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Staff Report

ITEM 4-1

To: Lemoore City Council
From: Joe Simonson, Parks and Recreation Director 
Date: October 14, 2014 **Meeting Date:** October 21, 2014
Subject: Pedestrian Crossing Study – Bush Street and Heinlen Street.

Discussion:

At the City Council Meeting of September 2, 2014, City Council requested a pedestrian crosswalk study across Bush Avenue due to abandonment of crosswalks on or near Bush Street and Follett Street. City Staff and City Engineer investigated and determined that should a marked crosswalk be required, one located at Bush and Heinlen Streets would be better suited since there are crosswalks located at Lemoore Avenue to the east and Hill Street to the west.

City Engineer Rick Joyner of Quad Knopf conducted a study (Attachment A) for Bush and Heinlen Streets and found the daily 24 hour traffic vehicle volume totaled 8,958 on a 30 mph street. During the study, it was documented that of the total 93 pedestrians observed, only 35 crossed Bush Street. Installing stop signs or traffic control devices on Bush Street do not meet any criteria set forth in Section 2B.07 of the California Manual of Uniformed Traffic Control Devices (CA MUTCD) since the volume of traffic and pedestrians were below the standards required. It was found the volume of traffic is 80% of the minimum value for a four lane street and a marked crosswalk is not necessary, but could be considered per FHWA HRT-04-100, Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Intersections. Should Council consider the addition of a marked crosswalk, appropriate signage and an accessible ramp on the south side of Bush Street would be required. Additional visibility lights may be warranted if Bush Street is considered a conventional highway.

Budget Impact:

If City Council chooses to implement a pedestrian crosswalk, a budget amendment to the Capital Improvement Project Streets Fund 029-4729 Misc. Expense and Planning is necessary. City Engineers have estimated a cost of \$17,000 for crosswalk markings, street light, signage and ADA accessible curb/ramp on the south side of Bush Street and Engineer cost of \$4,500 for plans, specs, and utility coordination. The current expended funds are approximated at \$54,000 of the \$100,00 budgeted.

Recommendation:

That the City Council discuss the information presented and direct City Staff by motion of its decision. If Council approves proceeding with a crosswalk, by motion, authorize a budget amendment to the Capital Improvement Fund with specified items to be included.

PEDESTRIAN CROSSING STUDY

**BUSH STREET
AT
HEINLEN STREET**

LEMOORE, CALIFORNIA

Prepared for:

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September 2014

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INTRODUCTION

This report has been prepared to present the results of a pedestrian crossing study, conducted by Quad Knopf, for a proposed marked pedestrian crosswalk across Bush Street at Heinlen Street in the City of Lemoore (see Figure 1). Quad Knopf was hired to review the existing intersection conditions and determine if a marked crosswalk at this location is appropriate, and if so, to recommend safety enhancements and pedestrian crossing alternatives. One alternative reviewed was a potential in-roadway warning light (IRWL) system. As part of this study, Quad Knopf also completed the analysis for a potential multi-way stop at the intersection.

Per Section 275 of the California Vehicle Code (CVC), a crosswalk is either:

- a. That portion of a roadway included within the prolongation or connection of the boundary lines of sidewalks at intersections where the intersecting roadways meet at approximately right angles, except the prolongation of such lines from an alley across a street.
- b. Any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface.

Thus, at an intersection, a crosswalk is defined as the extension of the sidewalk or the shoulder across the intersection, regardless of whether or not it is marked. And pedestrians can legally cross there, unless specifically prohibited.

Per Section 3B.18 of the *California Manual on Uniform Traffic Control Devices* (CA MUTCD), "Crosswalk lines should not be used indiscriminately. An engineering study should be performed before a marked crosswalk is installed at a location away from a traffic control signal or an approach controlled by a STOP or YIELD sign." Marked crosswalks do not guarantee a pedestrian's safety. In fact, they may provide a pedestrian with a false sense of security. As such, care must be taken when deciding whether or not to install a marked crosswalk at uncontrolled intersections.

This study reviews recommended guidelines for the installation of marked crosswalks and stop signs, including review of speed, vehicular and pedestrian volumes, collision history, and intersection characteristics to determine appropriate pedestrian safety features for the project intersection. This study documents the investigation, findings, conclusions, and recommendations made in conjunction with the specified task.

FILE NAME: L:\Projects\2014\140301\VCAD\Vicinity Map.dwg - LAST SAVE: 8/22/2014 2:08:12 PM PDT - BY: Matt Hamilton



PLOT DATE: Aug-22-2014 02:09PM
JOB NO. L140301
DWG. NAME: Vicinity Map.dwg
SCALE: NO SCALE
SHEET NO.: 1 OF 1

CITY OF LEMOORE
FIGURE 1 - VICINITY MAP
BUSH STREET
AT
HEINLEN STREET

PREPARED BY:



Quad Knopf
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EXISTING CONDITIONS

Bush Street is an existing 54' wide east-west arterial with two travel lanes in each direction. The posted speed limit for both directions of travel is 30 miles per hour. Parallel parking is permitted in the vicinity of the intersection. The area is residential on both sides of the street adjacent to the intersection, with a City park at the northwest corner.

Heinlen Street is a local street with one travel lane in each direction angling to the northwest from the T-intersection. It is a 56' wide street with no posted speed limit. The east side is residential with both parallel and diagonal parking; the west side is the City park with diagonal parking.

The project intersection is stop-controlled on Heinlen Street only. Both corners of the intersection are fully developed with sidewalk and accessible curb ramps and an east-west marked crosswalk on the north leg. Street lighting at the project intersection is limited with only one electrolier on the northeast corner.

Data Collection

Existing weekday traffic volume counts (including vehicle, truck, pedestrian and bicycles) and vehicle gap data were taken at the project intersection by Metro Traffic Data, Inc. on Thursday, August 28, 2014. Data was collected between 7:00 AM and 9:00 AM and between 2:00 PM and 6:00 PM, hours anticipated to have the most vehicle and pedestrian traffic due to the school hours for Lemoore High School (approximately 1,000 feet to the east of the project site) and Lemoore Elementary School (approximately 700 feet to the west). In addition, 24-hour traffic volumes were taken for each approach to the project intersection. The collected traffic data can be found in Appendix A.

The traffic data indicates there are 5,410 vehicles per day for the eastbound approach and 3,548 vehicles per day for the westbound approach for a total of 8,958 vehicles per day on Bush Street at the project intersection. The traffic data also indicates the peak hours are between 7:15 AM and 8:15 AM, 2:30 PM and 3:30 PM, and 5:00 PM and 6:00 PM. Bush Street volumes during the AM peak hour are 547 and 365 vehicles for the eastbound and westbound approaches, respectively; during the mid-day peak hour are 521 and 272 vehicles for the eastbound and westbound approaches, respectively; and during the PM peak hour are 516 and 339 vehicles for the eastbound and westbound approaches, respectively. There was no truck traffic during any of the data collection hours in the AM, mid-day, or PM.

During the AM peak hour, there were 37 pedestrians crossing the intersection; 10 of which were crossing Bush Street, seven on the east leg and three on the west leg of the intersection. During the mid-day peak hour, there were 68 pedestrians crossing the intersection; nine of which were crossing Bush Street, five on the east leg and four on the west leg of the intersection. During the PM peak hour, there were 15 pedestrians crossing the intersection; six of which were crossing Bush Street, four on the east leg and two on the west leg. There were nine bicyclists during the AM peak hour, seven during the mid-day peak hour, and three during the PM peak hour.

In addition to the traffic data collected, Quad Knopf conducted a field investigation at the intersection on Friday, August 22, 2014. Geometric conditions and operational characteristics of the intersection were investigated to determine possible recommendations for pedestrian safety.

