

Traffic Signal Warrant Analysis

Rosewood Drive & Fawn Drive and Rosewood Drive & Aspen Drive

November 3, 2022

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KHA #064405314

City of Killeen

Rosewood Drive & Fawn Drive Rosewood Drive & Aspen Drive



November 3, 2022
<u>Prepared By:</u>
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Contents

Executive Summary	1
Introduction	2
Purpose	2
Existing Conditions	2
Site Location	2
Study Roadways	2
Intersection Conditions	2
Traffic Volumes	7
Traffic Signal Warrant Analysis – Rosewood Drive & Fawn Drive	8
Assumptions	8
Study Procedure and Analysis Results	8
Warrant 1 – Eight Hour Vehicular Volume	9
Warrant 2 – Four Hour Vehicular Volume	15
Warrant 3 – Peak Hour Volume	16
Warrant 4 – Pedestrian Volume	18
Warrant 5 – School Crossing	18
Warrant 6 – Coordinated Signal System	18
Warrant 7 – Crash Experience	18
Warrant 8 – Roadway Network	20
Warrant 9 – Intersection near a Grade Crossing	20
Traffic Signal Warrant Analysis Summary	21
Traffic Signal Warrant Analysis – Rosewood Drive & Aspen Drive	22
Assumptions	22
Study Procedure and Analysis Results	22
Warrant 1 – Eight Hour Vehicular Volume	23
Warrant 2 – Four Hour Vehicular Volume	29
Warrant 3 – Peak Hour Volume	30
Warrant 4 – Pedestrian Volume	32
Warrant 5 – School Crossing	32
Warrant 6 – Coordinated Signal System	32

Warrant 7 – Crash Experience	
Warrant 8 – Roadway Network	1
Warrant 9 – Intersection near a Grade Crossing	1
Traffic Signal Warrant Analysis Summary	2
Conclusion and Recommendations	3

Figures

Figure 1: Site Location and Signalized Intersections	4
Figure 2: Rosewood Drive & Fawn Drive Lane Assignments and Stop-Control	5
Figure 3: Rosewood Drive & Aspen Drive Lane Assignments and Stop-Control	6
Figure 4: Warrant 1A	12
Figure 5: Warrant 1B	13
Figure 6: Warrant 1A&B	14
Figure 7: Warrant 2 (100%) - Four Hour Vehicular Volume	15
Figure 8: Warrant 3A (70%) - Peak Hour Volume	16
Figure 9: Warrant 3B (100%) - Peak Hour Volume	17
Figure 10: Warrant 1A	26
Figure 11: Warrant 1B	27
Figure 12: Warrant 1A&B	
Figure 13: Warrant 2 (70%) - Four Hour Vehicular Volume	29
Figure 14: Warrant 3A (70%) - Peak Hour Volume	
Figure 15: Warrant 3B (70%) - Peak Hour Volume	31

Tables

Table 1: Summary of Traffic Signal Warrant Analysis	1
Table 2: Warrant 1 – Eight Hour Vehicular Volume	.10
Table 3: Warrant 1 – Eight Hour Vehicular Volume Worksheet	.11
Table 4: Collision Types 2018-2021	.19
Table 5: Warrant 7 – Crash Experience	.19
Table 6: Summary of Warrants	21
Table 7: Warrant 1 – Eight Hour Vehicular Volume	24
Table 8: Warrant 1 – Eight Hour Vehicular Volume Worksheet	.25
Table 9: Collision Types 2018-2021	.33
Table 10: Warrant 7 – Crash Experience	.33
Table 11: Summary of Warrants	2
Table 12: Summary of Traffic Signal Warrant Analysis	3

Appendices

Appendix A: 2022 Existing Traffic Counts	A
Appendix B: Photo Log	B
Appendix C: Synchro Reports	D
Appendix D: Signal Warrants	D

EXECUTIVE SUMMARY

The objective of this analysis is to determine whether a traffic signal is warranted at either the unsignalized intersection of Rosewood Drive & Fawn Drive or the unsignalized intersection of Rosewood Drive & Aspen Drive.

The methodology used for the traffic signal warrant analysis is based on the procedure in the Texas Manual on Uniform Traffic Control Devices (TMUTCD) and is summarized below:

- Turning movement counts were collected both intersections in 15-minute increments for twelve hours on Wednesday August 31, 2022. Tube counts were collected along Rosewood Drive, Fawn Drive, and Aspen Drive for twenty-four hours on the same day. Hourly volumes were analyzed for each warrant volume criteria to determine if a minimum volume was met.
- A site visit was conducted to determine existing traffic controls, posted speed limits, lane widths, lane assignments, pedestrian facilities, and existing utilities.
- Crash data were analyzed, and crash diagrams were developed to determine if significant volumes of collisions occurred which would otherwise be preventable by the presence of a traffic signal.
- This study assumes the speed limit along Rosewood Drive will be raised to 45mph per City staff.

Table 1 below summarizes results of the traffic warrant analysis for the study intersection.

Warrant Number	Warrant Description	Rosewood Drive & Fawn Drive	Rosewood Drive & Aspen Drive
Warrant 1	Eight-Hour Vehicular Volume	No	No
Warrant 2	Four-Hour Vehicular Volume	Yes	No
Warrant 3	Peak-Hour Vehicular Volume	Yes (Warrant B)	Yes (Warrant B)
Warrant 4	Pedestrian Volume	No	No
Warrant 5	School Crossing	No	No
Warrant 6	Coordinated Signal System	No	No
Warrant 7	Crash Experience	No	No
Warrant 8	Roadway Network	No	No
Warrant 9	Intersection Near a Railroad Grade Crossing	No	No

Table 1: Summary of Traffic Signal Warrant Analysis

Based on the criteria, a traffic signal is recommended at both the intersection of Rosewood Drive & Fawn Drive and at the intersection of Rosewood Drive & Aspen Drive.

INTRODUCTION

PURPOSE

Kimley-Horn and Associates, Inc. was retained to conduct an analysis is to determine whether a traffic signal is warranted at either the unsignalized intersection of Rosewood Drive & Fawn Drive, and the unsignalized intersection of Rosewood Drive & Aspen Drive. These intersections are located in the City of Killeen, Bell County, Texas.

EXISTING CONDITIONS

SITE LOCATION

The intersections of Rosewood Drive & Fawn Drive and of Rosewood Drive & Aspen Drive are located in Bell County within the city limits of Killeen. *Figure 1* shows the site location and indicates the locations of existing signalized intersection within one mile of the study intersections along Rosewood Drive.

STUDY ROADWAYS

The major study area roadways are described below.

Rosewood Drive - is currently a five-lane undivided roadway, with two lanes in each direction of travel and a two-way left turn lane. The roadway is classified by the City of Killeen as a minor arterial. There is a posted speed limit of 35 mph in the northbound and southbound directions in the analysis vicinity. The City is taking ordinance forward to increase the speed limit to 45 mph. With this ordinance going forward, this study assumes a speed limit of 45 mph for Rosewood Drive. There is a 5-foot sidewalk on the westside of the roadway and no bike lanes in the study vicinity.

Fawn Drive - is currently a two-lane undivided roadway, with one lane in each direction of travel. The roadway is classified by the City of Killeen as a local street. There is a posted speed limit of 30 mph in the eastbound and westbound directions. There are 5-foot sidewalks on both sides of the street and no bike lanes in the study vicinity.

Aspen Drive - is currently a two-lane undivided roadway, with one lane in each direction of travel. The roadway is classified by City of Killeen as collector. There is a posted speed limit of 30 mph in the eastbound and westbound directions There are 5-foot sidewalks on both sides of the street and no bike lanes in the study vicinity.

INTERSECTION CONDITIONS

The intersection of Rosewood Drive & Fawn Drive is currently a three-leg intersection with the major road, Rosewood Drive, running in the north-south direction and the minor road, Aspen Drive, running in the east-west direction. The minor approach is stop-controlled while the two major approaches are free. In both the northbound and southbound direction, there is a two-way left-turn lane at the intersection. *Figure 2* is an aerial view of the intersection showing existing geometry, lane assignments, and traffic control.

The intersection of Rosewood Drive & Aspen Drive is currently a three-leg intersection with the major road, Rosewood Drive, running in the north-south direction and the minor road, Aspen Drive, running in the east-west direction. The minor approach is stop-controlled while the two major approaches are free. In both the northbound and southbound direction, there is a two-way left-turn lane at the intersection. *Figure 3* is an aerial view of the intersection showing existing geometry, lane assignments, and traffic control.

A site visit was conducted to determine posted speed limits, lane widths, pedestrian facilities, and utilities. In addition, photographs of each intersection approach were taken for verification of field data. Photos of each approach leg are provided in *Appendix C*. There are no existing school zone related speed reductions along any study roadways.

Figure 1: Site Location and Signalized Intersections

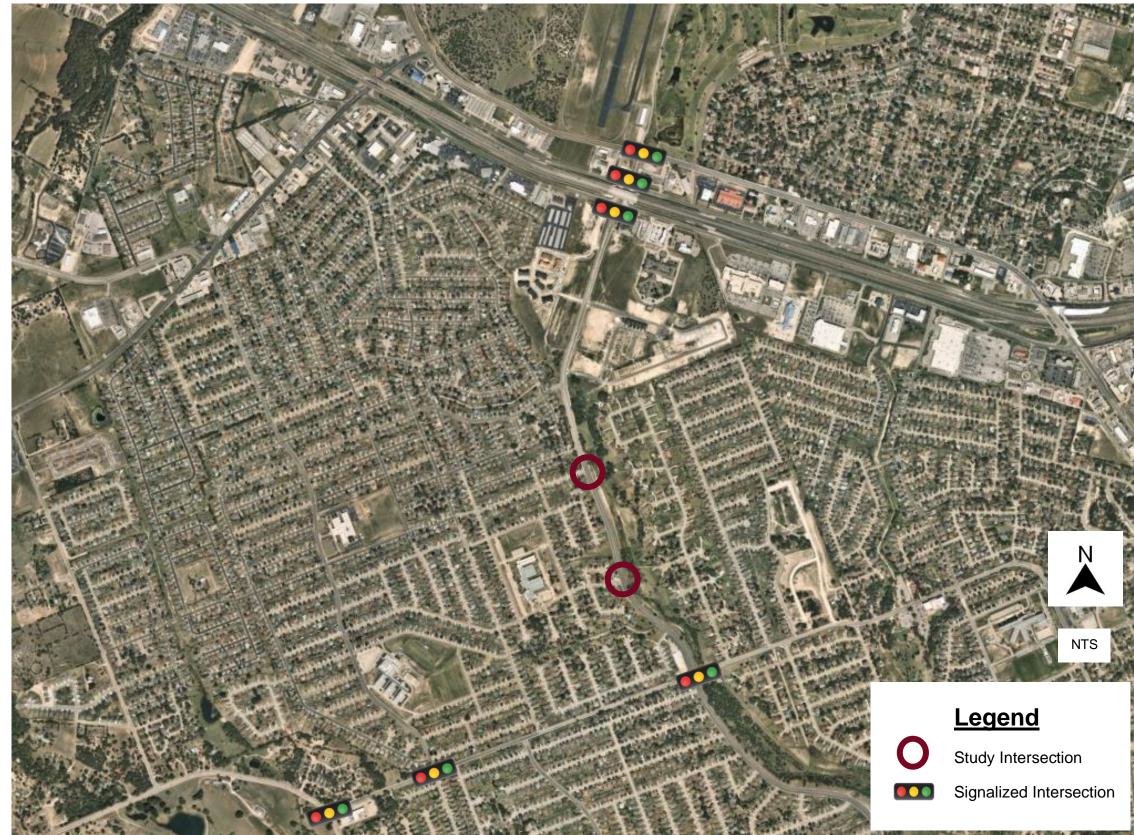




Figure 2: Rosewood Drive & Fawn Drive Lane Assignments and Stop-Control

Figure 3: Rosewood Drive & Aspen Drive Lane Assignments and Stop-Control



TRAFFIC VOLUMES

Existing turning movement counts were collected at three intersections during twelve (12) hours from 6:30 am to 6:30 pm on Wednesday, August 31, 2022. Existing tube counts were collected along Rosewood Drive, Fawn Drive, and Aspen Drive during twenty-four (24) hours from 12:00 am to 11:59 pm on the same date. Traffic count data is included in *Appendix B*.

- 1. Rosewood Drive & Fawn Drive
 - AM Peak Hour: 7:00 AM 8:00 AM
 - PM Peak Hour: 5:00 PM 6:00 PM
- 2. Rosewood Drive & Aspen Drive
 - AM Peak Hour: 7:00 AM 8:00 AM
 - PM Peak Hour: 5:00 PM 6:00 PM

TRAFFIC SIGNAL WARRANT ANALYSIS – ROSEWOOD DRIVE & FAWN DRIVE

This study documents the results of a traffic signal warrant analysis for the intersection of Rosewood Drive & Fawn Drive in the City of Killeen in Bell County, Texas.

ASSUMPTIONS

Several assumptions were made to analyze the data collected at each study intersection.

- Fawn Drive is treated as an eastbound-westbound roadway and Rosewood Drive is treated as a northbound-southbound roadway.
- The peak hour was determined to be the hour with the greatest vehicular volume. The AM peak and overall intersection peak was determined to be 7:00-8:00 AM, while the PM peak was determined to be 5:00-6:00 PM.
- For warrant analysis at the study intersection, the higher of the two minor street approach volumes was used.

STUDY PROCEDURE AND ANALYSIS RESULTS

The *Texas Manual of Uniform Traffic Control Devices* (Texas MUTCD, 2011 Edition) defines nine (9) warrants, or justifying set of conditions, at least one of which should be fully satisfied before signalization is considered as an option for traffic control. Factors included in the evaluation of these warrants include vehicle and pedestrian traffic volumes, the number of traffic lanes, the prevailing traffic speeds, traffic crash history, and measured delay for minor street traffic. The individual warrants are listed below, followed by a short description and analysis of each.

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour Vehicular Volume
- Warrant 4, Pedestrian Volume
- Warrant 5, School Crossing
- Warrant 6, Coordinated Signal System
- Warrant 7, Crash Experience
- Warrant 8, Roadway Network
- Warrant 9, Intersection Near a Railroad Grade Crossing

WARRANT 1 - EIGHT HOUR VEHICULAR VOLUME

As the title implies, this criterion is applied to the eight highest demand hours of the day for the major and minor street. At least eight hours of the day must exceed the thresholds required in order to warrant a traffic signal using Warrant 1.

Two criteria are checked. Condition A is based on minimum vehicular volumes. Condition B is based on interruption of continuous traffic. For both conditions, there are several reduction factors that may be taken if Condition A or Condition B is not satisfied. The combination of Conditions A & B is intended for application after trial of other alternatives that could cause less delay and inconvenience of traffic has failed to solve the traffic problems. The warrant is satisfied if both Conditions A and B are met with an 80% reduction. If the 85th percentile speed on the major street is greater than 40 mph, or if the intersection lies within the built-up area of an isolated community having a population less than 10,000, the criteria can be reduced by 70% of the original values for Condition A and Condition B or for the combination of Conditions A and B (resulting in 56% of the original value of Condition A and Condition A and Condition B for the combined case).

Table 2 and *Table 3*, as well as *Figure 4*, *Figure 5*, and *Figure 6* show the warrant criteria and traffic counts as they apply to that criteria.

