Scenario Summary Report
Scenario: MDD

Scenario Summary

ID	81
Label	MDD
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	ADD
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	MAX DAY
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary

Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (ft/s)
E-01	17	EJ-01	EH-1	135.0	0.0	0.00
E-02	185	EJ-01	EJ-02	135.0	0.0	0.00
E-03	108	EJ-02	J-01	135.0	266.3	3.02
E-04	108	J-01	EJ-03	135.0	615.7	3.93
E-05	13	EJ-03	EH-2	135.0	0.0	0.00
E-06	31	EJ-03	EJ-04	135.0	615.7	3.93
E-07	243	EJ-04	EJ-06	135.0	615.7	3.93
E-08	40	EH-3	EJ-05	135.0	0.0	0.00
E-09	139	EJ-05	EJ-06	135.0	0.0	0.00
E-10	13	EJ-06	EJ-07	135.0	615.7	3.93
E-11	29	EJ-07	EH-4	135.0	419.5	4.76
E-12	186	EJ-07	J-04	135.0	196.2	1.25
E-13	73	J-04	J-05	135.0	196.2	1.25
E-14	212	J-05	EJ-08	135.0	196.2	1.25
E-15	30	EJ-08	EJ-09	135.0	196.2	1.25
E-16	31	EJ-09	EH-5	135.0	0.0	0.00
P-1	73	J-01	J-02	135.0	882.0	5.63
P-2	99	J-02	J-03	135.0	0.0	0.00
P-3	21	J-03	H-1	135.0	0.0	0.00
P-4	47	J-05	H-2	135.0	0.0	0.00
P-199	149	R-3	EJ-02	135.0	266.3	3.02
P-200	156	R-2	EJ-09	135.0	196.2	2.23
RP-1	171	R-1	EH-4	135.0	419.5	2.68

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
EJ-01	4,655.70	0.0	4,880.58	97
EJ-02	4,656.70	0.0	4,880.58	97
EJ-03	4,656.30	0.0	4,880.69	97
EJ-04	4,656.30	0.0	4,880.90	97
EJ-05	4,655.90	0.0	4,882.59	98
EJ-06	4,655.50	0.0	4,882.59	98
EJ-07	4,655.40	0.0	4,882.68	98
EJ-08	4,654.00	0.0	4,883.07	99
EJ-09	4,653.90	0.0	4,883.10	99
J-01	4,656.50	0.0	4,879.94	97
J-02	4,656.50	882.0	4,878.95	96
J-03	4,656.50	0.0	4,878.95	96
J-04	4,654.70	0.0	4,882.83	99
J-05	4,654.40	0.0	4,882.89	99

Scenario Summary Report
Scenario: MDD plus FF

Scenario Summary	
ID	82
Label	MDD plus FF
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	ADD
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	MAX DAY PLUS FIRE
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary			
Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Fire Flow

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (ft/s)
E-01	17	EJ-01	EH-1	135.0	0.0	0.00
E-02	185	EJ-01	EJ-02	135.0	0.0	0.00
E-03	108	EJ-02	J-01	135.0	266.3	3.02
E-04	108	J-01	EJ-03	135.0	615.7	3.93
E-05	13	EJ-03	EH-2	135.0	0.0	0.00
E-06	31	EJ-03	EJ-04	135.0	615.7	3.93
E-07	243	EJ-04	EJ-06	135.0	615.7	3.93
E-08	40	EH-3	EJ-05	135.0	0.0	0.00
E-09	139	EJ-05	EJ-06	135.0	0.0	0.00
E-10	13	EJ-06	EJ-07	135.0	615.7	3.93
E-11	29	EJ-07	EH-4	135.0	419.5	4.76
E-12	186	EJ-07	J-04	135.0	196.2	1.25
E-13	73	J-04	J-05	135.0	196.2	1.25
E-14	212	J-05	EJ-08	135.0	196.2	1.25
E-15	30	EJ-08	EJ-09	135.0	196.2	1.25
E-16	31	EJ-09	EH-5	135.0	0.0	0.00
P-1	73	J-01	J-02	135.0	882.0	5.63
P-2	99	J-02	J-03	135.0	0.0	0.00
P-3	21	J-03	H-1	135.0	0.0	0.00
P-4	47	J-05	H-2	135.0	0.0	0.00
P-199	149	R-3	EJ-02	135.0	266.3	3.02
P-200	156	R-2	EJ-09	135.0	196.2	2.23
RP-1	171	R-1	EH-4	135.0	419.5	2.68

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
EJ-01	4,655.70	0.0	4,880.58	97
EJ-02	4,656.70	0.0	4,880.58	97
EJ-03	4,656.30	0.0	4,880.69	97
EJ-04	4,656.30	0.0	4,880.90	97
EJ-05	4,655.90	0.0	4,882.59	98
EJ-06	4,655.50	0.0	4,882.59	98
EJ-07	4,655.40	0.0	4,882.68	98
EJ-08	4,654.00	0.0	4,883.07	99
EJ-09	4,653.90	0.0	4,883.10	99
J-01	4,656.50	0.0	4,879.94	97
J-02	4,656.50	882.0	4,878.95	96
J-03	4,656.50	0.0	4,878.95	96
J-04	4,654.70	0.0	4,882.83	99
J-05	4,654.40	0.0	4,882.89	99

Fire Flow Node FlexTable: Fire Flow Report

Label	Elevation (ft)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Residual @ Total Flow Needed) (psi)	Pressure (Calculated Zone Lower Limit @ Total Flow Needed) (psi)	Junction w/ Minimum Pressure (System)	Junction w/ Minimum Pressure (Zone @ Total Flow Needed)
EH-1	4,655.70	2,000.0	2,713.5	20	51	53	EJ-01	EJ-01
EH-2	4,656.30	2,000.0	4,502.3	20	75	76	J-03	J-02
EH-3	4,655.90	2,000.0	4,173.5	20	75	79	EJ-05	EJ-05
EH-4	4,655.40	2,000.0	5,931.0	20	84	83	EH-3	J-02
EH-5	4,653.90	2,000.0	4,301.5	20	77	81	EJ-09	EJ-09
H-1	4,656.50	2,000.0	3,579.3	20	66	68	J-03	J-03
H-2	4,654.40	2,000.0	4,301.3	20	77	82	J-05	J-05
J-04	4,654.70	2,000.0	5,311.6	20	82	83	H-2	H-2

Scenario Summary Report
Scenario: PHD

Scenario Summary

ID	84
Label	PHD
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	ADD
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	PEAK HOUR
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary

Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (Absolute) (gpm)	Velocity (ft/s)
E-01	17	EJ-01	EH-1	135.0	0.0	0.00
E-02	185	EJ-01	EJ-02	135.0	0.0	0.00
E-03	108	EJ-02	J-01	135.0	399.5	4.53
E-04	108	J-01	EJ-03	135.0	923.5	5.89
E-05	13	EJ-03	EH-2	135.0	0.0	0.00
E-06	31	EJ-03	EJ-04	135.0	923.5	5.89
E-07	243	EJ-04	EJ-06	135.0	923.5	5.89
E-08	40	EH-3	EJ-05	135.0	0.0	0.00
E-09	139	EJ-05	EJ-06	135.0	0.0	0.00
E-10	13	EJ-06	EJ-07	135.0	923.5	5.89
E-11	29	EJ-07	EH-4	135.0	629.2	7.14
E-12	186	EJ-07	J-04	135.0	294.4	1.88
E-13	73	J-04	J-05	135.0	294.4	1.88
E-14	212	J-05	EJ-08	135.0	294.4	1.88
E-15	30	EJ-08	EJ-09	135.0	294.4	1.88
E-16	31	EJ-09	EH-5	135.0	0.0	0.00
P-1	73	J-01	J-02	135.0	1,323.0	8.44
P-2	99	J-02	J-03	135.0	0.0	0.00
P-3	21	J-03	H-1	135.0	0.0	0.00
P-4	47	J-05	H-2	135.0	0.0	0.00
P-199	149	R-3	EJ-02	135.0	399.5	4.53
P-200	156	R-2	EJ-09	135.0	294.4	3.34
RP-1	171	R-1	EH-4	135.0	629.2	4.02

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
EJ-01	4,655.70	0.0	4,874.07	94
EJ-02	4,656.70	0.0	4,874.07	94
EJ-03	4,656.30	0.0	4,874.29	94
EJ-04	4,656.30	0.0	4,874.75	95
EJ-05	4,655.90	0.0	4,878.32	96
EJ-06	4,655.50	0.0	4,878.32	96
EJ-07	4,655.40	0.0	4,878.51	97
EJ-08	4,654.00	0.0	4,879.34	97
EJ-09	4,653.90	0.0	4,879.40	98
J-01	4,656.50	0.0	4,872.70	94
J-02	4,656.50	1,323.0	4,870.61	93
J-03	4,656.50	0.0	4,870.61	93
J-04	4,654.70	0.0	4,878.84	97
J-05	4,654.40	0.0	4,878.97	97

APPENDIX B
Fire Flow Data

Fire Flow Test Data Sheet

Location of Test (Street and Cross Street): Stewart and 9th

Address Nearest Residual Hydrant: 901 Stewart St

Test Date: 9/16/2020 Test Time: 0940

Testing Personnel: NT, MT, AM

Pressure Zone: 4880 Main Size: 8"

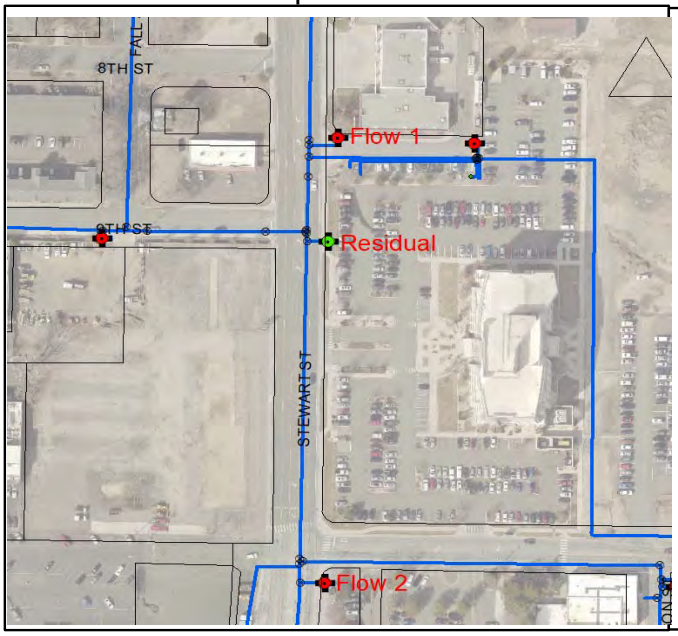
Comments:

Test Results:

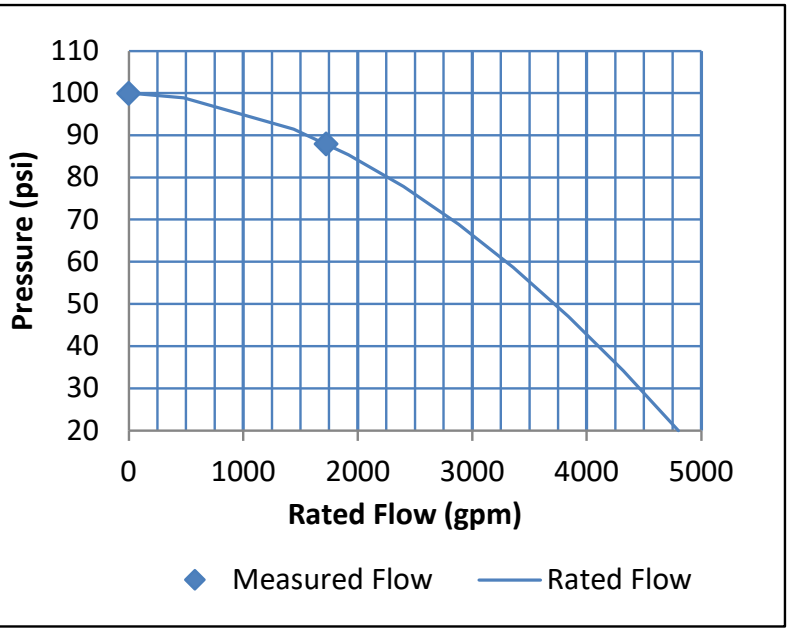
Residual Hydrant	
Static:	100 psi
Residual:	88 psi
Pressure Drop:	12 psi
	12 %

Flow Hydrant(s)	Testing Apparatus	Pitot Pressure (psi)	Discharge Diameter (in)	Outlet Coeff. (c)	Pitot Flow (gpm)
Flow 1	HM1	31	2	1.307	869
Flow 2	HM2	30	2	1.307	854
Flow 3					
				Total	1723

Area Map



Rated Flow



Rated Pressure (for Rated Capacity Calculation) 20 psi

Rated Capacity at 20 psi residual pressure. 4,800 gpm

Based on NFPA 291 - 2019 Edition and APWA Manual 17 - Fourth Edition

Pursuant to NFPA 291, fire flow test data over five years old should not be used.

Hydrant OBJECTID: 1893

Data Sheet File Name: Stewart-Ninth.pdf

APPENDIX C
Fire Flow Requirements

By
PCNA Group Consulting Engineers

PCNA GROUP
CONSULTING ENGINEERS

205 E. WARM SPRINGS RD, STE 105
LAS VEGAS, NEVADA 89119
+1 (702) 834-6200

Ref: *20201130 Fire Flow Requirements LV20033.docx*

PCNA Project # *LV20033*

November 30, 2020

Carson City Fire Department Station 51: Administrative Office
Attn: Dave Ruben, Fire Marshal
777 S. Stewart Street
Carson City, Nevada 89701

Project: **Carson City Wrap Apartments**
906 S. Stewart Street
Carson City, Nevada 89701

Re: **Preliminary Fire Flow Assessment**

Dear Mr. Ruben,

This "Preliminary Fire Flow Assessment" letter has been developed at the request of our client; **Perlman Architects**, to describe the preliminary fire flow design provisions for the proposed; Carson City Wrap Apartments project. Additionally, it requests confirmation as to how your department traditionally applies this data to new development projects.

The following codes & standards are applicable in the jurisdiction of Carson City, Nevada:

- 2018 International Building Code with Northern Nevada Amendments (IBC)
- 2018 International Fire Code with Northern Nevada Amendments (IFC)
- Applicable NFPA Standards (NFPA)

FIRE HYDRANT FLOW TEST RESULTS

The attached Fire Flow Test Data Sheets (by *Manhard Consulting)* contain the available fire flow supply information for two (2) fire hydrants located near the proposed project site.
Based on this test data, the available fire flow from each fire hydrant is summarized below:

NUMBER	LOCATION	FIRE FLOW SUPPLY
1	211 E. 9th Street	6,200 gpm at 20 psi
2	901 S. Stewart Street	4,800 gpm at 20 psi

This information was used to assess the how the available fire flow supply would impact the design requirements with respect to both proposed buildings on this site.

OVERALL PROJECT INFORMATION

The proposed project will consist of the new construction two (2) buildings. The first building will be a 5-story **Apartment Building** (Group R-2) of Type V-A construction with a total area of approximately 400,000 ft^2 (80,000 ft^2/floor). For the purposes of "code application", it will be sub-divided into smaller buildings via Fire Wall assemblies with openings to accommodate maximum allowable areas as based on occupancy group and construction type. The second building will be a 6-tier Group S-2 **Parking Garage Structure** (Group S-2) of Type II-A construction with a total area of approximately 192,000 ft^2 (32,000 ft^2/tier).

PCNA GROUP
CONSULTING ENGINEERS

FIRE FLOW DESIGN ASSESSMENT

The fire flow demand for each building is determined based on the Construction Type and Fire-Flow Calculation Area per IFC Appendix B. IFC Section B103 modifications were not considered because the project site appears to be served by a reliable & constant municipal water supply.

1. APARTMENT BUILDING (GROUP R-2)

The proposed apartment building will be sub-divided by fire walls that will contain openings to allow for pedestrian access between each separate building. Therefore, the fire flow calculation area is equal to the aggregate area of the entire apartment building, which is approx. 400,000 ft^2. For Type V-A construction having a total area of 191,401 ft^2 or more, the base fire flow demand is 8,000 gpm for 4 hours (per IFC Table B105.1(2)). This building will be fully sprinklered per IFC Section 903.3.1.1. As such, the required fire flow demand may be reduced by 50% to **4,000 gpm for 4 hours**, per IFC Table B105.2.

In result, the available fire flow supply indicated as supplied by either fire hydrant appears to satisfy the required fire flow demand for this building.

2. PARKING GARAGE STRUCTURE (GROUP S-2)

The fire flow calculation area is equal to the entire area, which is approx.192,000 ft^2. For Type II-A construction having a total of area of 166,501 ft^2 or more, the base fire flow demand is 6,000 gpm for 4 hours (per IFC Table B105.1(2)). The Open Parking Garage is not anticipated to be sprinklered. As such, the fire flow demand may not be reduced per IFC Table B105.2. As such, the required fire flow demand is **6,000 gpm for 4 hours**.

In result, the available fire flow supply of from Hydrant #1 (i.e. 6,200 gpm) would satisfy the required fire flow demand for this structure. However, the available fire flow supply from Hydrant #2 (i.e. 4,800 gpm) would not. Therefore, **we respectfully request confirmation from your office** as to whether; a) the fire flow supply from Hydrant #1 alone will satisfy the design requirements or b) the fire flow supplies from both hydrants must be considered.

If the fire flow supply from both hydrants must be considered, it may be possible to re-classify the proposed construction type from Type II-A to Type I-B construction. This would allow fire flow calculation area to consider only the largest floor area of; 32,000 ft^2, thereby reducing the required fire flow demand to **2,000 gpm for 2 hours** (per IFC Table B105.1(2)), which is easily satisfied by both hydrants. Of course, this option would likely represent a significant cost increase to the project and represents a higher construction type than what is otherwise required by the IBC.

CONCLUSION

We appreciate your review of this assessment and look forward to your response regarding our request to confirm the specific application criteria for fire flow demand. Should you have any questions, or require additional information, please do not hesitate to contact us.

Very truly yours,

PCNA Consulting Group Inc.

