



SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study



Prepared for the County of Lake

Submitted by
W-Trans

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Executive Summary

Project Purpose

State Route (SR) 20 (or “Highway 20”) serves multiple conflicting purposes for the communities along the north shore of Clear Lake in the County of Lake. The corridor serves as the main street for unincorporated communities, with commercial frontage and civic destinations for these communities, but also is a major east-west route for trucks and other through traffic in the region. This study was undertaken to identify and recommend improvements to focus more on the local transportation functions served by Highway 20 in these communities by reducing vehicle speeds and enhancing pedestrian and bicyclist access and safety throughout the four study communities.

This project built on previously adopted plans that highlighted longstanding issues in the region. The recommendations in this plan grew out of an analysis of transportation facilities in the study area, existing traffic conditions, and identification of key issues by local residents. Caltrans was consulted during the process to provide input on the proposed projects as they are ultimately responsible for implementing and maintaining facilities along the state highway system.

Study Area

The study area consists of four distinct segments in the unincorporated communities of Nice, Lucerne, Glenhaven, and Clearlake Oaks, focusing on the areas with the greatest concentration of residential and commercial activity. SR 20 serves as a through route along the lake, but because it runs parallel to the shoreline it can act as a barrier between pedestrians and the lake, the major attraction in the region.

Existing Conditions

Highway 20 has two travel lanes and a two-way left-turn lane (TWLTL) through Nice, Lucerne, and Clearlake Oaks. The corridor does not include a center turn lane in Glenhaven, which is considerably smaller than the other communities. The three larger communities feature a mix of commercial and residential land uses. Sidewalks are present in some areas, including the waterfront in Lucerne, but pedestrians are faced with gaps in the network and some locations where they are required to walk along the roadway shoulders. There are bike lanes along part of the Clearlake Oaks study segment. On-street parking is allowed along much of the corridor, although most of the commercial businesses provide off-street parking.

Traffic characteristics and operations were evaluated. Traffic volumes were lowest in Glenhaven, at approximately 6,700 vehicles per day, while volumes in the other communities ranged from 8,300 to 11,600 vehicles per day, with the highest volumes recorded in Nice. Posted speed limits are 35 miles per hour (mph) in Lucerne and Clearlake Oaks, 40 mph in Nice, and 45 mph in Glenhaven. Actual vehicle speeds were especially high in Nice, where the 85th percentile speed was recorded at 51 mph, or 11 mph over the speed limit. For the other three communities, the 85th percentile speeds were within 4 mph of the posted speed limits.

There are no traffic signals along the corridor with all intersections being uncontrolled on SR 20 and stop-controlled on the side streets. Analysis of operation at selected intersections indicates that all operate at acceptable service levels, with most operating at Level of Service (LOS) A or B during peak travel hours.

Community Engagement

Throughout the project, several strategies were used to consult with members of the community about local needs and to obtain comments on the proposed improvements. These included:

- **Community Workshops:** Four community workshops were held – two in Lucerne, one in Nice, and one in Clearlake Oaks – attracting 60 participants.
- **Online Interactive Map:** 157 comments were collected, indicating locations where respondents have encountered problems and where they recommended improvements.
- **Community Event Outreach:** Tables were set up at the “National Night Out” and Lake County Fair to inform community members about the project, to receive comments, and to solicit project recommendations. There were 30 people who stopped by at the table during the “National Night Out” event and 80 people dropped by at the Lake County Fair.
- **Online Survey:** An online survey was created to collect comments on the draft concept plans that were proposed for the study area, resulting in 149 completed responses.
- **TAG Meetings:** 4 meetings were held with a Technical Advisory group (TAG), which included representatives from the Lake Area Planning Council (Lake APC), Lake County Department of Public Works, Lake Transit, and Caltrans District 1.
- **Presentations:** Findings were presented to the Lake APC Technical Advisory Committee (TAC) and the Lake APC Board of Directors for comment and approval.

Key Issues

While some unique issues were identified for each of the four study communities, there were also some consistent themes that appeared throughout the community engagement process.

Pedestrian Crossings – Vehicle speeds and a low rate of drivers yielding to pedestrians were cited as posing significant challenges to people attempting to cross the street. It was also noted that drivers are routinely observed using the two-way left-turn lane as a passing lane in three of the four study communities.

Pedestrian Access – While the specific locations vary between communities, missing sidewalks and gaps in the sidewalk network are a concern throughout the study area.

Lighting – It is difficult for many drivers to see pedestrians at night due to the lack of adequate streetlighting at crosswalks.

Bicycle Access – Other than the bike lanes in the eastern section of Clearlake Oaks, there are no designated bicycle facilities along Highway 20 in the study area.

Alternatives

The potential projects include several types of improvements to be deployed throughout the project area. The emphasis was on pedestrian crossing improvements through the use of marked crosswalks to help drivers be more aware of pedestrians in the area, bulb-outs to shorten crossing distances, refuge islands in the center of the roadway, and pedestrian-activated flashing beacons at high-demand locations. To improve pedestrian and bicycle accommodations along Highway 20, recommendations include new sidewalks or paved walkways and bike lanes in three of the four study communities.



Caltrans Comments

Caltrans District 1 staff was consulted numerous times during the development of this plan. While supportive of many of the preliminary recommendations, Caltrans indicated its opposition to the use of raised pedestrian refuge islands in the corridor, given current conditions. As a result, the refuge islands as recommended would be flush with the roadway. Caltrans staff indicated that they would consider the use of raised refuge islands in the future if the flush islands were not sufficiently effective in reducing vehicle speeds.

Recommendations

Project recommendations included the following:

Nice

- Bike lanes throughout the study area
- Enhanced intersection crossings at 4 locations
- Sidewalks/pedestrian walkways

Lucerne

- Bike lanes throughout the study area
- Enhanced intersection crossings at 11 locations
- Sidewalks/pedestrian walkways

Glenhaven

- Colorized shoulders throughout the study area

Clearlake Oaks

- Bike lanes in the portion of the study area where they are not present
- Enhanced intersection crossings at 8 locations

Recommendations for All Study Area Communities

The following recommendations are applicable to all four study communities:

- Guidelines for application of gateway treatments
- Pedestrian-scale lighting at all marked crosswalks

Long-Term Potential Recommendations

- Roundabouts along Highway 20 at the intersections of 13th Avenue and Foothill Drive (west) in Lucerne, Keys Boulevard in Clearlake Oaks, and potentially at Sayre Avenue in Nice.
- Flush medians proposed in this plan could be replaced by raise medians if vehicle speeds are not sufficiently reduced.

Cost to Complete Recommended Plan

The estimated cost to design and construct the recommended projects is \$2,866,000 including \$614,200 for Nice, \$911,100 for Lucerne, \$317,400 for Glenhaven and \$1,023,300 for Clearlake Oaks.

Implementation

Priority projects were identified to help guide County staff and local agencies as they take steps to implement the project recommendations. Funding opportunities identified include the State's Active Transportation Program, California's largest source of funding for pedestrian and bicycle projects.

Introduction and Setting

Introduction and Purpose

The Lake Area Planning Council (Lake APC) received a State Highway Account Sustainable Transportation Planning Grant to conduct the *SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study*. The study was initiated to develop a traffic calming strategy to improve the attractiveness, multimodal transportation options, and overall livability along State Route (SR) 20 in the communities of Nice, Lucerne, Glenhaven, and Clearlake Oaks. Currently Highway 20 serves multiple conflicting purposes in the four study communities: 1) to be a “main street” for these communities providing the primary access route to local destinations, and 2) to function as a through route linking US 101 to I-5, serving trucks and other traffic trying to minimize their travel time. As a result, the corridor is characterized by relatively high-speed traffic that has had negative implications on access and safety for walking and bicycling trips. Highway 20 is classified by Caltrans as a minor arterial roadway, but due to its function as a through traffic route, it operates more like a principal arterial.

Caltrans’ long-term vision is to establish SR 29 and SR 53 – running along the south side of Clear Lake – as the primary east-west route through this area. Shifting the bulk of through traffic to these routes would enable Highway 20 to primarily function as a local access route, with vehicles operating at lower speeds, which would be more compatible with local traffic access including pedestrian and bicycle activity.

The purpose of the study was to develop a prioritized set of projects that could be implemented in the near-term to reduce vehicle speeds and to enhance the attractiveness and livability of the four study communities. The project built on several other planning efforts, including the *Highway 20 Traffic Calming and Beautification Plan*, *Active Transportation Plan for Lake County*, and the *Lake County Pedestrian Facility Needs Inventory and Engineered Feasibility Study*. This Plan’s recommendations were based on analysis of these prior plans, an assessment of existing conditions, and input from the community. Caltrans was also consulted in the development of recommendations as they are ultimately responsible for implementing and maintaining facilities along the state highway system.

The conceptual plans developed through this study are intended to provide the basis for grant funding applications to secure the resources needed to implement the proposed projects.

Study Area

The study area consists of SR 20 in Lake County within four unincorporated communities along the north shore of Clear Lake – Nice, Lucerne, Glenhaven and Clearlake Oaks, as presented in Figures 1 through 4. SR 20 serves as a through route along the lake, but because it is located along the shoreline it can act as a barrier between pedestrians and the lake, the major attraction in the region. The study area consists of four distinct segments in Nice, Lucerne, Glenhaven, and Clearlake Oaks, focusing on the areas with the greatest concentration of residential and commercial activity. The roadway in the study locations typically has a three-lane cross-section with two through lanes and a center two-way left-turn lane (TWLTL) and includes commercial development along the SR 20 frontage. SR 20 has only a two-lane cross-section in Glenhaven, which is substantially smaller than the other three communities, with almost exclusively residential land uses as well as the post office and convenience store.

Facilities for non-vehicle modes of travel vary throughout the corridor. There are significant gaps in the sidewalk network in all four communities, and all pedestrian crosswalks on SR 20 are uncontrolled as through traffic on SR 20 travels without restrictions since there are no traffic signals or all-way stop controls on the corridor. Three of the four study communities have no designated bicycle facilities along SR 20, with the exception being the eastern part of Clearlake Oaks. Bus service to all of the north shore communities is provided by Lake Transit’s Route 1.

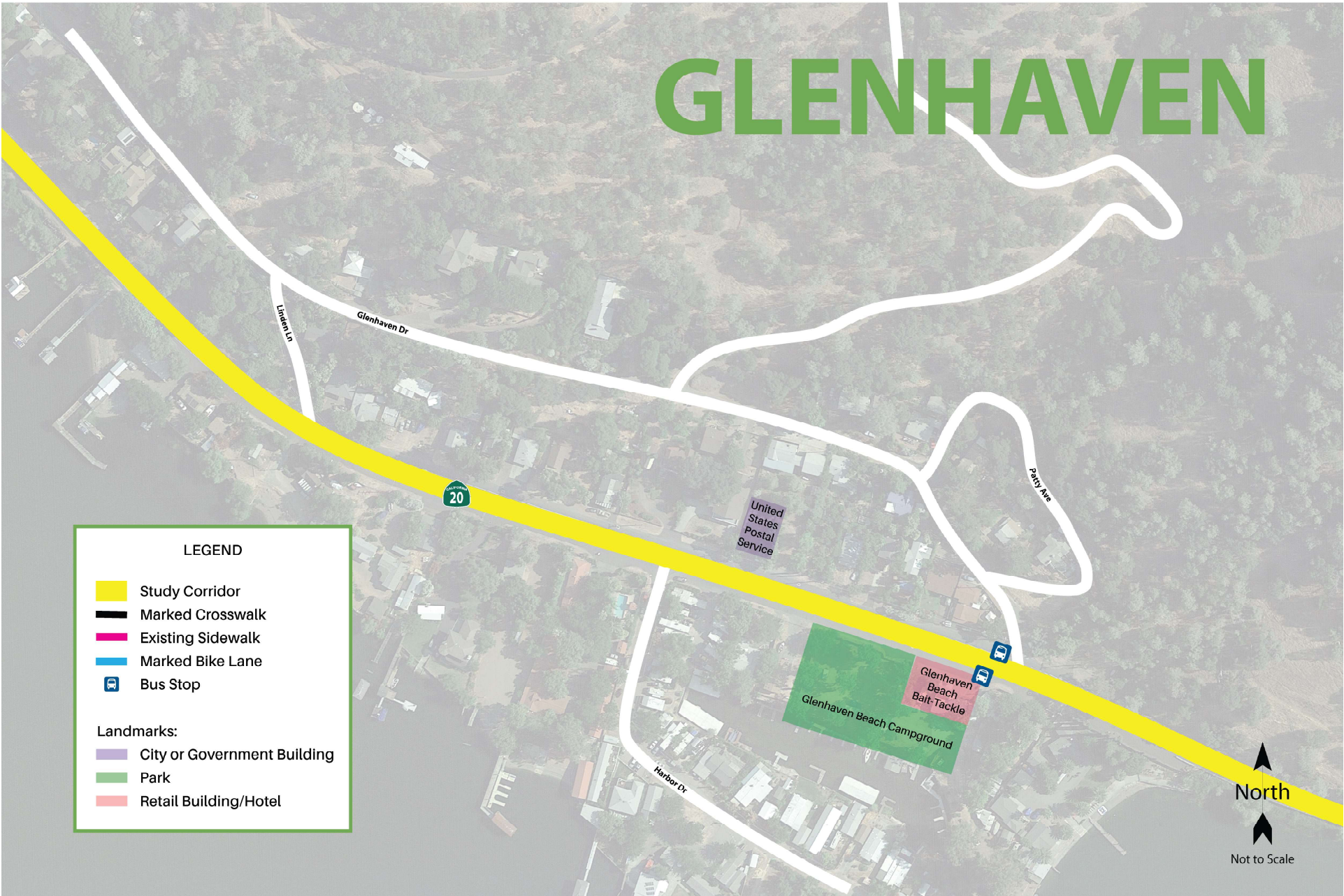


SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study
Figure 1 – Existing Conditions (Nice)



SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study
Figure 2 – Existing Conditions (Lucerne)

GLENHAVEN



SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study
Figure 3 – Existing Conditions (Glenhaven)



CLEARLAKE OAKS



SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study
Figure 4 – Existing Conditions (Clearlake Oaks)



While SR 20 generally runs east-west, it has a north-south orientation in three of the four study areas and is referred to as “north-south” based on this directionality for the entire study segment.

Caltrans describes its facilities according to postmile numbers. The postmile (PM) limits of the study area from west to east are as follows:

- **Nice** – PM 13.5 to 14.50
- **Lucerne** – PM 16.57 to 17.92
- **Glenhaven** – PM 24.20 to 24.48
- **Clearlake Oaks** – PM 27.53 to 29.06

Planning Context

This Plan builds on several previous plans and studies undertaken for the Highway 20 corridor in the north shore communities in recent years.

Highway 20 Traffic Calming and Beautification Plan (2005)

A precursor to the current study, this plan focused on developing a plan to calm traffic and recommend aesthetic improvements to establish Highway 20 as more of a main street in Nice, Lucerne, and Clearlake Oaks. Recommendations included extensive streetscape treatments, medians, lighting, landscaping, and park enhancements, some of which have been implemented. A summary of the recommendations and their status is included in Appendix A.

Lake County Pedestrian Facility Needs Inventory and Engineered Feasibility Study (Lake Walks Study) (2019)

This countywide study includes recommendations for pedestrian access and safety improvements throughout Lake County. The study includes a recommended set of 40 high priority projects, including the proposed improvements in the study area as presented in Table 1.

Table 1 – Lake Walks Study Priority Projects in Nice, Lucerne, and Clearlake Oaks		
Community	Location	Improvement Type
Nice	Sayre Ave to western boundary of U.S. Post Office	Sidewalks along both sides of Highway 20
	Sayre Ave	Move crosswalk to west side of intersection and add bulb-outs
	Levy Ave	Crosswalk and bulb-outs
	Keeling Ave	Bulb-outs at existing crosswalk
	Howard Ave/marina entrance	Bulb-outs at existing crosswalk
	Hudson Ave	Bulb-outs at existing crosswalk
	Entrance to WorldMark Clear Lake	Crosswalk and bulb-outs
Lucerne	U.S. Post Office	Crosswalk and bulb-outs
	3 rd Ave to Country Club Dr	Continuous sidewalks along waterfront side of Highway 20
	1 st Ave, 5 th Ave, 7 th Ave, 9 th Ave through 16 th Ave	Crosswalks and bulb-outs
Clearlake Oaks	Foothill Dr and 13 th Ave	Roundabout
	Island Dr to Foothill Blvd	Sidewalks on both sides
	Foothill Blvd (west)	Crosswalk
	Acorn St	Realign intersection
	Foothill Blvd (east)	Crosswalk, realign intersection
	Tower Mart	Crosswalk
Island Dr	Realign intersection	

Active Transportation Plan for Lake County (2016)

Adopted to serve as the nonmotorized element of the regional transportation plan, the *Active Transportation Plan for Lake County* was developed to replace the *2011 Regional Bikeway Plan* and build on the *2009 Safe Routes to School Plan*. The Active Transportation Plan identified and prioritized countywide priorities for projects to enhance access and safety for bicycling and walking, including safe routes to school. The Plan recommends Class II bike lanes along Highway 20, including both the study area communities and the segments of roadway connecting them, as listed in Table 2.

Community	Location	Improvement Type
Nice	Entire study area	Class II bike lanes
Lucerne	Entire study area	Class II bike lanes
Glenhaven	Entire study area	Class II bike lanes
Clearlake Oaks	High Valley Rd to Keys Blvd	Sidewalk on north side
	Entire study area	Class II bike lanes

In addition to the project list, the Plan included a focus on mechanisms to implement the identified projects by identifying potential funding sources, recommending policies to provide bicycle and pedestrian infrastructure – including bikeways, sidewalks, and end-of-trip facilities such as bicycle parking – as part of development and roadway construction projects. Other implementation strategies included developing partnerships with schools, public health professionals, and state and local agencies. In addition, the plan recommended implementation of a count program to conduct ongoing tracking of bicycling and walking, data which could guide prioritization of investments and support efforts to secure funding.

