OAKVIEW – ROY MEADOWS
TRAFFIC IMPACT ANALYSIS

City of Roy, WA

07/15/2022

Prepared for: Roy Meadows Development Group LLC
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July 2022

OAKVIEW – ROY MEADOWS
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

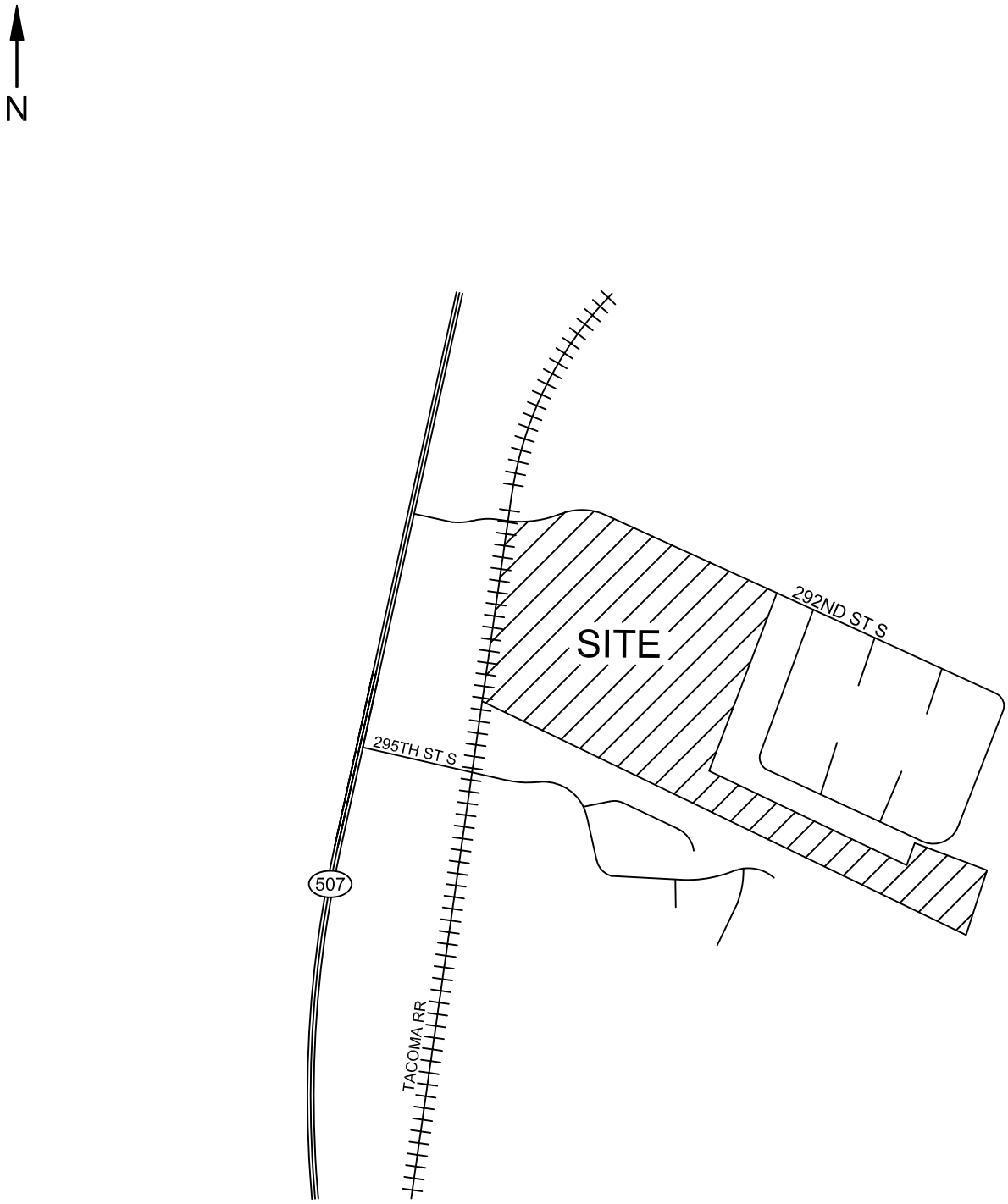
OAKVIEW – ROY MEADOWS
TRAFFIC IMPACT ANALYSIS

1. INTRODUCTION

The main goals of this study focus on the assessment of existing roadway conditions and forecasts of newly generated project traffic. The first task includes the review of general roadway information on the roadways serving the site, baseline vehicular volumes, and entering sight distance data. Forecasts of future traffic and dispersion patterns on the street system are then determined using established trip generation and distribution techniques. As a final step, appropriate conclusions and mitigation measures are defined if needed.

2. PROJECT DESCRIPTION

Oakview – Roy Meadows is a proposed residential project comprising 79 single-family dwelling units located in the city of Roy. The subject property is bordered to the north by 292nd Street S, just east of SR-507 S on 38.36-acre tax parcel #: 0217036009. The project site is largely undeveloped. One 3,000 square-foot structure exists on-site, which is to be demolished prior to new construction. Access to the site is proposed via two new roadways extending south from 292nd Street S. A 5-year horizon of 2027 was analyzed to assess future project impacts concerning the adjacent street network. Figure 1 on the following page shows the general site location and roadway network serving the vicinity. A site plan illustrating the overall configuration of the project is presented in Figure 2. A site aerial is provided below.



HEATH & ASSOCIATES

TRAFFIC AND CIVIL ENGINEERING

OAKVIEW PLAT

VICINITY MAP & ROADWAY SYSTEM
FIGURE 1

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OAKVIEW PLAT

SITE PLAN
FIGURE 2

3. EXISTING CONDITIONS

3.1 Existing Roadway Characteristics

Adjacent streets to the site are listed and described below:

SR-507 S: is a two-lane, north-south state route that is located to the west of the subject site. Travel lanes are approximately 11 feet in width, with additional turn-lanes provided at major intersections. Adjacent the subject site, shoulders along the western side of the roadway are composed of pavement approximately 4-6 feet in width. Along the eastern side of the roadway, shoulders are composed of paved segments followed by a vegetative buffer and sidewalk. Adjacent the subject site the posted speed limit is 40 mph. To the south, the speed limit transitions to 50 mph and to the north the speed limit is reduced to 30 mph as vehicles approach Roy's city center.

292nd Street S: is a two-lane, east-west private roadway bordering the subject site to the north. Total roadway width is approximately 26-feet. The roadway intersects with Chehalis Western Railroad along the northwest edge of the subject site. Shoulders are composed of grass/gravel. The posted speed limit is 20 mph.

3.2 Roadway Improvements

A review of the most recently available 2019-2024 City of Roy Transportation Improvement Program as well as the WSDOT 2022-2025 Statewide Transportation Improvement Program indicates that an improvement project is scheduled in the subject site's vicinity. Descriptions of the nearest project are provided below:

2019-2024 City of Roy Transportation Improvement Program

288th Street Reconstruction (Project #2): This project intends to resurface, restore, rehabilitate and construct asphalt concrete overlay, sidewalks, and storm drain improvements 288th Street from SR-507 S to the eastern City limit. The project total is estimated at $300,000.

3.3 Tacoma Railroad

Tacoma Railroad tracks border the subject site to the west. The client and Tacoma Railroad have been in discussion, with agreements that the client shall construct railroad crossing improvements adjacent the site in accordance with MUTCD standards. An example of warning sign placement and pavement markings at grade crossings in accordance with MUTCD standards is provided in the appendix. Final design shall be reviewed and approved by both Tacoma Railroad and City of Roy.

3.4 Public Transit Service

A review of the Pierce Transit regional bus schedule indicates transit service is not provided in the immediate vicinity of the site. Refer to the Pierce County Transit schedule for further details.

3.5 Accident History

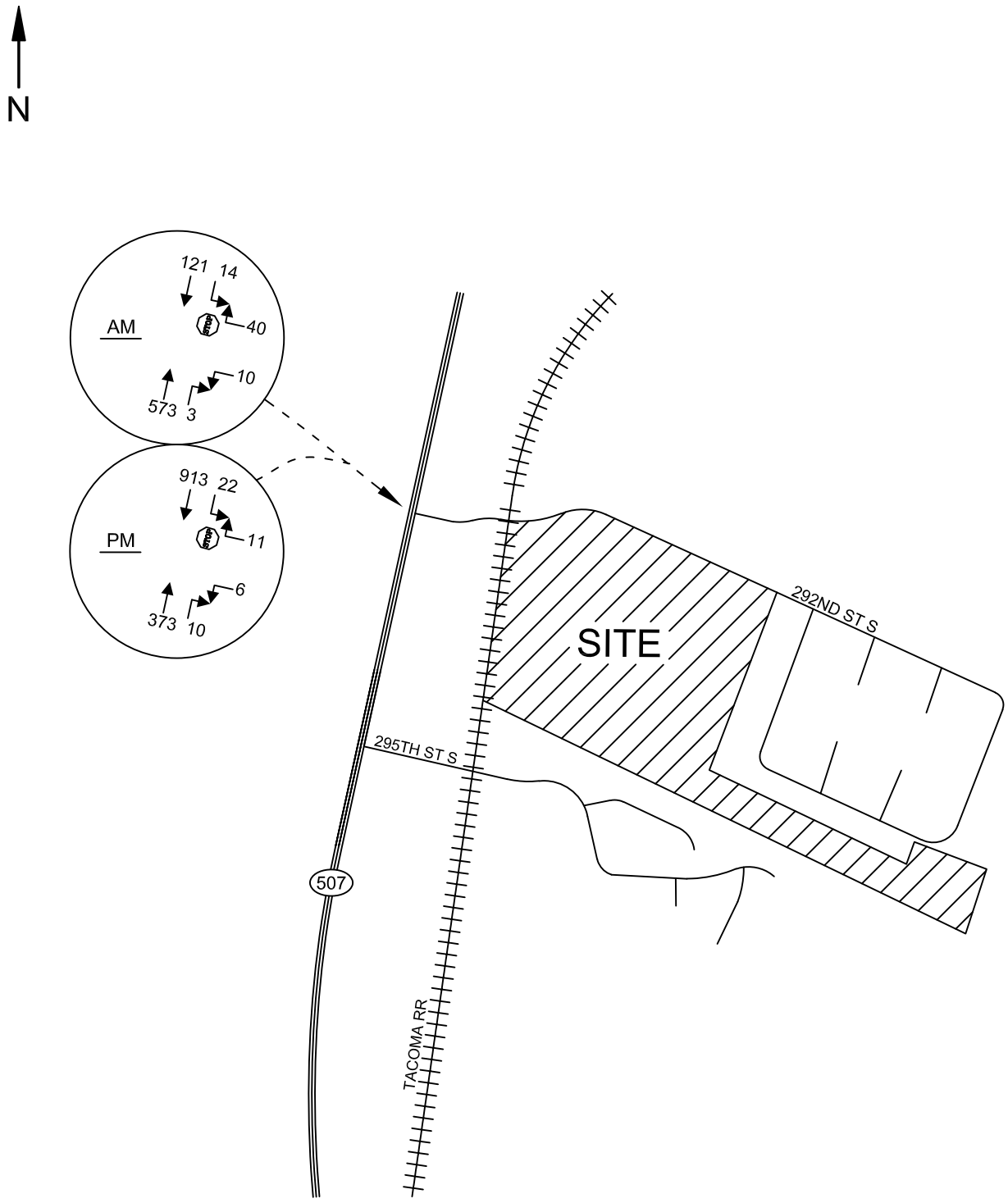
A list of the recorded accident history from the beginning of 2017 through April of 2020 for the study intersection of SR-507 & 292nd Street S was requested from WSDOT. According to their records, no collisions were reported at the study intersection over the past three years.