Michael R. Gentille, C.B.O.
President & CEO

Cory Runyon, P.E.
Project Manager / Fire Protection Engineer

11/20/2020

Project Information					
Project:	Carson City			Job#: _	
By:	MPP	Date:	11/20/2020	Sheet:	
Checked:		Date:		Client:	Perlman
Level:	Building A & B				

Hot and Cold Water Fixture Unit Calculation

		COLD		HOT	
FIXTURE	**QUANTITY**	**FIXTURE UNITS**	**TOTAL**	**FIXTURE UNITS**	**TOTAL**
Water Closet 1.6 GPF gravity Tank	365	2.5	912.5	0	0
Water Closet 1.6 GPF gravity Flush Valve	0	5	0	0	0
Urinal 1.0 GPF Flush Valve	0	4	0	0	0
Lavatory	400	1	400	1	400
Service sink	0	2	0	2	0
Bar Sink	0	1	0	1	0
Kitchen Sink	253	2	506	1.5	379.5
Dishwasher	0	1.5	0	2	0
Shower	365	2	730	1.5	547.5
Bathtub	0	4	0	3	0
Laundry Washing Machine	253	2.5	632.5	2	506
Hand Sink	0	1	0	1	0
Pedicure Station	0	2	0	2	0
Water cooler	0	1	0	0	0
Hose Bibb	0	2.5	0	0	0
Each Additional Hose Bibb	0	1	0	0	0
TOTAL FIXTURE UNITS			3181	Fixture Units	1833 Fixture Units
100 psi site pressure			440	GPM	

Manhard™
CONSULTING LTD

PRELIMINARY SEWER REPORT

FOR

STEWART STREET APARTMENTS

CARSON CITY, NEVADA

Prepared for:

Pillar Income Asset Management
1603 LBJ Frwy, Suite 800
Dallas, TX 75234

Prepared by:

Manhard Consulting
241 Ridge Street, Suite 400
Reno, Nevada 89501

Project: PIACCNV01

Date: 11/04/2020

Table of Contents

Appendices

Figures

1 INTRODUCTION

1.1 Purpose of Analysis

This report represents a preliminary analysis of the proposed sanitary sewer system for Stewart Street Apartments. The purpose of this analysis is to establish peak flow rates and evaluate proposed sanitary sewer sizes for the subject property.

1.2 Project Location and Description

The proposed Stewart Street Apartments is approximately 3.44 acres in size and located near the center portion of Carson City, northwest of the intersection of Little Lane and South Stewart Street. The proposed project site is situated within a portion of the Southeast ¼ of the Southwest ¼ and a portion of the Southwest ¼ of the Southwest ¼of Section 17, Township 15 North, and Range 20 East of the Mount Diablo Meridian (refer to Figure 1, Vicinity Map). The project site is within the existing parcels 004-055-07 and 004-055-02.

Figure 2, the Sewer Main Layout, illustrates the location and orientation of the project and its proposed building and roadway locations.

1.3 Project Description

The Stewart Street Apartments development is a proposed multi-family 5-story building which consists of a maximum of 253 residential units and a clubhouse. The project site is currently zoned Downtown Mixed Use.

2 PROPOSED ALIGNMENT AND QUANTITY OF SERVICE

2.1 Project Wastewater Collection System

Sewage flow from Stewart Street Apartments will be conveyed via 6" diameter PVC SDR-35 sewer lateral to the collection point (cleanout) located at the southern property line of the development at South Stewart Street and Little Lane. The sanitary sewer plumbing within the building flows south to the connection of the existing 15-inch sanitary sewer located in an existing parking lot south of the project. The proposed sizes and locations of the sanitary sewer mains can be found on the Sewer Main Layout, which is included in this report.

The minimum proposed slopes used within this development is 2.00%. The slope has been checked to ensure that it is within the Carson City required velocity of 2 fps and 10 fps during the peak flow condition.

2.2 Estimated Peak Sewage Flows

Calculations for the design of the sewer system were performed in accordance with Chapter 10, Section 11.243 of the Recommended Standards for Wastewater Facilities (10-State Standards), 2014 Edition and Division 15, Section 15.3.2 of the Carson City Development Standards and Carson City's Sewer System Master Plan Update, July 2017, by Atkins. According to analysis, the actual per capita flow was 148 gal/cap/day with a peaking factor ranging from 1.5 – 6.0 in wet weather conditions. Table 1 in the 10-State Standards suggests

using a peaking factor of 2.5 based on the population of Carson City, Nevada. For this analysis, the flow factors used in the calculations are 2.0 capita per dwelling unit for a condominium unit and 150 gal/cap/day to calculate average daily flow. A peaking factor of 2.5 is then applied to the daily average flow to compute the peak flow used in the design of the sanitary sewer. Complete peak flow calculations for Stewart Street Apartments are included within this report. The following table summarizes the results of the calculations of the peak daily flows for the residential subdivision:

Units	Capita/DU	GPD/ Capita	Peaking Factor	Peak Flow (gpd)	Peak Flow (cfs)
253	2.0	150	2.5	189,750	0.29
			Total	**189,750**	**0.29**

2.3 Proposed Sewer Mains

Basic normal depth calculations for the proposed 6-inch sewer lateral and existing 15-inch sewer main were done using open-channel pipe flow theory, the Manning's Formula, and *Bentley FlowMaster® V8i®* (*FlowMaster*) software. A Manning's Coefficient of 0.013 (assuming PVC pipe material) was used in all of these calculations. The *FlowMaster* worksheets that demonstrate these calculations are included within this report (Appendix A).

Per Carson City Development Standards, sewer mains are considered at capacity when peak flow is at d/D=0.50 for sewer mains that are 15" or less in diameter (Div. 15, Section 15.3.2.a.). In addition, the minimum velocity of 2 fps and the maximum velocity of 10 fps are required design conditions (Div 15, Section 15.3.2.e.). The *FlowMaster* calculations included within this report demonstrate that the various velocities of PVC sewer pipe at a d/D of 50% at the minimum and maximum slopes mentioned above are within the requirements for Carson City. The velocity of a 6-inch sewer main is 3.74 fps for a minimum pipe slope of 2.00%. All the calculated velocities described above are within the Carson City required ranged of 2 fps to 10 fps. These velocity calculations can be found in the *FlowMaster* calculations included within this report.

In addition to evaluating the sewer velocities within this development, this report also analyzes maximum capacity within the existing sewer pipe. As described above, the peak flow within the sewer main must remain at or below a normal depth of 50%. As shown in the *FlowMaster* calculations included within this report, a 15-inch PVC sewer at 0.50% can convey 1,476,031 gpd (2.28 cfs) at a maximum depth of 50%. An estimated flow of 1,002,000 gpd for the existing 15-inch sewer main was taken from the *Technical Memorandum – Little Lane Sewer Capacity* by Manhard Consulting dated December 9, 2019; therefore, the contribution by the proposed Stewart Street Apartments will be less than the 50% full capacity requirement, and the contribution will be 189,750 gpd (0.29 cfs), which is less than the maximum allowed capacity of an 15-inch sewer. The size and locations of the proposed sanitary sewers mentioned above can be found on the *Sanitary Sewer Plan*, which is included in this report.

3 CONCLUSION

The 6-inch sanitary sewer lateral proposed herein will adequately serve the project as planned. The attached *FlowMaster* worksheet calculates the maximum capacity of the existing 15-inch sewer main at a minimum slope of 0.50% in accordance with the requirements of Carson City. The 15-inch sewer main at 0.50% have a capacity of 1,476,031 gpd (2.28 cfs) at a maximum depth of 50%, which will be able to adequately serve Stewart Street Apartments.

The proposed sanitary sewerage system within this report for the Stewart Street Apartments development has adequate capacity to carry the subject property's peak sewage flow in conformance with the guidelines outlined in the Carson City Development Standards and the Recommended Standards for Wastewater Facilities (10-State Standards), 2014, and the Sewer System Master Plan Update, July 2017, by Atkins.

SANITARY SEWER CALCULATIONS FOR STEWART STREET APARTMENTS

The following calculations were performed in accordance with Chapter 10, Section 11.243 of the Recommended Standards for Wastewater Facilities, 2014 ed. (Ten-States Standards), Carson City Development Standards, and the Sewer System Master Plan Update, July 2017, by Atkins:

2.0 capita/dwelling unit
150 gal/capita/day

The site will consist of 253 dwelling units; therefore, the following equations are used:

Average flow = num. of dwellings * capita/dwelling * GPCD

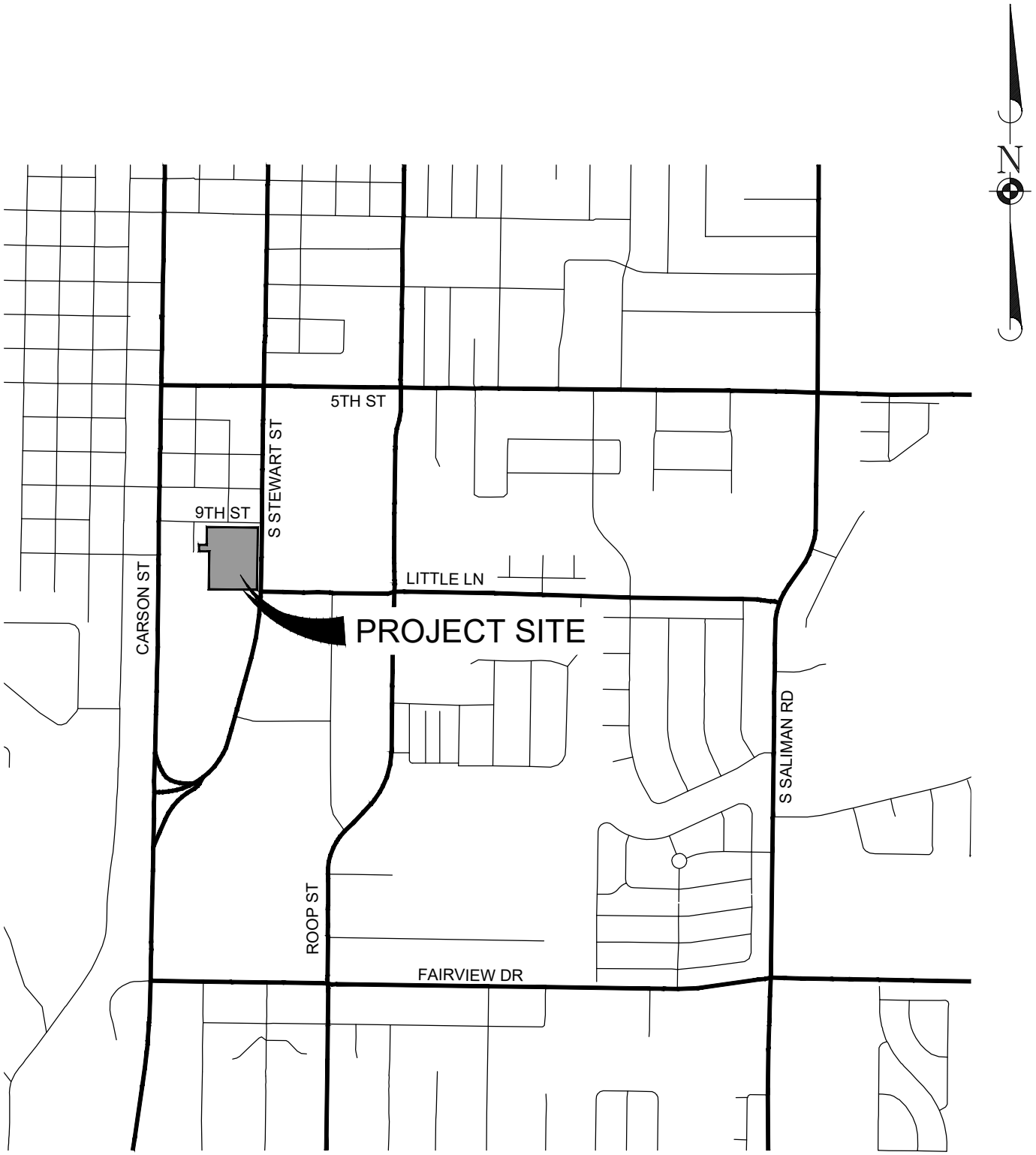
Average flow = 253 * 2.0 * 150 = 75,900 gpd = 0.12 cfs

Peak flow = Average flow * peaking factor

Peaking Factor = $(18 + P^{1/2}) / (4+P^{1/2})$ where P = population in thousands (or use value off Table 1 based on population). The maximum peaking factor is 4.2 according to Table 1 in the 10-State Standards. Based on the population of Carson City, Nevada, a peaking factor of 2.5 is acceptable.

Peak flow = 75.900 * 2.5 = 189,750 gpd = 0.29 cfs

The design shall be for the peak flow; therefore, the design flow is 0.29 cfs.



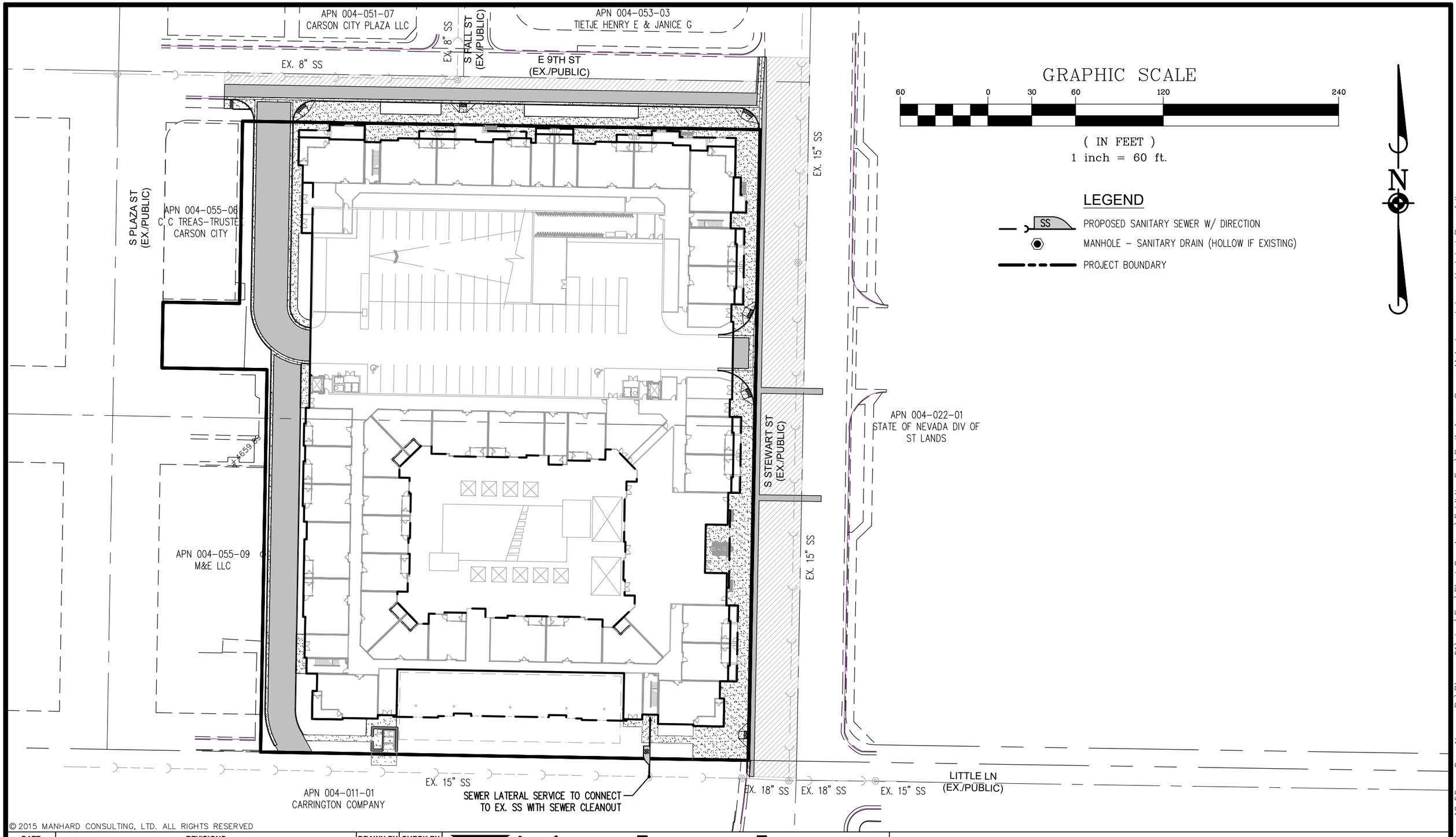
Manhard CONSULTING LTD
241 Ridge Street, Suite 400, Reno, NV 89501 ph:775-746-3500 fx:775.746.3520 manhard.com
Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

STEWART STREET APARTMENTS
CARSON CITY, NEVADA
VICINITY MAP

PROJ. MGR.:	DCB
DRAWN BY:	SDF
DATE:	NOV 2020
SCALE:	1"=1000'

SHEET 1 OF 2
PIA.CCNV01

Dwg Name: P:\Piaccnv01\dwg\Eng\Final Drawings\Exhibits Eng\Vicinity Map.dwg Updated By: sfellows 12:53



DATE	REVISIONS	DRAWN BY	CHECK BY

Manhard CONSULTING LTD
241 Ridge Street, Suite 400, Reno, NV 89501 ph:775-748-3500 fx:775.748.3520 manhard.com
Civil Engineers • Surveyors • Water Resource Engineers • Water & Wastewater Engineers
Construction Managers • Environmental Scientists • Landscape Architects • Planners

STEWART STREET APARTMENTS
CARSON CITY, NEVADA
SEWER MAIN LAYOUT

DRAWN BY:	DATE:	SCALE:	CODE:
SDF	NOV 2020	1"=60'	PIACCNV01

November 4, 2020 - 12:58 Dwg Name: P:\Piaccnv01\dwg\Eng\Final Drawings\Exhibits Eng\Preliminary Sewer Main Layout.dwg Updated By: sfellows

APPENDIX A

FlowMaster Flow Data

Worksheet for 6" Lateral to Building

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02000	ft/ft
Diameter	6.00	in
Discharge	189750.00	gal/day

Results

Normal Depth	2.53	in
Flow Area	0.08	ft²
Wetted Perimeter	0.71	ft
Hydraulic Radius	1.33	in
Top Width	0.49	ft
Critical Depth	0.27	ft
Percent Full	42.1	%
Critical Slope	0.00809	ft/ft
Velocity	3.74	ft/s
Velocity Head	0.22	ft
Specific Energy	0.43	ft
Froude Number	1.65	
Maximum Discharge	0.85	ft³/s
Discharge Full	0.79	ft³/s
Slope Full	0.00274	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	42.11	%
Downstream Velocity	Infinity	ft/s

Worksheet for 6" Lateral to Building

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.53	in
Critical Depth	0.27	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.00809	ft/ft

Worksheet for Ex. 15" Main

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Normal Depth	7.50	in
Diameter	15.00	in

Results

Discharge	1476031.20	gal/day
Flow Area	0.61	ft²
Wetted Perimeter	1.96	ft
Hydraulic Radius	3.75	in
Top Width	1.25	ft
Critical Depth	0.60	ft
Percent Full	50.0	%
Critical Slope	0.00562	ft/ft
Velocity	3.72	ft/s
Velocity Head	0.22	ft
Specific Energy	0.84	ft
Froude Number	0.94	
Maximum Discharge	4.91	ft³/s
Discharge Full	4.57	ft³/s
Slope Full	0.00125	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	50.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for Ex. 15" Main

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	7.50	in
Critical Depth	0.60	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00562	ft/ft

December 2, 2020

Chris Martinovich
Transportation / Traffic Engineer
Carson City Public Works Department
3505 Butti Way
Carson City, NV 89701

Response to Comments from Review of Traffic Impact Study for Stewart Street Apartments (city comments dated November 30, 2020)

Dear Mr. Martinovich,

The following responses address comments from the review of the Traffic Impact Study for Stewart Street Apartments project (city comments dated November 30, 2020):

Comment 1: *When referring to the Nevada Division of State Parks on Page 4, are you meaning the State Offices in the Raggio Building?*

Response: The Nevada Division of State Parks building was referring to the *Richard Bryan Building* (901 S. Stewart Street). Clarified on page 4 of the report.

