

October 1, 2018

Mr. Johannes Hoevertsz, PE County of Sonoma Department of Transportation and Public Works 2300 County Center Drive, Suite B 100 Santa Rosa, CA 95403

Barnett Valley Road All-Way Stop Controls Warrant Study

Dear Mr. Hoevertsz;

As requested, W-Trans has prepared a warrant analysis to determine the potential need for all-way stop controls (AWSC) at the intersections of Olsen Road/Barnett Valley Road and Kennedy Road/Barnett Valley Road in the County of Sonoma. Both intersections currently have two approaches stop-controlled in configurations that are atypical in that only one of the opposing approaches on Barnett Valley Road is stop-controlled at each location. The stop sign warrant analysis was based on the criteria published in the California *Manual on Uniform Traffic Control Devices* (CA-MUTCD).

Existing Conditions

Olsen Road/Barnett Valley Road is a two-way stop-controlled three-legged intersection with stop controls on the Olsen Road approach and the eastbound Barnett Valley Road approach. Both roads have two travel lanes of at least nine feet in width. Olsen Road generally has a straight, flat alignment. Barnett Valley Road has a rolling terrain and crests west of Olsen Road but sags to the east of Olsen Road. Landscaping and vegetation bound both sides of Barnett Valley Road, contributing to minor variations in roadway widths. Counts performed between April 2 and 4, 2018 indicate that Barnett Valley Road has an ADT of approximately 600 vehicles per day. Based on field observations performed on a Wednesday between 3:00 and 4:00 p.m., there were no pedestrians or bicyclists crossing or using the intersection.

Kennedy Road/Barnett Valley Road is also a two-way stop-controlled three-legged intersection, with stop controls on the Kennedy Road approach and the eastbound Barnett Valley Road approach. Both roads have two travel lanes of at least nine feet in width and generally rolling terrain. Further, Barnett Valley Road changes to Sanders Road once the roadway curves northward approximately 400 feet east of Kennedy Road. The roadway slopes upward west of Kennedy Road and continues to slope downward to the east of Kennedy Road. Landscaping and vegetation bound both sides of Barnett Valley Road, contributing to minor variations in roadway widths. Based on field observations performed on a Wednesday between 4:00 and 5:30 p.m., there were few pedestrians and no bicyclists crossing or using the intersection.

All-Way Stop Control Warrants

The stop sign warrant analysis was based on the *California Manual of Uniform Traffic Control Devices* (CA-MUTCD), which identifies five categories of criteria for determining if an intersection should be considered a candidate for all-way stop controls (AWSC), including the necessity for traffic signal control, various traffic volume levels on approaching streets, intersection collision records, a combination of these warrants, and several optional warrants. The four optional criteria for AWSC warrants listed in the CA-MUTCD include: (A) the potential for left turn conflicts; (B) the potential for vehicle/ pedestrian conflicts where there is a high volume of pedestrian activity; (C) restricted sight distance to the extent that turns at the intersection are difficult to complete; and (D) at the intersection of two residential neighborhood collector streets where AWSC would improve the overall operational characteristics of the intersection. All these warrants were evaluated; following are our findings.

Collision History

The collision histories for the study intersections were reviewed to determine any trends or patterns that may indicate safety issues that could be prevented via introduction of additional stop controls. For all-way stop-controls to be warranted to address a safety concern, at least five collisions of a type correctable through additional stop controls would need to have occurred within the last year. Collision records obtained from the California Highway Patrol for July 1, 2017 through June 30, 2018 were reviewed; this is the most current information available.

There were no collisions reported near either study intersection in the single 12-month period of July 1, 2017 through June 30, 2018. Therefore, the study intersections do not meet the warrant for all-way stop-control based on the collision history requirement.

