

TECHNICAL MEMORANDUM

DATE: September 23, 2016

TO: Mr. Garry Ford, P.E., PTOE, City Engineer

City of New Braunfels, Texas

FROM: John Friebele, P.E., PTOE

Lee Engineering, LLC

SUBJECT: Task Order #6-D – All-way Stop Evaluation, Gruene Rd. & Gruene Lake Dr.

(Technical Memorandum 128.06-D)

SUBJECT

All-way stop evaluation for the intersection of Gruene Rd. and Gruene Lake Dr.

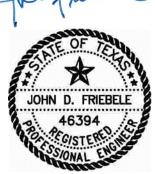
BACKGROUND

An all-way stop evaluation was performed for the intersection of Gruene Rd. and Gruene Lake Dr. The evaluation included an all-way stop warrant analysis along with the review of other characteristics of the intersection.

This intersection is located in the north-eastern part of the City east of the Loop 337/SH 46 and Hanz Dr. intersection. It is a four-legged intersection, with the east leg leading to Gruene Lake Village. Both streets have one approach lane. A site visit determined that the existing sight distance is acceptable for all approaches of the intersection and does not interfere drivers' ability to make a safe movement.

Crash information was obtained for this location, from the TxDOT Crash Records Information System (CRIS), for the 2-year period of January 1, 2013 through December 31, 2014. According to the data, there was two reported crashes at this intersection. One of the crashes that occurred is considered correctable, however five correctable crashes are required to meet the warrant criteria.

Traffic volumes were collected for this location over a 24-hour period on September 8, 2016. Based on the traffic volumes and roadway classifications, Gruene Rd. was selected as the "Major" street and Guene Lake Dr. was selected as the "Minor" street. Total intersection volume is 6,582 vehicles per day (vpd) with Gruene Rd. having 5,514 daily approach vehicles (84% of total) and Guene Lake Dr. having 1,068 vpd (16%). Hourly traffic volumes are modest with only one hour exceeding 300 approach vehicles on the major street (Gruene Rd.)



All-way Stop Evaluation Gruene Rd. & Gruene Lake Dr. 2 | P a g e

The all-way stop warrant analysis was conducted using recommendations made by the *Manual on Uniform Traffic Control Devices* (MUTCD) which include:

- 1. Review average volume for eight hours
 - a. Required volume for major street 300 vehicles per hour
 - b. Required volume for minor street 200 vehicles per hour
- 2. Review sight visibility at corners
- 3. Review number of correctable accidents within a 12-month period

CONCLUSION

The analysis concludes that none of the three warranting recommended criteria are met at the intersection.

ATTACHMENTS

- 1. All-way stop warrant analysis
- 2. 24-hr traffic volumes

TRAFFIC SIGNAL WARRANT STUDY GRUENE RD and GRUENE LAKE DR

M. U. T. C. D. MULTIWAY STOP - WARRANT # C Minimum Volume

REQUIRED AVERAGE VOLUME FOR 8 HOURS ON GRUENE RD	300
REQUIRED AVERAGE VOLUME FOR 8 HOURS ON GRUENE LAKE DR	200
REQUIRED PEAK HOUR DELAY ON GRUENE RD	30
REQUIRED PEAK HOUR DELAY ON GRUENE LAKE DR	Not Measured
NUMBER OF EIGHT-HOUR PERIODS SATISFIED:	0

WARRANT CRITERIA: NOT SATISFIED

RANKING BY MAJOR STREET GRUENE RD HOURLY VOLUMES

HOURLY VOLUME					
	BEGIN	MAJOR	MINOR		
RANK	TIME	STREET	STREET		
1	5:00 PM	489	85		
2	4:00 PM	447	114		
3	3:00 PM	439	69		
4	6:00 PM	424	93		
5	11:00 AM	396	88		
6	2:00 PM	368	63		
7	7:00 PM	357	42		
8	NOON	332	68		
9	1:00 PM	319	93		
10	10:00 AM	317	73		
11	9:00 AM	286	61		
12	8:00 PM	258	47		
13	8:00 AM	221	55		
14	10:00 PM	204	7		
15	9:00 PM	199	37		
16	11:00 PM	147	3		
17	7:00 AM	122	40		
18	MIDNITE	92	0		
19	6:00 AM	45	22		
20	1:00 AM	18	3		
21	5:00 AM	12	2		
22	2:00 AM	9	2		
23	3:00 AM	8	1		
24	4:00 AM	5	0		