Table 2: Warrant 1 – Eight Hour Vehicular Volume

	nes for moving ch approach	Vehicle (tot	es per hou al of both	ir on majo approach	r street ies)			on higher-v h (one dire	
Major Street	Minor Street	100% ^a	80% ^b	70%°	56% ^d	100% ^a	80% ^b	70%°	56% ^d
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition A-Minimum Vehicular Volume

Condition B-Interruption of Continuous Traffic

	nes for moving ch approach	Vehicle (tot	es per hou al of both	ir on majo approach	r street ies)	Vehicle minor-stre	es per hour et approac	on higher-v h (one dire	volume ction only)
Major Street	Minor Street	100%ª	80% ^b	70%°	56% ^d	100% ^a	80% ^b	70%°	56% ^d
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

^a Basic minimum hourly volume

^b Used for combination of Conditions A and B after adequate trial of other remedial measures

° May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

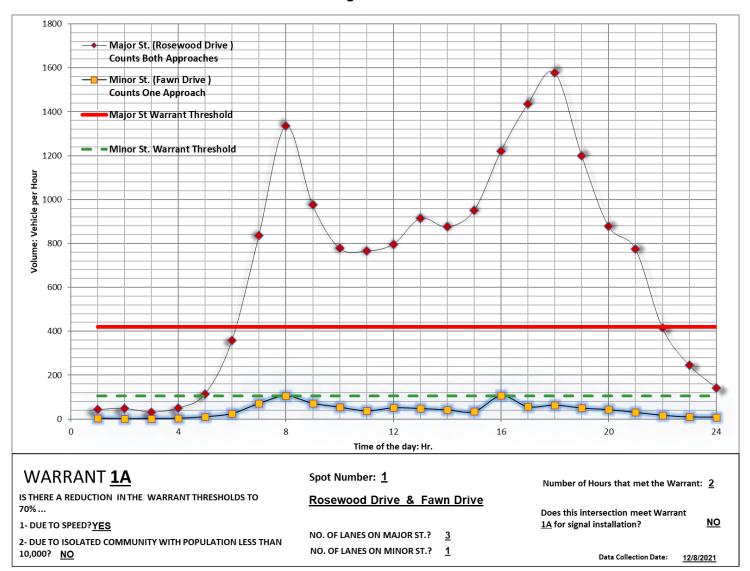
^d May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

**Source: 2011 TMUTCD Table 4C-1

Table 3: Warrant 1 – Eight Hour Vehicular Volume Worksheet

				Te>	Workshee	et for Signal	n Traffic Cor Warrants (Se our Vehicular	ction 4C)	5				
Intersection:	Rosew	ood Drive &	Fawn Drive				our verneular	Volume					
Date	10/31/2022	by	Kimley-Horn										
3	: No. of Lanes	on Maior St?								1			
1	: No. of Lanes												
45	: Speed limit o	r 85th Percer	ntile? (MPH)										
NO	: Is the intersec	tion within a	n Isolated communi	ty?									
	: if answer 4 is	Yes, then wh	at is the population	of the isolated	d community	/?							
NO	: Have other re	medial meas	sures been tried?										
				USE 70% V	VARRANTS 1	A AND 1B. DO	NOT USE CO	MBINATION OF	A & B				
	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
Time	N-S	E-W	70%	70%		70%	70%		56%	56%	56%	56%	
00:01 - 01:00	43	4	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
01:00 - 02:00	48	1	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
02:00 - 03:00 03:00 - 04:00	32 50	2	420 420	105 105	NO NO	630 630	53 53	NO NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
03:00 - 04:00	114	10	420	105	NO	630	53	NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
05:00 - 06:00	358	25	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
06:00 - 07:00	835	72	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
07:00 - 08:00	1336	106	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
08:00 - 09:00	975	72	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
09:00 - 10:00	778	55	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
10:00 - 11:00	766	38	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
11:00 - 12:00	796	51	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
12:00 - 13:00	914	48	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
13:00 - 14:00 14:00 - 15:00	876 950	42 35	420 420	105 105	NO NO	630 630	53 53	NO NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
15:00 - 16:00	1220	107	420	105	YES	630	53	YES	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
16:00 - 17:00	1435	57	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A N/A	N/A
17:00 - 18:00	1578	64	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
18:00 - 19:00	1200	50	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
19:00 - 20:00	878	43	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
20:00 - 21:00	774	30	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
21:00 - 22:00	415	17	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
22:00 - 23:00 23:00 - 24:00	245 142	9 8	420 420	105 105	NO NO	630 630	53 53	NO NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
20.00 - 24.00	172		720	105	NO			-	Number of Ho	ours that met th ours that met th	e Warrant 1A = e Warrant 1B =	2 7	
				Is the Interr	uption of C	ontinuous T	/arrant Met? (raffic Met? ((nd B Criteria	Condition B)					NO NO N/A

Figure 4: Warrant 1A



1800 **Counts Both Approaches** 1600 ——— Minor St. (Fawn Drive) **Counts One Approach** Major St Warrant Threshold 1400 Minor St. Warrant Threshold 1200 Volume: Vehicle per Hour 600 400 200 0 8 0 12 16 20 24 Time of the day: Hr. WARRANT 1B Spot Number: <u>1</u> Number of Hours that met the Warrant: 7 Rosewood Drive & Fawn Drive IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ... Does this intersection meet Warrant $\underline{\mathbf{1B}}$ NO for signal installation? 1- DUE TO SPEED? YES NO. OF LANES ON MAJOR ST.? 3 2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN NO. OF LANES ON MINOR ST.? 1 10,000? <u>NO</u> Data Collection Date: 12/8/2021

Figure 5: Warrant 1B

1800 - Major St. (Rosewood Drive) Counts Both Approaches 1600 –<mark>–</mark>– Minor St. (Fawn Drive) **Counts One Approach** 1400 Major St Warrant Threshold 1A 1200 Minor St. Warrant Threshold Volume: Vehicle per Hour 800 1A •••••• Major St. Warrant Threshold 1B --- Minor St. Warrant Threshold 1B 600 400 200 0 8 12 20 24 0 Λ 16 Time of the day: Hr. WARRANT 1A&B Spot Number: 1 Number of Hours that met the Warrant: 0 Rosewood Drive & Fawn Drive IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 56% ... Does this intersection meet Warrant N/A 1A&B for signal installation? 1- DUE TO SPEED? YES NO. OF LANES ON MAJOR ST.? 3 2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN NO. OF LANES ON MINOR ST.? 1 10,000? <u>NO</u> Data Collection Date: 12/8/2021

Figure 6: Warrant 1A&B

WARRANT 2 - FOUR HOUR VEHICULAR VOLUME

This warrant is similar to the eight-hour warrant and is based on traffic volumes during the highest four hours of the day. Traffic volumes are plotted on a graph to determine if they fall above the warrant curves. The reduction criteria are similar. If one of the two conditions apply, then a second graph with lower curves is used. *Figure 7* shows the data applied to Warrant 2. The traffic signal does meet the requirements of Warrant 2.

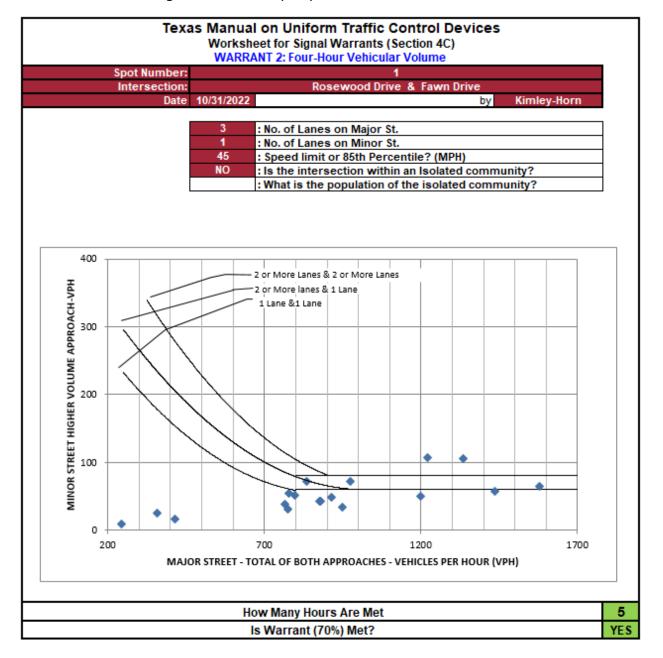


Figure 7: Warrant 2 (70%) - Four Hour Vehicular Volume

WARRANT 3 - PEAK HOUR VOLUME

This warrant is intended for use at a location where traffic conditions create undue delay to the side street for one or more hours during the day. Total stopped time delay for the side street must be documented to use this warrant. Reduction criteria and graphs similar to those in Warrant 2 are applied. Total stop time delays for the side street were determined using the SynchroTM simulation model. The SynchroTM report is provided in *Appendix D*, and *Figure 8* shows the application of data to Warrant 3 for the study intersection and the intersection does not satisfy Warrant 3A.

As *Figure 8* shows, the intersection satisfied Warrant 3B where there was at one hour when the minor street volume exceeded the threshold to meet the signal warrant criteria.

Spot Number: Intersection		1 Rosewood Drive & Fawn Drive	
	10/31/2022		ley-Horn
	49.7	: Total Stop Time Delay (hrs)	
	1	: Minor Street Approach Lanes	
	3	: Total Approaches	
NOT MET	64	: Minor Approach Volume	
	1642	: Total Entering Volume	
	17:00 - 18:00	: Peak Hour	

Figure 8: Warrant 3A (70%) - Peak Hour Volume

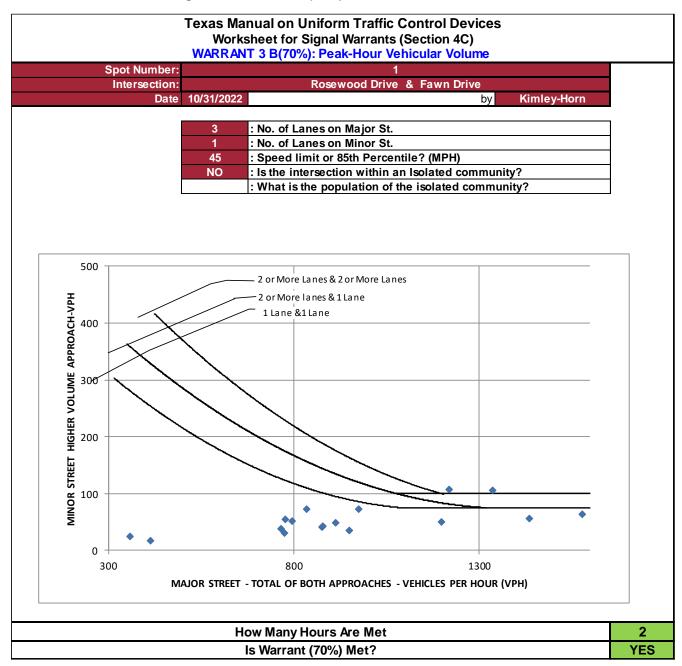


Figure 9: Warrant 3B (70%) - Peak Hour Volume

WARRANT 4 - PEDESTRIAN VOLUME

This warrant is intended when heavy traffic on the major street causes pedestrians to experience excessive delay in crossing the major street. Based on guidelines in TMUTCD Section 4C.05.04 - this warrant is not intended to be applied at locations where the distance to the nearest traffic control signal or Stop sign controlling the street that pedestrians desire to cross is less than 300', unless the proposed traffic control signal will not restrict the progressive movement of traffic. Based on pedestrian volumes collected during an 8-hour period, it was determined that pedestrian volumes across the major street did not meet minimum volume requirements of 75 pedestrians an hour at this intersection. Peak-hour pedestrian volumes are shown in *Appendix B*.

WARRANT 5 - SCHOOL CROSSING

This warrant is used where the fact that school children cross the major street is the principal reason to consider installing a signal. A minimum of 20 school children (elementary through high school) must cross during the highest hour and a study must show that the number of adequate gaps in the vehicle stream does not exist. Before installing a signal under this warrant, other remedial measures must be considered (i.e. warning signs and flashers, school speed zones, crossing guards, grade separation, etc.). No schools are located at the intersection. Therefore, the intersection does not meet Warrant 5.

WARRANT 6 - COORDINATED SIGNAL SYSTEM

If vehicle platoons in a coordinated system tend to "spread out" and need to be regrouped, this warrant may be considered. However, this warrant should not be applied where the resultant spacing of traffic control signals will be less than 1,000'. This intersection is not part of a coordinated signal system, therefore, Warrant 6 does not apply.

WARRANT 7 – CRASH EXPERIENCE

Warrant 7 requires that five or more reported crashes, correctible by a traffic signal, to have occurred in the last 12 months to satisfy Condition B of the warrant. There are minimum volume requirements for vehicles or pedestrians as well under Condition A of Warrant 7. Accident data was collected for the study intersection (within a 150' radius) from the TxDOT Crash Records Information System. This data was analyzed, and a crash diagram was developed for the study intersection. The collision types and their rate of occurrence within one year are listed in *Table 4*.

Table 4: Collision Types 2019-2022

Collision Type	2019	2020	2021	2022
One Motor Vehicle – Going Straight			1	
Same Direction – Both Going Straight – Sideswipe	1			
Angle – One Straight-One Left Turn	1		1	
Angle – Both Going Straight				1
Total Collisions Reported	2	0	2	1

The highlighted cells above indicate crashes that may be avoided by a traffic signal. In 2019, 2021 and 20212 each, there was one crash that may be potentially preventable with a traffic signal. Moreover, as summarized in *Table 5*, the side street traffic volume did not meet the minimum threshold as stated in Texas MUTCD 2011 Edition for Warrant 7 Conditions A or B to warrant a traffic signal. Therefore, the study intersection does not meet Warrant 7.

pot Number: ntersection:		1						
	Rosew	ood Drive &	Fawn Drive					
Date	10/31/2022	by	Kimley-Horn					
_								
	3		es on Major St?					
	1		es on Minor St?					
	NO	: Has adequ	ate trial of remedial	measure with	h adequate e	enforcement b	been tried?	
	NO	: Are there \$	ōor more Crashes S	usceptable to	Correction b	oy Signalizatio	on in a 12 Mon	th Pe
	Major	Minor		Condition A	Warrant	Condition B	Condition B	w
	Volume	Volume	Condition A Major	Minor	Condition	Major	Minor	Con
	(Both Apr.)	(One Apr.)	Volume	Volume	A Met?	Volume	Volume	B Me
ime	N-S	· · /						
me - 01:00	43	E-W 4	336	84	NO	504	42	NO
) - 02:00	48	1	336	84	NO	504	42	NO
0 - 03:00	32	2	336	84	NO	504	42	NO
0 - 04:00	50	3	336	84	NO	504	42	NO
0 - 05:00	114	10	336	84	NO	504	42	NO
0 - 06:00	358	25	336	84	NO	504	42	NO
0 - 07:00	835	72	336	84	NO	504	42	YES
- 08:00	1336	106	336	84	YES	504	42	YES
- 09:00	975	72	336	84	NO	504	42	YES
- 10:00	778	55	336	84	NO	504	42	YES
) - 11:00) - 12:00	766 796	38 51	336 336	84 84	NO NO	504 504	42 42	NO YES
12:00	914	48	336	84	NO	504	42	YES
- 13:00	876	40	336	84	NO	504	42	NO
- 15:00	950	35	336	84	NO	504	42	NO
- 16:00	1220	107	336	84	YES	504	42	YES
) - 17:00	1435	57	336	84	NO	504	42	YES
- 18:00	1578	64	336	84	NO	504	42	YES
- 19:00	1200	50	336	84	NO	504	42	YES
- 20:00	878	43	336	84	NO	504	42	YES
) - 21:00	774	30	336	84	NO	504	42	NO
0 - 22:00	415	17	336	84	NO	504	42	NO
00 - 23:00	245 142	9	336 336	84 84	NO NO	504 504	42 42	NO NO

Table 5: Warrant 7 – Crash Experience

WARRANT 8 - ROADWAY NETWORK

This warrant is used to encourage concentration and organization of traffic flow on a roadway network. It must be used on a principal through street and meet minimum volume requirements. Certain criteria must also be met for a roadway to be considered a major route. This intersection does not meet the criteria for Warrant 8.

