April 21, 2020
PK# 2667-19.394

TRAFFIC IMPACT ANALYSIS

Project:
2811 Maple Residential
In Dallas, Texas

Prepared for:
City of Dallas

On behalf of:
CRE GPIF 2811 Maple, LLC

Prepared by:

Steve E. Stoner

Steve E. Stoner, P.E., PTOE

Pacheco Koch

7557 Rambler Road, Suite 1400
Dallas, Texas 75231-2388
(972) 235-3031 www.pkce.com
TX.REG: ENGINEERING FIRM F-469
TX. REG. SURVEYING FIRM LS-100080-00

EXECUTIVE SUMMARY

The services of **Pacheco Koch** were retained by **CRE GPIF 2811 Maple, LLC** to prepare a Traffic Impact Analysis (TIA) for the proposed high-rise multifamily development located at 2811 Maple Avenue in Dallas, Texas. The Project will consist of approximately 220 multifamily dwelling units. Buildout of the Project is estimated to occur 2023. A TIA is required by the City of Dallas for review as part of the Owner's request to create a new PD subdistrict for the subject property.

The purpose of this report is to estimate the incremental impact on the background traffic operational conditions caused by the proposed development within a specific study area as determined by standardized engineering analyses. The study parameters used in this TIA are based upon the requirements of the City and are consistent with the standard industry practices used in similar studies.

Based upon the analyses performed herein, Pacheco Koch developed the following findings and recommendations.

FINDING: The study area for the proposed development consists of very urban conditions with high vehicular volumes during peak hours. However, intersections within the study area operate at acceptable operational conditions during peak hours periods.

FINDING: This analysis assumed significant increases in background traffic volumes generated by ongoing development in the vicinity (other than this project—2811 Maple Avenue), which includes the planned development on the adjacent property, 2323 Cedar Springs Road (commonly known as the Granite Properties project).

FINDING: The proposed multifamily development (2811 Maple Avenue) will generate relatively low traffic volumes during the peak hour periods in comparison to the estimated growth of background traffic.

FINDING: The addition of projected background traffic will have some measurable impact on current peak hour traffic operations; however, the calculated Levels of Service will remain in the range of acceptable conditions. The addition of site-generated traffic from the 2811 Maple Avenue development will add only a very small incremental increase in average delays and has no significant impact on overall peak traffic operations within the study area compared to background conditions.

FINDING: In future years after the project (2811 Maple Avenue) is developed, if aggressive traffic volume growth does occur, Levels of Service at the intersection of Cedar Springs Road and Maple Avenue may degrade to marginally unacceptable conditions.

- RECOMMENDATION: Due to right-of-way limitations in the area, the ability to physically add capacity to study area intersections is negligible.

However, maintaining adequate pedestrian capacity and safety is considered paramount. If intersection operations do degrade to unacceptable conditions over time, it is recommended that the City evaluate operational changes to the intersection, such as signal timing optimization, to improve intersection operations as appropriate.

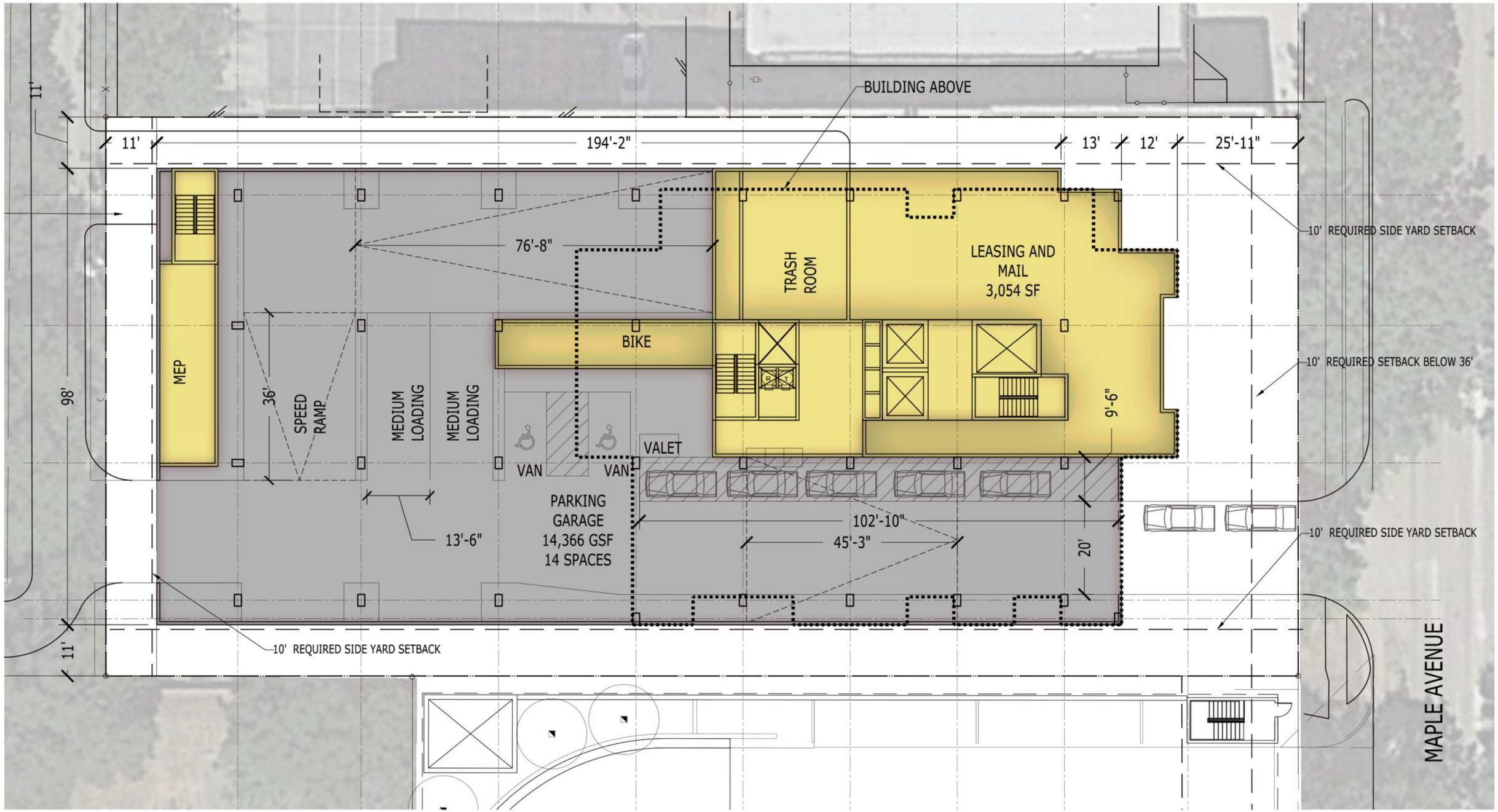
END

Site Location Map

2811 Maple Avenue, Dallas, Texas

PK 3482-20.205 (AJV: 04/08/20)

EXHIBIT 1



CONCEPTUAL LEVEL 1 PLAN AT 1”-20’ SCALE

2811 Maple Avenue, Dallas, Texas

Job #: 18069.00
Date: 2020-04-07
Drawn by: ELB, TLB, RTW, RR

Scale: 1"=20'
File Name: 2811 Maple SP-5.dwg
Not for regulatory approval, permitting, or construction

CRESCENT.

0 5 10 20'

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TRAFFIC IMPACT ANALYSIS
2811 Maple Residential
Dallas, Texas

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INTRODUCTION

The services of **Pacheco Koch** (PK) were retained by **CRE GPIF 2811 Maple, LLC** to prepare a Traffic Impact Analysis for a proposed, luxury, high-rise multifamily development located at 2811 Maple Avenue in Dallas, Texas. A preliminary site plan for the Project, prepared by **GFF Architects**, and a site location map (**Exhibit *1***) are provided following the EXECUTIVE SUMMARY section of this report.

In order to facilitate development of the Project, CRE GPIF 2811 Maple, LLC (the "Applicant") has made a request to the City of Dallas (the "Approving Agency") to create a new PD 193 subdistrict for the subject property. As part of application process for this request, submittal of a TIA commissioned by the Applicant must be submitted to the Approving Agency for review.

This TIA was prepared by traffic engineers at Pacheco Koch (the "Engineer") in accordance with industry and local standards. Pacheco Koch is a licensed engineering firm, based in Texas, that provides professional engineering and related services.

Purpose

A Traffic Impact Analysis (TIA) is an engineering study used to provide information on the projected off-site impacts produced by a specific Project on the traffic operations of public traffic facilities. Commissioning a TIA may be required by an Approving Agency when an Applicant is seeking approvals or entitlements for the Project. Using standardized analysis methodologies, the findings of the TIA are used to gage the direct impacts on the transportation system that are attributable to the Project. Under certain circumstances and within legal parameters, the Approving Agency may require the Applicant to fund the improvement(s) needed to mitigate the impacts.

A TIA should be prepared by a licensed Engineer skilled in the principles of traffic and transportation engineering and planning. The general methodologies, processes, and guidelines used in a TIA are established by industry standards—which are maintained by organizations such as the Institute of Transportation Engineers (ITE) and others—although, the project-specific parameters of the study (e.g., study locations, analysis scenarios, analytical assumptions, etc.) may be established by local ordinances or technical staff of the Approving Agency.

Based upon the findings of the analysis, the Engineer may suggest or recommend modifications to the transportation system that, in the Engineer's opinion, could improve overall traffic operations, safety, site access, circulation, etc. Such proposals may or may not be directly related to the traffic impacts of the Project. Implementation of any modifications to the transportation system are subject to the discretion and approval of the respective agency that is responsible for the operation of the facilities. Also, the Engineer's proposals should not be considered mandatory and are not intended to assign or imply funding responsibility.

A TIA is not a detailed site plan review nor a substitute for local or regional transportation planning.

Project Description

The Project will consist of approximately 220 residential dwelling unties. Buildout of the Project is estimated to occur 2023. The proposed site will provide an on-site, below-grade parking structure for tenants and visitors. Driveways will be provided on Maple Avenue and an alley connection that provides access to both Randall Street and Bookhout Street.

The 0.705-acre subject site is currently zoned Oak Lawn Special Purpose District for Light Commercial uses [PD 193 (LC)]. The property currently contains a vacant building that was previously used by a single-tenant commercial business.

Study Parameters

The study parameters used in this TIA are based upon industry standard practices and requirements of the City of Dallas.

This TIA analyzed the day-to-day traffic operations on the public roadway system at time periods that have the greatest combined volume of the background traffic and site-related traffic. Due to the predominant influence of background traffic, the weekday AM and PM peak hours of adjacent street traffic are typically analyzed.

The analysis scenarios addressed in this study include the following:

- at existing conditions ("Existing" scenario)
- at site buildout year without site-generated traffic ("Background" scenario)
- at site buildout year with site-generated traffic ("Buildout" scenario)
- at five years after buildout with site-generated traffic ("Horizon" scenario)

NOTE: Analyses of all future conditions scenarios utilize projected traffic volumes derived by Pacheco Koch using reasonable and customary assumptions that are based upon existing conditions where possible. ITE appropriately points out that, due to natural changes in traffic patterns that occur over time, the margin of error for projected traffic volumes increases as the length of time of the projection increases; and, any projection of hourly turning movement volumes beyond five years inherently contain significant assumptions.

The following technical assumptions were also made in this analysis.

- Traffic generated by the adjacent Granite Properties project, located at 2323 Cedar Springs Road, was included in the "background" traffic conditions for this study. The Granite Properties' development is planned to include 649,900 SF of office and 20,000 SF of restaurant uses. A Traffic Impact Analysis for that project was prepared by Kimley-Horn. The site-generated traffic volumes for the Granite Properties' project were obtained from that TIA and are provided in APPENDIX C.
- Background traffic is expected to increase at a rate of 1.5 percent per year based upon professional judgment. (Same growth rate used in the TIA for Granite Properties' 2323 Cedar Springs project.)

Study Area

The study area for a TIA is typically defined to allow an assessment of the most relevant traffic impacts to the local area. The extent of the study area is discretionary but is generally commensurate with the scale of the proposed development. Special localized factors may also be considered. The specific locations included in the study area of this TIA are listed below and depicted in **Exhibit *1***.

Traffic-Signal-Controlled Intersections:

(a) Cedar Springs Road and Maple Avenue
(b) Maple Avenue and Wolf Street

STOP-Sign-Controlled Intersections:

(c) Maple Avenue and Randall Street*
(d) Randall Street and Bookhout Street**
(e) Cedar Springs Road and Bookhout Street
(f) Major Site Driveways/Alleys

* Existing traffic volumes were not available and were derived from traffic counts from surrounding available intersections.

**All-Way STOP-Controlled

Roadway Links:

(A) Maple Avenue, west of Cedar Springs Road

- Existing operation and cross-section: *four lanes, two-way operation, undivided*
- City of Dallas Thoroughfare Plan Designation: *Community Collector, S-4-U*
- Current Daily Traffic Volume: *13,653 (Tuesday, April 23, 2018)*
- Bike Plan*: On-Street Bicycle Facility*
- Posted Speed: *30 MPH*

TRAFFIC IMPACT ANALYSIS

The following is a description of the analyses performed as part of this Traffic Impact Analysis.

Approach

The TIA presented in this report analyzed the operational conditions for the peak hours and study area as defined above using standardized analytical methodologies where applicable. Current (or recent) traffic volume data were collected on a typical day throughout the study area to represent existing traffic conditions. Where applicable, growth factors were applied to the existing volumes to project future background traffic at the site buildout year conditions. Then, traffic generated by the proposed development was projected using the standard

four-step approach: Trip Generation, Mode Split, Trip Distribution, and Traffic Assignment. By adding the site-generated traffic to the background traffic, the resulting site-plus-background traffic impact to operational conditions may be assessed from which approach mitigation measures may be recommended, if needed.

Background Traffic Volume Data

Existing Volumes

NOTE: Due to the current Covid-19 Pandemic, current traffic volumes would not represent normal traffic conditions and would not be valid for use in this study. Therefore, the methodology described below was employed to represent 'existing' traffic volume conditions for this analysis.

Current traffic volumes were collected during the analysis periods at the study area intersections on Tuesday, April 24, 2018 (obtained from the Granite Properties' 2323 Cedar Springs Road TIA, prepared by Kimley-Horn). The estimated background growth rate was applied for two additional years to compensate for the time difference. Traffic volumes are graphically summarized in APPENDIX A; detailed data sheets are provided in APPENDIX B.

Projected Background Traffic Volumes

Background traffic growth is defined as the normal growth of traffic that is not directly related to the subject development of this study.

By applying the assumed growth rate(s) described previously, future background traffic volumes at the Project buildout year were calculated for the study area intersections. These volumes are graphically summarized in APPENDIX A.

Site-Related Traffic

Trip Generation and Mode Split

Trip generation is calculated in terms of trip ends" – a trip end is a one-way vehicular trip entering or exiting a site driveway (i.e., a single vehicle entering and exiting a site represents two trip ends). Trip generation for this Project was calculated using the Institute of Transportation Engineers (ITE) *Trip Generation* manual (10th Edition). ITE *Trip Generation* is a compilation of actual, vehicular traffic volume generation data and statistics by land use as collected over several decades by creditable sources across the country. Using the ITE equations and rates is an accepted methodology to calculate the projected site-generated traffic volumes for many land uses (though engineering judgment is strongly advised).

The base trip generation data from ITE generally reflect average conditions for a standalone use on a typical day. However, in some cases, the Engineer may judge that other factors may be of sufficient significance to warrant adjusting the base ITE calculations in order to more accurately reflect Project-specific conditions. For this analysis no adjustments to the base ITE data were applied.

"Mode split" refers to the consideration of all modes of transportation. Typically, the majority of trips occur by passenger vehicles such as personal autos and ridesharing services. But, some alternative modes—such as travel by public transit, bicycle, and walking—do not generate additional vehicle trips. The default trip generation data from ITE is summarized in vehicular trip ends and incorporate "typical" mode split characteristics. However, when travel by alternative mode has the potential to be greater than normal, a reduction in the number of vehicular trip volume may be warranted. For this analysis a five percent (5%) mode split reduction was applied to the base ITE data to account for the potential use of transit/bicycle/walking near the site.

Table 1 provides a summary of the calculated net increase in trip ends generated by the project. Supplemental information used in the trip generation calculations is provided in APPENDIX C.

Table 1. Projected Trip Generation Summary

SCENARIO	DAILY TRIP ENDS (WEEKDAY)	AM PEAK HOUR TRIP ENDS (ADJACENT STREET PEAK)	PM PEAK HOUR TRIP ENDS (ADJACENT STREET PEAK)
		Total (In/Out)	**Total** (In/Out)
Proposed Development*	1,025	**70** (17/53)	**79** (51/32)

** Includes mode split reduction.*

Trip Distribution and Assignment

The distribution and assignment of site-generated trip ends to the surrounding roadway system is determined by proportionally estimating the orientation of travel via various travel routes. This is a subjective exercise based upon professional judgment considering such factors as directional characteristics of existing local traffic, trip attributes (e.g., trip purpose, trip length, travel time, etc.), roadway features (e.g., capacity, operational conditions, character of environment), regional demographics, etc.

Traffic for the proposed redevelopment was distributed and assigned to the study area roadway network based upon consideration of the factors listed above. Detailed trip distribution and traffic assignment calculations and results are summarized in APPENDIX C.

Site-Generated Traffic Volumes

Site-generated traffic is calculated by multiplying the trip generation value (from **Table 1**) by the corresponding traffic assignments (from APPENDIX C). The resulting cumulative (for all uses) peak period site-generated traffic volumes at buildout of the Project are graphically summarized in APPENDIX A.

Traffic Operational Analysis —Roadway Links

Description

A roadway link is a segment of roadway between two intersections. Roadway link capacity analysis is a comparison of actual or forecasted traffic volumes to the theoretically optimum roadway capacity. The capacity of the roadway link is predominantly a function of the roadway's cross-section (i.e., number of lanes, lane widths, type of center divider, etc.). However, other more theoretical factors also apply, such as the character of environment and the functional classification of the roadway. Generally, roadway link capacity is less critical than intersection capacity; however, it can provide a gage of the utilization of given roadway.

A specific industry standard for roadway link capacity does not exist, but the typical concept is derived from a base saturation flow rate (i.e., the maximum theoretical rate of continuous flow under ideal, unobstructed conditions -- in the traffic engineering industry, this value is generally considered to range between 1,900-2,100 vehicles per lane per hour). A series of adjustment factors are then applied to the saturation flow rate to reflect the characteristics of a given location.

The North Central Texas Council of Governments (NCTCOG) – the metropolitan planning agency for the Dallas-Fort Worth region – has derived internal "hourly service volume" guidelines used for transportation modelling purposes. The NCTCOG values were based upon the principals presented in the *Highway Capacity Manual* with "regional calibration" factors applied. Though these per-lane capacities, or "Service Volumes" (summarized in the table below), are intended for modelling purposes, they do provide a reasonable gage of theoretical capacity.

Area Type	Hourly Service Volumes By Roadway Function					
	Principal Arterial		Minor Arterial & Frontage Road		Collector & Local Street	
	Median-Divided or One-Way	Undivided Two-Way	Median-Divided or One-Way	Undivided Two-Way	Median-Divided or One-Way	Undivided Two-Way
CBD	725	650	725	650	475	425
Urban/ Commercial	850	775	825	750	525	475
Residential	925	875	900	825	575	525
Rural	1,025	925	975	875	600	550

To determine the utilization of a roadway, the volume:capacty ratio can be calculated – a v/c ratio of less than 1.0 indicates that the roadway is operating under capacity. NCTCOG's Level of Service denominations are as follows:

Volume:Capacity Ratio $\leq$ 65% is LOS *A/B/C*,
Volume:Capacity Ratio > 65% and $\leq$ 80% is LOS *D*,
Volume:Capacity Ratio > 80% and $\leq$ 100% is LOS *E*,
Volume:Capacity Ratio $\geq$ 100% is LOS *F*

Summary of Results

For roadways adjacent to or in the vicinity of the subject site, the volume/capacity ratio was calculated for existing and site buildout conditions. A summary of the link capacity analysis is provided in **Table 2**. See specific recommendations in the *Recommendations* section of this report.

Table 2. Roadway Link Capacity Analysis Results Summary

ROADWAY/ SCENARIO	PEAK HOUR VOLUME	THEORETICAL HOURLY CAPACITY	V:C RATIO/ LEVEL OF SERVICE
Maple Avenue			
Existing Conditions	1,285	3,000	0.43 – A/B/C
Buildout Year-Background Conditions	1,641	3,000	0.55 – A/B/C
Buildout Year-Buildout Conditions	1,680	3,000	0.56 – A/B/C

Traffic Operational Analysis —Roadway Intersections

Description

The level of performance of civil infrastructure can often be measured through an analysis of volume and capacity that considers various physical and operational characteristics of the system. For vehicular traffic an operational analysis of roadway intersection capacity over a 60-minute period is the most detailed type of analysis. An industry-standardized methodology for this type of analysis was developed by the Transportation Research Board and is presented in the Highway Capacity Manual (HCM). HCM uses the term "Level of Service" (or, LOS) to qualitatively describe the efficiency using a letter grade of A through F. Generally, LOS can be described as follows:

LOS *A* = free, unobstructed flow
LOS *B* = reasonably free flow
LOS *C* = stable flow
LOS *D* = approaching unstable flow
LOS *E* = unstable flow, operating at design capacity
LOS *F* = operating over design capacity

Traffic operational analysis is typically measured in one-hour periods during day-to-day peak conditions. In most urban settings, LOS C, or better, is desirable, although LOS D is considered to be acceptable in urban conditions; LOS E indicates a facility or maneuver is approaching capacity, while LOS F is theoretically an over-capacity condition. On highly-utilized transportation facilities, brief periods of LOS E or F conditions are not uncommon for during peak periods. In some cases measures to increase capacity, either through operational changes and/or physical improvements, can be identified to improve efficiency and sometimes raise Level of Service.

For traffic-signal-controlled ("signalized") intersections and STOP-controlled ("unsignalized") intersections, LOS is determined based upon the calculated average seconds of delay per vehicle. For signalized intersections the average delay per vehicle can be effectively calculated for the entire intersection; however, for unsignalized intersections the average delay per vehicle is calculated only by approach or by individual traffic maneuvers that must stop or yield right-of-way.

NOTE: The HCM unsignalized intersection analysis methodology was developed and calibrated for low-to-moderate volume intersections. When applied to intersections with one or more high-volume or high-capacity approaches, the analyses often reflect poor results (i.e., low Level of Service). However, the actual delay/operational conditions are typical of similar locations and do not necessarily represent unique conditions. Low-performing, high-volume, unsignalized intersections cannot be analytically mitigated unless a traffic signal is installed. (Traffic signal installation is subject to a detailed analysis of established criteria AND approval of the responsible agency. Neither Level of Service nor vehicle delay is a warrant for traffic signal installation.)

