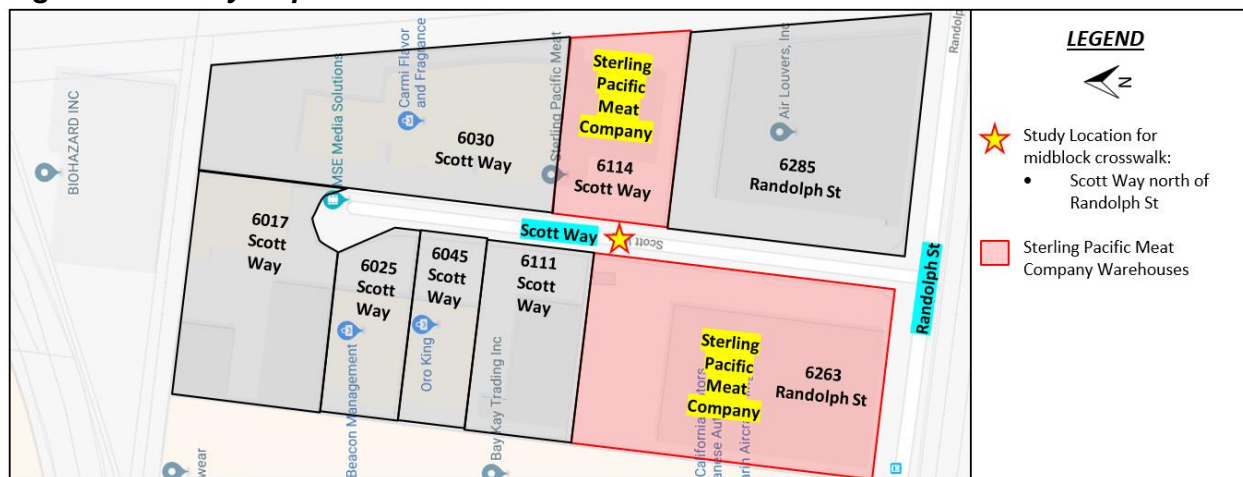


REPORT
REVIEW OF MIDBLOCK CROSSWALK REQUEST
CROSS SCOTT WAY NORTH OF RANDOLPH STREET
IN FRONT OF THE STERLING PACIFIC MEAT COMPANY WAREHOUSES
December 18, 2018
Transtech Engineers, Inc.

BACKGROUND:

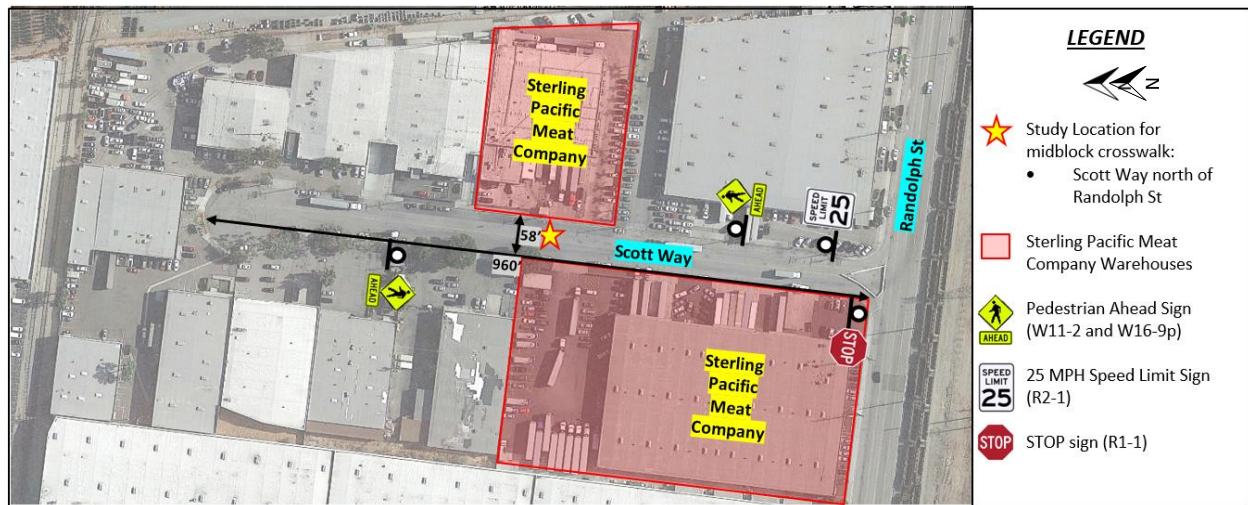
At City's request, Transtech has completed a review for the installation of a midblock crosswalk across of Scott Way north of Randolph Street in front of the Sterling Pacific Meat Company warehouses. Sterling Pacific Meat Company maintains two warehouses in the City of Commerce both located across from each other, at 6263 Randolph Street and at 6114 Scott Way. Sterling Pacific Meat Company operates its two warehouses 24 hours a day 7 days a week, its employees cross between the two warehouses frequently throughout the day between the hours of 6:00am to 5:30pm from Monday thru Friday to maintain operations. The company operates from 2:30am to 8:00pm, there are two shifts during that time period with approximately a total of 290 employees and a cleanup crew of approximately 20 workers come in from 8:00pm to 2:30am. Sterling Pacific Meat Company is requesting for a midblock crosswalk to be installed to allow passage for pedestrians from warehouse to warehouse in one centralized location. During periods of high pedestrian activity, Sterling Pacific Meat Company has been putting out green cones to "act as a crosswalk" and uses one of its security guards to "act as a crossing guard". The location of the request is depicted in Figure 1: Vicinity Map below.