WARRANT 9 - INTERSECTION NEAR A GRADE CROSSING

If an intersection is less than 140 feet from an at grade railroad crossing, and certain minimum traffic volumes are present, a signal with track preemption is required, only after other alternatives have been considered. Warrant 9 does not apply at the study intersection because there is no at grade railroad crossing near this location.

TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY

The following summarizes the results of the existing conditions analysis. The summaries of results are listed in *Table 6*.

Intersection:		1		
Major Street:	Rosewood Drive	Minor Street:	F	awn Drive
Intersection:	Rosewood Drive & Fawn Drive			
City/Twp:	Austin ETJ			
Date Performed:	10/31/2022	Performed By:	Ki	imley-Horn
Date Volumes	12/8/2021			
Collected:	12,0,2021			
	Warrant		Condition	Is Warrant Met
	DDANT 4. Fight Have Vakinglas Va	- 1		NO
VV A	RRANT 1: Eight-Hour Vehicular Vo	biume	On a dition A	NO
			Condition A Condition B	NO
			Condition A&B	NO N/A
				N/A
WZ	ARRANT 2: Four-Hour Vehicular Vo	olume	(70%)	YES
		June	(1070)	120
WA	RRANT 3: Peak-Hour Vehicular Vo	olume	(70%)	YES
			Condition A	NO
			Condition B	YES
	WARRANT 4: Pedestrian Volume	e	(70%)	NO
			Four Hour	NO
			Peak Hour	NO
	WARRANT 5: School Crossing			N/A
W	ARRANT 6: Coordinated Signal Sy	/stem		NO
	WARRANT 7: Crash Experience)		NO
			Condition A	NO
			Condition B	NO
	WADDANT & Deedway Netwood			
	WARRANT 8: Roadway Network	ĸ	F	NO
WADE	RANT 9: Intersection Near a Grade	Crossing		NO
TT AND		orosonig		
	lecus to Bo Add	ressed by Signalizatio	.	
		nesseu by Signalizatio	// 1.	

Table 6: Summary of Warrants

TRAFFIC SIGNAL WARRANT ANALYSIS – ROSEWOOD DRIVE & ASPEN DRIVE

This study documents the results of a traffic signal warrant analysis for the intersection of Rosewood Drive & Aspen Drive in the City of Killeen in Bell County, Texas.

ASSUMPTIONS

Several assumptions were made to analyze the data collected at each study intersection.

- Aspen Drive is treated as an eastbound-westbound roadway and Rosewood Drive is treated as a northbound-southbound roadway.
- The peak hour was determined to be the hour with the greatest vehicular volume. The AM peak was determined to be 7:00-8:00 AM, while the PM peak and overall intersection peak was determined to be 5:00-6:00 PM.
- For warrant analysis at the study intersection, the higher of the two minor street approach volumes was used.

STUDY PROCEDURE AND ANALYSIS RESULTS

The *Texas Manual of Uniform Traffic Control Devices* (Texas MUTCD, 2011 Edition) defines nine (9) warrants, or justifying set of conditions, at least one of which should be fully satisfied before signalization is considered as an option for traffic control. Factors included in the evaluation of these warrants include vehicle and pedestrian traffic volumes, the number of traffic lanes, the prevailing traffic speeds, traffic crash history, and measured delay for minor street traffic. The individual warrants are listed below, followed by a short description and analysis of each.

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour Vehicular Volume
- Warrant 4, Pedestrian Volume
- Warrant 5, School Crossing
- Warrant 6, Coordinated Signal System
- Warrant 7, Crash Experience
- Warrant 8, Roadway Network
- Warrant 9, Intersection Near a Railroad Grade Crossing

WARRANT 1 - EIGHT HOUR VEHICULAR VOLUME

As the title implies, this criterion is applied to the eight highest demand hours of the day for the major and minor street. At least eight hours of the day must exceed the thresholds required in order to warrant a traffic signal using Warrant 1.

Two criteria are checked. Condition A is based on minimum vehicular volumes. Condition B is based on interruption of continuous traffic. For both conditions, there are several reduction factors that may be taken if Condition A or Condition B is not satisfied. The combination of Conditions A & B is intended for application after trial of other alternatives that could cause less delay and inconvenience of traffic has failed to solve the traffic problems. The warrant is satisfied if both Conditions A and B are met with an 80% reduction. If the 85th percentile speed on the major street is greater than 40 mph, or if the intersection lies within the built-up area of an isolated community having a population less than 10,000, the criteria can be reduced by 70% of the original values for Condition A and Condition B or for the combination of Conditions A and B (resulting in 56% of the original value of Condition A and Condition A and Condition B for the combined case).

Table 7 and *Table 8*, as well as *Figure 10*, *Figure 11*, and *Figure 12*, show the warrant criteria and traffic counts as they apply to that criteria.

Table 7: Warrant 1 – Eight Hour Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicle (tot	es per hou al of both	ir on majo approach	r street ies)	Vehicles per hour on higher-volume minor-street approach (one direction only)				
Major Street	Minor Street	100% ^a	80% ^b	70%°	56% ^d	100% ^a	80% ^b	70%°	56% ^d	
1	1	500	400	350	280	150	120	105	84	
2 or more	1	600	480	420	336	150	120	105	84	
2 or more	2 or more	600	480	420	336	200	160	140	112	
1	2 or more	500	400	350	280	200	160	140	112	

Condition A-Minimum Vehicular Volume

Condition B-Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicle (tot	es per hou al of both	ir on majo approach	r street ies)	Vehicles per hour on higher-volume minor-street approach (one direction only)				
Major Street	Major Street Minor Street		80% ^b	70%°	56% ^d	100% ^a	80% ^b	70%°	56% ^d	
1	1	750	600	525	420	75	60	53	42	
2 or more	1	900	720	630	504	75	60	53	42	
2 or more	2 or more	900	720	630	504	100	80	70	56	
1	2 or more	750	600	525	420	100	80	70	56	

^a Basic minimum hourly volume

^b Used for combination of Conditions A and B after adequate trial of other remedial measures

° May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

^d May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

**Source: 2011 TMUTCD Table 4C-1

Table 8: Warrant 1 – Eight Hour Vehicular Volume Worksheet

							Warrants (Se						
ntersection:		od Drive &											-
Date	10/10/2022	by	Kimley-Horn	l									
3	: No. of Lanes of	n Major St?								ר			
1	: No. of Lanes of												
45	: Speed limit o	r 85th Percer	ntile? (MPH)										
NO	: Is the intersec	tion within a	n Isolated communi	ty?									
	: if answer 4 is	Yes, then wh	at is the population	of the isolated	d community	?				1			
NO			sures been tried?							1			
				USE 70% V	ARRANTS 1	A AND 1B. DO	NOT USE CO		- A & B				
	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
Time	N-S	E-W	70%	70%		70%	70%		56%	56%	56%	56%	
0:01 - 01:00	40	1	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
1:00 - 02:00	38	2	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
2:00 - 03:00 3:00 - 04:00	28	0	420 420	105 105	NO NO	630	53 53	NO NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
4:00 - 04:00 4:00 - 05:00	44 109	6 11	420	105	NO	630 630	53 53	NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
4:00 - 05:00 5:00 - 06:00	347	28	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
6:00 - 07:00	789	54	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
7:00 - 08:00	1319	164	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
8:00 - 09:00	953	53	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
9:00 - 10:00	739	36	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
0:00 - 11:00	728	47	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
1:00 - 12:00 2:00 - 13:00	736 849	31 39	420 420	105 105	NO NO	630 630	53 53	NO NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
3:00 - 13:00	837	48	420	105	NO	630	53	NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
4:00 - 15:00	919	44	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
5:00 - 16:00	1120	118	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
6:00 - 17:00	1348	56	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
7:00 - 18:00	1482	53	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
8:00 - 19:00	1123	44	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
9:00 - 20:00 0:00 - 21:00	817 699	23 24	420 420	105 105	NO NO	630 630	53 53	NO NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
1:00 - 22:00	373	11	420	105	NO	630	53	NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
2:00 - 23:00	212	8	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
3:00 - 24:00	124	9	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
							Nu	Imber of Hour		ours that met th ours that met th ombination Wa	e Warrant 1B =	2 6 0]
			A	Is the Minim	um Vehicul	ar Volume W	/arrant Met? (Condition A)					NO
			B.	Is the Interr	uption of C	ontinuous T	raffic Met? (Condition B)					NO
				C. Com	oination of	Warrants A a	nd B Criteria	Met?					N/A

Figure 10: Warrant 1A

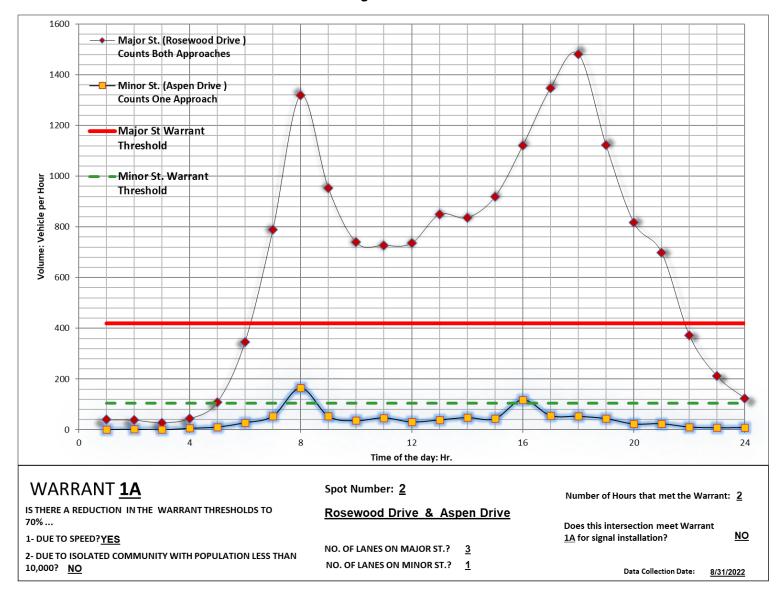
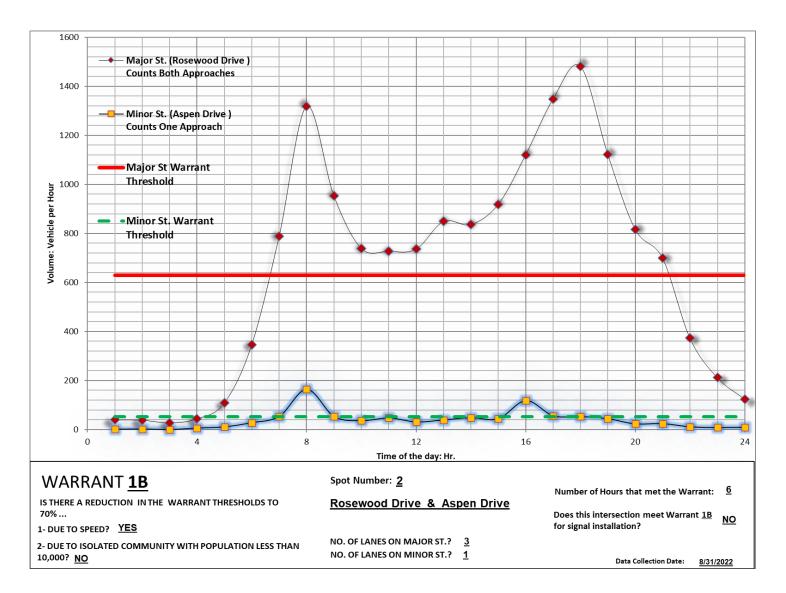


Figure 11: Warrant 1B

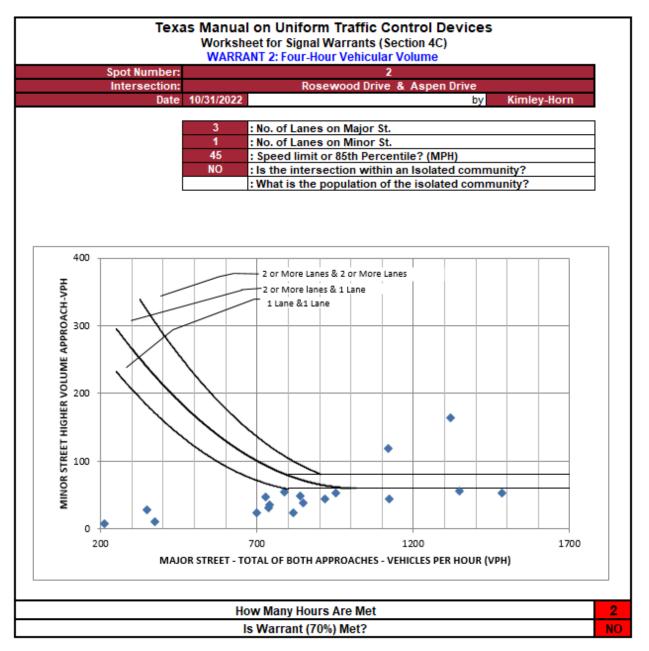


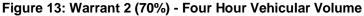
1600 Major St. (Rosewood Drive) Counts Both Approaches 1400 ——— Minor St. (Aspen Drive) **Counts One Approach** Major St Warrant 1200 Threshold 1A Minor St. Warrant Volume: Vehicle per Hour 80, 9 Threshold 1A •••••• Major St. Warrant Threshold 1B – – – Minor St. Warrant Threshold 1B 400 200 0 8 12 16 20 0 4 24 Time of the day: Hr. WARRANT 1A&B Spot Number: 2 Number of Hours that met the Warrant: 0 IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO Rosewood Drive & Aspen Drive 56% ... Does this intersection meet Warrant <u>N/A</u> 1- DUE TO SPEED? YES 1A&B for signal installation? NO. OF LANES ON MAJOR ST.? 3 2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN NO. OF LANES ON MINOR ST.? 1 10,000? <u>NO</u> Data Collection Date: 8/31/2022

Figure 12: Warrant 1A&B

WARRANT 2 - FOUR HOUR VEHICULAR VOLUME

This warrant is similar to the eight-hour warrant and is based on traffic volumes during the highest four hours of the day. Traffic volumes are plotted on a graph to determine if they fall above the warrant curves. The reduction criteria are similar. If one of the two conditions apply, then a second graph with lower curves is used. *Figure 13* shows the data applied to Warrant 2.





WARRANT 3 - PEAK HOUR VOLUME

This warrant is intended for use at a location where traffic conditions create undue delay to the side street for one or more hours during the day. Total stopped time delay for the side street must be documented to use this warrant. Reduction criteria and graphs similar to those in Warrant 2 are applied. Total stop time delays for the side street were determined using the SynchroTM simulation model. The SynchroTM report is provided in *Appendix D*, and *Figure 14* shows the application of data to Warrant 3 for the study intersection and the intersection does not satisfy Warrant 3A.

As *Figure 14* shows, the intersection satisfied Warrant 3B where there was at one hour when the minor street volume exceeded the threshold to meet the signal warrant criteria.