Lake County Regional Transportation Plan (2017)

The *Lake County Regional Transportation Plan* (RTP) highlights the county’s demographics and why facilities for walking and bicycling are of such importance to the local population, noting that the county has a relatively high percentage of residents age 65 and older of 19.8 percent, compared to 13.3 percent statewide, and a median income substantially below that of the statewide average. These groups rely less on driving and more on transit and walking to meet their transportation needs. In addition, 21.2 percent of residents were classified as disabled, more than double the statewide figure, so designing facilities to meet ADA requirements is especially important locally. As noted above, the RTP incorporated the Active Transportation Plan of Lake County as its nonmotorized element.

Lake County Transit Development and Marketing Plan (2015)

The plan largely focused on Lake Transit bus service, operational issues, and recommended improvements. It was closely coordinated with the development of the *Lake County 2014-2015 Coordinated Public Transit-Human Services Transportation Plan*, as the community engagement effort informed both initiatives. The community engagement process included stakeholder interviews and focus groups, which identified numerous bus stop infrastructure needs throughout Lake Transit’s service area. This includes improved signage, schedule information posted at stops, bus shelters, reduced spacing between bus stops, and sidewalks to improve bus stop access.

The Plan recommended that Lake Transit undertake a comprehensive study of bus stop improvements to provide sound recommendations on the priority improvements to bus stops, recommended amenities and their

respective costs. This effort has been completed, and recommendations for stops in Nice, Lucerne, Glenhaven, and Clearlake Oaks are presented in Appendix B.

Lake County Regional Blueprint Plan (2010)

The *Lake County Regional Blueprint Plan* presented a comprehensive approach to future development in Lake County, and improved multimodal transportation is a theme running through several of the Plan's guiding principles. This included creating more walkable and bikeable neighborhoods. The infrastructure needs identified through the plan included the following:

- Sidewalks
- Pedestrian-scale lighting
- Bicycle facilities, including bike lanes and a continuous bike route around the lake
- Facilities that would meet the needs of people disabilities, such as addition of curb ramps where needed

The "Balanced Growth" approach that was adopted as the vision for the Plan included an emphasis on new developments along major transportation routes. The future development pattern would be complemented by enhanced facilities for pedestrians, bicyclists, and transit users, to enable greater use of these transportation modes.

Existing Transportation Conditions

Existing Corridor Conditions

Segment 1 - Nice

The study area in Nice extends from just west of Sayre Avenue to a point just east of the intersection with Burpee Drive, a distance of one mile. Land uses along the corridor are primarily commercial, but there are also several residential parcels that are accessed by driveways on SR 20.

SR 20 runs uncontrolled (no traffic signals or stop signs) through the study area and has a posted speed limit of 40 mph. The Caltrans right-of-way is approximately 80 feet wide, with a roadway that is generally striped in a three-lane configuration, with two travel lanes and a two-way left-turn lane (TWLTL), each of which are 12 feet wide. The remainder of the right-of-way has an inconsistent configuration consisting of shoulders, sidewalks, and on-street parking areas of varying widths. There is an edgeline stripe separating the through travel lanes from the shoulder areas. Curb and gutter are present intermittently and the paved shoulder is as wide as 28 feet. In some locations there is no clear separation between the shoulder and the parking areas of adjacent businesses. Plates 1 and 2 show the cross-section at either end of the study area.



Plate 1 SR 20 at Keeling Avenue, Nice



Plate 2 SR 20 at Manzanita Drive, Nice

Pedestrian Facilities

There is a limited presence of sidewalks in the study area, notably along the frontage of the post office and Hinman Park along the north side of SR 20. Where sidewalks are present, there are curb ramps at the crossings. In other areas there are no dedicated pedestrian paths or walkways, so pedestrian access is provided by the paved or unpaved shoulders along much of the roadway. There are marked crosswalks at the intersections of Sayre Avenue, Keeling Avenue, Howard Avenue, and Hudson Avenue. Due to the wide shoulder area, crosswalks span a significantly greater distance than the travel way. For example, while the three lanes total 36 feet, the crosswalk at Sayre Avenue is 71 feet long. All these crosswalks are uncontrolled, with the only enhancements being continental style crosswalk markings and double-sided Pedestrian Crossing signs, although not at all locations. Field observations indicated that drivers in Nice were less likely to yield to pedestrians than in the other study area communities, and pedestrians crossing SR 20 often did not cross in crosswalks.

Bicycle Facilities

Although there are paved shoulders along most of the Nice corridor, there are no marked bike lanes on SR 20.

Transit Facilities

There are bus stops in both directions at three locations in the center of Nice: at Keeling Avenue, between Benton Avenue and Hudson Avenue, and at Manzanita Drive. Four of the six stops are located along the shoulder of the roadway and the stops are not clearly marked. The westbound bus stop at Keeling Avenue is clearly marked and features a shelter, while the westbound Manzanita Drive stop includes a bench.

Parking

Most businesses along the corridor have dedicated off-street parking areas. Parking is also available along the shoulder where enough width is available. Parking areas are not clearly differentiated from pedestrian space along the frontages with physical barriers or other treatments.

Segment 2 - Lucerne

Lucerne is the largest of the communities in the study area, with a population over 3,000. The study area extends 1.35 miles from Foothill Drive to Country Club Drive. The westernmost 0.28 miles of the study area has two travel lanes as the right-of-way is somewhat narrower than the remainder of the segment. The right-of-way is approximately 75 feet wide in the central part of Lucerne, and the roadway is striped for two travel lanes and a TWLTL, a 36-foot travel way with edgeline separating the through lanes from the shoulder area. Land uses in this area include numerous commercial businesses, the Lucerne Alpine Park, and Lucerne Elementary School. In comparison to Nice, the land uses are closer to the roadway and pedestrian areas are more clearly defined. SR 20 is uncontrolled through the study area. The posted speed is 35 mph. Plate 3 shows the pedestrian walkway provided along the waterfront, while Plate 4 shows a crosswalk at a location without sidewalks.



Plate 3 SR 20 at 3rd Avenue, Lucerne



Plate 4 SR 20 at 14th Avenue, Lucerne

Pedestrian Facilities

Throughout the Lucerne portion of the study area sidewalks are continuous along the northern side of SR 20 except for the two-lane section between Foothill Drive and the bridge at Morrison Creek. However, sidewalks are narrow in several areas. Along the south (lake) side of SR 20, there are sidewalks along the park, but otherwise pedestrians must use the shoulder. Some pedestrian improvements have been implemented in recent years, notably new sidewalks along the edge of the park and reconstructed corners and curb ramps at several intersections. There are marked crosswalks at eight intersections in this area including 1st Avenue, 2nd Avenue, 3rd

Avenue, 4th Avenue, 5th Avenue, 9th Avenue, 10th Avenue, 13th Avenue, and 16th Avenue. All these crosswalks are uncontrolled with the only enhancement being continental-style crosswalk markings. A few of the crossings also have double-sided Pedestrian Crossing signs. Pedestrians were observed generally using crosswalks, although driver yielding rates were low.

Bicycle Facilities

Although there are paved shoulders along most of the Lucerne corridor, there are no marked bike lanes on SR 20.

Transit Facilities

Lucerne has the largest number of bus stops among the four communities. The westbound stops provide a higher-quality space for riders as sidewalks provide separation from vehicle traffic. Most of the stops are adjacent to marked crosswalks, facilitating crossings of SR 20. There are bus stops at the following locations:

- 1st Avenue (eastbound and westbound)
- 2nd Avenue (eastbound)
- 5th Avenue (eastbound and westbound)
- Water service company (eastbound)
- 9th Avenue (eastbound and westbound)
- 13th Avenue (eastbound and westbound)
- 14th Avenue (westbound)
- 16th Avenue (eastbound)
- Country Club Drive (eastbound and westbound)

Parking

On-street parking is allowed throughout this section of SR 20. However, it receives relatively light use except during the summer.

Segment 3 - Glenhaven

Glenhaven is the smallest of the four study communities with a population of about 230. This section of the study area is approximately 0.24 miles long and includes two 12-foot travel lanes. There are no traffic controls or marked crosswalks on this section of SR 20, and the posted speed limit is 45 mph. This study segment has a right-of-way width of approximately 82 feet, with the space largely serving as shoulders and on-street parking. To the east and west of the Glenhaven portion of the study area the expansive right-of-way continues, but the area is more constrained as it includes steep slopes and the lake shoreline. There is no central commercial area as land uses are primarily residential with resort communities located off the highway along the lake. The only business in this segment is a bait shop store at the intersection of SR 20 and Glenhaven Drive, which is also the location of the only bus stop in the area and the post office. There are no sidewalks, so pedestrians and bicyclists traveling along SR 20 use the paved shoulders, which range in width. Plate 5 shows the cross-section of SR 20 through Glenhaven near the post office and bait shop, the only non-residential land uses along this segment.



Plate 5 SR 20 at Glenhaven Drive, Glenhaven

Segment 4 - Clearlake Oaks

The section of SR 20 through Clearlake Oaks is 1.5 miles long, extending from Shady Lane to east of Keys Boulevard. It includes two through lanes and a TWLTL throughout this segment, and the right-of-way ranges from approximately 80 to 100 feet wide. SR 20 has a posted speed limit of 35 mph and there are no controls on SR 20 throughout the study segment. Plate 6 shows the wide intersection and crosswalk at Acorn Street, while Plate 7 shows the eastern end of the project area, which includes bike lanes and sidewalks.



Plate 6 SR 20 at Acorn Street, Clearlake Oaks



Plate 7 SR 20 at Hoover Street, Clearlake Oaks

Pedestrian Facilities

There are continuous pedestrian facilities (mostly sidewalk) from Oakgrove Avenue to the eastern study area limits. Along the north side of SR 20 and at other locations in this segment sidewalks are present along frontages of recent developments. The western portion of this segment has limited sidewalks. There are marked crosswalks at six intersections: Hoover Street, Butler Street, High Valley Road (school crosswalk near East Lake School), Foothill Boulevard, Acorn Street, and Pine Street (at Nylander County Park). The crosswalk at Acorn Street is the longest crossing in the corridor at approximately 100 feet long. In the eastern portion of the project area locations with sidewalks and crossings include curb ramps, except for the crossing at Butler Street.

Bicycle Facilities

Class II bike lanes are marked along SR 20 throughout Clearlake Oaks. However, several bicyclists were observed traveling against traffic as bicyclists generally traveled in both directions along the south side of the road.

Transit Facilities

Clearlake Oaks is served by Lake Transit Route 1 with stops at seven locations. Stops are not clearly marked and none of the stops include benches or shelters. Most of the stop locations do not have sidewalks so riders must board and disembark along the shoulder.

- Short Street/Foothill Boulevard (eastbound)
- Pine Street (westbound)
- Short Street/Acorn Street (eastbound)
- Between Foothill Boulevard and Acorn Street (westbound)
- Lakeland Street (eastbound and westbound)
- Hoover Street (eastbound and westbound)
- High Valley Road (eastbound and westbound)
- Keys Boulevard (eastbound and westbound)

Parking

On-street parking is allowed throughout this section of SR 20, though it receives relatively light use except during the summer.

Transit Operations

Lake Transit

Lake Transit Route 1 serves the North Shore communities, providing service from Clearlake to Lakeport. On weekdays, service operates every one to two hours from 6:00 a.m. to 7:00 p.m. in the eastbound direction. In the westbound direction, there are nine buses per day, operating every one to two hours from 6:30 a.m. to 9:30 p.m.

Dial-A-Ride

Lake Transit offers Clearlake/Lower Lake Dial-A-Ride and Lakeport Dial-A-Ride during the same days and hours as the local bus routes. Dial-A-Ride provides curb-to-curb service. Passengers certified as eligible for Americans with Disabilities Act (ADA) paratransit receive reservation priority when calling one day or more in advance.

Flex Stop

In areas that are not served by Dial-A-Ride, Lake Transit offers “Flex Stop” service. The bus will travel up to one mile off its regular route to provide curbside service. Reservations must be made one day or more in advance.

Bicycle Network

The *Highway Design Manual*, Caltrans, 2017, classifies bikeways into four categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.

- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.
- **Class IV Bikeway** – also known as a separated bikeway, is a bikeway for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation (or, “buffer”) may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking. (Note: *Caltrans Design Information Bulletin Number 89, Class IV Bikeway Guidance*, December 2015, provides detailed guidance on Class IV Bikeways.)

Existing Bicycle Facilities

There are Class II bike lanes along the study corridor from the intersection of SR 20/Foothill Boulevard-Oakgrove Avenue to the intersection of SR 20/Keys Boulevard in Clearlake Oaks. Throughout the rest of the study area there is continuous edge line striping, and in many locations, there is enough paved width for a bike lane, but there is no bike lane striping or signage present and parking is permitted.

General Observations

Based on a review of field conditions in all four of the communities included in this study, the following general observations were made.

- Drivers typically do not yield to pedestrians.
- Sidewalks are discontinuous in many parts of the study area.
- Most bus stops are located along the shoulder of SR 20, and many of the stop locations are unclear due to signage that is not present or readily visible.
- Where bus stops are visible, many signs need replacement, and there are few with benches or shelters.

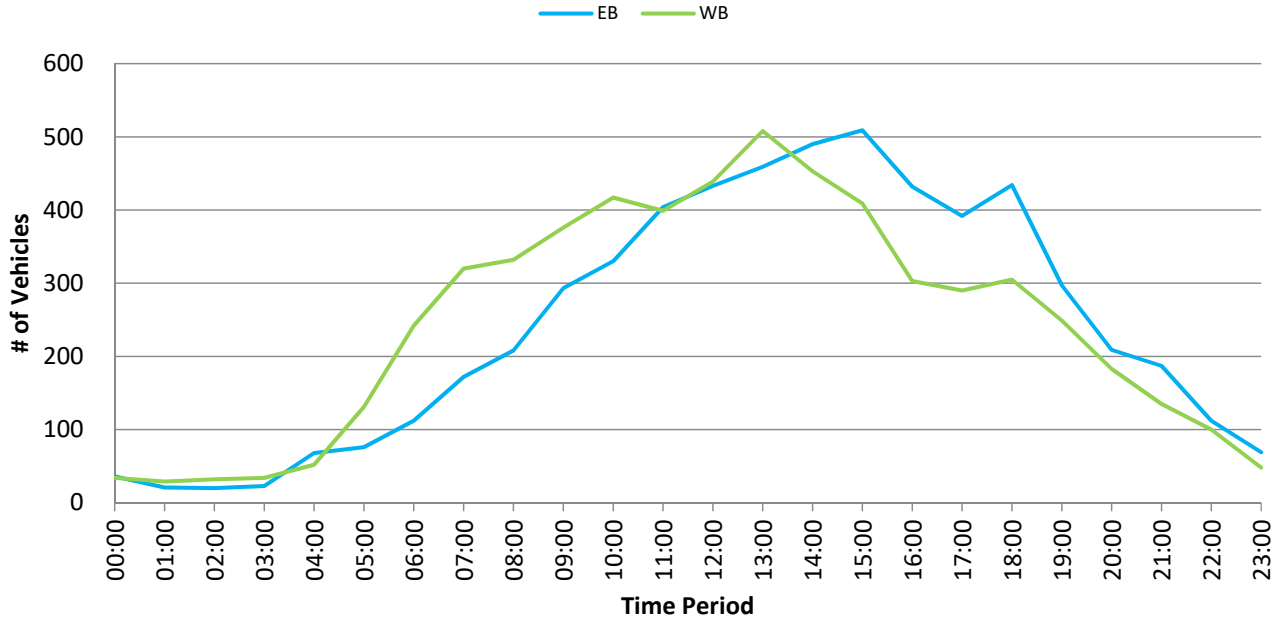
Traffic Volumes

Daily Traffic

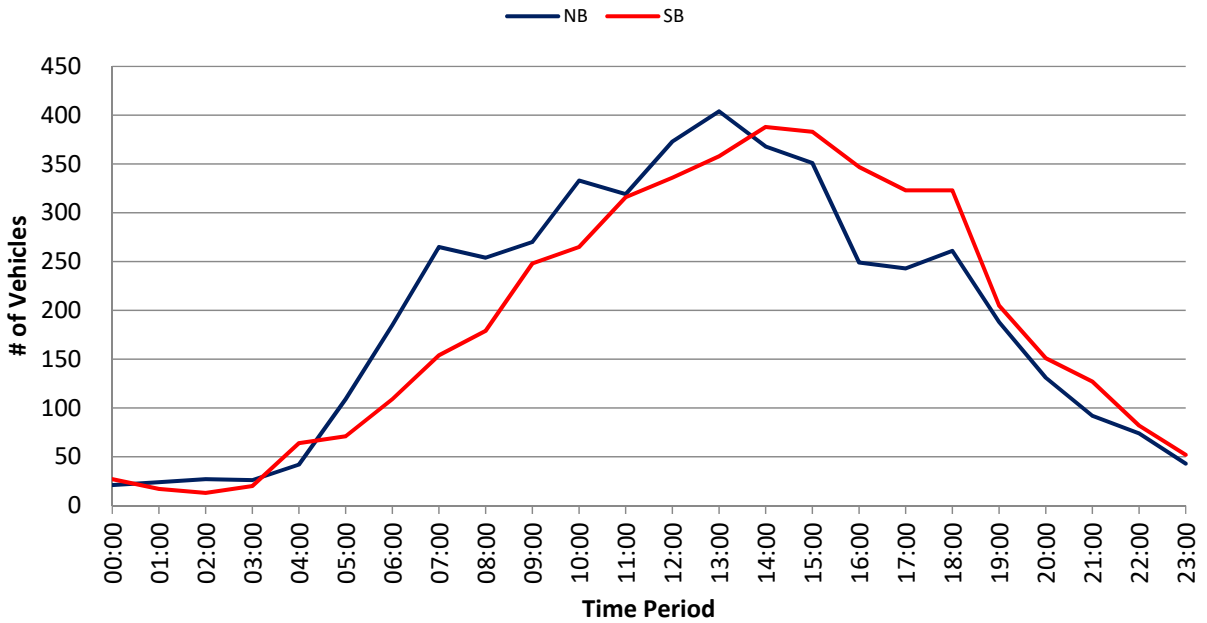
Daily vehicle traffic volumes were collected in each of the four communities on SR 20 in April 2019. The results are included in Appendix C. Daily traffic volumes along the corridor range from 6,700 to 11,600 vehicles per day as summarized in Table 3. Graphs 1 through 4 show the directional volumes at each of the four locations by time of day.

