Agenda Item Number: 1

Agenda Report Reviewed by:
City Manager:

CITY OF SEBASTOPOL
CITY COUNCIL
STAFF REPORT

Meeting Date:	November 1, 2016
To:	Honorable Mayor and Honorable City Councilmembers
From:	Henry Mikus, Engineering Manager
Subject:	Traffic and Safety Issues (Bodega Avenue Areas/Willow/Jewell Street Intersection/Local Streets Bike Lanes)
	Recommendation: Provide direction for next steps with each project.
Funding:	Currently Budgeted: __X__ Yes _____ No ____ N/A
	Net General Fund Cost: $ ____none_____
	$54,267 total cost for all three projects would be paid for from: Traffic Impact Fund and Pavement Fund

INTRODUCTION: W-Trans, an engineering consulting firm, has been retained by the City via several amendments to the firm's master agreement with the City, to provide assistance and technical expertise on the following projects:

a. Local Streets Bicycle/Pedestrian Pathways Design.
b. Pedestrian Crossings Safety Study for Bodega Avenue (Stop Light Discussions)
c. Discussion and Action on Results of the W-Trans Study and Recommendations for Willow Street/Jewell Avenue Intersection

Steve Weinberger, W-Trans Principal, will be presenting a report to the Council on the above-listed projects. His written report is attached.

BACKGROUND: All three projects have some history that is pertinent to discussion:

a. Bike pathways: The City, as part of its Bicycle and Pedestrian Plan, seeks to improve its bicycle and pedestrian pathways, including providing a safe but relatively direct connection between the two Class 1 pathways that reach the City. These are the east-west Joe Rodota Trail, and the north-south West County Trail. W-trans is providing the design for those pathways that traverse our own locally owned streets.
b. Bodega Avenue Safety Study: As a result of citizen input over concerns about the Bodega/Nelson intersection, W-Trans was retained to do a corridor safety study with a focus traffic calming and crosswalks.
c. Willow-Jewell Intersection: Also due to citizen input, in this case concern over near-misses at the Willow-Jewell intersection, W-Trans is providing some alternate alignments to enhance safety.

DISCUSSION: W-Trans is seeking Council feedback on the additional information plus changes made resulting from the discussion with Council October 4, 2016

a. Bike pathways: W-Trans has refined cross sections, which now show parking, lane widths, turn lanes, and medians. Net parking spaces "lost" is also shown. The next steps would be to complete the plans, then prepare the construction/installation bid package.
b. Bodega Avenue Safety Study: W-Trans has provided data and made recommendations regarding several Bodega Avenue intersections. These recommendations would become action items if endorsed by the Council.
c. Willow-Jewell intersection: W-Trans developed to finer detail the three scenarios chosen by the Council for further study and detail. It is hoped Council will be able to select their single preferred choice. An alternative for each scenario would be to simply utilize pavement striping to outline the proposed changes, allowing use as a "test" to check effectiveness and acceptance by the traveling public.

RECOMMENDATION: Provide direction/approval on recommendations as outlined by Staff and W-Trans.

Attachment(s):

W-Trans Reports

Bike Lane Designs for Local Streets

Background

W-Trans is preparing design plans for Class II (bike lanes) and Class III (Sharrows or Bike Route Signage) on local City streets. (This work does not include the design of Class II bike lanes on State Route 116 through the City which is separate and on a different work course.) W-Trans has finalized the recommended cross sections with City staff for the streets which have been identified to receive Class II bike lanes. These streets include:

North Main Street (Healdsburg Avenue to Eddie Lane)
Laguna Park Way
Morris Street (Sebastopol Road to Eddie Lane)
Covert Lane (Healdsburg Avenue to Ragle Road)
Bodega Avenue (Washington Avenue to City Limits)

Impact Assessment

Following are highlighted changes to the street cross sections on the five local streets intended to receive Class II bike lanes. The majority of these segments will have no change to on-street parking or vehicle travel lanes. The inclusion of the bike lanes will be accomplished primarily through narrowing of existing lanes, but maintaining minimum lane width standards. There are seven street segments (2, 3, 6, 7, 8, 13 and 14) which would experience either a elimination of on-street parking, left-turn lanes or raised median to accommodate the bike lanes. These impacts are detailed below **in bold**.

1 - North Main Street (Healdsburg Ave to Analy Ave)
- No loss of parking
- No change in number of vehicle lanes

2 - North Main Street (Analy Ave to Eddie Ln)
- **Loss of 11-12 parking spaces on the east side of the street fronting Analy High School**
- No change in number of vehicle lanes

3 - Laguna Park Way (Morris St to McKinley St)
- **Loss of 30-31 parking spaces on the north side of the street**
- No change in number of vehicle lanes

4 - Morris Street (Sebastopol Rd to Eddie Ln)
- No loss of parking
- No change in number of vehicle lanes

5 - Covert Lane (Healdsburg Ave to 105' East of Norlee St)
- No loss of parking
- No change in number of vehicle lanes

6 - Covert Lane (105' East of Norlee St to Pleasant Hill Ave North)
- No loss of parking
- **Left turn lanes eliminated**

7 - Covert Lane (Pleasant Hill Ave North to Teresa Ct)
- **Loss of 34-35 parking spaces total for this segment**
- No change in number of vehicle lanes or landscaped median

8 - Covert Lane (Teresa Ct to Ragle Rd)
- No loss of parking
- **Left turn lanes and three small landscaped medians eliminated**

9 - Bodega Avenue (Washington Ave to Robinson Rd)
- No change in number of vehicle lanes

10 - Bodega Avenue (Robinson Rd to 250' West of Robinson Rd)
- No change in number of vehicle lanes

11 - Bodega Avenue (250' West of Robinson Rd to Nelson Way)
- No change in number of vehicle lanes
- No change to center median and left-turn lanes

12 - Bodega Avenue (Nelson Way to 300' West of Nelson Way)
- No change in number of vehicle lanes
- No change to center median and left-turn lanes

13 - Bodega Avenue (300' West of Nelson Way to Virginia Ave)
- **Loss of 5-6 parking spaces on the north side of the street**
- No change in number of vehicle lanes

14 - Bodega Avenue (Virginia Ave to Golden Ridge Ave)
- **Loss of 13-14 parking spaces on the north side of the street**
- No change in number of vehicle lanes

15 - Bodega Avenue (Golden Ridge Ave to Pleasant Hill Ave North)
- No change in number of vehicle lanes

16 - Bodega Avenue (Pleasant Hill Ave North to West Hills Cir)
- No change in number of vehicle lanes

17 - Bodega Avenue (West Hills Cir to Ragle Rd)
- No loss of parking
- No change in number of vehicle lanes

18 - Bodega Avenue (Ragle Rd to Valley View Ct)
- No change in number of vehicle lanes

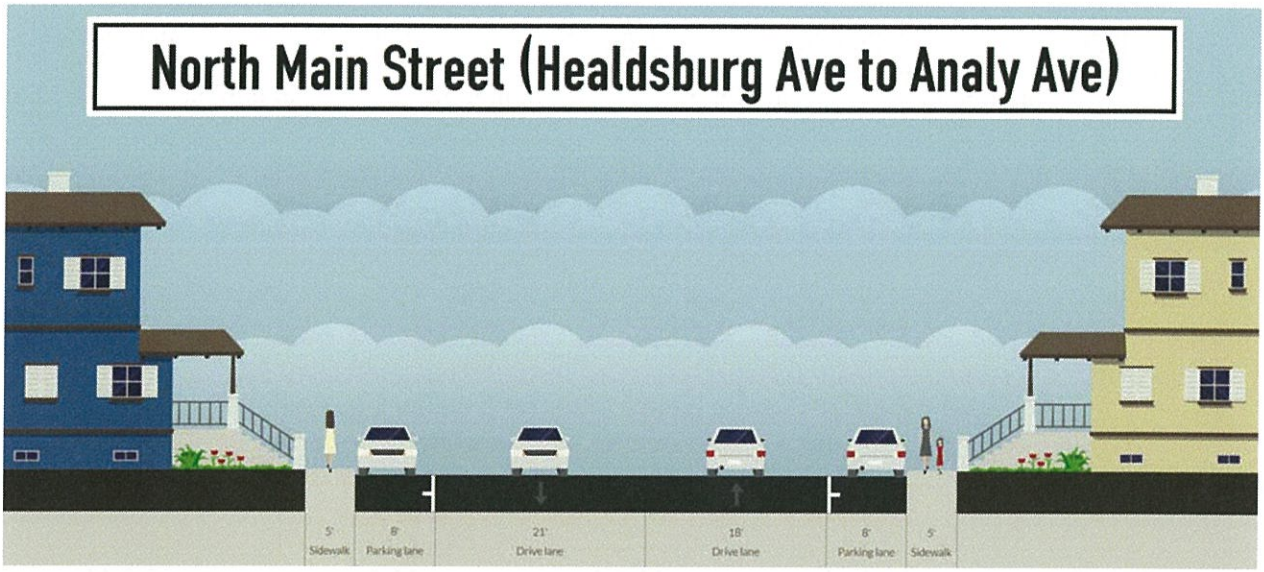
Attached are cross section displays for the segments on these corridors. Both the (general) existing cross section is shown followed by the recommended cross section which is being used to develop the bike lane striping plans. (All dimensions noted are in feet.)

Action Requested

Council should provide comments and direction if changes are necessary to the bike lane design process.

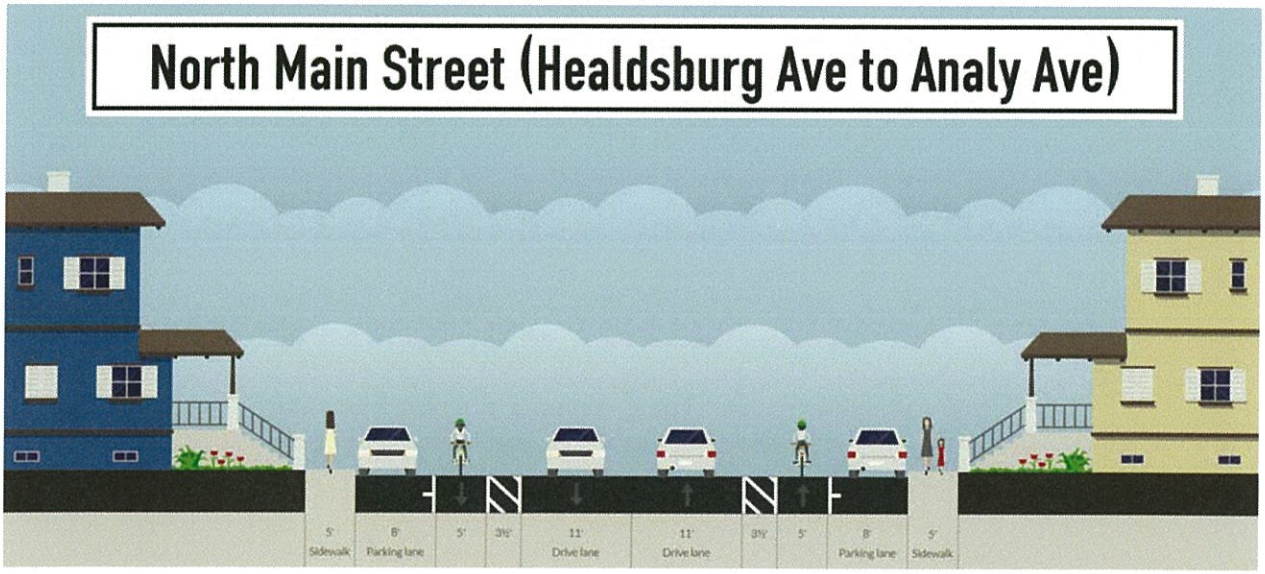
1- North Main Street (Healdsburg Ave to Analy Ave)

Existing - (Looking Northbound)



Parking	Travel Lane	Travel Lane	Parking
8 ft	21 ft	18 ft	8 ft

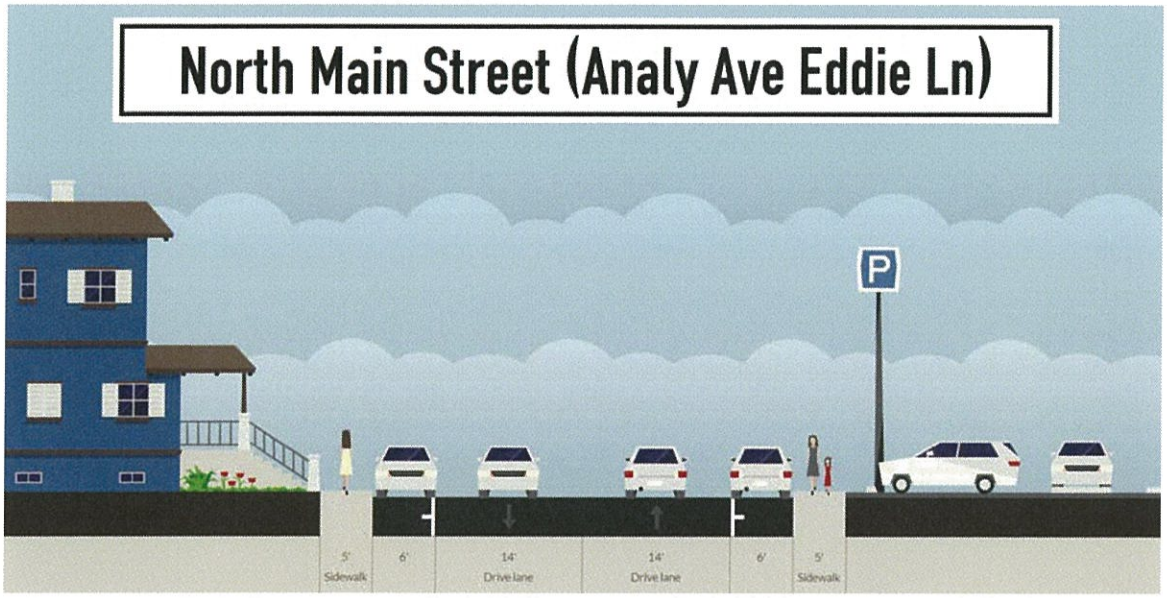
Recommended Cross Section



Parking	Bike Lane	Buffer	Travel Lane	Travel Lane	Buffer	Bike Lane	Parking
8 ft	5 ft	3.5 ft	11 ft	11 ft	3.5 ft	5 ft	8 ft