3.6 Baseline Peak Hour Volumes

Traffic counts were performed by our firm in October of 2018 at the study intersection of SR-507 S & 292nd Street S, which is anticipated to receive the bulk of vehicular impacts. Field data was collected between 4:00 PM to 6:00 PM. The busiest one-hour is then derived from each intersection count, known as the peak hour, to depict worst-case conditions. To substantiate our PM peak hour data, our counts were compared with traffic volumes provided by WSDOT. WSDOT performed counts at the intersection of SR-507 S & Water Street W (~0.88 miles north of the subject site) in March of 2018 between 6:00 AM to 10:00 AM and between 2:00 PM to 6:00 PM.

As our records indicated mildly larger PM peak hour volumes when compared with WSDOT data, Heath Traffic volumes were utilized to remain conservative in analysis. Because our firm did not gather AM data, through-volumes at the study intersection were extrapolated from the SR-507 S & Water Street W AM peak hour volumes provided by WSDOT. Turn movement volumes at the study intersection of SR-507 S & 292nd Street S were derived via ITE data. According to Pierce County parcel details, approximately 84 single-family homes are served via 292nd Street S. This would yield 16 inbound / 48 outbound AM peak hour trips entering/exiting 292nd Street S by way of SR-507 S. Figure A, provided in the appendix, illustrates 2018 volumes gathered by our firm and WSDOT. Also included are full-count data sheets.

Baseline 2022 AM and PM peak hour volumes were derived by applying a 1.0 percent compound annual growth rate to the 2018 counts. This background growth rate was derived from the City of Roy's Comprehensive Plan, which forecasts an annual population growth of approximately 1% from 2008 to 2035 as well as WSDOT volumes along SR-507 S showing stable conditions since 2014. Figure 3 on the following page illustrates baseline 2022 peak hour volumes for the intersection of study: SR-507 S & 292nd Street S.



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OAKVIEW PLAT

BASELINE 2022 PEAK HOUR VOLUMES
FIGURE 3

3.7 Sight Distance at Access Locations

Access to the site is proposed via two roadways extending south from 292nd Street S (see site plan, Figure 2). Preliminary examinations of the approximate access locations were made to determine whether adequate entering site distance is provided for project traffic. All proposed project accesses shall be designed consistent with City and AASHTO guidelines[1]. The proposed westerly access has been located so as to provide sufficient sight lines due to grading and a horizontal curve when looking to the east. Verification of sight lines at the proposed access locations may be required upon final site design.

4. FUTURE TRAFFIC CONDITIONS

4.1 Trip Generation

Trip generation is used to determine the magnitude of project impacts on the surrounding street system. This is denoted by the quantity or specific number of new trips that enter or exit a project during a designated time period, such as a specific peak hour or an entire day. Data presented in this report was taken from the Institute of Transportation Engineer's publication *Trip Generation* , 11th Edition. The designated land use for this project is defined as Single-Family Detached Housing (LUC 210). Data for the AM and PM peak hours was used for estimation purposes and was applied to the intersection network for future capacity analysis. Included in Table 1 below are the average weekday daily (AWDT) volumes and the AM and PM peak hours. ITE equations were utilized to calculate trip ends with dwelling units as the input variable. Refer to the appendix for trip generation output.

Table 1: Project Trip Generation

Land Use	Dwelling Units	AWDT	AM Peak-Hour Trips			PM Peak-Hour Trips		
			In	Out	Total	In	Out	Total
Single-Family	79	812	16	44	**60**	50	30	**80**

Based on ITE data, the project is anticipated to generate approximately 812 average weekday daily trips with up to 60 (16 inbound / 44 outbound) AM peak hour trips and 80 (50 inbound / 30 outbound) PM peak hour trips.

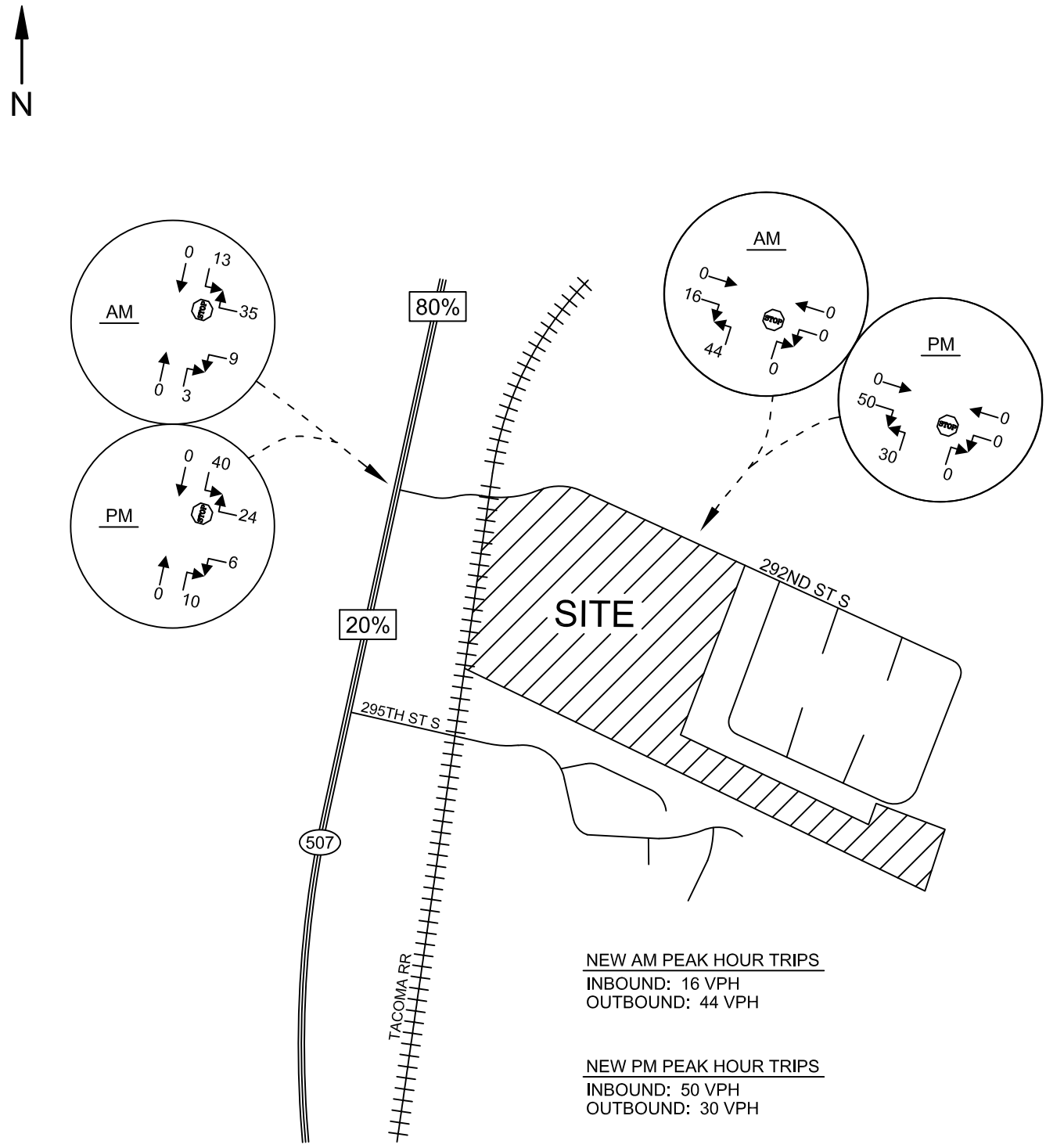
[1] AASHTO. “A Policy on Geometric Design of Highway and Streets” 7th Edition. (2018).

4.2 Trip Distribution and Assignment

Trip distribution describes the process by which project generated trips are dispersed on the street network surrounding the site. The specific destinations and origins of the generated traffic primarily influence the key intersections, which will effectively receive the bulk of project impacts. AM and PM peak hour trips generated by the project are expected to follow the general trip pattern as shown in Figure 4. Percentages are primarily based on baseline travel patterns identified from the field count and location of major nearby arterials. All project-generated traffic was assigned to a single eastern access off 292nd Street S to remain conservative in analysis.

4.3 Future Peak Hour Volumes

A 5-year horizon of 2027 was used to assess conditions and delays at the proposed project's access and adjacent intersections subsequent to buildout. Forecast 2027 background AM and PM peak hour volumes were derived by applying a 1.0 percent compound annual growth rate to the baseline volumes in Figure 3. Forecast 2027 AM and PM peak hour volumes without and with the Oakview – Roy Meadows project are illustrated in Figure 5 and Figure 6, respectively.



