

 **TRAFFIC IMPACT ANALYSIS**

MONROE WEST

JURISDICTION: CITY OF MONROE

Prepared for:
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Lake Stevens, Washington 98258

Prepared by:
Kimley»»Horn

January 2025
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FOR

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1. DEVELOPMENT IDENTIFICATION

Kimley-Horn and Associates, Inc. (Kimley-Horn) has been retained to provide a traffic impact analysis for the proposed Monroe West development (Development) to address the City of Monroe (City), Snohomish County (County) and Washington State Department of Transportation (WSDOT) traffic impacts. Matthew Palmer, responsible for this report and traffic analysis, is a licensed professional engineer (Civil) in the State of Washington.

The Development is proposed to consist of a total of 39 single-family detached residential units. The site is occupied with two single-family residential units. The site is located in the City along the south side of 134th Street SE, west of 191st Avenue SE. A site vicinity map has been included in **Figure 1** and a site plan has been provided in **Appendix A**.

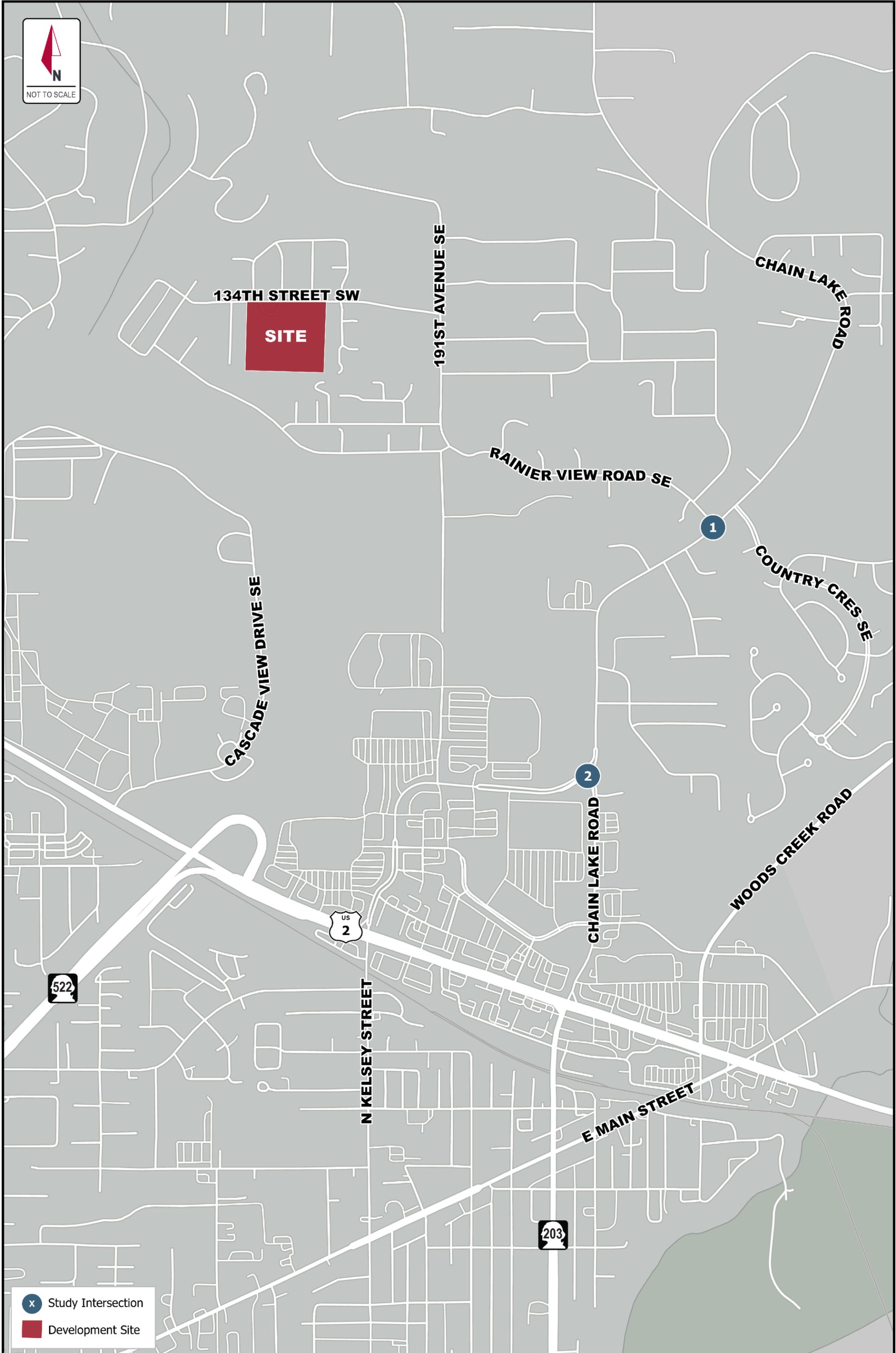
2. METHODOLOGY

Trip generation calculations for the Development have been performed utilizing average trip generation data contained in the Institute of Transportation Engineers' (ITE) *Trip Generation, 11th Edition (2021)*. The distribution of trips generated by the site is based on approved distributions for developments in the site vicinity.

Intersection level of service analysis has been performed based on typical City of Monroe requirements and previous scoping conversations with City of Monroe staff. Level of service analysis has been performed for the following City of Monroe intersections:

1. Chain Lake Road at Rainier View Road SE
2. Chain Lake Road at Kelsey Street

Congestion at intersections is generally measured in terms of level of service (LOS). In accordance with *Highway Capacity Manual: 7th Edition (HCM)* by the Transportation Research Board, road facilities and intersections are rated between LOS A and LOS F, with LOS A being free flow and LOS F being forced flow or over-capacity conditions. The level of service at signalized, roundabout, and all-way stop-controlled intersections is based on the average delay of all approaches. The level of service for two-way stop-controlled intersections is based on average delays for the stopped approach with the highest delay. Geometric characteristics and conflicting traffic movements are taken into consideration when determining level of service values. A summary of the intersection level of service criteria is included in **Table 1**.



- Study Intersection
- Development Site

FIGURE 1: SITE VICINITY MAP

Table 1: Level of Service Criteria for Intersections

Level of ¹ Service	Expected Delay	Intersection Control Delay (Seconds per Vehicle)	
		Unsignalized Intersections	Signalized Intersections
A	Little/No Delay	≤10	≤10
B	Short Delays	>10 and ≤15	>10 and ≤20
C	Average Delays	>15 and ≤25	>20 and ≤35
D	Long Delays	>25 and ≤35	>35 and ≤55
E	Very Long Delays	>35 and ≤50	>55 and ≤80
F	Extreme Delays ²	>50	>80

The City of Monroe has a level of service threshold of LOS D for arterial road intersections, which includes both of the City of Monroe study intersections. The level of service analysis has been performed utilizing the *Synchro 12* software for the intersection of Chain Lake Road at Rainier View Road (Study Intersection 1). The *Sidra 9.0* software has been utilized for the intersection of Chain Lake Road at Kelsey Street (Study Intersection 2), which is a roundabout.

The City of Monroe also has an interlocal agreement with Snohomish County to provide turning movements at Snohomish County key intersections impacted with 3 or more directional peak-hour trips on any approach or departure and for traffic mitigation fees.

3. TRIP GENERATION

The trip generation calculations for the Development are based on the average trip generation rates for ITE Land Use Code (LUC) 210, Single-Family Detached Housing. The existing residential use will be removed during construction of the Development. Therefore, credit for the existing use is accounted for in the trip generation calculations. The trip generation of the Development is summarized in **Table 2**.

¹ **Source:** *Highway Capacity Manual 7th Edition*.

LOS A: Free-flow traffic conditions, with minimal delay to stopped vehicles (no vehicle is delayed longer than one cycle at signalized intersection).

LOS B: Generally stable traffic flow conditions.

LOS C: Occasional back-ups may develop, but delay to vehicles is short term and still tolerable.

LOS D: During short periods of the peak hour, delays to approaching vehicles may be substantial but are tolerable during times of less demand (i.e. vehicles delayed one cycle or less at signal).

LOS E: Intersections operate at or near capacity, with long queues developing on all approaches and long delays.

LOS F: Jammed conditions on all approaches with excessively long delays and vehicles unable to move at times.

² When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection.

Table 2: Trip Generation Summary

Land Use	Size	Average Daily Trips (ADTs)			AM Peak-Hour Trips			PM Peak-Hour Trips		
		In	Out	Total	In	Out	Total	In	Out	Total
Single-Family Detached Housing ITE LUC 210	39 Units	184	184	368	7	20	27	23	14	37
Single-Family Detached Housing ITE LUC 210 (Removed)	-2 Units	-10	-9	-19	0	-1	-1	-1	-1	-2
Total		174	175	349	7	19	26	22	13	35

The Development is anticipated to generate approximately 349 average daily trips with approximately 26 AM peak-hour trips and 35 PM peak-hour trips. The trip generation calculations are provided in **Appendix B**.

4. TRIP DISTRIBUTION

The distribution of trips is based on prior projects in the site vicinity and local draw areas. The anticipated trip distribution is:

- 90% to and from the south along Chain Lake Road
- 7% to and from the north along Chain Lake Road
- 3% to and from the east along local roads

A detail trip distribution of Development trips for the AM and PM peak-hour is displayed in **Figure 2** and **Figure 3**, respectively.

