STAFF REPORT

Report To: The Carson City Regional Transportation Commission (RTC)

Meeting Date: June 12, 2019

Staff Contact: Lucia Maloney, Transportation Manager

Agenda Title: For Information Only – Informational presentation and discussion on traffic impacts and expectations resulting from the South Carson Street Complete Streets Project.

Staff Summary: Staff will present detailed traffic count information and findings from an independent Traffic Evaluation prepared for Carson City that assessed anticipated traffic impacts that may result from the South Carson Street Complete Streets Project. Design improvements resulting from the report will be presented.

Agenda Action: Other/Presentation **Time Requested:** 30 minutes

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Proposed Motion

-N/A

Background/Issues & Analysis

Carson City contracted with Headway Transportation (Headway) in December 2018 for professional services to review the 30% design plans for the South Carson Street Complete Streets Project and assist with identifying the necessary lane configuration improvements at intersections throughout the project corridor. The project consisted of conducting new data collection of peak-hour traffic volumes at 14 intersections. Subsequently, the consultant calculated levels of service for existing and 2040 (build-out) conditions that included traffic impacts expected from known development projects in the project's vicinity, including anticipated development in northern Douglas County. Headway developed detailed lane configuration recommendations that included the addition of right-turn pockets (deceleration lanes), additional turn pocket lengths, recommendations for speed limits, the configuration of the Stewart Street roundabout, and other operational recommendations for design elements contained within the 30% design plans. A summary of key findings are contained within the Executive Summary of Exhibit-1. Staff will present a summary of the report and discuss how key findings are being incorporated into the design of the project.

In addition to the evaluation conducted by Headway, staff has continued to monitor traffic volumes in the project vicinity as well as throughout Carson City. 2018 traffic volumes for South Carson Street and William Street are provided as Exhibit-2 and Exhibit-3, respectively. These traffic volumes are from the annual traffic reports published by the Nevada Department of Transportation (NDOT) Traffic Information Division in cooperation with the Federal Highway Administration (FHWA). These reports can also be found at: https://www.nevadadot.com/doing-business/about-ndot/ndot-divisions/planning/traffic-information.

The below information is also summarized in Exhibits 2 and 3 of this staff report.

South Carson Street

- Prior to 2001, South Carson Street had a 5-lane configuration, similar to the configuration proposed by the South Carson Complete Streets Project between Clearview Drive and Stewart Street. The traffic volumes in 2001 were reported at 43,500 annual average daily traffic (AADT), at the Koontz Lane station, nearly 78% greater than the volumes observed today. Additionally, the latest forecast for the 2040 scenario predicts 32,600 AADT at this station, nearly 25% less volume than what was observed in 2001.
- Prior to the freeway extension opening in 2017, South Carson Street traffic volumes were reported as 44,000 AADT at the Koontz Lane station
- The latest traffic volumes from 2018 were reported as 24,500 AADT, a 44% reduction in traffic
- The range of 2018 traffic volumes on South Carson Street between Koontz Lane and Stewart Street range from 24,500 AADT at Koontz Lane to 20,200 AADT at Stewart Street

William Street

- For general comparative purposes, South Carson Street is anticipated to function similar to William Street after the South Carson Street Complete Streets Project is constructed. William Street between Humbolt Lane and Carson Street is a 5-lane configuration similar to what South Carson Street will be between Clearview Drive and Stewart Street
- The range of 2018 traffic volumes on William Street between Humbolt Lane and Roop Street range from 25,500 AADT at Humbolt Lane to 18,200 AADT at Roop Street

Applicable Statute, Code, Policy, Rule or Regulation

-N/A

Financial Information

Is there a fiscal impact? ☐ Yes ☒ No

If yes, Fund Name, Account Name / Account Number:

Is it currently budgeted? ☐ Yes ☐ No

Explanation of Fiscal Impact:

Supporting Material

-Exhibit-1: Traffic Evaluation for S Carson Street, Headway Transportation
-Exhibit-2: 2018 NDOT Traffic Counts (TRINA), South Carson Street
-Exhibit-3: 2018 NDOT Traffic Counts (TRINA), William Street

TRAFFIC EVALUATION

FOR

SOUTH CARSON STREET

(Resurfacing & Complete Street Project)

May 6, 2019

PREPARED FOR:

Carson City Public Works

PREPARED BY:

EXECUTIVE SUMMARY

This Traffic Evaluation presents network management strategies and design recommendations to ensure the successful implementation and long-term operation of the S. Carson Street Resurfacing & Complete Street Project. The strategies and recommendations are based on 2040 traffic volume forecasts considering background growth and anticipated development projects in the vicinity. The analysis identifies existing and future Levels of Service for 14 study intersections along S. Carson Street between 5th Street and Appion Way to compare the existing traffic operations to the future traffic operations, including anticipated development, and identify the lane configurations and turn pocket lengths at those intersections (see **Figure 17**).

The key findings are:

- Proactively providing U-turn opportunities at major intersections throughout the corridor will reduce potential delays to drivers turning left from a side-street onto S. Carson Street during peak hours. This will allow drivers to make a right turn onto S. Carson Street and later make a U-turn movement if they do not want to wait for adequate left-turn gaps during peak hours. It is important to note that left-turns from side-streets onto major arterials are typically difficult during peak hours. This condition is commonly accepted on major arterial roadways like S. Carson Street, where signalization of low volume side-streets is not appropriate. Average delay considering all movements at side street stop-controlled intersections is very low due to the majority of traffic at these intersections traveling along the mainline and experiencing zero delay.
- Coordinating and optimizing traffic signals on the S. Carson Street corridor will be absolutely necessary to manage traffic and queuing and should be implemented with the Complete Street project changes.
- A roundabout at Stewart Street will require two westbound to southbound lanes within the roundabout to adequately accommodate the left turn volumes during the 2040 PM peak hour.
- The following five (5) modifications to Turn Pockets (**Table 6**) should be incorporated into the Complete Street design to proactively accommodate future traffic:
    - Right turn pockets are needed for northbound right-turns at 5th Street and Koontz Lane
    - Extend northbound right-turn pocket at Fairview Drive
    - Extend southbound left-turn pocket at Eagle Station Lane
    - Extend northbound left-turn pocket at Clearview Drive
- Based on this analysis, the City should anticipate the future need for a traffic signal at Appion Way to manage left turns both to and from Overland Street, Snyder Avenue, and Appion Way.
- The proposed speed limits on S. Carson Street (35 mph north of Clearview Drive and 25 mph north of Stewart Street) are appropriate starting points for new speed limits given the contextual change created by the Complete Streets project.

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INTRODUCTION

The primary purpose of this study is to recommend lane configurations on S. Carson Street between 5th Street and Appion Way that will accommodate 2040 traffic volume forecasts. This evaluation identifies lane configurations, turn pocket lengths, and other design elements to best manage future traffic volumes on S. Carson Street with the planned Complete Street configuration.

Study Area and Evaluated Scenarios

The following intersections are included in this study as requested by Carson City staff (see **Figure 1**):

Study Intersections on South Carson Street

- 5th Street
- Main Mall Entrance
- Stewart Street
- Fairview Drive
- Colorado Street
- Rhodes Street
- Sonoma Street
- Moses Street
- Koontz Lane
- Main Raley's Entrance
- Eagle Station Lane
- Clearview Drive
- Overland/Snyder Ave
- Appion Way

It is important to note that the Raley's Entrance and Main Mall Entrance represent the busiest commercial driveways along the corridor. These driveways were included in the analysis to determine the appropriate length of driveway turn pockets throughout the corridor.

Study Scenarios

This study includes analysis of intersections during the weekday AM and PM peak hours as these are the periods of time in which peak traffic is understood to occur. The evaluated scenarios are:

- Existing Conditions – evaluates existing traffic volumes in the current roadway configuration
- 2040 Cumulative Conditions – evaluates 2040 traffic volumes with additional traffic generated by anticipated development in the S. Carson Street vicinity and with the Complete Street improvements

The 2040 Cumulative study scenario includes 21 years of background growth at 0.5% per year and the inclusion of anticipated development affecting S. Carson Street but not yet captured in the Travel Demand Model (Carson Hills Apartments, North Douglas County Specific Plan, RC Zoning, Clearview Ridge, Appion Commercial Center, Fast Food Pad on Appion Way, and Cochise Multi-Family properties). The evaluated lane configurations are as shown in the S. Carson Street 30% plans (**Appendix A**).

ANALYSIS METHODOLOGY

Level of service (LOS) is a term commonly used by transportation practitioners to measure and describe the operational characteristics of intersections, roadway segments, and other facilities. This term equates seconds of delay per vehicle at intersections to letter grades "A" through "F" with "A" representing optimum conditions and "F" representing breakdown or over capacity flows.

Intersections

The complete methodology for intersection level of service analysis is established in the *Highway Capacity Manual (HCM) 2010*, published by the Transportation Research Board (TRB). **Table 1** presents the delay thresholds for each level of service grade at signalized and unsignalized intersections.

Table 1. Level of Service Definition for Intersections

Level of Service	Brief Description	Average Delay (seconds per vehicle)	
		Signalized Intersections	Unsignalized Intersections
A	Free flow conditions.	< 10	< 10
B	Stable conditions with some affect from other vehicles.	10 to 20	10 to 15
C	Stable conditions with significant affect from other vehicles.	20 to 35	15 to 25
D	High density traffic conditions still with stable flow.	35 to 55	25 to 35
E	At or near capacity flows.	55 to 80	35 to 50
F	Over capacity conditions.	> 80	> 50

Source: Highway Capacity Manual (2010), Chapters 18 and 19

Level of service calculations were performed for the signalized and stop controlled study intersections using the Synchro software package with analysis and results reported in accordance with the current *HCM 2010* methodology. The proposed roundabout at Stewart Street was analyzed using the SIDRA software package (utilizes HCM 2010) and the Fairview Drive intersection was analyzed using HCM 2000 methodology due to limitations of the 2010 methodology in evaluating shared & exclusive lanes.

Level of Service Policy

Carson City Municipal Code states that "A traffic LOS D or better…shall be maintained through mitigation of impacts from all conditions on all city maintained arterial, and collector roads and at city road intersections, except as noted in the Carson City master plan."[a]

Therefore, LOS D or better is deemed an acceptable operating condition. The LOS policy is not specific regarding side streets or minor movements. It is understood that minor movements and side street approaches on major arterials will commonly operate at LOS E or F during peak hours. This is a commonly accepted and manageable condition because it is not appropriate to signalize every minor street intersecting major arterials. It is expected that drivers will make indirect left turns during peak hour conditions.

EXISTING CONDITIONS

Roadway Facility

South Carson Street is a north-south major arterial roadway connecting Carson City with Minden/Gardnerville. This roadway is a vital connection for area businesses and is designated as the Business Route of US 395 through Carson City. South Carson Street between Fairview Drive and US 50 recently served as the main highway until the Carson Freeway (I-580) was completed in 2017. Following the completion of I-580, traffic volumes on S. Carson Street have decreased significantly and the roadway is a prime candidate for a Complete Streets redesign. Currently, S. Carson Street is a four-lane facility with 25-mph speed limit from 5th Street to 10th Street, a four-lane facility with a 35-mph speed limit from 10th to Stewart, and a six-lane facility with a 35-50 mph speed limits from Stewart Street to US 50. Current speed limits range from 35-mph between Stewart Street and Colorado Street, 45-mph between Colorado Street and Clearview Drive, and 50-mph from Clearview Drive to US 50. The current lane configurations and intersection controls at the study intersections on S. Carson Street are shown on **Figure 2**.

Existing Intersection Level of Service

Existing conditions intersection level of service analysis was performed using Synchro analysis software, and new vehicle/bicycle/pedestrian turning movement counts conducted between November 2018 and January 2019. The traffic volumes collected during this period were inflated by 5% to adjust for seasonality. The existing peak hour factors and heavy vehicle percentages from those recent traffic counts were used in the analysis. The existing peak hour traffic volumes are shown on **Figure 3**.

[a] Carson City Municipal Code 12.13.3.3.5.a accessed on August 27, 2018 at library.municode.com/nv/carson_city/codes

Current signal timing information was obtained from Carson City. We utilized the current cycle lengths and simple coordination signal timings to provide a direct comparison between current and future traffic operations (coordination along S. Carson Street is needed to achieve higher level of service for the future conditions). Additionally, conducting the analysis in this way enables evaluation of the worst-case scenario for side-streets and minor movements such that pocket lengths are appropriately sized for a wide range of future signal timing schemes. **Table 2** summarizes the existing conditions intersection level of service (for signalized intersections) and overall intersection delay results. The technical calculations and average delay for each side street movement are provided in **Appendix A**.

Table 2. Existing Conditions Intersection Level of Service Results

Existing Conditions - S. Carson Street						
			AM Peak		PM Peak	
ID	Intersection Name	Intersection Control	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
1	S. Carson & 5th Street	Signalized	**B**	**13.8**	**B**	**16.4**
2	S. Carson & Mall Entrance	Side Street STOP		0.4		0.4
3	S. Carson & Stewart Street	Signalized	**B**	**10.4**	**B**	**19.8**
4	S. Carson & Fairview Drive	Signalized	**C**	**26.2**	**C**	**31.2**
5	S. Carson & Colorado Street	Side Street STOP		1.6		1.4
6	S. Carson & Rhodes Street	Side Street STOP		2.0		3.9
7	S. Carson & Sonoma Street	Side Street STOP		1.6		1.4
8	S. Carson & Moses Street	Side Street STOP		0.3		0.8
9	S. Carson & Koontz Lane	Signalized	**D**	**36.1**	**C**	**29.6**
10	S. Carson & Raleys Entrance	Side Street STOP		0.1		0.2
11	S. Carson & Eagle Station Lane	Signalized	**B**	**19.4**	**B**	**14.2**
12	S. Carson & Clearview Drive	Signalized	**C**	**32.1**	**C**	**33.5**
13	S. Carson & Overland/Snyder Ave	Side Street STOP		1.4		2.2
14	S. Carson & Appion Way	Side Street STOP		1.5		3.7

Source: Headway Transportation, 2019

The signalized intersections all currently function within policy level of service. Each side street has relatively low volumes and reasonable delay considering the S. Carson Street context as a major arterial. Average delay considering all movements at side street stop-controlled intersections is very low due to the majority of traffic at these intersections traveling along the mainline and experiencing zero delay.

FUTURE CONDITIONS

This section describes the underlying traffic forecasting assumptions used to develop future traffic volumes for the corridor and describes the planned roadway and intersection configurations following the programmed complete street improvements.

2040 Baseline Traffic Volumes

The 2040 Baseline (20-year horizon) traffic volume forecasts (see **Figure 4**) were developed by factoring up the seasonally adjusted existing volumes by 0.5 percent per year for 21 years for a total growth factor of 10.5 percent. This background growth rate is consistent with the traffic volume growth on South Carson Street as shown in the Carson Area Metropolitan Planning Organization (CAMPO) travel demand model.

Anticipated Development Traffic Volumes

Anticipated Projects

The 2040 Baseline traffic volume forecasts described above do not fully account for future traffic volumes that would be generated by several anticipated private development projects in the vicinity of the S. Carson Street corridor (all projects located between Koontz Lane and Appion Way except North Douglas County Specific Plan Amendment). Carson City staff and the consulting team identified the following projects for inclusion in this evaluation:

- Carson Hills Apartments
- Clearview Ridge
- Cochise Street Multi-Family
- RC Zoning
- Appion Commercial Center
- Fast Food Pad on Appion Way
- North Douglas County Specific Plan Amendment

The development locations are shown on **Figure 5.**

Trip Generation

Trip generation rates for the anticipated developments were obtained from previously prepared traffic impact studies for the specific projects, as available, or the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 10th Edition*[b]. **Table 3** provides the land use mix and quantities used in this analysis to generate the Daily, AM peak hour, and PM peak hour trips for each development project. The resulting trip generation estimates are summarized in **Table 4**.

Table 3. Anticipated Development Land Use Quantities

Development Name	Land Use
Carson Hills Apartments	370 Multi-Family Units
Clearview Ridge	75 Single Family Homes
Cochise Multi-Family	143 Multi-Family Units
RC Zoning	120 Room Hotel
Appion Commercial Center	9,198 Sq. Feet Fast Food 3,600 Shopping Center
Fast Food Pad on Appion	2200 Sq. Feet Fast Food
North Douglas County Specific Plan Amendment	300 Single Family Attached Homes 610 Multi-Family Units 328 Single Family Detached Homes 114,200 Sq. Feet Shopping Center 475 Student School

Table 4. Anticipated Development AM, PM, and Daily Trip Totals

Development Name	PROJECT TRIP GENERATION		
	AM Peak	PM Peak	Daily Trips
Carson Hills Apartments	170	207	2,708
Clearview Ridge	56	74	708
Cochise Multi-Family	56	74	902
RC Zoning	74	88	1,468
Appion Commercial Center	217	163	4,564
Fast Food Pad on Appion	88	72	1,036
North Douglas County Specific Plan Amendment	755	995	10,709
Total:	1,416	1,673	22,095

[b] Trip generation estimates are intended to match those in submitted traffic impact studies to date. Trip generation estimates for projects without previously submitted traffic impact studies, were based on the best available land use mix data at the time of analysis. Any variation between the trip generation estimates used in this analysis and those in submitted traffic impact studies for each project is attributed a change in project land use quantities or types for that project following the completion of this analysis.

Trip Distribution & Assignment

Future development traffic was distributed, by individual project, to the adjacent roadway network based on existing travel patterns and the locations of complimentary land uses. All development trips were distributed throughout the entire study network to ensure a comprehensive evaluation. **Figures 6-12** illustrate the trip assignment for each development project included in this evaluation. The combination of anticipated development trips is shown on **Figure 13**.

2040 Cumulative Traffic Volumes

2040 Cumulative AM and PM peak hour traffic volumes (worst case scenario for the 20-year horizon) were developed by combining the 2040 Baseline volumes (**Figure 4**) and all of the anticipated development trips (**Figure 13**). The resulting cumulative traffic volumes are shown on **Figure 14**.

This evaluation also considers daily traffic volumes on S. Carson Street in the study corridor. The annual background growth rate of 0.5% was applied to the most recent NDOT reported Annual Average Daily Traffic (AADT) volumes to represent 21 years of total growth (total factor of 10.5%) and generate a baseline estimate of 2040 AADT. As shown in **Figure 15**, 2040 daily traffic on S. Carson Street could potentially reach 22,760 vehicles per day between 5th Street & Stewart Street and 37,073 vehicles per day between Clearview Drive and US 50. For comparison, the 2016 daily traffic on S. Carson Street prior to the completion of I-580 in 2017 was 52,000 vehicles per day.

Planned Complete Street Modifications

The proposed Complete Street redesign of S. Carson Street includes the following modifications (as of the 30% design stage):

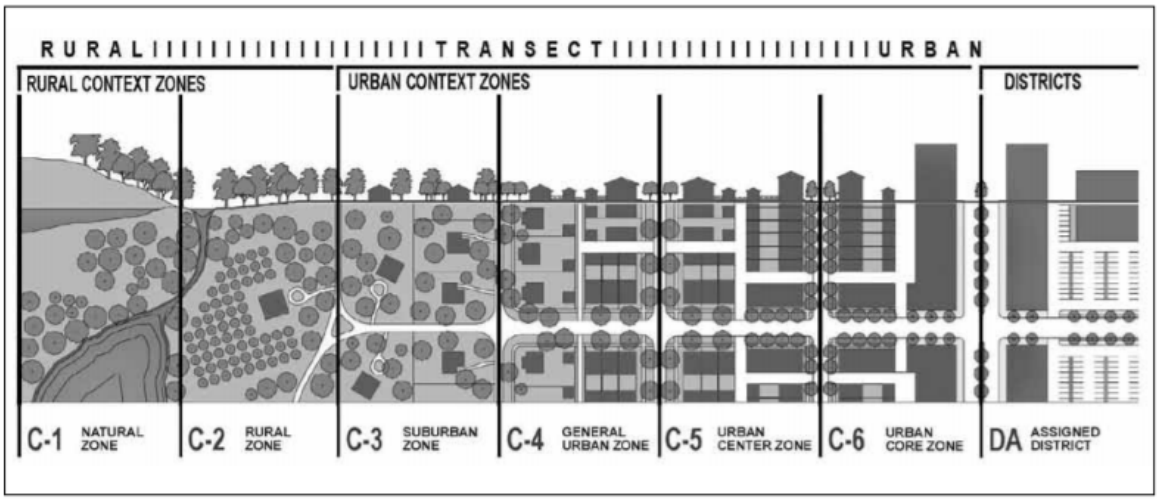
- Remove one northbound and one southbound travel lane from Appion Way to Stewart Street (resulting in two lanes in each direction)
- Remove one northbound lane from Stewart Street to 5th Street (resulting in a single northbound lane)
- Add a multi-use path on the east side of the roadway from Appion Way to Stewart Street
- Add bike lanes from Stewart Street to 5th Street
- Provide a center two-way left turn lane along the majority of S. Carson Street from Clearview Drive to Rhodes Street
- Maintain the existing two-way center turn lane between 5th Street and Stewart Street

The 30% stage plans reviewed in this evaluation are provided in **Appendix B**.

Speed Limits

The Complete Streets project will intentionally change the character of the roadway and it is important to identify appropriate speed limits for each unique section of the corridor based on urban context and applicable industry standards. ITE Guidance[c] identifies seven different urban form types (land uses/quantities, land use mix, building setbacks, residential and employment density) which are called "context zones" (**Figure 16**). As the context zone of the S. Carson Street corridor varies from north to south, the appropriate speed varies accordingly. Based on the urban form along the S. Carson Corridor, the corridor was divided into the following "context zone" sections.

1. 5th Street to Stewart Street – C-4: General Urban Zone
2. Stewart Street to Clearview Drive – C-3: Suburban Zone
3. Clearview Drive to Appion Way – C-3/C-2 – "Transitional Zone"



Source: ITE (2010) – Designing Walkable Urban Thoroughfares: A Context Sensitive Approach

Figure 16. Context Zones

The ITE guide identifies appropriate speed limits for context zones C-3 to C-6. The Clearview Drive to Appion Way area is intended to serve as a transitional zone to match the existing 50 mph speed limit south of Appion Way. Based on this guidance, the following speed limits are identified as being appropriate for the S. Carson Street corridor.

1. 5th Street to Stewart Street – 25 MPH
2. Stewart Street to Clearview Drive – 35 MPH
3. Clearview Drive to Appion Way – 50 MPH

[c] Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (2010)

These proposed speed limits align with the American Association of State Highway and Transportation Officials (AASHTO) Green Book: *"Urban arterials should be designed and control devices regulated, where practical, to permit running speeds of 20 to 45 mph. Speeds in the lower portion of this range are applicable to local and collector streets through residential areas and to arterial streets through more crowded business areas, while speeds in the higher portion of the range apply to high-type arterials in outlying suburban areas."*

2040 LEVEL OF SERVICE ANALYSIS

Level of service analysis was completed for each study intersection to compare the existing traffic operations to the future traffic operations, including anticipated development, and identify the lane configurations necessary to maintain acceptable operating conditions.

Table 5 shows the level of service and overall intersection delay results for the 2040 Cumulative scenario with the 30% design stage complete street configuration. Technical calculations and average delays for each side street movement in this scenario are provided in **Appendix C**.

Table 5. 2040 Cumulative Conditions Level of Service Analysis Results

2040 Cumulative Conditions						
			AM Peak		PM Peak	
ID	Intersection Name	Intersection Control	LOS	Average Delay (sec/veh)	LOS	Overall Delay (sec/veh)
1	S. Carson & 5th Street	Signalized	**B**	**16.9**	**B**	**18.9**
2	S. Carson & Mall Entrance	Side Street STOP		0.4		0.4
3	S. Carson & Stewart Street	Single Lane Roundabout[d]	**B**	**14.8**	**F**	**72.8**
4	S. Carson & Fairview Drive	Signalized	**E**	**58.7**	**D**	**47.0**
5	S. Carson & Colorado Street	Side Street STOP		2.6		3.8
6	S. Carson & Rhodes Street	Side Street STOP		4.5		43.1
7	S. Carson & Sonoma Street	Side Street STOP		2.0		3.5
8	S. Carson & Moses Street	Side Street STOP		0.5		3.9
9	S. Carson & Koontz Lane	Signalized	**C**	**26.7[e]**	**D**	**38.8**
10	S. Carson & Raleys Entrance	Side Street STOP		0.1		0.2
11	S. Carson & Eagle Station Lane	Signalized	**C**	**28.2**	**D**	**45.2**
12	S. Carson & Clearview Drive	Signalized	**D**	**36.4**	**D**	**39.4**
13	S. Carson & Overland/Snyder Ave	Side Street STOP		1.9		9.9
14	S. Carson & Appion Way	Side Street STOP		5.7		66.0

Source: Headway Transportation, 2019

[d] Based on 30% design concept. 60% design will incorporate second westbound left turn lane. Based on preliminary analysis, this will result in 2040 AM Peak LOS B and 2040 PM Peak LOS C (Appendix D).
[e] Major increase in mainline traffic with minimal delay and minimal increase in side-street traffic with higher delays results in reduced Overall LOS & Delay. Side-street movement LOS reduced in future (Appendix C)

As shown in **Table 5**, all of the intersections that are to remain signalized are projected to operate within Carson City policy LOS under the 2040 Cumulative Conditions scenario.

A roundabout is planned at the Stewart Street/S. Carson Street intersection. Operations analysis was conducted for this intersection using SIDRA software which is specifically designed for roundabout operations analysis. The SIDRA analysis indicates the preliminary configuration (shown in **Appendix D**) would not have adequate capacity for 2040 volumes and would result in LOS "F" during the PM peak period. Based on this analysis, two lanes are needed for the westbound to southbound movement in order to provide acceptable operations. For this reason, a second westbound turn lane is being incorporated into the 60% design plans. A preliminary SIDRA analysis of this design indicates that this will improve 2040 PM Peak LOS to "C". The detailed results of the SIDRA analysis for both roundabout concepts are included in **Appendix D**.

Side street operations at stop-controlled intersections will be impacted by the removal of a travel lane on S. Carson Street, most notably during the PM peak hour. This is an expected result of removing a travel lane from the mainline roadway because traffic in the remaining lanes becomes more condensed which reduces the length and number of gaps between vehicles on the mainline and makes it more difficult to enter the roadway from the side street. Delay on the side-streets is a commonly accepted and manageable condition on major arterial roadways since it is not appropriate to signalize low volume side streets and inappropriately impact mainline traffic flows. To proactively manage this situation, the project design should enable U-turns at major intersections to allow drivers to make a right turn on S. Carson Street and later make a U-turn movement if they do not want to wait for an adequate left-turn gap during the peak hours.

This analysis was conducted assuming a coordinated traffic signal system on S. Carson Street Corridor for both existing and future conditions. Proactive traffic signal management and a well- coordinated system will be necessary to manage the existing and future traffic volumes following the complete street modifications (removal of travel lanes/capacity reduction). Without signal coordination, significant congestion will likely occur on northbound Carson Street north of Stewart Street. It should be noted that the assumed signal coordination provides a worst-case scenario for determining side street operations and queue storage needs because mainline operations are appropriately prioritized in this scenario.

TURN POCKET RECOMMENDATIONS

Additional Lanes

Based on the 2040 Cumulative Condition traffic volumes and traffic operations analysis, turn pockets should be provided at the following locations not already shown in the 30% stage plans:

- Northbound right-turn lane at Koontz Lane (200 foot striped pocket)
- Northbound right-turn lane at 5th Street (350 foot striped pocket)

A northbound right-turn pocket is needed at Koontz Lane to serve the high projected right turn volumes (over 100 right turns in the PM peak hour). Removing high right-turn volumes from through lanes reduces rear-end collision probability and thereby improves safety.

A northbound right-turn pocket is needed at 5th Street so that right turn movements will not be blocked by the long northbound through queues that will develop at this location over time.

No turn pockets are required at either the Main Mall Entrance or the Raley's Entrance. This indicates that driveways throughout the corridor do not generate sufficient traffic at this time to require turn pockets.

Queue Storage

This analysis identifies the 95th percentile queue lengths for each movement (based on 2040 Cumulative Condition volumes and the proposed Complete Street configuration) and compares the projected queue lengths to the planned turn pocket lengths shown in the 30% design drawings. **Table 6** presents the locations for which modifications to the 30% design are recommended.

Table 6. Turn Pocket Recommendations

	Turning Movement	30% Design Turn Pocket Length (Feet)	95th Percentile Queue (Feet)	Recommended Turn Pocket Length (Feet)
S. Carson St & Koontz Lane	Northbound Right	0	610*	200
S. Carson St & 5th Street	Northbound Right	0	427*	350
S. Carson St & Eagle Station Lane	Southbound Left	185	214	215
S. Carson St & Fairview Drive	Northbound Right	150	220	230
S. Carson St & Clearview Drive	Northbound Left	200	227	250

**Represents Northbound Through Queue. Northbound right-turn pocket recommended to reduce spillback through side street intersections and improve safety.*

Proactive Network Management Strategies

Through this analysis we identified the following proactive strategies to enhance the project area roadway network and maximize the efficiency of the overall system. These strategies go beyond the scope of the current Complete Streets project but are intended to compliment the implementation of the project and maximize network efficiencies. The suggested proactive strategies are:

- Lengthen the westbound left-turn pocket at Fairview to 350 feet which will remove the short eastbound left turn pocket at the back of the westbound left-turn lane

- The City should plan for the signalization of Appion Way in order to divert left-turn demand from the Clearview Drive intersection and accommodate future northbound left-turn traffic at Appion Way.

    - The Clearview Drive eastbound approach to S. Carson Street was evaluated in detail in this analysis. The approach has a 130 foot eastbound left turn pocket with a center turn lane behind it, for over 350 feet of total storage, and a 100 foot eastbound right turn pocket. The projected 95th percentile eastbound left-turn queue under 2040 Cumulative conditions is approximately 380 feet, which would spillback into the westbound left-turn pocket at the Cochise Dr/Clearview Dr intersection. The right-turn queue is projected to be contained within the existing pocket length. The eastbound lane configurations are set such that the left-turn pocket would prohibit access to and from adjacent driveways on both the north and south sides of Clearview Drive. This condition is not projected to occur until 2040 during peak hours.

    - Northbound left-turns at Appion Way are expected to reach LOS "F" with the anticipated commercial developments (approx. 300 peak hour northbound left-turns) and continued background traffic volume growth. The reconfiguration of Carson Street will focus southbound traffic into two lanes until approximately 400 feet north of Appion Way, rather than three as exists today, and further reduce gaps in southbound traffic for northbound left-turn movements[f]. The analysis shows a need for 600 feet of northbound left-turn storage for the unsignalized condition under 2040 Cumulative conditions. We do not believe drivers will actually sit through that level of delay and therefore recommend signalization over providing a 600 foot northbound left-turn pocket.

- Closing the median opening at the Overland Street/Snyder Avenue intersection in conjunction with future improvements at Appion Way, particularly if Snyder Avenue were realigned opposite Appion Way, should be considered. Left turn and through movements from Overland Street are already extremely difficult during peak hours and prohibited from Snyder Avenue. The

[f] Based on 30% design plans

northbound left turn pocket to Overland Street would need to be removed to construct a southbound left turn lane to any new east leg opposite Appion Way.

- It is anticipated that a traffic signal will be needed at Rhodes Street with future redevelopment of the vacant Armory site (east side of S. Carson Street opposite Rhodes Street). The City should consider constructing a northbound right-turn lane at Rhodes Street now to avoid disruption of the multi-use path later. Similarly, we recommend the southbound left-turn to Rhodes Street and the northbound left-turn lane to Colorado Street be constructed back-to-back by the complete streets project to maximize the queue storage for both movements in the future.