The following table summarizes the LOS criteria for signalized and unsignalized intersections as defined in the latest edition of the *Highway Capacity Manual*.

	Signalized Intersection (Average Delay per Vehicle)	**Unsignalized Intersection (Average Delay per Vehicle)**
LOS *A*	≤ 10	≤ 10
LOS *B*	> 10 - ≤ 20	> 10 - ≤ 15
LOS *C*	> 20 - ≤ 35	> 15 - ≤ 25
LOS *D*	> 35 - ≤ 55	> 25 - ≤ 35
LOS *E*	> 55 - ≤ 80	> 35 - ≤ 50
LOS *F*	> 80	> 50

Analysis Traffic Volumes

Determination of the traffic impact associated with the Project is measured by comparing the incremental change in operational conditions during peak periods with and without site-related traffic. APPENDIX A provides exhibits summarizing the following:

- Existing traffic volumes during study peak hours
- Projected Background traffic volumes at the Site Buildout Year during study peak hours
- Projected Site-Generated traffic volumes during study peak hours
- Projected Background-plus-Site-Generated traffic volumes at the Site Buildout Year during study peak hours
- Projected five-year-after-buildout traffic volumes, including Site-Generated traffic during study peak hours

A summary of the existing intersection/roadway geometry and traffic control devices is also graphically summarized in APPENDIX A.

Summary of Results

Intersection capacity analyses presented in this study were performed using the *Synchro* software package. **Table 3** and **Table 4** provide a summary of the peak period intersection operational conditions under the analysis conditions presented previously. Detailed software output is provided in APPENDIX D.

SITE ACCESS EVALUATION

The City of Dallas *Street Design Manual* suggests various site access items should be evaluated for each project, where applicable. **Table 5** summarizes the findings and recommendations of these evaluations. Applicable supplemental information is provided in APPENDIX E.

[text continues on Page 12]

Table 3. Peak Hour Intersection Capacity Analysis Results Summary
(Signalized Intersections)

INTERSECTION		EXISTING CONDITIONS						BACKGROUND CONDITIONS						BUILDOUT CONDITIONS						HORIZON CONDITIONS					
		AM			PM			AM			PM			AM			PM			AM			PM		
		LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue
Cedar Springs Road	**Overall**	**C**	***(25.4)***		**C**	***(26.7)***		**C**	***(31.5)***		**D**	***(44.2)***		**C**	***(32.7)***		**D**	***(46.5)***		**D**	***(37.0)***		**E**	***(62.9)***	
@ Maple Avenue	NB Approach	B	*(14.9)*	126 ft	C	*(28.1)*	480 ft	C	*(23.0)*	148 ft	D	*(44.2)*	571 ft	C	*(23.3)*	148 ft	D	*(44.2)*	571 ft	C	*(24.5)*	160 ft	E	*(57.7)*	639 ft
	EB Approach	C	*(34.7)*	205 ft	C	*(31.9)*	255 ft	C	*(26.8)*	223 ft	E	*(66.8)*	534 ft	C	*(29.7)*	235 ft	E	*(74.0)*	548 ft	C	*(32.3)*	272 ft	F	*(>100)*	613 ft
	WB Approach	D	*(38.3)*	224 ft	B	*(19.6)*	132 ft	D	*(44.1)*	359 ft	B	*(18.8)*	174 ft	D	*(45.5)*	368 ft	B	*(19.1)*	179 ft	D	*(49.9)*	411 ft	C	*(20.4)*	200 ft
	SB Approach	B	*(17.6)*	322 ft	C	*(22.1)*	163 ft	C	*(30.2)*	507 ft	C	*(27.8)*	193 ft	C	*(30.8)*	509 ft	C	*(27.8)*	195 ft	D	*(37.5)*	566 ft	C	*(28.6)*	210 ft
Wolf Street	**Overall**	**B**	***(10.5)***		**B**	***(12.0)***		**B**	***(12.0)***		**B**	***(13.9)***		**B**	***(12.1)***		**B**	***(14.2)***		**B**	***(13.5)***		**B**	***(16.6)***	
@ Maple Avenue	NB Approach	B	*(12.6)*	78 ft	B	*(18.4)*	161 ft	B	*(13.8)*	93 ft	B	*(20.0)*	177 ft	B	*(14.0)*	94 ft	C	*(20.1)*	180 ft	B	*(15.5)*	111 ft	C	*(21.5)*	198 ft
	EB Approach	A	*(6.1)*	81 ft	A	*(10.0)*	112 ft	A	*(7.9)*	124 ft	B	*(11.1)*	134 ft	A	*(7.9)*	124 ft	B	*(11.2)*	134 ft	A	*(8.6)*	135 ft	B	*(12.3)*	148 ft
	WB Approach	B	*(10.7)*	158 ft	A	*(8.0)*	161 ft	B	*(13.8)*	191 ft	B	*(12.3)*	95 ft	B	*(14.1)*	191 ft	B	*(13.0)*	96 ft	B	*(16.6)*	193 ft	B	*(18.5)*	239 ft
	SB Approach	B	*(19.0)*	93 ft	B	*(13.6)*	75 ft	B	*(18.6)*	99 ft	B	*(13.6)*	81 ft	B	*(18.6)*	99 ft	B	*(13.6)*	81 ft	B	*(18.6)*	108 ft	B	*(13.7)*	86 ft

NOTE: Traffic signal operational parameters used in this analysis were based upon actual traffic signal operational characteristics observed in the field at the time of data collection.

Table 4. Peak Hour Intersection Capacity Analysis Results Summary
(Unsignalized Intersections)

INTERSECTION	TRAFFIC MANEUVER	EXISTING CONDITIONS						BACKGROUND CONDITIONS						BUILDOUT CONDITIONS					
		AM			PM			AM			PM			AM			PM		
		LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue	LOS	delay	queue
Randall Street	NBLTR	A	*(7.4)*	0 ft	A	*(7.8)*	0 ft	A	*(8.0)*	0 ft	A	*(8.7)*	1 ft	A	*(8.0)*	0 ft	A	*(8.8)*	1 ft
@ Bookhout Street	EBLTR	A	*(7.9)*	1 ft	A	*(8.3)*	1 ft	A	*(9.5)*	2 ft	A	*(9.3)*	1 ft	A	*(9.6)*	2 ft	A	*(9.3)*	1 ft
	WBLTR	A	*(7.5)*	0 ft	A	*(7.7)*	0 ft	A	*(8.0)*	0 ft	A	*(9.8)*	1 ft	A	*(8.0)*	0 ft	A	*(9.9)*	1 ft
	SBLTR	A	*(7.5)*	0 ft	A	*(7.8)*	0 ft	A	*(8.0)*	0 ft	A	*(9.5)*	0 ft	A	*(8.1)*	0 ft	A	*(8.6)*	0 ft
Randall Street	NB	B	*(13.2)*	6 ft	B	*(12.1)*	17 ft	C	*(15.3)*	6 ft	B	*(14.0)*	21 ft	C	*(16.5)*	7 ft	B	*(13.9)*	22 ft
@ Maple Avenue	WBL	A	*(8.4)*	9 ft	A	*(8.1)*	1 ft	A	*(8.5)*	11 ft	A	*(8.3)*	1 ft	A	*(8.5)*	11 ft	A	*(8.3)*	1 ft
Cedar Springs Road	NBL	B	*(11.2)*	2 ft	A	*(8.0)*	3 ft	B	*(14.9)*	26 ft	A	*(8.2)*	8 ft	C	*(15.2)*	27 ft	A	*(8.3)*	9 ft
@ Bookhout Street	EB	E	*(37.9)*	50 ft	C	*(20.2)*	45 ft	F	*(>100)*	215 ft	F	*(62.0)*	251 ft	F	*(>100)*	241 ft	F	*(77.6)*	282 ft
Maple Avenue	NB		-			-			-			-		B	*(11.8)*	6 ft	B	*(13.7)*	3 ft
@ Site Driveway 1	WBL		-			-			-			-		A	*(8.2)*	1 ft	A	*(8.5)*	2 ft
Randall Street	WB		-			-			-			-		A	*(8.9)*	0 ft	A	*(9.2)*	0 ft
@ Alley	SBL		-			-			-			-		A	*(7.3)*	0 ft	A	*(7.5)*	0 ft
Bookhout Street	EBL		-			-			-			-		A	*(7.4)*	0 ft	A	*(7.8)*	0 ft
@ Alley	SB		-			-			-			-		B	*(10.6)*	2 ft	B	*(11.1)*	1 ft

KEY:

A, B, C, D, E, F = Level-of-Service
NB-, SB-, EB-, WB- = intersection approach
AM = AM Peak Hour of Adjacent Street
(##.#) = Average Seconds of Delay Per Vehicle
-L, -T, -R = Left, Through, Right turning movement
PM = PM Peak Hour of Adjacent Street

SUMMARY OF FINDINGS AND RECOMMENDATIONS

NOTE: Recommendations presented in this report reflect the opinion of Pacheco Koch based solely upon technical analysis and professional judgment but are not intended to infer mandates or funding responsibility. Any proposed improvements in the public right-of-way are subject to approval of the responsible agency(-ies). Should the approving agency determine that any off-site improvements are required for approval of the Project, legal precedents apply regarding jurisdiction and funding.

The following findings and, if applicable, recommendations were based upon an analysis of the anticipated traffic impact generated by the proposed development scenario outlined in the Project Description section of this report.

FINDING: The study area for the proposed development consists of very urban conditions with high vehicular volumes during peak hours. However, intersections within the study area operate at acceptable operational conditions during peak hours periods.

FINDING: This analysis assumed significant increases in background traffic volumes generated by ongoing development in the vicinity (other than this project—2811 Maple Avenue), which includes the planned development on the adjacent property, 2323 Cedar Springs Road (commonly known as the Granite Properties project).

FINDING: The proposed multifamily development (2811 Maple Avenue) will generate relatively low traffic volumes during the peak hour periods in comparison to the estimated growth of background traffic.

FINDING: The addition of projected background traffic will have some measurable impact on current peak hour traffic operations; however, the calculated Levels of Service will remain in the range of acceptable conditions. The addition of site-generated traffic from the 2811 Maple Avenue development will add only a very small incremental increase in average delays and has no significant impact on overall peak traffic operations within the study area compared to background conditions.

FINDING: In future years after the project (2811 Maple Avenue) is developed, if aggressive traffic volume growth does occur, Levels of Service at the intersection of Cedar Springs Road and Maple Avenue may degrade to marginally unacceptable conditions.

- RECOMMENDATION: Due to right-of-way limitations in the area, the ability to physically add capacity to study area intersections is negligible. However, maintaining adequate pedestrian capacity and safety is considered paramount. If intersection operations do degrade to unacceptable conditions over time, it is recommended that the City evaluate operational changes to the intersection, such as signal timing optimization, to improve intersection operations as appropriate.

