



## MEMORANDUM

Date: April 3, 2024

To: Luke Sasse  
Timberland Inc.  
9321 NE 72<sup>nd</sup> Avenue  
Building C #7  
Vancouver WA 98665

copy: Travis Johnson, PE  
PLS Engineering

From: Frank Charbonneau, PE, PTOE

Subject: Traffic Assessment  
**Lewis River Subdivision**  
Lewis River Road/SR503, Woodland

FL2426

This memorandum will serve as the traffic analysis report for the Lewis River Subdivision (year 2024) development and the updated site plan in Woodland. The proposed subdivision will build a total of 85 single-family homes on the south side of Lewis River Road across from Insel Road and Gun Club Road on multiple tax lots. Figure `a` in the appendix represents the vicinity map and Figure `b` illustrates the site plan. There will be one site access to the highway, also depicted on the site plan.

In October 2022 Charbonneau Engineering prepared a traffic study for the same project site which at that time planned for a total of 252 multi-family apartment units, however the residential facility was never constructed.

After corresponding with WSDOT and City of Woodland staff it was decided that with fewer trips generated by the current development plan a limited traffic analysis would be sufficient for the 85-unit subdivision proposal. The scope of the study would need to address the project's trip generation and document the difference compared to the previous multifamily plan proposed in year 2022, evaluate the site access at Lewis River Road/SR503 for LOS/delay/v/c, and provide turn lane and signal warrants at the site access intersection with the highway. Ultimately an Intersection Control Evaluation (ICE) may be necessary since the project includes a new intersection with SR503. However, it is assumed this traffic analysis will provide the necessary findings to support the ICE. If further information is required it can be furnished after WSDOT completes review of this study.

Attached to this memorandum is the following documentation in support the analysis findings and recommendations.

- Maps and traffic flow volume diagrams
- Historical peak hour traffic counts (collected in 2022)
- In-Process traffic data

- Turn-Lane warrants
- Peak pour signal warrants
- LOS (Synchro) analysis printouts

The following tables list the trip generation for the proposed and former site uses. With 85 single-family housing units the site is projected to generate 802 trips per weekday with 60 trips in the AM peak hour and 80 trips in the PM peak hour. This represents approximately a 52% ADT decrease compared to the former site plan with 252 apartments and approximately a 40% trip generation decrease in the peak hours.

**Table 1. Projected trip generation for Lewis River Subdivision 2024.**

ITE Land Use	Units (#)	Weekday						
		ADT	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
<i>Single-Family (#210)</i>	85							
Generation Rate <sup>1</sup>		9.43	0.70	26%	74%	0.94	63%	37%
Site Trips		<b>802</b>	<b>60</b>	16	44	<b>80</b>	50	30

<sup>1</sup> Source: *Trip Generation*, 11th Edition, ITE, 2021, average rates.

**Table 2. Trip Generation Comparison.**

Site Development Scenario	Weekday						
	ADT	AM Peak Hour			PM Peak Hour		
		Total	Enter	Exit	Total	Enter	Exit
October 2022 Analysis (252 multi-family housing)	<b>1,698</b>	<b>101</b>	24	77	<b>129</b>	81	48
March 2024 Trip Generation (85 single-family homes)	<b>-802</b>	<b>-60</b>	-16	-44	<b>-80</b>	-50	-30
<b>Trip Generation Difference<sup>2</sup></b>	<b>896</b>	<b>41</b>	8	33	<b>49</b>	31	18

<sup>2</sup> Trip Generation Difference = October 2022 Trip Generation Estimate - March 2024 Trip Generation Estimate.

With 85 homes and fewer trips the proposed single-family subdivision will have a lesser impact on Lewis River Road/SR503 and the surrounding intersections in Woodland compared to the original development plan.

The existing and proposed travel lane and traffic control conditions are illustrated on Figure 'c' in the appendix. At the site access location a separate eastbound right turn lane and a separate westbound left turn lane are proposed. The turn lanes are supported by WSDOT for safety reasons. However, it is noted that the turn lane warrants are not met. The warrants are included in the appendix.

A series of traffic flow maps (Figures 1-6) have been prepared to illustrate the AM & PM peak hour traffic volumes at the site access intersection. The mapping includes the following;

Figure 1, Year 2024 Existing Traffic

The volumes are based on the year 2022 traffic counts. The values were factored by a 3%/year growth rate for two years to obtain the year 2024 volumes.

Figure 2, In-Process Traffic

This traffic included the trips attributed to two approved developments in Woodland including Logan’s Landing and Oak Village Apartments. Both developments were also addressed in the year 2022 traffic analysis.

Figure 3, Year 2027 Background Traffic

Background traffic covered the year 2024 traffic adjusted by growth (3%/year) for three years plus the in-process traffic.

Figure 4, Trip Distribution

The trip distribution was based on the traffic count data included in the year 2022 traffic study, and engineering judgment.

Figures 5a & 5b, Trip Assignment

These figures display the trip generation assignments for the AM & PM peak hours, respectively including at the site’s access with SR503.

Figure 6, Year 2027 Total Traffic

The AM & PM peak hour volumes shown represent the summation of the site generated trips and the year 2027 background traffic. The data was used in completing the intersection capacity analysis for the year 2027 scenario.

The capacity analysis was performed for the site access intersection on Lewis River Road/SR503 for the year 2027 total traffic scenario. The analysis determined the average delay, LOS, and volume/capacity (v/c) ratio. Table 3 presents a summary of the results.

**Table 3 Capacity analysis Summary**

Intersection	Type of Control	Peak Hour	Traffic Scenario			
			2027 Total			
			Crit. Mov't	LOS	Delay	v/c
Lewis River Rd (SR 503) & Site Access (Brady Road)	Two-way Stop	AM	NB	C	16.3	0.13
		PM	NB	D	28.7	0.18

Notes: 2016 Highway Capacity Manual methodology used in analysis, Synchro v11.  
 NB - Northbound, Crit. Mov't - Critical movement or critical approach.

The findings confirmed that the intersection will operate at acceptable LOS `D` or better during the peak hours and meet the City’s and WSDOT LOS `D` standard. The v/c ratio will be less than 0.19 and also meets the agency standard. The LOS printouts based on the Synchro model (version 11.1) are included in the appendix.

A peak hour signal warrant was prepared for the study intersection and it was determined a traffic signal is not warranted through the year 2027 total traffic scenario.

Traffic queuing at the site access intersection on SR503 was evaluated in the capacity analysis based on the 95<sup>th</sup> percentile values. For the northbound site access approach the peak hour queues are projected to not exceed one to two vehicles. The westbound left turn lane is projected to experience queues of one to two vehicles in the peak hours. With a storage length of 100 feet provided in the westbound left turn lane more than enough stacking distance will be provided.

Based on the analysis results it is recommended that the City of Woodland and WSDOT support and approve the development project consisting of 85 single-family housing units with a single access on SR503.

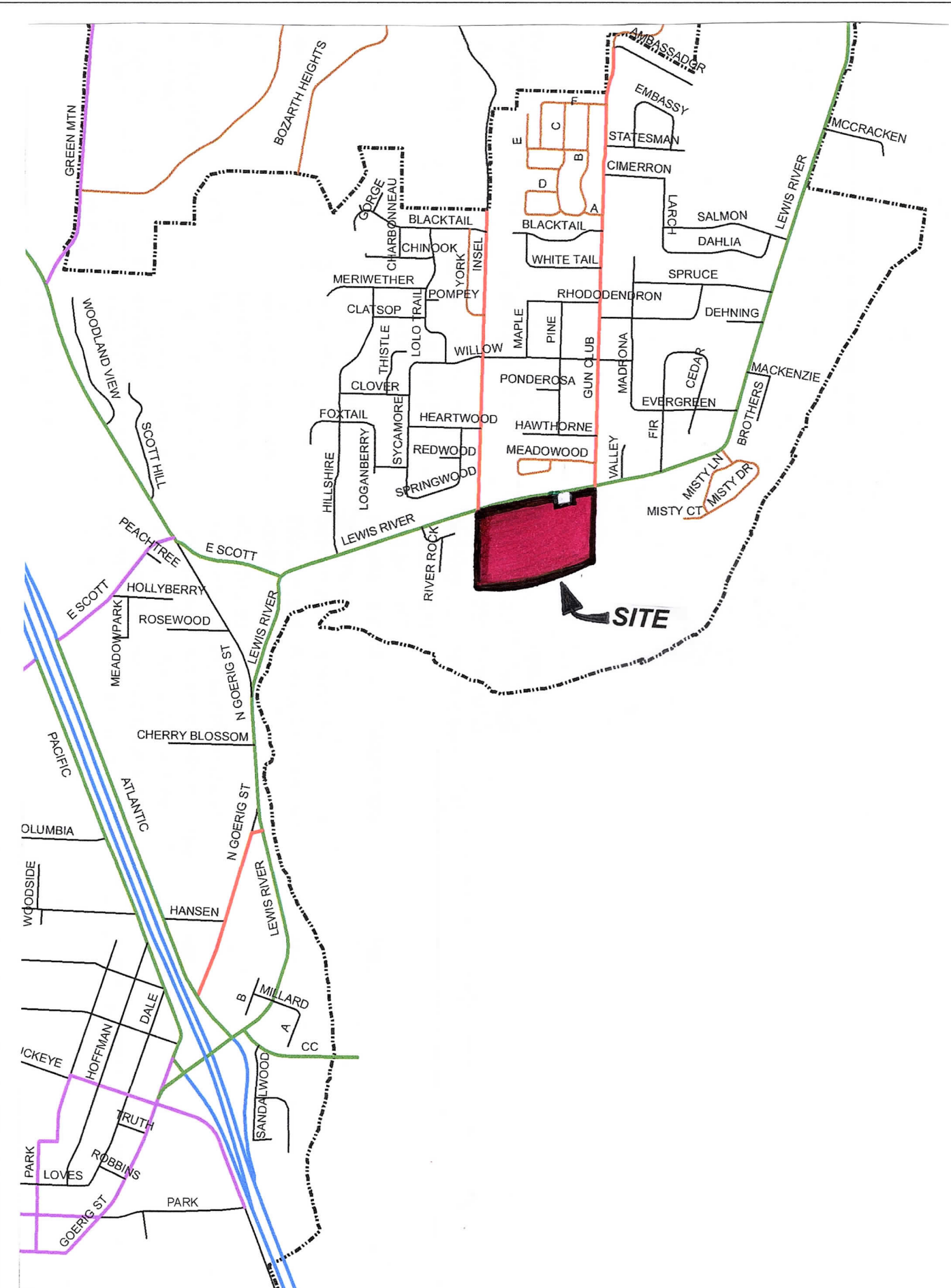
If you should have any questions, please contact Frank Charbonneau, PE, PTOE at 971.322.8003 or email [Frank@CharbonneauEngineer.com](mailto:Frank@CharbonneauEngineer.com).