AVERAGE OF EIGHT HOURLY VOLUMES						
RANKED	MAJOR	MINOR				
HOURS	STREET	STREET	SATISFIED?			
1 to 8	407	78	NO			
2 to 9	385	79	NO			
3 to 10	369	74	NO			
4 to 11	350	73	NO			
5 to 12	329	67	NO			
6 to 13	307	63	NO			
7 to 14	287	56	NO			
8 to 15	267	55	NO			
9 to 16	244	47	NO			
10 to 17	219	40	NO			
11 to 18	191	31	NO			
12 to 19	161	26	NO			
13 to 20	131	21	NO			
14 to 21	105	14	NO			
15 to 22	81	14	NO			
16 to 23	57	9	NO			
17 to 24	39	9	NO			

- 1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day, and
- 2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, but
 - 3. If the 85th-percentile approach speed of the major-street vehicular traffic exceeds 65 km/h or exceeds 40 mph, the minimum vehicular volume warrants are 70% of the above values.

ANALYIST: MRM





Average Daily Traffic Data

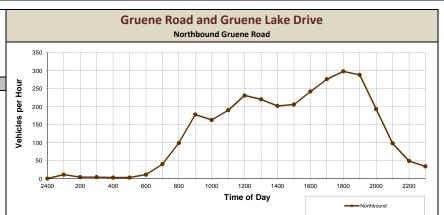
 Project No. :
 91-16

 Station No. :
 100

 Counter No. :
 7589

Day of Week: Thursday, September 08, 2016

Site: Northbound
Gruene Road
Location: South of Gruene Lake Drive
City/State: New Braunfels, Texas



End Time		Northbound	
15	0	Gruene Road	
	8		
30 45	0		
	0	11	
100		11	
115 130	0 1		
145	3		
200	0	4	
215	2	4	
230	0		
245	1		
300	1	4	
315	0	4	
330	1		
345	0		
400	2	3	
415	1	<u> </u>	
430	0		
445	1		
500	1	3	
515	3	<u> </u>	
530	0		
545	4		
600	4	11	
615	5	11	
630	14		
645	6		
700	15	40	
715	17	-	
730	25		
745	22		
800	35	99	
815	58		
830	44		
845	38		
900	38	178	
915	43		
930	35		
945	40		
1000	45	163	
1015	43		
1030	41		
1045	52		
1100	54	190	
1115	43		
1130	66		
1145	57		
1200	65	231	

		Northbound	
End Time		Gruene Road	
1215	55		
1230	51		
1245	52		
1300	62	220	
1315	56		
1330	46		
1345	61		
1400	39	202	
1415	48		
1430	52		
1445	46		
1500	60	206	
1515	49		
1530	68		
1545	65		
1600	60	242	
1615	85		
1630	72		
1645	61		
1700	58	276	
1715	75		
1730	75		
1745	77		
1800	71	298	
1815	87		
1830	77		
1845	69		
1900	55	288	
1915	56		
1930	64		
1945	28		
2000	45	193	
2015	28		
2030	32		
2045	16	00	
2100 2115	22 21	98	
2113	11		
2130	9		
2200	8	49	
2215	10	49	
2230	9		
2245	9		
2300	6	34	
2315	4	<u> </u>	
2330	4		
2345	0		
2400	2	10	
Daily Traffic Data		3,053	
Total ADT			053
		3,0	



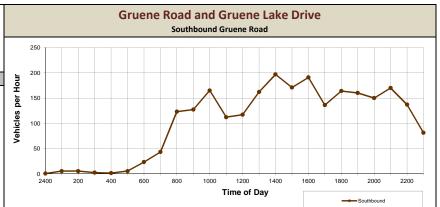
Average Daily Traffic Data

Project No.: Station No.: 200 Counter No. : 6343

Day of Week: Thursday, September 08, 2016

Southbound

Site: **Gruene Road** Location: North of Gruene Lake Drive City/State: New Braunfels, Texas