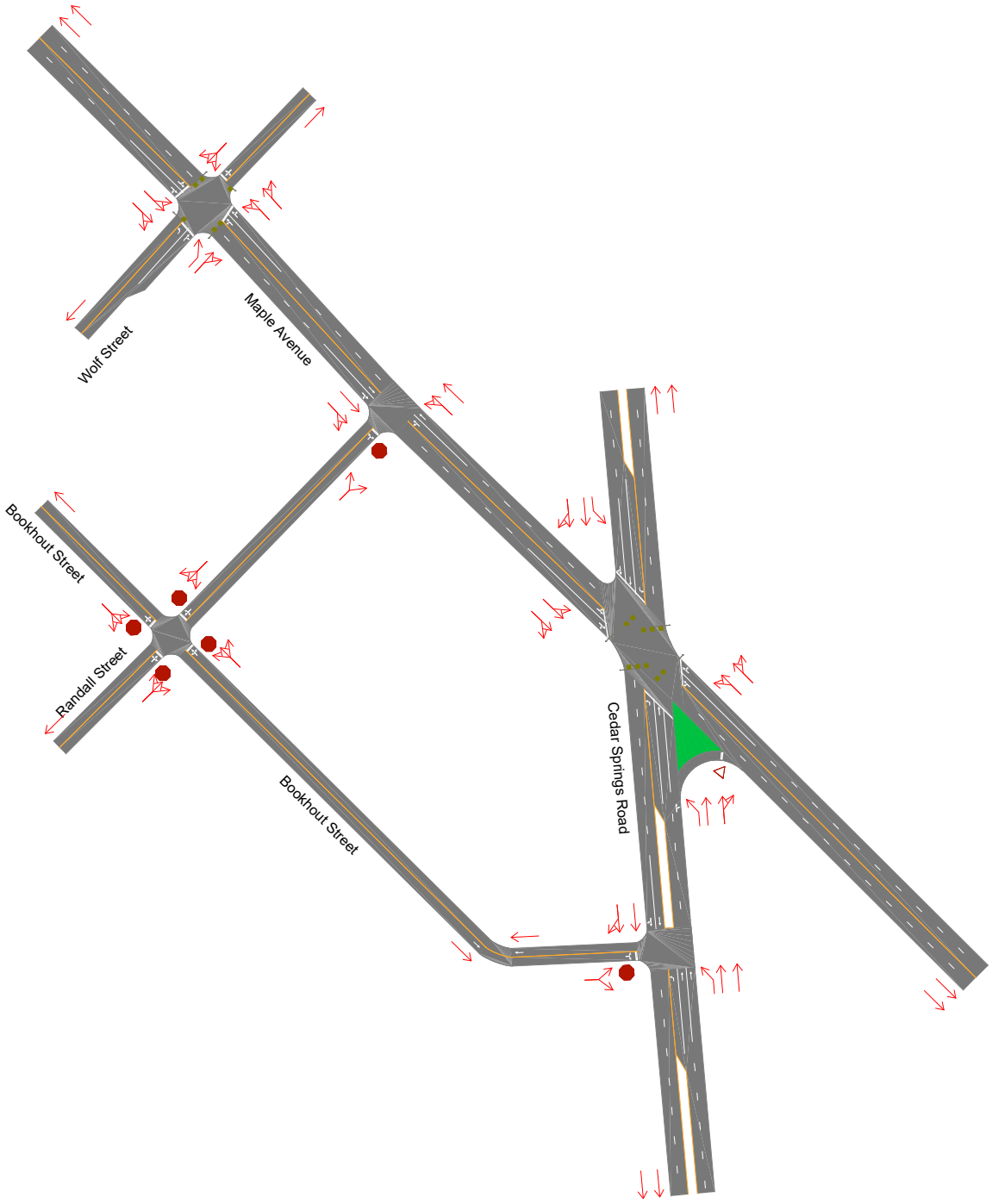
END OF MEMO

APPENDIX A. Traffic Volume Exhibits

Appendix A1 - Roadway Geometry

North ^

Not to Scale



3482-20.205

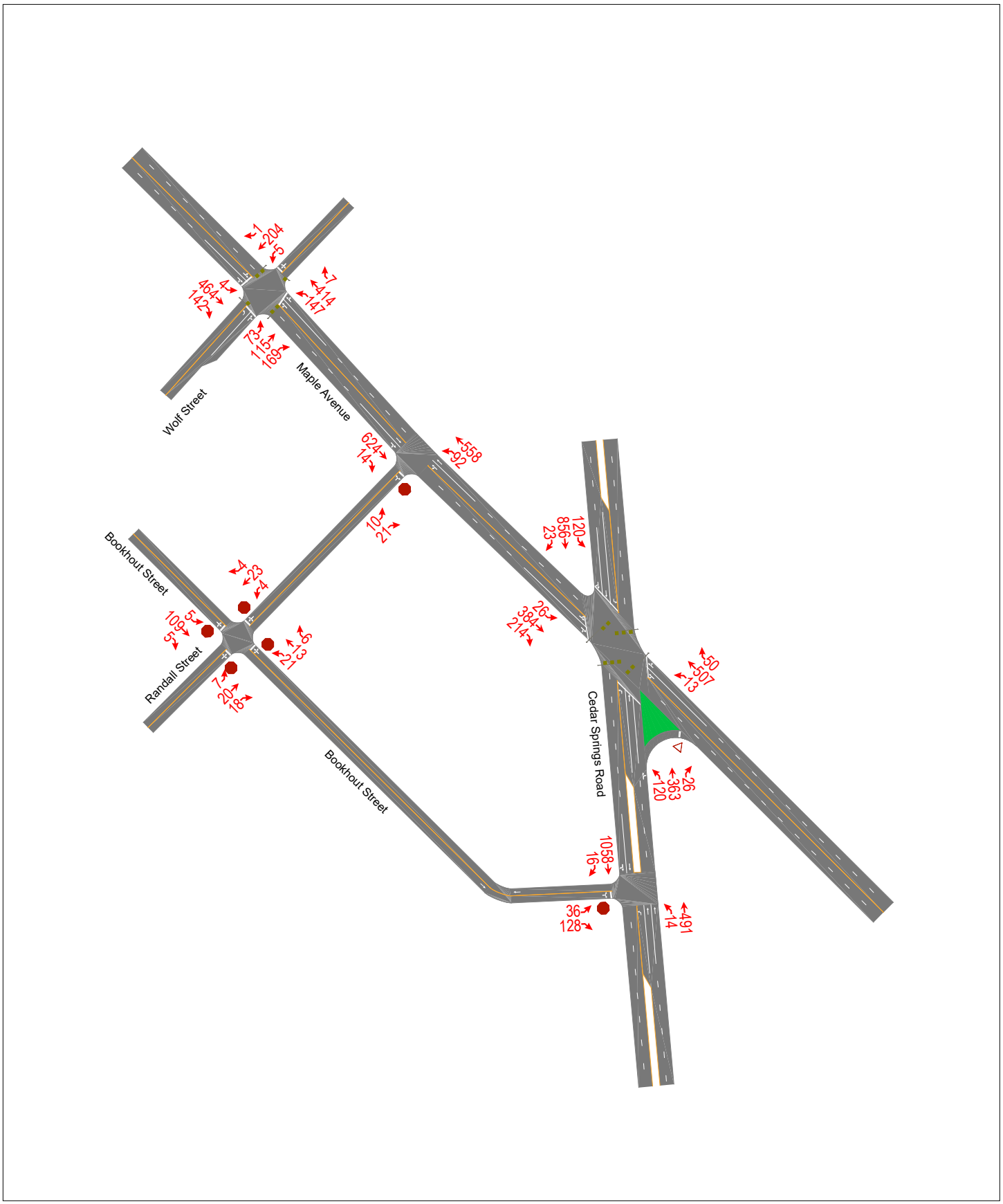
AJV

04/08/2020

Pacheco Koch

Appendix A2 - Existing AM

North ^
Not to Scale

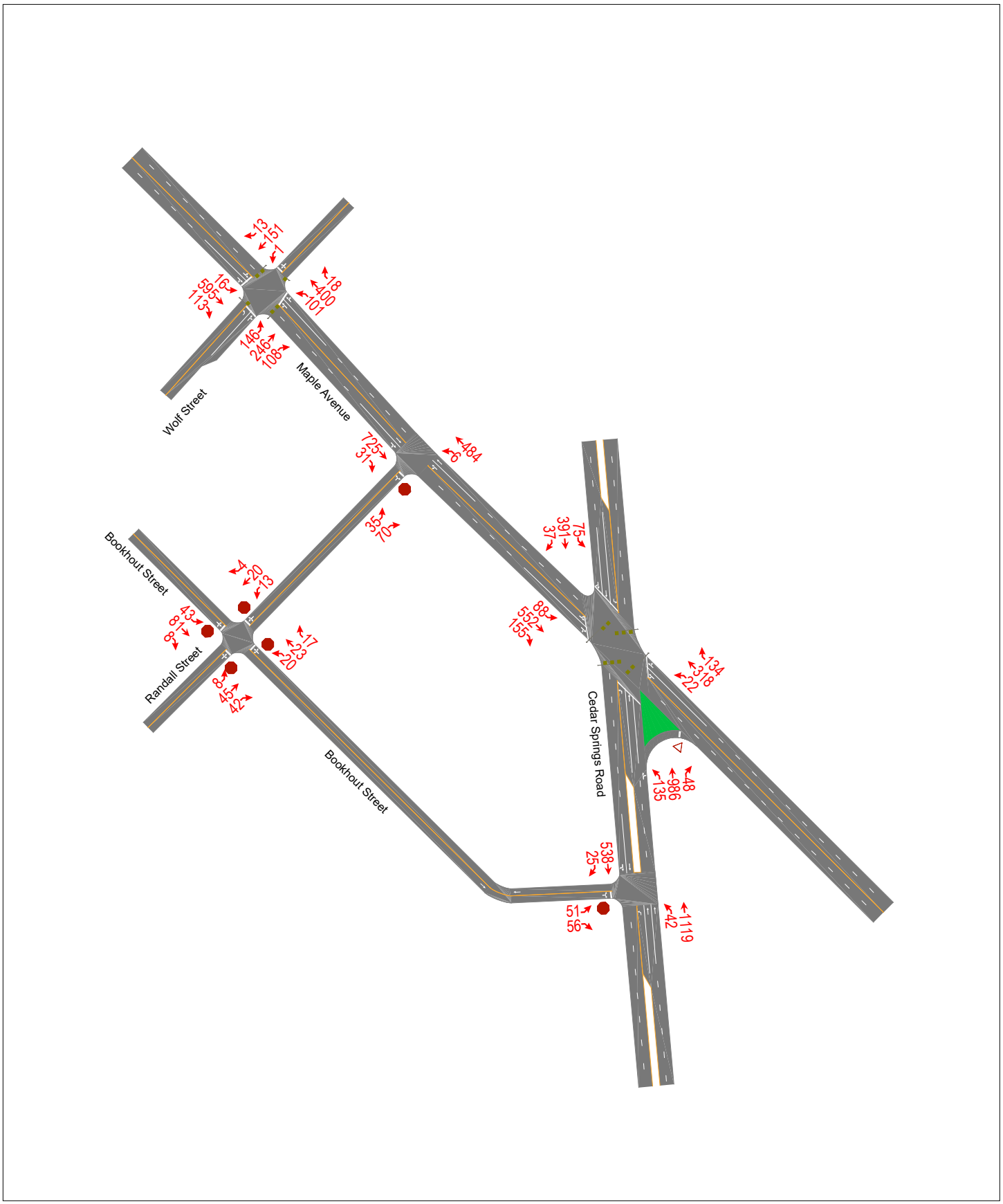


3482-20.205
AJV

04/08/2020
Pacheco Koch

Appendix A3 - Existing PM

North ^
Not to Scale



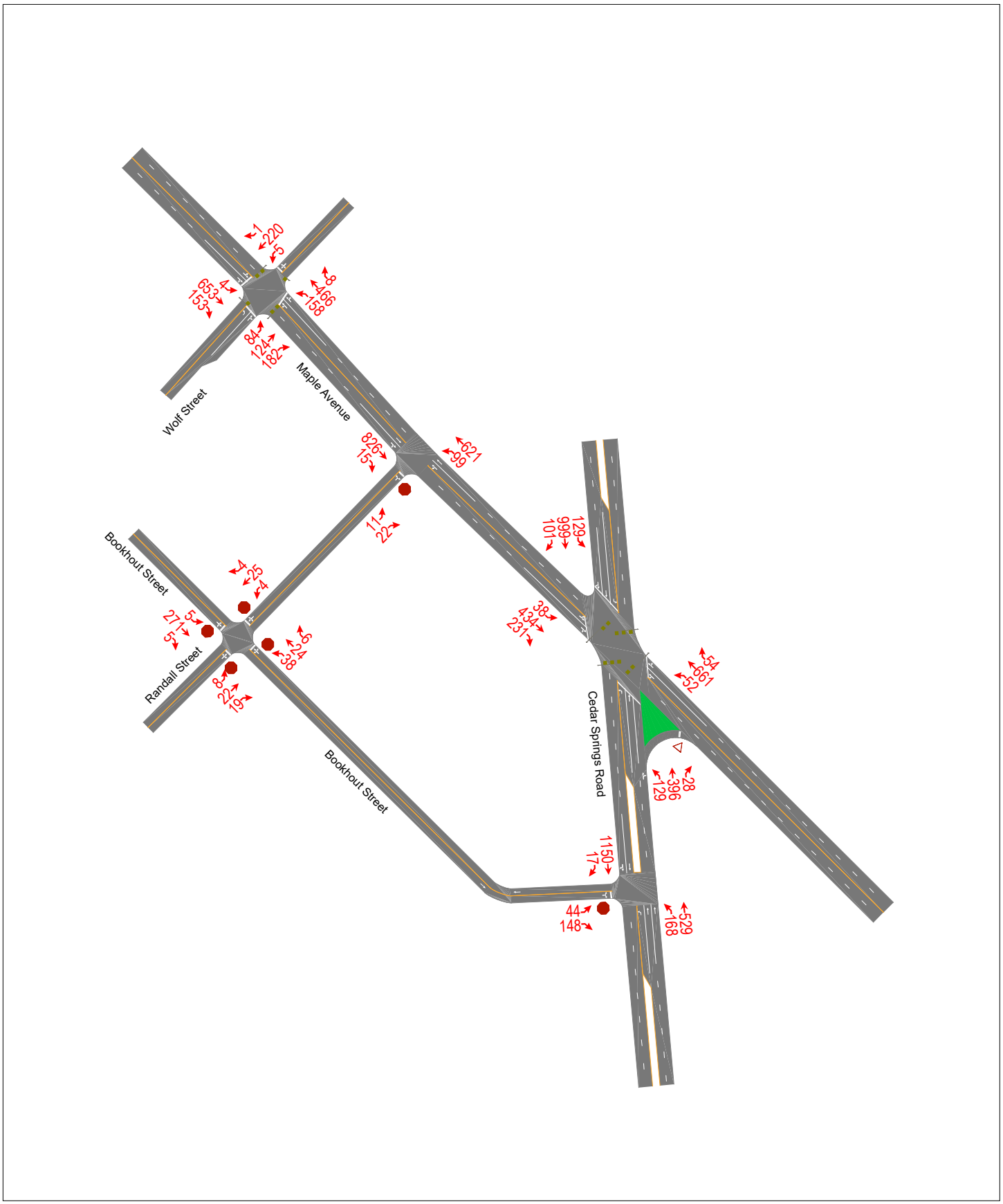
3482-20.205
AJV

04/08/2020
Pacheco Koch

Appendix A4 - Background AM

North ^

Not to Scale



3482-20.205

AJV

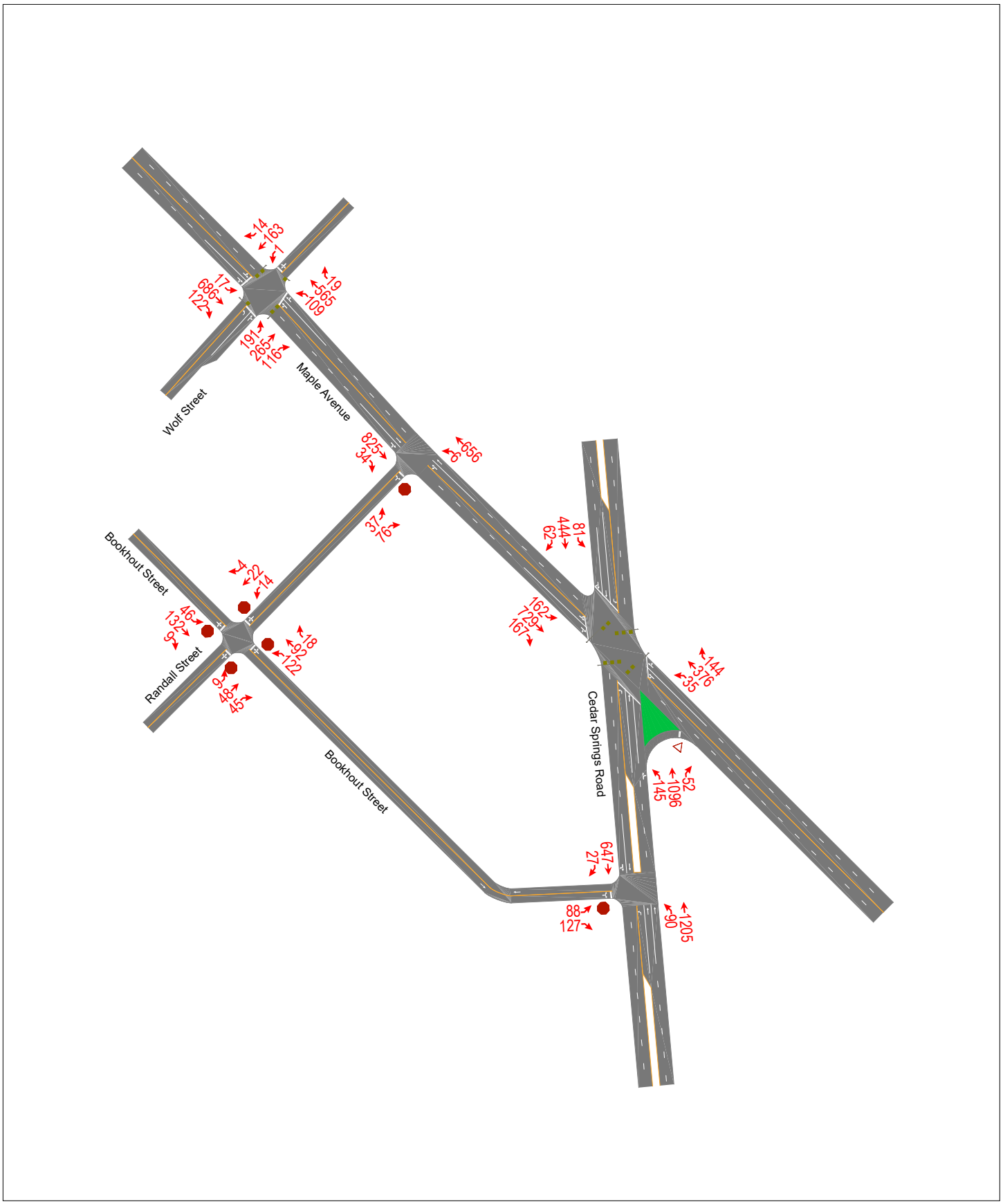
04/08/2020

Pacheco Koch

Appendix A5 - Background PM

North ^

Not to Scale



3482-20.205

AJV

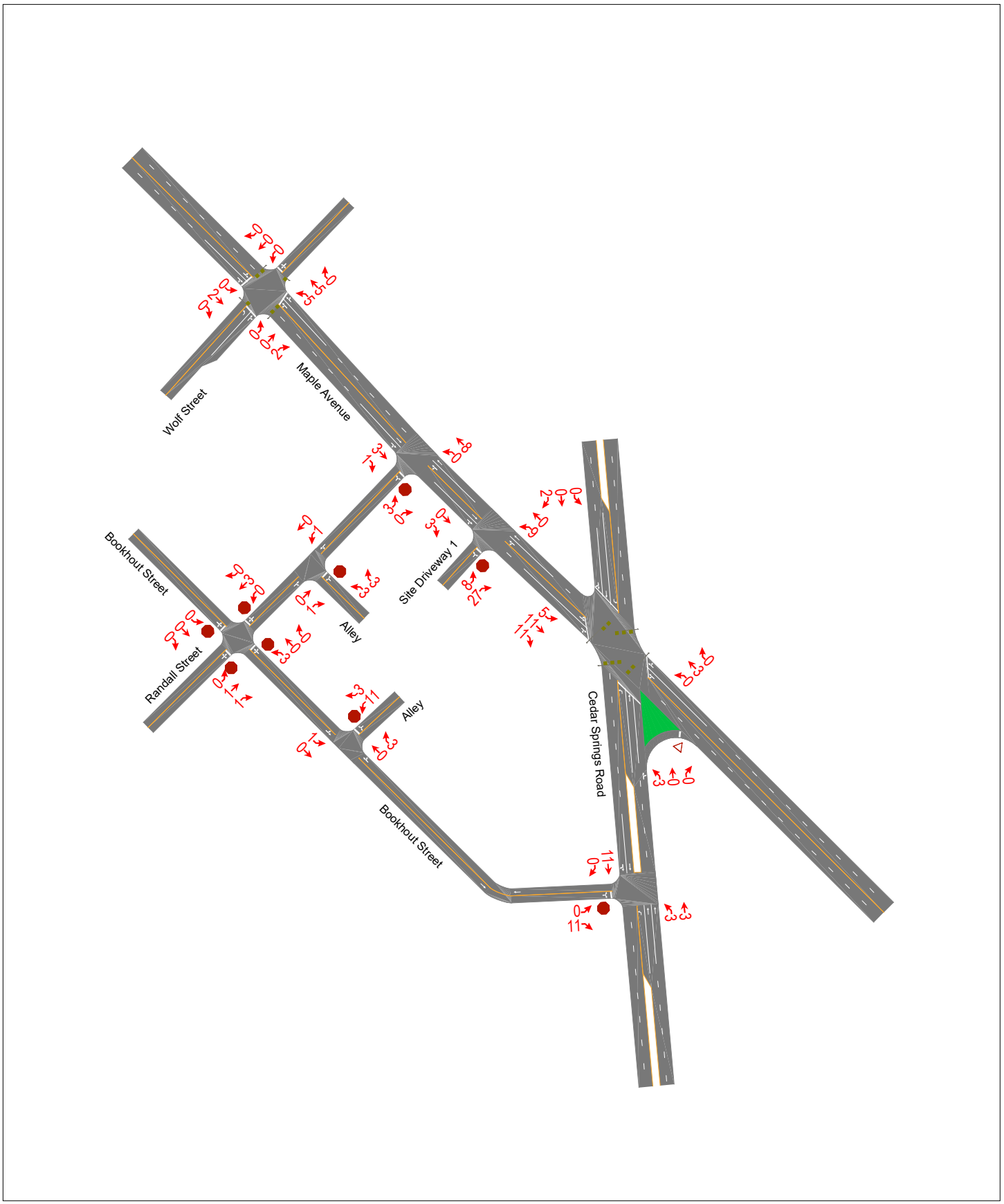
04/08/2020

Pacheco Koch

Appendix A6 - Site Generated AM

North ^

Not to Scale



3482-20.205

AJV

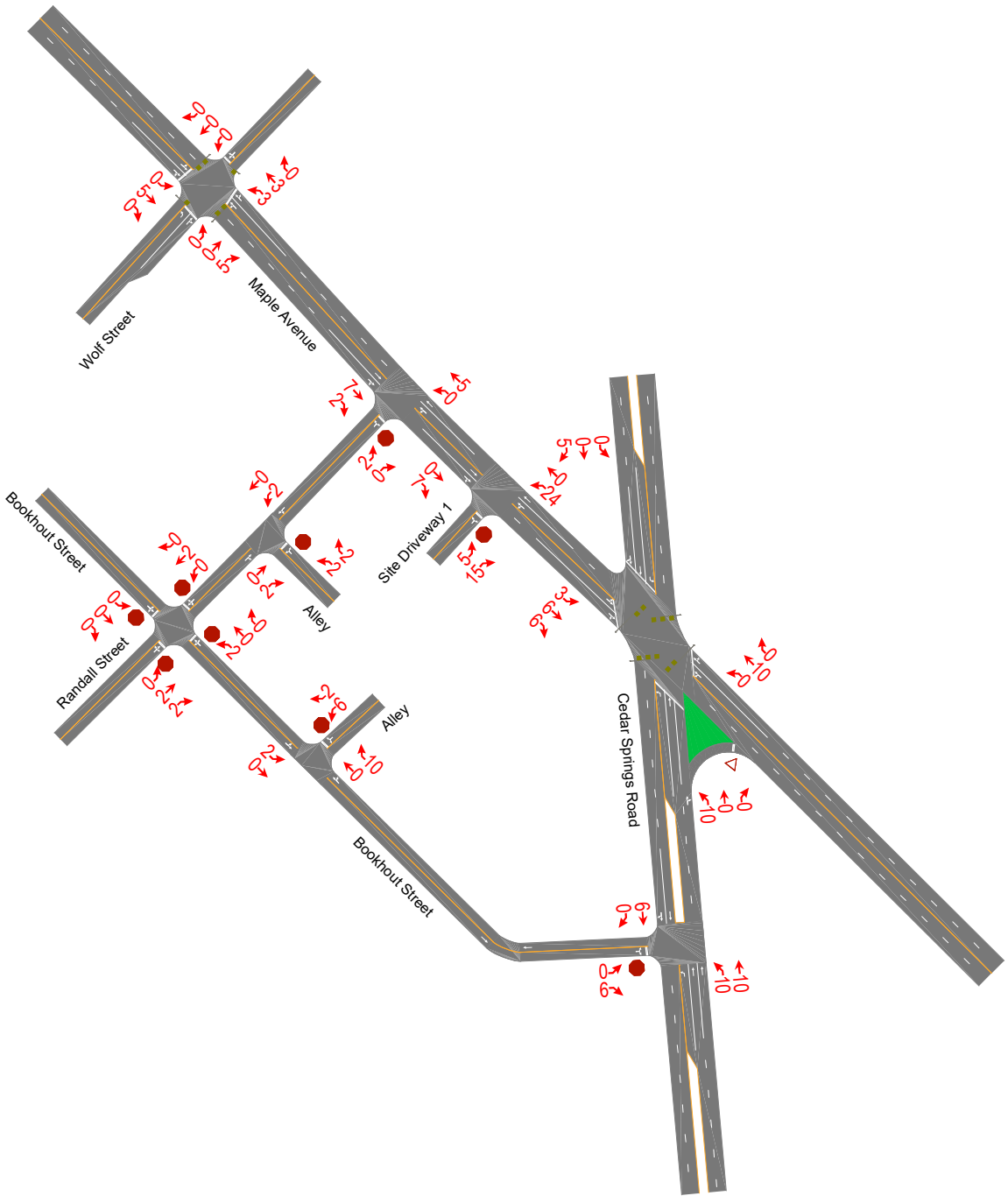
04/20/2020

Pacheco Koch

Appendix A7 - Site Generated PM

North ^

Not to Scale



3482-20.205

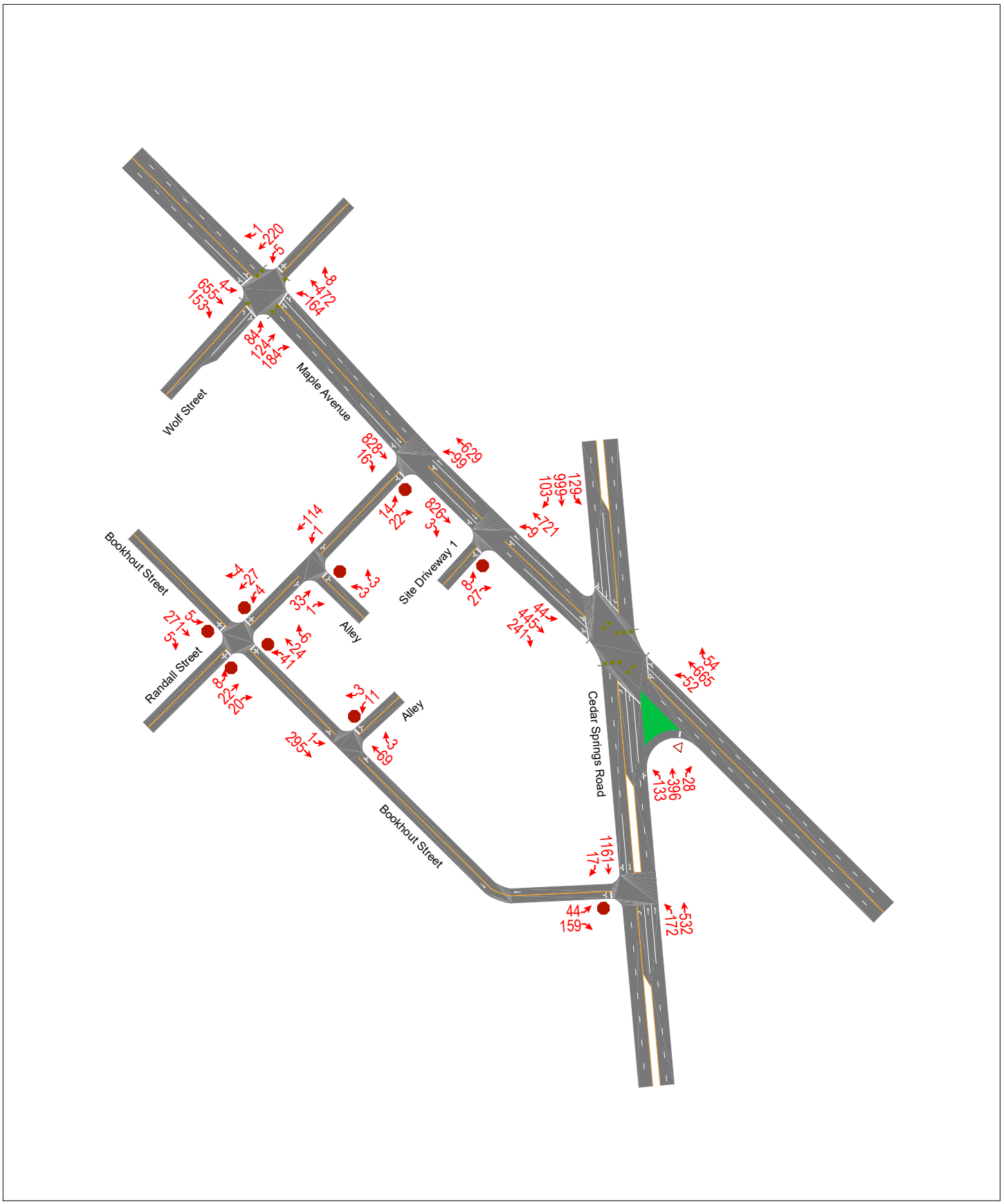
AJV

05/05/2020

Pacheco Koch

Appendix A8 - Buildout AM

North ^
Not to Scale

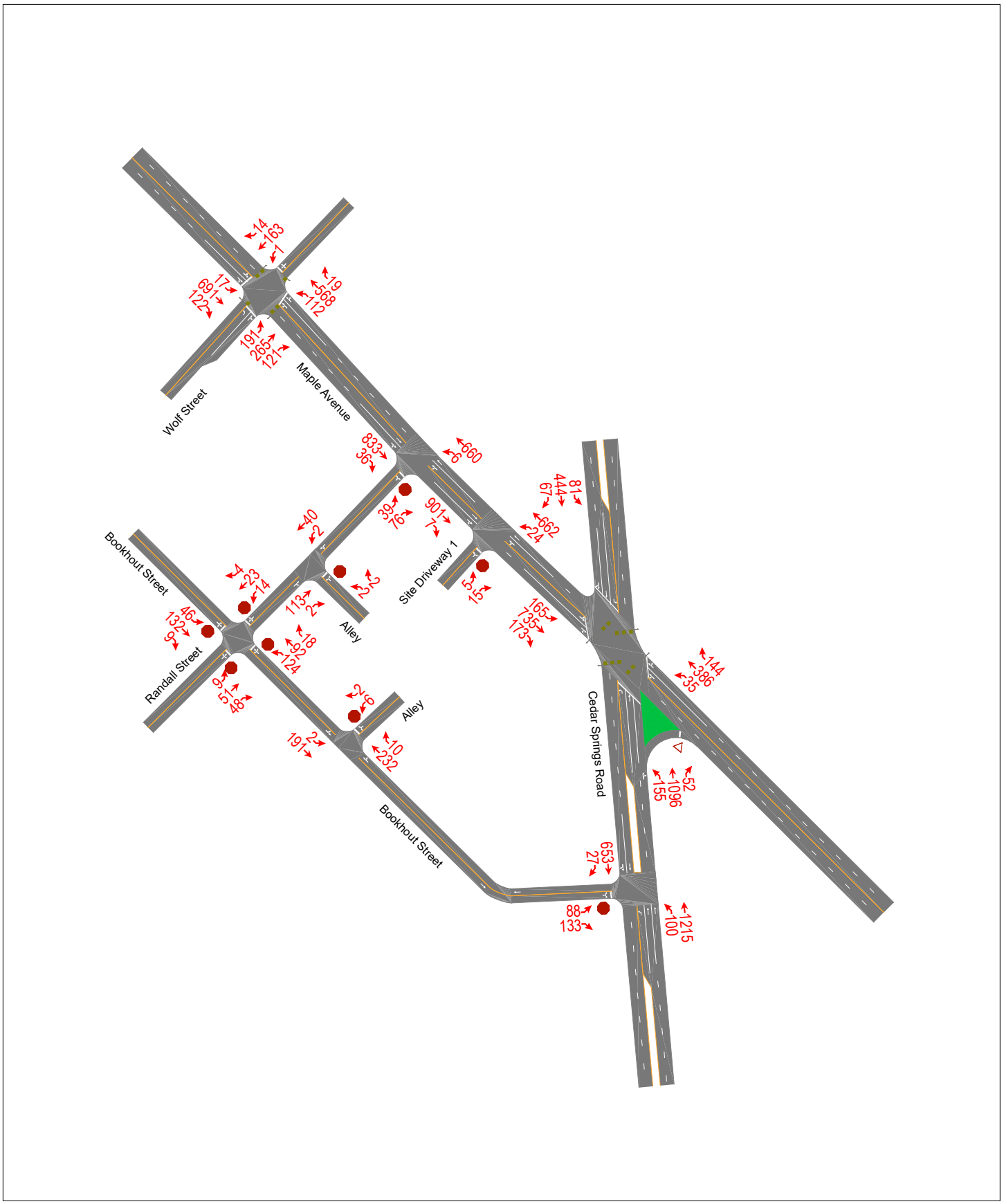


3482-20.205
AJV

04/20/2020
Pacheco Koch

Appendix A9 - Buildout PM

North ^
Not to Scale



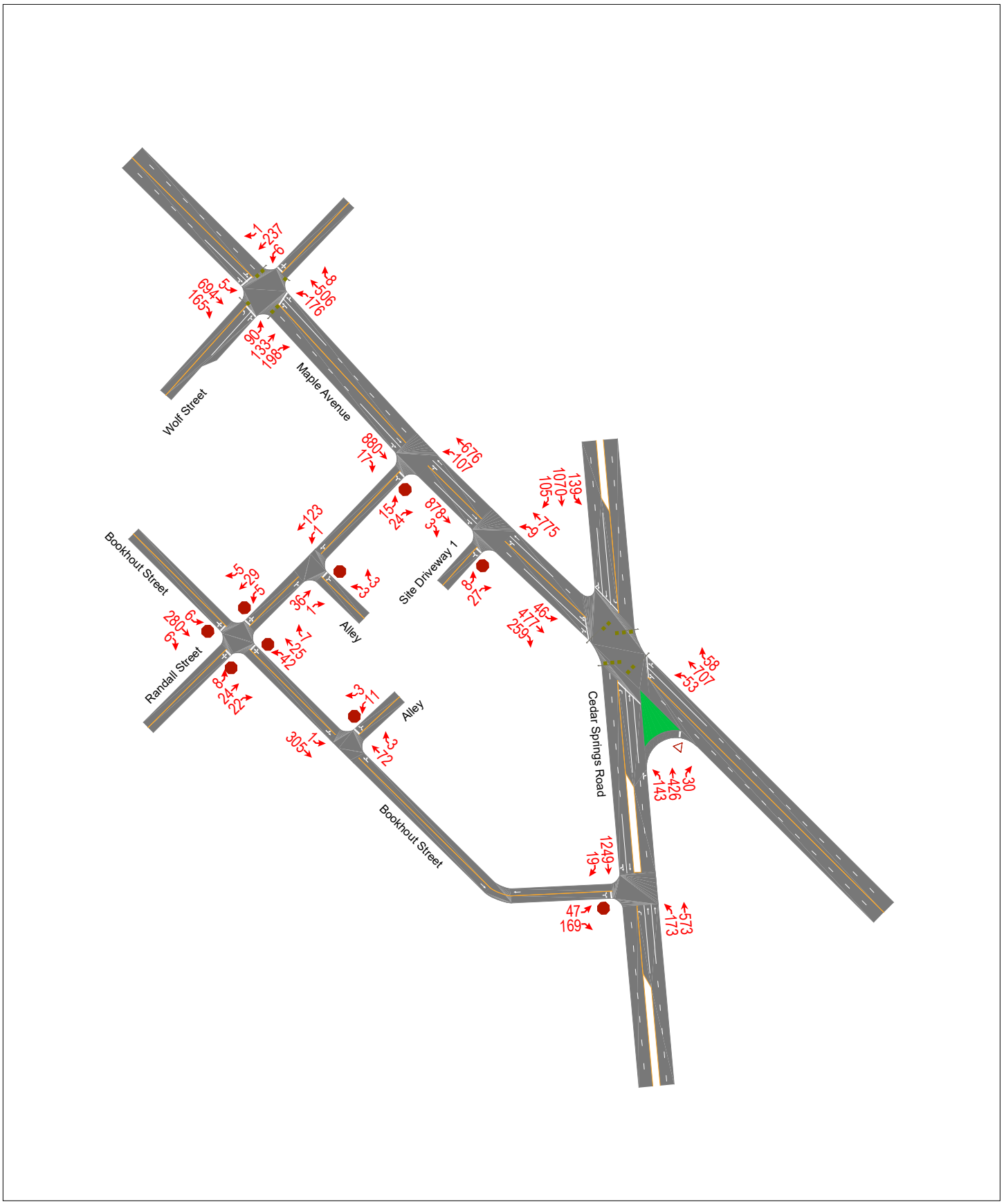
3482-20.205
AJV

04/20/2020
Pacheco Koch

Appendix A10 - Horizon AM

North ^

Not to Scale



3482-20.205

AJV

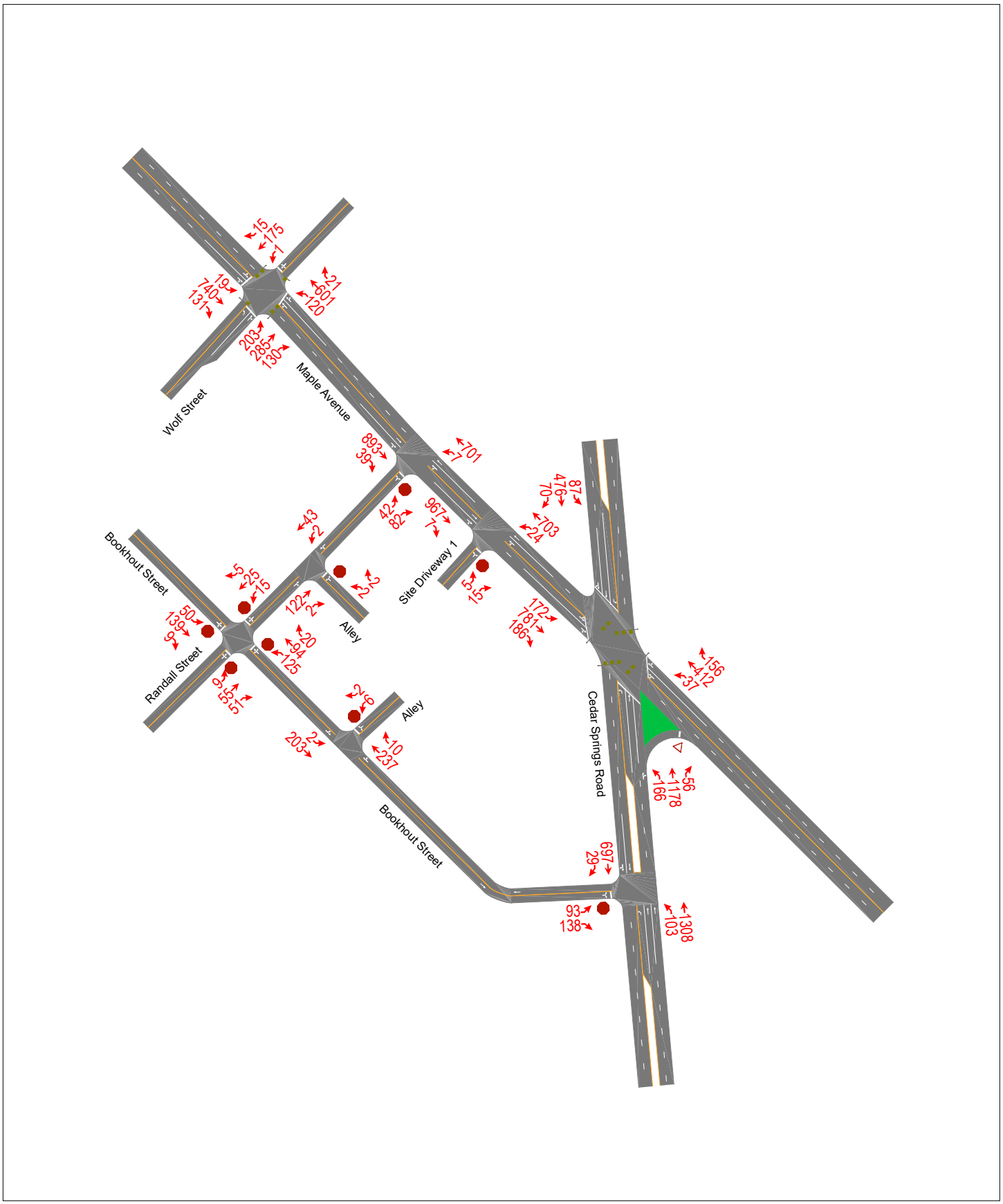
04/20/2020

Pacheco Koch

Appendix A11 - Horizon PM

North ^

Not to Scale



3482-20.205

AJV

05/06/2020

Pacheco Koch

APPENDIX B. Detailed Traffic Volume Data

3. Cedar Springs Road at Maple Avenue - TMC
Tue Apr 24, 2018
Full Length (7AM-9AM, 4:30PM-6:30PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 513738, Location: 32.79624, -96.805347, Site Code: 3

Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave., Pasadena, TX, 77503, US

Leg	Maple Avenue						Maple Avenue						Cedar Springs Road						Cedar Springs Road						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2018-04-24 7:00AM	3	60	25	0	**88**	0	3	135	8	0	**146**	0	32	30	6	0	**68**	2	21	68	1	0	**90**	0	**392**
7:15AM	4	40	31	0	**75**	2	2	135	4	0	**141**	3	33	46	4	0	**83**	0	11	103	8	0	**122**	2	**421**
7:30AM	3	91	41	0	**135**	0	1	183	14	0	**198**	4	29	57	6	0	**92**	4	18	144	4	0	**166**	0	**591**
7:45AM	3	98	50	0	**151**	1	5	135	13	0	**153**	3	34	89	7	0	**130**	2	35	204	7	0	**246**	3	**680**
Hourly Total	13	289	147	0	**449**	3	11	588	39	0	**638**	10	128	222	23	0	**373**	8	85	519	20	0	**624**	5	**2084**
8:00AM	12	91	59	0	**162**	2	1	149	9	0	**159**	3	23	95	5	0	**123**	3	22	190	4	0	**216**	0	**660**
8:15AM	6	79	40	0	**125**	1	4	102	11	0	**117**	2	31	102	5	0	**138**	1	38	272	3	0	**313**	1	**693**
8:30AM	5	116	65	0	**186**	4	3	121	17	0	**141**	8	32	77	9	0	**118**	2	25	190	9	0	**224**	1	**669**
8:45AM	9	95	38	0	**142**	2	4	108	9	0	**121**	2	26	92	8	0	**126**	1	29	224	7	0	**260**	1	**649**
Hourly Total	32	381	202	0	**615**	9	12	480	46	0	**538**	15	112	366	27	0	**505**	7	114	876	23	0	**1013**	3	**2671**
4:30PM	17	128	48	0	**193**	6	5	71	26	0	**102**	5	30	166	12	0	**208**	3	15	80	6	0	**101**	5	**604**
4:45PM	23	154	24	0	**201**	4	5	57	17	0	**79**	2	21	177	13	0	**211**	5	19	93	3	0	**115**	4	**606**
Hourly Total	40	282	72	0	**394**	10	10	128	43	0	**181**	7	51	343	25	0	**419**	8	34	173	9	0	**216**	9	**1210**
5:00PM	12	154	29	0	**195**	4	4	76	30	0	**110**	1	35	200	11	0	**246**	1	15	94	5	0	**114**	5	**665**
5:15PM	19	143	43	1	**206**	2	7	68	46	0	**121**	7	31	254	11	0	**296**	12	23	104	10	0	**137**	3	**760**
5:30PM	22	123	49	0	**194**	6	5	86	31	0	**122**	6	32	243	19	0	**294**	4	12	91	6	0	**109**	6	**719**
5:45PM	25	156	29	0	**210**	14	2	73	26	0	**101**	4	32	244	10	0	**286**	8	24	95	12	1	**132**	6	**729**
Hourly Total	78	576	150	1	**805**	26	18	303	133	0	**454**	18	130	941	51	0	**1122**	25	74	384	33	1	**492**	20	**2873**
6:00PM	22	130	34	0	**186**	6	8	91	31	0	**130**	1	40	245	8	0	**293**	5	16	101	9	0	**126**	7	**735**
6:15PM	29	110	46	0	**185**	5	2	62	30	0	**94**	7	28	200	12	0	**240**	11	14	107	4	0	**125**	2	**644**
Hourly Total	51	240	80	0	**371**	11	10	153	61	0	**224**	8	68	445	20	0	**533**	16	30	208	13	0	**251**	9	**1379**
Total	214	1768	651	1	**2634**	59	61	1652	322	0	**2035**	58	489	2317	146	0	**2952**	64	337	2160	98	1	**2596**	46	**10217**
% Approach	8.1%	67.1%	24.7%	0%	-	-	3.0%	81.2%	15.8%	0%	-	-	16.6%	78.5%	4.9%	0%	-	-	13.0%	83.2%	3.8%	0%	-	-	-
% Total	2.1%	17.3%	6.4%	0%	**25.8%**	-	0.6%	16.2%	3.2%	0%	**19.9%**	-	4.8%	22.7%	1.4%	0%	**28.9%**	-	3.3%	21.1%	1.0%	0%	**25.4%**	-	-
Lights	212	1742	642	1	**2597**	-	59	1626	319	0	**2004**	-	484	2309	140	0	**2933**	-	333	2150	98	1	**2582**	-	10116
% Lights	99.1%	98.5%	98.6%	100%	**98.6%**	-	96.7%	98.4%	99.1%	0%	**98.5%**	-	99.0%	99.7%	95.9%	0%	**99.4%**	-	98.8%	99.5%	100%	100%	**99.5%**	-	99.0%
Articulated Trucks	1	2	0	0	**3**	-	0	2	0	0	**2**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	6
% Articulated Trucks	0.5%	0.1%	0%	0%	**0.1%**	-	0%	0.1%	0%	0%	**0.1%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.1%
Buses and Single-Unit Trucks	1	24	9	0	**34**	-	2	24	3	0	**29**	-	5	8	6	0	**19**	-	4	9	0	0	**13**	-	95
% Buses and Single-Unit Trucks	0.5%	1.4%	1.4%	0%	**1.3%**	-	3.3%	1.5%	0.9%	0%	**1.4%**	-	1.0%	0.3%	4.1%	0%	**0.6%**	-	1.2%	0.4%	0%	0%	**0.5%**	-	0.9%
Pedestrians	-	-	-	-	-	55	-	-	-	-	-	48	-	-	-	-	-	60	-	-	-	-	-	39	
% Pedestrians	-	-	-	-	-	93.2%	-	-	-	-	-	82.8%	-	-	-	-	-	93.8%	-	-	-	-	-	84.8%	-
Bicycles on Crosswalk	-	-	-	-	-	4	-	-	-	-	-	10	-	-	-	-	-	4	-	-	-	-	-	7	
% Bicycles on Crosswalk	-	-	-	-	-	6.8%	-	-	-	-	-	17.2%	-	-	-	-	-	6.3%	-	-	-	-	-	15.2%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

NOTE: The information on this page was obtained for the Traffic Impact Analysis for 2323 Cedar Springs Road. (Kimley Horn, August 2018. Used by permission.)

4. Cedar Springs Road at Bookhout Street - TMC

Tue Apr 24, 2018
Full Length (7AM-9AM, 4:30PM-6:30PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 513740, Location: 32.795211, -96.805239, Site Code: 4

Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg / Direction	Bookhout Street Eastbound					Cedar Springs Road Northbound					Cedar Springs Road Southbound					
Time	L	R	U	**App**	Ped*	L	T	U	**App**	Ped*	T	R	U	**App**	Ped*	**Int**
2018-04-24 7:00AM	3	12	0	**15**	4	5	74	0	**79**	0	89	2	0	**91**	0	**185**
7:15AM	6	16	0	**22**	1	12	80	0	**92**	1	133	4	0	**137**	0	**251**
7:30AM	8	21	0	**29**	3	1	90	0	**91**	0	183	6	0	**189**	0	**309**