Minimum Volumes

Traffic counts for the westbound and eastbound approaches at the intersection of Olsen Road and Barnett Valley Road were reviewed to determine if the volumes were adequate to meet the minimum vehicular volume warrant for additional stop controls. To meet the AWSC volume warrant, the total combined vehicle and pedestrian volume at the intersection must be equal to or greater than 300 vehicles per hour for at least eight hours during the day plus the volume on the minor street (Olsen Lane) must be equal to or greater than 200 units per hour for the same eight hours. With regards to Barnett Valley Road, the eastbound and westbound counts indicate that the traffic volumes are not adequate to meet the volume warrant for all eight hours. Counts were not collected for the northbound approach on Olsen Road as it is a dead-end, minor road that terminates approximately 1,000 feet from the intersection. As the major street volumes are insufficient to meet the warrant, the Minimum Volume warrant is not met for the intersection of Barnett Valley Road/Olsen Road, so volumes on the minor street approach are not needed.

Traffic counts for the intersection of Kennedy Road and Barnett Valley Road were not collected but it was assumed that the eastbound and westbound traffic volumes are similar to those collected for the intersection of Olsen Road and Barnett Valley Road due to their proximity. Turning movement counts were collected between the hours of 4:00 and 5:30 p.m. on Wednesday August 29, 2018. The peak hour turning movement counts for the major street approaches at the intersection and the traffic volume counts collected from Olsen Road/Barnett Valley Road were used to develop a proportion for analysis. Applying this proportion equally to the counts collected for Olsen Road/Barnett Valley Road, the counts indicate that the traffic volumes are not adequate to meet the volume warrant for all eight hours. The Minimum Volume warrant is therefore not met for the intersection of Barnett Valley Road/Kennedy Road either.

Combination Warrant

This warrant is applied when no single criterion is satisfied, but the collision and minimum volume warrants are met at the 80-percent level. The collision criterion and the volumes at the study intersections were insufficient to meet the warrants at the 80 percent level. Therefore, this warrant is not met.

Optional Warrants

The CA-MUTCD also provides five optional warrants that were evaluated.

Left-turn Conflicts

No collisions occurred during the five-year period at either study intersection. Given the lack of a pattern involving left-turning traffic, there does not appear to be a concern specific to left-turning traffic, so this warrant is not met.

Vehicle/Pedestrian Conflicts

This warrant addresses intersections that have conflicts with vehicles and high pedestrian volumes. Due to this intersection being in a rural area with no pedestrian facilities and based on the field study, there is minimal pedestrian traffic at either study intersection; therefore, this warrant is not met.

Visibility

At unsignalized intersections a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the crossroad and the driver of an approaching vehicle. Adequate time must be provided for the waiting vehicle to either cross, turn left, or turn right, without requiring the through traffic to radically alter their speed. Sight distance was evaluated based on sight distance criteria contained in *A Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway Transportation Officials (AASHTO). The recommended sight distance at intersections of public streets is based on corner sight distances and the approach speed on the major street.

The recommended corner sight distance from the Olsen Road northbound approach is 390 feet based on a design speed of 35 mph. The westbound traffic on Barnett Valley Road was analyzed as this is the only movement that is not currently stop-controlled. A field review indicates that sight distance of approximately 35 feet is available to the east of the side street approach when measured from 15 feet back from the edgeline. Though sight lines are currently inadequate, if the waiting vehicle were to "creep" forward approximately four feet from the stop bar as expected, sight distance would improve to approximately 230 feet, which is still inadequate to meet the applicable sight distance standard. Because adequate sight distance cannot be achieved, this warrant is met for the intersection of Olsen Road/Barnett Valley Road.

Similarly, the westbound traffic on Barnett Valley Road was analyzed as this is the only movement that is not currently stop-controlled. A field review indicates that approximately 375 feet of sight distance is available to the east of the side street approach, when measured from 15 feet back from the edgeline. As this is less than the distance required for the posted speed limit, speeds were field measured at the location where vehicles can reasonably be seen exiting the curve onto Barnett Valley Road to determine the design approach speed for use in determining the minimum sight distance needed at the intersection. The survey indicated an 85th percentile speed of 25 mph in the westbound direction, resulting in a recommended corner sight distance of 280 feet from the Kennedy Road northbound approach. As the available sight lines are more than adequate for the actual approach speed, this warrant is not met for this intersection.