Collision History

Collision data for the project intersection was obtained from the California Highway Patrol (CHP) Statewide Integrated Traffic Records System (SWITRS) for a five-year period from January 2008 through December 2012. During this period, there were a total of two collisions at or near the intersection, none of which involved pedestrians or bicyclists. Both collisions resulted in injury. See Appendix B for SWITRS Collision Data.

METHODOLOGY

Quad Knopf staff followed the classic procedure of gathering pertinent information available from records, supplementing that with additional data gathered in the field, and then comparing the findings to applicable State and Federal guidelines. Guidelines, established in the *California Manual on Uniform Traffic Control Devices (CA MUTCD)*, dated January 13, 2012, were used to determine the need for the project intersection to be multi-way stop controlled (stop signs on all legs of the intersection). Determinations made regarding the installation of a marked crosswalk follow guidelines included in the Federal Highway Administration's (FHWA) HRT-04-100, *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations: Final Report and Recommended Guidelines*, dated September 2005. Guidelines in the CA MUTCD were also followed in determining the possibility of installing an in-roadway warning light system.

Multi-way Stop

Per Section 2B.07 of the CA MUTCD, the following criteria should be considered in the engineering study for a multi-way STOP sign installation:

- 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.
- 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.
- 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

2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
 3. If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.
- 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.

Option:

Other criteria that may be considered in an engineering study include:

- A. The need to control left-turn conflicts;
- B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
- C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to reasonably safely negotiate the intersection unless conflicting cross traffic is also required to stop; and
- 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.

Marked Crosswalks

FHWA guidelines indicate several scenarios where marked pedestrian crosswalks may be used to delineate pedestrian paths across roadways. According to FHWA-HRT-04-100, one scenario is at “nonsignalized locations where engineering judgment dictates that the number of motor vehicle lanes, pedestrian exposure, average daily traffic (ADT), posted speed limit, and geometry of the location would make the use of specially designated crosswalks desirable for traffic/pedestrian safety and mobility.” Table 1 summarizes these recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations per the FHWA’s guidelines.

Table 1
Recommendations for Marked Crosswalks/Pedestrian Improvements
at Uncontrolled Locations*

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT ≤ 9,000			Vehicle ADT > 9,000 to 12,000			Vehicle ADT > 12,000 to 15,000			Vehicle ADT > 15,000		
	Speed Limit**									≤ 30 mph	35 mph	40 mph
	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph			
Two lanes	C	C	P	C	C	P	C	C	N	C	P	N
Three lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multilane (4 or more lanes) with raised median***	C	C	P	C	P	N	P	P	N	N	N	N
Multilane (four or more lanes) without raised median	C	P	N	P	P	N	N	N	N	N	N	N

Reference: FHWA's HRT-04-100, *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations*

*These guidelines include intersection and midblock locations with no traffic signals or stop signs on the approach to the crossing. They do not apply to school crossings. A two-way center turn lane is not considered a median. Crosswalks should not be installed at locations that could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor will they necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g. raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding where to install crosswalks.

**Where the speed limit exceeds 40 miles per hour, marked crosswalks alone should not be used at unsignalized locations.

***The raised median or crossing island must be at least 4 feet wide and 6 feet long to serve adequately as a refuge area for pedestrians, in accordance with MUTCD and American Association of State Highway and Transportation Officials (AASHTO) guidelines.

C = Candidate sites for marked crosswalks. Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk. For an engineering study, a site review may be sufficient at some locations, while a more in-depth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, and other factors may be needed at other sites. It is recommended that a minimum utilization of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) be confirmed at a location before placing a high priority on the installation of a marked crosswalk alone.

P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements. These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

N = Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased by providing marked crosswalks alone. Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted, or other substantial crossing improvement to improve crossing safety for pedestrians.

In-Roadway Warning Lights (IRWL)

IRWL are a special type of lights installed in the roadway surface to warn road users that they are approaching a condition where they may need to slow down or come to a stop. IRWL are typically used at marked crosswalks on uncontrolled approaches. Per Section 4N.02 of the CA MUTCD, the following shall be considered when evaluating the need for IRWL:

- A. Whether the crossing is controlled or uncontrolled.
- B. An engineering traffic study to determine if In-Roadway Warning Lights are compatible with the safety and operation of nearby intersections, which may or may not be, controlled by traffic signals or STOP/YIELD signs.
- C. Standard traffic signs for crossings and crosswalk pavement markings are provided.
- D. At least 40 pedestrians regularly use the crossing during each of any two hours (not necessarily consecutive) during a 24-hour period.
- E. The vehicular volume through the crossing exceeds 200 vehicles per hour in urban areas or 140 vehicles per hour in rural areas during peak-hour pedestrian usage.
- F. The critical approach speed (85th percentile) is 45 mph or less.
- G. In-Roadway Warning Lights are visible to drivers at the minimum stopping sight distance for the posted speed limit.
- H. Public education on In-Roadway Warning Lights is conducted for new installations.

FINDINGS

Multi-way Stop

Based on the criteria per the CA MUTCD, as shown above and in Appendix C, the intersection of Bush Street and Heinlen Street does not currently warrant the installation of a multi-way stop. The warrants clearly demonstrate existing traffic volumes and collision history do not warrant the installation of stop signs on Bush Street. The following is a summary of the warrants:

Warrant A – *Interim Measure Where Signal Have Been Warranted* – is considered not satisfied. Traffic signal warrants were not included with this study as initial data did not indicate the need for such.

Warrant B – *Crash Problem* – cannot be considered satisfied because there were only two reported collisions during a five-year study period, only one of which may have been correctable by the installation of a multi-way stop.

Warrant C – *Minimum Volumes* – cannot be considered satisfied because the minimum traffic volume requirements for vehicles, pedestrians and bicycles on the minor street were not met. A study to determine the average delay to the minor street (Heinlen Street) traffic was not conducted because the prerequisite minimum traffic volume requirements were not met.

Warrant D – *Combination of Criterion* – cannot be considered satisfied because two of the three criteria (collision history and minimum traffic volumes on the minor street) do not meet at least 80 percent of the minimum values.

Marked Crosswalks

As indicated in the FHWA guidelines, as shown in Table 1, marked crosswalks alone (without other substantial pedestrian crossing improvements) are insufficient and should not be used under the following conditions:

- Where the speed limit exceeds 40 miles per hour.
- On a roadway with four or more lanes without a raised median or crossing island that has (or will soon have) an ADT of 12,000 or greater.
- On a roadway with four or more lanes with a raised median or crossing island that has (or soon will have) an ADT of 15,000 or greater.

As stated previously, the posted speed limit on Bush Street is 30 mph and the daily traffic volumes on Bush Street are 8,958. Therefore, this intersection could be considered a candidate for a marked crosswalk. However, if a marked crosswalk is installed, appropriate signage and an accessible ramp on the south side of Bush Street are required. Additional street lighting at the intersection is recommended. In addition, because the speed limit and traffic volume thresholds are barely met, a high-visibility crosswalk is recommended.

In-Roadway Warning Lights (IRWL)

Based on the criteria per the CA MUTCD, as shown above, IRWL are not currently warranted for a marked crosswalk across Bush Street at Heinlen Street. The current pedestrian volume does not meet the threshold of 40 pedestrians regularly using a crossing for each of two hours in a 24-hour period.