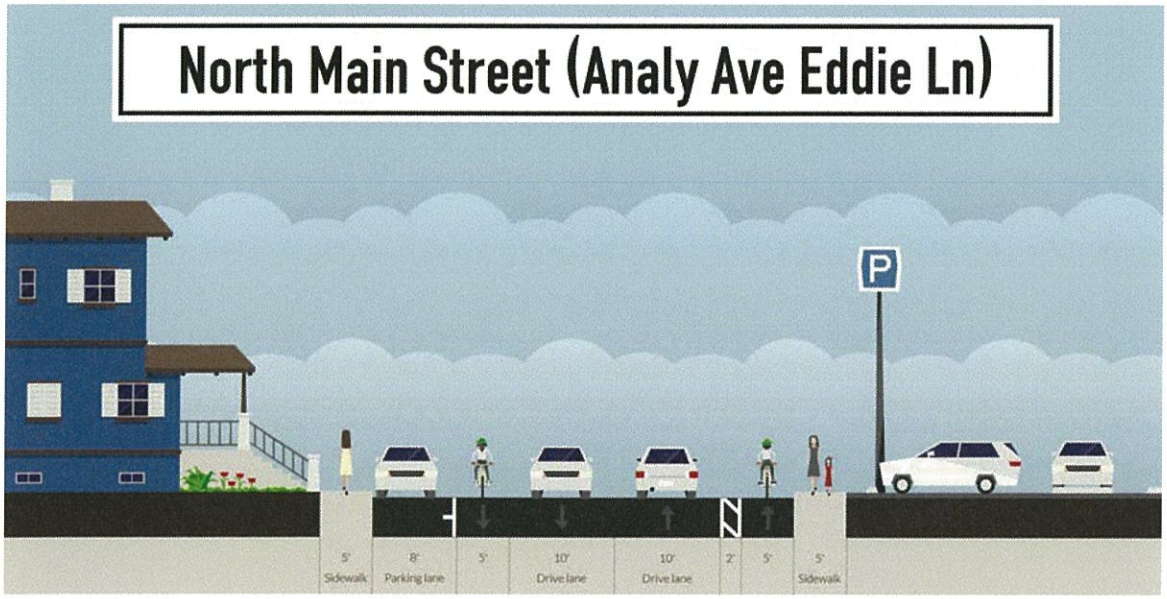
2 - North Main Street (Analy Ave to Eddie Ln)

Existing - (Looking Northbound)



Parking	Travel Lane	Travel Lane	Parking
6	14	14	6

Recommended Cross Section



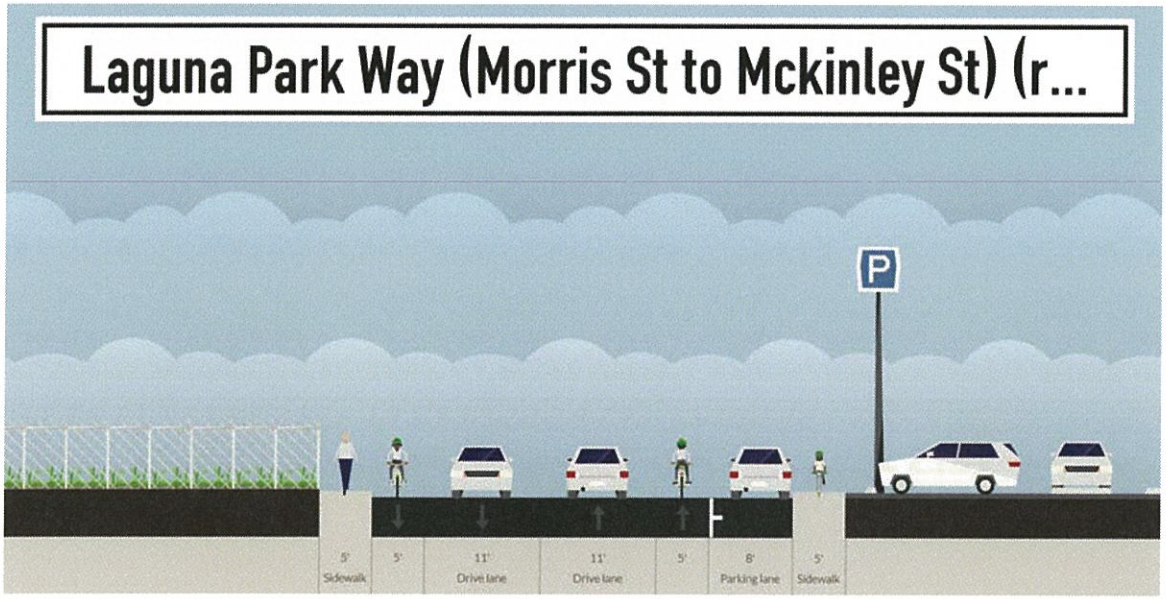
Parking	Bike Lane	Travel Lane	Travel Lane	Buffer	Bike Lane
8	5	10	10	2	5

3 - Laguna Park Way (Morris St to McKinley St)

Existing - (Looking Eastbound)

Parking	Travel Lane	Travel Lane	Parking
8	12	12	8

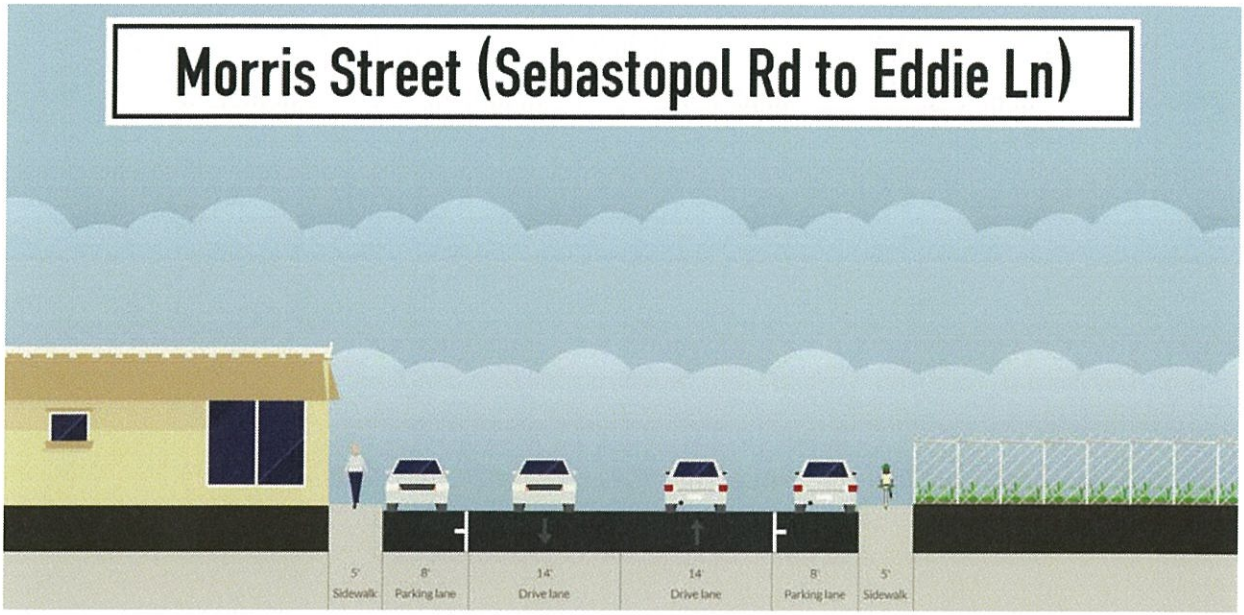
Recommended Cross Section



Bike Lane	Travel Lane	Travel Lane	Bike Lane	Parking
5	11	11	5	8

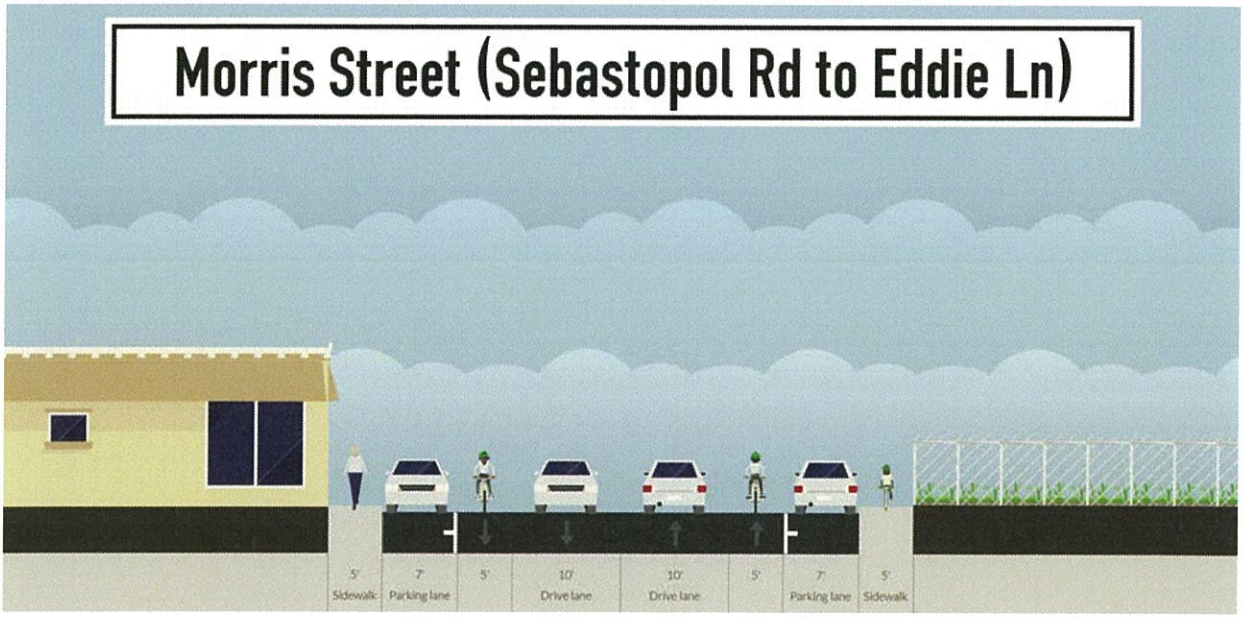
4 - Morris Street (Sebastopol Rd to Eddie Ln)

Existing - (Looking Northbound)



Parking	Travel Lane	Travel Lane	Parking
8	14	14	8

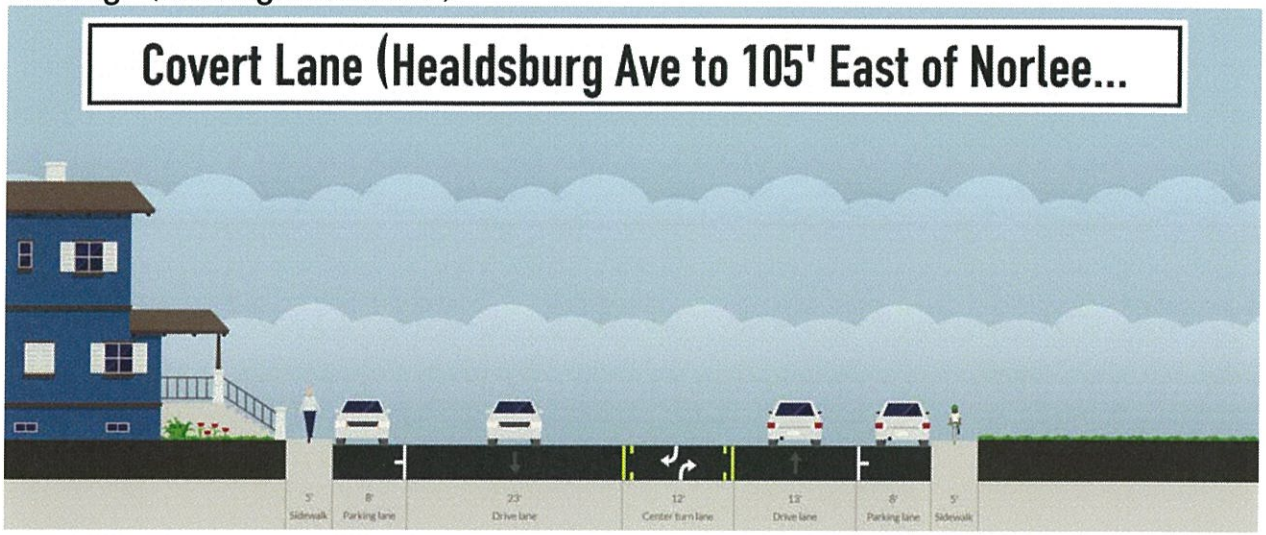
Recommended Cross Section



Parking	Bike Lane	Travel Lane	Travel Lane	Bike Lane	Parking
7	5	10	10	5	7

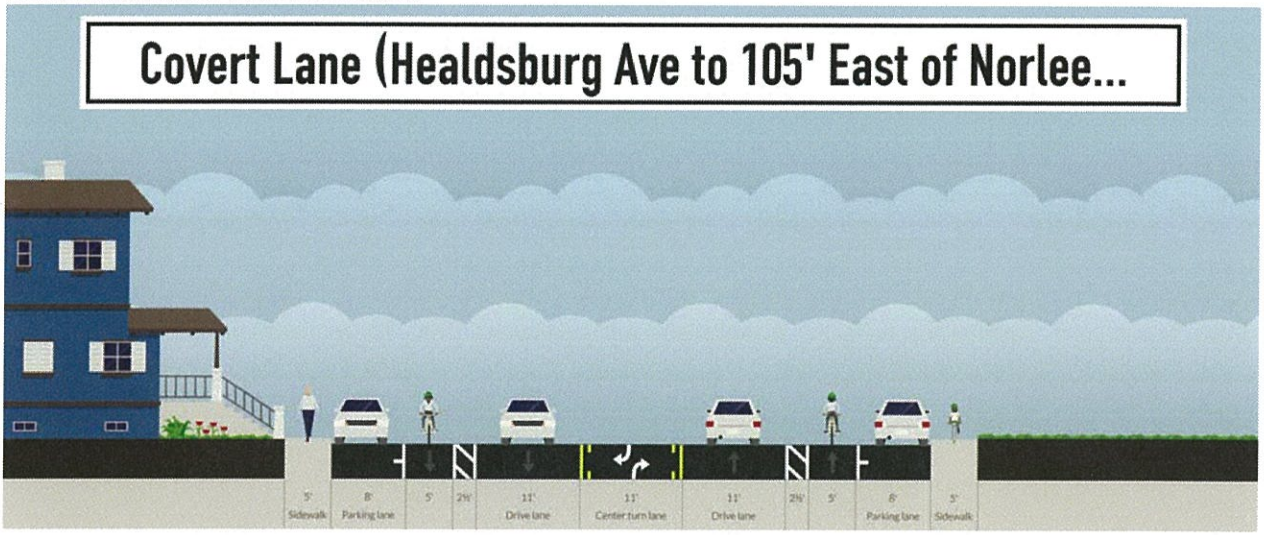
5 - Covert Lane (Healdsburg Ave to 105' East of Norlee St)