CONCLUSIONS

The recent completion of I-580 has changed travel patterns across Carson City and has significantly reduced traffic volumes on S. Carson Street between 5th Street and US 50. The lower traffic volumes on S. Carson Street create an opportunity to reimagine the roadway and implement Complete Street treatments. This evaluation presents 21-year horizon traffic volume forecasts, evaluates the lane configurations and turn pocket lengths in 30% plans on the Complete Streets project, and identifies recommendations for the Complete Streets project. This evaluation also offers longer-term recommendations for consideration with future projects. Following are the key findings and recommendations:

- Growing traffic volumes and fewer through lanes on S. Carson Street will increase delay for left-turns from side streets. This condition is typically manageable and commonly accepted on major arterial roadways where signalization of low volume side-streets is not appropriate (i.e. S. Carson Street). It is recommended that this condition be managed by the following strategies:
    - Provide U-turn opportunities at major intersections to enable drivers to make a right turn onto S. Carson Street and later make a U-turn movement if they do not want to wait for adequate left-turn gaps during peak hours.
    - Coordinate signal timings along S. Carson Street of optimum through-put and to create left-turn gaps between vehicles on the mainline.
    - Identify improvements to parallel side-street operations (Curry Street & Stewart Street) to proactively manage any diverted traffic from S. Carson Street onto these parallel facilities.
- Proactive traffic signal coordination and optimization for the S. Carson Street corridor will be absolutely necessary and should be implemented with the Complete Street project changes. Maximizing efficiency of traffic operations is critical to minimizing delay and queue lengths at signalized intersections especially in the southern portion of the project (Fairview Drive to Appion Way). Further evaluation of appropriate cycle lengths, timings, and clearance intervals will help the City manage traffic operations along the corridor as growth occurs.
- To proactively accommodate future traffic the following five (5) modifications to Turn Pockets (**Figure 17**) should be incorporated into the Complete Street design:
    - Right turn pockets are needed for northbound right-turns at 5th Street and Koontz Lane
    - Extend northbound right-turn pocket at Fairview Drive
    - Extend southbound left-turn pocket at Eagle Station Lane
    - Extend northbound left-turn pocket at Clearview Drive

- The preliminary Stewart Street roundabout configuration (30% design) requires two westbound to southbound lanes within the roundabout to adequately accommodate the high left turn volumes in the PM peak hour. A single lane configuration would likely result in Level of Service F and significant queueing during the 2040 PM peak hour. Based on this analysis, Carson City has committed to incorporating an additional westbound to southbound lane into the 60% design.

- The City should anticipate a need for future improvements in the Appion Way & Overland Street/Snyder Avenue area to address left-turn movements to and from Appion, Overland, and Snyder. Although further evaluation is needed, a traffic signal at Appion Way is a leading alternative for resolving several localized issues, particularly if Snyder Avenue could be realigned opposite Appion Way. Access management at the Overland Street intersection should be considered with the Appion Way improvement alternatives.

- The City should anticipate a need for future improvements at Rhodes Street with future redevelopment of the vacant Armory site (east side of S. Carson Street opposite Rhodes Street). The City should consider constructing a northbound right-turn lane at Rhodes Street now to avoid future disruption to the multi-use path.

- The following speed limits are recommended based on the land use and roadway context of this project and the agreed goal of creating a more walkable and bikeable street environment:

    - 5th Street to Stewart Street – 25 MPH
    - Stewart Street to Clearview Drive – 35 MPH
    - Clearview Drive to Appion Way – 50 MPH

Please do not hesitate to contact us at 775.322.4300 with any questions or comments.

