

HIGHWAY 6 RV STORAGE

LEVEL 2 TRAFFIC IMPACT STUDY

Project Location: 1930 Highway 6 & 50
Fruita, CO

CDOT Access: SH 6A/22.82/L

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Report Date: April 19, 2021



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Highway 6 RV Storage, Fruita, CO
Level 2 Traffic Impact Study

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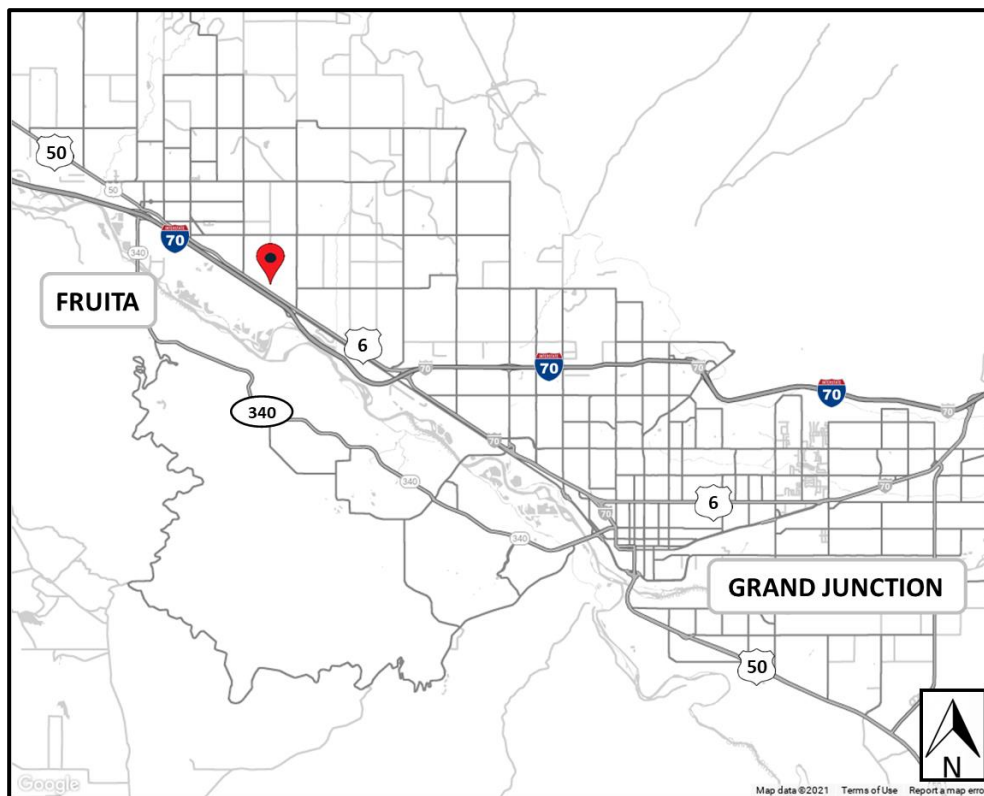
1. Introduction

APEX Consulting Engineers, LLC prepared this Level 2 Traffic Impact Study (Study) for the proposed Highway 6 RV Storage (Project), located at 1930 US-50, Fruita, CO, accessing the north side of SH 6A west of 19 1/2 Road at mile post 22.82 at an existing gravel access. The Project will construct 400 storage units and allocate 4 acres to RV storage. The following sections describe the Project, traffic volumes, auxiliary turn lane assessments, access spacing, and sight distance evaluation for this intersection.

2. Project Location and Description

As shown in Figure 1, the proposed Project will be located to the west of 19 1/2 Road along SH 6A in Fruita, CO. The Project is expected to be completed in 2023.

Figure 1 - Site Location Map



The Project extents and site access locations are shown in Figure 2.

Figure 2 – Project Site Access Locations and Adjacent Access Points



3. Trip Generation & Distribution

3.1 Trip Generation

Land Use Code 151, Industrial (Mini-Warehouse), from the ITE Trip Generation Manual 10th Edition, was used in trip generation calculations. In all peak hour cases, the higher of “either peak hour of roadway” or “peak hour of generator” is used, providing a conservative assessment. In this case, peak hour of generator is used. Trip generation traffic calculations from the ITETripGen Web-based App are attached in Appendix A. Table 1 provides the Project peak hour traffic in vehicles per hour (VPH).

Table 1 – Mini-Warehouse Peak Hour Traffic Volumes (VPH)

Period	Saturday
Entry	11
Exit	8
TOTAL	19

The ITE Trip Generation Manual 10th Edition does not have a land use code for RV storage facilities. APEX calculated trip generation rates for RV storage facilities by conducting two days of traffic counts at a business with similar use located at 2956 D 1/2 Road in Grand Junction, CO. The counts were conducted on Thursday and Friday, September 27 & 28, 2018 and found an average of 36 trips per day (ADT) with a peak of 9 trips on Friday, September 28, 2018 between 1:45 PM and 2:45 PM. Rates were then found by dividing the ADT and peak trips by the site area which is 8.57 acres. The calculations and rates are summarized in the following table and are attached in Appendix A.

Table 2 – RV Storage Rate Calculation

	Trips	Count Area (Acres)	Rate (Trips/Acre)	Project Area (Acres)	Project Trips (Rounded)
ADT	36	8.57	4.2	4	17
Peak Trips	9	8.57	1.1	4	5

Table 3 is a summary of the combined Project peak hour traffic volumes in vehicles per hour (VPH).

Table 3 – Project Peak Hour Traffic Volumes (VPH)

Period	Mini-Warehouse	RV Storage	Total
Entry	11	3	14
Exit	8	2	10
TOTAL	19	5	24

Note that the RV trips are calculated for a Friday peak and the Mini-Warehouse trips are for a Saturday peak. Both peaks will be evaluated to occur on a Saturday peak which is unlikely but provides a conservative analysis for this study.

