SPIKETON PLAT
TRAFFIC IMPACT ANALYSIS

City of Buckley, WA

RECEIVED
AUG 17 2016

GREGARY B. HEATH
STATE OF WASHINGTON
37740
REGISTERED
PROFESSIONAL ENGINEER
8/15/16

Prepared for: Dave Evans
Evans Development West, LLC
PO Box 1744
Wenatchee, WA 98807

Revised
August 2016

2214 Tacoma Road Puyallup WA 98371 (253) 770 1401 Fax (253) 770 1473 heathtraffic.com

August 18, 2016

Kathy Thompson
City Planner
City of Buckley
P.O. Box 1960
Buckley, WA 98321

Subject: Spiketon Plat Traffic Impact Analysis – Revisions

Ms. Thompson

This letter is in response to comments from Dominic Miller with Gray & Osborne, Inc, dated July 6, 2016 with regards to the subject TIA. The following numbers correspond to the received comments.

16A. The mentioned 1 percent growth rate was used for estimating volumes at the proposed SR-165/112th/Ryan Road intersection. The growth rate was changed to 2 percent for consistency.

16B. Table 3 shows both the AM and PM peak hour LOS summaries, but both were labeled AM. This has been corrected.

16C. The revisions to the growth rate (see comment 16A) show lower delays and LOS. Mitigation measures are not needed.

Please call if you require anything further.

Sincerely,

Gregary B. Heath, P.E.

SPIKETON PLAT
TRAFFIC IMPACT ANALYSIS

TABLE OF CONTENTS

I. Introduction....3
II. Project Description....3
III. Existing Conditions....3
IV. Forecasted Traffic Demand and Analysis....10
V. Conclusions and Mitigation Measures....19

Appendix

LIST OF TABLES

1. Existing Level of Service....9
2. Project Trip Generation....11
3. Future 2020 Level of Service....18

LIST OF FIGURES

1. Vicinity Map & Roadway System....4
2. Site Plan....5
3. Existing AM Peak Hour Volumes....7
4. Existing PM Peak Hour Volumes....8
5. AM Trip Distribution & Assignment....12
6. PM Trip Distribution & Assignment....13
7. 2020 AM Peak Hour Volumes Without Project....14
8. 2020 PM Peak Hour Volumes Without Project....15
9. 2020 AM Peak Hour Volumes With Project....16
10. 2020 PM Peak Hour Volumes With Project....17

SPIKETON PLAT
TRAFFIC IMPACT ANALYSIS

I. INTRODUCTION

This report summarizes traffic impacts related to the proposed Spiketon Plat. The general goals of this impact study concentrate on 1) the assessment of existing roadway conditions and intersection congestion, 2) forecasts of newly generated project traffic, 3) estimations of future delay, and 4) recommendations for mitigation. Preliminary tasks include the detailed collection of roadway information, road improvement information, and peak hour traffic counts. A level of service analysis for existing traffic conditions is then made to determine the present degree of intersection congestion. Based on this analysis, forecasts of future traffic levels on the surrounding street system are found. Following this forecast, the future service levels for the key intersections are investigated. As a final step, applicable conclusions and possible on-site or off-site mitigation measures are defined. The findings of this study are intended to ensure safe and efficient progression of vehicular and non-motorist traffic near the site.

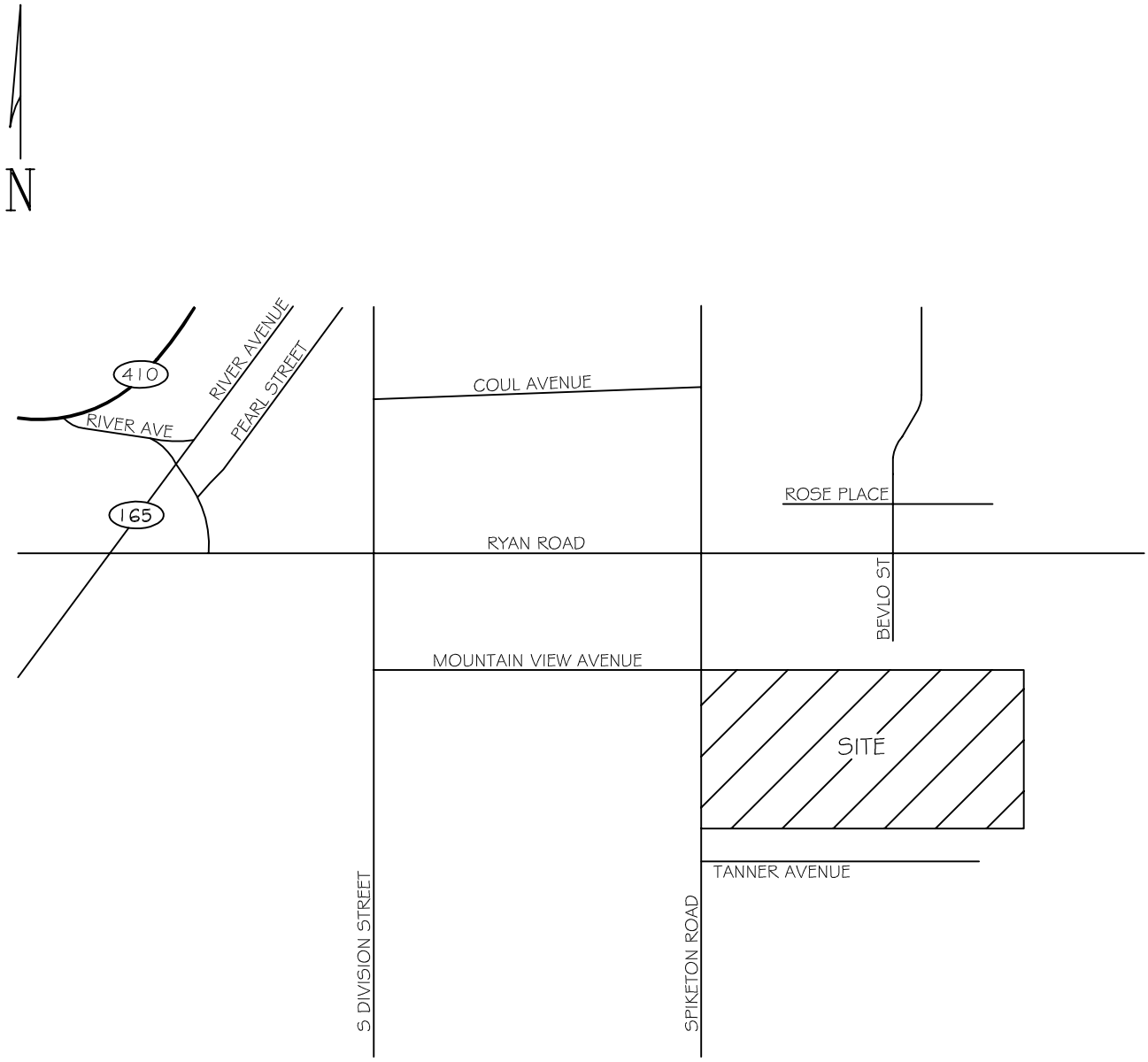
II. PROJECT DESCRIPTION

Spiketon Plat is a proposed 63-lot single family residential subdivision located on the east side of Spiketon Road, just north of the Tanner Avenue intersection on tax parcel number 0619101076 in the City of Buckley. Access is proposed via a new local road from Spiketon Road. The development includes a new north-south collector arterial that will eventually connect through adjacent properties to Tanner Avenue to the south and to Ryan Road (via Bevlo Street) to the north. Secondary emergency-vehicle only access will be provided to Bevlo Street, or if easements are not able to be obtained, through Tract C to Spiketon Road. Land uses surrounding the site are primarily residential with downtown Buckley to the north. The anticipated buildout year is assumed to be 2020, with 2020 chosen as the horizon year for a 5-year outlook. Figure 1 shows the site location and primary arterials serving the site. The general configuration of the project is shown on the site plan in Figure 2.

III. EXISTING CONDITIONS

A. Existing Street System

The street network serving the proposed project consists of a variety of roadways. Streets near the site mainly consist of two-lane and major arterials. Characteristics for these roadways vary with respect to lane widths, grades, speeds, and function. Differences are based on specific designations and proximity to major employment areas in the region. The major roadways and arterials surrounding the site are described below.



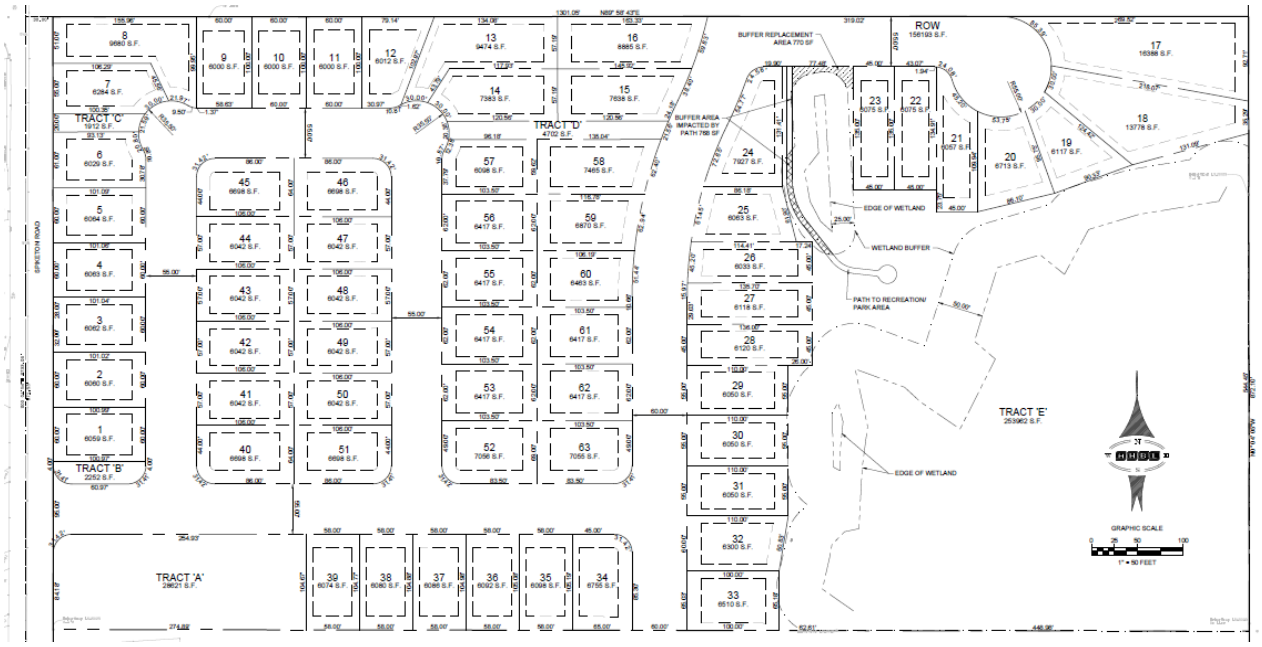
SPIKETON PLAT

HEATH & ASSOCIATES, INC
Transportation and Civil Engineering

VICINITY MAP & ROADWAY SYSTEM

FIGURE 1

N



SPIKETON PLAT

HEATH & ASSOCIATES, INC
Transportation and Civil Engineering

SITE PLAN

FIGURE 2

Ryan Road is an east-west, two-lane roadway that lies to the north of the site. The posted speed limit is 25 mph. Paving consists of asphalt concrete with lanes widths around 11 feet. Shoulders are curb and gutter with sidewalks provided in most areas. East of Spiketon Road shoulders transition in grass/gravel. Bike lanes are provided in areas. On street parking is also provided along portions of the roadway. Grades are mild in the area.

S Division Street is a north-south, two-lane residential roadway that lies to the west of the site with a posted speed limit of 25 mph. Shoulders are primarily grass/gravel with space for parking. Paving is asphalt concrete and lane widths are around 10 feet. Sidewalks are available in areas. The grade of the road is generally level.

Spiketon Road is a north-south, two-lane residential roadway that borders the west side of the site. The speed limit of 25 mph. Shoulders are primarily grass/gravel. Paving is asphalt concrete and lane widths are around 10 feet. The grade of the road is generally level. Sidewalks are provided in areas.

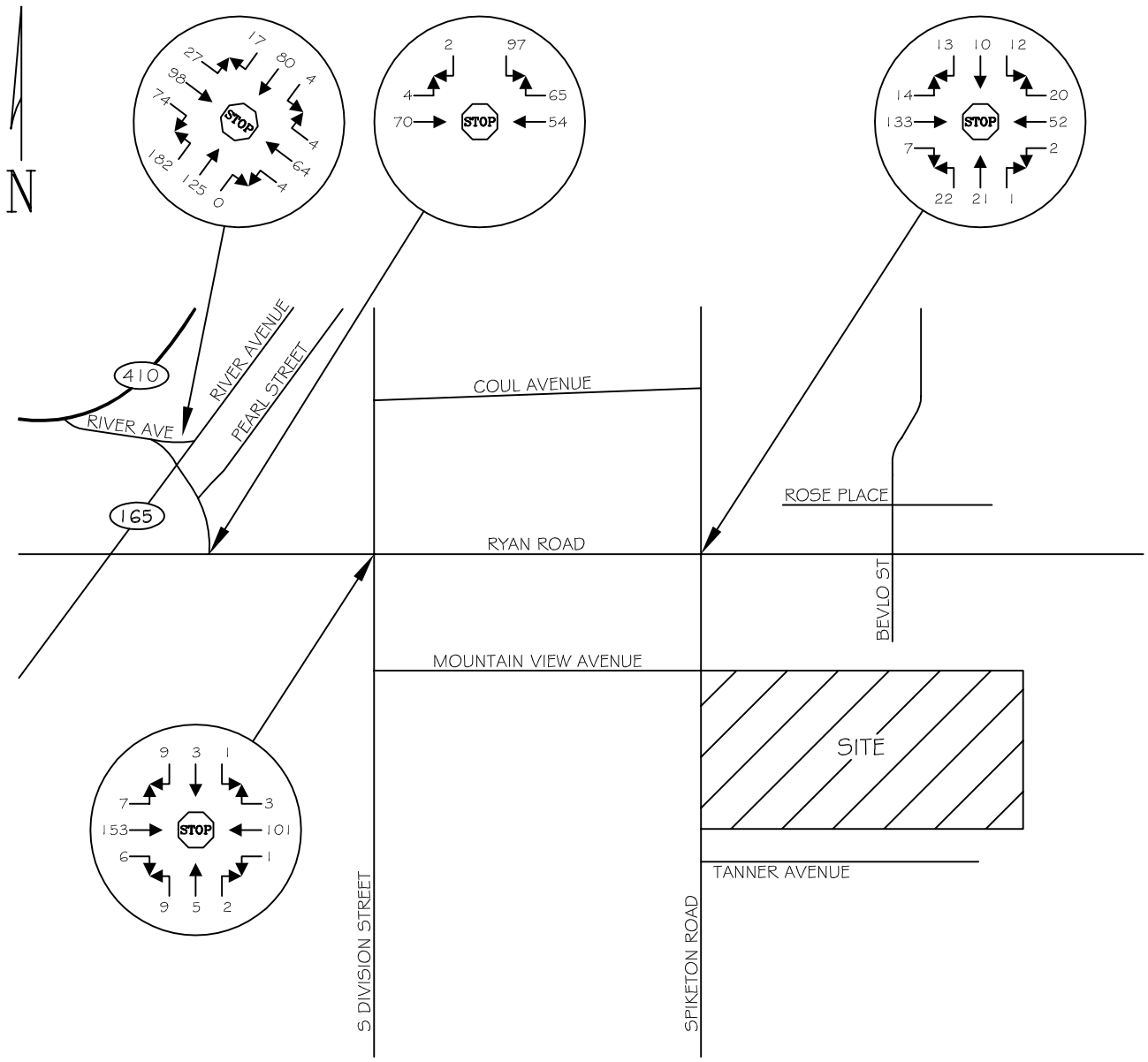
B. Existing Peak Hour Volumes

Field data for this study was collected between November of 2015. Traffic counts were taken during the morning peak period between the hours of 7 AM and 9 AM, and during the evening peak between 4 PM and 6 PM. These specific peak periods were targeted for analysis purposes since they generally represent a worst case scenario for residential developments with respect to traffic conditions. This is primarily due to the common 8 AM to 5 PM work schedule and the greater number of recreation and shopping trips associated with the late afternoon period. Residents typically return home after work at approximately the same time of day, between 5 PM and 6 PM, which translates to a natural peak in intersection traffic loads. Figure 3 and Figure 4 on the following pages show the peak hour counts taken at the primary intersections identified for potential traffic impacts associated with project traffic.

C. Existing Level of Service

Existing peak hour delays were determined using the *Highway Capacity Manual*. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. LOS is defined for a variety of facilities including intersections, freeways, arterials, etc. A complete definition of level of service and related criteria can be found in the HCM.

The methodology for determining the LOS at unsignalized intersections strives to determine the potential capacities for the various vehicle movements and ultimately determines the average total delay for each movement. *Potential Capacity* represents the number of additional vehicles that could effectively utilize a particular movement, which is essentially the equivalent of the difference between the movement capacity and the existing movement volume. *Total delay* is described as the elapsed time from when a vehicle stops at the end of a queue until the vehicle departs from the stop line. *Average*

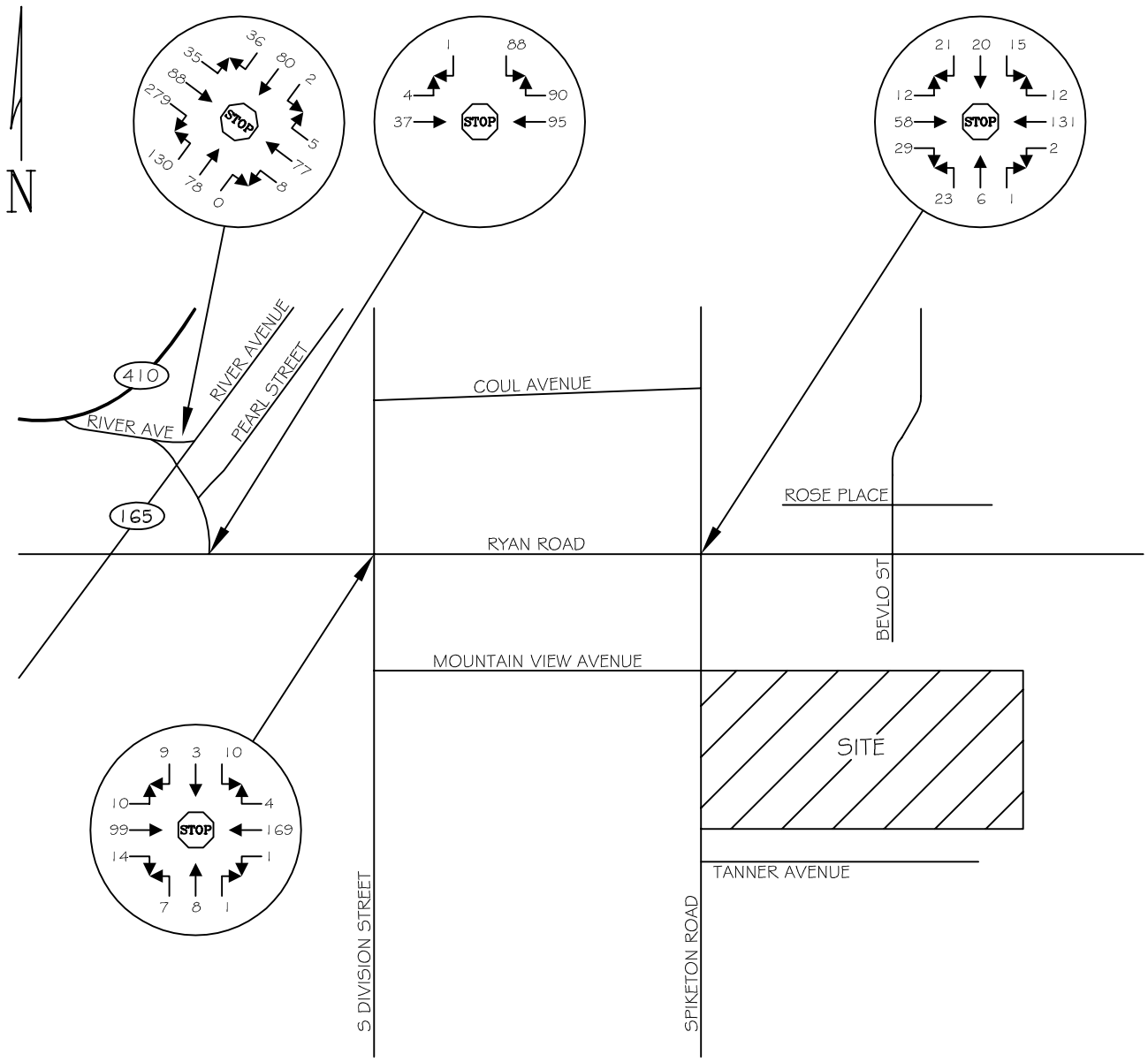


SPIKETON PLAT

HEATH & ASSOCIATES, INC
Transportation and Civil Engineering

EXISTING AM PEAK HOUR VOLUMES

FIGURE 3



SPIKETON PLAT

HEATH & ASSOCIATES, INC
Transportation and Civil Engineering

EXISTING PM PEAK HOUR VOLUMES

FIGURE 4

total delay is simply the mean total delay over the entire stream. A number of factors influence potential capacity and total delay including the availability/usefulness of gaps.