Sincerely,
Headway Transportation, LLC

Loren E. Chilson, PE
Principal

Attachments: Figures 1 – 17

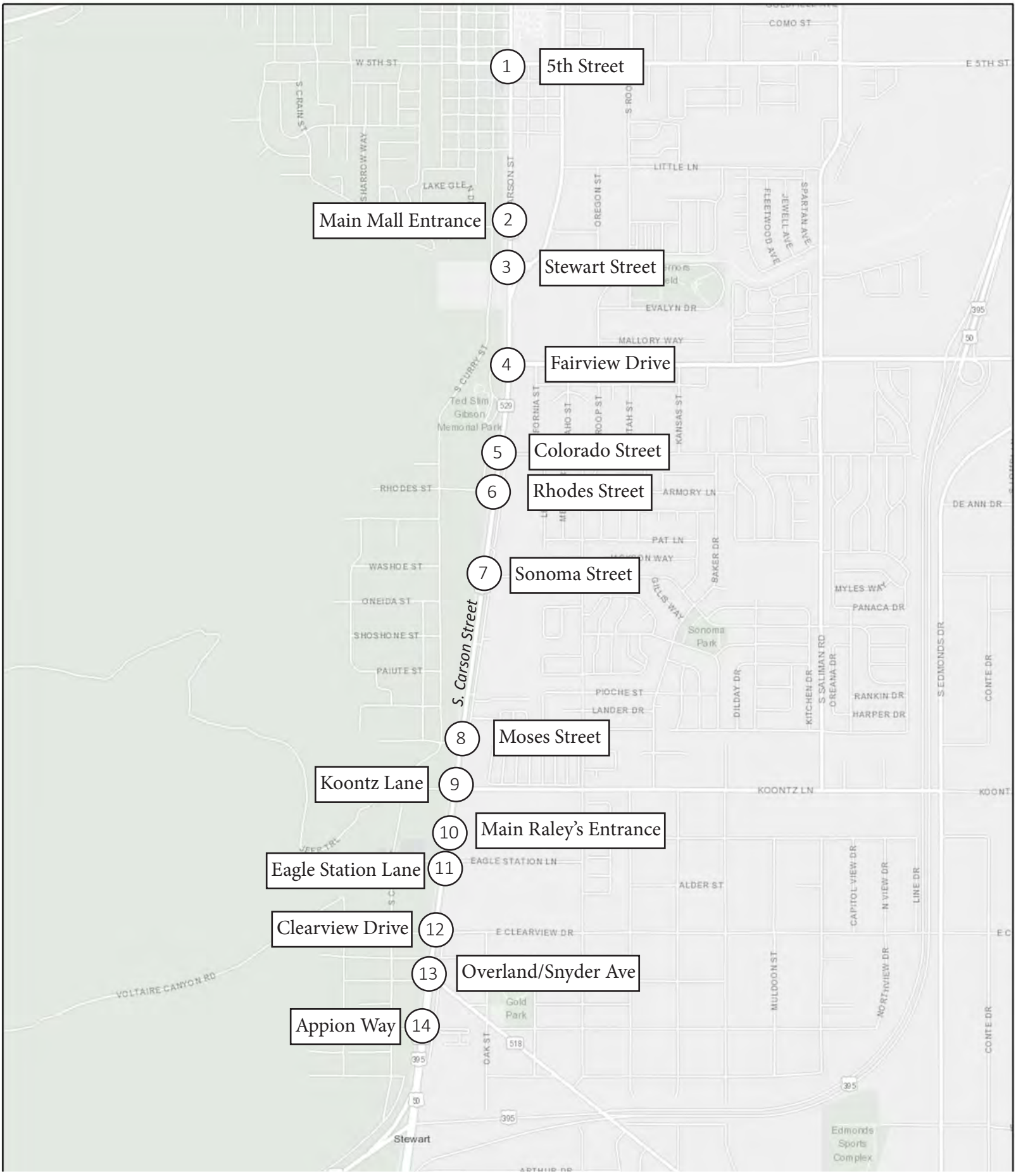
Appendix A – S. Carson Street 30% Plans

Appendix B – Existing Conditions LOS Calculations

Appendix C – 2040 Cumulative Conditions LOS Calculations

Appendix D – Stewart Street Roundabout Level of Service Analysis

Figures

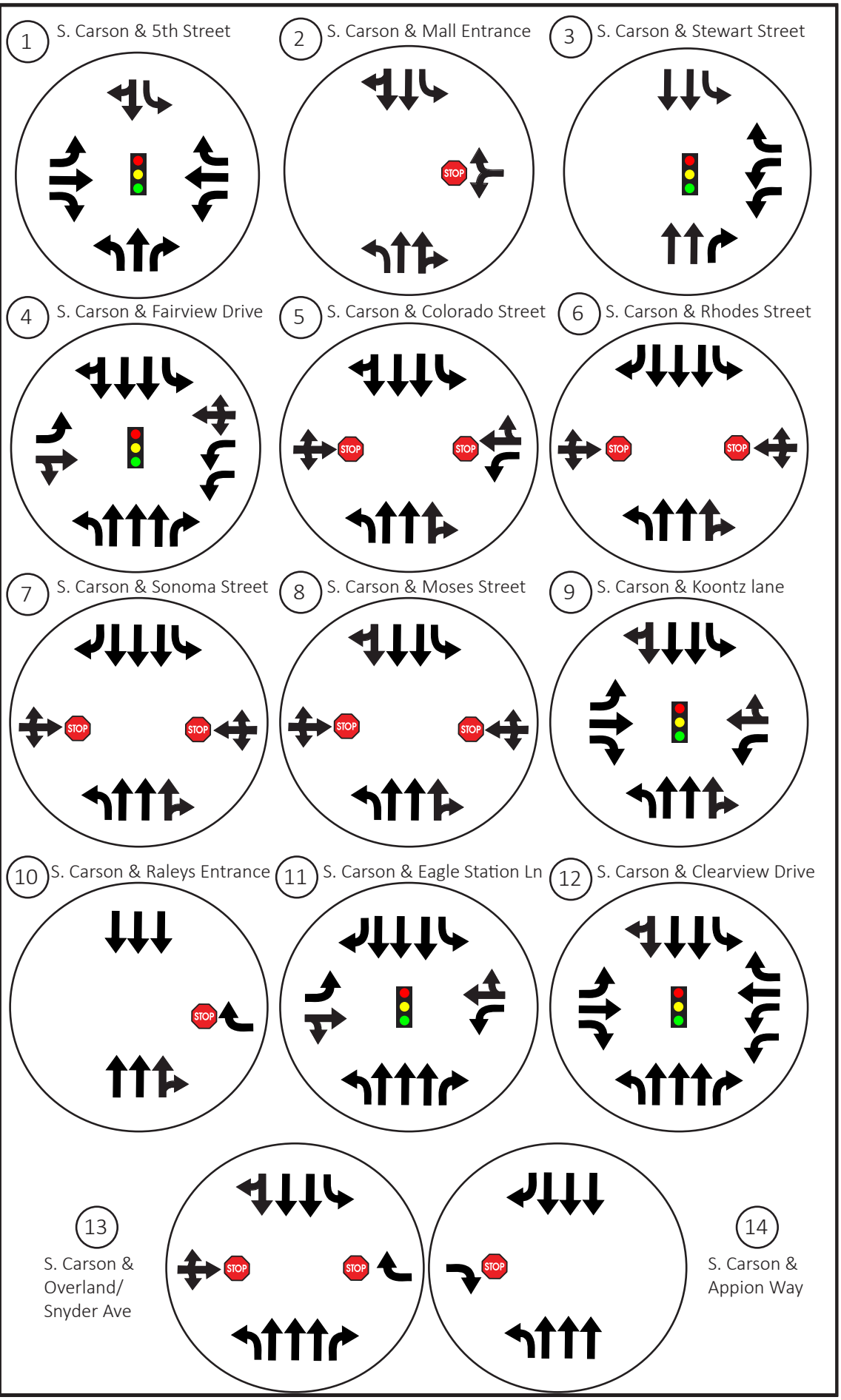


HEADWAY TRANSPORTATION

NO SCALE

Figure 1

S. Carson Street Traffic Evaluation Study Intersections



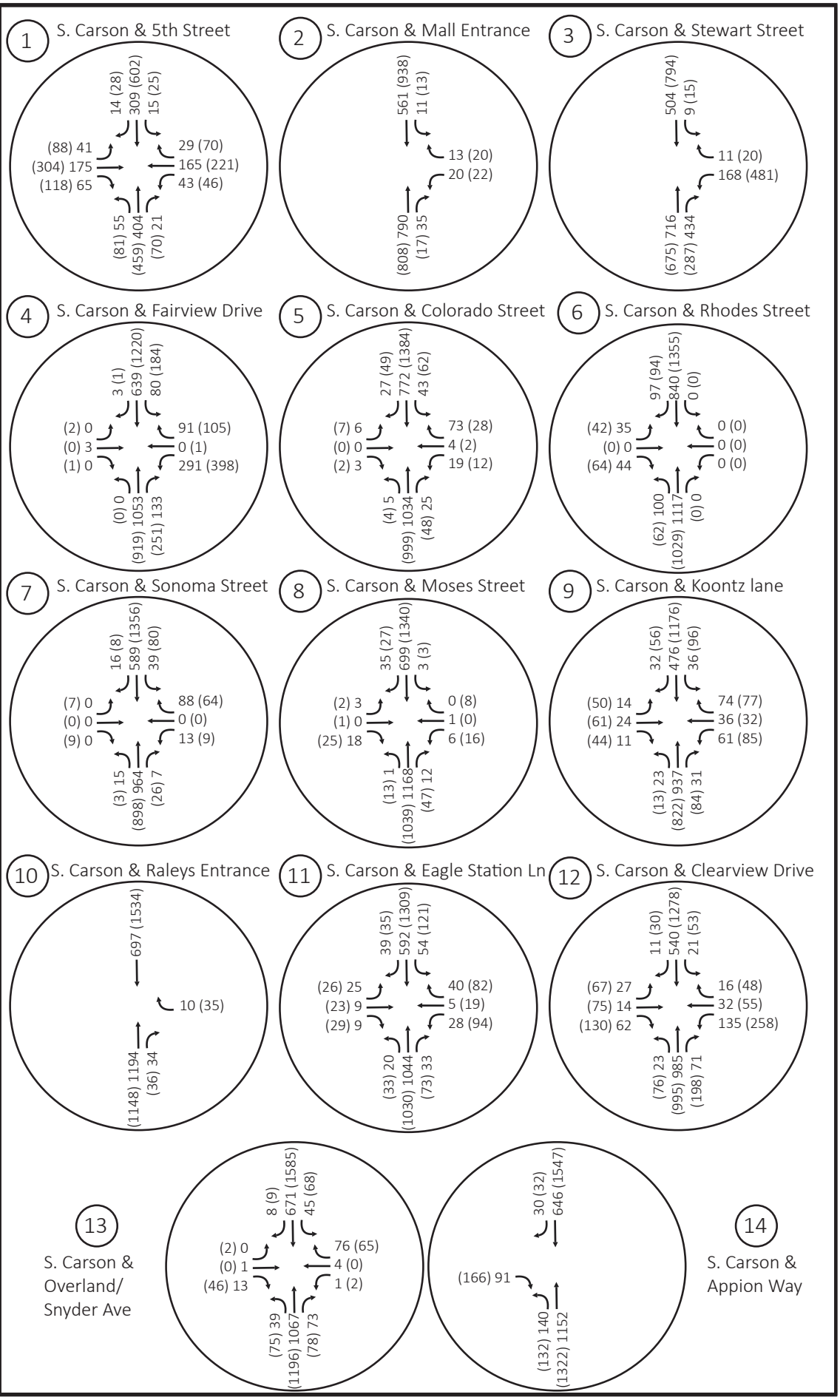
HEADWAY TRANSPORTATION

NO SCALE

Figure 2

S. Carson Street
Traffic Evaluation

Existing Lane Configurations & Controls



HEADWAY TRANSPORTATION

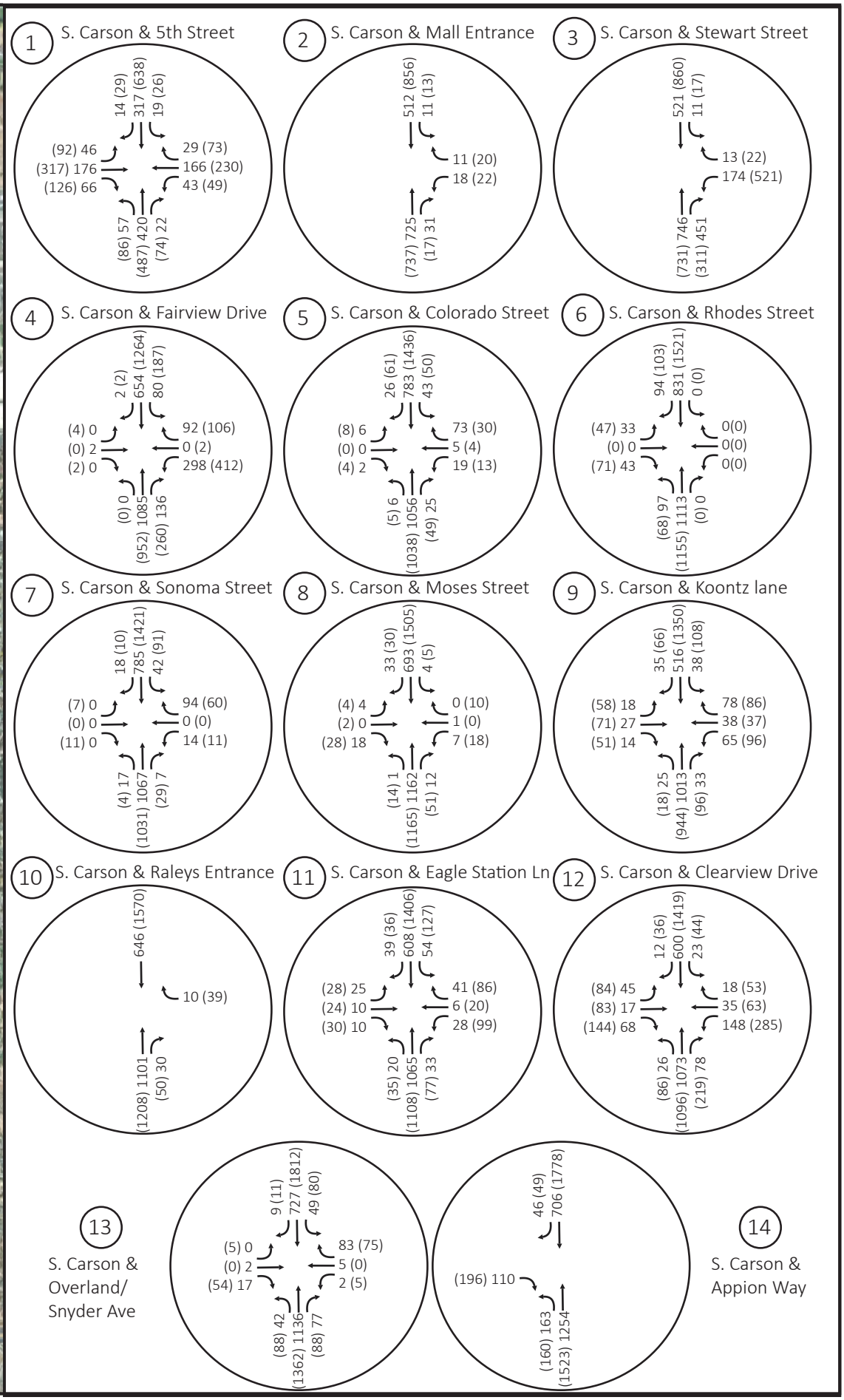
NO SCALE

AM (PM)- Turning Movement Volumes

Figure 3

S. Carson Street Traffic Evaluation

Existing AM & PM Peak Hour Traffic Volumes



HEADWAY TRANSPORTATION

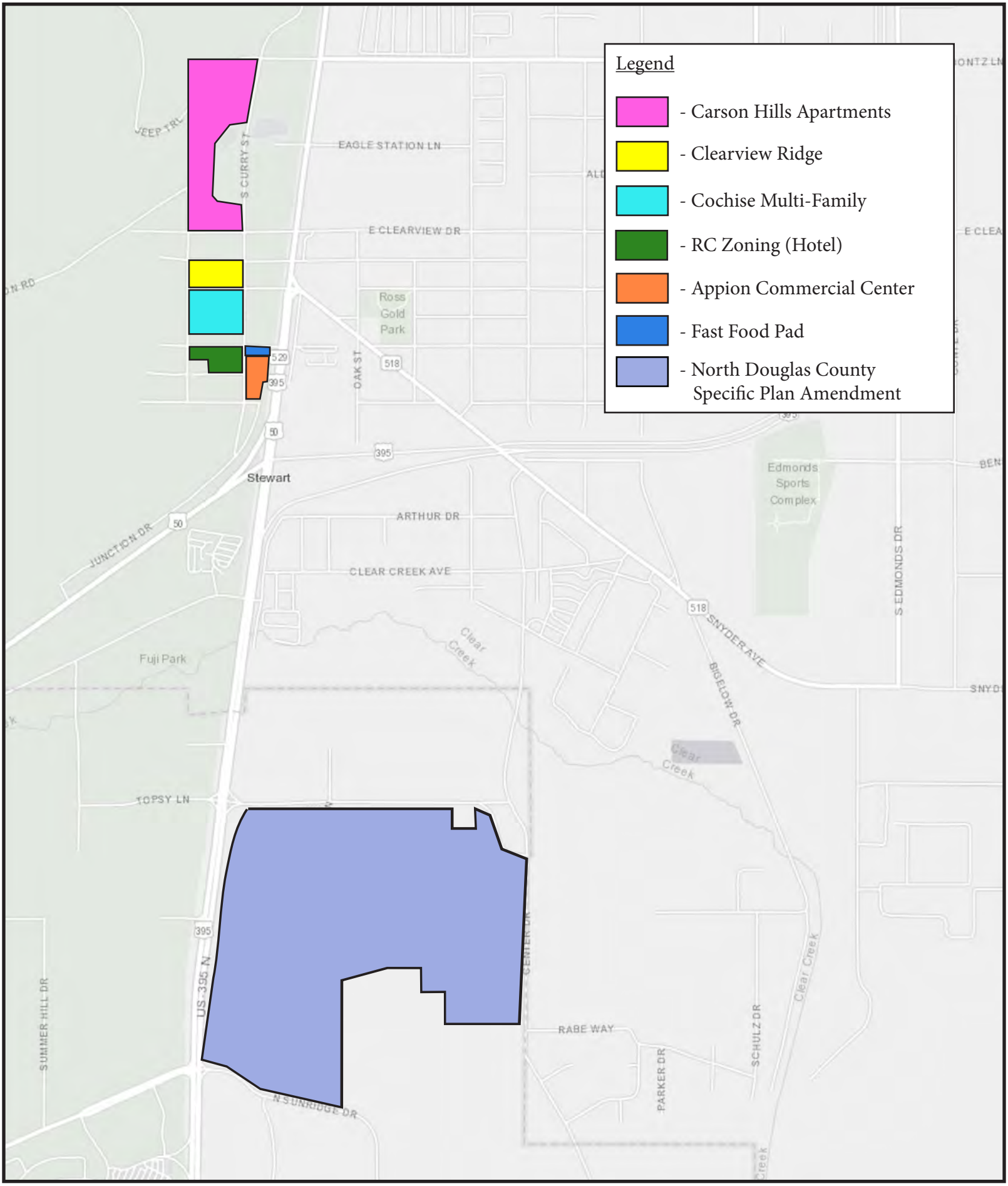
NO SCALE

AM (PM)- Turning Movement Volumes

Figure 4

S. Carson Street Traffic Evaluation

2040 Baseline AM & PM Peak Hour Traffic Volumes



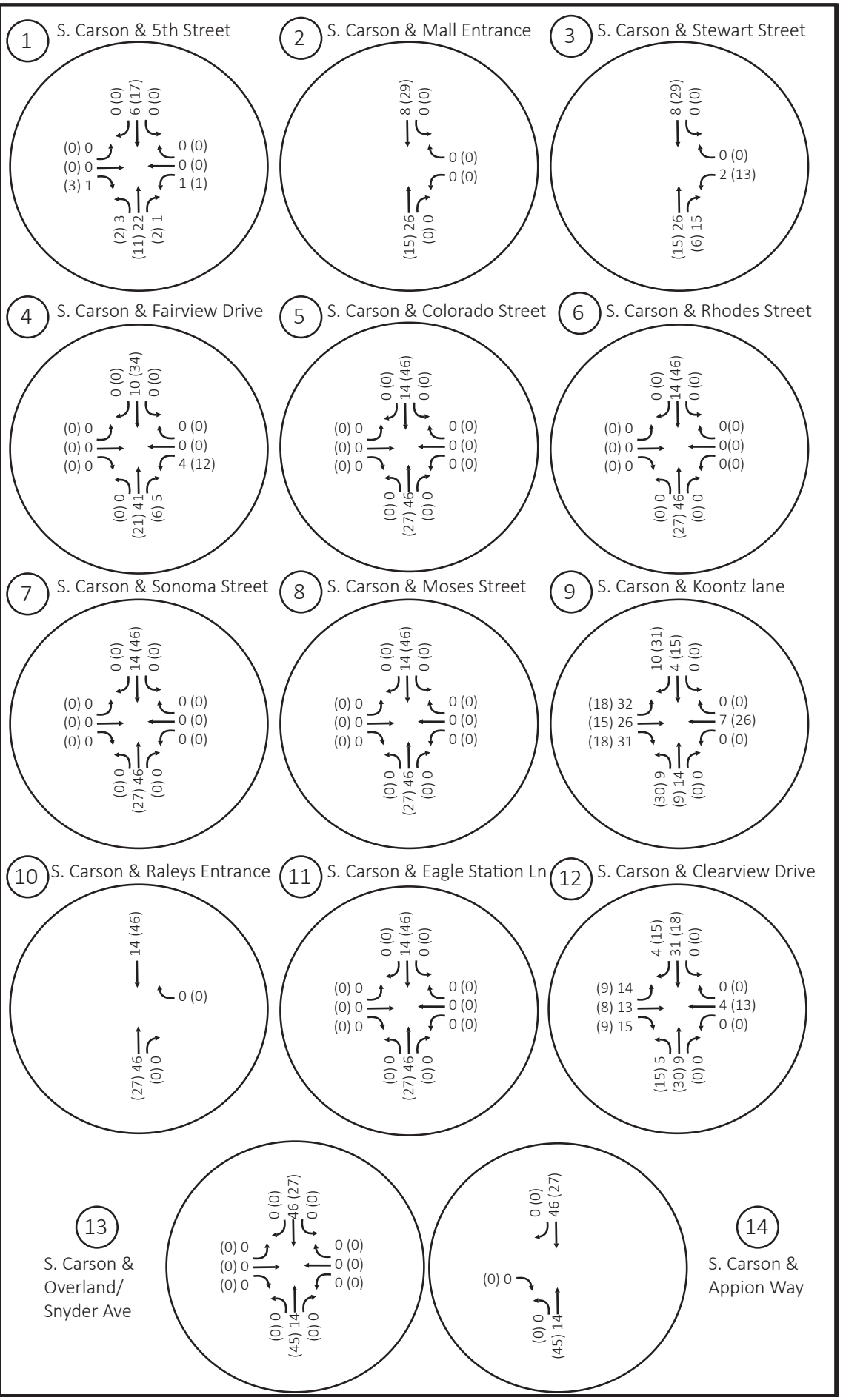
HEADWAY TRANSPORTATION

NO SCALE

Figure 5

S. Carson Street Traffic Evaluation

Anticipated Development Locations



HEADWAY TRANSPORTATION

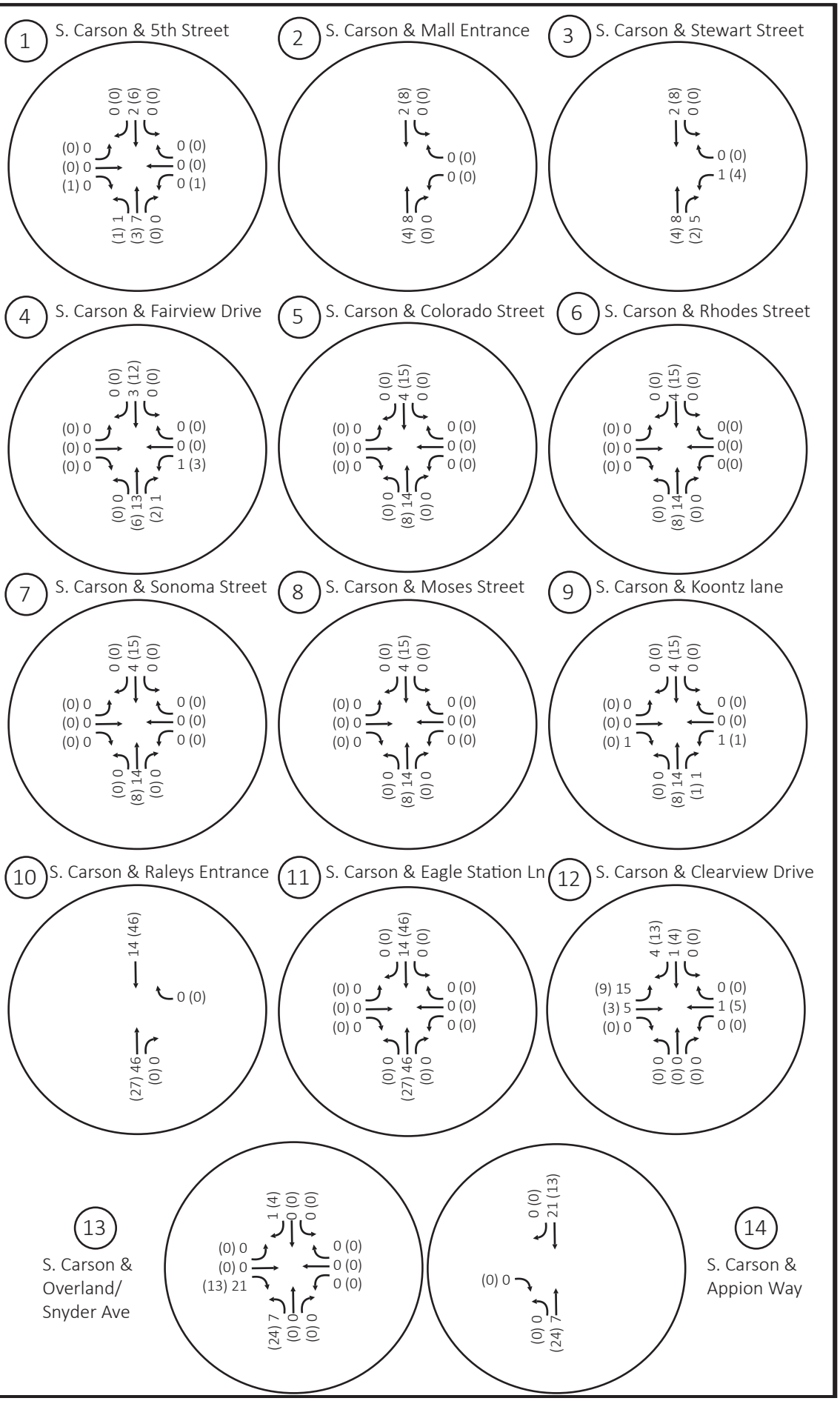
NO SCALE

AM (PM)- Turning Movement Volumes

Figure 6

S. Carson Street Traffic Evaluation

Carson Hills Apartments Project Trips



HEADWAY TRANSPORTATION

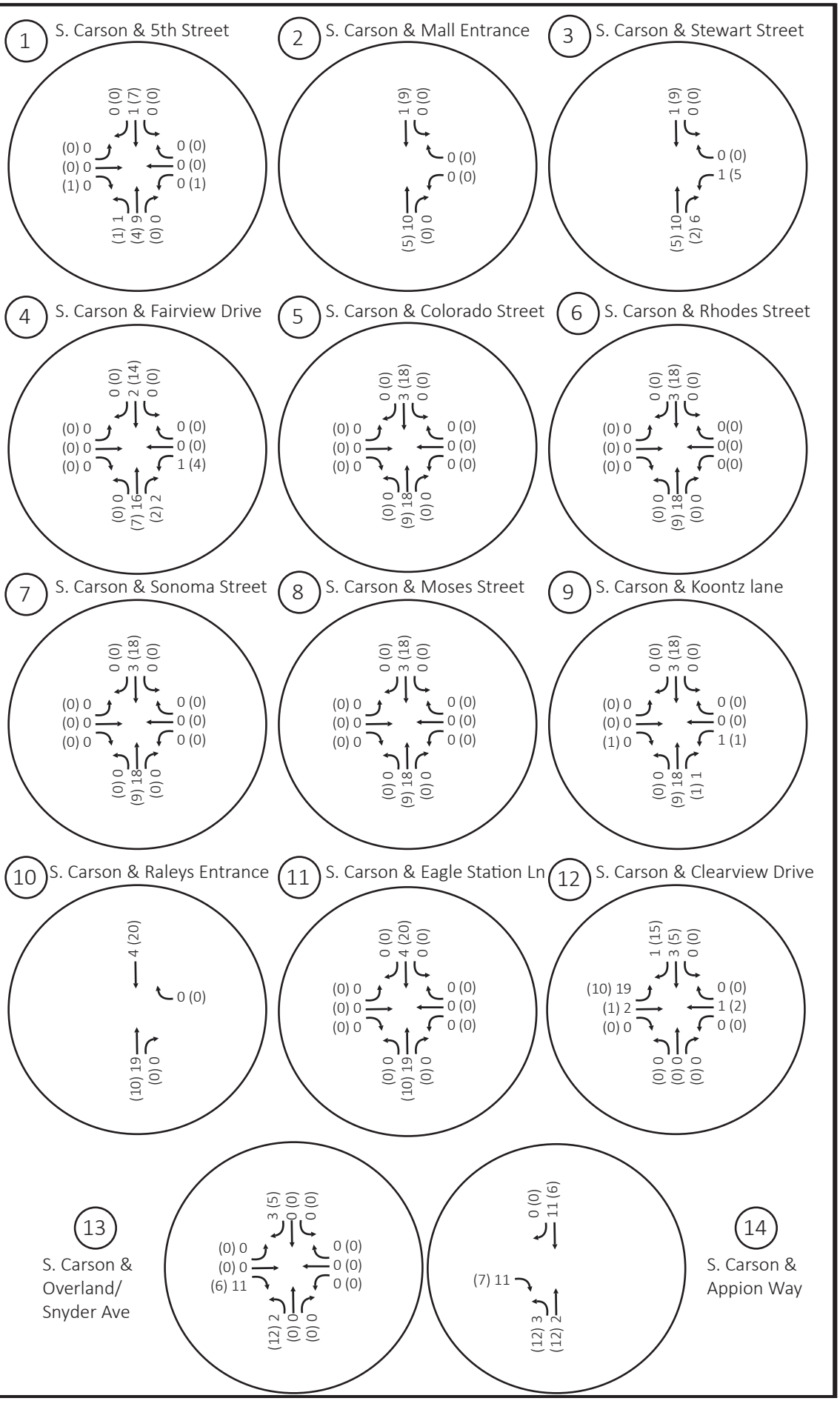
NO SCALE

AM (PM)- Turning Movement Volumes

Figure 7

S. Carson Street Traffic Evaluation

Clearview Ridge Project Trips



HEADWAY TRANSPORTATION

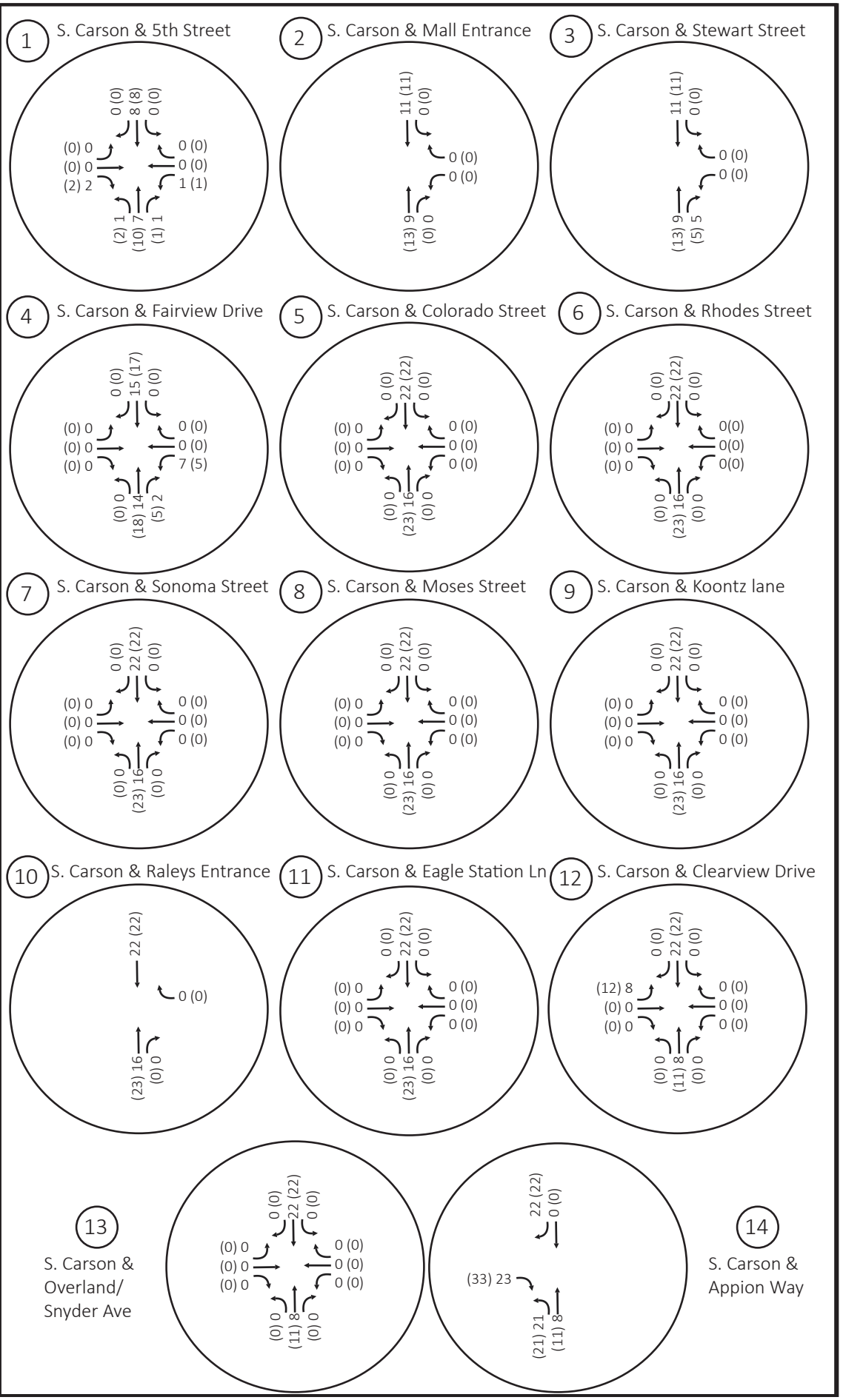
NO SCALE

AM (PM)- Turning Movement Volumes

Figure 8

S. Carson Street
Traffic Evaluation

Cochise Multi-Family Project Trips



HEADWAY TRANSPORTATION

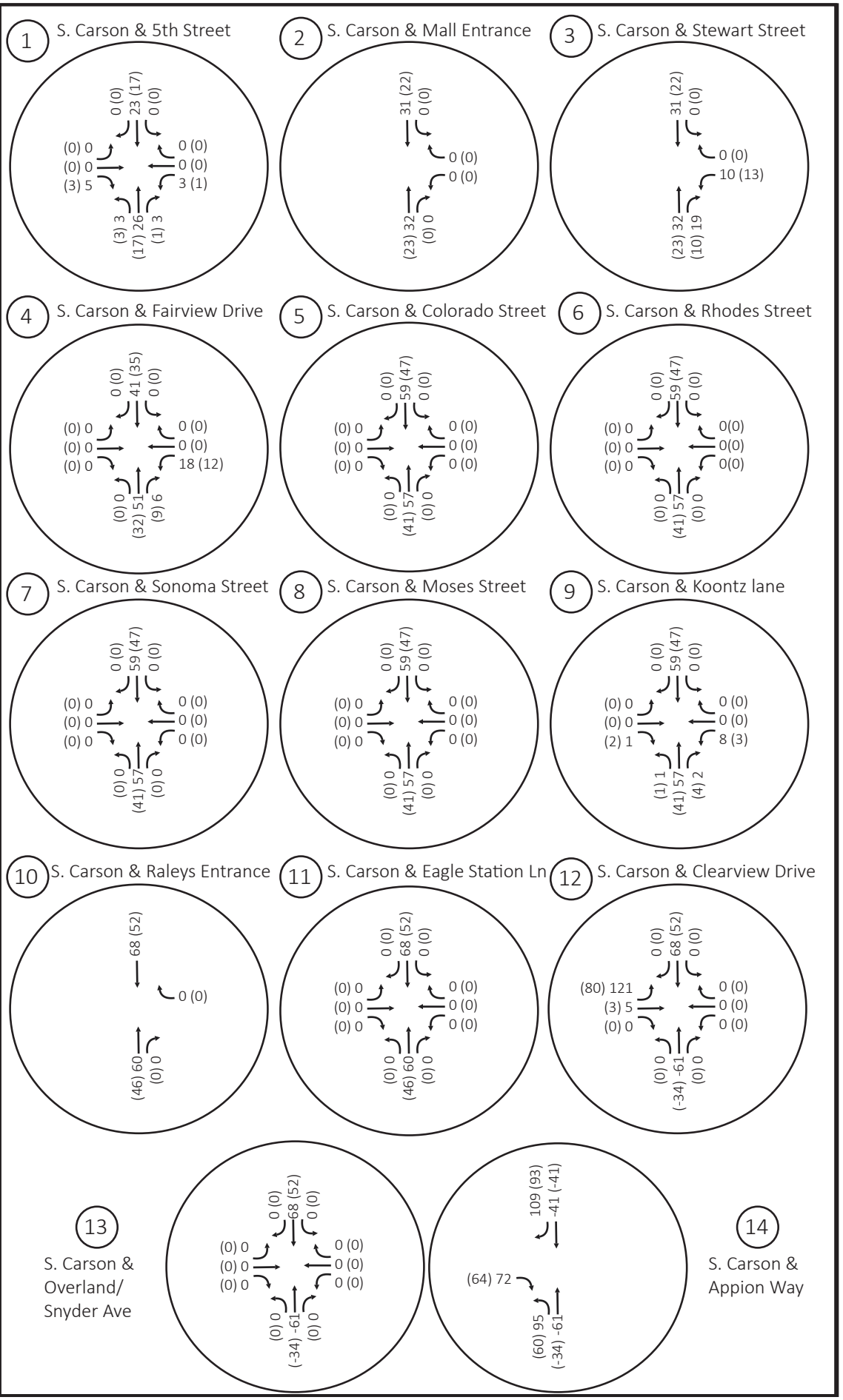
AM (PM)- Turning Movement Volumes

NO SCALE

Figure 9

S. Carson Street Traffic Evaluation

RC Zoning (Hotel) Project Trips



HEADWAY TRANSPORTATION

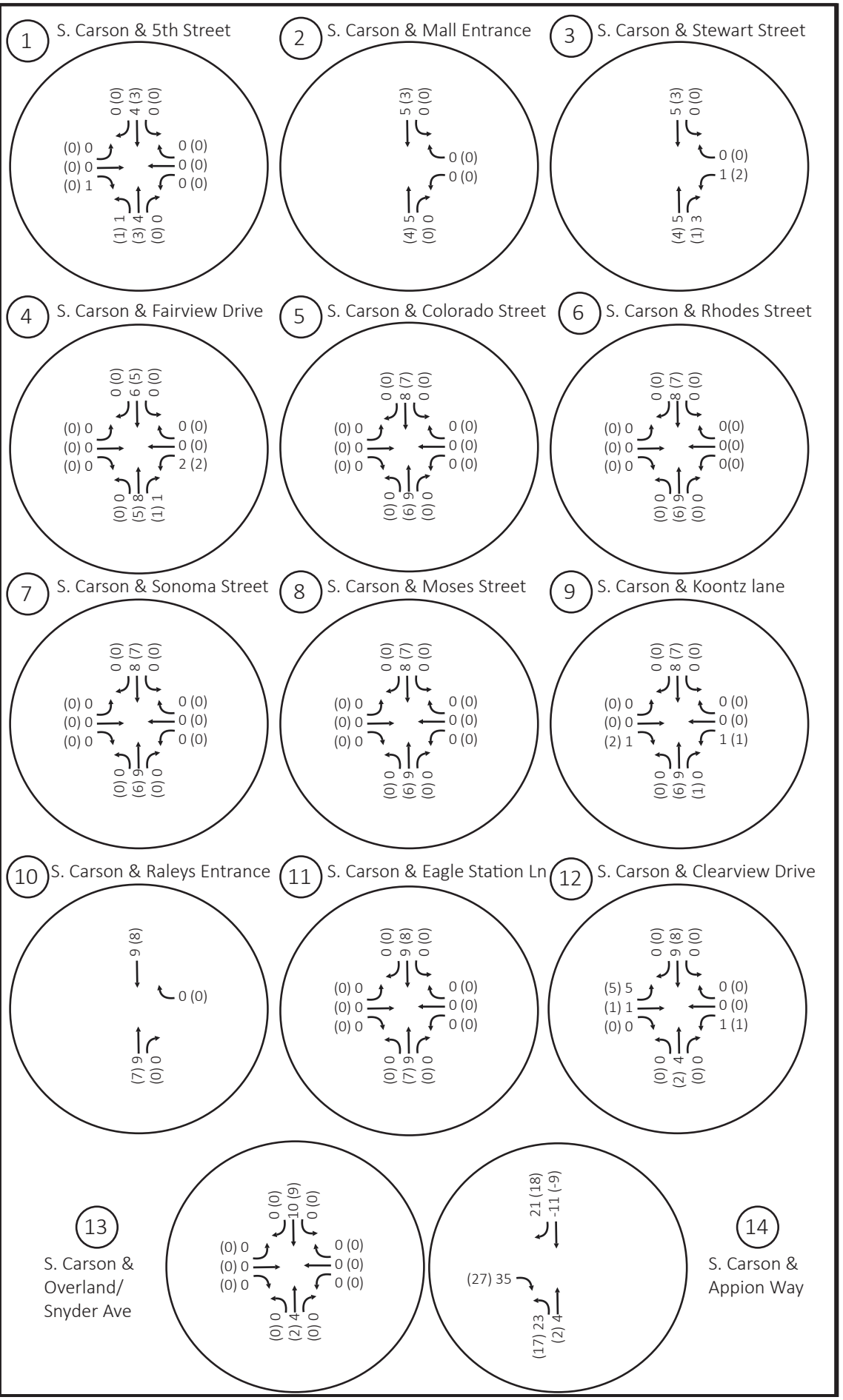
NO SCALE

AM (PM)- Turning Movement Volumes

Figure 10

S. Carson Street Traffic Evaluation

Appion Commercial Center Project Trips



HEADWAY TRANSPORTATION

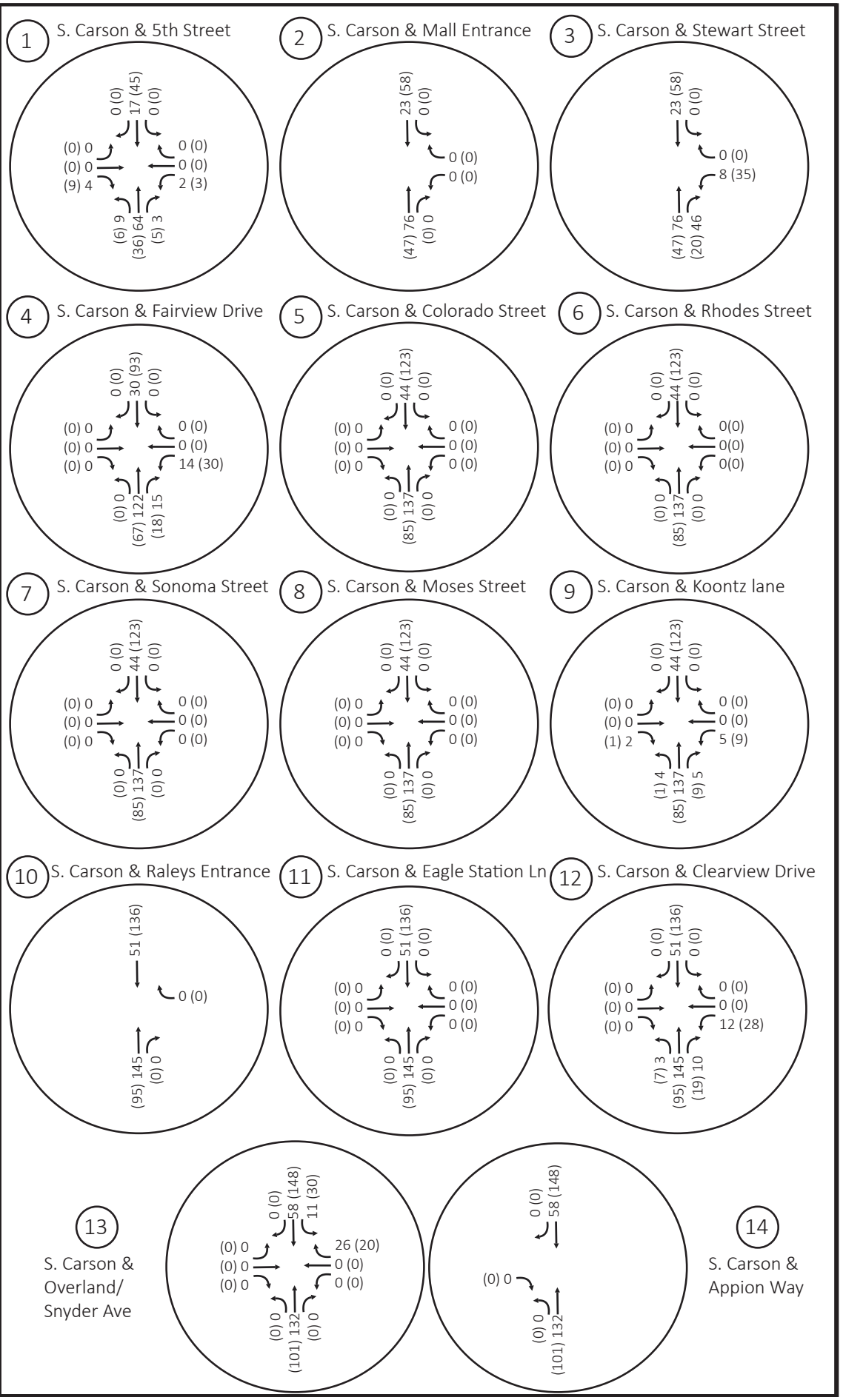
AM (PM)- Turning Movement Volumes

NO SCALE

Figure 11

S. Carson Street Traffic Evaluation

Fast Food Pad Project Trips



HEADWAY TRANSPORTATION

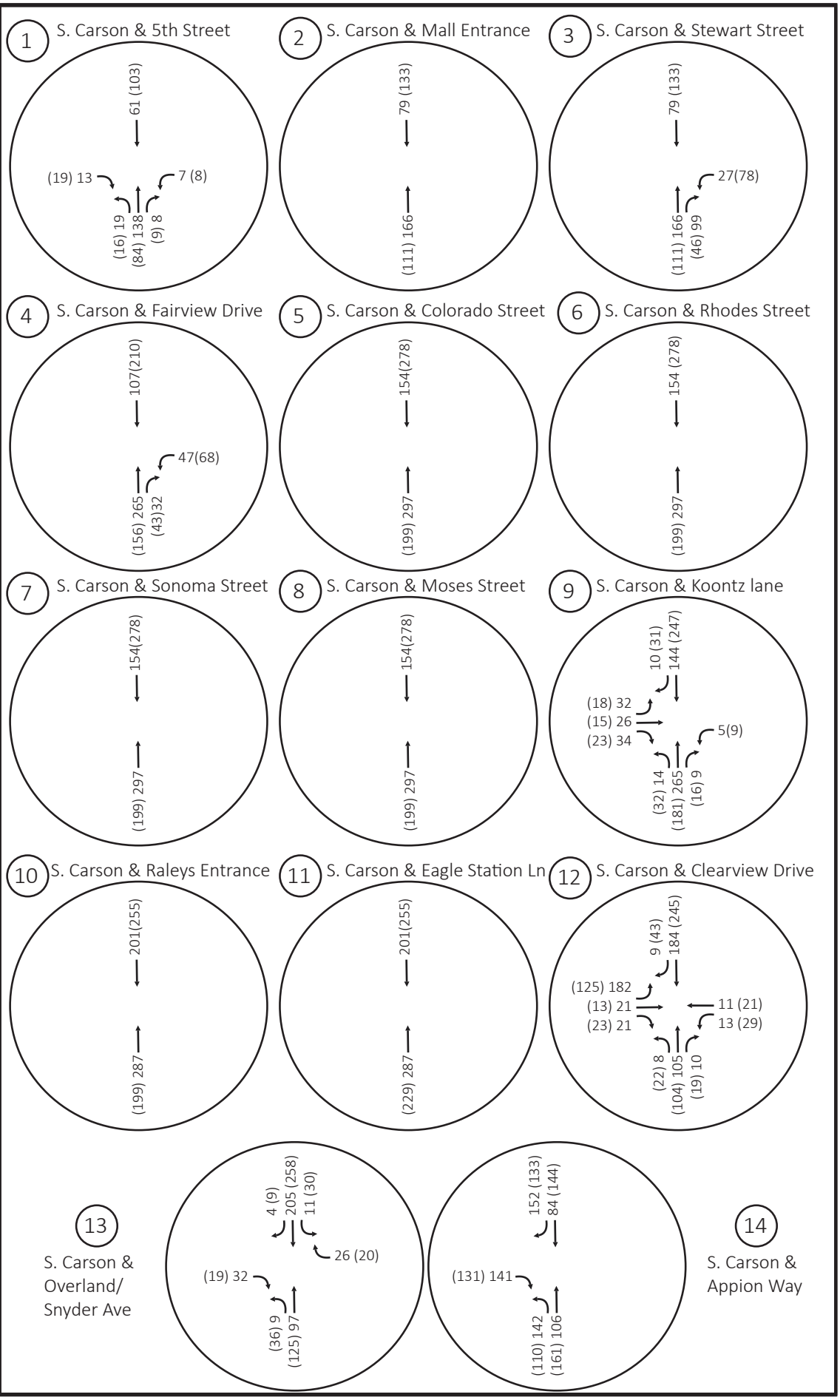
NO SCALE

AM (PM)- Turning Movement Volumes

Figure 12

S. Carson Street Traffic Evaluation

North Douglas Specific Plan Amendment Project Trips



HEADWAY TRANSPORTATION

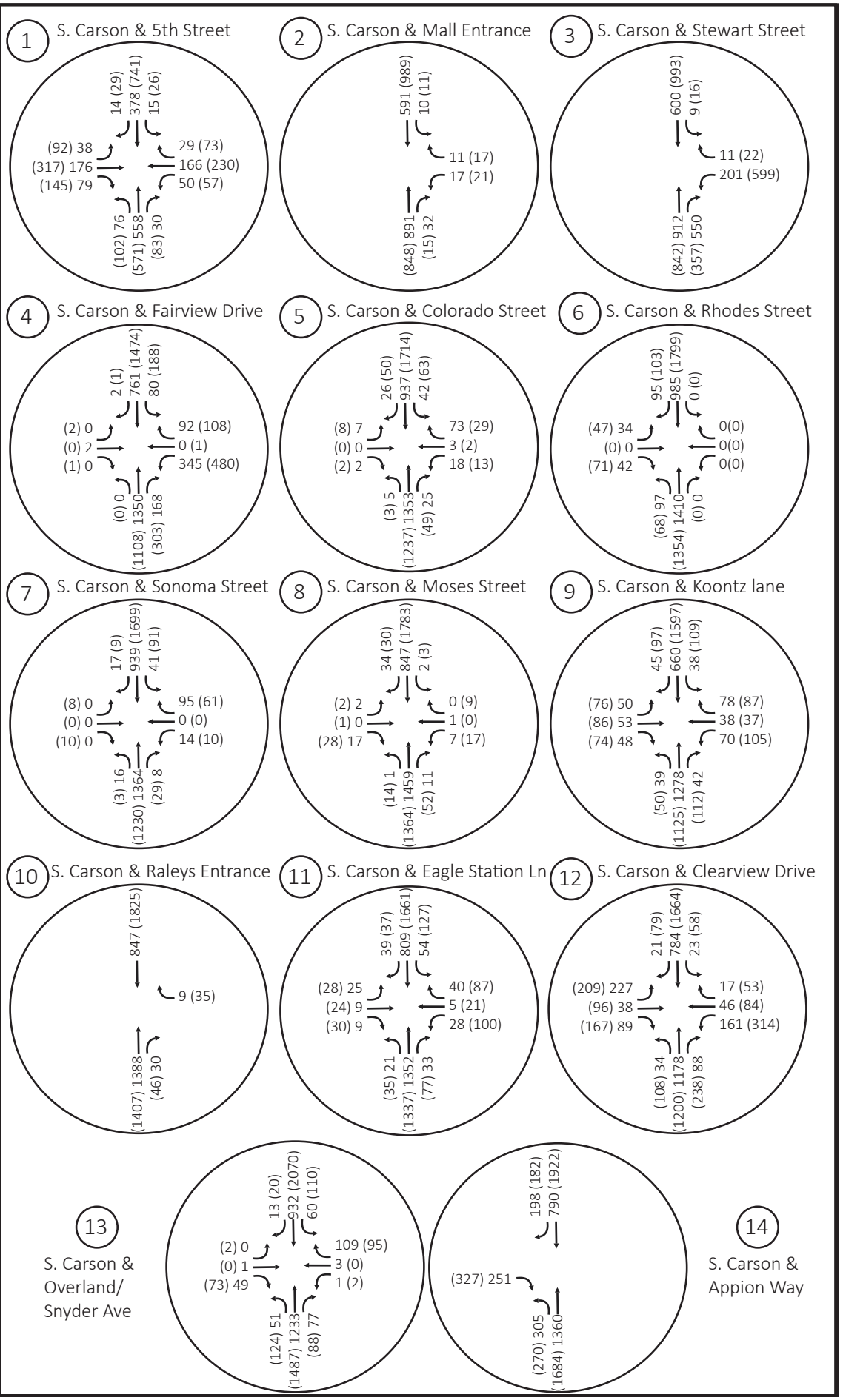
NO SCALE

AM (PM)- Turning Movement Volumes

Figure 13

S. Carson Street Traffic Evaluation

Total Anticipated Development Trips



HEADWAY TRANSPORTATION

AM (PM)- Turning Movement Volumes

NO SCALE

Figure 14

S. Carson Street Traffic Evaluation

2040 Cumulative AM & PM Peak Hour Traffic Volumes

HEADWAY TRANSPORTATION

NO SCALE

37,073
Estimated 2040 AADT
(28,000 + 2,940 + 6,159)

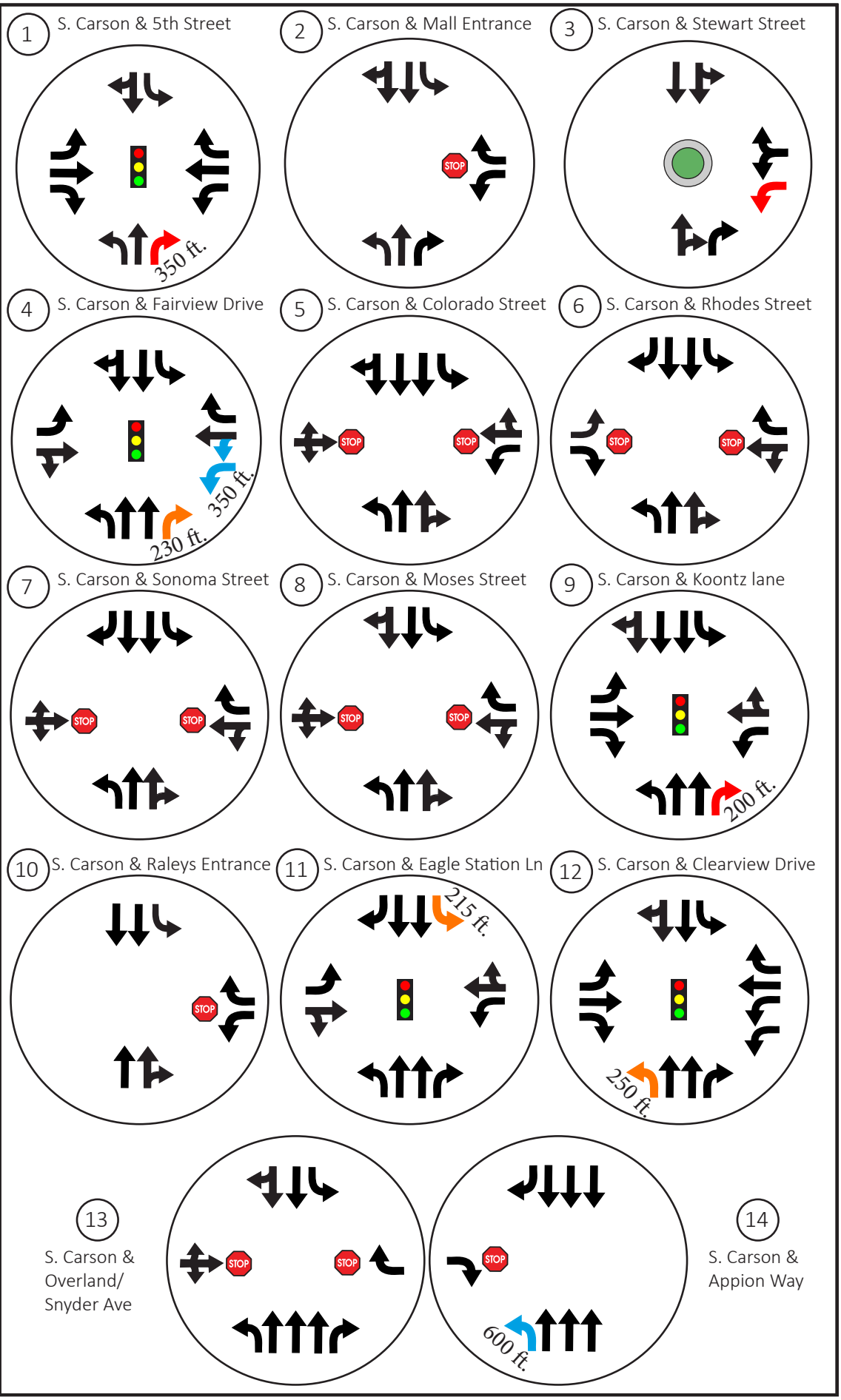
Estimated 2040 AADT

(NDOT 2017 AADT + 0.5% Growth to 2040 + Development Trips)

Figure 15

S. Carson Street Traffic Evaluation

2040 Cumulative Daily Traffic



HEADWAY TRANSPORTATION

NO SCALE

- Turn Lane Needed
- Lengthen Turn Pocket
- Consider Longer Turn Pocket

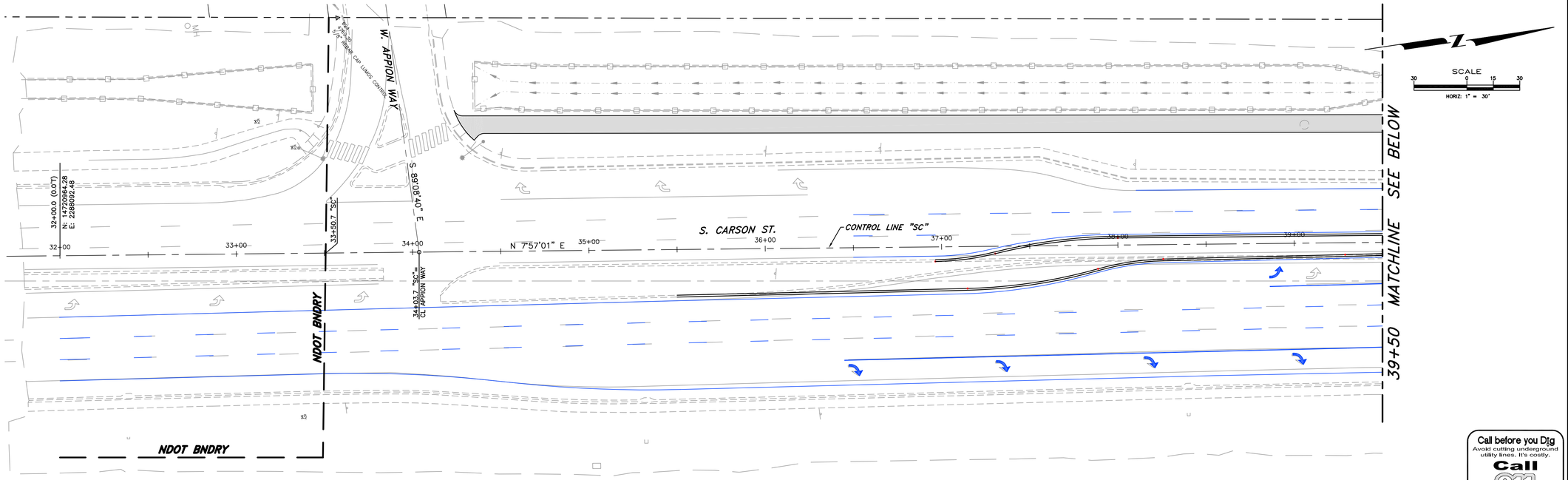
XXX ft. - Proposed Turn Pocket Length

Figure 17

S. Carson Street Traffic Evaluation

Proposed Lane Configurations & Controls

Appendix A
S. Carson Street 30% Plans



PLAN – S. CARSON STREET

SCALE: 1" = 30'

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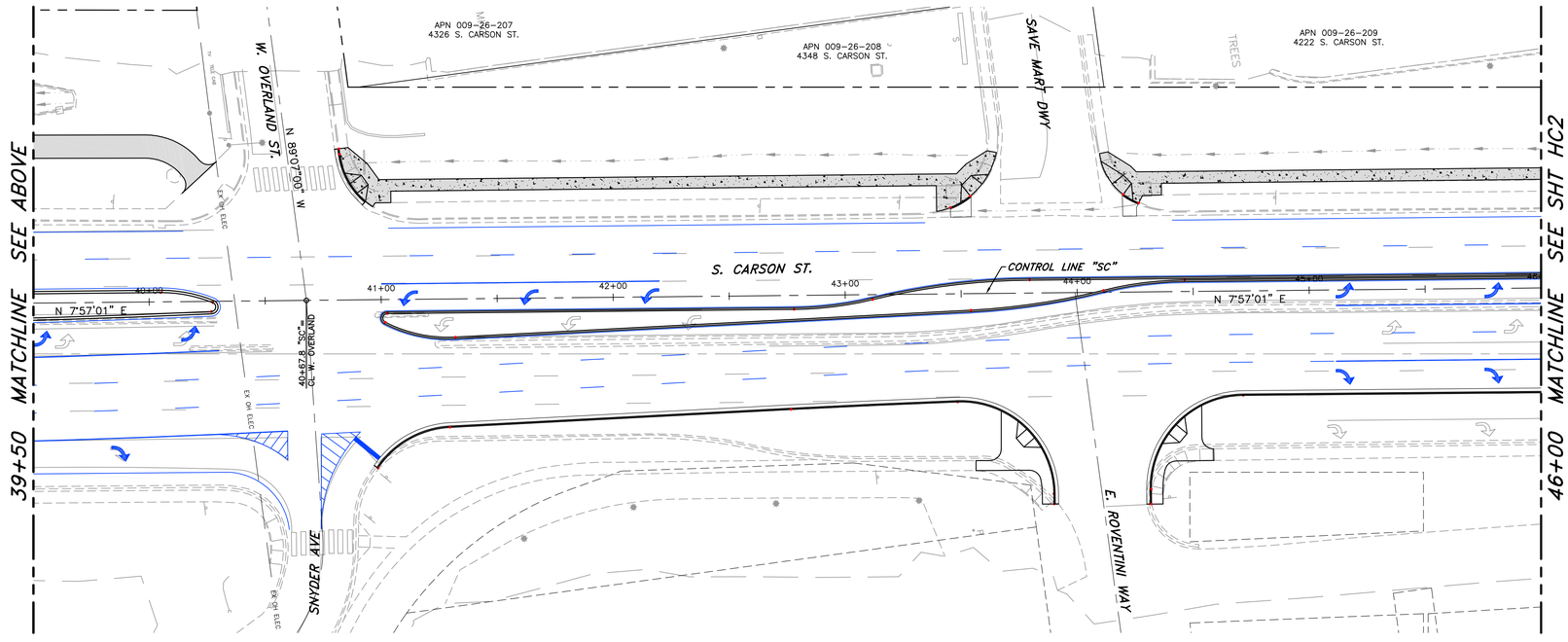

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BASIS OF BEARINGS

THE BASIS OF BEARING FOR THIS SURVEY IS BASED ON THE NEVADA COORDINATE SYSTEM OF 1983, WEST ZONE, NAD 83/94, 2010 CARSON CITY CONTROL NETWORK DATUM. DISTANCES SHOWN ARE GROUND DISTANCES USING A PROJECT COMBINED GRID TO GROUND SCALE FACTOR OF 1.0002.