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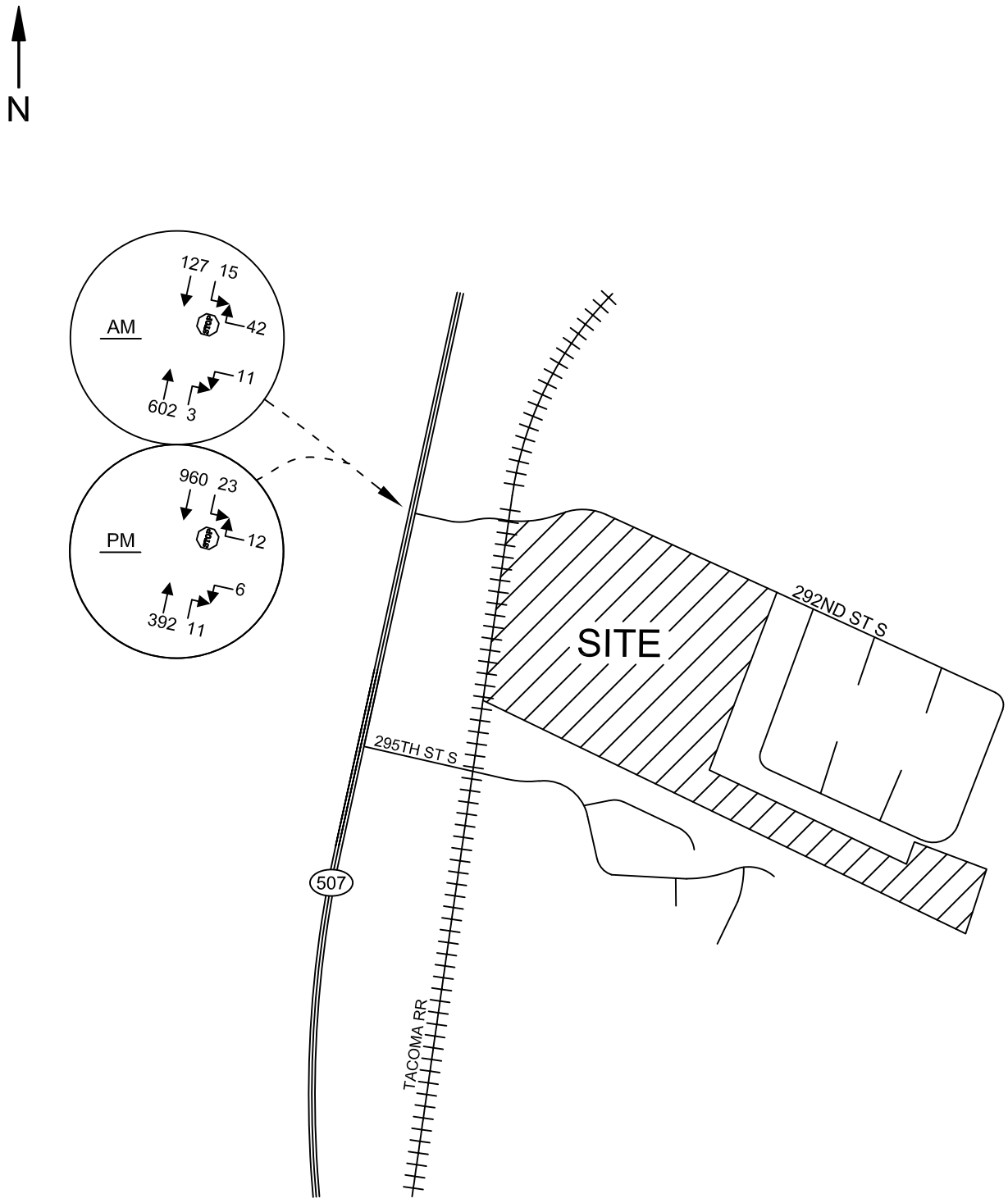
PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 4



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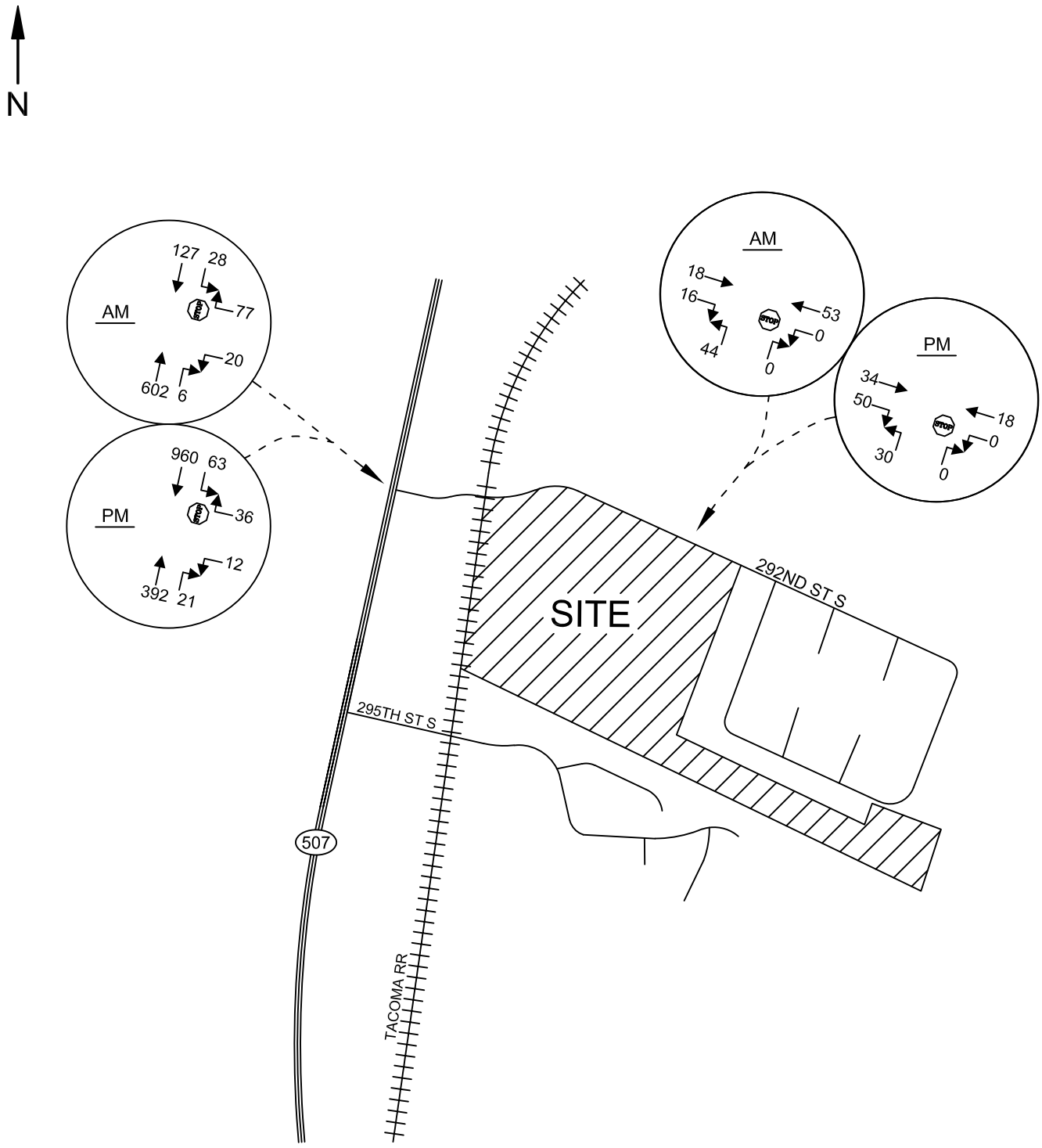
FORECAST 2027 PEAK HOUR BACKGROUND VOLUMES
FIGURE 5



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FORECAST 2027 PEAK HOUR VOLUMES WITH PROJECT
FIGURE 6

4.4 Forecast Level of Service

Peak hour delays were determined through the use of the *Highway Capacity Manual* 6th Edition. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. The range[2] for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating the worst conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the 2016 Highway Capacity Manual. For unsignalized, side-street stop-controlled intersections, LOS is determined by the movement with the highest delay. Level of service calculations were made through the use of the *Synchro 11* analysis program and were conducted for existing and forecast 2027 AM and PM peak hour conditions without and with the proposed development.

Table 2: Peak Hour Level of Service

Delays Given in Seconds per Vehicle

			Baseline 2022		*2027 Without*		*2027 With*	
Intersection	**Control**	**Peak Hour**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
SR-507 S & 292nd Street S	Stop	AM	B	14.2	B	14.9	C	16.6
		PM	C	18.9	C	19.9	C	22.1
Project Access & 292nd Street S	Stop	AM	-	-	-	-	A	9.2
		PM	-	-	-	-	A	9.1

WSDOT Level of Service standards are defined as LOS C for Tier 3 State Highways (SR-507)[3]. City of Roy Level of Service Standards within the study area are defined as LOS C or better[4]. Baseline 2022 AM and PM peak hour delays at the study intersection are shown to operate at LOS C or better. Accounting for background growth, forecast 2027 LOS at the intersection of study is shown to continue to operate at LOS C or better with the proposed Oakview – Roy Meadows project. Similarly, the proposed access is shown to operate satisfactorily at LOS A for both the AM and PM peak hours. No operational deficiencies are identified at the study intersection or access as a result of the project.

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[2] *Signalized Intersections - Level of Service*

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

Stop Controlled Intersections – Level of Service

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

Highway Capacity Manual, 6th Edition

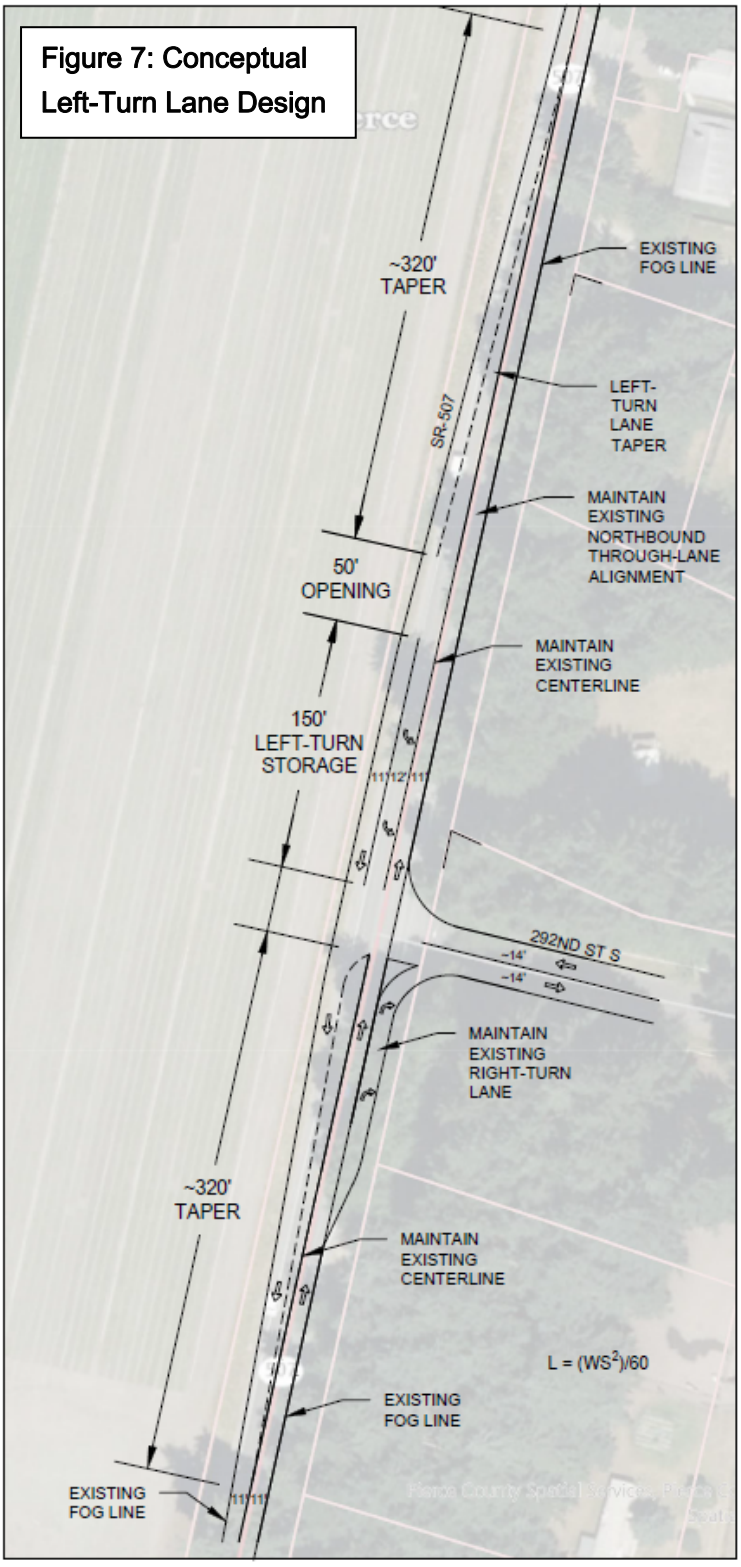
[3] Level of Service Standards for Washington State Highways, 2010

[4] City of Roy Comprehensive Plan, Transportation Element, 2015

4.5 Turn Lane Warrants

Procedures described in WSDOT's Design Manual (Figure 1310-7a) were used to ascertain left turn requirements. Left turn warrants were calculated at the initial access intersection of SR-507 S & 292nd Street S with project traffic as outlined in Figure 6. Based on through and turning volumes, and the 40-mph speed limit of SR-507 S adjacent 292nd Street S, a left turn lane is recommended at SR-507 S & 292nd Street S once the project is built out. The timing and design of the improvement would be based on discussions with WSDOT. Refer to the appendix for the nomograph and input values. A conceptual left turn lane design is illustrated to the right.