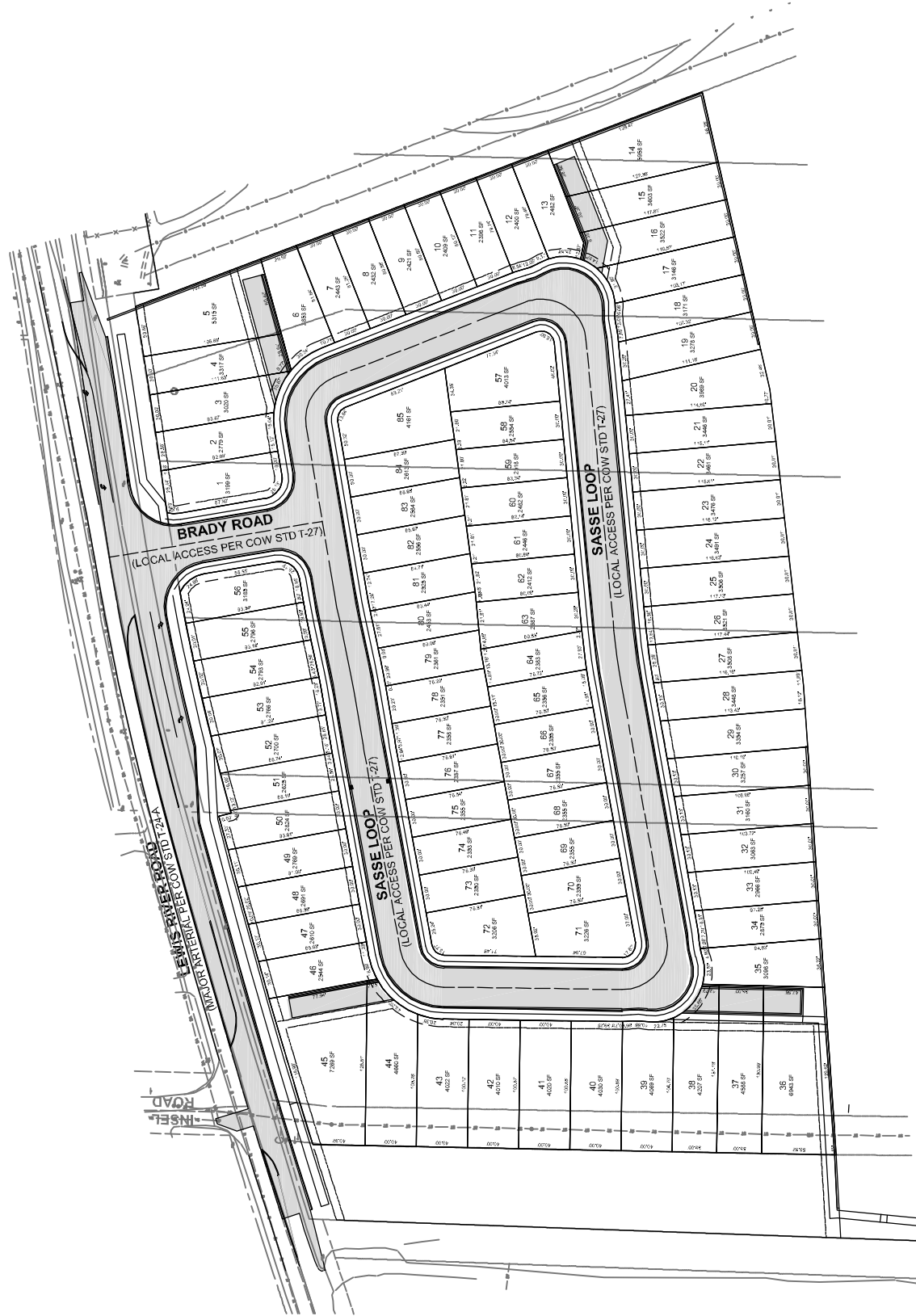
### Appendix

- Figure `a` Vicinity Map
- Figure `b` Site Plan
- Figure `c` Lane Configuration & Traffic Control
- Figure 1 Year 2024 Traffic
- Figure 2 In-Process Traffic
- Figure 3 Year 2027 Background Traffic
- Figure 4 Trip Distribution
- Figures 5a & 5b Trip Assignments, AM & PM Peak Hours
- Figure 6 Year 2027 Total Traffic
- Historical Traffic Count Data, Year 2022
- In-Process Traffic
- Left Turn Lane Warrant
- Right Turn Lane Warrant
- Traffic Signal Warrant
- Synchro LOS Printouts

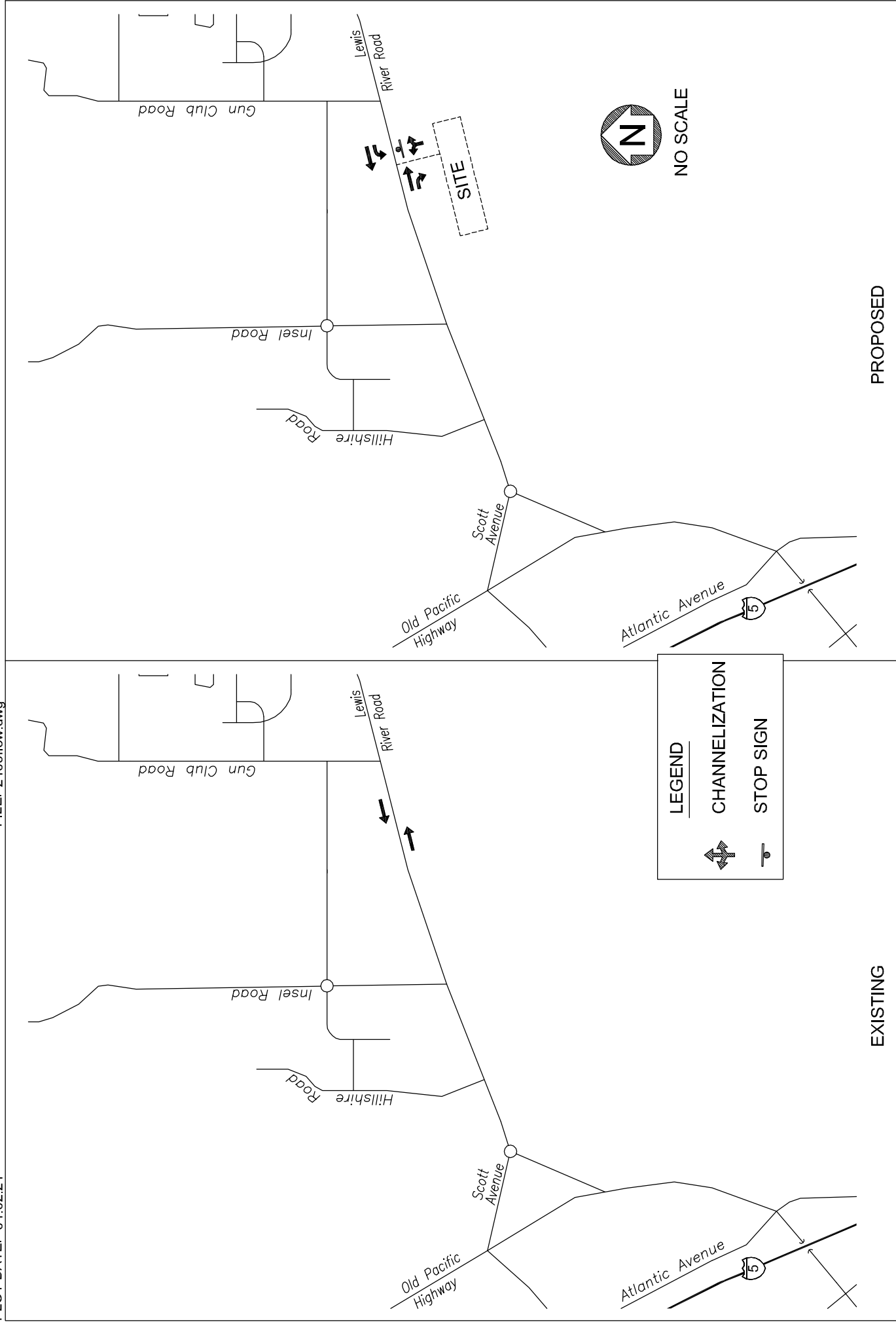
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PLOT DATE: 04.01.24

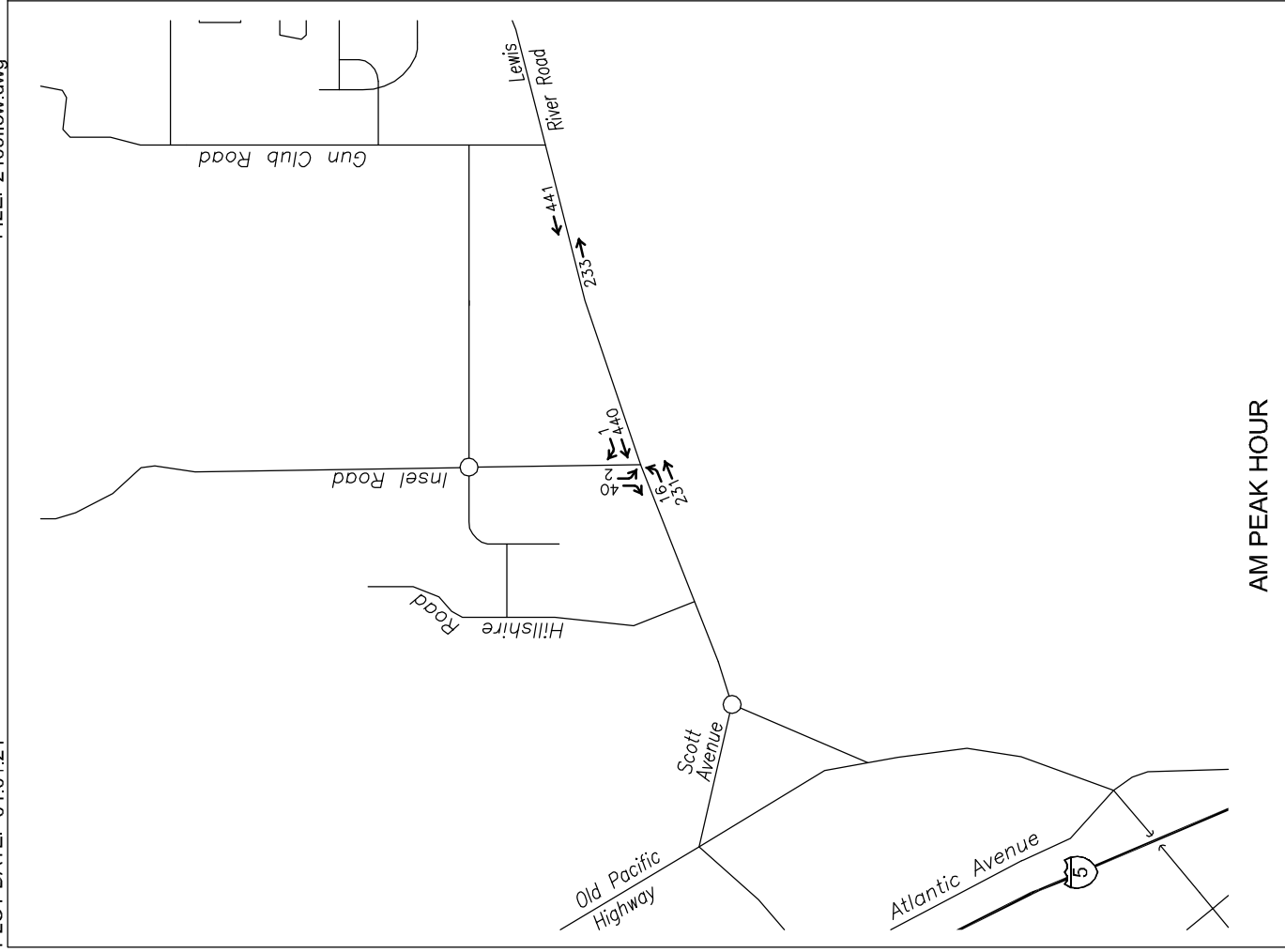
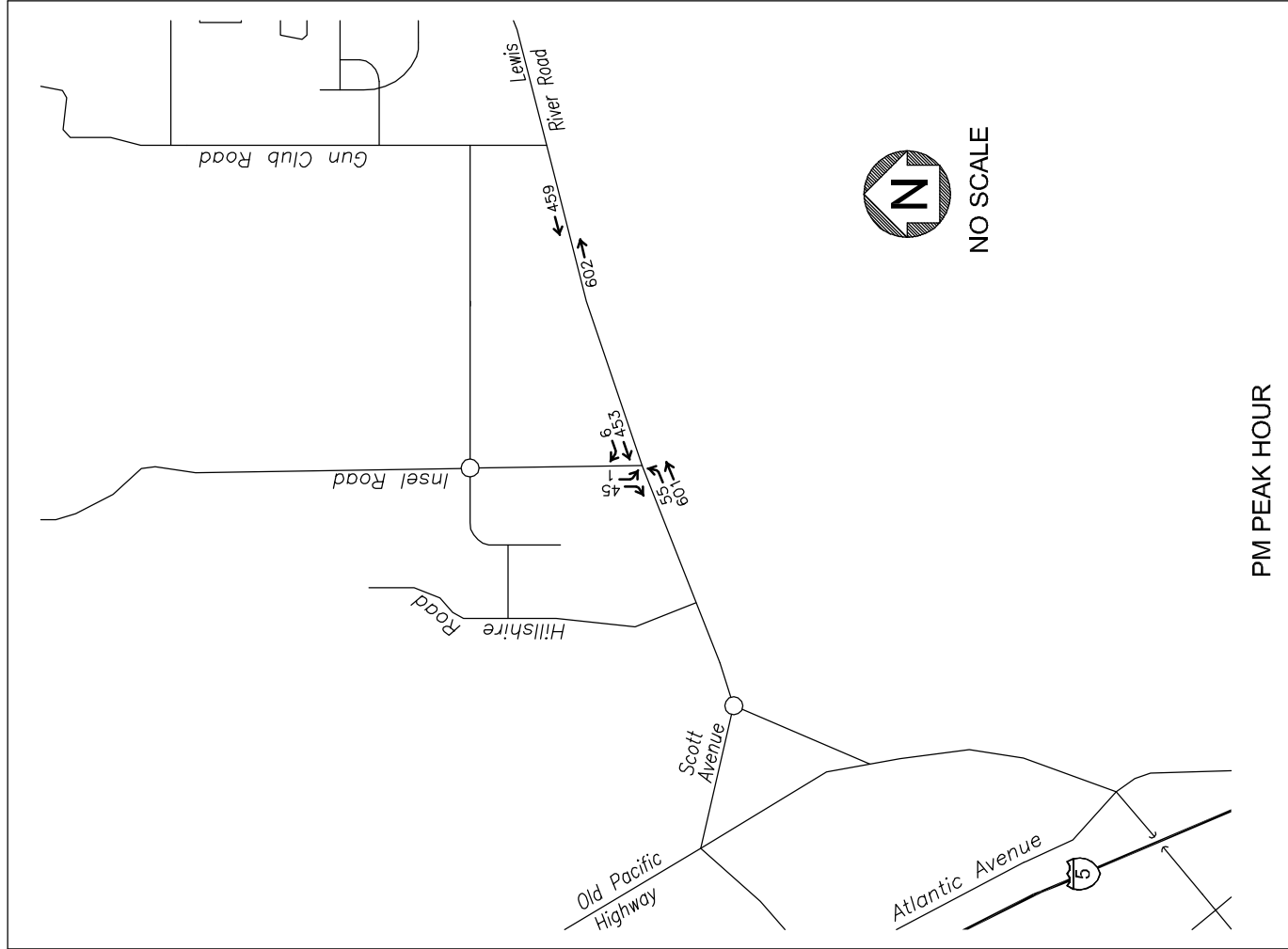