BASIS OF ELEVATIONS

DATUM: NAVD 88; 2010 CARSON CITY CONTROL NETWORK DATUM
PROJECT BENCHMARK = CARSON CITY CONTROL MONUMENT NO. CC061 HAVING AN ELEVATION OF 4776.35'

HORIZONTAL/VERTICAL CONTROL POINTS

CONTROL POINT	NORTH	EAST	ELEVATION	DESCRIPTION
23	14730335.18	2289301.49	4665.78	2" BRASS CAP CC023
35	14721202.38	2287726.76	4775.67	2" BRASS CAP CC035
61	14724504.89	2287825.31	4776.35	2" BRASS CAP CC061
88	14733297.24	2288569.24	4665.68	2" BRASS CAP CC088
603	14725811.89	2288872.18	4723.53	2" BRASS CAP NDOT 1401005
605	14724314.03	2288644.77	4753.28	2" ALUM CAP NDOT 1401004
606	14722697.70	2288402.47	4780.79	2" BRASS CAP NDOT 1010038M
617	14729458.08	2289428.68	4677.36	3 1/2" BRASS CAP NHD 158468H
624	14721139.84	2287982.49	4769.30	5/8" REBAR CAP LUMOS CONTROL
652	14731543.28	2289465.17	4661.12	MAG NAIL IN ASPHALT
653	14733281.49	2289534.56	4661.81	5/8" REBAR CAP LUMOS CONTROL
655	14734483.99	2289491.34	4673.43	SCRIBED "X" IN CONCRETE

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THOMAS B. GRUNDY
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PROJECT No. 03-1801

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HORIZONTAL CONTROL PLAN
STA 32+00 to STA 46+00

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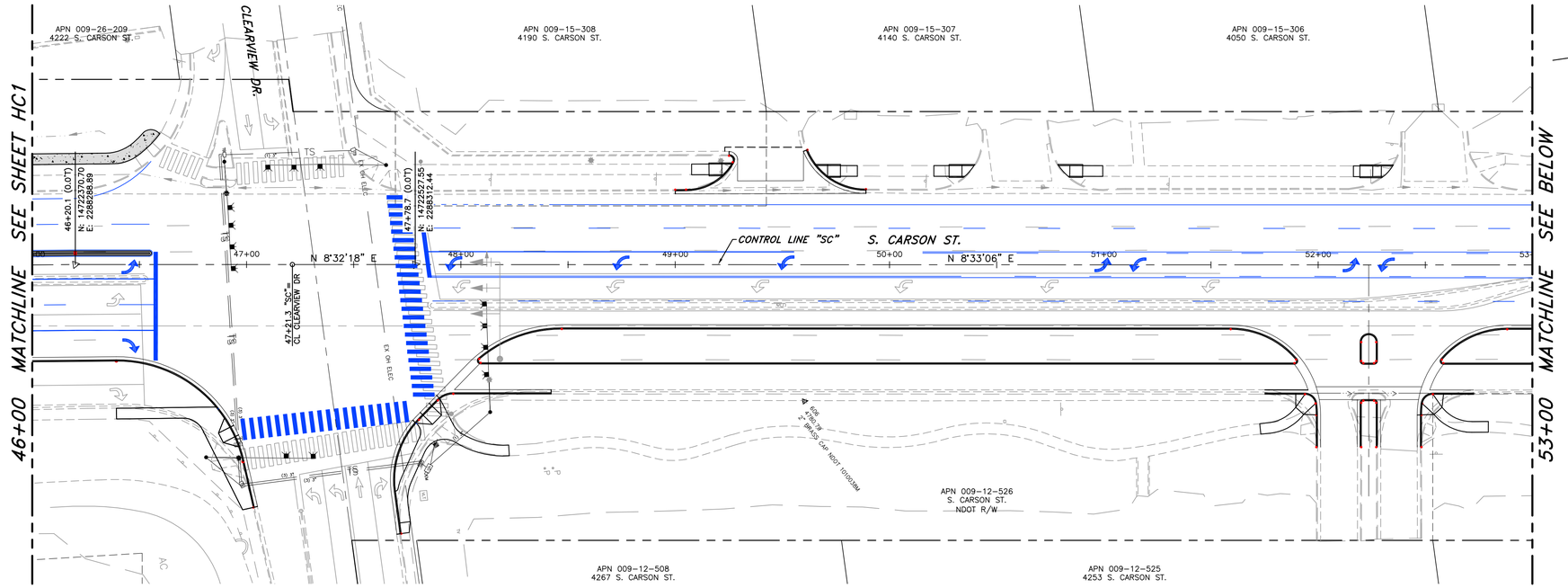

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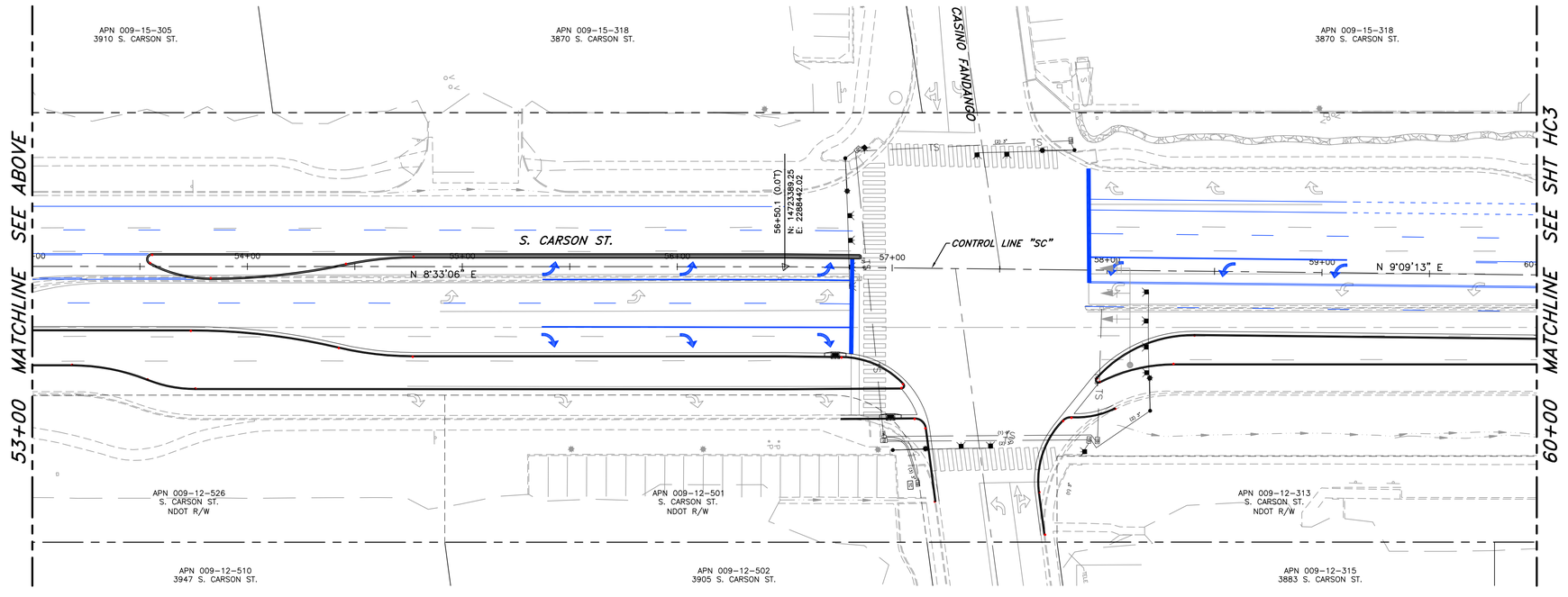

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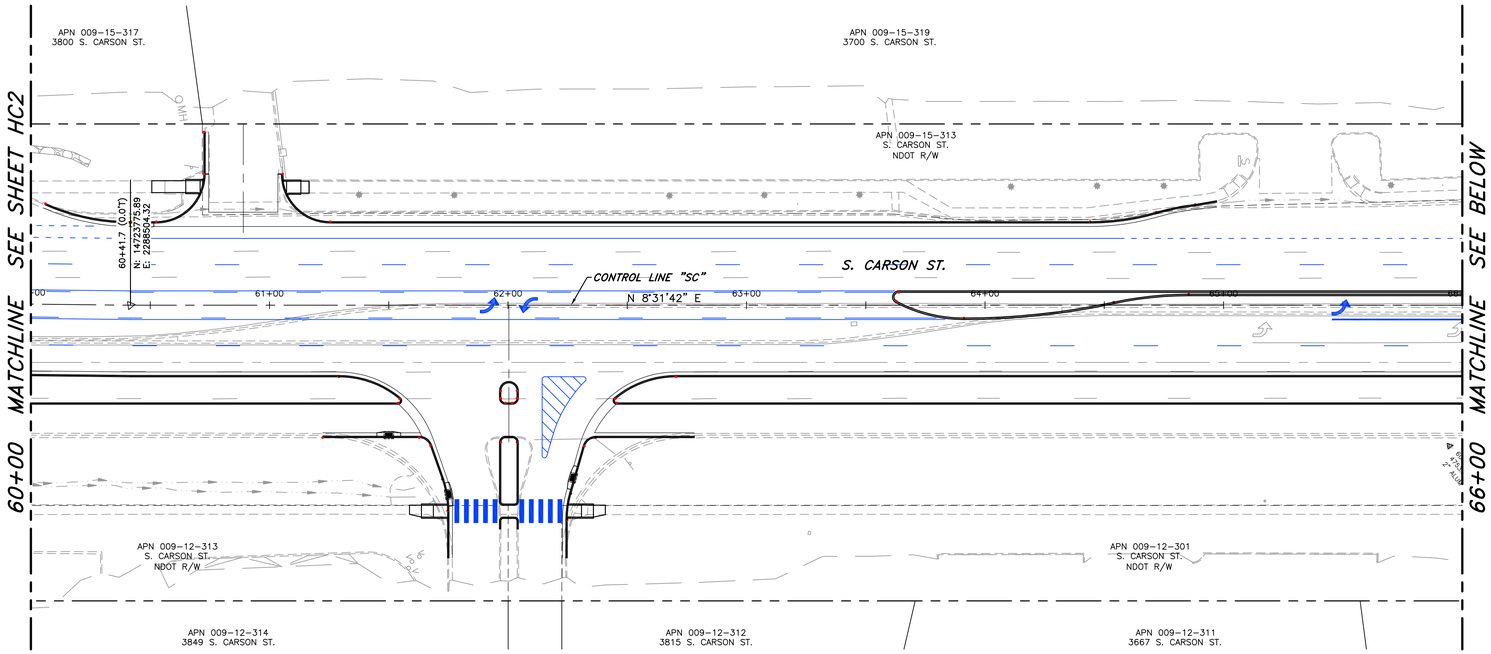

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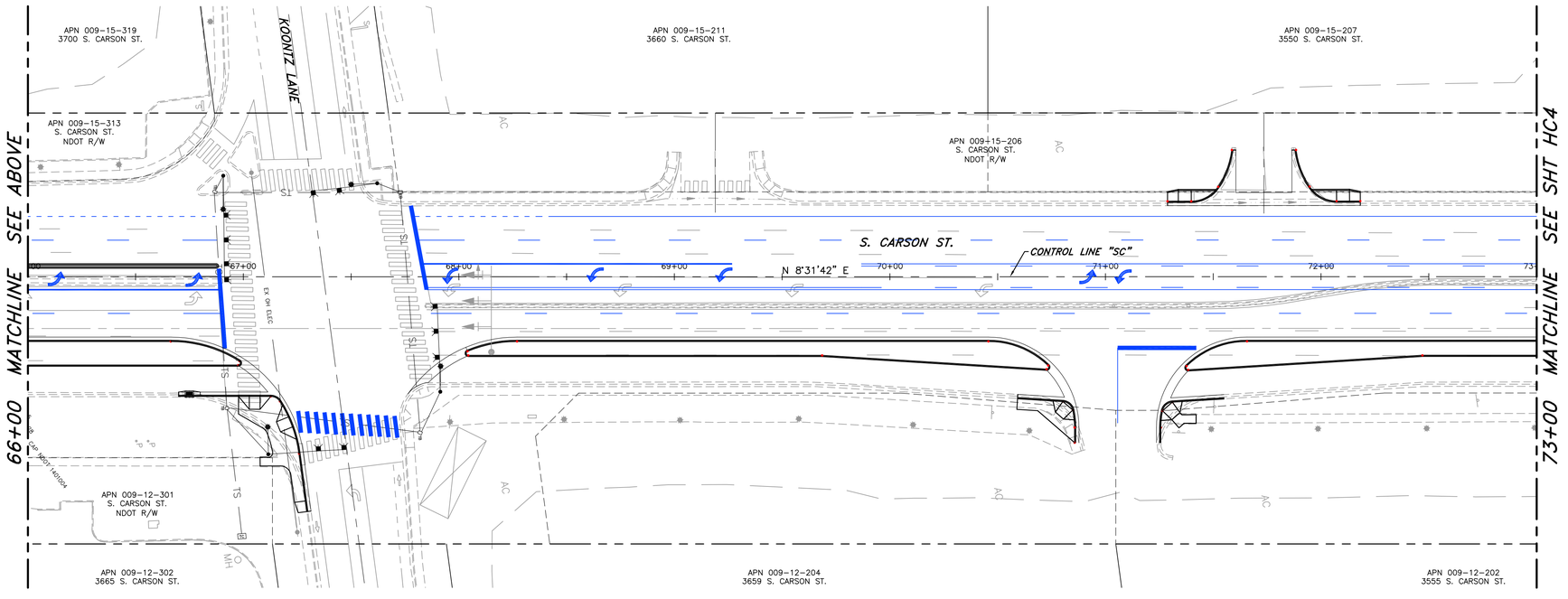

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SCALE: 1" = 30'

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30 0 15 30
HORIZ: 1" = 30'

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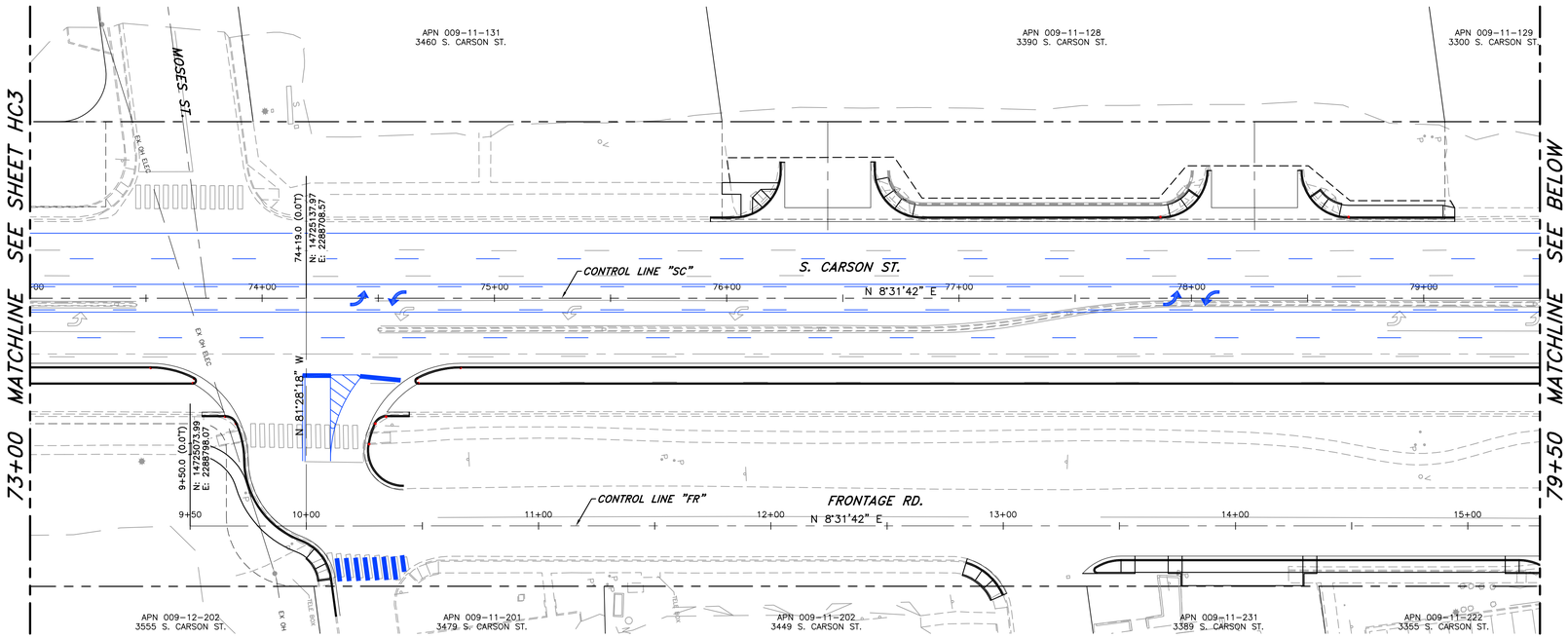

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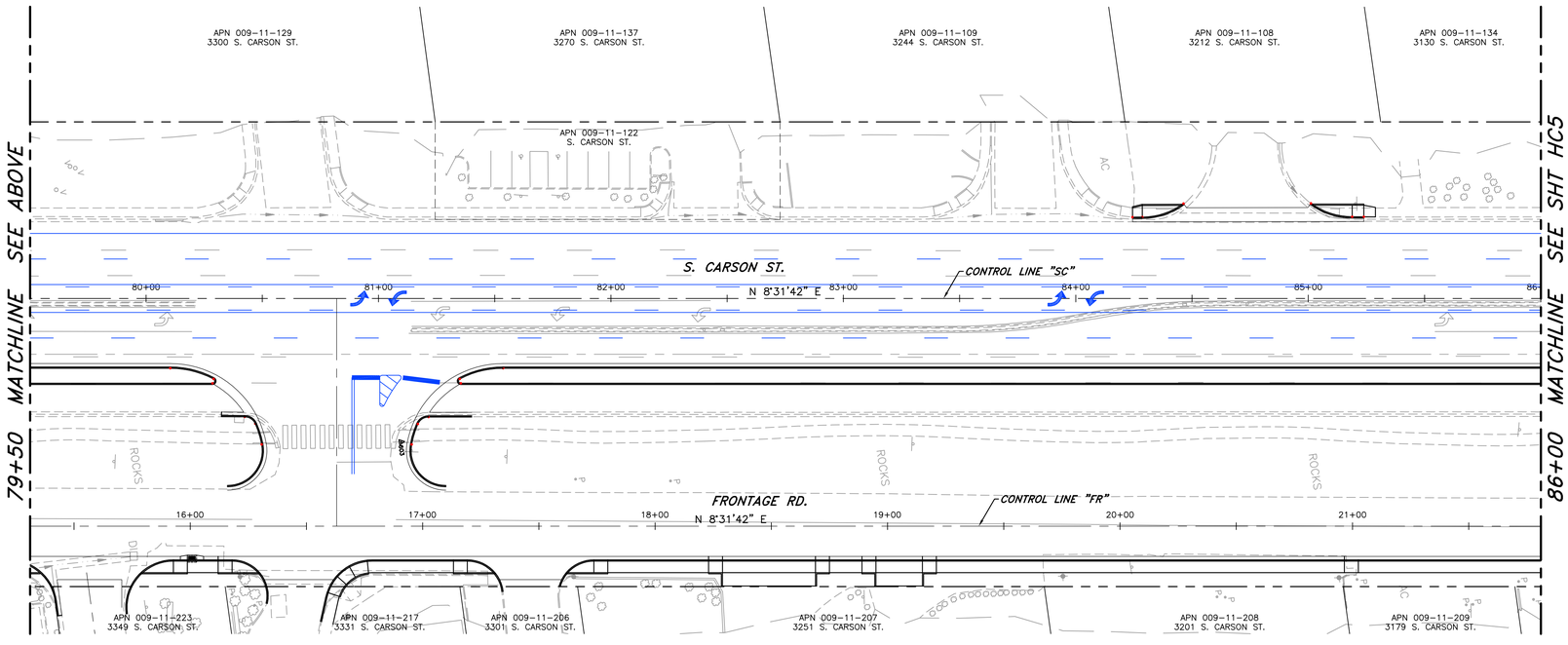

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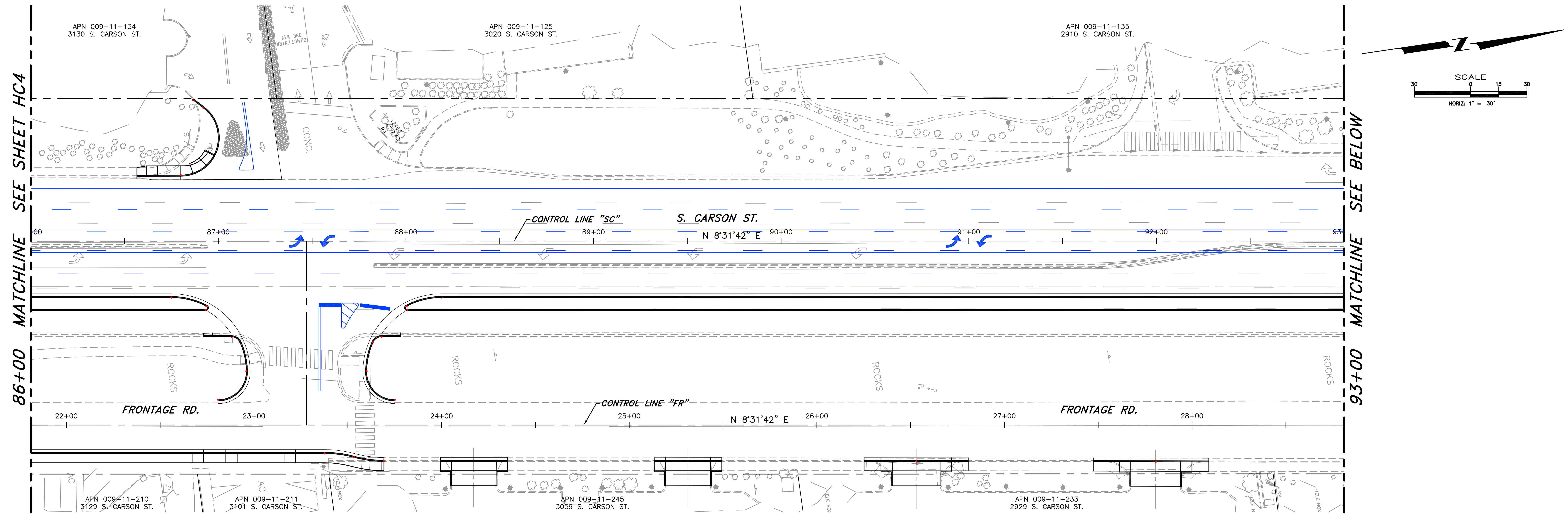

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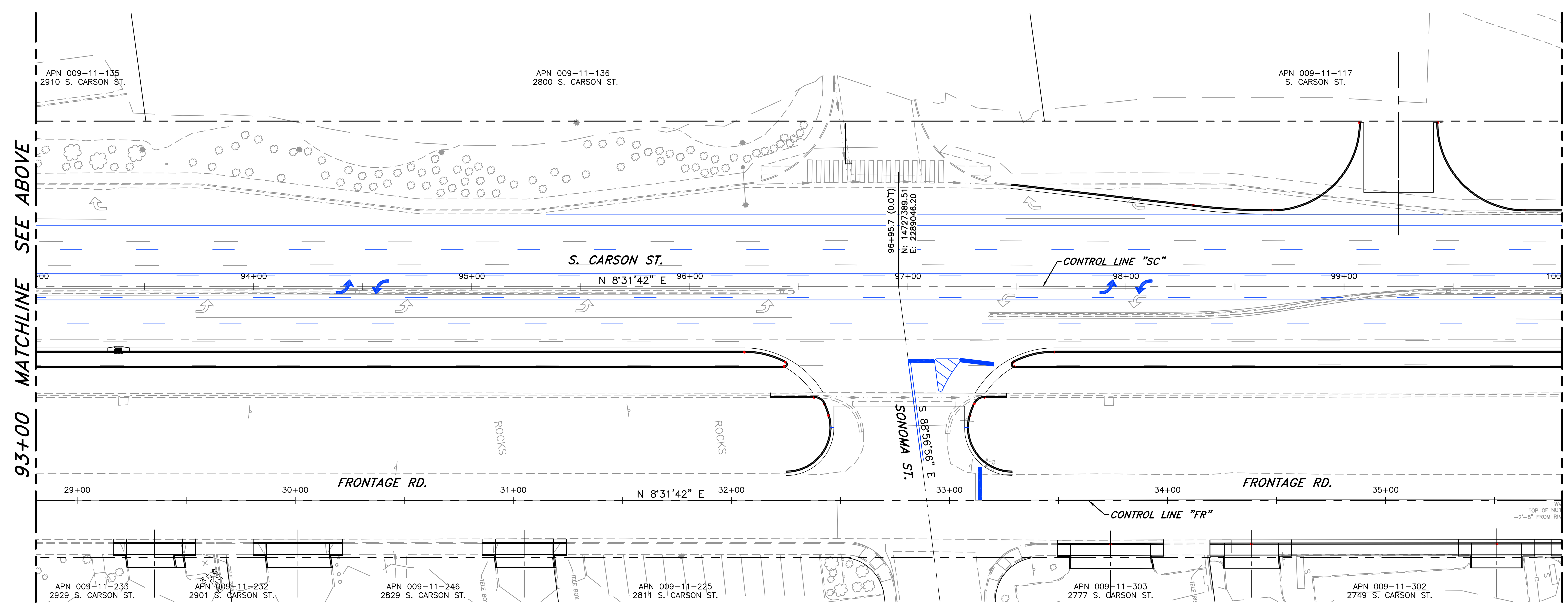

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PROJECT No. 03-1801

S. CARSON STREET HORIZONTAL CONTROL PLAN STA 86+00 to STA 100+00

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OF
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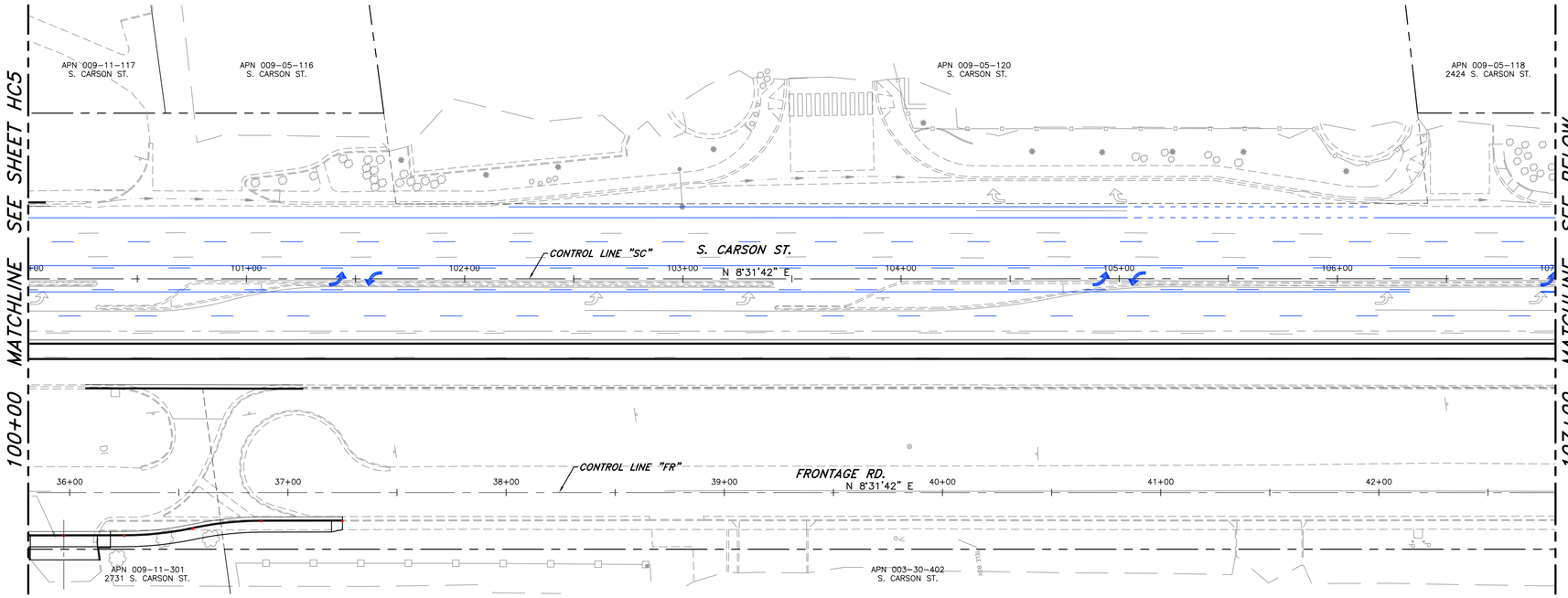
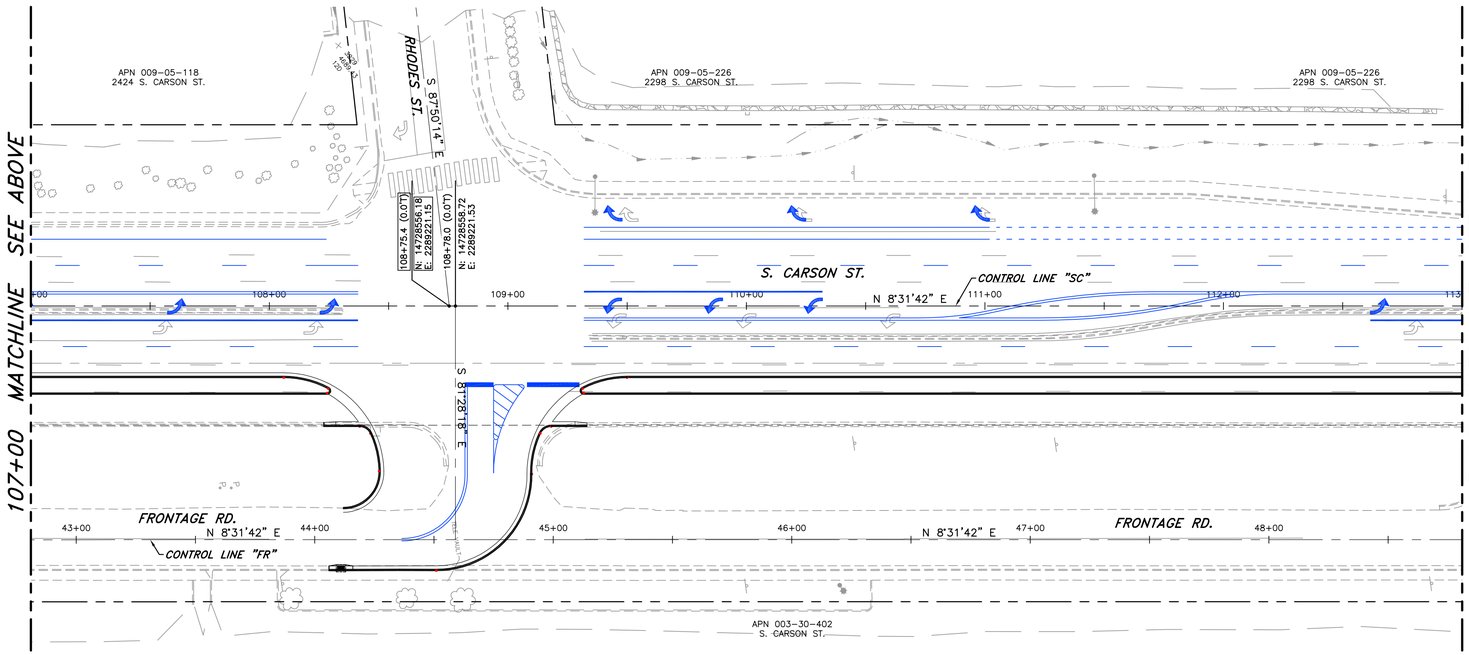
30% REVIEW PLANS



