Traffic Impact Analysis

Orchard Hills

Twisp, Washington

Prepared For:
Palm Investments North, LLC

Prepared By:
SCJ Alliance
8730 Tallon Lane NE, Suite 200
Lacey, WA 98516
360.352.1465

April 2023

SCJ ALLIANCE
CONSULTING SERVICES

Traffic Impact Analysis

Project Information

Project:	Orchard Hills
Prepared for:	Palm Investments North, LLC

Reviewing Agency

Jurisdiction:	Town of Twisp

Project Representative

Prepared by:	SCJ Alliance 8730 Tallon Lane NE, Suite 200 Lacey, WA 98516 360.352.1465 scjalliance.com
Contact:	Ryan Shea, PTP, Senior Transportation Planner
Project Reference:	SCJ #22-000682 Path: N:\Projects\5926 Palm Investment North LLC\22-000682 Palm Investment North LLC - Orchard Hills Housing\04 - Dels\Reports\TIA\Traffic Impact Analysis 2023-0405.docx

Signature

The technical material and data contained in the Traffic Impact Analysis were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.

Prepared by Ryan Shea, PTP, Senior Transportation Planner

4/11/2023

Approved by Eric Johnston, PE, Principal

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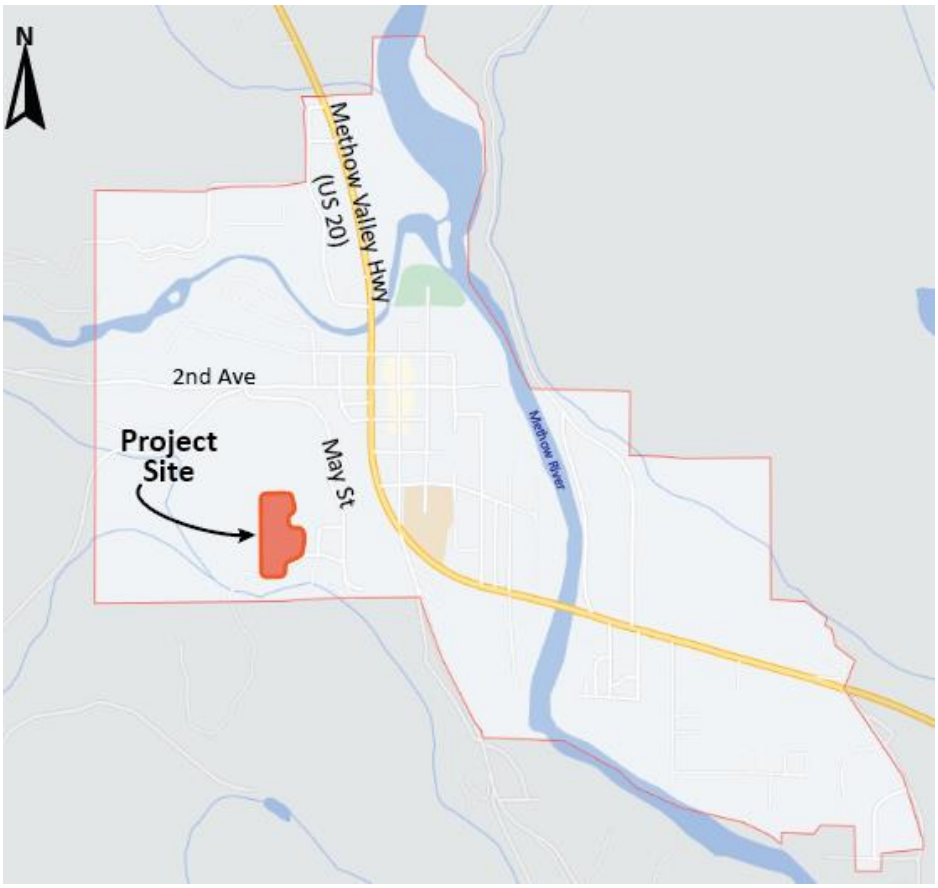
1 Introduction

1.1 Project Overview

Palm Investments North, LLC is proposing construction of the Orchard Hills project, a single-family residential development near Harrison Avenue and May Street in Twisp, Washington. The proposed project includes 53 single family lots.

Figure 1 illustrates the site vicinity and the transportation network serving the project area.

Figure 1. Site Vicinity Map



1.2 Study Context

This report has been prepared to provide the traffic analysis and project information to assist the Town of Twisp in reviewing the development proposal. A Traffic Scoping Letter (included in **Appendix A**) was prepared and submitted which documented the trip generation, distribution, and assignment of estimated project trips. Based on conversations with City staff the following intersections are included for analysis:

- Methow Valley Highway/Division Street (US 20) at 2nd Avenue
- May Street at 2nd Avenue

