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To: Bill Zenoni, City Manager

Cc: Kirk Rekers, Interim Chief of Police
Youa Hill, Director of Public Works

From: Dane H. Schilling, PE, City Engineer

Subject: Multi-Way Stop Sign Warrant Study at Wheatland Road and Oakley Lane, Wheatland, CA

In response to recent safety concerns brought to the City's attention about the intersection of Wheatland Road and Oakley Lane, this traffic study was conducted to determine if the intersection would qualify to be converted from a 2-way stop controlled intersection to a 4-way stop controlled intersection.

Background Information

The intersection of Wheatland Road and Oakley Lane (intersection) is located on the western limits of the City. Wheatland Road is classified as a "Major Collector" running east-west that serves city and county populations as well as agricultural truck traffic especially during harvest. Wheatland Road is within the City of Wheatland city limits. Oakley Lane is a local north-south road serving local residents and agricultural interests.

A newer housing subdivision called Caliterra Ranch was recently completed just south of the intersection, and is expected to increase the vehicular, pedestrian and bicycle volumes on Wheatland Road.

Traffic Study Data

Data for this study was taken from County of Yuba's South Valley Yuba County Traffic Volume Data (Tables 1 and 2) and from the City's 2022 Bishops Pumpkin Farm Traffic Study data (Table 3).

The Yuba County traffic volumes were recorded in November-December 2021 and January 2022. Table 1 below shows the results of the traffic counts in the study area. Traffic counts show that the average daily traffic (ADT) or volume on the western end of Wheatland Road at the time the data was recorded was 3,900 vehicles per day (vpd) which translates to 488 vehicles per hour (vph).

TABLE 1 – Yuba County Existing Average Daily Traffic Volumes (ADT): Major Road

COUNTY TRAFFIC STUDY DATA		TRAFFIC RATES IN VEH/HR	
Road	ADT Volume	PER 8 HOUR DAY	>300 VEH/HR ¹
Wheatland Rd near Forty Mile Rd	3900	488	Yes

¹ Per CAMUTCD 2B.07 C.1

TABLE 2 – Yuba County Existing Average Daily Traffic Volumes (ADT): Minor Road

COUNTY TRAFFIC STUDY DATA			
Road	TRAFFIC TYPE	VOLUME	UNITS PER HOUR
Oakley Lane near Wheatland Rd	Vehicular	1600	200
	Pedestrian	-	
	Bicycle	-	

The 2022 Bishops Pumpkin Farm Traffic Study was conducted by the City for the annual Bishops Pumpkin Farm Event to determine suitable event traffic control. Data was collected 30 days before and after the event to provide the study with a baseline of traffic conditions to compare with event traffic. Vehicle counts were collected over an 18-week period spanning before, during and after the 2022 Pumpkin Farm event. For the purposes of this study, only the off-season traffic counts were considered. The data from week 3 contained the highest volumes and was used for this study.

TABLE 3 – Bishops Farm Traffic Study Data for Week 3

BISHOPS FARM TRAFFIC STUDY DATA					
Road	MAX VEHICLE COUNTS (MAX WEEK) ³		COMBINED VALUES	ADT ²	>300 VEH/HR ¹
	EB	WB			
Wheatland Rd at Caliterra	9311	8355	17666	315	Yes
Wheatland Rd at High School	11514	9963	21477	384	Yes

²Assuming 8-hr day, 7-day week

³Values are off-season

The two areas of Wheatland Road included in this study are the Caliterra area, near Oakley Lane, and Wheatland Road near the High School. We took the off-season week with the greatest vehicle count, and, considering both travel directions, determined the ADT volume. ADT was determined assuming an 8-hr day and 7-day week. The average daily traffic for Wheatland Road at Caliterra and at the High School are 315 and 384 vph respectively (Table 3).

The Bishops Pumpkin Farm Traffic Study included speed data (Table 4). The speed limit at Wheatland Road is 35 mph. The Pumpkin Farm data shows that the 85th percentile speed at Wheatland Road on Caliterra, near Oakley Lane, is 45 mph.

TABLE 4 – Bishops Farm Traffic Speed Data

BISHOPS FARM TRAFFIC STUDY DATA	
Road	85 TH PERCENTILE SPEED
Wheatland Rd at Caliterra	45
Wheatland Rd at High School	35

In addition to traffic count data, collision data from CHP (California Highway Patrol) and the statewide Integrated Traffic Records System (TIMS). As of 2018, there have been eight collisions at the intersection of Oakley Lane and Wheatland Road plus four more reported since.

Multi-Way Stop Criteria

The California Manual of Uniform Traffic Control Devices (CAMUTCD) provides regulatory standards for the evaluation and implementation of traffic controls in California including multi-way stop controlled intersections as listed in Section 2B.07. Warrants listed in this section must be evaluated and met before installing a 4-way stop controlled intersection. Each CAMUTCD warrant or guideline is shown in italicized typeface and responses to each are in bold typeface.

- 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.*

Not Applicable. There are no plans to install a traffic control signal in this intersection.

- 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.*

According to the CHP and TIMS SWITRS data, there have been 8 total crashes reported from 2018-present or 5 years, equivalent to about 2 crashes per year. This guideline is not satisfied by this data. However, since the data was collected four more crashes involving right-angle turning collisions have been reported. This criterion is not met but is within 80% of the required threshold.

- C. *Minimum volumes:*
 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*

Table 1 shows that the ADT volume of Wheatland Road is 488 vph. This guideline is met.

2. *The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour*

for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but

In Table 2, the ADT on Oakley Lane for 8 hours is 200 vph, considering only vehicular volume. There is currently no data on pedestrian and bicycle volume for the minor road, as well as average delay to minor-street vehicular traffic. Anecdotal information provided through complaints indicates that drivers are waiting in this area for significant amounts of high school traffic to clear the area in the AM peak traffic period. The intersection appears to meet this criterion except that the amount of cross street delay is not known.

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

The Bishops Pumpkin Farm traffic speed data in Table 4 indicates that the approach speeds in the Caliterra section of Wheatland Road exceeds 40 mph, with its 85th percentile approach speed being 45 mph. The minimum vehicular volume warrants are then shown in Table 5.

TABLE 5 – Reduced Vehicular Volume Warrant Values

Reduced Values of C.1 and C.2				
Category	Units	70% Value	Actual	Met?
C.1	Veh/hr	210	315	Yes
C.2	Veh/hr	140	160	Yes
	ave delay (sec)	21	unknown	

- 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.*

Applying the allowed reductions, Criteria B, C.1 and C.2 are all satisfied and multi-way warrants are met.

Conclusion

Based on the data applied from Yuba County and the City's Bishops Pumpkin Farm Traffic Study, the conditions at the intersection of Wheatland Road and Oakley Lane do meet required warrants for the installation of a 4-way stop controlled intersection. Furthermore, traffic volumes from recent Plumas Lake developments that access Wheatland schools and the newly constructed single-family homes of Caliterra Ranch Villages 1 and 2 near the intersection are contributing additional traffic volume beyond what was captured in 2021/22 data. Therefore, the conversion of the intersection from a 2-way stop controlled intersection to a 4-way stop controlled intersection is warranted and recommended to improve safety at the intersection. The 4-way stop installation should be constructed in accordance with the CAMUTCD and industry practices as directed by the City Engineer.

Dane H. Schilling, PE
City Engineer