PLAN – S. CARSON STREET

SCALE: 1" = 30'



PLAN – S. CARSON STREET

SCALE: 1" = 30'

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CHECKED BY: TBG/DSA
DWG NO.: 031801-hc sht1 ph1.dwg
SCALE (HORIZ): 1"=30'
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PLOT DATE: 9/20/18

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No. 18808

DATE: 9/21/2018

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PROJECT No. 03-1801

S. CARSON STREET
HORIZONTAL CONTROL PLAN
STA 100+00 to STA 113+00

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 OR 1-800-227-2600

SHEET HC6 OF *

30% REVIEW PLANS

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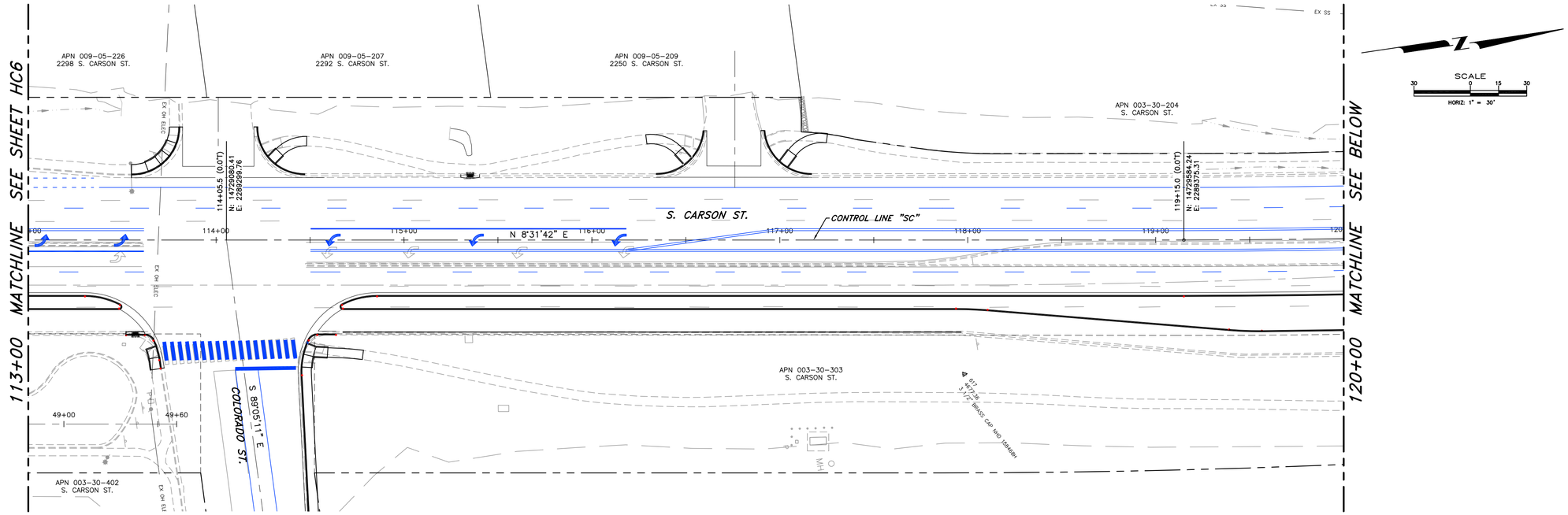
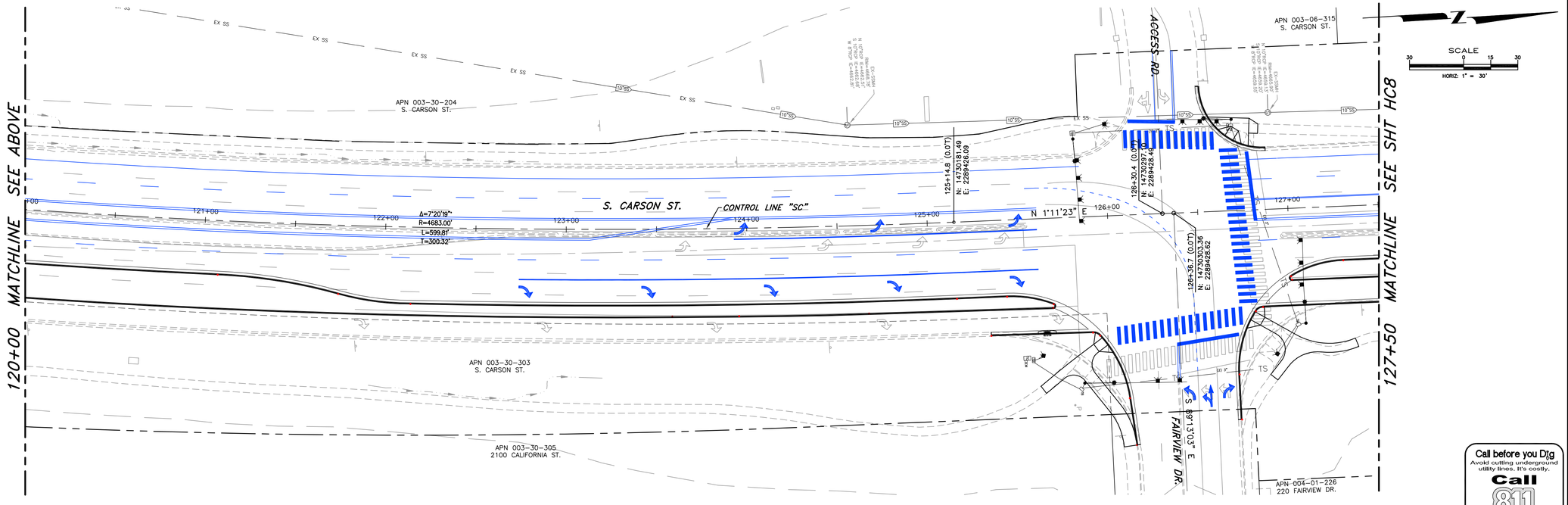


PLAN – S. CARSON STREET

SCALE: 1" = 30'



PLAN – S. CARSON STREET

SCALE: 1" = 30'

Call before you Dig
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DESIGNED BY: DGR/DLO/TBG
DRAWN BY: DGR/DLO
CHECKED BY: TBG/DSA
DWG NO.: 031801-hc sht& pn1.dwg
SCALE (HORIZ): 1"=30'
SCALE (VERT): 1"=3'
PLOT DATE: 9/20/18

CARSON CITY
PUBLIC WORKS DEPARTMENT
3505 BUTTI WAY CARSON CITY, NEVADA 89701
PH: 887-2355 FAX: 887-2112

PROFESSIONAL ENGINEER – STATE OF NEVADA
THOMAS B. GRUNDY
Exp: 6/30/19
CIVIL
No. 18808
DATE: 9/21/2018

REV.	DATE	DESCRIPTION	BY	APP'D

SOUTH CARSON STREET
RESURFACING & COMPLETE STREET PROJECT
PROJECT No. 03-1801
S. CARSON STREET
HORIZONTAL CONTROL PLAN
STA 113+00 to STA 127+50

SHEET
HC7
OF
*

30% REVIEW PLANS

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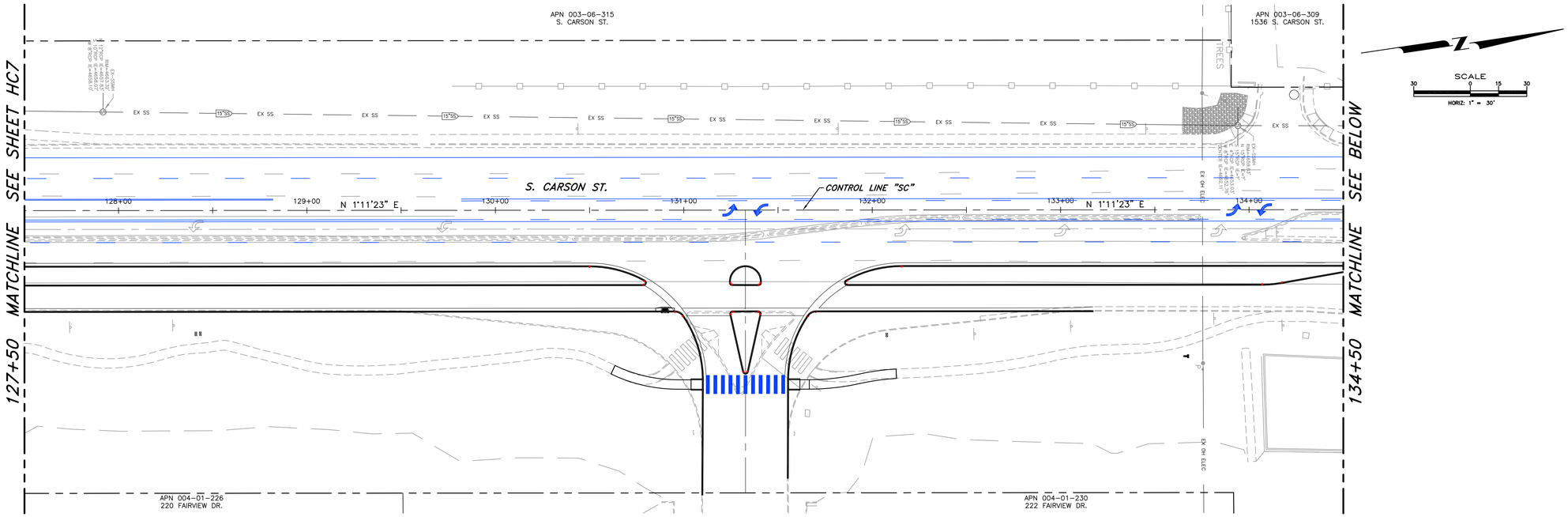
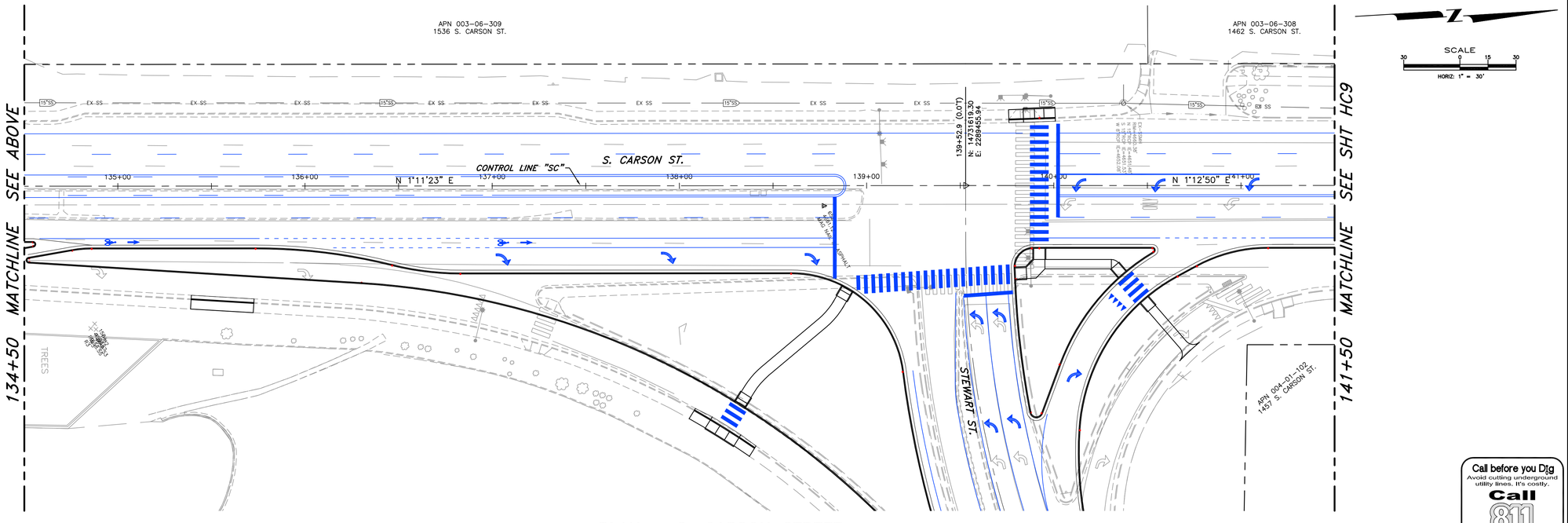


PLAN – S. CARSON STREET

SCALE: 1" = 30'



PLAN – S. CARSON STREET

SCALE: 1" = 30'

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DESIGNED BY: DGR/DLO/TBG
DRAWN BY: DGR/DLO
CHECKED BY: TBG/DSA
DWG NO.: 031801-hc sht1.dwg
SCALE (HORIZ): 1"=30'
SCALE (VERT): 1"=3'
PLOT DATE: 9/20/18

CARSON CITY
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PH: 887-2355 FAX: 887-2112

PROFESSIONAL ENGINEER – STATE OF NEVADA
THOMAS B. GRUNDY
Exp: 6/30/19
CIVIL
No. 18808

DATE: 9/21/2018

REV.	DATE	DESCRIPTION	BY	APP'D

SOUTH CARSON STREET
RESURFACING & COMPLETE STREET PROJECT
PROJECT No. 03-1801

S. CARSON STREET
HORIZONTAL CONTROL PLAN
STA 127+50 to STA 141+50

SHEET
HC8
OF
*

30% REVIEW PLANS

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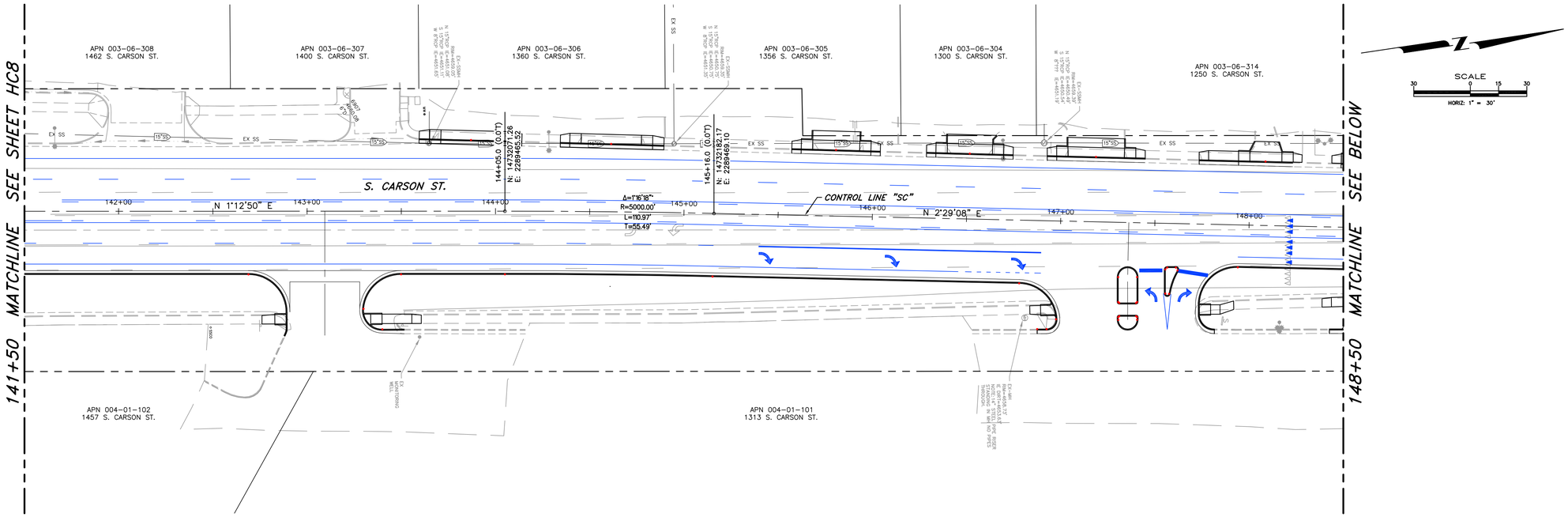
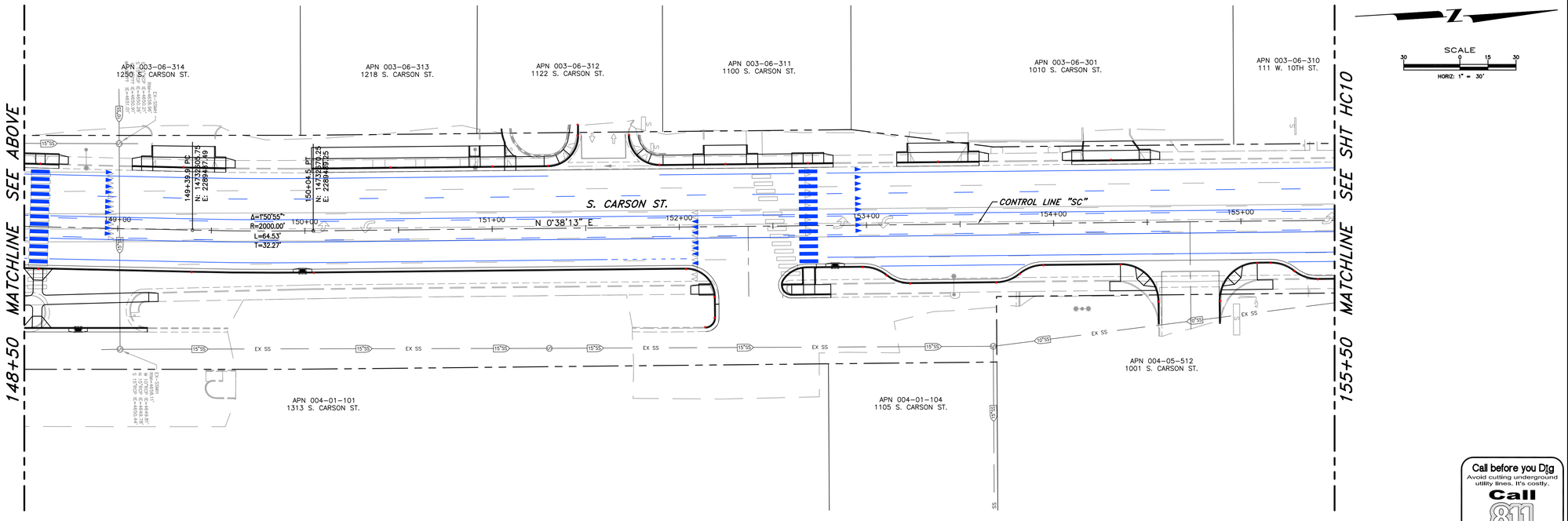


PLAN – S. CARSON STREET

SCALE: 1" = 30'



PLAN – S. CARSON STREET

SCALE: 1" = 30'

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DRAWN BY: DGR/DLO
CHECKED BY: TBG/DSA
DWG NO.: 031801-hc_sht4_pn1.dwg
SCALE (HORIZ): 1"=30'
SCALE (VERT): 1"=3'
PLOT DATE: 9/20/18

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PUBLIC WORKS DEPARTMENT
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PH: 887-2355 FAX: 887-2112

PROFESSIONAL ENGINEER – STATE OF NEVADA
THOMAS B. GRUNDY
Exp: 6/30/19
CIVIL
No. 18808
DATE: 9/21/2018

REV.	DATE	DESCRIPTION	BY	APP'D

SOUTH CARSON STREET
RESURFACING & COMPLETE STREET PROJECT
PROJECT No. 03-1801

S. CARSON STREET
HORIZONTAL CONTROL PLAN
STA 141+50 to STA 155+50

SHEET
HC9
OF
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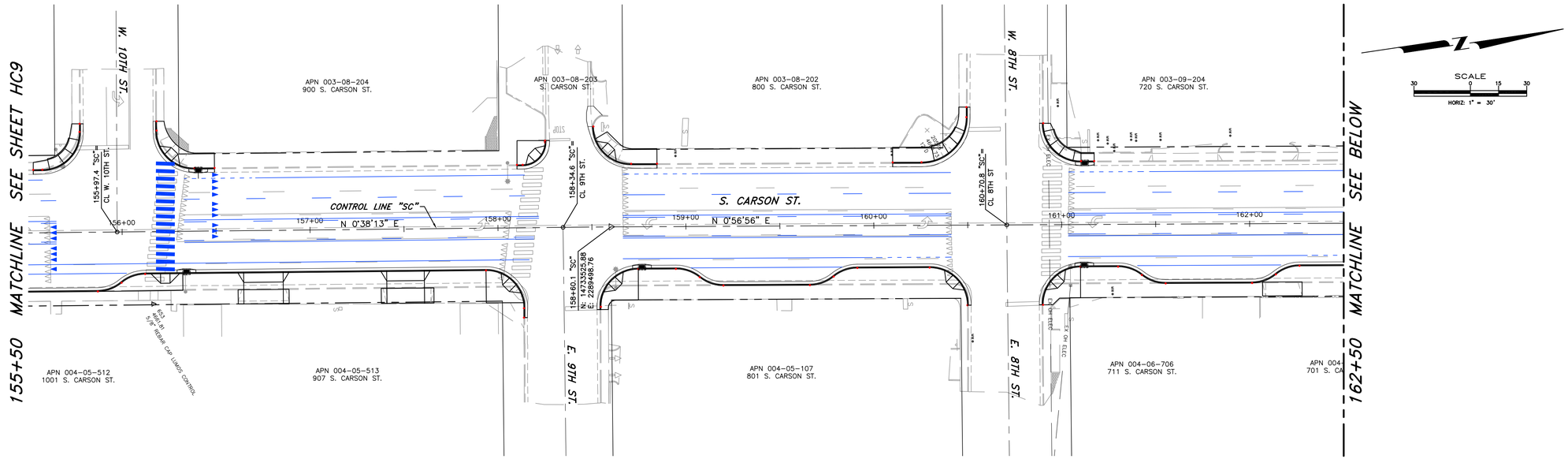
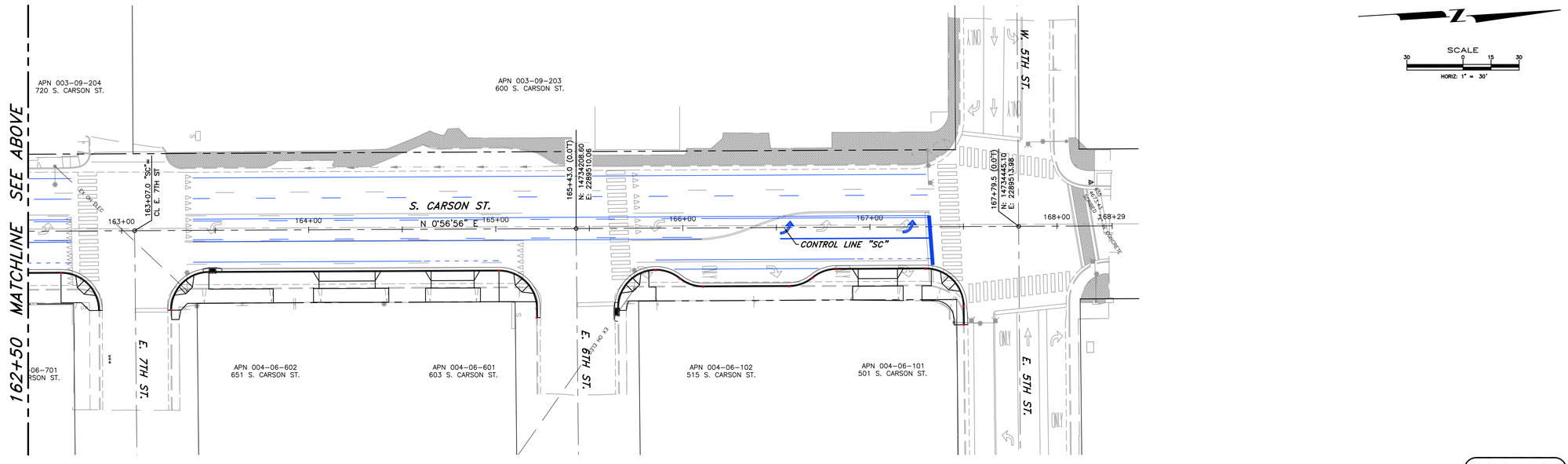


PLAN – S. CARSON STREET

SCALE: 1" = 30'



PLAN – S. CARSON STREET

SCALE: 1" = 30'

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OR
1-800-227-2600

DESIGNED BY: DGR/DLO/TBG
DRAWN BY: DGR/DLO
CHECKED BY: TBG/DSA
DWG NO.: 031801-hc sht& pn1.dwg
SCALE (HORIZ): 1"=30'
SCALE (VERT): 1"=3'
PLOT DATE: 9/20/18

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PH: 887-2355 FAX: 887-2112

PROFESSIONAL ENGINEER – STATE OF NEVADA
THOMAS B. GRUNDY
Exp: 6/30/19
CIVIL
No. 18808

DATE: 9/21/2018

REV.	DATE	DESCRIPTION	BY	APP'D

SOUTH CARSON STREET
RESURFACING & COMPLETE STREET PROJECT
PROJECT No. 03-1801

S. CARSON STREET
HORIZONTAL CONTROL PLAN
STA 155+50 to STA 168+00

SHEET
HC10
OF
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Appendix B
Existing Conditions LOS Calculations

Existing Conditions - S. Carson Street						
			AM Peak		PM Peak	
ID	Intersection Name	Intersection Control	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
1	S. Carson & 5th Street	Signalized				
	Overall		**B**	**13.8**	**B**	**16.4**
2	S. Carson & Mall Entrance	Side Street STOP				
	Overall			0.4		0.4
	Westbound		C	15.3	C	16.0
3	S. Carson & Stewart Street	Signalized				
	Overall		**B**	**10.4**	**B**	**19.8**
4	S. Carson & Fairview Drive	Signalized				
	Overall		**C**	**26.2**	**C**	**31.2**
5	S. Carson & Colorado Street	Side Street STOP				
	Overall			1.6		1.4
	Eastbound		D	29.8	F	72.5
	Westbound		C	23.6	E	39.3
6	S. Carson & Rhodes Street	Side Street STOP				
	Overall			2.0		3.9
	Eastbound		D	32.4	F	79.2
	Westbound		F	65.9	F	100.7
7	S. Carson & Sonoma Street	Side Street STOP				
	Overall			1.6		1.4
	Eastbound		D	29.9	E	44.3
	Westbound		C	18.9	C	20.7
8	S. Carson & Moses Street	Side Street STOP				
	Overall			0.3		0.8
	Eastbound		B	13.6	D	26.3
	Westbound		E	39.5	E	40.9
9	S. Carson & Koontz Lane	Signalized				
	Overall		**D**	**36.1**	**C**	**29.6**
10	S. Carson & Raleys Entrance	Side Street STOP				
	Overall			0.1		0.2
	Westbound Right		B	14.9	C	15.4
11	S. Carson & Eagle Station Lane	Signalized				
	Overall		**B**	**19.4**	**B**	**14.2**
12	S. Carson & Clearview Drive	Signalized				
	Overall		**C**	**32.1**	**C**	**33.5**
13	S. Carson & Overland/Snyder Ave*	Side Street STOP				
	Overall			1.4		2.2
	Eastbound		A	3.9	B	14.4
	Westbound		A	3.4	A	4.8
14	S. Carson & Appion Way*	Side Street STOP				
	Overall			1.5		3.7
	Eastbound Right		A	3.5	B	13.9
**Movement Delay based on SimTraffic Microsimulation*						

Source: Headway Transportation, 2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2	0	233	0	73	0	842	106	64	511	2
Future Volume (vph)	0	2	0	233	0	73	0	842	106	64	511	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5		6.5	6.5			6.5	6.5	6.5	6.5	
Lane Util. Factor		1.00		0.91	0.91			0.91	1.00	1.00	0.91	
Frt		1.00		1.00	0.89			1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	0.99			1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1863		3221	1484			5085	1583	1770	5082	
Flt Permitted		1.00		0.95	0.99			1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1863		3221	1484			5085	1583	1770	5082	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	0	2	0	291	0	91	0	1052	132	80	639	2
RTOR Reduction (vph)	0	0	0	0	106	0	0	0	49	0	0	0
Lane Group Flow (vph)	0	3	0	262	14	0	0	1053	84	80	642	0
Turn Type	Split	NA		Split	NA		Prot	NA	Prot	Prot	NA	
Protected Phases	4	4		8	8		5	2	2	1	6	
Permitted Phases												
Actuated Green, G (s)		1.3		18.4	18.4			101.6	101.6	12.7	120.8	
Effective Green, g (s)		1.3		18.4	18.4			101.6	101.6	12.7	120.8	
Actuated g/C Ratio		0.01		0.11	0.11			0.63	0.63	0.08	0.75	
Clearance Time (s)		6.5		6.5	6.5			6.5	6.5	6.5	6.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		15		370	170			3228	1005	140	3836	
v/s Ratio Prot		c0.00		c0.08	0.01			c0.21	0.05	c0.05	0.13	
v/s Ratio Perm												
v/c Ratio		0.20		0.71	0.08			0.33	0.08	0.57	0.17	
Uniform Delay, d1		78.8		68.2	63.2			13.4	11.3	71.0	5.5	
Progression Factor		1.00		1.00	1.00			1.28	4.15	0.88	0.74	
Incremental Delay, d2		6.5		6.1	0.2			0.3	0.2	5.5	0.1	
Delay (s)		85.3		74.3	63.5			17.5	46.8	68.3	4.2	
Level of Service		F		E	E			B	D	E	A	
Approach Delay (s)		85.3			70.9			20.8			11.3	
Approach LOS		F			E			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	140	52	34	132	23	44	323	17	12	247	11
Future Volume (veh/h)	33	140	52	34	132	23	44	323	17	12	247	11
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	41	175	65	42	165	29	55	404	21	15	309	14
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	130	287	244	120	287	244	829	1471	1251	802	1397	63
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	1.00	1.00	1.00	0.79	0.79	0.79
Sat Flow, veh/h	1184	1863	1583	1135	1863	1583	1052	1863	1583	958	1768	80
Grp Volume(v), veh/h	41	175	65	42	165	29	55	404	21	15	0	323
Grp Sat Flow(s),veh/h/ln	1184	1863	1583	1135	1863	1583	1052	1863	1583	958	0	1849
Q Serve(g_s), s	5.3	14.0	5.8	5.7	13.2	2.5	0.5	0.0	0.0	0.5	0.0	7.1
Cycle Q Clear(g_c), s	18.5	14.0	5.8	19.8	13.2	2.5	7.6	0.0	0.0	0.5	0.0	7.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	130	287	244	120	287	244	829	1471	1251	802	0	1460
V/C Ratio(X)	0.32	0.61	0.27	0.35	0.58	0.12	0.07	0.27	0.02	0.02	0.00	0.22
Avail Cap(c_a), veh/h	329	600	510	311	600	510	829	1471	1251	802	0	1460
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	71.4	63.2	59.7	72.4	62.8	58.3	0.2	0.0	0.0	3.6	0.0	4.3
Incr Delay (d2), s/veh	1.4	2.1	0.6	1.7	1.8	0.2	0.2	0.5	0.0	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	7.4	2.6	1.9	6.9	1.1	0.2	0.2	0.0	0.2	0.0	3.7
LnGrp Delay(d),s/veh	72.8	65.3	60.3	74.2	64.7	58.6	0.4	0.5	0.0	3.6	0.0	4.6
LnGrp LOS	E	E	E	E	E	E	A	A	A	A		A
Approach Vol, veh/h		281			236			480			338	
Approach Delay, s/veh		65.2			65.6			0.4			4.6	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		130.9		29.1		130.9		29.1
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green Setting (Gmax), s		99.5		51.5		99.5		51.5
Max Q Clear Time (g_c+I1), s		9.6		20.5		9.1		21.8
Green Ext Time (p_c), s		6.2		2.9		6.2		2.8