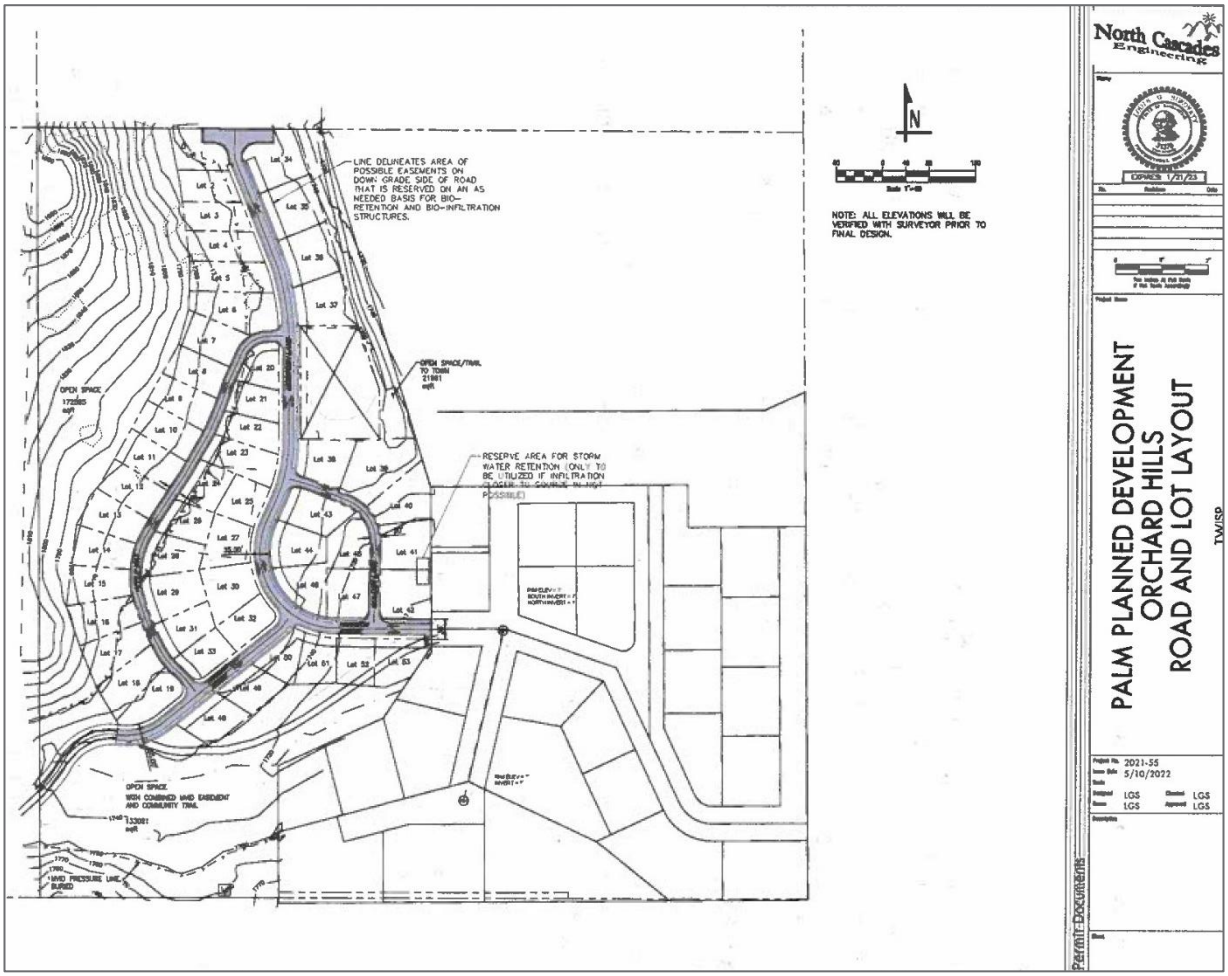
2 Project Description

2.1 Development Proposal

The proposed project would construct 53 single-family residential lots in the Town of Twisp. The project also proposes to dedicate approximately 7.5 acres to the Town of Twisp for a community park or permanent open space. Access to the project is proposed to be from Harrison Avenue. The project is anticipated to be constructed over three phases, with full build out occurring by 2028.

The preliminary site plan is provided on **Figure 2**.

Figure 2. Preliminary Site Plan



3 Existing Conditions

3.1 Area Land Uses

The proposed project will be located on undeveloped land located near Harrison Avenue and May Street in Twisp, Washington. The adjacent land uses are single family homes and vacant land.

3.2 Roadway Inventory

3.2.1 May Street

May Street is a north-south local access roadway that provides a single travel lane in each direction. This roadway serves single-family residences and does not currently provide sidewalks or bike lanes.

3.2.2 2nd Avenue

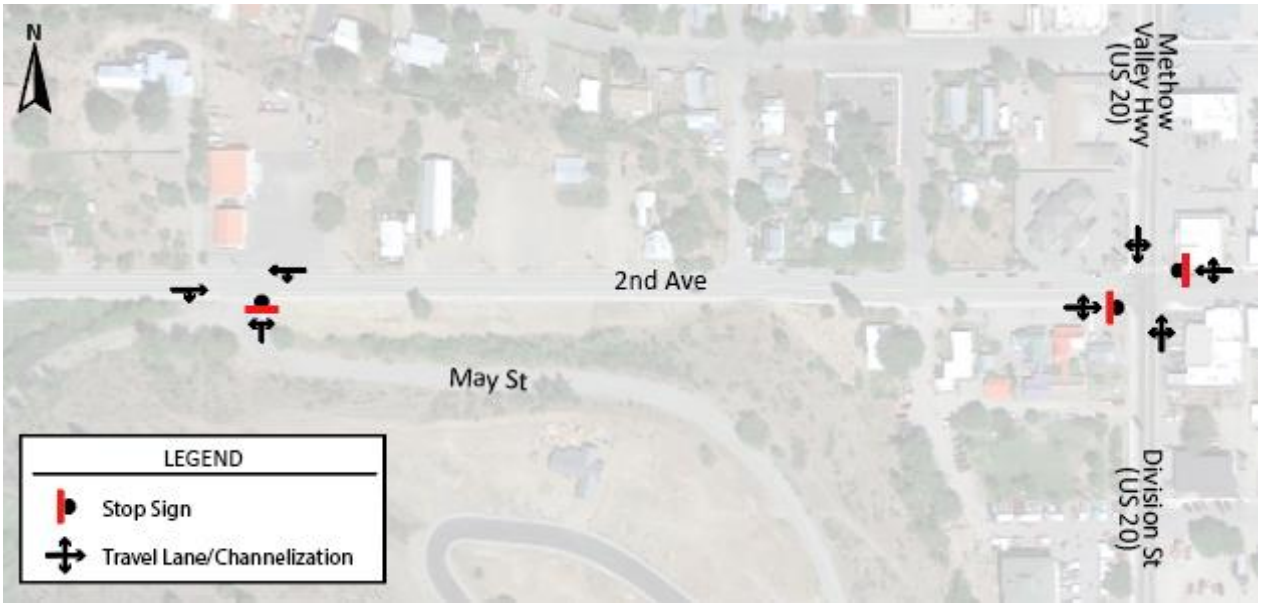
2nd Avenue, in the project vicinity, is an east-west major collector. This roadway provides one lane in each direction with a sidewalk along the south side of the road. There are currently no bike lanes provided.

3.2.3 Methow Valley Highway/Division Street (US 20)

Methow Valley Highway/Division Street (US 20), within the project vicinity, is a north-south minor arterial with a posted speed limit of 25 mph. This roadway provides a sidewalk along the west side of the road and provides bikes on both sides.

A summary of the existing intersection channelization and control type for each of the study intersections is provided in **Figure 3.**

Figure 3. Existing Channelization and Intersection Control



3.3 Traffic Volume Data

Traffic Count Consultants, TC2, a transportation data collection service, provided evening peak period turning movement counts for the intersections of 2nd Avenue at May Street and 2nd Avenue at Methow Valley Highway/Division Street (US 20).

The intersection of 2nd Avenue at May Street is immediately adjacent to the intersection of Lookout Mountain Road at May Street. As part of the data collection for 2nd Avenue at May Street the traffic volume turning movements to and from Lookout Mountain Road were also collected.

The counts were conducted on March 14, 2023 between 4:00 and 6:00 PM for the PM peak hour. **Figure 4** shows the existing, 2023 PM peak hour traffic volumes for the study intersections. The turning movement count diagrams are provided in **Appendix B.**

Figure 4. Existing 2023 PM Peak Hour Traffic Volumes

3.4 Crash History

The Washington Department of Transportation provides crash data for study area roadways. The data was collected over the five-year span between January 1, 2017 and December 31, 2021. There were three crashes reported at the intersection of 2nd Avenue and Methow Valley Highway/Division Street (US 20). Two were identified as property damage only and was reported as injury unknown. There were no reported crashes at the intersection of 2nd Avenue and May Street.

4 Project Traffic Characteristics

The project-related characteristics having the most effect on area traffic conditions are peak hour trip generation and the directional distribution of traffic volumes on the surrounding roadway network. The PM peak hour was selected as the traffic analysis period as it represents the highest potential traffic condition on area roadways.

4.1 Site-Generated Traffic Volumes

Vehicle trip generation was calculated using the trip generation rates contained in the 11th edition of the Trip Generation Manual by the *Institute of Transportation Engineers (ITE)*. Single-Family Detached Housing (land use code 210) land use category matches the proposed development and has been used to calculate the trip generation. For this analysis, the "fitted-curve" equation was used to estimate trips in preference to using the average trip rate as this approach was recommended by ITE.

Table 1 shows the trip generation characteristics for the land use category Single-Family Attached Housing.

Table 1. ITE Trip Generation Rate – Single-Family Detached Housing (Land Use Code 210)

Peak Period	Variable	Trip Rate	Enter %	Exit %
PM peak hour of Adjacent Street	Dwelling Units	1.03*	63%	37%

*Fitted curve equation rate

The total trip generation expected from this project is calculated by applying the unit measure for the land use category to the trip generation rate. The trip generation for the proposed Orchard Hills project is shown in **Table 2.** The trip generation calculations, including AM peak hour and daily are provided in **Appendix C**.