Figure 1: Vicinity Map



ANALYSIS:

Figure 2: Existing Conditions Map



Randolph Street: Randolph Street is approximately 58' (feet) in width with two lanes in each direction and a yellow center dashed line. Randolph Street has a posted speed limit of 45 MPH. Parking is permitted on the north side of the roadway except for street sweeping restrictions. The T-intersection at Randolph Street and Scott Way is stop controlled in the north leg and uncontrolled in east and west leg. Land use along Randolph Street at this location is considered industrial.

Scott Way: Scott Way is approximately 58' (feet) in width with one lane in each direction and a yellow center line. Scott Way has a posted speed limit of 25 MPH. The segment of Scott Way extends approximately to 960-feet in length north of Randolph Street and comes to an end. There are existing Pedestrian Ahead warning signs for northbound and southbound traffic approaching the area where the two warehouses are located at and where the majority of the pedestrians' cross at. Parking is permitted on both sides of roadway with the exception of street sweeping restrictions. Land use along Scott Way at this location is considered industrial. Most traffic occurring along Scott Way is from employees coming or going into their workplace or from transport trucks transporting goods into or out of the warehouses.

PICTURE SUMMARY



Figure 3: Speed Limit sign on Scotts Way facing northbound traffic



Figure 4: Pedestrian Ahead signage on Scotts Way facing northbound traffic



Figure 5: Pedestrian crossing Scott Way in the middle of the roadway from the west side to the east side



Figure 6: Area where pedestrians frequently cross, green cones used as makeshift "crosswalk" visible



Figure 7: Pedestrian Ahead signage on Scotts Way facing southbound traffic



Figure 8: West side of Scott Way where lunch tables are located, part of Sterling Pacific Meat Company



Figure 9: Area where pedestrians frequently cross, green cones used as makeshift “crosswalk” visible



Figure 10: East side of Scott Way, Sterling Pacific Meat Company’s security guard booth visible



Figure 11: Area where pedestrians frequently cross, green cones used as makeshift “crosswalk” visible



Figure 12: Area where pedestrians frequently cross, green cones used as makeshift “crosswalk” visible

AVERAGE DAILY TRAFFIC (ADT)

Randolph Street is considered a collector roadway and Scott Way is considered a local roadway. A vehicle count during the peak hour times of 6:00AM to 8:00AM, 11:30AM to 1:30PM, and 4:00PM to 6:00PM was conducted on Tuesday, November 27, 2018. The vehicle count data is expressed below:

Table 1: Vehicle Count				
AM Time (Every 30 mins)	Cars		Trucks 3+ Axle	
	NB	SB	NB	SB
6:00-6:30	6	3	5	3
6:30-7:00	11	5	2	4
7:00-7:30	9	3	3	3
7:30-8:00	8	4	1	2
SUB TOTAL	34	15	11	12
AFT Time (Every 30 mins)	Cars		Trucks 3+ Axle	
	NB	SB	NB	SB
11:30-12:00	13	13	2	3
12:00-12:30	11	16	6	2
12:30-13:00	16	3	3	4
13:00-13:30	10	7	2	3
SUB TOTAL	50	39	13	12
PM Time (Every 30 mins)	Cars		Trucks 3+ Axle	
	NB	SB	NB	SB
16:00-16:30	8	11	6	5
16:30-17:00	11	24	3	7
17:00-17:30	22	21	1	3
17:30-18:00	7	17	1	1
SUB TOTAL	48	73	11	16
(6) HOURS TOTAL	132	127	35	40
NB + SB DIR (6) HOURS TOTAL	259		75	