Table 3 – SR 20 Daily Traffic Volumes (vehicles per day)

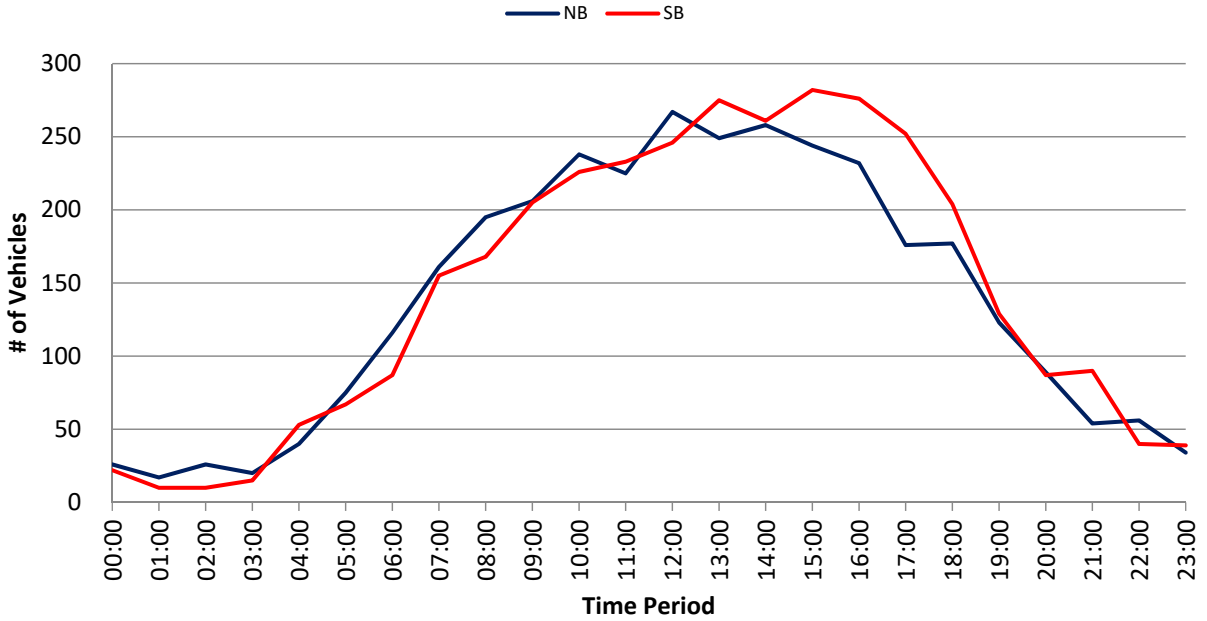
Location along SR 20	Eastbound	Westbound	Total
Nice (between Levy Ave and Keeling Ave)	5,876	5,820	11,606
Lucerne (between 7 th Ave and 8 th Ave)	4,558	4,652	9,210
Glenhaven (between Harbor Dr and US Post Office)	3,432	3,304	6,736
Clearlake Oaks (between Short St and Pine St)	4,254	4,096	8,350



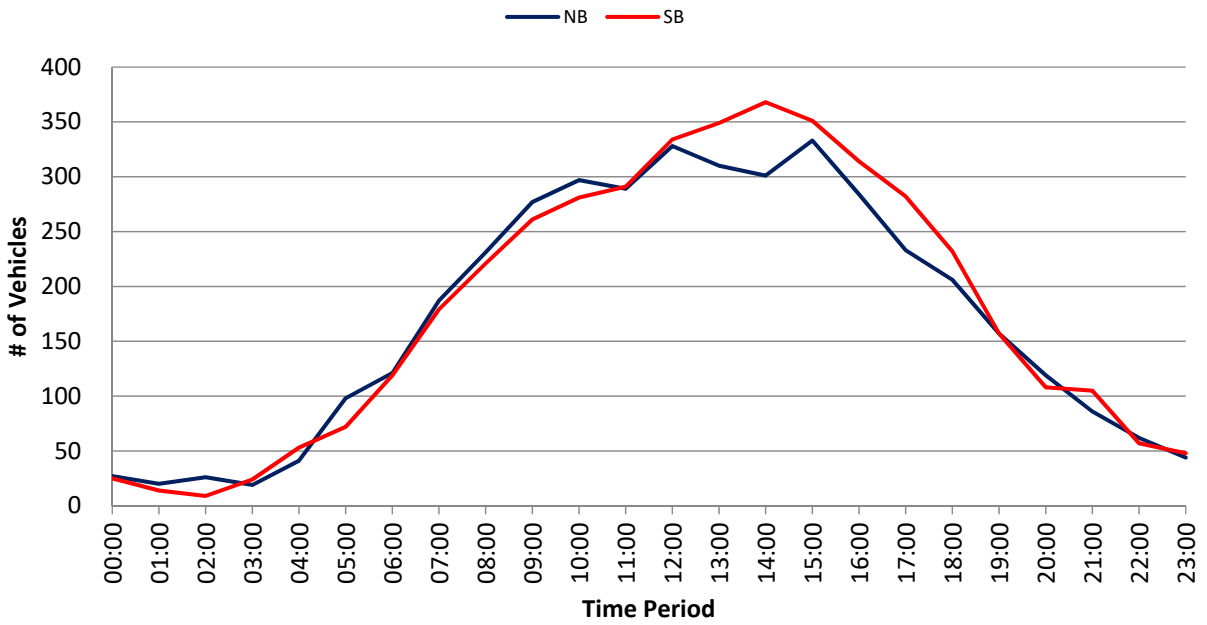
Graph 1 – SR 20 Volume in Nice (Between Levy Avenue and Keeling Avenue)



Graph 2 – SR 20 Volume in Lucerne (Between 7th and 8th Avenue)



Graph 3 – SR 20 Volume in Glenhaven (Between Harbor Drive and US Post Office)



Graph 4 – SR 120 Volume in Clearlake Oaks (Between Short Street and Pine Street)

Vehicle Travel Speeds

Due to varying conditions on SR 20, speed limits differ throughout the four communities ranging from 35 to 45 mph. Historically, Caltrans has set speed limits on State Highways based on the 85th percentile speed (the speed at or below which 85 percent of all vehicles are observed to travel under free-flowing conditions past a monitored point), which is required by the *California Vehicle Code* to radar enforce speed limits.

Speeds were surveyed on April 2, 2019 at the following locations on the corridor:

- **Nice** – between Levy Avenue and Keeling Avenue
- **Lucerne** – near 4th Avenue
- **Glenhaven** – near Harbor Drive
- **Clearlake Oaks** – between Butler Street and Hoover Street

Table 4 summarizes the speed survey results by segment. As shown, Lucerne, was the only location where the 85th percentile speed was at or below the current speed limit (35 mph). The other three locations had speeds higher than the current speed limit, with Nice having an 85th percentile speed more than 10 mph above the speed limit. Two speed surveys were performed at each location and the speed survey results are included in Appendix D.

Community Segment	Critical Speed (85th %-tile)	Existing Speed Limit	Speed Difference (+/-)
Nice <i>Between Levy Ave and Keeling Ave</i>	51	40	+11
Lucerne <i>At 4th Ave</i>	35	35	0
Glenhaven <i>At Harbor Dr</i>	49	45	+4
Clearlake Oaks <i>Between Butler St and Hoover St</i>	38	35	+3

Notes: Speed is shown in miles per hour; **Bold** = 85th percentile speed higher than the posted speed limit

Collision History and Safety Conditions

SWITRS Data

The collision history for the study area was reviewed to determine collision rates. Collision records for the study segments were obtained from the California Highway Patrol as published in their *Statewide Integrated Traffic Records System (SWITRS)* reports. The typical analysis period for collisions is five years, and the most recent five-year period available for the study segments at the time of the analysis was January 1, 2013 through December 31, 2017. Based on the consultant team’s experience conducting safety studies, five years is generally not an adequate time frame for pedestrian and bicycle collision analysis, as there are significantly fewer collisions involving these modes. To obtain a larger sample size that could provide a more meaningful collision pattern, a 10-year analysis period was used for these modes.

Collision maps for the corridors and collision rate calculations are included in Appendix E.

Segment Collision Rates

As shown in Table 5, the calculated collision rate for each study segment was compared to average collision rates for similar facilities statewide, as indicated in *2014 Collision Data on California State Highways*, Caltrans. There are no published collision rates for local roads in California, therefore, the Caltrans document is used for comparison purposes. Both Lucerne and Clearlake Oaks experienced collision rates that are higher than the Statewide Average for similar facilities.

Table 5 – Summary of Collision Rates

Community	Vehicle Volume	Total Collisions	Fatal Collisions	Injury Collisions	Collision Rate	Statewide Average*
Nice	11,606	21	0	0	0.99	1.16
Lucerne	9,210	30	0	0	1.79	1.16
Glenhaven	6,736	0	0	0	0.0	1.32
Clearlake Oaks	8,350	30	0	0	1.96	1.16

Notes: * Expected Statewide Average rate for similar facilities; Collision rates are in collisions per million vehicle miles

Pedestrian Collisions

The most current 10-year period available for reported pedestrian-related injury collisions along the study segment was from January 1, 2008 to December 31, 2017. During this period, there were 16 reported collisions in the study area involving pedestrians that resulted in injuries – four in Nice, eight in Lucerne, and four in Clearlake Oaks. There were no pedestrian injury collisions in Glenhaven. One of the pedestrian collisions in Nice resulted in a fatality. Following is a list of the locations where pedestrian-involved collisions occurred and the number of incidents at each location.

Nice

- Sayre Avenue – two collisions (one fatal)
- Keeling Avenue – one collision
- Howard Avenue – one collision

Lucerne

- Foothill Drive – one collision
- Grove Street – one collision
- Lake Street – one collision
- 2nd Avenue – one collision
- 6th Avenue – two collisions
- 9th Avenue – one collision
- 16th Avenue – one collision

Clearlake Oaks

- Acorn Street – one collision
- Butler Street – one collision
- Hoover Street – one collision
- East of Keys Boulevard – one collision

Bicycle Collisions

For the 10-year study period of January 1, 2008 to December 31, 2017 there were five reported collisions in the study area involving bicycles that resulted in injuries – two in Lucerne, and three in Clearlake Oaks. There were no injury collisions involving bicyclists in Glenhaven. There were two bicycle collisions resulting in fatalities, one in Nice near Sayre Avenue and one in Clearlake Oaks east of Keys Boulevard.

Pedestrian Crossings

There are 21 marked crosswalks in the study area which are summarized in Table 6.

Table 6 – Existing Marked Crosswalks			
Community Intersecting Street	Alignment	Leg	Signs
Nice			
<i>Sayre Ave</i>	4-Way	West	2 x 2
<i>Keeling Ave</i>	T	East	2 x 2
<i>Howard Ave</i>	4-Way	West	None
<i>Hudson Ave</i>	4-Way	West	2 x 2
Lucerne			
<i>1st Ave</i>	T	East	2 x 2
<i>2nd Ave</i>	T	East	None
<i>3rd Ave</i>	T	Both	None
<i>4th Ave</i>	T	West	None
<i>5th Ave</i>	T	West	None
<i>9th Ave</i>	4-Way	West	None
<i>10th Ave</i>	T	West	2 x 2
<i>13th Ave</i>	T	West	None
<i>16th Ave</i>	T	West	None
Clearlake Oaks			
<i>Pine St</i>	T	East	None
<i>Acorn St</i>	T	East	None
<i>Foothill Blvd</i>	T	West	None
<i>Lakeland St</i>	4-Way	East	None
<i>High Valley Rd</i>	T	East	2 x 1
<i>Butler St</i>	T	East	None
<i>Hoover St</i>	T	East	2 x 1
<i>West of Keys Blvd</i>	Midblock	None	None

Notes: 2 x 1 = One sign facing each direction; 2 x 2 = Double sided sign facing each direction

Pedestrian Crossing Warrants

As a preliminary step to evaluate the potential use of enhancements at crossings for pedestrians, warrant analyses were conducted for seven intersections in the study area relative to need for a High Intensity Activated Crosswalk (HAWK), Rectangular Rapid Flash Beacons (RRFB), or other intersection geometric crossing enhancements. The seven locations were selected based on their proximity to important community destinations, and included two each in Nice, Lucerne, and Clearlake Oaks, as well as one in Glenhaven. Traffic counts, including pedestrian crossing counts, were conducted at these seven locations in April 2019 during the a.m. (7:00-9:00) and p.m. (4:00-6:00) peak periods.

The analysis used the HAWK warrants from the *California Manual on Uniform Traffic Control Devices* (CA MUTCD) as well as the "Guidelines for Pedestrian Crossing Treatments" from the National Cooperative Highway Research Program (NCHRP) Report 562. These methodologies are based on the volume of pedestrians crossing, the volume of vehicle traffic, vehicle travel speeds and pedestrian crossing distance. It was determined that none of the locations currently meet the warrants for HAWK beacons, and only the SR 20/Acorn Street intersection in Clearlake Oaks meets the warrants for intersection enhancements. Warrants were generally not met because pedestrian crossing volumes are low. However, given the lack of existing pedestrian infrastructure and input from the public, it is likely that the existing vehicle traffic conditions are a deterrent to pedestrians attempting to cross the street.

Therefore, a sensitivity analysis was conducted to determine the number of pedestrians that would need to be present during the peak hour for each location to meet warrants for enhancements. From this analysis it was concluded that the crossings at Sayre Avenue in Nice and Acorn Street in Clearlake Oaks would both meet the warrants for a HAWK signal using the NCHRP warrants with an increase of only 14 to 15 pedestrians during the peak hour. Similarly, the remaining crossings would meet the NCHRP warrants for enhanced crossing treatments with only a moderate increase in pedestrian crossing activity. Given the characteristics of the surrounding land uses and destinations, it would be reasonable to assume that the number of pedestrians crossing at these locations would increase as a result of improved pedestrian infrastructure, so intersection crossing enhancements are recommended.

The crosswalk warrant results are summarized in Table 7 and copies of the worksheets are included in Appendix F.

Table 7 – Pedestrian Traffic Control Device Warrants

Community Intersecting Street	HAWK Existing Ped Activity	Enhanced Treatments (NCHRP)	
		Warrants Met? Existing Ped Activity	Warrants Met? Increased Pedestrian Activity
Nice			
<i>Sayre Ave</i>	No	No (0 peds)	Yes – “RED” (14 peds)
<i>Manzanita Dr (Howard)</i>	No	No (1 ped)	Yes – Enhanced (14 peds)
Lucerne			
<i>5th Ave</i>	No	No (8 peds)	Yes – Enhanced (25 peds)
<i>13th Ave</i>	No	No (5 peds)	Yes – Enhanced (24 peds)
Glenhaven			
<i>Midblock at Post Office</i>	No	No (10 peds)	Yes – Enhanced (14 peds)
Clearlake Oaks			
<i>Acorn St</i>	No	Yes (10 peds)	Yes – “RED” (15 peds)
<i>High Valley Rd</i>	No	No (2 peds)	Yes – Enhanced (34 peds)

Note: No = No additional enhancements; Enhanced = Warning Beacons or Geometric Enhancements; Red = midblock signal, half signal, HAWK; Peds = pedestrians; Pedestrian volumes in # peds per hour

Intersection Operations

The study included a detailed evaluation of operation at the following intersections on the corridor:

1. SR 20/Sayre Avenue
2. SR 20/Manzanita Drive (West)
3. 5th Avenue/SR 20
4. 13th Avenue/SR 20
5. SR 20/High Valley Road
6. SR 20/Keys Boulevard

Intersection Levels of Service

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using the unsignalized methodology for two-way stop-controlled intersections published in the *Highway Capacity Manual (HCM)*, Transportation Research Board, 2018, as applied by the Synchro 8 software package. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle. The “Two-Way Stop-Controlled” methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The ranges of delay associated with the various levels of service are indicated in Table 8.

Table 8 – Two-Way Stop-Control Intersection Level of Service Definitions

LOS	Two-Way Stop-Controlled
A	Delay of 0 to 10 seconds
B	Delay of 10 to 20 seconds
C	Delay of 20 to 35 seconds
D	Delay of 35 to 55 seconds
E	Delay of 55 to 80 seconds
F	Delay greater than 80 seconds

Reference: *Highway Capacity Manual*, 6th Edition, Transportation Research Board, 2018

Under existing conditions, all study intersections along the corridor were found to be operating at LOS A overall, which is considered acceptable under the applied standards. A summary of the intersection level of service calculations is contained in the Table 9. The calculations are included in Appendix G.

