0.02	0.18	0.05		0.06		0.15	0.03	

Intersection Summary

Area Type: Other

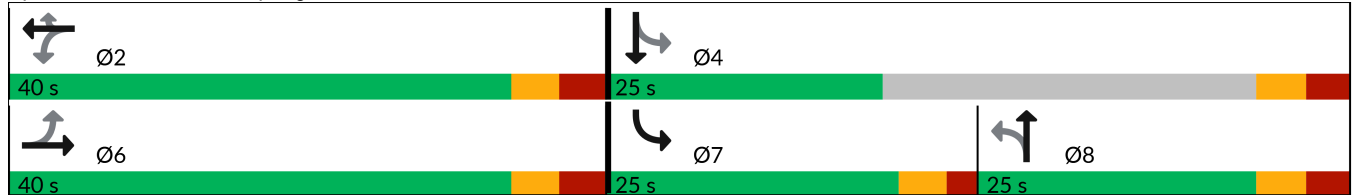
Cycle Length: 90

Actuated Cycle Length: 41.2

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Spring St & Summit Ave & Delafield St



# HCM 7th Signalized Intersection Summary

## 1: Spring St & Summit Ave & Delafield St

05/22/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	280	15	15	260	105	15	25	5	130	30	20
Future Volume (veh/h)	20	280	15	15	260	105	15	25	5	130	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1870	1870	1870	1826	1826	1826	1870	1870	1870
Adj Flow Rate, veh/h	22	304	16	16	283	71	16	27	5	141	33	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	5	5	5	2	2	2
Cap, veh/h	333	500	26	315	535	453	158	155	23	723	429	286
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.13	0.13	0.13	0.15	0.41	0.41
Sat Flow, veh/h	1018	1747	92	1059	1870	1582	326	1167	174	1781	1037	691
Grp Volume(v), veh/h	22	0	320	16	283	71	48	0	0	141	0	55
Grp Sat Flow(s),veh/h/ln	1018	0	1839	1059	1870	1582	1666	0	0	1781	0	1728
Q Serve(g_s), s	0.8	0.0	6.3	0.6	5.3	1.4	0.0	0.0	0.0	2.4	0.0	0.8
Cycle Q Clear(g_c), s	6.1	0.0	6.3	6.9	5.3	1.4	1.0	0.0	0.0	2.4	0.0	0.8
Prop In Lane	1.00		0.05	1.00		1.00	0.33		0.10	1.00		0.40
Lane Grp Cap(c), veh/h	333	0	526	315	535	453	337	0	0	723	0	714
V/C Ratio(X)	0.07	0.00	0.61	0.05	0.53	0.16	0.14	0.00	0.00	0.19	0.00	0.08
Avail Cap(c_a), veh/h	860	0	1477	863	1503	1271	833	0	0	1286	0	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.2	0.0	12.9	15.9	12.6	11.2	16.2	0.0	0.0	10.1	0.0	7.5
Incr Delay (d2), s/veh	0.1	0.0	0.8	0.0	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.2	0.1	1.9	0.4	0.4	0.0	0.0	0.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.2	0.0	13.8	16.0	13.2	11.3	16.3	0.0	0.0	10.1	0.0	7.5
LnGrp LOS	B		B	B	B	B	B			B		A
Approach Vol, veh/h		342			370			48				196
Approach Delay, s/veh		13.9			13.0			16.3				9.4
Approach LOS		B			B			B				A
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		18.3		23.6		18.3	11.8	11.9				
Change Period (Y+Rc), s		6.3		6.3		6.3	5.3	6.3				
Max Green Setting (Gmax), s		33.7		18.7		33.7	19.7	18.7				
Max Q Clear Time (g_c+I1), s		8.9		2.8		8.3	4.4	3.0				
Green Ext Time (p_c), s		1.6		0.1		1.7	0.1	0.1				
<b>Intersection Summary</b>												
HCM 7th Control Delay, s/veh				12.7								
HCM 7th LOS				B								



Lanes, Volumes, Timings  
 2: Delafield St & Buena Vista Ave.