NO SCALE



<p>LANE CONFIGURATIONS AND TRAFFIC CONTROL LEWIS RIVER SUBDIVISION 2024</p>	<p>NOTES:</p> <p>CHARBONNEAU ENGINEERING LLC</p> <p>PROJECT: 24-09</p>
<p>FIGURE C</p>	<p>EXISTING</p>



YEAR 2024 TRAFFIC  
LEWIS RIVER SUBDIVISION 2024

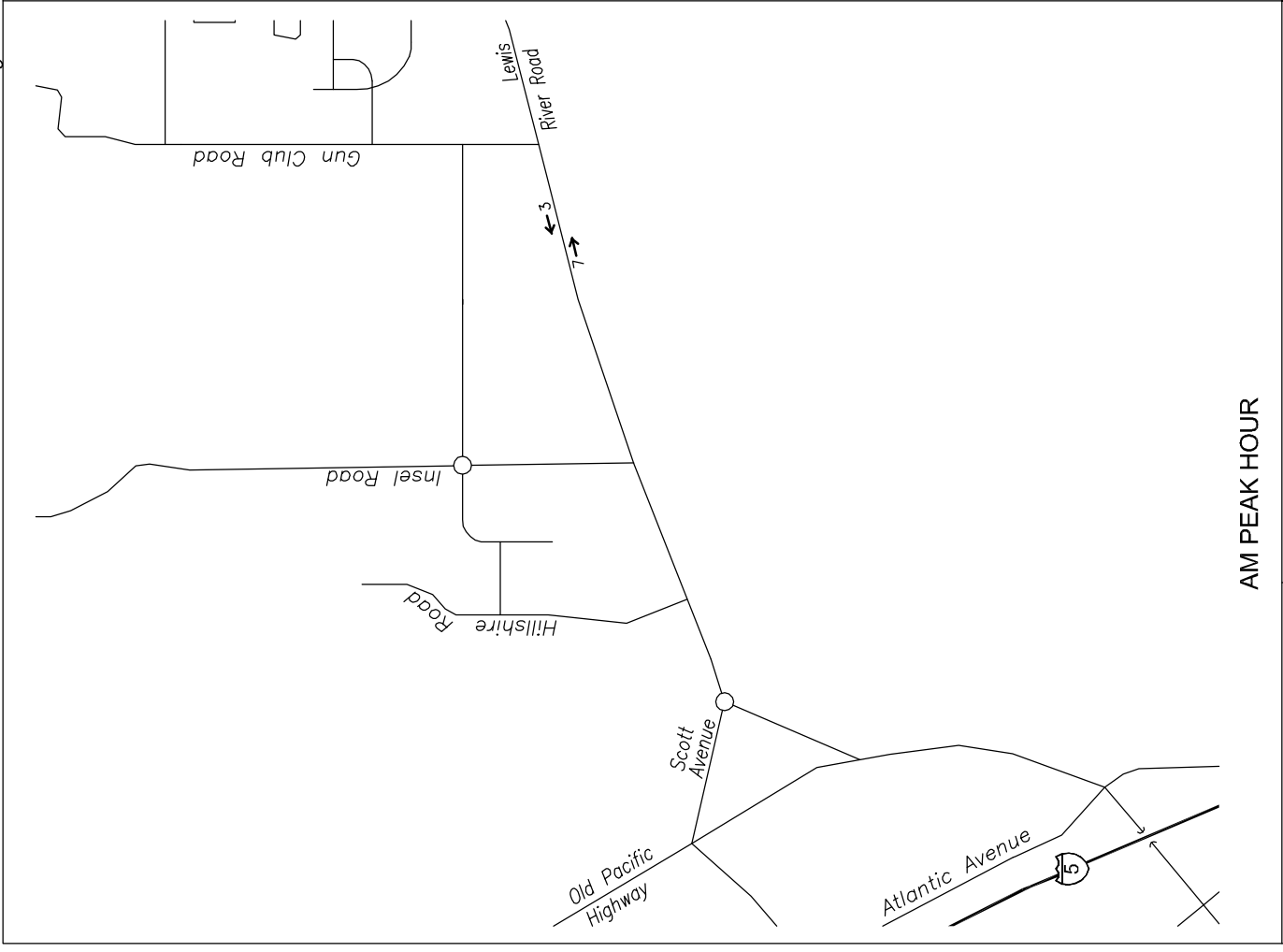
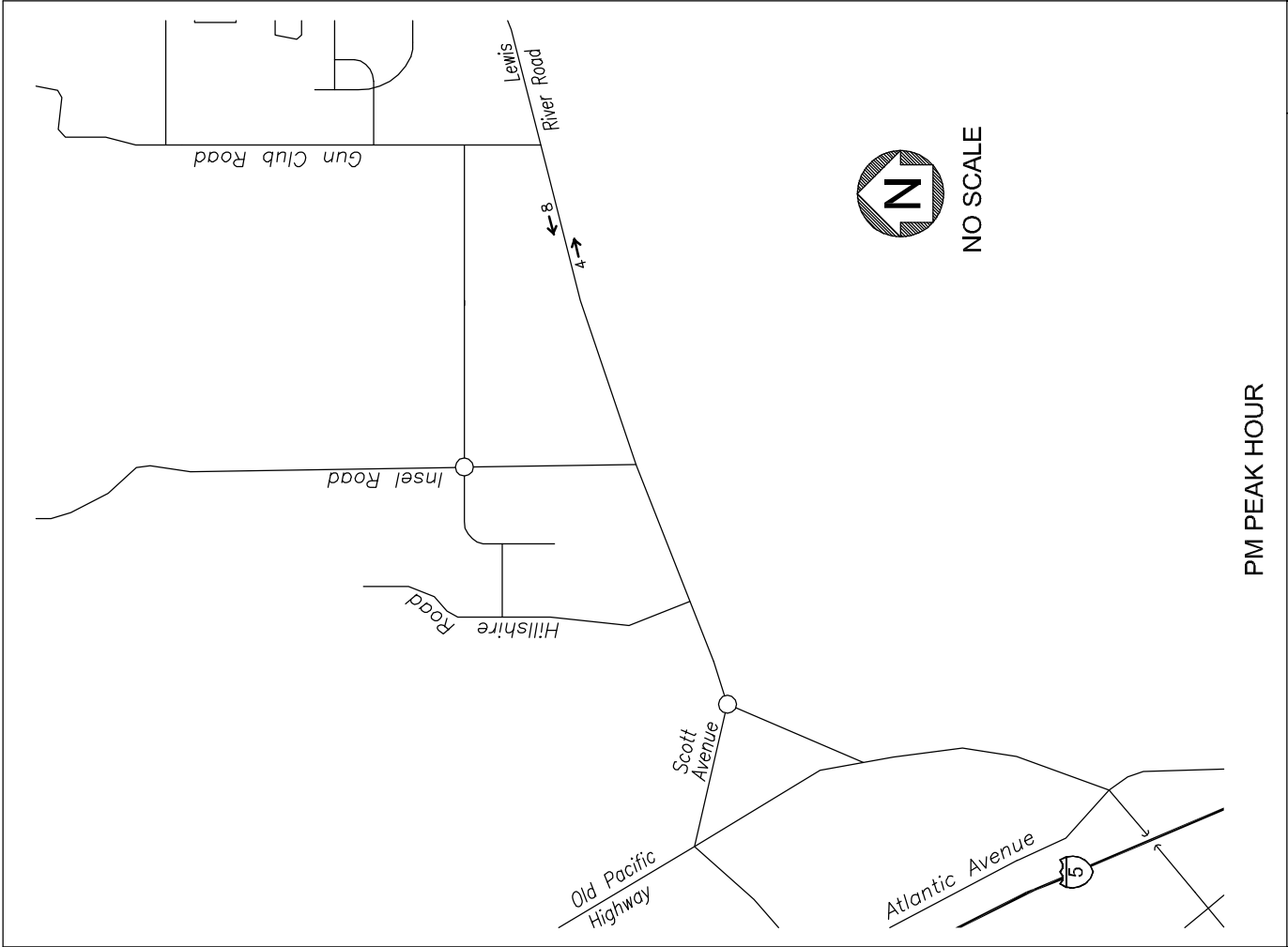
FIGURE  
1