Table 9 – Existing Peak Hour Intersection Levels of Service

Study Intersection Approach	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. SR 20/Sayre Ave	0.9	A	0.8	A
<i>Northbound (Sayre Ave) Approach</i>	<i>12.2</i>	<i>B</i>	<i>16.7</i>	<i>C</i>
<i>Southbound (Sayre Ave) Approach</i>	<i>11.1</i>	<i>B</i>	<i>13.6</i>	<i>B</i>
2. SR 20/Manzanita Dr (West)	0.3	A	0.4	A
<i>Southbound (Manzanita Dr) Approach</i>	<i>10.3</i>	<i>B</i>	<i>10.5</i>	<i>B</i>
3. 5 th Ave/SR 20	0.3	A	0.3	A
<i>Westbound (Fifth Ave) Approach</i>	<i>11.0</i>	<i>B</i>	<i>11.0</i>	<i>B</i>
4. 13 th Ave/SR 20	0.9	A	0.7	A
<i>Westbound (Thirteenth Ave) Approach</i>	<i>10.3</i>	<i>B</i>	<i>10.8</i>	<i>B</i>
5. SR 20/High Valley Rd	0.2	A	0.7	A
<i>Southbound (High Valley Rd) Approach</i>	<i>10.1</i>	<i>B</i>	<i>12.2</i>	<i>B</i>
6. SR 20/Keys Blvd	1.7	A	1.7	A
<i>Northbound (Keys Blvd) Approach</i>	<i>11.1</i>	<i>B</i>	<i>14.6</i>	<i>B</i>
<i>Southbound (Private Driveway) Approach</i>	<i>12.1</i>	<i>B</i>	<i>16.9</i>	<i>C</i>

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Community Engagement

Overview

The purpose of the community engagement program was to create an open, inclusive process that engaged a representative cross-section of area residents and stakeholders. The consultant team convened a technical advisory group (TAG) that included a cohort of representatives from local and regional agencies to help inform the community engagement process and development of the recommended improvements. Members of the TAG included representatives from Lake Area Planning Council (Lake APC), Lake County Public Works, Lake Transit, and Caltrans District 1. The consultant team also engaged residents and stakeholders in an intensive and highly participatory public process to assess and document conditions for all travel modes (walking, bicycling, transit, and driving) and users (youth, seniors, people with disabilities, residents, visitors, and businesses), identify shared values and concerns, and identify and prioritize enhancements.

The community engagement process included the following activities:

Outreach Phase I - Shape Recommended Improvements:

- Community Workshop #1, Lucerne (May 16, 2019)
- Wikimapping Online Interactive Tool (July – October 2019)
- Community Engagement Booths at Public Events – National Night Out (August 6, 2019), Lake County Fair (August 29 – September 1)

Outreach Phase II - Refine/Prioritize Recommended Improvements:

- Community Workshop #2, Lucerne (September 19, 2019)
- Community Workshop #3, Nice (December 4, 2019)
- Community Workshop #4, Clearlake Oaks (December 4, 2019)
- Recommended Improvements Online Survey (January 2020)
- Feedback on Draft Plan at Lake APC Technical Advisory Committee (TAC) Meeting (March 2020)
- Final Plan Adoption at Lake APC Council Hearing (April 2020)

The comments received in Outreach Phase I are presented below. Results of Outreach Phase II are included in the “Development and Refinement of Alternatives” chapter.

Publicity

The consultant team developed fliers for the community workshops, the Wikimapping Interactive Online Tool, and the Recommended Improvements Online Survey. Fliers were distributed widely to an outreach list (including local news media, social media, partner agency listservs, local chamber of commerce and other groups, and physical fliers distributed to central locations/bulletin boards) that was developed with input from the TAG

members in February 2019. A sample of publicity materials and the list of outreach recipients is included in Appendix H.

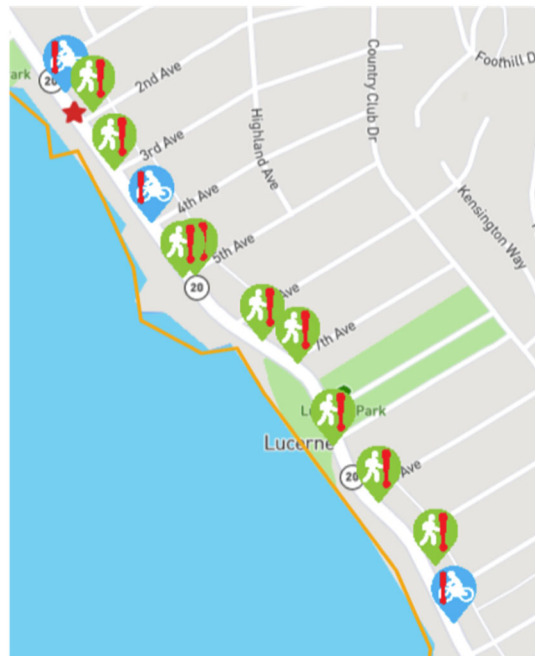
Outreach Phase I - Identify Concerns & Recommend Improvements

Community Workshop #1 (May 16, 2019)

The first community workshop was held in conjunction with the Lucerne Area Town Hall Meeting at the Lucerne Alpine Senior Center, a central location in Lucerne located close to Highway 20. The purpose of the workshop was to get feedback from residents and stakeholders to begin to understand the community's needs, key destinations where community members frequently travel or avoid, and opportunities for improvements. The community workshop included a presentation on tools and strategies for a walkable, bicycle-friendly highway corridor that supports motorists and non-motorists alike as well as the project purpose and goals, followed by an interactive mapping activity to solicit input and feedback. Community members located pedestrian, bicycle, and transit access issues on large maps of the project area. In total, approximately 25 community members attended the workshop. Community members were primarily concerned with speeding motor vehicle traffic and illegal maneuvers (such as passing slower traffic by illegally using the center median turn lane), and pedestrian safety concerns when crossing Highway 20.

WikiMapping Online Interactive Tool (July - October 2019)

The WikiMapping online interactive mapping tool was used to provide local stakeholders with an opportunity to identify specific locations where community members had difficulty walking, bicycling, accessing transit, driving, as well as key destinations in the project area. In addition to providing their own ideas, the tool allowed participants to respond or add to comments made by others on the map.



The WikiMapping online interactive mapping tool allowed users to pinpoint locations in the project area where there are issues or opportunities for improvements to walking, biking, and transit access.

In total, 157 comments were received, the overwhelming majority of which were concerning pedestrian-related improvements. These results are included in Appendix H. Key feedback, organized by community, included:

Nice

Pedestrian safety was a top concern due to traffic speeds and unsafe crossing conditions, including lack of marked and enhanced crosswalks and visibility of pedestrians entering the roadway or waiting to cross the street. Improved pedestrian lighting was also cited as a high priority for pedestrians, particularly at crosswalks. Generally, these improvements are desired at intersections with high pedestrian activity, such as grocery stores, parks, shopping centers, gas stations, and other public locations.

Lucerne

Pedestrian safety was a top concern also due to traffic speeds and lack of crosswalks and visibility of pedestrians seeking to cross the street (large parked vehicles in the center of town make visibility particularly challenging). Lack of sidewalks is also a top pedestrian safety issue. In particular, the lake side of Highway 20 has intermittent or no sidewalks throughout the project area in Lucerne.

The desire for improved bicycle facilities is another top concern, particularly in the north and south ends of the project area, but also in the center of town. Pinch points also make bicycle travel difficult, including the narrow bridge west of Lake Street and where large vehicles park on the roadway near the center of town, further narrowing the travel lane for bicycles.

Glenhaven

Pedestrian safety was a top concern, particularly since there are narrow roadways with corners with restricted sight lines and no pedestrian facilities. Linden Lane and the Post Office were identified as areas of concern in need of pedestrian improvements.

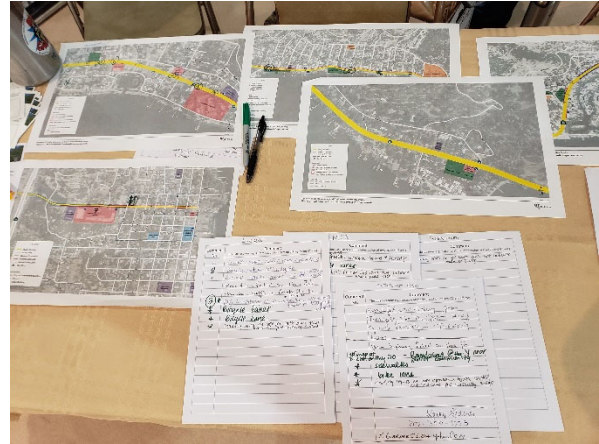
Clearlake Oaks

Pedestrian safety crossing Highway 20 was a top concern due to high motor vehicle speeds and unsafe crossing conditions.

Community Engagement Booths at National Night Out (August 6, 2019) and the Lake County Fair (August 29 - September 1)

The consultant team and Lake APC staff attended two community events to solicit additional input from people who live in, visit or drive the Highway 20 corridor through the study area. The booths included maps of the project area, “sticky dots” to identify challenges and potential solutions for walking, bicycling, transit, and driving, as well as sticky notes for general comments and feedback.

In total, staff spoke with approximately 30 community members at the “National Night Out” booth and 80 community members at the Lake County Fair booth.



Community members provide comments on maps of the project area at the Lake County State Fair, August 29 – September 1, 2019.

Key feedback received organized by community, included:

Nice

The major themes from these events were the same as the input received from the WikiMapping interactive mapping tool. Pedestrian safety was a top concern, in particular, with participants expressing concerns about traffic speeds and difficult crossing conditions, including lack of crosswalks. Improved pedestrian lighting at crosswalks was also a top concern, as comments included insufficient visibility of pedestrians seeking to cross the street. Improvements were recommended at intersections with high pedestrian traffic activity including grocery stores, parks, shopping centers, gas stations, and other public locations.

Lucerne

High motor vehicle speeds were generally cited as a top concern throughout the project area.

Glenhaven

Improving crosswalk safety and slowing vehicle traffic at the south entrance to the community, particularly near the Post Office, were cited as top concerns throughout the project area.

Clearlake Oaks

Unsafe motor vehicle speeds and maneuvers (especially drivers using the two-way left-turn lane to pass slower moving traffic), was cited as a top concern throughout the project area.

Similar to the feedback received from the WikiMapping interactive mapping tool, the overwhelming majority of comments received concerned pedestrian-related improvements.

Best Practices and Potential Improvement Measures

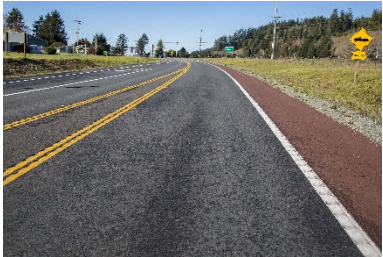
Based on the information collected, analysis of corridor conditions, and deficiencies noted, a “toolbox” of potential improvement measures as well as a set of specific potential infrastructure improvements was identified for consideration in developing the recommendations for this Plan.

Best Practice Toolbox

The following toolbox includes infrastructure improvements to address speed reduction, pedestrian crossing safety, bicycle facilities and other vehicle transportation best practices. These treatments were presented at the initial community workshop to solicit feedback, and were also reviewed by members of the TAG, including Caltrans.

Shoulder with Colored Pavement

- Helps slow traffic
- Delineates shoulder from travel lanes and parking
- Defines pedestrian walkways in rural areas
- Provides high visibility
- Has a low cost
- Reduces visual width of the street



Raised Median Pedestrian Refuge Island

- Reduces crossing distance
- Provides protection from vehicle traffic
- Allows pedestrians to cross one direction of traffic at a time
- Slows and calms traffic



Flush Pedestrian Refuge Island

- Reduces crossing distance
- Allows pedestrians to cross one direction of traffic at a time
- Slows and calms traffic



Roundabout

- Designed to slow speeds and significantly reduce collisions by requiring all vehicles to turn right as they enter the intersection
- Provides sidewalks and bicycle facilities along the perimeter
- Accommodates crosswalks through the splitter islands to create short crossing distances



Rectangular Rapid Flashing Beacon

- Increases driver awareness of pedestrians
- Is pedestrian-activated
- Is effective near schools and other locations with high pedestrian volumes



HAWK (Pedestrian Hybrid Beacon)

- Stops traffic when activated by pedestrian
- Is unlit when not in use, so has minimal impact on traffic flow
- Provides a protected crossing for pedestrians at locations with high traffic volumes



Curb Extension

- Reduces crossing distance, allowing pedestrians to cross more safely
- Provides additional visibility and protection for pedestrians, especially children
- Slows and calms traffic, particularly fast traffic turning from a major to a minor road



Class II Bike Lane

- Improves conditions for bicyclists by giving them exclusive right of way
- Increases visibility for drivers, making it easier to see cyclists
- Promotes cycling



Buffered Bike Lane

- Provides greater shy distance between motor vehicles and bicyclists
- Provides space for bicyclists to pass another bicyclist without encroaching into the vehicle travel lane
- Encourages bicycling by contributing to the perception of safety among users of the bicycle network



Raised Medians for Traffic Calming

- Slows traffic
- Creates space between vehicles on either side
- Reduces head on collisions



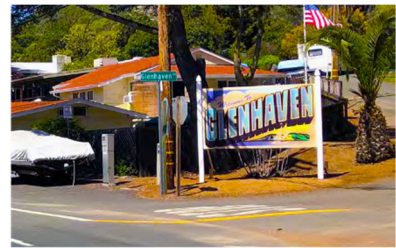
High Visibility Bike Lane Striping

- Used at high conflict zones, such as commercial driveways
- Alerts drivers, helps them anticipate bicyclists
- Designates space for bicycles, helps them maintain safe positioning in roadway



Gateway Treatments

- Provide a sense of place
- Have traffic calming potential
- Give driver notification of arrival



Pedestrian Lighting

- Increases visibility of pedestrians crossing the street
- Enables pedestrians to more easily see their surroundings
- Enhances visibility and promotes public safety



Bicycle Parking

- Provides designated place to leave bicycles at destination
- Guards against bicycle theft if well-designed
- Encourages bicycling



Street Trees

- Slows down traffic
- Provides shade
- Provides visual interest



Crosswalks

- Raises awareness of drivers to presence of pedestrians
- Increases visibility of pedestrians to drivers
- Guides pedestrians to recommended crossing locations



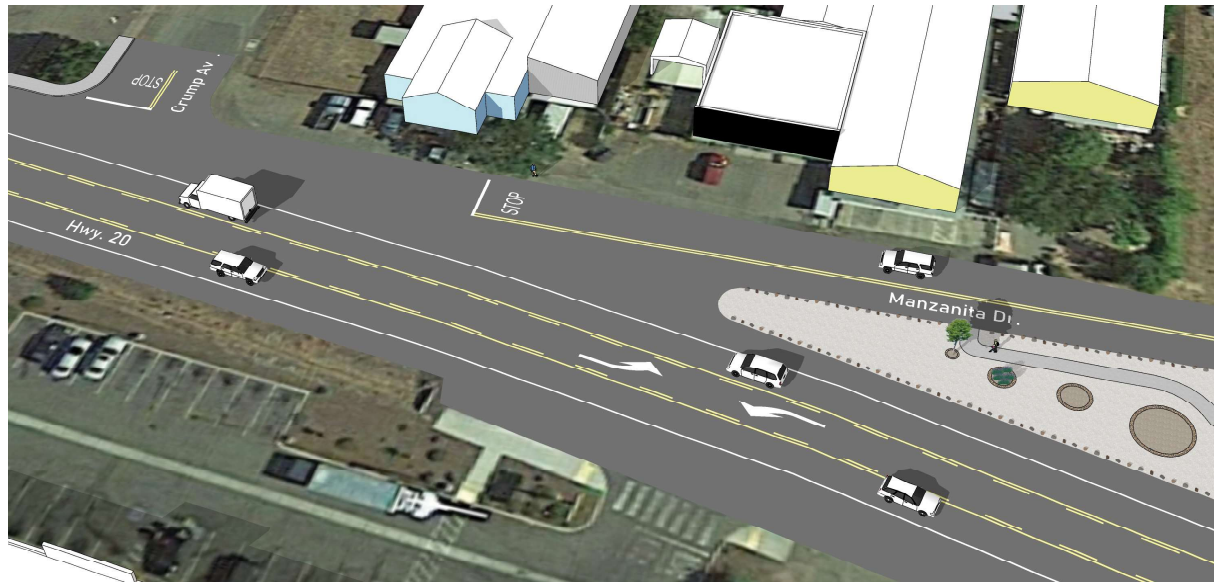
Green Infrastructure

- Convey drainage
- Provide buffer between pedestrians and traffic
- Create visual interest
- Lessen "heat island" effect



Specific Infrastructure Concepts

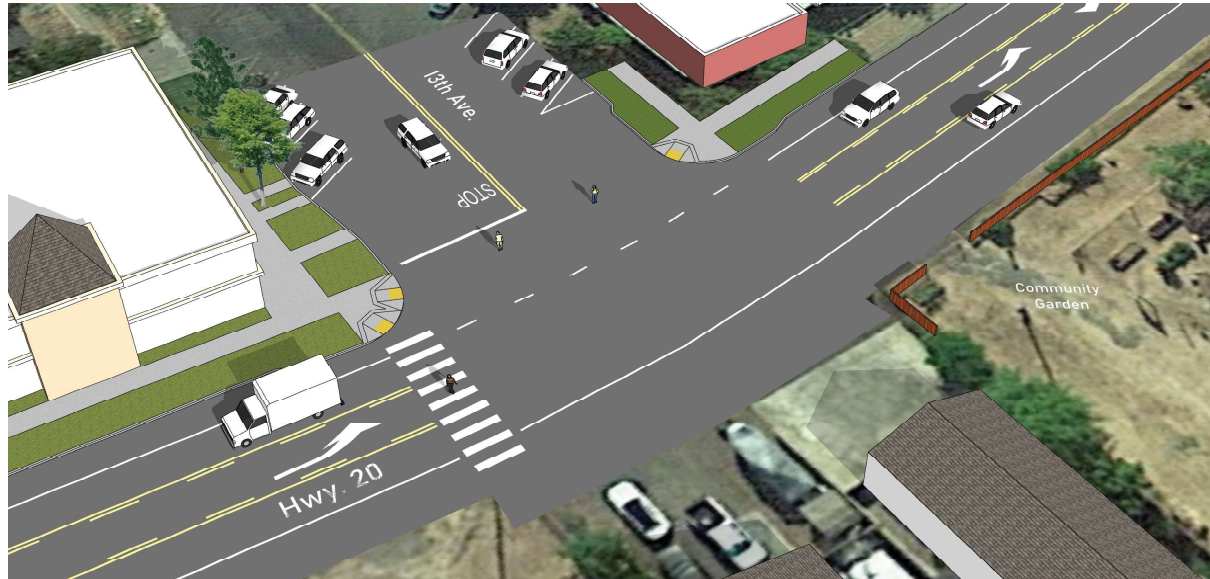
The best practice measures were applied to specific pedestrian crossing locations in Nice, Lucerne and Clearlake Oaks as shown in the 3D images in Figures 5, 6 and 7.