Comment 2: *Please indicate what ITE trip generation code was used for the Raggio Building and how were trips distributed to Stewart Street vs. Little Lane? Please document and list if any other properties used ITE trip generation rates and how those might have been applied.*

Response: The Government Office Building (730) land use from the *Trip Generation Manual, 10th Edition,* published by the Institute of Transportation Engineers (ITE) was used in estimating the peak hour trip generation for the Nevada Division of State Parks building (*Richard Bryan Building* at 901 S. Stewart Street). The building was estimated at 115,000 square feet based on online parcel map data. Trip generation was applied at all three driveways relative to the number of available parking spaces near each entrance/exit.

As stated in the traffic study, trips from smaller existing developments on 9th Street were also estimated since there is no model or NDOT data for 9th Street. The development land uses on 9th Street included office, pet supply store, and hotel. Average rates from the Trip Generation Manual, 10th Edition, published by the Institute of Transportation Engineers (ITE) were used and trips were assigned to/from 9th Street by the proximity of the business to either S. Carson Street or Stewart Street. No updates were made to the report.

Comment 3: *Baseline PM peak hour for SB Stewart seems low at both Stewart / 9th (413 vph) and Stewart/Little (426 vph). The NDOT counter south of 5th Street has an average closer to 460 vph. When you factor in the additional traffic generated from the Raggio Building turning south on to Stewart into the adjusted baseline volumes, I'd anticipate a volume at the intersection of Little Lane to be higher than the NDOT Count in the southbound direction. Refer to Figure 3.*

Response: The study used the highest PM peak hour (4-6 PM) on a midweek day (Tues-Thurs) available from the NDOT data. The highest PM peak hour was collected on Tuesday, October 29, 2019 with a bi-directional volume peak hour volume of 955. The corresponding peak hour northbound volume was given at 542 vehicles. Thus, the peak hour southbound volume would be 413 vehicles. The highest hour southbound volume (roughly 460) in the NDOT reports occurs in a different hour (12 PM) than the studied PM peak hour (4-6 PM). No updates were made to the report.

Comment 4: *Actual existing volumes on 9th as shown in Appendix A are higher than the adjusted volumes in Figure 4 and future volumes in Figure 4. They are also higher than the project plus volumes in Figures 6 and 7. This seems to contradict information listed in the second bullet in the narrative of the Baseline Conditions on Page 4. Can you please provide information as to why actual volumes may be higher, please adjust the volumes if needed accordingly, and clarify the bullet on Page 4?*

Response: When accounting for coronavirus closures, rerouting due to construction, and balancing with historical data, some movements increased and some decreased. With delay and southbound closure on Carson Street, traffic was using Stewart Street and 5th Street that would not typically occur. Therefore, some movements were lowered throughout the balancing process to account for the construction rerouting. No updates were made to the report.

Comment 5: *Future growth rates, Table 3, refers to the 2050 CAMPO model. The narrative refers to projects in the 2040 Regional Transportation Plan which may be different than those in the Draft 2050 Regional Transportation Plan. Please verify projects between the two models and plans to ensure consistency. The draft 2050 RTP can be found on the Carson City Website and hopefully will be formally adopted at the December 9th CAMPO Board Meeting.*

Response: The project list was updated to match the unconstrained list of projects stated in the *Draft 2050 Regional Transportation Plan* which include nearby pavement rehabilitation and Complete Street improvements for 5th Street and Roop Street. The 2050 CAMPO model used in the analysis includes the future widening of Roop Street to 4 lanes. See page 6 within the report for updates.

Comment 5: *Please provide clear documentation as to how growth rates were applied to the baseline volumes. Please document if growth rates were applied to approach volumes or to individual turning movements. The project may result in changes to turning movement percentages at intersections.*

Response: A growth factor of 1.3 was applied to each studied movement. Clarified on page 7 of the report.

Comment 5: *The existing intersection of Stewart Street/Little Lane provides the closest signalized (RRFB) pedestrian crossing of Stewart Street. Because of this crossing, the report recommends no additional crosswalks; however, access to this existing crosswalk is not ADA compliant. Can the report please document that assess is not ADA compliant at this intersection? This upgrade may be a reasonable intersection enhancement completed through the identified pro-rata contribution.*

Response: It has been noted that there may be ADA access deficiencies at the Stewart Street / Little Lane intersection. See page 4 in the updated report.

Comment 6: *As recommended in the report, a reevaluation/verification of the traffic volumes at the intersection of Stewart Street/Little Lane should occur. The revaluation shall utilize actual vehicle and pedestrian counts if state offices are re-opened and typical conditions reoccur, or shall utilize the most recent available historical data and the adjustment methodologies as described in the original traffic impact study and as approved by the City's Transportation Engineer. The signal warrant analysis shall include a review of the existing condition and the proposed project under a 10- Year Horizon Plus Project scenario.*

Response: Clarified in report to be more consistent with the above paragraph (see pages 12 and 13).

Sincerely,
Headway Transportation, LLC

Loren E. Chilson, PE
Principal

Attachments:

- Attachment A – Comments on Traffic Impact Study for Stewart Street Apartments Memorandum
- Attachment B – NDOT Traffic Data (Stewart St, 240 feet south of 5th Street)

CARSON CITY NEVADA
Consolidated Municipality and State Capital
PUBLIC WORKS
MEMORANDUM

TO: Headway Transportation

FROM: Chris Martinovich, PE Transportation / Traffic Engineer – Carson City Public Works

SUBJECT: **Comments on Traffic Impact Study for Stewart Street Apartments**

DATE: 11/30/20

When referring to the Nevada Division of State Parks on Page 4, are you meaning the State Offices in the Raggio Building?

Please indicate what ITE trip generation code was used for the Raggio Building and how were trips distributed to Stewart Street vs. Little Lane? Please document and list if any other properties used ITE trip generation rates and how those might have been applied.

Baseline PM peak hour for SB Stewart seems low at both Stewart / 9th (413 vph) and Stewart/Little (426 vph). The NDOT counter south of 5th Street has an average closer to 460 vph. When you factor in the additional traffic generated from the Raggio Building turning south on to Stewart into the adjusted baseline volumes, I'd anticipate a volume at the intersection of Little Lane to be higher than the NDOT Count in the southbound direction. Refer to Figure 3.

Actual existing volumes on 9th as shown in Appendix A are higher than the adjusted volumes in Figure 4 and future volumes in Figure 4. They are also higher than the project plus volumes in Figures 6 and 7. This seems to contradict information listed in the second bullet in the narrative of the Baseline Conditions on Page 4. Can you please provide information as to why actual volumes may be higher, please adjust the volumes if needed accordingly, and clarify the bullet on Page 4?

Future growth rates, Table 3, refers to the 2050 CAMPO model. The narrative refers to projects in the 2040 Regional Transportation Plan which may be different than those in the Draft 2050 Regional Transportation Plan. Please verify projects between the two models and plans to ensure consistency. The draft 2050 RTP can be found on the Carson City Website and hopefully will be formally adopted at the December 9th CAMPO Board Meeting

Please provide clear documentation as to how growth rates were applied to the baseline volumes. Please document if growth rates were applied to approach volumes or to individual turning movements. The project may result in changes to turning movement percentages at intersections.

The existing intersection of Stewart Street/Little Lane provides the closest signalized (RRFB) pedestrian crossing of Stewart Street. Because of this crossing, the report recommends no additional crosswalks; however, access to this existing crosswalk is not ADA compliant. Can the report please document that assess is not ADA compliant at this intersection? This upgrade

may be a reasonable intersection enhancement completed through the identified pro-rata contribution.

As recommended in the report, a reevaluation/verification of the traffic volumes at the intersection of Stewart Street/Little Lane should occur. The revaluation shall utilize actual vehicle and pedestrian counts if state offices are re-opened and typical conditions reoccur, or shall utilize the most recent available historical data and the adjustment methodologies as described in the original traffic impact study and as approved by the City's Transportation Engineer. The signal warrant analysis shall include a review of the existing condition and the proposed project under a 10- Year Horizon Plus Project scenario.

Nevada Department of Transportation

Short-term Hourly Traffic Volume for 10/28/201 through 10/31/2019

Site names: 0250009,Stewart St
County: Carson City

Location: 240ft S of 5th St

Seasonal Factor Grp: 01
Daily Factor Grp: 01
Axle Factor Grp: 07
Growth Factor Grp: 07

	Sun, Oct 27, 2019			Mon, Oct 28, 2019			Tue, Oct 29, 2019			Wed, Oct 30, 2019			Thu, Oct 31, 2019			Fri, Nov 1, 2019			Sat, Nov 2, 2019		
	Road	S	N	Road	S	N	Road	S	N	Road	S	N	Road	S	N	Road	S	N	Road	S	N
00:00							27	8	19	30	11	19	50	17	33						
01:00							16	5	11	16	5	11	17	5	12						
02:00							17	6	11	13	3	10	21	8	13						
03:00							21	11	10	22	12	10	27	14	13						
04:00							44	29	15	41	27	14	47	28	19						
05:00							154	107	47	154	102	52	137	94	43						
06:00							337	219	118	374	252	122	370	253	117						
07:00							637	369	268	649	393	256	646	380	266						
08:00							535	243	292	530	249	281	568	289	279						
09:00							461	218	243	500	249	251	523	248	275						
10:00							625	309	316	618	300	318	625	318	307						
11:00				803	381	422	815	422	393	811	393	418	740	342	398						
12:00				902	458	444	950	444	506	993	482	511									
13:00				841	393	448	819	374	445	821	376	445									
14:00				766	335	431	701	331	370	761	377	384									
15:00				777	360	417	785	342	443	819	371	448									
16:00				919	389	530	868	387	481	920	416	504									
17:00				863	340	523	827	335	492	806	338	468									
18:00				425	178	247	427	191	236	418	183	235									
19:00				240	106	134	279	126	153	260	109	151									
20:00				163	65	98	184	64	120	161	61	100									
21:00				116	42	74	120	44	76	157	52	105									
22:00				66	23	43	74	29	45	81	36	45									
23:00				46	17	29	67	27	40	51	18	33									
Total				6,927	3,087	3,840	9,790	4,640	5,150	10,006	4,815	5,191	3,771	1,996	1,775						
AM Peak Vol							815	422	393	811	393	418	740	399	398						
AM Peak Fct							.812	.837	.762	.831	.75	.804	.787	.932	.777						
AM Peak Hr				:	:	:	11: 00	11: 00	11: 00	11: 00	7: 00	11: 00	11: 00	7: 15	11: 00						
PM Peak Vol				1,020	458	577	955	444	542	998	482	526									
PM Peak Fct				.777	.854	.736	.793	.881	.774	.863	.893	.854									
PM Peak Hr				16: 15	12: 00	16: 15	16: 30	12: 00	16: 30	12: 15	12: 00	16: 30	:	:	:						
Seasonal Fct				.971	.971	.971	.971	.971	.971	.971	.971	.971	.971	.971	.971						
Daily Fct				.976	.976	.976	.937	.937	.937	.935	.935	.935	.918	.918	.918						
Axle Fct				.452	.452	.452	.452	.452	.452	.452	.452	.452	.452	.452	.452						
Pulse Fct				2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000						

Attachment B – NDOT Traffic Data (Stewart St, 240 feet south of 5th Street)

Created 06/02/2020 11:20 AM

ROAD AADT 8,194 NDIR AADT 3,901 PDIR AADT 4,293

TRAFFIC IMPACT STUDY

for

Stewart Street Apartments

December 2, 2020

PREPARED FOR:

Pillar Income Asset Management

PREPARED BY:

HEADWAY TRANSPORTATION

Headway Transportation, LLC
5482 Longley Lane, Suite B, Reno, Nevada 89511
775.322.4300
www.HeadwayTransportation.com

YOUR QUESTIONS ANSWERED QUICKLY

Why did you perform this study?

This Traffic Impact Study evaluates the potential traffic impacts associated with development of the proposed multifamily project at 906 S. Stewart Street in Carson City, NV. This study was undertaken to determine the existing and future traffic conditions, quantify traffic volumes generated by the proposed project, identify potential impacts, and develop recommendations to mitigate impacts, if any are found.

What does the project consist of?

The proposed project consists of up to 254 apartment units. The site is located in the southwest quadrant of Stewart Street and 9th Street. The primary access to the site is proposed to be on Stewart Street with secondary access provided on 9th Street.

How much traffic will the project generate?

The project is anticipated to generate approximately 1,859 Daily trips, 117 AM peak hour trips, and 142 PM peak hour new trips.

Does this project cause any traffic impacts?

With the addition of project traffic, all study intersections are anticipated to operate within level of service policy (LOS "D" or better) except for the eastbound approach at the Stewart Street / Little Lane intersection. The eastbound approach will operate at poor levels of service with or without the project and the project would not add any traffic to the subject movement.

Are any improvements recommended?

The project proposes to widen Stewart Street along the property frontage to enable the future striping of a bike lane.

Since typical day traffic volumes could not be collected, it is our recommendation that the Four-Hour Vehicular Volume Warrant be revaluated approximately one year from now (end of 2021) when state offices are reopened and typical conditions reoccur. The signal warrant analysis should consider existing traffic volumes and 10-Year Plus Project forecast volumes. Doing so would confirm whether or not a signal is needed at this location.

LIST OF FIGURES

LIST OF APPENDICES

INTRODUCTION

This report summarizes the results of a Traffic Impact Study completed to assess the potential impacts to the local roadway network associated with development of the proposed multifamily project at 906 S. Stewart Street in Carson City, NV. The proposed project consists of up to 254 apartment units. This report has been prepared to document existing traffic conditions, quantify traffic volumes generated by the proposed project, identify potential impacts, document findings, and make recommendations to mitigate impacts, if any are found.

Study Area and Evaluated Scenarios

The proposed project is located in the southwest quadrant of the Stewart Street / 9th Street intersection as shown on **Figure 1**. The project site plan is shown on **Figure 2**.

Study Intersections

The following intersections are evaluated in this report as defined during study scoping with Carson City staff:

- Carson Street / 9th Street
- Stewart Street / 5th Street
- Stewart Street / 9th Street
- Stewart Street / Little Lane
- Roop Street / Little Lane
- Stewart Street / Primary Entrance
- 9th Street / Secondary Access

Study Scenarios

This study includes the analysis of key intersections during the weekday AM (7-9 AM) and PM (4-6 PM) peak hours as these are the periods of time in which peak traffic is anticipated to occur. The evaluated development scenarios are:

- Baseline Conditions – evaluates existing traffic conditions
- Baseline Plus Project Conditions – evaluates Baseline conditions plus the proposed project
- Future Year Conditions – evaluates 20-year horizon traffic conditions
- Future Year Plus Project Conditions – evaluates 20-year horizon traffic conditions plus the proposed project

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

Intersection level of service methodology is established in the *Highway Capacity Manual (HCM) 6th Edition*, published by the Transportation Research Board (TRB). The methodology for signalized intersections determines the level of service by comparing the average control delay for the overall intersection to the delay thresholds in **Table 1**. Level of service at unsignalized (side-street stop controlled) intersections is determined by comparing the average control delay for the worst movement/approach to the delay thresholds in **Table 1.**

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 through 21

Level of service calculations were performed using the Vistro 2020 software package with results reported in accordance with the current *HCM 6th Edition* methodology.

Level of Service Policies

The Carson City Code of Ordinances Section 18.12.13 establishes Level of Service (LOS) "D" as the citywide LOS standard. 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.

EXISTING TRANSPORTATION FACILITIES

Roadway Facilities

A brief description of the key roadways in the study area is provided below:

Carson Street is a north-south roadway and is classified as a minor arterial by Nevada Department of Transportation (NDOT) within the project vicinity. Carson Street is currently undergoing complete street improvements and will be a four-lane roadway (two southbound lanes, one northbound lane, and a center-turn-lane) north of Stewart Street when improvements are complete.

Stewart Street is a five-lane roadway that generally runs in the north-south direction with two travel lanes in each direction and a center turn lane. The posted speed limit is 35 mph and it is classified as a minor arterial by NDOT within the project vicinity.

5th Street is an east-west roadway with three travel lanes (one lane in each direction and a center-turn-lane). The posted speed limit is 25 mph and it is classified as a minor arterial by NDOT.

Roop Street is generally a four-lane roadway that runs in north-south direction within the project area. North of Little Lane, it has two lanes in the northbound direction and one lane in the southbound direction with a center turn lane. South of Little Lane, Roop Street has two-travel lanes in each direction and does not have a center turn lane. The posted speed limit is 25 mph and it is classified as a minor collector by NDOT.