CONCLUSIONS OF STUDY

The following recommendations are made based on the findings of this study:

1. Installation of a multi-way stop at the intersection of Bush Street and Heinlen Street is not warranted per the CA MUTCD; and therefore, is not recommended at this time.
2. Based on FHWA guidelines for existing conditions, the intersection of Bush Street and Heinlen Street could be considered a candidate for a marked crosswalk. The following is

recommended based on current conditions for the intersection if the crosswalk is installed:

- a. Associated signage shall be installed.
 - b. An accessible curb ramp shall be constructed on the south side of Bush Street to comply with the current ADA requirements as indicated on the State of California Department of Transportation Standard Plan RSP A88A. A copy of said plan is included in Appendix D of this report.
 - c. Additional street lighting should be installed on the south side of Bush Street to illuminate the intersection and its pedestrian areas. According to Section 9-10.3 of the Caltrans Traffic Manual, "Where highway safety lighting is to be installed at intersections on conventional highways, (including the intersection of a freeway ramp with a local street), the minimum maintained horizontal illuminance should be as follows: in urban areas and expressways, 1.6 horizontal lux on the area normally bounded by the crosswalks, and 6.5 horizontal lux at the intersection of centerlines of the entering streets."
 - d. Because the thresholds for installing the crosswalk are barely met based on traffic volumes and speed limits, a high-visibility crosswalk is recommended.
3. Installation of IRWL at a marked crosswalk across Bush Street at the intersection of Heinlen Street is not warranted per the CA MUTCD; and therefore, is not recommended at this time.

APPENDICES

Collection Date: 8/28/2014

Time	Northbound			Southbound			Eastbound			Westbound			TOTALS		
	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds
12:00 AM to 12:15 AM	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0
12:15 AM to 12:30 AM	0	0	0	0	0	0	13	0	0	0	5	0	0	0	0
12:30 AM to 12:45 AM	0	0	0	0	0	0	13	0	0	0	9	0	0	0	0
12:45 AM to 1:00 AM	0	0	0	0	0	0	5	0	0	0	2	0	0	0	0
1:00 AM to 1:15 AM	0	0	0	1	0	0	4	0	0	0	3	0	0	0	0
1:15 AM to 1:30 AM	0	0	0	0	0	0	6	0	0	0	5	0	0	0	0
1:30 AM to 1:45 AM	0	0	0	0	0	0	5	0	0	0	4	0	0	0	0
1:45 AM to 2:00 AM	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0
2:00 AM to 2:15 AM	0	0	0	0	0	1	5	0	0	0	5	0	0	0	0
2:15 AM to 2:30 AM	0	0	0	0	0	0	4	0	0	3	2	0	0	0	0
2:30 AM to 2:45 AM	0	0	0	2	0	0	2	0	0	0	1	0	0	0	0
2:45 AM to 3:00 AM	0	0	0	0	0	0	4	1	0	0	1	0	0	0	0
3:00 AM to 3:15 AM	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0
3:15 AM to 3:30 AM	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0
3:30 AM to 3:45 AM	0	0	0	0	0	0	4	0	0	0	2	0	0	0	0
3:45 AM to 4:00 AM	0	0	0	1	0	0	4	0	0	0	3	0	0	0	0
4:00 AM to 4:15 AM	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0
4:15 AM to 4:30 AM	0	0	0	1	0	0	7	0	0	0	3	0	0	0	0
4:30 AM to 4:45 AM	0	0	0	0	0	0	14	0	0	0	5	0	0	0	0
4:45 AM to 5:00 AM	0	0	0	0	0	0	25	0	1	1	5	0	0	0	0
5:00 AM to 5:15 AM	0	0	0	2	0	0	29	0	0	0	4	0	0	0	0
5:15 AM to 5:30 AM	0	0	0	0	0	0	22	0	0	0	7	0	0	0	0
5:30 AM to 5:45 AM	0	0	0	1	0	0	24	0	1	12	0	0	0	1	0
5:45 AM to 6:00 AM	0	0	0	1	0	0	26	0	0	18	0	0	0	0	0
6:00 AM to 6:15 AM	0	0	0	1	0	0	47	0	1	16	0	0	0	3	0
6:15 AM to 6:30 AM	0	0	0	2	0	0	39	0	2	18	0	0	0	0	0
6:30 AM to 6:45 AM	0	0	0	1	0	0	53	0	3	22	0	0	0	0	0
6:45 AM to 7:00 AM	0	0	0	2	1	3	52	1	4	26	0	1	1	0	0
7:00 AM to 7:15 AM	0	0	0	1	0	0	78	0	4	34	0	0	1	0	0
7:15 AM to 7:30 AM	0	0	0	5	0	2	84	1	20	51	0	0	0	12	0
7:30 AM to 7:45 AM	0	0	0	12	0	13	156	5	11	114	1	0	0	22	0
7:45 AM to 8:00 AM	0	0	0	11	0	2	188	0	22	139	2	0	0	33	0
8:00 AM to 8:15 AM	0	0	0	8	0	0	119	0	7	71	0	0	0	34	0
8:15 AM to 8:30 AM	0	0	0	8	0	3	60	0	7	46	1	0	0	7	0
8:30 AM to 8:45 AM	0	0	0	7	0	0	45	0	2	29	0	0	0	11	0
8:45 AM to 9:00 AM	0	0	0	7	0	0	53	0	0	53	0	0	0	4	0
9:00 AM to 9:15 AM	0	0	0	10	1	0	56	0	1	30	0	0	0	6	0
9:15 AM to 9:30 AM	0	0	0	10	0	2	62	0	1	39	0	0	0	3	0
9:30 AM to 9:45 AM	0	0	0	10	0	0	56	0	2	38	0	0	0	2	0
9:45 AM to 10:00 AM	0	0	0	9	0	2	60	0	0	24	0	0	0	4	0
10:00 AM to 10:15 AM	0	0	0	13	0	0	62	0	0	46	0	0	0	0	0
10:15 AM to 10:30 AM	0	0	0	8	0	0	47	0	1	24	0	0	0	1	0
10:30 AM to 10:45 AM	0	0	0	12	0	0	64	0	4	38	0	0	0	4	0
10:45 AM to 11:00 AM	0	0	0	12	0	0	61	0	0	29	0	0	0	1	0
11:00 AM to 11:15 AM	0	0	0	5	0	0	63	0	0	33	0	0	0	0	0
11:15 AM to 11:30 AM	0	0	0	8	0	0	65	2	1	51	0	0	0	3	0
11:30 AM to 11:45 AM	0	0	0	14	0	0	76	0	0	39	0	0	0	0	0
11:45 AM to 12:00 PM	0	0	0	6	0	0	64	0	1	45	1	0	0	1	0
12:00 PM to 12:15 PM	0	0	0	9	0	1	72	0	0	56	0	0	0	1	0
12:15 PM to 12:30 PM	0	0	0	11	0	0	64	0	0	68	0	0	0	0	0
12:30 PM to 12:45 PM	0	0	0	15	0	0	63	0	0	53	0	0	0	0	0
12:45 PM to 1:00 PM	0	0	0	11	1	0	69	0	0	42	1	0	0	2	0