Intersection Summary	
HCM 2010 Ctrl Delay	26.6
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	136	9	580	351	7	408
Future Volume (veh/h)	136	9	580	351	7	408
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	168	0	716	0	9	504
Adj No. of Lanes	2	1	2	1	1	2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	220	101	3114	1393	689	3114
Arrive On Green	0.06	0.00	1.00	0.00	1.00	1.00
Sat Flow, veh/h	3442	1583	3632	1583	732	3632
Grp Volume(v), veh/h	168	0	716	0	9	504
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1583	732	1770
Q Serve(g_s), s	7.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.7	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	220	101	3114	1393	689	3114
V/C Ratio(X)	0.76	0.00	0.23	0.00	0.01	0.16
Avail Cap(c_a), veh/h	828	381	3114	1393	689	3114
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.96	0.00	1.00	1.00
Uniform Delay (d), s/veh	73.7	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.4	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	0.1	0.0	0.0	0.0
LnGrp Delay(d),s/veh	79.1	0.0	0.2	0.0	0.0	0.1
LnGrp LOS	E		A		A	A
Approach Vol, veh/h	168		716			513
Approach Delay, s/veh	79.1		0.2			0.1
Approach LOS	E		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		145.3				145.3		14.7
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		112.5				112.5		38.5
Max Q Clear Time (g_c+I1), s		2.0				2.0		9.7
Green Ext Time (p_c), s		11.3				11.3		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	20	9	51	30	62	19	785	26	30	399	27
Future Volume (veh/h)	12	20	9	51	30	62	19	785	26	30	399	27
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	14	24	0	61	36	74	23	937	31	36	476	32
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	1	3	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	25	98	83	78	45	92	515	3574	118	46	2156	144
Arrive On Green	0.01	0.05	0.00	0.04	0.08	0.08	0.10	0.24	0.24	0.03	0.45	0.45
Sat Flow, veh/h	1757	1845	1568	1757	540	1109	1757	5007	165	1757	4824	321
Grp Volume(v), veh/h	14	24	0	61	0	110	23	628	340	36	330	178
Grp Sat Flow(s),veh/h/ln	1757	1845	1568	1757	0	1649	1757	1679	1815	1757	1679	1788
Q Serve(g_s), s	1.3	2.0	0.0	5.5	0.0	10.5	1.9	24.4	24.4	3.3	9.6	9.8
Cycle Q Clear(g_c), s	1.3	2.0	0.0	5.5	0.0	10.5	1.9	24.4	24.4	3.3	9.6	9.8
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.09	1.00		0.18
Lane Grp Cap(c), veh/h	25	98	83	78	0	137	515	2396	1296	46	1500	799
V/C Ratio(X)	0.55	0.25	0.00	0.78	0.00	0.80	0.04	0.26	0.26	0.78	0.22	0.22
Avail Cap(c_a), veh/h	126	340	289	225	0	397	515	2396	1296	181	1500	799
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	78.3	72.7	0.0	75.7	0.0	72.1	51.9	26.8	26.8	77.4	27.1	27.2
Incr Delay (d2), s/veh	17.3	1.3	0.0	15.7	0.0	10.5	0.0	0.3	0.5	23.6	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.1	0.0	3.0	0.0	5.2	0.9	11.5	12.5	1.9	4.6	5.0
LnGrp Delay(d),s/veh	95.6	74.0	0.0	91.4	0.0	82.6	52.0	27.1	27.3	101.0	27.5	27.8
LnGrp LOS	F	E		F		F	D	C	C	F	C	C
Approach Vol, veh/h		38			171			991			544	
Approach Delay, s/veh		81.9			85.7			27.8			32.5	
Approach LOS		F			F			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	120.7	13.6	15.0	53.4	78.0	8.8	19.8
Change Period (Y+Rc), s	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Max Green Setting (Gmax), s	16.5	67.5	20.5	29.5	12.5	71.5	11.5	38.5
Max Q Clear Time (g_c+I1), s	5.3	26.4	7.5	4.0	3.9	11.8	3.3	12.5
Green Ext Time (p_c), s	0.0	6.9	0.1	0.8	0.1	3.2	0.0	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	36.1
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	7	7	22	4	32	16	825	26	43	468	31
Future Volume (veh/h)	20	7	7	22	4	32	16	825	26	43	468	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1900	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	25	9	9	28	5	40	20	1044	33	54	592	39
Adj No. of Lanes	1	1	0	1	1	0	1	3	1	1	3	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	37	26	26	55	7	58	501	3961	1233	69	2723	848
Arrive On Green	0.02	0.03	0.03	0.03	0.04	0.04	0.57	1.00	1.00	0.08	1.00	1.00
Sat Flow, veh/h	1757	848	848	1757	177	1417	1757	5036	1568	1757	5036	1568
Grp Volume(v), veh/h	25	0	18	28	0	45	20	1044	33	54	592	39
Grp Sat Flow(s),veh/h/ln	1757	0	1695	1757	0	1595	1757	1679	1568	1757	1679	1568
Q Serve(g_s), s	2.3	0.0	1.7	2.5	0.0	4.5	0.8	0.0	0.0	4.8	0.0	0.0
Cycle Q Clear(g_c), s	2.3	0.0	1.7	2.5	0.0	4.5	0.8	0.0	0.0	4.8	0.0	0.0
Prop In Lane	1.00		0.50	1.00		0.89	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	37	0	52	55	0	65	501	3961	1233	69	2723	848
V/C Ratio(X)	0.68	0.00	0.35	0.51	0.00	0.69	0.04	0.26	0.03	0.78	0.22	0.05
Avail Cap(c_a), veh/h	148	0	291	159	0	284	501	3961	1233	225	2723	848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00
Uniform Delay (d), s/veh	77.8	0.0	76.0	76.3	0.0	75.8	24.7	0.0	0.0	73.1	0.0	0.0
Incr Delay (d2), s/veh	19.6	0.0	3.9	7.3	0.0	12.4	0.0	0.2	0.0	17.4	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.8	1.3	0.0	2.2	0.4	0.1	0.0	2.7	0.0	0.0
LnGrp Delay(d),s/veh	97.4	0.0	79.9	83.6	0.0	88.2	24.8	0.2	0.0	90.5	0.2	0.1
LnGrp LOS	F		E	F		F	C	A	A	F	A	A
Approach Vol, veh/h		43			73			1097			685	
Approach Delay, s/veh		90.1			86.4			0.6			7.3	
Approach LOS		F			F			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	130.4	9.5	9.4	50.1	91.0	7.9	11.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	79.5	14.5	27.5	13.5	86.5	13.5	28.5
Max Q Clear Time (g_c+I1), s	6.8	2.0	4.5	3.7	2.8	2.0	4.3	6.5
Green Ext Time (p_c), s	0.1	8.8	0.1	0.0	0.1	4.3	0.1	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	8.3
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	12	53	116	27	14	20	844	61	18	463	9
Future Volume (veh/h)	23	12	53	116	27	14	20	844	61	18	463	9
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	27	14	0	135	32	16	23	985	71	21	540	10
Adj No. of Lanes	1	1	1	2	1	1	1	3	1	1	3	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	94	57	48	184	58	49	35	2235	696	631	3986	74
Arrive On Green	0.05	0.03	0.00	0.05	0.03	0.03	0.02	0.44	0.44	0.72	1.00	1.00
Sat Flow, veh/h	1757	1845	1568	3408	1845	1568	1757	5036	1568	1757	5091	94
Grp Volume(v), veh/h	27	14	0	135	32	16	23	985	71	21	356	194
Grp Sat Flow(s),veh/h/ln	1757	1845	1568	1704	1845	1568	1757	1679	1568	1757	1679	1828
Q Serve(g_s), s	2.4	1.2	0.0	6.2	2.7	1.6	2.1	21.6	4.2	0.6	0.0	0.0
Cycle Q Clear(g_c), s	2.4	1.2	0.0	6.2	2.7	1.6	2.1	21.6	4.2	0.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	94	57	48	184	58	49	35	2235	696	631	2628	1431
V/C Ratio(X)	0.29	0.25	0.00	0.73	0.56	0.33	0.65	0.44	0.10	0.03	0.14	0.14
Avail Cap(c_a), veh/h	170	380	323	501	473	402	159	2235	696	631	2628	1431
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	72.8	75.7	0.0	74.5	76.4	75.9	77.9	30.8	25.9	14.5	0.0	0.0
Incr Delay (d2), s/veh	1.7	2.2	0.0	5.6	8.1	3.8	18.7	0.6	0.3	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.6	0.0	3.1	1.5	0.7	1.2	10.2	1.9	0.3	0.0	0.1
LnGrp Delay(d),s/veh	74.5	78.0	0.0	80.1	84.5	79.7	96.6	31.4	26.2	14.5	0.1	0.2
LnGrp LOS	E	E		F	F	E	F	C	C	B	A	A
Approach Vol, veh/h		41			183			1079			571	
Approach Delay, s/veh		75.7			80.8			32.5			0.7	
Approach LOS		E			F			C			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	62.0	75.5	13.1	9.4	7.7	129.8	13.0	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	71.0	23.5	33.0	14.5	71.0	15.5	41.0
Max Q Clear Time (g_c+I1), s	2.6	23.6	8.2	3.2	4.1	2.0	4.4	4.7
Green Ext Time (p_c), s	2.5	8.0	0.4	0.0	0.0	3.5	0.4	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	28.4
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	2	15	3	58	4	817	20	34	610	21
Future Vol, veh/h	5	0	2	15	3	58	4	817	20	34	610	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	140	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	3	19	4	73	5	1034	25	43	772	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1298	1941	400	1452	1942	530	799	0	0	1059	0	0
Stage 1	872	872	-	1057	1057	-	-	-	-	-	-	-
Stage 2	426	1069	-	395	885	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	170	64	512	138	64	422	489	-	-	367	-	-
Stage 1	244	366	-	182	300	-	-	-	-	-	-	-
Stage 2	528	296	-	551	361	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	120	56	512	124	56	422	489	-	-	367	-	-
Mov Cap-2 Maneuver	120	56	-	124	56	-	-	-	-	-	-	-
Stage 1	242	323	-	180	297	-	-	-	-	-	-	-
Stage 2	426	293	-	484	319	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	29.8	23.6	0.1	0.8
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	489	-	-	154	124	319	367	-	-
HCM Lane V/C Ratio	0.01	-	-	0.058	0.153	0.242	0.117	-	-
HCM Control Delay (s)	12.4	-	-	29.8	39.2	19.8	16.1	-	-
HCM Lane LOS	B	-	-	D	E	C	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.5	0.9	0.4	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	0	34	0	0	0	77	862	0	0	648	75
Future Vol, veh/h	27	0	34	0	0	0	77	862	0	0	648	75
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	0	-	-	-	300	-	-	200	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	35	0	44	0	0	0	100	1117	0	0	840	97

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1487	-	420	1653	2254	559	937	0	0	1117	0	0
Stage 1	840	-	-	1317	1317	-	-	-	-	-	-	-
Stage 2	647	-	-	336	937	-	-	-	-	-	-	-
Critical Hdwy	6.44	-	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	-	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	-	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	-	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	131	0	497	104	41	405	420	-	-	344	-	-
Stage 1	257	0	-	119	225	-	-	-	-	-	-	-
Stage 2	388	0	-	597	342	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	107	-	497	77	31	405	420	-	-	344	-	-
Mov Cap-2 Maneuver	107	-	-	77	31	-	-	-	-	-	-	-
Stage 1	196	-	-	91	171	-	-	-	-	-	-	-
Stage 2	296	-	-	544	342	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.2	0	1.3	0
HCM LOS	D	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	420	-	-	107	497	-	344	-	-
HCM Lane V/C Ratio	0.238	-	-	0.327	0.089	-	-	-	-
HCM Control Delay (s)	16.2	-	-	54.2	12.9	0	0	-	-
HCM Lane LOS	C	-	-	F	B	A	A	-	-
HCM 95th %tile Q(veh)	0.9	-	-	1.3	0.3	-	0	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	11	0	75	13	826	6	33	505	14
Future Vol, veh/h	0	0	0	11	0	75	13	826	6	33	505	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	225	-	-	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	13	0	88	15	964	7	39	589	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1083	1668	295	1312	1681	486	605	0	0	971	0	0
Stage 1	667	667	-	998	998	-	-	-	-	-	-	-
Stage 2	416	1001	-	314	683	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	228	95	598	167	94	451	604	-	-	404	-	-
Stage 1	338	455	-	200	320	-	-	-	-	-	-	-
Stage 2	535	319	-	616	447	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	167	84	598	152	83	451	604	-	-	404	-	-
Mov Cap-2 Maneuver	167	84	-	152	83	-	-	-	-	-	-	-
Stage 1	330	411	-	195	312	-	-	-	-	-	-	-
Stage 2	420	311	-	557	404	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	18.8	0.2	0.9
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	604	-	-	-	360	404	-	-
HCM Lane V/C Ratio	0.025	-	-	-	0.279	0.095	-	-
HCM Control Delay (s)	11.1	-	-	0	18.8	14.8	-	-
HCM Lane LOS	B	-	-	A	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1	0.3	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↑↑↑		↰	↑↑↑	
Traffic Vol, veh/h	2	0	14	5	1	0	1	901	9	2	539	27
Future Vol, veh/h	2	0	14	5	1	0	1	901	9	2	539	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	230	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	18	6	1	0	1	1168	12	3	699	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1193	1905	367	1462	1916	590	734	0	0	1180	0	0
Stage 1	723	723	-	1176	1176	-	-	-	-	-	-	-
Stage 2	470	1182	-	286	740	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	197	68	538	136	67	386	525	-	-	320	-	-
Stage 1	309	429	-	150	263	-	-	-	-	-	-	-
Stage 2	496	262	-	640	421	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	192	67	538	130	66	386	525	-	-	320	-	-
Mov Cap-2 Maneuver	192	67	-	130	66	-	-	-	-	-	-	-
Stage 1	308	425	-	150	262	-	-	-	-	-	-	-
Stage 2	493	261	-	613	417	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.6	39.5	0	0.1
HCM LOS	B	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	525	-	-	439	112	320	-	-
HCM Lane V/C Ratio	0.002	-	-	0.047	0.069	0.008	-	-
HCM Control Delay (s)	11.9	-	-	13.6	39.5	16.3	-	-
HCM Lane LOS	B	-	-	B	E	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1	11	1	3	64	33	894	61	38	562	7
Future Vol, veh/h	0	1	11	1	3	64	33	894	61	38	562	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	Free	-	-	None
Storage Length	-	-	-	-	-	0	200	-	150	210	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	1	13	1	4	76	39	1067	73	45	671	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1272	1910	340	1504	1914	534	679	0	-	1067	0	0
Stage 1	765	765	-	1145	1145	-	-	-	-	-	-	-
Stage 2	507	1145	-	359	769	-	-	-	-	-	-	-
Critical Hdwy	6.46	6.56	7.16	6.46	6.56	7.16	5.36	-	-	5.36	-	-
Critical Hdwy Stg 1	7.36	5.56	-	7.36	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.76	5.56	-	6.76	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.83	4.03	3.93	3.83	4.03	3.93	3.13	-	-	3.13	-	-
Pot Cap-1 Maneuver	175	67	558	127	66	418	554	-	0	360	-	-
Stage 1	288	408	-	156	270	-	-	-	0	-	-	-
Stage 2	469	270	-	576	406	-	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	117	55	558	105	54	418	554	-	-	360	-	-
Mov Cap-2 Maneuver	117	55	-	105	54	-	-	-	-	-	-	-
Stage 1	268	357	-	145	251	-	-	-	-	-	-	-
Stage 2	351	251	-	491	355	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.9	15.5	0.4	1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	554	-	317	418	360	-	-
HCM Lane V/C Ratio	0.071	-	0.045	0.183	0.126	-	-
HCM Control Delay (s)	12	-	16.9	15.5	16.4	-	-
HCM Lane LOS	B	-	C	C	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	0.7	0.4	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	78	120	987	554	26
Future Vol, veh/h	0	78	120	987	554	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	450	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	91	140	1152	646	30

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	323	676	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	5.36	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	3.13	-	-	-
Pot Cap-1 Maneuver	0	572	556	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	572	556	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	1.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	556	-	572	-	-
HCM Lane V/C Ratio	0.252	-	0.159	-	-
HCM Control Delay (s)	13.6	-	12.5	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	1	-	0.6	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	7	853	24	0	498
Future Vol, veh/h	0	7	853	24	0	498
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	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	10	1194	34	0	697

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	614	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	373	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	373	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	373	-
HCM Lane V/C Ratio	-	-	0.026	-
HCM Control Delay (s)	-	-	14.9	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	9	564	25	8	401
Future Vol, veh/h	14	9	564	25	8	401
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	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	13	790	35	11	561

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1111	413	0	0	825	0
Stage 1	808	-	-	-	-	-
Stage 2	303	-	-	-	-	-
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	203	588	-	-	801	-
Stage 1	399	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	200	588	-	-	801	-
Mov Cap-2 Maneuver	313	-	-	-	-	-
Stage 1	399	-	-	-	-	-
Stage 2	713	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	383	801	-
HCM Lane V/C Ratio	-	-	0.084	0.014	-
HCM Control Delay (s)	-	-	15.3	9.6	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	1	322	1	85	0	744	203	149	988	1
Future Volume (vph)	2	0	1	322	1	85	0	744	203	149	988	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5			6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		0.91	0.91			0.91	1.00	1.00	0.91	
Frt	1.00	0.85		1.00	0.90			1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.98			1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		3221	1501			5085	1583	1770	5085	
Flt Permitted	0.95	1.00		0.95	0.98			1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1583		3221	1501			5085	1583	1770	5085	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor (vph)	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%	105%
Adj. Flow (vph)	2	0	1	398	1	105	0	919	251	184	1220	1
RTOR Reduction (vph)	0	1	0	0	49	0	0	0	115	0	0	0
Lane Group Flow (vph)	2	0	0	346	109	0	0	919	136	184	1221	0
Turn Type	Split	NA		Split	NA		Prot	NA	Prot	Prot	NA	
Protected Phases	4	4		8	8		5	2	2	1	6	
Permitted Phases												
Actuated Green, G (s)	1.3	1.3		22.7	22.7			86.5	86.5	23.5	116.5	
Effective Green, g (s)	1.3	1.3		22.7	22.7			86.5	86.5	23.5	116.5	
Actuated g/C Ratio	0.01	0.01		0.14	0.14			0.54	0.54	0.15	0.73	
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5	6.5	6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	14	12		456	212			2749	855	259	3702	
v/s Ratio Prot	c0.00	0.00		c0.11	0.07			0.18	0.09	c0.10	c0.24	
v/s Ratio Perm												
v/c Ratio	0.14	0.00		0.76	0.51			0.33	0.16	0.71	0.33	
Uniform Delay, d1	78.8	78.7		66.0	63.5			20.6	18.5	65.0	7.8	
Progression Factor	1.00	1.00		1.00	1.00			1.25	2.66	1.14	0.91	
Incremental Delay, d2	4.7	0.0		7.1	2.1			0.3	0.4	8.6	0.2	
Delay (s)	83.5	78.7		73.1	65.7			26.0	49.4	82.4	7.3	
Level of Service	F	E		E	E			C	D	F	A	
Approach Delay (s)		81.9			70.8			31.0			17.1	
Approach LOS		F			E			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	252	98	38	183	58	67	380	58	21	499	23
Future Volume (veh/h)	73	252	98	38	183	58	67	380	58	21	499	23
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	88	304	118	46	221	70	81	459	70	25	602	28
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	189	439	373	128	439	373	487	1319	1121	661	1250	58
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	1.00	1.00	1.00	0.71	0.71	0.71
Sat Flow, veh/h	1084	1863	1583	961	1863	1583	793	1863	1583	871	1766	82
Grp Volume(v), veh/h	88	304	118	46	221	70	81	459	70	25	0	630
Grp Sat Flow(s),veh/h/ln	1084	1863	1583	961	1863	1583	793	1863	1583	871	0	1848
Q Serve(g_s), s	12.3	23.8	9.8	7.3	16.5	5.7	4.1	0.0	0.0	1.4	0.0	24.2
Cycle Q Clear(g_c), s	28.7	23.8	9.8	31.2	16.5	5.7	28.2	0.0	0.0	1.4	0.0	24.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	189	439	373	128	439	373	487	1319	1121	661	0	1308
V/C Ratio(X)	0.47	0.69	0.32	0.36	0.50	0.19	0.17	0.35	0.06	0.04	0.00	0.48
Avail Cap(c_a), veh/h	289	611	520	217	611	520	487	1319	1121	661	0	1308
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	65.5	55.8	50.5	70.1	53.0	48.9	3.0	0.0	0.0	7.0	0.0	10.4
Incr Delay (d2), s/veh	1.8	2.0	0.5	1.7	0.9	0.2	0.7	0.7	0.1	0.1	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	12.5	4.4	2.0	8.6	2.5	1.0	0.3	0.0	0.4	0.0	12.7
LnGrp Delay(d),s/veh	67.2	57.8	51.0	71.8	53.9	49.1	3.7	0.7	0.1	7.1	0.0	11.6
LnGrp LOS	E	E	D	E	D	D	A	A	A	A		B
Approach Vol, veh/h		510			337			610			655	
Approach Delay, s/veh		57.8			55.3			1.1			11.5	
Approach LOS		E			E			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		117.8		42.2		117.8		42.2
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5
Max Green Setting (Gmax), s		98.5		52.5		98.5		52.5
Max Q Clear Time (g_c+I1), s		30.2		30.7		26.2		33.2
Green Ext Time (p_c), s		12.3		4.7		12.3		4.5

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	408	17	572	243	13	673
Future Volume (veh/h)	408	17	572	243	13	673
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	481	0	675	0	15	794
Adj No. of Lanes	2	1	2	1	1	2
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	552	254	2773	1240	641	2773
Arrive On Green	0.16	0.00	1.00	0.00	1.00	1.00
Sat Flow, veh/h	3442	1583	3632	1583	761	3632
Grp Volume(v), veh/h	481	0	675	0	15	794
Grp Sat Flow(s),veh/h/ln	1721	1583	1770	1583	761	1770
Q Serve(g_s), s	21.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	21.8	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	552	254	2773	1240	641	2773
V/C Ratio(X)	0.87	0.00	0.24	0.00	0.02	0.29
Avail Cap(c_a), veh/h	1301	599	2773	1240	641	2773
HCM Platoon Ratio	1.00	1.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.96	0.00	1.00	1.00
Uniform Delay (d), s/veh	65.6	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.4	0.0	0.2	0.0	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.8	0.0	0.1	0.0	0.0	0.1
LnGrp Delay(d),s/veh	70.0	0.0	0.2	0.0	0.1	0.3
LnGrp LOS	E		A		A	A
Approach Vol, veh/h	481		675			809
Approach Delay, s/veh	70.0		0.2			0.3
Approach LOS	E		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		129.8				129.8		30.2
Change Period (Y+Rc), s		4.5				4.5		4.5
Max Green Setting (Gmax), s		90.5				90.5		60.5
Max Q Clear Time (g_c+I1), s		2.0				2.0		23.8
Green Ext Time (p_c), s		15.5				15.5		1.8

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	55	39	76	29	69	12	736	75	86	1053	50
Future Volume (veh/h)	45	55	39	76	29	69	12	736	75	86	1053	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	50	61	0	85	32	77	13	822	84	96	1176	56
Adj No. of Lanes	1	1	1	1	1	0	1	3	0	1	3	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	66	110	94	105	39	95	24	3298	335	117	3757	179
Arrive On Green	0.04	0.06	0.00	0.06	0.08	0.08	0.02	0.93	0.93	0.07	0.76	0.76
Sat Flow, veh/h	1774	1863	1583	1774	486	1170	1774	4692	477	1774	4974	237
Grp Volume(v), veh/h	50	61	0	85	0	109	13	593	313	96	801	431
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1656	1774	1695	1779	1774	1695	1821
Q Serve(g_s), s	4.5	5.1	0.0	7.6	0.0	10.4	1.2	2.4	2.4	8.5	12.1	12.1
Cycle Q Clear(g_c), s	4.5	5.1	0.0	7.6	0.0	10.4	1.2	2.4	2.4	8.5	12.1	12.1
Prop In Lane	1.00		1.00	1.00		0.71	1.00		0.27	1.00		0.13
Lane Grp Cap(c), veh/h	66	110	94	105	0	134	24	2383	1250	117	2560	1375
V/C Ratio(X)	0.75	0.55	0.00	0.81	0.00	0.81	0.53	0.25	0.25	0.82	0.31	0.31
Avail Cap(c_a), veh/h	183	355	302	272	0	399	105	2383	1250	283	2560	1375
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	76.3	73.2	0.0	74.3	0.0	72.3	78.0	1.6	1.6	73.8	6.3	6.3
Incr Delay (d2), s/veh	15.6	4.3	0.0	13.3	0.0	11.0	17.0	0.2	0.5	13.0	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.8	0.0	4.1	0.0	5.2	0.7	1.1	1.2	4.6	5.8	6.3
LnGrp Delay(d),s/veh	91.9	77.5	0.0	87.7	0.0	83.3	95.0	1.9	2.1	86.8	6.6	6.9
LnGrp LOS	F	E		F		F	F	A	A	F	A	A
Approach Vol, veh/h		111			194			919			1328	
Approach Delay, s/veh		84.0			85.2			3.3			12.5	
Approach LOS		F			F			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.1	117.0	14.0	14.0	6.7	125.3	10.5	17.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	61.5	24.5	30.5	9.5	77.5	16.5	38.5
Max Q Clear Time (g_c+I1), s	10.5	4.4	9.6	7.1	3.2	14.1	6.5	12.4
Green Ext Time (p_c), s	0.2	22.6	0.2	0.4	0.0	23.3	0.3	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	17.8
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	19	24	79	16	69	28	863	61	101	1097	29
Future Volume (veh/h)	22	19	24	79	16	69	28	863	61	101	1097	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	26	23	29	94	19	82	33	1030	73	121	1309	35
Adj No. of Lanes	1	1	0	1	1	0	1	3	1	1	3	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	33	42	120	28	119	495	3539	1102	142	2527	787
Arrive On Green	0.02	0.04	0.04	0.07	0.09	0.09	0.56	1.00	1.00	0.16	0.99	0.99
Sat Flow, veh/h	1774	750	946	1774	307	1323	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	26	0	52	94	0	101	33	1030	73	121	1309	35
Grp Sat Flow(s),veh/h/ln	1774	0	1696	1774	0	1629	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	2.3	0.0	4.8	8.3	0.0	9.6	1.4	0.0	0.0	10.6	0.5	0.0
Cycle Q Clear(g_c), s	2.3	0.0	4.8	8.3	0.0	9.6	1.4	0.0	0.0	10.6	0.5	0.0
Prop In Lane	1.00		0.56	1.00		0.81	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	38	0	75	120	0	147	495	3539	1102	142	2527	787
V/C Ratio(X)	0.68	0.00	0.70	0.78	0.00	0.69	0.07	0.29	0.07	0.85	0.52	0.04
Avail Cap(c_a), veh/h	116	0	291	261	0	412	495	3539	1102	316	2527	787
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	77.8	0.0	75.4	73.4	0.0	70.6	25.8	0.0	0.0	66.3	0.3	0.2
Incr Delay (d2), s/veh	19.5	0.0	11.1	10.5	0.0	5.6	0.1	0.2	0.1	13.3	0.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	2.5	4.4	0.0	4.6	0.7	0.1	0.0	5.7	0.3	0.0
LnGrp Delay(d),s/veh	97.3	0.0	86.5	83.9	0.0	76.1	25.9	0.2	0.1	79.6	1.0	0.3
LnGrp LOS	F		F	F		E	C	A	A	E	A	A
Approach Vol, veh/h		78			195			1136			1465	
Approach Delay, s/veh		90.1			79.9			0.9			7.5	
Approach LOS		F			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.3	115.8	15.3	11.5	49.1	84.0	7.9	18.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	28.5	62.5	23.5	27.5	11.5	79.5	10.5	40.5
Max Q Clear Time (g_c+I1), s	12.6	2.0	10.3	6.8	3.4	2.5	4.3	11.6
Green Ext Time (p_c), s	0.2	8.8	0.7	0.2	0.1	12.3	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	65	113	224	48	42	66	862	172	46	1108	26
Future Volume (veh/h)	58	65	113	224	48	42	66	862	172	46	1108	26
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	67	75	0	258	55	48	76	995	198	53	1278	30
Adj No. of Lanes	1	1	1	2	1	1	1	3	1	1	3	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	104	88	311	84	71	578	2241	698	534	2125	50
Arrive On Green	0.10	0.06	0.00	0.09	0.05	0.05	0.33	0.44	0.44	0.60	0.83	0.83
Sat Flow, veh/h	1774	1863	1583	3442	1863	1583	1774	5085	1583	1774	5112	120
Grp Volume(v), veh/h	67	75	0	258	55	48	76	995	198	53	848	460
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	1863	1583	1774	1695	1583	1774	1695	1842
Q Serve(g_s), s	5.6	6.3	0.0	11.8	4.6	4.8	4.8	21.8	9.4	2.0	13.5	13.5
Cycle Q Clear(g_c), s	5.6	6.3	0.0	11.8	4.6	4.8	4.8	21.8	9.4	2.0	13.5	13.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	179	104	88	311	84	71	578	2241	698	534	1409	765
V/C Ratio(X)	0.37	0.72	0.00	0.83	0.65	0.67	0.13	0.44	0.28	0.10	0.60	0.60
Avail Cap(c_a), veh/h	183	378	322	527	472	401	578	2241	698	534	1409	765
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	67.2	74.3	0.0	71.6	75.2	75.2	38.0	31.1	15.6	22.7	9.0	9.0
Incr Delay (d2), s/veh	1.3	9.2	0.0	5.7	8.3	10.4	0.1	0.6	1.0	0.1	1.8	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	3.5	0.0	5.9	2.6	2.3	2.4	10.4	4.3	1.0	6.5	7.3
LnGrp Delay(d),s/veh	68.5	83.5	0.0	77.3	83.5	85.6	38.1	31.8	16.6	22.7	10.8	12.3
LnGrp LOS	E	F		E	F	F	D	C	B	C	B	B
Approach Vol, veh/h		142			361			1269			1361	
Approach Delay, s/veh		76.5			79.3			29.8			11.8	
Approach LOS		E			E			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	52.7	75.0	18.9	13.4	56.7	71.0	20.6	11.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	70.5	24.5	32.5	18.5	66.5	16.5	40.5
Max Q Clear Time (g_c+I1), s	4.0	23.8	13.8	8.3	6.8	15.5	7.6	6.8
Green Ext Time (p_c), s	0.2	8.4	0.7	0.6	0.2	10.7	0.3	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	29.8
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	0	2	10	2	23	3	809	39	50	1120	40
Future Vol, veh/h	6	0	2	10	2	23	3	809	39	50	1120	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	140	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	2	12	2	28	4	999	48	62	1384	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1942	2588	717	1709	2588	524	1433	0	0	1047	0	0
Stage 1	1533	1533	-	1031	1031	-	-	-	-	-	-	-
Stage 2	409	1055	-	678	1557	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	69	25	319	96	25	426	241	-	-	371	-	-
Stage 1	84	177	-	189	309	-	-	-	-	-	-	-
Stage 2	540	301	-	371	172	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	50	20	319	82	20	426	241	-	-	371	-	-
Mov Cap-2 Maneuver	50	20	-	82	20	-	-	-	-	-	-	-
Stage 1	83	147	-	186	304	-	-	-	-	-	-	-
Stage 2	492	296	-	307	143	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	72.5	39.3	0.1	0.7
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	241	-	-	63	82	162	371	-	-
HCM Lane V/C Ratio	0.015	-	-	0.157	0.151	0.191	0.166	-	-
HCM Control Delay (s)	20.2	-	-	72.5	56.5	32.4	16.6	-	-
HCM Lane LOS	C	-	-	F	F	D	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.5	0.7	0.6	-	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	0	56	0	0	0	54	902	0	0	1187	82
Future Vol, veh/h	37	0	56	0	0	0	54	902	0	0	1187	82
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	0	-	-	-	300	-	-	200	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	0	64	0	0	0	62	1029	0	0	1355	94