7:45AM	14	31	0	**45**	4	3	115	0	**118**	0	254	3	0	**257**	0	**420**
Hourly Total	31	80	0	**111**	12	21	359	0	**380**	1	659	15	0	**674**	0	**1165**
8:00AM	10	44	0	**54**	5	3	121	0	**124**	0	232	6	0	**238**	0	**416**
8:15AM	8	34	0	**42**	10	1	130	0	**131**	1	307	2	0	**309**	0	**482**
8:30AM	12	24	0	**36**	8	6	116	0	**122**	0	261	2	0	**263**	0	**421**
8:45AM	6	26	0	**32**	1	4	124	1	**129**	0	258	6	0	**264**	0	**425**
Hourly Total	36	128	0	**164**	24	14	491	1	**506**	1	1058	16	0	**1074**	0	**1744**
4:30PM	12	8	0	**20**	4	4	194	0	**198**	0	129	10	0	**139**	0	**357**
4:45PM	6	10	0	**16**	5	9	203	0	**212**	0	115	9	0	**124**	0	**352**
Hourly Total	18	18	0	**36**	9	13	397	0	**410**	0	244	19	0	**263**	0	**709**
5:00PM	13	20	0	**33**	6	6	244	0	**250**	0	132	4	0	**136**	0	**419**
5:15PM	15	7	0	**22**	4	10	267	1	**278**	0	154	2	0	**156**	0	**456**
5:30PM	10	10	0	**20**	1	10	291	0	**301**	1	128	7	0	**135**	0	**456**
5:45PM	8	22	0	**30**	4	9	283	3	**295**	0	120	8	0	**128**	0	**453**
Hourly Total	46	59	0	**105**	15	35	1085	4	**1124**	1	534	21	0	**555**	0	**1784**
6:00PM	18	17	0	**35**	5	13	278	0	**291**	0	136	8	0	**144**	0	**470**
6:15PM	12	9	0	**21**	24	5	223	3	**231**	1	153	7	0	**160**	1	**412**
Hourly Total	30	26	0	**56**	29	18	501	3	**522**	1	289	15	0	**304**	1	**882**
Total	161	311	0	**472**	89	101	2833	8	**2942**	4	2784	86	0	**2870**	1	**6284**
% Approach	34.1%	65.9%	0%	-	-	3.4%	96.3%	0.3%	-	-	97.0%	3.0%	0%	-	-	-
% Total	2.6%	4.9%	0%	**7.5%**	-	1.6%	45.1%	0.1%	**46.8%**	-	44.3%	1.4%	0%	**45.7%**	-	-
Lights	160	308	0	**468**	-	100	2815	8	**2923**	-	2768	85	0	**2853**	-	6244
% Lights	99.4%	99.0%	0%	**99.2%**	-	99.0%	99.4%	100%	**99.4%**	-	99.4%	98.8%	0%	**99.4%**	-	99.4%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	1	0	0	**1**	-	1
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Buses and Single-Unit Trucks	1	3	0	**4**	-	1	18	0	**19**	-	15	1	0	**16**	-	39
% Buses and Single-Unit Trucks	0.6%	1.0%	0%	**0.8%**	-	1.0%	0.6%	0%	**0.6%**	-	0.5%	1.2%	0%	**0.6%**	-	0.6%
Pedestrians	-	-	-	-	88	-	-	-	-	4	-	-	-	-	1	
% Pedestrians	-	-	-	-	98.9%	-	-	-	-	100%	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	1.1%	-	-	-	-	0%	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

NOTE: The information on this page was obtained for the Traffic Impact Analysis for 2323 Cedar Springs Road. (Kimley Horn, August 2018. Used by permission.)

9. Maple Avenue at Wolf Street - TMC

Tue Apr 24, 2018
Full Length (7AM-9AM, 4:30PM-6:30PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 513748, Location: 32.797966, -96.807377, Site Code: 9

Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave., Pasadena, TX, 77503, US

Leg	Maple Avenue						Maple Avenue						Wolf Street						Wolf Street						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2018-04-24 7:00AM	1	74	27	0	**102**	0	28	104	2	0	**134**	1	20	6	20	0	**46**	0	1	24	1	0	**26**	3	**308**
7:15AM	2	74	38	0	**114**	1	45	104	0	0	**149**	4	12	13	24	0	**49**	5	2	47	0	0	**49**	2	**361**
7:30AM	2	113	36	0	**151**	0	51	125	1	0	**177**	1	11	13	24	0	**48**	1	1	53	0	0	**54**	1	**430**
7:45AM	2	110	37	0	**149**	0	37	115	1	0	**153**	0	20	32	41	0	**93**	2	2	50	0	0	**52**	2	**447**
Hourly Total	7	371	138	0	**516**	1	161	448	4	0	**613**	6	63	64	109	0	**236**	8	6	174	1	0	**181**	8	**1546**
8:00AM	0	124	36	0	**160**	2	38	107	2	0	**147**	0	18	21	42	0	**81**	3	0	57	1	0	**58**	0	**446**
8:15AM	1	102	33	0	**136**	2	39	97	1	0	**137**	4	20	34	38	0	**92**	1	1	53	0	0	**54**	3	**419**
8:30AM	1	128	36	0	**165**	1	33	95	3	0	**131**	0	15	28	48	0	**91**	1	2	44	0	0	**46**	1	**433**
8:45AM	2	102	34	0	**138**	0	39	97	1	0	**137**	2	22	31	48	0	**101**	0	0	35	0	0	**35**	1	**411**
Hourly Total	4	456	139	0	**599**	5	149	396	7	0	**552**	6	75	114	176	0	**365**	5	3	189	1	0	**193**	5	**1709**
4:30PM	3	132	32	0	**167**	0	28	97	5	0	**130**	2	18	35	23	0	**76**	4	1	31	2	0	**34**	0	**407**
4:45PM	1	152	30	0	**183**	1	24	70	4	0	**98**	9	25	43	29	0	**97**	11	1	36	1	0	**38**	7	**416**
Hourly Total	4	284	62	0	**350**	1	52	167	9	0	**228**	11	43	78	52	0	**173**	15	2	67	3	0	**72**	7	**823**
5:00PM	4	151	24	0	**179**	4	24	91	3	0	**118**	5	28	58	21	0	**107**	4	1	48	6	0	**55**	3	**459**
5:15PM	4	144	27	0	**175**	1	31	93	5	0	**129**	3	31	74	23	0	**128**	18	1	46	1	0	**48**	4	**480**
5:30PM	5	143	27	0	**175**	4	27	92	5	0	**124**	0	29	47	34	0	**110**	4	0	33	4	0	**37**	2	**446**
5:45PM	5	162	29	0	**196**	4	20	98	6	0	**124**	1	40	64	28	0	**132**	4	1	35	4	0	**40**	13	**492**
Hourly Total	18	600	107	0	**725**	13	102	374	19	0	**495**	9	128	243	106	0	**477**	30	3	162	15	0	**180**	22	**1877**
6:00PM	2	146	30	0	**178**	6	23	117	2	0	**142**	11	46	61	23	0	**130**	6	0	37	4	0	**41**	9	**491**
6:15PM	5	135	34	0	**174**	3	14	73	3	0	**90**	11	32	43	23	0	**98**	8	4	27	5	0	**36**	8	**398**
Hourly Total	7	281	64	0	**352**	9	37	190	5	0	**232**	22	78	104	46	0	**228**	14	4	64	9	0	**77**	17	**889**
Total	40	1992	510	0	**2542**	29	501	1575	44	0	**2120**	54	387	603	489	0	**1479**	72	18	656	29	0	**703**	59	**6844**
% Approach	1.6%	78.4%	20.1%	0%	-	-	23.6%	74.3%	2.1%	0%	-	-	26.2%	40.8%	33.1%	0%	-	-	2.6%	93.3%	4.1%	0%	-	-	-
% Total	0.6%	29.1%	7.5%	0%	**37.1%**	-	7.3%	23.0%	0.6%	0%	**31.0%**	-	5.7%	8.8%	7.1%	0%	**21.6%**	-	0.3%	9.6%	0.4%	0%	**10.3%**	-	-
Lights	39	1962	505	0	**2506**	-	494	1548	43	0	**2085**	-	384	602	484	0	**1470**	-	15	652	29	0	**696**	-	6757
% Lights	97.5%	98.5%	99.0%	0%	**98.6%**	-	98.6%	98.3%	97.7%	0%	**98.3%**	-	99.2%	99.8%	99.0%	0%	**99.4%**	-	83.3%	99.4%	100%	0%	**99.0%**	-	98.7%
Articulated Trucks	0	1	0	0	**1**	-	2	1	0	0	**3**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	4
% Articulated Trucks	0%	0.1%	0%	0%	**0%**	-	0.4%	0.1%	0%	0%	**0.1%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.1%
Buses and Single-Unit Trucks	1	29	5	0	**35**	-	5	26	1	0	**32**	-	3	1	5	0	**9**	-	3	4	0	0	**7**	-	83
% Buses and Single-Unit Trucks	2.5%	1.5%	1.0%	0%	**1.4%**	-	1.0%	1.7%	2.3%	0%	**1.5%**	-	0.8%	0.2%	1.0%	0%	**0.6%**	-	16.7%	0.6%	0%	0%	**1.0%**	-	1.2%
Pedestrians	-	-	-	-	-	28	-	-	-	-	-	54	-	-	-	-	-	67	-	-	-	-	-	56	
% Pedestrians	-	-	-	-	-	96.6%	-	-	-	-	-	100%	-	-	-	-	-	93.1%	-	-	-	-	-	94.9%	-
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	3	
% Bicycles on Crosswalk	-	-	-	-	-	3.4%	-	-	-	-	-	0%	-	-	-	-	-	6.9%	-	-	-	-	-	5.1%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

NOTE: The information on this page was obtained for the Traffic Impact Analysis for 2323 Cedar Springs Road. (Kimley Horn, August 2018. Used by permission.)