Collection Date: 8/28/2014

Time	Northbound			Southbound			Eastbound			Westbound			TOTALS			
	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds	
1:00 PM to 1:15 PM	0	0	0	8	0	0	74	1	0	0	34	0	0	1	0	0
1:15 PM to 1:30 PM	0	0	0	12	1	0	59	0	0	0	53	0	0	1	0	0
1:30 PM to 1:45 PM	0	0	0	7	0	0	67	0	0	0	44	0	0	0	0	0
1:45 PM to 2:00 PM	0	0	0	8	0	0	64	0	0	0	67	0	0	0	0	0
2:00 PM to 2:15 PM	0	0	0	5	0	0	65	0	0	1	57	0	0	0	1	0
2:15 PM to 2:30 PM	0	0	0	4	0	2	79	1	0	0	76	0	0	1	2	0
2:30 PM to 2:45 PM	0	0	0	15	0	0	122	1	4	0	86	0	2	1	6	0
2:45 PM to 3:00 PM	0	0	0	12	0	0	133	1	15	0	80	0	1	1	16	0
3:00 PM to 3:15 PM	0	0	0	8	0	1	151	0	4	0	41	0	0	0	6	0
3:15 PM to 3:30 PM	0	0	0	25	0	0	115	1	1	1	103	4	100	5	101	0
3:30 PM to 3:45 PM	0	0	0	11	0	2	99	0	4	0	75	0	48	0	54	0
3:45 PM to 4:00 PM	0	0	0	12	1	6	104	0	1	0	54	0	6	1	13	0
4:00 PM to 4:15 PM	0	0	0	20	0	0	90	0	0	0	46	1	0	1	0	0
4:15 PM to 4:30 PM	0	0	0	7	0	0	101	0	0	0	61	0	0	0	0	0
4:30 PM to 4:45 PM	0	0	0	23	0	0	103	0	0	0	75	0	0	0	0	0
4:45 PM to 5:00 PM	0	0	0	4	0	4	112	0	2	0	70	0	0	0	6	0
5:00 PM to 5:15 PM	0	0	0	12	0	0	120	0	2	0	82	0	1	0	3	0
5:15 PM to 5:30 PM	0	0	0	18	0	0	140	0	3	0	88	1	3	1	6	0
5:30 PM to 5:45 PM	0	0	0	17	0	0	148	1	3	0	97	0	0	1	3	0
5:45 PM to 6:00 PM	0	0	0	11	0	0	108	0	0	0	72	1	5	1	5	0
6:00 PM to 6:15 PM	0	0	0	6	0	1	83	0	3	0	61	0	0	0	4	0
6:15 PM to 6:30 PM	0	0	0	10	0	0	91	0	0	0	61	0	1	0	1	0
6:30 PM to 6:45 PM	0	0	0	22	0	0	87	0	0	0	48	0	0	0	0	0
6:45 PM to 7:00 PM	0	0	0	13	0	0	83	0	0	0	49	1	1	0	1	0
7:00 PM to 7:15 PM	0	0	0	12	0	0	61	1	1	0	43	0	0	1	2	0
7:15 PM to 7:30 PM	0	0	0	13	0	1	65	0	1	0	48	0	1	0	3	0
7:30 PM to 7:45 PM	0	0	0	11	0	1	49	1	2	0	52	0	0	1	3	0
7:45 PM to 8:00 PM	0	0	0	9	0	4	45	1	1	0	46	0	1	0	6	0
8:00 PM to 8:15 PM	0	0	0	8	0	0	73	0	0	0	65	0	1	0	1	0
8:15 PM to 8:30 PM	0	0	0	8	0	0	51	0	1	0	39	0	1	0	2	0
8:30 PM to 8:45 PM	0	0	0	8	0	1	61	0	1	0	56	0	1	0	3	0
8:45 PM to 9:00 PM	0	0	0	4	0	1	49	0	2	0	35	0	0	0	3	0
9:00 PM to 9:15 PM	0	0	0	6	0	0	61	0	0	0	34	1	0	1	0	0
9:15 PM to 9:30 PM	0	0	0	5	0	0	58	0	0	0	50	0	2	0	2	0
9:30 PM to 9:45 PM	0	0	0	4	0	0	48	0	0	0	33	0	0	0	0	0
9:45 PM to 10:00 PM	0	0	0	5	0	0	26	0	0	0	32	0	0	0	0	0
10:00 PM to 10:15 PM	0	0	0	0	0	0	28	0	0	0	13	0	0	0	0	0
10:15 PM to 10:30 PM	0	0	0	1	0	0	20	0	0	0	19	0	0	0	0	0
10:30 PM to 10:45 PM	0	0	0	3	0	0	24	0	0	0	17	0	0	0	0	0
10:45 PM to 11:00 PM	0	0	0	1	0	0	18	0	0	0	8	0	0	0	0	0
11:00 PM to 11:15 PM	0	0	0	1	0	0	15	0	0	0	13	0	0	0	0	0
11:15 PM to 11:30 PM	0	0	0	2	0	0	16	0	0	0	15	0	0	0	0	0
11:30 PM to 11:45 PM	0	0	0	0	0	0	19	0	0	0	8	0	0	0	0	0
11:45 PM to 12:00 AM	0	0	0	1	0	0	13	0	0	0	8	0	0	0	0	0
DAILY TOTALS	0	0	0	629	5	64	5410	19	151	3548	15	214	9587	39	429	0

TOTALS		
Vehicles	Bikes	Peds
948	9	96

Time	Northbound			Southbound			Eastbound			Westbound		
	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds	Vehicles	Bikes	Peds
7:15 AM to 8:15 AM	0	0	0	36	0	17	547	6	60	365	3	19



Metro Traffic Data Inc.
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Turning Movement Report

Prepared For:

Lisa Wallis
 Quad Knopf, Inc.
 5110 West Cypress Ave
 Visalia, CA 93277

LOCATION Bush Street @ Heinlen Street
 COUNTY Kings
 COLLECTION DATE 8/29/2014

LATITUDE 36.298295°
 LONGITUDE -119.784109°
 WEATHER Sunny and Clear

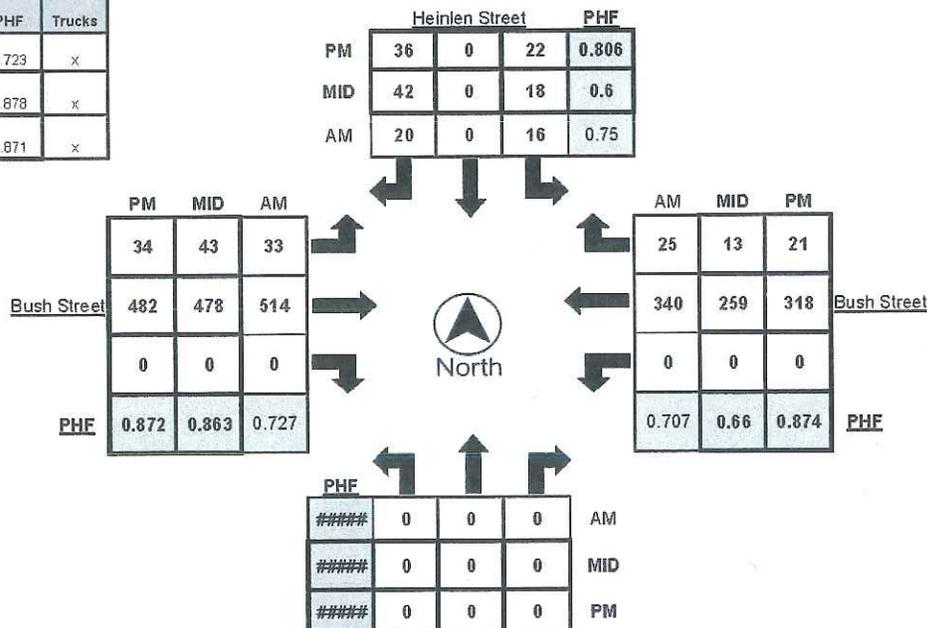
Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:00 AM - 7:15 AM	0	0	0	x	0	0	1	x	2	76	0	x	0	34	0	x
7:15 AM - 7:30 AM	0	0	0	x	0	0	5	x	1	83	0	x	0	48	3	x
7:30 AM - 7:45 AM	0	0	0	x	7	0	5	x	4	152	0	x	0	108	8	x
7:45 AM - 8:00 AM	0	0	0	x	7	0	4	x	18	172	0	x	0	118	11	x
8:00 AM - 8:15 AM	0	0	0	x	2	0	6	x	12	107	0	x	0	68	3	x
8:15 AM - 8:30 AM	0	0	0	x	5	0	3	x	4	56	0	x	0	44	2	x
8:30 AM - 8:45 AM	0	0	0	x	5	0	2	x	8	37	0	x	0	27	2	x
8:45 AM - 9:00 AM	0	0	0	x	2	0	5	x	6	47	0	x	0	46	7	x
TOTAL	0	0	0	x	28	0	31	x	53	730	0	x	0	491	36	x