05/22/2024



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	40	100	280	25	75	340
Future Volume (vph)	40	100	280	25	75	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	50	0		115	0	
Storage Lanes	1	1		1	0	
Taper Length (ft)	100				25	
Link Speed (mph)	30		30			30
Link Distance (ft)	452		196			403
Travel Time (s)	7.0		4.6			5.1
Confl. Peds. (#/hr)				2	2	
Confl. Bikes (#/hr)						
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	116	326	29	0	482
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
2: Delafield St & Buena Vista Ave.

05/22/2024

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	40	100	280	25	75	340
Future Vol, veh/h	40	100	280	25	75	340
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	115	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	116	326	29	87	395

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	897	328	0	0	357
Stage 1	328	-	-	-	-
Stage 2	570	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	310	714	-	-	1202
Stage 1	730	-	-	-	-
Stage 2	566	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	281	712	-	-	1200
Mov Cap-2 Maneuver	281	-	-	-	-
Stage 1	729	-	-	-	-
Stage 2	513	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.7	0	1.49
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	281	712	325	-
HCM Lane V/C Ratio	-	-	0.166	0.163	0.073	-
HCM Control Delay (s/veh)	-	-	20.4	11	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.6	0.2	-

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	95	20	10	10	480	100	20	5	125	195	10
Future Volume (vph)	20	95	20	10	10	480	100	20	5	125	195	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%			0%				0%		
Storage Length (ft)		125		0	150		50		50		0	
Storage Lanes		1		0	1		0		1		1	
Taper Length (ft)		100			125				75			
Right Turn on Red				No				No				No
Link Speed (mph)			30			30				30		
Link Distance (ft)			435			580				357		
Travel Time (s)			9.9			13.2				8.1		
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)			0%			0%				0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	128	33	0	11	666	0	0	6	139	228	0
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Detector Phase	1	1	6		6	2			4	8	10	
Switch Phase												
Minimum Initial (s)	6.0	6.0	12.0		12.0	12.0			10.0	10.0	10.0	
Minimum Split (s)	14.0	14.0	19.0		19.0	19.0			17.0	17.0	17.0	
Total Split (s)	14.0	14.0	55.0		55.0	41.0			20.0	20.0	20.0	
Total Split (%)	14.7%	14.7%	57.9%		57.9%	43.2%			21.1%	21.1%	21.1%	
Maximum Green (s)	8.0	8.0	48.0		48.0	34.0			13.0	13.0	13.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	3.0		3.0	3.0			3.0	3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Lost Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lead/Lag	Lead	Lead				Lag						
Lead-Lag Optimize?	Yes	Yes				Yes						
Vehicle Extension (s)	1.5	1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Minimum Gap (s)	1.5	1.5	3.9		3.9	3.9			1.5	1.5	1.5	
Time Before Reduce (s)	15.0	15.0	19.0		19.0	19.0			30.0	30.0	25.0	
Time To Reduce (s)	0.0	0.0	11.0		11.0	11.0			0.0	0.0	0.0	
Recall Mode	None	None	C-Min		C-Min	C-Min			None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.81	0.03		0.01	1.02			0.05	0.59	0.56	
Control Delay (s/veh)		80.6	11.9		11.9	73.8			37.2	50.2	31.1	