Т	Worksh	ual on Uniform Traffic Control Devices eet for Signal Warrants (Section 4C) NT 3 A: Peak-Hour Vehicular Volume	
Spot Number:		2	
Intersection:		Rosewood Drive & Aspen Drive	
Date	10/10/2022	by Kimley-H	lorn
NOT MET	31.2 1 3 53 1535 17:00 - 18:00	: Total Stop Time Delay (hrs) : Minor Street Approach Lanes : Total Approaches : Minor Approach Volume : Total Entering Volume : Peak Hour	
		Is Warrant 3 A Met?	NO

Figure 14: Warrant 3A (70%) - Peak Hour Volume

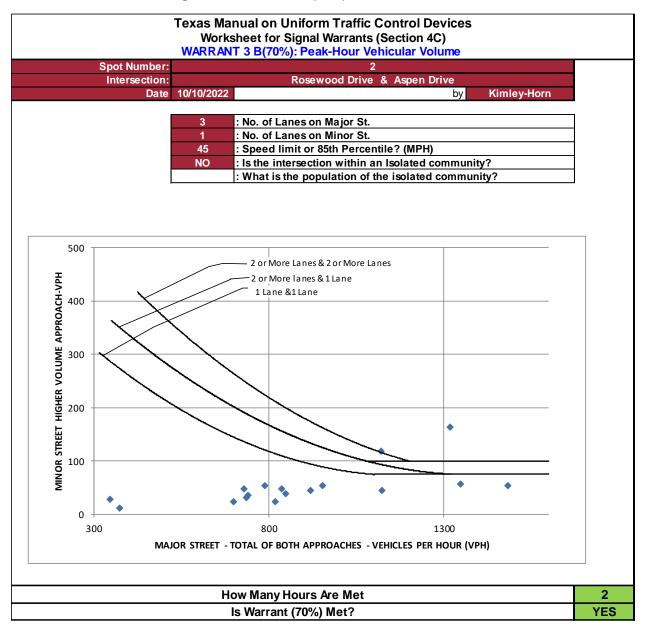


Figure 15: Warrant 3B (70%) - Peak Hour Volume

WARRANT 4 - PEDESTRIAN VOLUME

This warrant is intended when heavy traffic on the major street causes pedestrians to experience excessive delay in crossing the major street. Based on guidelines in TMUTCD Section 4C.05.04 - this warrant is not intended to be applied at locations where the distance to the nearest traffic control signal or Stop sign controlling the street that pedestrians desire to cross is less than 300', unless the proposed traffic control signal will not restrict the progressive movement of traffic. Based on pedestrian volumes collected during an 8-hour period, it was determined that pedestrian volumes across the major street did not meet minimum volume requirements of 75 pedestrians an hour at this intersection. Peak-hour pedestrian volumes are shown in *Appendix B*.

WARRANT 5 – SCHOOL CROSSING

This warrant is used where the fact that school children cross the major street is the principal reason to consider installing a signal. A minimum of 20 school children (elementary through high school) must cross during the highest hour and a study must show that the number of adequate gaps in the vehicle stream does not exist. Before installing a signal under this warrant, other remedial measures must be considered (i.e. warning signs and flashers, school speed zones, crossing guards, grade separation, etc.). No schools are located at the intersection. Therefore, the intersection does not meet Warrant 5.

WARRANT 6 - COORDINATED SIGNAL SYSTEM

If vehicle platoons in a coordinated system tend to "spread out" and need to be regrouped, this warrant may be considered. However, this warrant should not be applied where the resultant spacing of traffic control signals will be less than 1,000'. This intersection is not part of a coordinated signal system, therefore, Warrant 6 does not apply.

WARRANT 7 – CRASH EXPERIENCE

Warrant 7 requires that five or more reported crashes, correctible by a traffic signal, to have occurred in the last 12 months to satisfy Condition B of the warrant. There are minimum volume requirements for vehicles or pedestrians as well under Condition A of Warrant 7. Accident data was collected for the study intersection (within a 150' radius) from the TxDOT Crash Records Information System. This data was analyzed, and a crash diagram was developed for the study intersection. The collision types and their rate of occurrence within one year are listed in *Table 9*.

Collision Type	2019	2020	2021	2022
One Motor Vehicle – Going Straight		1		
One Motor Vehicle – Turning Right				
Same Direction – Both Going Straight Rear-End			1	1
Same Direction – One Straight One Stopped	1	1		
Angle – One Right One Stopped		1		
Angle – One Straight-One Left Turn		2		
Angle – Both Going Straight	1		1	
Total Collisions Reported	2	5	2	1

The highlighted cells above indicate crashes that may be avoided by a traffic signal. In 2020 there were three crashes that may be potentially preventable with a traffic signal, while in 2019 as in 2021 each, there was one crash that may be potentially preventable with a traffic signal. Moreover, as summarized in *Table 10*, the side street traffic volume did not meet the minimum threshold as stated in Texas MUTCD 2011 Edition for Warrant 7 Conditions A or B to warrant a traffic signal. Therefore, the study intersection does meet Warrant 7.

				eet for Signa	Warrants	(Section 4C		
Spot Number:		2	W	ARRANT 7:0	Crash Expe	rience		
Intersection:	Posowe	bod Drive &	Aspon Drivo					
Date	10/10/2022	by by	Kimley-Horn					
Date	10/10/2022	by	Killiey-Holli	1				
1	3	. No of Lan	es on Major St?					
	1		es on Minor St?					
	NO		ate trial of remedial	measure with	adequate e	enforcement b	een tried?	
	NO		5 or more Crashes S					th Period?
	Major	Minor		Condition A	Warrant	Condition B	Condition B	Warrant
	Major Volume	Minor Volume	Condition A Major	Minor	Warrant Condition	Condition B Major	Condition B Minor	Warrant Condition
	(Both Apr.)	(One Apr.)	Volume	Volume	A Met?	Volume	Volume	B Met?
Time	N-S	E-W						
00 - 01:00	40	1	336	84	NO	504	42	NO
00 - 02:00	38	2	336	84	NO	504	42	NO
00 - 03:00	28	0	336	84	NO	504	42	NO
0 - 04:00	44	6	336	84	NO	504	42	NO
0 - 05:00	109	11	336	84	NO	504	42	NO
0 - 06:00	347	28	336	84	NO	504	42	NO
) - 07:00	789	54	336	84	NO	504	42	YES
0 - 08:00	1319	164	336	84	YES	504	42	YES
0 - 09:00	953	53	336	84	NO	504	42	YES
0 - 10:00	739	36	336	84	NO	504	42	NO
0 - 11:00	728	47	336	84	NO	504	42	YES
0 - 12:00	736	31	336	84	NO	504	42	NO
- 13:00	849	39	336	84	NO	504	42	NO
0 - 14:00	837	48	336	84	NO	504	42	YES
0 - 15:00	919	44	336	84	NO	504	42	YES
0 - 16:00	1120	118	336	84	YES	504	42	YES
0 - 17:00	1348	56	336	84	NO	504	42	YES
00 - 18:00	1482	53	336	84	NO	504	42	YES
0 - 19:00	1123	44	336	84	NO	504	42	YES
00 - 20:00	817	23	336	84	NO	504	42	NO
0 - 21:00	699	24	336	84	NO	504	42	NO
00 - 22:00	373	11	336	84	NO	504	42	NO
00 - 23:00	212	8	336	84	NO	504	42 42	NO
0 - 24:00	124 Is there	Number o	336 n the warrant thresh f Hours that met the f Hours that met the	warrant 7A =	NO NO 2 10	504	42	NO
	A. Is t	Number o Number o he Minimun	f Hours that met the	warrant 7A = warrant 7B = Warrant Me	2 10 et Based or		· · ·	

Table 10: Warrant 7 – Crash Experience

WARRANT 8 - ROADWAY NETWORK

This warrant is used to encourage concentration and organization of traffic flow on a roadway network. It must be used on a principal through street and meet minimum volume requirements. Certain criteria must also be met for a roadway to be considered a major route. This intersection does not meet the criteria for Warrant 8.

WARRANT 9 - INTERSECTION NEAR A GRADE CROSSING

If an intersection is less than 140 feet from an at grade railroad crossing, and certain minimum traffic volumes are present, a signal with track preemption is required, only after other alternatives have been considered. Warrant 9 does not apply at the study intersection because there is no at grade railroad crossing near this location.

TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY

The following summarizes the results of the existing conditions analysis. The summaries of results are listed in *Table 11*.

Intersection:		2		
Major Street:	Rosewood Drive	Minor Street:	A	spen Drive
Intersection:	Rosewood Drive & Aspen Drive			
City/Twp:	Austin ETJ			
Date Performed:	10/10/2022	Performed By:	Ki	imley-Horn
Date Volumes Collected:	8/31/2022			
	Warrant		Condition	Is Warrant Met
14/				
V/	ARRANT 1: Eight-Hour Vehicular Vo	piume	Condition A	NO
			Condition A Condition B	NO NO
			Condition A&B	N/A
				IWA
W	ARRANT 2: Four-Hour Vehicular Vo	lume	(70%)	NO
W	ARRANT 3: Peak-Hour Vehicular Vo	olume	(70%)	YES
			Condition A	NO
			Condition B	YES
	WARRANT 4: Pedestrian Volume	•	(70%)	NO
			Four Hour	NO
			Peak Hour	NO
	WARRANT 5: School Crossing			N/A
Ň	ARRANT 6: Coordinated Signal Sy	vstem		NO
	WARRANT 7: Crash Experience			NO
	WARNANT 7. Grash Experience		Condition A	NO NO
			Condition B	NO
	WARRANT 8: Roadway Network	(NO
WAR	RANT 9: Intersection Near a Grade	Crossing		NO
		ressed by Signalizatio		

Table 11: Summary of Warrants

CONCLUSION AND RECOMMENDATIONS

The 2011 Edition of the TMUTCD contains nine warrants for traffic signals. The intersection analyzed currently meets the following warrants as shown in *Table 12*.

Warrant		Inters	ection
Number	Warrant Description	Rosewood Drive & Fawn Drive	Rosewood Drive & Aspen Drive
Warrant 1	Eight-Hour Vehicular Volume	No	No
Warrant 2	Four-Hour Vehicular Volume	Yes	No
Warrant 3	Peak-Hour Vehicular Volume	Yes (Warrant B)	Yes (Warrant B)
Warrant 4	Pedestrian Volume	No	No
Warrant 5	School Crossing	No	No
Warrant 6	Coordinated Signal System	No	No
Warrant 7	Crash Experience	No	No
Warrant 8	Roadway Network	No	No
Warrant 9	Intersection Near a Railroad Grade Crossing	No	No

Table 12: Summary of Traffic Signal Warrant Analysis

Based on the criteria ,Kimley-Horn recommends a traffic signal at the intersections of Rosewood Drive & Fawn Drive and Rosewood Drive & Aspen Drive.

Appendix

Rosewood Drive - Signal Warrant

Appendix A: 2022 Existing Traffic Counts

LOCATION: Rosewood Dr -- Fawn Dr OC JOB #: 15913130 CITY/STATE: Killeen, TX DATE: Wed, Aug 31 2022 Peak-Hour: 7:00 AM -- 8:00 AM 431 1002 0.8 14 Peak 15-Min: 7:15 AM -- 7:30 AM ÷ ÷ ŧ **↑** 0 1.3 55 376 0 1.8 . . 61 🛥 101 🛊 **t** 0 1.6 + 5.9 1 **•** 0 **t** 0 **4** 0 0 0.93 0 0 ÷ 0 • + • 5.6 **→** 0 **¬** 6 **7** 107 🜩 h ŧ ŧ C h 6 901 0 0 0.2 0 ŧ ŧ. ÷ **↑** 0.2 Quality Counts 382 907 1.3 DATA THAT DRIVES COMMUNITIES 0 0 0 0 . ι. ... ┫ • • **t** 0 Ate 0 1 0 **+** 0 0 7 **f** 0 r 4 ŧ 0 0 0 N/A N/A ÷ t و t ٠ 🛥 N/A ← N/A N/A N/A Î a Ī ٦ ٤ ٦, ç ŧ r ٩ ŧ N/A N/A 4 ŧ Rosewood Dr Rosewood Dr Fawn Dr Fawn Dr 15-Min Count Period Hourly Totals (Northbound) (Southbound) (Eastbound) (Westbound) Total Beginning At Left Thru Right υ Left Thru Right υ Left Thru Right υ Left Thru Right υ 7:00 AM 0 232 0 0 0 84 18 0 33 0 0 0 0 0 0 369 2 0 0 0 S AN 0 7:30 AM 220 0 99 11 17 0 348 0 0 0 0 0 0 0 0 1 0 0 0 7 0 0 0 0 0 0 1445 7:45 AM 1 191 119 19 0 339 2 8:00 AM 250 137 1326 19 3 0 0 0 80 8 5 0 0 0 0 0 0 0 3 0 0 0 0 75 0 17 0 0 0 0 0 0 8:15 AM 169 269 1206 3 8:30 AM 0 197 0 4 0 15 0 0 282 0 0 66 0 0 0 0 0 1140 8:45 AM 188 0 0 6 0 0 0 0 0 265 1066 0 58 12 0 0 1 Northbound Peak 15-Min Flowrates Southbound Eastbound Westbound Total Left Thru Right U Left Thru Right U Left Thru Right υ Left Thru Right U 1032 0 0 0 1556 16 296 128 0 0 All Vehicles 0 0 76 0 8 0 0 Heavy Trucks 0 0 0 0 0 0 8 0 0 0 0 0 8 Buses Pedestrians 0 0 4 0 4 0 0 0 0 0 0 0 0 0 0 0 Bicycles 0 0 Scooters Comments:

Report generated on 9/14/2022 11:26 AM

LOCATION: Rosewood Dr -- Fawn Dr OC JOB #: 15913131 CITY/STATE: Killeen, TX DATE: Wed, Aug 31 2022 Peak-Hour: 5:00 PM -- 6:00 PM 1.4 Peak 15-Min: 5:15 PM -- 5:30 PM ŧ 0.9 . J. . 57 **t** 0 1 + 1.8 + **•** 0 • 0 0 + 0.89 + ÷ • 3.2 + 16.7 63 🔸 ŧ ŧ 1.3 + ÷ ŧ ŧ Ouality Counts DATA THAT DRIVES COMMUNITIES ┫ • • **t** 0 Ate ÷ **f** 0 ŧ C N/A N/A ÷ t و t 🕳 N/A ← N/A N/A N/A Î a Ī ç r ŧ N/A N/A ŧ Rosewood Dr Rosewood Dr Fawn Dr Fawn Dr 15-Min Count Period Hourly Totals (Northbound) (Southbound) (Eastbound) (Westbound) Total Beginning At Left Thru Right υ Left Thru Right υ Left Thru Right υ Left Thru Right υ 4:00 PM 4:15 PM 4:30 PM 4 0 4:45 PM 5:00 PM 5:15 PM 5:30 PM 5:45 PM Northbound Peak 15-Min Flowrates Southbound Eastbound Westbound Total Left Thru Right U Left Thru Right U Left Thru Right υ Left Thru Right U All Vehicles Heavy Trucks Buses Pedestrians Bicycles Scooters Comments:

Report generated on 9/14/2022 11:26 AM

LOCATION: Rosewood Dr -- Fawn Dr OC JOB #: 15913132 CITY/STATE: Killeen, TX DATE: Wed, Aug 31 2022 Peak-Hour: 12:00 PM -- 1:00 PM Peak 15-Min: 12:45 PM -- 1:00 PM ŧ ŧ **↑** 0 0.7 . . **t** 0 42 **1** 0 - 0 + **a** 0 **•** 0 **t** 0 0.93 + ÷ + 0 + 0 7 4 7 ŧ ŧ h C 0.8 ŧ ŧ ÷ **↑** 0.8 Ouality Counts 0.7 DATA THAT DRIVES COMMUNITIES . ι. ... ┫ • • **t** 0 Ste **+** 0 **f** 0 ŧ ¢ N/A N/A ÷ t و t 🛥 N/A ← N/A N/A N/A Î a Ī ٦, ç ŧ r ŧ N/A N/A ŧ Rosewood Dr Rosewood Dr Fawn Dr Fawn Dr 15-Min Count Period Hourly Totals (Northbound) (Southbound) (Eastbound) (Westbound) Total Beginning At Left Thru Right υ Left Thru Right υ Left Thru Right υ Left Thru Right υ 11:00 AM 11:15 AM 9 11:30 AM 2 0 11:45 AM 12:00 PM 0 12:15 PM 0 0 12:30 PM 12:45 PM n n Northbound Southbound Eastbound Westbound Peak 15-Min Flowrates Total Left Thru U Left Thru Right υ Left Right υ Left Thru Right υ Right Thru All Vehicles Heavy Trucks Buses Pedestrians Bicycles Scooters Comments:

Report generated on 9/14/2022 11:26 AM

LOCATION: Rosewood Dr -- Aspen Dr QC JOB #: 15913133 CITY/STATE: Killeen, TX DATE: Wed, Aug 31 2022 Peak-Hour: 7:00 AM -- 8:00 AM 0.2 Peak 15-Min: 7:15 AM -- 7:30 AM ŧ ÷ **↑** 0 5.7 0.9 . . **t** 0 104 🛥 96 🖈 38 🛥 0 🛊 **•** 0 **t** 0 0 0.92 + ÷ + 164 🔸 68 🥆 18 + 44 ŧ ŧ C 2.9 0.2 + ÷ ŧ **↑** 0.5 Ouality Counts 1.4 DATA THAT DRIVES COMMUNITIES n . ι. ... ┫ • • **t** 0 Ste **+** 0 **f** 0 ¢ ŧ N/A N/A ÷ t و t 🛥 N/A ← N/A N/A N/A Î a Ī ٦, ç ŧ r ŧ N/A N/A ŧ Rosewood Dr Rosewood Dr Aspen Dr Aspen Dr 15-Min Count Period Hourly Totals (Northbound) (Southbound) (Eastbound) (Westbound) Total Beginning At Left Thru Right υ Left Thru Right υ Left Thru Right υ Left Thru Right υ 7:00 AM S AN 7:30 AM 7:45 AM 8:00 AM 2 8:15 AM 8:30 AM 8:45 AM Northbound Peak 15-Min Flowrates Southbound Eastbound Westbound Total Left Thru Right U Left Thru Right U Left Thru Right υ Left Thru Right U All Vehicles Heavy Trucks Buses Pedestrians Bicycles Scooters Comments:

Report generated on 9/14/2022 11:26 AM

LOCATION: CITY/STATE:	Rosew	ood Dr													QC DATE:	JOB	#: 1593	13134
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15-Min Count Period Beginning At	Left		vood Dr bound) Right	U	Left		/ood Dr bound) Right	U	Left		en Dr bound) Right	U	Left		en Dr bound) Right	U	Total	Hourly Totals
4:00 PM 4:15 PM 4:30 PM 4:45 PM 5:00 PM 5:15 PM	3 3 7 3 1 4 5 4	113 126 133 102 135 159 137 142	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	181 203 202 215 212 230 202 184	15 15 14 17 17 20 15 15	0 0 0 0 0 0 0 0	16 13 12 8 11 11 7 9	0 0 0 0 0 0 0 0	1 1 0 5 4 2 6 3	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0	329 361 368 350 380 426 372 357	1408 1459 1524 1528 1535
5:30 PM 5:45 PM	4		bound			South Thru	bound Right	U	Left	Eastb Thru	oound Right	U	Left	Westl Thru	bound Right	U	To	tal
	4 Left	North Thru	Right	U	Left	mu	night	0	-0.0							Ŷ		
5:45 PM Peak 15-Min				U 0	0 0 0	920 12 0 0	80 0 0	0	44 0 0	0 0 0 0	8 0 0	0	0 0	0 0 0 0	0 0 0	0	1	04 2))

Report generated on 9/14/2022 11:26 AM

LOCATION: Rosewood Dr -- Aspen Dr OC JOB #: 15913135 CITY/STATE: Killeen, TX DATE: Wed, Aug 31 2022 Peak-Hour: 12:00 PM -- 1:00 PM Peak 15-Min: 12:45 PM -- 1:00 PM ŧ ŧ **↑** 0 0.8 . . **t** 0 50 - 31 + 0 - 0 + **a** 0 **•** 0 **t** 0 0.93 + ÷ + 0 + 0 7 39 🔺 ŧ ŧ h C 0.9 ŧ ŧ ÷ **↑** 0.9 Ouality Counts 0.8 DATA THAT DRIVES COMMUNITIES n . ι. ... ┫ • • **t** 0 Ste ÷ 0 7 **f** 0 ¢ ŧ N/A N/A ÷ t و t 🛥 N/A ← N/A N/A N/A Î a Ī ç r ŧ N/A N/A ŧ Rosewood Dr Rosewood Dr Aspen Dr Aspen Dr 15-Min Count Period Hourly Totals (Northbound) (Southbound) (Eastbound) (Westbound) Total Beginning At Left Thru Right υ Left Thru Right υ Left Thru Right υ Left Thru Right υ 11:00 AM 7 11:15 AM 11:30 AM 4 0 5 11:45 AM 12:00 PM 2 0 0 12:15 PM 12:30 PM 12:45 PM Ω n n Northbound Southbound Eastbound Westbound Peak 15-Min Flowrates Total Left Thru U Left Thru Right υ Left Right υ Left Thru Right υ Right Thru All Vehicles Heavy Trucks Buses Pedestrians Bicycles Scooters Comments:

Report generated on 9/14/2022 11:26 AM

LOCATION: Rosewood Dr -- Fawn Dr QC JOB #: 15913109 CITY/STATE: Killeen, TX DATE: Wed, Aug 31 2022 Peak-Hour: 5:00 PM -- 6:00 PM 979 665 0.8 1.4 ♦ ♦ 88 891 0 Peak 15-Min: 5:15 PM -- 5:30 PM ŧ **↑** 0 0 0.9 ÷ J . 1 + 1.8 2 98 🔶 57 🍠 **t** 0 **+** 0 **t** 0 + 0 0.89 0 🔺 0 0 🌩 **•** 0 4 3.2 🔹 16.7 🥆 **€** 0 → 0 63 **→** 6 **٦** ↑ 10 ↓ 1 ↑
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15-Min Count Period			ood Dr bound)				ood Dr bound)				n Dr ound)				n Dr bound)		Total	Hourly Totals
Beginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		Totals
6:30 AM	0	166	0	0	0	64	10	0	21	0	0	0	0	0	0	0	261	
6:45 AM	7	184	0	0	0	91	14	0	22	0	1	0	0	0	0	0	319	
7:00 AM	0	232	0	0	0	84	18	0	33	0	2	0	0	0	0	0	369	
7:15 AM	4	258	0	0	0	74	19	0	32	0	2	0	0	0	0	0	389	1338
7:30 AM	1	220	0	0	0	99	11	0	17	0	0	0	0	0	0	0	348	1425
7:45 AM	1	191	0	0	0	119	7	0	19	0	2	0	0	0	0	0	339	1445
8:00 AM	3	137	0	0	0	80	8	0	19	0	3	0	0	0	0	0	250	1326
8:15 AM	0	169	0	0	0	75	5	0	17	0	3	0	0	0	0	0	269	1206
8:30 AM	0	197	0	0	0	66	4	0	15	0	0	0	0	0	0	0	282	1140
8:45 AM	1	188	0	0	0	58	6	0	12	0	0	0	0	0	0	0	265	1066
9:00 AM	1	139	0	0	0	76	3	0	11	0	0	0	0	0	0	0	230	1046
9:15 AM	0	120	0	0	0	51	4	0	16	0	0	0	0	0	0	0	191	968
9:30 AM	1	119	0	0	0	64	7	0	13	0	1	0	0	0	0	0	205	891
9:45 AM	2	121	0	0	0	70	8	0	11	0	0	0	0	0	0	0	212	838
10:00 AM	2	118	0	0	0	77	5	0	7	0	1	0	0	0	0	0	210	818
10:15 AM	1	85	0	0	0	87	11	0	9	0	1	0	0	0	0	0	194	821
10:30 AM	0	118	0	0	0	80	4	0	9	0	1	0	0	0	0	0	212	828
10:45 AM	1	107	0	0	0	78	8	0	8	0	0	0	0	0	0	0	202	818
11:00 AM	1	88	0	0	0	77	9	0	12	0	0	0	0	0	0	0	187	795
11:15 AM	0	104	0	0	0	78	9	0	10	0	1	0	0	0	0	0	202	803
11:30 AM	0	97	0	0	0	87	10	0	15	0	1	0	0	0	0	0	210	801
11:45 AM	2	115	0	0	0	112	6	0	9	0	1	0	0	0	0	0	245	844
12:00 PM	0	94	0	0	0	98	17	0	9	0	0	0	0	0	0	0	218	875
12:15 PM	0	131	0	0	0	97	6	0	8	0	2	0	0	0	0	0	244	917
12:30 PM	2	141	0	0	0	87	6	0	12	0	0	0	0	0	0	0	248	955
12:45 PM	2	110	0	0	0	121	12	0	13	0	2	0	0	0	0	0	260	970
1:00 PM	1	121	0	0	0	114	7	0	6	0	1	0	0	0	0	0	250	1002
1:15 PM	3	100	0	0	0	108	10	0	13	0	0	0	0	0	0	0	234	992
1:30 PM	1	105	0	0	0	95	8	0	8	0	1	0	0	0	0	0	218	962
1:45 PM	1	106	0	0	0	112	9	0	10	0	1	0	0	0	0	0	239	941
2:00 PM	1	94	0	0	0	107	7	0	7	0	1	0	0	0	0	0	217	908
2:15 PM	3	103	0	0	0	115	15	0	9	0	0	0	0	0	0	0	245	919
2:30 PM	4	103	0	0	0	149	12	0	4	0	0	0	0	0	0	0	272	973
2:45 PM	1	120	0	0	0	138	16	0	6	0	6	0	0	0	0	0	287	1021
3:00 PM	3	137	0	0	0	143	29	0	27	0	10	0	0	0	0	0	349	1153
3:15 PM	2	139	0	0	0	131	19	0	21	0	1	0	0	0	0	0	313	1221
3:30 PM	0	135	0	0	0	164	15	0	25	0	4	0	0	0	0	0	343	1292
3:45 PM	2	113	0	0	0	157	23	0	19	0	1	0	0	0	0	0	315	1320
4:00 PM	2	132	0	0	0	189	17	0	7	0	3	0	0	0	0	0	350	1321

15-Min Count Period			ood Dr bound)				ood Dr bound)				/n Dr bound)				n Dr bound)		Total	Hourly Totals
Beginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		Totals
					-				-				-				-	
4:15 PM	1	138	0	0	0	216	25	0	11	0	1	0	0	0	0	0	392	1400
4:30 PM	2	146	0	0	0	216	10	0	15	0	1	0	0	0	0	0	390	1447
4:45 PM	4	107	0	0	0	239	16	0	17	0	0	0	0	0	0	0	383	1515
5:00 PM	3	140	0	0	0	227	20	0	8	0	1	0	0	0	0	0	399	1564
5:15 PM	4	167	0	0	0	247	28	0	19	0	2	0	0	0	0	0	467	1639
5:30 PM	1	146	0	0	0	217	21	0	19	0	2	0	0	0	0	0	406	1655
5:45 PM	2	155	0	0	0	200	19	0	11	0	1	0	0	0	0	0	388	1660
6:00 PM	0	132	0	0	0	165	18	0	18	0	0	0	0	0	0	0	333	1594
6:15 PM	2	156	0	0	0	152	17	0	9	0	1	0	0	0	0	0	337	1464
Peak 15-Min		North	bound			South	bound			Eastb	ound			West	oound		-	
Flowrates	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	10	tal
All Vehicles	16	668	0	0	0	988	112	0	76	0	8	0	0	0	0	0	18	68
Heavy Trucks	0	4	Ō	-	0	16	0	-	0	Ō	Ō	-	0	Ō	Ō	-		0
Buses			-				-			-	-			-			_	
Pedestrians		0				0				0				0				0
Bicycles	0	0	0		0	0	0		0	Ō	0		0	Ō	0			0
Scooters																		
Comments:																		

Report generated on 9/14/2022 11:30 AM

LOCATION: Rosewood Dr -- Aspen Dr QC JOB #: 15913110 CITY/STATE: Killeen, TX DATE: Wed, Aug 31 2022 Peak-Hour: 5:00 PM -- 6:00 PM 895 611 0.6 0.5 ♦67 828 0 Peak 15-Min: 5:15 PM -- 5:30 PM ŧ **↑** 0 0.6 0 ÷ . 81 🔶 38 🌶 **t** 0 **+** 0 **t** 0 **+** 0 **€** 0 **€** 0 0 🔸 0.90 0 🌩 0 **+** 0 + 0 **+** 0 **-€** 0 **→** 0 53 🔹 15 🥆

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15-Min Count Period			ood Dr bound)				ood Dr bound)				en Dr ound)				en Dr bound)		Total	Hourly Totals
Beginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		Totals
6:30 AM	8	153	0	0	0	56	10	0	11	0	6	0	0	0	0	0	244	
6:45 AM	25	190	0	0	0	68	26	0	12	0	0	0	0	0	0	0	321	
7:00 AM	34	210	0	0	0	70	14	0	27	0	26	0	0	0	0	0	381	
7:15 AM	24	218	0	0	0	69	6	0	39	0	32	0	0	0	0	0	388	1334
7:30 AM	3	210	0	0	0	91	7	0	16	0	4	0	0	0	0	0	331	1421
7:45 AM	8	171	0	0	0	117	8	0	14	0	6	0	0	0	0	0	324	1424
8:00 AM	2	138	0	0	0	77	4	0	7	0	6	0	0	0	0	0	234	1277
8:15 AM	2	148	0	0	0	76	1	0	13	0	1	0	0	0	0	0	241	1130
8:30 AM	1	183	0	0	0	62	7	0	13	0	3	0	0	0	0	0	269	1068
8:45 AM	3	179	0	0	0	54	2	0	9	0	1	0	0	0	0	0	248	992
9:00 AM	1	127	0	0	0	73	5	0	10	0	1	0	0	0	0	0	217	975
9:15 AM	3	117	0	0	0	45	5	0	8	0	0	0	0	0	0	0	178	912
9:30 AM	3	106	0	0	0	61	4	0	4	0	0	0	0	0	0	0	178	821
9:45 AM	2	116	0	0	0	66	4	0	10	0	3	0	0	0	0	0	201	774
10:00 AM	1	107	0	0	0	68	9	0	12	0	2	0	0	0	0	0	199	756
10:15 AM	2	79	0	0	0	78	8	0	9	0	2	0	0	0	0	0	178	756
10:30 AM	2	111	0	0	0	76	5	0	9	0	1	0	0	0	0	0	204	782
10:45 AM	1	103	0	0	0	72	8	0	7	0	4	1	0	0	0	0	196	777
11:00 AM	1	82	0	0	0	67	10	0	5	0	1	0	0	0	0	0	166	744
11:15 AM	4	98	0	0	0	67	11	0	7	0	1	0	0	0	0	0	188	754
11:30 AM	2	91	0	0	0	82	7	0	5	0	1	0	0	0	0	0	188	738
11:45 AM	4	112	0	0	0	103	5	0	11	0	0	0	0	0	0	0	235	777
12:00 PM	1	90	0	0	0	87	9	0	6	0	2	0	0	0	0	0	195	806
12:15 PM	3	117	0	0	0	90	10	0	6	0	2	0	0	0	0	0	228	846
12:30 PM	2	135	0	0	0	80	7	0	8	0	2	1	0	0	0	0	235	893
12:45 PM	0	106	0	0	0	107	17	0	10	0	2	0	0	0	0	0	242	900
1:00 PM	4	114	0	0	0	103	10	0	10	0	4	0	0	0	0	0	245	950
1:15 PM	3	84	0	0	0	100	10	0	12	0	2	0	0	0	0	0	211	933
1:30 PM	3	102	0	0	0	87	7	0	5	0	0	0	0	0	0	0	204	902
1:45 PM	5	96	0	0	0	101	9	0	11	0	4	0	0	0	0	0	226	886
2:00 PM	2	86	0	0	0	95	13	0	10	0	2	0	0	0	0	0	208	849
2:15 PM	2	97	0	0	0	103	13	0	10	0	2	0	0	0	0	0	227	865
2:30 PM	11	101	0	0	0	137	12	0	10	0	0	0	0	0	0	0	271	932
2:45 PM	10	114	0	0	0	123	18	0	5	0	5	0	0	0	0	0	275	981
3:00 PM	4	115	0	0	0	137	19	0	26	0	38	0	0	0	0	0	339	1112
3:15 PM	1	128	Ō	Ō	Ō	122	10	Ō	12	Ō	4	Ō	Ō	Ō	Ō	Ō	277	1162
3:30 PM	5	121	0	0	0	148	19	0	10	0	4	0	0	0	0	0	307	1198
3:45 PM	3	101	Ō	Ō	0	145	6	Ō	17	Ō	7	Ō	Ō	Ō	Ō	Ō	279	1202
4:00 PM	3	113	0	0	0	181	15	0	16	0	1	0	0	0	0	0	329	1192