Existing - (Looking Westbound)



Parking	Travel Lane	Median/Turn Lane	Travel Lane	Parking
8	23	12	13	8

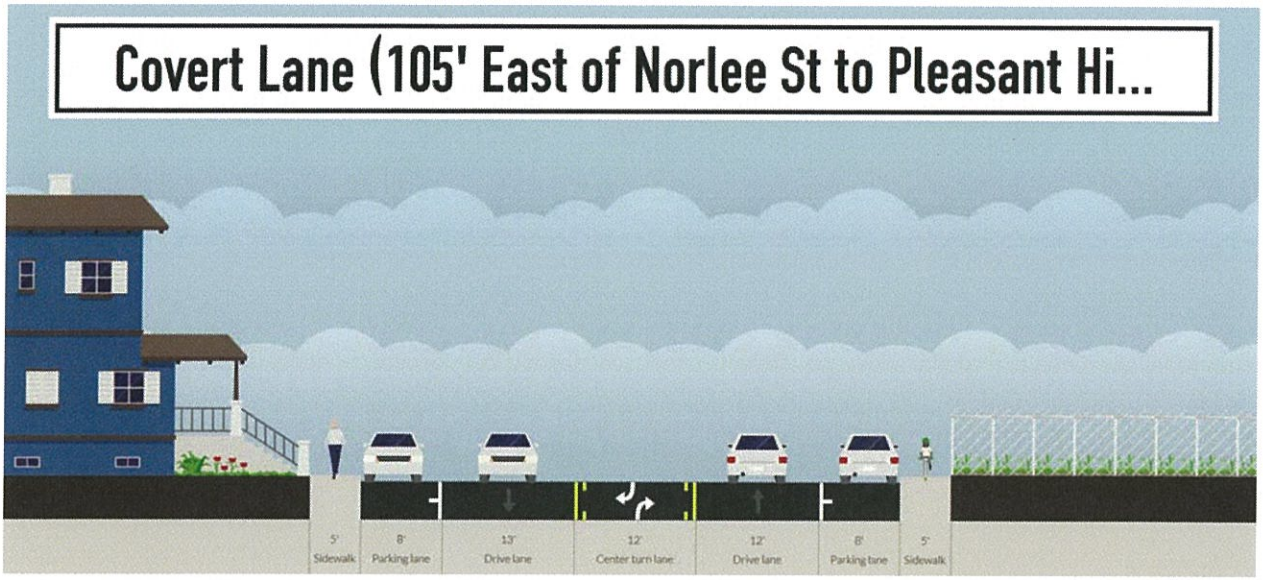
Recommended Cross Section



Parking	Bike Lane	Buffer	Travel Lane	Turn Lane	Travel Lane	Buffer	Bike Lane	Parking
8	5	2.5	11	11	11	2.5	5	8

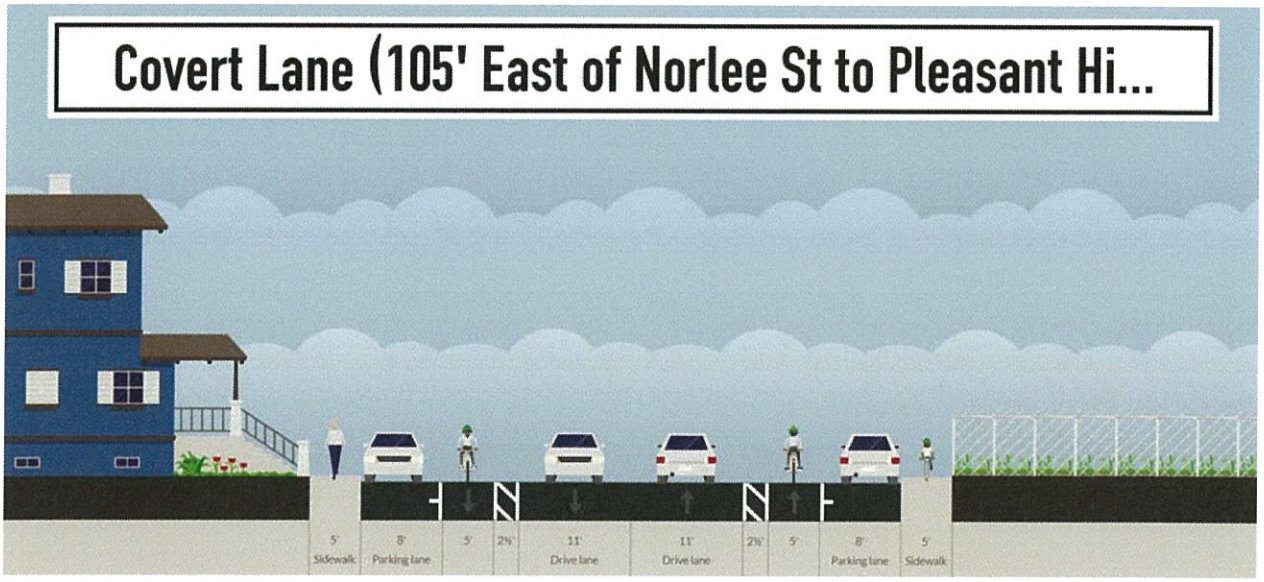
6 - Covert Lane (105' East of Norlee St to Pleasant Hill Ave North)

Existing - (Looking Westbound)



Parking	Travel Lane	Turn Lane	Travel Lane	Parking
8	13	12	12	8

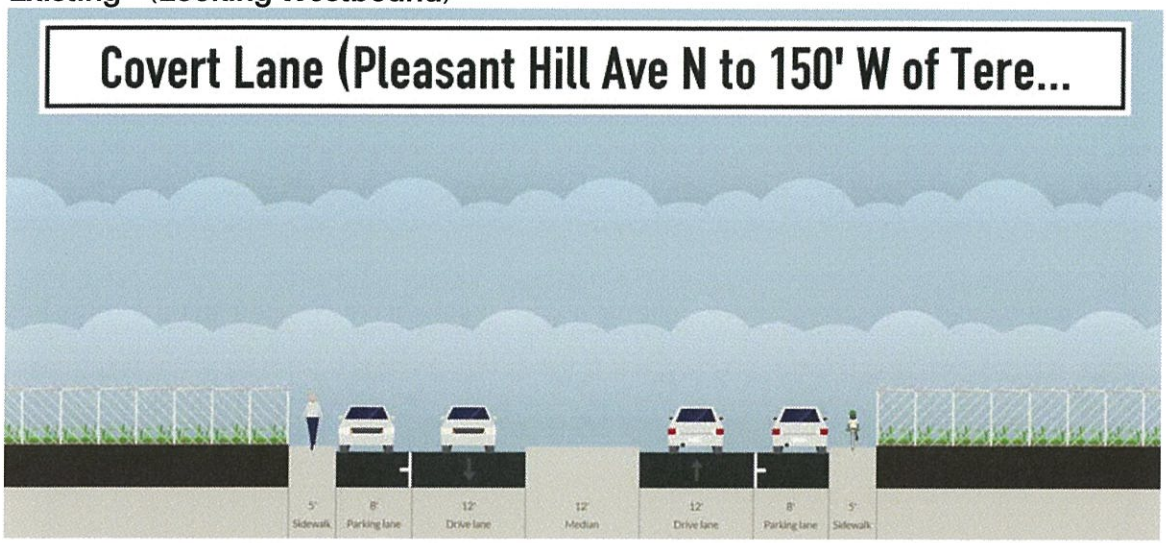
Recommended Cross Section



Parking	Bike Lane	Buffer	Travel Lane	Travel Lane	Buffer	Bike Lane	Parking
8	5	2.5	11	11	2.5	5	8

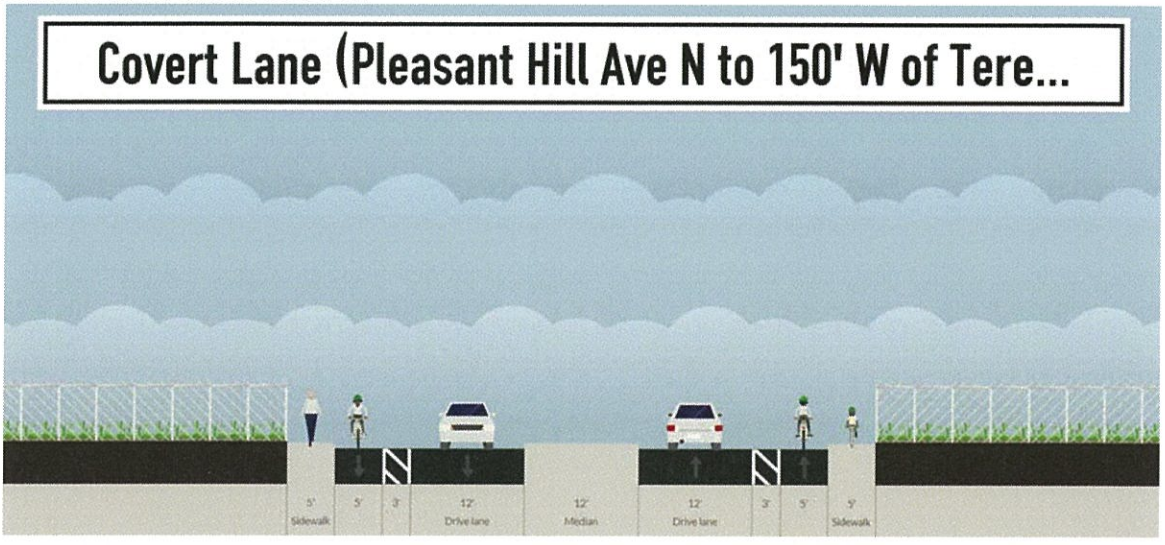
7 - Covert Lane (Pleasant Hill Ave North to Teresa Ct)

Existing - (Looking Westbound)



Parking	Travel Lane	Raised Median/ Turn Lane	Travel Lane	Parking
8	12	12	12	8

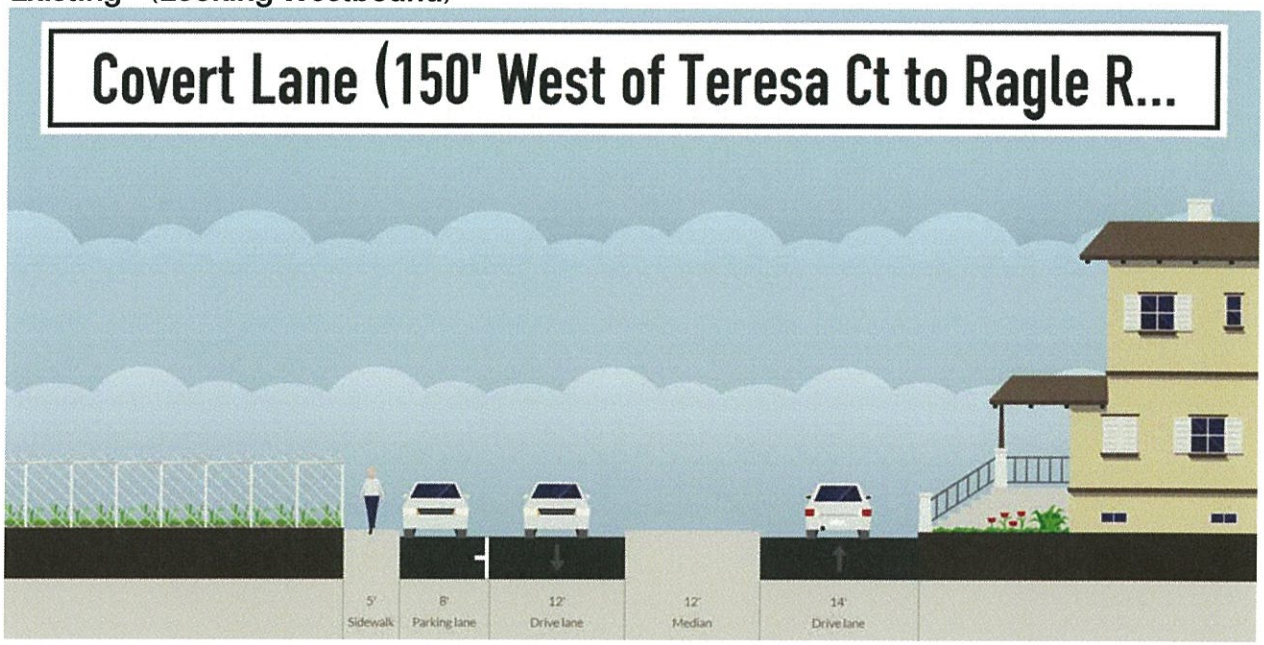
Recommended Cross Section



Bike Lane	Buffer	Travel Lane	Raised Median/ Turn Lane	Travel Lane	Buffer	Bike Lane
5	3	12	12	12	3	5