Little Lane is generally a two-lane roadway with one travel lane in each direction that runs in the east-west direction. The posted speed limit is 25 mph and it is classified as a minor collector by NDOT within the project vicinity.

Bicycle and Pedestrian Facilities

Within the project vicinity, Carson Street is undergoing complete street improvements. Once completed, Carson Street will have a bike lane and sidewalk on each side with a landscape buffer. Sidewalks exist on both sides on the majority of roadways within the project area except for small sections on Little Lane and Roop Street. Bicycle lanes currently exist on both sides of 5th Street, Roop Street, and Little Lane.

Transit Service

The Washoe County Regional Transportation Commission (Washoe RTC) and Jump Around Carson (JAC) currently operate transit services within the study area. The RTC operates the Regional Connector Route through the study area with nearby stops on Little Lane (NDOT Facility) and Stewart Street (Capitol Complex). **Exhibit 1** shows the RTC Regional Connector bus route within the study area.

Jump Around Carson (JAC) currently operates Route 3 within the project area. Route 3 utilizes Stewart Street, Little Street, and Roop Street as shown in **Exhibit 2**. There are two stops near the project at the

Stewart Street / 8th Street intersection and the Stewart Street / Little Lane intersection. Marked crosswalks are provided on Stewart Street at 7th Street and Little Lane and are within 150 feet of the existing transit stops on the east side of Stewart Street. Additional crosswalks are not recommended. However, it should be noted that there may be ADA access deficiencies at the Stewart Street / Little Lane intersection.

Exhibit 1. RTC Transit Map

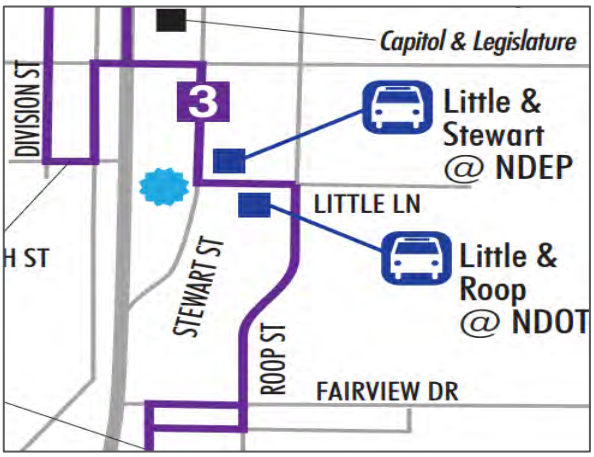


Exhibit 2. JAC Transit Map

BASELINE CONDITIONS

Traffic Volumes

Peak period turning movement counts were collected in October 2020. Due to coronavirus containment measures, some schools were not in session and some businesses (including NDOT headquarters) were closed at the time of this study. Additionally, road construction was ongoing on Carson Street, and at the Carson Street / Stewart Street intersection, causing traffic to divert and reroute. Since "typical day" count data cannot be collected for the foreseeable future, it was necessary to factor up and adjust the counts to represent typical conditions by comparing the counts to historical data. The methodology below outlines the approach to developing the turning movement volumes used in this study:

- Existing traffic volumes were collected at the study intersections on a typical weekday in October 2020, provided in **Appendix A**.
- The collected peak hour traffic volumes on 9th Street and at the Richard Bryan Building, 901 S. Stewart Street, did not reflect typical conditions due to construction and COVID-19 restrictions. Therefore, the existing side-street volumes for the adjacent business and the Richard Bryan Building were estimated using the Trip Generation Manual, 10th Edition, published by the Institute of Transportation Engineers (ITE). It is important to note that the trip generation estimates project on to 9th Street were higher than the collected traffic volumes.
- The October 2020 counts were compared to historical NDOT traffic data (peak hour segment volumes) within the study area. The NDOT Count locations within the study area are shown in **Exhibit 3**.

- The collected peak hour counts were factored and balanced using the Turns32 software program, a traffic volume tool that computes/forecast traffic volumes, to match the peak hour segment flows obtained from NDOT.
- Minor corrections and adjustments were made to calibrate the peak hour volumes.
- The existing Roop Street / Little Lane intersection volumes were obtained from the *S. Carson Street Parallel Route Assessment* (Headway Transportation, 2020) and compared to the October 2020 counts.
- Carson Street / 9th Street volumes were adjusted to balance with the Carson Street / 5th Street volumes collected for the S. Carson Street Evaluation.

When accounting for coronavirus closures, rerouting due to construction and balancing with historical data, some movements increased and some decreased. The resulting baseline peak hour traffic volumes are shown in **Figure 3**. A concerted effort has been made to provide conservative baseline traffic volumes.

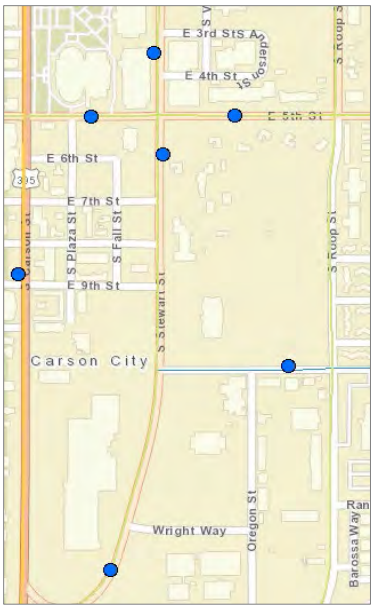


Exhibit 3. NDOT Count Locations

Intersection Level of Service Analysis

Table 2 presents the level of service analysis for the Baseline conditions and the calculation sheets are provided in **Appendix B**, attached. Existing signal timing was obtained from Carson City and used in this analysis.

Table 2: Baseline Conditions Intersection Level of Service

ID	Intersection	Intersection Control	Movement	AM Peak		PM Peak	
				LOS	Delay	LOS	Delay
1	Carson St. / 9th Street	Side-Street STOP	Northbound Left	A	8.4	A	9.7
			Southbound Left	A	8.6	A	9.0
			Eastbound Approach	B	13.8	C	19.5
			Westbound Approach	B	13.9	C	17.7
3	Stewart Street / 5th Street	Signalized	Overall	B	11.4	B	14.2
4	Stewart Street / 9th Street	Side-Street STOP	Northbound Left	A	8.3	A	8.3
			Eastbound Approach	B	10.7	B	11.1
6	Stewart Street / Little Lane	Side-Street STOP	Northbound Left	A	7.8	A	8.0
			Southbound Left	A	8.3	A	8.6
			Eastbound Approach	C	17.6	D	29.7
			Westbound Left	B	13.4	C	16.8
			Westbound Thru-Right	B	14.1	C	16.9
7	Roop Street / Little Lane	Signalized	Overall	A	9.6	B	10.1

Under Baseline conditions, all studied intersections and movements are anticipated to operate at acceptable levels of service (LOS "D" or better).

FUTURE YEAR CONDITIONS

Traffic Volumes

Significant changes are planned for the study area by the analysis year 2040. The following projects are either underway or in the fiscally unconstrained transportation improvements list in the *Draft 2050 Regional Transportation Plan* in or near the study area*:*

- Roop Street from Washington Street to Fifth Street: Widen to four lanes. This project is just north of the study limits.
- Roop Street from 5th Street to Colorado Street: Pavement Rehabilitation and Complete Street improvements.
- 5th Street from S. Carson Street to Saliman Road: Pavement Rehabilitation and Complete Street improvements.
- S. Carson Street corridor from 5th Street to Freeway Interchange: Complete Streets project to add multimodal facilities and reduce the number of lanes each direction. This project is almost finished.

It is expected that anticipated development and planned roadway projects will increase volumes and shift traffic patterns by the future year scenario. It is anticipated that some northbound traffic may move from S. Carson Street to Stewart Street and Roop Street during peak travel times in the long-term horizon. **Table 3** shows the future growth rate calculations for the study segments within the project area.

Table 3. Future Year Growth Rate Calculations

Location -->	Carson St S/O 5th	Stewart St N/O 5th	Stewart St S/O 5th	5th St W/O Stewart	5th St E/O Stewart	Stewart St N/O Little	Stewart St S/O Little	Little Ln E/O Stewart	Roop St N/O Little	Roop St S/O Little	Little Ln E/O Roop
2019 NDOT AADT	12,800	11,400	8,200	5,100	5,400	8,200	5,700	2,050	7,400	7,400	2,050
Demand Model Volumes											
2020 CAMPO ADT	16,942	11,004	8,090	7,385	6,323	9,048	8,732	345	6,720	4,092	1,978
2050 CAMPO ADT	10,551	13,690	10,429	9,329	7,575	12,669	11,387	1,281	9,680	7,052	2,960
Model Difference 2050-2020	-6,391	2,685	2,339	1,944	1,252	3,621	2,655	936	2,960	2,960	982
Growth Rate Method											
30 Years % Change	-38%	24%	29%	26%	20%	40%	30%	271%	44%	72%	50%
% per year	-1.3%	0.8%	1.0%	0.9%	0.7%	1.3%	1.0%	9.0%	1.5%	2.4%	1.7%
21 years growth factor	**0.7**	**1.2**	**1.2**	**1.2**	**1.1**	**1.3**	**1.2**	**2.9**	**1.3**	**1.5**	**1.3**
Growth Difference Method											
30 Years Increase	-6,391	2,685	2,339	1,944	1,252	3,621	2,655	936	2,960	2,960	982
2050 ADT	6,409	14,085	10,539	7,044	6,652	11,821	8,355	2,986	10,360	10,360	3,032
2050 ADT-2019 NDOT ADT	-6,391	2,685	2,339	1,944	1,252	3,621	2,655	936	2,960	2,960	982
% Change	-50%	24%	29%	38%	23%	44%	47%	46%	40%	40%	48%
% per year	-1.6%	0.8%	0.9%	1.2%	0.7%	1.4%	1.5%	1.5%	1.3%	1.3%	1.5%
21 years growth factor	**0.7**	**1.2**	**1.2**	**1.3**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**

As shown in the table, based on CAMPO travel demand model outputs, the 20-year growth factor is 0.7 on Carson Street (less volume than existing due to the reduction of lanes), and 1.3 at all other study intersections. However, to be conservative, traffic volumes at the Carson Street / 9th Street intersection were adjusted to balance with the 2040 Cumulative volumes at the Carson Street / 5th Street intersection developed in the S. Carson Street Evaluation. The Carson Street Evaluation assumed traffic increases due to planned/approved developments. Again, to be conservative, a 1.3 growth factor was applied to all

turning movements at the study intersections. The future year traffic volumes and controls are shown in **Figure 4**.

Intersection Level of Service Analysis

Table 4 shows the Future Year conditions level of service analysis results. The technical calculations are provided in **Appendix C**.

Table 4: Future Year Intersection Level of Service

ID	Intersection	Intersection Control	Movement	AM Peak		PM Peak	
				LOS	Delay	LOS	Delay
1	Carson St. / 9th Street	Side-Street STOP	Northbound Left	A	8.7	B	10.5
			Southbound Left	A	9.4	A	9.6
			Eastbound Approach	C	16.2	C	24.8
			Westbound Approach	C	16.8	C	22.1
3	Stewart Street / 5th Street	Signalized	Overall	B	12.0	B	14.8
4	Stewart Street / 9th Street	Side-Street STOP	Northbound Left	A	8.6	A	8.7
			Eastbound Approach	B	11.4	B	12.1
6	Stewart Street / Little Lane	Side-Street STOP	Northbound Left	A	8.0	A	8.2
			Southbound Left	A	8.7	A	9.2
			Eastbound Approach	C	24.1	F	86.6
			Westbound Left	C	15.8	D	25.9
			Westbound Thru-Right	C	16.1	C	21.8
7	Roop Street / Little Lane	Signalized	Overall	B	10.2	B	10.9

Under Future Year conditions, all studied intersections operate at acceptable levels of service (LOS "D" or better) except for the eastbound approach at the Stewart Street / Little Lane intersection. The eastbound approach is a parking lot driveway with other available access points and options to which drivers can reroute if sufficient gaps are not available for left or through movements. It is likely that as delay increases, drivers would divert to other access points or turn right and reroute. LOS "F" at a private driveway on a major roadway at peak hours is a manageable and acceptable condition given there are other access options.

PROJECT CONDITIONS

Project Description

The proposed project is located on the southwest quadrant of the Stewart Street / 9th Street intersection. The project proposes to have a primary entrance opposite the Richard Bryan Building on Stewart Street and a secondary access on 9th Street approximately 250' west of Stewart Street. The preliminary project site plan is shown in **Figure 2**, attached.

Trip Generation

Vehicular trip generation rates for the proposed project were obtained from the *Trip Generation Manual, 10th Edition*, published by the Institute of Transportation Engineers (ITE). **Table 5** provides the Daily, AM Peak Hour, and PM Peak Hour trip generation calculations for the proposed project.

Table 5: Vehicular Trip Generation Estimates

(ITE #) Land Use	Quantity	Daily	AM Peak			PM Peak		
			Total	In	Out	Total	In	Out
Multifamily Housing, Low-Rise (220)	254 units	1,859	117	27	90	142	89	53

As shown in the table, the project is anticipated to generate approximately 1,859 Daily trips, 117 AM peak hour trips, and 142 PM peak hour trips.

Trip Distribution

Traffic generated by the project was distributed to the road network based on the location of the project in relation to major activity centers and the roadway network. The project trips were distributed as follows:

- 25% to/from the north via Stewart Street
- 20% to/from the north via Carson Street
- 20% to/from the south via Stewart Street
- 10% to/from the south via Carson Street
- 15% to/from the east via Little Lane
- 5% to/from the south via Roop Street
- 5% to/from the east via 5th Street

The project trip distribution and assignment is shown on **Figure 5**.

Project Access

Access is proposed via two project driveways, a primary entrance on Stewart Street and a secondary access on 9th Street. Both project driveways are proposed as single lane approaches with side-street stop control allowing for all turning movements. A center turn lane on Stewart Street will facilitate two-stage left-turns from the primary entrance.

BASELINE PLUS PROJECT CONDITIONS

Traffic Volumes

Baseline Plus Project traffic volumes were developed by adding the project generated trips (**Figure 5**) to the Baseline traffic volumes (**Figure 3**). The Baseline lane configurations, controls and peak hour turning movement volumes are shown in **Figure 6,** attached.

Intersection Level of Service Analysis

Table 6 shows the Baseline Plus Project intersection level of service results for the AM and PM peak hours. The technical calculations are provided in **Appendix D**.

Table 6: Baseline Plus Project Intersection Level of Service

ID	Intersection	Intersection Control	Movement	AM Peak		PM Peak	
				LOS	Delay	LOS	Delay
1	Carson Street / 9th Street	Side-Street STOP	Northbound Left	A	8.4	A	9.7
			Southbound Left	A	8.7	A	9.1
			Eastbound Approach	B	13.9	C	19.9
			Westbound Approach	B	14.1	C	18.0
2	9th Street / Secondary Access	Side-Street STOP	Westbound Left	A	7.3	A	7.3
			Northbound Approach	A	8.6	A	8.8
3	Stewart Street / 5th Street	Signalized	Overall	B	11.3	B	14.2
4	Stewart Street / 9th Street	Side-Street STOP	Northbound Left	A	8.3	A	8.4
			Eastbound Approach	B	11.3	B	11.6
5	Stewart Street / Primary Entrance	Side-Street STOP	Northbound Left	A	8.0	A	8.4
			Southbound Left	A	8.3	A	8.6
			Eastbound Approach	B	13.8	B	13.2
			Westbound Left	C	15.3	C	17.3
			Westbound Right	A	9.6	B	10.4
6	Stewart Street / Little Lane	Side-Street STOP	Northbound Left	A	7.9	A	8.0
			Southbound Left	A	8.4	A	8.7
			Eastbound Approach	C	19.7	D	34.3
			Westbound Left	B	14.2	C	17.8
			Westbound Thru-Right	B	14.9	C	17.8
7	Roop Street / Little Lane	Signalized	Overall	A	9.7	B	10.2

With the addition of project traffic, all study intersections and movements are anticipated to operate at acceptable levels of service (LOS "D" or better).

FUTURE YEAR PLUS PROJECT CONDITIONS

Traffic Volumes

Future Year Plus Project traffic volumes were developed by adding the project generated trips (**Figure 5**) to the Future Year traffic volumes (**Figure 4**). The Future Year lane configurations, controls and peak hour turning movement volumes are shown in **Figure 7,** attached.

Intersection Level of Service Analysis

Table 7 shows the Future Year Plus Project condition level of service analysis results. The technical calculations are provided in **Appendix E**.

Table 7: Future Year Plus Project Intersection Level of Service

ID	Intersection	Intersection Control	Movement	AM Peak		PM Peak	
				LOS	Delay	LOS	Delay
1	Carson Street / 9th Street	Side-Street STOP	Northbound Left	A	8.7	B	10.5
			Southbound Left	A	9.4	A	9.6
			Eastbound Approach	C	16.3	D	25.3
			Westbound Approach	C	17.2	C	22.7
2	9th Street / Secondary Access	Side-Street STOP	Westbound Left	A	7.3	A	7.3
			Northbound Approach	A	8.7	A	8.8
3	Stewart Street / 5th Street	Signalized	Overall	B	12.0	B	14.8
4	Stewart Street / 9th Street	Side-Street STOP	Northbound Left	A	8.6	A	8.8
			Eastbound Approach	B	12.1	B	12.7
5	Stewart Street / Primary Entrance	Side-Street STOP	Northbound Left	A	8.3	A	8.9
			Southbound Left	A	8.6	A	9.2
			Eastbound Approach	C	15.1	B	14.9
			Westbound Left	C	16.6	C	21.3
			Westbound Right	A	9.8	B	11.2
6	Stewart Street / Little Lane	Side-Street STOP	Northbound Left	A	8.1	A	8.2
			Southbound Left	A	8.8	A	9.4
			Eastbound Approach	D	27.9	F	113.8
			Westbound Left	C	17.0	D	28.9
			Westbound Thru-Right	C	17.2	C	23.2
7	Roop Street / Little Lane	Signalized	Overall	B	10.3	B	11.1

Under Future Year Plus Project conditions, all study intersections and movements are anticipated to operate at acceptable levels of service (LOS "D" or better) except for the eastbound approach at the Stewart Street / Little Lane intersection. It is important to note that the project does not add any project trips to the subject movement and the driveway will operate at poor levels of service with or without the project. Both the Stewart Street / 5th Street and Roop Street / Little Lane intersections operate within acceptable levels of service with all movements operating at LOS "C" or better. Therefore, the current configuration of permissive lefts turns are deemed acceptable through the 20-year horizon.