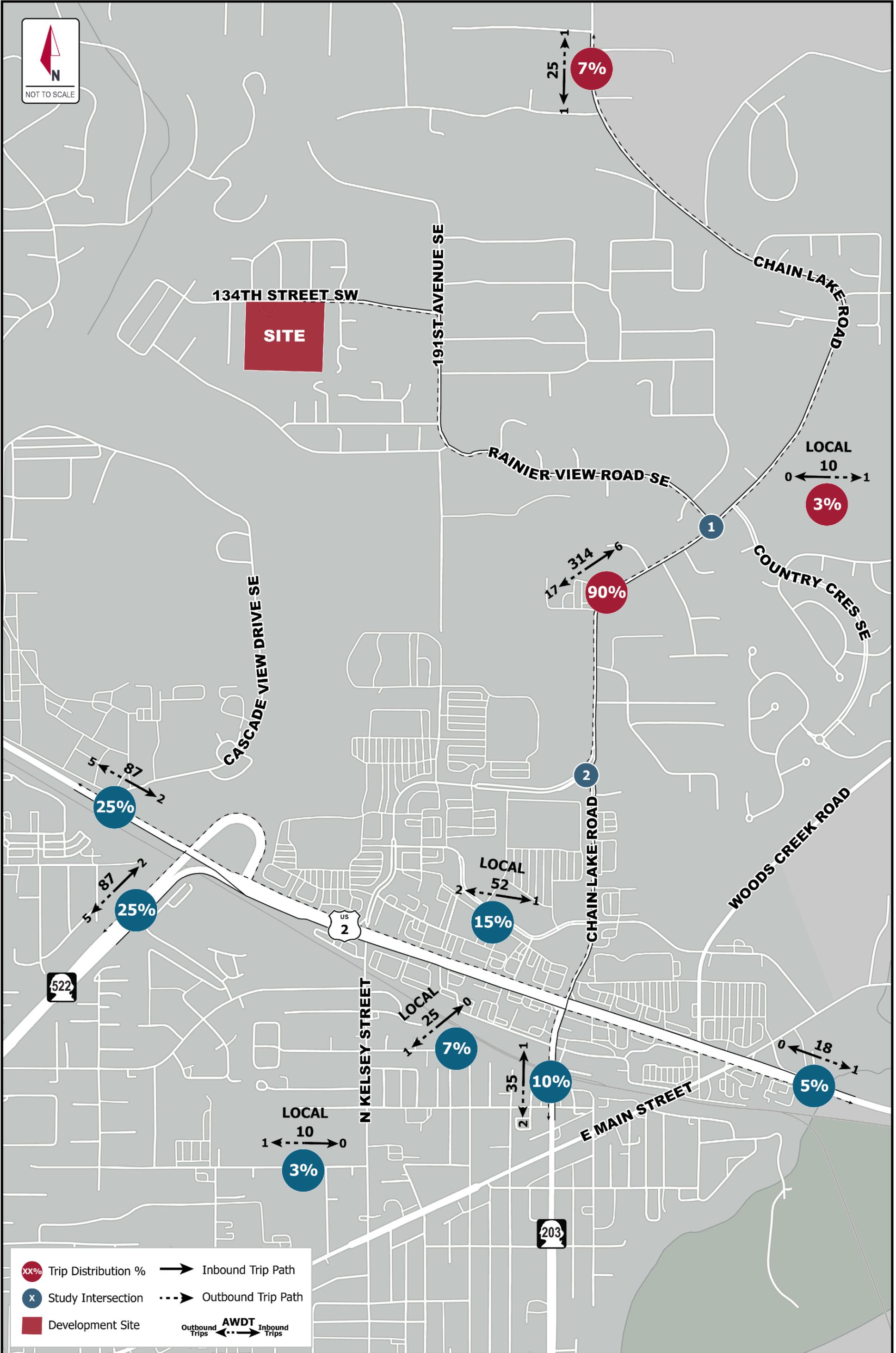


FIGURE 2: DEVELOPMENT TRIP DISTRIBUTION - AM PEAK HOUR
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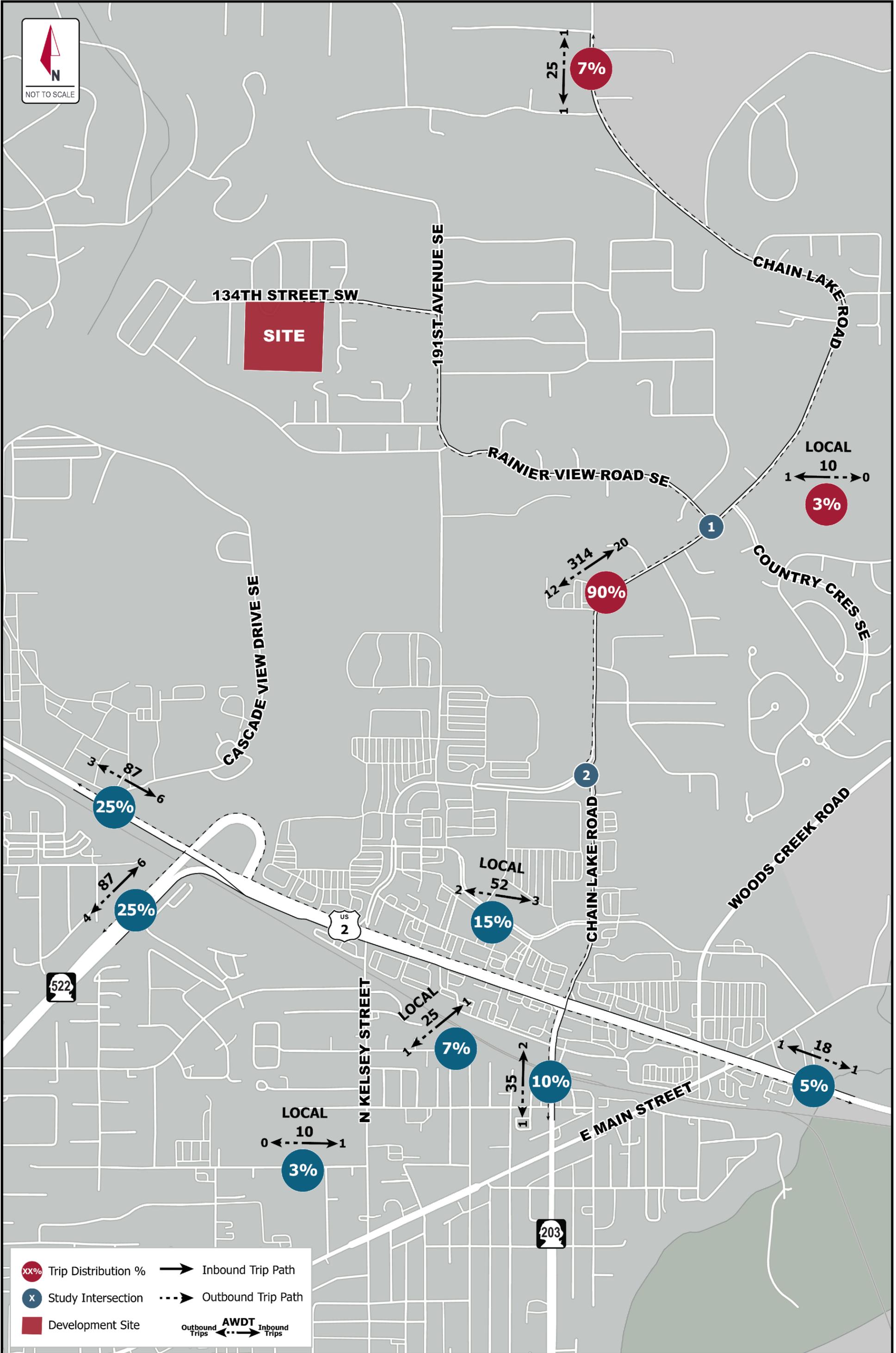


FIGURE 3: DEVELOPMENT TRIP DISTRIBUTION - PM PEAK HOUR
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5. SNOHOMISH COUNTY INTERSECTIONS

The interlocal agreement with Snohomish County requires key intersections impacted with 3 or more directional peak-hour trips on any approach or departure to be shown. Snohomish County’s trip distribution policy states that trips along US-2 do not need to be distributed west of 88th Street SE. Trips traveling to and from the south along SR-522 and SR-203 are anticipated to travel to and from King County. The Development will impact 3 key intersections during both the AM and PM peak-hours. The AM and PM peak-hour key intersection impacts are shown in tabular form in **Table 3** and **Table 4**, respectively.

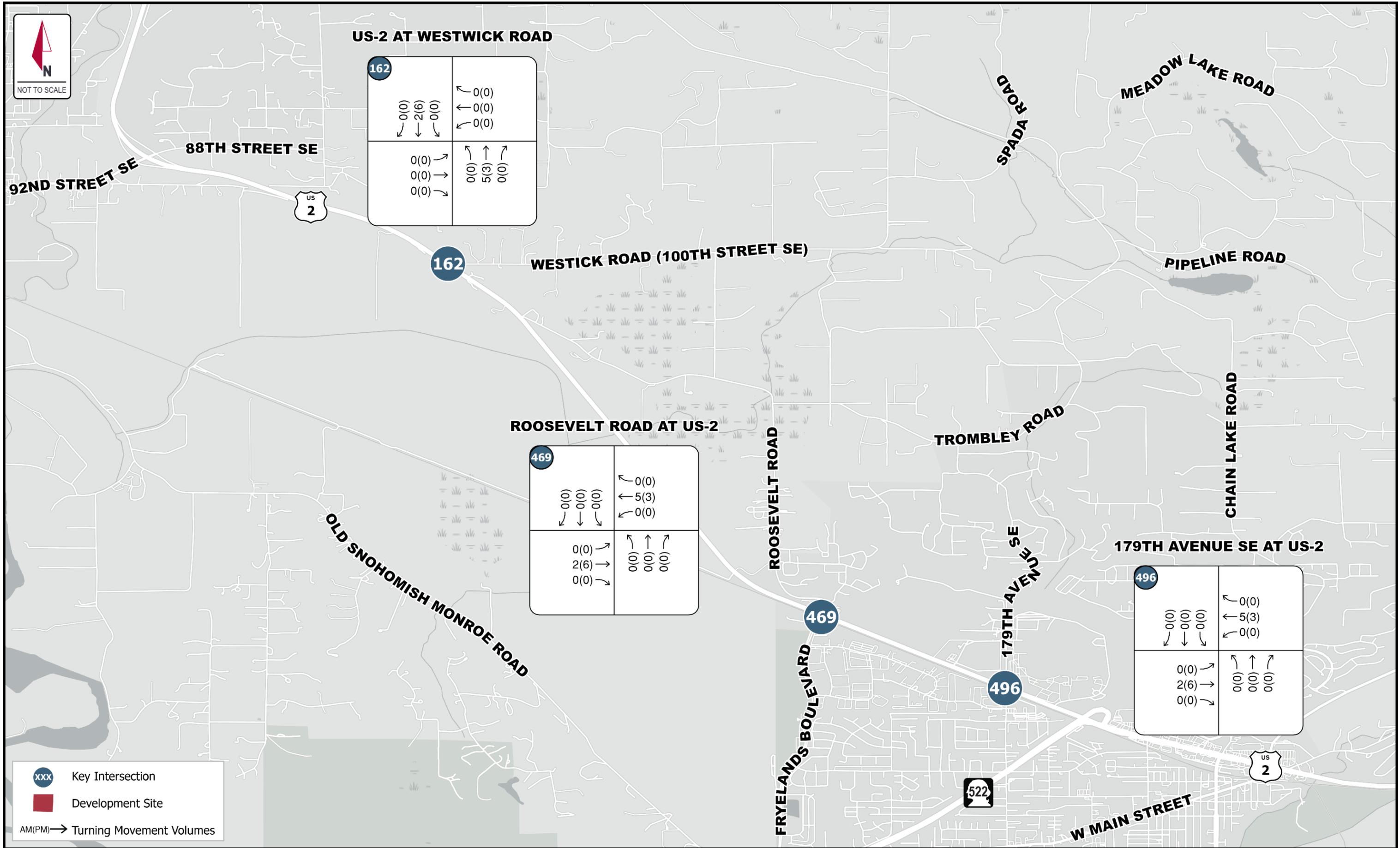
Table 3: Key Intersection Volumes – AM Peak Hour

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#162: US-2 at Westwick Road	0	0	0	0	0	0	0	5	0	0	2	0
#469: Roosevelt Road/Fryelands Boulevard at US-2	0	2	0	0	5	0	0	0	0	0	0	0
#496: 179 th Avenue SE at US-2	0	2	0	0	5	0	0	0	0	0	0	0

Table 4: Key Intersection Volumes – PM Peak Hour

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#162: US-2 at Westwick Road	0	0	0	0	0	0	0	3	0	0	6	0
#469: Roosevelt Road/Fryelands Boulevard at US-2	0	6	0	0	3	0	0	0	0	0	0	0
#496: 179 th Avenue SE at US-2	0	6	0	0	3	0	0	0	0	0	0	0

The key intersection locations and impacts are shown in **Figure 4** for the AM and PM peak-hours.



6. INTERSECTION LEVEL OF SERVICE ANALYSIS

The intersections that have been analyzed as part of this report are based on the typical City of Monroe requirements and previous scoping discussions with City of Monroe staff. Level of service analysis has been performed for the following intersections for the weekday PM peak-hour:

1. Chain Lake Road at Rainier View Road SE
2. Chain Lake Road at Kelsey Street

The analysis has been completed for the existing, 2027 no-build and 2027 build conditions.