Figure 7: Conceptual Left-Turn Lane Design



5. SUMMARY

The Oakview – Roy Meadows is a proposed 79-unit single-family plat located in the city of Roy with a site address of 29401 SR-507 S. The subject site is located on the 38.36-acre tax parcel #: 0217036009. Access to the site is proposed via two roadways extending south from 292nd Street S. Based on ITE data the project is anticipated to generate up to 60 (16 inbound / 44 outbound) AM peak hour trips and 81 (50 inbound / 30 outbound) PM peak hour trips. Baseline 2022 level of service at the study intersection of SR-507 S & 292nd Street S is shown to operate at LOS C or better during the AM and PM peak hours.

A five-year horizon of 2027 was analyzed and assumes project buildout and full occupancy. Forecast 2027 AM and PM peak hour delays at the intersection of study and project access are anticipated to operate at LOS C or better indicating no operational deficiencies. Moreover, a left turn lane warrant was analyzed at the study intersection of SR-507 S & 292nd Street S and was found *warranted* under forecast 2027 PM peak hour conditions. The timing and design of the left turn lane should be made based on discussions with WSDOT.

Based on the findings above, proposed mitigation is as follows:

1. Construct a left turn lane on SR-507 at 292nd Street S. Procedures described in WSDOT's Design Manual (Figure 1310-9) were used to ascertain left turn storage length requirements. Based on the 40-mph posted speed limit at the intersection and additional criteria, a southbound 150-foot left-turn storage length appears to be warranted at SR-507 at 292nd Street S. A conceptual southbound left-turn lane design is illustrated in the preceding page. Final design shall be coordinated with and meet WSDOT standards in terms of storage length and tapers.

2. Provide MUTCD standard pavement markings and signage at the railroad crossing on 292nd Street E as agreed to with Tacoma Rail. Along with standard railroad crossing sign assemblies along 292nd Street E, it is recommended to include MUTCD warning sign—W10-3—at the western proposed access road due to proximity to rail crossing.

No other mitigation is identified at this time.

OAKVIEW – ROY MEADOWS
TRAFFIC IMPACT ANALYSIS

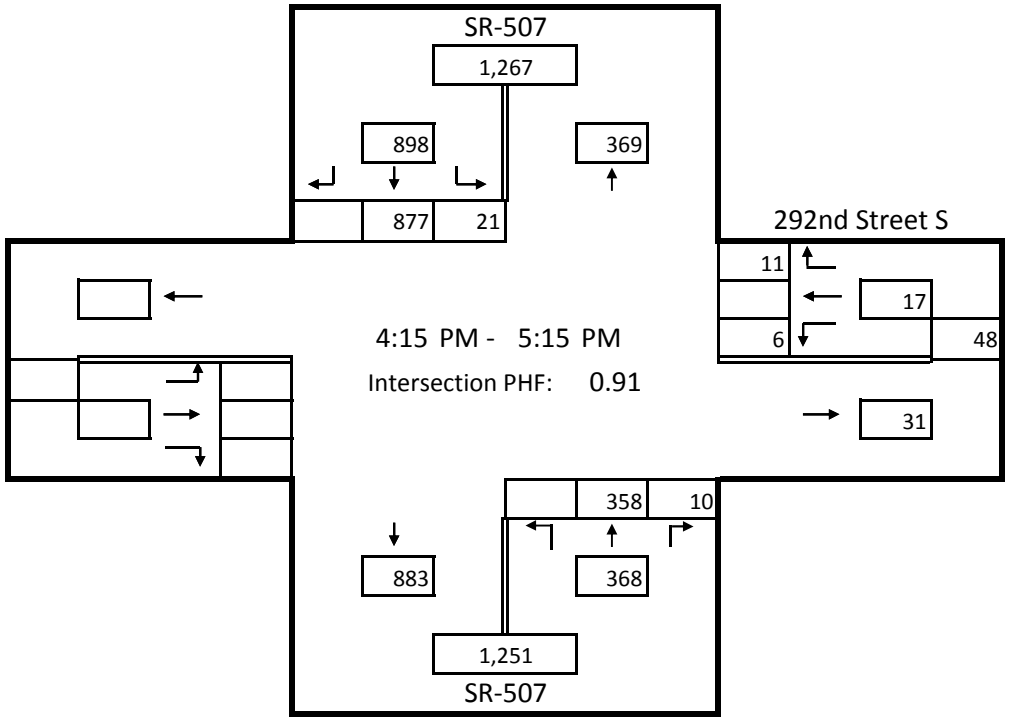
APPENDIX

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

Project Name: **Roy Meadows Manor**
Intersection: SR-507 & 292nd Street S
Jurisdiction: City of Roy

Date of Count: 10/3/2018
Project Number: 4194

Time Period	Soutbound SR-507				Westbound 292nd Street S				Northbound SR-507				Eastbound				
	HV	R	T	L	HV	R	T	L	HV	R	T	L	HV	R	T	L	Total
4:00 PM	4		217	1	0	3		3	2	3	69						302
4:15 PM	4		251	3	0	1		2	0	1	97						359
4:30 PM	5		237	7	0	4		2	2	3	81						341
4:45 PM	5		208	5	0	2		0	1	4	79						304
5:00 PM	2		181	6	0	4		2	7	2	101						305
5:15 PM	0		196	5	0	1		1	2	2	78						285
5:30 PM	0		168	2	0	6		0	2	0	70						248
5:45 PM	1		133	6	0	3		1	0	1	75						220
Total	21		1,591	35	0	24		11	16	16	650						2,364
Peak Hour	**4:15 PM to 5:15 PM**																Total
Peak Total	16		877	21	0	11		6	10	10	358						1,283
Heavy Veh.	1.3%				0.0%				2.4%								
PHF	0.88				0.71				0.89								



WASHINGTON DEPARTMENT OF TRANSPORTATION
5720 Capital Boulevard SE
Tumwater,WA 98501-5201
Olympic Region Traffic Data

Counter:D4-3263
Counted By:BUZZ
Weather:RAIN
SR 507 AT WATER STREET MP 35.83

File Name : SR 507 AT WATER ST 32218 AM
Site Code : 50732218
Start Date : 3/22/2018
Page No : 1

Groups Printed- CASRS - TRUCKS - PEDS

	SR 507 FROM SR 7 (TACOMA) From North				NO APPROACH From East				SR 507 FROM SR 702(McKENNA) From South				WATER STREET (ACCESS TO JBLM) From West				
Start Time	NO LEFT TURN	**Thru**	**Right**	App. Total	**Left**	**Thru**	**Right**	App. Total	**Left**	**Thru**	NO RIGHT TURN	App. Total	NO LEFT TURN	**Thru**	**Right**	App. Total	Int. Total
06:00 AM	0	16	3	19	0	0	0	0	18	120	0	138	0	3	4	7	164
06:15 AM	0	30	8	38	0	0	0	0	10	159	0	169	0	3	2	5	212
06:30 AM	0	28	6	34	0	0	0	0	12	133	0	145	0	3	1	4	183
06:45 AM	0	30	3	33	0	0	0	0	11	134	0	145	0	5	3	8	186
Total	0	104	20	124	0	0	0	0	51	546	0	597	0	14	10	24	745
07:00 AM	0	32	9	41	0	0	0	0	13	117	0	130	0	4	3	7	178
07:15 AM	0	33	6	39	0	0	0	0	6	129	0	135	0	2	7	9	183
07:30 AM	0	50	4	54	0	0	0	0	11	107	0	118	0	0	4	4	176
07:45 AM	0	51	4	55	0	0	0	0	4	89	0	93	0	1	5	6	154
Total	0	166	23	189	0	0	0	0	34	442	0	476	0	7	19	26	691
08:00 AM	0	48	3	51	0	0	0	0	6	100	0	106	0	3	2	5	162
08:15 AM	0	41	7	48	0	0	0	0	7	94	0	101	0	0	2	2	151
08:30 AM	0	55	2	57	0	0	0	0	8	89	0	97	0	2	11	13	167
08:45 AM	0	42	2	44	0	0	0	0	7	79	0	86	0	2	7	9	139
Total	0	186	14	200	0	0	0	0	28	362	0	390	0	7	22	29	619

WASHINGTON DEPARTMENT OF TRANSPORTATION
5720 Capital Boulevard SE
Tumwater,WA 98501-5201
Olympic Region Traffic Data

File Name : SR 507 AT WATER ST 32218 AM
Site Code : 50732218
Start Date : 3/22/2018
Page No : 2