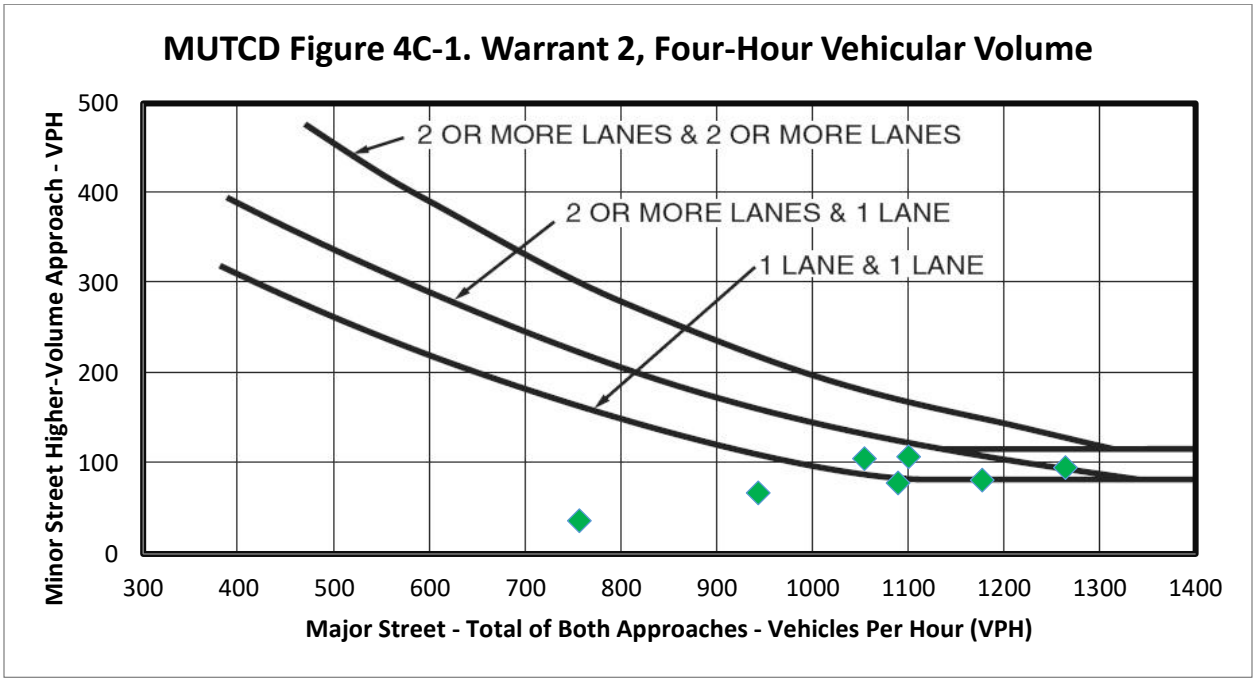
Stewart Street / Little Lane Signal Warrant Analysis

A preliminary analysis of the Pedestrian Volume Warrant (Warrant 7) and the Four-Hour Vehicular Volume Warrant (Warrant 2) were conducted for the Stewart Street / Little Lane intersection to determine whether or not a traffic signal would be justified in the future.

The MUTCD states that the minimum threshold for meeting the Pedestrian Volume Warrant is either 133 pedestrian crossings during the peak hour or 107 pedestrian crossings per hour for four separate hours. During data collection, three pedestrians were observed crossing Stewart Street in each of the AM and PM peak hours. This is significantly below the threshold of meeting the pedestrian warrant. Therefore, it is anticipated that this warrant would not be met.

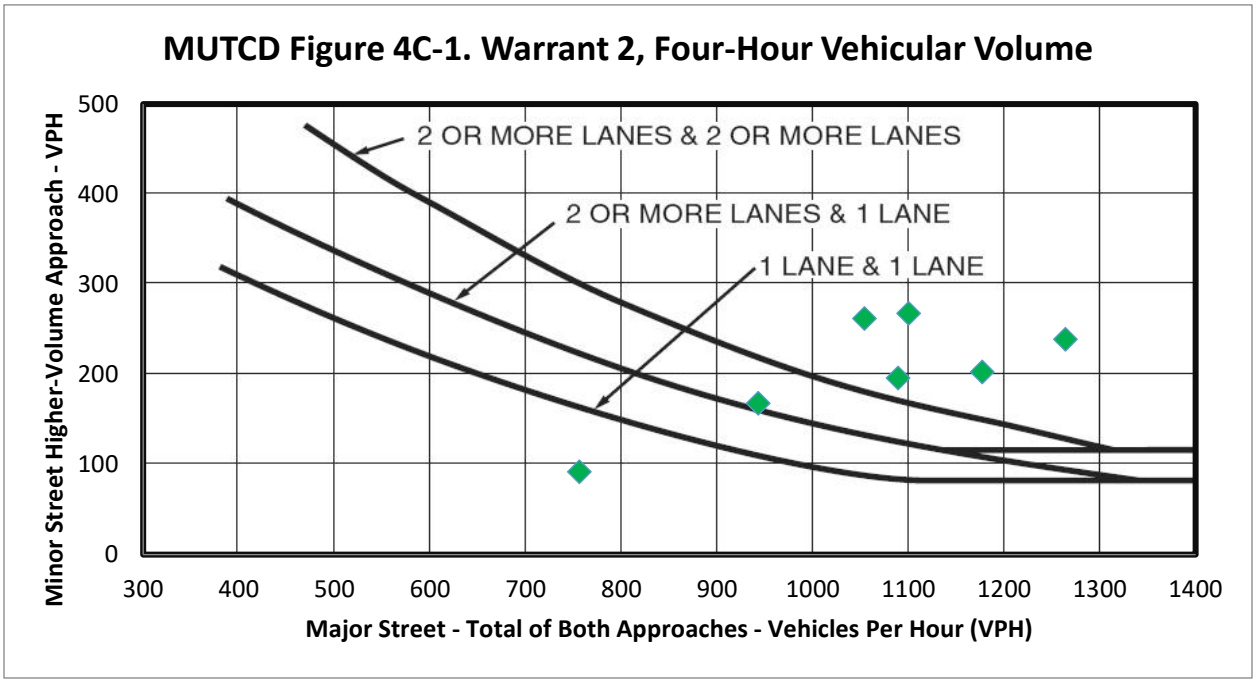
The Four-Hour Vehicular Volume Warrant was analyzed using two lanes for the westbound approach and one lane for the eastbound approach. According to the MUTCD, "the need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in *Figure 4C-1* for the existing combination of approach lanes. A factor of the highest peak hour using NDOT data from the Stewart Street (between Carson Street and Little Street) and Little Lane count locations was used to estimate off-peak traffic volumes. **Exhibit 4** and **Exhibit 5** show the preliminary Four-Hour Vehicular Volume Warrant analysis. The 7 highest PM hours were considered since the side-street approach volumes were much higher in the PM peak hour than the AM peak hour.

Exhibit 4: Eastbound Approach Four-Hour Warrant Analysis (2 or More Lanes & 1 Lane)



As shown in **Exhibit 4**, it is not anticipated that the combination of eastbound approach volumes and major street volume will meet the Four-Hour Vehicular Volume Warrant.

Exhibit 5: Westbound Approach Four-Hour Warrant Analysis (2 or More Lanes & 2 Lane)



As shown in **Exhibit 5**, it is anticipated that the 2040 volumes at the Stewart Street / Little Lane intersection will meet the Four-Hour Vehicular Volume Warrant for installing a traffic signal. This is a preliminary analysis based on the available data and estimated turning movement counts.

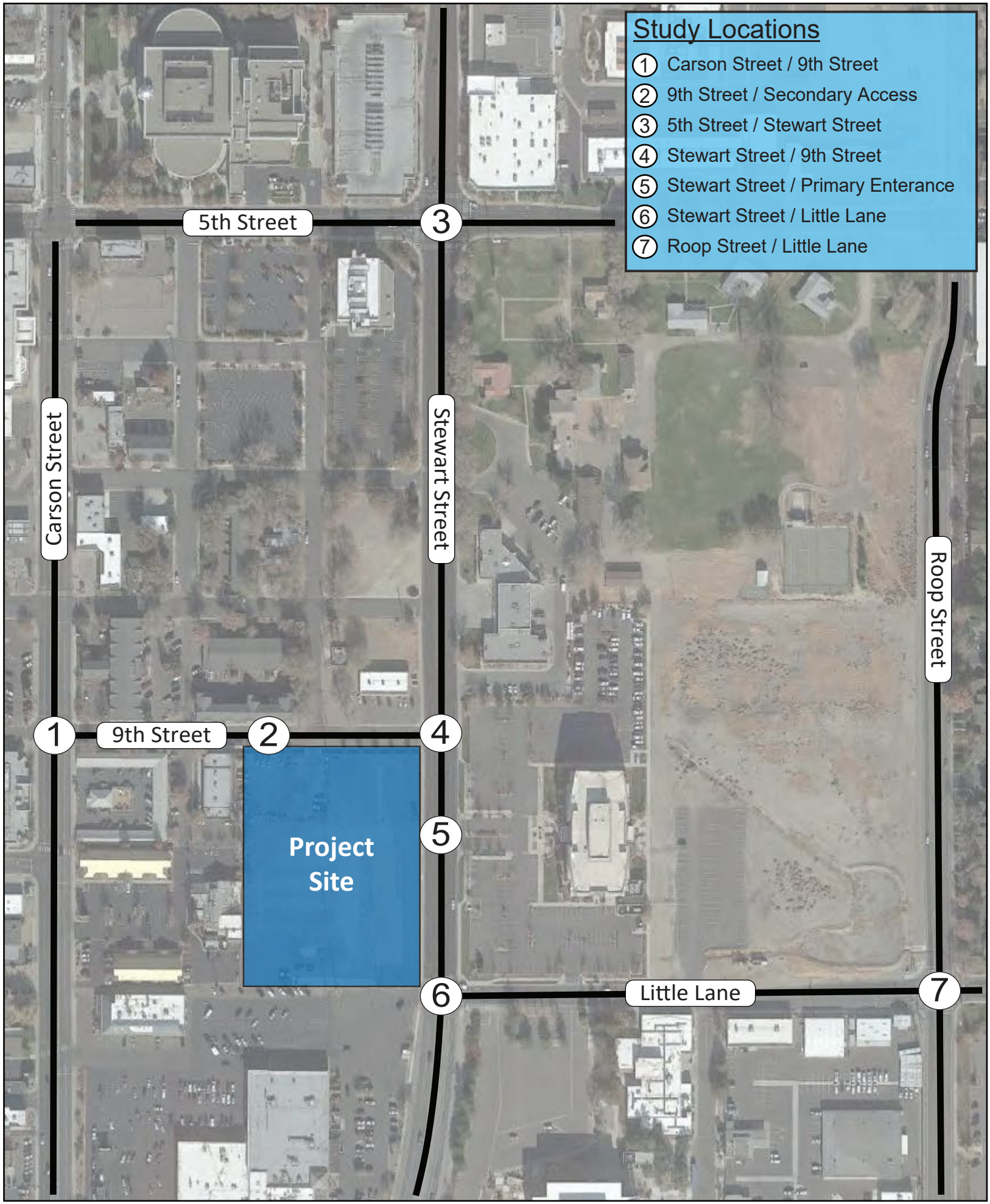
Since typical day traffic volumes could not be collected, it is our recommendation that the Four-Hour Vehicular Volume Warrant be revaluated approximately one year from now (end of 2021) when state offices are reopened and typical conditions reoccur. Doing so would confirm whether or not a signal is needed at this location.

CONCLUSIONS & RECOMMENDATIONS

The following is a list of key findings and recommendations:

- The proposed 254 unit multifamily site is anticipated to generate 1,859 Daily trips, 117 AM peak hour trips, and 142 PM peak hour new trips.
- Access is proposed via two project driveways, a primary access on Stewart Street and a secondary access on 9th Street. Both project driveways are proposed as side-street stop control with single-lane approaches. All turning movements are allowed and a center turn lane on Stewart Street will facilitate two-stage left-turns from the primary project driveway.
- Under Baseline conditions, all study intersections and movements operate at acceptable levels of service (LOS “D” or better).

- Under Future Year conditions, all study intersections are anticipated to operate at acceptable levels of service (LOS "D" or better) except for the eastbound approach at the Stewart Street / Little Lane intersection.
- With the addition of project traffic, all study movements and intersections will operate at acceptable levels of service (LOS "D" or better) except for the eastbound approach at the Stewart Street / Little Lane intersection. The eastbound approach will operate at poor levels of service with or without the project and the project would not add any traffic to the subject movement.
- Both Stewart Street / 5th Street and Roop Street / Little Lane intersections operate within acceptable levels of service and all movements operate at LOS "C" or better. Therefore, the current configuration of permissive left turns is deemed acceptable.
- Marked crosswalks are provided at 7th Street and Little Lane and are within 150 feet of the existing transit stops on the east side of Stewart Street. Additional crosswalks are not recommended.
- The project will widen Stewart Street along the property frontage to allow for future striping of a bike lane.
- It is anticipated that the 2040 volumes at the Stewart Street / Little Lane intersection will meet the Four-Hour Vehicular Volume Warrant for installing a traffic signal. This is a preliminary analysis based on the available data and estimated turning movement counts.
- Since typical day traffic volumes could not be collected, it is our recommendation that the Four-Hour Vehicular Volume Warrant be revaluated approximately one year from now (end of 2021) when state offices are reopened and typical conditions reoccur. The signal warrant analysis should consider existing traffic volumes and 10-Year Plus Project forecast volumes. Doing so would confirm whether or not a signal is needed at this location.



HEADWAY TRANSPORTATION

NO SCALE

Legend:

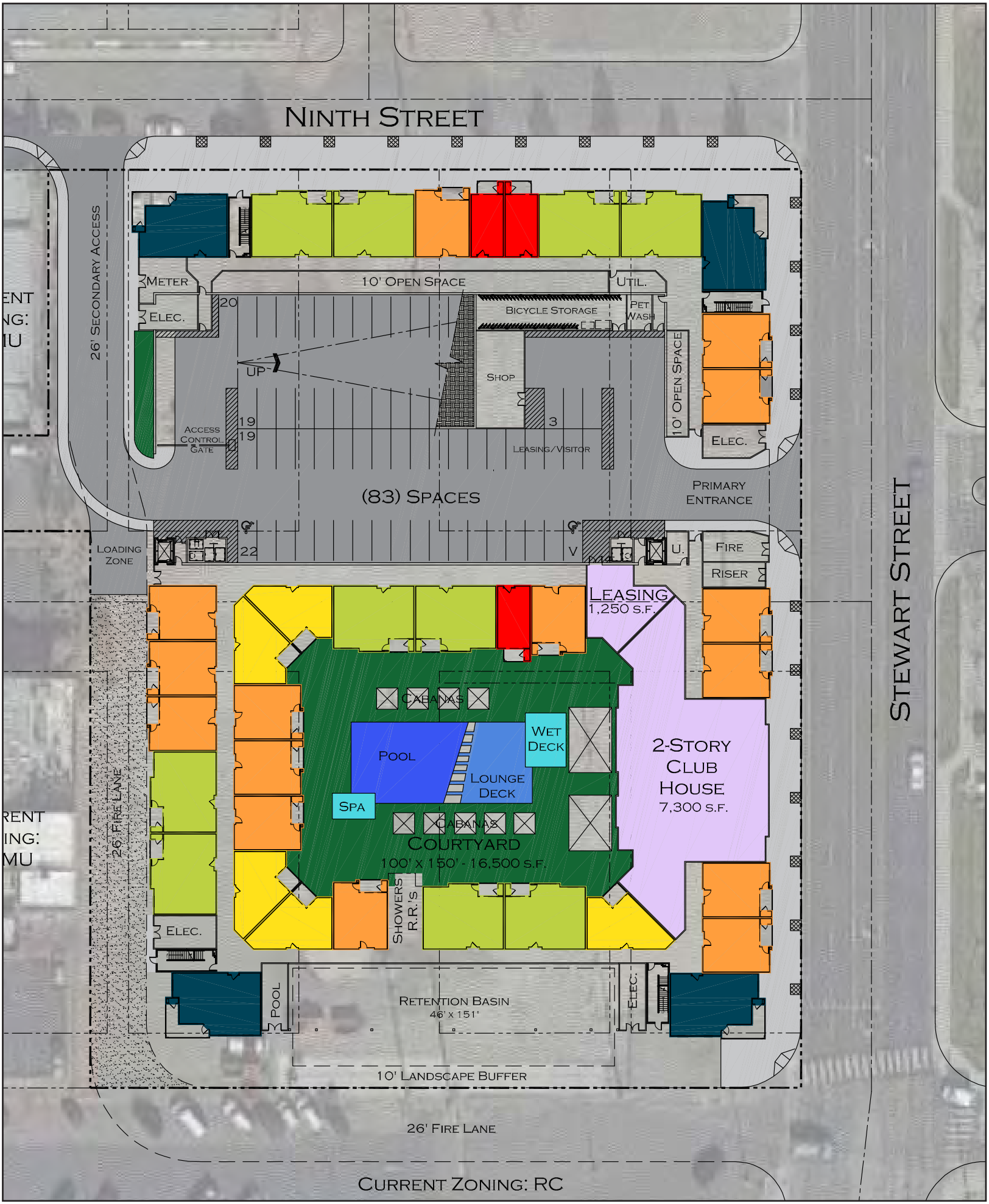
(#) Study Intersection

Project Site

Figure 1

Stewart Street Apartments
Traffic Impact Study

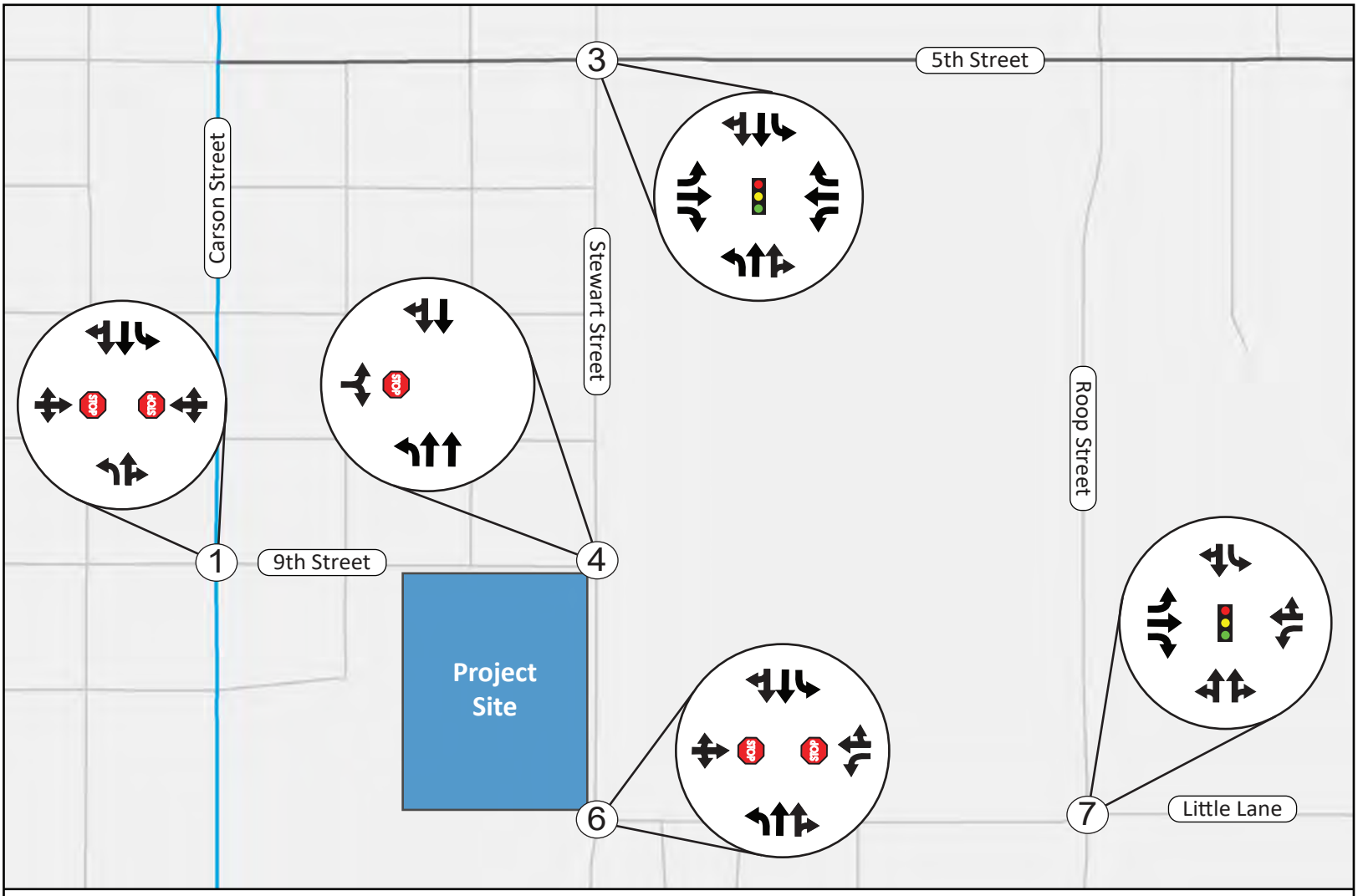
Project Site and Study Intersections

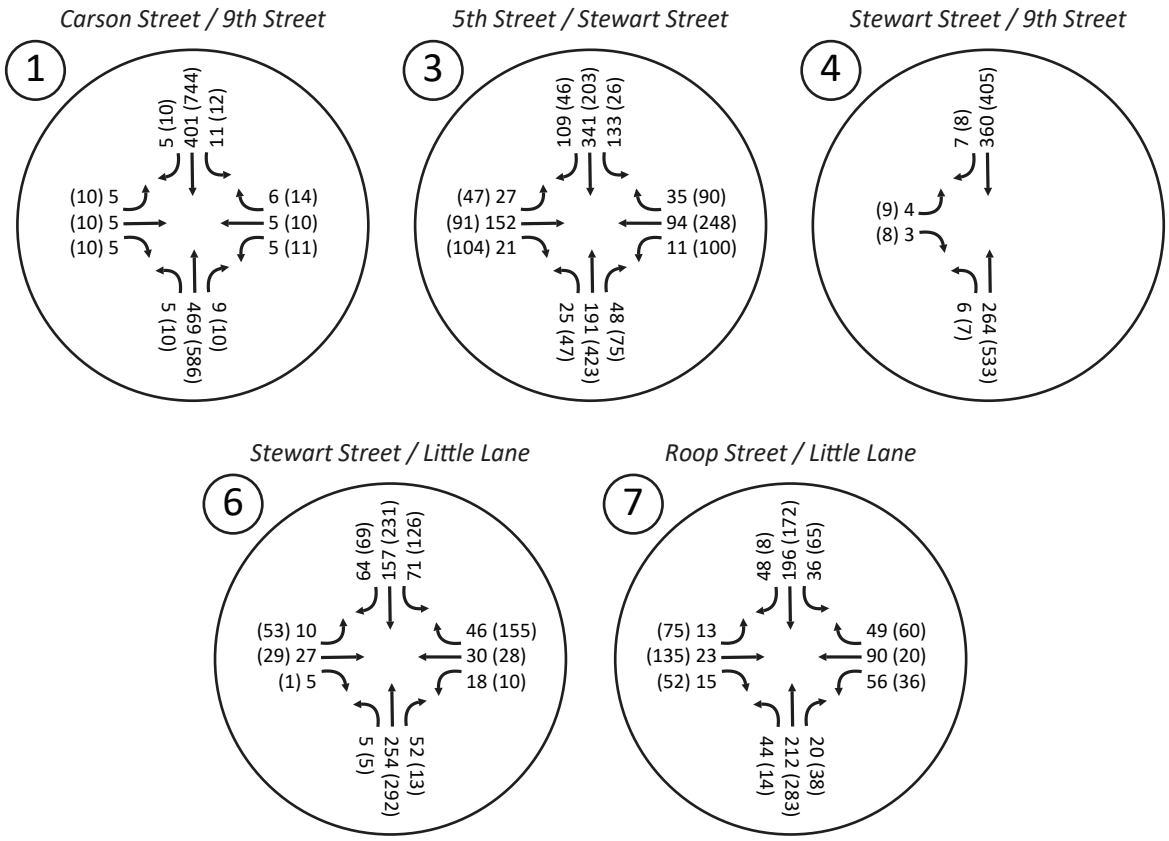


HEADWAY TRANSPORTATION

NO SCALE

Figure 2
Stewart Street Apartments
Traffic Impact Study
Preliminary Site Plan





AM Peak Hour Volume (PM Peak Hour Volume)

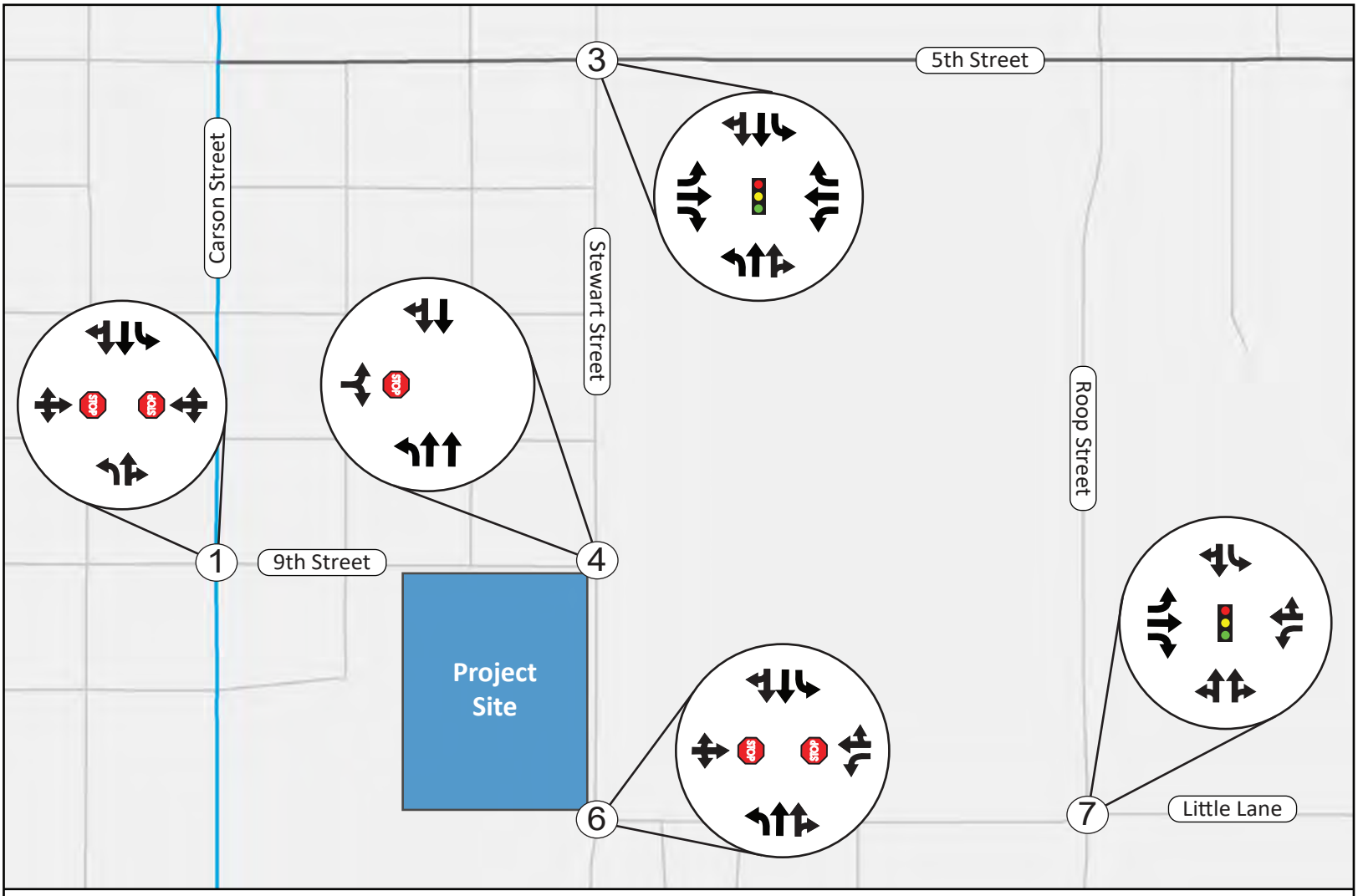
HEADWAY TRANSPORTATION

NO SCALE

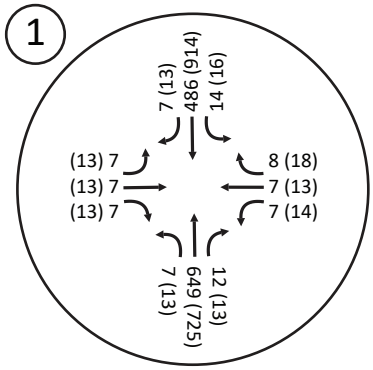
Figure 3

Stewart Street Apartments
Traffic Impact Study

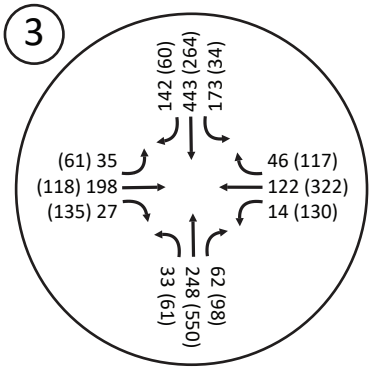
Baseline Traffic Volumes, Lane Configurations, and Controls



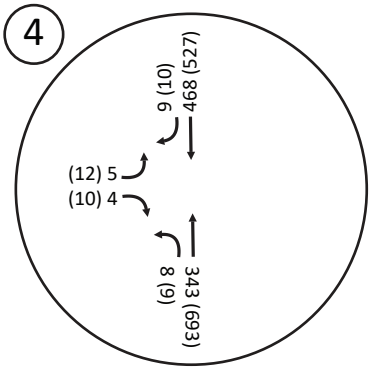
Carson Street / 9th Street



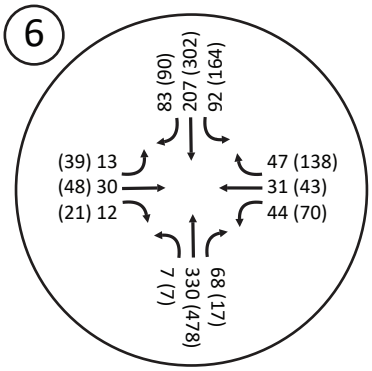
5th Street / Stewart Street



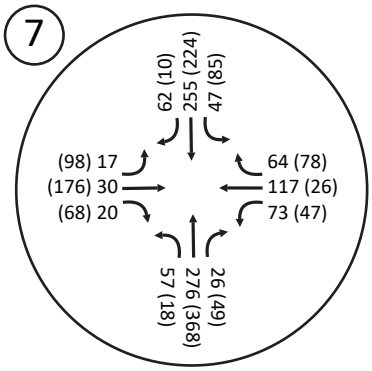
Stewart Street / 9th Street



Stewart Street / Little Lane



Roop Street / Little Lane

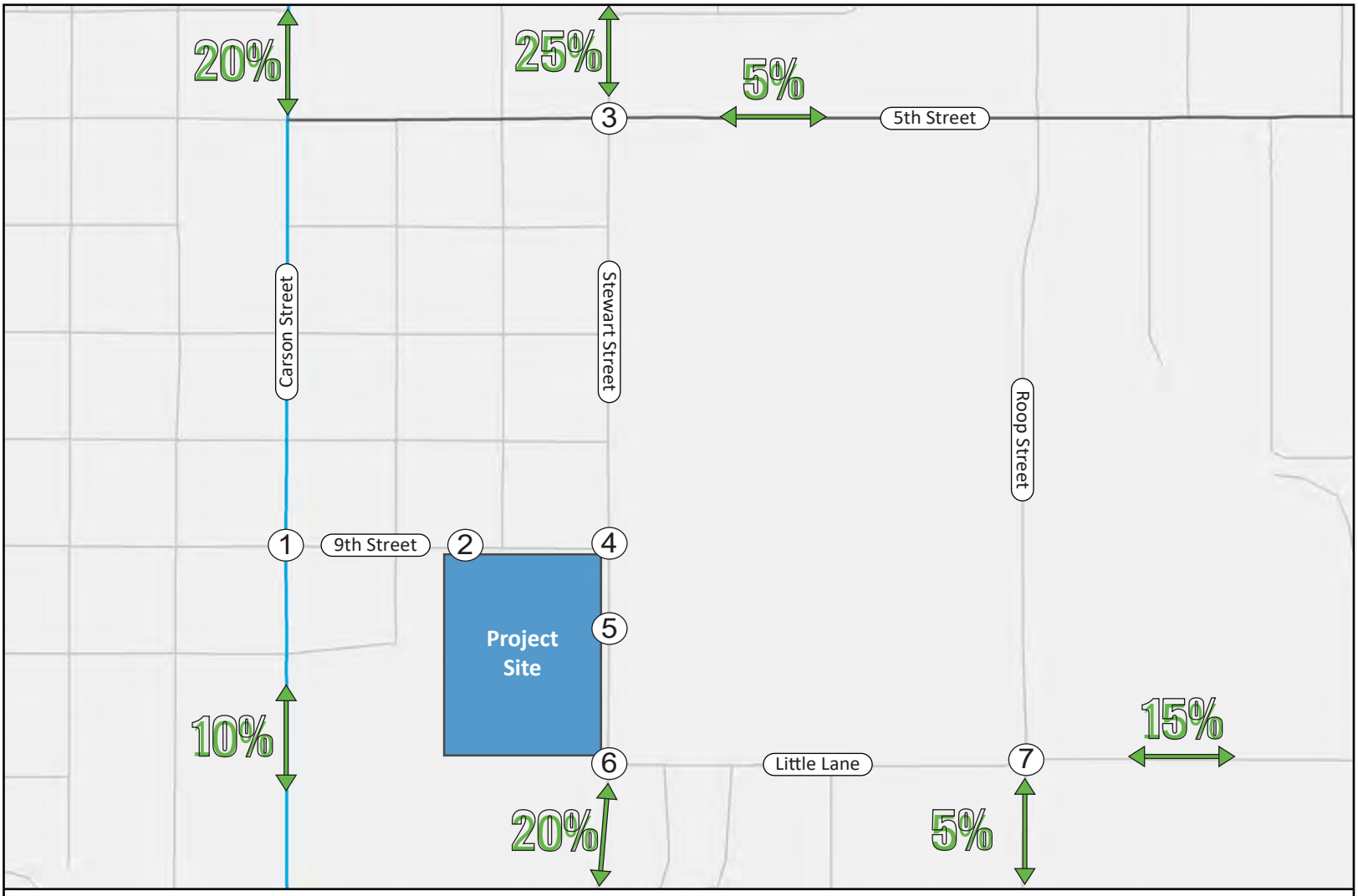


AM Peak Hour Volume (PM Peak Hour Volume)

HEADWAY TRANSPORTATION

NO SCALE

Figure 4
Stewart Street Apartments
Traffic Impact Study
Future Year Traffic Volumes, Lane Configurations, and Controls



Carson Street / 9th Street

1

2 (5)
4 (3)
6 (4)
2 (7)

5th Street / Stewart Street

3

7 (22)
(14) 4
1 (4)
14 (8)
23 (13)
5 (3)

Stewart Street / Primary Driveway

5

10 (33)
(20) 35
(22) 38
11 (37)

9th Street / Secondary Access

2

(12) 4
2 (7)
10 (7)
7 (4)

Stewart Street / 9th Street

4

2 (7)
10 (33)
(4) 7
35 (20)

Stewart Street / Little Lane

6

19 (11)
19 (11)
5 (17)
6 (20)

Roop Street / Little Lane

7

(8) 14
4 (13)
(3) 5
1 (4)

AM Peak Hour Volume (PM Peak Hour Volume)