6.1. Turning Movement Volumes

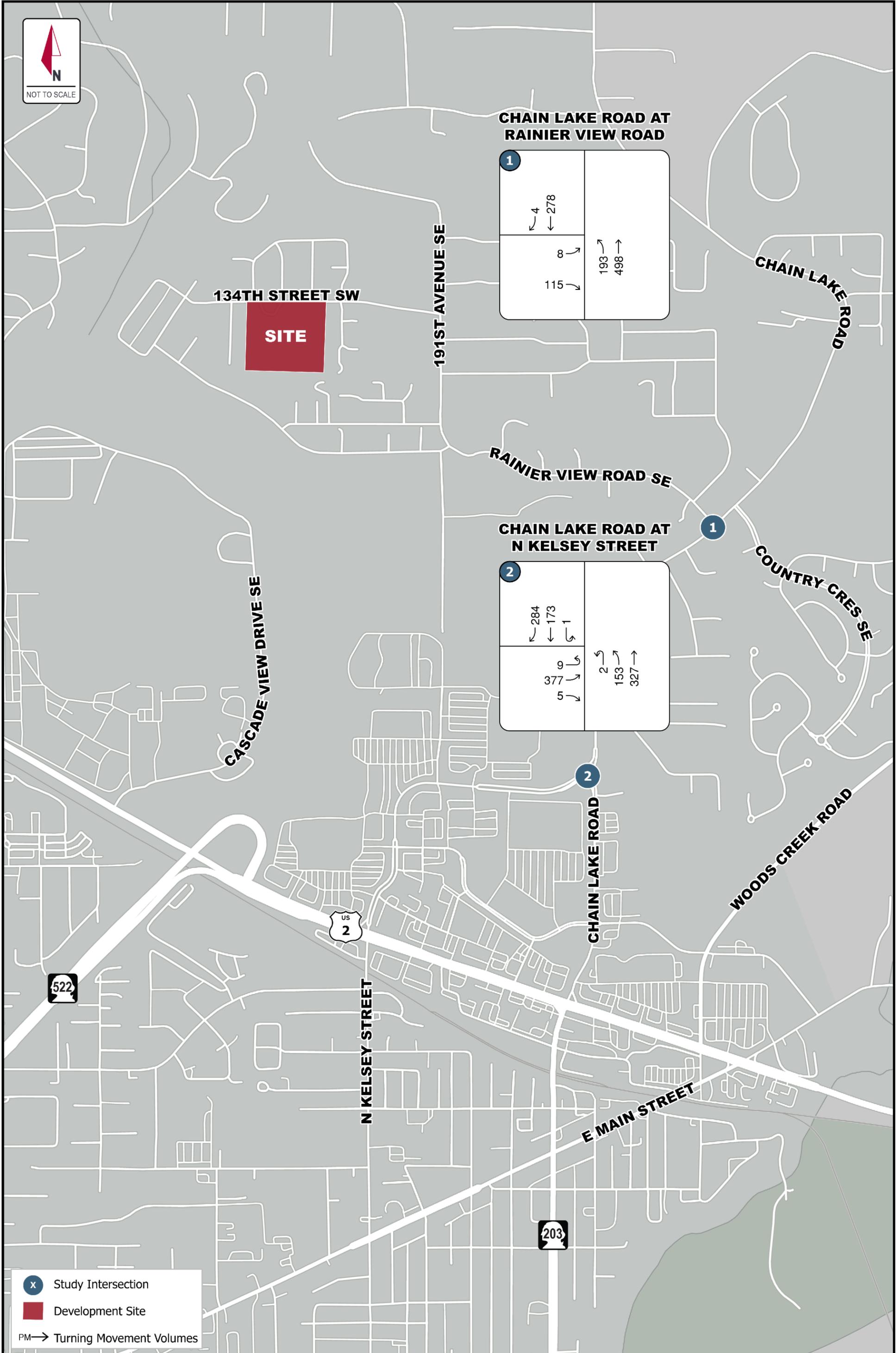
The existing turning movements at the study intersections are based on data collected by the independent count firm, Traffic Data Gathering (TDG). Turning movement counts were collected for Chain Lake Road at Rainier View Road SE in July 2024. Turning movement counts were collected for Chain Lake Road at Kelsey Street in January 2025. The existing turning movements at the study intersections are shown in **Figure 5**. The count data is provided in **Appendix C**.

The year 2027 was used to forecast future volume projections based on the anticipated completion of the Development. The 2027 no-build volumes have been calculated by applying a 2% annually compounding growth rate with the following pipeline developments:

- Cooper Point
- Garibaldi

The approved PM peak-hour trip distributions for the pipeline developments are included in the **Appendix D**. The 2027 no-build turning movements at the study intersections are shown in **Figure 6**.

The 2027 build turning movements were calculated by adding the Development's turning movements to the 2027 no-build turning movements. The 2027 build turning movements are shown in **Figure 7**. The turning movement calculations are included in **Appendix E**.



CHAIN LAKE ROAD AT RAINIER VIEW ROAD

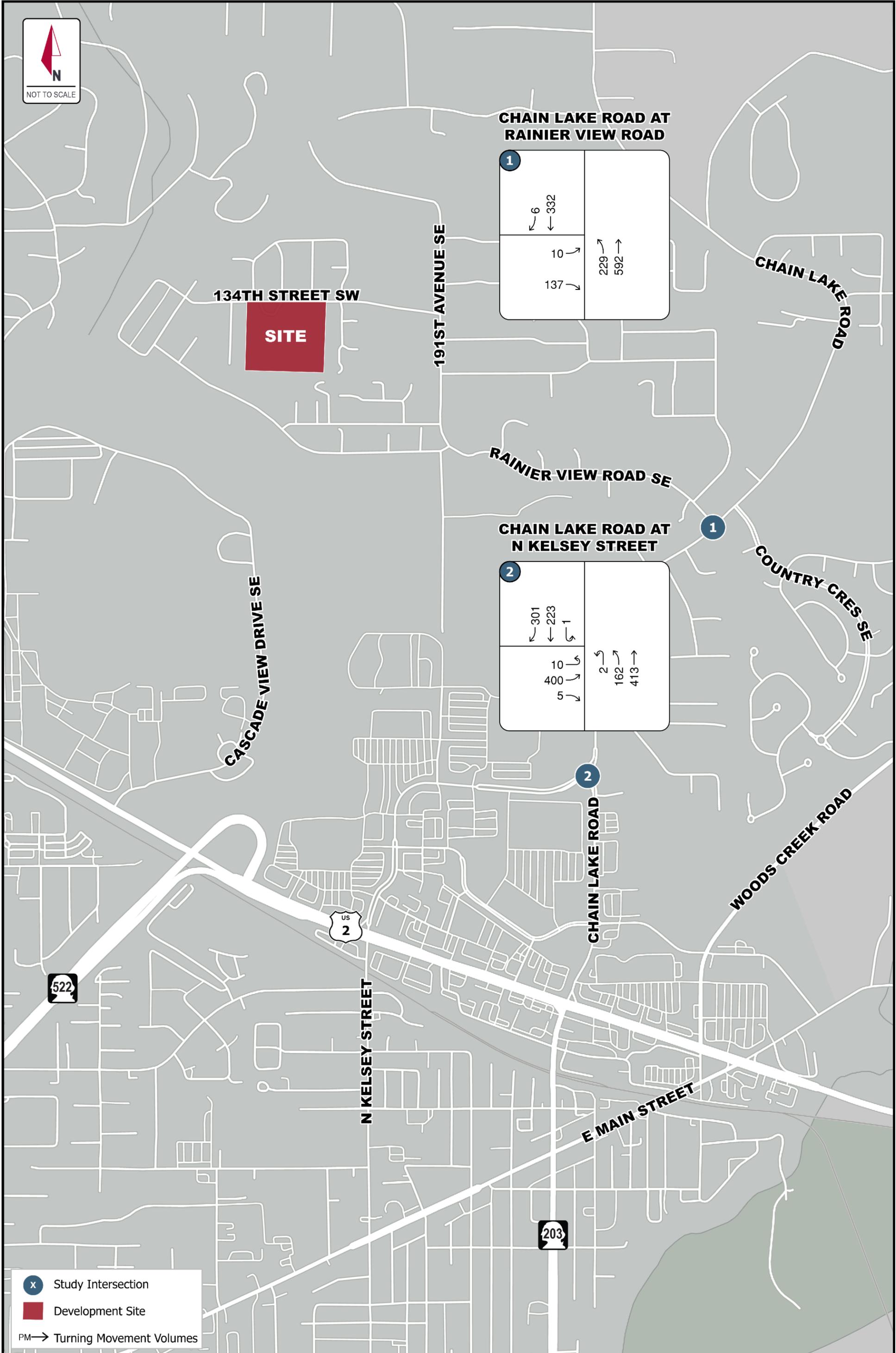
1	
<p>4 ← 278</p> <p>8 →</p> <p>115 ↓</p>	<p>193 →</p> <p>498 →</p>

CHAIN LAKE ROAD AT N KELSEY STREET

2	
<p>284 ←</p> <p>173 ←</p> <p>1 ↓</p>	<p>2 →</p> <p>153 →</p> <p>327 →</p>
<p>9 ↗</p> <p>377 ↘</p> <p>5 ↓</p>	

- x Study Intersection
- Development Site
- PM → Turning Movement Volumes

FIGURE 5: EXISTING TURNING MOVEMENTS - PM PEAK-HOUR
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CHAIN LAKE ROAD AT RAINIER VIEW ROAD

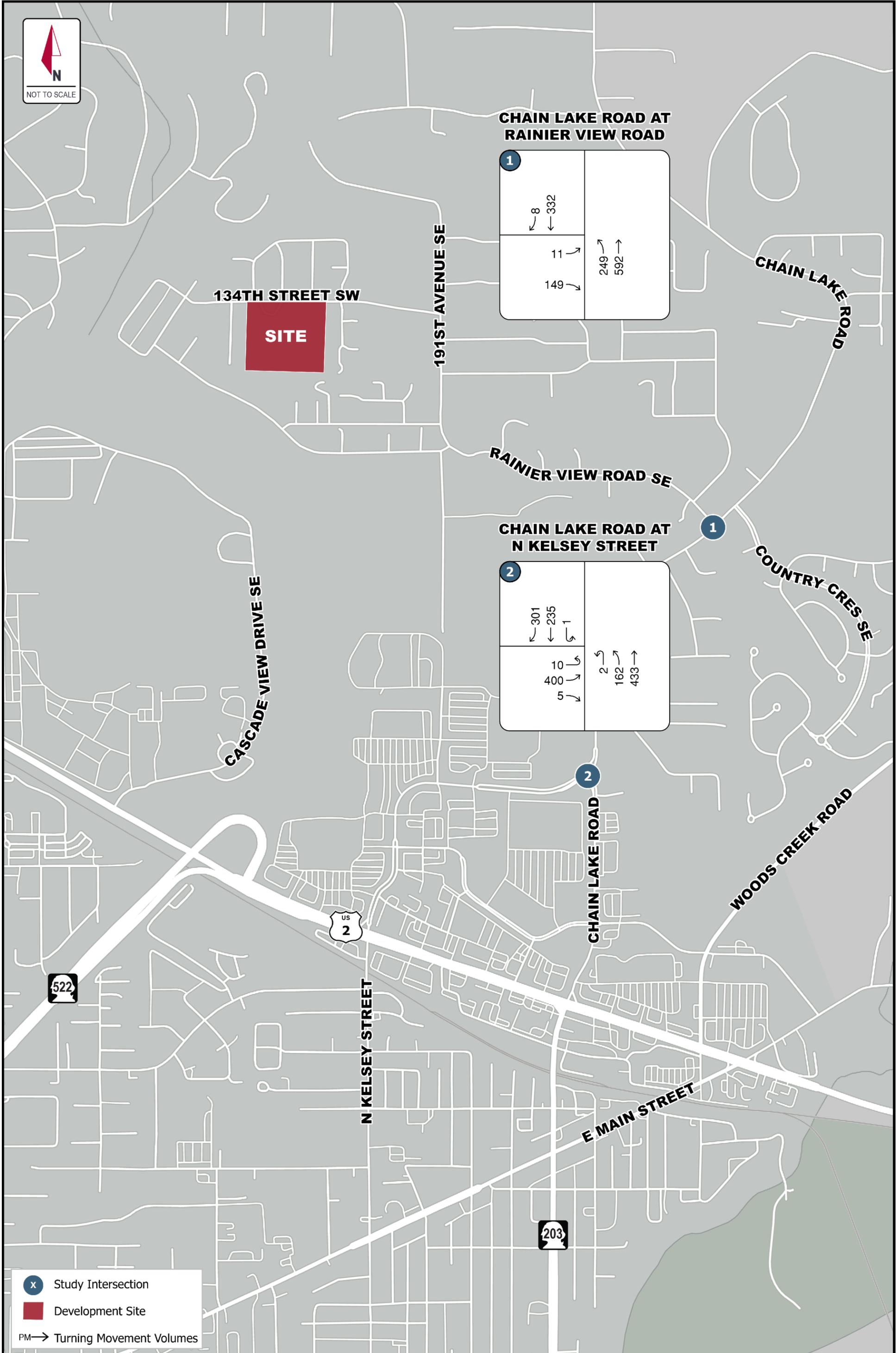
1	
← 6 ← 332	
10 → 137 →	← 229 → 592

CHAIN LAKE ROAD AT N KELSEY STREET

2	
← 301 ← 228 ← 1	
10 ↗ 400 → 5 ↘	← 2 → 162 → 413

- x Study Intersection
- Development Site
- PM → Turning Movement Volumes

FIGURE 6: 2027 NO-BUILD TURNING MOVEMENTS - PM PEAK-HOUR
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CHAIN LAKE ROAD AT RAINIER VIEW ROAD

1	
← 8 ← 332	
11 → 149 →	← 249 → 592

CHAIN LAKE ROAD AT N KELSEY STREET

2	
← 301 ← 235 ← 1	
10 ↘ 400 → 5 ↘	← 2 → 162 → 433

- x Study Intersection
- Development Site
- PM → Turning Movement Volumes

FIGURE 7: 2027 BUILD TURNING MOVEMENTS - PM PEAK-HOUR
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6.2. Intersection Level of Service Results

The level of service analysis has been performed utilizing the existing control, channelization, peak-hour factors and heavy-vehicle factors from the existing counts for the PM peak-hour. The 2027 no-build and 2027 build level of service analysis does not include any changes to the existing channelization or control. The level of service summary for the PM peak-hour is shown in **Table 5**.