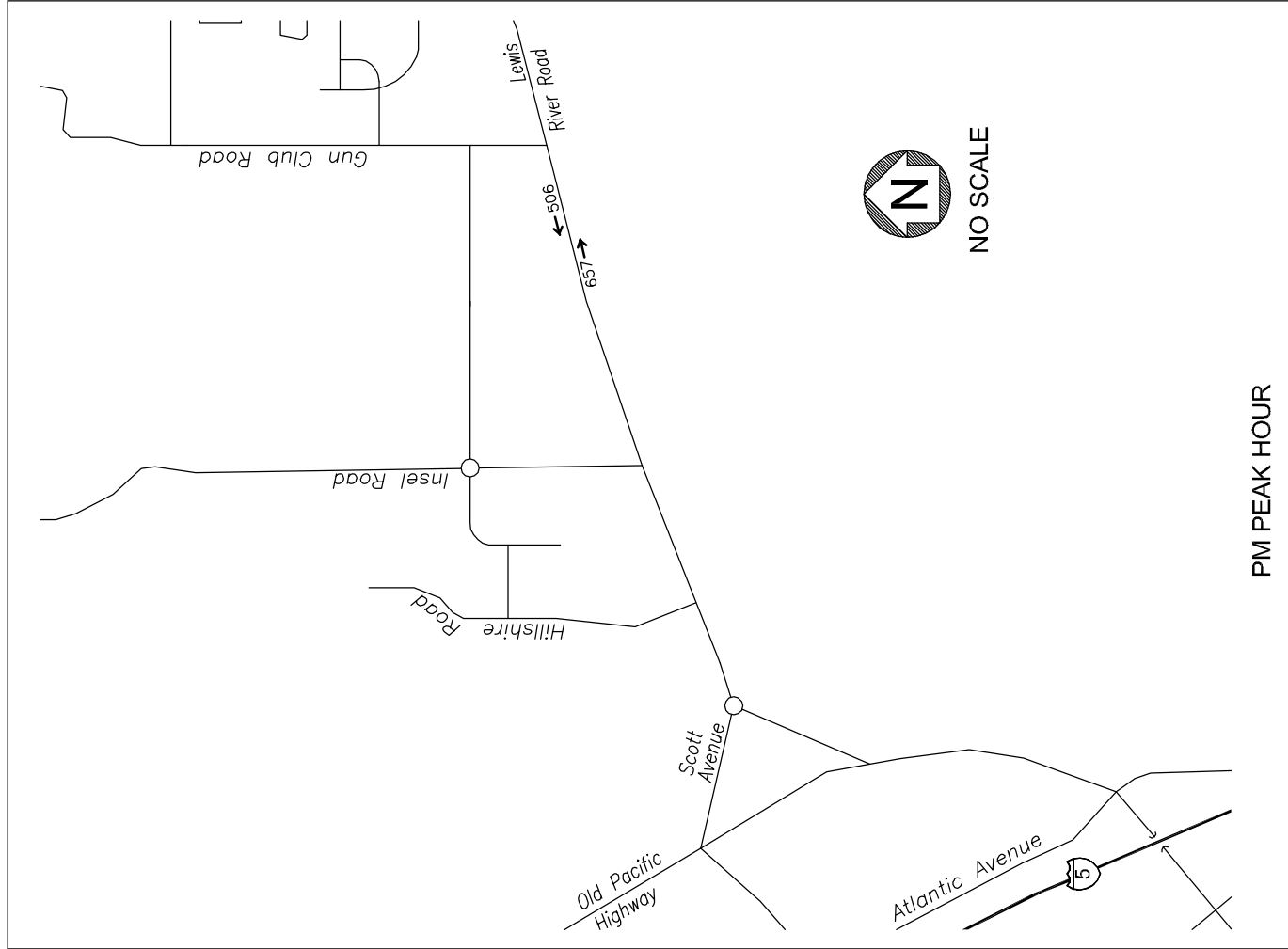
NOTES: Year 2024 Traffic = 2022 traffic counts + growth (3%/yr for 2 years).