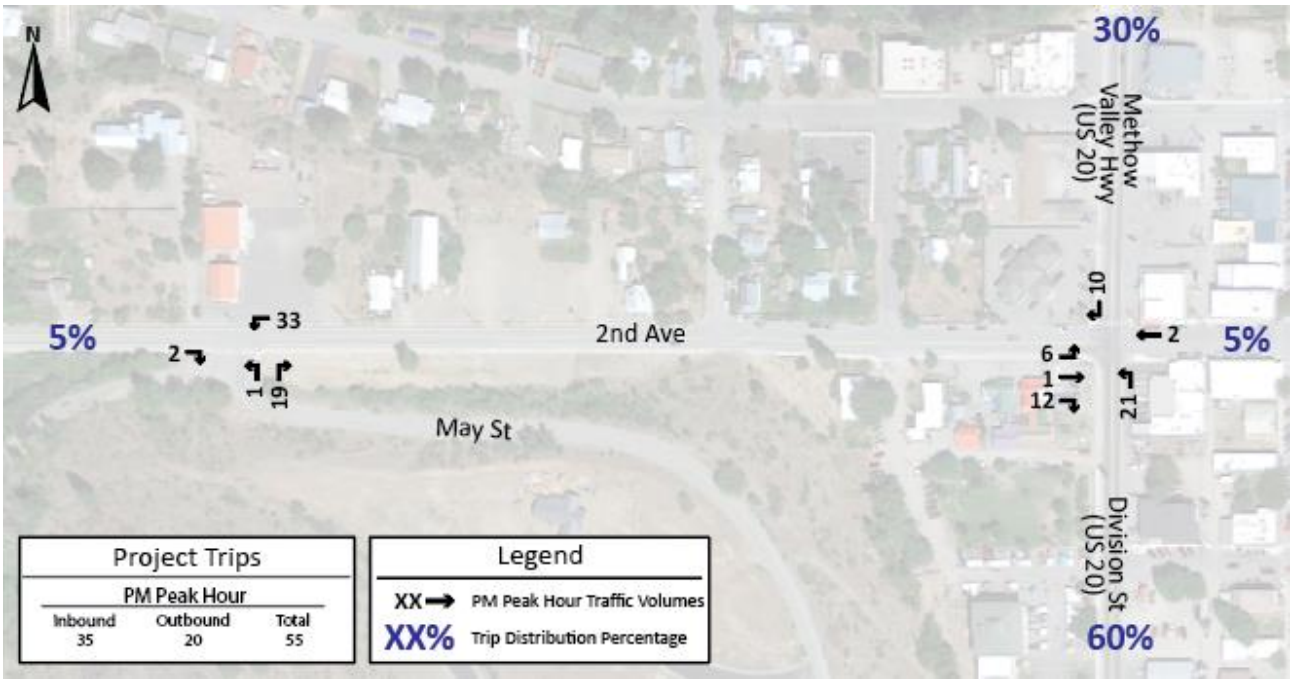
Table 2. Project Trip Generation

Peak Period	Size	Total Trips	Enter	Exit
PM peak hour of Adjacent Street	53	55	35	20

4.2 Site Traffic Distribution and Assignment

For this study, the regional distribution of traffic to and from the proposed project was estimated based on locations and densities of commercial and employment areas. The regional traffic distribution percentages and site traffic assignment for the proposed development for the PM peak hour and daily time periods are shown on **Figure 5**.

Figure 5. Site-Generated PM Peak Hour Volumes



5 Future Traffic Conditions

5.1 Roadway Network Improvements

The Twisp six-year Transportation Improvement Program (TIP) 2023 does not include an identified project that could affect the study area. The Town of Twisp Comprehensive Plan, Proposed Motorized Transportation Improvements was reviewed, and the following improvements were identified in the project area:

- Project #8-Provide second access for the Painter's Addition area.
- Project #9-Provide improvements (turn lanes and lighting) to the intersection of Second Avenue and SR 20.

Neither of these improvements are expected to be constructed prior to the completion of the proposed Orchard Hills project. As such, they have not been included in the operations analysis described below.

5.2 Future Traffic Volumes

Traffic volume forecasts were prepared for PM peak hour conditions for the 2028 horizon year. The future traffic volume forecast includes non-specific background traffic growth and estimated traffic generated by the proposed project.

It is anticipated that background growth will occur within the study area and affect traffic volumes. To calculate a background growth rate historic traffic counts on Methow Valley Highway (US 20) for 2010 and 2018 were identified. An annualized growth rate between the two data points was determined which equates to 2 percent per year.

The projected 2028 traffic volumes without the project are shown on **Figure 6.** The projected 2028 traffic volumes with project are shown on **Figure 7.**

The traffic volume calculations for the study intersections are included in **Appendix C**.

Figure 6. Projected 2028 PM Peak Hour Traffic Volumes without Project

Figure 7. Projected 2028 PM Peak Hour Traffic Volumes with Project

6 Traffic Operations Analysis

Traffic analyses were conducted to identify any deficiencies within the study area for the PM peak hour in the 2023 base year and the 2028 horizon year. The PM peak hour was selected as the traffic analysis period as it represents the highest potential traffic condition on area roadways.

6.1 Level of Service

The acknowledged source for determining overall capacity for arterial segments and independent intersections is the current edition of the *Highway Capacity Manual* (HCM). Intersection analysis was performed using the Synchro software package. This software implements the methods of the 6th edition HCM.

Capacity analysis results are described in terms of Level of Service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a particular street or highway during a specific time interval. It ranges from A (very little delay) to F (long delays and congestion).

6.1.1 Intersection Operations

For signalized intersections, the overall LOS grade represents the weighted average of all movements at the intersection. For intersections under minor street stop-sign control, the LOS of the most difficult movement (typically the minor street left turn) represents the intersection level of service. The LOS/delay criteria for stop sign-controlled intersections are different than for signalized intersections because driver expectation is that a signalized intersection is designed to carry higher traffic volumes and experience greater delay.

Table 3 shows the Level of Service criteria for stop-controlled intersections and signalized intersections.

Table 3. Level of Service Criteria for Intersections

Level of Service	Signalized/Roundabout Intersection Average Control Delay (seconds/vehicle)	Stop-Controlled Intersection Average Control Delay (seconds/vehicle)
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

6.2 Volume to Capacity Ratio

Another measure of the performance of an intersection is the "degree of saturation" which is typically presented as the "volume to capacity" (v/c) ratio. Many factors affect the volume of traffic an intersection can accommodate during a specific time interval. These factors include the number of lanes, lane widths, the type of signal phasing, the number of parking maneuvers on the adjacent street, etc. Based on these factors, the intersection (or individual lane group) is determined to have a total theoretical vehicle carrying capacity "c" for the analysis period. The analysis period volume "v" is compared to the calculated carrying capacity and presented as a ratio. If the v/c ratio is below 1.0, the demand volume is less than the maximum capacity. If the v/c ratio is over 1.0, the demand volume is exceeding the available capacity.

6.3 Intersection Analysis

The analysis was conducted for the following scenarios:

- Existing 2023 traffic volumes
- Projected 2028 traffic volumes without the Project
- Projected 2028 traffic volumes with the Project

The intersection control and channelization are documented earlier in this report in Figure 3. The LOS analysis worksheets are included in **Appendix D.** Following is a description of the Level of Service analysis results for the study intersections with the scenarios listed above.