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	245	40	175	190	5
Future Volume (vph)	5	25	245	40	175	190	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12
Grade (%)			0%		0%		
Storage Length (ft)		75		0	300	0	
Storage Lanes		1		0	1	0	
Taper Length (ft)		75			50		
Right Turn on Red				No			No
Link Speed (mph)			30		30		
Link Distance (ft)			192		329		
Travel Time (s)			4.4		7.5		
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0
Parking (#/hr)							
Mid-Block Traffic (%)			0%		0%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	34	316	0	411	0	0
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Detector Phase	8	8	4		9		
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0		10.0		
Minimum Split (s)	17.0	17.0	17.0		17.0		
Total Split (s)	20.0	20.0	20.0		20.0		
Total Split (%)	21.1%	21.1%	21.1%		21.1%		
Maximum Green (s)	13.0	13.0	13.0		13.0		
Yellow Time (s)	4.0	4.0	4.0		4.0		
All-Red Time (s)	3.0	3.0	3.0		3.0		
Lost Time Adjust (s)		0.0	0.0		0.0		
Total Lost Time (s)		7.0	7.0		7.0		
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	1.5	1.5	1.5		1.5		
Minimum Gap (s)	1.5	1.5	1.5		1.5		
Time Before Reduce (s)	30.0	30.0	30.0		25.0		
Time To Reduce (s)	0.0	0.0	0.0		0.0		
Recall Mode	None	None	None		None		
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
v/c Ratio		0.22	0.73		0.99dr		
Control Delay (s/veh)		41.0	50.7		69.0		

Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024

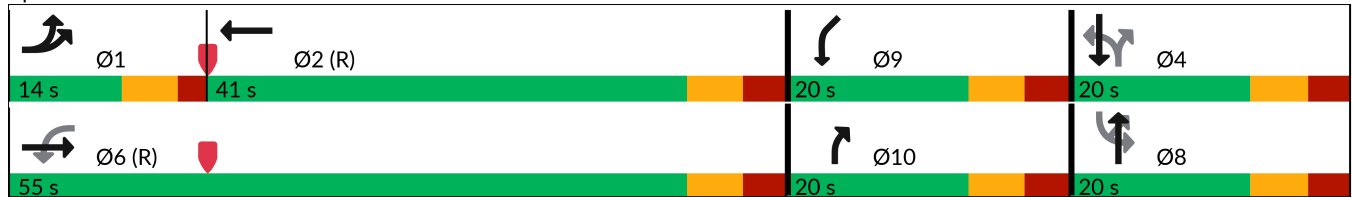


Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Queue Delay		0.0	0.0		0.0	0.0			0.0	0.0	0.0	
Total Delay (s/veh)		80.6	11.9		11.9	73.8			37.2	50.2	31.1	
Queue Length 50th (ft)		77	10		3	~439			3	80	104	
Queue Length 95th (ft)		#183	24		12	#652			15	140	170	
Internal Link Dist (ft)			355			500				277		
Turn Bay Length (ft)		125			150				50			
Base Capacity (vph)		158	908		695	649			121	254	404	
Starvation Cap Reductn		0	0		0	0			0	0	0	
Spillback Cap Reductn		0	0		0	0			0	0	0	
Storage Cap Reductn		0	0		0	0			0	0	0	
Reduced v/c Ratio		0.81	0.04		0.02	1.03			0.05	0.55	0.56	

Intersection Summary

Area Type: Other  
 Cycle Length: 95  
 Actuated Cycle Length: 95  
 Offset: 76 (80%), Referenced to phase 2:WBT and 6:EBWB, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 3: Madison St & W. North St/E. North St & Delafield St



Lanes, Volumes, Timings

3: Madison St & W. North St/E. North St & Delafield St

05/22/2024

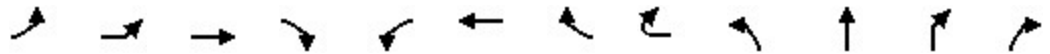


Lane Group	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Queue Delay		0.0	0.0		0.0		
Total Delay (s/veh)		41.0	50.7		69.0		
Queue Length 50th (ft)		19	97		127		
Queue Length 95th (ft)		48	142		#215		
Internal Link Dist (ft)			112		249		
Turn Bay Length (ft)		75			300		
Base Capacity (vph)		161	469		445		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.21	0.67		0.92		
Intersection Summary							