The range for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating the worst conditions with heavy control delays. Existing LOS is shown below in Table 1. This analysis involved the *Synchro* computer analysis program, which is based on the 2010 Highway Capacity Manual.

TABLE 1
Existing Level of Service
Delays given in seconds per vehicle

Intersection	*Control*	*Approach*	*LOS*	*Delay*
AM Peak Hour				
SR-165/Ryan/River	Stop	Eastbound	B	10.2
		Westbound	A	9.2
		Northbound	B	12.1
		Southbound	A	9.0
		Overall	B	10.8
Ryan Rd/River Ave	Stop	Eastbound LT	A	7.5
		Southbound	B	10.6
Ryan Rd/Division St	Stop	Eastbound LT	A	7.5
		Westbound LT	A	7.6
		Northbound	B	11.4
		Southbound	A	9.9
Ryan Rd/Spiketon Road	Stop	Eastbound LT	A	7.4
		Westbound LT	A	7.6
		Northbound	B	11.4
		Southbound	A	10.3
PM Peak Hour				
SR-165/Ryan/River	Stop	Eastbound	B	14.0
		Westbound	A	9.7
		Northbound	B	11.7
		Southbound	A	9.9
		Overall	B	12.4
Ryan Rd/River Ave	Stop	Eastbound LT	A	7.7
		Southbound	B	10.7
Ryan Rd/Division St	Stop	Eastbound LT	A	7.7
		Westbound LT	A	7.5
		Northbound	B	11.8
		Southbound	B	11.1
Ryan Rd/Spiketon Road	Stop	Eastbound LT	A	7.7
		Westbound LT	A	7.4
		Northbound	B	11.9
		Southbound	A	11.2

As shown in Table 1, existing delays are generally mild with delays at LOS A to LOS B. The SR-165/Ryan Road/River Avenue intersection has some unconventional geometry

that was modeled differently than actual operations. The eastbound movement (SR-165, coming from SR-410) has free through movements and right turns while left turns are effectively a two stage movement in order to turn onto River Avenue. The southbound, westbound, and northbound legs are stop controlled. Limitations in the Synchro program prevents as-is analysis. To estimate delays and build in being conservative the eastbound movement was considered stop controlled as well, with free right turns. This will overestimate eastbound through delays (which are actually free) and impact delays at the other three legs.

City of Buckley plans show improvements are scheduled for the SR-165/River Avenue/Ryan Road conjunction. At full buildout the project will realign SR-165 to intersect SR-410 with a traffic signal at this intersection and improve alignment of SR-165/Ryan Road/122th Street. Future delay analysis assumed this project completed.

D. Pedestrian and Bicycle Activity

Pedestrian and bicycle activity was observed in the vicinity of the project during peak hours of travel. Observations were made during routine peak hour movement counts and during site visits. Mild to moderate pedestrian and bicycle volumes were noted in the area. The growing availability of pedestrian facilities, generally in the form of sidewalks, crosswalks, and bike lanes, help minimize any potential conflict between motorist and non-motorist traffic.

E. Public Transit

A review of the Pierce Transit regional bus schedule shows transit service is not provided in the area.

F. Sight Distance at Access Driveways

The project will have a new primary access constructed onto Spiketon Road. A preliminary examination of the access point onto Spiketon Road was made to determine whether adequate entering sight distance is provided for project traffic. The posted speed limit of both these roadways is 25 mph. In accordance with AASHTO Green Book standards, a minimum entering sight distance of 280 feet is typically required for a 25 mph design speed. Based on preliminary measurements, requirements are met at the project entrance. The area has minimal vertical curvature and no horizontal curvature. With no other sight distance hindrances present, sight distance requirements are easily met.

IV. FORECASTED TRAFFIC DEMAND AND ANALYSIS

A. Trip Generation

Trip generation is used to determine the magnitude of project impacts on the surrounding street system. This is usually denoted by the quantity or specific number of new trips that enter and exit a project during a designated time period, such as a specific peak hour (AM or PM) or an entire day. Data presented in this report was taken from the Institute of Transportation Engineer's publication *Trip Generation*, Ninth Edition. The designated lane use for this project is defined as Single Family Detached Housing (LUC 210). Data for the AM and PM peak hours were used for estimation purposes and was applied to the intersection network for future capacity analysis. Table 2 gives a summary of the estimated project trip generation. Included are the average weekday volume and the AM and PM peak hour volumes.

TABLE 2
Project Trip Generation
63 Single Family Units

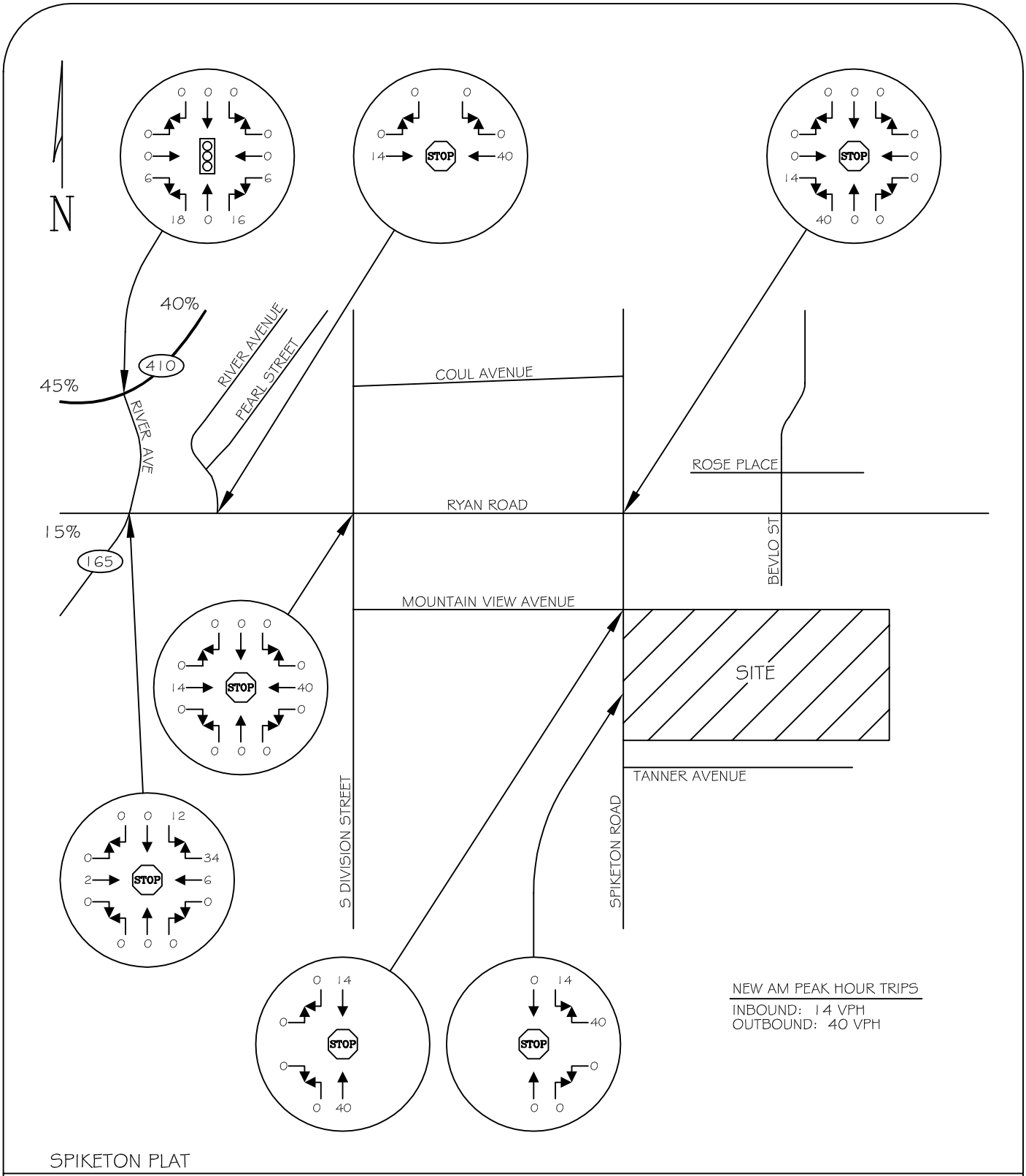
Time Period	*Volume*
AWDT	687 vpd
AM Peak Inbound	14 vph
AM Peak Outbound	40 vph
AM Peak Total	54 vph
PM Peak Inbound	43 vph
PM Peak Outbound	26 vph
PM Peak Total	69 vph

B. Trip Assignment and Distribution

The destination and origination of the generated traffic primarily influences the project entrances and the key intersections which would effectively receive the majority of project related traffic. In traffic engineering, trip assignment and distribution is used to determine and apply the expected future project traffic to the road system and the primary roadways. The trips generated by the project are expected to follow the general patterns as shown in Figure 5 and Figure 6 on the following pages. Percentages are generally based on the nearby roadway network and existing traffic volumes.

C. Future Traffic Volumes With and Without the Project

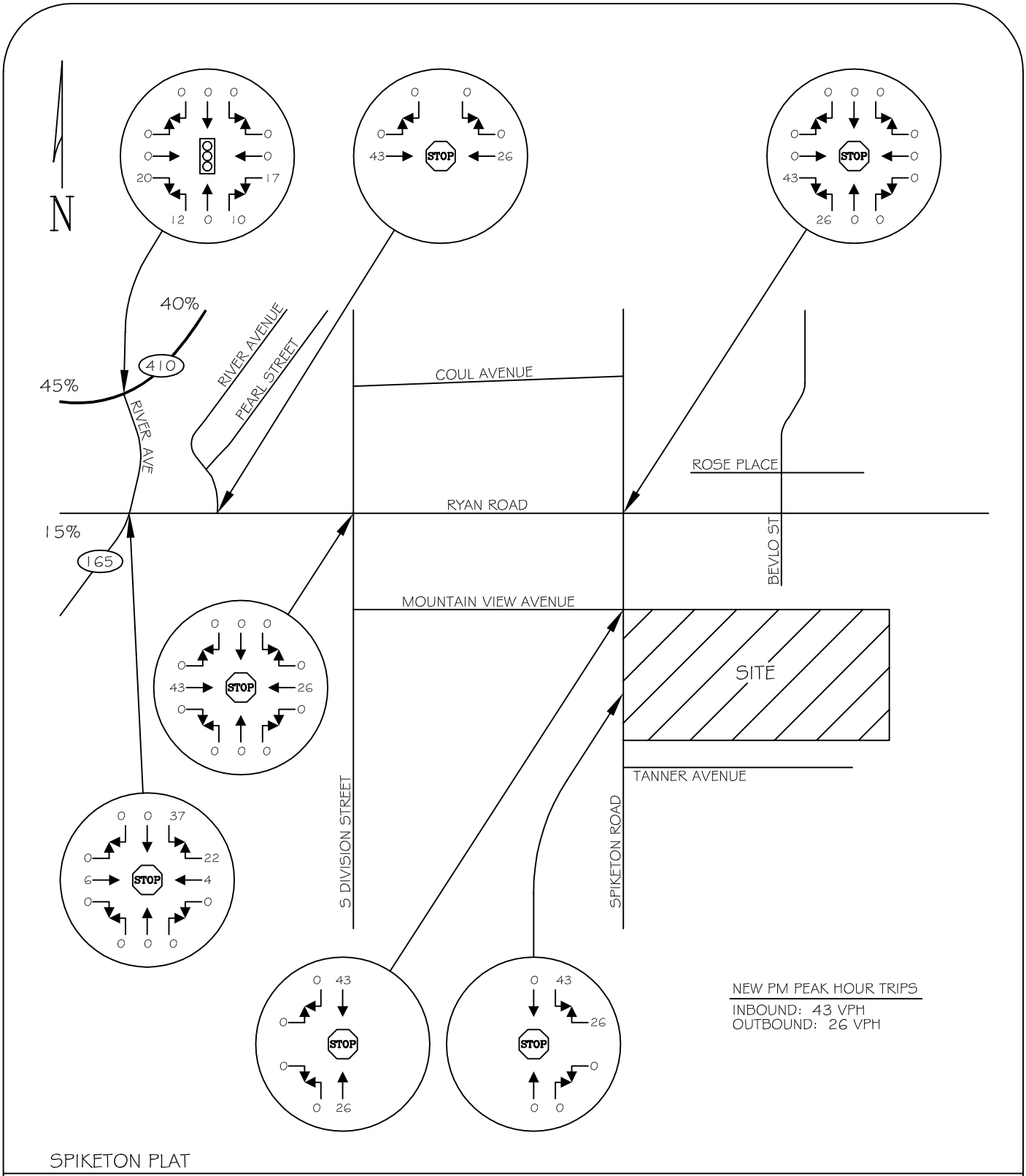
The year 2020 was used for a 5 year horizon year for future traffic delay analysis. Future 2020 traffic volumes without the project were derived by applying a 2.0 percent growth rate per year to the existing traffic volumes shown in Figure 3. This rate in conservative based on WSDOT data for the area outlined in the latest Annual Traffic Report, which show little to no growth in the along SR-165. The applicable WSDOT data can be found in the appendix. Future 2020 volumes without project traffic are shown in Figure 7 and