6.3.1 2nd Avenue at May Street

This is a three-legged intersection under stop-sign control for the northbound approach. In the PM peak hour, the intersection currently operates at a LOS A. In the projected 2028 horizon, this intersection is expected to remain at LOS A with and without project traffic.

Adjacent to this intersection is a second intersection, where Lookout Mountain Road connects to May Street. During the PM peak period (4:00-6:00) there were 13 vehicles observed using this road, with 9 vehicles occurring between 4:00 and 5:00. Given the small volume of traffic using this road there is no operational issue at this intersection. These volumes were included in the analysis of 2nd avenue at May Street.

6.3.2 2nd Avenue at Methow Valley Highway/Division Street (US 20)

This is a four-legged intersection under stop-sign control for the eastbound and westbound approaches. In the PM peak hour, the intersection currently operates at a LOS B. In the projected 2028 horizon, this intersection is expected to remain at LOS B with and without project traffic.

The intersection operational results for the PM peak hour are presented in **Table 4**.

Table 4. PM Peak Hour Intersection Operating Conditions

		Base Year 2023		Projected 2028 Without Project		Projected 2028 With Project	
Intersection	Control	LOS (Delay)	Worst V/C Ratio	LOS (Delay)	Worst V/C Ratio	LOS (Delay)	Worst V/C Ratio
2nd Avenue/May Street	TWSC[2]	A (9.0)	0.01	A (9.1)	0.02	A (8.9)	0.04
2nd Avenue/Methow Valley Highway/Division Street (US 20)	TWSC[2]	**A** (12.0)	0.14	B (12.7)	0.16	B (13.4)	0.21

1. Two-Way Stop-Control

Based on the operational analysis results both study intersections are projected to operate with short delays for the minor street movements. This indicates that even during high traffic events, including emergency situations that might funnel additional traffic through the study area, the intersections should operate with an acceptable level of service.

6.4 Non-Motorized Facilities

The proposed project will access the town of Twisp via May Street. Currently this road provides two twelve-foot travel lanes and experiences low traffic volumes. After completion of the project the traffic volumes on May Street will increase, but will remain low, with less than 100 total vehicles during the PM peak hour. The existing roadway width and low projected traffic volumes will safely accommodate bicycle and pedestrian traffic.

7 Summary and Conclusions

Palm Investments North, LLC is proposing construction of the Orchard Hills project, a single-family residential development near Harrison Avenue and May Street in Twisp, Washington. The proposed project includes 53 single family lots. The project also proposes to dedicate approximately 7.5 acres to the Town of Twisp for a community park or permanent open space. Access to the project is proposed to be from Harrison Avenue. The project is anticipated to be constructed over three phases, with full build out occurring by 2028.

At full occupancy, the project is estimated to generate approximately 55 new-to network trip ends during the PM peak hour. An evaluation of the existing 2023 and projected 2028 horizon year with and without the project traffic was performed. All of the study area intersections are projected to operate at LOS B or better. This indicates that even during high traffic events, including emergency situations that might funnel additional traffic through the study area, the intersections should operate with an acceptable level of service.

Appendix A

Traffic Scoping Letter

SCJ ALLIANCE
CONSULTING SERVICES

Technical Memo

To Town of Twisp

From: Ryan Shea, PTP, Senior Transportation Planner

Date: September 15, 2022

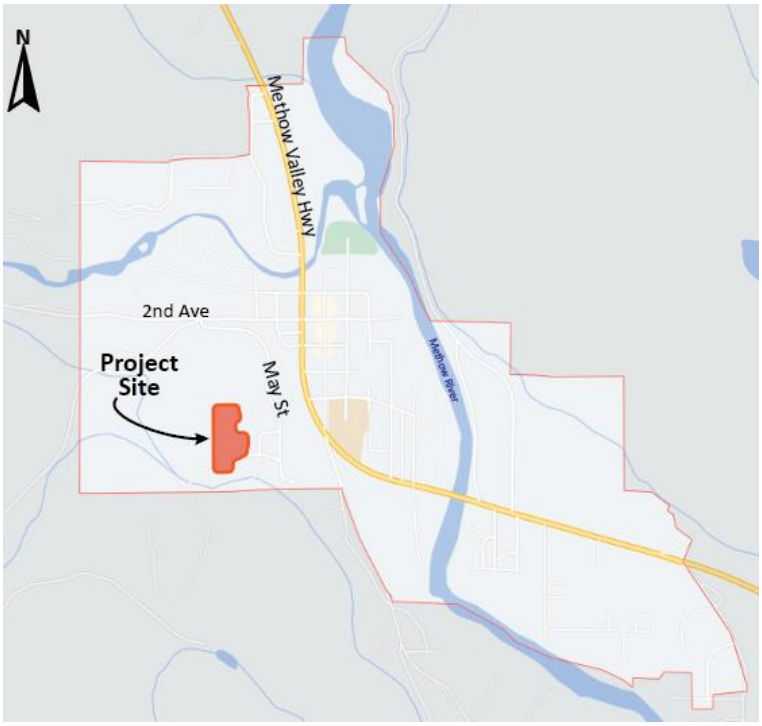
Project: Orchard Hills

Subject: Traffic Scoping Analysis

Introduction:

Palm Investments North, LLC is proposing construction of the Orchard Hills project, a single-family residential development near Harrison Avenue and May Street in Twisp, Washington. The proposed project includes 53 single family lots. This Traffic Scoping Analysis estimates the trip generation, distribution, and assignment for the proposed development. **Figure 1** illustrates the site vicinity and the transportation network serving the project area.

Figure 1. Site Vicinity



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CONSULTING SERVICES

Proposed Development

The proposed project would construct 53 single-family residential lots in the Town of Twisp. The project also proposes to dedicate approximately 7.5 acres to the Town of Twisp for a community park or permanent open space. Access to the project is proposed to be from Harrison Avenue. The project is anticipated to be constructed over three phases, with full build out occurring by 2028.

The preliminary site plan is attached.

Project Traffic Characteristics

The two project-related characteristics having the most effect on area traffic conditions are peak hour trip generation and the directional distribution of traffic volumes on the surrounding roadway network.

Site-Generated Traffic Volumes

Vehicle trip generation was calculated using the trip generation rates contained in the 11th edition of the Trip Generation Manual by the *Institute of Transportation Engineers (ITE)*. Single-Family Detached Housing (land use code 210) land use category matches the proposed development and has been used to calculate the trip generation. For this analysis, the "fitted-curve" equation was used to estimate trips in preference to using the average trip rate as this approach was recommended by ITE.

Table 1 shows the trip generation characteristics for the land use category Single-Family Attached Housing.

Table 1. ITE Trip Generation Rate – Single-Family Detached Housing (Land Use Code 210)

Peak Period	Variable	Trip Rate	Enter %	Exit %
AM peak hour of Adjacent Street	Dwelling Units	0.79*	26%	74%
PM peak hour of Adjacent Street	Dwelling Units	1.03*	63%	37%
Daily	Dwelling Units	10.62*	50%	50%

*Fitted curve equation rate

The total trip generation expected from this project is calculated by applying the unit measure for each land use category to the appropriate trip generation rate. The trip generation for the proposed Orchard Hills project is shown in **Table 2** below.