Residential Collector Streets

For this criterion to be met, the intersection must be of two residential neighborhood collector (through) streets of similar design that would be improved by all-way stop-controls. These intersections are in a rural setting and not a residential neighborhood; therefore, this warrant is not met.

Conclusions and Recommendations

- Field observations as well as the data reviewed and analysis performed indicate that none of the warrants specific to installation of all-way stop controls were met at the intersection of Kennedy Road/Barnett Valley Road. However, given the existing visibility issues, the installation of all-way stop controls is warranted at the intersection of Olsen Road/Barnett Valley Road.
- It is recommended that all-way stop controls be installed at Olsen Road/Barnett Valley Road. No additional stop controls are recommended at Kennedy Road/Barnett Valley Road.

Mr. Johannes Hoevertsz, PE

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Thank you for giving W-Trans the opportunity to provide these services. Please let us know if you have any questions.

Sincerely,

Brandon Duong Intern RTOE ≴teve Weinberger, PE, Principal SJW/bd/SOX927.L1



Enclosures: Traffic Counts, Warrant Results

Device ID: 303773 Operator: EB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Barnett Valley Road Lane: 21.86 Street: 69011 City: Barnett Valley Road County: W/olson Road State: EB		Raw Count: AADT Count: AADT Factor: Speed Limit:	549 275 1 55	
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Road Sur Wet	way face /Dry
Mon,04/02/2018					
[12:00-13:00]	21	36 MPH	72 F		
[13:00-14:00]	15	23 MPH	64 F		
[14:00-15:00]	19	22 MPH	64 F		
[15:00-16:00]	19	0 MPH	63 F		
[16:00-17:00]	16	60 MPH	86 F		
[17:00-18:00]	20	36 MPH	82 F		
[18:00-19:00]	. 9	31 MPH	68 F		
[19:00-20:00]	14	27 MPH	59 F		
[20:00-21:00]	8	25 MPH	57 F.		
[21:00-22:00]	2	23 MPH	55 F		
[22:00-23:00]	2	23 MPH	54 F		-
[23:00-00:00]	2	23 MPH	54 F		
Mon,04/02/2018	147	34 MPH	65 F		
Tue,04/03/2018		4			
[00:00-01:00]	0	0 MPH	52 F		
[01:00-02:00]	0	0 MPH	52 F		÷
[02:00-03:00]	1	22 MPH	50 F		
[03:00-04:00]	3	23 MPH	50 F		
[04:00-05:00]	1	22 MPH	48 F		
[05:00-06:00]	5	22 MPH	48 F		
[06:00-07:00]	8	20 MPH	48 F		
[07:00-08:00]	16	18 MPH	50 F		
[08:00-09:00]	21	19 MPH	64 F		828°/.
[09:00-10:00]	18	23 MPH	84 F		
[10:00-11:00]	31	22 MPH	72 F		
)4/05/2018 11:39		/		Page:	1

04/05/2018 11:39

Device ID: 30 Operator: EE Begin: 04 End: 04 Hours: 48 Period (min): 60	93773 3 1/02/2018 12:00 1/04/2018 12:00 8.00	Location: Barnett Lane: 21.86 Street: 69011 City: Barnett County: W/olson State: EB	Valley Road Valley Road a Road	Raw Cou AADT Cou AADT Facto Speed Lim	nt: 549 nt: 275 or: 1 nit: 55
	Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
	Tue,04/03/2018				
	[11:00-12:00]	26	22 MPH	66 F	······
	[12:00-13:00]	17	22 MPH	68 F	
,	[13:00-14:00]	.17	20 MPH	64 F	
	[14:00-15:00]	15	19 MPH	63 F	
	[15:00-16:00]	23	25 MPH	63 F	
	[16:00-17:00]	22	24 MPH	84 F	
	[17:00-18:00]	22	21 MPH	79 F	
	[18:00-19:00]	10	56 MPH	64 F	
-	[19:00-20:00]	10	43 MPH	57 F	
	[20:00-21:00]	6	36 MPH	55 F	
	[21:00-22:00]	2	. 30 MPH	55 F	
	[22:00-23:00]	1	28 MPH	54 F	
	[23:00-00:00]	1	32 MPH	54 F	
	Tue,04/03/2018	276	24 MPH	60 F	
	Wed,04/04/2018	0	0 MPH	52 F	
	[00.00-01.00]	1	28 MPH	52 F	
	[01:00-02:00]	, 0	0 MPH	52 F	
	[02:00-00:00]	4	28 MPH	52 F	
	[03:00-04:00]	0	0 MPH	52 F	
	[05:00-06:00]	8	28 MPH	52 F	
	[06:00-07:00]	8	27 MPH	52 F	
	[07:00-08:00]	15	22 MPH	54 F	
	[00.00-00.00]	21	18 MPH	63 F	
	[09:00-09:00]	21		001	