12. Bookhout Street at Randall Street - TMC
Tue Apr 24, 2018
Full Length (7AM-9AM, 4:30PM-6:30PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)
All Movements
ID: 513752, Location: 32.796358, -96.80747, Site Code: 12

Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave., Pasadena, TX, 77503, US

Leg	Bookhout Street						Bookhout Street						Randall Street						Randall Street						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2018-04-24 7:00AM	2	8	0	0	**10**	1	4	9	1	0	**14**	1	1	5	1	0	**7**	4	2	2	1	0	**5**	2	**36**
7:15AM	1	12	2	0	**15**	0	12	6	2	0	**20**	1	2	7	5	0	**14**	2	0	5	0	0	**5**	1	**54**
7:30AM	1	15	1	0	**17**	0	3	8	2	0	**13**	0	1	4	6	0	**11**	2	1	6	1	0	**8**	3	**49**
7:45AM	2	32	1	0	**35**	1	6	7	3	0	**16**	1	3	5	6	0	**14**	2	0	7	1	0	**8**	0	**73**
Hourly Total	6	67	4	0	**77**	2	25	30	8	0	**63**	3	7	21	18	0	**46**	10	3	20	3	0	**26**	6	**212**
8:00AM	1	26	0	0	**27**	0	3	1	3	0	**7**	1	1	7	5	0	**13**	5	1	3	0	0	**4**	2	**51**
8:15AM	1	23	1	0	**25**	1	8	1	0	0	**9**	1	2	5	4	0	**11**	3	0	7	2	0	**9**	0	**54**
8:30AM	1	28	3	0	**32**	2	4	4	0	0	**8**	1	1	3	3	0	**7**	5	1	6	1	0	**8**	0	**55**
8:45AM	4	23	0	0	**27**	2	8	2	5	0	**15**	3	1	9	3	0	**13**	3	2	6	1	0	**9**	0	**64**
Hourly Total	7	100	4	0	**111**	5	23	8	8	0	**39**	6	5	24	15	0	**44**	16	4	22	4	0	**30**	2	**224**
4:30PM	5	10	0	0	**15**	2	7	3	0	0	**10**	4	4	4	5	0	**13**	5	2	8	4	0	**14**	3	**52**
4:45PM	5	10	0	0	**15**	2	2	6	1	0	**9**	2	1	8	3	0	**12**	2	1	6	1	0	**8**	1	**44**
Hourly Total	10	20	0	0	**30**	4	9	9	1	0	**19**	6	5	12	8	0	**25**	7	3	14	5	0	**22**	4	**96**
5:00PM	5	26	1	0	**32**	3	4	1	5	0	**10**	1	3	5	7	0	**15**	2	5	12	1	0	**18**	4	**75**
5:15PM	13	24	4	0	**41**	3	4	3	3	0	**10**	2	2	7	5	0	**14**	6	2	8	2	0	**12**	6	**77**
5:30PM	10	16	1	0	**27**	1	4	5	2	0	**11**	3	3	9	6	0	**18**	1	5	7	1	0	**13**	1	**69**
5:45PM	12	21	2	0	**35**	0	4	6	2	0	**12**	3	3	17	15	0	**35**	4	2	7	1	0	**10**	3	**92**
Hourly Total	40	87	8	0	**135**	7	16	15	12	0	**43**	9	11	38	33	0	**82**	13	14	34	5	0	**53**	14	**313**
6:00PM	6	25	2	0	**33**	2	10	5	6	0	**21**	11	0	11	10	0	**21**	3	1	6	1	0	**8**	3	**83**
6:15PM	15	19	3	0	**37**	1	2	7	7	1	**17**	6	2	8	11	0	**21**	4	5	0	1	0	**6**	5	**81**
Hourly Total	21	44	5	0	**70**	3	12	12	13	1	**38**	17	2	19	21	0	**42**	7	6	6	2	0	**14**	8	**164**
Total	84	318	21	0	**423**	21	85	74	42	1	**202**	41	30	114	95	0	**239**	53	30	96	19	0	**145**	34	**1009**
% Approach	19.9%	75.2%	5.0%	0%	**-**	-	42.1%	36.6%	20.8%	0.5%	**-**	-	12.6%	47.7%	39.7%	0%	**-**	-	20.7%	66.2%	13.1%	0%	**-**	-	-
% Total	8.3%	31.5%	2.1%	0%	**41.9%**	-	8.4%	7.3%	4.2%	0.1%	**20.0%**	-	3.0%	11.3%	9.4%	0%	**23.7%**	-	3.0%	9.5%	1.9%	0%	**14.4%**	-	-
Lights	83	316	21	0	**420**	-	85	73	42	1	**201**	-	30	110	94	0	**234**	-	30	96	18	0	**144**	-	999
% Lights	98.8%	99.4%	100%	0%	**99.3%**	-	100%	98.6%	100%	100%	**99.5%**	-	100%	96.5%	98.9%	0%	**97.9%**	-	100%	100%	94.7%	0%	**99.3%**	-	99.0%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	1
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0.9%	0%	0%	**0.4%**	-	0%	0%	0%	0%	**0%**	-	0.1%
Buses and Single-Unit Trucks	1	2	0	0	**3**	-	0	1	0	0	**1**	-	0	3	1	0	**4**	-	0	0	1	0	**1**	-	9
% Buses and Single-Unit Trucks	1.2%	0.6%	0%	0%	**0.7%**	-	0%	1.4%	0%	0%	**0.5%**	-	0%	2.6%	1.1%	0%	**1.7%**	-	0%	0%	5.3%	0%	**0.7%**	-	0.9%
Pedestrians	-	-	-	-	-	21	-	-	-	-	-	41	-	-	-	-	-	52	-	-	-	-	-	34	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	98.1%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	1.9%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

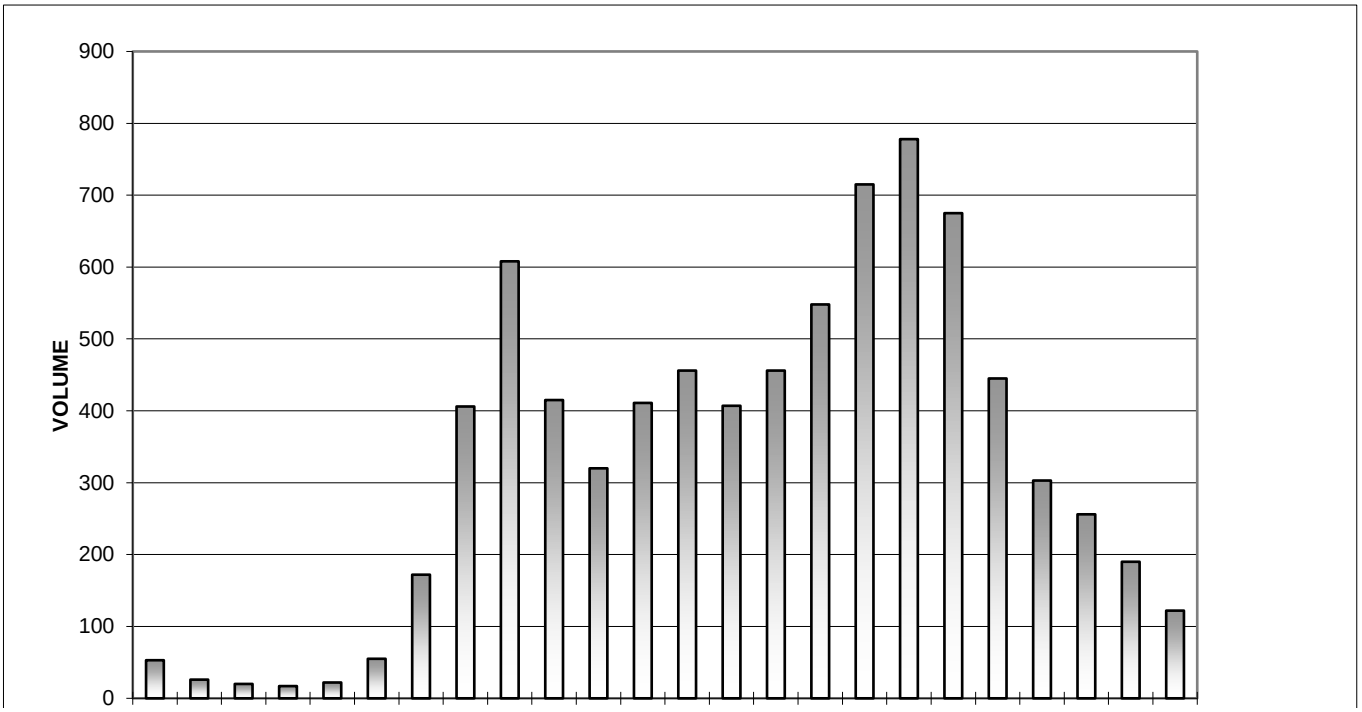
NOTE: The information on this page was obtained for the Traffic Impact Analysis for 2323 Cedar Springs Road. (Kimley Horn, August 2018. Used by permission.)

EB Maple Avenue West of Cedar Springs Road

Date Began:
4/24/2018

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	16	22	9	6	53
1:00	4	6	7	9	26
2:00	4	6	9	1	20
3:00	5	5	4	3	17
4:00	3	3	8	8	22
5:00	10	15	9	21	55
6:00	30	36	46	60	172
7:00	74	71	120	141	406
8:00	157	132	164	155	608
9:00	134	116	86	79	415
10:00	89	72	77	82	320
11:00	84	111	108	108	411
12:00	126	97	126	107	456
13:00	104	109	100	94	407
14:00	118	108	128	102	456
15:00	121	129	155	143	548
16:00	159	169	187	200	715
17:00	182	192	187	217	778
18:00	176	188	147	164	675
19:00	122	109	110	104	445
20:00	94	71	69	69	303
21:00	52	62	63	79	256
22:00	56	64	36	34	190
23:00	38	42	23	19	122
				TOTAL:	7876

The A.M. peak hour from 8:00 to 9:00 is 608
The P.M. peak hour from 17:00 to 18:00 is 778



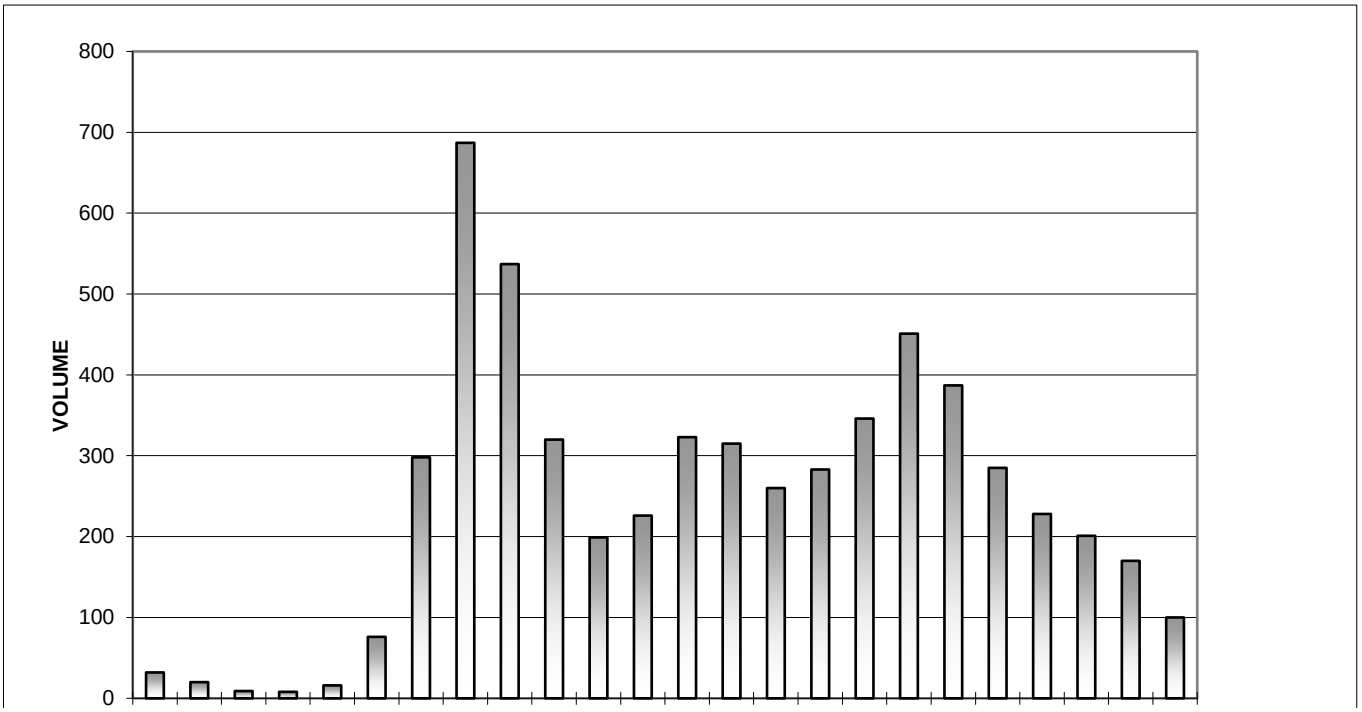
NOTE: The information on this page was obtained for the Traffic Impact Analysis for 2323 Cedar Springs Road. (Kimley Horn, August 2018. Used by permission.)

WB Maple Avenue West of Cedar Springs Road

Date Began:
4/24/2018

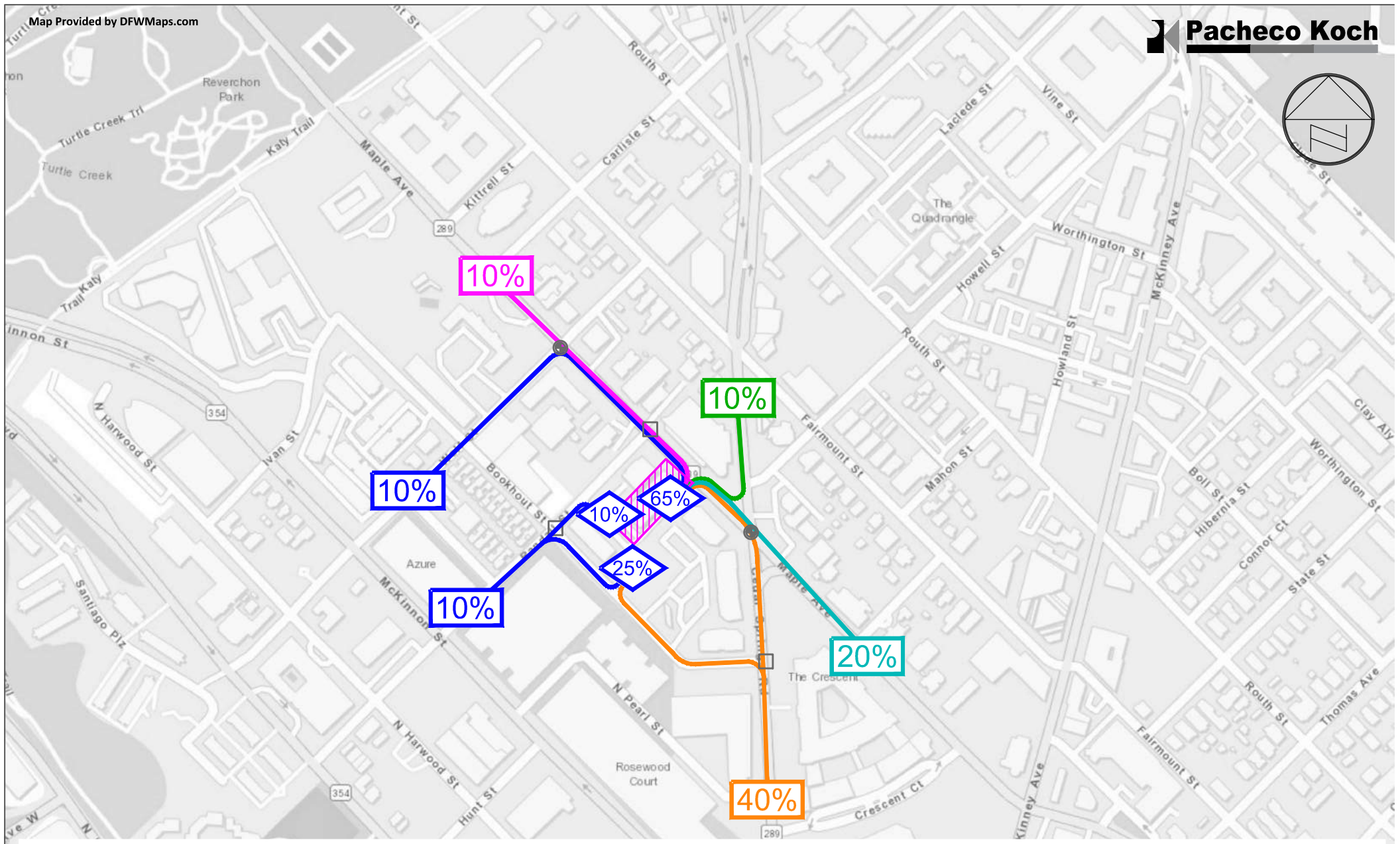
TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	14	10	6	2	32
1:00	5	5	8	2	20
2:00	1	4	0	4	9
3:00	1	1	3	3	8
4:00	3	3	3	7	16
5:00	10	11	25	30	76
6:00	30	57	98	113	298
7:00	156	161	199	171	687
8:00	168	120	129	120	537
9:00	83	84	77	76	320
10:00	59	57	51	32	199
11:00	48	56	60	62	226
12:00	85	79	80	79	323
13:00	89	80	75	71	315
14:00	74	61	61	64	260
15:00	78	66	62	77	283
16:00	84	87	93	82	346
17:00	108	107	120	116	451
18:00	128	96	84	79	387
19:00	78	77	71	59	285
20:00	58	57	51	62	228
21:00	53	53	55	40	201
22:00	48	36	42	44	170
23:00	30	22	22	26	100
				TOTAL:	5777

The A.M. peak hour from 7:15 to 8:15 is 699
The P.M. peak hour from 17:15 to 18:15 is 471



NOTE: The information on this page was obtained for the Traffic Impact Analysis for 2323 Cedar Springs Road. (Kimley Horn, August 2018. Used by permission.)