Groups Printed- CASRS - TRUCKS - PEDS

	SR 507 FROM SR 7 (TACOMA) From North				NO APPROACH From East				SR 507 FROM SR 702(McKENNA) From South				WATER STREET (ACCESS TO JBLM) From West				
Start Time	NO LEFT TURN	**Thru**	**Right**	App. Total	**Left**	**Thru**	**Right**	App. Total	**Left**	**Thru**	NO RIGHT TURN	App. Total	NO LEFT TURN	**Thru**	**Right**	App. Total	Int. Total
09:00 AM	0	39	2	41	0	0	0	0	3	61	0	64	0	0	5	5	110
09:15 AM	0	33	2	35	0	0	0	0	8	79	0	87	0	2	3	5	127
09:30 AM	0	49	0	49	0	0	0	0	7	61	0	68	0	3	4	7	124
09:45 AM	0	36	0	36	0	0	0	0	4	80	0	84	0	2	6	8	128
Total	0	157	4	161	0	0	0	0	22	281	0	303	0	7	18	25	489
Grand Total	0	613	61	674	0	0	0	0	135	1631	0	1766	0	35	69	104	2544
Apprch %	0	90.9	9.1		0	0	0		7.6	92.4	0		0	33.7	66.3		
Total %	0	24.1	2.4	26.5	0	0	0	0	5.3	64.1	0	69.4	0	1.4	2.7	4.1	
CASRS	0	520	61	581	0	0	0	0	135	1553	0	1688	0	34	68	102	2371
% CASRS	0	84.8	100	86.2	0	0	0	0	100	95.2	0	95.6	0	97.1	98.6	98.1	93.2
TRUCKS	0	93	0	93	0	0	0	0	0	78	0	78	0	1	1	2	173
% TRUCKS	0	15.2	0	13.8	0	0	0	0	0	4.8	0	4.4	0	2.9	1.4	1.9	6.8
PEDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% PEDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WASHINGTON DEPARTMENT OF TRANSPORTATION
5720 Capital Boulevard SE
Tumwater,WA 98501-5201
Olympic Region Traffic Data

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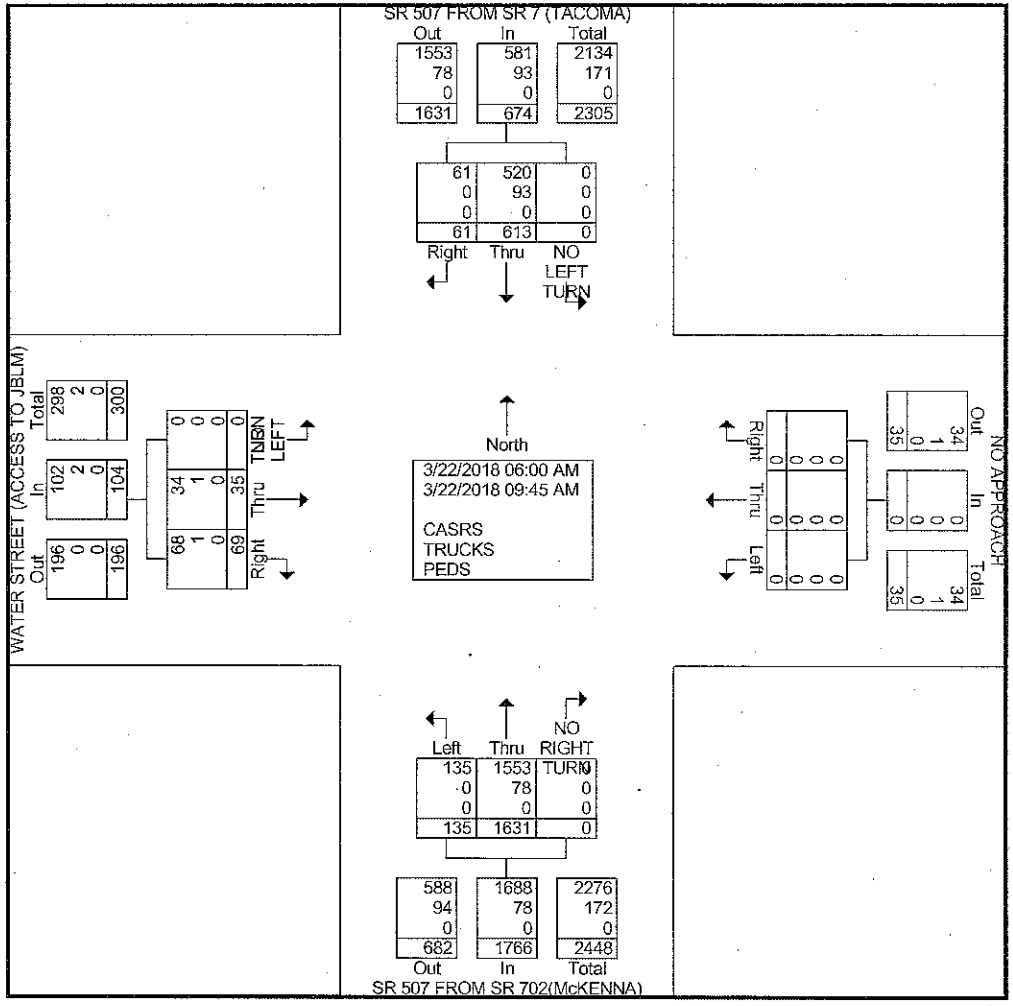
Site Code : 50732218
Start Date : 3/22/2018
Page No : 3



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5720 Capital Boulevard SE
Tumwater,WA 98501-5201
Olympic Region Traffic Data

File Name : SR 507 AT WATER ST 32218 AM
Site Code : 50732218
Start Date : 3/22/2018
Page No : 4

	SR 507 FROM SR 7 (TACOMA) From North				NO APPROACH From East				SR 507 FROM SR 702(McKENNA) From South				WATER STREET (ACCESS TO JBLM) From West				
Start Time	NO LEFT TURN	**Thru**	**Right**	App. Total	**Left**	**Thru**	**Right**	App. Total	**Left**	**Thru**	NO RIGHT TURN	App. Total	NO LEFT TURN	**Thru**	**Right**	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:15 AM																	
06:15 AM	0	30	8	38	0	0	0	0	10	**159**	0	**169**	0	3	2	5	**212**
06:30 AM	0	28	6	34	0	0	0	0	12	133	0	145	0	3	1	4	183
06:45 AM	0	30	3	33	0	0	0	0	11	134	0	145	0	**5**	**3**	**8**	186
07:00 AM	0	**32**	**9**	**41**	0	0	0	0	**13**	117	0	130	0	4	3	7	178
Total Volume	0	120	26	146	0	0	0	0	46	543	0	589	0	15	9	24	759
% App. Total	0	82.2	17.8		0	0	0		7.8	92.2	0		0	62.5	37.5		
PHF	.000	.938	.722	.890	.000	.000	.000	.000	.885	.854	.000	.871	.000	.750	.750	.750	.895
CASRS	0	98	26	124	0	0	0	0	46	531	0	577	0	15	9	24	725
% CASRS	0	81.7	100	84.9	0	0	0	0	100	97.8	0	98.0	0	100	100	100	95.5
TRUCKS	0	22	0	22	0	0	0	0	0	12	0	12	0	0	0	0	34
% TRUCKS																	
PEDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% PEDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WASHINGTON DEPARTMENT OF TRANSPORTATION
5720 Capital Boulevard SE
Tumwater,WA 98501-5201
Olympic Region Traffic Data

Counter:D4-3263
Counted By:BUZZ
Weather:CLOUDY
SR 507 AT WATER STREET MP 35.83

File Name : SR 507 AT WATER ST 32018 PM
Site Code : 50732018
Start Date : 3/20/2018
Page No : 1

Groups Printed- CARS - TRUCKS - PEDS

	SR 507 FROM SR 7 (TACOMA) From North				NO APPROACH From East				SR 507 FROM SR 702(McKENNA) From South				WATER STREET (ACCESS TO JBLM) From West				
Start Time	NO LEFT TURN	**Thru**	**Right**	App. Total	**Left**	**Thru**	**Right**	App. Total	**Left**	**Thru**	NO RIGHT TURN	App. Total	NO LEFT TURN	Thru To SR 507	**Right**	App. Total	Int. Total
02:00 PM	0	123	3	126	0	0	0	0	3	45	0	48	0	2	48	50	224
02:15 PM	0	132	1	133	0	0	0	0	4	51	0	55	0	0	53	53	241
02:30 PM	0	135	2	137	0	0	0	0	3	49	0	52	0	1	57	58	247
02:45 PM	0	141	4	145	0	0	0	0	1	52	0	53	0	3	52	55	253
Total	0	531	10	541	0	0	0	0	11	197	0	208	0	6	210	216	965
03:00 PM	0	139	5	144	0	0	0	0	0	56	0	56	0	6	47	53	253
03:15 PM	0	143	3	146	0	0	0	0	3	62	0	65	0	7	52	59	270
03:30 PM	0	148	2	150	0	0	0	0	2	67	0	69	0	4	55	59	278
03:45 PM	0	144	6	150	0	0	0	0	2	62	0	64	0	4	53	57	271
Total	0	574	16	590	0	0	0	0	7	247	0	254	0	21	207	228	1072
04:00 PM	0	164	1	165	0	0	0	0	2	67	0	69	0	4	63	67	301
04:15 PM	0	157	5	162	0	0	0	0	3	60	0	63	0	4	104	108	333
04:30 PM	0	176	6	182	0	0	0	0	4	62	0	66	0	10	64	74	322
04:45 PM	0	142	4	146	0	0	0	0	4	54	0	58	0	2	94	96	300
Total	0	639	16	655	0	0	0	0	13	243	0	256	0	20	325	345	1256

WASHINGTON DEPARTMENT OF TRANSPORTATION
5720 Capital Boulevard SE
Tumwater,WA 98501-5201
Olympic Region Traffic Data

File Name : SR 507 AT WATER ST 32018 PM
Site Code : 50732018
Start Date : 3/20/2018
Page No : 2