Table 2. Project Trip Generation

Peak Period	Size	Total Trips	Enter	Exit
AM peak hour of Adjacent Street	53	42	11	31
PM peak hour of Adjacent Street	53	55	35	20
Daily	53	563	281	282

Site Traffic Distribution and Assignment

For this study, the regional distribution of traffic to and from the proposed project was estimated based on locations and densities of commercial and employment areas. The regional traffic distribution percentages and site traffic assignment for the proposed development for the PM peak hour and daily time periods are shown on **Figure 2.**

Public Comments

It is understood that information about this project has been shared with the public and concerns have been raised. Regarding traffic, the following concerns have been expressed:

- The proposed roadways will be too narrow to accommodate traffic and other travel modes/snow removal/emergency access.
- The existing May Street and Harrison Avenue will not be able to handle the additional traffic generated by the project.
- Project traffic impacts at the intersection of May Street and Second Avenue.

The specific design requirements to ensure accommodations of snow removal and emergency access will be dictated by the Town roadway design standards. The project internal street network has been designed to accommodate future connections to adjacent properties when they develop, which would provide additional vehicle connections. Traffic operational impacts to existing roadways and intersections, including May Street at Second Avenue, and an assessment of pedestrian facilities, can be further addressed if necessary in a traffic impact analysis.

We have presented this information for the Town's use in determining the Scope of Work for a Traffic Impact Analysis. If you have any questions or need additional information, please call me at 360.352.1465.

Respectfully,
SCJ Alliance

Ryan Shea, PTP
Senior Transportation Planner

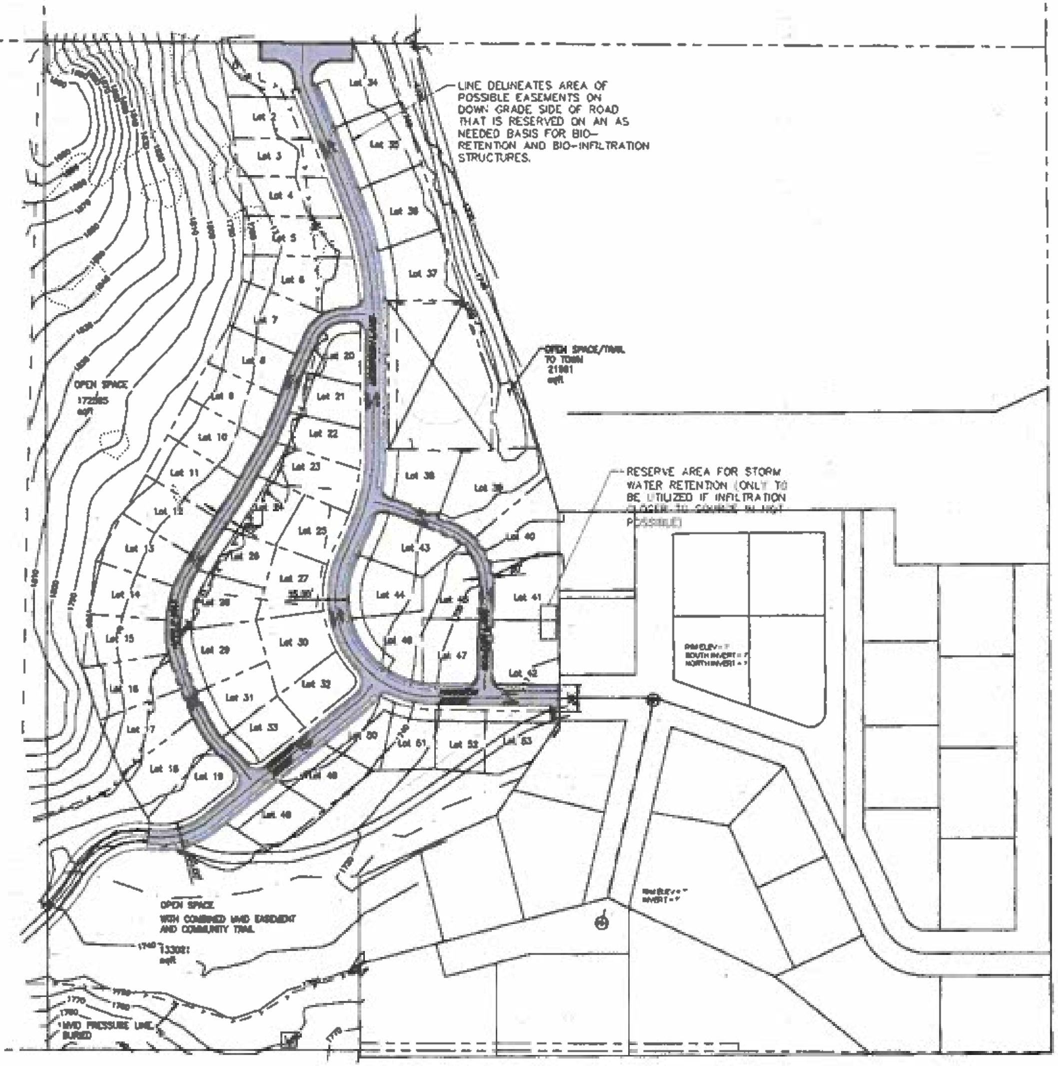
Enclosures: Preliminary Site Plan
Figure 2

N:\Projects\5926 Palm Investment North LLC\22-000682 Palm Investment North LLC - Orchard Hills Housing\04 - Dels\Reports\2022-0915 Orchard Hills Traffic Scoping.docx

ROAD SECTIONS FOR HARRISON <u>STREET AND MACINTOSH LANE:</u>
RIGHT OF WAY = 35'
7' GRAVEL PARKING LANE
(2)10' PAVED TRAVEL LANES
3' GRAVEL SWALE, 6" DEEP
5' PAVED SIDE WALK

ROAD SECTIONS FOR APPLE <u>WAY AND GOLDEN WAY:</u>
RIGHT OF WAY = 20'
2' GRAVEL SHOULDER
(2)8' PAVED TRAVEL LANES
2' GRAVEL SHOULDER

AREAS(ACRES):
TOTAL AREA = 16.81A
OPEN SPACE = 7.52A
% OPEN SPACE = 44.74%



N

Scale 1"=60'

NOTE: ALL ELEVATIONS WILL BE VERIFIED WITH SURVEYOR PRIOR TO FINAL DESIGN.