APPENDIX C. Site-Generated Traffic Supplement

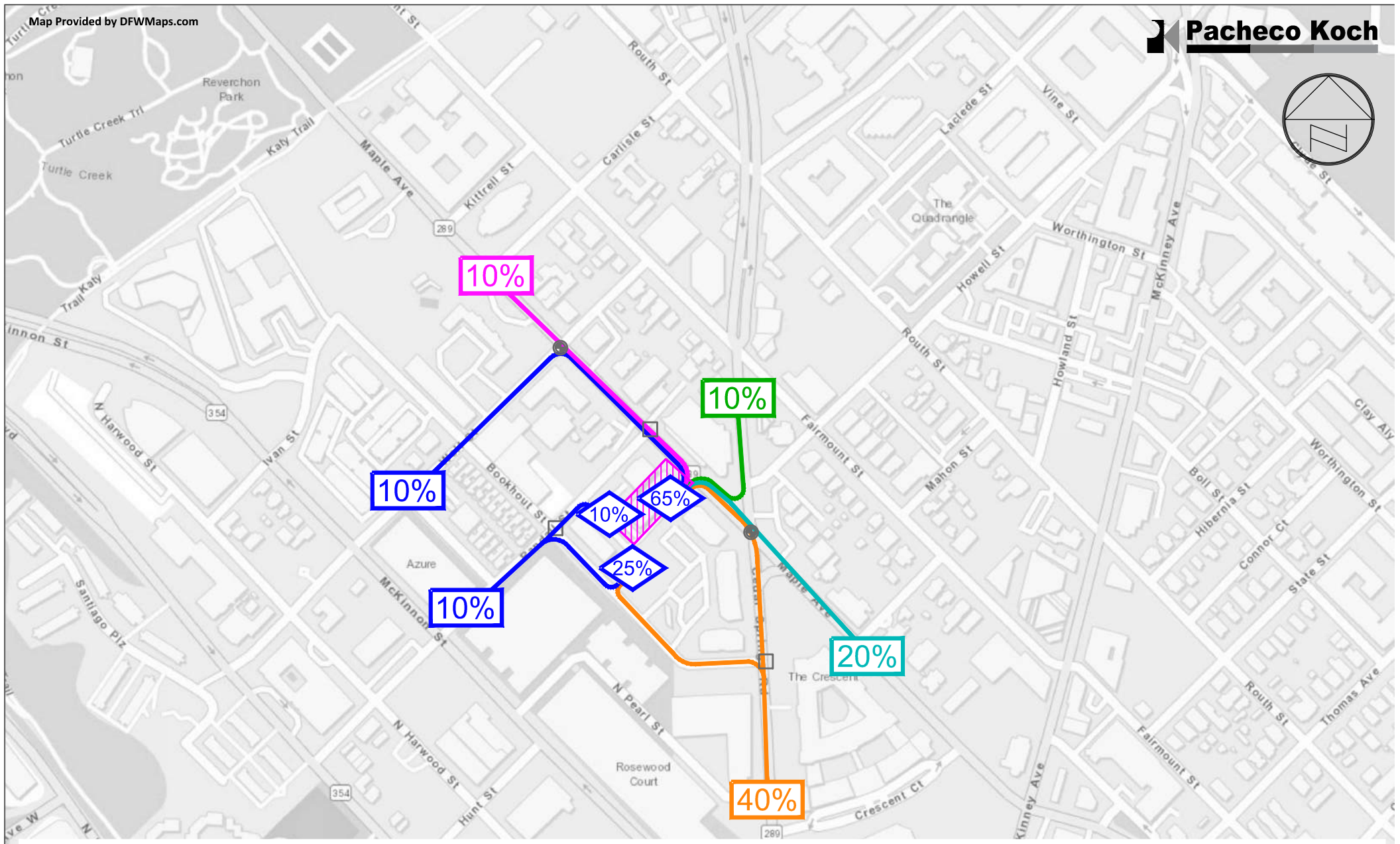


Site Generated Trip Distribution - Inbound

2811 Maple Avenue, Dallas, Texas

PK 3482-20.205 (AJV: 04/20/20)

APPENDIX **C1**



Site Generated Trip Distribution - Outbound

2811 Maple Avenue, Dallas, Texas

PK 3482-20.205 (AJV: 04/20/20)

APPENDIX **C2**

Trip Generation Summary

Alternative: Alternative 1
Phase:
Project: 2811 Maple Avenue

Open Date: 4/8/2020
Analysis Date: 4/8/2020

ITE	Land Use		Weekday Average Daily Trips Enter	Exit	Total		Weekday AM Peak Hour of Adjacent Street Traffic Enter	Exit	Total		Weekday PM Peak Hour of Adjacent Street Traffic Enter	Exit	Total
222	HIGH-RISE 1		540	539	1079		18	56	74		51	32	83
	220 Dwelling Units												
Unadjusted Volume			540	539	1079		18	56	74		51	32	83
Internal Capture Trips			0	0	0		0	0	0		0	0	0
Pass-By Trips			0	0	0		0	0	0		0	0	0
Volume Added to Adjacent Streets			540	539	1079		18	56	74		51	32	83

Total Weekday Average Daily Trips Internal Capture = 0 Percent
Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent
Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

* - Custom rate used for selected time period.

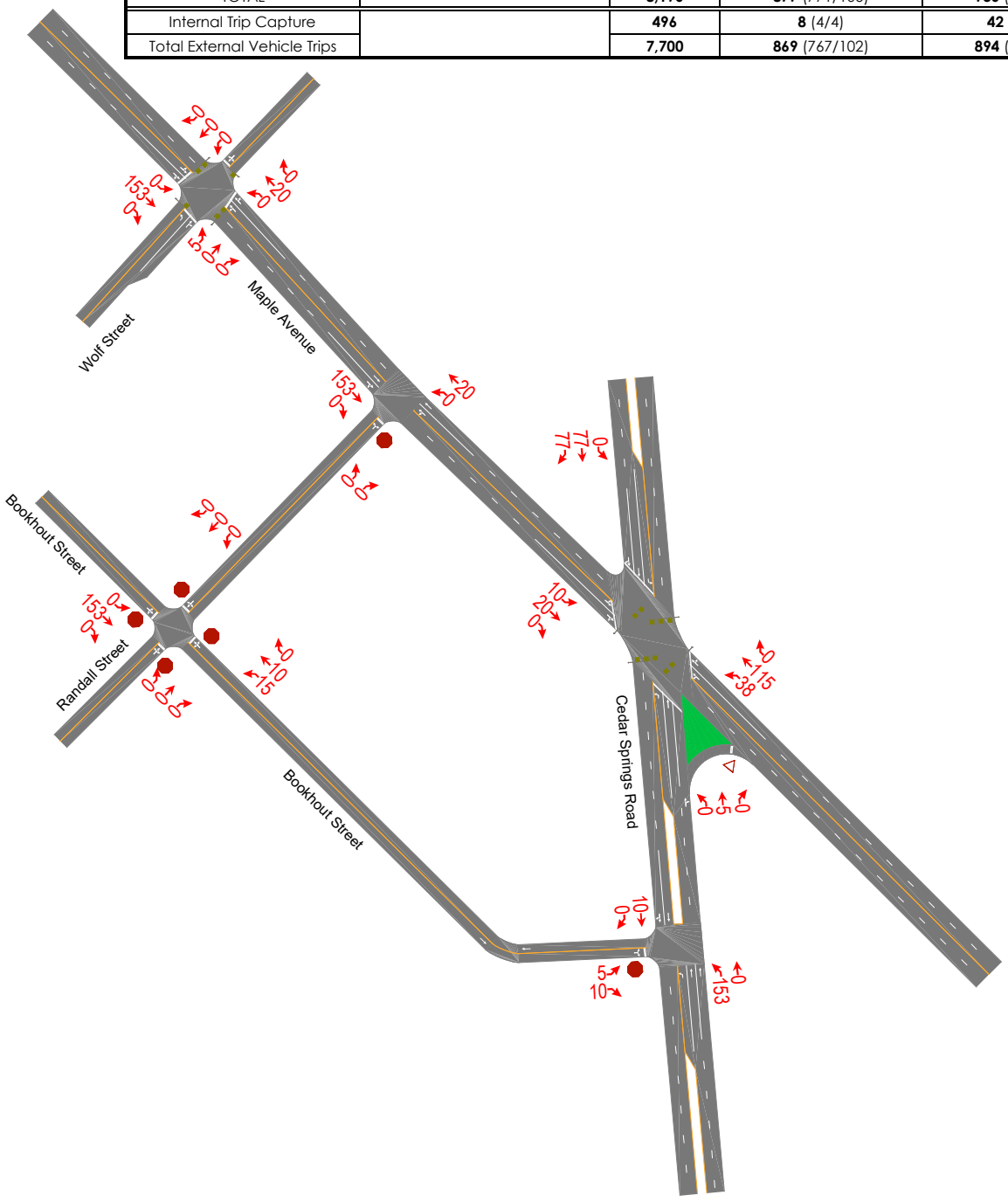
Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

Appendix C - Off-Site Site Generated AM

North ^

Not to Scale

USE	AMOUNT	ITE CODE	DAILY TRIP ENDS (WEEKDAY)	AM PEAK HOUR TRIP ENDS (ADJACENT STREET PEAK)	PM PEAK HOUR TRIP ENDS (ADJACENT STREET PEAK)
				Total (In/Out)	**Total** (In/Out)
Quality Restaurant	20,000 SF	931	**1,677**	**15** (12/3)	**156** (105/51)
General Office Building	649,900 SF	730	**6,519**	**862** (759/103)	**780** (140/640)
TOTAL			**8,196**	**877** (771/106)	**936** (245/691)
Internal Trip Capture			**496**	**8** (4/4)	**42** (21/21)
Total External Vehicle Trips			**7,700**	**869** (767/102)	**894** (224/670)



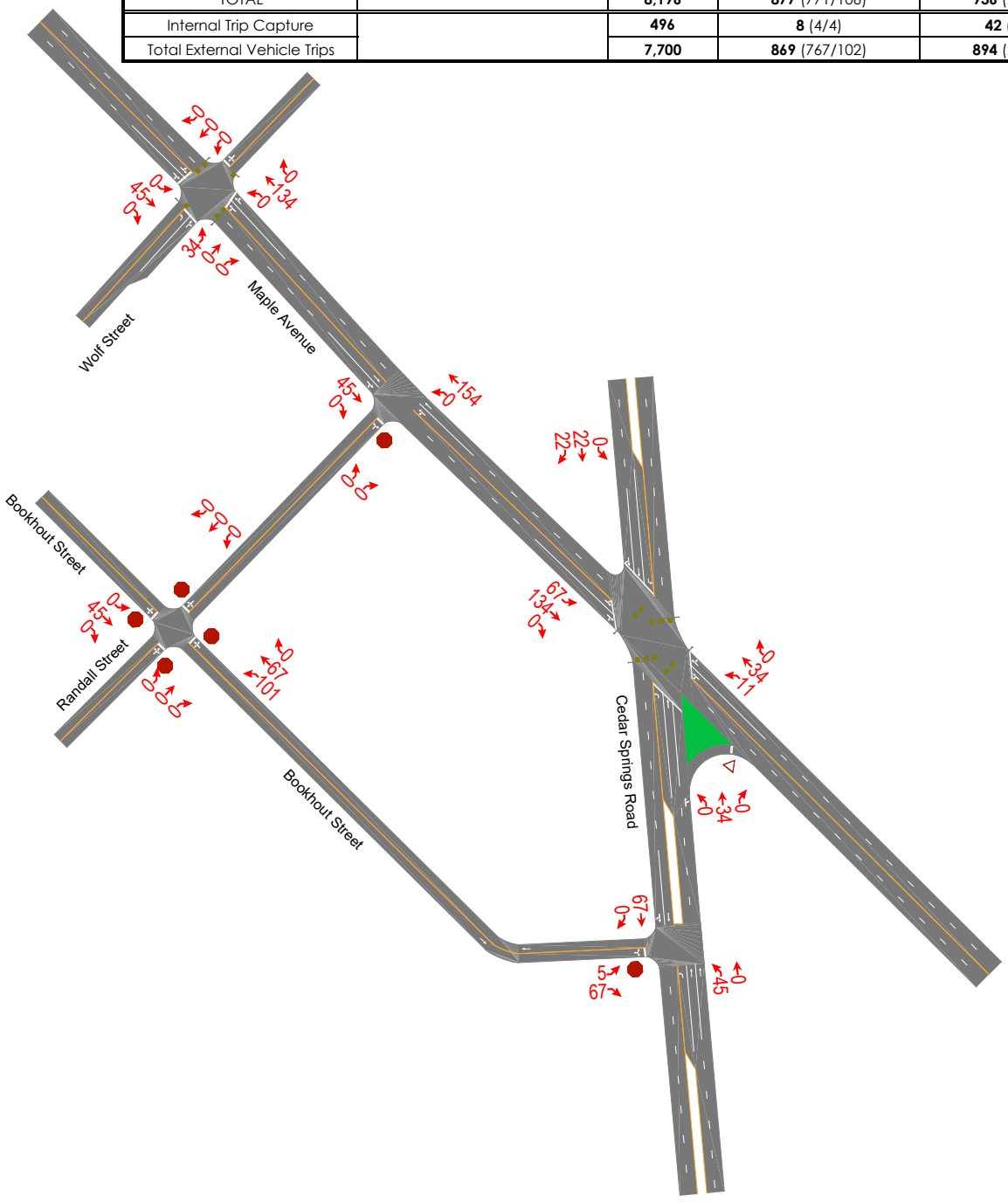
NOTE: The information on this page was obtained for the Traffic Impact Analysis for 2323 Cedar Springs Road. (Kimley Horn, August 2018. Used by permission.)

Appendix C - Off-Site Site Generated PM

North ^

Not to Scale

USE	AMOUNT	ITE CODE	DAILY TRIP ENDS (WEEKDAY)	AM PEAK HOUR TRIP ENDS (ADJACENT STREET PEAK)	PM PEAK HOUR TRIP ENDS (ADJACENT STREET PEAK)
				Total (In/Out)	**Total** (In/Out)
Quality Restaurant	20,000 SF	931	**1,677**	**15** (12/3)	**156** (105/51)
General Office Building	649,900 SF	730	**6,519**	**862** (759/103)	**780** (140/640)
TOTAL			**8,196**	**877** (771/106)	**936** (245/691)
Internal Trip Capture			**496**	**8** (4/4)	**42** (21/21)
Total External Vehicle Trips			**7,700**	**869** (767/102)	**894** (224/670)



NOTE: The information on this page was obtained for the Traffic Impact Analysis for 2323 Cedar Springs Road. (Kimley Horn, August 2018. Used by permission.)

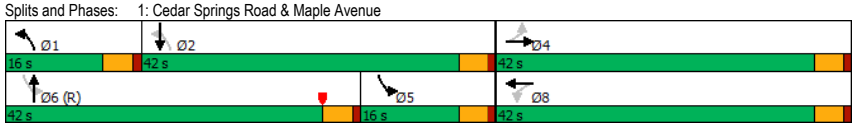
APPENDIX D. Detailed Intersection Capacity Analysis Results

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	384	214	13	507	50	120	363	26	120	856	23
Future Volume (vph)	26	384	214	13	507	50	120	363	26	120	856	23
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
Adj. Flow (vph)	28	417	233	14	551	54	130	395	28	130	930	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	678	0	0	619	0	130	423	0	130	955	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.5	27.5		36.5	36.5		22.5	22.5		28.5	28.5	
Total Split (s)	42.0	42.0		42.0	42.0		16.0	42.0		16.0	42.0	
Total Split (%)	42.0%	42.0%		42.0%	42.0%		16.0%	42.0%		16.0%	42.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	Max	
Act Effct Green (s)		26.2			26.2		60.3	48.8		60.3	51.7	
Actuated g/C Ratio		0.26			0.26		0.60	0.49		0.60	0.52	
v/c Ratio		0.83			0.74		0.36	0.25		0.20	0.52	
Control Delay		34.7			38.3		10.9	16.1		9.7	18.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		34.7			38.3		10.9	16.1		9.7	18.7	
LOS		C			D		B	B		A	B	
Approach Delay		34.7			38.3			14.9			17.6	
Approach LOS		C			D			B			B	
Queue Length 50th (ft)		165			186		29	78		29	201	
Queue Length 95th (ft)		205			224		64	126		64	322	
Internal Link Dist (ft)		206			555			338			273	
Turn Bay Length (ft)							115			125		
Base Capacity (vph)		1128			1193		412	1712		636	1823	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.60			0.52		0.32	0.25		0.20	0.52	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 6:NBSB, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83

Intersection Signal Delay: 25.4 — Intersection LOS: C
Intersection Capacity Utilization 79.9% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Cedar Springs Road & Maple Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	464	142	147	414	7	73	115	169	5	204	1
Future Volume (vph)	4	464	142	147	414	7	73	115	169	5	204	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
Adj. Flow (vph)	4	504	154	160	450	8	79	125	184	5	222	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	662	0	0	618	0	79	309	0	0	228	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	28.0	28.0		28.0	28.0		22.0	22.0		22.0	22.0	
Total Split (%)	56.0%	56.0%		56.0%	56.0%		44.0%	44.0%		44.0%	44.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		28.6			28.6		12.4	12.4			12.4	
Actuated g/C Ratio		0.57			0.57		0.25	0.25			0.25	
v/c Ratio		0.35			0.45		0.30	0.57			0.50	
Control Delay		6.1			10.7		16.8	11.5			19.0	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		6.1			10.7		16.8	11.5			19.0	
LOS		A			B		B	B			B	
Approach Delay		6.1			10.7			12.6			19.0	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		37			98		19	35			58	
Queue Length 95th (ft)		81			158		41	78			93	
Internal Link Dist (ft)		238			303			165			124	
Turn Bay Length (ft)												
Base Capacity (vph)		1905			1385		368	699			644	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.35			0.45		0.21	0.44			0.35	

Intersection Summary
Cycle Length: 50
Actuated Cycle Length: 50
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 45
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.5 — Intersection LOS: B
Intersection Capacity Utilization 75.9% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 4: Wolf Street & Maple Avenue

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	5	109	5	21	13	6	7	20	18	4	23	4
Future Vol, veh/h	5	109	5	21	13	6	7	20	18	4	23	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	118	5	23	14	7	8	22	20	4	25	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	7.5	7.4	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	4%	53%	13%
Vol Thru, %	44%	92%	32%	74%
Vol Right, %	40%	4%	15%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	45	119	40	31
LT Vol	7	5	21	4
Through Vol	20	109	13	23
RT Vol	18	5	6	4
Lane Flow Rate	49	129	43	34
Geometry Grp	1	1	1	1
Degree of Util (X)	0.055	0.147	0.051	0.039
Departure Headway (Hd)	4.05	4.093	4.191	4.22
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	870	871	846	835
Service Time	2.143	2.145	2.261	2.316
HCM Lane V/C Ratio	0.056	0.148	0.051	0.041
HCM Control Delay	7.4	7.9	7.5	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.5	0.2	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	624	14	92	558	10	21
Future Vol, veh/h	624	14	92	558	10	21
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	678	15	100	607	11	23

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	693	0	1190	347
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	504	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1155	-	275	*877
Stage 1	-	-	-	-	703	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	1155	-	239	*877
Mov Cap-2 Maneuver	-	-	-	-	239	-
Stage 1	-	-	-	-	611	-
Stage 2	-	-	-	-	572	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	13.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	1155	-
HCM Lane V/C Ratio	0.072	-	-	0.087	-
HCM Control Delay (s)	13.2	-	-	8.4	0.4
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	36	128	14	491	1058	16
Future Vol, veh/h	36	128	14	491	1058	16
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	-	115	-	-	-
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	39	139	15	534	1150	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1456	584	1167	0	-	0
Stage 1	1159	-	-	-	-	-
Stage 2	297	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	121	455	594	-	-	-
Stage 1	261	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	118	455	594	-	-	-
Mov Cap-2 Maneuver	118	-	-	-	-	-
Stage 1	254	-	-	-	-	-
Stage 2	728	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	37.9	0.3	0
HCM LOS	E		

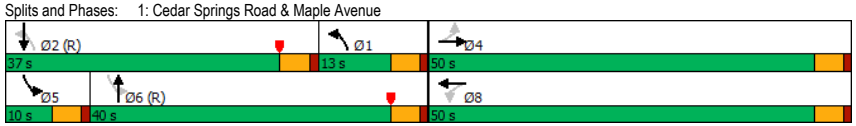
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	594	-	280	-	-
HCM Lane V/C Ratio	0.026	-	0.637	-	-
HCM Control Delay (s)	11.2	-	37.9	-	-
HCM Lane LOS	B	-	E	-	-
HCM 95th %tile Q(veh)	0.1	-	4	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	552	155	22	318	134	135	986	48	75	391	37
Future Volume (vph)	88	552	155	22	318	134	135	986	48	75	391	37
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
Adj. Flow (vph)	96	600	168	24	346	146	147	1072	52	82	425	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	864	0	0	516	0	147	1124	0	82	465	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	50.0	50.0		50.0	50.0		13.0	40.0		10.0	37.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		13.0%	40.0%		10.0%	37.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)		38.3			38.3		48.2	43.4		49.1	39.7	
Actuated g/C Ratio		0.38			0.38		0.48	0.43		0.49	0.40	
v/c Ratio		0.84			0.43		0.32	0.74		0.39	0.33	
Control Delay		31.9			19.6		18.3	29.4		19.4	22.5	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		31.9			19.6		18.3	29.4		19.4	22.5	
LOS		C			B		B	C		B	C	
Approach Delay		31.9			19.6			28.1			22.1	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)		241			105		47	325		25	104	
Queue Length 95th (ft)		255			132		94	#480		57	163	
Internal Link Dist (ft)		206			555			338			273	
Turn Bay Length (ft)							115			125		
Base Capacity (vph)		1217			1397		460	1526		210	1393	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.71			0.37		0.32	0.74		0.39	0.33	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 8 (8%), Referenced to phase 2:NBSB and 6:NBSB, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84

Intersection Signal Delay: 26.7 — Intersection LOS: C
Intersection Capacity Utilization 84.4% — ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cedar Springs Road & Maple Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	595	113	101	400	18	146	246	108	1	151	13
Future Volume (vph)	16	595	113	101	400	18	146	246	108	1	151	13
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
Adj. Flow (vph)	17	647	123	110	435	20	159	267	117	1	164	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	787	0	0	565	0	159	384	0	0	179	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2 10			2 10			4 12			4 12	
Permitted Phases	2 10			2 10			4 12			4 12		
Detector Phase	2 10	2 10		2 10	2 10		4 12	4 12		4 12	4 12	
Switch Phase												
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)												
Total Split (%)												
Yellow Time (s)												
All-Red Time (s)												
Lost Time Adjust (s)												
Total Lost Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode												
Act Effct Green (s)		48.5			48.5		33.5	33.5			33.5	
Actuated g/C Ratio		0.48			0.48		0.34	0.34			0.34	
v/c Ratio		0.50			0.52		0.44	0.63			0.29	
Control Delay		10.0			8.0		17.6	18.7			13.6	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		10.0			8.0		17.6	18.7			13.6	
LOS		A			A		B	B			B	
Approach Delay		10.0			8.0			18.4			13.6	
Approach LOS		A			A			B			B	
Queue Length 50th (ft)		85			66		46	111			47	
Queue Length 95th (ft)		112			65		78	161			75	
Internal Link Dist (ft)		238			303			165			124	
Turn Bay Length (ft)												
Base Capacity (vph)		1586			1081		390	655			665	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.50			0.52		0.41	0.59			0.27	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 72 (72%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.63

Lane Group	Ø2	Ø4	Ø10	Ø12
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	2	4	10	12
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	35.0	25.0	20.0	20.0
Total Split (%)	35%	25%	20%	20%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Max	Max	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Intersection Signal Delay: 12.0	Intersection LOS: B
Intersection Capacity Utilization 78.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Wolf Street & Maple Avenue

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	43	81	8	20	23	17	8	45	42	13	20	4
Future Vol, veh/h	43	81	8	20	23	17	8	45	42	13	20	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	47	88	9	22	25	18	9	49	46	14	22	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.3	7.7	7.8	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	33%	33%	35%
Vol Thru, %	47%	61%	38%	54%
Vol Right, %	44%	6%	28%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	132	60	37
LT Vol	8	43	20	13
Through Vol	45	81	23	20
RT Vol	42	8	17	4
Lane Flow Rate	103	143	65	40
Geometry Grp	1	1	1	1
Degree of Util (X)	0.121	0.174	0.078	0.051
Departure Headway (Hd)	4.204	4.367	4.307	4.524
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	855	826	834	793
Service Time	2.218	2.367	2.322	2.54
HCM Lane V/C Ratio	0.12	0.173	0.078	0.05
HCM Control Delay	7.8	8.3	7.7	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.6	0.3	0.2

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	725	31	6	484	35	70
Future Vol, veh/h	725	31	6	484	35	70
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	788	34	7	526	38	76