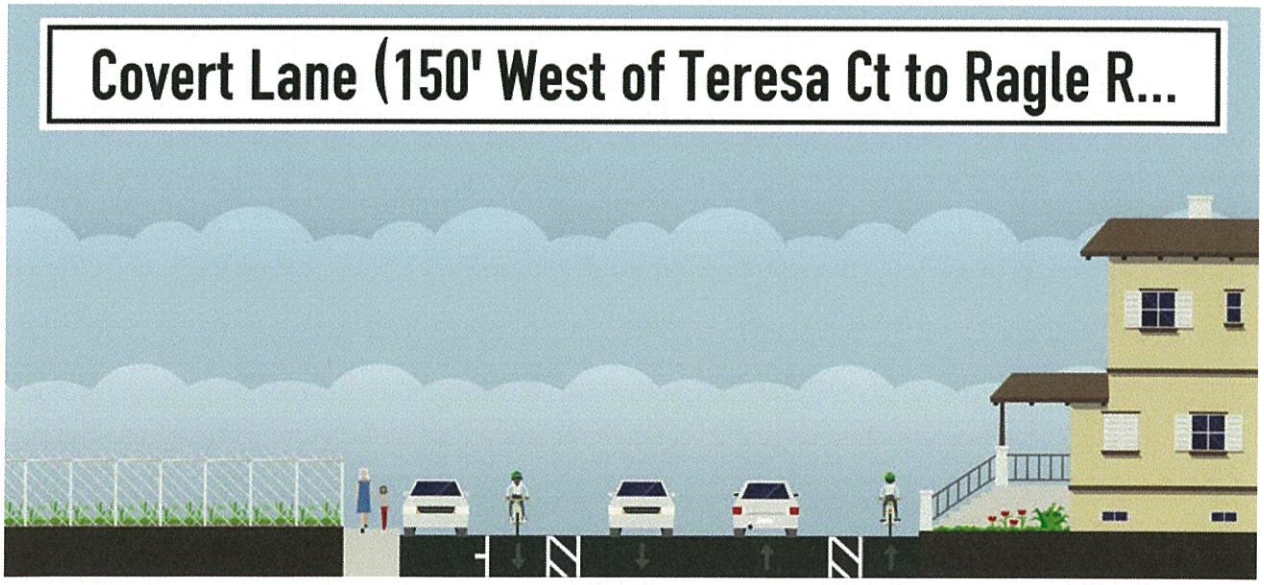
8 - Covert Lane (Teresa Ct to Ragle Rd)

Existing - (Looking Westbound)



Parking	Travel Lane	Raised Median/ Turn Lane	Travel Lane
8	12	12	14

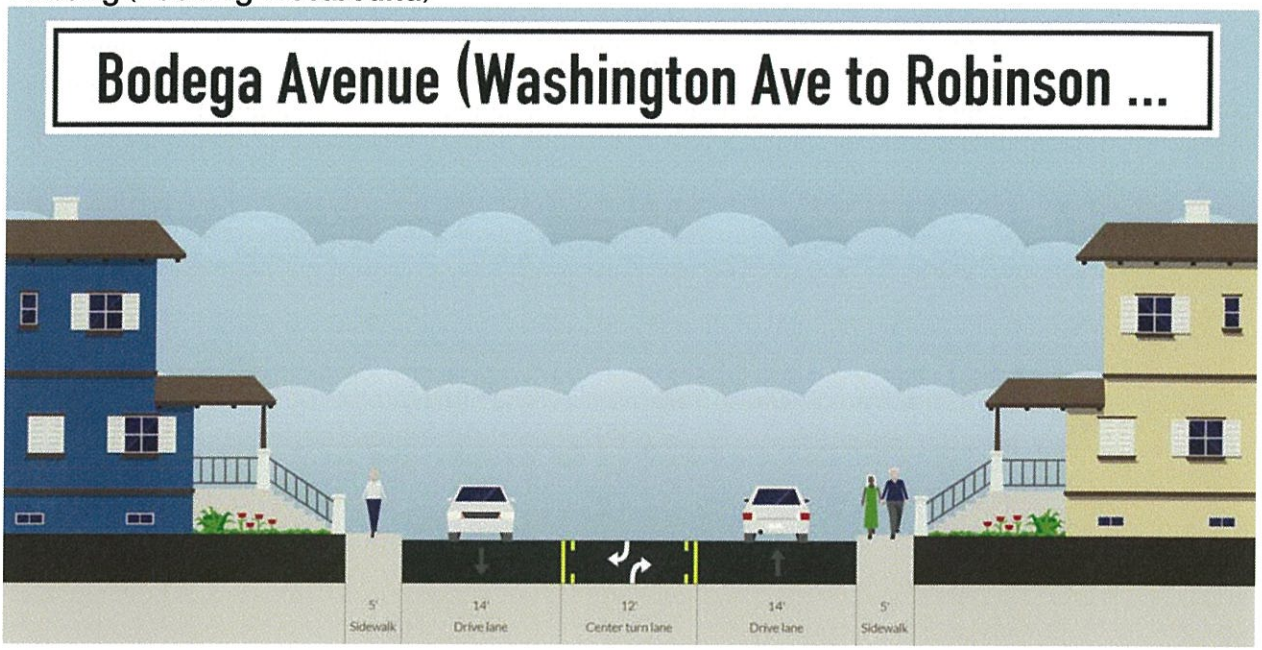
Recommended Cross Section



Bike Lane	Buffer	Travel Lane	Travel Lane	Buffer	Bike Lane	Parking
5	3	11	11	3	5	8

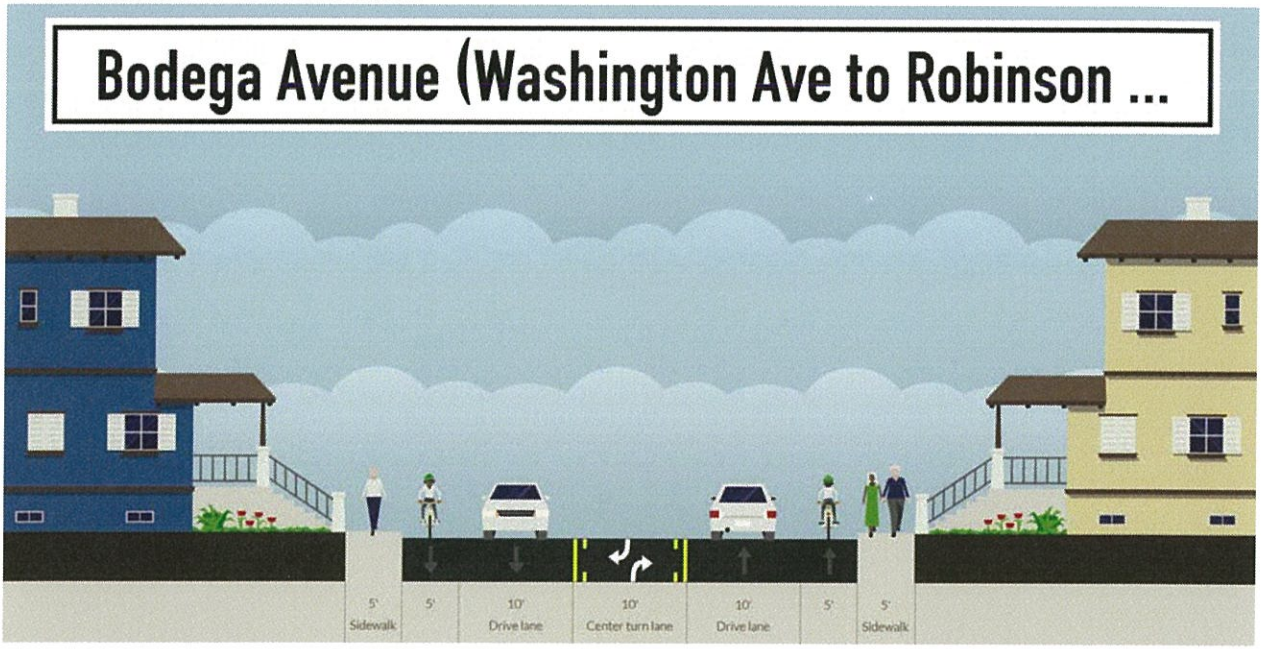
9 - Bodega Avenue (Washington Ave to Robinson Rd)

Existing (Looking Westbound)



Travel Lane	Turn Lane	Travel Lane
14	12	14

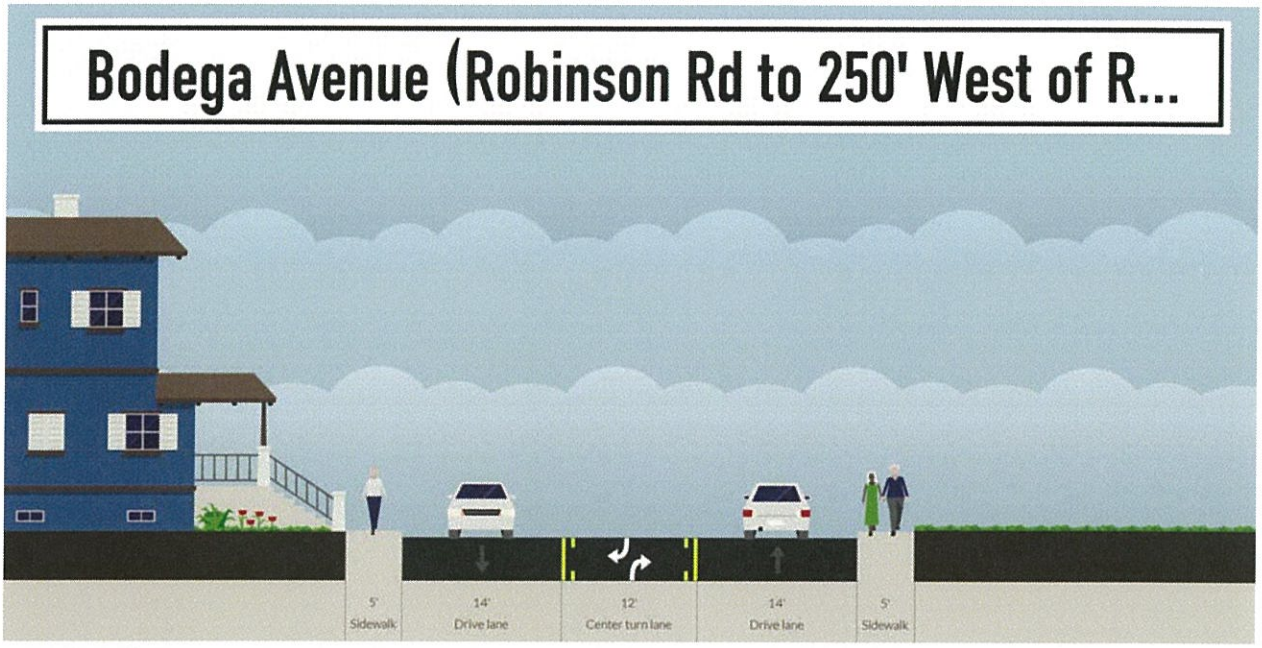
Recommended Cross Section



Bike Lane	Travel Lane	Turn Lane	Travel Lane	Bike Lane
5	10	10	10	5

10 - Bodega Avenue (Robinson Rd to 250' West of Robinson Rd)

Existing (Looking Westbound)



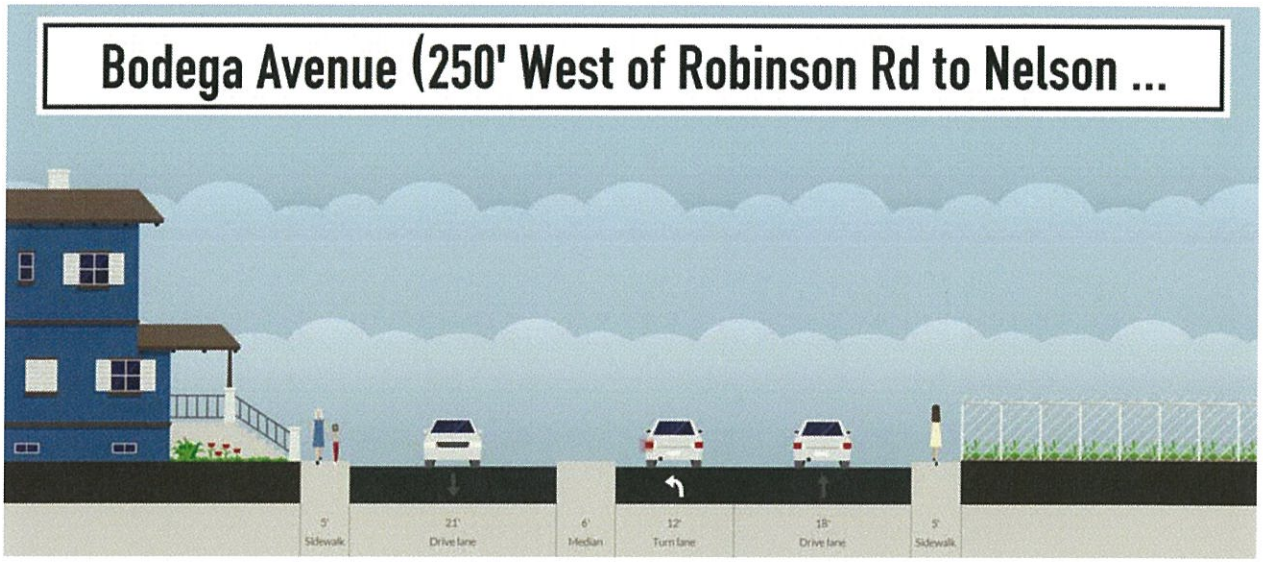
Travel Lane	Turn Lane	Travel Lane
14	12	14