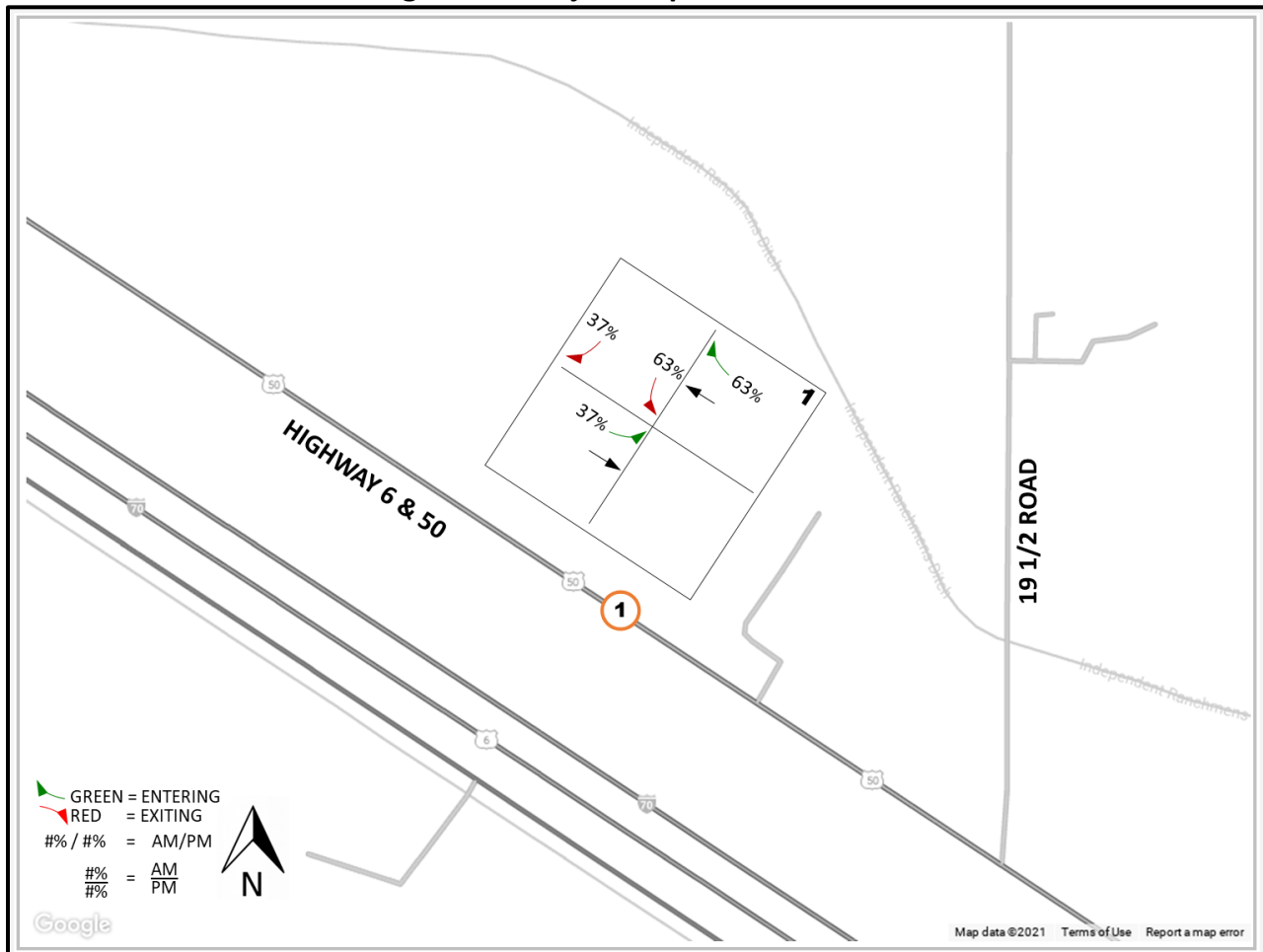
4. Trip Distribution & Assignment

4.1 Determination of Trip Distribution

Project trip distributions were assigned using the distributions from the turning movement counts at SH 6 & the Fruita Storage access located east of the Project. All day counts were conducted on Saturday April 3, 2021. Turning movement counts at the access only considered traffic using Fruita Storage. The distribution found is used for both AM and PM conditions.

The detailed Project trip distribution is shown in Figure 3.