CHARBONNEAU  
ENGINEERING LLC

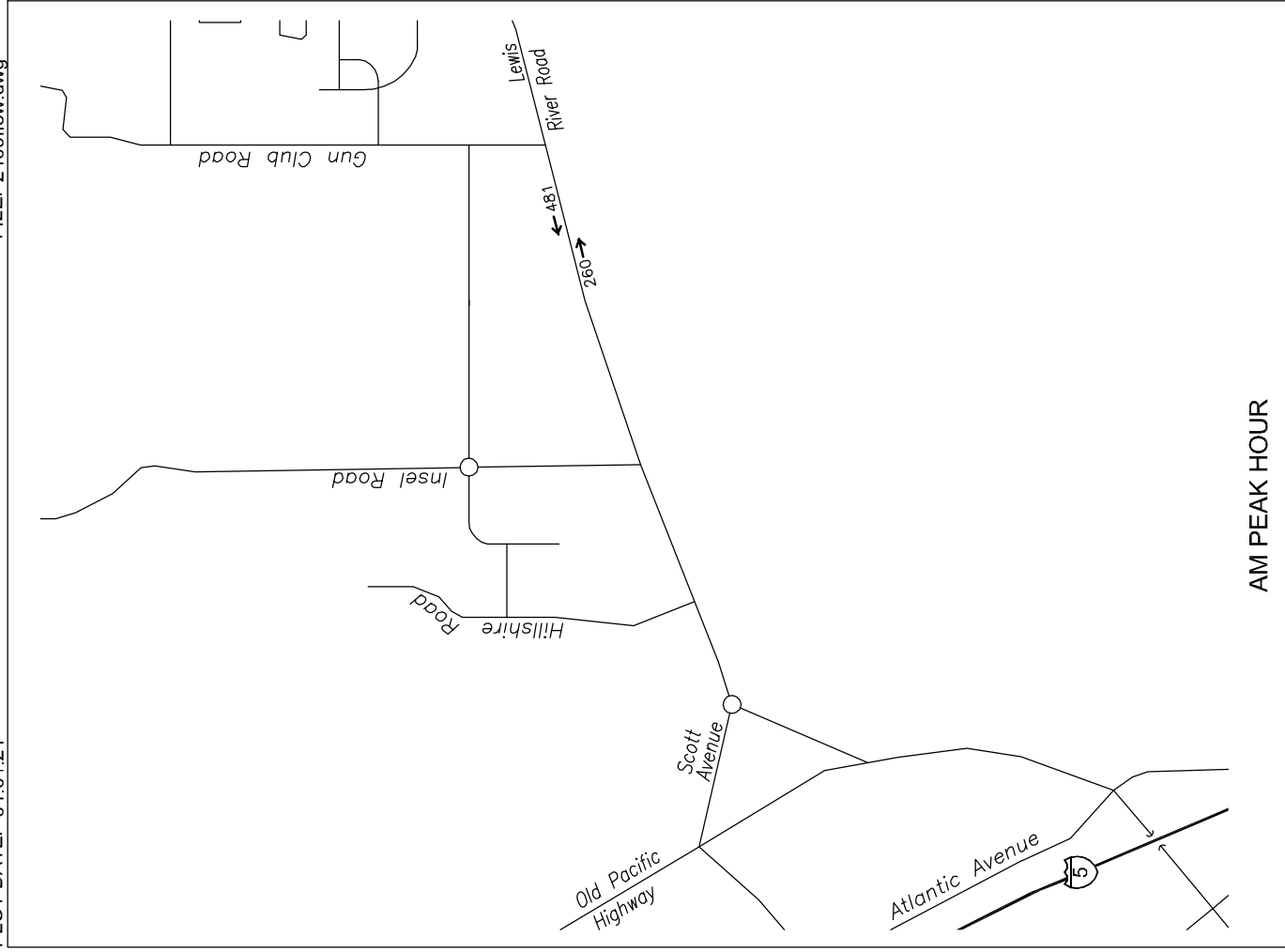
PROJECT: 24-09





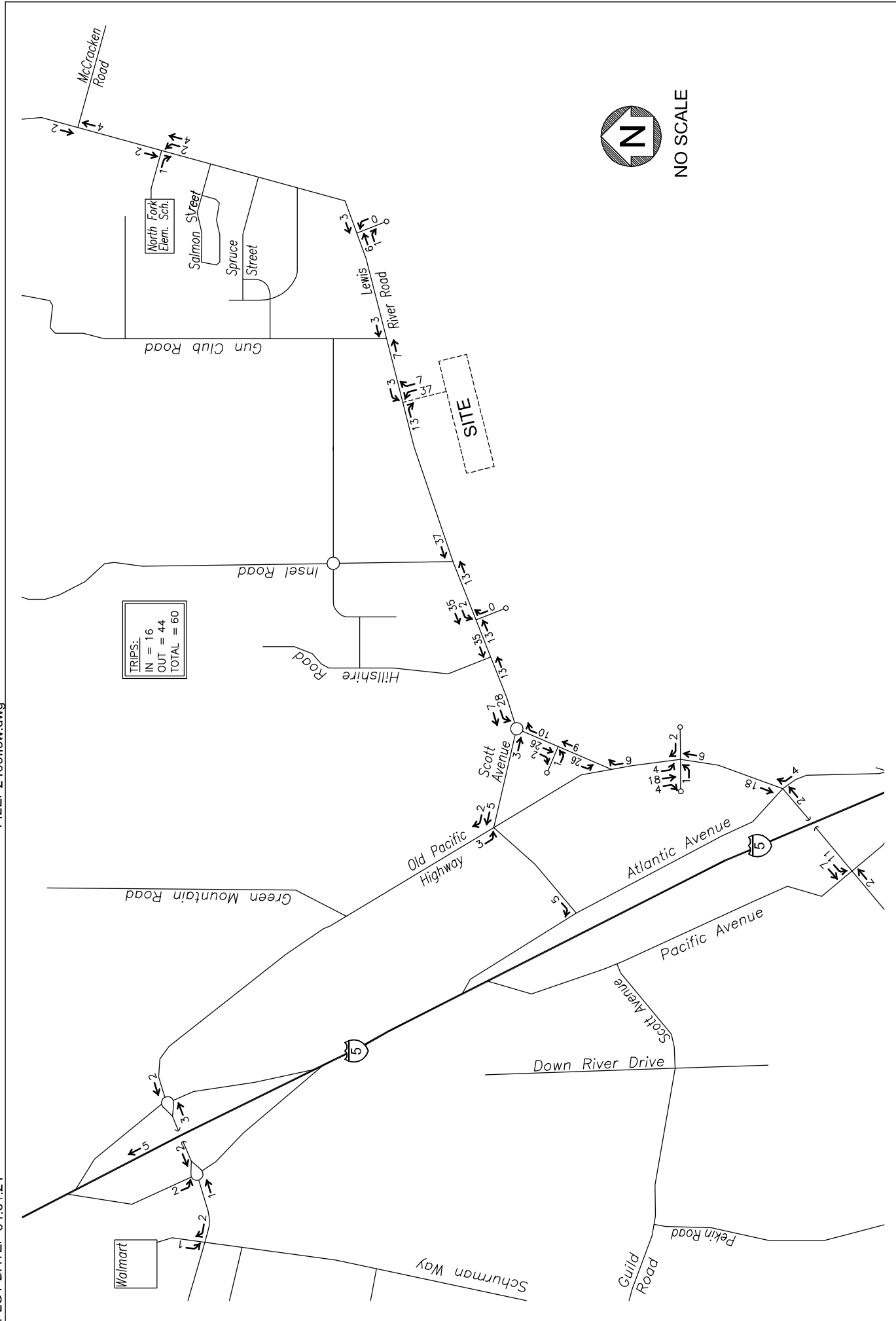


PM PEAK HOUR



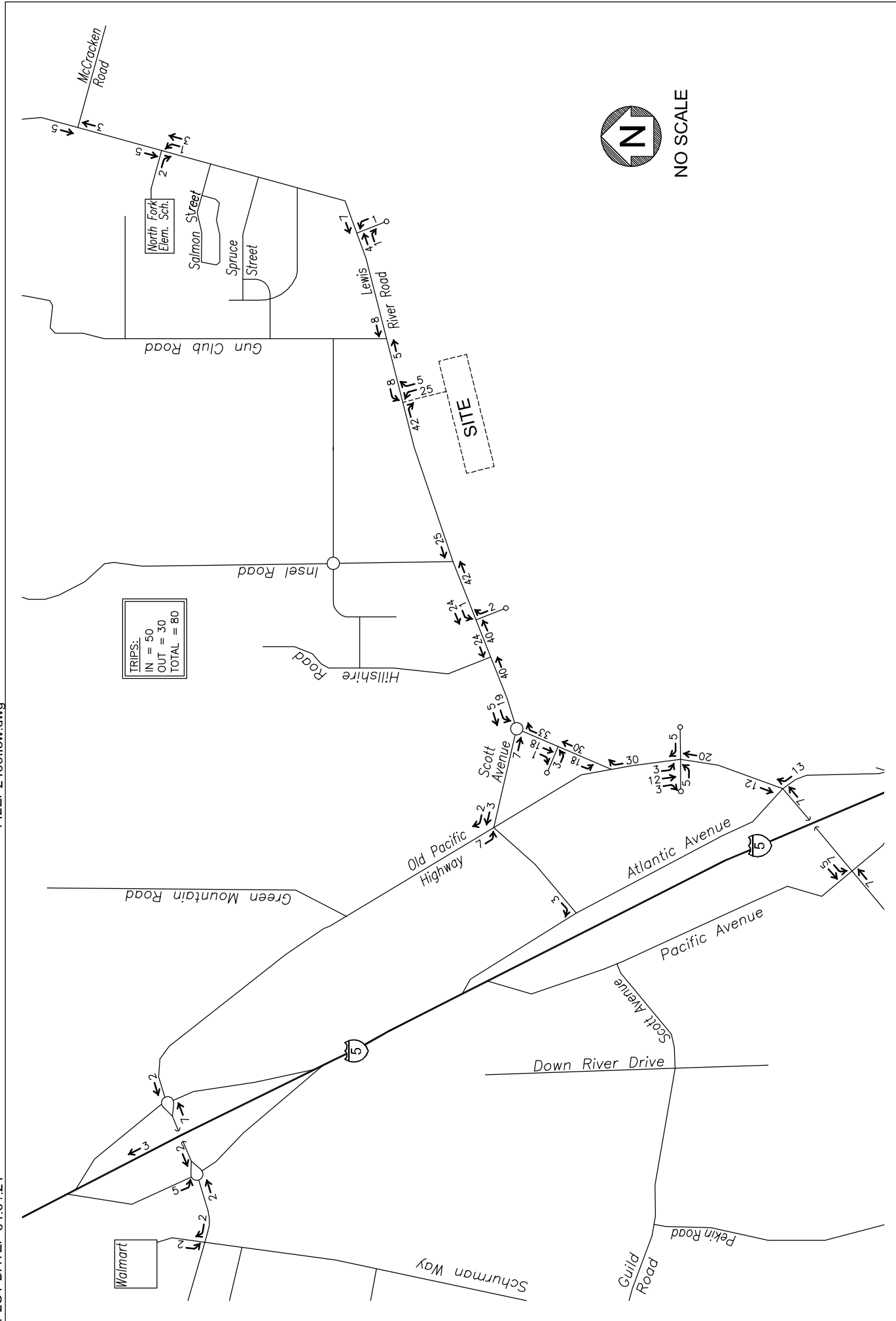
AM PEAK HOUR





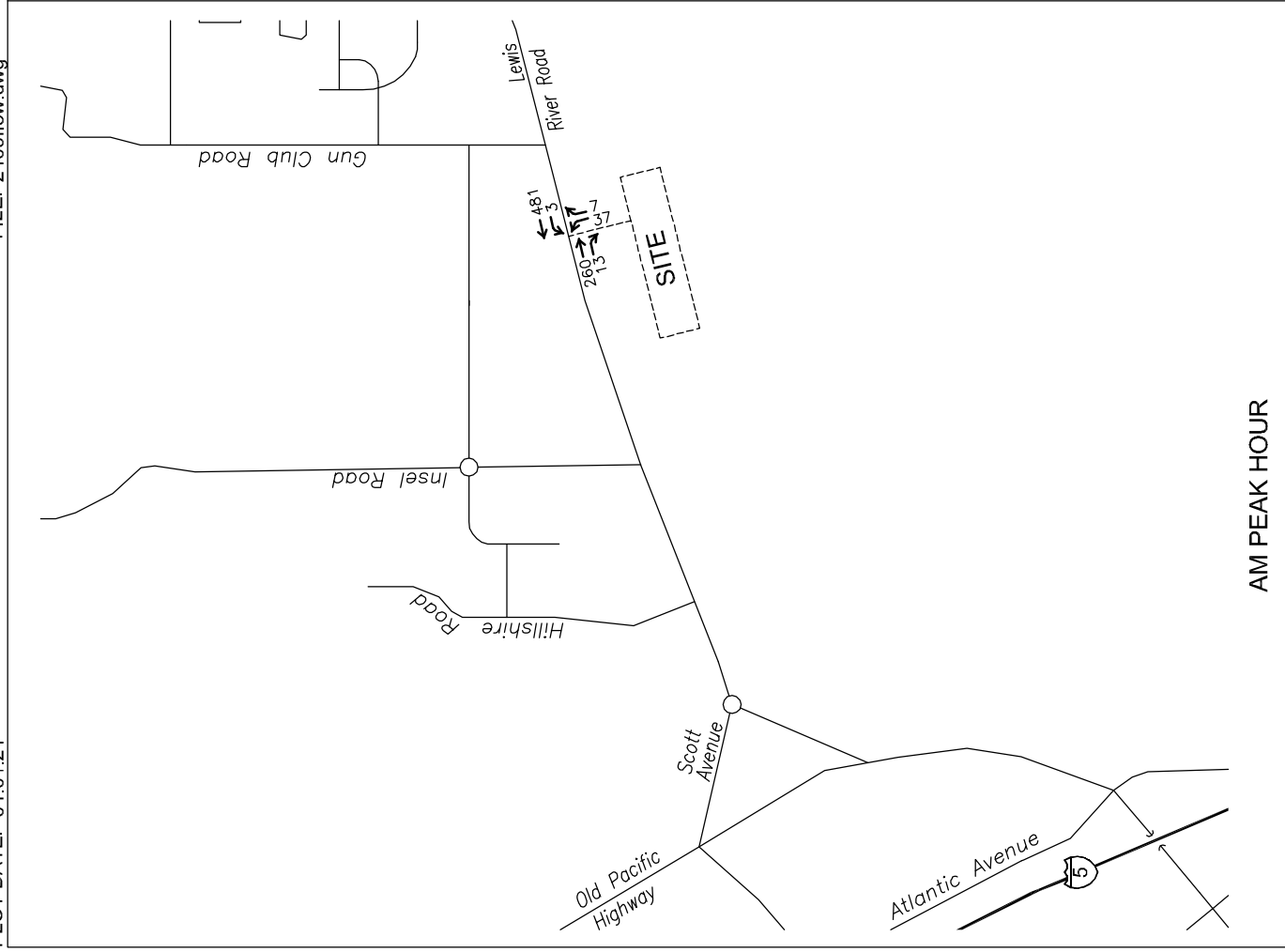
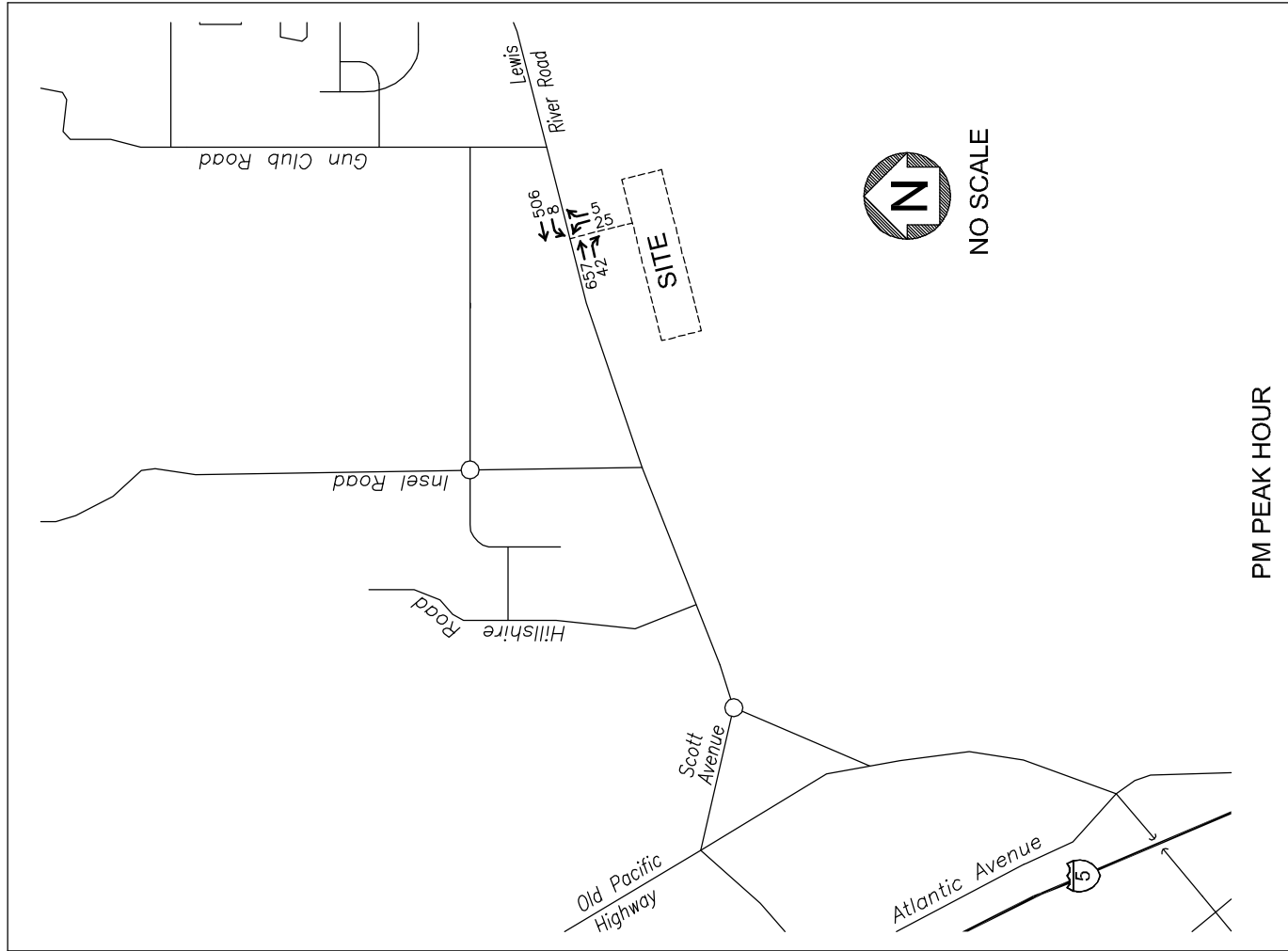
TRIP ASSIGNMENT  
AM PEAK HOUR  
LEWIS RIVER SUBDIVISION 2024

NOTES: The site's trip generation is based on Single-Family (ITE 210) trip rates.