North Cascades Engineering

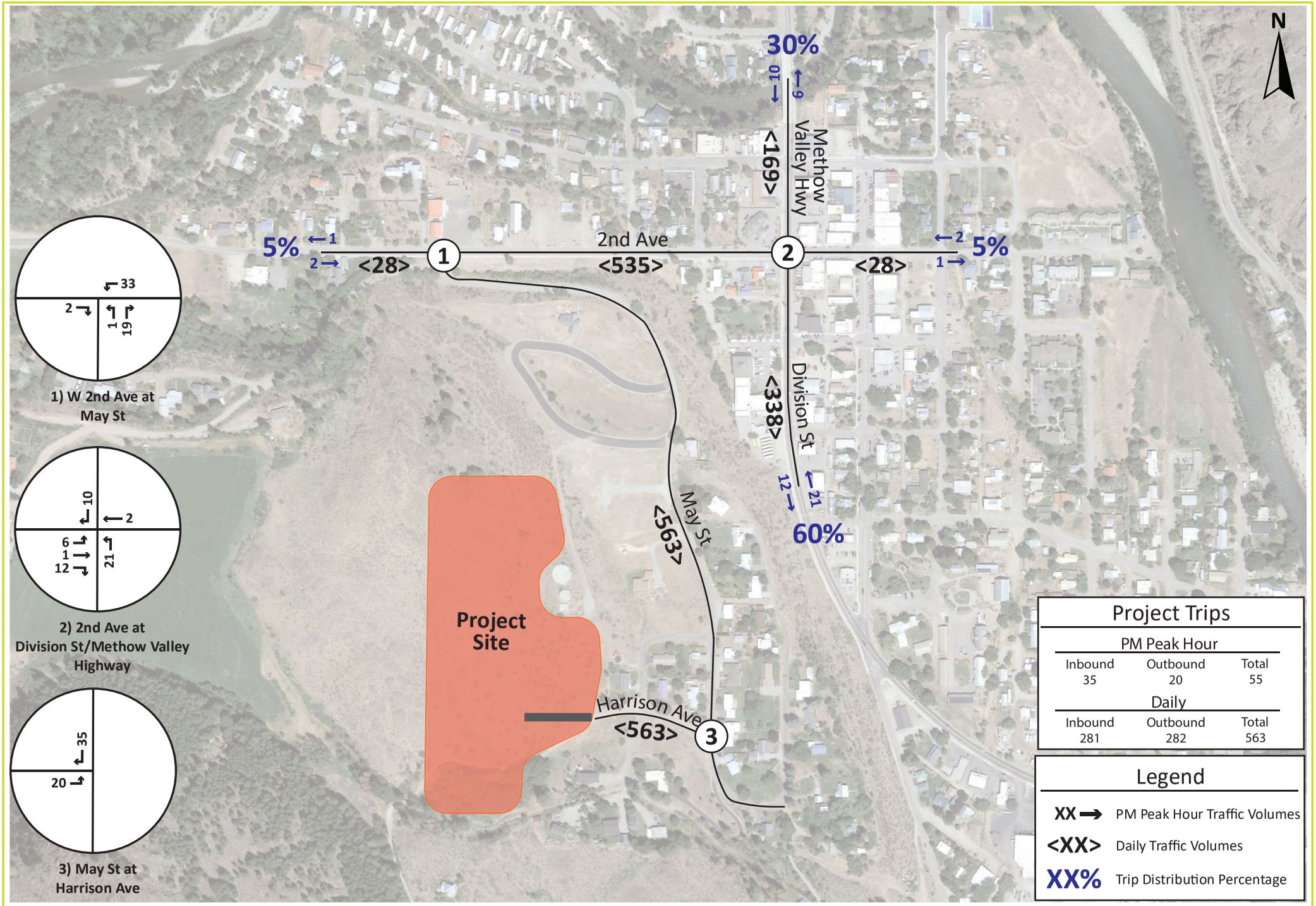
EXPIRES 1/21/23

PALM PLANNED DEVELOPMENT
ORCHARD HILLS
ROAD AND LOT LAYOUT

TWISP

2021-55
5/10/2022
LGS LGS
LGS LGS

Permit Documents



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Orchard Hill
Twisp, Washington
Traffic Scoping Analysis

Figure 2
Site-Generated Traffic Volumes
PM Peak Hour

Appendix B

Traffic Volume Counts

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

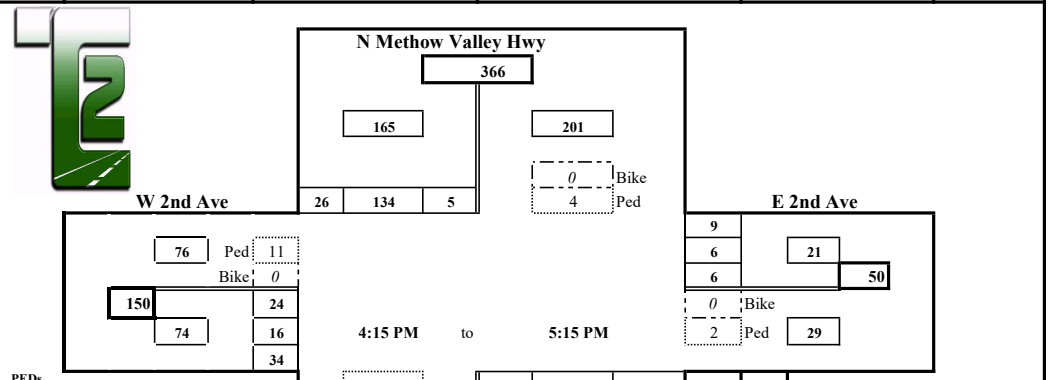
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: N Methow Valley Hwy/Division St & E/W 2nd Ave **Date of Count:** Tue 03/14/2023

Location: Twisp, Washington **Checked By:** Jen

Time Interval	From North on (SB) N Methow Valley Hwy				From South on (NB) Division St				From East on (WB) E 2nd Ave				From West on (EB) W 2nd Ave				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	2	38	5	0	14	42	1	0	0	0	6	1	4	2	16	130
4:30 P	1	0	37	4	1	14	41	3	0	0	2	2	0	5	4	7	119
4:45 P	1	2	39	9	0	6	34	1	0	1	2	2	1	4	4	9	113
5:00 P	0	0	20	7	0	8	51	3	0	1	1	2	0	4	4	12	113
5:15 P	1	3	38	6	0	16	42	1	0	4	1	3	0	11	4	6	135
5:30 P	2	3	38	5	0	9	35	1	0	0	1	0	0	7	5	7	111
5:45 P	0	3	36	6	0	2	28	1	0	2	3	4	0	9	1	7	102
6:00 P	0	2	38	5	0	8	29	3	0	2	1	6	0	4	2	9	109
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	5	15	284	47	1	77	302	14	0	10	11	25	2	48	26	73	932
	Peak Hour: 4:15 PM to 5:15 PM																
Total	3	5	134	26	1	44	168	8	0	6	6	9	1	24	16	34	480
Approach	165				220				21				74				480
%HV	1.8%				0.5%				n/a				1.4%				1.0%
PHF	0.83				0.89				0.66				0.88				0.89



540 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.88	1.4%
WB	0.66	n/a
NB	0.89	0.5%
SB	0.83	1.8%
T Int.	0.89	1.0%

Check In: 480 Out: 480

Conditions:

PEDs Across:

	N	S	E	W	
INT 01	8	1	0	2	11
INT 02	2	1	2	1	6
INT 03	2	2	0	4	8
INT 04	0	3	0	2	5
INT 05	0	0	0	4	4
INT 06	0	1	0	1	2
INT 07	0	0	1	3	4
INT 08	6	0	6	5	17
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	18	8	9	22	57

Bicycles From:

	N	S	E	W	
INT 01	0	0	0	0	0
INT 02	0	0	0	0	0
INT 03	0	0	0	0	0
INT 04	0	0	0	0	0
INT 05	0	0	0	0	0
INT 06	0	0	0	0	0
INT 07	0	1	0	0	1
INT 08	0	0	0	0	0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	1	0	0	1