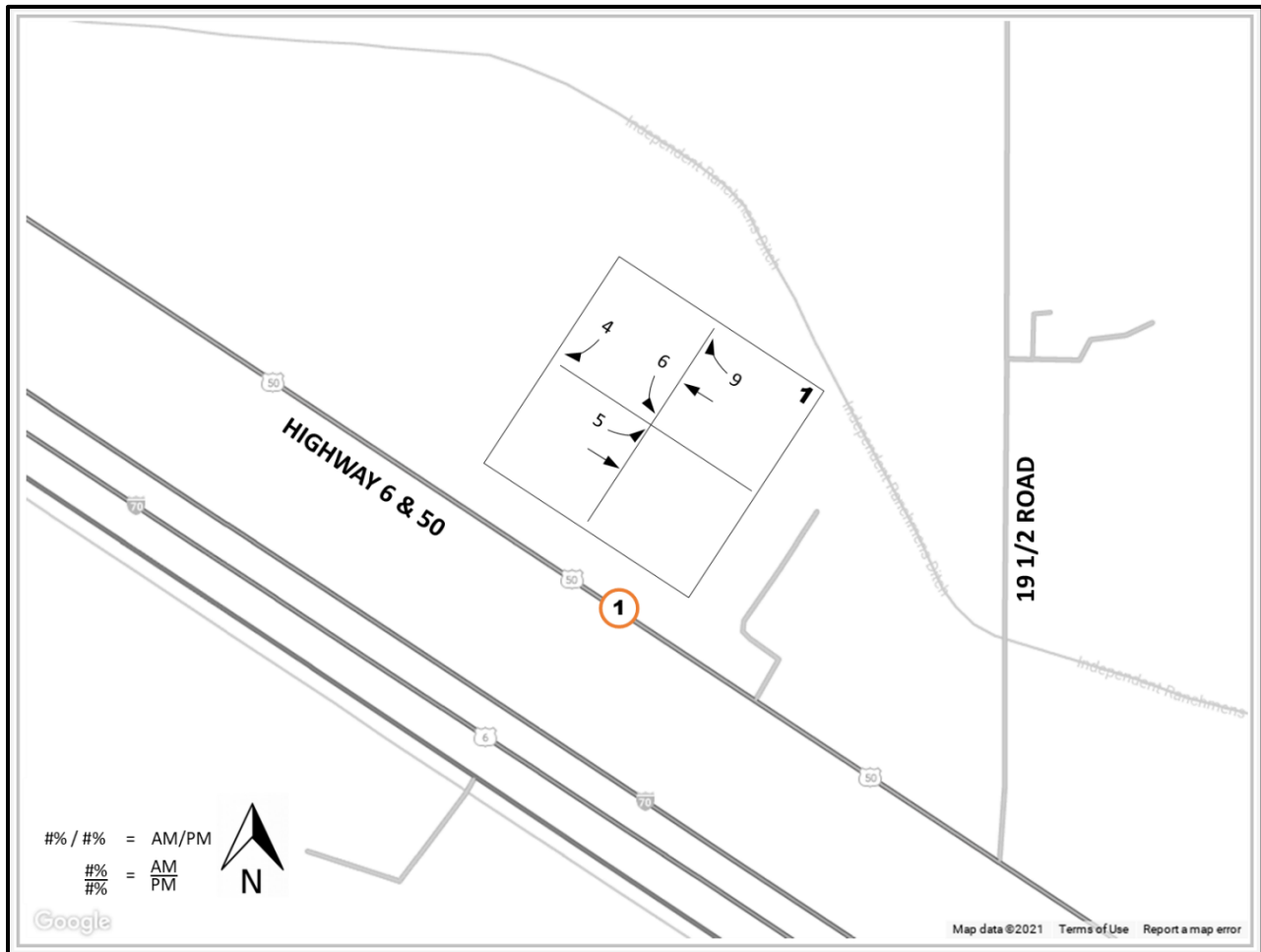
Figure 3 – Project Trip Distribution



4.2 Assignment of Project Traffic

Project traffic determined from the trip generation calculation is assigned to the existing traffic network using the distributions from Figure 3. The resulting Project trip assignment is shown in Figure 4.

Figure 4 – Project Trip Assignment



5. Existing & Future Traffic Volumes

All day intersection turning movement counts were conducted at the following intersections March 27, 2021.

- SH 6A & Project Access (Intersection 1)

Peak seasonal adjustment of 1.22 was used to account for the traffic counts being completed in March. Table 4 shows the monthly peak seasonal adjustments using a similar roadway with a CDOT continuous counting station.

Table 4 – Peak Season Adjustment Factors by Month

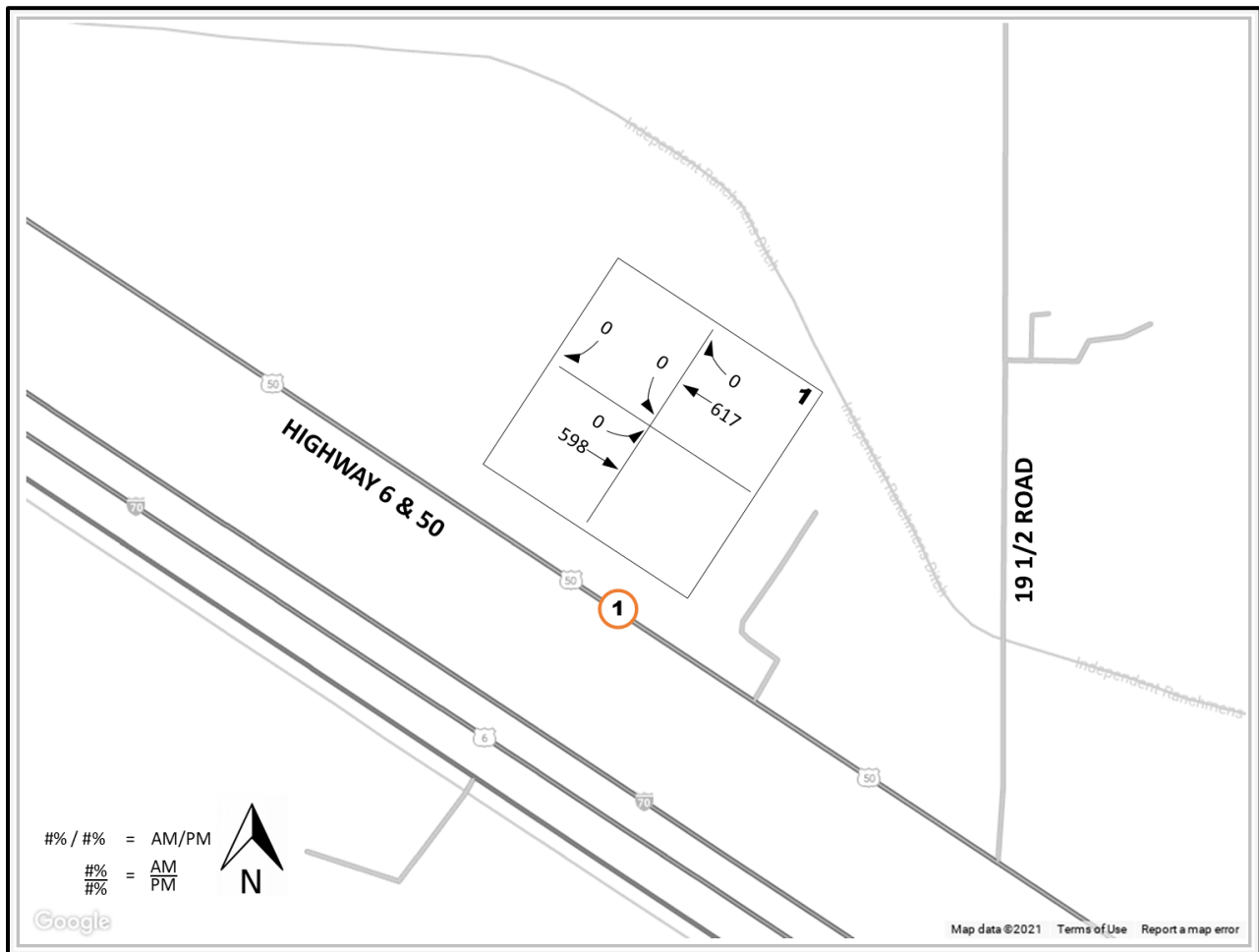
Seasonal Adjustments
CDOT Count Station ID 15: SH 050A Traffic Data - South of Whitewater