TRIP ASSIGNMENT  
PM PEAK HOUR  
LEWIS RIVER SUBDIVISION 2024

NOTES: The site's trip generation is based on Single-Family (ITE 210) trip rates.



2027 TOTAL TRAFFIC  
LEWIS RIVER SUBDIVISION 2024

FIGURE  
6

NOTES: 2027 Total Traffic =  
2027 Background Traffic + Trip Assignment.

CHARBONNEAU  
ENGINEERING LLC

PROJECT: 24-09



### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	2	0	1	0	3	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	4	0	1	0	5	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	2	0	0	0	2	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	1	0	0	0	1	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	3	0	2	0	5	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	2	0	0	0	2	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	1	0	1	0	2	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	1	0	0	0	1	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	1	0	2	0	3	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	1	0	0	0	1	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	5	0	3	0	8	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	1	0	2	0	3	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	0	0	3	0	3	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	0	0	2	0	2	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
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8:25 AM	0	0	1	0	1	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	3	0	4	0	7	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	3	0	2	0	5	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	3	0	0	0	3	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	2	0	0	0	2	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	3	0	1	1	5	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	1	0	1	0	2	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	41	0	28	1	70	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	19	0	19	0	38	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0





### Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	1	0	0	1	2	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	1	0	1	0	2	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	2	0	0	0	2	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	1	1
4:25 PM	0	0	1	0	1	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	2	0	2	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	0	0	0	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	1	0	1	0	2	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
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4:55 PM	0	0	1	0	1	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	1	0	2	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	1	0	1	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	2	0	0	0	2	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	2	0	0	0	2	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	1	0	0	0	1	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	1	0	0	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	1	0	1	0	2	5:45 PM	0	0	0	1	1	5:45 PM	0	0	0	1	1
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	16	0	11	1	28	Count Total	0	0	0	1	1	Count Total	0	0	0	2	2
Peak Hour	8	0	9	0	17	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	1	1

## Site Trips

### Trip Generation

The proposed development will include the construction of eight, three-story apartment buildings consisting of 186 dwelling units. To estimate the number of trips that will be generated by the proposed use, trip equations from the *Trip Generation Manual*<sup>1</sup> were used. Specifically, data from land use code 221, *Multifamily Housing (Mid-Rise)*, was used to estimate site trip generation based on the number of dwelling units.

The trip generation calculations show that the proposed project is projected to generate 63 morning peak hour trips, 80 evening peak hour trips, and 1,012 average weekday trips. The trip generation estimates are summarized in Table 3. Detailed trip generation calculations are in the technical appendix to this report.

**Table 3: Trip Generation Summary**

Land Use	ITE Code	Size/Rate	Morning Peak Hour			Evening Peak Hour			Weekday Total
			Enter	Exit	Total	Enter	Exit	Total	
Multifamily Housing (Mid-Rise)	221	186 dwelling units	16	47	63	49	31	80	1,012

### Trip Distribution

The directional distribution of site trips to/from the project site was estimated based on the locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections.

The following trip distribution is projected:

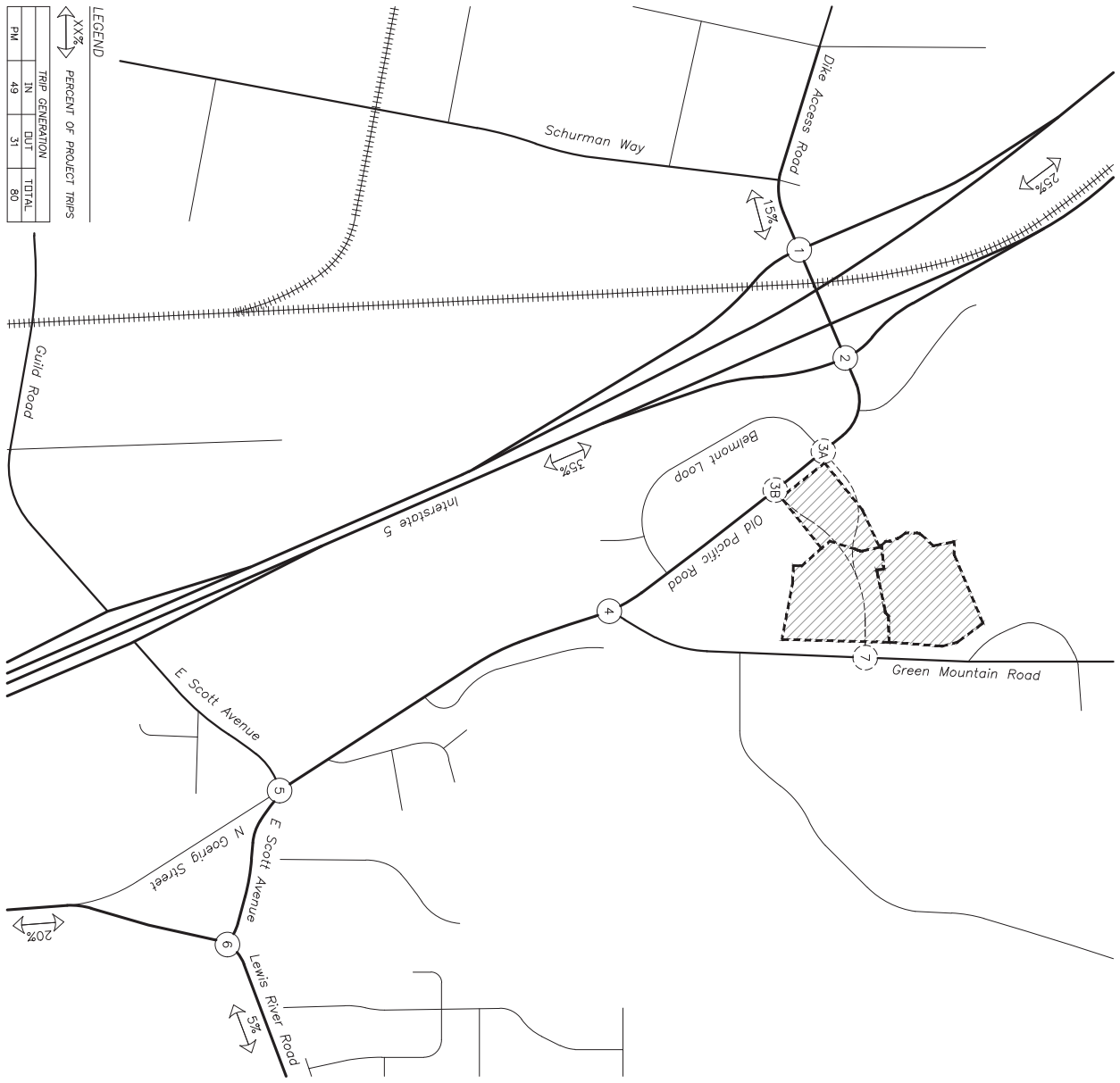
- Approximately 35 percent of site trips will travel to/from the south along I-5 (south of Dike Access Road);
- Approximately 25 percent of site trips will travel to/from the north along I-5 (north of Dike Access Road);
- Approximately 20 percent of site trips will travel to/from the south along Lewis River Road (south of N Goerig Street);
- Approximately 15 percent of site trips will travel to/from the west along Dike Access Road (west of I-5); and
- Approximately 5 percent of site trips will travel to/from the east along Lewis River Road (east/north of E Scott Avenue).

<sup>1</sup> Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10<sup>th</sup> Edition, 2017.

Based on the site plan and locations of proposed accesses, site trips are expected to utilize site accesses as follows:

- Approximately 80 percent of site trips will utilize the proposed Burris Lane access along Old Pacific Highway; and
- Approximately 20 percent of site trips will utilize the proposed Burris Lane access along Green Mountain Road.

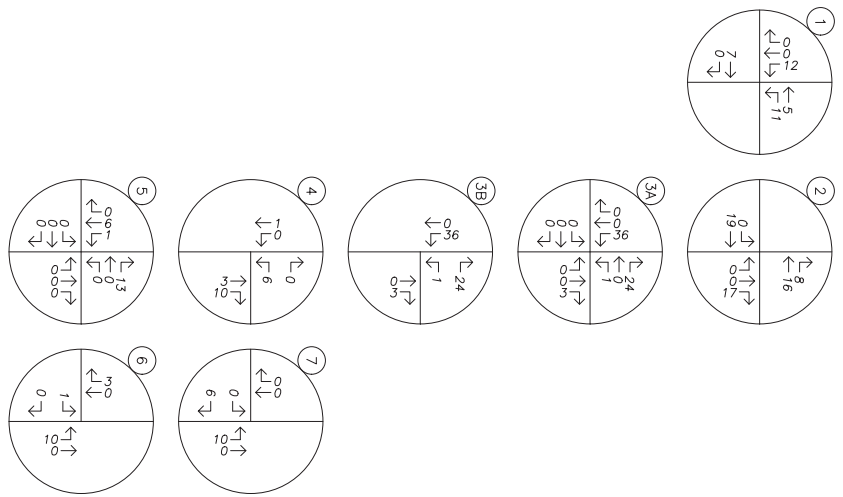
The trip distribution and assignment for the site trips generated during the evening peak hour is shown in Figure 3.



LEGEND

XX% PERCENT OF PROJECT TRIPS

TRIP GENERATION			
PM	IN	OUT	TOTAL
49	31	80	



## 4. FUTURE TRAFFIC CONDITIONS

### 4.1 Trip Generation

Trip generation is defined by the number of vehicular movements that enter or exit a site during a particular timeframe such as a specific hour or an entire day. Trip generation estimates provided herein for the proposed 408 multi-family dwelling units and 7,776 square feet of commercial space were obtained from the July 9, 2021 *Logan's Landing Trip Generation & Distribution Analysis* prepared by Lancaster Mobley (attached). The report utilized data from the Institute of Transportation Engineer's publication *Trip Generation Manual*. See table below for trip generation summary with more detailed calculations and derivations provided in the appendix.