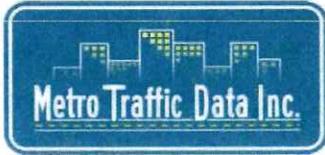
Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
2:00 PM - 2:15 PM	0	0	0	x	4	0	1	x	2	63	0	x	0	56	1	x
2:15 PM - 2:30 PM	0	0	0	x	0	0	4	x	9	70	0	x	0	74	2	x
2:30 PM - 2:45 PM	0	0	0	x	4	0	11	x	10	112	0	x	0	64	4	x
2:45 PM - 3:00 PM	0	0	0	x	8	0	4	x	13	120	0	x	0	57	3	x
3:00 PM - 3:15 PM	0	0	0	x	4	0	4	x	7	144	0	x	0	41	0	x
3:15 PM - 3:30 PM	0	0	0	x	2	0	23	x	13	102	0	x	0	97	6	x
3:30 PM - 3:45 PM	0	0	0	x	2	0	9	x	10	89	0	x	0	71	4	x
3:45 PM - 4:00 PM	0	0	0	x	7	0	5	x	16	88	0	x	0	52	2	x
TOTAL	0	0	0	x	31	0	61	x	80	788	0	x	0	512	22	x

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
4:00 PM - 4:15 PM	0	0	0	x	8	0	12	x	6	84	0	x	0	45	1	x
4:15 PM - 4:30 PM	0	0	0	x	3	0	4	x	13	88	0	x	0	60	1	x
4:30 PM - 4:45 PM	0	0	0	x	6	0	17	x	6	97	0	x	0	73	2	x
4:45 PM - 5:00 PM	0	0	0	x	1	0	3	x	5	107	0	x	0	64	6	x
5:00 PM - 5:15 PM	0	0	0	x	2	0	10	x	9	111	0	x	0	80	2	x
5:15 PM - 5:30 PM	0	0	0	x	6	0	12	x	11	129	0	x	0	78	10	x
5:30 PM - 5:45 PM	0	0	0	x	8	0	9	x	9	139	0	x	0	89	8	x
5:45 PM - 6:00 PM	0	0	0	x	6	0	5	x	5	103	0	x	0	71	1	x
TOTAL	0	0	0	x	40	0	72	x	64	858	0	x	0	560	31	x

PEAK HOUR	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:15 AM - 8:15 AM	0	0	0	x	16	0	20	x	33	514	0	x	0	340	25	x
2:30 PM - 3:30 PM	0	0	0	x	18	0	42	x	43	478	0	x	0	259	13	x
5:00 PM - 6:00 PM	0	0	0	x	22	0	36	x	34	462	0	x	0	318	21	x

	PHF	Trucks
AM	0.723	x
MID	0.678	x
PM	0.871	x





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Turning Movement Report

Prepared For:

Lisa Wallis
 Quad Knopf, Inc.
 5110 West Cypress Ave
 Visalia, CA 93277

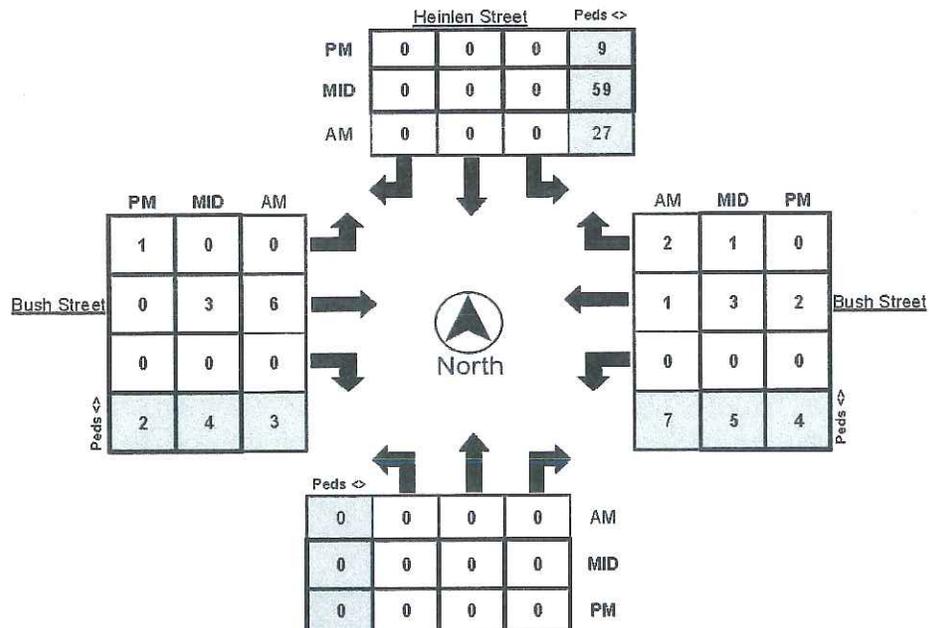
LOCATION Bush Street @ Heinlen Street LATITUDE 36.298295°
 COUNTY Kings LONGITUDE -119.784109°
 COLLECTION DATE 8/28/2014 WEATHER Sunny and Clear

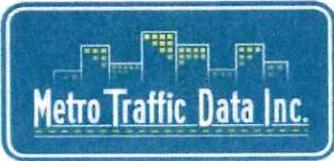
Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	6	0	0	0	0	0	1	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	11	0	0	0	0	0	5	0	5	0	0	1	0
7:45 AM - 8:00 AM	0	0	0	10	0	0	0	0	0	0	0	2	0	1	1	3
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0
8:30 AM - 8:45 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	30	0	0	0	0	0	6	0	12	0	2	2	3

Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
2:00 PM - 2:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 2:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2:30 PM - 2:45 PM	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	0
2:45 PM - 3:00 PM	0	0	0	11	0	0	0	0	0	1	0	0	0	0	0	0
3:00 PM - 3:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM - 3:30 PM	0	0	0	43	0	0	0	0	0	1	0	5	0	3	1	4
3:30 PM - 3:45 PM	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	1
3:45 PM - 4:00 PM	0	0	0	2	1	0	0	0	0	0	0	2	0	0	0	0
TOTAL	0	0	0	83	1	0	0	0	1	3	0	7	0	3	1	6

Time	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0	1
5:00 PM - 5:15 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	2
5:30 PM - 5:45 PM	0	0	0	2	0	0	0	0	1	0	0	2	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	3	0	0	0	0	0	0	0	2	0	1	0	0
TOTAL	0	0	0	13	0	0	0	0	1	0	0	8	0	3	0	3

PEAK HOUR	Northbound Bikes			N.Leg Peds	Southbound Bikes			S.Leg Peds	Eastbound Bikes			E.Leg Peds	Westbound Bikes			W.Leg Peds
	Left	Thru	Right		Left	Thru	Right		Left	Thru	Right		Left	Thru	Right	
7:15 AM - 8:15 AM	0	0	0	27	0	0	0	0	0	6	0	7	0	1	2	3
2:30 PM - 3:30 PM	0	0	0	59	0	0	0	0	0	3	0	5	0	3	1	4
5:00 PM - 6:00 PM	0	0	0	9	0	0	0	0	1	0	0	4	0	2	0	2