HEATH & ASSOCIATES, INC
Transportation and Civil Engineering

AM TRIP DISTRIBUTION & ASSIGNMENT

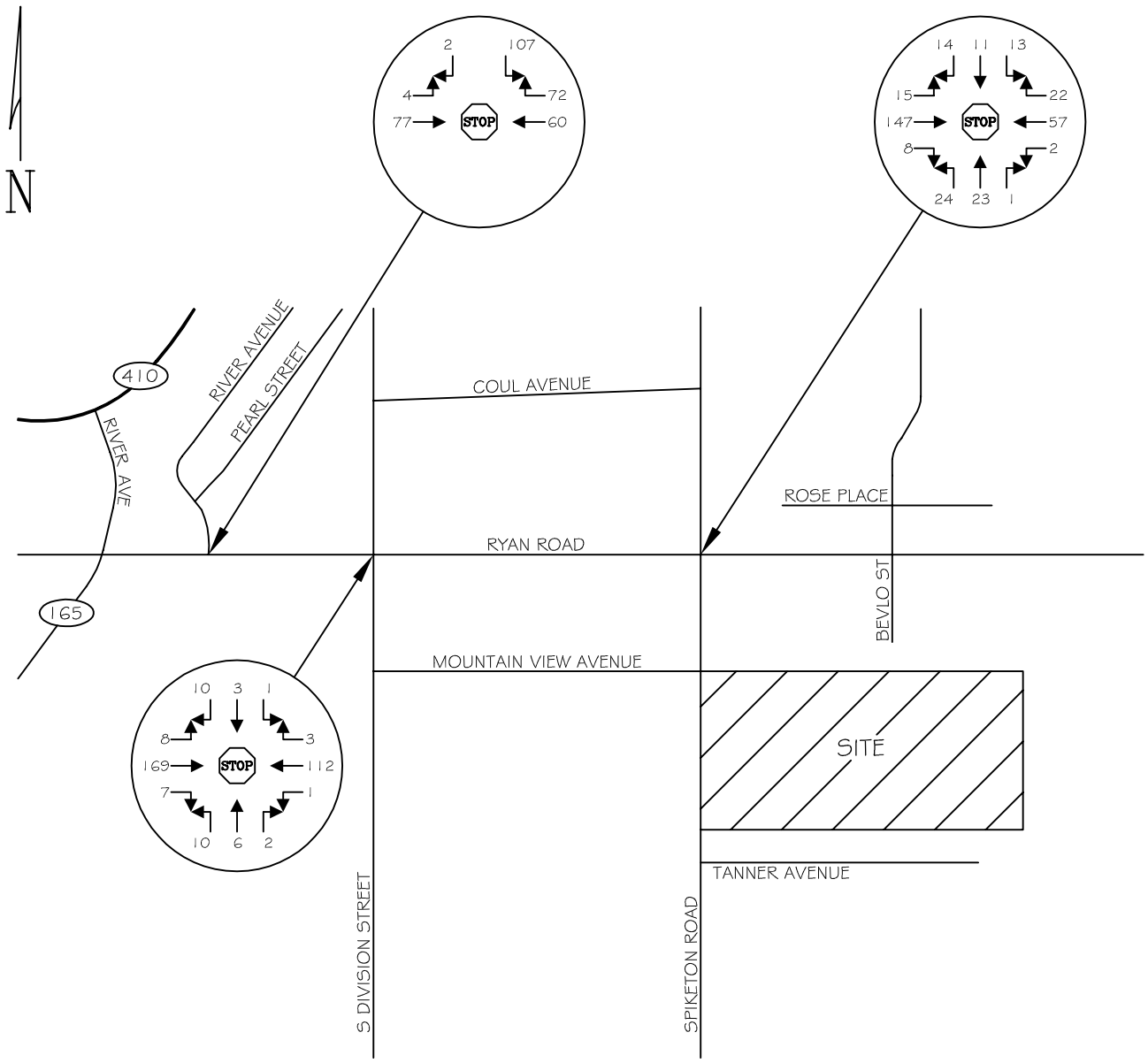
FIGURE 5



HEATH & ASSOCIATES, INC
Transportation and Civil Engineering

PM TRIP DISTRIBUTION & ASSIGNMENT

FIGURE 6

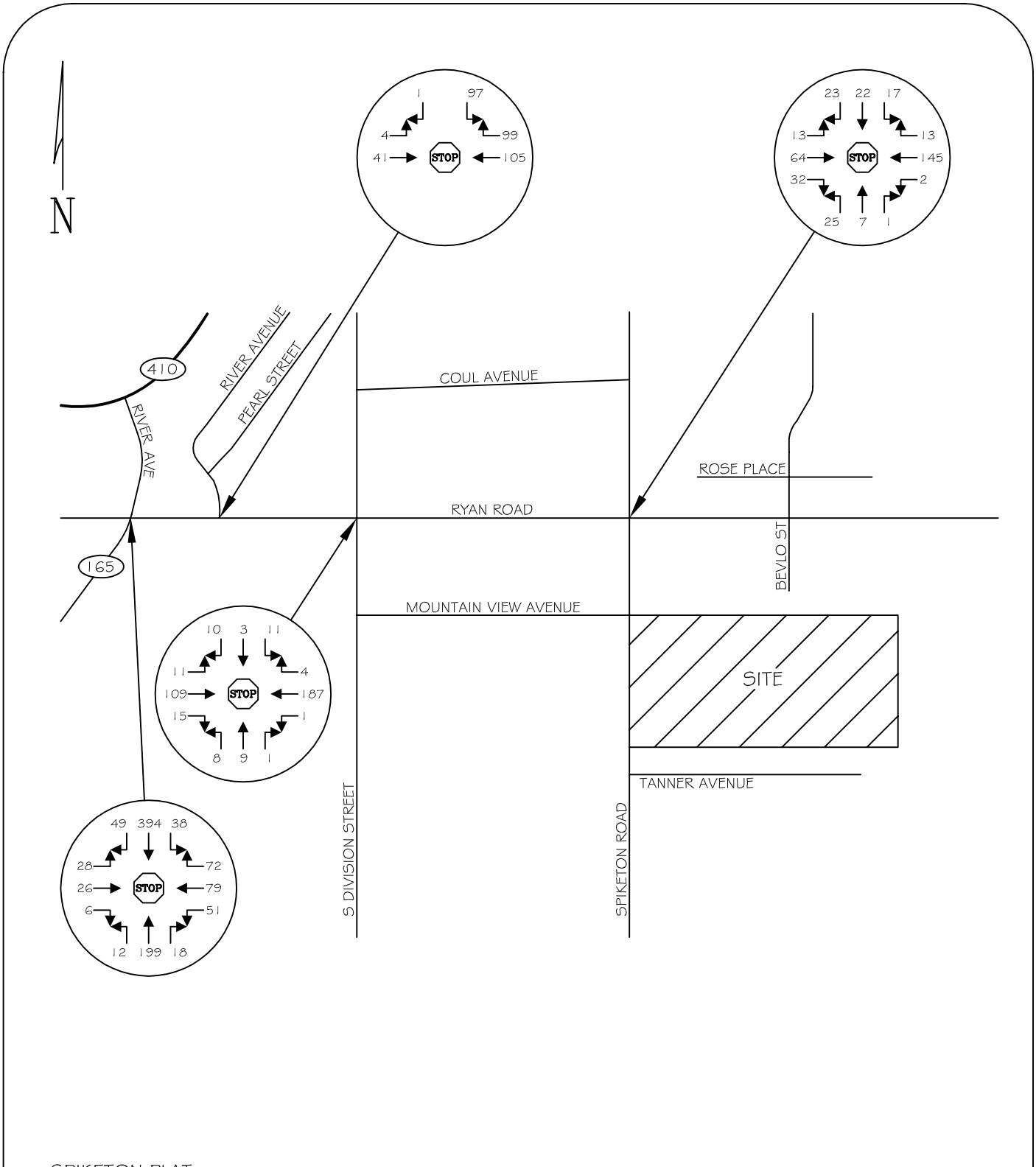


SPIKETON PLAT

HEATH & ASSOCIATES, INC
Transportation and Civil Engineering

2020 AM PEAK HOUR VOLUMES WITHOUT PROJECT

FIGURE 7

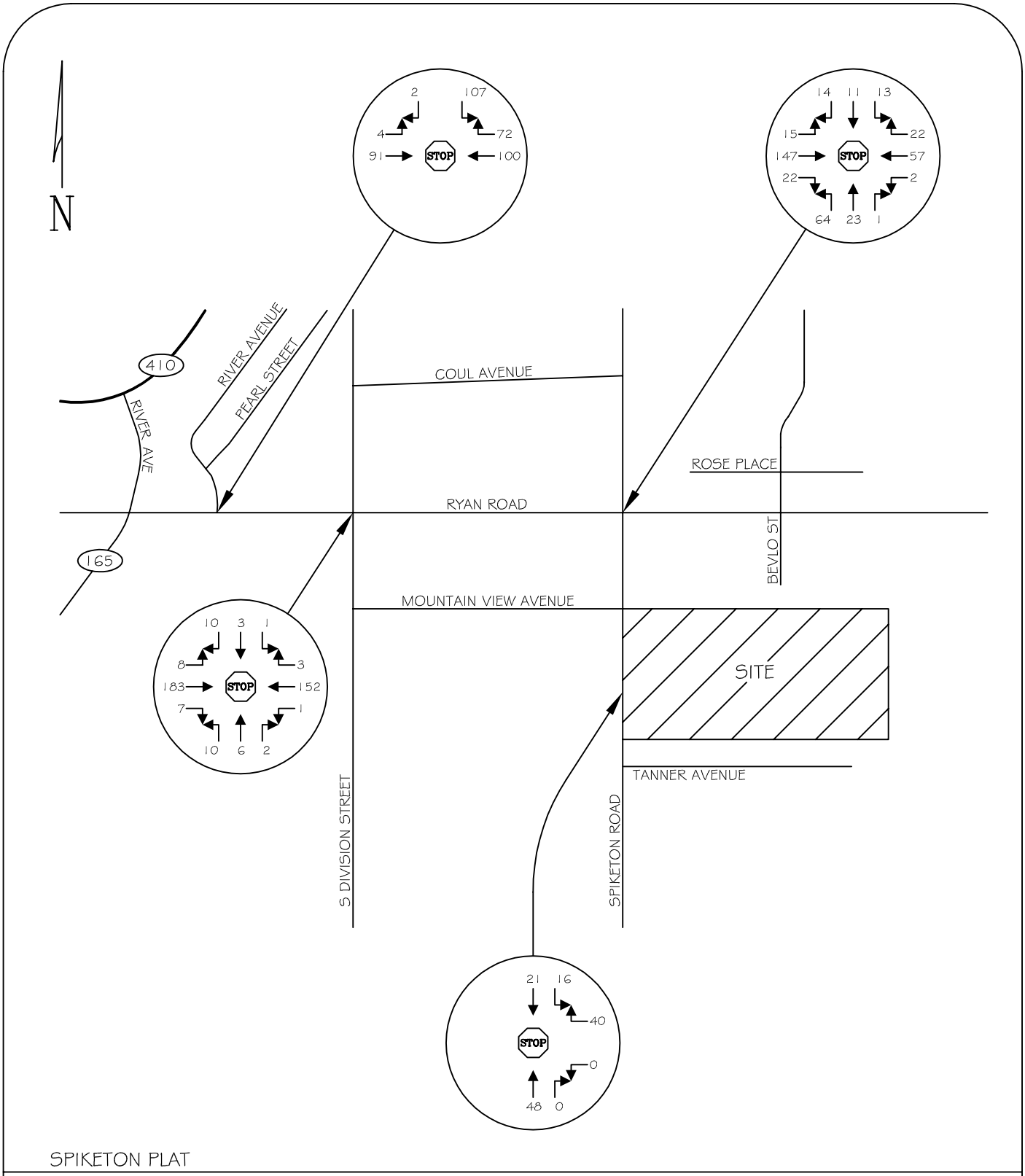


SPIKETON PLAT

HEATH & ASSOCIATES, INC
Transportation and Civil Engineering

2020 PM PEAK HOUR VOLUMES WITHOUT PROJECT

FIGURE 8

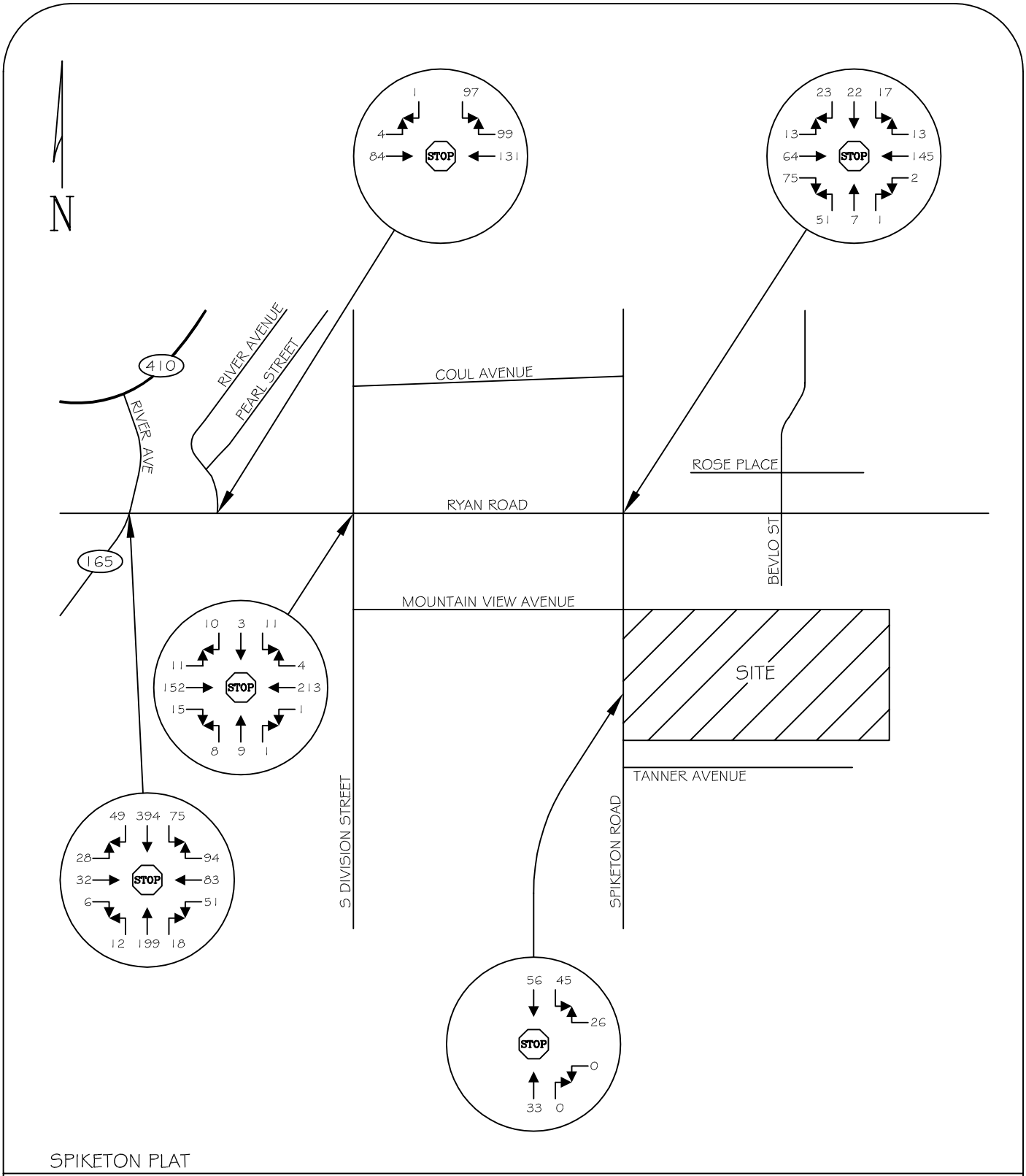


SPIKETON PLAT

HEATH & ASSOCIATES, INC
Transportation and Civil Engineering

2020 AM PEAK HOUR VOLUMES WITH PROJECT

FIGURE 9



SPIKETON PLAT

HEATH & ASSOCIATES, INC
Transportation and Civil Engineering

2020 PM PEAK HOUR VOLUMES WITH PROJECT

FIGURE 10

Figure 8. Future 2020 volumes with the Spiketon Plat project traffic included are shown in Figure 9 and Figure 10. Volumes at the SR-165/Ryan Road/112th Street intersection were estimated from future modeling volumes provided by the City of Buckley. The City has modeled 2040 PM peak hour volumes at this intersection as part of the SR-410/SR-165 and SR-165/Ryan Road realignment. A 2 percent growth rate per year was used to project back to 2020 volumes. A copy of the City's data is attached in the appendix.

D. Future Level of Service Results

A level of service analysis was made of the future peak hour volumes with and without project generated trips. Results for intersection delay conditions were again determined using Synchro. A summary of the analysis results are shown in Table 3.

TABLE 3
Future 2020 Level of Service

			Without Project		With Project	
Intersection	*Control*	*Geometry*	*LOS*	*Delay*	*LOS*	*Delay*
____AM Peak Hour						
Ryan Rd/River Ave	Stop	Eastbound LT	A	7.6	A	7.7
		Southbound	B	10.9	B	11.6
Ryan Rd/Division St	Stop	Eastbound LT	A	7.6	A	7.7
		Westbound LT	A	7.7	A	7.7
		Northbound	B	11.9	B	12.7
		Southbound	B	10.0	B	10.5
Ryan Rd/Spiketon Rd	Stop	Eastbound LT	A	7.4	A	7.4
		Westbound LT	A	7.6	A	7.7
		Northbound	B	11.8	B	12.6
		Southbound	B	10.6	B	10.7
Spiketon Rd/Entrance	Stop	Southbound LT	-	-	A	7.3
		Westbound	-	-	A	8.7
____PM Peak Hour						
SR-165/Ryan/112th St	All Way	Eastbound	B	10.4	B	10.6
	Stop	Westbound	B	11.3	B	12.0
		Northbound	B	12.2	B	12.7
		Southbound	C	20.8	C	21.3
		Overall	C	16.2	C	16.7
Ryan Rd/River Ave	Stop	Eastbound LT	A	7.8	A	7.9
		Southbound	B	10.0	B	12.1
Ryan Rd/Division St	Stop	Eastbound LT	A	7.8	A	7.9
		Westbound LT	A	7.5	A	7.6
		Northbound	B	12.4	B	13.4
		Southbound	B	11.4	B	12.2
Ryan Rd/Spiketon Rd	Stop	Eastbound LT	A	7.8	A	7.8
		Westbound LT	A	7.5	A	7.6
		Northbound	B	12.5	B	13.5
		Southbound	B	11.6	B	12.0
Spiketon Rd/Entrance	Stop	Southbound LT	-	-	A	7.3
		Westbound	-	-	A	8.6

As shown in Table 3, future delays are expected to be remain mostly mild in the LOS A to LOS C range. Project traffic is shown to cause no significant increases in level of service. Only minor increases in delays are expected. Overall, the local roadway network is shown to have the available capacity to support increases in traffic associated with the Spiketon Plat.

E. Left Turn Lane Warrants

Left turn lanes are a means of providing necessary storage space for left turning vehicles at intersections. Methods have been developed by various agencies to determine under what circumstances a left turn lane would be needed. For this impact study, procedures described by the WSDOT Design Manual Exhibit 1310-15a were used to ascertain storage requirements on Spiketon Road at the project entrance. An additional two inbound left turns were added to account for the two single family residence on Tanner Avenue. This warrant, therefore, satisfies analysis at both the proposed primary entrance and Tanner Avenue onto Spiketon Road. Based on both AM and PM 2020 peak hour volumes with project traffic a left turn lane *would not be warranted.* Refer to the appendix for the warrant nomographs.

V. CONCLUSIONS AND MITIGATION MEASURES

The proposed Spiketon Plat residential project will add 63 single family houses to the City of Buckley. The project will be a moderate generator of new trips to the area with 687 average daily trips accessing the site. During the AM peak hour approximately 54 trips would be expected into and out of the site, while 69 trips are expected during the PM peak hour. Sight distance at the project entrances is adequate. Future AM and PM peak hour delays are expected to be mild to moderate with delays mostly in the LOS A to LOS C range with the SR-165/Ryan Road/112th Street intersection experiencing potentially up to LOS E delays.

The intersection of SR-410 and SR-165 has been projected for signalization in the future. Any pro-rata share contribution to the project would be discussed with WSDOT and the city of Buckley. Attached to the appendix is an excerpt from the WSDOT Capital Projects System identifying projects proposed for the 2017-2019 biennium and the 2019-2021 biennium.

SPIKETON PLAT
TRAFFIC IMPACT ANALYSIS

APPENDIX

LEVEL OF SERVICE

The following are excerpts from the *2010 Highway Capacity Manual - Transportation Research Board Special Report 209.*

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six LOS are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of those conditions.

Level-of-Service definitions

The following definitions generally define the various levels of service for arterials.

Level of service A represents primarily free-flow operations at average travel speeds, usually about 90 percent of the free-flow speed for the arterial classification. Vehicles are seldom impeded in their ability to maneuver in the traffic stream. Delay at signalized intersections is minimal.

Level of service B represents reasonably unimpeded operations at average travel speeds, usually about 70 percent of the free-flow speed for the arterial classification. The ability to maneuver in the traffic stream is only slightly restricted and delays are not bothersome.

Level of service C represents stable operations; however, ability to maneuver and change lanes in midblock locations may be more restricted than in LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50 percent of the average free-flow speed for the arterial classification.

Level of service D borders on a range in which small increases in flow may cause substantial increases in approach delay and hence decreases in arterial speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or some combination of these. Average travel speeds are about 40 percent of free-flow speed.

Level of service E is characterized by significant delays and average travel speeds of one-third the free-flow speed or less. Such operations are caused by some combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.

Level of service F characterizes arterial flow at extremely low speeds, from less than one-third to one-quarter of the free-flow speed. Intersection congestion is likely at critical signalized locations, with long delays and extensive queuing.

These definitions are general and conceptual in nature, and they apply primarily to uninterrupted flow. Levels of service for interrupted flow facilities vary widely in terms of both the user's perception of service quality and the operational variables used to describe them.

For each type of facility, levels of service are defined based on one or more operational parameters that best describe operating quality for the subject facility type. While the concept of level of service attempts to address a wide range of operating conditions, limitations on data collection and availability make it impractical to treat the full range of operational parameters for every type of facility. The parameters selected to define levels of service for each facility type are called "measures of effectiveness" or "MOE's", and represent available measures that best describe the quality of operation on the subject facility type.

Each level of service represents a range of conditions, as defined by a range in the parameters given. Thus, a level of service is not a discrete condition, but rather a range of conditions for which boundaries are established.

The following tables describe levels of service for signalized and unsignalized intersections. Level of service for signalized intersections is defined in terms of average control delay. Delay is a measure of driver discomfort, frustration, fuel consumption and lost travel time, as well as time from movements at slower speeds and stops on intersection approaches as vehicles move up in queue position or slow down upstream of an intersection. Level of service for unsignalized intersections is determined by the computed or measured control delay and is determined for each minor movement.

Signalized Intersections - Level of Service

Level of Service	Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Unsignalized Intersections - Level of Service

Level of Service	Average Total Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

As described in the 2000 Highway Capacity Manual, level of service breakpoints for all-way stop controlled (AWSC) intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from distinct kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an AWSC intersection. Thus, a higher level of control delay is acceptable at a signalized intersection for the same level of service.

AWSC Intersections - Level of Service

Level of Service	Average Total Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Detailed Land Use Data
For 63 Dwelling Units of SFHOUSE 1
(210) Single-Family Detached Housing

Project: Spiketon Plat
Phase: -
Description:

Open Date: 5/9/2016
Analysis Date: 5/9/2016

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% Exit	Use Eq.	Equation	R2
Weekday Average Daily Trips	687	0	9.52	4.31	21.85	3.7	198	50	50	True	Ln(T) = 0.92 Ln(X) + 2.72	0.95
Weekday AM Peak Hour of Generator	49	0	0.77	0.33	2.27	0.91	180	26	74	False	T = 0.70(X) + 12.12	0.89
Weekday AM Peak Hour of Adjacent Street Traffic	54	0	0.75	0.33	2.27	0.9	194	25	75	True	T = 0.70(X) + 9.74	0.89
Weekday PM Peak Hour of Generator	64	0	1.02	0.42	2.98	1.05	174	64	36	False	Ln(T) = 0.88 Ln(X) + 0.62	0.91
Weekday PM Peak Hour of Adjacent Street Traffic	69	0	1	0.42	2.98	1.05	207	63	37	True	Ln(T) = 0.90 Ln(X) + 0.51	0.91
Saturday Average Daily Trips	624	0	9.91	5.32	15.25	3.72	215	50	50	False	Ln(T) = 0.93 Ln(X) + 2.64	0.92
Saturday Peak Hour of Generator	59	0	0.93	0.5	1.75	0.99	215	54	46	False	T = 0.89(X) + 8.77	0.91
Sunday Average Daily Trips	543	0	8.62	4.74	12.31	3.36	218	50	50	False	T = 8.63(X) - 0.63	0.93
Sunday Peak Hour of Generator	54	0	0.86	0.55	1.48	0.95	212	53	47	False	Ln(T) = 0.91 Ln(X) + 0.31	0.88

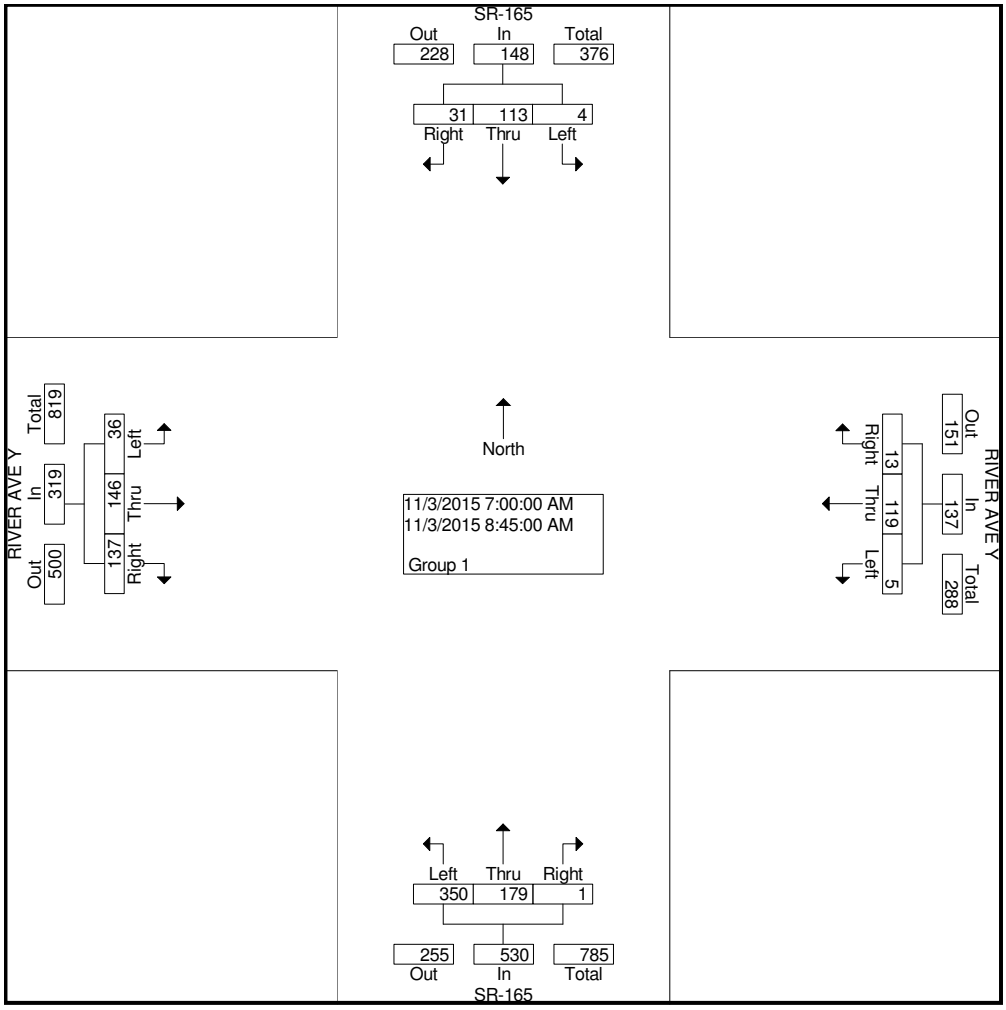
Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696g
Site Code : 00003696
Start Date : 11/3/2015
Page No : 1