15-Min Count Period			ood Dr bound)				vood Dr bound)				en Dr bound)				en Dr bound)		Total	Hourly Totals
Beginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		TOtals
4:15 PM	3	126	0	0	0	203	15	0	13	0	1	0	0	0	0	0	361	1276
4:30 PM	7	133	0	0	0	202	14	0	12	0	0	0	0	0	0	0	368	1337
4:45 PM	3	102	0	0	0	215	17	0	8	0	5	0	0	0	0	0	350	1408
5:00 PM	1	135	0	0	0	212	17	0	11	0	4	0	0	0	0	0	380	1459
5:15 PM	4	159	0	0	0	230	20	0	11	0	2	0	0	0	0	0	426	1524
5:30 PM	5	137	0	0	0	202	15	0	7	0	6	0	0	0	0	0	372	1528
5:45 PM	4	142	0	0	0	184	15	0	9	0	3	0	0	0	0	0	357	1535
6:00 PM	4	125	0	0	0	152	14	0	8	0	2	0	0	0	0	0	305	1460
6:15 PM	3	148	0	0	0	133	16	0	11	0	3	0	0	0	0	0	314	1348
Peak 15-Min		North	bound			South	bound			Eastb	ound			West	oound		_	
Flowrates	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	10	tal
All Vehicles	16	636	0	0	0	920	80	0	44	0	8	0	0	0	0	0	17	'04
Heavy Trucks	0	0	Ō	-	0	12	0		0	Ō	Ō	-	0	Ō	Ō			2
Buses	-																_	_
Pedestrians		0				0				0				0			()
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0			5
Scooters																		
Comments:																		

Report generated on 9/14/2022 11:30 AM

Appendix B: Photo Log

Rosewood Drive & Fawn Drive – Eastbound Approach



Rosewood Drive & Fawn Drive – Southbound Approach



Appendix C: Synchro Reports

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	- M		٦	† †	A	
Traffic Volume (vph)	101	6	6	901	376	55
Future Volume (vph)	101	6	6	901	376	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.992				0.981	
Flt Protected	0.955		0.950			
Satd. Flow (prot)	1765	0	1770	3539	3472	0
Flt Permitted	0.955		0.950			
Satd. Flow (perm)	1765	0	1770	3539	3472	0
Link Speed (mph)	30			35	35	
Link Distance (ft)	863			1592	448	
Travel Time (s)	19.6			31.0	8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	7	7	979	409	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	117	0	7	979	469	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utiliza	tion 37.5%			IC	U Level	of Service
Analysis Period (min) 15						
<u>j</u>						

Int Delay, s/veh	2.2						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	ł
Lane Configurations	- Y		- ኘ	- 11	_ ≜ î≽		
Traffic Vol, veh/h	101	6	6	901	376	55	,
Future Vol, veh/h	101	6	6	901	376	55	;
Conflicting Peds, #/hr	0	0	0	0	0	0)
Sign Control	Stop	Stop	Free	Free	Free	Free	ý
RT Channelized	-	None	-	None	-	None	ý
Storage Length	0	-	200	-	-	-	-
Veh in Median Storage,	,# 0	-	-	0	0	-	-
Grade, %	0	-	-	0	0	-	-
Peak Hour Factor	92	92	92	92	92	92	2
Heavy Vehicles, %	2	2	2	2	2	2)
Mvmt Flow	110	7	7	979	409	60)

Major/Minor	Minor2	Ν	Najor1	Maj	or2		
Conflicting Flow All	943	235	469	0	-	0	
Stage 1	439	-	-	-	-	-	
Stage 2	504	-	-	-	-	-	
Critical Hdwy	6.84	6.94	4.14	-	-	-	
Critical Hdwy Stg 1	5.84	-	-	-	-	-	
Critical Hdwy Stg 2	5.84	-	-	-	-	-	
Follow-up Hdwy	3.52	3.32	2.22	-	-	-	
Pot Cap-1 Maneuver	261	767	1089	-	-	-	
Stage 1	617	-	-	-	-	-	
Stage 2	572	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	259	767	1089	-	-	-	
Mov Cap-2 Maneuver	259	-	-	-	-	-	
Stage 1	613	-	-	-	-	-	
Stage 2	572	-	-	-	-	-	

Approach	EB	NB	SB
HCM Control Delay, s	28.2	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	1089	- 269	-	-
HCM Lane V/C Ratio	0.006	- 0.432	-	-
HCM Control Delay (s)	8.3	- 28.2	-	-
HCM Lane LOS	А	- D	-	-
HCM 95th %tile Q(veh)	0	- 2.1	-	-

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		ľ	<u></u>	A1⊅	
Traffic Volume (vph)	96	68	69	809	347	35
Future Volume (vph)	96	68	69	809	347	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.944				0.986	
Flt Protected	0.972		0.950			
Satd. Flow (prot)	1709	0	1770	3539	3490	0
Flt Permitted	0.972		0.950			
Satd. Flow (perm)	1709	0	1770	3539	3490	0
Link Speed (mph)	30			35	35	
Link Distance (ft)	1027			649	1592	
Travel Time (s)	23.3			12.6	31.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	104	74	75	879	377	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	178	0	75	879	415	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary						
	Other					
Control Type: Unsignalized						
Intersection Capacity Utilizat	ion 38.5%			IC	CU Level	of Service I
Analysis Period (min) 15						

Int Delay, s/veh	3.7						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	2
Lane Configurations	۰¥		٦	- 11	_ ^ ↑₽		
Traffic Vol, veh/h	96	68	69	809	347	35	j
Future Vol, veh/h	96	68	69	809	347	35)
Conflicting Peds, #/hr	0	0	0	0	0	0)
Sign Control	Stop	Stop	Free	Free	Free	Free)
RT Channelized	-	None	-	None	-	None	į
Storage Length	0	-	200	-	-	-	
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	104	74	75	879	377	38	}

Major/Minor	Minor2	N	Najor1	Maj	or2		
Conflicting Flow All	986	208	415	0	-	0	
Stage 1	396	-	-	-	-	-	
Stage 2	590	-	-	-	-	-	
Critical Hdwy	6.84	6.94	4.14	-	-	-	
Critical Hdwy Stg 1	5.84	-	-	-	-	-	
Critical Hdwy Stg 2	5.84	-	-	-	-	-	
Follow-up Hdwy	3.52	3.32	2.22	-	-	-	
Pot Cap-1 Maneuver	245	798	1140	-	-	-	
Stage 1	649	-	-	-	-	-	
Stage 2	517	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuve		798	1140	-	-	-	
Mov Cap-2 Maneuve	r 229	-	-	-	-	-	
Stage 1	606	-	-	-	-	-	
Stage 2	517	-	-	-	-	-	

Approach	EB	NB	SB	
HCM Control Delay, s	28.7	0.7	0	
HCM LOS	D			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	1140	- 325	-	-
HCM Lane V/C Ratio	0.066	- 0.548	-	-
HCM Control Delay (s)	8.4	- 28.7	-	-
HCM Lane LOS	А	- D	-	-
HCM 95th %tile Q(veh)	0.2	- 3.1	-	-

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EBL	EBR	NBL	NBT	SBT	SBR
Υ		۲	<u></u>	∱1 }	
57	6	10	608	891	88
57	6	10	608	891	88
1900	1900	1900	1900	1900	1900
0	0	200			0
1	0	1			0
25		25			
1.00	1.00	1.00	0.95	0.95	0.95
0.986				0.986	
0.957		0.950			
1758	0	1770	3539	3490	0
0.957		0.950			
1758	0	1770	3539	3490	0
30			35	35	
863			1592	448	
19.6			31.0	8.7	
0.92	0.92	0.92	0.92	0.92	0.92
62	7	11	661	968	96
69	0	11	661	1064	0
No	No	No	No	No	No
Left	Right	Left	Left	Left	Right
12			12	12	
0			0	0	
16			16	16	
1.00	1.00	1.00	1.00	1.00	1.00
15	9	15			9
Stop			Free	Free	
Other					
tion 37.6%)		IC	CU Level	of Service
	Y 57 57 57 57 1900 0 1 25 1.00 0.986 0.957 1758 0.957 1758 30 863 19.6 0.92 62 69 No Left 12 0 16 1.00 15 Stop	Y 6 57 6 1900 1900 0 0 1900 100 0 0 1 0 25 1.00 1.00 1.00 0.986 0.957 1758 0 0.957 1758 1758 0 30 863 19.6 0.92 0.92 0.92 62 7 69 0 No No Left Right 12 0 16 1.00 15 9 Stop 2	Y Y 57 6 10 57 6 10 1900 1900 1900 0 0 200 1 0 1 25 25 1.00 1.00 1.00 0.986 0 0.957 0.950 1778 0.957 0.950 1770 0.957 0.950 1770 30 30 863 1770 30 69 0 11 No No No Left Right Left 12 0 16 Stop	Y Y Y 57 6 10 608 57 6 10 608 1900 1900 1900 1900 0 0 200 1 1 0 1 1 25 25 25 1.00 1.00 0.986 0.957 0.950 1758 0.957 0.950 1758 1770 3539 0.957 0.950 1758 31.0 0.957 0.92 0.92 0.92 1758 0 1770 3539 30 35 363 1592 19.6 31.0 0.92 0.92 0.92 0.92 0.92 0.92 62 7 11 661 No No No No Left Right Left Left 12 12 0 0 16 16 16 16 1.00 1.00 1.00 1.00 15	Y A A A 57 6 10 608 891 1900 1900 1900 1900 1900 0 0 200 1900 1900 1 0 1 1900 1900 1900 25 25 1.00 1.00 1.00 0.95 0.95 0.986 0.986 0.986 0.986 0.986 0.957 0.950 1758 0 1770 3539 3490 0.957 0.950 1758 0 1770 3539 3490 30 35 35 35 35 363 1592 448 19.6 31.0 8.7 0.92 0.92 0.92 0.92 62 7 11 661 968 968 968 69 0 11 661 1064 No No No 12 12 12 12 12 12 12 12 12 12 12 12 12

Int Delay, s/veh	2						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	l
Lane Configurations	- Y		- ኘ	- 11	_ ≜ î≽		
Traffic Vol, veh/h	57	6	10	608	891	88	}
Future Vol, veh/h	57	6	10	608	891	88	5
Conflicting Peds, #/hr	0	0	0	0	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free	÷
RT Channelized	-	None	-	None	-	None	÷
Storage Length	0	-	200	-	-	-	
Veh in Median Storage,	,# 0	-	-	0	0	-	-
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	1
Heavy Vehicles, %	2	2	2	2	2	2)
Mvmt Flow	62	7	11	661	968	96	,

Major/Minor	Minor2	Ν	Najor1	Ма	jor2	
Conflicting Flow All	1369	532	1064	0	-	0
Stage 1	1016	-	-	-	-	-
Stage 2	353	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	138	492	651	-	-	-
Stage 1	310	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuve	r 136	492	651	-	-	-
Mov Cap-2 Maneuve	r 136	-	-	-	-	-
Stage 1	305	-	-	-	-	-
Stage 2	682	-	-	-	-	-

Approach	EB	NB	SB	
HCM Control Delay, s	49.7	0.2	0	
HCM LOS	E			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	651	- 146	-	-
HCM Lane V/C Ratio	0.017	- 0.469	-	-
HCM Control Delay (s)	10.6	- 49.7	-	-
HCM Lane LOS	В	- E	-	-
HCM 95th %tile Q(veh)	0.1	- 2.2	-	-

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Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	- M		5	† †	∱1 }	
Traffic Volume (vph)	38	15	14	573	828	67
Future Volume (vph)	38	15	14	573	828	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.962				0.989	
Flt Protected	0.965		0.950			
Satd. Flow (prot)	1729	0	1770	3539	3500	0
Flt Permitted	0.965		0.950			
Satd. Flow (perm)	1729	0	1770	3539	3500	0
Link Speed (mph)	30			35	35	
Link Distance (ft)	1027			649	1592	
Travel Time (s)	23.3			12.6	31.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	16	15	623	900	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	57	0	15	623	973	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type: 0	Other					
Control Type: Unsignalized						
Intersection Capacity Utiliza	tion 35.0%)		IC	CU Level	of Service
Analysis Period (min) 15						

Int Delay, s/veh	1.2						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	!
Lane Configurations	۰¥		- ኘ	- 11	_ ≜ †}		
Traffic Vol, veh/h	38	15	14	573	828	67	
Future Vol, veh/h	38	15	14	573	828	67	!
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	-	200	-	-	-	
Veh in Median Storage	,# 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	92	92	92	92	1
Heavy Vehicles, %	2	2	2	2	2	2)
Mvmt Flow	41	16	15	623	900	73	

Minor2	Ν	/lajor1	Maj	or2		
1279	487	973	0	-	0	
937	-	-	-	-	-	
342	-	-	-	-	-	
6.84	6.94	4.14	-	-	-	
5.84	-	-	-	-	-	
5.84	-	-	-	-	-	
3.52	3.32	2.22	-	-	-	
158	526	704	-	-	-	
342	-	-	-	-	-	
691	-	-	-	-	-	
			-	-	-	
r 155	526	704	-	-	-	
r 155	-	-	-	-	-	
335	-	-	-	-	-	
691	-	-	-	-	-	
	1279 937 342 6.84 5.84 3.52 158 342 691 r 155 r 155 335	1279 487 937 - 342 - 6.84 6.94 5.84 - 3.52 3.32 158 526 342 - 691 - r 155 526 335 -	1279 487 973 937 - - 342 - - 6.84 6.94 4.14 5.84 - - 5.84 - - 3.52 3.32 2.22 158 526 704 342 - - 691 - - r 155 526 704 155 - - 335 - -	1279 487 973 0 937 - - - 342 - - - 6.84 6.94 4.14 - 5.84 - - - 3.52 3.32 2.22 - 158 526 704 - 342 - - - 691 - - - r 155 526 704 - r 155 - - - 335 - - - -	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