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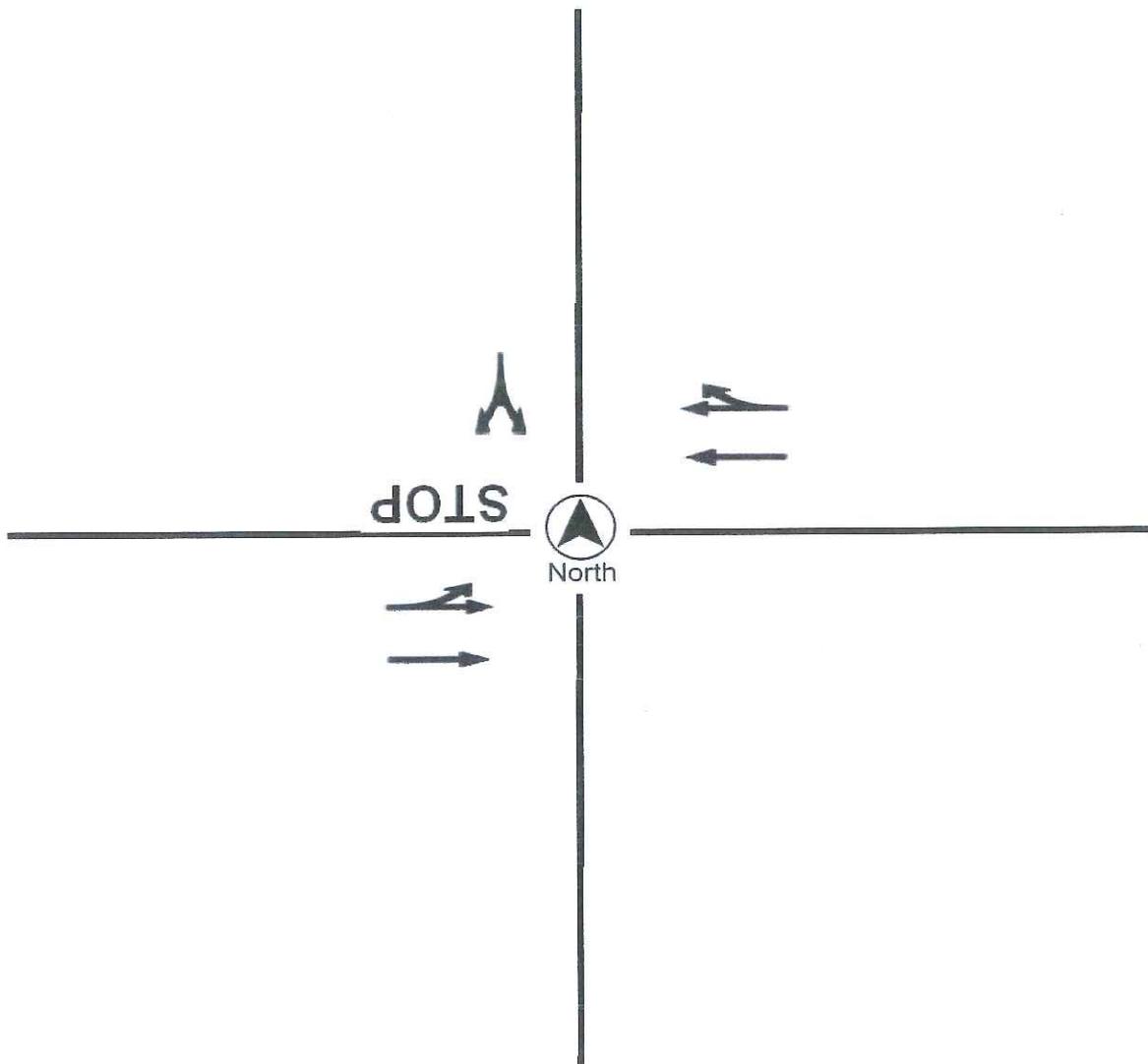
Turning Movement Report

Prepared For:

Lisa Wallis
Quad Knopf, Inc.
5110 West Cypress Ave
Visalia, CA 93277

LOCATION	<u>Bush Street @ Heinlen Street</u>	N/S STREET	<u>Heinlen Street</u>
COUNTY	<u>Kings</u>	E/W STREET	<u>Bush Street</u>
COLLECTION DATE	<u>8/28/2014</u>	WEATHER	<u>Sunny and Clear</u>
CYCLE TIME	<u>N/A</u>	CONTROL TYPE	<u>One-Way Stop</u>

COMMENTS



APPENDIX B

SWITRS COLLISION DATA

Does not include State Highway cases

Primary Rd	BUSH ST WEST	Distance (ft)	0	Direction	Population	3	Rpt Dist	CITY	Beat	L3A	Type	0	NCIC	1603	State Hwy?	N	Route	Badge	1069	Postmile Prefix	Collision Date	20110531	Time	1629	Day	TUE		
City	Lemore	County	Kings	Violation	IMPROP TURN	Weather2	CLEAR	Collision Type	HIT OBJECT	Rdwy Condt	NO UNUSL CND	Rdwy Condt2	Severity	NO UNUSL CND	PDO	Viol	OAF1	Viol	OAF2	Safety Equip	SP Info	SP Info	SP Info	SP Info	SP Info	SP Info		
Primary Collision Factor	CLEAR	Weather1	CLEAR	Motor Vehicle Involved With	OTHER MV	Lighting	DAYLIGHT	Make	Year	2005	-	3	N	OAF1	Viol	OAF2	Safety Equip	Cntrl Dev	FUNCTNG	Loc Type	Ext Of Inj	AGE	Sex	F	64	0	M	G
Hit and Run																												

Party Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Year	2005	-	3	N	OAF1	Viol	OAF2	Safety Equip	SP Info									
1F	DRVR	63	M	W	HNBD	RGT TURN	E	A	0700	CHRY	2005	-	3	N	OAF1	Viol	OAF2	Safety Equip	SP Info									
Party Info																												

Primary Rd	BUSH ST WEST	Distance (ft)	0	Direction	Population	3	Rpt Dist	LEWOO	Beat	L3B	Type	0	NCIC	1603	State Hwy?	N	Route	Badge	1250	Postmile Prefix	Collision Date	20110618	Time	1702	Day	SAT		
City	Lemore	County	UNKOWN	Violation	UNKNOWN	Weather2	CLEAR	Collision Type	BROADSIDE	Rdwy Condt	NO UNUSL CND	Rdwy Condt2	Severity	INJURY	PDO	Viol	OAF1	Viol	OAF2	Safety Equip	SP Info	SP Info	SP Info	SP Info	SP Info	SP Info	SP Info	
Primary Collision Factor	CLEAR	Weather1	CLEAR	Motor Vehicle Involved With	OTHER MV	Lighting	DAYLIGHT	Make	Year	2001	-	3	N	OAF1	Viol	OAF2	Safety Equip	Cntrl Dev	FUNCTNG	Loc Type	Ext Of Inj	AGE	Sex	F	17	0	M	G
Hit and Run																												

Party Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Year	2006	-	3	N	OAF1	Viol	OAF2	Safety Equip	SP Info									
1	DRVR	27	F	W	HNBD	PROC ST	N	A	0100	TOYOT	2006	-	3	N	OAF1	Viol	OAF2	Safety Equip	SP Info									
Party Info																												