Groups Printed- Group 1

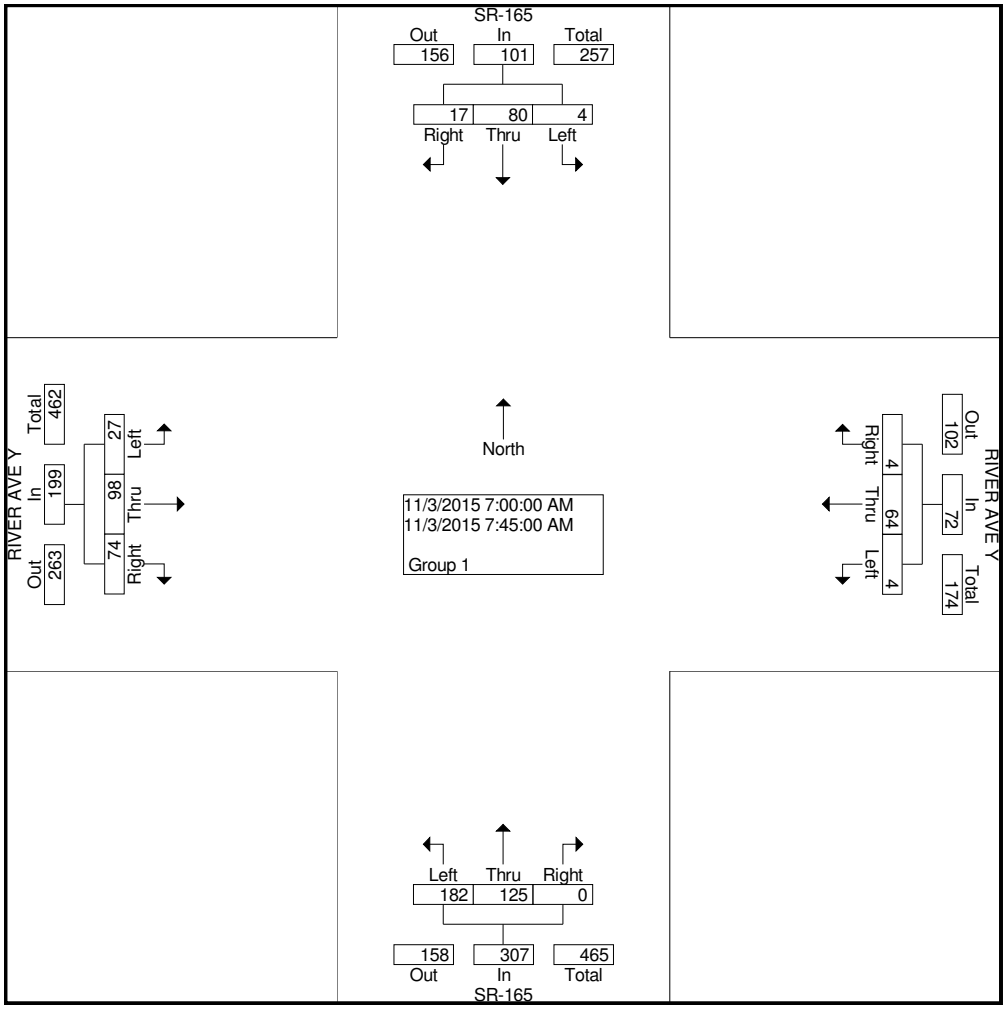
	SR-165 Southbound			RIVER AVE Y Westbound			SR-165 Northbound			RIVER AVE Y Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	2	11	1	1	14	2	0	19	36	24	16	3	129
07:15 AM	5	20	1	0	12	0	0	29	46	15	25	4	157
07:30 AM	1	16	0	2	18	2	0	58	59	22	23	10	211
07:45 AM	9	33	2	1	20	0	0	19	41	13	34	10	182
Total	17	80	4	4	64	4	0	125	182	74	98	27	679
08:00 AM	5	8	0	2	12	1	0	12	42	11	13	2	108
08:15 AM	4	6	0	4	11	0	1	12	41	18	11	4	112
08:30 AM	0	8	0	2	8	0	0	10	40	16	6	2	92
08:45 AM	5	11	0	1	24	0	0	20	45	18	18	1	143
Total	14	33	0	9	55	1	1	54	168	63	48	9	455
Grand Total	31	113	4	13	119	5	1	179	350	137	146	36	1134
Apprch %	20.9	76.4	2.7	9.5	86.9	3.6	0.2	33.8	66.0	42.9	45.8	11.3	
Total %	2.7	10.0	0.4	1.1	10.5	0.4	0.1	15.8	30.9	12.1	12.9	3.2	



Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696g
Site Code : 00003696
Start Date : 11/3/2015
Page No : 2

	SR-165 Southbound				RIVER AVE Y Westbound				SR-165 Northbound				RIVER AVE Y Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:00 AM																
Volume	17	80	4	101	4	64	4	72	0	125	182	307	74	98	27	199	679
Percent	16.8	79.2	4.0		5.6	88.9	5.6		0.0	40.7	59.3		37.2	49.2	13.6		
07:30 Volume	1	16	0	17	2	18	2	22	0	58	59	117	22	23	10	55	211
Peak Factor																	0.805
High Int.	07:45 AM				07:30 AM				07:30 AM				07:45 AM				
Volume	9	33	2	44	2	18	2	22	0	58	59	117	13	34	10	57	
Peak Factor				0.574				0.818				0.656				0.873	

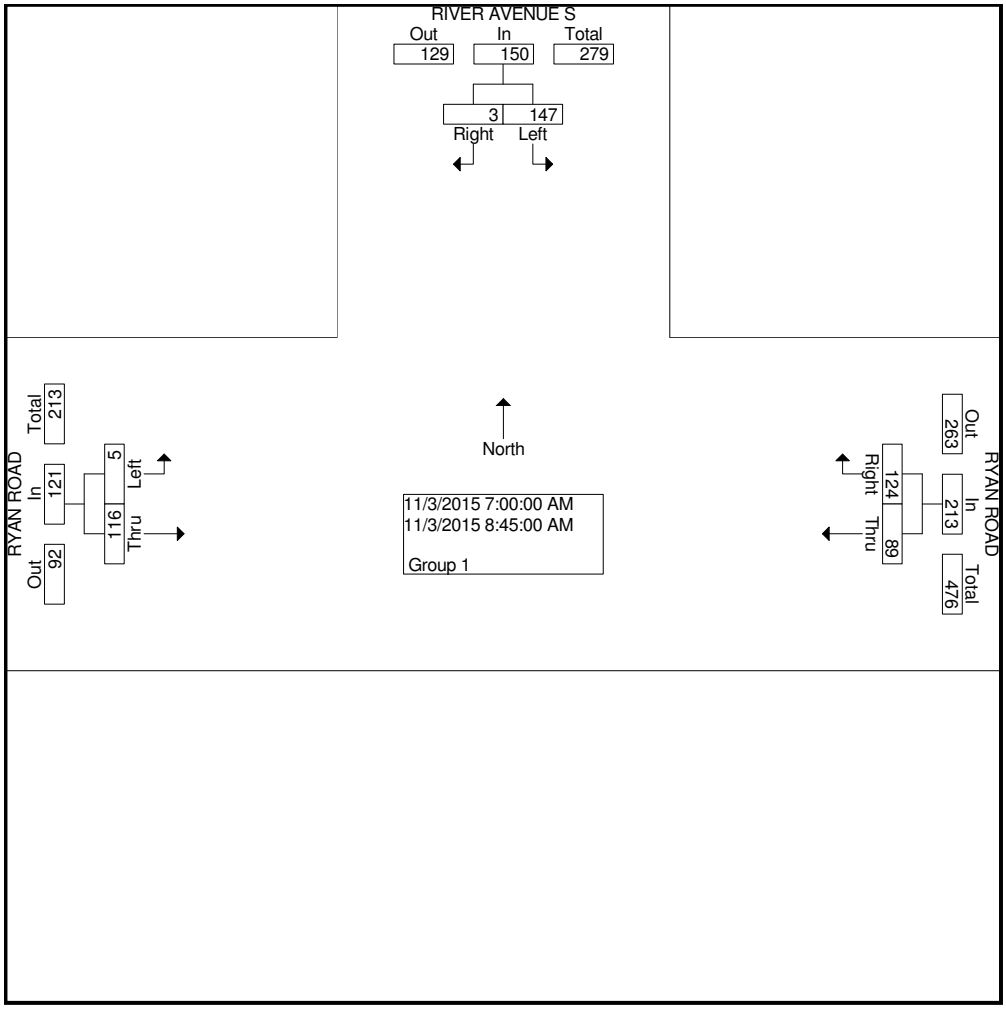


Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696e
Site Code : 00003696
Start Date : 11/3/2015
Page No : 1

Groups Printed- Group 1

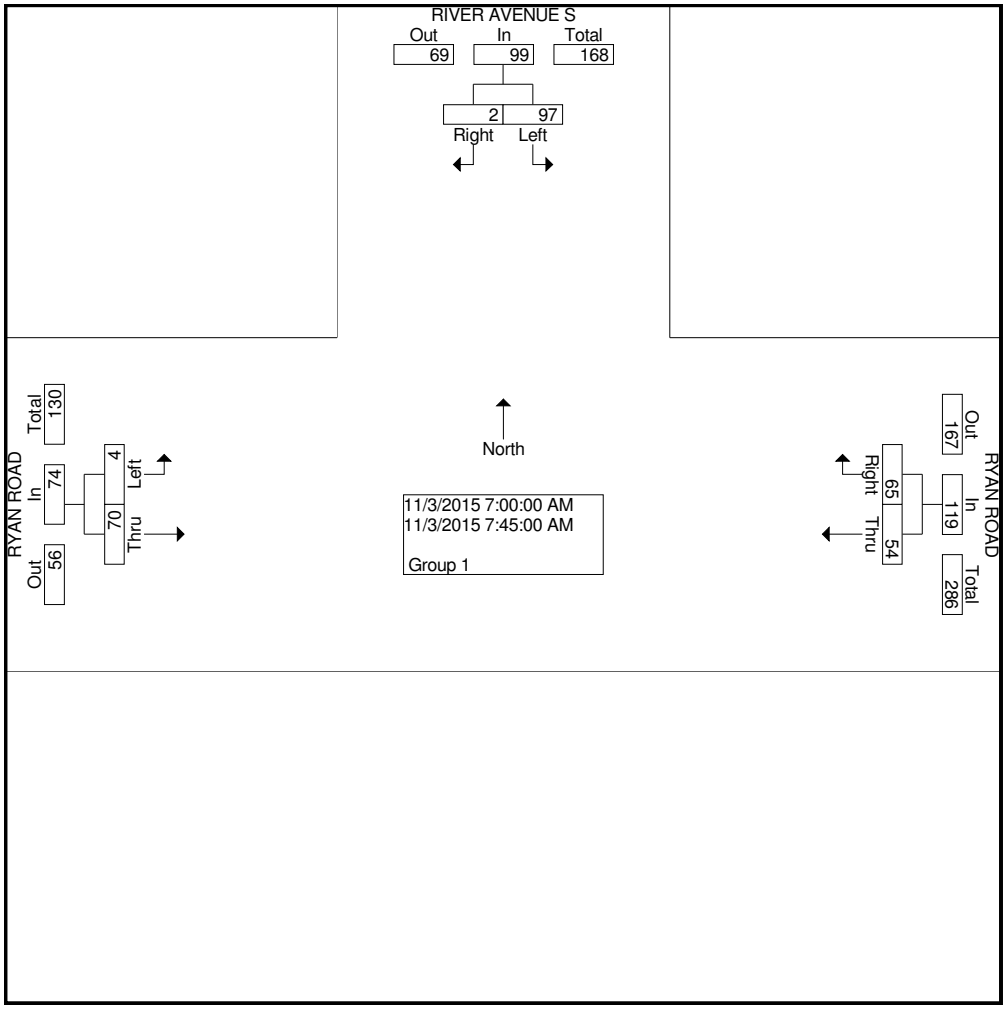
	RIVER AVENUE S Southbound			RYAN ROAD Westbound			RIVER AVENUE S Northbound			RYAN ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	1	0	19	14	26	0	0	0	0	0	9	1	70
07:15 AM	0	0	24	13	17	0	0	0	0	0	22	0	76
07:30 AM	0	0	21	18	5	0	0	0	0	0	19	1	64
07:45 AM	1	0	33	20	6	0	0	0	0	0	20	2	82
Total	2	0	97	65	54	0	0	0	0	0	70	4	292
08:00 AM	0	0	13	13	7	0	0	0	0	0	10	1	44
08:15 AM	1	0	12	15	6	0	0	0	0	0	7	0	41
08:30 AM	0	0	7	10	14	0	0	0	0	0	13	0	44
08:45 AM	0	0	18	21	8	0	0	0	0	0	16	0	63
Total	1	0	50	59	35	0	0	0	0	0	46	1	192
Grand Total	3	0	147	124	89	0	0	0	0	0	116	5	484
Apprch %	2.0	0.0	98.0	58.2	41.8	0.0	0.0	0.0	0.0	0.0	95.9	4.1	
Total %	0.6	0.0	30.4	25.6	18.4	0.0	0.0	0.0	0.0	0.0	24.0	1.0	



Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696e
Site Code : 00003696
Start Date : 11/3/2015
Page No : 2

	RIVER AVENUE S Southbound				RYAN ROAD Westbound				RIVER AVENUE S Northbound				RYAN ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:00 AM																
Volume	2	0	97	99	65	54	0	119	0	0	0	0	0	70	4	74	292
Percent	2.0	0.0	98.0		54.6	45.4	0.0		0.0	0.0	0.0		0.0	94.6	5.4		
07:45 Volume	1	0	33	34	20	6	0	26	0	0	0	0	0	20	2	22	82
Peak Factor																	0.890
High Int.	07:45 AM				07:00 AM				6:45:00 AM				07:15 AM				
Volume	1	0	33	34	14	26	0	40	0	0	0	0	0	22	0	22	
Peak Factor				0.728				0.744								0.841	

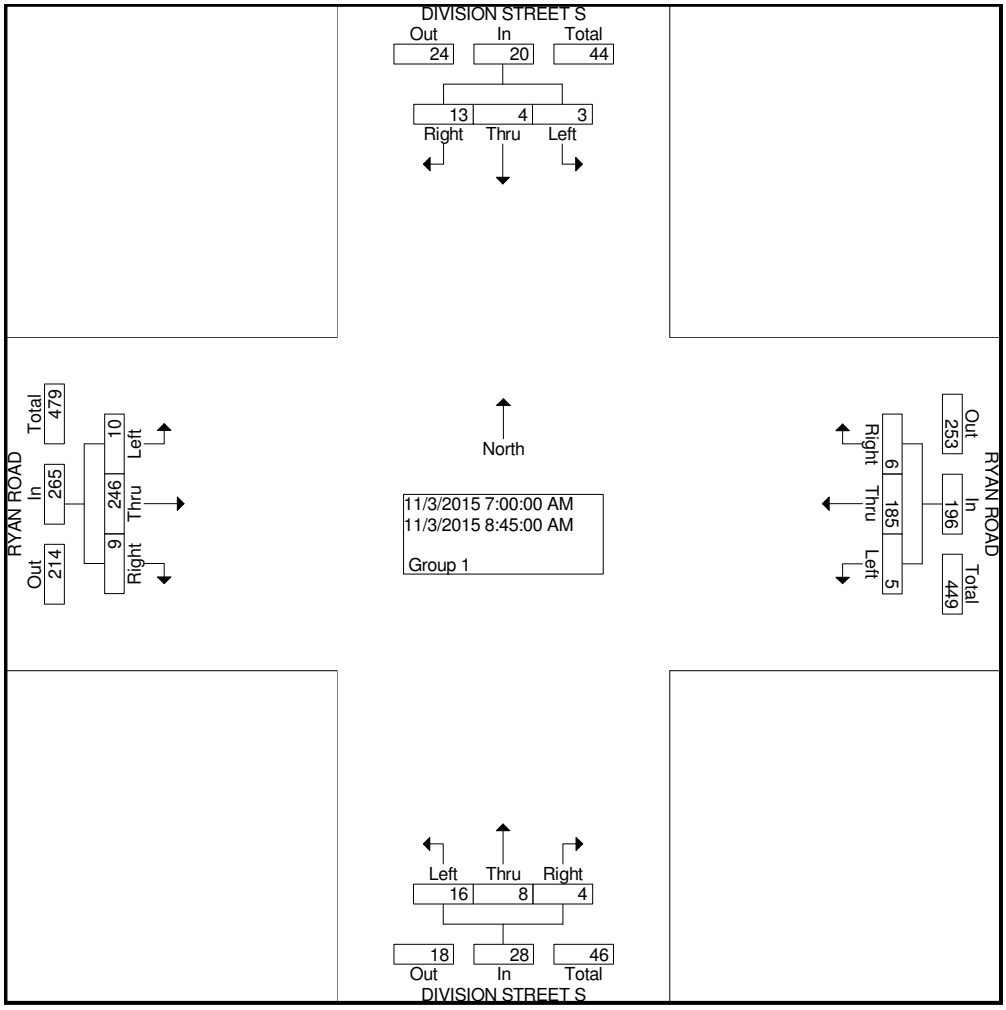


Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696c
Site Code : 00003696
Start Date : 11/3/2015
Page No : 1

Groups Printed- Group 1

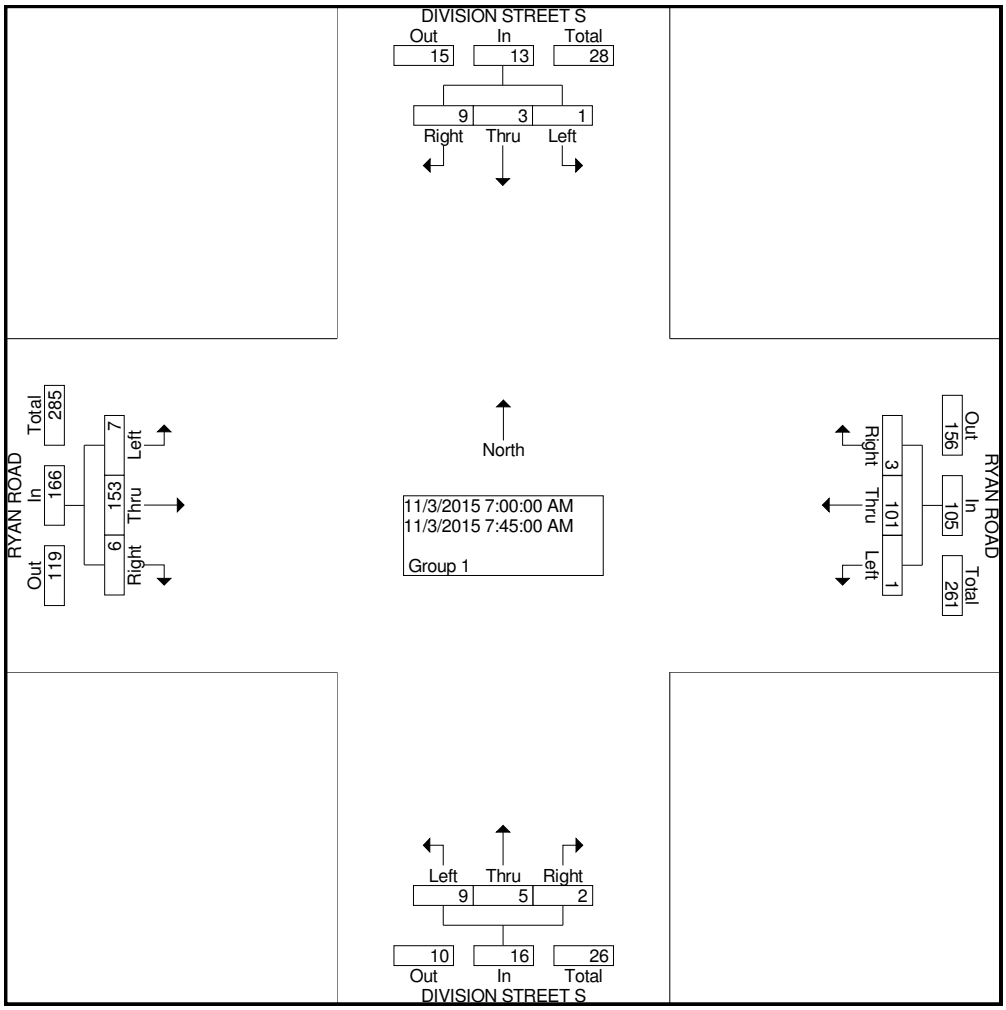
	DIVISION STREET S Southbound			RYAN ROAD Westbound			DIVISION STREET S Northbound			RYAN ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	3	0	1	1	37	1	1	0	0	2	25	3	74
07:15 AM	2	0	0	0	24	0	0	1	3	1	41	1	73
07:30 AM	1	1	0	1	19	0	0	2	3	1	38	1	67
07:45 AM	3	2	0	1	21	0	1	2	3	2	49	2	86
Total	9	3	1	3	101	1	2	5	9	6	153	7	300
08:00 AM	1	0	0	1	17	0	2	2	1	1	22	0	47
08:15 AM	0	0	1	0	20	1	0	1	1	1	18	1	44
08:30 AM	3	1	1	1	20	2	0	0	2	0	21	2	53
08:45 AM	0	0	0	1	27	1	0	0	3	1	32	0	65
Total	4	1	2	3	84	4	2	3	7	3	93	3	209
Grand Total	13	4	3	6	185	5	4	8	16	9	246	10	509
Apprch %	65.0	20.0	15.0	3.1	94.4	2.6	14.3	28.6	57.1	3.4	92.8	3.8	
Total %	2.6	0.8	0.6	1.2	36.3	1.0	0.8	1.6	3.1	1.8	48.3	2.0	



Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696c
Site Code : 00003696
Start Date : 11/3/2015
Page No : 2

	DIVISION STREET S Southbound				RYAN ROAD Westbound				DIVISION STREET S Northbound				RYAN ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:00 AM																
Volume	9	3	1	13	3	101	1	105	2	5	9	16	6	153	7	166	300
Percent	69.2	23.1	7.7		2.9	96.2	1.0		12.5	31.3	56.3		3.6	92.2	4.2		
07:45 Volume	3	2	0	5	1	21	0	22	1	2	3	6	2	49	2	53	86
Peak Factor																	0.872
High Int.	07:45 AM				07:00 AM				07:45 AM				07:45 AM				
Volume	3	2	0	5	1	37	1	39	1	2	3	6	2	49	2	53	
Peak Factor				0.650				0.673				0.667				0.783	

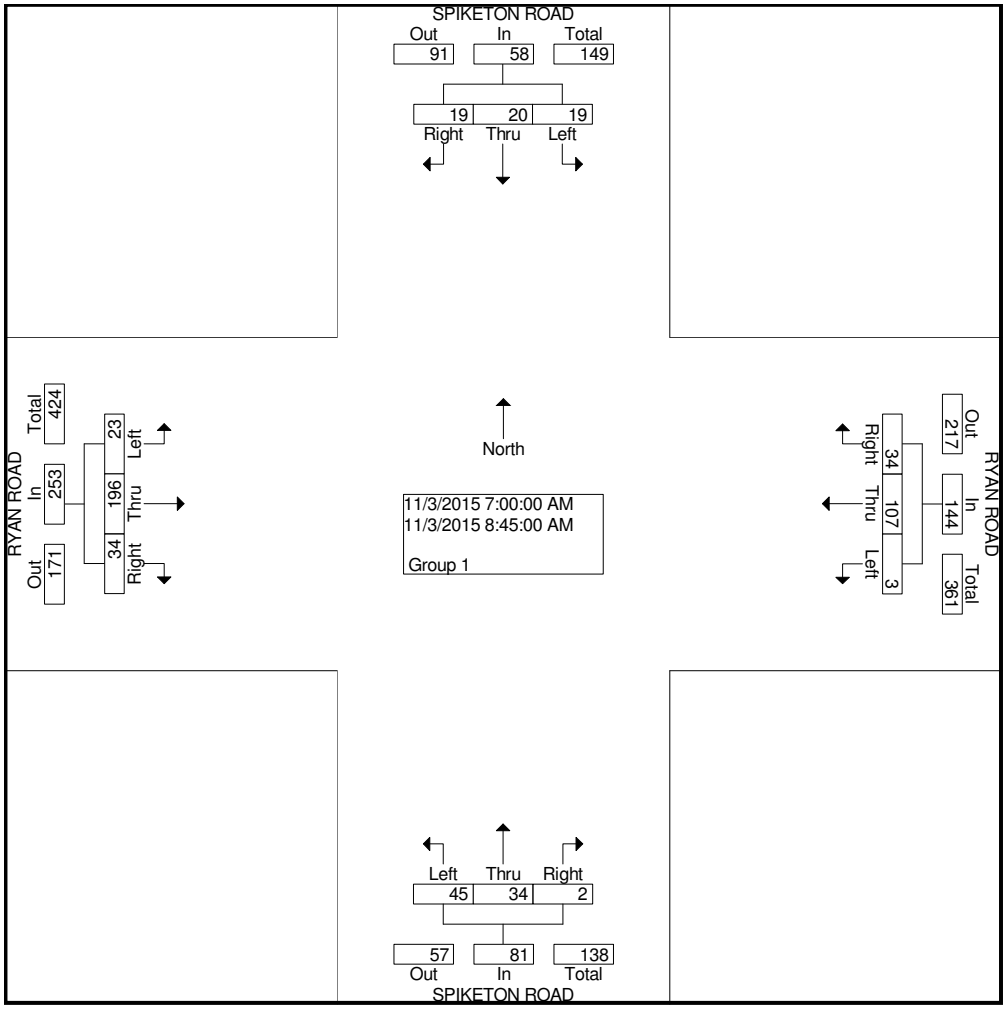


Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696a
Site Code : 00003696
Start Date : 11/3/2015
Page No : 1

Groups Printed- Group 1

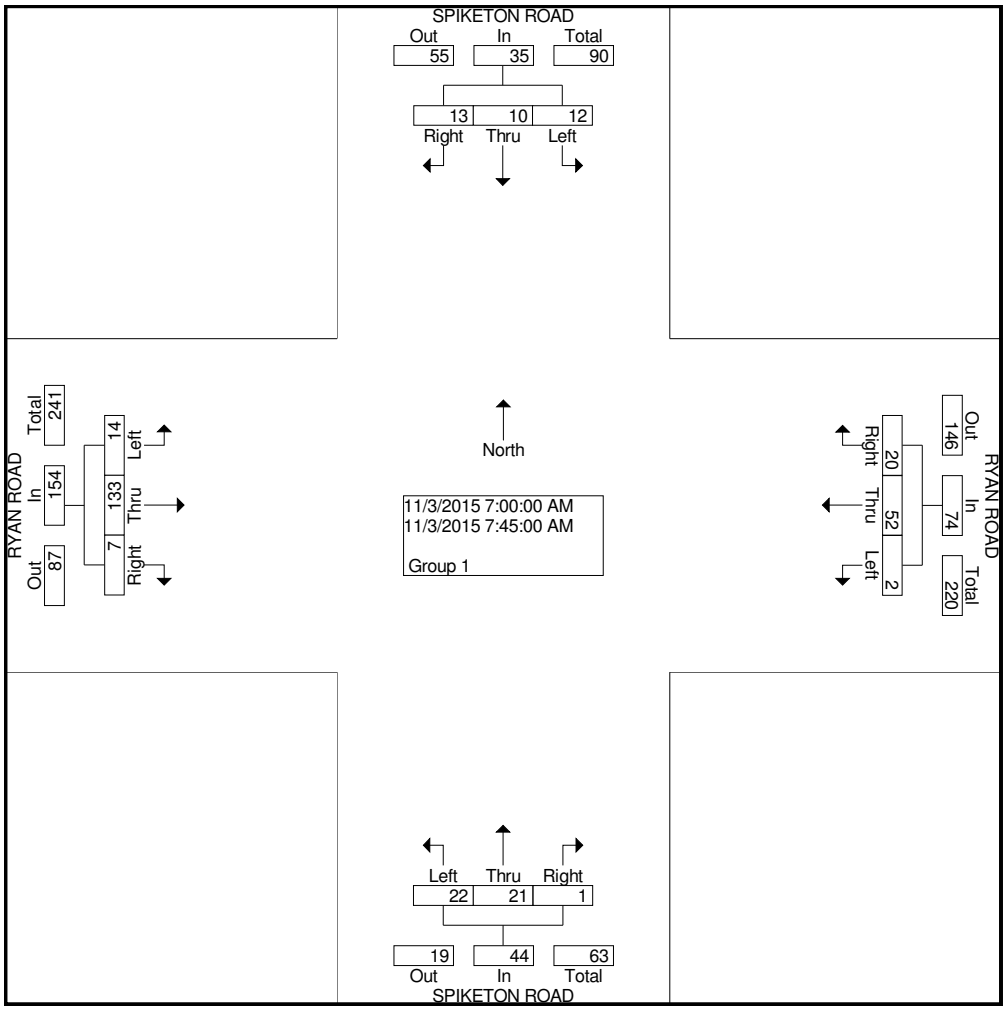
	SPIKETON ROAD Southbound			RYAN ROAD Westbound			SPIKETON ROAD Northbound			RYAN ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	5	2	2	6	13	0	0	2	12	2	22	1	67
07:15 AM	4	2	2	5	13	0	0	2	3	2	34	5	72
07:30 AM	2	3	2	4	13	1	1	10	3	1	31	4	75
07:45 AM	2	3	6	5	13	1	0	7	4	2	46	4	93
Total	13	10	12	20	52	2	1	21	22	7	133	14	307
08:00 AM	1	1	1	3	9	0	0	3	4	3	22	1	48
08:15 AM	3	0	3	1	10	1	1	1	5	1	17	1	44
08:30 AM	1	1	0	3	14	0	0	3	8	4	13	4	51
08:45 AM	1	8	3	7	22	0	0	6	6	19	11	3	86
Total	6	10	7	14	55	1	1	13	23	27	63	9	229
Grand Total	19	20	19	34	107	3	2	34	45	34	196	23	536
Apprch %	32.8	34.5	32.8	23.6	74.3	2.1	2.5	42.0	55.6	13.4	77.5	9.1	
Total %	3.5	3.7	3.5	6.3	20.0	0.6	0.4	6.3	8.4	6.3	36.6	4.3	



Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696a
Site Code : 00003696
Start Date : 11/3/2015
Page No : 2

	SPIKETON ROAD Southbound				RYAN ROAD Westbound				SPIKETON ROAD Northbound				RYAN ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:00 AM																
Volume	13	10	12	35	20	52	2	74	1	21	22	44	7	133	14	154	307
Percent	37.1	28.6	34.3		27.0	70.3	2.7		2.3	47.7	50.0		4.5	86.4	9.1		
07:45 Volume	2	3	6	11	5	13	1	19	0	7	4	11	2	46	4	52	93
Peak Factor																	0.825
High Int.	07:45 AM				07:00 AM				07:00 AM				07:45 AM				
Volume	2	3	6	11	6	13	0	19	0	2	12	14	2	46	4	52	
Peak Factor				0.795				0.974				0.786				0.740	

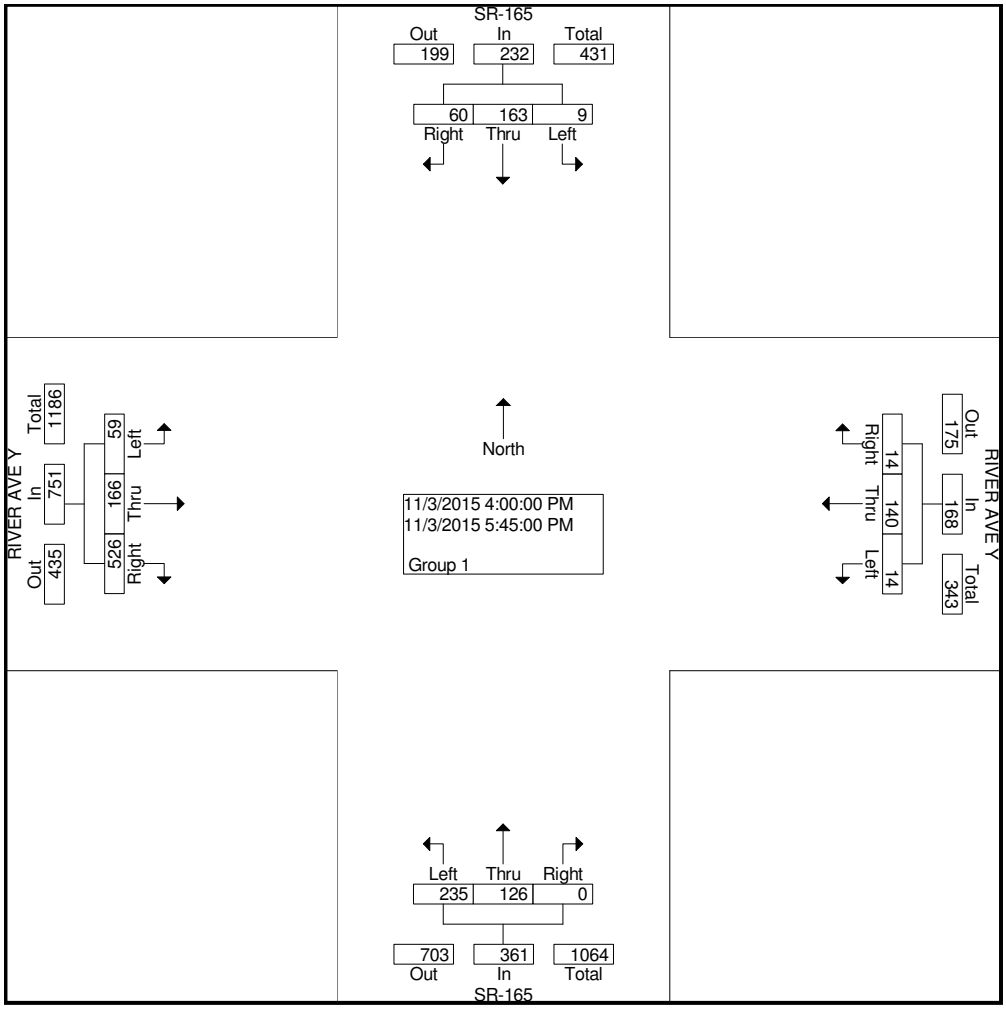


Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696h
Site Code : 00003696
Start Date : 11/3/2015
Page No : 1

Groups Printed- Group 1

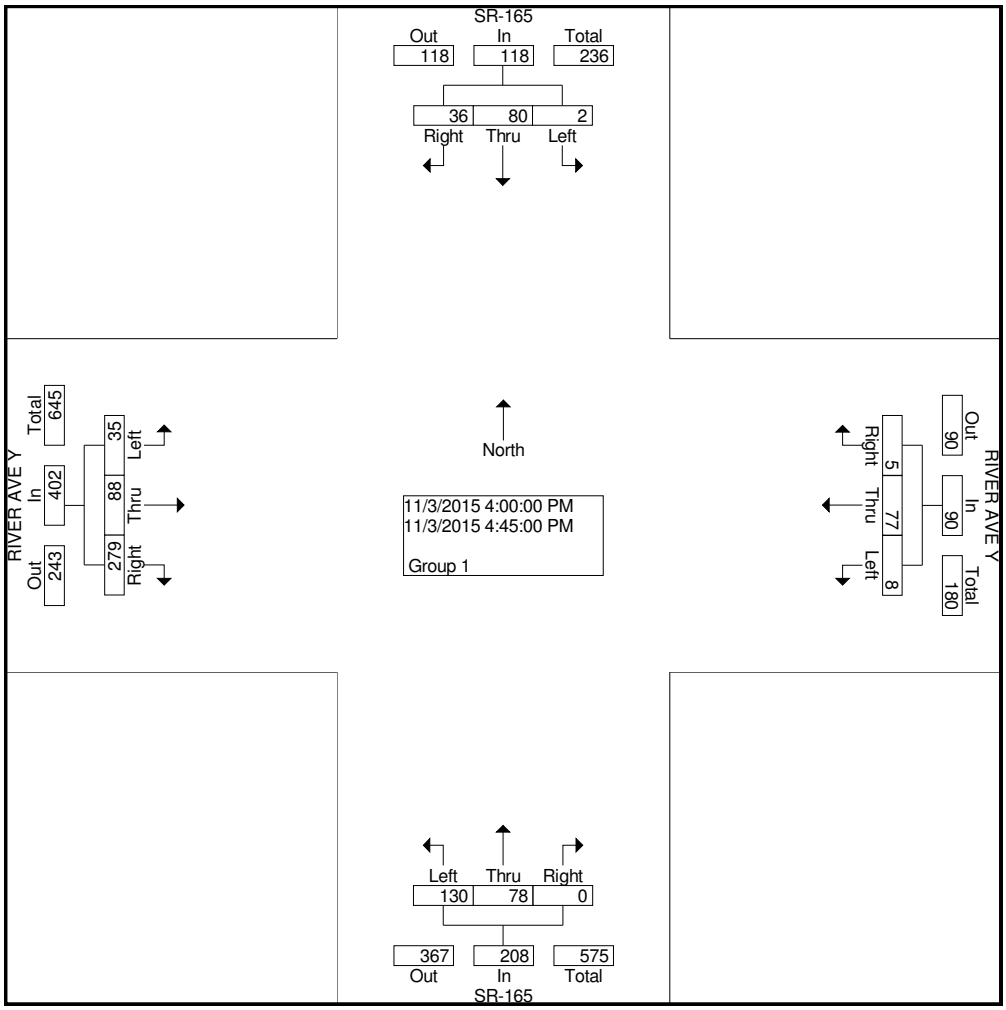
	SR-165 Southbound			RIVER AVE Y Westbound			SR-165 Northbound			RIVER AVE Y Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	9	24	0	0	20	1	0	23	28	70	23	9	207
04:15 PM	11	25	0	1	15	3	0	19	38	73	22	11	218
04:30 PM	10	17	1	3	25	1	0	14	28	70	23	8	200
04:45 PM	6	14	1	1	17	3	0	22	36	66	20	7	193
Total	36	80	2	5	77	8	0	78	130	279	88	35	818
05:00 PM	10	28	0	1	18	0	0	12	29	71	18	7	194
05:15 PM	4	21	3	3	12	3	0	10	28	63	14	7	168
05:30 PM	3	23	0	3	18	2	0	18	22	58	27	8	182
05:45 PM	7	11	4	2	15	1	0	8	26	55	19	2	150
Total	24	83	7	9	63	6	0	48	105	247	78	24	694
Grand Total	60	163	9	14	140	14	0	126	235	526	166	59	1512
Apprch %	25.9	70.3	3.9	8.3	83.3	8.3	0.0	34.9	65.1	70.0	22.1	7.9	
Total %	4.0	10.8	0.6	0.9	9.3	0.9	0.0	8.3	15.5	34.8	11.0	3.9	



Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696h
Site Code : 00003696
Start Date : 11/3/2015
Page No : 2

	SR-165 Southbound				RIVER AVE Y Westbound				SR-165 Northbound				RIVER AVE Y Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:00 PM																
Volume	36	80	2	118	5	77	8	90	0	78	130	208	279	88	35	402	818
Percent	30.5	67.8	1.7		5.6	85.6	8.9		0.0	37.5	62.5		69.4	21.9	8.7		
04:15 Volume	11	25	0	36	1	15	3	19	0	19	38	57	73	22	11	106	218
Peak Factor																	0.938
High Int.	04:15 PM				04:30 PM				04:45 PM				04:15 PM				
Volume	11	25	0	36	3	25	1	29	0	22	36	58	73	22	11	106	
Peak Factor				0.819				0.776				0.897				0.948	

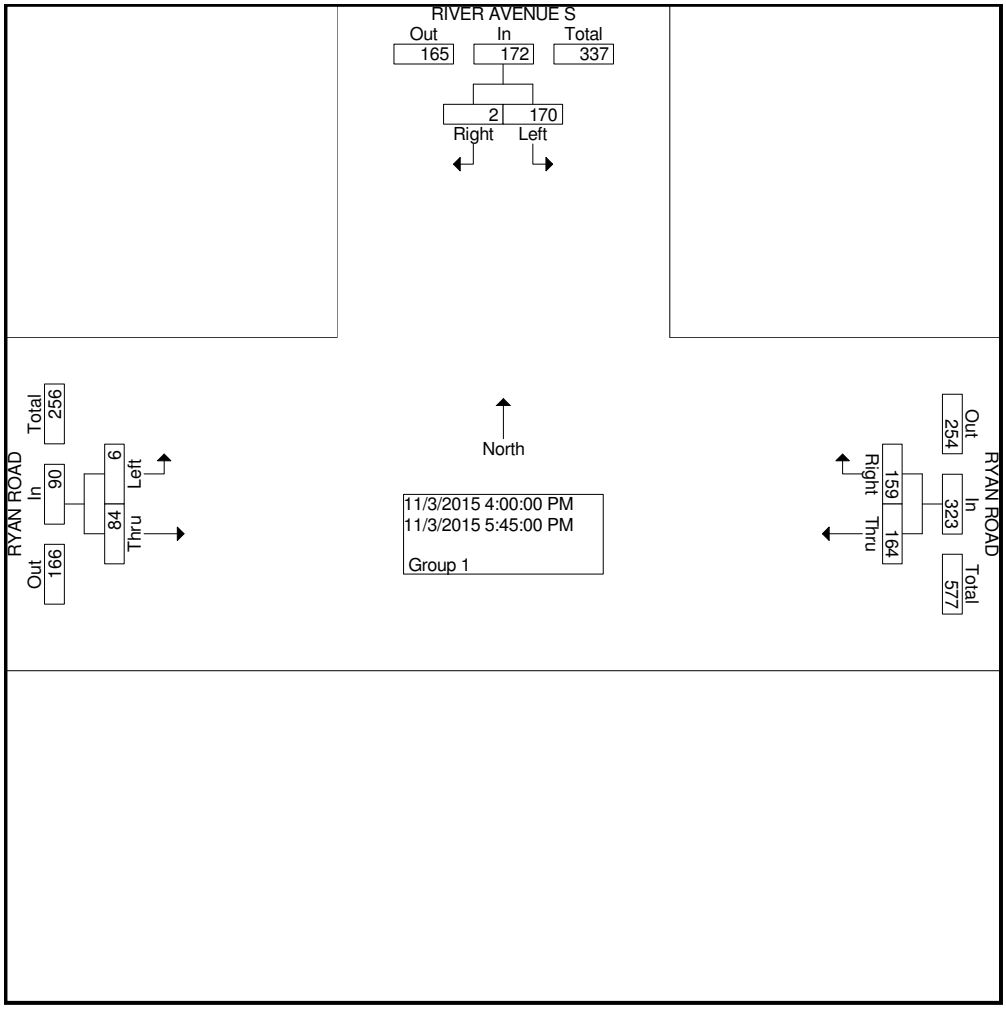


Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696f
Site Code : 00003696
Start Date : 11/3/2015
Page No : 1