In order to see the traffic patterns along Scott Way, a vehicle count was taken on Scott Way north of Randolph Street at the same time the pedestrians counts were conducted. According to the data presented in Table 1: Vehicle Count, during the peak commute times from 6:00AM to 8:00AM, 11:30AM to 1:30PM, and 4:00PM to 6:00PM a maximum of 259 cars and 75 trucks (3+ Axle) traveled along Scott Way north of Randolph Street. Scott Way is a cul-de-sac, it extends for approximately 960-feet north of Randolph Street before coming to an end.

PEDESTRIAN COUNTS

To determine how many pedestrians are crossing midblock across of Scott Way north of Randolph Street, a pedestrian count during the peak hour times of 6:00AM to 8:00AM, 11:30AM to 1:30PM, and 4:00PM to 6:00PM was conducted on Tuesday, November 27, 2018. There are no existing crosswalks along the segment of Scott Way.

Table 2: Pedestrian Count	
<i>AM Time (Every 30 mins)</i>	<i>Number of Peds Xing Midblock (EB/WB Direction)</i>
6:00-6:30	93
6:30-7:00	10
7:00-7:30	5
7:30-8:00	6
SUB TOTAL	114
<i>AFT Time (Every 30 mins)</i>	<i>Number of Peds Xing Midblock (EB/WB Direction)</i>
11:30-12:00	14
12:00-12:30	32
12:30-13:00	55
13:00-13:30	10
SUB TOTAL	111
<i>PM Time (Every 30 mins)</i>	<i>Number of Peds Xing Midblock (EB/WB Direction)</i>
16:00-16:30	20
16:30-17:00	40
17:00-17:30	40
17:30-18:00	16
SUB TOTAL	116
(6) HOURS TOTAL	341 PEDS

According to the data presented in *Table 2: Pedestrian Count*, during the peak commute times from 6:00AM to 8:00AM, 11:30AM to 1:30PM, and 4:00PM to 6:00PM a maximum of 341 pedestrians crossed midblock across of Scott Way. In just a 30-minute span from 6:00AM to 6:30AM 93 pedestrians crossed midblock across of Scott Way.

ACCIDENT INVESTIGATION

An accident investigation was conducted using the last 5.5 available years from SWITRS (Statewide Integrated Traffic Records System) records. A total of 4 accidents were

reported at the segment of Scott Way north of Randolph Street in the last 5.5 available years (2013 to current available data as of September 2018).

Table 3: Summary of Accident History provides a detailed list of the collisions at the segment of Scott Way north of Randolph Street.

1 accident in 2018 (January to September 2018)
 2 accidents in 2017
 0 accidents in 2016
 0 accidents in 2015
 1 accident in 2014
 0 accidents in 2013

Table 3: Summary of Accident History							
No.	Location	Dist.	Date	Time	Collision Type	Severity	Factor
1	SCOTT WAY AT RANDOLPH ST	175'N	08/23/18	08:55	REAR END	PDO	NB BACKING VEH HIT EB PARKED VEH
2	SCOTT WAY AT RANDOLPH ST	66'N	11/30/17	12:50	SIDESWIP E	PDO	NB LFT TURN VEH HIT NB ENT TRAF VEH
3	SCOTT WAY AT RANDOLPH ST	375'N	08/17/17	14:30	NOT STATED	PDO	NB THRU VEH HIT OBJ
4	SCOTT WAY AT RANDOLPH ST	870'N	12/15/14	10:00	SIDESWIP E	PDO	NB UNS TURN VEH HIT NB PARKED VEH

CRITERIA FOR DETERMINING IF A MIDBLOCK CROSSWALK IS WARRANTED

The California Manual of Uniform Traffic Devices (CAMUTCD) describes applications and placement of crosswalk markings, Section 3B.18 Crosswalk Markings. Crosswalk markings provide guidance for pedestrians who are crossing roadways by defining and delineating paths on approaches to and within signalized intersections, and on approaches to other intersections where traffic stops. In conjunction with signs and other measures, crosswalk markings help to alert road users of a designated pedestrian crossing point across roadways at locations that are not controlled by traffic control signals or STOP or YIELD signs. At non-intersection locations, crosswalk markings legally establish the crosswalk.