Table 5: Intersection Level of Service Summary

Intersection	Control	Existing Conditions		2027 No-Build Conditions		2027 Build Conditions	
		LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
1. Chain Lake Road at Rainier View Road SW	Two-Way Stop-Control	B	12.4	B	14.7	C	15.5
2. Chain Lake Road at Kelsey Street	Roundabout	A	8.6	A	8.6	A	8.7

The study intersections currently operate at LOS B or better during the PM peak-hour. The study intersections are anticipated to continue to operate at LOS C or better during the PM peak-hour under the 2027 no-build and 2027 build conditions. The intersection level of service calculations are provided in **Appendix F**.

7. TRAFFIC MITIGATION FEES

The Washington Growth Management Act and Revised Code of Washington 82.02.050(2) authorize local jurisdictions to establish proportionate share traffic mitigation fees in order to fund capital facilities, such as roads and intersections. The Development is located within the City of Monroe, which has established traffic mitigation fees. The City of Monroe also has interlocal agreements with Snohomish County and WSDOT for traffic mitigation fees.

7.1. City of Monroe

The City of Monroe has established a traffic mitigation fee schedule per Schedule A: General Development Permits and Fees Effective January 1, 2025. The fee for single-family residential units is \$4,231 per unit. The 37 new units of the Development will result in City of Monroe traffic mitigation fees of \$156,547.00. It should be noted that these fees may not vest and may be higher when the building applications are pulled.

7.2. Snohomish County

The City of Monroe and Snohomish County have an interlocal agreement that provides for the payment of traffic mitigation for impacts to Snohomish County roadways in Transportation Service Area (TSA) C by City of Monroe developments. Traffic mitigation fees are based on predetermined area impacts or impacts to actual improvement projects. The trip distribution shows that the Monroe West development will not impact any Snohomish County improvement projects in the Transportation Needs Report in TSA C with three directional PM peak-hour trips. According to Section 3(a)2 of the *Snohomish County Traffic Worksheet and Traffic Study Requirements for Developments in the City of Monroe*, City of Monroe developments are only required to pay traffic mitigation fees for improvements in the Transportation Needs Report in TSA C impacted with three directional peak-hour trips. Snohomish County traffic mitigation fees should therefore not be required for the Monroe West development.

7.3. WSDOT

The City of Monroe and WSDOT have an interlocal agreement that provides for the payment of traffic mitigation fees. The interlocal agreement states that a development only has a “significant adverse impact” if the development contributes 25 or more trips to a WSDOT project. The Development is not anticipated to impact any WSDOT projects with 25 PM peak-hour trips and is therefore not anticipated to have a “significant adverse impact” on WSDOT intersections. WSDOT does not have a collection project for any of the intersections near the Development and therefore WSDOT traffic mitigation fees should not be assessed for the Development.

8. CONCLUSIONS

The Development is proposed to consist of 39 single-family residential units with 2 existing units being removed. The 37 new units of the Monroe West development are anticipated to generate approximately 349 average daily trips with approximately 26 AM peak-hour trips and 35 PM peak-hour trips. The level of service analysis shows that the study intersections are anticipated to operate at acceptable levels of service in the 2027 no-build and build conditions. The Development will have City of Monroe traffic mitigation fees of \$156,547.00. The development’s impacts will not meet the thresholds for paying traffic mitigation fees to Snohomish County or WSDOT.

APPENDIX A
SITE PLAN

APPENDIX B
TRIP GENERATION CALCULATIONS

Trip Generation for: Weekday
(a.k.a.): Average Weekday Daily Trips (AWDT)
With SEPA

			NET EXTERNAL TRIPS BY TYPE																	
			Gross Trips						Internal Crossover		IN BOTH DIRECTIONS				DIRECTIONAL ASSIGNMENTS					
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	TOTAL In+Out (Total)	PASS-BY		DIVERTED LINK		NEW In+Out (Total)	PASS-BY		DIVERTED LINK		NEW	
										% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)		In	Out	In	Out	In	Out
Single-Family Detached Housing	39 units	210	9.43	50%	50%	368	0%	0	368	0%	0	0%	0	368	0	0	0	0	184	184
Single-Family Detached Housing	-2 units	210	9.43	50%	50%	-19	0%	0	-19	0%	0	0%	0	-19	0	0	0	0	-10	-9
Total						349		0	349		0		0	349	0	0	0	0	174	175

Trip Generation for: Weekday, Peak Hour of Adjacent Street Traffic, One Hour between 7 and 9 AM
(a.k.a.): Weekday AM Peak Hour

With SEPA

			NET EXTERNAL TRIPS BY TYPE																		
			Gross Trips							Internal Crossover		IN BOTH DIRECTIONS				DIRECTIONAL ASSIGNMENTS					
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	TOTAL In+Out (Total)	PASS-BY		DIVERTED LINK		NEW In+Out (Total)	PASS-BY		DIVERTED LINK		NEW		
										% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)		In	Out	In	Out	In	Out	
Single-Family Detached Housing	39 units	210	0.70	25%	75%	27	0%	0	27	0%	0	0%	0	27	0	0	0	0	7	20	
Single-Family Detached Housing	-2 units	210	0.70	25%	75%	-1	0%	0	-1	0%	0	0%	0	-1	0	0	0	0	0	-1	
Total						26		0	26		0		0	26	0	0	0	0	7	19	

Trip Generation for: Weekday, Peak Hour of Adjacent Street Traffic, One Hour between 4 and 6 PM
(a.k.a.): Weekday PM Peak Hour

With SEPA

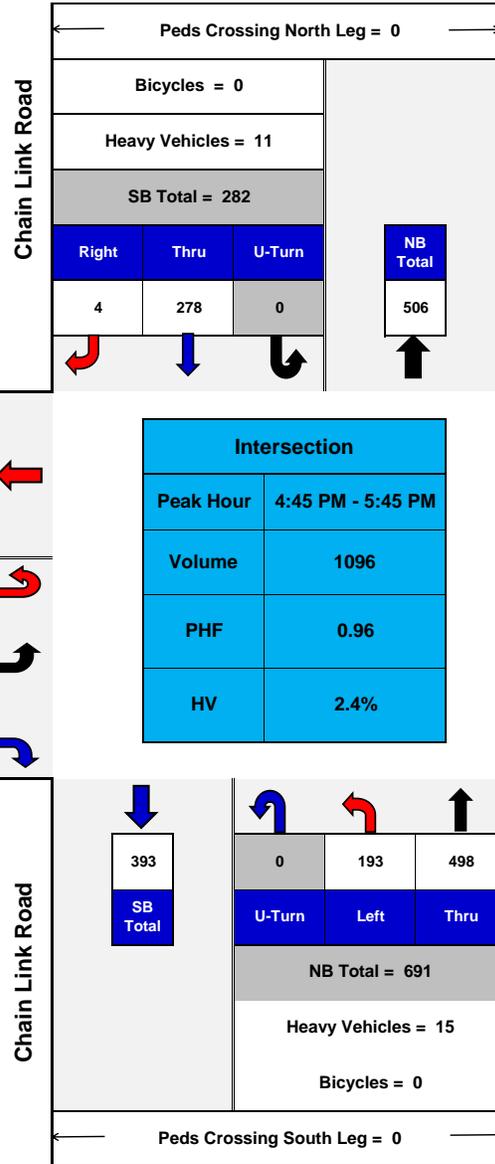
			NET EXTERNAL TRIPS BY TYPE																		
			Gross Trips							Internal Crossover		IN BOTH DIRECTIONS				DIRECTIONAL ASSIGNMENTS					
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	TOTAL In+Out (Total)	PASS-BY		DIVERTED LINK		NEW In+Out (Total)	PASS-BY		DIVERTED LINK		NEW		
										% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)		In	Out	In	Out	In	Out	
Single-Family Detached Housing	39 units	210	0.94	63%	37%	37	0%	0	37	0%	0	0%	0	37	0	0	0	0	23	14	
Single-Family Detached Housing	-2 units	210	0.94	63%	37%	-2	0%	0	-2	0%	0	0%	0	-2	0	0	0	0	-1	-1	
Total						35		0	35		0		0	35	0	0	0	0	22	13	

APPENDIX C
COUNT DATA

Rainier View Road @ Chain Link Road Monroe, WA



Count Period	
Date	Time
Wed 7/31/2024	4:00 PM - 6:00 PM



Approach	PHF	HV
NB Approach	0.96	2.2%
SB Approach	0.83	3.9%
EB Approach	0.77	0.0%
Intersection	0.96	2.4%

PHF = Peak Hour Factor
 HV = Heavy Vehicles

TURNING MOVEMENTS DIAGRAM PEAK HOUR SUMMARY





INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Rainier View Road @ Chain Link Road
Monroe, WA

DATE OF COUNT: Wed. 7/31/2024

COUNTED BY: TDG

START OF COUNT: 4:00 PM

DATE OF REDUCTION: 8/1/2024

TIME OF COUNT: 4:00 PM - 6:00 PM

DURATION OF COUNT (Hrs): 2

TIME INTERVAL ENDING AT	FROM NORTH ON (Southbound) Chain Link Road							FROM SOUTH ON (Northbound) Chain Link Road							FROM EAST ON (Westbound)							FROM WEST ON (Eastbound) Rainier View Road							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
04:15 PM	0	0	0	0	0	62	0	0	0	8	0	43	128	0	0	0	0	0	0	0	0	0	0	2	0	3	0	32	268
04:30 PM	0	0	3	0	0	66	1	0	0	7	0	39	115	0	0	0	0	0	0	0	0	0	0	3	0	0	0	40	261
04:45 PM	0	0	2	0	0	66	1	0	0	1	0	48	118	0	0	0	0	0	0	0	0	0	1	1	0	1	0	37	271
05:00 PM	0	0	6	0	0	84	1	0	0	1	0	56	119	0	0	0	0	0	0	0	0	0	0	0	0	2	0	16	278
05:15 PM	0	0	2	0	0	59	1	0	0	4	0	44	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	255
05:30 PM	0	0	2	0	0	56	2	0	0	6	0	55	125	0	0	0	0	0	0	0	0	0	0	0	0	4	0	36	278
05:45 PM	0	0	1	0	0	79	0	0	0	4	0	38	138	0	0	0	0	0	0	0	0	0	0	0	0	2	0	28	285
06:00 PM	0	0	0	0	0	77	0	0	0	1	0	54	109	0	0	0	0	0	0	0	0	0	0	0	0	3	0	31	274
PEAK HOUR TOTALS	0	0	11	0	0	278	4	0	0	15	0	193	498	0	0	0	0	0	0	0	0	0	0	0	0	8	0	115	INTERSECTION
ALL MOVEMENTS	282							691							0							123							1096
% HV	3.9%		2.2%		#N/A		0.0%		2.4%																				
PEAK HOUR FACTOR	0.83							0.96							#N/A							0.77							0.96