Device ID: 303773 Operator: EB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Barnett V Lane: 21.86 Street: 69011 City: Barnett V County: W/olson State: EB	Valley Road Valley Road Road	Raw Cou AADT Cou AADT Fact Speed Lin	nt: 549 nt: 275 or: 1 nit: 55
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Wed,04/04/2018				
[09:00-10:00]	27	18 MPH	73 F	
[10:00-11:00]	17	18 MPH	75 F	
[11:00-12:00]	25	18 MPH	75 F	
Wed,04/04/2018	126	20 MPH	59 F	•
04/02/2018 12:00 04/04/2018 12:00	549	25 MPH	61 F	

04/05/2018 11:39

Device ID: 303774 Operator: WB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Barnett Lane: 21.86 Street: 69011 City: Barnett County: W/Olsor State: WB	Valley Road Valley Road I Road	Raw Count: 615 AADT Count: 308 AADT Factor: 1 Speed Limit: 55		
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry	
Mon,04/02/2018				-	
[12:00-13:00]	21	28 MPH	77 F		
[13:00-14:00]	22	26 MPH	70 F		
[14:00-15:00]	20	30 MPH	68 F		
[15:00-16:00]	25	28 MPH	91 F		
[16:00-17:00]	24	32 MPH	93 F		
[17:00-18:00]	31	27 MPH	84 F		
[18:00-19:00]	24	29 MPH	72 F		
[19:00-20:00]	21	33 MPH	64 F		
[20:00-21:00]	11	30 MPH	61 F		
[21:00-22:00]	9	28 MPH	59 F		
[22:00-23:00]	7	28 MPH	57 F	·	
[23:00-00:00]	2	25 MPH	55 F	·	
Mon,04/02/2018	217	29 MPH	71 F		
Tue,04/03/2018	1		55 E		
[00:00-01:00]	1	42 WPH	55 F		
[01:00-02:00]	0	0 MPH	54 F		
[02:00-03:00]	0	0 MPH	54 F		
[03:00-04:00]	0	0 MPH	52 F		
[04:00-05:00]	1	32 MPH	52 F		
[05:00-06:00]	2	50 MPH	50 F		
[06:00-07:00]	5	29 MPH	50 F		
[07:00-08:00]	19	27 MPH	52 F		
[08:00-09:00]	11	28 MPH	64 F		
[09:00-10:00]	14	31 MPH	84 F		
[10:00-11:00]	20	28 MPH	99 F		

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Device ID: 303774 Operator: WB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Barnett Valley Ro Lane: 21.86 Street: 69011 City: Barnett Valley Ro County: W/Olson Road State: WB	pad	Raw Coun AADT Coun AADT Facto Speed Limi	t: 615 t: 308 r: 1 t: 55
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Tue,04/03/2018				
[11:00-12:00]	20	27 MPH	88 F	
[12:00-13:00]	23	29 MPH	77 F	1999 - 1999 -
[13:00-14:00]	19	28 MPH	70 F	
[14:00-15:00]	19	30 MPH	68 F	
[15:00-16:00]	29	28 MPH	91 F	
[16:00-17:00]	23	30 MPH	91 F	
[17:00-18:00]	33	─ 27 MPH	82 F	
[18:00-19:00]	21	28 MPH	70 F	
[19:00-20:00]	24	30 MPH	61 F	
[20:00-21:00]	21	28 MPH	59 F	
[21:00-22:00]	6	29 MPH	59 F	
[22:00-23:00]	5	24 MPH	57 F	
[23:00-00:00]	3	27 MPH	55 F	
Tue,04/03/2018	319	29 MPH	66 F	
Wed,04/04/2018			66.5	
	0		55 F	
[01:00-02:00]	1	28 MPH	55 F	
,	0	OMPH	54 F	
[03:00-04:00]	1	UMPH	54 F	
[04:00-05:00]	0	0 MPH	54 F	
[05:00-06:00]	1	28 MPH	54 F	
[06:00-07:00]	6	29 MPH	54 F	
[07:00-08:00]	7	29 MPH	55 F	
[08:00-09:00]	15	29 MPH	64 F	****