HEADWAY TRANSPORTATION

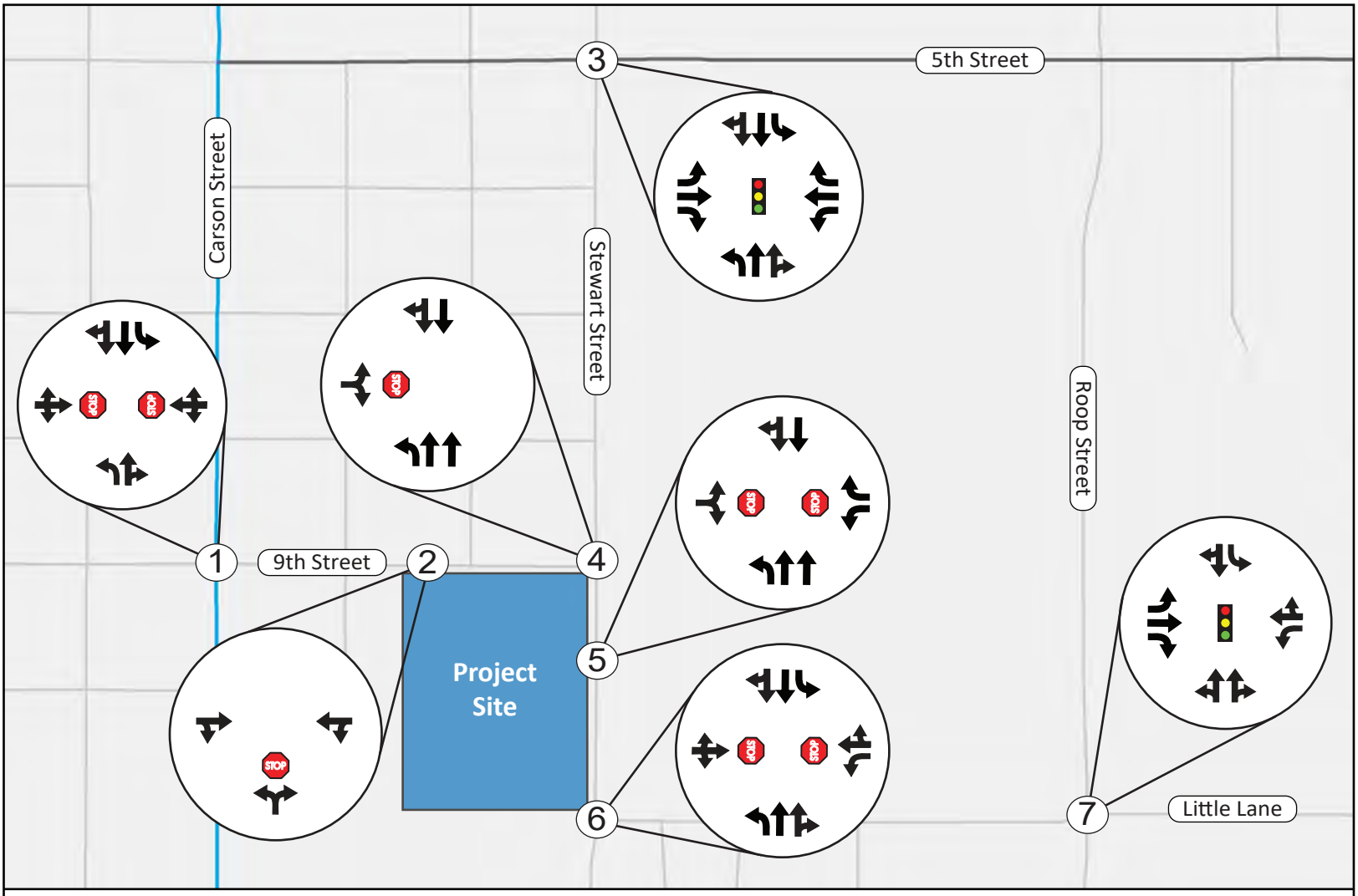
NO SCALE

XX% Trip Distribution

Figure 5

Stewart Street Apartments
Traffic Impact Study

Project Trip Distribution and Assignment



Carson Street / 9th Street

1

5 (10)
401 (744)
13 (17)
(10) 5
(10) 5
(10) 5
10 (17)
5 (10)
11 (15)
5 (10)
469 (586)
11 (17)

5th Street / Stewart Street

3

109 (46)
348 (225)
133 (26)
(47) 27
(91) 152
(118) 26
35 (90)
94 (248)
12 (104)
39 (55)
214 (436)
53 (78)

Stewart Street / Primary Driveway

5

11 (34)
275 (397)
88 (15)
(20) 35
(0) 0
(22) 38
29 (45)
0 (0)
19 (30)
11 (37)
241 (464)
56 (101)

9th Street / Secondary Access

2

(20) 14
(12) 4
12 (20)
2 (7)
10 (7)
7 (4)

Stewart Street / 9th Street

4

9 (15)
371 (439)
(13) 11
(8) 3
6 (7)
296 (553)

Stewart Street / Little Lane

6

64 (69)
178 (243)
90 (137)
(30) 10
(37) 23
(16) 9
41 (123)
24 (33)
34 (54)
5 (5)
260 (388)
52 (13)

Roop Street / Little Lane

7

48 (8)
196 (172)
96 (56)
(75) 13
(143) 37
(55) 20
49 (60)
94 (33)
56 (36)
45 (18)
212 (283)
20 (38)

AM Peak Hour Volume (PM Peak Hour Volume)

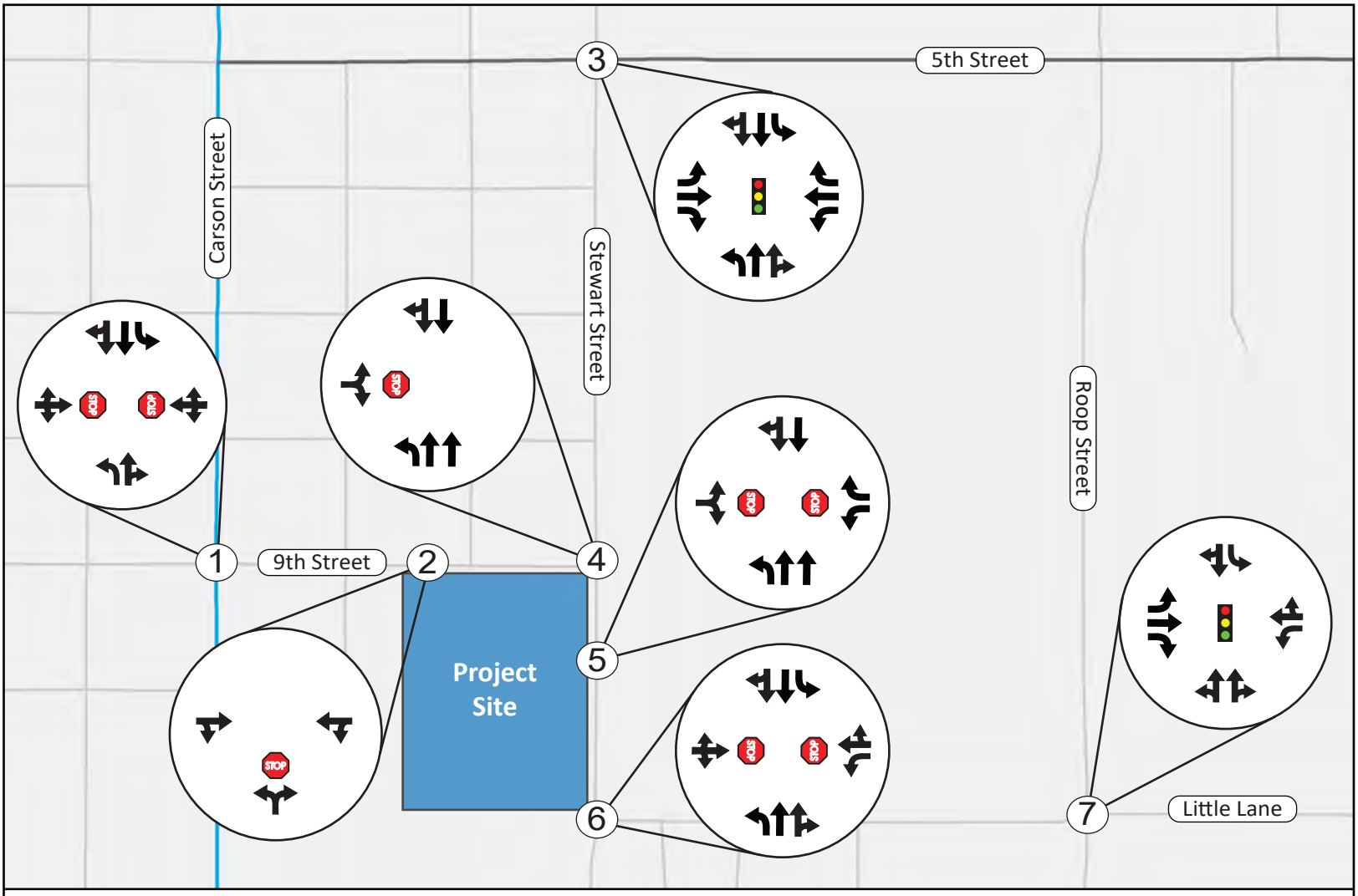
HEADWAY TRANSPORTATION

NO SCALE

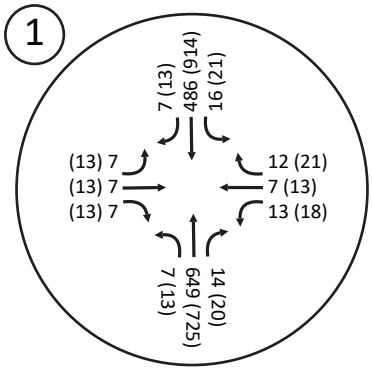
Figure 6

Stewart Street Apartments
Traffic Impact Study

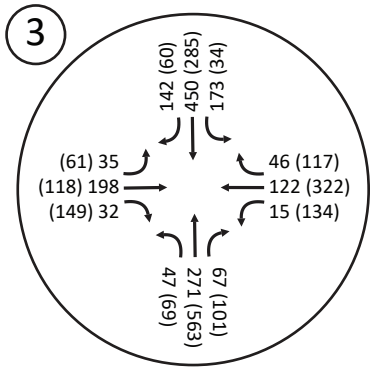
Baseline Plus Project Traffic Volumes, Lane Configurations, and Controls



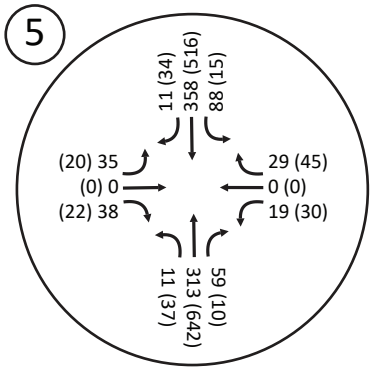
Carson Street / 9th Street



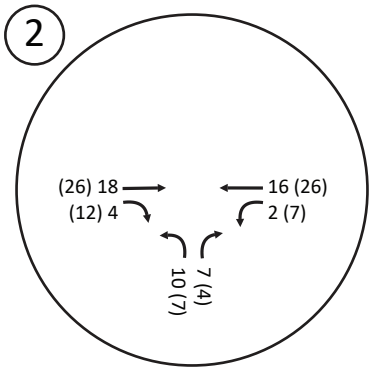
5th Street / Stewart Street



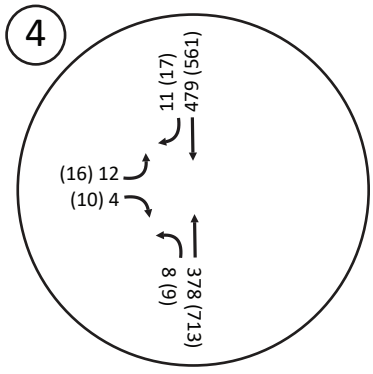
Stewart Street / Primary Driveway



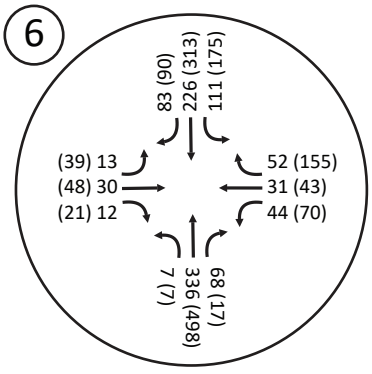
9th Street / Secondary Access



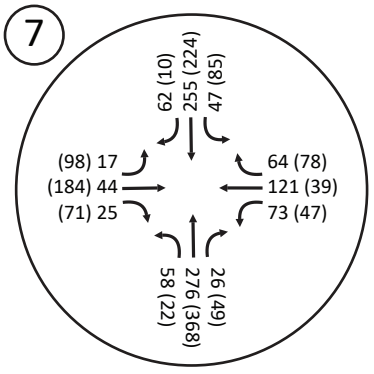
Stewart Street / 9th Street



Stewart Street / Little Lane



Roop Street / Little Lane



AM Peak Hour Volume (PM Peak Hour Volume)

HEADWAY TRANSPORTATION

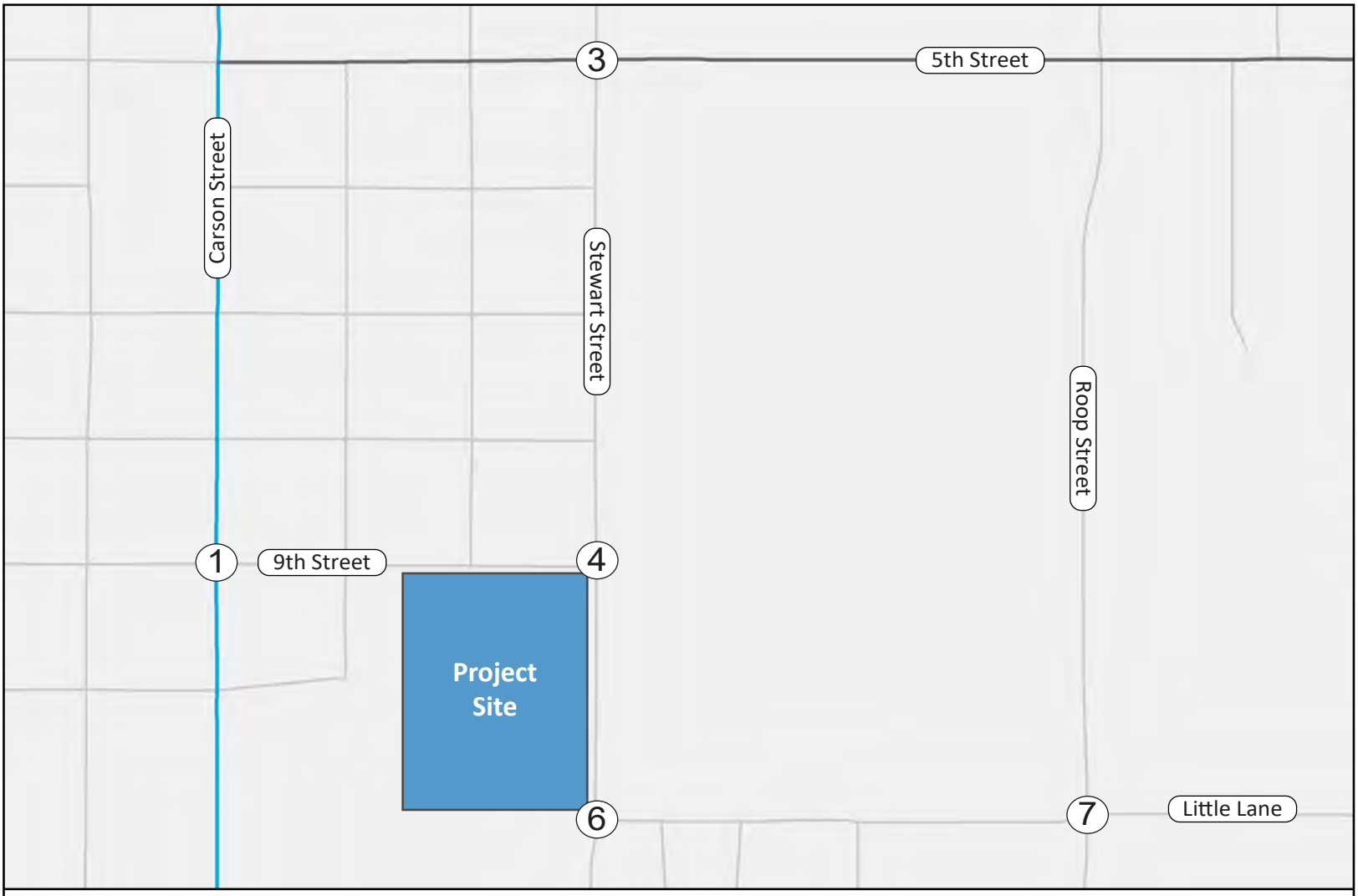
NO SCALE

Figure 7

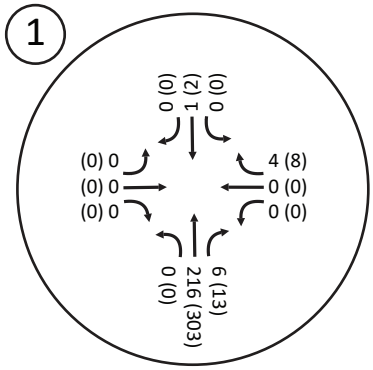
Stewart Street Apartments
Traffic Impact Study

Future Year Plus Project Traffic Volumes, Lane Configurations, and Controls

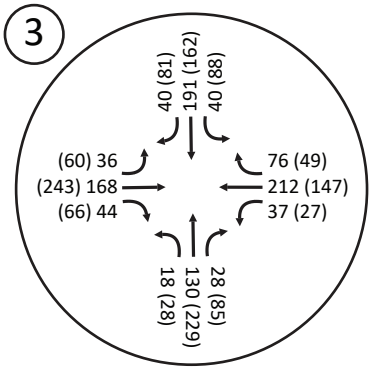
Appendix A
Collected Counts - October 2020