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. The engineering study should consider the number of lanes, the presence of a median, the distance from adjacent signalized intersections, the pedestrian volumes and delays, the average daily traffic (ADT), the posted or statutory speed limit or 85th-percentile speed, the geometry of the location, the possible consolidation of multiple crossing points, the availability of street lighting, and other appropriate factors. New marked crosswalks across uncontrolled roadways should include measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence.

Because non-intersection pedestrian crossings are generally unexpected by the road user, warning signs should be installed for all marked crosswalks at non-intersection locations and adequate visibility should be provided by parking prohibitions.

The following factors may be considered in determining whether a marked crosswalk should be used:

- A. Vehicular approach speeds from both directions.
- B. Vehicular volume and density.
- C. Vehicular turning movements.
- D. Pedestrian volumes.
- E. Roadway width.
- F. Day and night visibility by both pedestrians and road users.
- G. Channelization is desirable to clarify pedestrian routes for sighted or sight impaired pedestrians.
- H. Discouragement of pedestrian use of undesirable routes.
- I. Consistency with markings at adjacent intersections or within the same intersection.

Crosswalk markings may be established between intersections (mid-block) in accordance with CVC 21106(a).

Mid-block pedestrian crossings are generally unexpected by the motorist and should be discouraged unless, in the opinion of the engineer, there is strong justification in favor of such installation. Particular attention should be given to roadways with two or more traffic lanes in one direction as a pedestrian may be hidden from view by a vehicle yielding the right-of-way to a pedestrian.

CRITERIA FOR DETERMINING IF A WARNING BEACON IS WARRANTED

The California Manual of Uniform Traffic Devices (CAMUTCD) describes applications and placement of Warning Beacons, Chapter 4L – Flashing Beacons. A Flashing Beacon is a highway traffic signal with one or more signal sections that operates in a flashing mode. It can provide traffic control when used as an intersection control beacon or it can provide warning when used in other applications.

Typical applications of Warning Beacons include the following:

- A. At obstructions in or immediately adjacent to the roadway;
- B. As supplemental emphasis to warning signs;
- C. As emphasis for midblock crosswalks;
- D. As supplemental emphasis to regulatory signs, except STOP, DO NOT ENTER, WRONG WAY, and
- E. SPEED LIMIT signs; and
- F. In conjunction with a regulatory or warning sign that includes the phrase WHEN FLASHING in its legend to
- G. indicate that the regulation is in effect or that the condition is present only at certain times.

A Warning Beacon shall consist of one or more signal sections of a standard traffic signal face with a flashing CIRCULAR YELLOW signal indication in each signal section. A Warning Beacon shall be used only to supplement an appropriate warning or regulatory sign or marker. Warning Beacons, if used at intersections, shall not face conflicting vehicular approaches. If a Warning Beacon is suspended over the roadway, the clearance above the pavement shall be a minimum of 15 feet and a maximum of 19 feet.

The condition or regulation justifying Warning Beacons should largely govern their location with respect to the roadway. If an obstruction is in or adjacent to the roadway, illumination of the lower portion or the beginning of the obstruction or a sign on or in front of the obstruction, in addition to the beacon, should be considered. Warning Beacons should be operated only during those periods or times when the condition or regulation exists.

Warning Beacons that are actuated by pedestrians, bicyclists, or other road users may be used as appropriate to provide additional warning to vehicles approaching a crossing or other location. If Warning Beacons have more than one signal section, they may be flashed either alternately or simultaneously. A flashing yellow beacon interconnected with a traffic signal controller assembly may be used with a traffic signal warning sign.

LINE OF SIGHT AT INTERSECTIONS

The driver of a vehicle approaching or departing from an intersection should have an unobstructed view of the intersection, including any traffic control devices, and sufficient lengths along the intersecting highway to permit the driver to anticipate and avoid potential collisions (Maze and Plazak 2000). These unobstructed views form triangular areas known as sight triangles. Any object within the sight triangle that would obstruct the driver's view of an approaching vehicle should be removed or modified or appropriate traffic control devices should be installed as per the Manual on Uniform Traffic Control Devices. Obstructions within sight triangles could be buildings, vehicles, hedges, trees, bushes, tall crops, walls, fences or parked cars. A parked vehicle extends approximately 7-feet from the curb, so it's necessary to take into account the width of a vehicle when determining the amount of red curb needed to obtain a clear sight triangle (Figure 15). The line of sight uses the driver's eye height for measurement (3' 6").