STATION ID	CAL YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
15	2021	8630	9570										
15	2020	9027	9854	8510	6925	9809	11364	12027	13086	12032	11405	9319	8596
15	2019	8675	9365	10200	11001	11623	12374	12976	12914	12418	11962	10365	9760
15	2018	8966	9470	10277	10626	11574	11950	12178	12345	11894	10986	10240	9568
15	2017	8185	9381	10083	10495	11041	11874	11675	12191	11745	10989	10137	9686
15	2016	8306	9280	9738	10135	11022	11813	12133	12093	11843	11176	9993	9456
15	2015	8495	8948	9596	9807	10578	11328	11691	11397	11217	10499	9340	8939
15	2014	7870	8209	8995	8829	9385	10084	10233	10322	10057	10091	9021	8853
15	2013	7880	8380	9157	9070	10226	10657	10826	10823	10148	9747	8912	8298
15	2012	8371	8740	9372	9330	10111	11005	10942	11053	10507	9922	9109	8371
15	2011	8241	8561	9262	9472	9892	10885	11027	11199	10728	9959	9278	8835
15	2010	8031	8525	9240	9592	10360	11189	11467	11393	10991	10183	9168	8926
15	2009	8657	9205	9465	9710	10407	11171	11578	11327	10876	10032	9187	8379
15	2008	7967	8590	9044	9164	9852	11022	10884	11128	10716	10252	9496	8972
15	2007	8185	8899	9371	9734	10048	10454	11497	10934	10555		9407	8600
15	2006	8450	9178	8814	10029				10370	10564	10207	9292	9117
15	2005	8056	8418	9357	9552	10238	11082	11620	11202	10220	10138	9331	9148
15	2004	7973	8488	9270	7917	8819	10878	11128	11084	10589	10082	9044	9213
15	2003	7950	8153	8646	8652	9685	10432	11045	10740	10157	9911	8769	8903
15	2002							10790	11931	10184	9650	8780	8810
Average		8,311	8,906	9,355	9,447	10,275	11,151	11,429	11,449	10,918	10,400	9,378	8,970
% of highest month		73%	78%	82%	83%	90%	97%	100%	100%	95%	91%	82%	78%
Peak Season Factor		1.38	1.29	1.22	1.21	1.11	1.03	1.00	1.00	1.05	1.10	1.22	1.28

The existing peak hour traffic, adjusted for peak season, is represented in Figure 5. Count summaries are included in Appendix B.



Figure 5 – Existing Peak Hour Traffic adjusted for Peak Season
 (From counts 3/27/2021)



6. Study Years Traffic Volumes

Future background traffic is determined in this section.

The study years are 2023 and 2043. The Grand Valley Metropolitan Planning Organization (GVMPO) provided traffic volumes from the Regional Travel Demand Model (RTDM), base 2018 + future 2045, and are the basis for the following growth factors. Note that the study model period uses 2019 instead of 2018 as directed by the GVMPO.

Table 5 – Road Segment Growth

Road	Segment	ADT		Period Growth Factor	Avg. Annual Growth Rate	2 - year growth factor (2021-2023)	22 - year growth factor (2021-2043)
		2019	2045				
SH 6 & 50	Both Sides	13,745	19,458	1.416	1.35	1.027	1.343

These growth factors were used to determine future peak hour background traffic volumes, as shown in the peak hour traffic calculations provided in Appendix C.

7. Study Period Volumes

Future background traffic includes the current land use traffic at the site and the through volumes with the growth factors applied to the seasonally adjusted current traffic volumes.

Total traffic volumes consist of future background traffic volumes plus Project trips to demonstrate the proposed use of the site. The following figures present background and total peak hour traffic for the Saturday peak hour study period. Calculations are included in Appendix C.



Figure 6 – Background Peak Hour Future Traffic (Year 2023)