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	822	0	1082	411
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	277	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1163	-	435	*793
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	745	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	1163	-	432	*793
Mov Cap-2 Maneuver	-	-	-	-	432	-
Stage 1	-	-	-	-	741	-
Stage 2	-	-	-	-	745	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	12.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	620	-	-	1163	-
HCM Lane V/C Ratio	0.184	-	-	0.006	-
HCM Control Delay (s)	12.1	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	51	56	42	1119	538	25
Future Vol, veh/h	51	56	42	1119	538	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	-	115	-	-	-
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	55	61	46	1216	585	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1299	306	612	0	-	0
Stage 1	599	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	220	*886	1238	-	-	-
Stage 1	776	-	-	-	-	-
Stage 2	454	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	212	*886	1238	-	-	-
Mov Cap-2 Maneuver	212	-	-	-	-	-
Stage 1	747	-	-	-	-	-
Stage 2	454	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.2	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1238	-	352	-	-
HCM Lane V/C Ratio	0.037	-	0.33	-	-
HCM Control Delay (s)	8	-	20.2	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.4	-	-

Notes

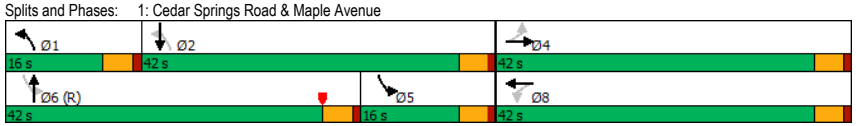
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	434	231	52	661	54	129	396	28	129	999	101
Future Volume (vph)	38	434	231	52	661	54	129	396	28	129	999	101
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
Adj. Flow (vph)	41	472	251	57	718	59	140	430	30	140	1086	110
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	764	0	0	834	0	140	460	0	140	1196	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.5	27.5		36.5	36.5		22.5	22.5		28.5	28.5	
Total Split (s)	42.0	42.0		42.0	42.0		16.0	42.0		16.0	42.0	
Total Split (%)	42.0%	42.0%		42.0%	42.0%		16.0%	42.0%		16.0%	42.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	Max	
Act Effct Green (s)		35.3			35.3		51.2	39.7		51.2	42.0	
Actuated g/C Ratio		0.35			0.35		0.51	0.40		0.51	0.42	
v/c Ratio		0.77			0.90		0.59	0.33		0.27	0.81	
Control Delay		26.8			44.1		26.4	21.9		14.7	32.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		26.8			44.1		26.4	21.9		14.7	32.0	
LOS		C			D		C	C		B	C	
Approach Delay		26.8			44.1			23.0			30.2	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)		166			250		43	107		43	357	
Queue Length 95th (ft)		223			#359		99	148		75	#507	
Internal Link Dist (ft)		206			555			338			273	
Turn Bay Length (ft)							115			125		
Base Capacity (vph)		1043			984		277	1397		519	1471	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.73			0.85		0.51	0.33		0.27	0.81	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 6:NBSB, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90

Intersection Signal Delay: 31.5 — Intersection LOS: C
Intersection Capacity Utilization 95.0% — ICU Level of Service F
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cedar Springs Road & Maple Avenue



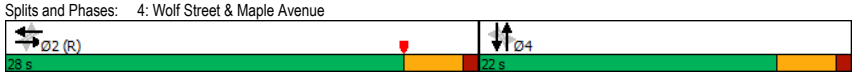
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	653	153	158	466	8	84	124	182	5	220	1
Future Volume (vph)	4	653	153	158	466	8	84	124	182	5	220	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	710	166	172	507	9	91	135	198	5	239	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	880	0	0	688	0	91	333	0	0	245	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	28.0	28.0		28.0	28.0		22.0	22.0		22.0	22.0	
Total Split (%)	56.0%	56.0%		56.0%	56.0%		44.0%	44.0%		44.0%	44.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		27.9			27.9		13.1	13.1			13.1	
Actuated g/C Ratio		0.56			0.56		0.26	0.26			0.26	
v/c Ratio		0.47			0.57		0.34	0.60			0.51	
Control Delay		7.9			13.8		17.2	12.9			18.6	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		7.9			13.8		17.2	12.9			18.6	
LOS		A			B		B	B			B	
Approach Delay		7.9			13.8			13.8			18.6	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		64			129		21	44			60	
Queue Length 95th (ft)		124			m191		46	93			99	
Internal Link Dist (ft)		238			303			165			124	
Turn Bay Length (ft)												
Base Capacity (vph)		1863			1217		357	690			645	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.47			0.57		0.25	0.48			0.38	

Intersection Summary
Cycle Length: 50
Actuated Cycle Length: 50
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60

Intersection Signal Delay: 12.0	Intersection LOS: B
Intersection Capacity Utilization 85.4%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 4: Wolf Street & Maple Avenue



Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	271	5	38	24	6	8	22	19	4	25	4
Future Vol, veh/h	5	271	5	38	24	6	8	22	19	4	25	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	295	5	41	26	7	9	24	21	4	27	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	8	8	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	2%	56%	12%
Vol Thru, %	45%	96%	35%	76%
Vol Right, %	39%	2%	9%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	281	68	33
LT Vol	8	5	38	4
Through Vol	22	271	24	25
RT Vol	19	5	6	4
Lane Flow Rate	53	305	74	36
Geometry Grp	1	1	1	1
Degree of Util (X)	0.068	0.351	0.093	0.048
Departure Headway (Hd)	4.624	4.138	4.519	4.797
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	778	855	796	750
Service Time	2.631	2.234	2.529	2.805
HCM Lane V/C Ratio	0.068	0.357	0.093	0.048
HCM Control Delay	8	9.5	8	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	1.6	0.3	0.2

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	826	15	99	621	11	22
Future Vol, veh/h	826	15	99	621	11	22
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	898	16	108	675	12	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	914	0	1460	457
Stage 1	-	-	-	-	906	-
Stage 2	-	-	-	-	554	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	*1125	-	*230	*752
Stage 1	-	-	-	-	*710	-
Stage 2	-	-	-	-	*539	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*1125	-	*195	*752
Mov Cap-2 Maneuver	-	-	-	-	*195	-
Stage 1	-	-	-	-	*601	-
Stage 2	-	-	-	-	*539	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	15.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	385	-	-	* 1125	-
HCM Lane V/C Ratio	0.093	-	-	0.096	-
HCM Control Delay (s)	15.3	-	-	8.5	0.5
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	34.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	44	148	168	529	1150	17
Future Vol, veh/h	44	148	168	529	1150	17
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	-	115	-	-	-
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	48	161	183	575	1250	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1913	634	1268	0	-	0
Stage 1	1259	-	-	-	-	-
Stage 2	654	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	60	422	544	-	-	-
Stage 1	231	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 40	422	544	-	-	-
Mov Cap-2 Maneuver	~ 40	-	-	-	-	-
Stage 1	153	-	-	-	-	-
Stage 2	479	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 354	3.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	544	-	132	-	-
HCM Lane V/C Ratio	0.336	-	1.581	-	-
HCM Control Delay (s)	14.9	-	$ 354	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	1.5	-	14.9	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	729	167	35	376	144	145	1096	52	81	444	62
Future Volume (vph)	162	729	167	35	376	144	145	1096	52	81	444	62
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
Adj. Flow (vph)	176	792	182	38	409	157	158	1191	57	88	483	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1150	0	0	604	0	158	1248	0	88	550	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	50.0	50.0		50.0	50.0		13.0	40.0		10.0	37.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		13.0%	40.0%		10.0%	37.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)		45.5			45.5		41.0	37.5		41.9	32.5	
Actuated g/C Ratio		0.46			0.46		0.41	0.38		0.42	0.32	
v/c Ratio		1.06			0.50		0.46	0.95		0.51	0.48	
Control Delay		66.8			18.8		26.3	46.4		26.9	27.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		66.8			18.8		26.3	46.4		26.9	27.9	
LOS		E			B		C	D		C	C	
Approach Delay		66.8			18.8			44.2			27.8	
Approach LOS		E			B			D			C	
Queue Length 50th (ft)		~403			123		58	412		31	142	
Queue Length 95th (ft)		#534			174		100	#571		61	193	
Internal Link Dist (ft)		206			555			338			273	
Turn Bay Length (ft)							115			125		
Base Capacity (vph)		1087			1200		347	1320		171	1140	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		1.06			0.50		0.46	0.95		0.51	0.48	

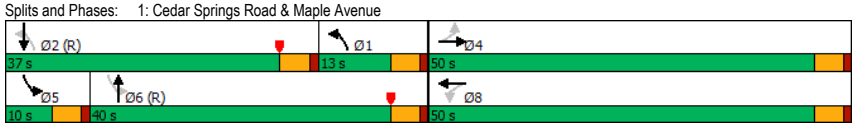
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 8 (8%), Referenced to phase 2:NBSB and 6:NBSB, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06

Intersection Signal Delay: 44.2 — Intersection LOS: D
Intersection Capacity Utilization 97.6% — ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cedar Springs Road & Maple Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	686	122	109	565	19	191	265	116	1	163	14
Future Volume (vph)	17	686	122	109	565	19	191	265	116	1	163	14
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
Adj. Flow (vph)	18	746	133	118	614	21	208	288	126	1	177	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	897	0	0	753	0	208	414	0	0	193	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2 10			2 10			4 12			4 12	
Permitted Phases	2 10			2 10			4 12			4 12		
Detector Phase	2 10	2 10		2 10	2 10		4 12	4 12		4 12	4 12	
Switch Phase												
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)												
Total Split (%)												
Yellow Time (s)												
All-Red Time (s)												
Lost Time Adjust (s)												
Total Lost Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode												
Act Effct Green (s)		47.8			47.8		34.2	34.2			34.2	
Actuated g/C Ratio		0.48			0.48		0.34	0.34			0.34	
v/c Ratio		0.58			0.74		0.58	0.66			0.30	
Control Delay		11.1			12.3		21.0	19.4			13.6	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		11.1			12.3		21.0	19.4			13.6	
LOS		B			B		C	B			B	
Approach Delay		11.1			12.3			20.0			13.6	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)		103			92		61	117			49	
Queue Length 95th (ft)		134			95		104	177			81	
Internal Link Dist (ft)		238			303			165			124	
Turn Bay Length (ft)												
Base Capacity (vph)		1556			1021		380	655			666	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.58			0.74		0.55	0.63			0.29	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 72 (72%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74

Lane Group	Ø2	Ø4	Ø10	Ø12
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	2	4	10	12
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	35.0	25.0	20.0	20.0
Total Split (%)	35%	25%	20%	20%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Max	Max	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Intersection Signal Delay: 13.9	Intersection LOS: B
Intersection Capacity Utilization 88.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Wolf Street & Maple Avenue

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	46	132	9	122	92	18	9	48	45	14	22	4
Future Vol, veh/h	46	132	9	122	92	18	9	48	45	14	22	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	143	10	133	100	20	10	52	49	15	24	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	9.8	8.7	8.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	25%	53%	35%
Vol Thru, %	47%	71%	40%	55%
Vol Right, %	44%	5%	8%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	102	187	232	40
LT Vol	9	46	122	14
Through Vol	48	132	92	22
RT Vol	45	9	18	4
Lane Flow Rate	111	203	252	43
Geometry Grp	1	1	1	1
Degree of Util (X)	0.148	0.261	0.322	0.062
Departure Headway (Hd)	4.796	4.62	4.603	5.147
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	745	776	779	693
Service Time	2.842	2.66	2.642	3.202
HCM Lane V/C Ratio	0.149	0.262	0.323	0.062
HCM Control Delay	8.7	9.3	9.8	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	1	1.4	0.2

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	825	34	6	656	37	76
Future Vol, veh/h	825	34	6	656	37	76
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	897	37	7	713	40	83

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	934	0	1287	467
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	371	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1083	-	321	*761
Stage 1	-	-	-	-	690	-
Stage 2	-	-	-	-	668	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	1083	-	317	*761
Mov Cap-2 Maneuver	-	-	-	-	317	-
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	668	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	14
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	522	-	-	1083	-
HCM Lane V/C Ratio	0.235	-	-	0.006	-
HCM Control Delay (s)	14	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	88	127	90	1205	647	27
Future Vol, veh/h	88	127	90	1205	647	27
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	-	115	-	-	-
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	96	138	98	1310	703	29

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1569	366	732	0	-	0
Stage 1	718	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	153	*824	1214	-	-	-
Stage 1	777	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	141	*824	1214	-	-	-
Mov Cap-2 Maneuver	141	-	-	-	-	-
Stage 1	714	-	-	-	-	-
Stage 2	379	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	62	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1214	-	276	-	-
HCM Lane V/C Ratio	0.081	-	0.847	-	-
HCM Control Delay (s)	8.2	-	62	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0.3	-	7.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	901	0	0	662	0	0
Future Vol, veh/h	901	0	0	662	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	979	0	0	720	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	979	0	1339	490
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	360	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	*1045	-	*240	*699
Stage 1	-	-	-	-	*659	-
Stage 2	-	-	-	-	*677	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*1045	-	*240	*699
Mov Cap-2 Maneuver	-	-	-	-	*240	-
Stage 1	-	-	-	-	*659	-
Stage 2	-	-	-	-	*677	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	* 1045	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	113	0	0	40
Future Vol, veh/h	0	0	113	0	0	40
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	0	123	0	0	43

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	166	123	0	0	123	0
Stage 1	123	-	-	-	-	-
Stage 2	43	-	-	-	-	-
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	824	928	-	-	1464	-
Stage 1	902	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	824	928	-	-	1464	-
Mov Cap-2 Maneuver	824	-	-	-	-	-
Stage 1	902	-	-	-	-	-
Stage 2	979	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1464	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	191	232	0	0	0
Future Vol, veh/h	0	191	232	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	208	252	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	252	0	-	0	460	252
Stage 1	-	-	-	-	252	-
Stage 2	-	-	-	-	208	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1313	-	-	-	559	787
Stage 1	-	-	-	-	790	-
Stage 2	-	-	-	-	827	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1313	-	-	-	559	787
Mov Cap-2 Maneuver	-	-	-	-	559	-
Stage 1	-	-	-	-	790	-
Stage 2	-	-	-	-	827	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

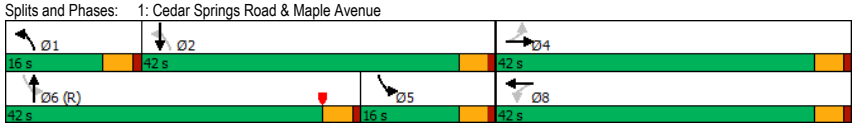
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1313	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	445	241	52	665	54	133	396	28	129	999	103
Future Volume (vph)	44	445	241	52	665	54	133	396	28	129	999	103
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
Adj. Flow (vph)	48	484	262	57	723	59	145	430	30	140	1086	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	794	0	0	839	0	145	460	0	140	1198	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.5	27.5		36.5	36.5		22.5	22.5		28.5	28.5	
Total Split (s)	42.0	42.0		42.0	42.0		16.0	42.0		16.0	42.0	
Total Split (%)	42.0%	42.0%		42.0%	42.0%		16.0%	42.0%		16.0%	42.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	Max	
Act Effct Green (s)		35.5			35.5		51.0	39.5		51.0	41.5	
Actuated g/C Ratio		0.36			0.36		0.51	0.40		0.51	0.42	
v/c Ratio		0.83			0.91		0.60	0.33		0.27	0.82	
Control Delay		29.7			45.5		27.2	22.0		14.8	32.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		29.7			45.5		27.2	22.0		14.8	32.7	
LOS		C			D		C	C		B	C	
Approach Delay		29.7			45.5			23.3			30.8	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)		176			254		44	107		43	360	
Queue Length 95th (ft)		235			#368		104	148		75	#509	
Internal Link Dist (ft)		206			555			338			273	
Turn Bay Length (ft)							115			125		
Base Capacity (vph)		1004			970		277	1387		517	1455	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.79			0.86		0.52	0.33		0.27	0.82	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 6:NBSB, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91

Intersection Signal Delay: 32.7 — Intersection LOS: C
Intersection Capacity Utilization 96.2% — ICU Level of Service F
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cedar Springs Road & Maple Avenue



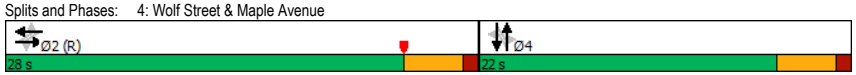
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	655	153	164	472	8	84	124	184	5	220	1
Future Volume (vph)	4	655	153	164	472	8	84	124	184	5	220	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	712	166	178	513	9	91	135	200	5	239	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	882	0	0	700	0	91	335	0	0	245	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	28.0	28.0		28.0	28.0		22.0	22.0		22.0	22.0	
Total Split (%)	56.0%	56.0%		56.0%	56.0%		44.0%	44.0%		44.0%	44.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		27.9			27.9		13.1	13.1			13.1	
Actuated g/C Ratio		0.56			0.56		0.26	0.26			0.26	
v/c Ratio		0.47			0.58		0.34	0.61			0.51	
Control Delay		7.9			14.1		17.2	13.1			18.6	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		7.9			14.1		17.2	13.1			18.6	
LOS		A			B		B	B			B	
Approach Delay		7.9			14.1			14.0			18.6	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		64			135		21	45			60	
Queue Length 95th (ft)		124			m191		46	94			99	
Internal Link Dist (ft)		238			303			165			124	
Turn Bay Length (ft)												
Base Capacity (vph)		1863			1204		357	689			645	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.47			0.58		0.25	0.49			0.38	

Intersection Summary
Cycle Length: 50
Actuated Cycle Length: 50
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61

Intersection Signal Delay: 12.1	Intersection LOS: B
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 4: Wolf Street & Maple Avenue



Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	271	5	41	24	6	8	22	20	4	27	4
Future Vol, veh/h	5	271	5	41	24	6	8	22	20	4	27	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	295	5	45	26	7	9	24	22	4	29	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.6	8	8	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	16%	2%	58%	11%
Vol Thru, %	44%	96%	34%	77%
Vol Right, %	40%	2%	8%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	281	71	35
LT Vol	8	5	41	4
Through Vol	22	271	24	27
RT Vol	20	5	6	4
Lane Flow Rate	54	305	77	38
Geometry Grp	1	1	1	1
Degree of Util (X)	0.07	0.36	0.097	0.051
Departure Headway (Hd)	4.628	4.248	4.536	4.81
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	775	852	792	745
Service Time	2.65	2.248	2.554	2.834
HCM Lane V/C Ratio	0.07	0.358	0.097	0.051
HCM Control Delay	8	9.6	8	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	1.6	0.3	0.2

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	828	16	99	629	14	22
Future Vol, veh/h	828	16	99	629	14	22
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	900	17	108	684	15	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	917	0	1467	459
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	558	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1125	-	*226	*752
Stage 1	-	-	-	-	*710	-
Stage 2	-	-	-	-	*537	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	1125	-	*191	*752
Mov Cap-2 Maneuver	-	-	-	-	*191	-
Stage 1	-	-	-	-	*600	-
Stage 2	-	-	-	-	*537	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	16.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	351	-	-	1125	-
HCM Lane V/C Ratio	0.111	-	-	0.096	-
HCM Control Delay (s)	16.5	-	-	8.5	0.5
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.3	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	39.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	44	159	172	532	1161	17
Future Vol, veh/h	44	159	172	532	1161	17
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	-	115	-	-	-
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	48	173	187	578	1262	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1934	640	1280	0	-	0
Stage 1	1271	-	-	-	-	-
Stage 2	663	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	58	418	538	-	-	-
Stage 1	227	-	-	-	-	-
Stage 2	474	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 38	418	538	-	-	-
Mov Cap-2 Maneuver	~ 38	-	-	-	-	-
Stage 1	148	-	-	-	-	-
Stage 2	474	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 391.6	3.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	538	-	132	-	-
HCM Lane V/C Ratio	0.348	-	1.672	-	-
HCM Control Delay (s)	15.2	-	$ 391.6	-	-
HCM Lane LOS	C	-	F	-	-
HCM 95th %tile Q(veh)	1.5	-	16.2	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	826	3	9	721	8	27
Future Vol, veh/h	826	3	9	721	8	27
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	898	3	10	784	9	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	901	0	1312	451
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	412	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	*1125	-	*314	*752
Stage 1	-	-	-	-	*710	-
Stage 2	-	-	-	-	*637	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*1125	-	*309	*752
Mov Cap-2 Maneuver	-	-	-	-	*309	-
Stage 1	-	-	-	-	*699	-
Stage 2	-	-	-	-	*637	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	566	-	-	* 1125	-
HCM Lane V/C Ratio	0.067	-	-	0.009	-
HCM Control Delay (s)	11.8	-	-	8.2	0.1
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	3	33	1	1	114
Future Vol, veh/h	3	3	33	1	1	114
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	3	3	36	1	1	124

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	163	37	0	0	37	0
Stage 1	37	-	-	-	-	-
Stage 2	126	-	-	-	-	-
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	828	1035	-	-	1574	-
Stage 1	985	-	-	-	-	-
Stage 2	900	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	827	1035	-	-	1574	-
Mov Cap-2 Maneuver	827	-	-	-	-	-
Stage 1	984	-	-	-	-	-
Stage 2	900	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	919	1574	-
HCM Lane V/C Ratio	-	-	0.007	0.001	-
HCM Control Delay (s)	-	-	8.9	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	295	69	3	11	3
Future Vol, veh/h	1	295	69	3	11	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	321	75	3	12	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	78	0	-	0	400	77
Stage 1	-	-	-	-	77	-
Stage 2	-	-	-	-	323	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1520	-	-	-	606	984
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	734	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1520	-	-	-	605	984
Mov Cap-2 Maneuver	-	-	-	-	605	-
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	734	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

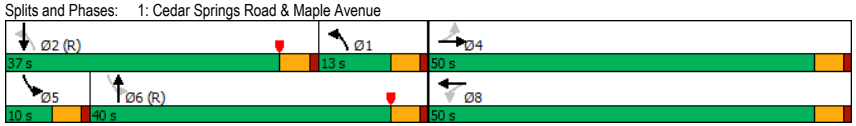
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1520	-	-	-	659
HCM Lane V/C Ratio	0.001	-	-	-	0.023
HCM Control Delay (s)	7.4	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