Recommended Cross Section

Bike Lane	Travel Lane	Turn Lane	Travel Lane	Bike Lane
5	10	10	10	5

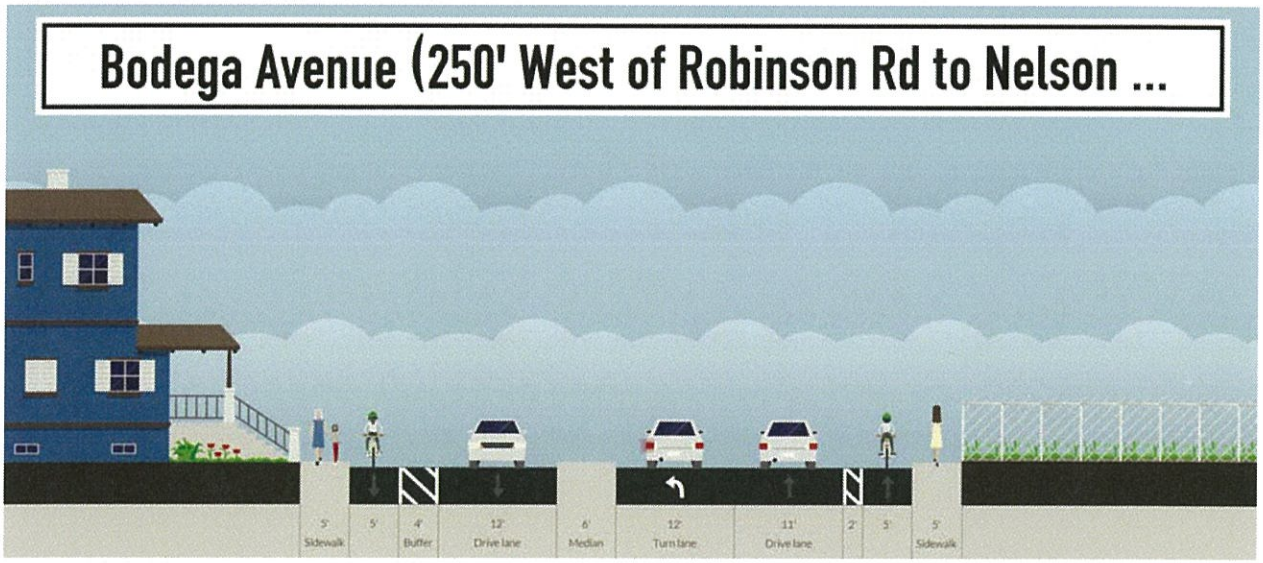
11 - Bodega Avenue (250' West of Robinson Rd to Nelson Way)

Existing (Looking Westbound)



Travel Lane	Median	Turn Lane	Travel Lane
21	6	12	18

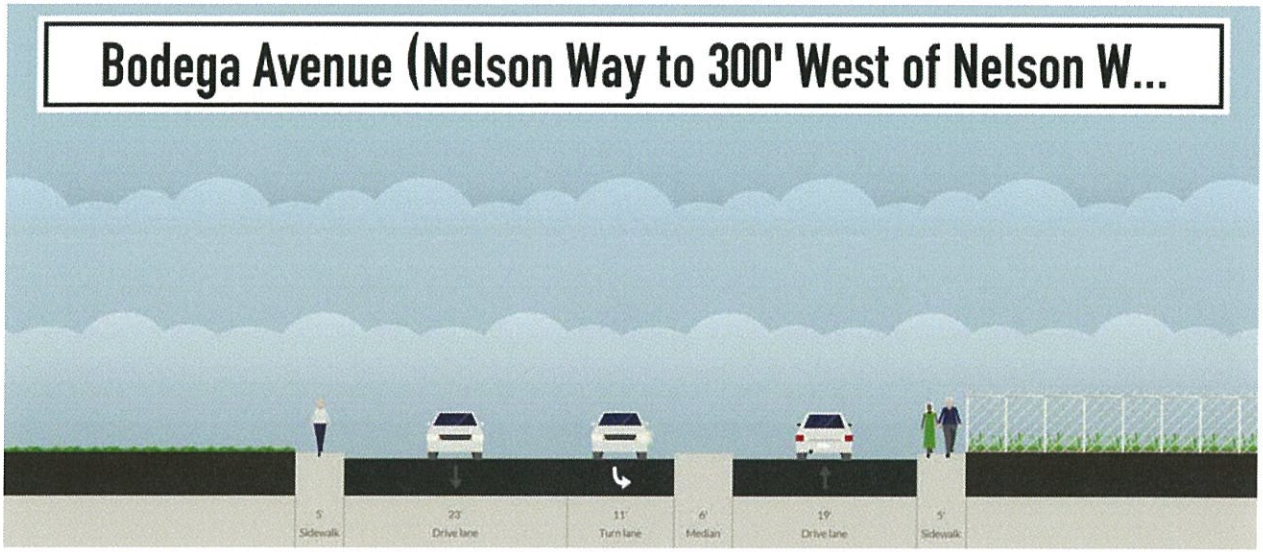
Recommended Cross Section



Bike Lane	Buffer	Travel Lane	Median	Turn Lane	Travel Lane	Buffer	Bike Lane
5	4	12	6	12	11	2	5

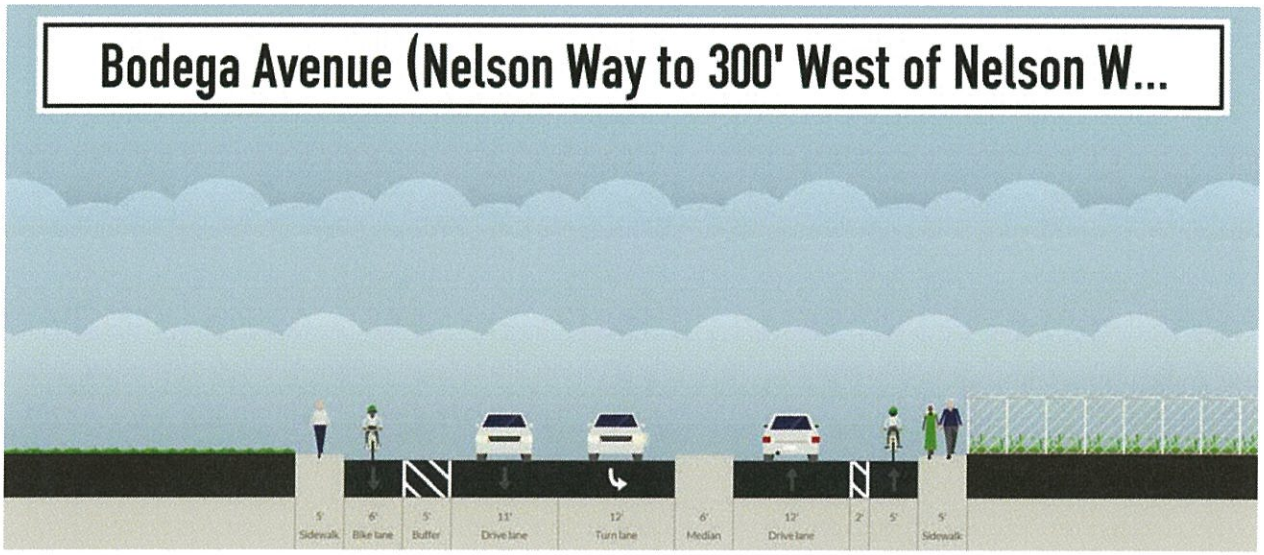
12 - Bodega Avenue (Nelson Way to 300' West of Nelson Way)

Existing (Looking Westbound)



Travel Lane	Turn Lane	Median	Travel Lane
23	11	6	19

Recommended Cross Section



Bike Lane	Buffer	Travel Lane	Turn Lane	Median	Travel Lane	Buffer	Bike Lane
6	5	11	12	6	12	2	5

13 - Bodega Avenue (300' West of Nelson Way to Virginia Ave)

Existing (Looking Westbound)

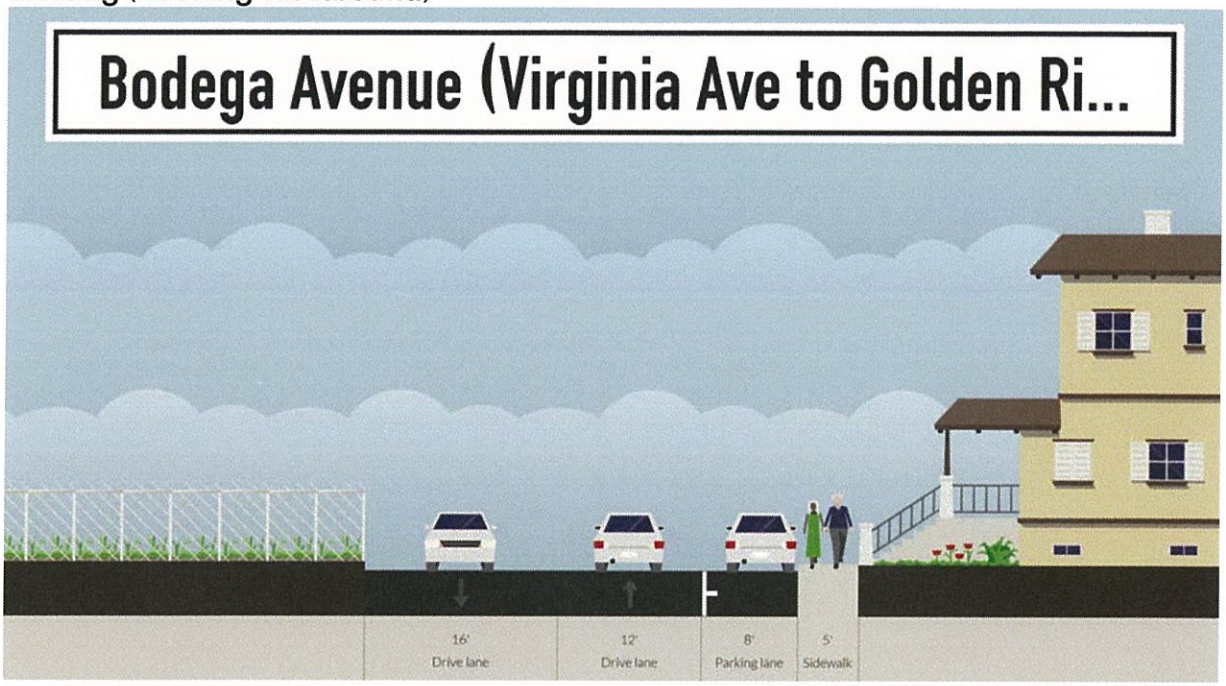
Travel Lane	Travel Lane	Parking
12	12	8

Recommended Cross Section

Bike Lane	Travel Lane	Travel Lane	Bike Lane
5	11	11	5

14 - Bodega Avenue (Virginia Ave to Golden Ridge Ave)

Existing (Looking Westbound)



Travel Lane	Travel Lane	Parking
16	12	8

Recommended Cross Section

Bike Lane	Buffer	Travel Lane	Travel Lane	Buffer	Bike Lane
5	2	11	11	2	5

15 - Bodega Avenue (Golden Ridge Ave to Pleasant Hill Ave North)

Existing (Looking Westbound)

Travel Lane	Travel Lane
15	15

Recommended Cross Section

Bike Lane	Travel Lane	Travel Lane	Bike Lane
5	10	10	5

16 - Bodega Avenue (Pleasant Hill Ave North to West Hills Cir)

Existing (Looking Westbound)