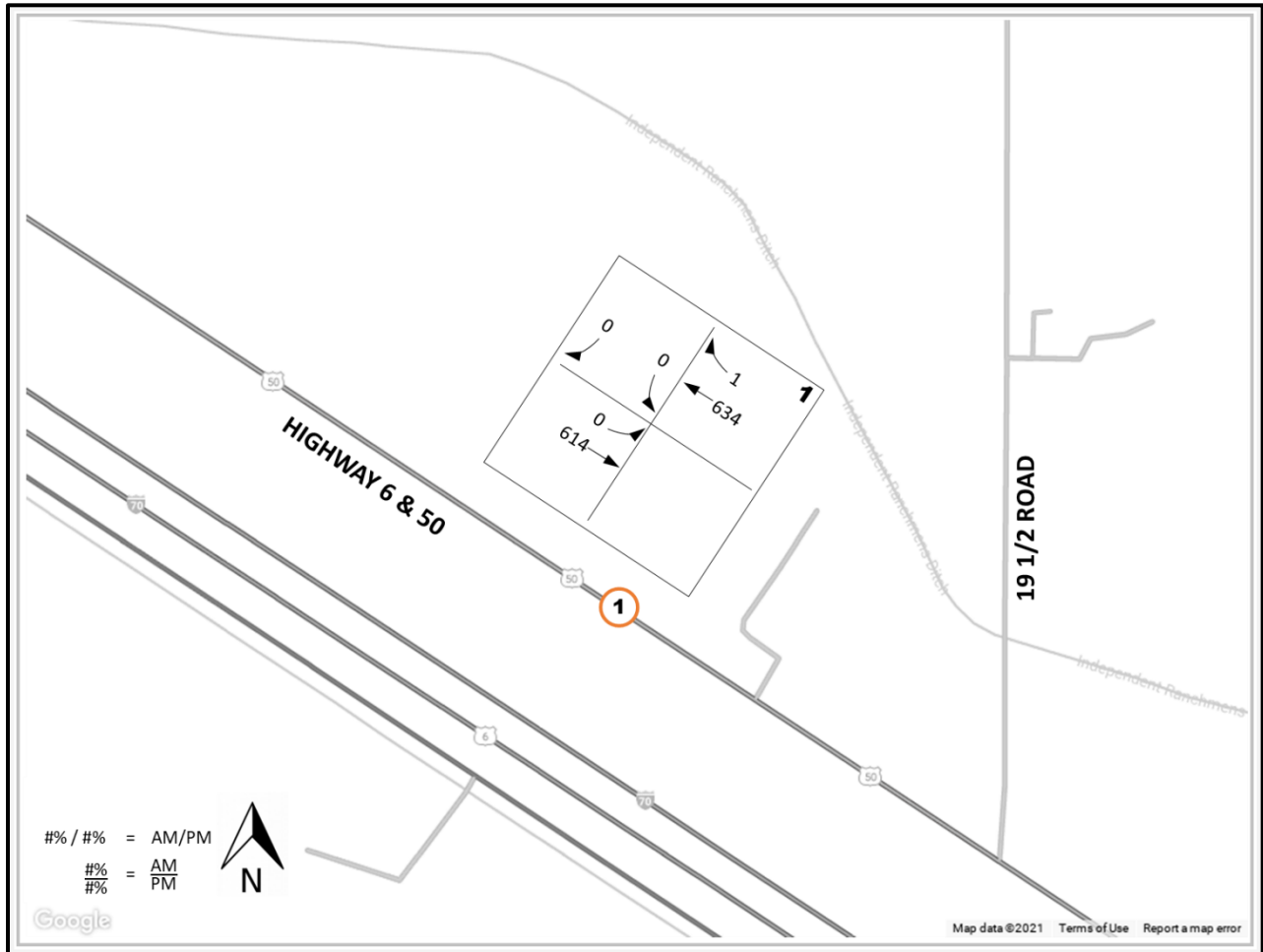


Figure 7 –Total Peak Hour Future Traffic (Year 2023)

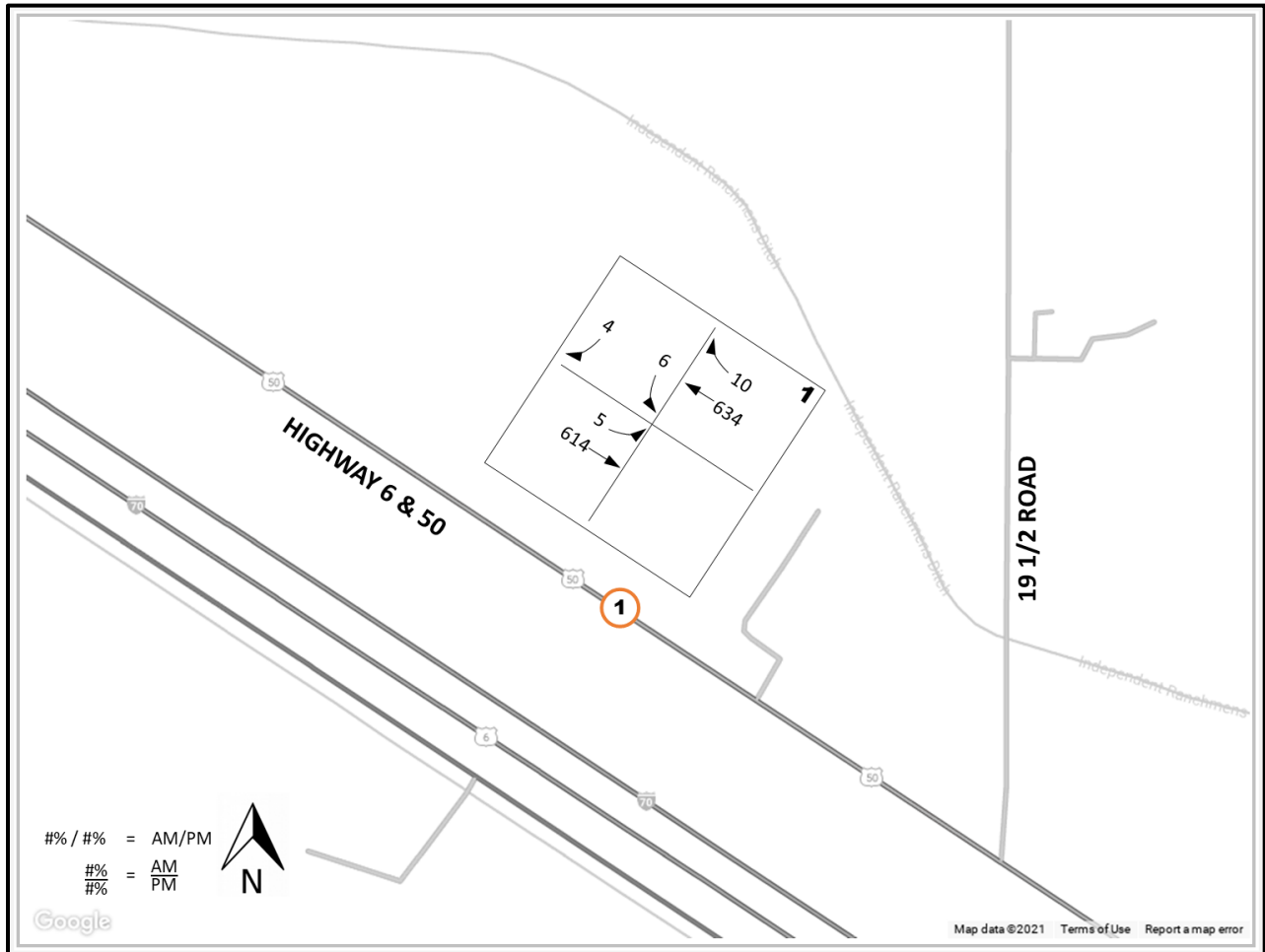


Figure 8 – Background Peak Hour Future Traffic (Year 2043)