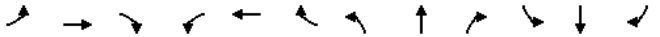
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	735	173	35	386	144	155	1096	52	81	444	67
Future Volume (vph)	165	735	173	35	386	144	155	1096	52	81	444	67
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	799	188	38	420	157	168	1191	57	88	483	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1166	0	0	615	0	168	1248	0	88	556	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	50.0	50.0		50.0	50.0		13.0	40.0		10.0	37.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		13.0%	40.0%		10.0%	37.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)		45.5			45.5		41.0	37.5		41.9	32.5	
Actuated g/C Ratio		0.46			0.46		0.41	0.38		0.42	0.32	
v/c Ratio		1.08			0.52		0.49	0.95		0.51	0.49	
Control Delay		74.0			19.1		27.7	46.4		26.9	27.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		74.0			19.1		27.7	46.4		26.9	27.9	
LOS		E			B		C	D		C	C	
Approach Delay		74.0			19.1			44.2			27.8	
Approach LOS		E			B			D			C	
Queue Length 50th (ft)		~416			127		63	412		31	143	
Queue Length 95th (ft)		#548			179		106	#571		61	195	
Internal Link Dist (ft)		206			555			338			273	
Turn Bay Length (ft)							115			125		
Base Capacity (vph)		1081			1192		344	1320		171	1139	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		1.08			0.52		0.49	0.95		0.51	0.49	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 8 (8%), Referenced to phase 2:NBSB and 6:NBSB, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08

Intersection Signal Delay: 46.5 Intersection LOS: D
Intersection Capacity Utilization 98.4% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cedar Springs Road & Maple Avenue





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	691	122	112	568	19	191	265	121	1	163	14
Future Volume (vph)	17	691	122	112	568	19	191	265	121	1	163	14
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
Adj. Flow (vph)	18	751	133	122	617	21	208	288	132	1	177	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	902	0	0	760	0	208	420	0	0	193	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2 10			2 10			4 12			4 12	
Permitted Phases	2 10			2 10			4 12			4 12		
Detector Phase	2 10	2 10		2 10	2 10		4 12	4 12		4 12	4 12	
Switch Phase												
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)												
Total Split (%)												
Yellow Time (s)												
All-Red Time (s)												
Lost Time Adjust (s)												
Total Lost Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode												
Act Effct Green (s)		47.7			47.7		34.3	34.3			34.3	
Actuated g/C Ratio		0.48			0.48		0.34	0.34			0.34	
v/c Ratio		0.58			0.76		0.57	0.67			0.30	
Control Delay		11.2			13.0		21.0	19.7			13.6	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		11.2			13.0		21.0	19.7			13.6	
LOS		B			B		C	B			B	
Approach Delay		11.2			13.0			20.1			13.6	
Approach LOS		B			B			C			B	
Queue Length 50th (ft)		103			93		60	119			49	
Queue Length 95th (ft)		134			96		104	180			81	
Internal Link Dist (ft)		238			303			165			124	
Turn Bay Length (ft)												
Base Capacity (vph)		1553			1006		380	655			666	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.58			0.76		0.55	0.64			0.29	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 72 (72%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76

Lane Group	Ø2	Ø4	Ø10	Ø12
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	2	4	10	12
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	35.0	25.0	20.0	20.0
Total Split (%)	35%	25%	20%	20%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Max	Max	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Intersection Signal Delay: 14.2	Intersection LOS: B
Intersection Capacity Utilization 88.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Wolf Street & Maple Avenue

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	46	132	9	124	92	18	9	51	48	14	23	4
Future Vol, veh/h	46	132	9	124	92	18	9	51	48	14	23	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	143	10	135	100	20	10	55	52	15	25	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	9.9	8.8	8.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	25%	53%	34%
Vol Thru, %	47%	71%	39%	56%
Vol Right, %	44%	5%	8%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	108	187	234	41
LT Vol	9	46	124	14
Through Vol	51	132	92	23
RT Vol	48	9	18	4
Lane Flow Rate	117	203	254	45
Geometry Grp	1	1	1	1
Degree of Util (X)	0.157	0.262	0.327	0.064
Departure Headway (Hd)	4.802	4.646	4.628	5.165
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	744	770	776	690
Service Time	2.852	2.688	2.667	3.224
HCM Lane V/C Ratio	0.157	0.264	0.327	0.065
HCM Control Delay	8.8	9.3	9.9	8.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	1	1.4	0.2

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	833	36	6	660	39	76
Future Vol, veh/h	833	36	6	660	39	76
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	905	39	7	717	42	83

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	944	0	1298	472
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	373	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	*1092	-	*349	*730
Stage 1	-	-	-	-	*689	-
Stage 2	-	-	-	-	*666	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*1092	-	*345	*730
Mov Cap-2 Maneuver	-	-	-	-	*345	-
Stage 1	-	-	-	-	*681	-
Stage 2	-	-	-	-	*666	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	530	-	-	* 1092	-
HCM Lane V/C Ratio	0.236	-	-	0.006	-
HCM Control Delay (s)	13.9	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	88	133	100	1215	653	27
Future Vol, veh/h	88	133	100	1215	653	27
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	-	115	-	-	-
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	96	145	109	1321	710	29

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1604	370	739	0	-	0
Stage 1	725	-	-	-	-	-
Stage 2	879	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	142	*824	1205	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	129	*824	1205	-	-	-
Mov Cap-2 Maneuver	129	-	-	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	366	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	77.6	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1205	-	262	-	-
HCM Lane V/C Ratio	0.09	-	0.917	-	-
HCM Control Delay (s)	8.3	-	77.6	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0.3	-	8.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	901	7	24	662	5	15
Future Vol, veh/h	901	7	24	662	5	15
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	979	8	26	720	5	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	987	0	1395	494
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	412	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	*1045	-	*215	*699
Stage 1	-	-	-	-	*659	-
Stage 2	-	-	-	-	*637	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*1045	-	*206	*699
Mov Cap-2 Maneuver	-	-	-	-	*206	-
Stage 1	-	-	-	-	*632	-
Stage 2	-	-	-	-	*637	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	437	-	-	* 1045	-
HCM Lane V/C Ratio	0.05	-	-	0.025	-
HCM Control Delay (s)	13.7	-	-	8.5	0.2
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	113	2	2	40
Future Vol, veh/h	2	2	113	2	2	40
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	2	2	123	2	2	43

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	171	124	0	0	125	0
Stage 1	124	-	-	-	-	-
Stage 2	47	-	-	-	-	-
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	819	927	-	-	1462	-
Stage 1	902	-	-	-	-	-
Stage 2	975	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	818	927	-	-	1462	-
Mov Cap-2 Maneuver	818	-	-	-	-	-
Stage 1	901	-	-	-	-	-
Stage 2	975	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	869	1462	-
HCM Lane V/C Ratio	-	-	0.005	0.001	-
HCM Control Delay (s)	-	-	9.2	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	191	232	10	6	2
Future Vol, veh/h	2	191	232	10	6	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	208	252	11	7	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	263	0	-	0	470	258
Stage 1	-	-	-	-	258	-
Stage 2	-	-	-	-	212	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1301	-	-	-	552	781
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	823	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1301	-	-	-	551	781
Mov Cap-2 Maneuver	-	-	-	-	551	-
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	823	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	11.1
HCM LOS			B

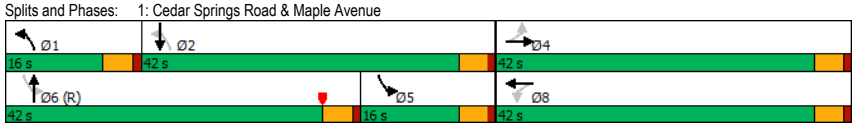
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1301	-	-	-	595
HCM Lane V/C Ratio	0.002	-	-	-	0.015
HCM Control Delay (s)	7.8	0	-	-	11.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	477	259	53	707	58	143	426	30	139	1070	105
Future Volume (vph)	46	477	259	53	707	58	143	426	30	139	1070	105
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
Adj. Flow (vph)	50	518	282	58	768	63	155	463	33	151	1163	114
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	850	0	0	889	0	155	496	0	151	1277	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	27.5	27.5		36.5	36.5		22.5	22.5		28.5	28.5	
Total Split (s)	42.0	42.0		42.0	42.0		16.0	42.0		16.0	42.0	
Total Split (%)	42.0%	42.0%		42.0%	42.0%		16.0%	42.0%		16.0%	42.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lead		Lag	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	Max	
Act Effct Green (s)		36.9			36.9		49.6	38.1		49.6	39.9	
Actuated g/C Ratio		0.37			0.37		0.50	0.38		0.50	0.40	
v/c Ratio		0.87			0.95		0.63	0.37		0.31	0.91	
Control Delay		32.3			49.9		28.9	23.1		16.1	40.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		32.3			49.9		28.9	23.1		16.1	40.1	
LOS		C			D		C	C		B	D	
Approach Delay		32.3			49.9			24.5			37.5	
Approach LOS		C			D			C			D	
Queue Length 50th (ft)		193			280		48	117		47	400	
Queue Length 95th (ft)		#272			#411		110	160		80	#566	
Internal Link Dist (ft)		206			555			338			273	
Turn Bay Length (ft)							115			125		
Base Capacity (vph)		989			955		277	1340		484	1400	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.86			0.93		0.56	0.37		0.31	0.91	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 6:NBSB, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95

Intersection Signal Delay: 37.0 — Intersection LOS: D
Intersection Capacity Utilization 101.6% — ICU Level of Service G
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cedar Springs Road & Maple Avenue

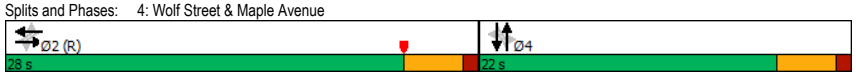


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	694	165	176	506	8	90	133	198	6	237	1
Future Volume (vph)	5	694	165	176	506	8	90	133	198	6	237	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	754	179	191	550	9	98	145	215	7	258	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	938	0	0	750	0	98	360	0	0	266	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	28.0	28.0		28.0	28.0		22.0	22.0		22.0	22.0	
Total Split (%)	56.0%	56.0%		56.0%	56.0%		44.0%	44.0%		44.0%	44.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		27.3			27.3		13.7	13.7			13.7	
Actuated g/C Ratio		0.55			0.55		0.27	0.27			0.27	
v/c Ratio		0.51			0.67		0.37	0.65			0.53	
Control Delay		8.6			16.6		17.4	15.0			18.6	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		8.6			16.6		17.4	15.0			18.6	
LOS		A			B		B	B			B	
Approach Delay		8.6			16.6			15.5			18.6	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		73			163		23	55			65	
Queue Length 95th (ft)		135			m193		50	111			108	
Internal Link Dist (ft)		238			303			165			124	
Turn Bay Length (ft)												
Base Capacity (vph)		1823			1123		343	678			642	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.51			0.67		0.29	0.53			0.41	

Intersection Summary
Cycle Length: 50
Actuated Cycle Length: 50
Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67

Intersection Signal Delay: 13.5 — Intersection LOS: B
Intersection Capacity Utilization 91.0% — ICU Level of Service E
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Wolf Street & Maple Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	781	186	37	412	156	166	1178	56	87	476	70
Future Volume (vph)	172	781	186	37	412	156	166	1178	56	87	476	70
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
Adj. Flow (vph)	187	849	202	40	448	170	180	1280	61	95	517	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1238	0	0	658	0	180	1341	0	95	593	0
Turn Type	Perm	NA		Perm	NA		D.P+P	NA		D.P+P	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	50.0	50.0		50.0	50.0		13.0	40.0		10.0	37.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		13.0%	40.0%		10.0%	37.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)		45.5			45.5		41.0	37.5		41.9	32.5	
Actuated g/C Ratio		0.46			0.46		0.41	0.38		0.42	0.32	
v/c Ratio		1.17			0.57		0.55	1.02		0.56	0.52	
Control Delay		110.9			20.4		30.9	61.3		29.1	28.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		110.9			20.4		30.9	61.3		29.1	28.6	
LOS		F			C		C	E		C	C	
Approach Delay		110.9			20.4			57.7			28.6	
Approach LOS		F			C			E			C	
Queue Length 50th (ft)		~471			142		67	~502		34	155	
Queue Length 95th (ft)		#613			200		112	#639		#66	210	
Internal Link Dist (ft)		206			555			338			273	
Turn Bay Length (ft)							115			125		
Base Capacity (vph)		1056			1145		329	1320		171	1139	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		1.17			0.57		0.55	1.02		0.56	0.52	

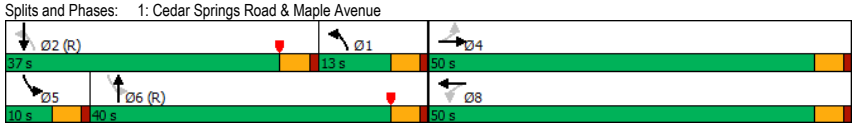
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 8 (8%), Referenced to phase 2:NBSB and 6:NBSB, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.17

Intersection Signal Delay: 62.9 — Intersection LOS: E
Intersection Capacity Utilization 104.1% — ICU Level of Service G
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Cedar Springs Road & Maple Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	740	131	120	601	21	203	285	130	1	175	15
Future Volume (vph)	19	740	131	120	601	21	203	285	130	1	175	15
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
Adj. Flow (vph)	21	804	142	130	653	23	221	310	141	1	190	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	967	0	0	806	0	221	451	0	0	207	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2 10			2 10			4 12			4 12	
Permitted Phases	2 10			2 10			4 12			4 12		
Detector Phase	2 10	2 10		2 10	2 10		4 12	4 12		4 12	4 12	
Switch Phase												
Minimum Initial (s)												
Minimum Split (s)												
Total Split (s)												
Total Split (%)												
Yellow Time (s)												
All-Red Time (s)												
Lost Time Adjust (s)												
Total Lost Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode												
Act Effct Green (s)		47.3			47.3		34.7	34.7			34.7	
Actuated g/C Ratio		0.47			0.47		0.35	0.35			0.35	
v/c Ratio		0.63			0.85		0.62	0.71			0.32	
Control Delay		12.3			18.5		22.6	21.0			13.7	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		12.3			18.5		22.6	21.0			13.7	
LOS		B			B		C	C			B	
Approach Delay		12.3			18.5			21.5			13.7	
Approach LOS		B			B			C			B	
Queue Length 50th (ft)		115			97		66	131			53	
Queue Length 95th (ft)		148			#239		114	198			86	
Internal Link Dist (ft)		238			303			165			124	
Turn Bay Length (ft)												
Base Capacity (vph)		1531			948		370	655			666	
Starvation Cap Reductn		0			0		0	0			0	
Spillback Cap Reductn		0			0		0	0			0	
Storage Cap Reductn		0			0		0	0			0	
Reduced v/c Ratio		0.63			0.85		0.60	0.69			0.31	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 72 (72%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85

Lane Group	Ø2	Ø4	Ø10	Ø12
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	2	4	10	12
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	35.0	25.0	20.0	20.0
Total Split (%)	35%	25%	20%	20%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Max	Max	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

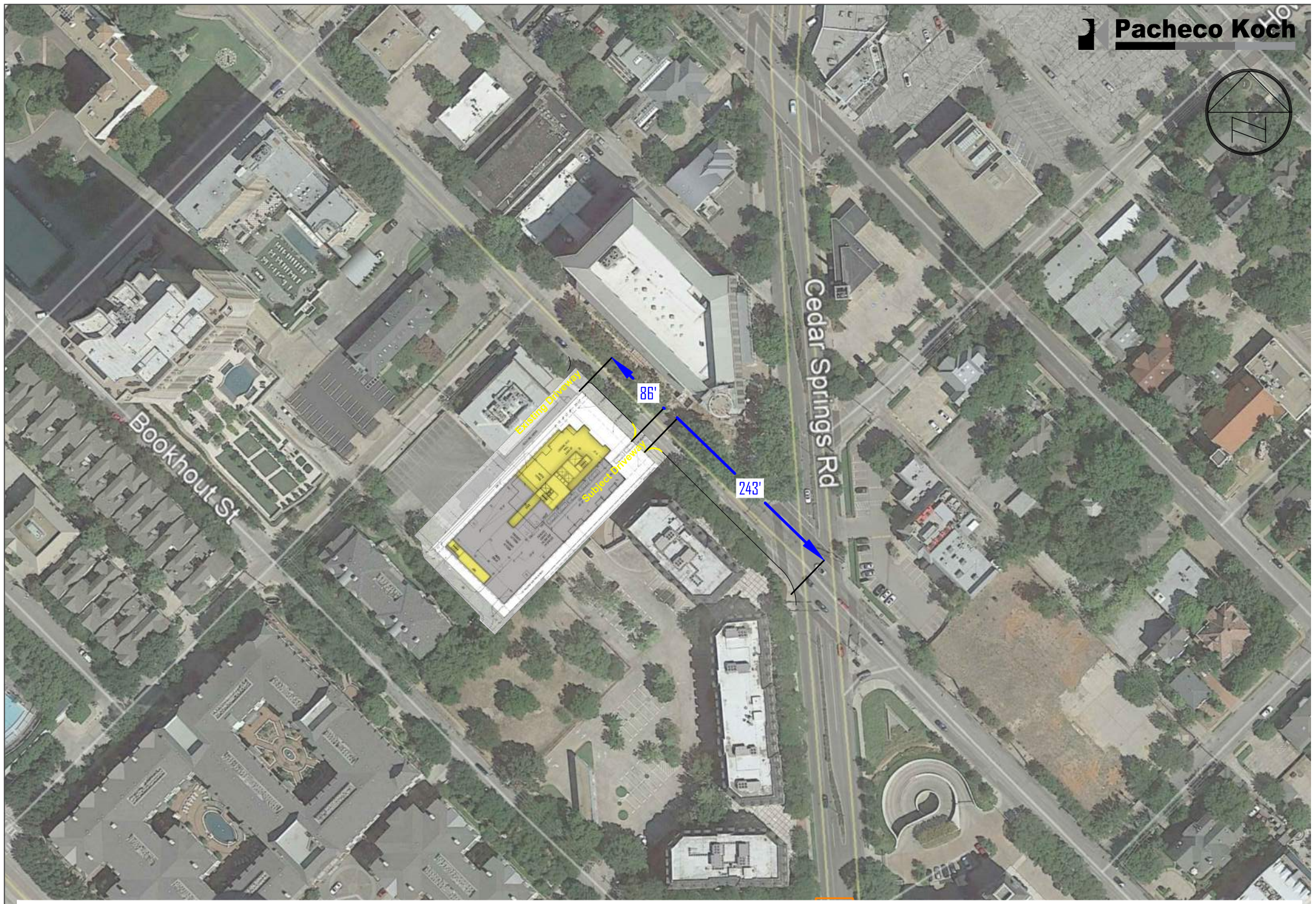
Intersection Summary

Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 94.0%	ICU Level of Service F
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Wolf Street & Maple Avenue

APPENDIX E. Site Access Evaluation Supplement

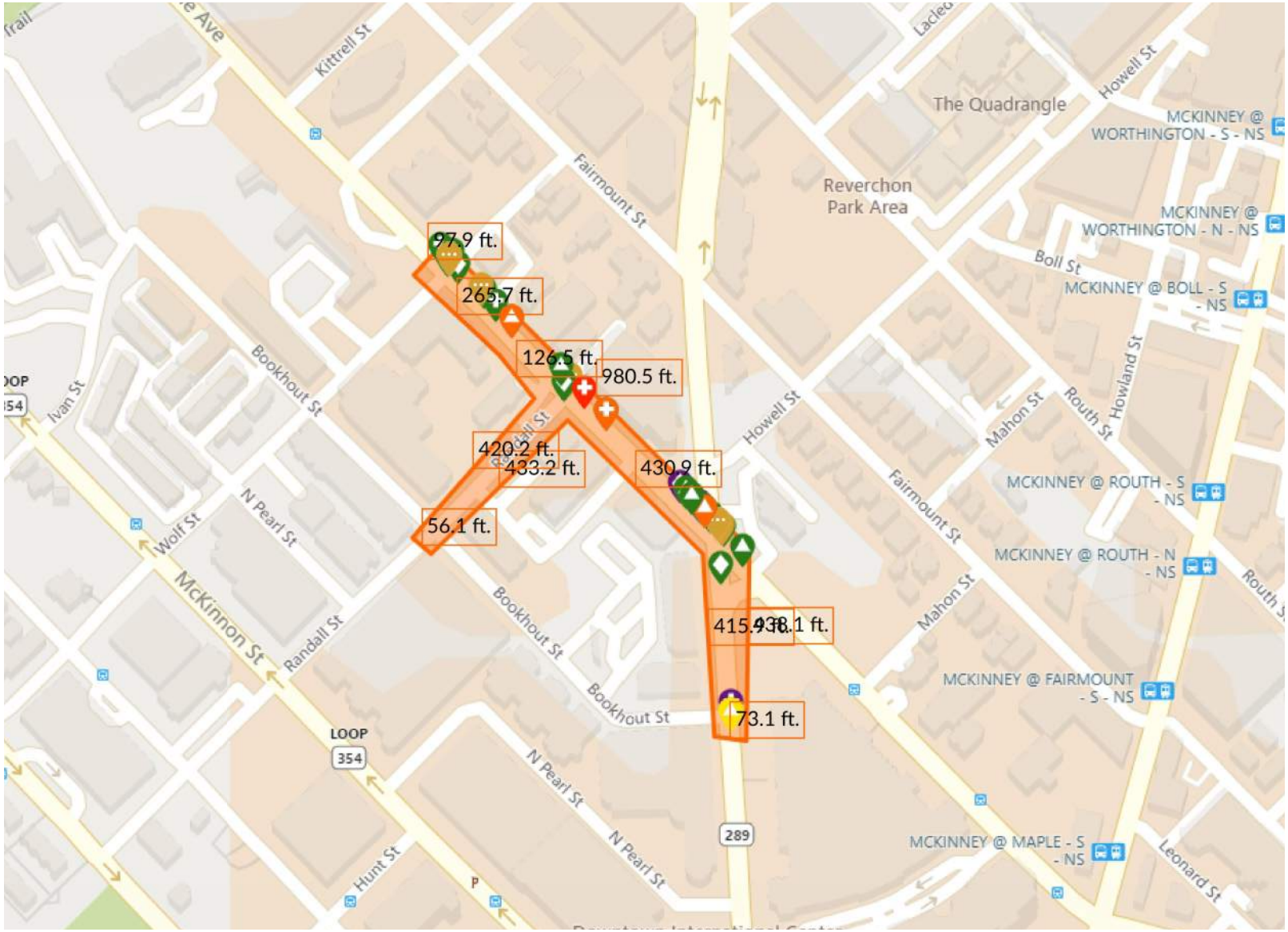


Driveway Spacing

2811 Maple Avenue, Dallas, Texas

PK #3482-20.205 (AJV: 04/08/20)

APPENDIX **E1**



More Than 1 Crash Located

2019: N - NOT INJURED

2018: N - NOT INJURED

2017: N-NOT INJURED

2018: C - POSSIBLE INJURY

2017: C - POSSIBLE INJURY

2019: B - NON-INCAPACITATING INJURY

2018: B - NON-INCAPACITATING INJURY

2018: B - NON-INCAPACITATING INJURY

2018: 99 - UNKNOWN

2017: 99 - UNKNOWN

APPENDIX **E2**