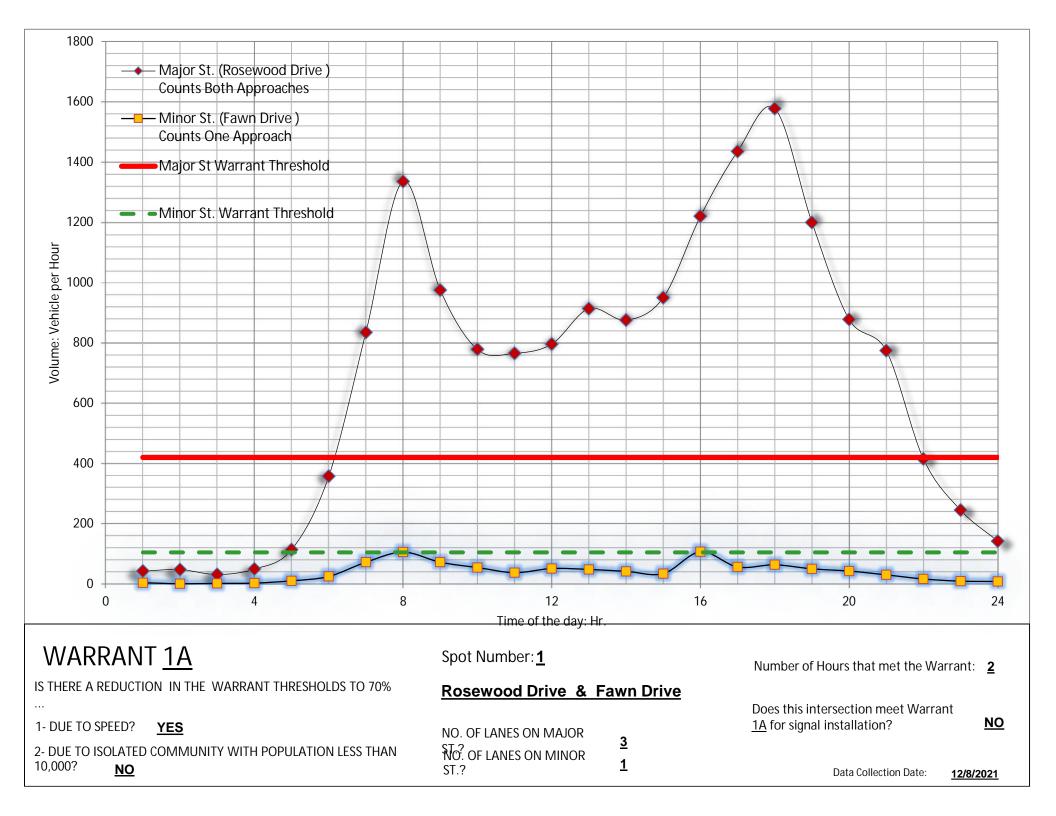
Approach	EB	NB	SB
HCM Control Delay, s	31.2	0.2	0
HCM LOS	D		

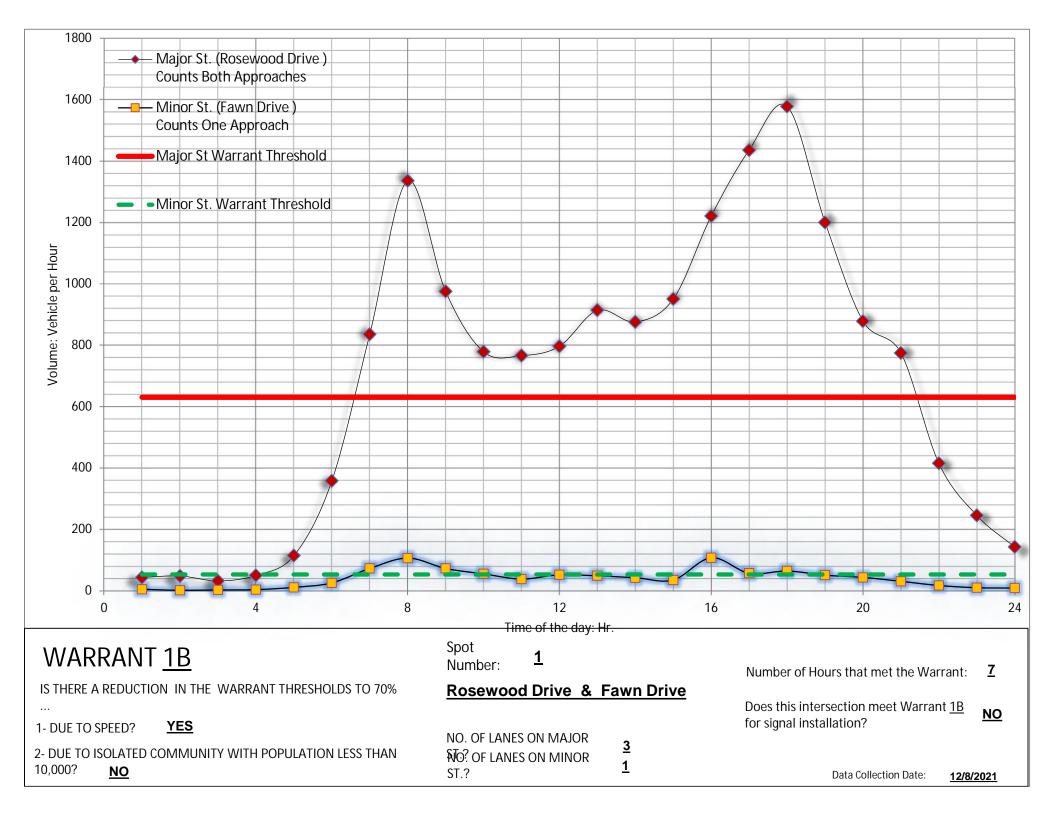
Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	704	- 194	-	-
HCM Lane V/C Ratio	0.022	- 0.297	-	-
HCM Control Delay (s)	10.2	- 31.2	-	-
HCM Lane LOS	В	- D	-	-
HCM 95th %tile Q(veh)	0.1	- 1.2	-	-

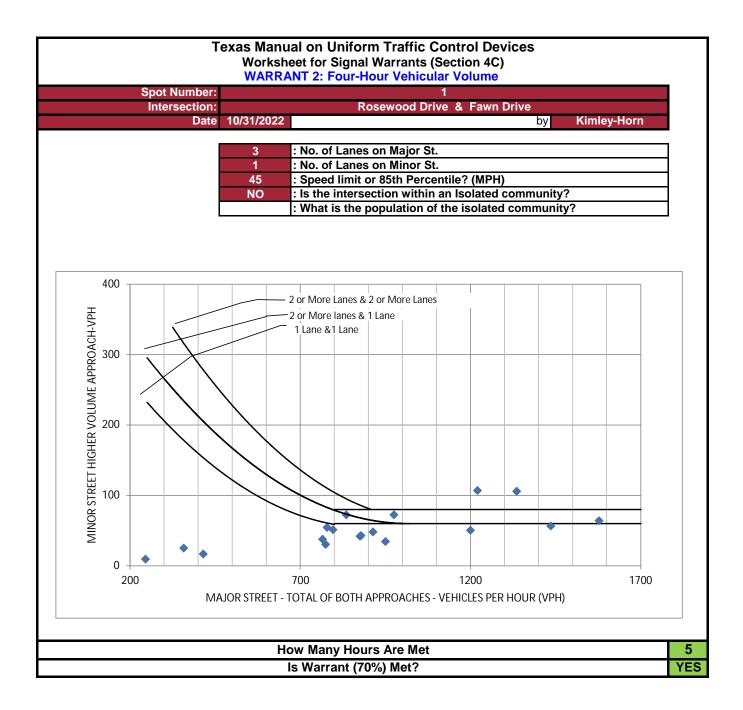
Appendix D: Signal Warrants

	Summar	y of Warrants		
		4		
Intersection: Major Street:	Rosewood Drive	1 Minor Street:	F	awn Drive
Intersection:	Rosewood Drive & Fawn Drive	winor Street.	1	
City/Twp:	Austin ETJ			
Date Performed:	10/31/2022	Performed By:	Ki	mley-Horn
Date Volumes				
Collected:	12/8/2021			
	Warrant		Condition	Is Warrant Met
	Wallant		Condition	
WA	RRANT 1: Eight-Hour Vehicular Vo	lume		NO
			Condition A	NO
			Condition B	NO
			Condition A&B	N/A
\A//	ARRANT 2: Four-Hour Vehicular Vol	umo	(70%)	YES
VV /	ARRANT 2. FOUL-HOUL VEHICULAL VOL	ume	(70%)	TES
WA	RRANT 3: Peak-Hour Vehicular Vo	lume	(70%)	YES
			Condition A	NO
			Condition B	YES
	WARRANT 4: Pedestrian Volume		(70%)	NO
	Wallour 4.1 Guedinan Volume		Four Hour	NO
			Peak Hour	NO
	WARRANT 5: School Crossing			N/A
W	ARRANT 6: Coordinated Signal Sys	stem		NO
	WARRANT 7: Crash Experience			NO
	•		Condition A	NO
			Condition B	NO
	WADDANT 9. Deedwood Notice			
	WARRANT 8: Roadway Network			NO
WARF	ANT 9: Intersection Near a Grade C	Crossing		NO
	Issue to Be Add	Iressed by Signalization	ו:	

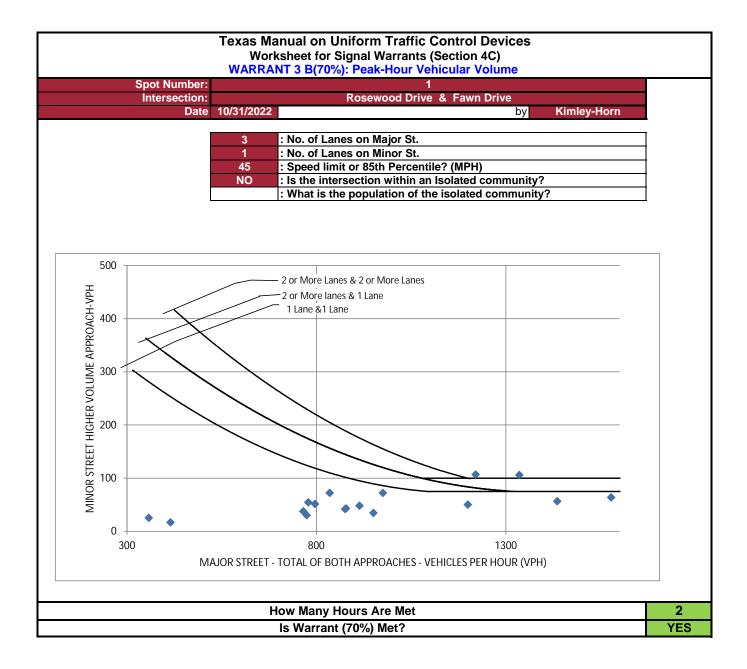
Intersection:	Posou	ood Drive &	Fawn Drivo	1	WARRAN	III. EIGIII-H	our Vehicular	volume					
Date	10/31/2022	bv	Kimley-Horn										
		,											
3	: No. of Lanes o	on Major St?								1			
1	: No. of Lanes of	on Minor St?											
45	: Speed limit or	85th Percent	ile? (MPH)										
NO	: Is the intersec	tion within ar	Isolated community	?									
	: if answer 4 is	Yes. then what	at is the population of	the isolated c	ommunity?								
NO			res been tried?							4			
ine ine	. Have other rer	neului meusu											
				USE 70% \	WARRANTS 1	IA AND 1B. DO	NOT USE COM	MBINATION OF	A & B				
	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
Time	N-S	E-W	70%	70%		70%	70%		56%	56%	56%	56%	
00:01 - 01:00	43	4	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
01:00 - 02:00	48	1	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
02:00 - 03:00	32	2	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
03:00 - 04:00	50	3	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
04:00 - 05:00	114	10	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
05:00 - 06:00	358	25	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
06:00 - 07:00 07:00 - 08:00	835 1336	72 106	420 420	105 105	NO YES	630 630	53 53	YES YES	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
07:00 - 08:00	975	72	420	105	NO	630	53	YES	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
09:00 - 10:00	778	55	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
10:00 - 11:00	766	38	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
11:00 - 12:00	796	51	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
12:00 - 13:00	914	48	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
13:00 - 14:00	876	42	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
14:00 - 15:00	950	35	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
5:00 - 16:00	1220	107	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
6:00 - 17:00 7:00 - 18:00	1435 1578	57 64	420 420	105 105	NO NO	630 630	53 53	YES YES	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
8:00 - 19:00	1578	64 50	420	105	NO	630	53	NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
9:00 - 20:00	878	43	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
20:00 - 21:00	774	30	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
21:00 - 22:00	415	17	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
22:00 - 23:00	245	9	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
23:00 - 24:00	142	8	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
									Number of H	lours that met ti	ne Warrant 1A =	2	1
										lours that met th		7	1
								Number of Ho	urs that met the 0			0	1
												·	-
			A	. Is the Minim	num Vehicu	lar Volume W	arrant Met? (Condition A)					NO
				B. Is the Inter	ruption of C	Continuous T	raffic Met? (C	ondition B)					NO
							and B Criteria						







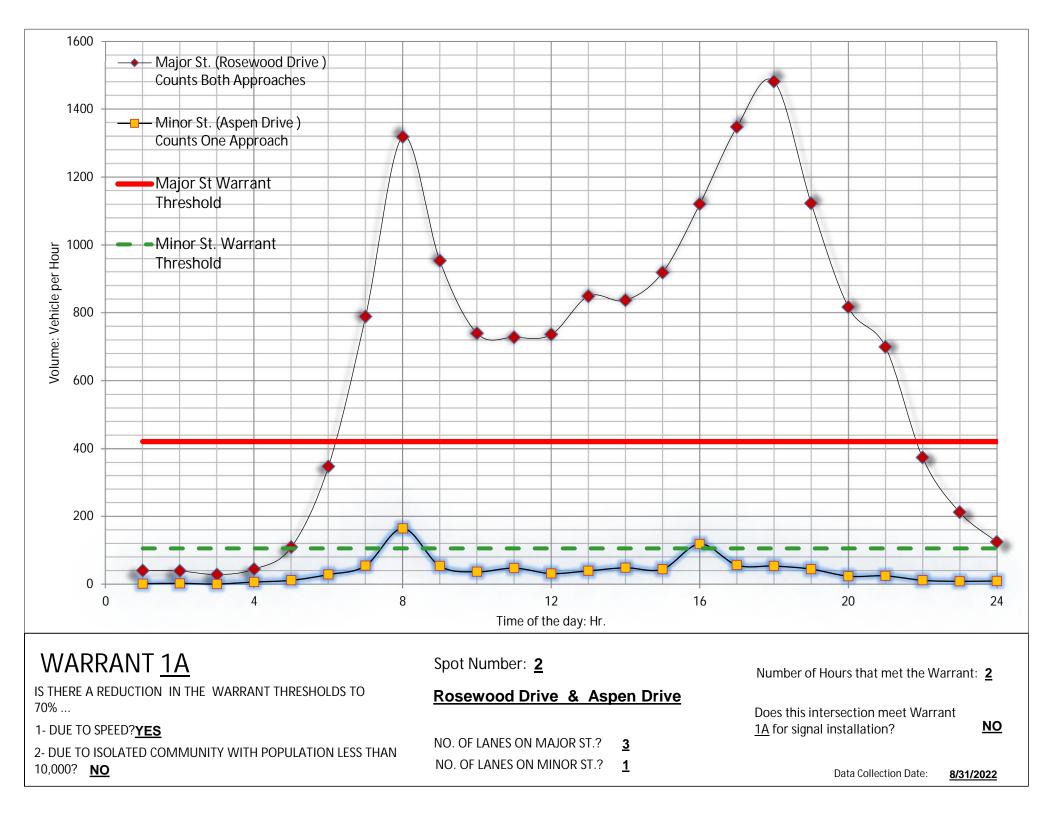
	Works	ual on Uniform Traffic Control Devices heet for Signal Warrants (Section 4C) NT 3 A: Peak-Hour Vehicular Volume		
Spot Number:		1		
Intersection:		Rosewood Drive & Fawn Drive		
Date	10/31/2022	by	Kimley-Horn	
NOT MET	49.7 1 3 64 1642 17:00 - 18:00	: Total Stop Time Delay (hrs) : Minor Street Approach Lanes : Total Approaches : Minor Approach Volume : Total Entering Volume : Peak Hour		
		Is Warrant 3 A Met?		NO