HV = Heavy Vehicle
 PHF = Peak Hour Factor

4:00 PM - 6:00 PM PEAK HOUR: 4:45 PM - 5:45 PM

ROLLING HOUR COUNT

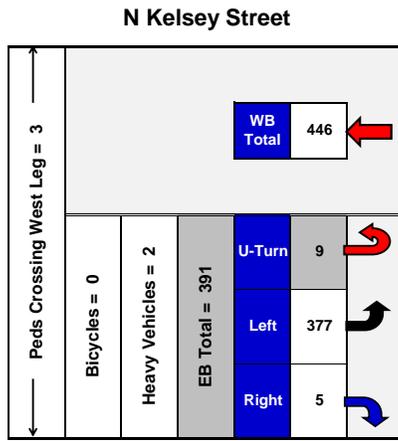
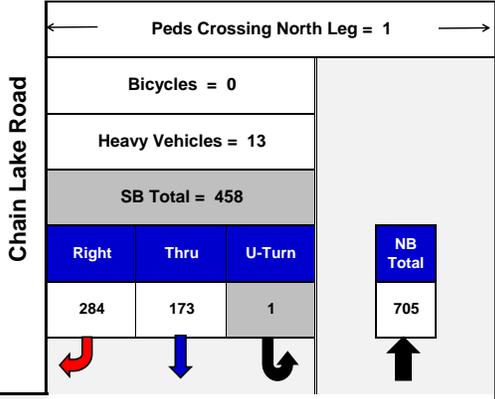
TIME INTERVAL	FROM NORTH ON (Southbound) Chain Link Road							FROM SOUTH ON (Northbound) Chain Link Road							FROM EAST ON (Westbound)							FROM WEST ON (Eastbound) Rainier View Road							INTERVAL TOTALS	
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right		
4:00 PM - 5:00 PM	0	0	11	0	0	278	3	0	0	17	0	186	480	0	0	0	0	0	0	0	0	0	0	1	6	0	6	0	125	1078
4:15 PM - 5:15 PM	0	0	13	0	0	275	4	0	0	13	0	187	468	0	0	0	0	0	0	0	0	0	0	1	4	0	3	0	128	1065
4:30 PM - 5:30 PM	0	0	12	0	0	265	5	0	0	12	0	203	478	0	0	0	0	0	0	0	0	0	0	1	1	0	7	0	124	1082
4:45 PM - 5:45 PM	0	0	11	0	0	278	4	0	0	15	0	193	498	0	0	0	0	0	0	0	0	0	0	0	0	8	0	115	1096	
5:00 PM - 6:00 PM	0	0	5	0	0	271	3	0	0	15	0	191	488	0	0	0	0	0	0	0	0	0	0	0	0	9	0	130	1092	
4:00 PM - 6:00 PM Total:	0	0	16	0	0	549	6	0	0	32	0	377	968	0	0	0	0	0	0	0	0	0	0	1	6	0	15	0	255	2170

Chain Lake Road @ N Kelsey Stree

Monroe, WA

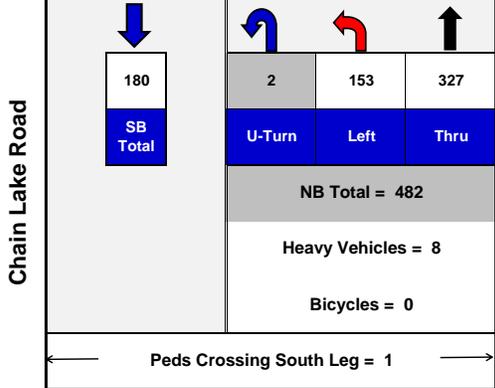


Count Period	
Date	Time
Tue 1/7/2025	4:00 PM - 6:00 PM



Intersection	
Peak Hour	4:45 PM - 5:45 PM
Volume	1331
PHF	0.93
HV	1.7%

Approach	PHF	HV
NB Approach	0.85	1.7%
SB Approach	0.89	2.8%
EB Approach	0.85	0.5%
Intersection	0.93	1.7%



PHF = Peak Hour Factor
HV = Heavy Vehicles

TURNING MOVEMENTS DIAGRAM PEAK HOUR SUMMARY





INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Chain Lake Road @ N Kelsey Stree
Monroe, WA

DATE OF COUNT: Tue. 1/7/2025

COUNTED BY: TDG

START OF COUNT: 4:00 PM

DATE OF REDUCTION: 1/8/2025

TIME OF COUNT: 4:00 PM - 6:00 PM

DURATION OF COUNT (Hrs): 2

TIME INTERVAL ENDING AT	FROM NORTH ON (Southbound) Chain Lake Road							FROM SOUTH ON (Northbound) Chain Lake Road							FROM EAST ON (Westbound)							FROM WEST ON (Eastbound) N Kelsey Street							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
04:15 PM	1	0	8	0	0	32	69	0	0	1	5	49	72	0	0	0	0	0	0	0	0	0	0	1	1	102	0	0	330
04:30 PM	1	0	5	0	0	36	82	0	0	2	1	31	76	0	0	0	0	0	0	0	0	0	2	0	88	0	0	314	
04:45 PM	3	0	5	0	0	41	56	0	0	3	2	40	80	0	0	0	0	0	0	0	0	2	0	1	1	88	0	0	308
05:00 PM	0	0	5	0	0	57	71	0	0	4	1	39	63	0	0	0	0	0	0	0	0	0	0	0	0	69	0	1	301
05:15 PM	0	0	2	0	0	40	80	0	0	1	0	42	99	0	0	0	0	0	0	0	0	3	0	1	3	95	0	0	359
05:30 PM	1	0	5	0	0	40	67	0	0	2	1	31	76	0	0	0	0	0	0	0	0	0	0	0	4	107	0	4	330
05:45 PM	0	0	1	1	0	36	66	1	0	1	0	41	89	0	0	0	0	0	0	0	0	0	0	1	2	106	0	0	341
06:00 PM	0	0	2	0	0	27	63	0	0	3	1	31	78	0	0	0	0	0	0	0	0	0	0	1	0	90	0	0	290
PEAK HOUR TOTALS	1	0	13	1	0	173	284	1	0	8	2	153	327	0	0	0	0	0	0	0	0	3	0	2	9	377	0	5	INTERSECTION
ALL MOVEMENTS	458							482							0							391							1331
% HV	2.8%							1.7%							#N/A							0.5%							1.7%
PEAK HOUR FACTOR	0.89							0.85							#N/A							0.85							0.93

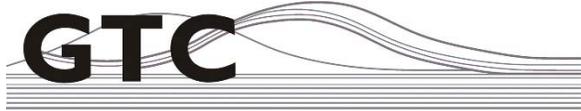
HV = Heavy Vehicle
 PHF = Peak Hour Factor

4:00 PM - 6:00 PM PEAK HOUR: 4:45 PM - 5:45 PM

ROLLING HOUR COUNT

TIME INTERVAL	FROM NORTH ON (Southbound) Chain Lake Road							FROM SOUTH ON (Northbound) Chain Lake Road							FROM EAST ON (Westbound)							FROM WEST ON (Eastbound) N Kelsey Street							INTERVAL TOTALS
	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	Peds	Bicycle	HV	U-Turn	Left	Thru	Right	
4:00 PM - 5:00 PM	5	0	23	0	0	166	278	0	0	10	9	159	291	0	0	0	0	0	0	0	0	2	0	4	2	347	0	1	1253
4:15 PM - 5:15 PM	4	0	17	0	0	174	289	0	0	10	4	152	318	0	0	0	0	0	0	0	0	5	0	4	4	340	0	1	1282
4:30 PM - 5:30 PM	4	0	17	0	0	178	274	0	0	10	4	152	318	0	0	0	0	0	0	0	0	5	0	2	8	359	0	5	1298
4:45 PM - 5:45 PM	1	0	13	1	0	173	284	1	0	8	2	153	327	0	0	0	0	0	0	0	0	3	0	2	9	377	0	5	1331
5:00 PM - 6:00 PM	1	0	10	1	0	143	276	1	0	7	2	145	342	0	0	0	0	0	0	0	0	3	0	3	9	398	0	4	1320
4:00 PM - 6:00 PM Total:	6	0	33	1	0	309	554	1	0	17	11	304	633	0	0	0	0	0	0	0	0	5	0	7	11	745	0	5	2573

APPENDIX D
PIPELINE INFORMATION



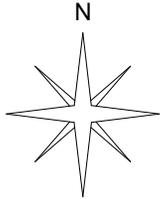
Gibson Traffic Consultants, Inc.
2813 Rockefeller Avenue
Suite B
Everett, WA 98201
425.339.8266

Cooper Point Traffic Impact Analysis

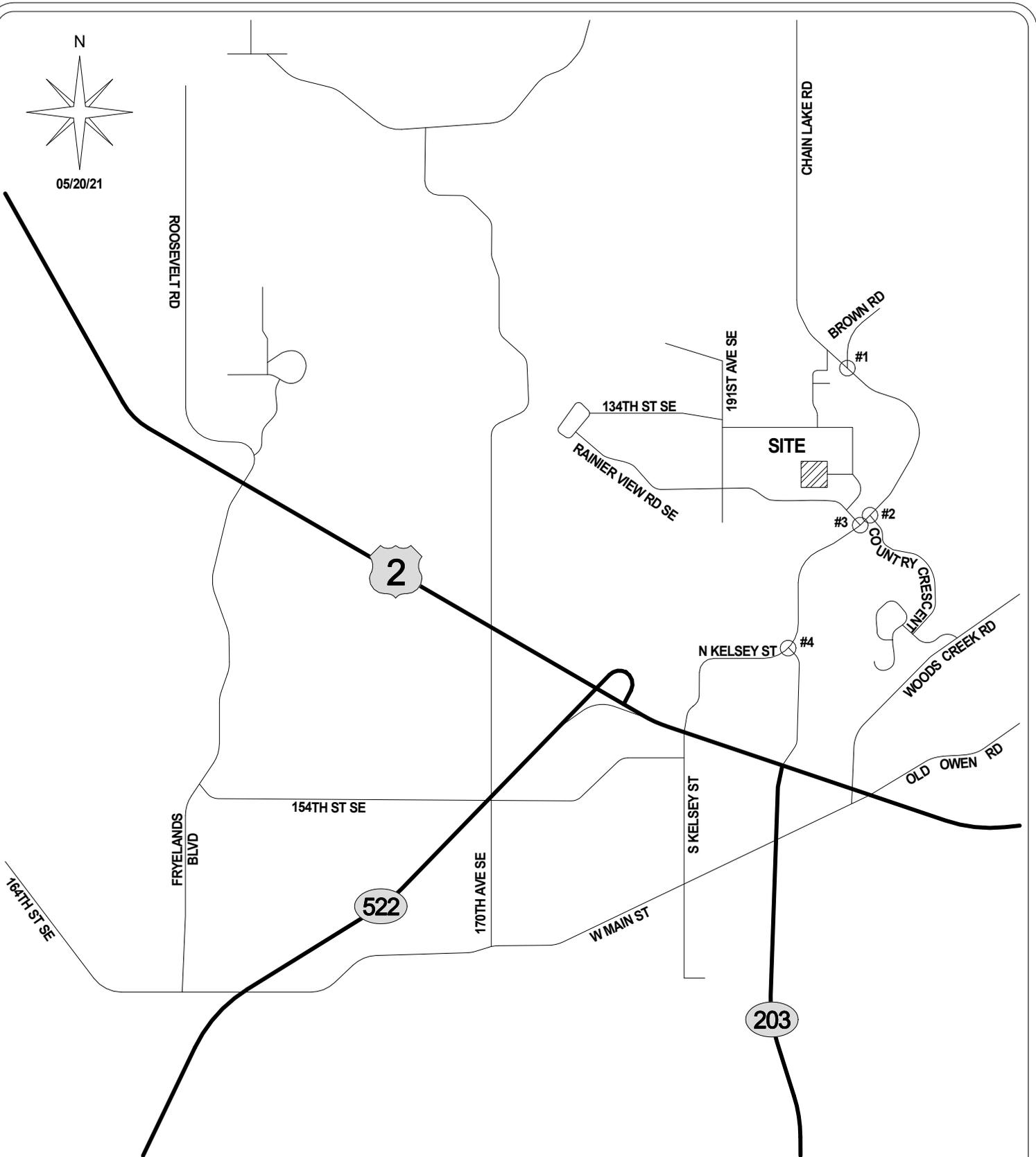
Jurisdiction: City of Monroe

May 2021





05/20/21



GIBSON TRAFFIC CONSULTANTS

**TRAFFIC IMPACT STUDY
GTC #21-028**

**COOPER POINT
32 NET NEW
SINGLE-FAMILY
RESIDENTIAL UNITS**

CITY OF MONROE

LEGEND



DEVELOPMENT SITE



STUDY INTERSECTION

**FIGURE 1
SITE VICINITY
MAP**

3. TRIP GENERATION

The trip generation calculations for the Cooper Point development are based on the average trip generation rates for ITE Land Use Code 210, Single-Family Detached Housing. The trip generation calculations are based on the 32 net new units of the Cooper Point development, which includes credit for the 1 existing unit on the site. The trip generation calculations are summarized in Table 2.