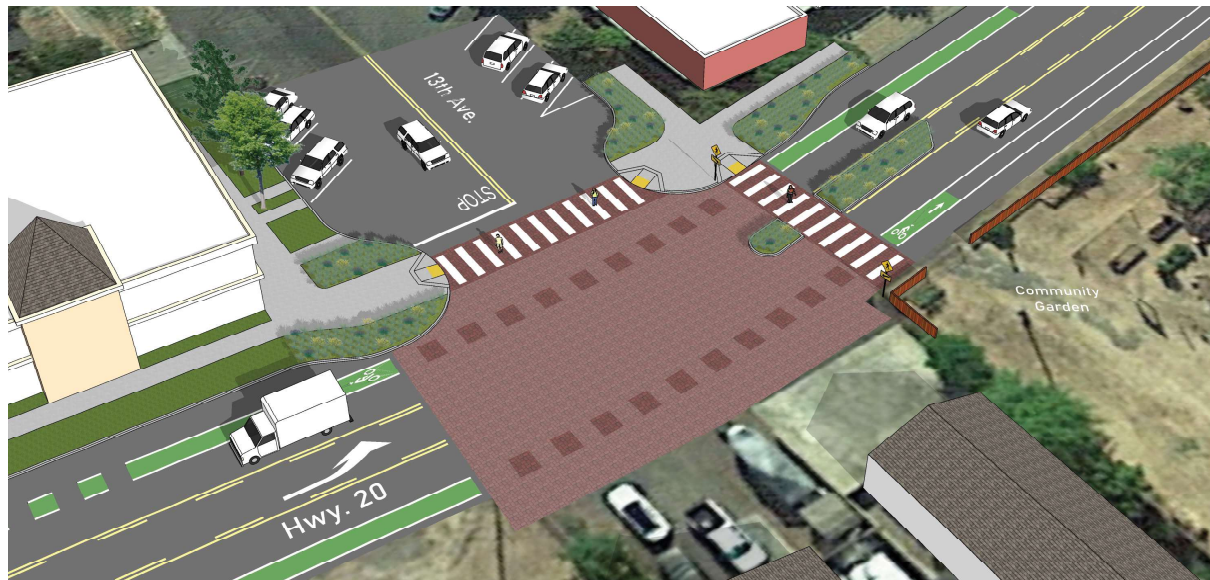
Existing Conditions



Proposed Concept



Existing Conditions



Proposed Concept



Existing Conditions



Proposed Concept

Development and Refinement of Alternatives

Based on the recommendations developed through previous studies, data analysis, information collected through field reviews, and input from the public, six strategies were identified to best address the chief concerns in the corridor. While the themes are largely consistent throughout the corridor, the recommended treatments vary by community, as described below.

Strategies to Address Key Issues

Strategies were selected based on their effectiveness in addressing the identified problem; impacts on circulation and emergency vehicle access; and construction and maintenance costs. Input from Caltrans was also considered, as Caltrans approval will be required for any modifications within the state-owned right-of-way and they would be responsible for ongoing maintenance.

- **Enhance pedestrian crossing safety:** Infrastructure improvements can be used to enhance pedestrian crossings by reducing the crossing distance and raising awareness of motorists to the presence of pedestrians. Treatments that could benefit pedestrians include new marked crosswalks, colored pavement to visually define pedestrian refuge areas, high visibility signage, and flashing warning beacons. Pedestrian refuge islands have only been recommended to reduce crossing distances at locations where they would not impact vehicle turning movements. For intersections where turning movements would be impacted – including four-legged intersections – curb extensions were recommended to reduce the crossing distance rather than a center median. Lighting is an additional element that would enhance roadway crossings and should be included at all crosswalks in the study area (see discussion below).
- **Establish continuous pedestrian walkways:** Sidewalks or another type of designated “all-weather” walkway should be in place on both sides of Highway 20 throughout each of the four study communities. This would address the lack of walkways in many areas, provide continuity of the fragmented existing walkways, and enhance access to local destinations such as businesses, recreational areas, and bus stops. Concrete sidewalks with curb and gutter are recommended in locations anticipated to be used by higher volumes of pedestrians and where they would eliminate gaps in existing sidewalks. At other locations, striped asphalt walkways are generally recommended, as they would provide designated pedestrian space at a significantly lower cost. Use of colorized asphalt along roadway shoulders is one option that may be used to identify space for pedestrians while visually narrowing the roadway to encourage reduced vehicle speeds.
- **Establish continuous bicycle facilities:** To facilitate bicycle travel along Highway 20 within the study communities, bike lanes have been recommended in Nice, Lucerne, and Clearlake Oaks. In Glenhaven, given the community’s small size and modest demand for walking and bicycling trips, the use of colorized asphalt is recommended for use by both bicyclists and pedestrians. To further support bicycle access, bicycle parking is recommended for locations where high demand is anticipated.
- **Improve lighting for pedestrians:** Lighting has been recommended to improve visibility for pedestrians travelling along the corridor and crossing the street and to make them more visible to drivers. This includes providing lighting that would provide adequate illumination longitudinally along the sidewalks and walkways as well as across the entire crossing at all marked crosswalks. (The County and Caltrans would need to come to an agreement of which agency would be responsible for lighting installation and maintenance.)
- **Discourage use of center turn lane as a passing lane:** Numerous agency staff and residents indicated that the TWLTL in Nice, Lucerne, and Clearlake Oaks is used by some drivers as a passing lane, adding to the challenges pedestrians face crossing the roadway. The proposed refuge islands should encourage drivers to remain in the travel lane and reduce the incidence of this behavior. The refuge islands would be marked with

paint or thermoplastic and would be flush with the roadway. Traffic enforcement activities by the California Highway Patrol would further support the use of engineering strategies to address this issue. Given the length of the corridor, these efforts should strategically target locations where this illegal and inappropriate use of the turn lane has been reported and documented.

- Reduce vehicle speeds:** Several of the strategies described above would help to better visually narrow the roadway and define the space allocated to all roadway users. While many of these treatments are recommended for use at specific intersections and roadway segments, this plan also recommends taking a corridor-level approach to speed reduction through the use of gateway treatments on both entries of each of the four communities. Such treatments – including community gateway signage, radar feedback signs, speed reduction pavement markings, and colorized median islands – offer a way of signaling drivers that they are entering an area with higher levels of activity and they should expect to see pedestrians and bicyclists. Recommendations are made not only for new facilities, but also for relocation or modification of some of the existing gateway treatments.

Preliminary Recommendations

Corridor Recommendations

To address the identified concerns, the consultant team developed recommendations for each of the four communities. This included corridor-focused treatments to enhance bicycling and walking along Highway 20 through each of the communities as summarized in Table 10.

Community	Limits	Description
Nice	Entire study area	Bike lanes Sidewalk gaps Asphalt walkway
Lucerne	Entire study area	Bike lanes Sidewalk gaps
Glenhaven	Entire study area	Colorized shoulder
Clearlake Oaks	Island Dr to Foothill Blvd	Bike lanes Sidewalk gaps

Pedestrian Crossing Recommendations

The consultant team also developed intersection-specific recommendations that focused on enhancing safety of pedestrian crossings at key locations, as listed in Table 11.

Table 11 – Existing Pedestrian Crossing Facilities and Preliminary Recommendations

Community Intersecting Street	Existing	Recommendation
Nice		
<i>Sayre Ave</i>	Crosswalk (west)	Bulb-outs
<i>Keeling Ave</i>	Crosswalk (east)	Pedestrian refuge island, RRFB*
<i>Howard Ave</i>	Crosswalk (west)	Pedestrian refuge island; close 1 block of Howard on north side
<i>Hudson Ave</i>	Crosswalk (west)	Bulb-outs
Lucerne		
<i>1st Ave</i>	Crosswalk (east)	Pedestrian refuge island, RRFB*
<i>3rd Ave</i>	Crosswalk (both)	Pedestrian refuge island on east leg
<i>7th Ave</i>	No crosswalk	New crosswalk; pedestrian refuge island; walkway to park
<i>10th Ave</i>	Crosswalk (west)	Bulb-out on south side
<i>11th Ave</i>	No crosswalk	New crosswalk on east leg; pedestrian refuge island
<i>13th Ave</i>	Crosswalk (west)	New crosswalk on east leg; pedestrian refuge island, RRFB*
<i>16th Ave</i>	Crosswalk (west)	Bulb-out on south side
Clearlake Oaks		
<i>Pine St</i>	Crosswalk (east)	Pedestrian refuge island
<i>Acorn St</i>	Crosswalk (east)	Pedestrian refuge island (see concept design)
<i>Foothill Blvd</i>	Crosswalk (west)	Bulb-outs
<i>Lakeland St</i>	Crosswalk (east)	Bulb-outs
<i>High Valley Rd</i>	Crosswalk (east)	Bulb-out on south side, RRFB* (school)
<i>Butler St</i>	Crosswalk (east)	Reconsider guardrail location; if feasible relocate crosswalk to west leg; pedestrian refuge island
<i>Hoover St</i>	Crosswalk (east)	Bulb-outs
<i>Keys Blvd</i>	Midblock crosswalk	Bulb-outs

Note: * Rectangular Rapid Flashing Beacons

It should be noted that raised medians were presented during this process as a measure to a) enhance pedestrian crosswalks, b) discourage the use of the center TWLTL for passing and c) to assist with speed reduction. Caltrans has indicated that raised medians are not currently acceptable as the center TWLTL provides additional space that can be used to enhance emergency vehicle access and fire evacuation, and due to safety concerns if vehicles that are travelling at the recorded speeds collide with the raised medians base. The California Highway Patrol (CHP) and CalFire also expressed concern about the potential impact of raised medians on emergency vehicle access.

Caltrans has indicated a willingness to accept flush, colorized medians and to review their impact over time and to consider the use of raised medians in the future if these flush medians do not result in the desired speed reduction effect.

Stakeholder Input (Phase II)

Outreach Phase II built on Phase I by consolidating the community’s priorities, needs, and identified problem and opportunity areas into the development of a series of recommended improvements. The recommended

improvements were presented for additional community feedback in community workshops 2, 3 and 4 and via an online survey. The feedback received as a result of community engagement in Outreach Phase II shaped the final recommendations presented in this report.

Caltrans Comments

As Highway 20 is part of the state highway system, approval from Caltrans is necessary to implement any improvements within its right-of-way. The consultant team provided Caltrans District 1 staff with a preliminary list of recommended locations and design treatments. Subsequently, the consultant and Lake APC had several discussions with Caltrans staff to review these proposals and to identify and address issues of concern.

As previously mentioned, Caltrans staff expressed concern about the proposed raised pedestrian refuge islands, as the two-way left-turn lane would no longer be continuous throughout the study corridor. Caltrans identified the following concerns:

- **Emergency vehicle access:** The two-way left-turn lane currently enhances emergency vehicle access by providing a route that is separated from the through travel lanes.
- **Impacts to circulation:** Depending on the specific location, pedestrian refuge islands could impact left-turning vehicles, which currently enter the two-way left-turn lane prior to turning onto side streets.
- **Safety:** Drivers may collide with the raised medians. Given the current vehicle speeds in the corridor, collisions would be more likely to cause injuries or significant damage to vehicles.
- **Evacuation routes:** The two-way left-turn lane can be used as part of an evacuation route for emergencies when traffic capacity would be strained.

Phase II Community Workshops

Preliminary plans were presented at the community workshops on September 19 and December 4 community workshops. The September 19 workshop was held in Lucerne, which was selected due to its central location in the corridor. However, this resulted in minimal participation from residents of the other study area communities. To solicit additional input, workshops were held in Nice and Clearlake Oaks on December 4. Key recommendations, organized by community, include:

Nice

The majority of community members indicated that they preferred the draft improvements identified along Highway 20 in Nice. Notable areas of consensus included:

- Bulb-outs at Sayre Avenue
- Crosswalk with Channelization at Manzanita Avenue

Lucerne

The majority of community members indicated that they preferred many of the draft improvements presented in Lucerne. Notable areas of consensus included:

- Flush Pedestrian Refuge Island at 1st Avenue
- Crosswalk at 7th Avenue
- Flush Pedestrian Refuge Island at 7th Avenue
- Pedestrian Path to Park at 7th Avenue

- Bulb-out on south side at 10th Avenue
- Crosswalk on east side of 11th Avenue
- Bulb-out on south side at 16th Avenue
- Flush Traffic calming median at 16th Avenue

Glenhaven

Input received centered around the desire for a crosswalk at the post office.

Clearlake Oaks

Community members overwhelmingly supported nearly every improvement presented, with the exception of one community member having a neutral preference for relocating the guardrail at Butler Street.

Online Survey

After the December community workshops, an online survey was posted to solicit additional feedback on the draft concept plans. In total, 149 survey responses were received which are included in Appendix H. Respondents were asked to rate each recommended improvement on a scale from 1 to 5, with ratings ranging from “1” being a strong dislike to “5” being a strong like. Key feedback received provided below is organized by community and received an average preference score of at least 3.8 or above:

Nice

- Rectangular Rapid Flashing Beacons (RRFBs) at Keeling Avenue
- Crosswalk with Channelization at Manzanita Avenue
- Traffic Calming Walkway at Hudson Avenue

Lucerne

- RRFBs at 3rd Avenue
- Crosswalk at 7th Avenue
- Pedestrian Path to Park at 7th Avenue
- Flush Traffic Calming Median at 11th Avenue
- Crosswalk on east side of 13th Avenue
- Flush Traffic Calming Median at 16th Avenue

Clearlake Oaks

- RRFBs at High Valley Road
- Flush Traffic Calming Medians at High Valley Road
- Flush Traffic Calming Medians west of Keys Boulevard

Recommended Plan

Based on consultation with Caltrans, the TAG, and stakeholder input, the preliminary recommendations largely remained the same, but were refined and updated as needed. As noted earlier, Caltrans District 1 staff expressed opposition to the use of raised medians along Highway 20 given current conditions. The recommended plan has retained the concept of using pedestrian refuge islands, but the refuge islands were designed to be flush with the roadway. The final recommendations are described in Table 12 and Table 13 below for each of the study communities. It should be noted that the concept plans provided in this report will be more fully developed as the design process moves forward. Issues such as providing adequate turning radii for the largest expected vehicles will be addressed at that time.

Table 12 – Recommended Improvements for Bicycling and Walking Along Highway 20

Community	Limits	Description
Nice	Entire study area	Bike lanes Sidewalk gaps Asphalt walkway
Lucerne	Entire study area	Bike lanes Sidewalk gaps
Glenhaven	Entire study area	Colorized shoulder
Clearlake Oaks	Island Dr to Foothill Blvd	Bike lanes Sidewalk gaps

Table 13 – Existing Pedestrian Crossing Facilities and Preferred Plan Recommendations

Community Intersecting Street	Existing	Recommendations
Nice		
<i>Sayre Ave</i>	Crosswalk (west)	Bulb-outs
<i>Keeling Ave</i>	Crosswalk (east)	Pedestrian refuge island; RRFB
<i>Howard Ave</i>	Crosswalk (west)	Bulb-outs, shift crosswalk to the west; close 1 block of Howard Ave on north side
<i>Hudson Ave</i>	Crosswalk (west)	Bulb-outs
Lucerne		
<i>1st Ave</i>	Crosswalk (east)	Pedestrian refuge island; RRFB
<i>3rd Ave</i>	Crosswalk (both)	Pedestrian refuge island on east leg
<i>7th Ave</i>	No crosswalk	New crosswalk; pedestrian refuge island; walkway to park
<i>10th Ave</i>	Crosswalk (west)	Bulb-out on south side
<i>11th Ave</i>	No crosswalk	New crosswalk on east leg; pedestrian refuge island
<i>13th Ave</i>	Crosswalk (west)	New crosswalk on east leg; pedestrian refuge island; RRFB
<i>16th Ave</i>	Crosswalk (west)	Pedestrian refuge island; bulb-out on south side
Clearlake Oaks		
<i>Pine St</i>	Crosswalk (east)	Pedestrian refuge island
<i>Acorn St</i>	Crosswalk (east)	Pedestrian refuge island (see concept design)
<i>Foothill Blvd</i>	Crosswalk (west)	Bulb-outs
<i>Lakeland St</i>	Crosswalk (east)	Bulb-out on south side
<i>High Valley Rd</i>	Crosswalk (east)	Bulb-out on south side; RRFB (school); refuge island
<i>Butler St</i>	Crosswalk (east)	Relocate crosswalk to west leg and add refuge island if internal walkway is provided from intersection to Dollar General entrance and if feasible based on traffic circulation considerations; ADA ramp should be provided on north side regardless of crosswalk location.
<i>Hoover St</i>	Crosswalk (east)	Bulb-outs; refuge island
<i>Keys Blvd</i>	Midblock crosswalk	Bulb-outs; refuge island

Note: RRFB = Rectangular Rapid Flashing Beacons

Community Recommendations

Nice

Primary concerns identified by the public and through field observation were high speed traffic, low incidence of drivers yielding to pedestrians, limited sidewalks, and in adequate lighting at crosswalks and along sidewalks. The following facility recommendations are made for Nice:

- **Pedestrian refuge islands** were recommended for the existing crosswalks at Keeling Avenue and Howard Avenue. The refuge island at the Howard Avenue crosswalk would be contingent on closing the block of Howard Avenue between Manzanita Drive and Highway 20 to vehicular traffic.