Groups Printed- Group 1

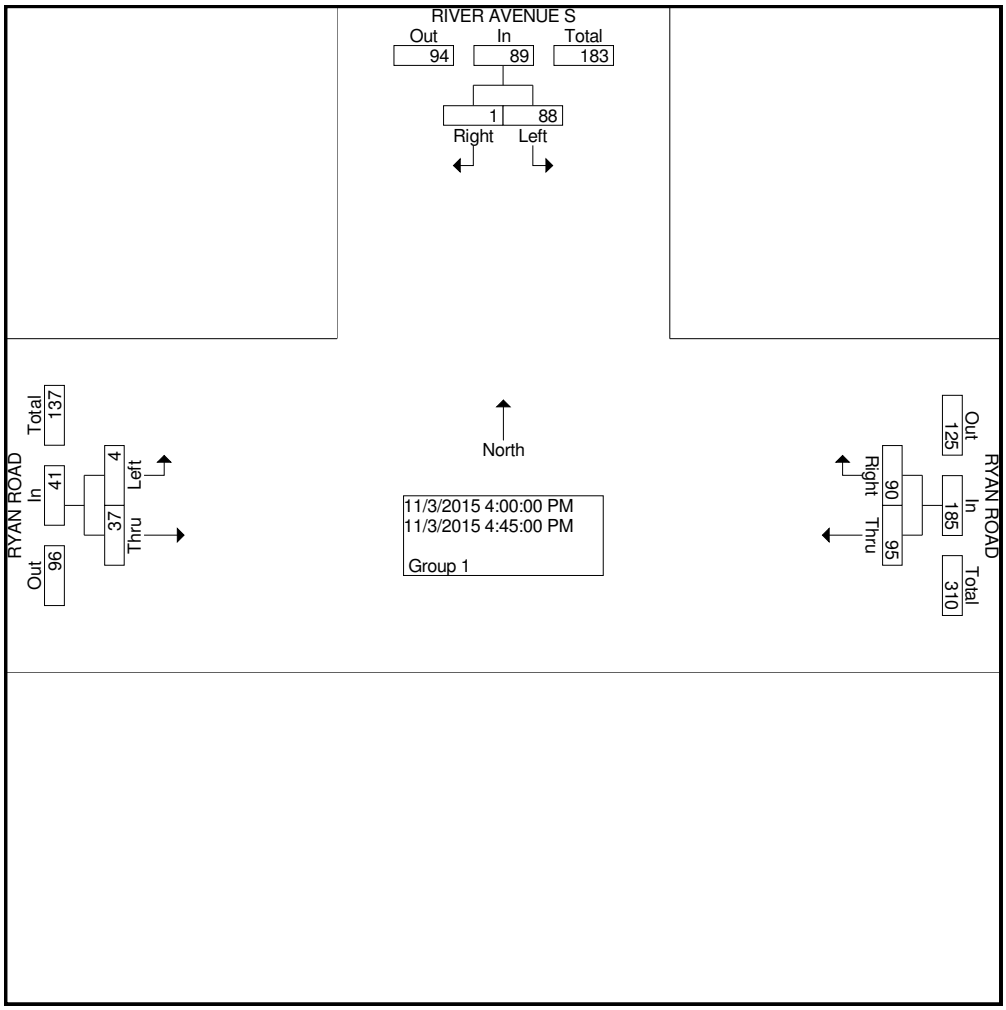
	RIVER AVENUE S Southbound			RYAN ROAD Westbound			Northbound			RYAN ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	0	0	27	22	23	0	0	0	0	0	14	1	87
04:15 PM	1	0	21	18	21	0	0	0	0	0	8	1	70
04:30 PM	0	0	20	29	33	0	0	0	0	0	7	1	90
04:45 PM	0	0	20	21	18	0	0	0	0	0	8	1	68
Total	1	0	88	90	95	0	0	0	0	0	37	4	315
05:00 PM	0	0	21	16	13	0	0	0	0	0	7	1	58
05:15 PM	0	0	17	13	18	0	0	0	0	0	11	1	60
05:30 PM	0	0	27	23	25	0	0	0	0	0	20	0	95
05:45 PM	1	0	17	17	13	0	0	0	0	0	9	0	57
Total	1	0	82	69	69	0	0	0	0	0	47	2	270
Grand Total	2	0	170	159	164	0	0	0	0	0	84	6	585
Apprch %	1.2	0.0	98.8	49.2	50.8	0.0	0.0	0.0	0.0	0.0	93.3	6.7	
Total %	0.3	0.0	29.1	27.2	28.0	0.0	0.0	0.0	0.0	0.0	14.4	1.0	



Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696f
Site Code : 00003696
Start Date : 11/3/2015
Page No : 2

	RIVER AVENUE S Southbound				RYAN ROAD Westbound				Northbound				RYAN ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:00 PM																
Volume	1	0	88	89	90	95	0	185	0	0	0	0	0	37	4	41	315
Percent	1.1	0.0	98.9		48.6	51.4	0.0		0.0	0.0	0.0		0.0	90.2	9.8		
04:30 Volume	0	0	20	20	29	33	0	62	0	0	0	0	0	7	1	8	90
Peak Factor																	0.875
High Int.	04:00 PM				04:30 PM				3:45:00 PM				04:00 PM				
Volume	0	0	27	27	29	33	0	62	0	0	0	0	0	14	1	15	
Peak Factor				0.824				0.746								0.683	

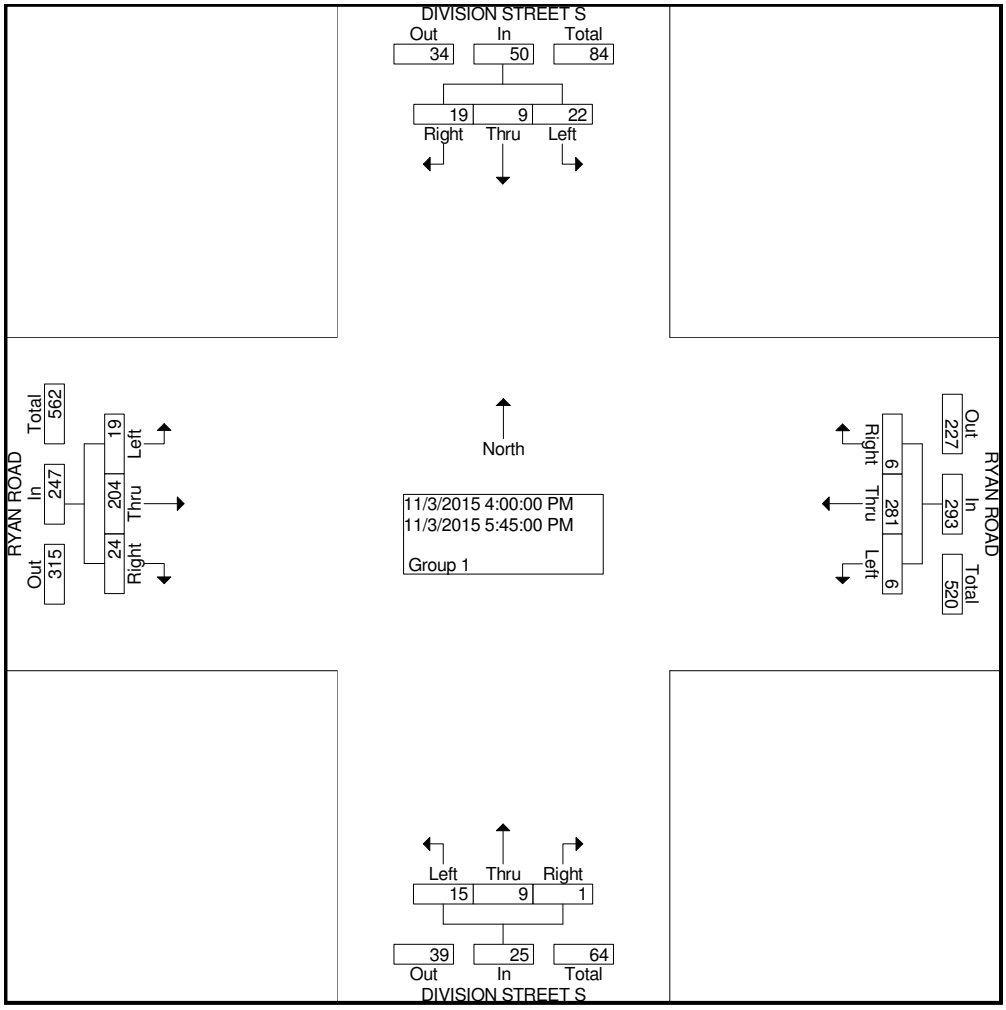


Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696d
Site Code : 00003696
Start Date : 11/3/2015
Page No : 1

Groups Printed- Group 1

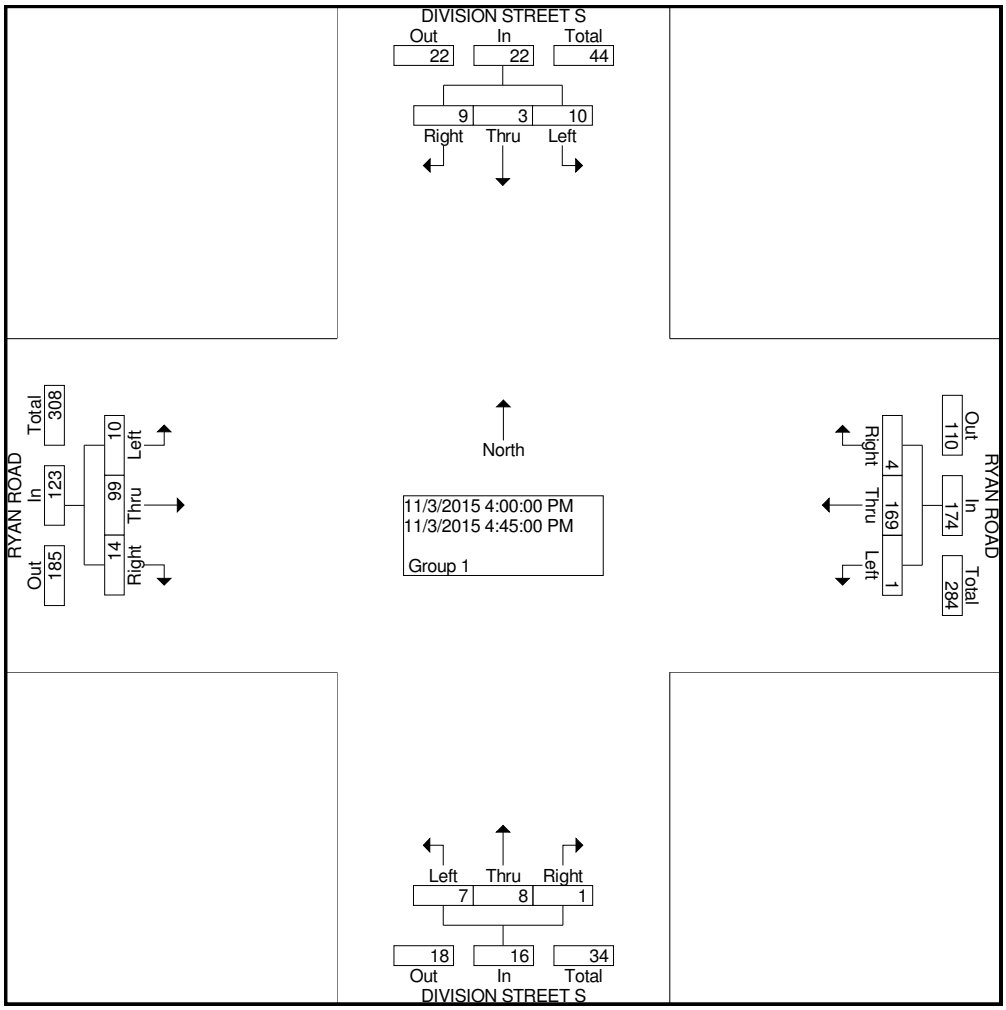
	DIVISION STREET S Southbound			RYAN ROAD Westbound			DIVISION STREET S Northbound			RYAN ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	2	0	5	0	41	0	0	3	2	5	31	2	91
04:15 PM	3	0	0	1	35	1	0	0	1	5	25	2	73
04:30 PM	1	2	4	2	60	0	1	2	1	3	18	4	98
04:45 PM	3	1	1	1	33	0	0	3	3	1	25	2	73
Total	9	3	10	4	169	1	1	8	7	14	99	10	335
05:00 PM	2	1	4	0	26	1	0	0	2	1	23	4	64
05:15 PM	3	0	2	0	26	2	0	0	1	3	21	2	60
05:30 PM	3	3	1	2	36	2	0	0	3	5	36	3	94
05:45 PM	2	2	5	0	24	0	0	1	2	1	25	0	62
Total	10	6	12	2	112	5	0	1	8	10	105	9	280
Grand Total	19	9	22	6	281	6	1	9	15	24	204	19	615
Apprch %	38.0	18.0	44.0	2.0	95.9	2.0	4.0	36.0	60.0	9.7	82.6	7.7	
Total %	3.1	1.5	3.6	1.0	45.7	1.0	0.2	1.5	2.4	3.9	33.2	3.1	



Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696d
Site Code : 00003696
Start Date : 11/3/2015
Page No : 2

	DIVISION STREET S Southbound				RYAN ROAD Westbound				DIVISION STREET S Northbound				RYAN ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:00 PM																
Volume	9	3	10	22	4	169	1	174	1	8	7	16	14	99	10	123	335
Percent	40.9	13.6	45.5		2.3	97.1	0.6		6.3	50.0	43.8		11.4	80.5	8.1		
04:30 Volume	1	2	4	7	2	60	0	62	1	2	1	4	3	18	4	25	98
Peak Factor																	0.855
High Int.	04:00 PM				04:30 PM				04:45 PM				04:00 PM				
Volume	2	0	5	7	2	60	0	62	0	3	3	6	5	31	2	38	
Peak Factor				0.786				0.702				0.667				0.809	

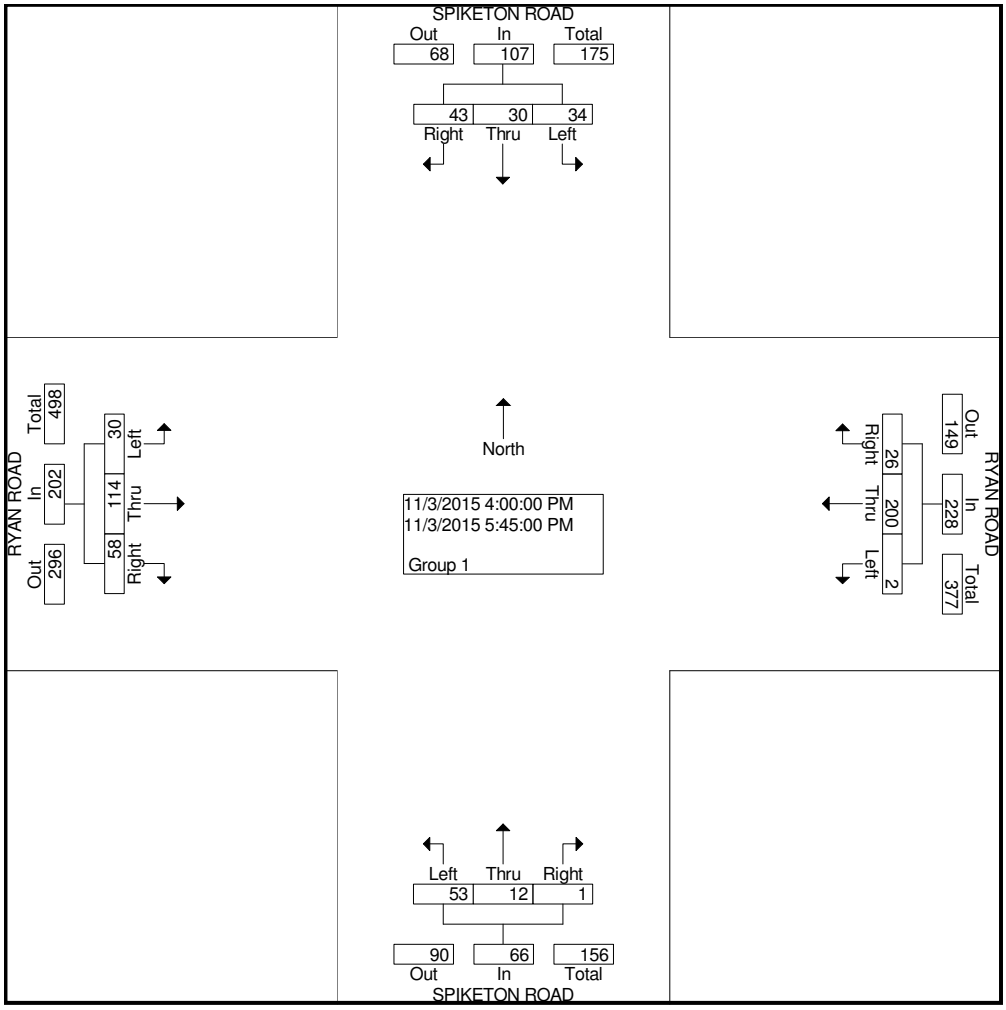


Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696b
Site Code : 00003696
Start Date : 11/3/2015
Page No : 1

Groups Printed- Group 1

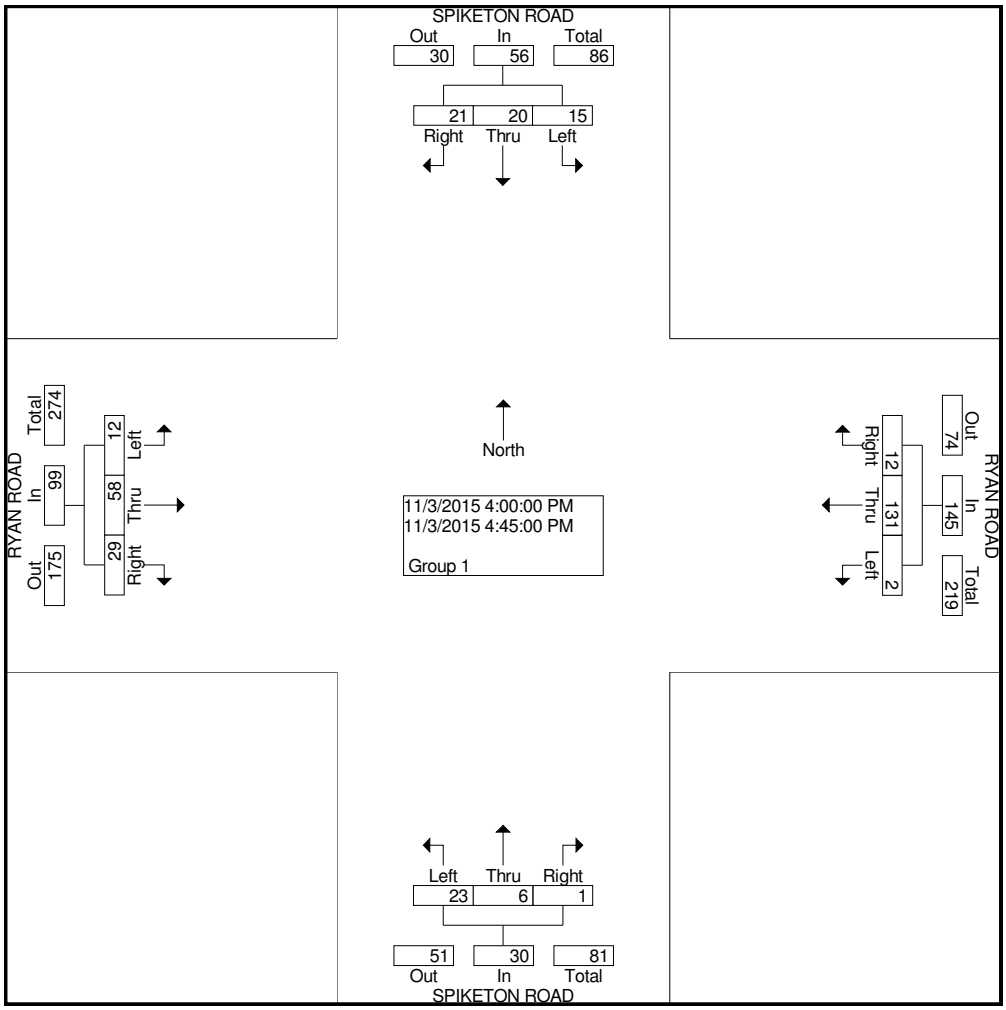
	SPIKETON ROAD Southbound			RYAN ROAD Westbound			SPIKETON ROAD Northbound			RYAN ROAD Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	4	5	3	2	33	0	0	0	6	12	17	4	86
04:15 PM	8	5	3	4	25	1	1	2	3	7	14	2	75
04:30 PM	2	4	6	3	54	1	0	2	7	5	12	1	97
04:45 PM	7	6	3	3	19	0	0	2	7	5	15	5	72
Total	21	20	15	12	131	2	1	6	23	29	58	12	330
05:00 PM	5	1	8	2	20	0	0	0	4	7	17	3	67
05:15 PM	7	4	7	4	15	0	0	1	6	2	11	5	62
05:30 PM	4	3	2	5	25	0	0	3	14	10	14	8	88
05:45 PM	6	2	2	3	9	0	0	2	6	10	14	2	56
Total	22	10	19	14	69	0	0	6	30	29	56	18	273
Grand Total	43	30	34	26	200	2	1	12	53	58	114	30	603
Apprch %	40.2	28.0	31.8	11.4	87.7	0.9	1.5	18.2	80.3	28.7	56.4	14.9	
Total %	7.1	5.0	5.6	4.3	33.2	0.3	0.2	2.0	8.8	9.6	18.9	5.0	