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1891	-	678	1695	2602	515	1449	0	0	1029	0	0
Stage 1	1355	-	-	1153	1153	-	-	-	-	-	-	-
Stage 2	536	-	-	542	1449	-	-	-	-	-	-	-
Critical Hdwy	6.44	-	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	-	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	-	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	-	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	74	0	338	98	24	432	236	-	-	379	-	-
Stage 1	112	0	-	156	270	-	-	-	-	-	-	-
Stage 2	453	0	-	449	194	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	59	-	338	63	18	432	236	-	-	379	-	-
Mov Cap-2 Maneuver	59	-	-	63	18	-	-	-	-	-	-	-
Stage 1	83	-	-	115	199	-	-	-	-	-	-	-
Stage 2	334	-	-	364	194	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	73	0	1.4	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	236	-	-	59	338	-	379	-	-
HCM Lane V/C Ratio	0.261	-	-	0.716	0.189	-	-	-	-
HCM Control Delay (s)	25.6	-	-	156.1	18.1	0	0	-	-
HCM Lane LOS	D	-	-	F	C	A	A	-	-
HCM 95th %tile Q(veh)	1	-	-	3.1	0.7	-	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	0	8	8	0	48	3	804	23	72	1214	7
Future Vol, veh/h	6	0	8	8	0	48	3	804	23	72	1214	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	225	-	-	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	9	9	0	54	3	898	26	80	1356	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1881	2446	678	1619	2441	462	1364	0	0	924	0	0
Stage 1	1516	1516	-	917	917	-	-	-	-	-	-	-
Stage 2	365	930	-	702	1524	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	75	31	338	109	31	467	260	-	-	426	-	-
Stage 1	86	180	-	227	349	-	-	-	-	-	-	-
Stage 2	574	344	-	359	179	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	56	25	338	90	25	467	260	-	-	426	-	-
Mov Cap-2 Maneuver	56	25	-	90	25	-	-	-	-	-	-	-
Stage 1	85	146	-	224	345	-	-	-	-	-	-	-
Stage 2	502	340	-	284	145	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	44.3	20.7	0.1	0.9
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	260	-	-	107	292	426	-	-
HCM Lane V/C Ratio	0.013	-	-	0.146	0.214	0.189	-	-
HCM Control Delay (s)	19	-	-	44.3	20.7	15.4	-	-
HCM Lane LOS	C	-	-	E	C	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.8	0.7	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	22	14	0	7	11	910	41	3	1174	24
Future Vol, veh/h	2	1	22	14	0	7	11	910	41	3	1174	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	230	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	1	25	16	0	8	13	1039	47	3	1340	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1802	2472	684	1632	2462	543	1367	0	0	1086	0	0
Stage 1	1360	1360	-	1089	1089	-	-	-	-	-	-	-
Stage 2	442	1112	-	543	1373	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	84	30	335	107	30	414	259	-	-	356	-	-
Stage 1	111	215	-	173	290	-	-	-	-	-	-	-
Stage 2	516	282	-	449	212	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	79	28	335	92	28	414	259	-	-	356	-	-
Mov Cap-2 Maneuver	79	28	-	92	28	-	-	-	-	-	-	-
Stage 1	105	213	-	164	276	-	-	-	-	-	-	-
Stage 2	481	268	-	410	210	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.3	40.9	0.2	0
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	259	-	-	197	124	356	-	-
HCM Lane V/C Ratio	0.048	-	-	0.145	0.193	0.01	-	-
HCM Control Delay (s)	19.6	-	-	26.3	40.9	15.2	-	-
HCM Lane LOS	C	-	-	D	E	C	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.5	0.7	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	41	2	0	58	67	1071	70	61	1419	8
Future Vol, veh/h	2	0	41	2	0	58	67	1071	70	61	1419	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	Free	-	-	None
Storage Length	-	-	-	-	-	0	200	-	150	210	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	46	2	0	65	75	1196	78	68	1585	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2354	3072	797	2116	-	598	1594	0	-	1196	0	0
Stage 1	1726	1726	-	1346	-	-	-	-	-	-	-	-
Stage 2	628	1346	-	770	-	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	-	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	-	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	38	12	283	54	0	382	200	-	0	314	-	-
Stage 1	61	142	-	114	0	-	-	-	0	-	-	-
Stage 2	398	218	-	326	0	-	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	19	6	283	27	-	382	200	-	-	314	-	-
Mov Cap-2 Maneuver	19	6	-	27	-	-	-	-	-	-	-	-
Stage 1	38	111	-	71	-	-	-	-	-	-	-	-
Stage 2	207	136	-	214	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	33.8	16.3	2	0.8
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	200	-	172	382	314	-	-
HCM Lane V/C Ratio	0.374	-	0.279	0.17	0.217	-	-
HCM Control Delay (s)	33.4	-	33.8	16.3	19.6	-	-
HCM Lane LOS	D	-	D	C	C	-	-
HCM 95th %tile Q(veh)	1.6	-	1.1	0.6	0.8	-	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	150	119	1196	1400	29
Future Vol, veh/h	0	150	119	1196	1400	29
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	450	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	166	132	1322	1547	32

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	774	1579	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	5.34	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	3.12	-	-	-
Pot Cap-1 Maneuver	0	293	204	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	293	204	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.2	4.5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	204	-	293	-	-
HCM Lane V/C Ratio	0.645	-	0.566	-	-
HCM Control Delay (s)	50	-	32.2	-	-
HCM Lane LOS	E	-	D	-	-
HCM 95th %tile Q(veh)	3.8	-	3.2	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	28	918	36	0	1227
Future Vol, veh/h	0	28	918	36	0	1227
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	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	35	1148	45	0	1534

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	597	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	382	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	382	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	382	-
HCM Lane V/C Ratio	-	-	0.092	-
HCM Control Delay (s)	-	-	15.4	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	14	577	12	9	670
Future Vol, veh/h	16	14	577	12	9	670
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	-	-	-	75	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	20	808	17	13	938

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1312	413	0	0	825	0
Stage 1	817	-	-	-	-	-
Stage 2	495	-	-	-	-	-
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	150	588	-	-	801	-
Stage 1	395	-	-	-	-	-
Stage 2	578	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	148	588	-	-	801	-
Mov Cap-2 Maneuver	277	-	-	-	-	-
Stage 1	395	-	-	-	-	-
Stage 2	569	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	368	801	-
HCM Lane V/C Ratio	-	-	0.114	0.016	-
HCM Control Delay (s)	-	-	16	9.6	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Appendix C
2040 Cumulative Conditions LOS Calculations

2040 Cumulative Conditions						
			AM Peak		PM Peak	
ID	Intersection Name	Intersection Control	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
1	S. Carson & 5th Street	Signalized				
	Overall		**B**	**16.9**	**B**	**18.9**
2	S. Carson & Mall Entrance	Side Street STOP				
	Overall			0.4		0.4
	Westbound		C	16.8	C	17.2
3	S. Carson & Stewart Street	Roundabout				
	Overall		**B**	**14.8**	**F**	**72.8**
4	S. Carson & Fairview Drive	Signalized				
	Overall		**E**	**58.7**	**D**	**47.0**
5	S. Carson & Colorado Street	Side Street STOP				
	Overall			2.6		3.8
	Eastbound		F	89.6	F	>300
	Westbound		F	54.5	F	135.1
6	S. Carson & Rhodes Street	Side Street STOP				
	Overall			4.5		43.1
	Eastbound		F	138.2	F	>300
	Westbound		F	135.0	F	>300
7	S. Carson & Sonoma Street	Side Street STOP				
	Overall			2.0		3.5
	Eastbound		F	85.4	F	>300
	Westbound		E	37.3	F	60.8
8	S. Carson & Moses Street	Side Street STOP				
	Overall			0.5		3.9
	Eastbound		C	17.2	F	75.3
	Westbound		F	115.0	F	>300
9	S. Carson & Koontz Lane	Signalized				
	Overall		**C**	**26.7**	**D**	**38.8**
10	S. Carson & Raleys Entrance	Side Street STOP				
	Overall			0.1		0.2
	Westbound Right		B	14.8	C	15.9
11	S. Carson & Eagle Station Lane	Signalized				
	Overall		**C**	**28.2**	**D**	**45.2**
12	S. Carson & Clearview Drive	Signalized				
	Overall		**D**	**40.9**	**E**	**57.5**
13	S. Carson & Overland/Snyder Ave*	Side Street STOP				
	Overall			1.9		9.9
	Eastbound		B	10.4	D	27.2
	Westbound		B	12.0	C	22.5
14	S. Carson & Appion Way*	Side Street STOP				
	Overall			5.7		66.0
	Eastbound Right		A	6.4	E	46.2
**Movement Delay based on SimTraffic Microsimulation*						

Source: Headway Transportation, 2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	292	133	52	212	67	94	525	76	24	682	27
Future Volume (veh/h)	85	292	133	52	212	67	94	525	76	24	682	27
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	92	317	145	57	230	73	102	571	83	26	741	29
Adj No. of Lanes	1	1	1	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	269	471	400	203	471	400	267	870	127	338	974	38
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.55	0.55	0.55	0.55	0.55	0.55
Sat Flow, veh/h	1072	1863	1583	926	1863	1583	696	1591	231	776	1781	70
Grp Volume(v), veh/h	92	317	145	57	230	73	102	0	654	26	0	770
Grp Sat Flow(s),veh/h/ln	1072	1863	1583	926	1863	1583	696	0	1822	776	0	1850
Q Serve(g_s), s	5.2	10.0	4.9	3.8	6.8	2.3	8.7	0.0	16.5	1.6	0.0	21.0
Cycle Q Clear(g_c), s	12.0	10.0	4.9	13.8	6.8	2.3	29.6	0.0	16.5	18.1	0.0	21.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.13	1.00		0.04
Lane Grp Cap(c), veh/h	269	471	400	203	471	400	267	0	997	338	0	1012
V/C Ratio(X)	0.34	0.67	0.36	0.28	0.49	0.18	0.38	0.00	0.66	0.08	0.00	0.76
Avail Cap(c_a), veh/h	278	487	414	211	487	414	267	0	997	338	0	1012
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.8	21.9	20.0	28.1	20.7	19.0	22.9	0.0	10.4	16.8	0.0	11.4
Incr Delay (d2), s/veh	0.7	3.5	0.6	0.7	0.8	0.2	4.1	0.0	3.4	0.4	0.0	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	5.6	2.2	1.0	3.6	1.0	1.9	0.0	9.1	0.4	0.0	12.0
LnGrp Delay(d),s/veh	26.6	25.3	20.5	28.8	21.5	19.2	27.0	0.0	13.8	17.2	0.0	16.8
LnGrp LOS	C	C	C	C	C	B	C		B	B		B
Approach Vol, veh/h		554			360			756			796	
Approach Delay, s/veh		24.3			22.2			15.6			16.8	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		42.1		22.9		42.1		22.9
Change Period (Y+Rc), s		6.5		6.5		6.5		6.5
Max Green Setting (Gmax), s		35.0		17.0		35.0		17.0
Max Q Clear Time (g_c+I1), s		31.6		14.0		23.0		15.8
Green Ext Time (p_c), s		2.7		1.4		8.2		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	1	442	1	99	0	1019	279	173	1356	1
Future Volume (vph)	2	0	1	442	1	99	0	1019	279	173	1356	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5		6.5	6.5	6.5	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frt	1.00	0.85		1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1583		1681	1686	1583		3539	1583	1770	3539	
Flt Permitted	0.95	1.00		0.95	0.39	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1583		1681	686	1583		3539	1583	1770	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	0	1	480	1	108	0	1108	303	188	1474	1
RTOR Reduction (vph)	0	1	0	0	0	72	0	0	58	0	0	0
Lane Group Flow (vph)	2	0	0	240	241	36	0	1108	245	188	1475	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	2 3	1	6	
Permitted Phases						8						
Actuated Green, G (s)	1.3	3.8		50.9	61.2	53.4		58.5	115.9	20.8	85.8	
Effective Green, g (s)	1.3	3.8		50.9	61.2	53.4		58.5	115.9	20.8	85.8	
Actuated g/C Ratio	0.01	0.02		0.32	0.38	0.33		0.37	0.72	0.13	0.54	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5		6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	14	37		534	580	528		1293	1146	230	1897	
v/s Ratio Prot	0.00	0.00		c0.14	0.13			c0.31	0.15	0.11	c0.42	
v/s Ratio Perm					c0.03	0.02						
v/c Ratio	0.14	0.00		0.45	0.42	0.07		0.86	0.21	0.82	0.78	
Uniform Delay, d1	78.8	76.2		43.4	36.3	36.3		46.9	7.2	67.8	29.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.22	2.44	1.00	1.00	
Incremental Delay, d2	4.7	0.0		0.6	0.5	0.1		7.1	0.1	19.7	3.2	
Delay (s)	83.5	76.3		44.0	36.8	36.4		64.0	17.6	87.4	32.7	
Level of Service	F	E		D	D	D		E	B	F	C	
Approach Delay (s)		81.1			39.6			54.1			38.9	
Approach LOS		F			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	79	68	97	34	80	46	1035	103	100	1469	89
Future Volume (veh/h)	70	79	68	97	34	80	46	1035	103	100	1469	89
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	76	86	0	105	37	87	50	1125	112	109	1597	97
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	95	111	94	147	44	103	245	2021	201	130	1889	114
Arrive On Green	0.05	0.06	0.00	0.08	0.09	0.09	0.14	0.62	0.62	0.07	0.56	0.56
Sat Flow, veh/h	1774	1863	1583	1774	495	1163	1774	3252	323	1774	3391	205
Grp Volume(v), veh/h	76	86	0	105	0	124	50	612	625	109	829	865
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	1658	1774	1770	1806	1774	1770	1827
Q Serve(g_s), s	6.8	7.3	0.0	9.2	0.0	11.8	4.0	32.0	32.1	9.7	62.5	63.8
Cycle Q Clear(g_c), s	6.8	7.3	0.0	9.2	0.0	11.8	4.0	32.0	32.1	9.7	62.5	63.8
Prop In Lane	1.00		1.00	1.00		0.70	1.00		0.18	1.00		0.11
Lane Grp Cap(c), veh/h	95	111	94	147	0	147	245	1100	1122	130	985	1017
V/C Ratio(X)	0.80	0.77	0.00	0.71	0.00	0.84	0.20	0.56	0.56	0.84	0.84	0.85
Avail Cap(c_a), veh/h	128	239	203	172	0	254	245	1100	1122	216	985	1017
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	74.8	74.2	0.0	71.5	0.0	71.8	61.2	17.5	17.5	73.2	29.6	29.8
Incr Delay (d2), s/veh	22.0	10.9	0.0	10.9	0.0	12.0	0.4	2.0	2.0	13.4	8.6	8.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	4.1	0.0	5.0	0.0	5.9	2.0	16.2	16.6	5.2	32.8	34.5
LnGrp Delay(d),s/veh	96.8	85.1	0.0	82.4	0.0	83.7	61.6	19.5	19.5	86.6	38.2	38.7
LnGrp LOS	F	F		F		F	E	B	B	F	D	D
Approach Vol, veh/h		162			229			1287			1803	
Approach Delay, s/veh		90.6			83.1			21.2			41.4	
Approach LOS		F			F			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.2	105.9	19.8	16.0	28.6	95.6	15.1	20.7
Change Period (Y+Rc), s	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Max Green Setting (Gmax), s	19.5	78.5	15.5	20.5	8.9	89.1	11.5	24.5
Max Q Clear Time (g_c+I1), s	11.7	34.1	11.2	9.3	6.0	65.8	8.8	13.8
Green Ext Time (p_c), s	0.1	10.0	0.2	0.3	0.1	12.8	0.1	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	38.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	22	28	92	19	80	32	1230	71	117	1528	34
Future Volume (veh/h)	26	22	28	92	19	80	32	1230	71	117	1528	34
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	28	24	30	100	21	87	35	1337	77	127	1661	37
Adj No. of Lanes	1	1	0	1	1	0	1	2	1	1	2	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	58	33	42	120	25	104	351	1660	743	474	1904	852
Arrive On Green	0.03	0.04	0.04	0.07	0.08	0.08	0.20	0.47	0.47	0.27	0.54	0.54
Sat Flow, veh/h	1774	754	942	1774	317	1314	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	28	0	54	100	0	108	35	1337	77	127	1661	37
Grp Sat Flow(s),veh/h/ln	1774	0	1696	1774	0	1631	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	2.7	0.0	5.4	9.5	0.0	11.2	2.8	55.1	4.6	9.7	69.9	1.9
Cycle Q Clear(g_c), s	2.7	0.0	5.4	9.5	0.0	11.2	2.8	55.1	4.6	9.7	69.9	1.9
Prop In Lane	1.00		0.56	1.00		0.81	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	58	0	75	120	0	129	351	1660	743	474	1904	852
V/C Ratio(X)	0.48	0.00	0.72	0.83	0.00	0.84	0.10	0.81	0.10	0.27	0.87	0.04
Avail Cap(c_a), veh/h	81	0	268	171	0	236	351	1660	743	474	1904	852
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.74	0.74	0.74	1.00	1.00	1.00
Uniform Delay (d), s/veh	81.3	0.0	80.7	78.8	0.0	77.6	56.1	38.7	25.3	49.5	34.4	18.7
Incr Delay (d2), s/veh	6.2	0.0	12.1	20.7	0.0	13.0	0.1	3.2	0.2	0.3	5.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	2.8	5.4	0.0	5.5	1.4	27.7	2.1	4.8	35.5	0.8
LnGrp Delay(d),s/veh	87.5	0.0	92.7	99.4	0.0	90.6	56.2	42.0	25.5	49.8	40.2	18.8
LnGrp LOS	F		F	F		F	E	D	C	D	D	B
Approach Vol, veh/h		82			208			1449			1825	
Approach Delay, s/veh		90.9			94.9			41.4			40.5	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	52.2	86.7	18.0	14.1	40.4	98.5	12.1	20.1
Change Period (Y+Rc), s	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Max Green Setting (Gmax), s	21.3	80.2	16.5	27.0	9.5	92.0	7.8	24.7
Max Q Clear Time (g_c+I1), s	11.7	57.1	11.5	7.4	4.8	71.9	4.7	13.2
Green Ext Time (p_c), s	0.3	10.3	0.1	0.2	0.2	12.1	0.1	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	45.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	192	88	154	289	77	49	99	1104	219	53	1531	73
Future Volume (veh/h)	192	88	154	289	77	49	99	1104	219	53	1531	73
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	209	96	0	314	84	53	108	1200	238	58	1664	79
Adj No. of Lanes	1	1	1	2	1	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	227	161	137	360	117	99	280	1710	765	290	1682	79
Arrive On Green	0.13	0.09	0.00	0.10	0.06	0.06	0.16	0.48	0.48	0.16	0.49	0.49
Sat Flow, veh/h	1774	1863	1583	3442	1863	1583	1774	3539	1583	1774	3441	163
Grp Volume(v), veh/h	209	96	0	314	84	53	108	1200	238	58	852	891
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	1863	1583	1774	1770	1583	1774	1770	1834
Q Serve(g_s), s	18.6	7.9	0.0	14.4	7.1	5.2	8.7	42.4	14.6	4.5	75.9	77.3
Cycle Q Clear(g_c), s	18.6	7.9	0.0	14.4	7.1	5.2	8.7	42.4	14.6	4.5	75.9	77.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	227	161	137	360	117	99	280	1710	765	290	865	896
V/C Ratio(X)	0.92	0.60	0.00	0.87	0.72	0.53	0.39	0.70	0.31	0.20	0.98	0.99
Avail Cap(c_a), veh/h	227	288	244	415	274	233	280	1710	765	290	865	896
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.68	0.68
Uniform Delay (d), s/veh	68.9	70.4	0.0	70.6	73.6	72.7	60.4	32.3	25.2	57.9	40.3	40.7
Incr Delay (d2), s/veh	38.4	3.5	0.0	16.5	8.0	4.4	0.9	2.4	1.1	0.2	21.9	23.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.5	4.3	0.0	7.7	3.9	2.4	4.4	21.2	6.6	2.2	42.2	45.0
LnGrp Delay(d),s/veh	107.3	73.9	0.0	87.1	81.5	77.1	61.3	34.8	26.2	58.1	62.2	64.2
LnGrp LOS	F	E		F	F	E	E	C	C	E	E	E
Approach Vol, veh/h		305			451			1546			1801	
Approach Delay, s/veh		96.8			84.9			35.3			63.0	
Approach LOS		F			F			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.6	83.8	23.2	20.3	31.7	84.7	27.0	16.6
Change Period (Y+Rc), s	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Max Green Setting (Gmax), s	12.7	77.3	19.3	24.7	11.8	78.2	20.5	23.5
Max Q Clear Time (g_c+I1), s	6.5	44.4	16.4	9.9	10.7	79.3	20.6	9.1
Green Ext Time (p_c), s	0.2	11.0	0.3	1.0	0.0	0.0	0.0	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	57.5
HCM 2010 LOS	E

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	2	12	2	27	3	1138	45	58	1577	46
Future Vol, veh/h	7	0	2	12	2	27	3	1138	45	58	1577	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	140	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	2	13	2	29	3	1237	49	63	1714	50

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2491	3157	882	2251	3158	643	1764	0	0	1286	0	0
Stage 1	1865	1865	-	1268	1268	-	-	-	-	-	-	-
Stage 2	626	1292	-	983	1890	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	15	11	289	23	10	416	350	-	-	535	-	-
Stage 1	75	121	-	178	238	-	-	-	-	-	-	-
Stage 2	439	232	-	267	117	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	10	10	289	21	9	416	350	-	-	535	-	-
Mov Cap-2 Maneuver	10	10	-	21	9	-	-	-	-	-	-	-
Stage 1	74	107	-	176	236	-	-	-	-	-	-	-
Stage 2	401	230	-	234	103	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 537.5	135.1	0	0.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	350	-	-	13	21	101	535	-	-
HCM Lane V/C Ratio	0.009	-	-	0.753	0.621	0.312	0.118	-	-
HCM Control Delay (s)	15.4	-	-	-$ 537.5	$ 326.1	56	12.6	-	-
HCM Lane LOS	C	-	-	F	F	F	B	-	-
HCM 95th %tile Q(veh)	0	-	-	1.7	1.8	1.2	0.4	-	-

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

Intersection	
Int Delay, s/veh	43.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	43	0	65	1	1	1	63	1246	1	0	1655	95
Future Vol, veh/h	43	0	65	1	1	1	63	1246	1	0	1655	95
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	None	-	-	None
Storage Length	150	-	0	-	-	0	100	-	-	75	-	135
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	47	0	71	1	1	1	68	1354	1	0	1799	103

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2613	-	900	2391	3393	678	1902	0	0	1355	0	0
Stage 1	1799	-	-	1491	1491	-	-	-	-	-	-	-
Stage 2	814	-	-	900	1902	-	-	-	-	-	-	-
Critical Hdwy	7.54	-	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	-	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 12	0	282	18	7	395	309	-	-	504	-	-
Stage 1	83	0	-	129	185	-	-	-	-	-	-	-
Stage 2	338	0	-	300	116	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 8	-	282	11	5	395	309	-	-	504	-	-
Mov Cap-2 Maneuver	~ 8	-	-	11	5	-	-	-	-	-	-	-
Stage 1	65	-	-	101	144	-	-	-	-	-	-	-
Stage 2	261	-	-	225	116	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, $	1241.2	$ 454	1	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	309	-	-	8	282	7	395	504	-	-
HCM Lane V/C Ratio	0.222	-	-	5.842	0.251	0.311	0.003	-	-	-
HCM Control Delay (s)	19.9	-	-	$ 3084.1	22	$ 673.9	14.1	0	-	-
HCM Lane LOS	C	-	-	F	C	F	B	A	-	-
HCM 95th %tile Q(veh)	0.8	-	-	7.3	1	0.7	0	0	-	-

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

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	9	9	0	56	3	1132	27	84	1563	8
Future Vol, veh/h	7	0	9	9	0	56	3	1132	27	84	1563	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	None	-	-	None
Storage Length	-	-	-	-	-	75	100	-	-	100	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	10	10	0	61	3	1230	29	91	1699	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2502	3146	850	2283	3141	630	1708	0	0	1259	0	0
Stage 1	1881	1881	-	1251	1251	-	-	-	-	-	-	-
Stage 2	621	1265	-	1032	1890	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	15	11	304	21	11	424	368	-	-	548	-	-
Stage 1	73	119	-	183	242	-	-	-	-	-	-	-
Stage 2	442	239	-	249	117	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	11	9	304	18	9	424	368	-	-	548	-	-
Mov Cap-2 Maneuver	11	9	-	18	9	-	-	-	-	-	-	-
Stage 1	72	99	-	182	240	-	-	-	-	-	-	-
Stage 2	375	237	-	201	98	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 322.7	60.8	0	0.7
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	368	-	-	24	18	424	548	-	-
HCM Lane V/C Ratio	0.009	-	-	0.725	0.543	0.144	0.167	-	-
HCM Control Delay (s)	14.9	-	-	-$ 322.7	$ 346.1	14.9	12.9	-	-
HCM Lane LOS	B	-	-	F	F	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	2.2	1.5	0.5	0.6	-	-

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

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	26	16	0	8	13	1255	48	3	1640	28
Future Vol, veh/h	2	1	26	16	0	8	13	1255	48	3	1640	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	None	-	-	None
Storage Length	-	-	-	-	-	75	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	1	28	17	0	9	14	1364	52	3	1783	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2514	3248	907	2316	3237	708	1813	0	0	1416	0	0
Stage 1	1804	1804	-	1418	1418	-	-	-	-	-	-	-
Stage 2	710	1444	-	898	1819	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	14	9	279	20	9	377	335	-	-	477	-	-
Stage 1	82	130	-	144	201	-	-	-	-	-	-	-
Stage 2	391	195	-	301	127	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	13	9	279	~ 16	9	377	335	-	-	477	-	-
Mov Cap-2 Maneuver	13	9	-	~ 16	9	-	-	-	-	-	-	-
Stage 1	79	129	-	138	193	-	-	-	-	-	-	-
Stage 2	366	187	-	267	126	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	75.3	$ 392.9	0.2	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	335	-	-	81	16	377	477	-	-
HCM Lane V/C Ratio	0.042	-	-	0.389	1.087	0.023	0.007	-	-
HCM Control Delay (s)	16.2	-	-	75.3	$ 581.9	14.8	12.6	-	-
HCM Lane LOS	C	-	-	F	F	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.5	2.6	0.1	0	-	-

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

Intersection	
Int Delay, s/veh	9.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	67	0	0	87	114	1368	81	101	1904	18
Future Vol, veh/h	2	0	67	0	0	87	114	1368	81	101	1904	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	Free	-	-	None
Storage Length	-	-	-	-	-	0	200	-	150	210	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	73	0	0	95	124	1487	88	110	2070	20

Major/Minor	Minor2		Minor1			Major1				Major2		
Conflicting Flow All	3143	4035	1045	-	-	744	2090	0	-	1487	0	0
Stage 1	2300	2300	-	-	-	-	-	-	-	-	-	-
Stage 2	843	1735	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	6.99	6.54	6.94	-	-	7.14	4.14	-	-	5.34	-	-
Critical Hdwy Stg 1	6.54	5.54	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.67	4.02	3.32	-	-	3.92	2.22	-	-	3.12	-	-
Pot Cap-1 Maneuver	7	3	225	0	0	306	261	-	0	226	-	-
Stage 1	39	72	-	0	0	-	-	-	0	-	-	-
Stage 2	302	140	-	0	0	-	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	~ 2	1	225	-	-	306	261	-	-	226	-	-
Mov Cap-2 Maneuver	~ 2	1	-	-	-	-	-	-	-	-	-	-
Stage 1	20	37	-	-	-	-	-	-	-	-	-	-
Stage 2	110	74	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 394.3	21.9	2.4	1.8
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	261	-	53	306	226	-	-
HCM Lane V/C Ratio	0.475	-	1.415	0.309	0.486	-	-
HCM Control Delay (s)	30.7	-	$ 394.3	21.9	35.1	-	-
HCM Lane LOS	D	-	F	C	E	-	-
HCM 95th %tile Q(veh)	2.4	-	6.9	1.3	2.4	-	-

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

Intersection	
Int Delay, s/veh	66

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	301	248	1549	1768	167
Future Vol, veh/h	0	301	248	1549	1768	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	450	-	-	300
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	327	270	1684	1922	182

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	961	2104	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	5.34	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	3.12	-	-	-
Pot Cap-1 Maneuver	0	~ 220	~ 111	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	~ 220	~ 111	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	282.5	100.9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	~ 111	-	220	-	-
HCM Lane V/C Ratio	2.429	-	1.487	-	-
HCM Control Delay (s)	$ 731.3	-	282.5	-	-
HCM Lane LOS	F	-	F	-	-
HCM 95th %tile Q(veh)	24	-	19.6	-	-

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

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	32	1294	42	0	1679
Future Vol, veh/h	0	32	1294	42	0	1679
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	-	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	35	1407	46	0	1825

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	727	0	0	1453	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	4.14	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	0	366	-	-	462	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	366	-	-	462	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	366	462	-
HCM Lane V/C Ratio	-	-	0.095	-	-
HCM Control Delay (s)	-	-	15.9	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	16	780	14	10	910
Future Vol, veh/h	19	16	780	14	10	910
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	0	-	0	75	-
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	21	17	848	15	11	989