Device ID: 303774 Operator: WB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Barnett Valle Lane: 21.86 Street: 69011 City: Barnett Valle County: W/Olson Roa State: WB	ey Road ey Road ad	Raw Count: 615 AADT Count: 308 AADT Factor: 1 Speed Limit: 55	
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Wed,04/04/2018				
[09:00-10:00]	16	29 MPH	77 F	
[10:00-11:00]	16	29 MPH	84 F	
[11:00-12:00]	16	28 MPH	81 F	
Wed,04/04/2018	79	29 MPH	62 F	
04/02/2018 12:00 04/04/2018 12:00	615	29 MPH	66 F	-

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Device ID: 303775 Operator: EB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Kennedy Lane: 10.69 Street: 69005 City: Kennedy County: E/Buche State: EB	y Road y Road yr Valley Road	Raw Cou AADT Cou AADT Fact Speed Lin	nt: 859 nt: 430 or: 1 nit: 35
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Mon,04/02/2018				
[12:00-13:00]	31	36 MPH	109 F	
[13:00-14:00]	28	38 MPH	111 F	
[14:00-15:00]	26	38 MPH	113 F	
[15:00-16:00]	37	36 MPH	106 F	
[16:00-17:00]	34	37 MPH	102 F	
[17:00-18:00]	45	37 MPH	91 F	
[18:00-19:00]	25	38 MPH	73 F	
[19:00-20:00]	26	38 MPH	64 F	
[20:00-21:00]	20	37 MPH	61 F	-
[21:00-22:00]	13	35 MPH	57 F	
[22:00-23:00]	8	39 MPH	55 F	
[23:00-00:00]	. 4	34 MPH	54 F	
Mon,04/02/2018	297	37 MPH	83 F	
Tue,04/03/2018	0		54 E	
	0		54 F	
[01:00-02:00]	2	40 MPH	52 F	
[02:00-03:00]	0	0 MPH	50 F	
[03:00-04:00]	. 1	32 MPH	48 F	
[04:00-05:00]	0	0 MPH	48 F	
[05:00-06:00]	3	26 MPH	46 F	
[06:00-07:00]	3	24 MPH	46 F	· · ·
[07:00-08:00]	15	38 MPH	52 F	
[08:00-09:00]	26	33 MPH	66 F	
[09:00-10:00]	16	35 MPH	82 F	
[10:00-11:00]	25	37 MPH	97 F	

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Device ID: 303775 Operator: EB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Kennedy Road Lane: 10.69 Street: 69005 City: Kennedy Road County: E/Bucher Valley Road State: EB		Raw Count: AADT Count: AADT Factor: Speed Limit:	859 430 1 35
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Tue,04/03/2018				
[11:00-12:00]	29	34 MPH	108 F	
[12:00-13:00]	39	37 MPH	113 F	
[13:00-14:00]	19	37 MPH	113 F	
[14:00-15:00]	21	36 MPH	115 F	
[15:00-16:00]	47	37 MPH	109 F	1.555
[16:00-17:00]	30	39 MPH	100 F	
[17:00-18:00]	53	Зэмрн	84 F	
[18:00-19:00]	37	38 MPH	72 F	
[19:00-20:00]	30	40 MPH	63 F	11. · · · · · · · · · · · · · · · · · ·
[20:00-21:00]	27	35 MPH	59 F	
[21:00-22:00]	9	35 MPH	59 F	
[22:00-23:00]	10	37 MPH	57 F	
[23:00-00:00]	3	43 MPH	55 F	-
Tue,04/03/2018	445	37 MPH	73 F	
Wed,04/04/2018	2	32 MPH	55 F	
[01:00-02:00]	5	36 MPH	55 F	
[07:00-02:00]	0		55 F	
[02:00-03:00]	0		55 F	
[03:00-04:00]	4		557	
[04:00-05:00]	1	OMPH	04 F	
[05:00-06:00]	0	UMPH	54 -	
[06:00-07:00]	6	29 MPH	54 F	
[07:00-08:00]	11	35 MPH	57 F	1000
[08:00-09:00]	18	38 MPH	70 F	