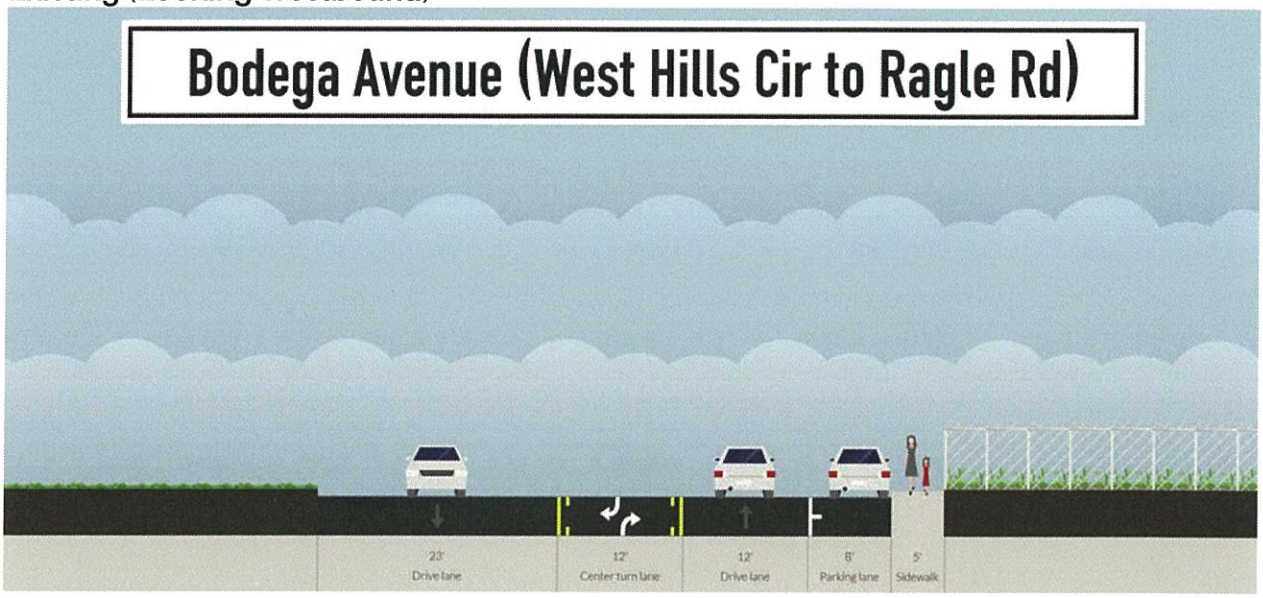
Travel Lane	Turn Lane	Travel Lane
18	13	16

Recommended Cross Section

Bike Lane	Buffer	Travel Lane	Turn Lane	Travel Lane	Buffer	Bike Lane
5	2	11	11	11	2	5

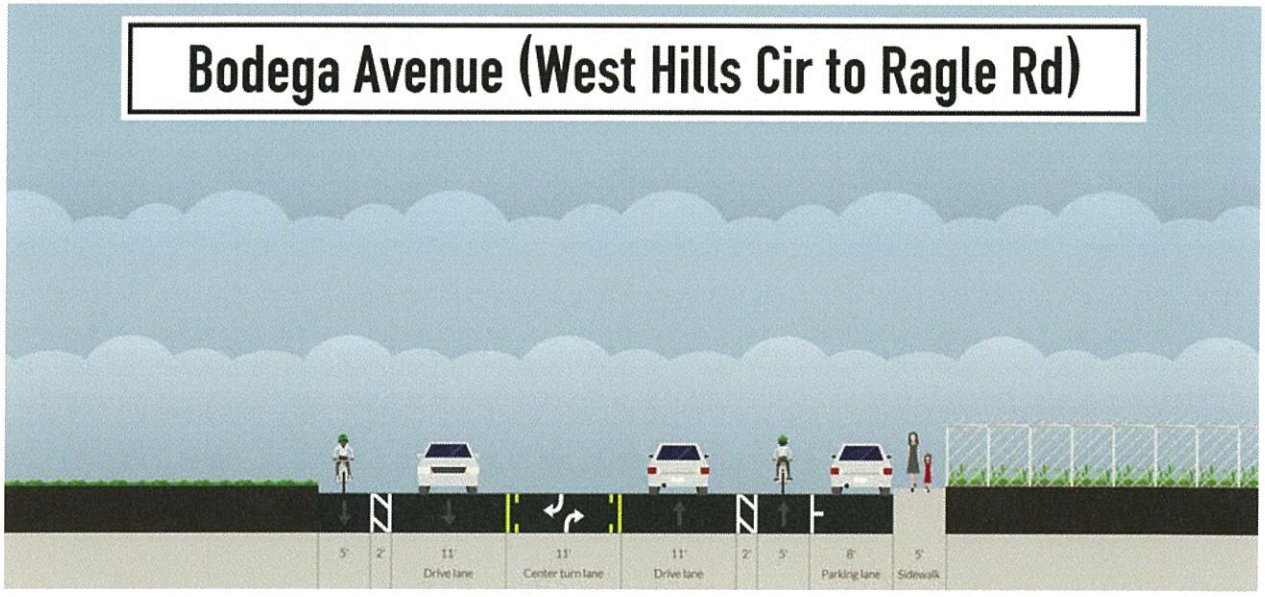
17 - Bodega Avenue (West Hills Cir to Ragle Rd)

Existing (Looking Westbound)



Shoulder	Travel Lane	Turn Lane	Travel Lane	Parking
10	13	12	12	8

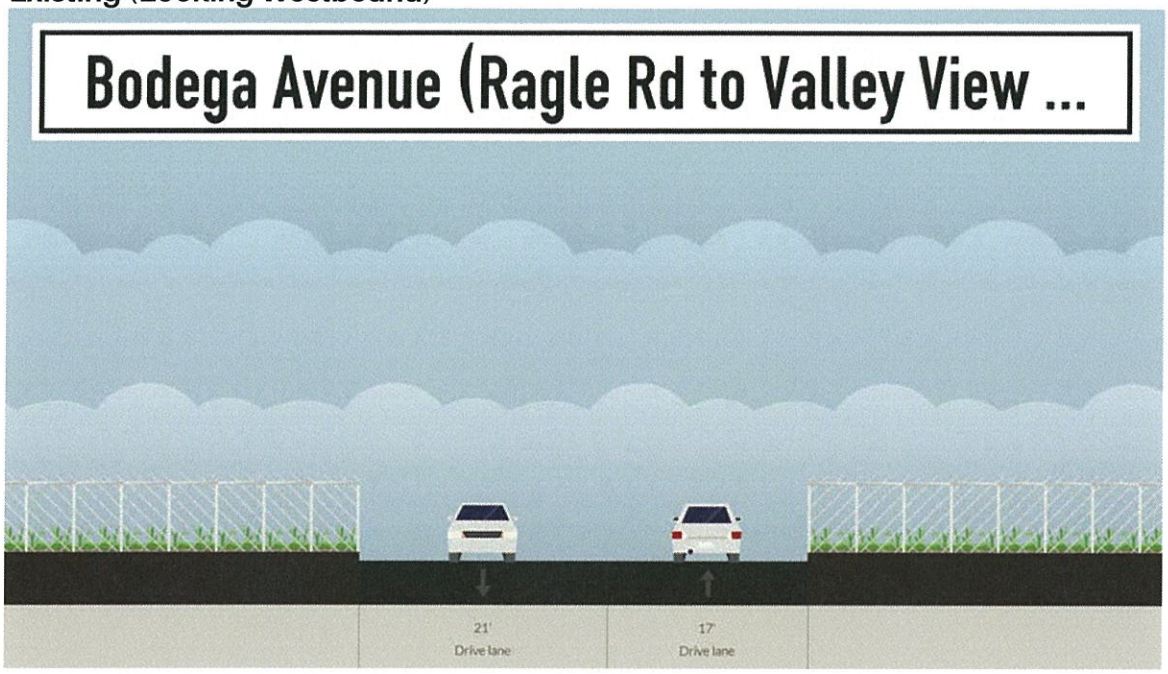
Recommended Cross Section



Bike Lane	Buffer	Travel Lane	Turn Lane	Travel Lane	Buffer	Bike Lane	Parking
5	2	11	11	11	2	5	8

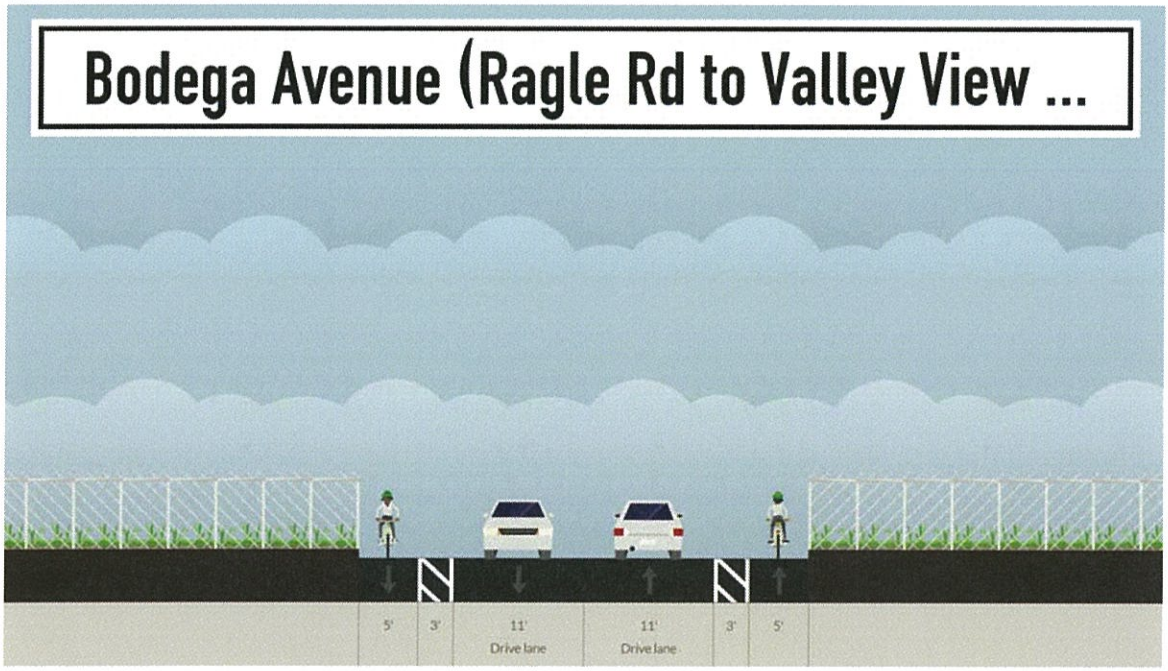
18 - Bodega Avenue (Ragle Rd to Valley View Ct)

Existing (Looking Westbound)



Shoulder	Travel Lane	Travel Lane
8	13	17

Recommended Cross Section



Bike Lane	Buffer	Travel Lane	Travel Lane	Buffer	Bike Lane
5	3	11	11	3	5

Pedestrian Crossings Safety Study for Bodega Avenue

Background

W-Trans was tasked with evaluating existing marked crosswalks at 'uncontrolled' (i.e., non-signalized) intersections on Bodega Avenue in order to improve pedestrian crossing safety at these locations. The following intersections were evaluated:

1. Bodega Avenue/Florence Avenue
2. Bodega Avenue/Washington Avenue
3. Bodega Avenue/Robinson Road
4. Bodega Avenue/Nelson Way-Gold Ridge Farm
5. Bodega Avenue/Ragle Road

The process included vehicle traffic volume data counts, pedestrian crossing counts, vehicle speed surveys on Bodega Avenue, examination of collision records, warrant analysis and field reviews.

Traffic Data Results

Speeds – As shown on the attachment, the 85th percentile speed on Bodega Avenue (*The speed at or below which 85% of all vehicles are observed to travel under free flowing conditions which is also used to set speed limits.*) was surveyed as follows:

near Florence Avenue – 28 mph
near Washington Avenue – 28 mph
near Robinson Road – 28 mph
near Nelson Way-Gold Ridge Farm – 37 mph
near Ragle Road – 41 mph

Peak Hour Traffic Volumes

Vehicle traffic volume counts are shown below along with other intersections for comparison.

Intersection	Northbound (vph)	Southbound (vph)	Bodega Avenue Total Both Dir (vph)
High Street	100	67	1,015
Florence Avenue	-	88	1,075
Dutton-Jewell	158	33	1,106
Washington Street	-	36	1,075
Robinson Road	46	0	1,037
Nelson-GRF	18	12	1,020
Pleasant Hill	162	167	916
Ragle Road	10	172	842

Pedestrian Crossing Volumes

Based on 24-hour pedestrian video counts, the highest hourly pedestrian crossing volume at any of these intersections was approximately 15 crossings. The general range was approximately 8-15 crossings per hour.

Warrant Evaluations

A "Warrant Evaluation" was completed using the State of California *Manual on Uniform Traffic Control Devices* (CA MUTCD) and national pedestrian safety improvement warrants published by the National Cooperative Highway Research Program (NCHRP) for each of the following improvement alternatives.

- Traffic signal
- Pedestrian hybrid beacon (HAWK)
- In-Roadway Warning Lights (IRWL)
- Rectangular Rapid Flashing Beacon (RRFB)
- High Visibility crosswalk markings and signs

Because of the unfamiliarity with the HAWK and RRFB devices which are relatively new to California, additional information is shown below.

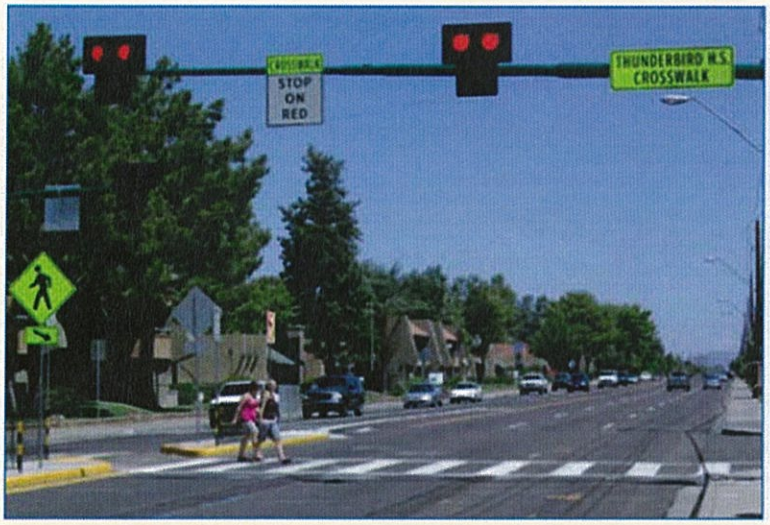
Following is the results of the warrant analysis which indicates where various devices are warranted.