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1365	848	0	0	863	0
Stage 1	848	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	150	360	-	-	777	-
Stage 1	419	-	-	-	-	-
Stage 2	564	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	148	360	-	-	777	-
Mov Cap-2 Maneuver	284	-	-	-	-	-
Stage 1	419	-	-	-	-	-
Stage 2	556	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.2	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	284	360	777	-
HCM Lane V/C Ratio	-	-	0.073	0.048	0.014	-
HCM Control Delay (s)	-	-	18.7	15.5	9.7	-
HCM Lane LOS	-	-	C	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.2	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	162	73	46	153	27	70	513	28	14	348	13
Future Volume (veh/h)	35	162	73	46	153	27	70	513	28	14	348	13
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	38	176	79	50	166	29	76	558	30	15	378	14
Adj No. of Lanes	1	1	1	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	232	340	289	220	340	289	102	1081	58	472	821	30
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.06	0.62	0.62	0.46	0.46	0.46
Sat Flow, veh/h	1183	1863	1583	1120	1863	1583	1774	1752	94	825	1785	66
Grp Volume(v), veh/h	38	176	79	50	166	29	76	0	588	15	0	392
Grp Sat Flow(s),veh/h/ln	1183	1863	1583	1120	1863	1583	1774	0	1846	825	0	1851
Q Serve(g_s), s	1.9	5.5	2.8	2.7	5.2	1.0	2.7	0.0	11.6	0.7	0.0	9.4
Cycle Q Clear(g_c), s	7.1	5.5	2.8	8.3	5.2	1.0	2.7	0.0	11.6	2.1	0.0	9.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.05	1.00		0.04
Lane Grp Cap(c), veh/h	232	340	289	220	340	289	102	0	1139	472	0	851
V/C Ratio(X)	0.16	0.52	0.27	0.23	0.49	0.10	0.75	0.00	0.52	0.03	0.00	0.46
Avail Cap(c_a), veh/h	327	490	417	310	490	417	177	0	1139	472	0	851
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.0	24.0	22.8	27.7	23.8	22.1	30.2	0.0	7.0	10.4	0.0	12.0
Incr Delay (d2), s/veh	0.3	1.2	0.5	0.5	1.1	0.1	10.3	0.0	1.7	0.1	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	3.0	1.3	0.9	2.8	0.4	1.6	0.0	6.4	0.2	0.0	5.2
LnGrp Delay(d),s/veh	27.4	25.2	23.3	28.2	24.9	22.3	40.5	0.0	8.7	10.6	0.0	13.8
LnGrp LOS	C	C	C	C	C	C	D		A	B		B
Approach Vol, veh/h		293			245			664			407	
Approach Delay, s/veh		25.0			25.3			12.3			13.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		46.6		18.4	10.2	36.4		18.4
Change Period (Y+Rc), s		6.5		6.5	6.5	6.5		6.5
Max Green Setting (Gmax), s		34.9		17.1	6.5	21.9		17.1
Max Q Clear Time (g_c+I1), s		13.6		9.1	4.7	11.4		10.3
Green Ext Time (p_c), s		7.2		1.8	0.0	4.9		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	16.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2	0	317	0	85	0	1242	155	74	700	2
Future Volume (vph)	0	2	0	317	0	85	0	1242	155	74	700	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.5		6.5	6.5	6.5		6.5	6.5	6.5	6.5	
Lane Util. Factor		1.00		0.95	0.95	1.00		0.95	1.00	1.00	0.95	
Frt		1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1863		1681	1681	1583		3539	1583	1770	3538	
Flt Permitted		1.00		0.95	0.39	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1863		1681	687	1583		3539	1583	1770	3538	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2	0	345	0	92	0	1350	168	80	761	2
RTOR Reduction (vph)	0	0	0	0	0	58	0	0	29	0	0	0
Lane Group Flow (vph)	0	2	0	172	173	34	0	1350	139	80	763	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	2 3	1	6	
Permitted Phases						8						
Actuated Green, G (s)		3.8		48.8	59.1	59.1		69.8	118.6	11.6	87.9	
Effective Green, g (s)		3.8		48.8	59.1	59.1		69.8	118.6	11.6	87.9	
Actuated g/C Ratio		0.02		0.30	0.37	0.37		0.44	0.74	0.07	0.55	
Clearance Time (s)		6.5		6.5	6.5	6.5		6.5		6.5	6.5	
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		44		512	556	584		1543	1173	128	1943	
v/s Ratio Prot		0.00		c0.10	0.09			c0.38	0.09	c0.05	0.22	
v/s Ratio Perm					c0.02	0.02						
v/c Ratio		0.05		0.34	0.31	0.06		0.87	0.12	0.62	0.39	
Uniform Delay, d1		76.3		43.1	35.9	32.5		41.1	5.9	72.1	20.7	
Progression Factor		1.00		1.00	1.00	1.00		1.44	2.03	1.00	1.00	
Incremental Delay, d2		0.4		0.4	0.3	0.0		6.8	0.0	9.2	0.6	
Delay (s)		76.8		43.4	36.3	32.6		66.0	11.9	81.2	21.3	
Level of Service		E		D	D	C		E	B	F	C	
Approach Delay (s)		76.8			38.3			60.0			27.0	
Approach LOS		E			D			E			C	

Intersection Summary			
HCM 2000 Control Delay	46.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	49	44	64	35	72	36	1176	39	35	607	41
Future Volume (veh/h)	46	49	44	64	35	72	36	1176	39	35	607	41
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	50	53	0	70	38	78	39	1278	42	38	660	45
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	64	77	65	141	46	95	296	2382	78	49	1821	124
Arrive On Green	0.04	0.04	0.00	0.08	0.09	0.09	0.17	0.69	0.69	0.03	0.55	0.55
Sat Flow, veh/h	1757	1845	1568	1757	540	1109	1757	3463	114	1757	3330	227
Grp Volume(v), veh/h	50	53	0	70	0	116	39	646	674	38	347	358
Grp Sat Flow(s),veh/h/ln	1757	1845	1568	1757	0	1649	1757	1752	1825	1757	1752	1805
Q Serve(g_s), s	4.5	4.5	0.0	6.1	0.0	11.1	3.0	29.2	29.3	3.4	17.9	17.9
Cycle Q Clear(g_c), s	4.5	4.5	0.0	6.1	0.0	11.1	3.0	29.2	29.3	3.4	17.9	17.9
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.06	1.00		0.13
Lane Grp Cap(c), veh/h	64	77	65	141	0	141	296	1205	1255	49	958	987
V/C Ratio(X)	0.78	0.69	0.00	0.50	0.00	0.82	0.13	0.54	0.54	0.78	0.36	0.36
Avail Cap(c_a), veh/h	126	236	201	170	0	253	296	1205	1255	115	958	987
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	76.4	75.6	0.0	70.5	0.0	72.0	56.6	12.4	12.4	77.3	20.5	20.5
Incr Delay (d2), s/veh	18.2	10.4	0.0	2.7	0.0	11.2	0.2	1.7	1.7	22.7	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.5	0.0	3.1	0.0	5.5	1.5	14.6	15.2	2.0	9.0	9.2
LnGrp Delay(d),s/veh	94.7	86.0	0.0	73.2	0.0	83.2	56.8	14.1	14.0	100.0	21.5	21.5
LnGrp LOS	F	F		E		F	E	B	B	F	C	C
Approach Vol, veh/h		103			186			1359			743	
Approach Delay, s/veh		90.2			79.4			15.3			25.5	
Approach LOS		F			E			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	116.5	19.3	13.2	33.5	94.0	12.3	20.2
Change Period (Y+Rc), s	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Max Green Setting (Gmax), s	10.5	87.5	15.5	20.5	10.5	87.5	11.5	24.5
Max Q Clear Time (g_c+I1), s	5.4	31.3	8.1	6.5	5.0	19.9	6.5	13.1
Green Ext Time (p_c), s	0.0	12.7	0.5	0.1	1.0	4.9	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	26.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	8	8	26	5	37	19	1244	30	50	744	36
Future Volume (veh/h)	23	8	8	26	5	37	19	1244	30	50	744	36
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1900	1845	1845	1900	1845	1845	1845	1845	1845	1845
Adj Flow Rate, veh/h	25	9	9	28	5	40	21	1352	33	54	809	39
Adj No. of Lanes	1	1	0	1	1	0	1	2	1	1	2	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
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	36	25	25	55	7	56	338	1971	882	391	2076	929
Arrive On Green	0.02	0.03	0.03	0.03	0.04	0.04	0.19	0.56	0.56	0.22	0.59	0.59
Sat Flow, veh/h	1757	848	848	1757	177	1417	1757	3505	1568	1757	3505	1568
Grp Volume(v), veh/h	25	0	18	28	0	45	21	1352	33	54	809	39
Grp Sat Flow(s),veh/h/ln	1757	0	1695	1757	0	1595	1757	1752	1568	1757	1752	1568
Q Serve(g_s), s	2.4	0.0	1.8	2.6	0.0	4.7	1.6	46.2	1.6	4.1	20.6	1.7
Cycle Q Clear(g_c), s	2.4	0.0	1.8	2.6	0.0	4.7	1.6	46.2	1.6	4.1	20.6	1.7
Prop In Lane	1.00		0.50	1.00		0.89	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	36	0	50	55	0	63	338	1971	882	391	2076	929
V/C Ratio(X)	0.69	0.00	0.36	0.51	0.00	0.71	0.06	0.69	0.04	0.14	0.39	0.04
Avail Cap(c_a), veh/h	89	0	252	89	0	166	338	1971	882	391	2076	929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.79	0.79	0.79	1.00	1.00	1.00
Uniform Delay (d), s/veh	81.8	0.0	80.0	80.1	0.0	79.7	55.4	26.2	16.4	52.4	18.2	14.3
Incr Delay (d2), s/veh	21.3	0.0	4.4	7.3	0.0	13.5	0.1	1.6	0.1	0.2	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.9	1.4	0.0	2.3	0.8	22.8	0.7	2.0	10.0	0.8
LnGrp Delay(d),s/veh	103.0	0.0	84.4	87.4	0.0	93.2	55.5	27.7	16.5	52.6	18.7	14.4
LnGrp LOS	F		F	F		F	E	C	B	D	B	B
Approach Vol, veh/h		43			73			1406			902	
Approach Delay, s/veh		95.2			91.0			27.9			20.5	
Approach LOS		F			F			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	43.9	101.0	11.7	11.4	38.9	106.0	9.9	13.2
Change Period (Y+Rc), s	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Max Green Setting (Gmax), s	13.5	94.5	8.5	25.0	8.5	99.5	8.5	17.5
Max Q Clear Time (g_c+I1), s	6.1	48.2	4.6	3.8	3.6	22.6	4.4	6.7
Green Ext Time (p_c), s	0.1	13.0	0.0	0.0	0.0	6.2	0.0	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	28.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	209	35	82	148	42	16	31	1084	81	21	721	19
Future Volume (veh/h)	209	35	82	148	42	16	31	1084	81	21	721	19
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	227	38	0	161	46	17	34	1178	88	23	784	21
Adj No. of Lanes	1	1	1	2	1	1	1	2	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	252	63	53	503	71	60	44	1522	681	389	2201	59
Arrive On Green	0.14	0.03	0.00	0.15	0.04	0.04	0.02	0.43	0.43	0.22	0.63	0.63
Sat Flow, veh/h	1757	1845	1568	3408	1845	1568	1757	3505	1568	1757	3487	93
Grp Volume(v), veh/h	227	38	0	161	46	17	34	1178	88	23	394	411
Grp Sat Flow(s),veh/h/ln	1757	1845	1568	1704	1845	1568	1757	1752	1568	1757	1752	1828
Q Serve(g_s), s	20.3	3.3	0.0	6.8	3.9	1.7	3.1	45.8	5.4	1.7	17.1	17.1
Cycle Q Clear(g_c), s	20.3	3.3	0.0	6.8	3.9	1.7	3.1	45.8	5.4	1.7	17.1	17.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	252	63	53	503	71	60	44	1522	681	389	1106	1154
V/C Ratio(X)	0.90	0.61	0.00	0.32	0.65	0.28	0.78	0.77	0.13	0.06	0.36	0.36
Avail Cap(c_a), veh/h	368	496	421	503	271	230	107	1522	681	389	1106	1154
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.97	0.97
Uniform Delay (d), s/veh	67.4	76.2	0.0	61.0	75.9	74.8	77.6	38.6	27.1	49.1	14.0	14.0
Incr Delay (d2), s/veh	18.5	9.2	0.0	0.4	9.7	2.5	25.2	3.9	0.4	0.1	0.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.2	1.8	0.0	3.2	2.2	0.8	1.8	22.9	2.4	0.8	8.5	8.8
LnGrp Delay(d),s/veh	85.9	85.4	0.0	61.4	85.6	77.3	102.8	42.4	27.5	49.2	14.9	14.9
LnGrp LOS	F	F		E	F	E	F	D	C	D	B	B
Approach Vol, veh/h		265			224			1300			828	
Approach Delay, s/veh		85.8			67.5			43.0			15.8	
Approach LOS		F			E			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	41.9	76.0	30.1	11.9	10.5	107.5	29.4	12.6
Change Period (Y+Rc), s	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Max Green Setting (Gmax), s	7.5	69.5	14.0	43.0	9.7	67.3	33.5	23.5
Max Q Clear Time (g_c+I1), s	3.7	47.8	8.8	5.3	5.1	19.1	22.3	5.9
Green Ext Time (p_c), s	0.1	8.6	0.6	0.2	0.0	5.2	0.6	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	40.9
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	0	2	17	3	67	5	1245	23	39	862	24
Future Vol, veh/h	6	0	2	17	3	67	5	1245	23	39	862	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	75	-	-	140	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	2	18	3	73	5	1353	25	42	937	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1722	2422	482	1929	2423	689	963	0	0	1378	0	0
Stage 1	1034	1034	-	1376	1376	-	-	-	-	-	-	-
Stage 2	688	1388	-	553	1047	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	57	32	530	40	32	388	711	-	-	493	-	-
Stage 1	248	308	-	153	211	-	-	-	-	-	-	-
Stage 2	403	208	-	485	303	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	39	29	530	37	29	388	711	-	-	493	-	-
Mov Cap-2 Maneuver	39	29	-	37	29	-	-	-	-	-	-	-
Stage 1	246	282	-	152	210	-	-	-	-	-	-	-
Stage 2	320	207	-	442	277	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	89.6	54.5	0	0.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	711	-	-	51	37	254	493	-	-
HCM Lane V/C Ratio	0.008	-	-	0.171	0.499	0.3	0.086	-	-
HCM Control Delay (s)	10.1	-	-	89.6	175.5	25.1	13	-	-
HCM Lane LOS	B	-	-	F	F	D	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	1.7	1.2	0.3	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	0	39	1	1	1	89	1297	0	0	906	87
Future Vol, veh/h	31	0	39	1	1	1	89	1297	0	0	906	87
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	None	-	-	None
Storage Length	150	-	0	-	-	0	100	-	-	75	-	135
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	0	42	1	1	1	97	1410	0	0	985	95

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1885	-	493	2097	2684	705	1080	0	0	1410	0	0
Stage 1	985	-	-	1604	1604	-	-	-	-	-	-	-
Stage 2	900	-	-	493	1080	-	-	-	-	-	-	-
Critical Hdwy	7.54	-	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	-	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	43	0	522	30	22	379	641	-	-	480	-	-
Stage 1	266	0	-	110	163	-	-	-	-	-	-	-
Stage 2	300	0	-	526	293	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	36	-	522	24	19	379	641	-	-	480	-	-
Mov Cap-2 Maneuver	36	-	-	24	19	-	-	-	-	-	-	-
Stage 1	226	-	-	93	138	-	-	-	-	-	-	-
Stage 2	252	-	-	483	293	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	138.2	135	0.7	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	641	-	-	36	522	21	379	480	-	-
HCM Lane V/C Ratio	0.151	-	-	0.936	0.081	0.104	0.003	-	-	-
HCM Control Delay (s)	11.6	-	-	296.3	12.5	195.3	14.5	0	-	-
HCM Lane LOS	B	-	-	F	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	3.4	0.3	0.3	0	0	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	1	13	0	87	15	1255	7	38	864	16
Future Vol, veh/h	1	1	1	13	0	87	15	1255	7	38	864	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	None	-	-	None
Storage Length	-	-	-	-	-	75	100	-	-	100	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	1	14	0	95	16	1364	8	41	939	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1735	2425	470	1952	2438	686	956	0	0	1372	0	0
Stage 1	1021	1021	-	1400	1400	-	-	-	-	-	-	-
Stage 2	714	1404	-	552	1038	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	56	32	540	38	31	390	715	-	-	496	-	-
Stage 1	253	312	-	148	205	-	-	-	-	-	-	-
Stage 2	388	204	-	486	306	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	39	29	540	34	28	390	715	-	-	496	-	-
Mov Cap-2 Maneuver	39	29	-	34	28	-	-	-	-	-	-	-
Stage 1	247	286	-	145	200	-	-	-	-	-	-	-
Stage 2	287	200	-	443	281	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	85.4	37.3	0.1	0.5
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	715	-	-	48	34	390	496	-	-
HCM Lane V/C Ratio	0.023	-	-	0.068	0.416	0.242	0.083	-	-
HCM Control Delay (s)	10.2	-	-	85.4	172	17.2	12.9	-	-
HCM Lane LOS	B	-	-	F	F	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	1.4	0.9	0.3	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	16	6	1	0	1	1342	10	2	779	31
Future Vol, veh/h	2	0	16	6	1	0	1	1342	10	2	779	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	17	7	1	0	1	1459	11	2	847	34

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1600	2340	441	1895	2352	735	881	0	0	1470	0	0
Stage 1	868	868	-	1467	1467	-	-	-	-	-	-	-
Stage 2	732	1472	-	428	885	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	71	36	564	42	35	362	763	-	-	455	-	-
Stage 1	314	368	-	134	190	-	-	-	-	-	-	-
Stage 2	379	189	-	575	361	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	69	36	564	41	35	362	763	-	-	455	-	-
Mov Cap-2 Maneuver	69	36	-	41	35	-	-	-	-	-	-	-
Stage 1	314	367	-	134	190	-	-	-	-	-	-	-
Stage 2	376	189	-	555	360	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.2	115	0	0
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	763	-	-	314	40	-	455	-	-
HCM Lane V/C Ratio	0.001	-	-	0.062	0.19	-	0.005	-	-
HCM Control Delay (s)	9.7	-	-	17.2	115	0	13	-	-
HCM Lane LOS	A	-	-	C	F	A	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.6	-	0	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1	45	1	3	100	47	1134	71	55	857	12
Future Vol, veh/h	0	1	45	1	3	100	47	1134	71	55	857	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Stop	-	-	Free	-	-	None
Storage Length	-	-	-	-	-	0	200	-	150	210	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	1	49	1	3	109	51	1233	77	60	932	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1656	2394	473	1922	2400	617	945	0	-	1233	0	0
Stage 1	1059	1059	-	1335	1335	-	-	-	-	-	-	-
Stage 2	597	1335	-	587	1065	-	-	-	-	-	-	-
Critical Hdwy	7.01	6.56	6.96	7.01	6.56	7.16	4.16	-	-	5.36	-	-
Critical Hdwy Stg 1	6.56	5.56	-	7.36	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.76	5.56	-	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.68	4.03	3.33	3.68	4.03	3.93	2.23	-	-	3.13	-	-
Pot Cap-1 Maneuver	81	33	535	53	32	369	716	-	0	299	-	-
Stage 1	233	297	-	117	219	-	-	-	0	-	-	-
Stage 2	426	219	-	446	295	-	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	41	24	535	37	24	369	716	-	-	299	-	-
Mov Cap-2 Maneuver	41	24	-	37	24	-	-	-	-	-	-	-
Stage 1	216	237	-	109	203	-	-	-	-	-	-	-
Stage 2	275	203	-	322	236	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.4	18.8	0.4	1.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	716	-	366	369	299	-	-
HCM Lane V/C Ratio	0.071	-	0.137	0.295	0.2	-	-
HCM Control Delay (s)	10.4	-	16.4	18.8	20	-	-
HCM Lane LOS	B	-	C	C	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.5	1.2	0.7	-	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	231	281	1251	727	182
Future Vol, veh/h	0	231	281	1251	727	182
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	450	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	251	305	1360	790	198

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	395	988	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	5.36	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	3.13	-	-	-
Pot Cap-1 Maneuver	0	514	394	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	514	394	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.5	7.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	394	-	514	-	-
HCM Lane V/C Ratio	0.775	-	0.488	-	-
HCM Control Delay (s)	39.4	-	18.5	-	-
HCM Lane LOS	E	-	C	-	-
HCM 95th %tile Q(veh)	6.5	-	2.7	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	8	1277	28	0	779
Future Vol, veh/h	0	8	1277	28	0	779
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	75	-	-	-	-
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	9	1388	30	0	847

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1827	709	0	0	-	-
Stage 1	1403	-	-	-	-	-
Stage 2	424	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	-	-
Pot Cap-1 Maneuver	68	377	-	-	0	-
Stage 1	193	-	-	-	0	-
Stage 2	628	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	68	377	-	-	-	-
Mov Cap-2 Maneuver	155	-	-	-	-	-
Stage 1	193	-	-	-	-	-
Stage 2	628	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	-	377	-
HCM Lane V/C Ratio	-	-	-	0.023	-
HCM Control Delay (s)	-	-	0	14.8	-
HCM Lane LOS	-	-	A	B	-
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	10	820	29	9	544
Future Vol, veh/h	16	10	820	29	9	544
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	0	-	0	75	-
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	17	11	891	32	10	591

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1207	891	0	0	923	0
Stage 1	891	-	-	-	-	-
Stage 2	316	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	189	340	-	-	738	-
Stage 1	400	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	186	340	-	-	738	-
Mov Cap-2 Maneuver	308	-	-	-	-	-
Stage 1	400	-	-	-	-	-
Stage 2	703	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.8	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	308	340	738	-
HCM Lane V/C Ratio	-	-	0.056	0.032	0.013	-
HCM Control Delay (s)	-	-	17.4	15.9	9.9	-
HCM Lane LOS	-	-	C	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0	-

Appendix D
Stewart St Roundabout Level of Service Analysis

MOVEMENT SUMMARY

Site: S. Carson & Stewart Street - AM 2040

New Site
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: S. Carson Street											
8	T1	985	3.0	0.909	29.5	LOS D	23.1	591.9	0.45	0.13	23.3
18	R2	692	3.0	0.443	0.1	LOS A	0.0	0.0	0.00	0.00	33.0
Approach		1677	3.0	0.909	17.4	LOS C	23.1	591.9	0.27	0.07	26.5
East: Stewart Street											
1	L2	221	3.0	0.590	24.2	LOS C	2.7	70.3	0.80	0.92	23.7
16	R2	14	3.0	0.590	24.2	LOS C	2.7	70.3	0.80	0.92	23.3
Approach		235	3.0	0.590	24.2	LOS C	2.7	70.3	0.80	0.92	23.6
North: S. Carson Street											
7	L2	12	3.0	0.243	6.7	LOS A	1.0	24.7	0.39	0.29	30.3
4	T1	650	3.0	0.243	2.1	LOS A	1.0	24.7	0.12	0.09	32.4
Approach		662	3.0	0.243	2.2	LOS A	1.0	24.7	0.12	0.09	32.4
All Vehicles		2574	3.0	0.909	14.1	LOS B	23.1	591.9	0.28	0.16	27.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: S. Carson & Stewart Street - PM 2040

New Site
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: S. Carson Street											
8	T1	915	3.0	0.849	22.9	LOS C	14.6	373.9	0.36	0.12	24.5
18	R2	388	3.0	0.248	0.0	LOS A	0.0	0.0	0.00	0.00	32.6
Approach		1303	3.0	0.849	16.1	LOS C	14.6	373.9	0.27	0.09	26.5
East: Stewart Street											
1	L2	651	3.0	1.579	295.3	LOS F	86.9	2224.3	1.00	4.87	6.1
16	R2	24	3.0	1.579	295.3	LOS F	86.9	2224.3	1.00	4.87	6.1
Approach		675	3.0	1.579	295.3	LOS F	86.9	2224.3	1.00	4.87	6.1
North: S. Carson Street											
7	L2	17	3.0	0.428	10.9	LOS B	2.0	50.8	0.59	0.61	28.1
4	T1	1079	3.0	0.428	3.0	LOS A	2.0	50.8	0.16	0.16	31.4
Approach		1097	3.0	0.428	3.1	LOS A	2.0	50.8	0.16	0.17	31.3
All Vehicles		3075	3.0	1.579	72.8	LOS F	86.9	2224.3	0.39	1.17	15.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: S. Carson & Stewart Street (2 Lane RAB) - AM 2040

New Site
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: S. Carson Street											
3	T1	991	3.0	0.913	30.0	LOS D	24.3	622.5	0.42	0.11	23.1
18	R2	598	3.0	0.362	0.1	LOS A	0.0	0.0	0.00	0.00	33.0
Approach		1589	3.0	0.913	18.8	LOS C	24.3	622.5	0.26	0.07	26.0
East: Stewart Street											
1	L2	218	3.0	0.292	14.3	LOS B	1.0	25.6	0.71	0.73	26.4
16	R2	12	3.0	0.292	14.3	LOS B	1.0	25.6	0.71	0.73	25.9
Approach		230	3.0	0.292	14.3	LOS B	1.0	25.6	0.71	0.73	26.3
North: S. Carson Street											
7	L2	10	3.0	0.243	6.6	LOS A	1.0	24.7	0.38	0.29	30.4
4	T1	652	3.0	0.243	2.1	LOS A	1.0	24.7	0.12	0.09	32.4
Approach		662	3.0	0.243	2.2	LOS A	1.0	24.7	0.12	0.09	32.4
All Vehicles		2482	3.0	0.913	13.9	LOS B	24.3	622.5	0.27	0.14	27.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: S. Carson & Stewart Street (2 Lane RAB) - PM 2040

New Site
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: S. Carson Street											
8	T1	915	3.0	0.649	22.9	LOS C	14.6	373.9	0.38	0.12	24.5
18	R2	388	3.0	0.248	0.0	LOS A	0.0	0.0	0.00	0.00	32.6
Approach		1303	3.0	0.649	16.1	LOS C	14.6	373.9	0.27	0.09	26.5
East: Stewart Street											
1	L2	651	3.0	0.790	37.4	LOS E	5.2	132.8	0.87	1.11	20.5
16	R2	24	3.0	0.790	37.4	LOS E	5.2	132.8	0.87	1.11	20.3
Approach		675	3.0	0.790	37.4	LOS E	5.2	132.8	0.87	1.11	20.5
North: S. Carson Street											
7	L2	17	3.0	0.456	14.0	LOS B	2.1	52.8	0.67	0.73	27.0
4	T1	1079	3.0	0.456	3.1	LOS A	2.1	52.8	0.15	0.16	31.3
Approach		1097	3.0	0.456	3.3	LOS A	2.1	52.8	0.16	0.17	31.2
All Vehicles		3075	3.0	0.649	16.2	LOS C	14.6	373.9	0.36	0.34	26.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Stewart Street / S. Carson Street Roundabout Design Concept - 30% Design

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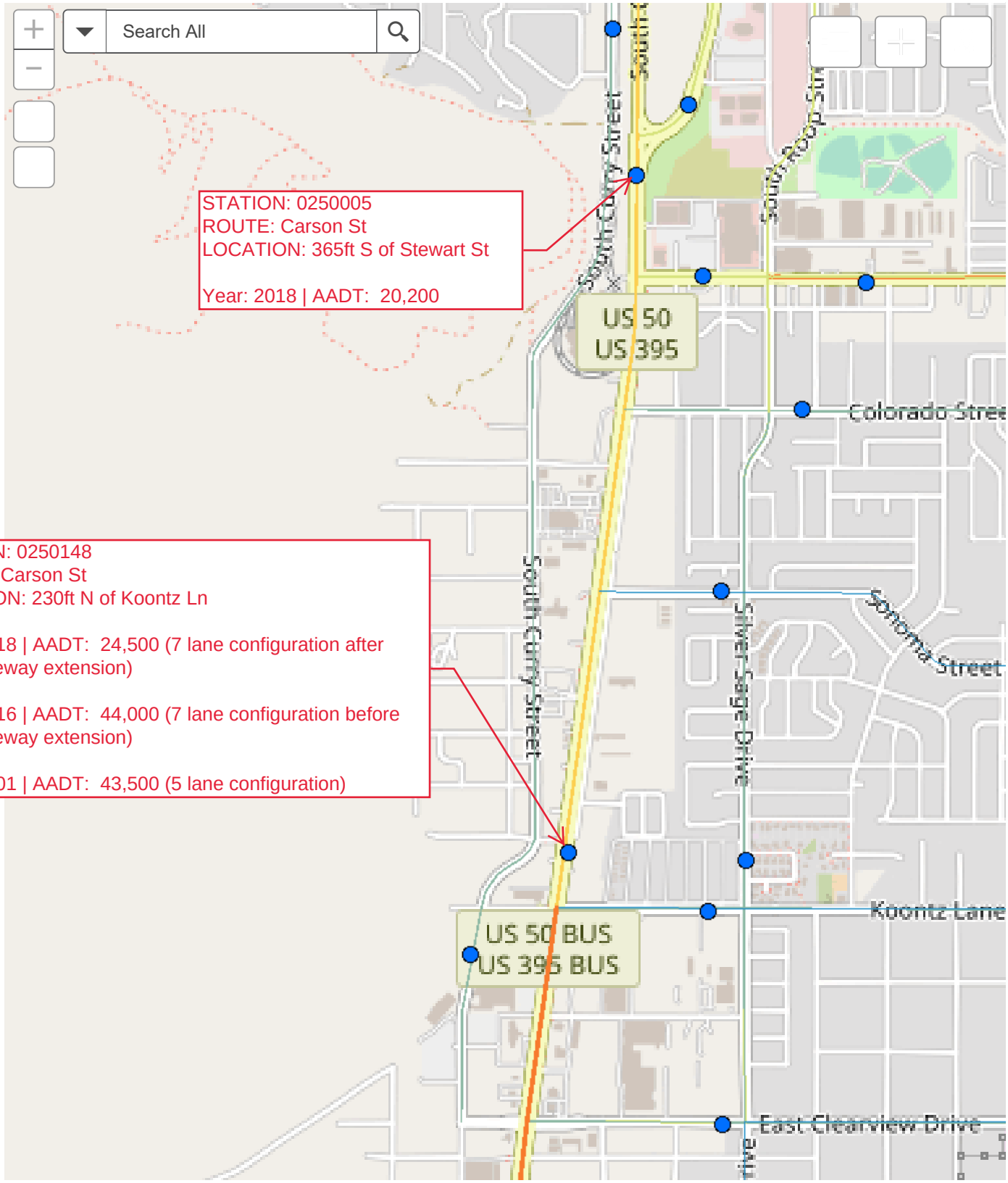
Exhibit-2: 2018 NDOT Traffic Counts (TRINA), South Carson Street

TRINA Traffic Information Systems



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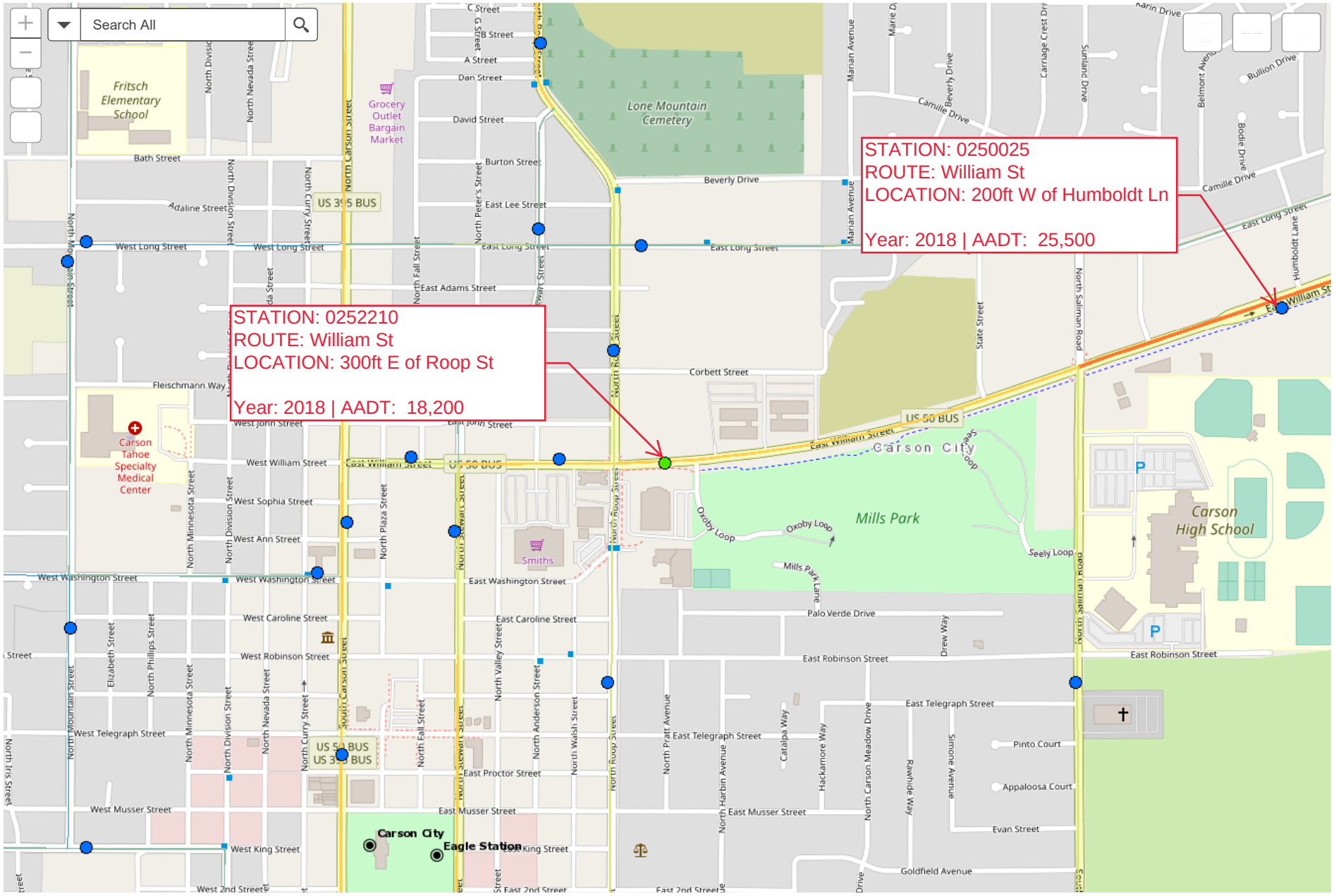
TRINA Traffic Information Systems

Exhibit-3: 2018 NDOT Traffic Counts (TRINA), William Street



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