Table 2: Trip Generation Summary

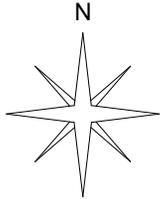
32 Net New Single-Family Residential Units	Average Daily Trips			AM Peak-Hour Trips			PM Peak-Hour Trips		
	Inbound	Outbound	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
Generation Rate	9.44 trips per unit			0.74 trips per unit			0.99 trips per unit		
Splits	50%	50%	100%	25%	75%	100%	63%	37%	100%
Trips	151.04	151.04	302.08	5.92	17.76	23.68	19.96	11.72	31.68

The 32 net new units are anticipated to generate approximately 302 average daily trips with approximately 24 AM peak-hour trips and 32 PM peak-hour trips.

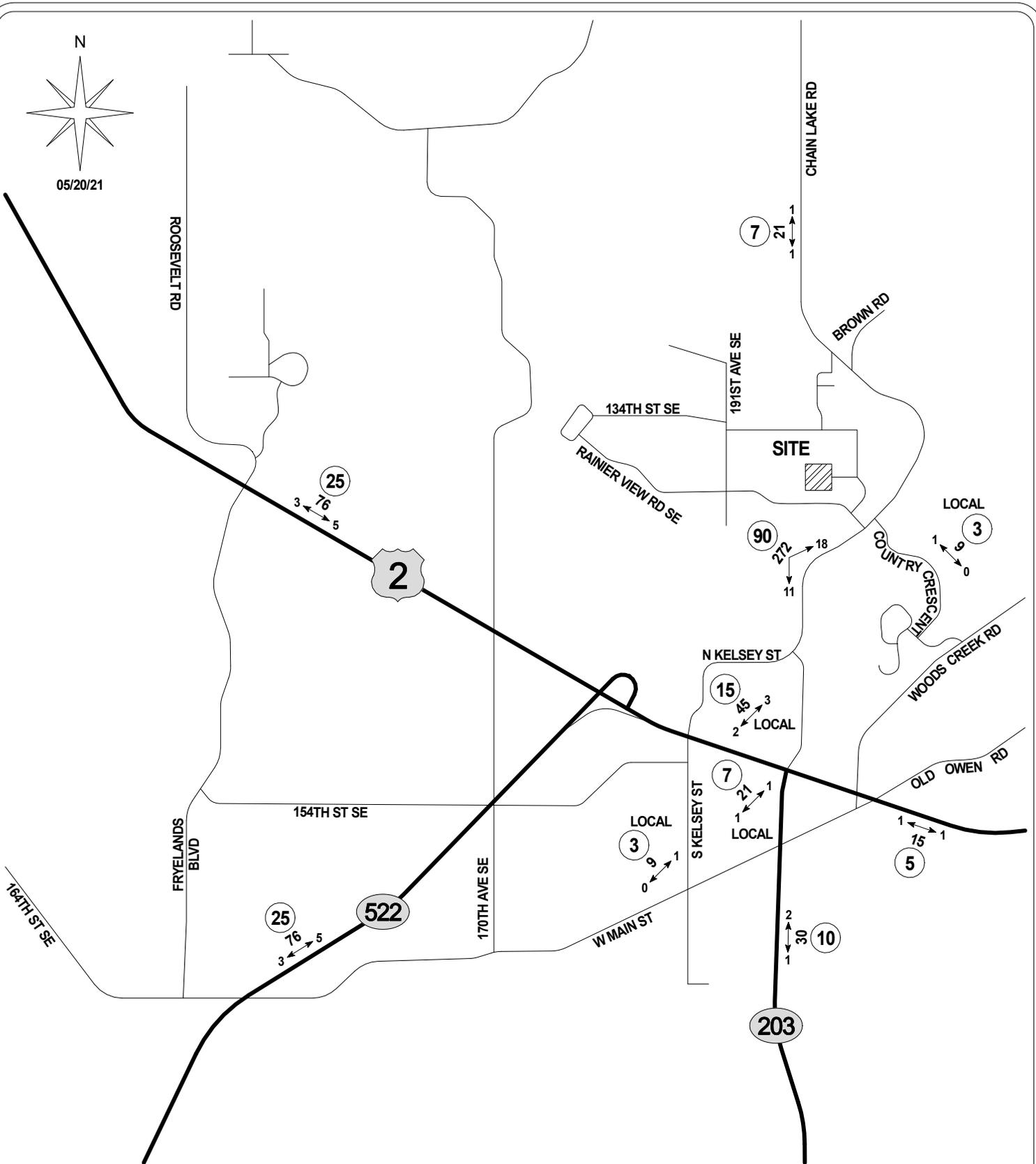
4. TRIP DISTRIBUTION

The distribution of trips generated by the Cooper Point development is based on approved distributions for developments in the site vicinity. It is anticipated that 25% of the trips generated by the development will travel to and from the west along US-2. Approximately 35% of the trips generated by the development will travel to and from the south, twenty-five percent along SR-522 and ten percent along SR-203. It is estimated that 28% of the trips generated by the development will travel to and from local areas in the vicinity of the development, ten percent south of US-2, fifteen percent north of US-2, and three percent to the east. The remaining 12% of the trips generated by the development are anticipated to travel to and from the north and east, seven percent to and from the north along Chain Lake Road and five percent to and from the east along US-2. Detailed distributions are included in Figure 2 for the AM peak-hour and Figure 3 for the PM peak-hour.

The interlocal agreement with Snohomish County requires key intersections impacted with 3 or more directional peak-hour trips on any approach or departure to be shown. The trips generated by the Cooper Point development will impact 3 key intersections during the AM and PM peak-hours. The key intersection impacts are shown in detail in the attachments of this report. Snohomish County's trip distribution policy states that trips along US-2 do not need to be distributed west of 88th Street SE. Trips traveling to and from the south along SR-522 and SR-203 are anticipated to travel to and from King County.



05/20/21



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #21-028

COOPER POINT
32 NET NEW
SINGLE-FAMILY
RESIDENTIAL UNITS

CITY OF MONROE

LEGEND

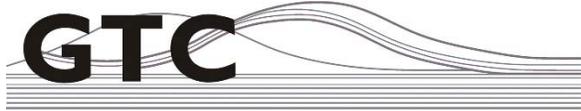
AWDT
PM ↔ PEAK

NEW SITE TRAFFIC
(DAILY/PEAK-HOUR)



TRIP DISTRIBUTION %

FIGURE 3
DEVELOPMENT
TRIP DISTRIBUTION
PM PEAK-HOUR

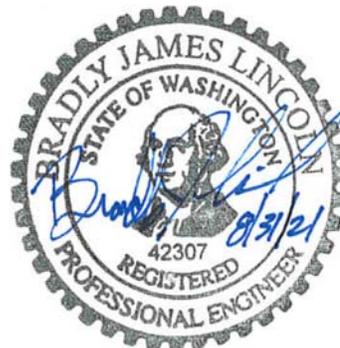


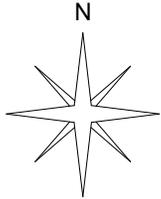
Gibson Traffic Consultants, Inc.
2813 Rockefeller Avenue
Suite B
Everett, WA 98201
425.339.8266

Garibaldi Traffic Impact Analysis

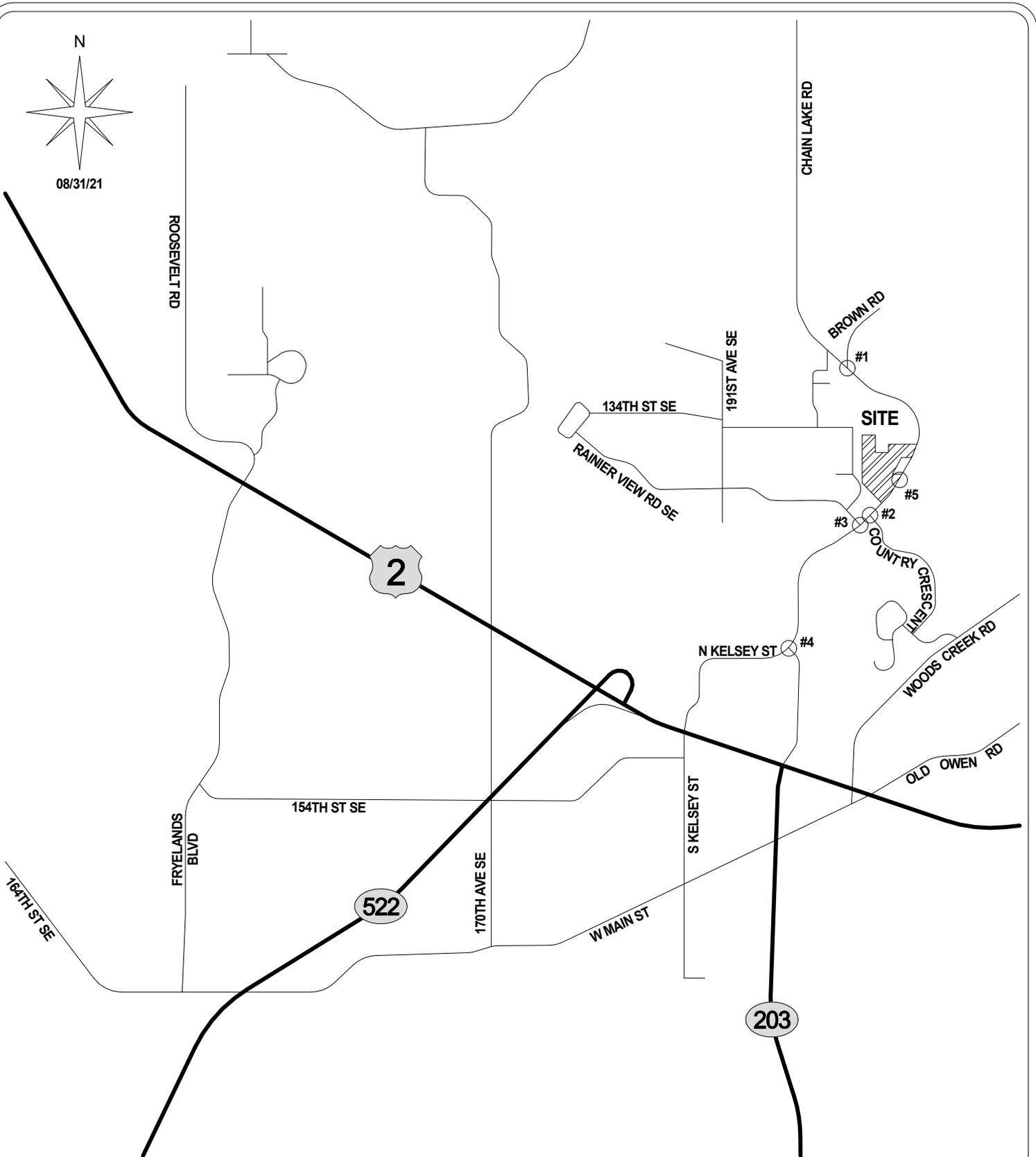
Jurisdiction: City of Monroe

August 2021





08/31/21



GIBSON TRAFFIC CONSULTANTS

**TRAFFIC IMPACT STUDY
GTC #18-334**

**GARIBALDI DEVELOPMENT
86 NET NEW SINGLE FAMILY
DWELLINGS**

LEGEND



DEVELOPMENT SITE



STUDY INTERSECTION

**FIGURE 1
SITE VICINITY
MAP**

CITY OF MONROE

3. TRIP GENERATION

The trip generation calculations for the Garibaldi development are based on the average trip generation rates for ITE Land Use Code 210, Single-Family Detached Housing. The trip generation calculations are based on the 86 net new units of the Garibaldi development, which includes credit for the 2 existing units on the site, and are summarized in Table 2.