# HCM Signalized Intersection Capacity Analysis

## 3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Traffic Volume (vph)	20	95	20	10	10	480	100	20	5	125	195	10
Future Volume (vph)	20	95	20	10	10	480	100	20	5	125	195	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.99		1.00	0.99			1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00	1.00	
Frt		1.00	0.95		1.00	0.97			1.00	1.00	0.85	
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00	1.00	
Satd. Flow (prot)		1770	1758		1739	1780			1710	1863	1542	
Flt Permitted		0.95	1.00		0.73	1.00			0.49	1.00	1.00	
Satd. Flow (perm)		1770	1758		1346	1780			884	1863	1542	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	106	22	11	11	533	111	22	6	139	217	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	128	33	0	11	666	0	0	6	139	228	0
Confl. Peds. (#/hr)	4	8		14	14		4		14		8	9
Confl. Bikes (#/hr)							1				1	1
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%	3%	3%	2%	2%	2%	2%
Turn Type	Prot	Prot	NA		D.Pm	NA			D.Pm	NA	custom	
Protected Phases	1	1	6			2				8	10	
Permitted Phases					6				4		4	
Actuated Green, G (s)		8.4	49.1		49.1	34.7			11.9	11.9	24.9	
Effective Green, g (s)		8.4	49.1		49.1	34.7			11.9	11.9	24.9	
Actuated g/C Ratio		0.09	0.52		0.52	0.37			0.13	0.13	0.26	
Clearance Time (s)		6.0	7.0		7.0	7.0			7.0	7.0	7.0	
Vehicle Extension (s)		1.5	4.9		4.9	4.9			1.5	1.5	1.5	
Lane Grp Cap (vph)		156	908		695	650			110	233	517	
v/s Ratio Prot		c0.07	0.02			c0.37				0.07	0.06	
v/s Ratio Perm					0.01				0.01		0.09	
v/c Ratio		0.82	0.03		0.01	1.02			0.05	0.59	0.44	
Uniform Delay, d1		42.5	11.3		11.1	30.1			36.5	39.2	29.2	
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00	1.00	
Incremental Delay, d2		26.7	0.0		0.0	41.6			0.0	2.7	0.2	
Delay (s)		69.3	11.3		11.2	71.8			36.6	42.0	29.4	
Level of Service		E	B		B	E			D	D	C	
Approach Delay (s/veh)			57.4			70.8				34.2		
Approach LOS			E			E				C		

### Intersection Summary

HCM 2000 Control Delay (s/veh)	57.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis  
 3: Madison St & W. North St/E. North St & Delafield St

05/22/2024



Movement	SBL2	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations							
Traffic Volume (vph)	5	25	245	40	175	190	5
Future Volume (vph)	5	25	245	40	175	190	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		
Lane Util. Factor		1.00	0.95		0.97		
Frbp, ped/bikes		1.00	0.98		1.00		
Flpb, ped/bikes		0.94	1.00		1.00		
Frt		1.00	0.97		0.92		
Flt Protected		0.95	1.00		0.97		
Satd. Flow (prot)		1671	3428		3251		
Flt Permitted		0.66	1.00		0.97		
Satd. Flow (perm)		1175	3428		3251		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	28	272	44	194	211	6
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	34	316	0	411	0	0
Confl. Peds. (#/hr)	8	9		14			
Confl. Bikes (#/hr)				1			
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	D.Pm	D.Pm	NA		Prot		
Protected Phases			4		9		
Permitted Phases	8	8					
Actuated Green, G (s)		11.9	11.9		13.0		
Effective Green, g (s)		11.9	11.9		13.0		
Actuated g/C Ratio		0.13	0.13		0.14		
Clearance Time (s)		7.0	7.0		7.0		
Vehicle Extension (s)		1.5	1.5		1.5		
Lane Grp Cap (vph)		147	429		444		
v/s Ratio Prot			c0.09		c0.13		
v/s Ratio Perm		0.03					
v/c Ratio		0.23	0.73		0.99dr		
Uniform Delay, d1		37.4	40.0		40.5		
Progression Factor		1.00	1.00		1.00		
Incremental Delay, d2		0.2	5.6		24.8		
Delay (s)		37.7	45.6		65.3		
Level of Service		D	D		E		
Approach Delay (s/veh)			44.8		65.3		
Approach LOS			D		E		
<b>Intersection Summary</b>							