Intersection	Traffic Signal	HAWK	Enhanced or Flashing Beacon
Florence	X[1]		X
Washington			X
Robinson			X
Nelson-Gold Ridge		X[3]	X
Ragle	X[2]	X[3]	X

1 – Installation of a traffic signal is not appropriate given proximity to the Dutton-Jewell traffic signal.
2 – Warrant met based on vehicle traffic volumes on the southbound approach.
3 – HAWK warrant met assuming the pedestrian crossing volume would double to 20 vehicles per hour during the peak hour.

HAWK (Pedestrian Hybrid Beacon)

A HAWK beacon (High-Intensity Activated crossWalK beacon) is a traffic control device used to stop road traffic and allow pedestrians to cross safely. It is officially known as a Pedestrian Hybrid Beacon (PHB). The purpose of a HAWK beacon is to allow protected pedestrian crossings, stopping road traffic only as needed. A PHB is distinct from pre-timed traffic signals and constant flash warning beacons because it is only activated by pedestrians when needed. Where standard traffic signal 'warrants' prevent the installation of standard three-color traffic signals, the HAWK beacon provides an alternative.

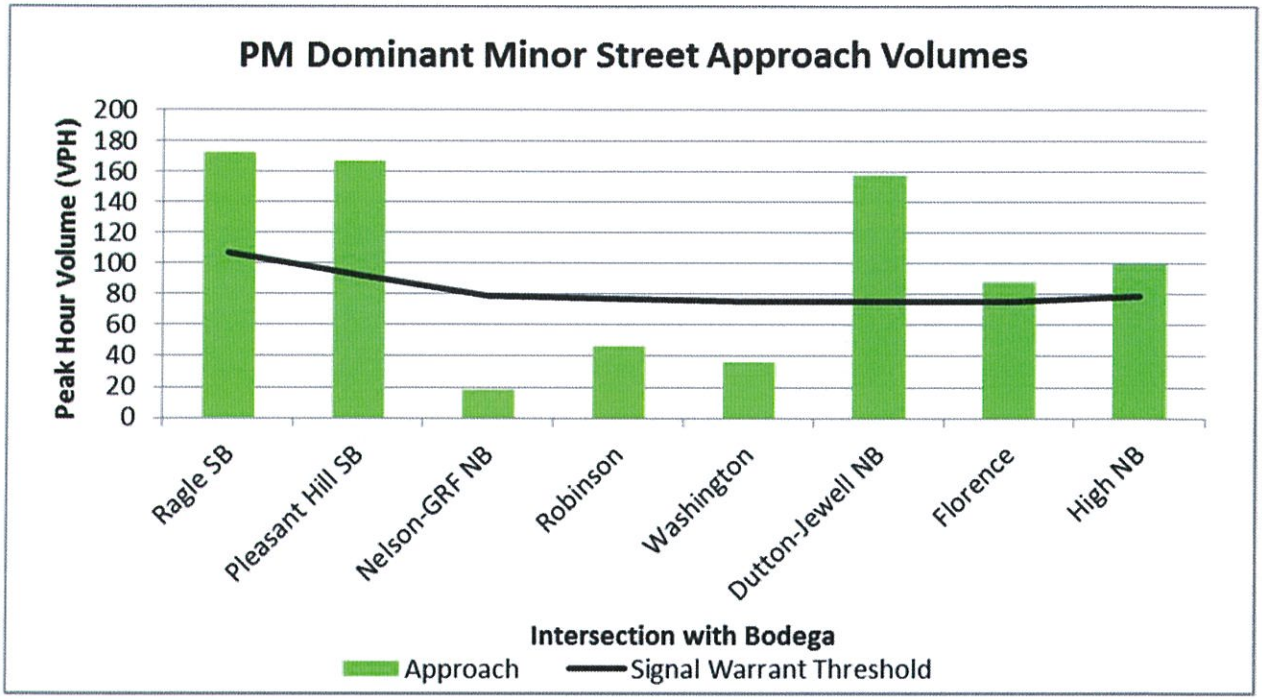


The design of the PHB consists of two horizontally-arranged red lenses above a single yellow lens. The signal face for drivers remains unlit or "dark" until the pedestrian activates the system. While the signal is dark, the pedestrian display shows a Don't Walk indication. To activate the PHB pedestrians push an accessible button located on a pole or post at the roadside. The actuated beacon then begins to flash yellow to warn motorists that the beacon has been activated. This brief flashing yellow interval is followed by a steady yellow interval, then by a steady red signal indicating motorists need to come to a complete stop and wait at the stop line. While motorists are seeing the steady red indication, the Walk sign is lit for pedestrians, allowing them to cross the roadway. After the pedestrian WALK phase ends, the pedestrian signal indication changes to a flashing DON'T WALK to notify pedestrians not to begin crossing. During the flashing Don't Walk phase, the PHB displays alternating flashing red lights to drivers. The flashing red indicates to drivers that they are to stop and yield to pedestrians in the crosswalk, and can proceed once pedestrians are clear.

The Manual on Uniform Traffic Control Devices has guidelines that should be met before a HAWK beacon is installed. The guidelines consider pedestrian and vehicle traffic volumes, vehicle speeds, and roadway width.

PHBs have been shown to significantly reduce pedestrian crashes. A Federal Highway Administration (FHWA) study published in 20101 found that pedestrian hybrid beacons can reduce pedestrian crashes by 69 percent and total crashes by 29 percent. Because PHBs remain dark until activated, they can help increase driver attention to pedestrians crossing the roadway, and can reduce rear-end collisions. The pedestrian hybrid beacon's red signal indication removes any judgment from the motorists and requires a complete stop. The PHB provides a clear message that motorists must stop and allow pedestrians to cross the street. Motorist compliance with the requirement to yield has been shown to exceed 90 percent at PHBs

A Caltrans District 1 video on the device is shown here: https://youtu.be/JdauhuZaChM



Rectangular Rapid Flash Beacon (RRFB)

The Rectangular Rapid Flash Beacon (RRFB) is a device using LED flashing beacons in combination with pedestrian warning signs, to provide a high-visibility strobe-like warning to drivers when pedestrians use a crosswalk.

RRFBs are user-actuated amber LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. They can be activated by pedestrians manually by a push button or passively by a pedestrian detection system.

RRFBs use an irregular flash pattern that is similar to emergency flashers on police vehicles.

RRFBs may be installed on either two-lane or multi-lane roadways.

The State of California *Manual on Uniform Traffic Control Devices* does caution users against installing unwarranted traffic signals. Following are excerpts from that reference:

> *Since vehicular delay and the frequency of some types of crashes are sometimes greater under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic control (traffic signal) signals even if one or more of the signal warrants has been satisfied.*
>
> *Traffic control signals are often considered a panacea for all traffic problems at intersections. This belief has led to traffic control signals being installed at many locations where they are not needed, adversely affecting the safety and efficiency of vehicular, bicycle, and pedestrian traffic.*

Recommendations

Based on a review of the field conditions, traffic data and warrant analysis, following are recommendations for modifications intended to improve pedestrian crossing conditions:

Bodega Avenue/Florence Avenue

- relocate crosswalk location to the east side of the intersection with new ADA ramps
- install a raised pedestrian refuge island
- install pedestrian crossing signs

Bodega Avenue/Washington Avenue

- install a raised pedestrian refuge island within the existing center lane area
- install pedestrian crossing signs

Bodega Avenue/Robinson Road

- restripe crosswalks with high visibility markings.
- install Rectangular Rapid Flashing Beacon with pedestrian crossing signs (both directions)

Bodega Avenue/Nelson Way-Gold Ridge Farm

Our evaluation of the intersection considered the following factors:

- Vehicle speeds are 37 mph (85th percentile speeds) which are not conducive to safe pedestrian crossings.
- Side street vehicle traffic volumes are far short of the warrant thresholds which would indicate the need for a traffic signal.
- The installation of an unwarranted traffic signal may lead to additional vehicle collisions and increased speeds on Bodega Avenue with a more frequent green signal indication.
- Pedestrian crossing volumes are less than 10-15 crossing per hour which causes the HAWK warrants to fall short of the recommended thresholds. If pedestrian crossing volumes were more than 20 crossings during the peak hour, HAWK warrants would be met. This level of pedestrian crossings may occur if pedestrians were given more opportunity to cross Bodega Avenue under lower speed conditions.
- The planned bike lanes on Bodega Avenue will narrow existing travel lanes and help to reduce vehicle speeds slightly.
- Even with the bike lanes, there would still be 2-4 feet of pavement on both sides of the median which could be used to either 'bulbout' either corner of the crosswalk or add to the existing center median to create a wider refuge area.

Based on these factors, our recommendations include:

- installation of a HAWK pedestrian crossing device
- Redesign of the intersection with the bike lanes and a wider median to create a pedestrian refuge
- Modification of the existing medians to remove the concrete fill and replace with low level landscaping.

Bodega Avenue/Ragle Road

The intersection currently meets peak hour traffic signal warrants. Therefore, it is recommended that the City investigate more detailed 8-hour warrants to determine if either a traffic signal or roundabout should be programmed into the City's Capital Improvement Program (CIP)

It should be noted that the bike lane design for Bodega Avenue will include standard Class II bike lanes to the east of Ragle Road, and a Class I two-way bike path on the unpaved grass section along the south side of Bodega Avenue to the west of Ragle Road. This crosswalk on the west side of the intersection will need to be upgraded to a 'bike-cross' to accommodate bicycle crossings from the westbound bike lane to the bike path on the south side.

In the interim, before the traffic control is upgraded at the intersection, the following measures should be installed:

- install Rectangular Rapid Flashing Beacons in each direction with appropriate crossing signage
- install a raised pedestrian refuge island between the westbound lane and eastbound left-turn lane (cross section dimensions shown below)

Shoulder	WB Travel	Median	EB Left	EB Travel	Shoulder	Bike Path
5	12	8	12	12	5	8

Action Requested

Based on comments received from Council, the safety assessment and recommendations will be updated and finalized.