**Table 3: Project Trip Generation—408 Apartment Dwelling Units & 7,776 sf Commercial**

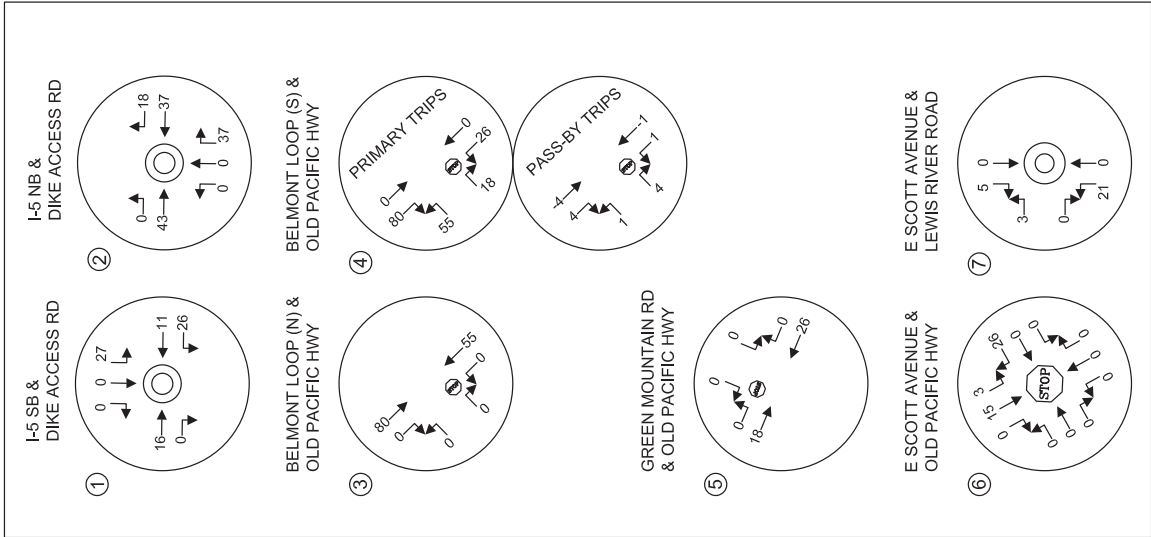
Trip Type	AWDT	AM Peak-Hour Trips			PM Peak-Hour Trips		
		In	Out	Total	In	Out	Total
Primary	2364	38	102	140	111	78	189
Pass-by	94	1	1	2	5	5	10
<b>Total</b>	<b>2270</b>	<b>37</b>	<b>101</b>	<b>138</b>	<b>106</b>	<b>73</b>	<b>179</b>

As summarized above, trips to and from the site are broken into primary and pass-by. Primary trips are considered new trips to the adjacent street network whereas pass-by trips are trips already passing the site along the subject property—a common trip type with commercial uses.

In total, 2,270 average weekday daily trips are expected with 138 AM and 179 PM peak hour trips as a result of the proposed development.

### 4.2 Distribution & Assignment

Trip distribution describes the anticipated travel routes for inbound and outbound project traffic during the peak hour study periods. Trips generated by the project are expected to follow the general pattern as shown in Figure 4. Percentages are based on previous projects/submittals in the past. All traffic was assigned via the single access to Franklin Street via Belmont Loop and subsequently Old Pacific Highway. Subsequently, an approximate 75/25 north/south split is anticipated.



**LOGAN'S LANDING**  
 PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT  
 FIGURE 4

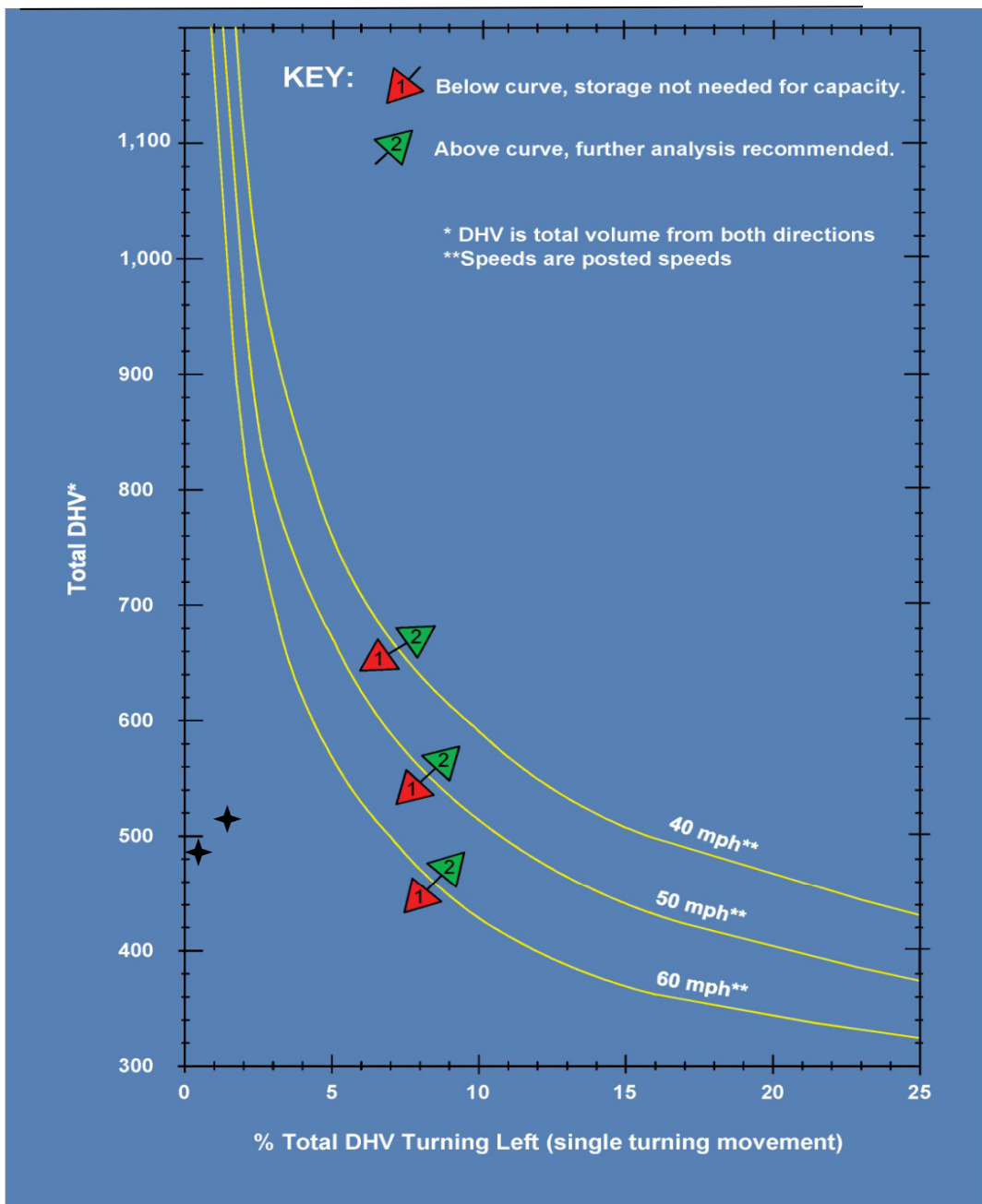


Exhibit 1310-7. Left-turn Storage Guidelines--: Two-Lane, Unsignalized.

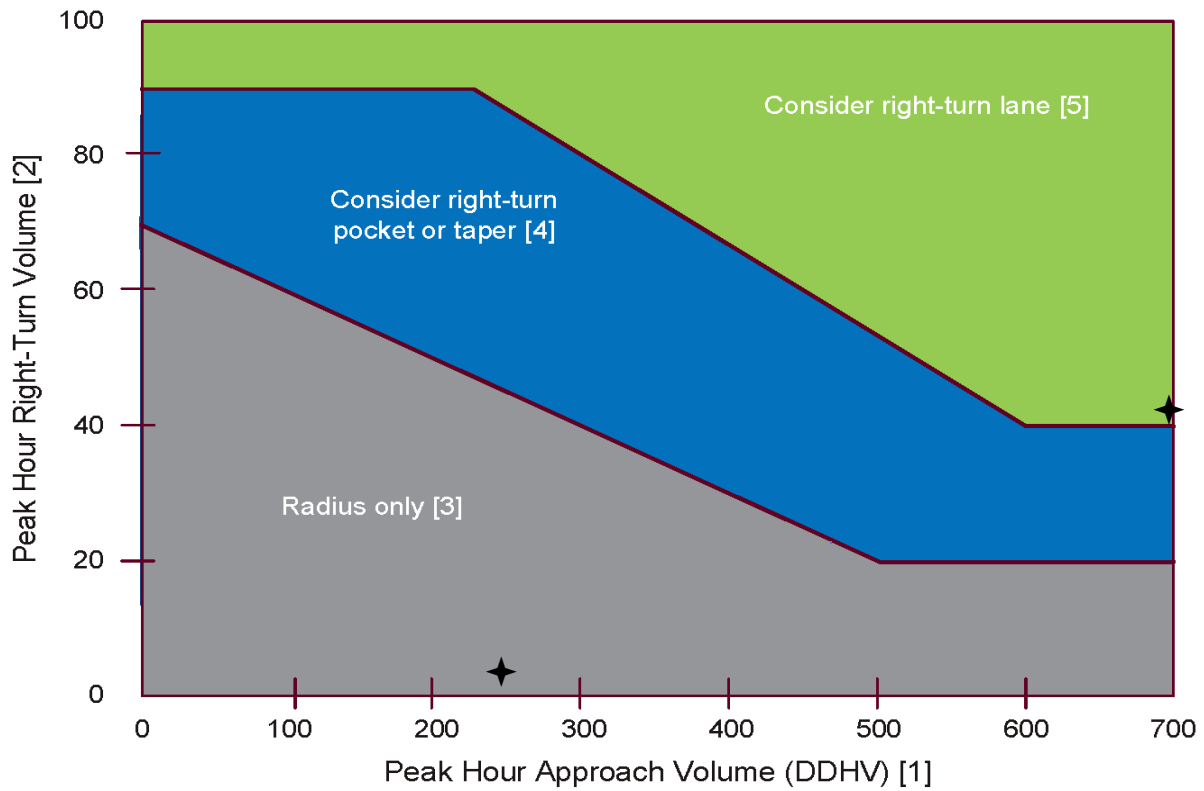
**Storage requirements for critical left-turn movements at unsignalized intersections on 2-lane highways.**

Intersection	Mov't	Analysis Period	Speed V (mph)	Left Turns in Advancing Volume (vph)	Total DHV	% Left Turns in Advancing Volume L	Storage Req'd (ft)
Lewis River Road (SR 503) & Site Access (Brady Road)	WB LT	2027 Total Traffic-AM Peak	35	3	484	0.6%	None
		2027 Total Traffic-PM Peak		8	514	1.6%	None

Source: WSDOT Design Guide, September 2021.



Exhibit 1310-19. Right-turn Lane Guidelines:- Two-Lane, Unsignalized.



Notes:

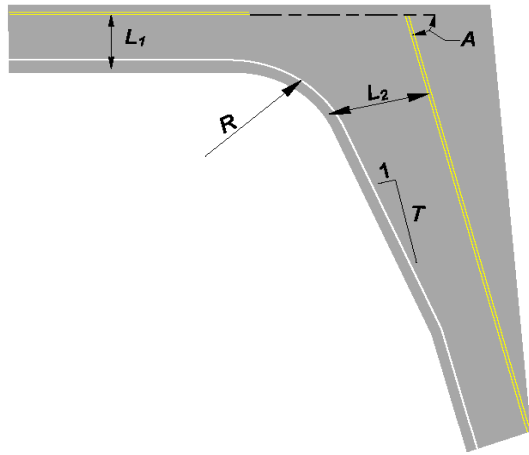
- [1] For two-lane highways, use the peak hour DDHV (through + right-turn).  
For multilane, highways (posted speed 45 mph or above), use the right-lane peak hour approach volume (through + right-turn).
- [2] When all three of the following conditions are met, reduce the right-turn DDHV by 20:
  - The posted speed is 45 mph or below
  - The right-turn volume is greater than 40 VPH
  - The peak hour approach volume (DDHV) is less than 300 VPH
- [3] For right-turn corner design, see Exhibit 1310-6.
- [4] For right-turn pocket or taper design, see Exhibit 1310-20.
- [5] For right-turn lane design, see Exhibit 1310-21.