Primary Rd	BUSH ST WEST	Distance (ft)	8	Direction	Population	3	Rpt Dist	FOX ST	Beat	L3C	Type	0	NCIC	1603	State Hwy?	N	Route	Badge	1069	Postmile Prefix	Collision Date	20110502	Time	1520	Day	MON		
City	Lemore	County	UNSAFE SPEED	Violation	UNSAFE SPEED	Weather2	CLEAR	Collision Type	REAR END	Rdwy Condt	NO UNUSL CND	Rdwy Condt2	Severity	NO UNUSL CND	PDO	Viol	OAF1	Viol	OAF2	Safety Equip	SP Info	SP Info	SP Info	SP Info	SP Info	SP Info	SP Info	
Primary Collision Factor	CLEAR	Weather1	CLEAR	Motor Vehicle Involved With	OTHER MV	Lighting	DAYLIGHT	Make	Year	2001	-	3	N	OAF1	Viol	OAF2	Safety Equip	Cntrl Dev	FUNCTNG	Loc Type	Ext Of Inj	AGE	Sex	F	13	0	M	G
Hit and Run																												

Party Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Year	2006	-	3	N	OAF1	Viol	OAF2	Safety Equip	SP Info									
1	DRVR	40	F	W	HNBD	STOPPED	E	A	0700	KIA	2006	-	3	N	OAF1	Viol	OAF2	Safety Equip	SP Info									
Party Info																												

Primary Rd	BUSH ST WEST	Distance (ft)	0	Direction	Population	3	Rpt Dist	HAMLET ST	Beat	L3C	Type	0	NCIC	1603	State Hwy?	N	Route	Badge	1204	Postmile Prefix	Collision Date	20110306	Time	0939	Day	SUN		
City	Lemore	County	R-O-W AUTO	Violation	R-O-W AUTO	Weather2	RAINING	Collision Type	SIDESWIPE	Rdwy Condt	NO UNUSL CND	Rdwy Condt2	Severity	NO UNUSL CND	PDO	Viol	OAF1	Viol	OAF2	Safety Equip	SP Info	SP Info	SP Info	SP Info	SP Info	SP Info	SP Info	
Primary Collision Factor	RAINING	Weather1	RAINING	Motor Vehicle Involved With	OTHER MV	Lighting	DAYLIGHT	Make	Year	2008	-	3	N	OAF1	Viol	OAF2	Safety Equip	Cntrl Dev	FUNCTNG	Loc Type	Ext Of Inj	AGE	Sex	M	38	0	M	G
Hit and Run																												

Party Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Year	2010	-	2	N	OAF1	Viol	OAF2	Safety Equip	SP Info									
1F	DRVR	46	M	W	HNBD	LFT TURN	N	A	0100	VOLKS	2010	-	2	N	OAF1	Viol	OAF2	Safety Equip	SP Info									
Party Info																												

Primary Rd	BUSH ST WEST	Distance (ft)	94	Direction	Population	3	Rpt Dist	HEINLEN ST	Beat	L3C	Type	0	NCIC	1603	State Hwy?	N	Route	Badge	1069	Postmile Prefix	Collision Date	20110526	Time	0826	Day	THU		
City	Lemore	County	WRONG SIDE	Violation	WRONG SIDE	Weather2	CLEAR	Collision Type	HEAD-ON	Rdwy Condt	NO UNUSL CND	Rdwy Condt2	Severity	INJURY	PDO	Viol	OAF1	Viol	OAF2	Safety Equip	SP Info	SP Info	SP Info	SP Info	SP Info	SP Info	SP Info	
Primary Collision Factor	CLEAR	Weather1	CLEAR	Motor Vehicle Involved With	OTHER MV	Lighting	DAYLIGHT	Make	Year	2008	-	3	N	OAF1	Viol	OAF2	Safety Equip	Cntrl Dev	FUNCTNG	Loc Type	Ext Of Inj	AGE	Sex	M	11	0	M	G
Hit and Run																												

Party Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Year	2009	-	3	N	OAF1	Viol	OAF2	Safety Equip	SP Info									
1	DRVR	29	F	H	HNBD	PROC ST	E	D	2200	DODGE	2009	-	3	N	OAF1	Viol	OAF2	Safety Equip	SP Info									
Party Info																												

This report is accepted subject to the Terms of Use. Due to collision records processing backlog, SWMTR data is typically seven months behind. Data requested for dates seven months prior to the current date will be incomplete.

APPENDIX C

MULTI-WAY STOP WARRANTS

MULTIWAY STOP WARRANTS

CALC MJH DATE 9/15/14

CHK LMWD DATE 9/17/14

MAJOR STREET: BUSH STREET

MINOR STREET: HEINLEN STREET

The following warrants are based on Section 2B.07 Multiway Stop Applications in the California MUTCD.

WARRANT A - Interim measure where signals have been warranted SATISFIED YES NO

Where traffic control signals are justified, the multiway 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.

WARRANT B - Crash Problem SATISFIED YES NO

A crash problem, as indicated by 5 or more reported crashes in a 12-month period that are susceptible to correction by a multiway stop installation. Such crashes include right- and left-turn collisions as well as right-angle collisions.

History of collisions

	MONTH											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<u>2008</u>	<u>0</u>	<u>1</u>	<u>0</u>									
Y <u>2009</u>	<u>0</u>											
E <u>2010</u>	<u>0</u>											
A <u>2011</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>						
R <u>2012</u>	<u>0</u>											

* Collision susceptible to correction

Most correctible accidents in a 12 month period 1

WARRANT C - Minimum Volumes SATISFIED YES NO

1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day, and
2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, but

MULTIWAY STOP WARRANTS

MAJOR STREET: BUSH STREET

MINOR STREET: HEINLEN STREET

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 above values.

Posted speed = 30 mph.

Minimum Volume Requirement	70% shown in brackets	HOUR										AVG. % MET
		1700-1800	0700-0800	1500-1600	1400-1500	1600-1700	1800-1900	1200-1300	0800-0900			
Vehs volume both approaches major street	300 (210)	855	834	742	660	658	564	487	476			660 314%
Vehs, peds & bikes both approaches minor street	200 (140)	58	53	66	38	58	52	48	33			51 36%

FULFILLED YES NO

AND,

Average delay to the minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour.

Average measured delay on minor street, N/A seconds.

FULFILLED YES NO

WARRANT D - Combination of Warrants

SATISFIED YES NO

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.

Criteria B satisfaction = 20 % FULFILLED YES NO

Criteria C.1 satisfaction = 314 % FULFILLED YES NO

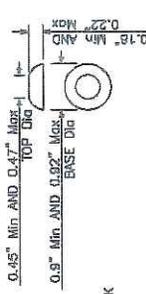
Criteria C.2 satisfaction = 36 % FULFILLED YES NO

OPTION Other criteria that may be considered in an engineering study include:

- A. The need to control left-turn conflicts;
- B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
- C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to reasonably safely negotiate the intersection unless conflicting cross traffic is also required to stop; and
- D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multiway stop control would improve traffic operational characteristics of the intersection.