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Device ID: 303775 Operator: EB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Kennedy Road Lane: 10.69 Street: 69005 City: Kennedy Road County: E/Bucher Valley R State: EB	load	Raw Count AADT Count AADT Factor Speed Limit	: 859 : 430 : 1 : 35
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Wed,04/04/2018				
[09:00-10:00]	24	36 MPH	82 F	
[10:00-11:00]	24	35 MPH	93 F	
[11:00-12:00]	26	37 MPH	95 F	
Wed,04/04/2018	. 117	36 MPH	65 F	
04/02/2018 12:00			-	· · · · · · · · · · · · · · · · · · ·
04/04/2018 12:00	859	37 MPH	73 F	

Device ID: 303776 Operator: WB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Kenned Lane: 10.69 Street: 69005 City: Kenned County: E/Buche State: WB	y Road y Road er Valley Road	Raw Cou AADT Cou AADT Fact Speed Lin	nt: 892 nt: 446 or: 1 nit: 35
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Mon.04/02/2018	i en clinter d'unité d'unité d'unité de la company de La company de la company de			
[12:00-13:00]	29	32 MPH	117 F	
[13:00-14:00]	30	30 MPH	117 F	<
[14:00-15:00]	19	34 MPH	118 F	
[15:00-16:00]	35	31 MPH	108 F	
[16:00-17:00]	28	31 MPH	104 F	
[17:00-18:00]	23	32 MPH	90 F	
[18:00-19:00]	17	32 MPH	72 F	
[19:00-20:00]	13	32 MPH	63 F	:
[20:00-21:00]	9	29 MPH	59 F	
[21:00-22:00]	2	25 MPH	57 F	<u></u>
[22:00-23:00]	4	33 MPH	55 F	10 M M
[23:00-00:00]	0	0 MPH	54 F	<u></u>
Mon,04/02/2018	209	32 MPH	85 F	
Tue,04/03/2018				
[00:00-01:00]	0	0 MPH	54 F	
[01:00-02:00]	0	0 MPH	52 F	
[02:00-03:00]	1	0 MPH	50 F	
[03:00-04:00]	2	33 MPH	50 F	222
[04:00-05:00]	3	29 MPH	48 F	
[05:00-06:00]	15	33 MPH	48 F	
[06:00-07:00]	16	31 MPH	46 F	
[07:00-08:00]	37	34 MPH	54 F	
[08:00-09:00]	47	32 MPH	68 F	
[09:00-10:00]	44	32 MPH	86 F	
[10:00-11:00]	35	32 MPH	100 F	