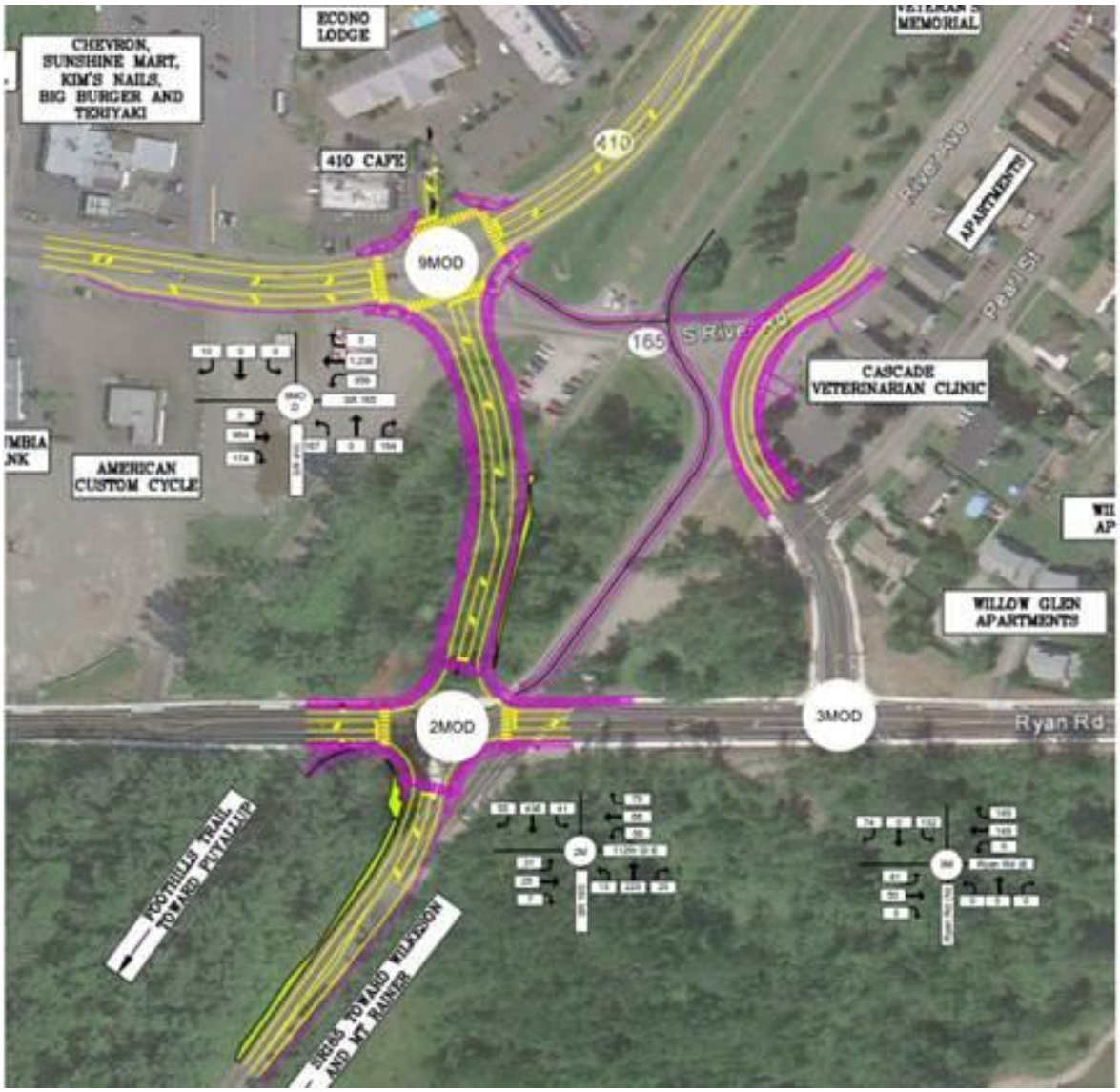


Heath & Associates, Inc.
2214 Tacoma Road
Puyallup, WA 98371

File Name : 3696b
Site Code : 00003696
Start Date : 11/3/2015
Page No : 2

	SPIKETON ROAD Southbound				RYAN ROAD Westbound				SPIKETON ROAD Northbound				RYAN ROAD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:00 PM																
Volume	21	20	15	56	12	131	2	145	1	6	23	30	29	58	12	99	330
Percent	37.5	35.7	26.8		8.3	90.3	1.4		3.3	20.0	76.7		29.3	58.6	12.1		
04:30 Volume	2	4	6	12	3	54	1	58	0	2	7	9	5	12	1	18	97
Peak Factor																	0.851
High Int.	04:15 PM				04:30 PM				04:30 PM				04:00 PM				
Volume	8	5	3	16	3	54	1	58	0	2	7	9	12	17	4	33	
Peak Factor				0.875				0.625				0.833				0.750	




CHEVRON, SUNSHINE MART, KIM'S NAILS, BIG BURGER AND TERIYAKI
ECONO LODGE
410 CAFE
410
9MOD
165
S RIVER RD
CASCADE VETERINARIAN CLINIC
APARTMENTS
Pearl St
AMERICAN CUSTOM CYCLE
WILLOW GLEN APARTMENTS
2MOD
3MOD
Ryan Rd
FOOTHILLS TRAIL TOWARD PUYALLUP
TRAIL TOWARD WILKESON AND MT RAINIER

STATE OF WASHINGTON - DEPARTMENT OF TRANSPORTATION
T R I P S S Y S T E M
ANNUAL TRAFFIC REPORT

STATE ROUTE	STATE ROUTE MILEPOST	LOCATION	COUPLET	FUNCT CLASS	TRUCK PERCENTAGES SNGL	DBL	TRIPLE	TOTAL	AVERAGE DAILY TRAFFIC VOLUME 2011 UNITS	2012 UNITS	2013 UNITS	2014 UNITS
		STATE ROUTE NO 164 MAINLINE SR 18 TO SR 410/ENUMCLAW										
164	000.44	AFTER JCT 7TH ST SE		2							33000*	34000
164	000.92	AFTER JCT 12TH ST SE WYE CONN		2					32000	32000	31000*	32000
164	002.28	AFTER JCT DOGWOOD ST SE		2						24000*	24000*	24000
164	004.37	AFTER JCT PVT RD*ACADEMY DR SE		2					17000	17000*	17000	17000
164	007.51	BEFORE JCT SE 400TH ST		2					13000	13000*	13000	13000
164	007.51	AFTER JCT SE 400TH ST		2					9900	9800*	9900	10000
164	013.30	BEFORE JCT 244TH AVE SE		2						10000*	10000	10000
164	013.30	AFTER JCT 244TH AVE SE		2						9200*	9300	9400
164	014.52	BEFORE JCT SR 169*PORTER ST		2					9600	9500*	9600	9800
164	014.68	AFTER JCT RAILROAD ST		2					9200	8600*	8700	8800
164	015.10	BEFORE JCT CEDAR ST		2					7300	7000*	7000	7200
		STATE ROUTE NO 165 MAINLINE MT RAINIER BRY TO SR 410										
165	010.91	BEFORE JCT FAIRFAX FOREST PRESERVE		3					140	120*	120	170*
165	010.91	AFTER JCT FAIRFAX FOREST PRESERVE		3					390	240*	250	380*
165	015.41	BEFORE JCT WILKESON-CARBONADO RD		3						1300*	1300	1300*
165	015.41	AFTER JCT WILKESON-CARBONADO RD		3					1600	1500*	1500	1500*
165	016.74	AFTER JCT DAVIS ST		2					3300	2700*	2800	2800*
165	019.57	BEFORE JCT SR 162		2					5700	5300*	5400	4900*
165	019.58	AFTER JCT SR 162 WYE CONN		2					5200	4700*	4800	5100* } no growth
165	021.21	BEFORE JCT SR 410 WYE CONN		2					7200	6400*	6400	6600* }
		STATE ROUTE NO 166 MAINLINE SR 16 TO PRT ORCHARD ECL										
166	002.90	BEFORE JCT SIDNEY AVE		1					14000	14000	14000	13000*
166	002.90	AFTER JCT SIDNEY AVE		1					17000	16000	17000	15000*
166	003.38	BEFORE JCT BAY ST WYE CONN		1					18000	17000	18000	16000*

* BASED ON ACTUAL COUNT
\+ SOURCE OF TRUCK PERCENTAGES

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	153	6	1	101	3	9	5	2	1	3	9
Future Vol, veh/h	7	153	6	1	101	3	9	5	2	1	3	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	67	67	67	67	67	67	65	65	65
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	9	196	8	1	151	4	13	7	3	2	5	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	155	0	0	204	0	0	383	376	200	379	378	153
Stage 1	-	-	-	-	-	-	218	218	-	156	156	-
Stage 2	-	-	-	-	-	-	165	158	-	223	222	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1438	-	-	1380	-	-	579	558	846	582	557	898
Stage 1	-	-	-	-	-	-	789	726	-	851	772	-
Stage 2	-	-	-	-	-	-	842	771	-	784	723	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1438	-	-	1380	-	-	563	554	846	570	553	898
Mov Cap-2 Maneuver	-	-	-	-	-	-	563	554	-	570	553	-
Stage 1	-	-	-	-	-	-	783	721	-	845	771	-
Stage 2	-	-	-	-	-	-	823	770	-	768	718	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	11.4	9.9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	584	1438	-	-	1380	-	-	756
HCM Lane V/C Ratio	0.041	0.006	-	-	0.001	-	-	0.026
HCM Control Delay (s)	11.4	7.5	0	-	7.6	0	-	9.9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	14	133	7	2	52	20	22	21	1	12	10	13
Future Vol, veh/h	14	133	7	2	52	20	22	21	1	12	10	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	97	97	97	79	79	79	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	19	180	9	2	54	21	28	27	1	15	13	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	74	0	0	189	0	0	304	300	184	304	295	64
Stage 1	-	-	-	-	-	-	222	222	-	68	68	-
Stage 2	-	-	-	-	-	-	82	78	-	236	227	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1538	-	-	1397	-	-	652	616	864	652	620	1006
Stage 1	-	-	-	-	-	-	785	723	-	947	842	-
Stage 2	-	-	-	-	-	-	931	834	-	772	720	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1538	-	-	1397	-	-	624	607	864	622	611	1006
Mov Cap-2 Maneuver	-	-	-	-	-	-	624	607	-	622	611	-
Stage 1	-	-	-	-	-	-	774	713	-	934	841	-
Stage 2	-	-	-	-	-	-	901	833	-	732	710	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.2	11.4	10.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	620	1538	-	-	1397	-	-	720
HCM Lane V/C Ratio	0.09	0.012	-	-	0.001	-	-	0.061
HCM Control Delay (s)	11.4	7.4	0	-	7.6	0	-	10.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	4	70	54	65	97	2
Future Vol, veh/h	4	70	54	65	97	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	74	74	73	73
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	83	73	88	133	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	161	0	-	0	210	117
Stage 1	-	-	-	-	117	-
Stage 2	-	-	-	-	93	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1430	-	-	-	783	941
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	936	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1430	-	-	-	780	941
Mov Cap-2 Maneuver	-	-	-	-	780	-
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	933	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1430	-	-	-	783
HCM Lane V/C Ratio	0.003	-	-	-	0.173
HCM Control Delay (s)	7.5	-	-	-	10.6
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.6

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	27	98	74	0	4	64	4	0	182	125	0
Future Vol, veh/h	0	27	98	74	0	4	64	4	0	182	125	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0
Mvmt Flow	0	29	107	80	0	4	70	4	0	198	136	0
Number of Lanes	0	1	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.2	9.2	12.1
HCM LOS	B	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	59%	100%	0%	6%	4%
Vol Thru, %	41%	0%	57%	89%	79%
Vol Right, %	0%	0%	43%	6%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	307	27	172	72	101
LT Vol	182	27	0	4	4
Through Vol	125	0	98	64	80
RT Vol	0	0	74	4	17
Lane Flow Rate	334	29	187	78	110
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.456	0.05	0.279	0.12	0.153
Departure Headway (Hd)	4.923	6.185	5.375	5.498	5.11
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	724	574	662	656	706
Service Time	3	3.977	3.167	3.498	3.11
HCM Lane V/C Ratio	0.461	0.051	0.282	0.119	0.156
HCM Control Delay	12.1	9.3	10.3	9.2	9
HCM Lane LOS	B	A	B	A	A
HCM 95th-tile Q	2.4	0.2	1.1	0.4	0.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	4	80	17
Future Vol, veh/h	0	4	80	17
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	4	87	18
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	9
HCM LOS	A

Lane

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	10	99	14	1	169	4	7	8	1	10	3	9
Future Vol, veh/h	10	99	14	1	169	4	7	8	1	10	3	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	70	70	70	67	67	67	79	79	79
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	122	17	1	241	6	10	12	1	13	4	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	247	0	0	140	0	0	411	406	131	409	411	244
Stage 1	-	-	-	-	-	-	156	156	-	247	247	-
Stage 2	-	-	-	-	-	-	255	250	-	162	164	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1331	-	-	1456	-	-	555	537	924	556	534	800
Stage 1	-	-	-	-	-	-	851	772	-	761	706	-
Stage 2	-	-	-	-	-	-	754	704	-	845	766	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1331	-	-	1456	-	-	540	531	924	541	528	800
Mov Cap-2 Maneuver	-	-	-	-	-	-	540	531	-	541	528	-
Stage 1	-	-	-	-	-	-	842	764	-	753	705	-
Stage 2	-	-	-	-	-	-	739	703	-	822	758	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	11.8	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	550	1331	-	-	1456	-	-	621
HCM Lane V/C Ratio	0.043	0.009	-	-	0.001	-	-	0.045
HCM Control Delay (s)	11.8	7.7	0	-	7.5	0	-	11.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	12	58	29	2	131	12	23	6	1	15	20	21
Future Vol, veh/h	12	58	29	2	131	12	23	6	1	15	20	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	63	63	63	83	83	83	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	16	77	39	3	208	19	28	7	1	17	23	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	227	0	0	116	0	0	376	362	97	357	372	217
Stage 1	-	-	-	-	-	-	129	129	-	224	224	-
Stage 2	-	-	-	-	-	-	247	233	-	133	148	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1353	-	-	1485	-	-	585	569	965	602	561	828
Stage 1	-	-	-	-	-	-	880	793	-	783	722	-
Stage 2	-	-	-	-	-	-	761	716	-	875	779	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1353	-	-	1485	-	-	544	560	965	589	553	828
Mov Cap-2 Maneuver	-	-	-	-	-	-	544	560	-	589	553	-
Stage 1	-	-	-	-	-	-	869	783	-	773	721	-
Stage 2	-	-	-	-	-	-	714	715	-	855	769	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.1	11.9	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	555	1353	-	-	1485	-	-	644
HCM Lane V/C Ratio	0.065	0.012	-	-	0.002	-	-	0.099
HCM Control Delay (s)	11.9	7.7	0	-	7.4	0	-	11.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	4	37	90	95	88	1
Future Vol, veh/h	4	37	90	95	88	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	68	75	75	82	82
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	54	120	127	107	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	247	0	-	0	249	183
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	66	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1331	-	-	-	744	865
Stage 1	-	-	-	-	853	-
Stage 2	-	-	-	-	962	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1331	-	-	-	741	865
Mov Cap-2 Maneuver	-	-	-	-	741	-
Stage 1	-	-	-	-	853	-
Stage 2	-	-	-	-	958	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	10.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1331	-	-	-	742
HCM Lane V/C Ratio	0.004	-	-	-	0.146
HCM Control Delay (s)	7.7	-	-	-	10.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	35	88	279	0	8	77	5	0	130	78	0
Future Vol, veh/h	0	35	88	279	0	8	77	5	0	130	78	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0
Mvmt Flow	0	38	96	303	0	9	84	5	0	141	85	0
Number of Lanes	0	1	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	14	9.7	11.7
HCM LOS	B	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	62%	100%	0%	9%	2%
Vol Thru, %	38%	0%	24%	86%	68%
Vol Right, %	0%	0%	76%	6%	31%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	208	35	367	90	118
LT Vol	130	35	0	8	2
Through Vol	78	0	88	77	80
RT Vol	0	0	279	5	36
Lane Flow Rate	226	38	399	98	128
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.353	0.065	0.567	0.154	0.196
Departure Headway (Hd)	5.628	6.157	5.114	5.654	5.512
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	640	582	706	634	650
Service Time	3.665	3.886	2.843	3.696	3.553
HCM Lane V/C Ratio	0.353	0.065	0.565	0.155	0.197
HCM Control Delay	11.7	9.3	14.4	9.7	9.9
HCM Lane LOS	B	A	B	A	A
HCM 95th-tile Q	1.6	0.2	3.6	0.5	0.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	2	80	36
Future Vol, veh/h	0	2	80	36
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	2	87	39
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	9.9
HCM LOS	A

Lane

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	169	7	1	112	3	10	6	2	1	3	10
Future Vol, veh/h	8	169	7	1	112	3	10	6	2	1	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	67	67	67	67	67	67	65	65	65
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	217	9	1	167	4	15	9	3	2	5	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	172	0	0	226	0	0	424	417	221	420	418	169
Stage 1	-	-	-	-	-	-	242	242	-	172	172	-
Stage 2	-	-	-	-	-	-	182	175	-	248	246	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1417	-	-	1354	-	-	544	530	824	547	529	880
Stage 1	-	-	-	-	-	-	766	709	-	835	760	-
Stage 2	-	-	-	-	-	-	824	758	-	760	706	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1417	-	-	1354	-	-	527	525	824	534	524	880
Mov Cap-2 Maneuver	-	-	-	-	-	-	527	525	-	534	524	-
Stage 1	-	-	-	-	-	-	760	703	-	828	759	-
Stage 2	-	-	-	-	-	-	804	757	-	742	700	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	11.9	10
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	548	1417	-	-	1354	-	-	738
HCM Lane V/C Ratio	0.049	0.007	-	-	0.001	-	-	0.029
HCM Control Delay (s)	11.9	7.6	0	-	7.7	0	-	10
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	15	147	8	2	57	22	24	23	1	13	11	14
Future Vol, veh/h	15	147	8	2	57	22	24	23	1	13	11	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	97	97	97	79	79	79	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	20	199	11	2	59	23	30	29	1	16	14	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	81	0	0	209	0	0	335	331	204	334	324	70
Stage 1	-	-	-	-	-	-	245	245	-	74	74	-
Stage 2	-	-	-	-	-	-	90	86	-	260	250	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1529	-	-	1374	-	-	622	592	842	623	597	998
Stage 1	-	-	-	-	-	-	763	707	-	940	837	-
Stage 2	-	-	-	-	-	-	922	827	-	749	704	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1529	-	-	1374	-	-	592	582	842	591	587	998
Mov Cap-2 Maneuver	-	-	-	-	-	-	592	582	-	591	587	-
Stage 1	-	-	-	-	-	-	752	696	-	926	835	-
Stage 2	-	-	-	-	-	-	889	825	-	706	693	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.2	11.8	10.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	591	1529	-	-	1374	-	-	694
HCM Lane V/C Ratio	0.103	0.013	-	-	0.002	-	-	0.068
HCM Control Delay (s)	11.8	7.4	0	-	7.6	0	-	10.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	4	77	60	72	107	2
Future Vol, veh/h	4	77	60	72	107	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	74	74	73	73
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	92	81	97	147	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	178	0	-	0	231	130
Stage 1	-	-	-	-	130	-
Stage 2	-	-	-	-	101	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1410	-	-	-	762	925
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	928	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1410	-	-	-	759	925
Mov Cap-2 Maneuver	-	-	-	-	759	-
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	925	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1410	-	-	-	762
HCM Lane V/C Ratio	0.003	-	-	-	0.196
HCM Control Delay (s)	7.6	-	-	-	10.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.7