APPENDIX D

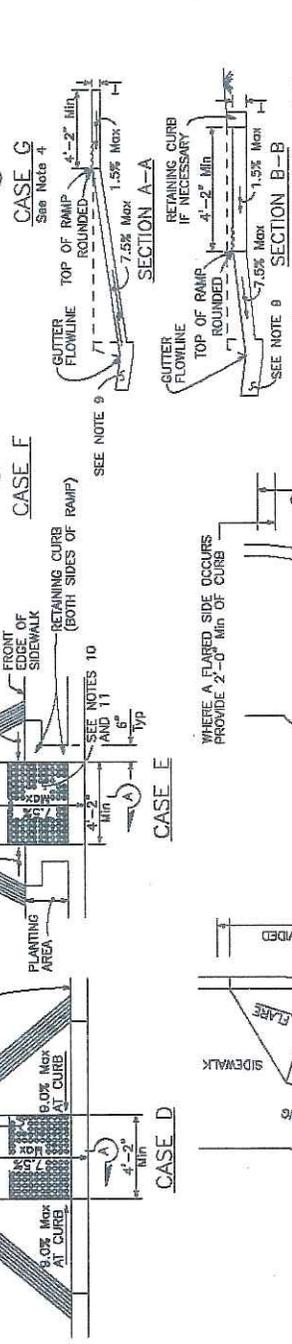
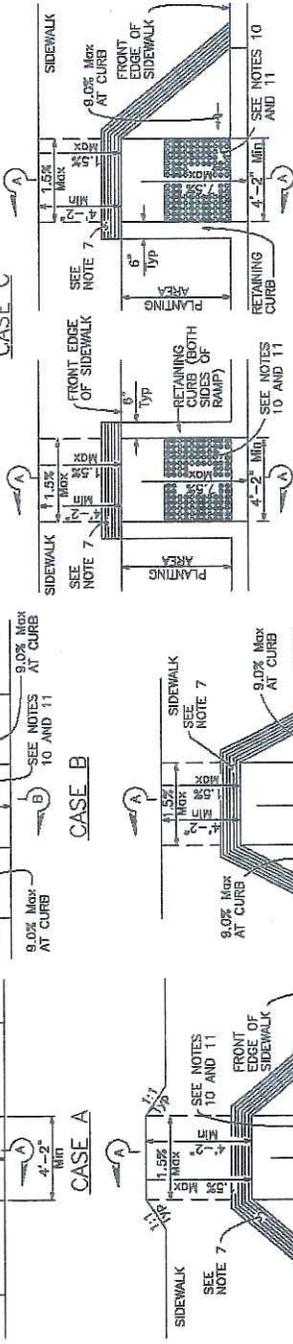
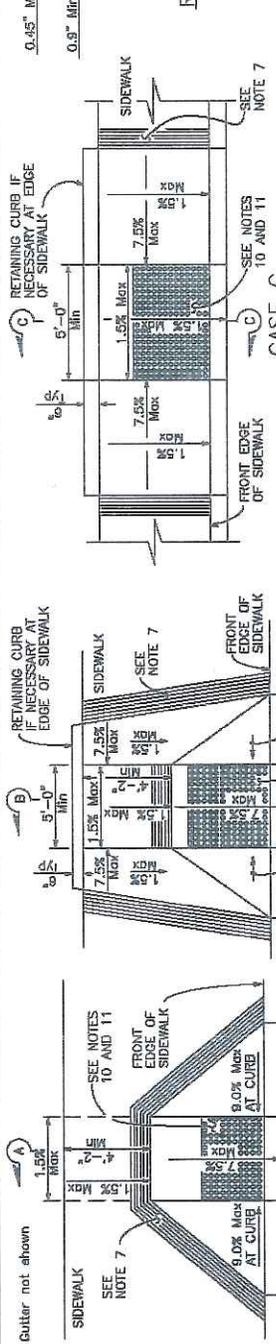
CALTRANS STANDARD PLAN RSP A88A



RAISED TRUNCATED DOME

NOTES:

1. As site conditions dictate, Case A through Case G curb ramps may be used. The case of curb ramps used in Detail A do not have to be the same. Case A through Case G curb ramps also may be used at mid block locations, as site conditions dictate.
2. If distance from curb to back of sidewalk is too short to accommodate ramp and 4'-2" platform (landing) as shown in Case A, the sidewalk may be depressed longitudinally as in Case B, C or D, or may be widened as in Case E.
3. When ramp is located in center of curb return, crosswalk configuration must be similar to that shown for Detail B.
4. As site conditions dictate, the retaining curb aids and the flared side of the Case G ramp shall be constructed in reversed position.
5. If located on a curve, the sides of the ramp need not be parallel, but the minimum width of the ramp shall be 4'-2".
6. Side slope of ramp flares vary uniformly from a maximum of 8.0% at curb to conform to longitudinal slope adjacent to top of the ramp, except in Case C and Case F.
7. The curb ramp shall be outlined, as shown, with a 1'-0" wide border with 1/2" grooves approximately 1/2" apart.
8. Transitions from ramps and landing to walks, gutters or streets shall be flush (no lip) and free of abrupt changes.
9. Counter slopes of adjoining gutters and road surfaces immediately adjacent to curb ramps shall be a minimum of 1.5% for each 2'-0" of width.
10. Curb ramps shall have a detectable warning surface that extends the full width of the ramp and 4'-2" beyond the curb ramp. Detectable warning surfaces may be used on a 4'-2" wide curb ramp. Detectable warning surfaces shall conform to the requirements in the Standard Specifications.
11. The edge of the detectable warning surface nearest the street shall be between 6" and 8" from the gutter flowline.
12. Sidewalk and ramp thickness, "T", shall be 3" minimum.
13. Utility call boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
14. Detectable warning surfaces may have to be cut to allow removal of utility covers while maintaining full detectable warning width and depth.



**RAISED TRUNCATED DOME PATTERN (IN-LINE)
DETECTABLE WARNING SURFACE**

See Note 10

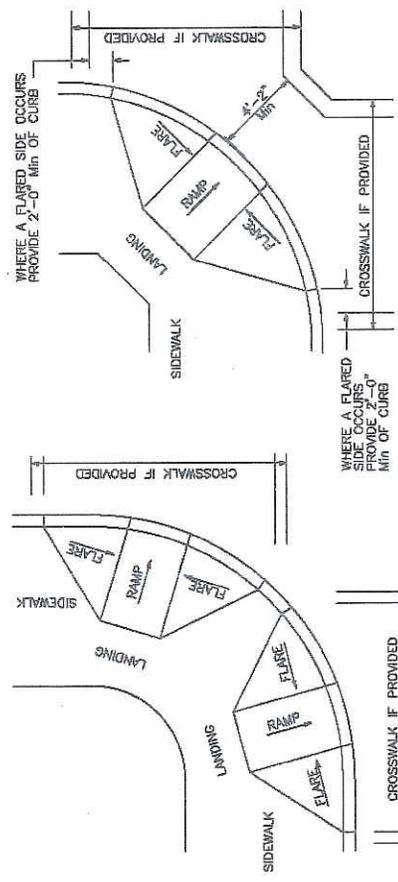
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CURB RAMP DETAILS

NO SCALE

RSP AB8A DATED MARCH 21, 2014 SUPERSEDES RSP AB8A DATED JULY 18, 2013 AND STANDARD PLAN AB8A DATED MAY 20, 2011 - PAGE 121 OF THE STANDARD PLANS BOOK DATED 2010.

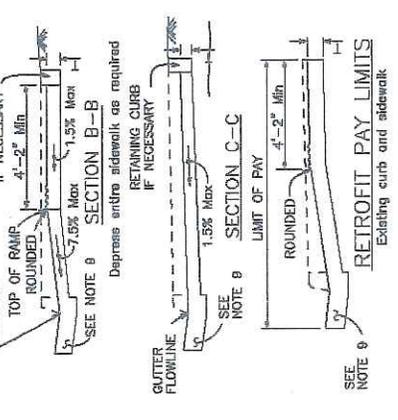
REVISED STANDARD PLAN RSP AB8A



DETAIL B

TYPICAL ONE-RAMP CORNER INSTALLATION

See Notes 1 and 3



DETAIL B

TYPICAL TWO-RAMP CORNER INSTALLATION

See Note 1

DETAIL C

TYPICAL ONE-RAMP CORNER INSTALLATION

See Note 1

DETAIL D

TYPICAL ONE-RAMP CORNER INSTALLATION

See Note 1

DETAIL E

TYPICAL ONE-RAMP CORNER INSTALLATION

See Note 1

DETAIL F

TYPICAL ONE-RAMP CORNER INSTALLATION

See Note 1

DETAIL G

TYPICAL ONE-RAMP CORNER INSTALLATION

See Note 1