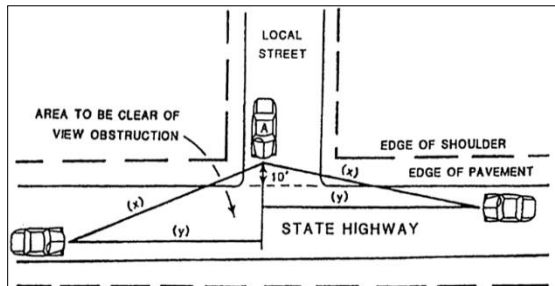


Figure 13: Example of Stopping Sight Distance Triangle

Per AASHTO's guidelines, for a roadway with a posted speed of 25 mph the sight distance is 155 feet. When looking at the sight distance triangles for pedestrians waiting to cross Scott Way across the midblock crosswalk, if bulb-outs are installed no additional is required but additional red curb on the west side of Scott

Way is recommended on either side of the bulb-out to provide a clear line of sight. With the installation of the bulb-outs and striping of the additional red curb 4 parking spaces along Scott Way will be removed.

Table 5: Stopping Sight Distance				
Design Speed (mph)	Brake reaction distance (ft)	Braking distance on level (ft)	Stopping Sight Distance	
			Calculated (ft)	Design (ft)
15	55.1	21.6	76.7	80
20	73.5	38.4	111.9	115
25	91.9	60.0	151.9	155
30	110.3	86.4	196.7	200
35	128.6	117.6	246.2	250
40	147.0	153.6	300.6	305
45	165.4	194.4	359.8	360
50	183.8	240.0	423.8	425
55	202.1	290.3	492.4	495
60	220.5	345.5	566.0	570
Note: Brake reaction distance predicated on a time of 2.5s; deceleration rate 11.2 ft/sec ²				

Figure 14: Example of Stopping Sight Distance Triangle with Vehicles Parked Along Curb

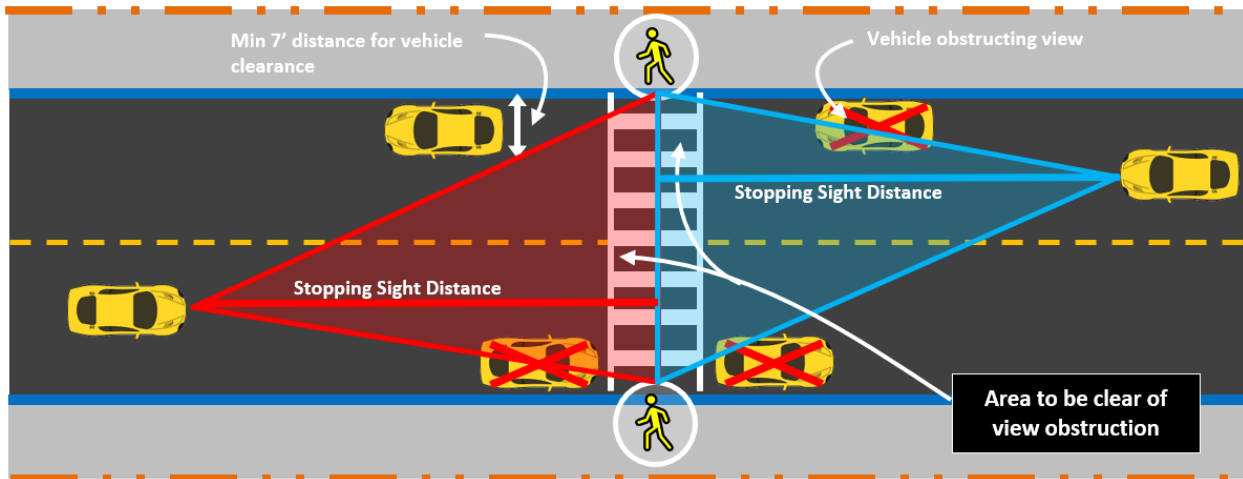
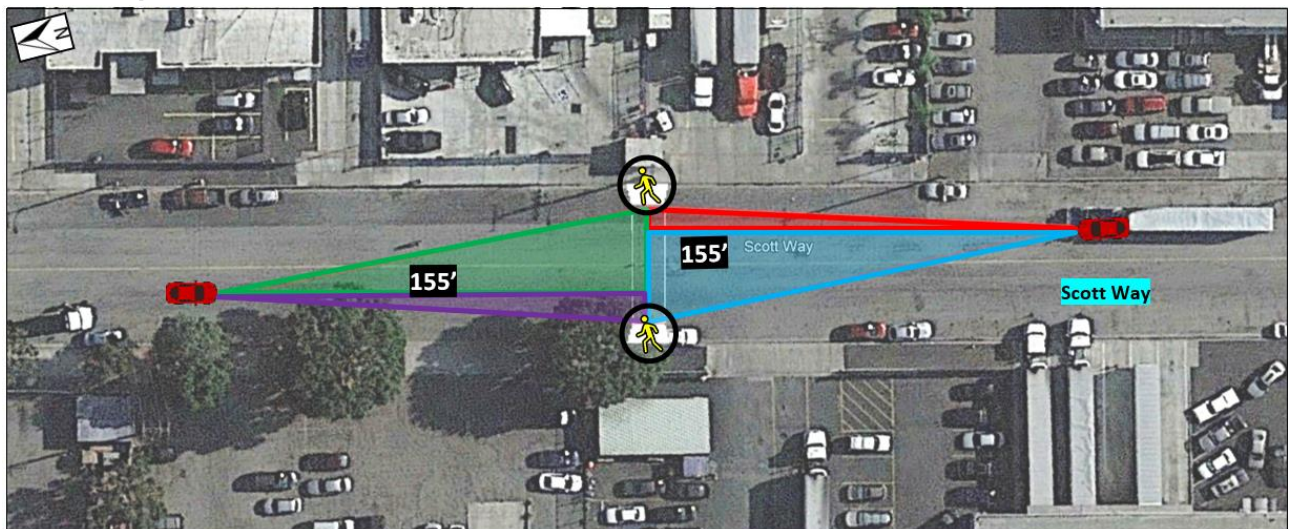