04/05/2018 11:59

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Device ID: 303776 Operator: WB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Kennedy Road Lane: 10.69 Street: 69005 City: Kennedy Road County: E/Bucher Valley Road State: WB		Raw Coun AADT Coun AADT Facto Speed Limi	t: 892 t: 446 r: 1 t: 35
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Tue,04/03/2018				
[11:00-12:00]	28	31 MPH	113 F	
[12:00-13:00]	32	30 MPH	118 F	
[13:00-14:00]	26	33 MPH	118 F	
[14:00-15:00]	20	34 MPH	120 F	<u></u>
[15:00-16:00]	26	31 MPH	111 F	
[16:00-17:00]	36	34 MPH	100 F	
[17:00-18:00]	29	30 MPH	86 F	
[18:00-19:00]	29	33 MPH	72 F	
[19:00-20:00]	14	33 MPH	63 F	
[20:00-21:00]	10	28 MPH	59 F	
[21:00-22:00]	6	40 MPH	59 F	
[22:00-23:00]	2	33 MPH	57 F	
[23:00-00:00]	1	28 MPH	55 F	
Tue,04/03/2018	459	32 MPH	74 F	
Wed,04/04/2018				
[00:00-01:00]	0	0 MPH	55 F	
[01:00-02:00]	1	75 MPH	55 F	
[02:00-03:00]	1	38 MPH	55 F	
[03:00-04:00]	4	38 MPH	55 F	
[04:00-05:00]	0	0 MPH	55 F	
[05:00-06:00]	14	36 MPH	55 F	
[06:00-07:00]	15	31 MPH	55 F	111
[07:00-08:00]	29	35 MPH	57 F	
[08:00-09:00]	50) 33 MPH	70 F	

04/05/2018 11:59

Page:

2

Device ID: 303776 Operator: WB Begin: 04/02/2018 12:00 End: 04/04/2018 12:00 Hours: 48.00 Period (min): 60	Location: Kennedy Lane: 10.69 Street: 69005 City: Kennedy County: E/Buche State: WB	y Road y Road r Valley Road	Raw Cou AADT Cou AADT Fact Speed Lin	nt: 892 nt: 446 or: 1 nit: 35
Date And Time Range	Period Volume	Average Speed	Roadway Temperature	Roadway Surface Wet/Dry
Wed,04/04/2018				
[09:00-10:00]	. 37	31 MPH	84 F	
[10:00-11:00]	38	31 MPH	97 F	
[11:00-12:00]	35	31 MPH	99 F	
Wed,04/04/2018	224	33 MPH	66 F	
04/02/2018 12:00 04/04/2018 12:00	892	32 MPH	75 F	

17:00

Peak Hour

-

18:00

California Manual on Uniform Traffic Control Devices (CaMUTCD) All-Way Stop Control (AWSC) Warrant Worksheet

Intersection #:	1	Calc:	BD	
Major Street:	Barnett Valley Road	Date:	8/31/2018	
Minor Street:	Olsen Road	Check:	DJW	
Existing Control:	Two-Way Stop	Date:	9/14/2018	
Volume Count Date:	4/3/2018			
Speed Count Date:	N/A	At least or	ne warrant satisfied	
Field Visit Date:	8/29/2018	Optional Warrants Satisfi		

WARRANT A - Interim Measure

CaMUTCD Language

Condition A: Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

Are traffic control signals justified at this location? No

WARRANT B - Crash History

CaMUTCD Language

Condition B: Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.

	Crashes	Minimum
Total in a 12-month period	0	-
Total in a 12-month period susceptible to correction by AWSC	0	5

WARRANT C - Eight Hour Volume

CaMUTCD Language

Condition C.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

Condition C.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.

Hour			C.1 Volume	C.2 Volume
7:00	-	8:00	35	0
10:00	-	11:00	51	0
11:00	-	12:00	46	0
12:00	-	13:00	40	0
13:00	-	14:00	36	0
15:00	-	16:00	52	0
16:00	-	17:00	45	0
17:00	-	18:00	55	0

	Average		
	Volume	Minimum	Satisfied?
C.1	45	300	No
C.2	0	200	No

C.1+C.2 or C.3 Satisfied?

	Peak Hour		
	Delay	Minimum	Satisfied?
C.2	N/A	30	No

Satisfied? No

Satisfied?



No 1

No

No

California Manual on Uniform Traffic Control Devices (CaMUTCD) All-Way Stop Control (AWSC) Warrant Worksheet



No

Intersection #:	1
Major Street:	Barnett Valley Road
Minor Street:	Olsen Road

CaMUTCD Language

Condition C.3: If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.

	Value	Minimum	Satisfied?
C.1. Major Street Enteirng Vehicles (Both Approaches)	45	210	No
C.2. Minor Street Entering Vehicles, Pedestrians, and Bicycles (Both Approaches)	0	140	No
C.2. Minor Street Peak Hour Vehicle Delay (Seconds)	N/A	21	No
C.3. Major Street 85th-percentile Speed	N/A	41	No

WARRANT D - Combination of Above

Satisfied?