**Treatment for critical right-turn movements at unsignalized intersections on 2-lane highways.**

Intersection	Mov't	Analysis Period	Speed V (mph)	Peak Hour Approach Volume (DDHV)	Peak Hour Right Turn Volume	Treatment Recommended
Lewis River Road (SR 503) & Site Access (Brady Road)	EB	2027 Total Traffic - AM Peak	35	273	13	Radius only
	RT	2027 Total Traffic - PM Peak		699	42	Consider Right-turn lane

Source: WSDOT Design Manual, September 2021.

**Exhibit 1310-6 Initial Ranges for Right-Turn Corner (Simple Curve-Taper)**



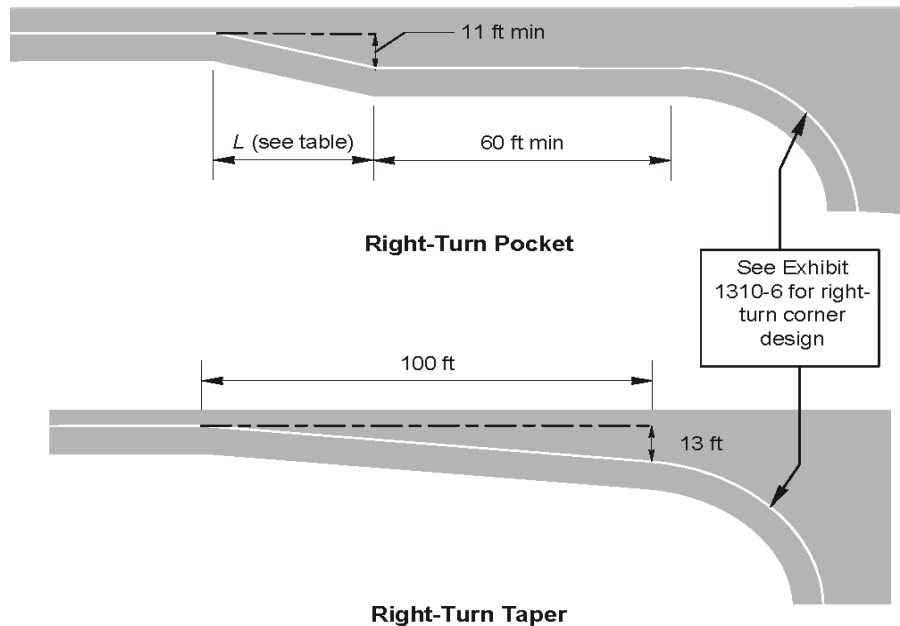
- $L_1$  = Available roadway width [2] that the vehicle is turning from
- $L_2$  = Available roadway width [2] for the vehicle leaving the intersection
- $R$  = Radius to the edge of traveled way
- $T$  = Taper rate (length per unit of width of widening)
- $A$  = Delta angle of the turning vehicle

Vehicle	A	R	$L_1$ [1]	$L_2$ [2]	T
P	All	30	11	11	25
SU-30 & CITY-BUS	All	50	11	11	25
WB-40	All	55	11	15	7.5
WB-67	All	50-85	11	22-24	7

**Notes:**

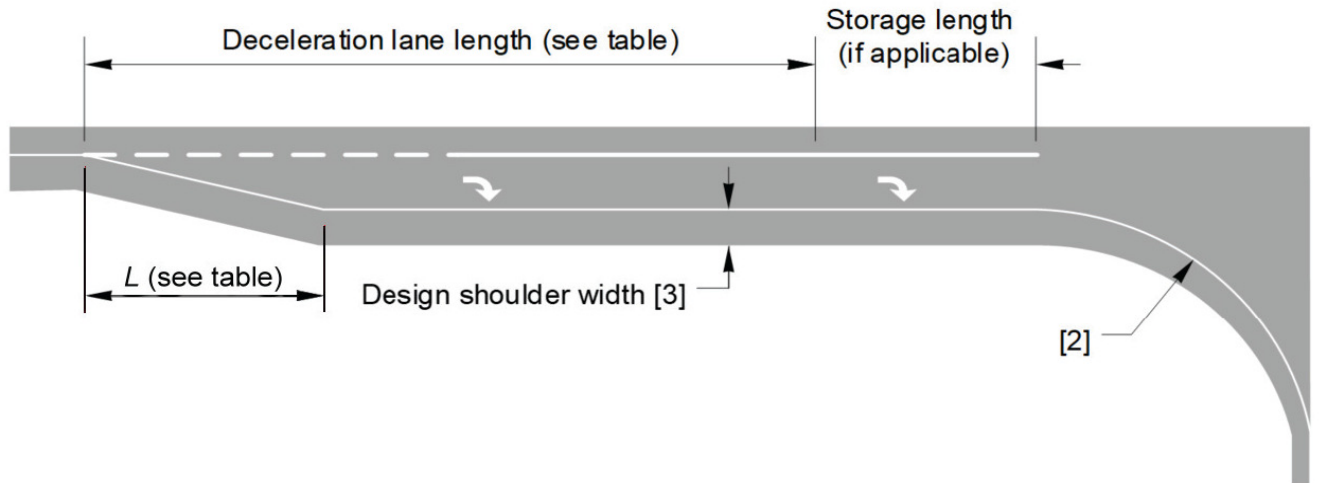
- [1] When available roadway width is less than 11 ft, widen at 25:1.
- [2] Available roadway width includes the shoulder, less a 2-ft clearance to a curb, and all the same-direction lanes of the exit leg at signalized intersections.

**Exhibit 1310-20 Right-Turn Pocket and Right-Turn Taper**



Posted Speed Limit	L
Below 40 mph	40 ft
40 mph or above	100 ft

**Exhibit 1310-21 Right-Turn Lane**



Posted Speed Limit	L
Below 40 mph	40 ft
40 mph or above	100 ft

Highway Design Speed (mph)	Deceleration Lane Length (ft)
30	160 [1]
35	220
40	275
45	350
50	425
55	515
60	605
65	715
70	820

Grade	Upgrade	Downgrade
3% to less than 5%	0.9	1.2
5% or more	0.8	1.35
Adjustment Multiplier for Grades 3% or Greater		

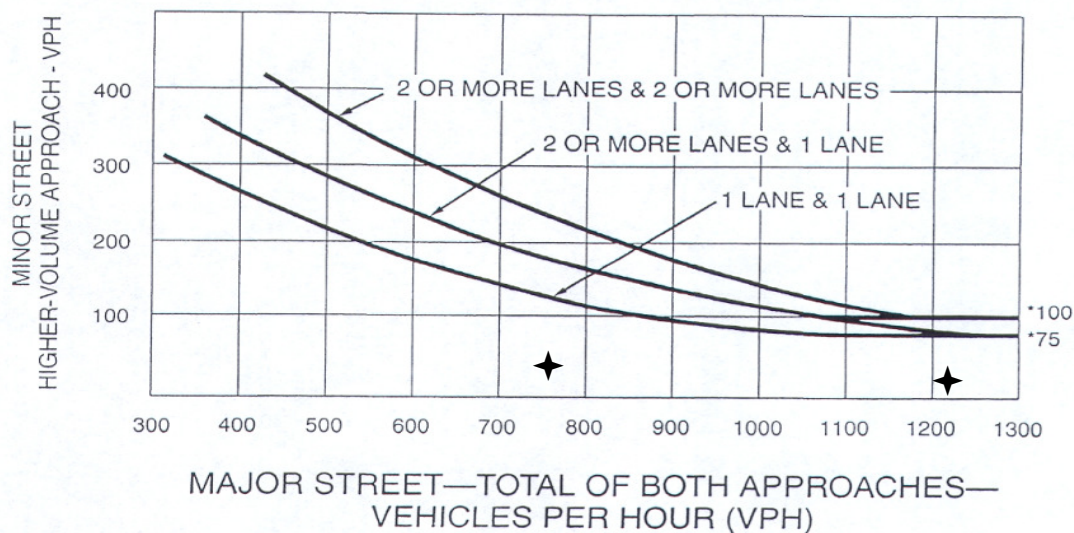
**Minimum Deceleration Lane Length (ft)**

Notes:

- [1] When adjusting for grade, do not reduce the deceleration lane to less than 150 ft.
- [2] For right-turn corner design, see Exhibit 1310-6.
- [3] See Section 1310.03(6) and Chapter 1230.

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Table for Figure 4C-4**

One lane and one lane		Two or more lanes and one lane		Two or more lanes and two or more lanes	
VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)	VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)	VPH on the major street (Total of both approaches)	VPH on the minor street (Higher volume approach)
1300	75	1300	75 or 100*	1300	100
1200	75	1200	80 or 100*	1200	100
1100	75	1100	100	1100	120
1000	80	1000	120	1000	150
900	100	900	140	900	175
800	120	800	160	800	225
700	145	700	200	700	260
600	170	600	245	600	315
500	220	500	280	500	370
400	260	400	340	400	Not available

\* Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Peak hour volume warrant for signalization data.**

Intersection	Analysis Period	Major Street Speed (mph)	Major Street		Minor Street High Volume Approach		Signal Warranted?
			Volume (vph)	Lanes (#)	Volume (vph)	Lanes (#)	
Site Access (Brady Road) & Lewis River Rd (SR 503)	2027 Total Traffic - AM Peak	35	757	2	44	1	No
	2027 Total Traffic - PM Peak		1,213		30		No

Source: *Manual on Uniform Traffic Control Devices (MUTCD)*, 2009 Edition.

Lanes, Volumes, Timings  
 1: Site Access (Brady Rd) & Lewis River Road(SR 503)

2027 Total Traffic, AM Peak Hour  
 04/01/2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	260	13	3	481	37	7
Future Volume (vph)	260	13	3	481	37	7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	8%	8%	5%	5%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 37.7% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	260	13	3	481	37	7
Future Vol, veh/h	260	13	3	481	37	7
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	90	90	90	90	90	90
Heavy Vehicles, %	8	8	5	5	2	2
Mvmt Flow	289	14	3	534	41	8

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	303	0	836 296
Stage 1	-	-	-	-	296 -
Stage 2	-	-	-	-	540 -
Critical Hdwy	-	-	4.15	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.245	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1241	-	337 743
Stage 1	-	-	-	-	755 -
Stage 2	-	-	-	-	584 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1241	-	336 743
Mov Cap-2 Maneuver	-	-	-	-	336 -
Stage 1	-	-	-	-	755 -
Stage 2	-	-	-	-	582 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	16.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	368	-	-	1241	-
HCM Lane V/C Ratio	0.133	-	-	0.003	-
HCM Control Delay (s)	16.3	-	-	7.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Lanes, Volumes, Timings  
 1: Site Access (Brady Rd) & Lewis River Road(SR 503)

2027 Total Traffic, PM Peak Hour

04/01/2024



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	657	42	8	506	25	5
Future Volume (vph)	657	42	8	506	25	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 47.1% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	657	42	8	506	25	5
Future Vol, veh/h	657	42	8	506	25	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	90	90	90	90	90	90
Heavy Vehicles, %	1	1	2	2	2	2
Mvmt Flow	730	47	9	562	28	6

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	777	0	1334 754
Stage 1	-	-	-	-	754 -
Stage 2	-	-	-	-	580 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	839	-	170 409
Stage 1	-	-	-	-	465 -
Stage 2	-	-	-	-	560 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	839	-	167 409
Mov Cap-2 Maneuver	-	-	-	-	167 -
Stage 1	-	-	-	-	465 -
Stage 2	-	-	-	-	551 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	28.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	185	-	-	839	-
HCM Lane V/C Ratio	0.18	-	-	0.011	-
HCM Control Delay (s)	28.7	-	-	9.3	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-