- **Curb extensions** were recommended at the existing crosswalks at Sayre Avenue and Hudson Avenue.
- **Pedestrian walkways** should be provided throughout the study area to establish continuous pedestrian facilities in the most densely developed part of the community. This should take the form of sidewalks where they would connect to existing facilities. At other locations the walkway could be an asphalt path, which would be a less expensive alternative. These improvements should include the areas at bus stops to enhance pedestrian access to transit service.
- **Rectangular rapid flashing beacons (RRFB)** were recommended at the intersections of Highway 20 and Keeling Avenue due to its proximity to Hinman Park and Lake Transit bus stops.
- **Bike lanes** were recommended along the entire length of Highway 20 through this portion of the study area. The bike lanes could be implemented without any impacts to on-street parking in the area.

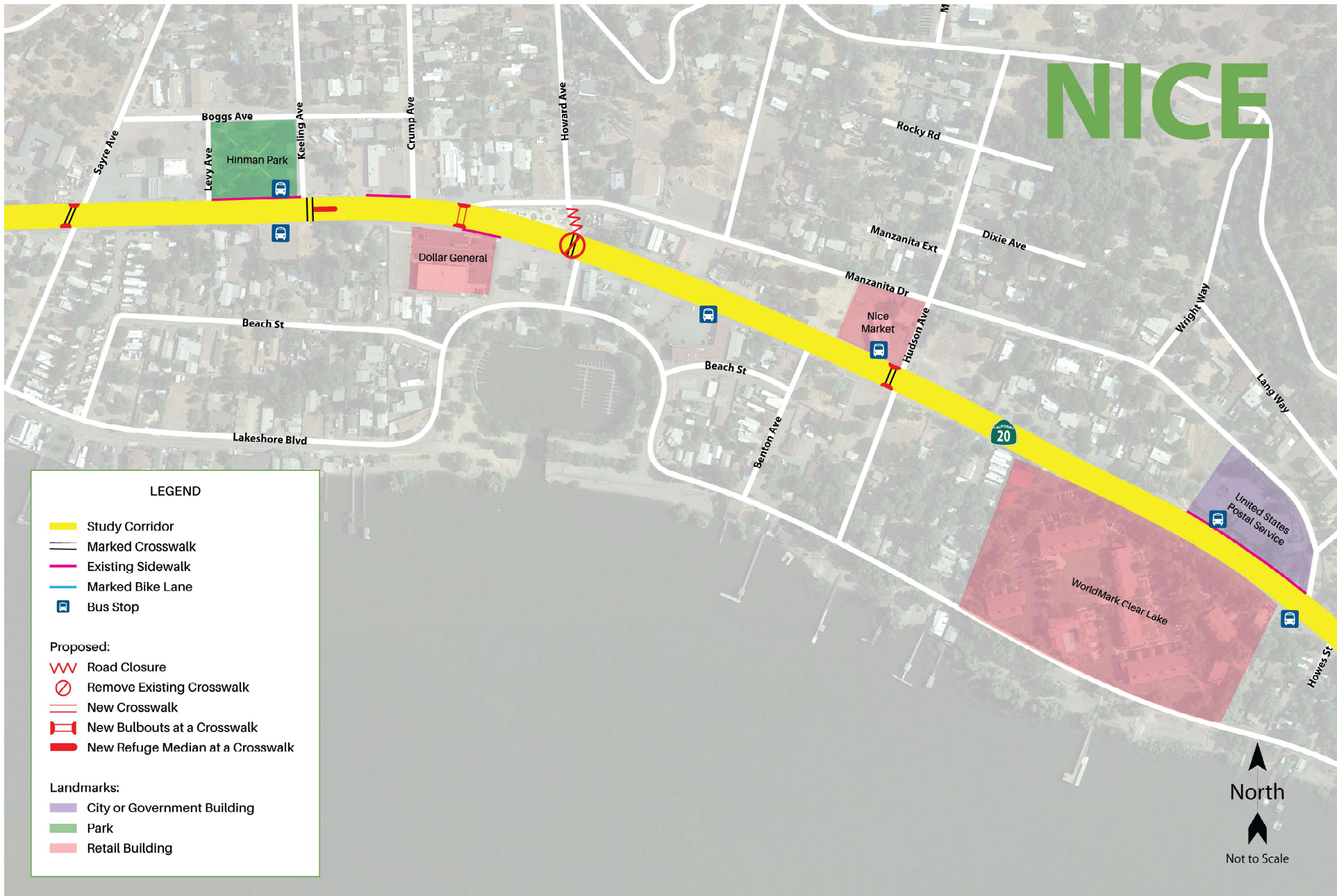
The recommendations for Nice are illustrated in a “30 percent geometric concept plan” which is provided in Appendix I and also shown in Figure 8.

Lucerne

The following recommendations are made for Lucerne:

- **Crosswalks** should be constructed on the east leg of the intersections at 7th, 11th, and 13th Avenues. Crosswalks were recommended only at strategic locations, as overuse of crosswalks tends to reduce their effectiveness.
- **Pedestrian refuge islands** were recommended for the east leg of the intersections at 1st, 3rd, 7th, 11th, and 13th Avenues. As these are all T-intersections along the lakefront, westbound drivers do not have an option to turn left, so the refuge island at these locations would not impact local circulation. Refuge islands would be flush with the existing pavement.
- **Curb extensions/bulb-outs** were recommended for the western leg of existing crosswalks at 10th Avenue and 16th Avenue. Pedestrian refuge islands were determined to be inappropriate for these locations as they would impact left-turning vehicles; curb extensions are an alternative means of providing protection for pedestrians and reducing the crossing distance.
- **Pedestrian walkways** were recommended along both sides of Highway 20 throughout the study area. Sidewalks along the north side of Highway 20 are generally five feet wide and extend throughout the study area. In some locations the effective width has been narrowed by vegetation; regular maintenance should be undertaken to maintain a minimum width of five feet, and consideration should be given to widening sidewalks at high demand locations. An asphalt path was recommended east of the waterfront area, which has an existing sidewalk.
- **Pedestrian beacons**, rectangular rapid flashing beacons (RRFB), should be installed at the intersections of Keeling Avenue and 13th Avenue.
- **Bike lanes** were recommended for the entire length of the study area. To retain on-street parking, it was recommended that the centerline of the roadway be relocated toward the south, as it was determined that the public right-of-way along the south side of the roadway is sufficient to accommodate this modification.

The recommendations for Lucerne are illustrated in a “30 percent geometric concept plan” in Appendix J and also shown in Figure 9.



SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study
Figure 8 – Proposed Crosswalk Improvements (Nice)





SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study
Figure 9 – Proposed Crosswalk Improvements (Lucerne)

Glenhaven

The Glenhaven portion of the study area is approximately one-quarter mile long, the smallest of the four study communities. It is the only community with a two-lane configuration, without a two-way left-turn lane.

- **Colorized shoulders** were recommended throughout Glenhaven to provide accommodations for pedestrians and bicyclists and to visually narrow the roadway to drivers. Given the size of the community and the anticipated level of demand, sidewalks and bike lanes were determined not to be cost-effective. Similar treatments have been effectively used along other state highways passing through rural communities as shown in Plate 8.



Plate 8 Colorized Shoulders

Clearlake Oaks

The recommendations for Clearlake Oaks are primarily limited to the western portion of the study area, as pedestrian- and bicycle-related improvements had been previously completed on the eastern end. The Eastlake Elementary Safe Routes to School Project, which extended from the intersection of Foothill Boulevard to Clear Lake Oaks Plaza, included sidewalks, bike lanes, lighting improvements, and new crosswalks.

- **Pedestrian crossings:** No new marked crosswalks were recommended. However, it was recommended that the intersection of Highway 20/Acorn Street be realigned to reduce the length of the crosswalk and provide a more comfortable crossing environment for pedestrians.
- **Pedestrian refuge islands** were recommended at the intersections of Highway 20 with Pine Street, Acorn Street, and Butler Street.
- **Curb extensions/bulb-outs** should be installed at existing crosswalks at the intersections of Foothill Boulevard, Lakeland Street, High Valley Road (south side only), Hoover Street, and west of Keys Boulevard.
- **Pedestrian walkways:** Currently most of the study corridor east of the intersection of Highway 20/Oakgrove Avenue has existing sidewalks along both sides of Highway 20. It was recommended that sidewalks be constructed along the remainder of the study area to eliminate gaps in the main commercial area.
- **Bike lanes:** It was recommended that the existing bike lanes be extended west of Oakgrove Avenue to cover the entirety of the Clearlake Oaks study area.

The recommendations for Clearlake Oaks are illustrated in a “30 percent geometric concept plan” in Appendix K and also shown in Figure 10.

CLEARLAKE OAKS

LEGEND

- ▬ Study Corridor
- ▬ Marked Crosswalk
- ▬ Existing Sidewalk
- ▬ Marked Bike Lane
- Ⓜ Bus Stop

Proposed:

- ▬ Road Closure
- ⊘ Remove Existing Crosswalk
- ▬ New Crosswalk
- ▬ New Bulbouts at a Crosswalk
- ▬ New Refuge Median at a Crosswalk

Landmarks:

- ▭ City or Government Building
- ▭ Park
- ▭ Retail Building



SR 20 Northshore Communities Traffic Calming Plan and Engineered Feasibility Study
Figure 10 – Proposed Crosswalk Improvements (Clearlake Oaks)



Corridor-Level Recommendations

Lighting

Lighting, where available in the study area, is generally designed to serve the needs of drivers. The exception is the eastern half of Clearlake Oaks, where the safe routes to school improvements included pedestrian-scale lighting at each marked crosswalk. This practice should be implemented throughout the remainder of the study corridor to enhance visibility of pedestrians to drivers. This issue was raised by numerous participants in the community engagement process, particularly in Nice.

Guidelines for Traffic Calming Entry Features

There are currently a series of “traffic calming entry features” along the Highway 20 corridor near the entrances to each of the four study communities, including radar speed displays, pedestrian zone signs, place name signs, and pedestrian beacons. These signs and devices are intended to communicate to drivers that they are entering a developed area, that they should expect to see pedestrians crossing the roadway, and that they should reduce their speeds. While all of these features are in place at most of the entrances to each of the communities, there are some locations where they are not provided. In addition, the placement is inconsistent and could potentially be modified to be more effective.

- **Pedestrian zone warning signs:** These signs serve as a reminder to drivers to expect to see pedestrians in developed areas. These signs have been installed throughout the study area, but the locations are not linked to specific areas where pedestrian crossings would be anticipated. For example, the pedestrian warning sign approaching Clearlake Oaks in the westbound direction indicates that pedestrians would be present for the following 21 miles.
- **Flashing beacons:** Flashing beacons are present at the eastbound and westbound entrances to Nice, Lucerne, and Clearlake Oaks. These beacons are continuously flashing, and while they are generally visible to drivers, they may not have as great of a speed reduction effect as push-button activated beacons, which flash only when pedestrians are present.
- **Radar speed displays:** Radar speed signs are present at each of the four study communities, near the eastbound and westbound entrances to Clearlake Oaks, the westbound entrances to Nice and Lucerne, and the eastbound entrance to Glenhaven. These devices serve to notify drivers of their current speeds and the speed limit, encouraging speed reduction.
- **Place name signs:** Place name signs are located at the entrance to each of the four study communities, with the exception of the eastbound direction approaching Nice and the eastbound direction approaching Clearlake Oaks. They are located outside of the public right-of-way and are therefore not necessarily consistent with the requirements of the Caltrans Gateway Monuments program, which governs such signs on properties overseen by Caltrans. While these signs have the potential to serve as an artistic statement and reflect the local community character, the signs are often difficult to see due to their location and they are inconsistently applied throughout the study area. For example, the sign in the westbound direction entering Clearlake Oaks is near the center of the study area, while the radar sign and flashing beacon are located approximately one mile further east. Examples of place name signs are shown in Plates 9 and 10.



Plate 9 Glenhaven Welcome Sign



Plate 10 Needles Welcome Sign

- **Traffic calming medians:** Similar to the pedestrian refuge islands and colored shoulders discussed above, traffic calming medians would serve to visually narrow the roadway. These medians could be designed either flush with the roadway or as a raised median and would further identify an area as more densely developed and encourage slower speeds.

General Guidelines

The following guidelines are recommended to provide consistency in the application of these treatments and enhance the effectiveness in the areas analyzed through this project. While Caltrans has jurisdiction over the highway right-of-way, these recommendations can serve as the basis for discussions between Lake County and Caltrans to agree upon the appropriate application of these measures to potentially reduce vehicle speeds and enhance the safety of the road for all users.

Placement: These treatments should be located approximately 300 to 600 feet in advance of the first marked crosswalk drivers will encounter as they enter the most densely developed part of each community. For traffic calming medians, the location may not coincide with the other features, as it will depend on the roadway configuration. Recommended application is typically where Highway 20 transitions from a two-lane roadway to a three-lane roadway with a two-way left-turn lane as indicated in Plate 11. Marked crosswalks are not recommended for these locations.



Plate 11 Two Way Left-turn Lane

Consistency: They should be installed in a consistent sequence to create a sense of consistency, enabling drivers to better anticipate the change in context as they travel through the corridor.

Cost Estimate of Recommended Plan

Following is a summary of the construction cost estimates for the infrastructure recommendations in each of the four communities:

Community	Description	Estimate (\$)
Nice	Striping, Crosswalks, Lighting, etc.	614,200
Lucerne	Striping, Crosswalks, Lighting, etc.	911,100
Glenhaven	Shoulder Paving	317,400
Clearlake Oaks	Striping, Crosswalks, Lighting, etc.	1,023,300
Total		2,866,000

Cost estimate details are included Appendix L.

Implementation and Funding

The timing and access to project funding is unpredictable. While the recommendations from this study could potentially be funded with a single grant, it may require agencies to be opportunistic in pursuing individual projects and assembling resources from multiple funding programs. To help guide the implementation of the preferred alternative, selected improvements were identified as priorities, based on which improvements are anticipated to meet the greatest need, as described below.

Near-Term Priorities

Recommended improvements were prioritized based on:

- **Location:** Intersection improvements were selected based on anticipated safety benefits as well as proximity to schools, parks, bus stops, and other generators of pedestrian traffic.
- **Access:** Facilities that will improve access for bicyclists and pedestrians along SR 20 were given a higher priority.
- **Elimination of gaps:** New sidewalks or pedestrian pathway segments were selected as priorities if they will eliminate a gap in the existing network, as this would benefit the users of the rest of the sidewalk network.
- **Geographic distribution:** Priorities were selected so that the priorities for each of the four study communities would be addressed.

The specific improvements identified as immediate priorities are described in Table 14.

Table 14 – Near-Term Priority Improvements			
Community	Location	Proposed Improvements	Justification
Nice	SR 20/Keeling Ave	Flush median, RRFB	Proximity to park and bus stops
	SR 20/Manzanita Ave	Reconfigure intersection to enhance safety, reuse excess roadway pavement	Reduce pedestrian crossing distance, proximity to Dollar General
	Entire study area	Bike lanes	Enhance bicycle access and safety
Lucerne	SR 20/3 rd Ave	Flush median, RRFB	Access to center of waterfront park
	Entire Study area	Bike lanes	Enhance bicycle access and safety
Glenhaven	Entire study area	Colorized shoulders	Visually narrow roadway, provide designated space for bicyclists and pedestrians
Clearlake Oaks	SR 20/High Valley Rd	Bulb-out, flush median, RRFB	Proximity to East Lake School and bus stops
	SR 20/Acorn St	Reconfigure intersection to enhance safety, flush median, reuse excess roadway pavement	Reduce pedestrian crossing distance, proximity to park and shopping
	SR 20 from Island Dr to Oakgrove Ave	Bike lanes	Enhance bicycle access and safety, complete bike lanes through center of Clearlake Oaks

Note: RRFB = Rectangular Rapid Flashing Beacon

Active Transportation Program

The Active Transportation Program (ATP) is the largest program in the state for projects designed to improve conditions for bicycling and walking, distributing over \$200 million per year. The program is highly competitive. The application scoring criteria prioritize funding to disadvantaged communities, and the four study area communities all qualify as disadvantaged under the ATP evaluation criteria. ATP is administered by the California Transportation Commission (CTC) and Caltrans.

Information about the program is available at the CTC web site (<https://catc.ca.gov/programs/active-transportation-program>) and the Caltrans web site (<https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/active-transportation-program>).

Potential Long-Term Recommendations

In addition to the near-term recommendations described above, there are several potential improvements that could potentially be implemented in the long term along the corridor as conditions change.

Raised pedestrian refuge islands: While pedestrian refuge islands are recommended in this Plan to be flush with the roadway, Caltrans has indicated that if sufficient speed reductions are not attained with this design that they will consider use of raised medians.