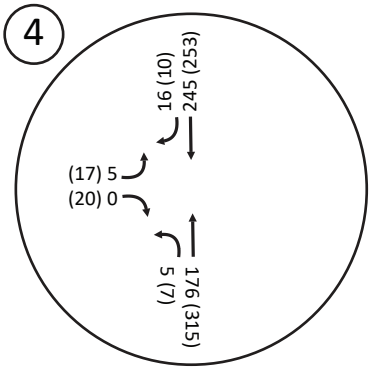
Carson Street / 9th Street



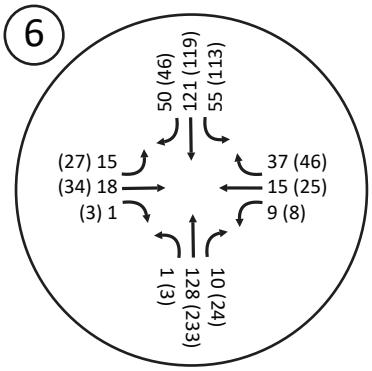
5th Street / Stewart Street



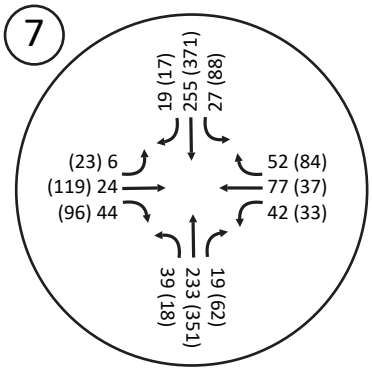
Stewart Street / 9th Street



Stewart Street / Little Lane



Roop Street / Little Lane



AM Peak Hour Volume (PM Peak Hour Volume)

Appendix B
Baseline Conditions LOS Calculations

Intersection Level Of Service Report
Intersection 1: Carson St / 9th St

Control Type:	Two-way stop	Delay (sec / veh):	16.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.018

Intersection Setup

Name	Carson St			Carson St			9th St			9th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Carson St			Carson St			9th St			9th St		
Base Volume Input [veh/h]	5	469	9	11	401	5	5	5	5	5	5	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	469	9	11	401	5	5	5	5	5	5	6
Peak Hour Factor	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	140	3	3	119	1	1	1	1	1	1	2
Total Analysis Volume [veh/h]	6	558	11	13	477	6	6	6	6	6	6	7
Pedestrian Volume [ped/h]	0			0			3			3		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			Yes	Yes
Number of Storage Spaces in Median	0	0	1	1

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.00	0.01	0.00	0.00	0.02	0.02	0.01	0.02	0.02	0.01
d_M, Delay for Movement [s/veh]	8.36	0.00	0.00	8.64	0.00	0.00	14.85	16.43	10.13	15.41	16.36	10.47
Movement LOS	A	A	A	A	A	A	B	C	B	C	C	B
95th-Percentile Queue Length [veh/ln]	0.02	0.00	0.00	0.04	0.00	0.00	0.13	0.13	0.13	0.14	0.14	0.14
95th-Percentile Queue Length [ft/ln]	0.42	0.00	0.00	0.99	0.00	0.00	3.29	3.29	3.29	3.51	3.51	3.51
d_A, Approach Delay [s/veh]	0.09			0.23			13.80			13.89		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	0.61											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 3: Stewart St / 5th St

Control Type:	Signalized	Delay (sec / veh):	11.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.242

Intersection Setup

Name	Stewart St			Stewart St			5th St			5th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	150.00	100.00	100.00	100.00	100.00	100.00	115.00	100.00	115.00	115.00	100.00	115.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Stewart St			Stewart St			5th St			5th St		
Base Volume Input [veh/h]	25	191	48	133	341	109	27	152	21	11	94	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	25	0	0	57	0	0	11	0	0	18
Total Hourly Volume [veh/h]	25	191	23	133	341	52	27	152	10	11	94	17
Peak Hour Factor	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	58	7	41	104	16	8	46	3	3	29	5
Total Analysis Volume [veh/h]	30	233	28	162	416	63	33	185	12	13	115	21
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	3			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			3		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	1			0			1			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	2	0	0	6	0	0	4	0	0	8	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	0	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	40	0	0	40	0	0	30	0	0	30	0
Amber [s]	0.0	4.1	0.0	0.0	4.1	0.0	0.0	3.4	0.0	0.0	3.4	0.0
All red [s]	0.0	2.8	0.0	0.0	2.8	0.0	0.0	2.4	0.0	0.0	2.4	0.0
Split [s]	0	33	0	0	33	0	0	32	0	0	32	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	2.5	0.0	0.0	2.5	0.0
Walk [s]	0	8	0	0	8	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	19	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	4.9	0.0	0.0	4.9	0.0	0.0	3.8	0.0	0.0	3.8	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
C, Cycle Length [s]	65	65	65	65	65	65	65	65	65	65	65	65
L, Total Lost Time per Cycle [s]	6.90	6.90	6.90	6.90	6.90	6.90	5.80	5.80	5.80	5.80	5.80	5.80
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	4.90	4.90	4.90	4.90	4.90	4.90	3.80	3.80	3.80	3.80	3.80	3.80
g_i, Effective Green Time [s]	42	42	42	42	42	42	10	10	10	10	10	10
g / C, Green / Cycle	0.65	0.65	0.65	0.65	0.65	0.65	0.16	0.16	0.16	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.03	0.07	0.07	0.14	0.13	0.13	0.03	0.10	0.01	0.01	0.06	0.01
s, saturation flow rate [veh/h]	923	1885	1805	1126	1885	1800	1287	1885	1581	1208	1885	1602
c, Capacity [veh/h]	634	1219	1167	777	1219	1164	200	298	250	150	298	253
d1, Uniform Delay [s]	6.30	4.36	4.37	6.31	4.66	4.67	28.88	25.55	23.22	30.77	24.54	23.35
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.08	0.08	0.08	0.08	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.14	0.18	0.19	0.61	0.37	0.39	0.28	1.57	0.06	0.18	0.61	0.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.11	0.11	0.21	0.20	0.20	0.16	0.62	0.05	0.09	0.39	0.08
d, Delay for Lane Group [s/veh]	6.44	4.54	4.56	6.92	5.03	5.06	29.17	27.13	23.28	30.95	25.15	23.45
Lane Group LOS	A	A	A	A	A	A	C	C	C	C	C	C
Critical Lane Group	No	No	No	Yes	No	No	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	0.17	0.52	0.52	0.94	1.04	1.01	0.49	2.70	0.16	0.20	1.59	0.27
50th-Percentile Queue Length [ft/ln]	4.27	13.10	12.94	23.42	26.10	25.22	12.37	67.58	3.89	5.06	39.66	6.85
95th-Percentile Queue Length [veh/ln]	0.31	0.94	0.93	1.69	1.88	1.82	0.89	4.87	0.28	0.36	2.86	0.49
95th-Percentile Queue Length [ft/ln]	7.69	23.58	23.30	42.15	46.98	45.39	22.26	121.65	7.01	9.10	71.40	12.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	6.44	4.55	4.56	6.92	5.04	5.06	29.17	27.13	23.28	30.95	25.15	23.45
Movement LOS	A	A	A	A	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	4.75			5.52			27.22			25.42		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	11.42											
Intersection LOS	B											
Intersection V/C	0.242											

Other Modes

g_Walk,mi, Effective Walk Time [s]	12.0	12.0	12.0	12.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	4741.48
d_p, Pedestrian Delay [s]	21.61	21.61	21.61	21.61
l_p,int, Pedestrian LOS Score for Intersection	2.509	2.637	2.273	2.483
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	803	803	806	806
d_b, Bicycle Delay [s]	11.65	11.64	11.59	11.58
l_b,int, Bicycle LOS Score for Intersection	1.820	2.135	1.957	1.835
Bicycle LOS	A	B	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 4: Stewart St / 9th St

Control Type:	Two-way stop	Delay (sec / veh):	11.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.009

Intersection Setup

Name	Stewart St		Stewart St		9th St	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	50.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00		35.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	Stewart St		Stewart St		9th St	
Base Volume Input [veh/h]	6	264	360	7	4	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	264	360	7	4	3
Peak Hour Factor	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	80	110	2	1	1
Total Analysis Volume [veh/h]	7	322	439	9	5	4
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.01	0.01
d_M, Delay for Movement [s/veh]	8.25	0.00	0.00	0.00	11.50	9.68
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.02	0.00	0.00	0.00	0.04	0.04
95th-Percentile Queue Length [ft/ln]	0.47	0.00	0.00	0.00	1.07	1.07
d_A, Approach Delay [s/veh]	0.18		0.00		10.69	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.20					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 6: Stewart St / Little Ln

Control Type:	Two-way stop	Delay (sec / veh):	19.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.104

Intersection Setup

Name	Stewart St			Stewart St			Little Ln			Little Ln		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Stewart St			Stewart St			Little Ln			Little Ln		
Base Volume Input [veh/h]	5	254	52	71	159	64	10	23	9	34	24	36
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	254	52	71	159	64	10	23	9	34	24	36
Peak Hour Factor	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	81	17	23	51	21	3	7	3	11	8	12
Total Analysis Volume [veh/h]	6	326	67	91	204	82	13	29	12	44	31	46
Pedestrian Volume [ped/h]	0			3			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	Yes
Number of Storage Spaces in Median	0	0	1	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.08	0.00	0.00	0.04	0.10	0.01	0.09	0.07	0.06
d_M, Delay for Movement [s/veh]	7.82	0.00	0.00	8.34	0.00	0.00	18.53	19.84	11.07	13.40	14.11	10.32
Movement LOS	A	A	A	A	A	A	C	C	B	B	B	B
95th-Percentile Queue Length [veh/ln]	0.01	0.00	0.00	0.25	0.00	0.00	0.56	0.56	0.56	0.31	0.44	0.44
95th-Percentile Queue Length [ft/ln]	0.35	0.00	0.00	6.32	0.00	0.00	13.94	13.94	13.94	7.65	10.92	10.92
d_A, Approach Delay [s/veh]	0.12			2.01			17.58			12.41		
Approach LOS	A			A			C			B		
d_I, Intersection Delay [s/veh]	3.42											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 7: Little Ln / Roop St

Control Type:	Signalized	Delay (sec / veh):	9.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.236

Intersection Setup

Name	Roop St			Roop St			Little Ln			Little Ln		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	75.00	100.00	75.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Roop St			Roop St			Little Ln			Little Ln		
Base Volume Input [veh/h]	44	212	20	36	196	48	13	23	15	56	90	49
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	10	0	0	25	0	0	8	0	0	25
Total Hourly Volume [veh/h]	44	212	10	36	196	23	13	23	7	56	90	24
Peak Hour Factor	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	66	3	11	61	7	4	7	2	18	28	8
Total Analysis Volume [veh/h]	55	265	13	45	245	29	16	29	9	70	113	30
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			2		
v_di, Inbound Pedestrian Volume crossing m	0			2			0			0		
v_co, Outbound Pedestrian Volume crossing	2			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			2		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			1			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	2	0	0	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	40	0	0	40	0	15	14	0	20	14	0
Amber [s]	0.0	3.7	0.0	0.0	3.7	0.0	3.0	3.4	0.0	3.0	3.4	0.0
All red [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.2	1.0	0.0	2.1	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	2.0	0.0	0.0	2.0	0.0	1.5	1.7	0.0	1.5	1.7	0.0
Walk [s]	0	7	0	0	8	0	0	7	0	0	8	0
Pedestrian Clearance [s]	0	13	0	0	16	0	0	16	0	0	15	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	3.7	0.0	0.0	3.7	0.0	3.2	2.4	0.0	3.1	2.4	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	R	L	C
C, Cycle Length [s]	27	27	27	27	27	27	27	27	27
L, Total Lost Time per Cycle [s]	5.70	5.70	5.70	5.70	5.20	4.40	4.40	5.10	4.40
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.70	3.70	3.70	3.70	3.20	2.40	2.40	3.10	2.40
g_i, Effective Green Time [s]	8	8	8	8	1	2	2	2	3
g / C, Green / Cycle	0.28	0.28	0.28	0.28	0.02	0.08	0.08	0.08	0.13
(v / s)_i Volume / Saturation Flow Rate	0.14	0.11	0.04	0.15	0.01	0.02	0.01	0.04	0.08
s, saturation flow rate [veh/h]	1054	1694	1108	1850	1795	1885	1562	1795	1816
c, Capacity [veh/h]	481	476	391	520	38	144	120	136	232
d1, Uniform Delay [s]	7.69	7.79	11.06	8.14	12.96	11.61	11.49	11.92	11.08
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.13	0.20	0.05	0.31	2.79	0.25	0.10	1.12	1.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.31	0.39	0.12	0.53	0.42	0.20	0.08	0.52	0.62
d, Delay for Lane Group [s/veh]	7.83	7.99	11.11	8.45	15.76	11.86	11.59	13.04	12.07
Lane Group LOS	A	A	B	A	B	B	B	B	B
Critical Lane Group	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.45	0.59	0.19	0.91	0.10	0.13	0.04	0.35	0.66
50th-Percentile Queue Length [ft/ln]	11.17	14.78	4.78	22.82	2.60	3.36	1.04	8.77	16.53
95th-Percentile Queue Length [veh/ln]	0.80	1.06	0.34	1.64	0.19	0.24	0.07	0.63	1.19
95th-Percentile Queue Length [ft/ln]	20.10	26.60	8.61	41.07	4.69	6.05	1.87	15.78	29.76

Movement, Approach, & Intersection Results

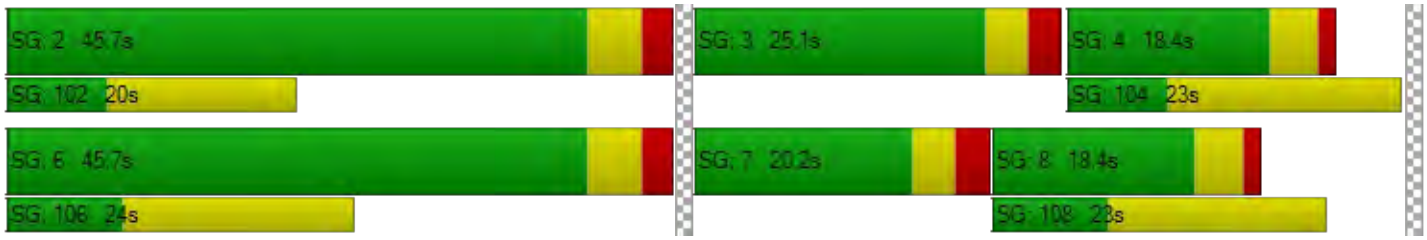
d_M, Delay for Movement [s/veh]	7.83	7.93	7.99	11.11	8.45	8.45	15.76	11.86	11.59	13.04	12.07	12.07
Movement LOS	A	A	A	B	A	A	B	B	B	B	B	B
d_A, Approach Delay [s/veh]	7.92			8.82			12.97			12.39		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	9.57											
Intersection LOS	A											
Intersection V/C	0.236											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	12.0	12.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	5508.85	0.00	4624.29
d_p, Pedestrian Delay [s]	34.67	33.80	33.80	34.67
l_p,int, Pedestrian LOS Score for Intersection	2.137	2.303	2.277	2.130
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	889	889	311	311
d_b, Bicycle Delay [s]	13.89	13.89	32.10	32.09
l_b,int, Bicycle LOS Score for Intersection	1.843	2.127	1.662	1.952
Bicycle LOS	A	B	A	A

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 1: Carson St / 9th St

Control Type:	Two-way stop	Delay (sec / veh):	23.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.050

Intersection Setup

Name	Carson St			Carson St			9th St			9th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

Volumes

Name	Carson St			Carson St			9th St			9th St		
Base Volume Input [veh/h]	10	586	10	12	744	10	10	10	10	11	10	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	586	10	12	744	10	10	10	10	11	10	14
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	168	3	3	214	3	3	3	3	3	3	4
Total Analysis Volume [veh/h]	11	674	11	14	855	11	11	11	11	13	11	16
Pedestrian Volume [ped/h]	0			0			2			2		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			Yes	Yes
Number of Storage Spaces in Median	0	0	1	1

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.00	0.02	0.01	0.00	0.05	0.05	0.02	0.05	0.05	0.02
d_M, Delay for Movement [s/veh]	9.70	0.00	0.00	9.03	0.00	0.00	22.59	22.96	13.01	20.28	22.90	12.08
Movement LOS	A	A	A	A	A	A	C	C	B	C	C	B
95th-Percentile Queue Length [veh/ln]	0.04	0.00	0.00	0.05	0.00	0.00	0.39	0.39	0.39	0.42	0.42	0.42
95th-Percentile Queue Length [ft/ln]	1.08	0.00	0.00	1.17	0.00	0.00	9.86	9.86	9.86	10.48	10.48	10.48
d_A, Approach Delay [s/veh]	0.15			0.14			19.52			17.72		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	0.96											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 3: Stewart St / 5th St

Control Type:	Signalized	Delay (sec / veh):	14.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.293

Intersection Setup

Name	Stewart St			Stewart St			5th St			5th St		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Entry Pocket Length [ft]	150.00	100.00	100.00	100.00	100.00	100.00	115.00	100.00	115.00	115.00	100.00	115.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Stewart St			Stewart St			5th St			5th St		
Base Volume Input [veh/h]	47	423	75	26	203	46	47	91	104	100	248	90
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	39	0	0	24	0	0	54	0	0	47
Total Hourly Volume [veh/h]	47	423	36	26	203	22	47	91	50	100	248	43
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	122	10	7	58	6	14	26	14	29	71	12
Total Analysis Volume [veh/h]	54	486	41	30	233	25	54	105	57	115	285	49
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	2			1			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			2			1		
v_co, Outbound Pedestrian Volume crossing	0			0			1			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			1			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	2	0	0	6	0	0	4	0	0	8	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	0	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	40	0	0	40	0	0	30	0	0	30	0
Amber [s]	0.0	4.1	0.0	0.0	4.1	0.0	0.0	3.4	0.0	0.0	3.4	0.0
All red [s]	0.0	2.8	0.0	0.0	2.8	0.0	0.0	2.4	0.0	0.0	2.4	0.0
Split [s]	0	33	0	0	33	0	0	32	0	0	32	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	2.5	0.0	0.0	2.5	0.0
Walk [s]	0	8	0	0	8	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	19	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	4.9	0.0	0.0	4.9	0.0	0.0	3.8	0.0	0.0	3.8	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0