Figure 15: Stopping Sight Distance Triangle for Midblock Crosswalk on Scott Way north of Randolph St



RECOMMENDATION:

The study concluded that the intersection meets the criteria for the installation of a midblock crosswalk across of Scott Way north of Randolph Street as set forth by the California Manual of Uniform Traffic Control Devices (CAMUTCD). It is recommended to install further traffic measures to improve the overall safety of the midblock crosswalk including bulb-outs, warning flashing beacons with crosswalk warning signs, additional red curb to provide a clear line of sight, advanced crosswalk sign with pavement markings, yield here to pedestrian signs with yield lines, additional lighting above midblock crosswalk, and reflective pavement markers delineating the midblock crosswalk. As a part of the study, a field review of existing conditions, vehicle counts, pedestrian counts, line of sight were analyzed. Please refer to **Figure 16: Proposed Recommendations Diagram** for a visual demonstration of the proposed recommendations. The recommendations are as follows:

- ① Install a midblock ladder crosswalk in white high visibility paint in the location specified in Figure 16 per CAMUTCD Section 3B.18.
 - White high visibility ladder striped crosswalk will improve sight visibility for pedestrians crossing and will channelize pedestrians to one centralized location.
- ② Install bulb-out with ADA compliant ramps, approximately 8-feet wide from the edge of the curb, on the east and west side of the midblock crosswalk. See Figure 17.
 - A bulb-out shortens the crossing distance and allows the pedestrian waiting to cross to be more visible to the approaching driver.
- ③ Install white reflective pavement markers delineating the midblock crosswalk.
- ④ Install double sided “Pedestrian Crossing with Diagonal Downward Pointing Arrow” signs (W11-2/size 36x36 and W16-7P/size 30x18) with a yellow flashing Warning Beacon above the signs on the east and west side of the midblock crosswalk.
- ⑤ Install “Yield Here to Pedestrians” signs (R1-5) and “Yield” lines in white high visibility paint at a distance of 20 to 50 in advance of the midblock crosswalk for northbound and southbound direction.
- ⑥ Install new “Pedestrian Ahead” signs (W11-2/size 36x36 and W16-9P/size 30x18) and “PED XING” in white high visibility paint for northbound and southbound direction.
- ⑦ Install pedestrian light on the west side of Scott Way above midblock crosswalk to provide adequate illumination of the crosswalk and allow pedestrians to be more visible during nighttime conditions.
- ⑧ Paint curb on the west side of Scott Way on the north and south side of bulb-out from driveway to driveway in red and paint curb of bulb-outs in red.