Groups Printed- CARS - TRUCKS - PEDS

	SR 507 FROM SR 7 (TACOMA) From North				NO APPROACH From East				SR 507 FROM SR 702(McKENNA) From South				WATER STREET (ACCESS TO JBLM) From West				
Start Time	NO LEFT TURN	**Thru**	**Right**	**App. Total**	**Left**	**Thru**	**Right**	**App. Total**	**Left**	**Thru**	NO RIGHT TURN	**App. Total**	NO LEFT TURN	Thru To SR 507	**Right**	**App. Total**	**Int. Total**
05:00 PM	0	154	5	159	0	0	0	0	0	67	0	67	0	3	74	77	303
05:15 PM	0	142	1	143	0	0	0	0	0	52	0	52	0	6	72	78	273
05:30 PM	0	182	3	185	0	0	0	0	3	65	0	68	0	9	58	67	320
05:45 PM	0	153	3	156	0	0	0	0	1	53	0	54	0	3	42	45	255
Total	0	631	12	643	0	0	0	0	4	237	0	241	0	21	246	267	1151
06:00 PM	0	167	5	172	0	0	0	0	0	47	0	47	0	8	42	50	269
Grand Total	0	2542	59	2601	0	0	0	0	35	971	0	1006	0	76	1030	1106	4713
Apprch %	0	97.7	2.3		0	0	0		3.5	96.5	0		0	6.9	93.1		
Total %	0	53.9	1.3	55.2	0	0	0	0	0.7	20.6	0	21.3	0	1.6	21.9	23.5	
CARS	0	2523	58	2581	0	0	0	0	35	948	0	983	0	76	1030	1106	4670
% CARS	0	99.3	98.3	99.2	0	0	0	0	100	97.6	0	97.7	0	100	100	100	99.1
TRUCKS	0	19	1	20	0	0	0	0	0	23	0	23	0	0	0	0	43
% TRUCKS	0	0.7	1.7	0.8	0	0	0	0	0	2.4	0	2.3	0	0	0	0	0.9
PEDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% PEDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WASHINGTON DEPARTMENT OF TRANSPORTATION
5720 Capital Boulevard SE
Tumwater,WA 98501-5201
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File Name : SR 507 AT WATER ST 32018 PM
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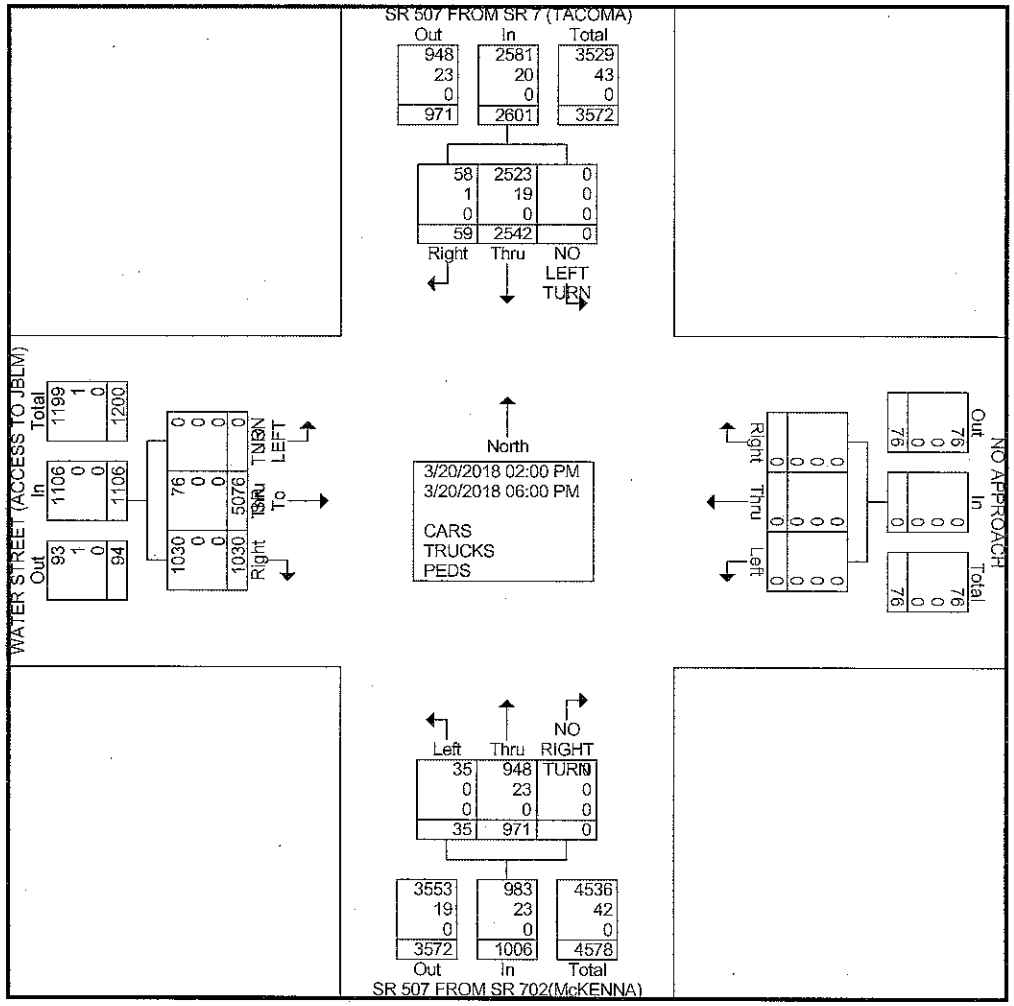
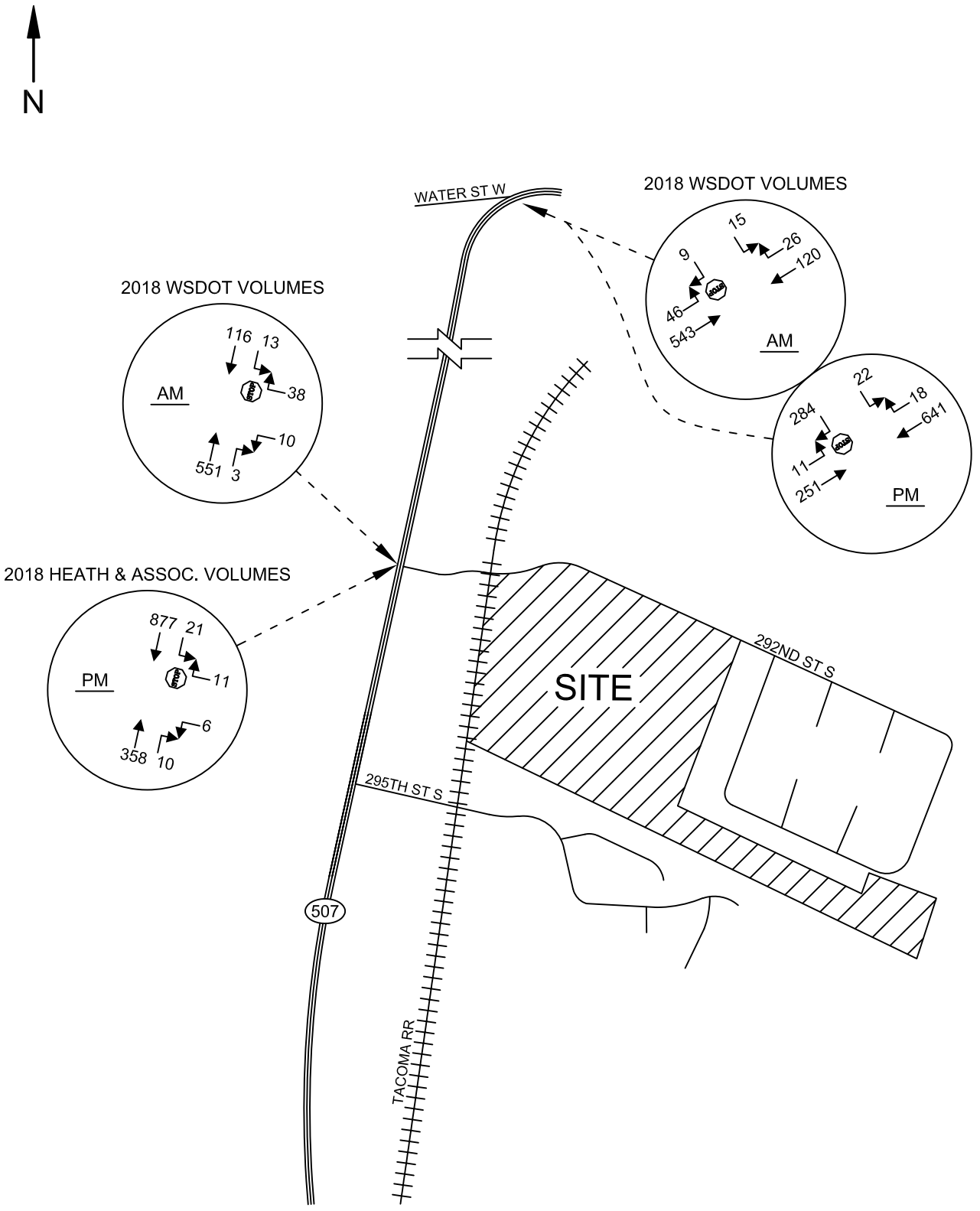
Start Date : 3/20/2018
Page No : 3



WASHINGTON DEPARTMENT OF TRANSPORTATION
5720 Capital Boulevard SE
Tumwater,WA 98501-5201
Olympic Region Traffic Data

File Name : SR 507 AT WATER ST 32018 PM
Site Code : 50732018
Start Date : 3/20/2018
Page No : 4

	SR 507 FROM SR 7 (TACOMA) From North				NO APPROACH From East				SR 507 FROM SR 702(McKENNA) From South				WATER STREET (ACCESS TO JBLM) From West				
Start Time	NO LEFT TURN	**Thru**	**Right**	**App. Total**	**Left**	**Thru**	**Right**	**App. Total**	**Left**	**Thru**	NO RIGHT TURN	**App. Total**	NO LEFT TURN	Thru To SR 507	**Right**	**App. Total**	**Int. Total**
Peak Hour Analysis From 02:00 PM to 04:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:45 PM																	
03:45 PM	0	144	**6**	150	0	0	0	0	2	62	0	64	0	4	53	57	271
04:00 PM	0	164	1	165	0	0	0	0	2	**67**	0	**69**	0	4	63	67	301
04:15 PM	0	157	5	162	0	0	0	0	3	60	0	63	0	4	**104**	**108**	**333**
04:30 PM	0	**176**	6	**182**	0	0	0	0	**4**	62	0	66	0	**10**	64	74	322
Total Volume	0	641	18	659	0	0	0	0	11	251	0	262	0	22	284	306	1227
% App. Total	0	97.3	2.7		0	0	0		4.2	95.8	0		0	7.2	92.8		
PHF	.000	.911	.750	.905	.000	.000	.000	.000	.688	.937	.000	.949	.000	.550	.683	.708	.921
CARS	0	633	17	650	0	0	0	0	11	235	0	246	0	22	284	306	1202
% CARS	0	98.8	94.4	98.6	0	0	0	0	100	93.6	0	93.9	0	100	100	100	98.0
TRUCKS	0	8	1	9	0	0	0	0	0	16	0	16	0	0	0	0	25
% TRUCKS																	
PEDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% PEDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