End Time		Southbound		
		Gruene Road		
15	3			
30	2			
45	0			
100	0	5		
115	2			
130	2			
145	1			
200	0	5	 	
215	0			
230	0			
245	1	_		
300	1	2		
315	1			
330	0			
345	0			
400	0	1	_	
415	1			
430	1			
445	1	-		
500	2	5		
515	1 4			
530	2			
545		22		
600	16 8	23		
615 630	7			
645	9			
700	19	43		
715	19	45		
730	25			
745	43			
800	36	123		
815	42	143		
830	34			
845	24			
900	27	127		
915	24			
930	42			
945	47			
1000	52	165		
1015	23	_00		
1030	34			
1045	29			
1100	26	112		
1115	22			
1130	28			
1145	37			
1200	30	117		

1215 35	End Time		Southbound	
1230			Gruene Road	
1245		35		
1300	1230	36		
1315	1245	43		
1330	1300	48	162	
1345				
1400 53 197 1415 55 1430 29 1445 47 1500 40 171 1515 64 1530 37 1545 43 1600 47 191 1615 30 1630 42 1645 40 1700 24 136 1715 39 1730 46 1745 43 1800 36 164 1815 28 1830 43 1845 47 1900 42 160 1915 46 1930 28 1945 48 2000 28 150 2015 38 2030 56 2045 43 2100 33 170 2115 52 2200 19 137 2215 35 2230 17 2245 19 2300 10 81 2315 6 2330 4 2345 1 2	1330	55		
1415	1345	41		
1430	1400	53	197	
1445	1415	55		
1500	1430	29		
1515	1445	47		
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Daily Traffic Data 2,461				
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Total ADT 2,461	Total ADT		2,	461



Average Daily Traffic Data

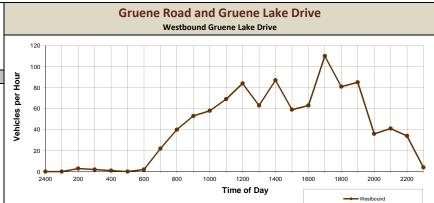
 Project No. :
 91-16

 Station No. :
 300

 Counter No. :
 4788

Day of Week: Thursday, September 08, 2016

Site: Westbound
Gruene Lake Drive
Location: East of Gruene Road
City/State: New Braunfels, Texas



15 0 12 30 0 112 45 0 12	End Time		Westbound		End '
30 0 0 12 12 13 13 15 15 15 15 15 15 16 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18	2.10 1.11.0	Gı	ruene Lake Drive		2.1.0
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945 12 1000 12 1015 16 1030 24 1045 13 1100 16 69 1115 25 1130 19 1145 21 123 22 124 23 125 23 127 23 128 24 129 23 1200 19 84					
1000 12 58 1015 16 1030 24 1045 13 1100 16 69 1115 25 1130 19 1145 21 1200 19 84					
1015 16 1030 24 1045 13 1100 16 69 1115 25 1130 19 1145 21 1200 19 84					
1030 24 1045 13 1100 16 69 23 1115 25 1130 19 1145 21 1200 19 84 24			58		
1045 13 1100 16 69 1115 25 1130 19 1145 21 1200 19 84					
1100 16 69 1115 25 23 1130 19 23 1145 21 23 1200 19 84					
1115 25 1130 19 1145 21 1200 19 84					
1130 19 1145 21 1200 19 84			69		
1145 21 1200 19 84 23					
1200 19 84 24					
Dail	1200	19	84		
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End Time		Westbound	
	Gr	uene Lake Drive	
1215	18		
1230	20		
1245	7		
1300	18	63	
1315	31		
1330	28		
1345	15		
1400	13	87	
1415	12		
1430	19		
1445	13		
1500	15	59	
1515	13		
1530	20		
1545	13		
1600	17	63	
1615	26		
1630	32		
1645	35		
1700	17	110	
1715	23		
1730	15		
1745	25		
1800	18	81	
1815	22		
1830	17		
1845	24		
1900	22	85	
1915	14		
1930	9		
1945	10		
2000	3	36	
2015	5		
2030	14		
2045	14		
2100	8	41	
2115	14		
2130	8		
2145	7		
2200	5	34	
2215	2		
2230	0		
2245	0		
2300	2	4	
2315	0		
2330	0		
2345	1		
2400	0	1	
Daily Traffic Data		998	
Total ADT		9	98