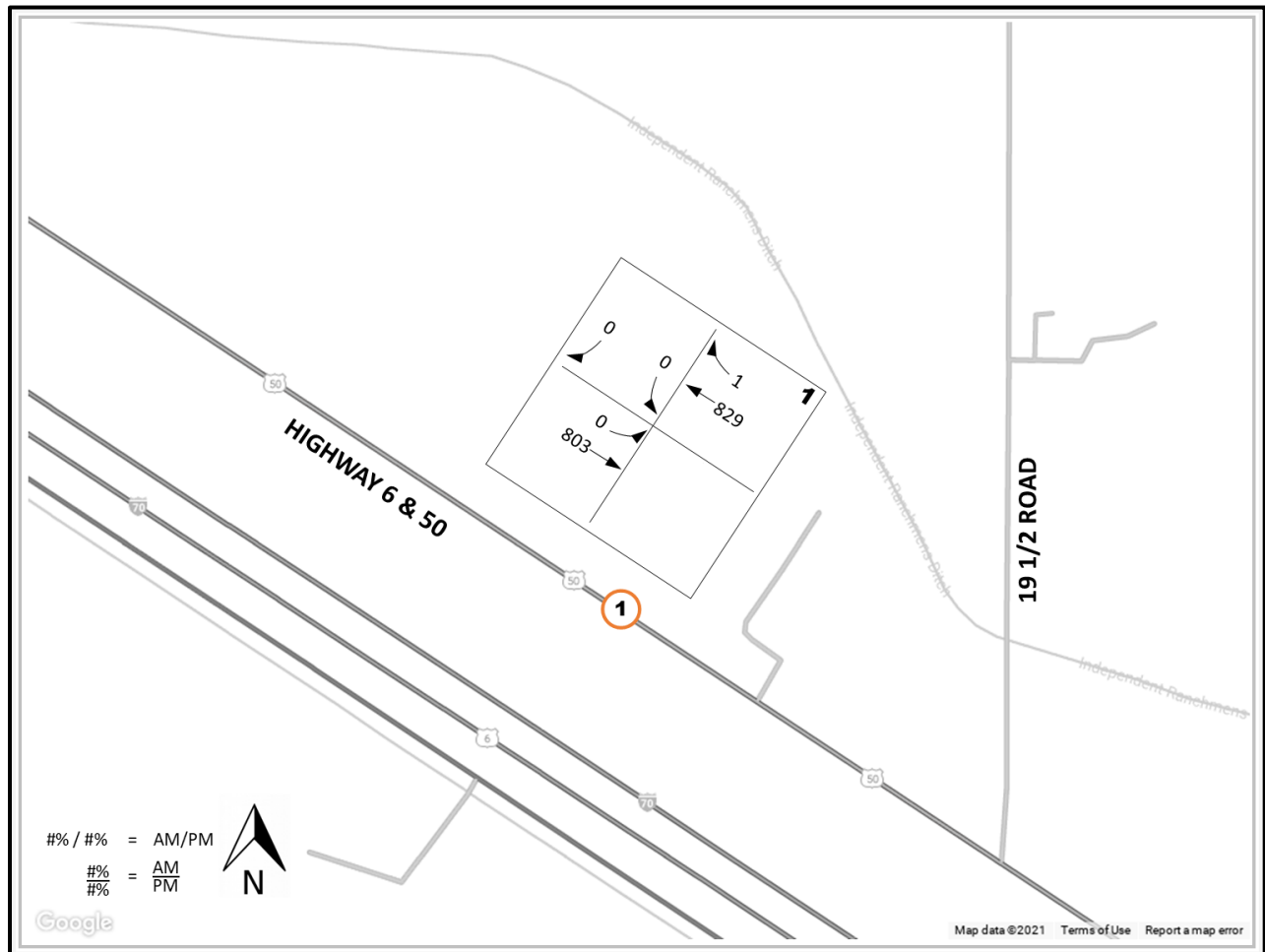
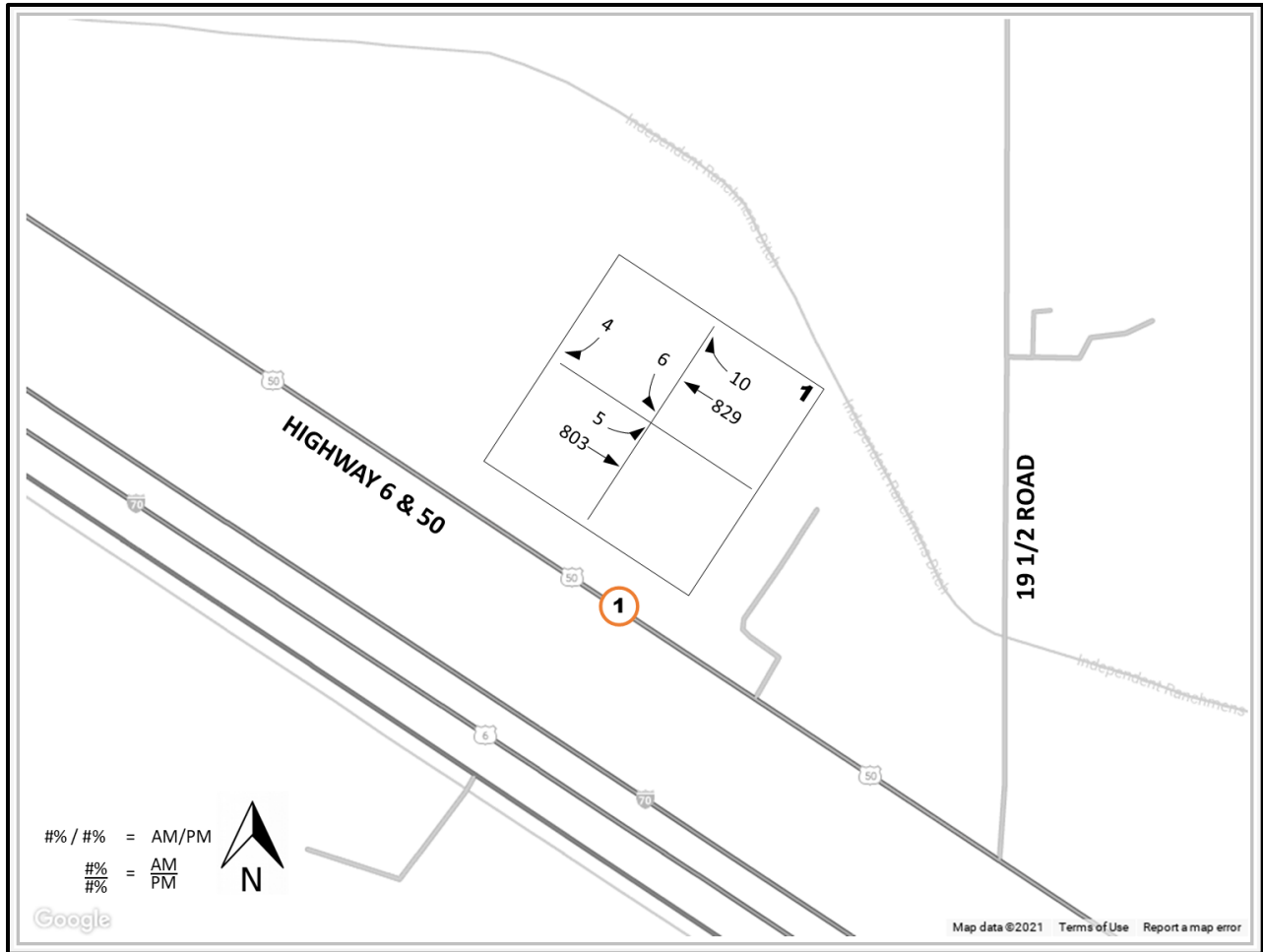