HEATH & ASSOCIATES

TRAFFIC AND CIVIL ENGINEERING

OAKVIEW PLAT

EXISTING 2018 PM PEAK HOUR VOLUMES
FIGURE A

2009 Edition Part 8 Figure 8B-6. Example of Placement of Warning Signs and Pavement Markings at Grade Crossings

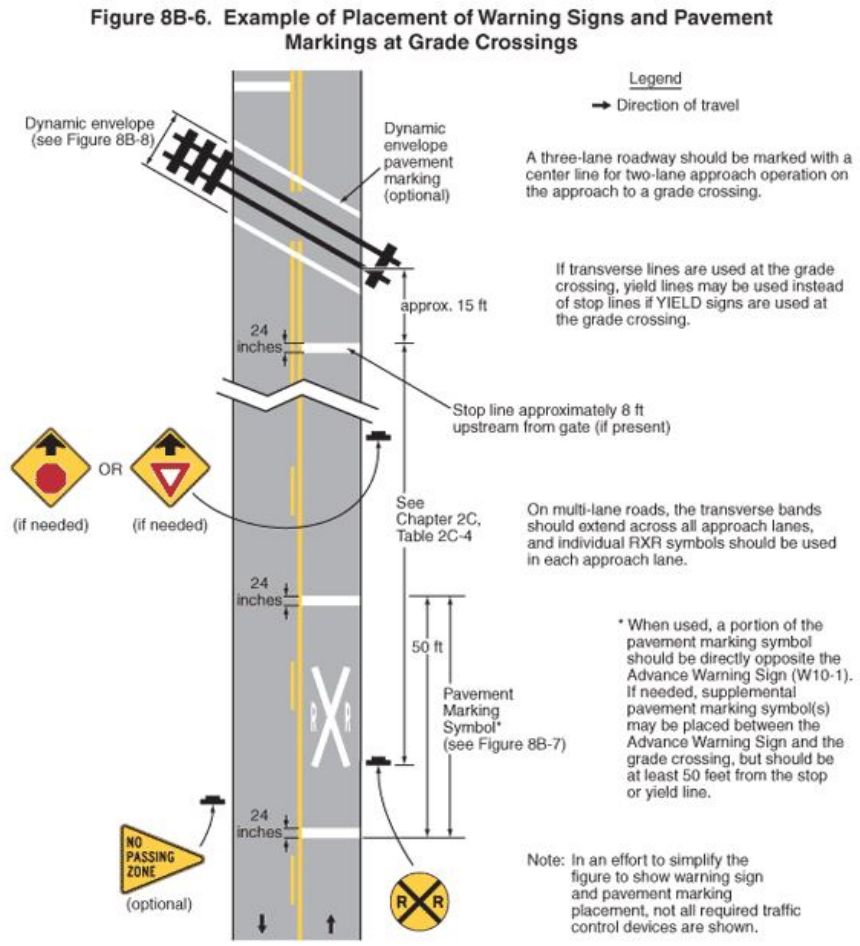


Figure 8B-6. Example of Placement of Warning Signs and Pavement Markings at Grade Crossings

Single-Family Detached Housing
(210)

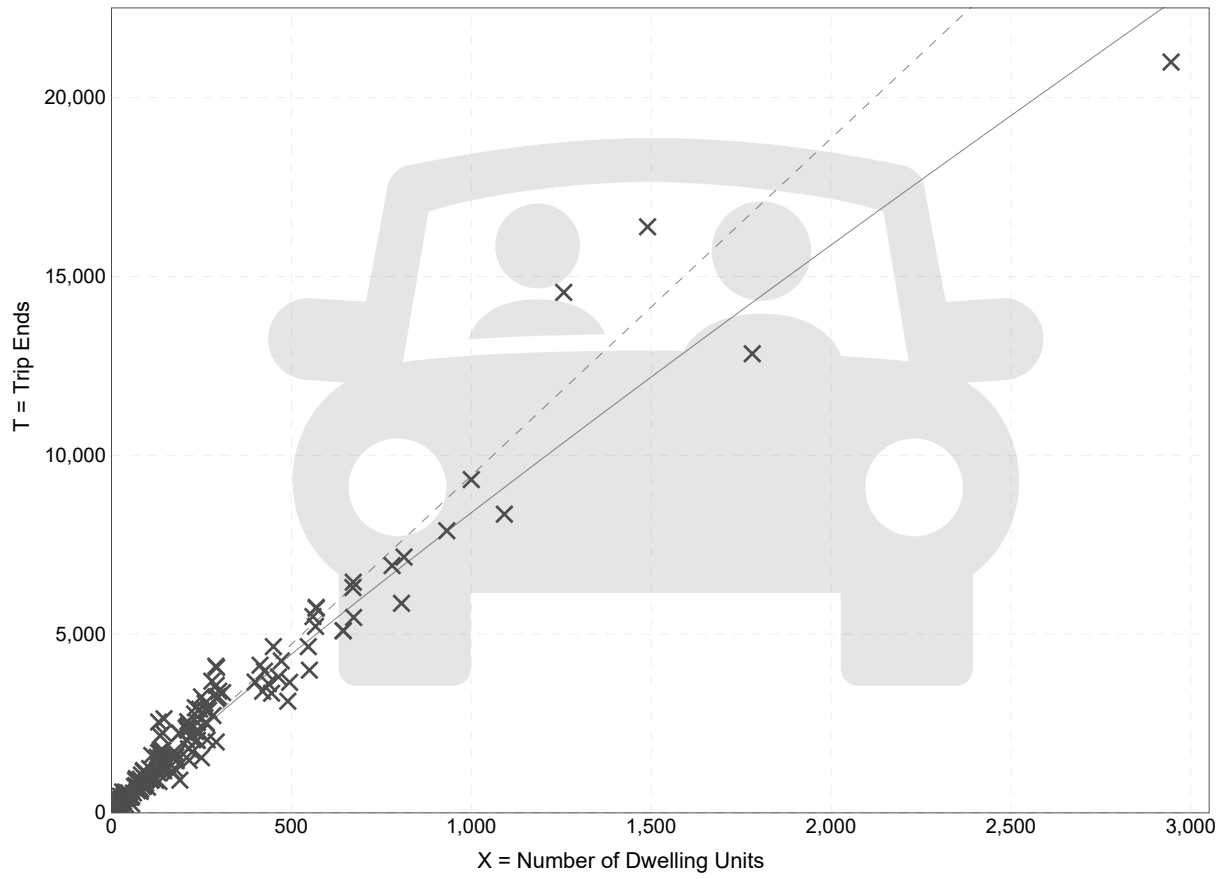
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



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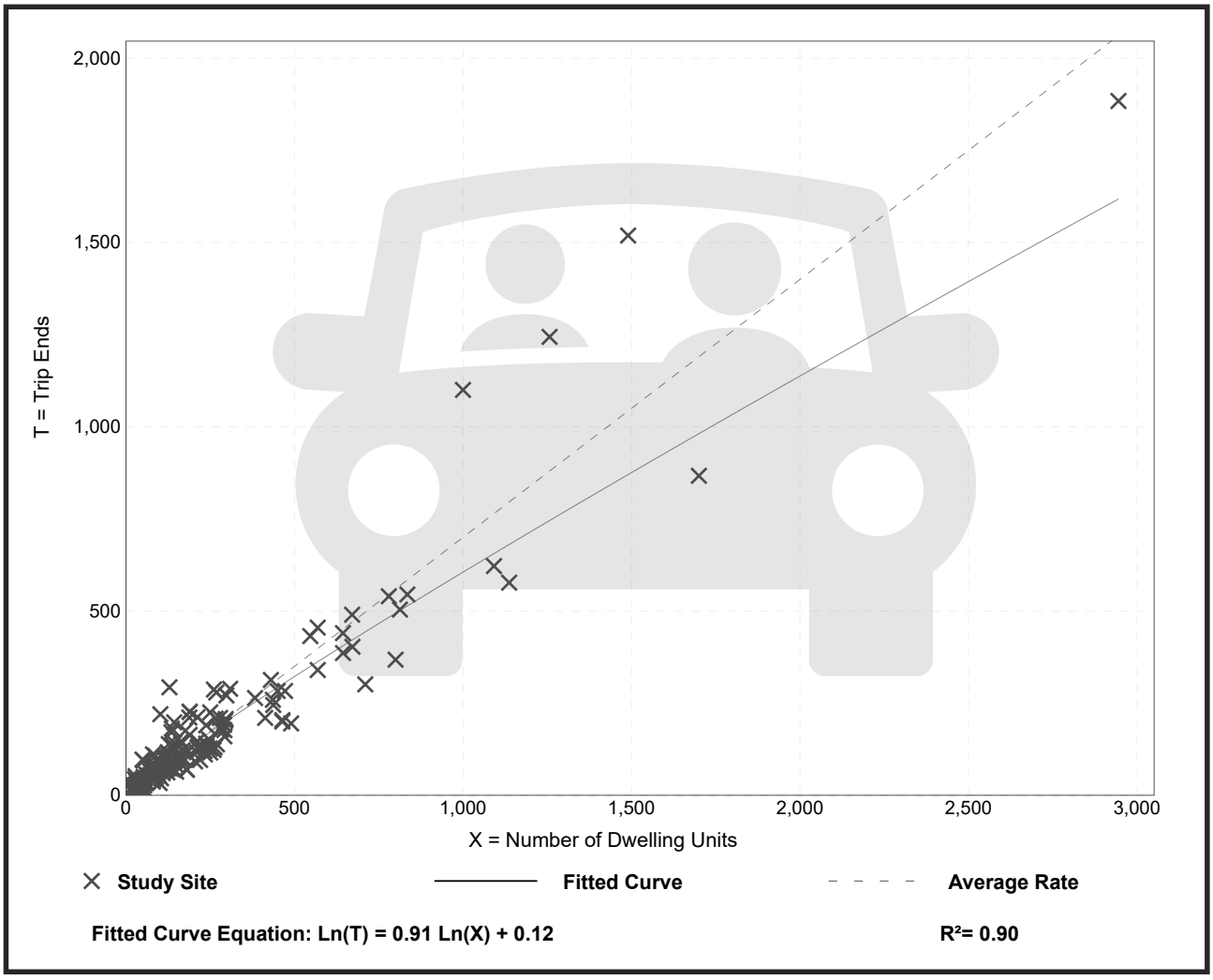
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



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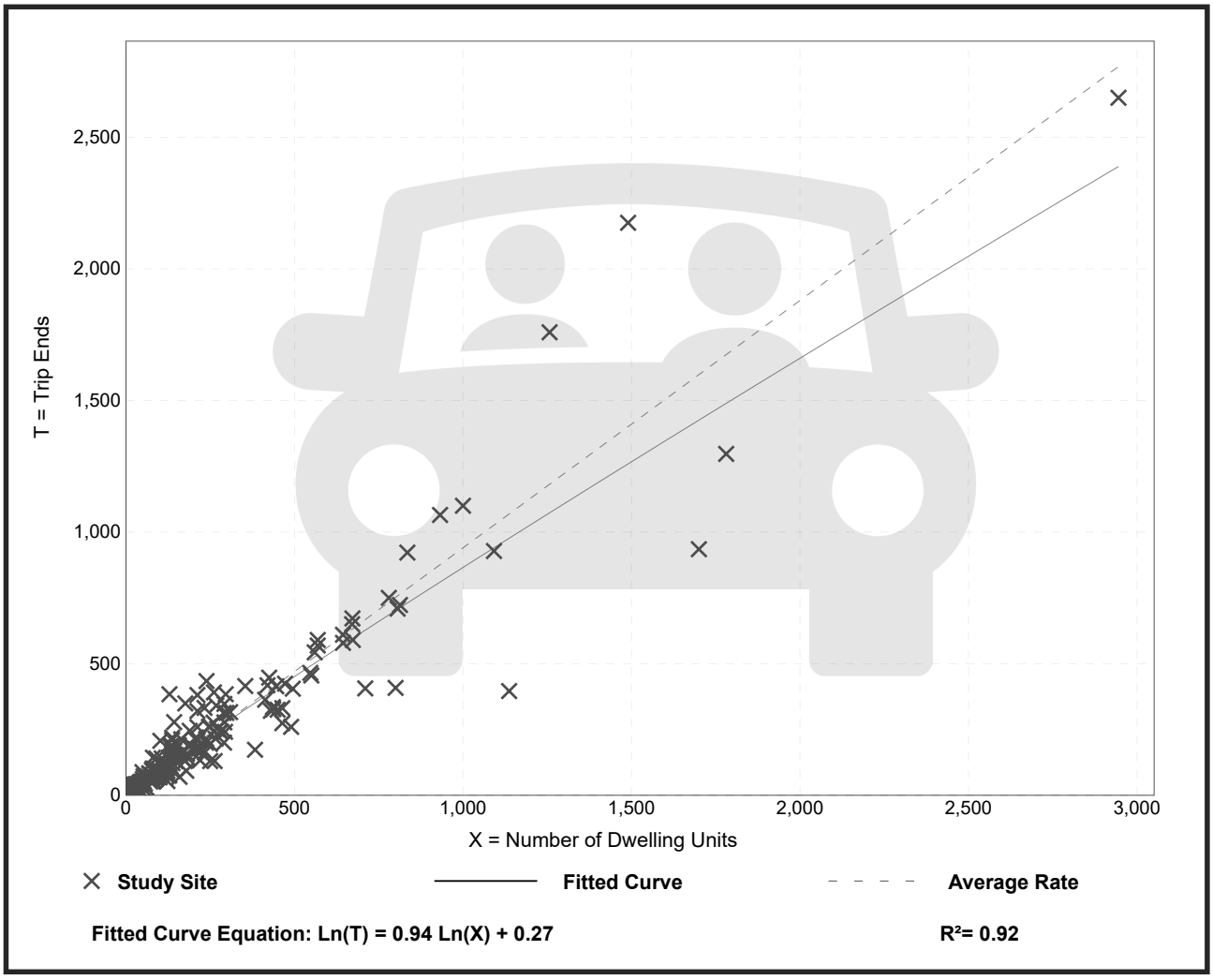
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