Roundabouts: The 2005 *Highway 20 Traffic Calming and Beautification Plan* recommended roundabouts at several locations. While the roundabouts are not currently necessary for traffic operations purposes, they could potentially serve a function as a gateway treatment to encourage reduced speeds. However, due to the complexity of these projects – including the required acquisition of right-of-way – it is recommended that the roundabouts be retained as part of the plan but as part of a long-term vision. As indicated in Table 15, roundabouts are recommended for the following locations:

Community	Intersection
Nice	Sayre Ave*
Lucerne	Foothill Dr (west)
Lucerne	13 th Ave
Clearlake Oaks	Keys Blvd

Note: * Sayre Ave was identified as a “potential” roundabout in the *Highway 20 Traffic Calming and Beautification Plan*

Study Participants and References

Study Participants

Technical Advisory Group (TAG)

John Speka – *Project Manager, Lake Area Planning Council*
Lisa Davey-Bates – *Lake Area Planning Council*
Scott De Leon, Todd Mansell – *Lake County Public Works*
Wanda Gray – *Lake Transit*
Alexis Kelso – *Caltrans District 1*



Consultant Team

W-Trans

Steve Weinberger, PE, PTOE – *Managing Principal*
Barry Bergman, AICP – *Senior Planner*
Briana Byrne, EIT – *Associate Engineer*
Katia Wolfe – *Graphics*
Alex Scrobonia – *Editing/Formatting*
Dalene J. Whitlock, PE, PTOE – *Quality Control*

Local Government Commission

Josh Meyer – *Director, Community Planning Programs*
Cayla McDonell – *Project Manager*

Bottomley Associates

Claire Vlach – *Urban Designer*

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- Lake County Transit Development and Marketing Plan, Lake Transit, 2015
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LKX078

Appendix A

Summary of Recommendations





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Table 1 – Implementation Status of Highway 20 Traffic Calming and Beautification Plan (2005)

Location	Improvement from 2005 Plan	Status/Issues	
Nice	Class I path from Lakeshore Boulevard to Hudson Avenue	Not implemented	
	Class II bike lanes throughout Nice	Not implemented	
	Gateway to Crump Avenue	Completed	
	Hinman Park	Completed	
	Keeling Avenue – decorative pedestrian crossing	Not implemented	
	Levy Avenue – decorative pedestrian crossing	Not implemented	
	Keeling Avenue to Sayre Avenue – landscaped median	Not implemented	
	Crump Avenue to Sayre Avenue – street trees and 6’ sidewalks	Not implemented	
Gateway to Crump Avenue	Sayre Avenue – in-pavement crosswalk lights, decorative paving, bulbouts	Not implemented	
	West of Sayre Avenue – gateway elements such as monument signage, rumble strips, landscaping, and radar speed sign	Flashing beacon installed	
	Manzanita Drive (west) to Hudson Avenue	Hudson Avenue to Howard Avenue – median	Not implemented
		Hudson Avenue – decorative crossing, in-pavement crossing lights, bulbouts, and bus shelter	Not implemented
		Triangle Park to Crump Avenue – median	Not implemented
		Howard Avenue – in-pavement crosswalk lights, decorative paving, bulbouts, landscaping	Not implemented
		Manzanita Drive – restrict the one-block segment of Manzanita along Triangle Park to one-way, westbound traffic only	Not implemented
	Hudson Avenue to Manzanita Drive (east)	Manzanita Drive – relocate crosswalk to midblock location at west end of post office property, add decorative paving and in-pavement crosswalk lights	Not implemented
Worldmark resort driveway – pedestrian refuge island at west side of driveway, median from driveway to pedestrian crossing at post office		Not implemented	
Manzanita Drive (east) to Gateway	East of Manzanita Drive (east) – gateway elements such as monument signage, rumble strips, landscaping and radar speed sign	Gateway sign, flashing beacon, radar sign	
	Lakeshore Boulevard to Manzanita Drive – median with combination of landscape and hardscape, narrow lanes to 11’	Not implemented	
Lucerne	Gateway (Foothill Drive) – landscaped roundabout, rumble strips monument signage and radar speed sign	Flashing beacon, radar sign, gateway sign	
	1 st Avenue – bulbouts and decorative crossing; median/pedestrian refuge east of 1 st Avenue	Not implemented	
	Foothill Drive to Morrison Creek Bridge – street trees, sidewalks, lighting	Not implemented	
	2 nd Avenue to 6 th Avenue	2 nd Avenue-3 rd Avenue – landscaped median	Not implemented

	3rd Avenue – bulbouts and in-pavement crosswalk lights	Not implemented
	3 rd Avenue-4 th Avenue – landscaped median	Not implemented
	5 th Avenue – decorative crossing and bulbouts	Bulbout on northwest corner
	6 th Avenue-7 th Avenue – landscaped median	Not implemented
7 th Avenue to 10 th Avenue	Harbor Park – close the north west (of the three) driveways	Not implemented
	9 th Avenue – decorative pedestrian crossings with in-pavement crossing lights, pedestrian islands and bulbouts	Bulbouts on west leg
	10 th Avenue – decorative pedestrian crossings, bulbouts, and pedestrian refuge islands	Not implemented
	10 th Avenue-11 th Avenue – landscaped median	Not implemented
11 th Avenue to 14 th Avenue	11 th Avenue-12 th Avenue – landscaped median	Not implemented
	13 th Avenue – roundabout, including decorative paving	Not implemented
	14 th Avenue-15 th Avenue – landscaped median	Not implemented
Clearlake Oaks	Keys Boulevard to Tower Market – Class I bikeway along lake side (transitioning to Class II bike lanes at both ends)	Not implemented
	Entire segment – landscaped median (gaps as needed for traffic circulation)	Not implemented
Gateway to Keys Boulevard	6’ sidewalks on north side; street trees and lighting on both sides	Sidewalks implemented
Keys Boulevard to Hoover Street	Keys Boulevard – roundabout	Not implemented
	West of Keys Boulevard intersection – bus shelter	Not implemented
	6’ sidewalks on north side; street trees and lighting on both sides	Sidewalks and lighting implemented on south side
Hoover Street to High Valley Road	6’ sidewalks and lighting along both sides	Sidewalks and lighting implemented on south side
	Hoover Street – decorative crosswalk, bulbouts, refuge islands, in-pavement crosswalk lights	Not implemented
	High Valley Road – decorative crosswalk, bulbouts, in-pavement crosswalk lights	Not implemented
	East Lake Elementary School – bus shelters at existing bus stops	Not implemented
High Valley Road to Lakeland Street	6’ sidewalks along south side	Completed
	Existing bus stops – install bus shelters	Not implemented
	Lakeland Street-Oakgrove Avenue – decorative crosswalks, bulbouts, in-pavement crosswalk lights	Not implemented

Lakeland Street to Foothill Drive (east)	Steep slope area on north side – grade-separated roadway and sidewalk	Completed
	Foothill Drive – decorative crosswalks, bulbouts, in-pavement crosswalk lights	Not implemented
Foothill Drive (east) to Foothill Drive (west)	Entire segment – 6’ sidewalks on both sides of roadway, street trees, lighting	Not implemented
	Bike parking	Not implemented
	Foothill Drive (east) – realign intersection	Not implemented
	Acorn Street – realign intersection, decorative paving, bulbouts, refuge island, in-pavement crosswalk lights, bus stops on north and south side	Not implemented
Foothill Drive (west) to Gateway	Foothill Drive (west) – realign intersection	Not implemented
	Entire segment – 6’ sidewalk on south side	Not implemented
	Tower Market – midblock crossing at transition from Class I to Class II, include decorative crosswalk, in-pavement crosswalk lights, and bulbouts	Not implemented
	Tower Market – bus stops with bus shelters	Not implemented
	Island Drive – realign intersection	Not implemented
	West of Foothill Drive (west) – gateway treatments including monument sign, landscaping, radar speed sign, rumble strip	Not implemented



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Appendix B

Recommended Bus Stop Improvements



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Bus Stop Passenger Amenities -- Route 1 Westbound

Bus Stop ID	Bus Stop Name	Repeats	Boardings	Sign			Pole		Bench		Shelter		Shade	Light at Stop	Street Light	Lat	Long	ADA Accessible?
				Y/N	Condition	Blocked by Vegetation?	Y/N	Condition	Y/N	Condition	Y/N	Condition						
10.02	KEYS BLVD		Med 6	No	N/A	N/A	No	N/A	No	N/A	No	N/A	D	No	No	39.0252333	-122.65932	Yes
10.03	HWY 20 & POST OFFICE		Low	No	N/A	N/A	No	N/A	No	N/A	No	N/A	C	No	No	39.02634	-122.66171	Yes
10.04	EAST LAKE SCHOOL		Low	Yes	F	No	No	N/A	No	N/A	No	N/A	A	No	No	39.027767	-122.6667	Yes
10.05	LAKE ST		Low						Under Construction							39.0261	-122.671	
10.06	RED & WHITE MARKET		Low	No	N/A	No	No	N/A	Yes	B	No	N/A	F	No	No	39.024265	-122.67445	Yes
10.07	MATTRESS STORE		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	F	No	No	39.022754	-122.67529	Yes
10.08	LAKEVIEW DR		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	C	No	No	39.124866	-122.86037	No
10.09	BLUE FISH COVE		Low	Yes	C	No	Yes	B	No	N/A	No	N/A	B	No	No	39.0218061	-122.71273	Yes
10.10	INDIAN BEACH RESORT		Low	Yes	B	No	Yes	B	No	N/A	No	N/A	B	No	No	39.024024	-122.72368	Yes
10.11	GLENHAVEN DR		Low	Yes	B	No	Yes	B	No	N/A	No	N/A	D	No	No	39.02594	-122.73051	No
10.12	BRUNER DR		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	F	No	No	39.043139	-122.77573	No
10.13	DRIFTWOOD LOUNGE	11.24	Low	Yes	A	Yes	Yes	A	No	N/A	No	N/A	C	No	No	39.06735	-122.78321	No
10.14	LAUREL DELL AT RIVERA MOTEL	11.23	Low	Yes	A	No	Yes	A	No	N/A	No	N/A	C	No	No	39.06893	-122.78261	No
10.15	BELL RAY		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	B	No	No	39.076609	-122.78291	No
10.16	LAKESHORE & HWY 20		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	A	No	No	39.078893	-122.78603	No
10.17	LUCERNE ELEMENTARY SCHOOL		Low	Yes	A	No	Yes	A	Yes	B	No	N/A	A	No	No	39.083391	-122.79077	Yes
10.18	HWY 20 & 14TH		Low	Yes	C	No	Yes	C	No	N/A	No	N/A	B	No	No	39.083391	-122.79077	No
10.19	TOWER MART		Low	Yes	A	No	Yes	A	Yes	A	Yes	A	B	Yes	No	39.02164	-122.67537	Yes
10.20	AT MARYMOUNT COLLEGE AT 13TH		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	C	No	No	39.089294	-122.79057	No
10.21	HWY 20 & 9TH		Med	No	N/A	No	No	N/A	Yes	B	No	N/A	D	No	No	39.09047	-122.79578	Yes
10.22	HWY 20 & 5TH		Med	Yes	A	No	Yes	A	Yes	A	Yes	A	A	Yes	Yes	39.09229	-122.79833	Yes
10.23	HWY 20 & 1ST ST		Med	Yes	D	No	No	N/A	Yes	B	Yes	D	C	Yes	Yes	39.095318	-122.8008	Yes
10.24	THE HARBOR		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	C	No	No	39.09916	-122.80438	Yes
10.25	NICE POST OFFICE		Med	No	N/A	No	No	N/A	Yes	B	No	N/A	D	No	No	39.120298	-122.83638	Yes
10.26	NICE MARKET		Med	No	N/A	No	No	N/A	No	N/A	No	N/A	D	No	No	39.127013	-122.84036	Yes
10.27	HINMAN PARK		Low	Yes	C	No	Yes	B	Yes	D	Yes	D	C	Yes	Yes	39.123122	-122.84597	Yes

Bus Stop Passenger Amenities -- Route 1 Eastbound

Bus Stop ID	Bus Stop Name	Repeats	Boardings	Sign			Pole		Bench		Shelter		Shade	Light at Stop	Street Light	Lat	Long	ADA Access-ible?
				Y/N	Condition	Blocked by Vegetation?	Y/N	Condition	Y/N	Condition	Y/N	Condition						
11.09	BAT HOUSE ACROSS FROM HINMAN PARK		Low	Yes	B	No	Yes	B	No	N/A	No	N/A	F	No	No	39.122902	-122.84595	No
11.10	MARINA GRILL		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	F	Yes	Yes	39.12231	-122.84181	Yes
11.11	WORLD MARK-NICE POST OFFICE		Med	No	N/A	N/A	No	N/A	No	N/A	No	N/A	D	No	No	39.120298	-122.83668	No
11.12	THE HARBOR		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	C	Yes	No	39.09916	-122.80438	No
11.13	1ST ST & HWY 20		Med	No	N/A	N/A	No	N/A	No	N/A	No	N/A	C	No	No	39.095318	-122.8008	No
11.14	2ND & HWY 20 BTWN XWALK & ALPINE PARK SIGN		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	C	No	Yes	39.093476	-122.79807	Yes
11.15	5TH AND HWY 20 NEAR FIRE HYDRANT IN FRONT OF THE WATER SERVICE COMPANY		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	D	No	No	39.09229	-122.79833	Yes
11.16	FRONT OF THE WATER SERVICE COMPANY		Low	No	N/A	N/A	No	N/A	No	N/A	No	N/A	F	No	Yes	38.812386	-122.71112	Yes
11.17	9TH & HWY 20 LUCERNE HARBOR PARK		Low	Yes	B	No	Yes	F	Yes	B	No	N/A	D	No	No	39.090008	-122.79578	Yes
11.18	13TH & COUNTRY CLUB/MARYMONT COLLEGE		Low	No	N/A	N/A	No	N/A	No	N/A	No	N/A	F	No	No	39.089294	-122.79057	Yes
11.19	13TH & HWY 20 COMMUNITY GARDEN PARK		Low	Yes	B	No	Yes	B	No	N/A	No	N/A	D	No	No	39.087128	-122.79352	No
11.20	16TH & HWY 20 OLD MONUMENT SIGN		Low	No	N/A	N/A	No	N/A	No	N/A	No	N/A	D	No	No	39.085594	-122.79182	No
11.21	LAKESHORE & HWY 20		Low	Yes	B	No	Yes	B	No	N/A	No	N/A	B	No	No	39.078893	-122.78603	Yes
11.22	JUST BEFORE BELL RAY		Low	Yes	B	No	Yes	B	No	N/A	No	N/A	B	No	No	39.076727	-122.78333	Yes
11.23	LAUREL DELL AT RIVERA MOTEL	10.14	Low	Yes	A	No	Yes	A	No	N/A	No	N/A	C	No	No	39.06893	-122.78261	No
11.24	DRIFTWOOD LOUNGE	10.13	Low	Yes	A	Yes	Yes	A	No	N/A	No	N/A	C	No	No	39.06735	-122.78321	No
11.25	BRUNER DR-GRAVEL PULL OUT-KONA TAYHEE		Low	No	N/A	N/A	No	N/A	No	N/A	No	N/A	A	No	No	39.04269	-122.77568	No
11.26	GLENHAVEN		Low	Yes	B	No	No	N/A	No	N/A	No	N/A	D	No	No	39.02594	-122.73051	Yes
11.27	INDIAN BEACH RESORT		Low	No	N/A	No	No	N/A	No	N/A	No	N/A	B	No	No	39.024024	-122.72368	Yes
11.28	BLUE FISH COVE		Low	Yes	B	No	Yes	B	No	N/A	No	N/A	B	No	No	39.0218061	-122.71273	Yes
11.29	LAKEVIEW		Low	No	N/A	N/A	No	N/A	No	N/A	No	N/A	C	No	No	39.124866	-122.86037	No
11.30	TOWER MART		Low	Yes	A	No	Yes	A	Yes	A	No	N/A	B	No	No	39.02164	-122.67537	Yes
11.31	THE BARN		Low	No	N/A	N/A	No	N/A	No	N/A	No	N/A	B	No	Yes	39.02305	-122.67497	Yes
11.32	LAKE ST		Low	No	N/A	N/A	No	N/A	No	N/A	No	N/A	F	No	No	39.0261	-122.671	No
11.33	EAST LAKE SCHOOL		Low	Yes	B	No	No	N/A	No	N/A	No	N/A	B	No	No	39.027767	-122.6667	Yes
11.34	HWY 20 BURGERS		Low	No	N/A	N/A	No	N/A	No	N/A	No	N/A	C	No	No	39.02621	-122.66197	Yes
11.35	KEYS BLVD		Low	Yes	B	No	No	N/A	Yes	D	No	N/A	D	No	No	39.0252333	-122.65932	Yes

Appendix C

Daily Traffic Counts





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VOLUME

SR-20 Bet. Levy Ave & Keeling Ave

Day: Tuesday
Date: 4/2/2019

City: Nice
Project #: CA19_8172_001

DAILY TOTALS					NB	SB						Total			
					0	0						11,606			
					5,786							5,820			
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL			
00:00			12	6	18		12:00			117	107	224			
00:15			10	15	25		12:15			104	114	218			
00:30			9	6	15		12:30			111	104	215			
00:45			5	36	7	34	12:45			101	433	114	439	215	872
01:00			9	12	21		13:00			125	137	262			
01:15			2	3	5		13:15			90	124	214			
01:30			5	4	9		13:30			112	107	219			
01:45			5	21	10	29	13:45			132	459	140	508	272	967
02:00			3	5	8		14:00			114	122	236			
02:15			2	11	13		14:15			123	112	235			
02:30			8	10	18		14:30			120	107	227			
02:45			7	20	6	32	14:45			133	490	112	453	245	943
03:00			7	12	19		15:00			111	106	217			
03:15			6	5	11		15:15			136	92	228			
03:30			2	11	13		15:30			129	112	241			
03:45			8	23	6	34	15:45			133	509	99	409	232	918
04:00			25	7	32		16:00			108	77	185			
04:15			14	14	28		16:15			112	78	190			
04:30			9	7	16		16:30			112	69	181			
04:45			20	68	24	52	16:45			100	432	79	303	179	735
05:00			19	27	46		17:00			115	79	194			
05:15			14	38	52		17:15			101	70	171			
05:30			19	29	48		17:30			100	76	176			
05:45			24	76	37	131	17:45			76	392	65	290	141	682
06:00			25	39	64		18:00			118	85	203			
06:15			30	48	78		18:15			123	69	192			
06:30			22	80	102		18:30			106	83	189			
06:45			35	112	75	242	18:45			87	434	68	305	155	739
07:00			32	81	113		19:00			63	81	144			
07:15			38	74	112		19:15			77	52	129			
07:30			41	88	129		19:30			81	70	151			
07:45			61	172	77	320	19:45			76	297	46	249	122	546
08:00			45	85	130		20:00			58	59	117			
08:15			54	86	140		20:15			56	47	103			
08:30			52	84	136		20:30			53	40	93			
08:45			57	208	77	332	20:45			42	209	37	183	79	392
09:00			59	95	154		21:00			48	40	88			
09:15			66	85	151		21:15			50	31	81			
09:30			82	103	185		21:30			53	32	85			
09:45			86	293	93	376	21:45			36	187	32	135	68	322
10:00			87	86	173		22:00			31	20	51			
10:15			74	108	182		22:15			34	27	61			
10:30			81	115	196		22:30			24	25	49			
10:45			88	330	108	417	22:45			23	112	28	100	51	212
11:00			102	99	201		23:00			23	15	38			
11:15			95	104	199		23:15			17	15	32			
11:30			105	89	194		23:30			20	8	28			
11:45			102	404	107	399	23:45			9	69	10	48	19	117
TOTALS			1763	2398	4161		TOTALS			4023	3422	7445			
SPLIT %			42.4%	57.6%	35.9%		SPLIT %			54.0%	46.0%	64.1%			