Table 2: Trip Generation Summary

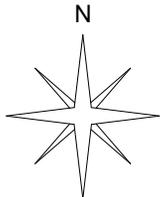
86 Net New Single-Family Residential Units	Average Daily Trips			AM Peak-Hour Trips			PM Peak-Hour Trips		
	Inbound	Outbound	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
Generation Rate	9.44 trips per unit			0.74 trips per unit			0.99 trips per unit		
Splits	50%	50%	100%	25%	75%	100%	63%	37%	100%
Trips	405.92	405.92	811.84	15.91	47.73	63.64	53.64	31.50	85.14

The 86 net new units are anticipated to generate approximately 812 average daily trips with approximately 64 AM peak-hour trips and 85 PM peak-hour trips.

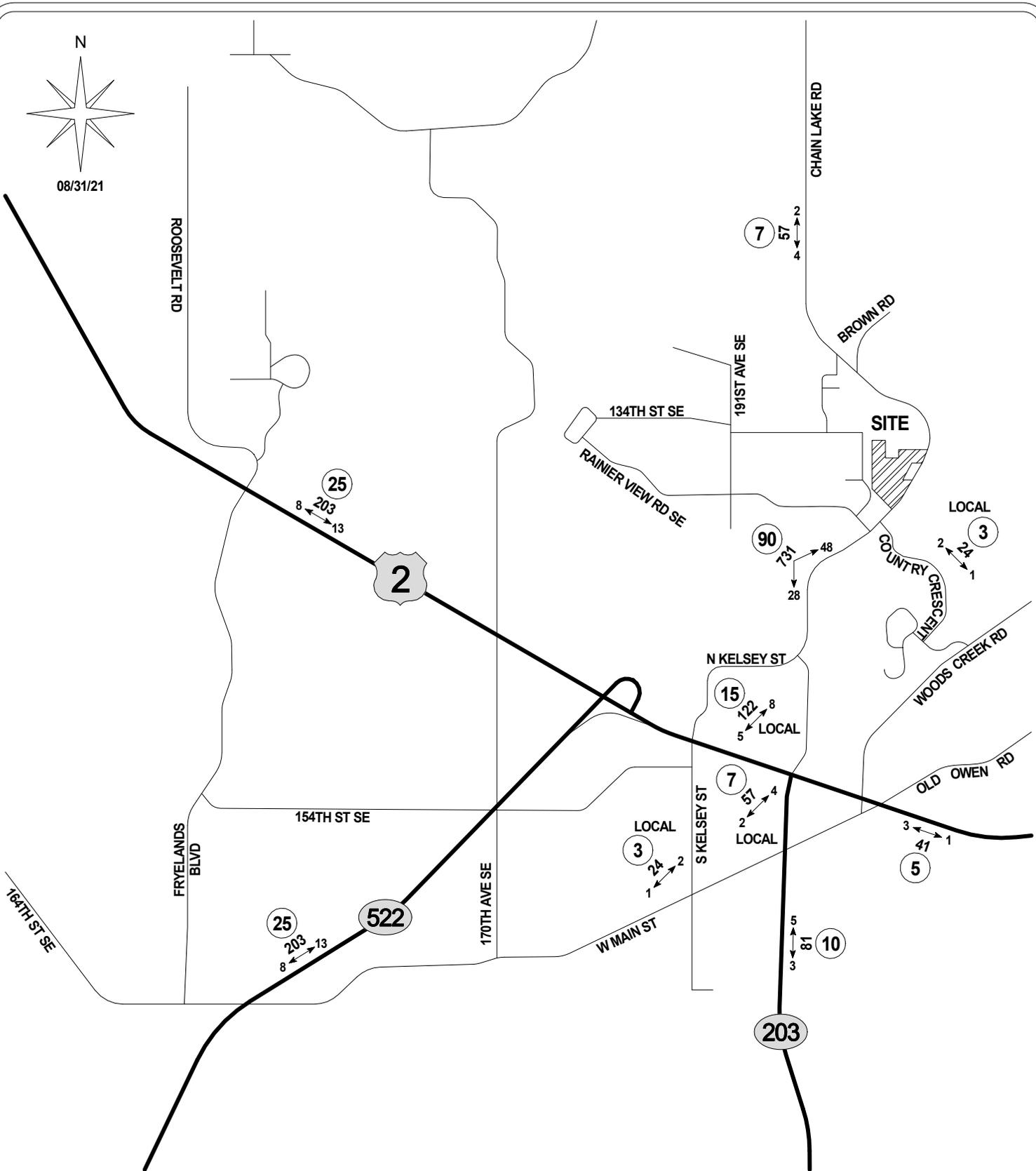
4. TRIP DISTRIBUTION

The distribution of trips generated by the Garibaldi development is based on approved distributions for developments in the site vicinity. It is anticipated that 25% of the trips generated by the development will travel to and from the west along US-2. Approximately 35% of the trips generated by the development will travel to and from the south, twenty-five percent along SR-522 and ten percent along SR-203. It is estimated that 28% of the trips generated by the development will travel to and from local areas in the vicinity of the development, ten percent south of US-2, fifteen percent north of US-2, and three percent to the east. The remaining 12% of the trips generated by the development are anticipated to travel to and from the north and east, seven percent to and from the north along Chain Lake Road and five percent to and from the east along US-2. Detailed distributions are included in Figure 2 for the AM peak-hour and Figure 3 for the PM peak-hour.

The interlocal agreement with Snohomish County requires key intersections impacted with 3 or more directional peak-hour trips on any approach or departure to be shown. The Garibaldi development will impact 7 key intersections during the AM and PM peak-hours. The key intersection impacts are shown in detail in the attachments of this report. Snohomish County's trip distribution policy states that trips along US-2 do not need to be distributed west of 88th Street SE. Trips traveling to and from the south along SR-522 and SR-203 are anticipated to travel to and from King County.



08/31/21



GIBSON TRAFFIC CONSULTANTS

**TRAFFIC IMPACT STUDY
GTC #18-334**

**GARIBALDI DEVELOPMENT
86 NET NEW SINGLE FAMILY
DWELLINGS**

LEGEND

AWDT
PM ↔ PEAK

NEW SITE TRAFFIC
(DAILY/PEAK-HOUR)