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Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	40	573	3	14	121
Future Vol, veh/h	10	40	573	3	14	121
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	-	-	125	-	-
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	1	1	15
Mvmt Flow	11	44	637	3	16	134

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	803	637	0	0	640	0
Stage 1	637	-	-	-	-	-
Stage 2	166	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	354	479	-	-	949	-
Stage 1	529	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	348	479	-	-	949	-
Mov Cap-2 Maneuver	348	-	-	-	-	-
Stage 1	529	-	-	-	-	-
Stage 2	850	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.2	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	445	949	-
HCM Lane V/C Ratio	-	-	0.125	0.016	-
HCM Control Delay (s)	-	-	14.2	8.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	11	373	10	22	913
Future Vol, veh/h	6	11	373	10	22	913
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	-	-	125	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	1	1	2	2	2	2
Mvmt Flow	7	12	410	11	24	1003

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1461	410	0	0	421	0
Stage 1	410	-	-	-	-	-
Stage 2	1051	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.12	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.218	-
Pot Cap-1 Maneuver	143	644	-	-	1138	-
Stage 1	672	-	-	-	-	-
Stage 2	338	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	136	644	-	-	1138	-
Mov Cap-2 Maneuver	136	-	-	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	322	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.9	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	278	1138	-
HCM Lane V/C Ratio	-	-	0.067	0.021	-
HCM Control Delay (s)	-	-	18.9	8.2	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	42	602	3	15	127
Future Vol, veh/h	11	42	602	3	15	127
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	-	-	125	-	-
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	1	1	15
Mvmt Flow	12	47	669	3	17	141

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	844	669	0	0	672	0
Stage 1	669	-	-	-	-	-
Stage 2	175	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	335	459	-	-	923	-
Stage 1	511	-	-	-	-	-
Stage 2	858	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	328	459	-	-	923	-
Mov Cap-2 Maneuver	328	-	-	-	-	-
Stage 1	511	-	-	-	-	-
Stage 2	841	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	424	923	-
HCM Lane V/C Ratio	-	-	0.139	0.018	-
HCM Control Delay (s)	-	-	14.9	9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	12	392	11	23	960
Future Vol, veh/h	6	12	392	11	23	960
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	-	-	125	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	1	1	2	2	2	2
Mvmt Flow	7	13	431	12	25	1055

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1536	431	0	0	443	0
Stage 1	431	-	-	-	-	-
Stage 2	1105	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.12	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.218	-
Pot Cap-1 Maneuver	128	626	-	-	1117	-
Stage 1	657	-	-	-	-	-
Stage 2	318	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	121	626	-	-	1117	-
Mov Cap-2 Maneuver	121	-	-	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	301	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.9	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	262	1117	-
HCM Lane V/C Ratio	-	-	0.075	0.023	-
HCM Control Delay (s)	-	-	19.9	8.3	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	77	602	6	28	127
Future Vol, veh/h	20	77	602	6	28	127
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	-	-	125	-	-
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	1	1	15
Mvmt Flow	22	86	669	7	31	141

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	872	669	0	0	676	0
Stage 1	669	-	-	-	-	-
Stage 2	203	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	322	459	-	-	920	-
Stage 1	511	-	-	-	-	-
Stage 2	833	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	310	459	-	-	920	-
Mov Cap-2 Maneuver	310	-	-	-	-	-
Stage 1	511	-	-	-	-	-
Stage 2	802	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.6	0	1.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	418	920	-
HCM Lane V/C Ratio	-	-	0.258	0.034	-
HCM Control Delay (s)	-	-	16.6	9.1	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1	0.1	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	18	16	0	53	44	0
Future Vol, veh/h	18	16	0	53	44	0
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	17	0	58	48	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	37	0	87	29
Stage 1	-	-	-	-	29	-
Stage 2	-	-	-	-	58	-
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	-	-	1574	-	914	1046
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	965	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1574	-	914	1046
Mov Cap-2 Maneuver	-	-	-	-	914	-
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	965	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	914	-	-	1574	-
HCM Lane V/C Ratio	0.052	-	-	-	-
HCM Control Delay (s)	9.2	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	36	392	21	63	960
Future Vol, veh/h	12	36	392	21	63	960
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	-	-	125	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	1	1	2	2	2	2
Mvmt Flow	13	40	431	23	69	1055

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1624	431	0	0	454	0
Stage 1	431	-	-	-	-	-
Stage 2	1193	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.12	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.218	-
Pot Cap-1 Maneuver	113	626	-	-	1107	-
Stage 1	657	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	96	626	-	-	1107	-
Mov Cap-2 Maneuver	96	-	-	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	245	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.1	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	263	1107	-
HCM Lane V/C Ratio	-	-	0.201	0.063	-
HCM Control Delay (s)	-	-	22.1	8.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.2	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	34	50	0	18	30	0
Future Vol, veh/h	34	50	0	18	30	0
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	54	0	20	33	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	91	0	84	64
Stage 1	-	-	-	-	64	-
Stage 2	-	-	-	-	20	-
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	-	-	1504	-	918	1000
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	1003	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1504	-	918	1000
Mov Cap-2 Maneuver	-	-	-	-	918	-
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	1003	-

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

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	918	-	-	1504	-
HCM Lane V/C Ratio	0.036	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

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

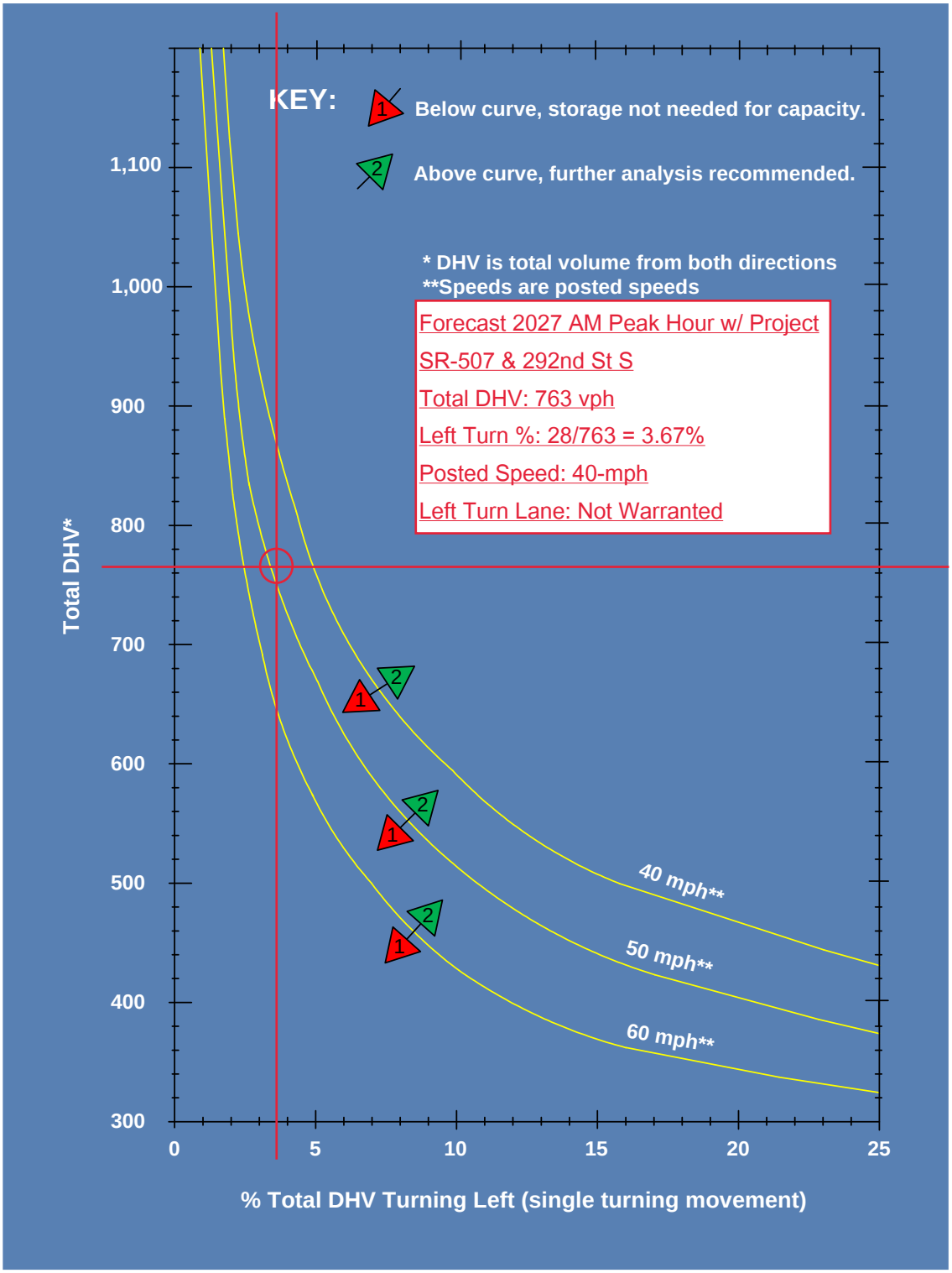

Exhibit 1310-7 Left-Turn Storage Guidelines: Two-Lane, Unsignalized