Special Notes

SCJ23030M_01P

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

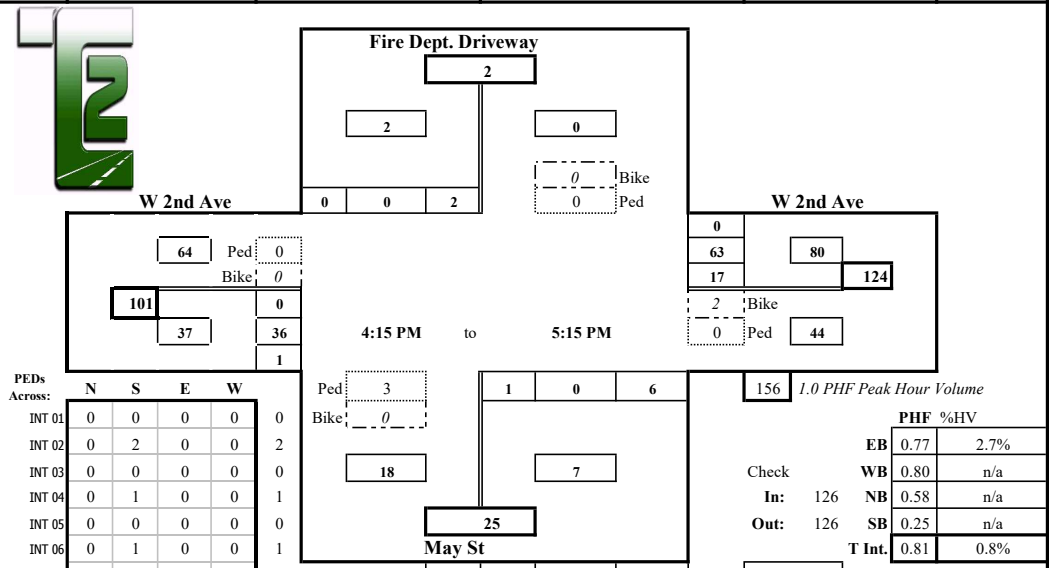
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Fire Department Driveway/May St & W 2nd Ave **Date of Count:** Tue 03/14/2023

Location: Twisp, Washington **Checked By:** Jen

Time Interval	From North on (SB) Fire Dept. Driveway				From South on (NB) May St				From East on (WB) W 2nd Ave				From West on (EB) W 2nd Ave				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	0	0	0	0	2	0	4	0	2	14	0	1	0	8	1	31
4:30 P	0	2	0	0	0	0	0	2	0	2	14	0	1	0	10	0	30
4:45 P	0	0	0	0	0	0	0	1	0	3	14	0	0	0	4	0	22
5:00 P	0	0	0	0	0	1	0	2	0	8	17	0	0	0	10	1	39
5:15 P	0	0	0	0	0	0	0	1	0	4	18	0	0	0	12	0	35
5:30 P	0	0	0	0	0	0	0	3	0	5	8	0	0	0	8	0	24
5:45 P	0	0	0	0	0	0	0	2	0	1	11	0	0	0	12	0	26
6:00 P	0	0	0	0	0	0	0	3	0	3	11	0	0	0	11	0	28
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	2	0	0	0	3	0	18	0	28	107	0	2	0	75	2	235
Peak Hour: 4:15 PM to 5:15 PM																	
Total	0	2	0	0	0	1	0	6	0	17	63	0	1	0	36	1	126
Approach	2				7				80				37				126
%HV	n/a				n/a				n/a				2.7%				0.8%
PHF	0.25				0.58				0.80				0.77				0.81



156 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.77	2.7%
WB	0.80	n/a
NB	0.58	n/a
SB	0.25	n/a
T Int.	0.81	0.8%

Check In: 126 Out: 126

Conditions:

PEDs Across:

	N	S	E	W	
INT 01	0	0	0	0	0
INT 02	0	2	0	0	2
INT 03	0	0	0	0	0
INT 04	0	1	0	0	1
INT 05	0	0	0	0	0
INT 06	0	1	0	0	1
INT 07	0	2	0	0	2
INT 08	0	1	0	0	1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	7	0	0	7

Bicycles From:

	N	S	E	W	
INT 01	0	0	0	0	0
INT 02	0	0	2	0	2
INT 03	0	0	0	0	0
INT 04	0	0	0	0	0
INT 05	0	0	0	0	0
INT 06	0	0	0	0	0
INT 07	0	0	0	0	0
INT 08	0	0	0	0	0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	2	0	2

Special Notes

SCJ23030M_02P

Prepared for: **SCJ Alliance**

Traffic Count Consultants, Inc.

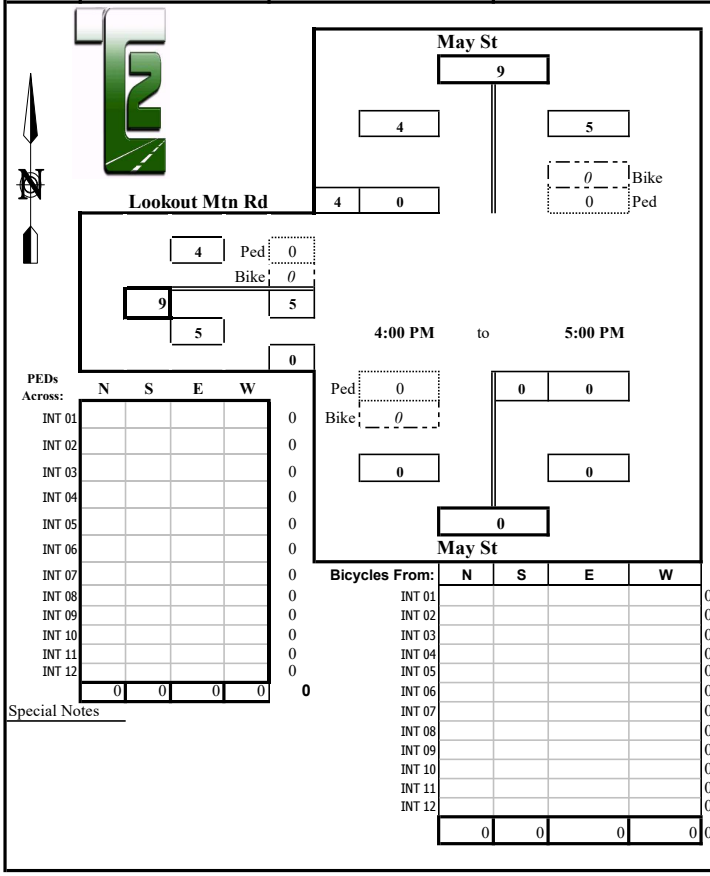
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: May St & Lookout Mountain Rd (Turns Only) **Date of Count:** Tue 03/14/2023

Location: Twisp, Washington **Checked By:** Jen

Time Interval	From North on (SB) May St				From South on (NB) May St				From East on (WB) 0				From West on (EB) Lookout Mtn Rd				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	0	0	2	0	0	0	0	0	0	0	0	0	4	0	0	6
4:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 P	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 P	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	2
5:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 P	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	3
5:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	0	4	0	1	0	0	0	0	0	0	0	6	0	2	13
Peak Hour: 4:00 PM to 5:00 PM																	
Total	0	0	0	4	0	0	0	0	0	0	0	0	0	5	0	0	9
Approach	4				0				0				5				9
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.50				n/a				n/a				0.31				0.38



24 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.31	n/a
Check	WB	n/a	n/a
In: 9	NB	n/a	n/a
Out: 9	SB	0.50	n/a
	T Int.	0.38	0.0%

Conditions:

Special Notes

SCJ23030M_03P

Appendix C

Traffic Volume Calculation Worksheets

SCJ ALLIANCE
CONSULTING SERVICES

Orchard Hills

Twisp, WA
Trip Generation

Project Trip Generation

PM Peak Hour Trip Generation

Site Plan Description	LUC	ITE Description	Variable	Value	Trip Rate	Distribution		Total Trips		
						In	Out	In	Out	Total
Single Family Homes	210	Single-Family Detached Housing	Dwelling Units	53.0	1.03	63%	37%	35	20	55
Total								**35**	**20**	**55**