CaMUTCD Language

Condition D: Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

	Value	Minimum	Satisfied?
B. Crashes in 12-month period susceptible to correction by AWSC	No Data	4	No
C.1. Major Street Enteirng Vehicles (Both Approaches)	45	240	No
C.2. Minor Street Entering Vehicles, Pedestrians, and Bicycles (Both Approaches)	0	160	No
C.2. Minor Street Peak Hour Vehicular Delay (Seconds)	N/A	24	Yes

OPTIONAL WARRANTS

1 Optional Warrant Satisfied

A	The need to control left-turn conflicts	Satisfied?	No
В	The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes	Satisfied?	No
с	Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop	Satisfied?	Yes
D	An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection	Satisfied?	No

17:00

-

18:00

California Manual on Uniform Traffic Control Devices (CaMUTCD) All-Way Stop Control (AWSC) Warrant Worksheet

Calc: BD Date: 8/31/2018 Check: DJW Date: 9/14/2018

At least one warrant satisfied? No Optional Warrants Satisfied? 0

WARRANT A - Interim Measure

2

Barnett Valley Road

Kennedy Rd

4/3/2018

9/12/2018

8/29/2018

Two-Way Stop

CaMUTCD Language

Intersection #:

Major Street:

Minor Street:

Existing Control:

Volume Count Date:

Speed Count Date:

Field Visit Date:

Condition A: Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

Are traffic control signals justified at this location? No

WARRANT B - Crash History

CaMUTCD Language

Condition B: Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.

	Crashes	Minimum
Total in a 12-month period	0	-
Total in a 12-month period susceptible to correction by AWSC	0	5

C.2 Volume

WARRANT C - Eight Hour Volume

CaMUTCD Language

Hour

Condition C.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

Condition C.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.

7:00	-	8:00	63	0	
10:00	-	11:00	92	0	
11:00	-	12:00	83	0	
12:00	-	13:00	72	0	
13:00	-	14:00	65	0	
15:00	-	16:00	94	0	
16:00	-	17:00	81	0	
17:00	-	18:00	99	0	
Peak Hour					

C.1 Volume

	Average		
	Volume	Minimum	Satisfied?
C.1	81	300	No
C.2	0	200	No

	Peak Hour		
	Delay	Minimum	Satisfied?
C.2	N/A	30	No

Satisfied?

Satisfied?

C.1+C.2 or C.3 Satisfied? No



No

No

California Manual on Uniform Traffic Control Devices (CaMUTCD) All-Way Stop Control (AWSC) Warrant Worksheet

W-Trans

Intersection #:	2
Major Street:	Barnett Valley Road
Minor Street:	Kennedy Rd

CaMUTCD Language

Condition C.3: If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.

	Value	Minimum	Satisfied?
C.1. Major Street Enteirng Vehicles (Both Approaches)	81	210	No
C.2. Minor Street Entering Vehicles, Pedestrians, and Bicycles (Both Approaches)	0	140	No
C.2. Minor Street Peak Hour Vehicle Delay (Seconds)	N/A	21	No
C.3. Major Street 85th-percentile Speed	N/A	41	No

WARRANT D - Combination of Above

Satisfied? No

CaMUTCD Language

Condition D: Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

	Value	Minimum	Satisfied?
B. Crashes in 12-month period susceptible to correction by AWSC	No Data	4	No
C.1. Major Street Enteirng Vehicles (Both Approaches)	81	240	No
C.2. Minor Street Entering Vehicles, Pedestrians, and Bicycles	0	160	No
(Both Approaches)	0	100	NO
C.2. Minor Street Peak Hour Vehicular Delay (Seconds)	N/A	24	Yes

OPTIONAL WARRANTS

0 Optional Warrants Satisfied

A	The need to control left-turn conflicts	Satisfied?	No
В	The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes	Satisfied?	No
С	Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop	Satisfied?	No
D	An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection	Satisfied?	No