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	11	109	15	1	187	4	8	9	1	11	3	10
Future Vol, veh/h	11	109	15	1	187	4	8	9	1	11	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	70	70	70	67	67	67	79	79	79
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	14	135	19	1	267	6	12	13	1	14	4	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	273	0	0	153	0	0	452	447	144	451	453	270
Stage 1	-	-	-	-	-	-	171	171	-	273	273	-
Stage 2	-	-	-	-	-	-	281	276	-	178	180	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1302	-	-	1440	-	-	521	509	909	522	506	774
Stage 1	-	-	-	-	-	-	836	761	-	737	688	-
Stage 2	-	-	-	-	-	-	730	685	-	828	754	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1302	-	-	1440	-	-	504	502	909	505	499	774
Mov Cap-2 Maneuver	-	-	-	-	-	-	504	502	-	505	499	-
Stage 1	-	-	-	-	-	-	826	752	-	728	687	-
Stage 2	-	-	-	-	-	-	713	684	-	802	745	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	12.4	11.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	516	1302	-	-	1440	-	-	589
HCM Lane V/C Ratio	0.052	0.01	-	-	0.001	-	-	0.052
HCM Control Delay (s)	12.4	7.8	0	-	7.5	0	-	11.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	13	64	32	2	145	13	25	7	1	17	22	23
Future Vol, veh/h	13	64	32	2	145	13	25	7	1	17	22	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	63	63	63	83	83	83	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	17	85	43	3	230	21	30	8	1	19	25	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	251	0	0	128	0	0	413	398	107	393	410	240
Stage 1	-	-	-	-	-	-	141	141	-	247	247	-
Stage 2	-	-	-	-	-	-	272	257	-	146	163	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1326	-	-	1470	-	-	553	543	953	570	534	804
Stage 1	-	-	-	-	-	-	867	784	-	761	706	-
Stage 2	-	-	-	-	-	-	738	699	-	861	767	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1326	-	-	1470	-	-	509	534	953	556	525	804
Mov Cap-2 Maneuver	-	-	-	-	-	-	509	534	-	556	525	-
Stage 1	-	-	-	-	-	-	855	773	-	750	705	-
Stage 2	-	-	-	-	-	-	687	698	-	839	756	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.1	12.5	11.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	522	1326	-	-	1470	-	-	613
HCM Lane V/C Ratio	0.076	0.013	-	-	0.002	-	-	0.115
HCM Control Delay (s)	12.5	7.8	0	-	7.5	0	-	11.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	4	41	105	99	97	1
Future Vol, veh/h	4	41	105	99	97	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	68	75	75	82	82
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	60	140	132	118	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	272	0	-	0	278	206
Stage 1	-	-	-	-	206	-
Stage 2	-	-	-	-	72	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1303	-	-	-	716	840
Stage 1	-	-	-	-	833	-
Stage 2	-	-	-	-	956	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1303	-	-	-	713	840
Mov Cap-2 Maneuver	-	-	-	-	833	-
Stage 1	-	-	-	-	833	-
Stage 2	-	-	-	-	952	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1303	-	-	-	833
HCM Lane V/C Ratio	0.005	-	-	-	0.143
HCM Control Delay (s)	7.8	-	-	-	10
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	28	26	6	0	51	79	72	0	12	199	18
Future Vol, veh/h	0	28	26	6	0	51	79	72	0	12	199	18
Peak Hour Factor	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0
Mvmt Flow	0	29	27	6	0	53	82	75	0	13	207	19
Number of Lanes	0	1	1	0	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	10.4	11.3	12.2
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	92%	0%	81%	0%	52%	0%	89%
Vol Right, %	0%	8%	0%	19%	0%	48%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	217	28	32	51	151	38	443
LT Vol	12	0	28	0	51	0	38	0
Through Vol	0	199	0	26	0	79	0	394
RT Vol	0	18	0	6	0	72	0	49
Lane Flow Rate	12	226	29	33	53	157	40	461
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.023	0.376	0.061	0.063	0.106	0.276	0.068	0.723
Departure Headway (Hd)	6.554	5.987	7.48	6.835	7.155	6.307	6.221	5.638
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	545	599	477	522	500	568	576	641
Service Time	4.305	3.738	5.252	4.606	4.911	4.063	3.963	3.379
HCM Lane V/C Ratio	0.022	0.377	0.061	0.063	0.106	0.276	0.069	0.719
HCM Control Delay	9.5	12.3	10.7	10.1	10.8	11.5	9.4	21.8
HCM Lane LOS	A	B	B	B	B	B	A	C
HCM 95th-tile Q	0.1	1.7	0.2	0.2	0.4	1.1	0.2	6.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	38	394	49
Future Vol, veh/h	0	38	394	49
Peak Hour Factor	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	40	410	51
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	20.8
HCM LOS	C

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	8	183	7	1	152	3	10	6	2	1	3	10
Future Vol, veh/h	8	183	7	1	152	3	10	6	2	1	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	67	67	67	67	67	67	65	65	65
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	235	9	1	227	4	15	9	3	2	5	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	231	0	0	244	0	0	502	494	239	498	496	229
Stage 1	-	-	-	-	-	-	260	260	-	232	232	-
Stage 2	-	-	-	-	-	-	242	234	-	266	264	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1349	-	-	1334	-	-	483	479	805	486	478	815
Stage 1	-	-	-	-	-	-	749	697	-	775	716	-
Stage 2	-	-	-	-	-	-	766	715	-	744	694	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1349	-	-	1334	-	-	467	474	805	474	473	815
Mov Cap-2 Maneuver	-	-	-	-	-	-	467	474	-	474	473	-
Stage 1	-	-	-	-	-	-	742	691	-	768	715	-
Stage 2	-	-	-	-	-	-	746	714	-	725	688	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	12.7	10.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	492	1349	-	-	1334	-	-	676
HCM Lane V/C Ratio	0.055	0.008	-	-	0.001	-	-	0.032
HCM Control Delay (s)	12.7	7.7	0	-	7.7	0	-	10.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	15	147	22	2	57	22	64	23	1	13	11	14
Future Vol, veh/h	15	147	22	2	57	22	64	23	1	13	11	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	97	97	97	79	79	79	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	20	199	30	2	59	23	81	29	1	16	14	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	81	0	0	228	0	0	344	340	214	343	343	70
Stage 1	-	-	-	-	-	-	254	254	-	74	74	-
Stage 2	-	-	-	-	-	-	90	86	-	269	269	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1529	-	-	1352	-	-	614	585	831	615	583	998
Stage 1	-	-	-	-	-	-	755	701	-	940	837	-
Stage 2	-	-	-	-	-	-	922	827	-	741	690	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1529	-	-	1352	-	-	585	575	831	583	573	998
Mov Cap-2 Maneuver	-	-	-	-	-	-	585	575	-	583	573	-
Stage 1	-	-	-	-	-	-	744	690	-	926	835	-
Stage 2	-	-	-	-	-	-	889	825	-	698	680	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.2	12.6	10.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	584	1529	-	-	1352	-	-	684
HCM Lane V/C Ratio	0.191	0.013	-	-	0.002	-	-	0.069
HCM Control Delay (s)	12.6	7.4	0	-	7.7	0	-	10.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	4	91	100	72	107	2
Future Vol, veh/h	4	91	100	72	107	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	74	74	73	73
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	108	135	97	147	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	232	0	-	0	302	184
Stage 1	-	-	-	-	184	-
Stage 2	-	-	-	-	118	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1348	-	-	-	694	864
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	912	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1348	-	-	-	691	864
Mov Cap-2 Maneuver	-	-	-	-	691	-
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	909	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1348	-	-	-	694
HCM Lane V/C Ratio	0.004	-	-	-	0.215
HCM Control Delay (s)	7.7	-	-	-	11.6
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.8

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	40	48	0	16	21
Future Vol, veh/h	0	40	48	0	16	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	44	53	0	18	23

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	112	53	0	0	53	0
Stage 1	53	-	-	-	-	-
Stage 2	59	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	890	1020	-	-	1566	-
Stage 1	975	-	-	-	-	-
Stage 2	969	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	879	1020	-	-	1566	-
Mov Cap-2 Maneuver	879	-	-	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	957	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	3.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1020	1566	-
HCM Lane V/C Ratio	-	-	0.044	0.011	-
HCM Control Delay (s)	-	-	8.7	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	11	152	15	1	213	4	8	9	1	11	3	10
Future Vol, veh/h	11	152	15	1	213	4	8	9	1	11	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	70	70	70	67	67	67	79	79	79
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	14	188	19	1	304	6	12	13	1	14	4	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	310	0	0	206	0	0	542	537	197	542	543	307
Stage 1	-	-	-	-	-	-	224	224	-	310	310	-
Stage 2	-	-	-	-	-	-	318	313	-	232	233	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1262	-	-	1377	-	-	454	453	849	454	450	738
Stage 1	-	-	-	-	-	-	783	722	-	705	663	-
Stage 2	-	-	-	-	-	-	698	661	-	775	716	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1262	-	-	1377	-	-	439	447	849	438	444	738
Mov Cap-2 Maneuver	-	-	-	-	-	-	439	447	-	438	444	-
Stage 1	-	-	-	-	-	-	773	713	-	696	662	-
Stage 2	-	-	-	-	-	-	681	660	-	749	707	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0	13.4	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	455	1262	-	-	1377	-	-	528
HCM Lane V/C Ratio	0.059	0.011	-	-	0.001	-	-	0.058
HCM Control Delay (s)	13.4	7.9	0	-	7.6	0	-	12.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	13	64	75	2	145	13	51	7	1	17	22	23
Future Vol, veh/h	13	64	75	2	145	13	51	7	1	17	22	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	63	63	63	83	83	83	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	17	85	100	3	230	21	61	8	1	19	25	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	251	0	0	185	0	0	442	427	135	422	467	240
Stage 1	-	-	-	-	-	-	170	170	-	247	247	-
Stage 2	-	-	-	-	-	-	272	257	-	175	220	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1326	-	-	1402	-	-	529	523	919	546	496	804
Stage 1	-	-	-	-	-	-	837	762	-	761	706	-
Stage 2	-	-	-	-	-	-	738	699	-	832	725	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1326	-	-	1402	-	-	486	515	919	532	488	804
Mov Cap-2 Maneuver	-	-	-	-	-	-	486	515	-	532	488	-
Stage 1	-	-	-	-	-	-	825	751	-	750	705	-
Stage 2	-	-	-	-	-	-	687	698	-	810	715	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.1	13.5	12
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	493	1326	-	-	1402	-	-	587
HCM Lane V/C Ratio	0.144	0.013	-	-	0.002	-	-	0.12
HCM Control Delay (s)	13.5	7.8	0	-	7.6	0	-	12
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	4	84	131	99	97	1
Future Vol, veh/h	4	84	131	99	97	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	68	68	75	75	82	82
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	124	175	132	118	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	307	0	-	0	376	241
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	135	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1265	-	-	-	629	803
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	896	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1265	-	-	-	626	803
Mov Cap-2 Maneuver	-	-	-	-	626	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	892	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1265	-	-	-	627
HCM Lane V/C Ratio	0.005	-	-	-	0.191
HCM Control Delay (s)	7.9	-	-	-	12.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.7

Intersection	
Int Delay, s/veh	3.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	26	33	0	45	56
Future Vol, veh/h	0	26	33	0	45	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	29	37	0	50	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	199	37	0	0	37	0
Stage 1	37	-	-	-	-	-
Stage 2	162	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	794	1041	-	-	1587	-
Stage 1	991	-	-	-	-	-
Stage 2	872	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	768	1041	-	-	1587	-
Mov Cap-2 Maneuver	768	-	-	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	843	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	3.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1041	1587	-
HCM Lane V/C Ratio	-	-	0.028	0.032	-
HCM Control Delay (s)	-	-	8.6	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Intersection	
Intersection Delay, s/veh	16.7
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	28	32	6	0	51	83	94	0	12	199	18
Future Vol, veh/h	0	28	32	6	0	51	83	94	0	12	199	18
Peak Hour Factor	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0
Mvmt Flow	0	29	33	6	0	53	86	98	0	13	207	19
Number of Lanes	0	1	1	0	0	1	1	0	0	1	1	0

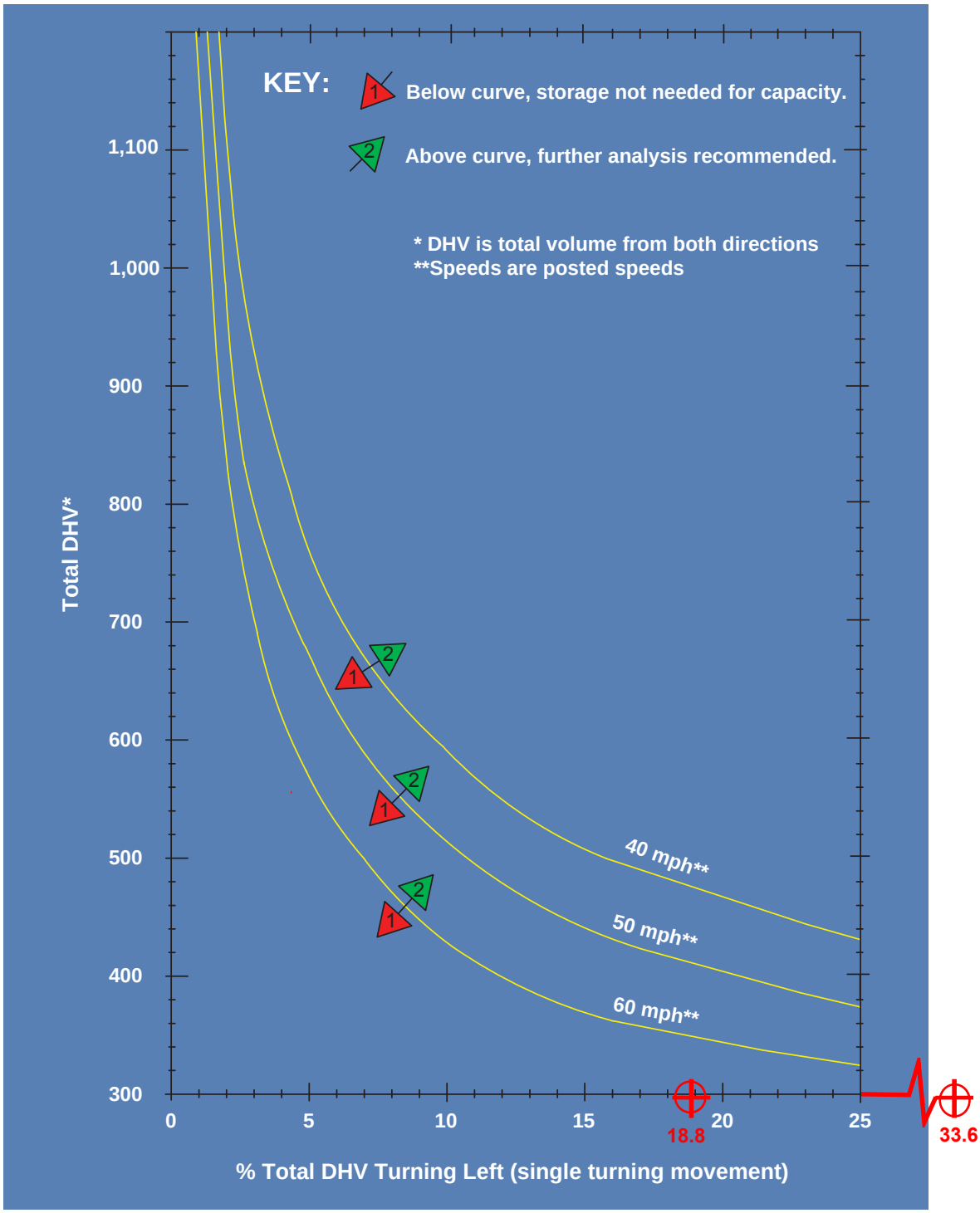
Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	10.6	12	12.7
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	92%	0%	84%	0%	47%	0%	89%
Vol Right, %	0%	8%	0%	16%	0%	53%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	217	28	38	51	177	75	443
LT Vol	12	0	28	0	51	0	75	0
Through Vol	0	199	0	32	0	83	0	394
RT Vol	0	18	0	6	0	94	0	49
Lane Flow Rate	12	226	29	40	53	184	78	461
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.023	0.389	0.062	0.077	0.107	0.327	0.138	0.74
Departure Headway (Hd)	6.76	6.193	7.651	7.027	7.276	6.388	6.358	5.774
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	528	579	466	507	491	561	563	623
Service Time	4.521	3.954	5.432	4.807	5.039	4.151	4.106	3.522
HCM Lane V/C Ratio	0.023	0.39	0.062	0.079	0.108	0.328	0.139	0.74
HCM Control Delay	9.7	12.9	10.9	10.4	10.9	12.3	10.1	23.2
HCM Lane LOS	A	B	B	B	B	B	B	C
HCM 95th-tile Q	0.1	1.8	0.2	0.2	0.4	1.4	0.5	6.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	75	394	49
Future Vol, veh/h	0	75	394	49
Peak Hour Factor	0.92	0.96	0.96	0.96
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	78	410	51
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	21.3
HCM LOS	C



Spiketon Road & Entrance

2020 AM Peak Hour Volumes With Project
AM DHV: 85 vph
Left Turn %: 18.8
LEFT TURN LANE NOT WARRANTED

2020 PM Peak Hour Volumes With Project
PM DHV: 134
Left Turn %: 33.6
LEFT TURN LANE NOT WARRANTED

Left-Turn Storage Guidelines: Two-Lane, Unsignalized

Exhibit 1310-7a

Executive TEIS - Capital Projects System

Project Listing

2015 Updated Six Year Plan by Region, Program

Grouping: Region, Program **Dollars In Thousands**

PIN	Project Title	Prior	13 - 15	15 - 17	17 - 19	19 - 21	21 - 23	23 - 25	25 - 27	27 - 29	29 - 31	Future	Total
3 - Olympic		**481,673**	**238,964**	**501,066**	**565,490**	**563,859**	**396,530**	**157,553**	**0**	**0**	**0**	**0**	**2,905,137**
P - Preservation		**11,072**	**56,205**	**92,587**	**50,950**	**42,853**	**18,106**	**0**	**0**	**0**	**0**	**0**	**271,781**
341025A	SR 410/Buckley - Rebuild Signals	0	0	59	560	1,175	0	0	0	0	0	0	1,794
350736A	SR 507/Old Hwy 99 to E of Water St - Paving	0	456	3,013	0	0	0	0	0	0	0	0	3,469
350739A	SR 507/Golphnee Lp SE to 295th St S - Paving	0	16	1,390	0	0	0	0	0	0	0	0	1,406
350913A	SR 509/Wapato Creek to Marine View Dr - Paving	55	1,189	8	0	0	0	0	0	0	0	0	1,252
350914D	SR 509/S of East West Rd to Norpoint Way - Paving	0	856	6	0	0	0	0	0	0	0	0	862
350917A	SR 509/E 21st St to E 11th St - Paving	0	0	2,389	0	0	0	0	0	0	0	0	2,389
351034A	SR 510/Yelm Ave West to SR 507 - Paving	0	0	363	0	0	0	0	0	0	0	0	363
351216D	SR 512/Golden-Givens Rd to Jct SR 167 - Paving	0	0	0	3,131	0	0	0	0	0	0	0	3,131
370507A	I-705/N of Pacific Ave to Schuster Parkway - Paving	0	0	343	0	0	0	0	0	0	0	0	343
4 - Southwest		**348,865**	**174,474**	**151,712**	**95,964**	**102,047**	**91,846**	**68,553**	**0**	**0**	**0**	**0**	**1,033,456**
I - Improvement		**326,918**	**123,240**	**82,352**	**36,786**	**69,940**	**81,791**	**68,553**	**0**	**0**	**0**	**0**	**789,575**
400014R	SR 4 and SR 432 Centerline Rumble Strips - Safety	0	0	381	156	0	0	0	0	0	0	0	537
400014S	SR 503, 503 Spur, 504 and 505 - Centerline Rumble Strips	0	0	233	86	0	0	0	0	0	0	0	318
400015I	SWR - Intersection Safety Implementation Program	0	0	602	0	0	0	0	0	0	0	0	602
400015Q	SWR - Traffic Operation Assessments	0	100	188	188	188	0	0	0	0	0	0	664
400016A	SWR Regionwide Curb Ramps - ADA Compliance	0	0	1,426	0	0	0	0	0	0	0	0	1,426
400016F	SW Region/Clark County Locations - High Friction Surfacing	0	0	455	0	0	0	0	0	0	0	0	455
400016R	SWR Regionwide Safety - Shoulder Rumble Strips Phase 1	0	0	735	0	0	0	0	0	0	0	0	735
400017A	Ridgefield Rail Overpass	0	0	300	7,468	0	0	0	0	0	0	0	7,768
400017S	SWR - Regionwide Curve Warning Signing Phase II	0	0	386	0	0	0	0	0	0	0	0	386
400018F	SW Region/Regionwide High Friction Surface Installation	0	0	0	500	0	0	0	0	0	0	0	500
400018R	SWR Regionwide Safety - Shoulder Rumble Strips Phase II	0	0	0	400	0	0	0	0	0	0	0	400
400018S	SW Region/Regionwide Curve Warning Sign Update	0	0	0	355	0	0	0	0	0	0	0	355
400020F	SW Region/Regionwide High Friction Surface Installation	0	0	0	0	500	0	0	0	0	0	0	500
400020G	SW Region/Regionwide Guardrail Installation	0	0	0	0	879	0	0	0	0	0	0	879