Intersection Modification for Jewell Ave and Willow St

Alt A

SEB050

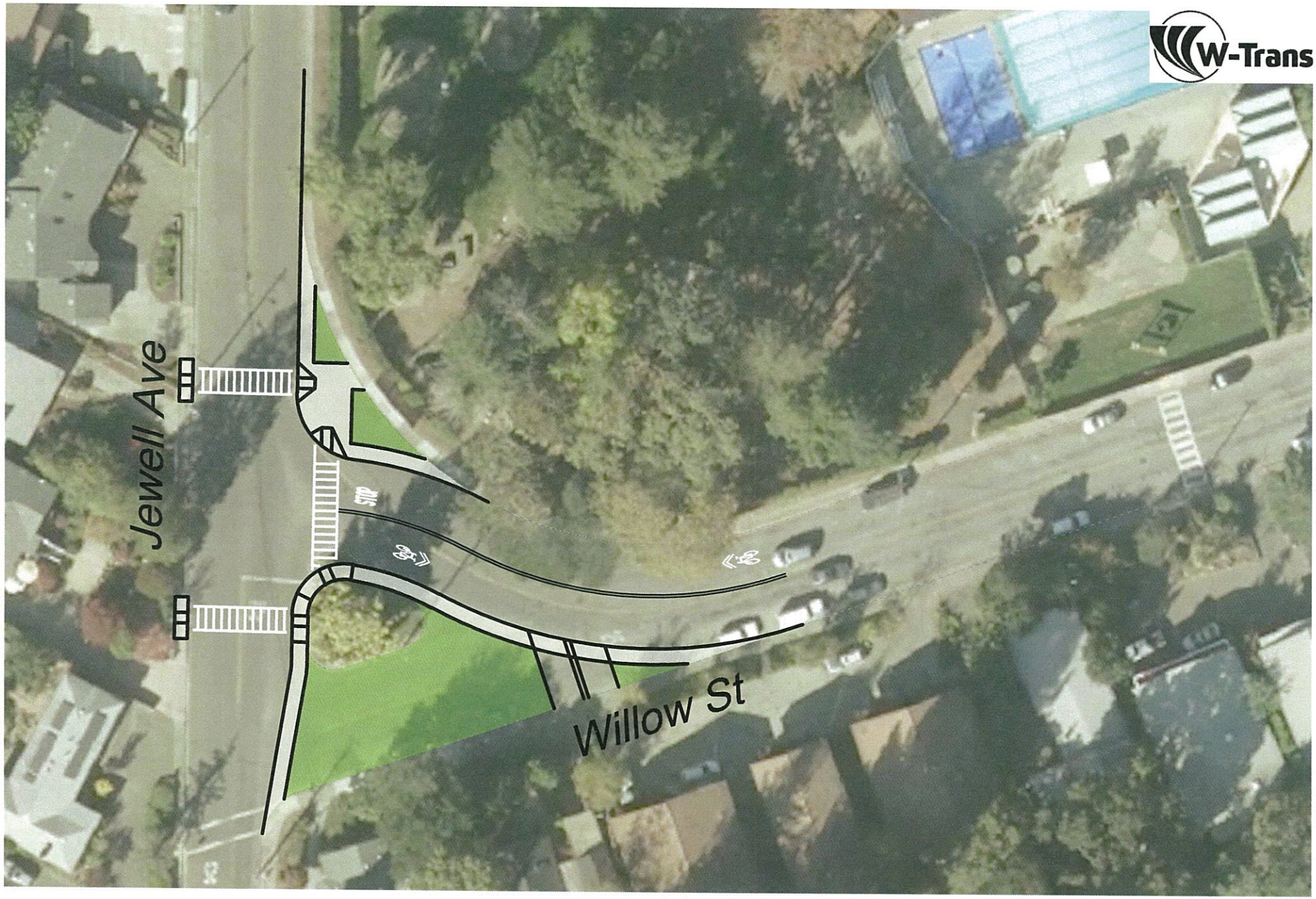
10/19/2016

Intersection Modification for Jewell Ave and Willow St

Alt A - Striping

SEB050

10/19/2016



Intersection Modification for Jewell Ave and Willow St

Alt B

SEB050

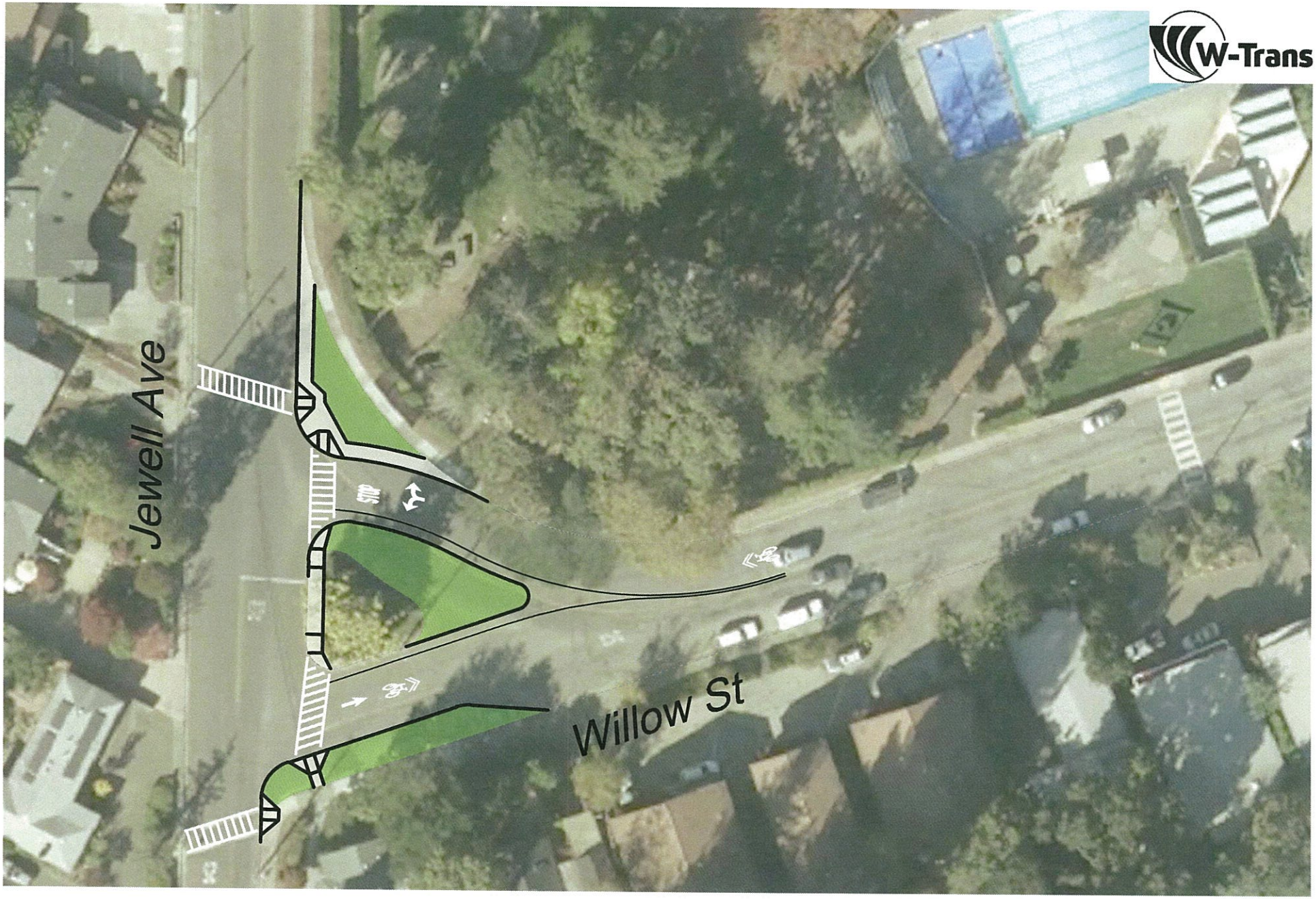
10/19/2016

Intersection Modification for Jewell Ave and Willow St

SEB050

Alt B - Stiping

10/19/2016



Intersection Modification for Jewell Ave and Willow St

Alt C

SEB050

10/19/2016

Intersection Modification for Jewell Ave and Willow St

Alt C - Striping

SEB050

10/19/2016

Intersection Alternatives for Jewell Avenue/Willow Street

Background

W-Trans has been tasked with developing alternative intersection geometrics for the intersection of Jewell Avenue/Willow Street. At the previous council meeting on October 4, 2016, W-Trans presented five optional alignments which would each create a more standard intersection, increase pedestrian access and provide more space for landscaping features. Based on the direction from the City Council, three alternatives have been refined and will be presented.

Since the last meeting, the Consultant and City staff met with the Fire Department to review the alternatives and discuss potential issues with fire truck maneuverability. Field tests were conducted with the City's largest ladder truck to help inform the concept design.

It should be noted that Willow Street including the intersection with Jewell Avenue will be repaved in 2017. Therefore, this is an opportune time to complete these modifications. Prior to the repaving project, any of the alternatives can be striped temporarily to test the circulation and maneuverability. After repaving, striping can be installed either with the new alternative or with the existing lane geometrics.

Alternatives

The 3 alternatives include:

Alternative A - Closure of the northern curved section of Willow Street

Under this alternative, all traffic would utilize the southern section of Willow Street and create a more standard T intersection which would be Stop controlled. Traffic on Jewell Avenue would run free flow. The existing island would be incorporated into the added green space. Sidewalks/walkways would be added to provide access to the southwest corner of the island where the new crosswalk would be located. The ultimate alignment and a short term striping installation are attached.

Alternative B - Closure of the southern straight section of Willow Street

Under this alternative, all traffic would utilize the northern section of Willow Street with realignment to eliminate the curve and closure of the southern segment of Willow Street. This realignment would create a more standard T intersection which would be Stop controlled. Traffic on Jewell Avenue would run free flow. The existing island would be incorporated into the added green space. Sidewalks/walkways would be added to provide access to the new crosswalk on the Willow Street leg of the intersection. The ultimate alignment and a short term striping installation are attached.

Alternative C - Conversion of Willow Street to a One-Way Couplet

Under this alternative, traffic on either side of the median would be converted to a 'one-way' couplet with westbound traffic on the north and southbound traffic on the south. The northern section would be realigned to eliminate the curve. This realignment would create an 'elongated' T intersection which would be Stop controlled on the Willow Street approach. Traffic on Jewell Avenue would run free flow. The existing island would remain in its current configuration separating the two directions of travel before they rejoin to the east. Green space would be created both north and south of the intersection. Sidewalks/walkways would be added to provide access to the new crosswalks. The ultimate alignment and a short term striping installation are attached.

Assessment

All 3 of these alternatives provide the following features:

- Ability to serve the vehicle turning movement demands
- Increase in pedestrian access and additional pedestrian crosswalks
- Maintenance of the existing island with the tree and utility pole.
- Similar supply of on-street parking on Willow Street.
- No change to residential driveway access in the vicinity
- Elimination of the speed and vehicle conflicts on the "Willow to Jewell curve."
- An opportunity for additional green space and urban design elements.
- Accommodation of City fire truck maneuverability.
- More bike friendly access conditions.
- Ability to be installed as a temporary striping project to test the results.

If installed permanently, all 3 of the alternatives will require:

- New sections of sidewalk
- Curb ramps for ADA access to the new crosswalk.

Following is a discussion of other issues associated with each specific alternative:

Alternative A

All traffic is served on the southern section of Willow Street bringing more traffic closer to the residences on the south side of the intersection.

This configuration will require the second largest amount of new sidewalk to be provided of the 3 alternatives, but will only require 2 new curb ramps.

The reclaimed pavement area for green space is the largest of the three alternative which could create an opportunity for more design possibilities, but would likely be a more costly landscaping project. (It may not be possible to provide contiguous space for an expanded park because of the abrupt elevation difference between the park space and the road in this area.)

Both pedestrian crossings of Jewell Avenue would be to the far south which may generate a desire to add a midblock crossing further north which may need additional crossing facilities to supplement the crossing.

Alternative B

This configuration will require the largest amount of new sidewalk to be provided of the 3 alternatives, and will require 4 new curb ramps.

The closure of the southern section of Willow Street will require extension of an existing private driveway as shown on the plans.

The added crosswalks across Jewell Avenue are located in a more advantageous location for pedestrian crossing activity.

Alternative C

This configuration will require the least amount of new sidewalk to be provided of the 3 alternatives, but will require 5 new ADA curb ramps.

The added northern crosswalk across Jewell Avenue would be located in a more advantageous location for pedestrian crossing activity.

The elongated intersection alignment, although not typical, would not be expected to cause additional vehicle conflicts given the volume and speed of traffic in this area.

The reclaimed pavement areas for green space are a small size which are likely to be a less costly landscaping project than the two larger areas in the other two alternatives.

Action Requested

Council should provide direction on which of the 3 alternatives (A, B or C) Public Works should move forward to implementation, or provide direction on leaving the intersection in its current configuration for next year's repaving project.

Detailed Engineer's Estimate For Construction Items Only

Agency: City of Sebastopol

Project Name: Intersection Improvements at Jewell and Willow

Project Location: Sebastopol, California

Date of Estimate: October 24, 2016

Prepared by: Steve Weinberger and William Petker

Alternative A - Ultimate

Item No.	Description	Quantity	Units	Unit Cost	Total
1	Curb and Gutter	382	LF	$35.00	$13,370
2	Sidewalk	1,721	SF	$8.00	$13,768
3	Ramps	1	EA	$5,000.00	$5,000
4	Roadway Excavation	285	CY	$35.00	$9,960
5	Landscaping & Irrigation	5,005	SF	$12.00	$60,060
6	Sigining and Striping	1	LS	$5,000.00	$5,000

TOTAL: $107,158

Alternative B - Ultimate

Item No.	Description	Quantity	Units	Unit Cost	Total
1	Curb and Gutter	469	LF	$35.00	$16,415
2	Sidewalk	2,409	SF	$8.00	$19,272
3	Ramps	7	EA	$5,000.00	$35,000
4	Roadway Excavation	317	CY	$35.00	$11,081
5	Landscaping & Irrigation	4,533	SF	$12.00	$54,396
6	Sigining and Striping	1	LS	$6,000.00	$6,000
7	Install Driveway	430	SF	$12.00	$5,160

TOTAL: $147,324

Alternative C - Ultimate

Item No.	Description	Quantity	Units	Unit Cost	Total
1	Curb and Gutter	470	LF	$35.00	$16,450
2	Sidewalk	1,320	SF	$8.00	$10,560
3	Ramps	6	EA	$5,000.00	$30,000
4	Roadway Excavation	200	CY	$35.00	$7,006
5	Landscaping & Irrigation	3,414	SF	$12.00	$40,968
6	Sigining and Striping	1	LS	$5,750.00	$5,750

TOTAL: $110,734

Detailed Engineer's Estimate
For Construction Items Only

Agency: City of Sebastopol

Project Name: Bodega Ave Crossing Recommendations

Project Location: Sebastopol, California

Date of Estimate: October 25, 2016

Prepared by: Steve Weinberger and William Petker

Bodega Ave/Florence Ave

Item No.	Description	Quantity	Units	Unit Cost	Total
1	Median Curb	80	LS	$20.00	$1,600
2	Median Concrete	165	SF	$8.00	$1,320
3	Signing and Striping	1	LS	$3,000.00	$3,000
4	Roadway Excavation	1	LS	$1,000.00	$1,000
5	Curb Ramp Upgrades	2	EA	$5,000.00	$10,000

TOTAL: $16,920

Bodega Ave/Washington Ave

Item No.	Description	Quantity	Units	Unit Cost	Total
1	Median Curb	80	LS	$20.00	$1,600
2	Median Concrete	165	SF	$8.00	$1,320
3	Signing and Striping	1	LS	$1,500.00	$1,500
4	Roadway Excavation	1	LS	$1,000.00	$1,000

TOTAL: $5,420

Bodega Ave/Robins on

Item No.	Description	Quantity	Units	Unit Cost	Total
1	Rectangular Rapid Flashing Beacon (RRFB, 2 poles)	1	LS	$20,000.00	$20,000
2	High Visilibity Crosswalks	1	LS	$3,500.00	$3,500

TOTAL: $23,500

Bodega Ave/Nelson Way-Gold Ridge Farm

Item No.	Description	Quantity	Units	Unit Cost	Total
1	High Intensity Activated Crosswalk (HAWK)	1	LS	$165,000.00	$165,000
2	Remove Concrete	800	SF	$5.00	$4,000
3	Lasdscape & Irrigation	800	SF	$12.00	$9,600
4	Median Curb	50	LF	$20.00	$1,000
5	Ped Refuge Concrete	100	SF	$8.00	$800
6	Signing and Striping	1	LS	$5,000.00	$5,000

TOTAL: $185,400

Bodega Ave/Ragle Rd - Interim

Item No.	Description	Quantity	Units	Unit Cost	Total
1	Median Curb	92	LF	$20.00	$1,840
2	Median Concrete	185	SF	$8.00	$1,480
3	RRFB (3-poles)	1	LS	$24,000.00	$24,000
4	Signing and Striping	1	LS	$6,500.00	$6,500

				TOTAL:	$33,820

Bodega Ave/Ragle Rd - Ultimate

Item No.	Description	Quantity	Units	Unit Cost	Total
1	Traffic Signal	1	LS	$300,000.00	$300,000
				TOTAL:	$300,000