TRIP DISTRIBUTION %

**FIGURE 3
DEVELOPMENT
TRIP DISTRIBUTION
PM PEAK-HOUR**

CITY OF MONROE

APPENDIX E
TURNING MOVEMENT CALCULATIONS

1 Chain Lake @ Rainier View

Synchro ID: 1

Existing
Average Weekday
PM Peak-Hour

Date: 7/31/2024

Data Source: TDG

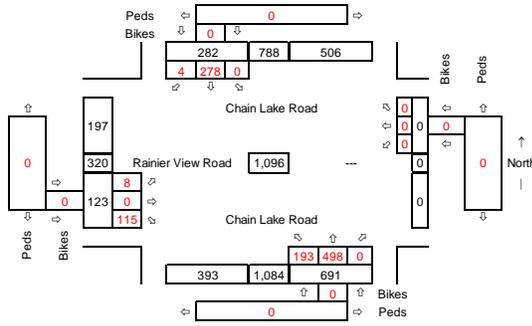
PHF: 0.96

EB HVF= 0%

WB HVF= 0%

NB HVF= 2%

SB HVF= 4%



No-Build
Average Weekday
PM Peak-Hour

Year: 2027

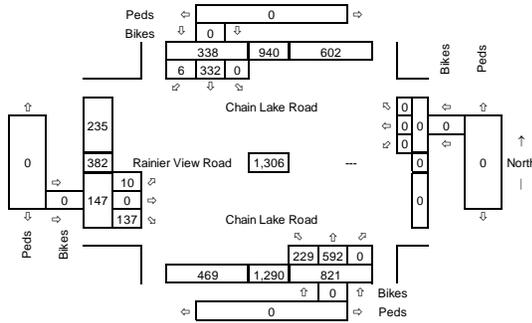
Years of Growth = 3

Growth Rate = 3%

Growth Factor = 1.09

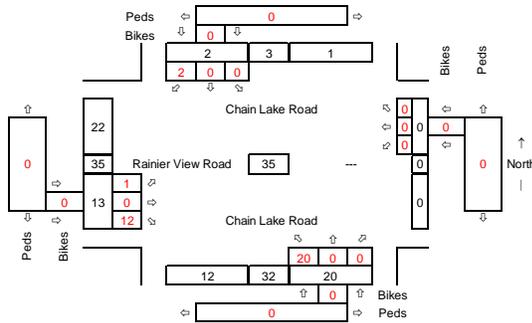
Grow Peds? No

Grow Bikes? No

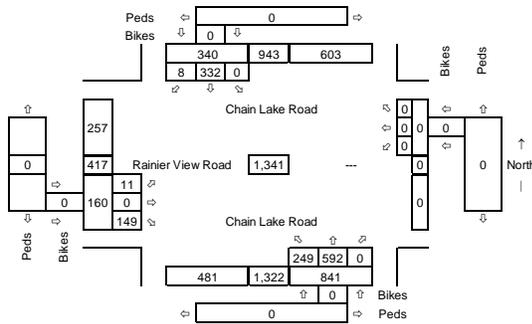


Development Trips
Average Weekday
PM Peak-Hour

Monroe West

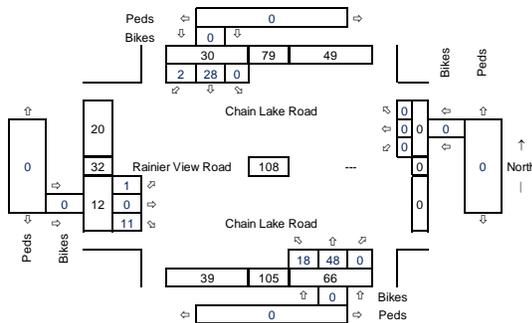


Build Trips
Average Weekday
PM Peak-Hour



Total Pipeline Trips
Average Weekday
PM Peak-Hour

Cooper Point & Garibaldi



2 Chain Lake @ Kelsey St

Synchro ID: 2

Existing

Average Weekday
PM Peak-Hour

Date: 1/7/2025

Data Source: TDG

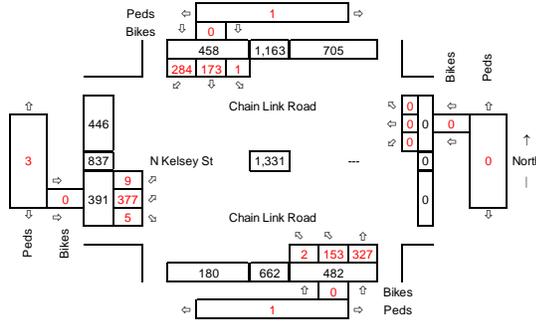
PHF: 0.93

EB HVF= 1%

WB HVF= 0%

NB HVF= 2%

SB HVF= 3%



No-Build

Average Weekday
PM Peak-Hour

Year: 2027

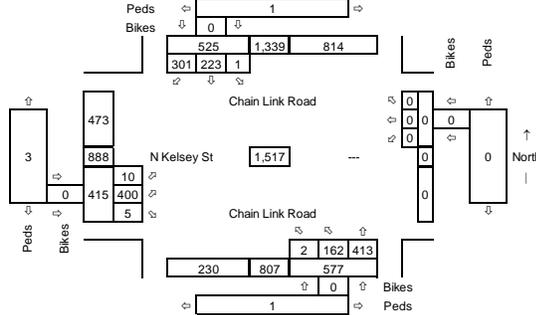
Years of Growth = 2

Growth Rate = 3%

Growth Factor = 1.06

Grow Peds? No

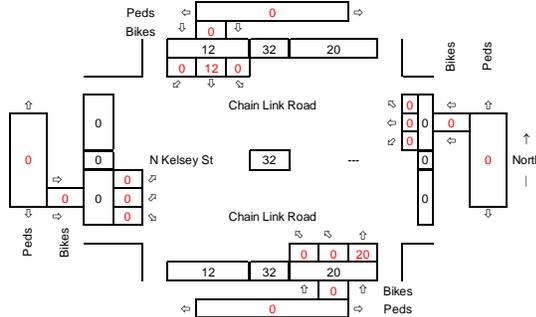
Grow Bikes? No



Development Trips

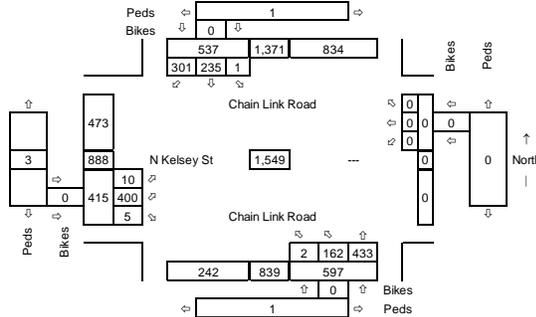
Average Weekday
PM Peak-Hour

Monroe West



Build Trips

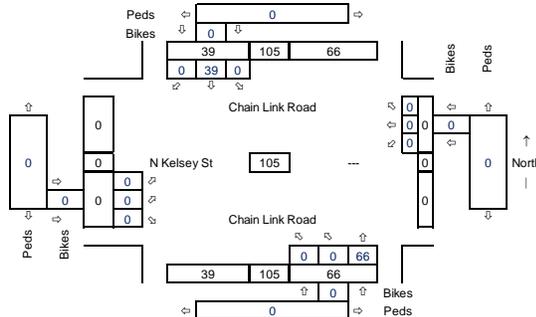
Average Weekday
PM Peak-Hour



Total Pipeline Trips

Average Weekday
PM Peak-Hour

Cooper Point & Garibaldi



APPENDIX F
LEVEL OF SERVICE CALCULATIONS

HCM 7th TWSC
 1: CHAIN LAKE ROAD & RAINIER VIEW ROAD

MONROE WEST

Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	↑	↑	W
Traffic Vol, veh/h	8	115	193	498	278	4
Future Vol, veh/h	8	115	193	498	278	4
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	2	4	4
Mvmt Flow	8	120	201	519	290	4

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	1213	292	294	0	0
Stage 1	292	-	-	-	-
Stage 2	921	-	-	-	-
Critical Hdwy	6.4	6.2	4.12	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.218	-	-
Pot Cap-1 Maneuver	203	752	1268	-	-
Stage 1	763	-	-	-	-
Stage 2	391	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	171	752	1268	-	-
Mov Cap-2 Maneuver	171	-	-	-	-
Stage 1	642	-	-	-	-
Stage 2	391	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v12.37		2.34	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1268	-	616	-	-
HCM Lane V/C Ratio	0.159	-	0.208	-	-
HCM Control Delay (s/veh)	8.4	-	12.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.6	-	0.8	-	-

HCM 7th TWSC
 1: CHAIN LAKE ROAD & RAINIER VIEW ROAD

MONROE WEST

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	↑	W	
Traffic Vol, veh/h	10	137	229	592	332	6
Future Vol, veh/h	10	137	229	592	332	6
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	2	4	4
Mvmt Flow	10	143	239	617	346	6

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	1443	349	352	0	0
Stage 1	349	-	-	-	-
Stage 2	1094	-	-	-	-
Critical Hdwy	6.4	6.2	4.12	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.218	-	-
Pot Cap-1 Maneuver	147	699	1207	-	-
Stage 1	719	-	-	-	-
Stage 2	324	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	118	699	1207	-	-
Mov Cap-2 Maneuver	118	-	-	-	-
Stage 1	577	-	-	-	-
Stage 2	324	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.69	2.43	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1207	-	524	-	-
HCM Lane V/C Ratio	0.198	-	0.292	-	-
HCM Control Delay (s/veh)	8.7	-	14.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.7	-	1.2	-	-

HCM 7th TWSC
1: CHAIN LAKE ROAD & RAINIER VIEW ROAD

MONROE WEST

Intersection						
Int Delay, s/veh	3.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	↑	W	
Traffic Vol, veh/h	11	149	249	592	332	8
Future Vol, veh/h	11	149	249	592	332	8
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	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	2	4	4
Mvmt Flow	11	155	259	617	346	8

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	1485	350	354	0	0
Stage 1	350	-	-	-	-
Stage 2	1135	-	-	-	-
Critical Hdwy	6.4	6.2	4.12	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.218	-	-
Pot Cap-1 Maneuver	139	698	1205	-	-
Stage 1	718	-	-	-	-
Stage 2	309	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	109	698	1205	-	-
Mov Cap-2 Maneuver	109	-	-	-	-
Stage 1	563	-	-	-	-
Stage 2	309	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v15.49		2.61	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1205	-	509	-	-
HCM Lane V/C Ratio	0.215	-	0.328	-	-
HCM Control Delay (s/veh)	8.8	-	15.5	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.8	-	1.4	-	-

MOVEMENT SUMMARY

 Site: 2 [Existing (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Chain Lake Road at N Kelsey St
 Site Category: Monroe West
 Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	[Total HV]	[Veh.]	[Dist]				veh/h	%				
South: Chain Lake Road															
3u	U	All MCs	2	2.0	2	2.0	0.578	16.0	LOS B	4.8	120.7	0.73	0.73	0.83	32.6
3	L2	All MCs	165	2.0	165	2.0	0.578	13.7	LOS B	4.8	120.7	0.73	0.73	0.83	32.6
8	T1	All MCs	352	2.0	352	2.0	0.578	8.5	LOS A	4.8	120.7	0.73	0.73	0.83	33.2
Approach			518	2.0	518	2.0	0.578	10.2	LOS B	4.8	120.7	0.73	0.73	0.83	33.0
North: Chain Lake Road															
7u	U	All MCs	1	3.0	1	3.0	0.463	13.0	LOS B	3.3	84.8	0.51	0.52	0.51	34.2
4	T1	All MCs	186	3.0	186	3.0	0.463	5.5	LOS A	3.3	84.8	0.51	0.52	0.51	34.9
14	R2	All MCs	305	3.0	305	3.0	0.463	5.4	LOS A	3.3	84.8	0.51	0.52	0.51	34.6
Approach			492	3.0	492	3.0	0.463	5.5	LOS A	3.3	84.8	0.51	0.52	0.51	34.7
West: N Kelsey St															
5u	U	All MCs	10	1.0	10	1.0	0.320	12.6	LOS B	2.0	49.2	0.41	0.62	0.41	32.2
5	L2	All MCs	405	1.0	405	1.0	0.320	10.3	LOS B	2.0	49.2	0.41	0.62	0.41	32.2
12	R2	All MCs	5	1.0	5	1.0	0.003	3.8	LOS A	0.0	0.0	0.00	0.48	0.00	36.4
Approach			420	1.0	420	1.0	0.320	10.3	LOS B	2.0	49.2	0.40	0.62	0.40	32.2
All Vehicles			1431	2.1	1431	2.1	0.578	8.6	LOS A	4.8	120.7	0.56	0.63	0.59	33.3

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 2 [2027 No-Build (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Chain Lake Road at N Kelsey St
 Site Category: Monroe West
 Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV] veh/h	%	[Total HV] veh/h	%				[Veh.] veh	[Dist] ft				
South: Chain Lake Road															
3u	U	All MCs	2	2.0	2	2.0	0.624	16.2	LOS B	5.8	148.3	0.77	0.75	0.90	32.5
3	L2	All MCs	174	2.0	174	2.0	0.624	13.9	LOS B	5.8	148.3	0.77	0.75	0.90	32.5
8	T1	All MCs	444	2.0	444	2.0	0.624	8.7	LOS A	5.8	148.3	0.77	0.75	0.90	33.2
Approach			620	2.0	620	2.0	0.624	10.2	LOS B	5.8	148.3	0.77	0.75	0.90	33.0
North: Chain Lake Road															
7u	U	All MCs	1	3.0	1	3.0	0.483	12.9	LOS B	3.6	92.6	0.52	0.52	0.52	34.2
4	T1	All MCs	240	3.0	240	3.0	0.483	5.4	LOS A	3.6	92.6	0.52	0.52	0.52	34.9
14	R2	All MCs	324	3.0	324	3.0	0.483	5.3	LOS A	3.6	92.6	0.52	0.52	0.52	34.6
Approach			565	3.0	565	3.0	0.483	5.4	LOS A	3.6	92.6	0.52	0.52	0.52	34.7
West: N Kelsey St															
5u	U	All MCs	11	1.0	11	1.0	0.315	12.6	LOS B	2.0	49.7	0.45	0.63	0.45	32.1
5	L2	All MCs	430	1.0	430	1.0	0.315	10.4	LOS B	2.0	49.7	0.45	0.63	0.45	32.1
12	R2	All MCs	5	1.0	5	1.0	0.003	3.8	LOS A	0.0	0.0	0.00	0.48	0.00	36.4
Approach			446	1.0	446	1.0	0.315	10.4	LOS B	2.0	49.7	0.44	0.63	0.44	32.1
All Vehicles			1631	2.1	1631	2.1	0.624	8.6	LOS A	5.8	148.3	0.59	0.64	0.64	33.3

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 2 [2027 Build (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Chain Lake Road at N Kelsey St
 Site Category: Monroe West
 Roundabout

Vehicle Movement Performance																
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%				[Veh.]	[Dist]					
			veh/h	%	veh/h	%	v/c	sec			veh	ft				mph
South: Chain Lake Road																
3u	U	All MCs	2	2.0	2	2.0	0.647	16.5	LOS B	6.4	161.5	0.79	0.76	0.94	32.5	
3	L2	All MCs	174	2.0	174	2.0	0.647	14.2	LOS B	6.4	161.5	0.79	0.76	0.94	32.5	
8	T1	All MCs	466	2.0	466	2.0	0.647	9.0	LOS A	6.4	161.5	0.79	0.76	0.94	33.1	
Approach			642	2.0	642	2.0	0.647	10.4	LOS B	6.4	161.5	0.79	0.76	0.94	32.9	
North: Chain Lake Road																
7u	U	All MCs	1	3.0	1	3.0	0.494	13.0	LOS B	3.8	96.4	0.53	0.52	0.53	34.1	
4	T1	All MCs	253	3.0	253	3.0	0.494	5.5	LOS A	3.8	96.4	0.53	0.52	0.53	34.9	
14	R2	All MCs	324	3.0	324	3.0	0.494	5.4	LOS A	3.8	96.4	0.53	0.52	0.53	34.5	
Approach			577	3.0	577	3.0	0.494	5.4	LOS A	3.8	96.4	0.53	0.52	0.53	34.7	
West: N Kelsey St																
5u	U	All MCs	11	1.0	11	1.0	0.318	12.7	LOS B	2.0	50.5	0.46	0.63	0.46	32.1	
5	L2	All MCs	430	1.0	430	1.0	0.318	10.4	LOS B	2.0	50.5	0.46	0.63	0.46	32.1	
12	R2	All MCs	5	1.0	5	1.0	0.003	3.8	LOS A	0.0	0.0	0.00	0.48	0.00	36.4	
Approach			446	1.0	446	1.0	0.318	10.4	LOS B	2.0	50.5	0.45	0.63	0.45	32.1	
All Vehicles			1666	2.1	1666	2.1	0.647	8.7	LOS A	6.4	161.5	0.61	0.64	0.67	33.3	

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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