Figure 9 – Total Peak Hour Future Traffic (Year 2043)



8. Auxiliary Turn Lane Evaluation

The need for auxiliary lanes was based on the turn lane warrants listed in the SHAC. The following table shows the data and criteria necessary to identify the need for exclusive right-turn and left-turn deceleration and acceleration lanes at the intersections in the Study area.

SH 6A is an east west highway with milepost markings increasing from west to east and is classified by CDOT as R-A.

Table 6 – Comparison of Turning Volumes to Turn Lane Requirements

SH 6A & Project Access (Year 2043 Condition)			
Speed Limit = 55 mph			
Auxiliary Lane	Turning Volume (VPH)	CDOT Auxiliary Lane Requirements	Lane Required?
WB Right Turn Deceleration Lane (inbound)	10	Greater than 25 vph	NO
EB Left Turn Deceleration Lane (inbound)	5	Greater than 10 vph	NO
SB Right Turn Acceleration Lane (outbound)	4	More than 50 vph, with speed limit over 40 mph	NO
SB Left Turn Acceleration Lane (outbound)	6	May be req'd if benefit to safety and operations. Generally not required if speed < 45 mph	NO

Auxiliary lanes are not required for this Project.

9. Intersection Sight Distance

SH 6A is a 2-lane roadway with a posted speed limit of 55 mph with a grade less than 3% travelling from the east to the west of the Project access (Intersection 1). Sight distance increases are not required, and the study will not use reductions in sight distance that are allowed for grades greater than 3%.

The required sight distance for a vehicle traveling on the highway toward the access is 550 feet for a 55 mph speed limit (from Table 4-1 SHAC). The observed sight distance is greater than 550 feet from each direction of travel to the Project access. Refer to Images 1 and 2.



Image 1 – Looking East from 550’ West of the Project Access



Image 2 – Looking West from 550’ East of the Project Access



The required sight distance for passenger cars and pickup trucks entering the roadway with a posted speed limit of 55 mph is 550 feet per SHAC, Table 4-2. The observed sight distance is greater than 550 feet looking north and south at the highway access, as shown in Images 3 and 4.

Image 3 – Looking East 550’ from the Project Access



Image 4 – Looking West 550’ from the Project Access



10. Existing Access Permits

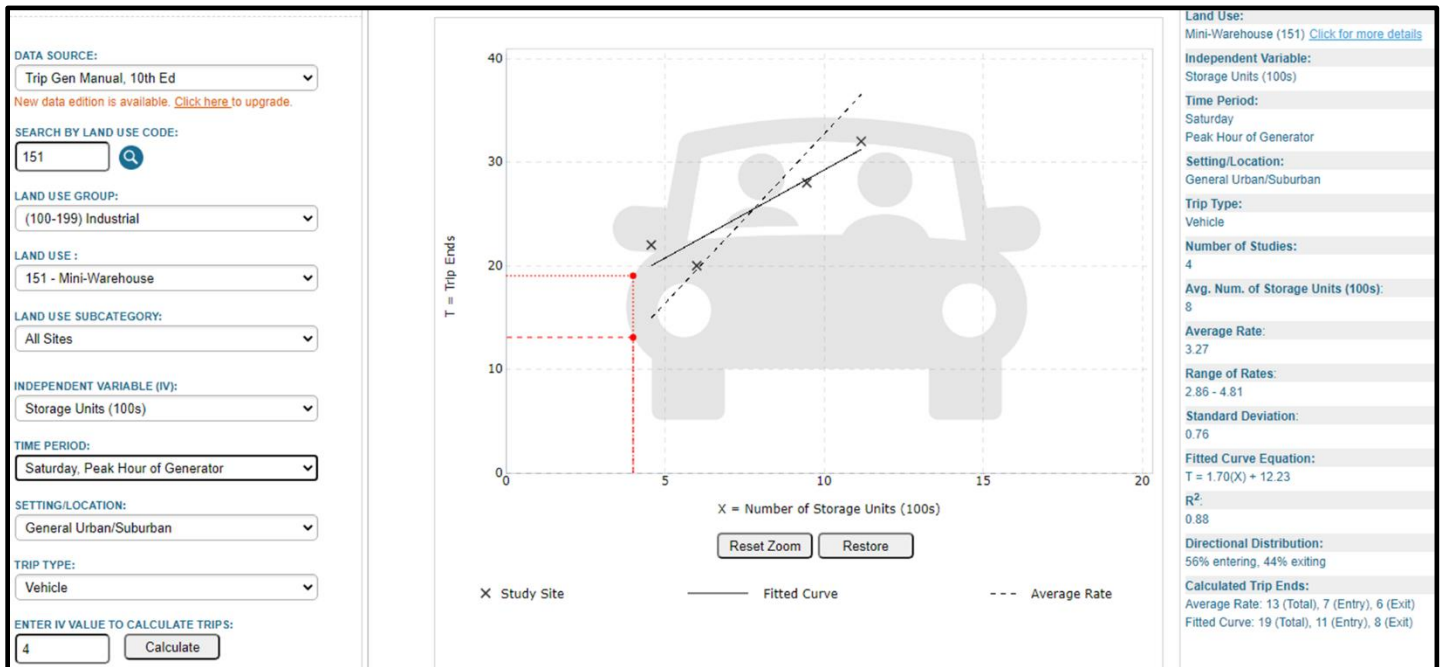
No permits are recorded for the existing Project access.