Lanes, Volumes, Timings  
4: Delafield St & North Drwy.

05/22/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	15	25	290	355	25
Future Volume (vph)	15	15	25	290	355	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	50			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		50			
Link Speed (mph)	25			30	30	
Link Distance (ft)	193			206	111	
Travel Time (s)	4.4			7.5	7.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	32	0	27	315	413	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
4: Delafield St & North Drwy.

05/22/2024

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	WT		T	T	T	
Traffic Vol, veh/h	15	15	25	290	355	25
Future Vol, veh/h	15	15	25	290	355	25
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	16	27	315	386	27

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	769	399	413	0	-	0
Stage 1	399	-	-	-	-	-
Stage 2	370	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	369	650	1146	-	-	-
Stage 1	677	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	361	650	1146	-	-	-
Mov Cap-2 Maneuver	361	-	-	-	-	-
Stage 1	661	-	-	-	-	-
Stage 2	699	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v13.35		0.65	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1146	-	464	-	-
HCM Lane V/C Ratio	0.024	-	0.07	-	-
HCM Control Delay (s/veh)	8.2	-	13.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Lanes, Volumes, Timings  
5: Delafield St & South Drwy.

05/22/2024



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	10	0	315	360	10
Future Volume (vph)	0	10	0	315	360	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	0	0			0
Storage Lanes	0	1	0			0
Taper Length (ft)	25		25			
Link Speed (mph)	25			30	30	
Link Distance (ft)	189			329	206	
Travel Time (s)	4.3			7.5	4.6	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	0	342	402	0
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other  
Control Type: Unsignalized

HCM 7th TWSC  
5: Delafield St & South Drwy.

05/22/2024

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	10	0	315	360	10
Future Vol, veh/h	0	10	0	315	360	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	0	342	391	11

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	397	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	653	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	653	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v10.61		0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 653	-	-
HCM Lane V/C Ratio	- 0.017	-	-
HCM Control Delay (s/veh)	- 10.6	-	-
HCM Lane LOS	- B	-	-
HCM 95th %tile Q(veh)	- 0.1	-	-

Lanes, Volumes, Timings  
 15: Madison St & Madison St Driveway

05/22/2024



Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑			↑
Traffic Volume (vph)	0	315	240	10	0	5
Future Volume (vph)	0	315	240	10	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	0			0	0	0
Storage Lanes	0			0	0	1
Taper Length (ft)	25				25	
Link Speed (mph)		30	30		30	
Link Distance (ft)		299	192		141	
Travel Time (s)		6.8	4.4		3.2	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	342	272	0	0	5
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other  
 Control Type: Unsignalized

HCM 7th TWSC  
 15: Madison St & Madison St Driveway

05/22/2024

Intersection						
Int Delay, s/veh	0.1					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑↑	↑			↑
Traffic Vol, veh/h	0	315	240	10	0	5
Future Vol, veh/h	0	315	240	10	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	342	261	11	0	5

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	-	0	-	0	266
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.319
Pot Cap-1 Maneuver	0	-	-	-	772
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	772
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	SE	NW	SW
HCM Control Delay, s/v	0	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NWT	NWR	SETSWLn1
Capacity (veh/h)	-	-	772
HCM Lane V/C Ratio	-	-	0.007
HCM Control Delay (s/veh)	-	-	9.7
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0