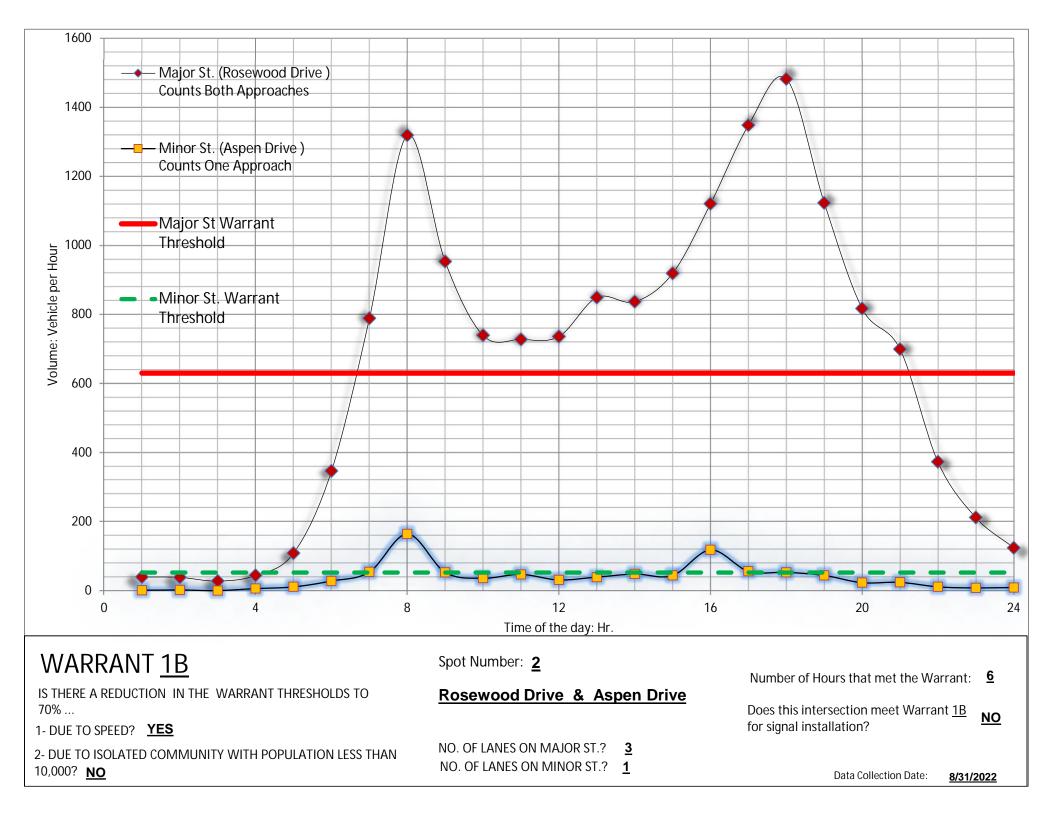


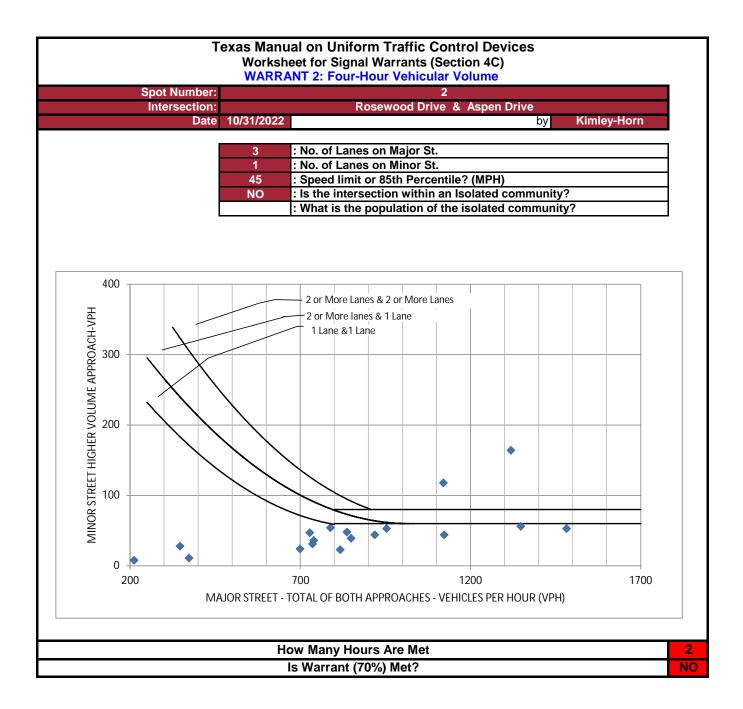
pot Number:		1	V	VARRANT 7:	Crash Expe	rience			
	Baser		Four Drive						
ntersection: Date	10/31/2022	vood Drive &							
Date	10/31/2022	by	Kimley-Horn						
	3	: No. of Lane	s on Major St?						
	1		s on Minor St?						-
	NO	: Has adequa	te trial of remedial m	easure with ad	equate enfor	cement been	ried?		
	NO	: Are there 5	or more Crashes Sus	ceptable to Co	orrection by S	ignalization ir	a 12 Month Per	iod?	
	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	
Time	N-S	E-W							
00:00 - 01:00	43	4	336	84	NO	504	42	NO	
01:00 - 02:00	48	1	336	84	NO	504	42	NO	
02:00 - 03:00	32	2	336	84	NO	504	42	NO	
03:00 - 04:00	50	3	336	84	NO	504	42	NO	
4:00 - 05:00	114	10	336	84	NO	504	42 42	NO NO	
5:00 - 06:00 6:00 - 07:00	358 835	25 72	336 336	84 84	NO NO	504 504	42	YES	
7:00 - 07:00	1336	106	336	84	YES	504	42	YES	
7:00 - 08:00 8:00 - 09:00	975	72	336	84	NO	504	42	YES	
9:00 - 10:00	778	55	336	84	NO	504	42	YES	
0:00 - 11:00	766	38	336	84	NO	504	42	NO	
1:00 - 12:00	796	51	336	84	NO	504	42	YES	
2:00 - 13:00	914	48	336	84	NO	504	42	YES	
3:00 - 14:00	876	42	336	84	NO	504	42	NO	
4:00 - 15:00	950	35	336	84	NO	504	42	NO	
5:00 - 16:00	1220	107	336	84	YES	504	42	YES	
6:00 - 17:00	1435	57	336	84	NO	504	42	YES	
7:00 - 18:00	1578	64	336	84	NO	504	42	YES	
8:00 - 19:00	1200	50	336	84	NO	504	42	YES	
9:00 - 20:00	878	43	336	84	NO	504	42	YES	
0:00 - 21:00	774	30	336	84	NO	504	42	NO	
1:00 - 22:00	415	17	336	84	NO	504	42	NO	
2:00 - 23:00	245	9	336	84	NO	504	42	NO	
23:00 - 24:00	142	8	336	84	NO	504	42	NO	
	Is the		in the warrant thresh	ŕ	NO	-			
			of Hours that met the		2	1			
		Number	of Hours that met the	e warrant 7B =	11]			

	Summa	ry of Warrants					
Interception		2					
Intersection: Major Street:	Rosewood Drive	∠ Minor Street:	Δ	spen Drive			
Intersection:	Rosewood Drive & Aspen Drive	winor Street.					
City/Twp:	Austin ETJ						
Date Performed:	10/31/2022	Performed By:	By: Kimley-Horn				
Date Volumes				-, -			
Collected:	8/31/2022						
	Warrant		Condition	Is Warrant Met			
	Warrant		Condition				
WA	RRANT 1: Eight-Hour Vehicular Vo	lume		NO			
	~		Condition A	NO			
			Condition B	NO			
			Condition A&B	N/A			
			(700())				
WA	RRANT 2: Four-Hour Vehicular Vo	lume	(70%)	NO			
WA	RRANT 3: Peak-Hour Vehicular Vo	lume	(70%)	YES			
117	INTANT 5. Teak-flour venicular vo	iunie	Condition A	NO			
			Condition B	YES			
			Contaition D	120			
	WARRANT 4: Pedestrian Volume		(70%)	NO			
			Four Hour	NO			
			Peak Hour	NO			
	WARRANT 5: School Crossing			N/A			
w	ARRANT 6: Coordinated Signal Sys	stem		NO			
				NO			
	WARRANT 7: Crash Experience			NO			
	÷		Condition A	NO			
			Condition B	NO			
	WADDANT 9. Deedway Natural						
	WARRANT 8: Roadway Network			NO			
WARR	ANT 9: Intersection Near a Grade	Crossing		NO			
	Joous to Do Add	headad by Signalization					
	Issue to Be Add	dressed by Signalization	1:				

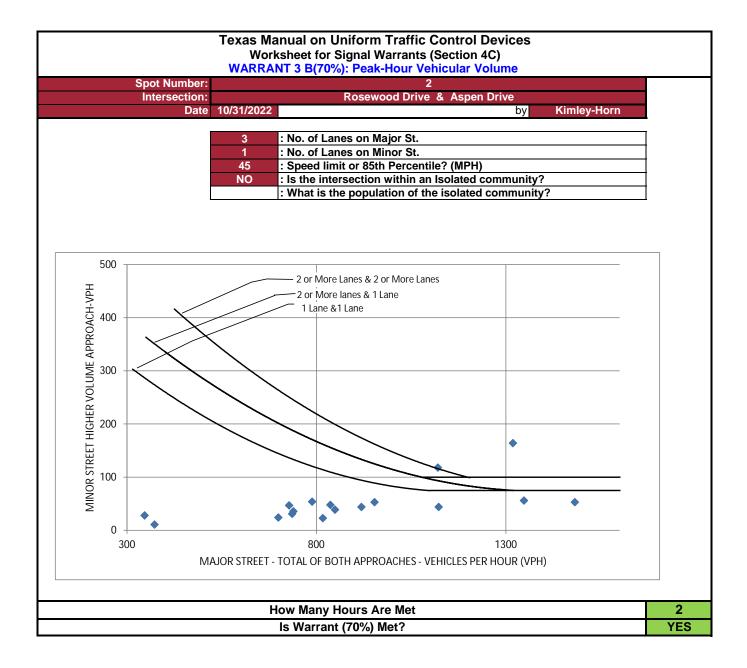
				Te	Workshe	et for Signal	n Traffic Cor Warrants (Sec our Vehicular	ction 4C)	•				
Intersection:	Rosew	ood Drive &	Aspen Drive		TANIA	i i. Eighten	our verneular	Volume					
Date	10/31/2022	by	Kimley-Horn										
3	: No. of Lanes o	on Major St?								1			
1	: No. of Lanes of												
45	: Speed limit or	85th Percent	ile? (MPH)										
NO	: Is the intersec	tion within ar	Isolated community	?									
	: if answer 4 is `	Yes, then what	at is the population of	the isolated c	community?								
NO	: Have other ren	nedial measu	res been tried?		-					-			
				USE 70% \	WARRANTS 1	IA AND 1B. DO	NOT USE CO	BINATION OF	A & B				
	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
Time	N-S	E-W	70%	70%		70%	70%		56%	56%	56%	56%	
0:01 - 01:00	40	1	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
1:00 - 02:00	38	2	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
2:00 - 03:00	28	0	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
3:00 - 04:00	44	6	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
4:00 - 05:00	109	11	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
5:00 - 06:00	347	28	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
6:00 - 07:00	789	54	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
7:00 - 08:00 8:00 - 09:00	1319 953	164 53	420 420	105 105	YES NO	630 630	53 53	YES YES	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
9:00 - 10:00	739	36	420	105	NO	630	53	NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
0:00 - 11:00	739	47	420	105	NO	630	53	NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
1:00 - 12:00	736	31	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
2:00 - 13:00	849	39	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
3:00 - 14:00	837	48	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
4:00 - 15:00	919	44	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
5:00 - 16:00	1120	118	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
6:00 - 17:00	1348	56	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
7:00 - 18:00	1482	53	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
8:00 - 19:00	1123	44	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
9:00 - 20:00	817	23	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
0:00 - 21:00	699	24	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
1:00 - 22:00	373 212	11	420 420	105	NO NO	630 630	53 53	NO NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
2:00 - 23:00	124	8	420	105 105	NO	630	53 53	NO	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
								Number of Hou	Number of H	lours that met th		2 6	
				B. Is the Inter	ruption of C	Continuous T	arrant Met? (raffic Met? (C and B Criteria	ondition B)					NO NO N/A







-	Works	ual on Uniform Traffic Control Devices heet for Signal Warrants (Section 4C) NT 3 A: Peak-Hour Vehicular Volume			
Spot Number:		2			
Intersection:	Rosewood Drive & Aspen Drive				
Date	10/31/2022	by Kimley-Ho	rn		
NOT MET	31.2 1 3 53 1535 17:00 - 18:00	: Total Stop Time Delay (hrs) : Minor Street Approach Lanes : Total Approaches : Minor Approach Volume : Total Entering Volume : Peak Hour			
		Is Warrant 3 A Met?	NO		



pot Number:		2	V	VARRANT 7:	Crash Expe	rience					
			••••••								
ntersection:		rood Drive &									
Date	10/31/2022	by	Kimley-Horn								
	3	: No. of Lane	s on Major St?								
	1		s on Minor St?								
	NO : Has adequate trial of remedial mea				equate enfor	cement been	tried?				
	NO	· · ·									
	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?			
Time	N-S	E-W									
0:00 - 01:00	40	1	336	84	NO	504	42	NO			
01:00 - 02:00	38	2	336	84	NO	504	42	NO			
02:00 - 03:00	28	0	336	84	NO	504	42	NO			
03:00 - 04:00	44	6	336	84	NO	504	42	NO			
4:00 - 05:00	109	11	336	84	NO	504	42	NO			
5:00 - 06:00	347	28	336	84	NO	504	42	NO			
6:00 - 07:00	789	54	336	84	NO	504	42	YES			
7:00 - 08:00 8:00 - 09:00	1319 953	164	336 336	84 84	YES NO	504 504	42 42	YES YES			
9:00 - 09:00 9:00 - 10:00	739	53 36	336	84 84	NO	504	42	NO			
9:00 - 10:00 0:00 - 11:00	728	47	336	84	NO	504	42	YES			
1:00 - 12:00	736	31	336	84	NO	504	42	NO			
2:00 - 13:00	849	39	336	84	NO	504	42	NO			
3:00 - 14:00	837	48	336	84	NO	504	42	YES			
4:00 - 15:00	919	44	336	84	NO	504	42	YES			
5:00 - 16:00	1120	118	336	84	YES	504	42	YES			
6:00 - 17:00	1348	56	336	84	NO	504	42	YES			
7:00 - 18:00	1482	53	336	84	NO	504	42	YES			
8:00 - 19:00	1123	44	336	84	NO	504	42	YES			
9:00 - 20:00	817	23	336	84	NO	504	42	NO			
0:00 - 21:00	699	24	336	84	NO	504	42	NO			
1:00 - 22:00	373	11	336	84	NO	504	42	NO			
2:00 - 23:00	212	8	336	84	NO	504	42	NO			
3:00 - 24:00	124	9	336	84	NO	504	42	NO			
	Is the		in the warrant thresh	ŕ	<u>NO</u> 2	7					
			of Hours that met the			4					
		Number	of Hours that met the	e warrant /B =	10	J					