11. Summary and Recommendations

- The project results in an overall increase in traffic at the Project site from the existing volume of 1 vph in the peak hour to 25 vph in the PM peak hour.
- A CDOT access permit is required at the Project access for a DHV permit volume of 25 trips.
- CDOT has recommended to City of Fruita Staff, that a shared access be provided on the east property line with the adjacent property owner. The access should be moved to the east property line and an easement for half of the shared access should be provided.



Appendix A – Project Trip Generation



Project Mini-Warehouse Peak Hour Trips

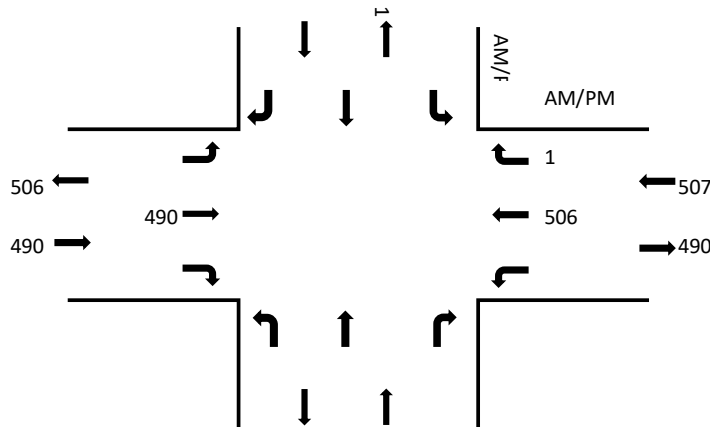
RV Storage Rate Calculation

	Trips	Count Area (Acres)	Rate (Trips/Acre)	Project Area (Acres)	Project Trips (Rounded)
ADT	36	8.57	4.2	4	17
Peak Trips	9	8.57	1.1	4	5

Appendix B – Intersection Turning Movement Count Traffic Summaries

14:00	0	108	0	0	0	116	0	0	0	0	0	0	0	0	0	0	0	224
14:15	0	91	0	0	0	114	0	0	0	0	0	0	0	0	0	0	0	205
14:30	0	108	0	0	0	108	0	0	0	0	0	0	0	0	0	0	0	216
14:45	0	103	0	0	0	110	0	0	0	0	0	0	0	0	0	0	0	213
15:00	0	98	0	0	0	117	0	0	0	0	0	0	0	0	0	0	0	215
15:15	0	96	0	0	0	112	0	0	0	0	0	0	0	0	0	0	0	208
15:30	0	102	0	0	0	108	0	0	0	0	0	0	0	0	0	0	0	210
15:45	0	90	0	0	0	119	0	0	0	0	0	0	0	0	0	0	0	209
16:00	0	99	0	0	0	131	0	0	0	0	0	0	0	0	0	0	0	230
16:15	0	94	0	0	0	110	0	0	0	0	0	0	0	0	0	0	0	204
16:30	0	99	0	0	0	109	0	0	0	0	0	0	0	0	0	0	0	208
16:45	0	81	0	0	0	118	0	0	0	0	0	0	0	0	0	0	0	199
17:00	0	85	0	0	0	114	0	0	0	0	0	0	0	0	0	0	0	199
17:15	0	73	0	0	0	125	0	0	0	0	0	0	0	0	0	0	0	198
17:30	0	80	0	0	0	102	0	0	0	0	0	0	0	0	0	0	0	182
17:45	0	84	0	0	0	97	0	0	0	0	0	0	0	0	0	0	0	181
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	4184	0	0	0	4156	1	0	0	0	0	0	0	1	0	0	0	8342

Peak Hr	0	490	0	0	0	506	1	0	0	0	0	0	0	0	0	0	0	997						
														EB	WB	NB	SB	Total						
Intersection Peak Hour:	11:15																			490	507	0	0	997



Appendix C – Peak Hour Traffic Calculations

INT 1 - SH 6 & Project Access

4/19/2021

HWY 50 RV Storage

Saturday Condition												
Description	Eastbound			Westbound			Northbound			Southbound		
	L	TH	R	L	TH	R	L	TH	R	L	TH	R
Existing Volumes	0	490			506	1				0		0
¹ Seasonally Adjusted base volumes	0	598	0	0	617	1	0	0	0	0	0	0
Trip Distribution % Inbound Phase 1	37%	0%	0%	0%	0%	63%	0%	0%	0%	0%	0%	0%
Trip Distribution % Outbound Phase 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	63%	0%	37%
Driveway Enter "1" Yes, or "0" No Phase 1	1	1	1	1	1	1	1	1	1	1	1	1
Trip Distribution % Inbound Phase 2	37%	0%	0%	0%	0%	63%	0%	0%	0%	0%	0%	0%
Trip Distribution % Outbound Phase 2	0%	0%	0%	0%	0%	0%	0%	0%	0%	63%	0%	37%
Driveway Enter "1" Yes, or "0" No Phase 2	1	1	1	1	1	1	1	1	1	1	1	1
Project Trip Volume Inbound - Phase 1	5	0	0	0	0	9	0	0	0	0	0	0
Project Trip Volume Outbound - Phase 1	0	0	0	0	0	0	0	0	0	6	0	4
Project Trip Volume Total - Phase 1	5	0	0	0	0	9	0	0	0	6	0	4
Project Trip Volume Inbound - Phase 2	5	0	0	0	0	9	0	0	0	0	0	0
Project Trip Volume Outbound - Phase 2	0	0	0	0	0	0	0	0	0	6	0	4
Project Trip Volume Total - Phase 2	5	0	0	0	0	9	0	0	0	6	0	4
Growth Factor Period 1	1.000	1.027	0.000	0.000	1.027	1.000	0.000	0.000	0.000	1.000	0.000	1.000
Growth Factor Period 2	1.000	1.343	0.000	0.000	1.343	1.000	0.000	0.000	0.000	1.000	0.000	1.000
Future Background Volume - Period 1	0	614			634	1				0		0
Future Background Volume - Period 2	0	803			829	1				0		0
Other Trip Assignment AM Period 1												
Other Trip Assignment AM Period 2												
Total Future Volume - Period 1	5	614			634	10				6		4
Total Future Volume - Period 2	5	803			829	10				6		4