Figure 16: Proposed Recommendations Diagram

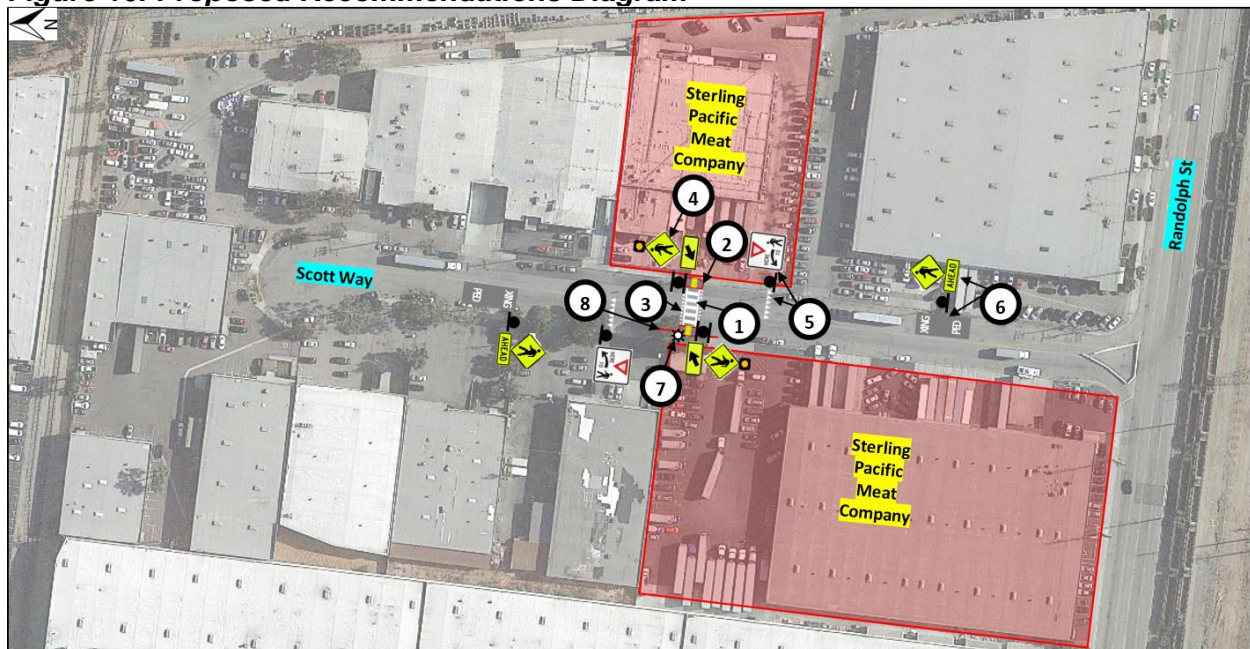


Figure 17: Sample of Bulb-out



Report prepared under the supervision of:
Ali Cayir, PE

ATTACHMENTS:

1. Pedestrian and Vehicle Count Sheet

ATTACHMENT 1: PEDESTRIAN AND VEHICLE COUNT SHEET

PEDESTRIAN AND VEHICLE COUNT ON SCOTTS WAY (MIDBLOCK NEAR GUARD SHACK)

Count taken on Tuesday November 27, 2018

MIDBLOCK COUNT ON SCOTTS WAY NORTH OF RANDOLPH					
TIME	PEDS CROSSING SCOTTS WAY MIDBLOCK ¹	CARS		TRUCKS 3+ AXLE	
		NB	SB	NB	SB
06:00-06:30	93	6	3	5	3
06:30-07:00	10	11	5	2	4
07:00-07:30	5	9	3	3	3
07:30-08:00	6	8	4	1	2
Sub total	114	34	15	11	12
11:30-12:00	14	13	13	2	3
12:00-12:30	32	11	16	6	2
12:30-13:00	55	16	3	3	4
13:00-13:30	10	10	7	2	3
Sub total	111	50	39	13	12
16:00-16:30	20	8	11	6	5
16:30-17:00	40	11	24	3	7
17:00-17:30	40	22	21	1	3
17:30-18:00	16	7	17	1	1
Sub total	116	48	73	11	16
(6) HOUR TOTALS	341	132	127	35	40

¹. EB and WB (Included both directions)