210 Fitted Curve Equation 1.03

AM Peak Hour Trip Generation

Site Plan Description	LUC	ITE Description	Variable	Value	Trip Rate	Distribution		Total Trips		
						In	Out	In	Out	Total
Single Family Homes	210	Single-Family Detached Housing	Dwelling Units	53.0	0.79	26%	74%	11	31	42
Total								**11**	**31**	**42**

210 Fitted Curve Equation 0.79

Daily Trip Generation

Site Plan Description	LUC	ITE Description	Variable	Value	Trip Rate	Distribution		Total Trips		
						In	Out	In	Out	Total
Single Family Homes	210	Single-Family Detached Housing	Dwelling Units	53.0	10.62	50%	50%	281	282	563
Total								**281**	**282**	**563**

210 Fitted Curve Equation 10.62

SCJ ALLIANCE
CONSULTING SERVICES

Orchard Hills

PM Peak Hour Volumes

Background Growth **2.00%**

Intersection	Movement		Existing 2023 Volumes	Background 2028 Growth	Baseline 2028 Volumes	Site Generated Primary	Projected 2028 Volumes
		L	**0**	0	**0**	0	**0**
	EB	T	**36**	4	**40**	0	**40**
		R	**1**	0	**1**	1	**2**
1		L	**17**	2	**19**	22	**41**
May St	WB	T	**63**	6	**69**	0	**69**
2nd Ave		R	**0**	0	**0**	0	**0**
		L	**1**	0	**1**	1	**2**
TMC Date: 03/14/2023	NB	T	**0**	0	**0**	0	**0**
		R	**6**	1	**7**	18	**25**
4:15 - 5:15 PM		L	**2**	0	**2**	0	**2**
PHF: 0.81	SB	T	**0**	0	**0**	0	**0**
		R	**0**	0	**0**	0	**0**
			126		**139**		**181**
		L	**24**	2	**26**	6	**32**
	EB	T	**16**	2	**18**	1	**19**
		R	**34**	3	**37**	12	**49**
2		L	**6**	1	**7**	0	**7**
Methow Valley Hwy/Division St	WB	T	**6**	1	**7**	2	**9**
2nd Ave		R	**9**	1	**10**	0	**10**
		L	**44**	4	**48**	21	**69**
TMC Date: 03/14/2023	NB	T	**168**	17	**185**	0	**185**
		R	**8**	1	**9**	0	**9**
4:15 - 5:15 PM		L	**5**	1	**6**	0	**6**
PHF: 0.89	SB	T	**134**	13	**147**	0	**147**
		R	**26**	3	**29**	10	**39**
			480		**529**		**581**

Appendix D

Capacity Analysis Worksheets

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	35	5	15	65	5	5
Future Vol, veh/h	35	5	15	65	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	3	3	1	1	1	1
Mvmt Flow	43	6	19	80	6	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	49	0	164	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	118	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1564	-	829	1026
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	910	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1564	-	818	1026
Mov Cap-2 Maneuver	-	-	-	-	818	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	898	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	910	-	-	1564	-
HCM Lane V/C Ratio	0.014	-	-	0.012	-
HCM Control Delay (s)	9	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	25	15	35	5	5	10	45	170	10	5	135	25
Future Vol, veh/h	25	15	35	5	5	10	45	170	10	5	135	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	2	2	2
Mvmt Flow	28	17	39	6	6	11	51	191	11	6	152	28

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	485	482	166	505	491	197	180	0	0	202	0	0
Stage 1	178	178	-	299	299	-	-	-	-	-	-	-
Stage 2	307	304	-	206	192	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.12	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.218	-	-
Pot Cap-1 Maneuver	494	485	881	479	480	847	1402	-	-	1370	-	-
Stage 1	826	754	-	712	668	-	-	-	-	-	-	-
Stage 2	705	665	-	798	743	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	466	463	881	430	458	847	1402	-	-	1370	-	-
Mov Cap-2 Maneuver	466	463	-	430	458	-	-	-	-	-	-	-
Stage 1	792	750	-	683	641	-	-	-	-	-	-	-
Stage 2	661	638	-	742	739	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	11.4	1.5	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1402	-	-	596	582	1370	-	-
HCM Lane V/C Ratio	0.036	-	-	0.141	0.039	0.004	-	-
HCM Control Delay (s)	7.7	0	-	12	11.4	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	40	5	20	70	5	5
Future Vol, veh/h	40	5	20	70	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	3	3	1	1	1	1
Mvmt Flow	49	6	25	86	6	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	55	0	188	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	136	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1556	-	803	1019
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	893	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1556	-	789	1019
Mov Cap-2 Maneuver	-	-	-	-	789	-
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	878	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	889	-	-	1556	-
HCM Lane V/C Ratio	0.014	-	-	0.016	-
HCM Control Delay (s)	9.1	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	20	35	5	5	10	50	185	10	5	145	30
Future Vol, veh/h	25	20	35	5	5	10	50	185	10	5	145	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	2	2	2
Mvmt Flow	28	22	39	6	6	11	56	208	11	6	163	34

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	526	523	180	549	535	214	197	0	0	219	0	0
Stage 1	192	192	-	326	326	-	-	-	-	-	-	-
Stage 2	334	331	-	223	209	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.12	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.218	-	-
Pot Cap-1 Maneuver	464	460	865	448	453	829	1382	-	-	1350	-	-
Stage 1	812	743	-	689	650	-	-	-	-	-	-	-
Stage 2	682	647	-	782	731	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	436	437	865	395	430	829	1382	-	-	1350	-	-
Mov Cap-2 Maneuver	436	437	-	395	430	-	-	-	-	-	-	-
Stage 1	775	739	-	657	620	-	-	-	-	-	-	-
Stage 2	636	617	-	720	727	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.7	11.8	1.6	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1382	-	-	557	550	1350	-	-
HCM Lane V/C Ratio	0.041	-	-	0.161	0.041	0.004	-	-
HCM Control Delay (s)	7.7	0	-	12.7	11.8	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.1	0	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	40	5	40	70	5	25
Future Vol, veh/h	40	5	40	70	5	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	3	3	1	1	1	1
Mvmt Flow	49	6	49	86	6	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	55	0	236	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	184	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1556	-	754	1019
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	850	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1556	-	729	1019
Mov Cap-2 Maneuver	-	-	-	-	729	-
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	822	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	956	-	-	1556	-
HCM Lane V/C Ratio	0.039	-	-	0.032	-
HCM Control Delay (s)	8.9	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	20	50	5	10	10	70	185	10	5	145	40
Future Vol, veh/h	30	20	50	5	10	10	70	185	10	5	145	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	2	2	2
Mvmt Flow	34	22	56	6	11	11	79	208	11	6	163	45

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	581	575	186	609	592	214	208	0	0	219	0	0
Stage 1	198	198	-	372	372	-	-	-	-	-	-	-
Stage 2	383	377	-	237	220	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.12	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.218	-	-
Pot Cap-1 Maneuver	427	430	859	409	420	829	1369	-	-	1350	-	-
Stage 1	806	739	-	651	621	-	-	-	-	-	-	-
Stage 2	642	618	-	768	723	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	390	399	859	346	390	829	1369	-	-	1350	-	-
Mov Cap-2 Maneuver	390	399	-	346	390	-	-	-	-	-	-	-
Stage 1	753	735	-	608	580	-	-	-	-	-	-	-
Stage 2	580	577	-	692	719	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.4	13	2.1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1369	-	-	540	479	1350	-	-
HCM Lane V/C Ratio	0.057	-	-	0.208	0.059	0.004	-	-
HCM Control Delay (s)	7.8	0	-	13.4	13	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.8	0.2	0	-	-