DAILY TOTALS					NB	SB						Total	
					0	0						11,606	
					5,786							5,820	
AM Peak Hour			11:45	11:45	11:45		PM Peak Hour			14:45	13:00	13:45	
AM Pk Volume			434	432	866		PM Pk Volume			509	508	970	
Pk Hr Factor			0.927	0.947	0.967		Pk Hr Factor			0.936	0.907	0.892	
7 - 9 Volume	0	0	380	652	1032		4 - 6 Volume	0	0	824	593	1417	
7 - 9 Peak Hour			07:45	07:30	07:45		4 - 6 Peak Hour			16:15	16:15	16:15	
7 - 9 Pk Volume	0	0	212	336	544		4 - 6 Pk Volume	0	0	439	305	744	
Pk Hr Factor	0.000	0.000	0.869	0.955	0.971		Pk Hr Factor	0.000	0.000	0.954	0.965	0.959	



VOLUME

SR-20 Bet. Levy Ave & Keeling Ave

Day: Wednesday
Date: 4/3/2019

City: Nice
Project #: CA19_8172_001

DAILY TOTALS					NB	SB	EB	WB	Total					
					0	0	6,281	6,158	12,439					
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
00:00			11	16	27	12:00			115	114	229			
00:15			16	9	25	12:15			92	101	193			
00:30			20	8	28	12:30			120	140	260			
00:45			9	56	2	35	12:45		107	434	106	461	213	895
01:00			13	10	23	13:00			109	114	223			
01:15			6	10	16	13:15			114	111	225			
01:30			8	10	18	13:30			102	111	213			
01:45			10	37	3	33	13:45		110	435	107	443	217	878
02:00			5	5	10	14:00			117	125	242			
02:15			4	5	9	14:15			125	102	227			
02:30			4	13	17	14:30			122	110	232			
02:45			2	15	5	28	14:45		104	468	143	480	247	948
03:00			2	5	7	15:00			134	128	262			
03:15			9	5	14	15:15			159	111	270			
03:30			15	12	27	15:30			138	120	258			
03:45			19	45	18	40	15:45		155	586	105	464	260	1050
04:00			14	22	36	16:00			141	126	267			
04:15			13	21	34	16:15			129	86	215			
04:30			12	20	32	16:30			133	116	249			
04:45			11	50	28	91	16:45		130	533	116	444	246	977
05:00			10	34	44	17:00			103	97	200			
05:15			11	33	44	17:15			160	85	245			
05:30			27	36	63	17:30			110	102	212			
05:45			19	67	25	128	17:45		125	498	76	360	201	858
06:00			20	42	62	18:00			117	86	203			
06:15			17	52	69	18:15			111	73	184			
06:30			46	68	114	18:30			111	64	175			
06:45			46	129	63	225	18:45		99	438	65	288	164	726
07:00			47	85	132	19:00			90	49	139			
07:15			49	103	152	19:15			84	58	142			
07:30			58	116	174	19:30			99	65	164			
07:45			58	212	124	428	19:45		94	367	57	229	151	596
08:00			88	106	194	20:00			70	34	104			
08:15			65	96	161	20:15			48	36	84			
08:30			46	103	149	20:30			54	38	92			
08:45			81	280	109	414	20:45		50	222	40	148	90	370
09:00			86	88	174	21:00			52	36	88			
09:15			61	84	145	21:15			42	27	69			
09:30			68	81	149	21:30			34	36	70			
09:45			70	285	101	354	21:45		42	170	27	126	69	296
10:00			102	107	209	22:00			36	38	74			
10:15			75	94	169	22:15			41	26	67			
10:30			97	87	184	22:30			14	18	32			
10:45			84	358	103	391	22:45		29	120	20	102	49	222
11:00			111	117	228	23:00			23	18	41			
11:15			93	99	192	23:15			16	13	29			
11:30			92	65	157	23:30			12	18	30			
11:45			119	415	94	375	23:45		10	61	22	71	32	132
TOTALS			1949	2542	4491	TOTALS			4332	3616	7948			
SPLIT %			43.4%	56.6%	36.1%	SPLIT %			54.5%	45.5%	63.9%			

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	6,281	6,158	12,439

AM Peak Hour			11:45	07:15	11:45	PM Peak Hour			15:15	14:45	15:15
AM Pk Volume			446	449	895	PM Pk Volume			593	502	1055
Pk Hr Factor			0.929	0.905	0.861	Pk Hr Factor			0.932	0.878	0.977
7 - 9 Volume	0	0	492	842	1334	4 - 6 Volume	0	0	1031	804	1835
7 - 9 Peak Hour			08:00	07:15	07:30	4 - 6 Peak Hour			16:00	16:00	16:00
7 - 9 Pk Volume	0	0	280	449	711	4 - 6 Pk Volume	0	0	533	444	977
Pk Hr Factor	0.000	0.000	0.795	0.905	0.916	Pk Hr Factor	0.000	0.000	0.945	0.881	0.915



VOLUME

SR-20 Bet. 7th Ave & 8th Ave

Day: Tuesday
Date: 4/2/2019City: Lucerne
Project #: CA19_8172_002

DAILY TOTALS					NB	SB	EB	WB	Total		
					4,652	4,558	0	0	9,210		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	7	11			18	12:00	89	91			180
00:15	7	7			14	12:15	92	72			164
00:30	4	6			10	12:30	95	83			178
00:45	3	21	3	27	6 48	12:45	97	373	90	336	187 709
01:00	11	8			19	13:00	107	90			197
01:15	2	1			3	13:15	89	93			182
01:30	5	2			7	13:30	113	92			205
01:45	6	24	6	17	12 41	13:45	95	404	83	358	178 762
02:00	6	1			7	14:00	96	102			198
02:15	5	1			6	14:15	88	90			178
02:30	9	2			11	14:30	104	75			179
02:45	7	27	9	13	16 40	14:45	80	368	121	388	201 756
03:00	6	4			10	15:00	74	73			147
03:15	7	9			16	15:15	95	87			182
03:30	6	5			11	15:30	100	122			222
03:45	7	26	2	20	9 46	15:45	82	351	101	383	183 734
04:00	2	17			19	16:00	67	95			162
04:15	13	26			39	16:15	52	89			141
04:30	15	11			26	16:30	65	75			140
04:45	12	42	10	64	22 106	16:45	65	249	88	347	153 596
05:00	23	14			37	17:00	71	85			156
05:15	26	15			41	17:15	59	80			139
05:30	27	22			49	17:30	59	74			133
05:45	33	109	20	71	53 180	17:45	54	243	84	323	138 566
06:00	46	24			70	18:00	73	79			152
06:15	33	30			63	18:15	64	75			139
06:30	56	27			83	18:30	58	105			163
06:45	50	185	28	109	78 294	18:45	66	261	64	323	130 584
07:00	55	35			90	19:00	58	53			111
07:15	67	31			98	19:15	37	56			93
07:30	66	36			102	19:30	55	47			102
07:45	77	265	52	154	129 419	19:45	38	188	49	205	87 393
08:00	47	23			70	20:00	39	48			87
08:15	70	46			116	20:15	35	34			69
08:30	60	62			122	20:30	25	32			57
08:45	77	254	48	179	125 433	20:45	32	131	37	151	69 282
09:00	69	51			120	21:00	31	39			70
09:15	57	62			119	21:15	24	30			54
09:30	74	70			144	21:30	18	32			50
09:45	70	270	65	248	135 518	21:45	19	92	26	127	45 219
10:00	76	79			155	22:00	19	20			39
10:15	87	60			147	22:15	22	18			40
10:30	83	62			145	22:30	23	26			49
10:45	87	333	64	265	151 598	22:45	10	74	18	82	28 156
11:00	82	90			172	23:00	14	14			28
11:15	66	71			137	23:15	10	15			25
11:30	72	81			153	23:30	8	15			23
11:45	99	319	74	316	173 635	23:45	11	43	8	52	19 95
TOTALS	1875	1483			3358	TOTALS	2777	3075			5852
SPLIT %	55.8%	44.2%			36.5%	SPLIT %	47.5%	52.5%			63.5%

DAILY TOTALS					NB	SB	EB	WB	Total		
					4,652	4,558	0	0	9,210		
AM Peak Hour	11:45	11:45			11:45	PM Peak Hour	12:45	15:30			12:45
AM Pk Volume	375	320			695	PM Pk Volume	406	407			771
Pk Hr Factor	0.947	0.879			0.965	Pk Hr Factor	0.898	0.834			0.940
7 - 9 Volume	519	333	0	0	852	4 - 6 Volume	492	670	0	0	1162
7 - 9 Peak Hour	07:00	07:45			07:45	4 - 6 Peak Hour	16:30	16:00			16:00
7 - 9 Pk Volume	265	183	0	0	437	4 - 6 Pk Volume	260	347	0	0	596
Pk Hr Factor	0.860	0.738	0.000	0.000	0.847	Pk Hr Factor	0.915	0.913	0.000	0.000	0.920

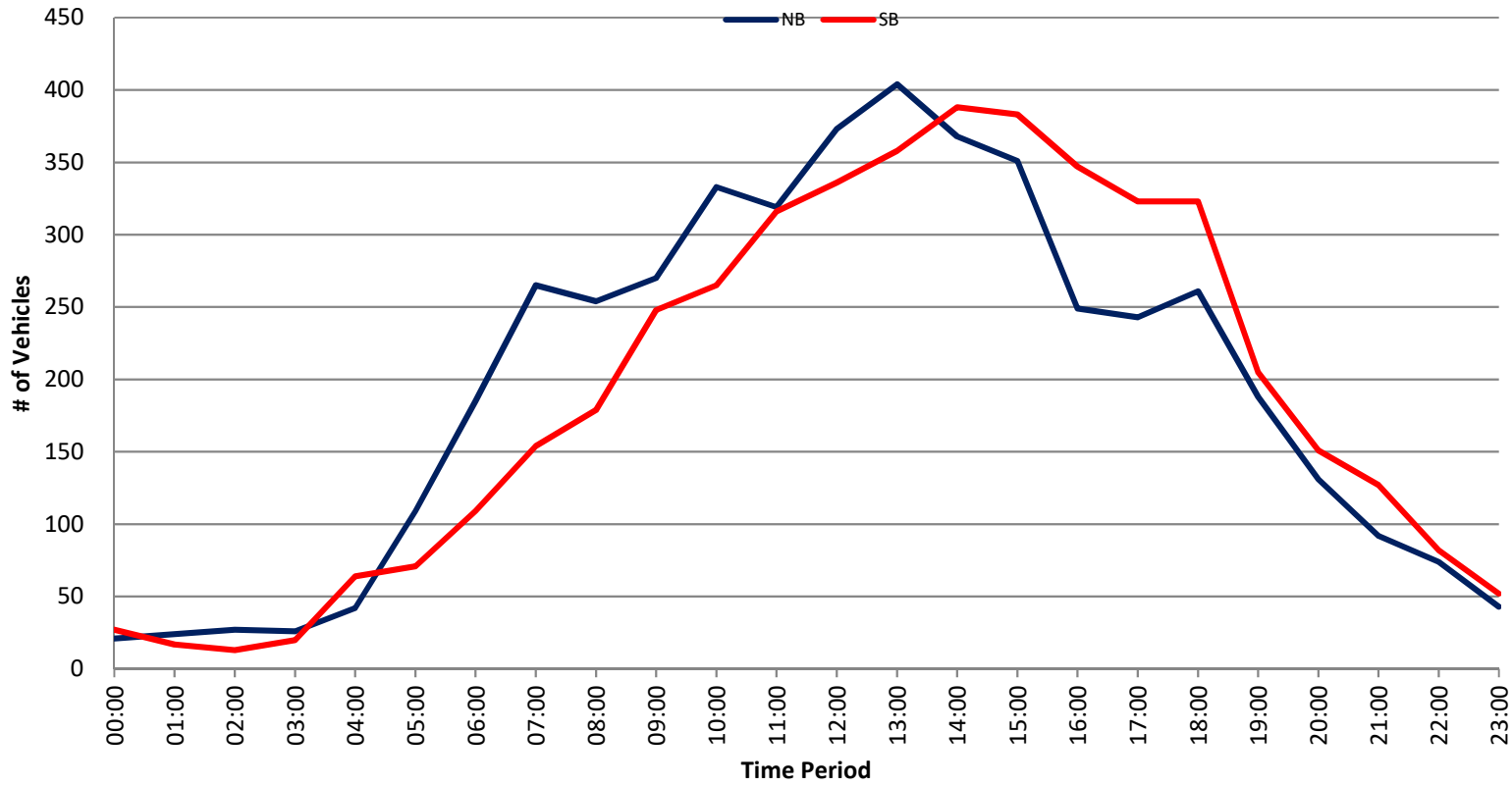
Prepared by NDS/ATD

Project #: CA19_8172_002

City: Lucerne

Location: SR-20 Bet. 7th Ave & 8th Ave

Date: 4/2/2019



VOLUME

SR-20 Bet. 7th Ave & 8th Ave

Day: Wednesday
Date: 4/3/2019City: Lucerne
Project #: CA19_8172_002

DAILY TOTALS					NB	SB	EB	WB	Total		
					4,909	4,870	0	0	9,779		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	10	4			14	12:00	113	94			207
00:15	6	8			14	12:15	94	92			186
00:30	4	19			23	12:30	92	79			171
00:45	7	27	5	36	12	12:45	93	392	82	347	175
01:00	8	10			18	13:00	81	94			175
01:15	6	8			14	13:15	88	102			190
01:30	6	4			10	13:30	100	79			179
01:45	3	23	5	27	8	13:45	93	362	92	367	185
02:00	5	7			12	14:00	90	67			157
02:15	8	4			12	14:15	67	110			177
02:30	11	3			14	14:30	95	90			185
02:45	4	28	4	18	8	14:45	116	368	86	353	202
03:00	4	3			7	15:00	85	96			181
03:15	4	4			8	15:15	102	117			219
03:30	16	9			25	15:30	87	107			194
03:45	11	35	17	33	28	15:45	96	370	98	418	194
04:00	27	14			41	16:00	80	123			203
04:15	10	17			27	16:15	86	113			199
04:30	22	11			33	16:30	96	89			185
04:45	25	84	13	55	38	16:45	80	342	92	417	172
05:00	22	10			32	17:00	67	100			167
05:15	27	7			34	17:15	82	80			162
05:30	18	23			41	17:30	58	83			141
05:45	23	90	26	66	49	17:45	63	270	94	357	157
06:00	39	14			53	18:00	65	88			153
06:15	34	16			50	18:15	60	63			123
06:30	54	31			85	18:30	48	81			129
06:45	59	186	45	106	104	18:45	56	229	84	316	140
07:00	57	34			91	19:00	44	55			99
07:15	63	43			106	19:15	49	72			121
07:30	94	51			145	19:30	44	72			116
07:45	86	300	52	180	138	19:45	45	182	58	257	103
08:00	90	81			171	20:00	19	56			75
08:15	85	46			131	20:15	33	39			72
08:30	90	51			141	20:30	36	42			78
08:45	82	347	52	230	134	20:45	23	111	28	165	51
09:00	70	60			130	21:00	19	37			56
09:15	63	55			118	21:15	29	32			61
09:30	62	56			118	21:30	22	23			45
09:45	62	257	60	231	122	21:45	25	95	26	118	51
10:00	89	77			166	22:00	28	25			53
10:15	83	72			155	22:15	19	24			43
10:30	81	79			160	22:30	16	18			34
10:45	78	331	71	299	149	22:45	11	74	19	86	30
11:00	98	93			191	23:00	17	20			37
11:15	70	73			143	23:15	17	10			27
11:30	91	85			176	23:30	24	12			36
11:45	79	338	88	339	167	23:45	10	68	7	49	17
TOTALS	2046	1620			3666	TOTALS	2863	3250			6113
SPLIT %	55.8%	44.2%			37.5%	SPLIT %	46.8%	53.2%			62.5%

DAILY TOTALS					NB	SB	EB	WB	Total
					4,909	4,870	0	0	9,779
AM Peak Hour	11:45	11:30			11:30	PM Peak Hour	14:30	15:15	15:15
AM Pk Volume	378	359			736	PM Pk Volume	398	445	810
Pk Hr Factor	0.836	0.955			0.889	Pk Hr Factor	0.858	0.904	0.925
7 - 9 Volume	647	410	0	0	1057	4 - 6 Volume	612	774	1386
7 - 9 Peak Hour	07:30	07:30			07:30	4 - 6 Peak Hour	16:00	16:00	16:00
7 - 9 Pk Volume	355	230	0	0	585	4 - 6 Pk Volume	342	417	759
Pk Hr Factor	0.944	0.710	0.000	0.000	0.855	Pk Hr Factor	0.891	0.848	0.935



VOLUME

SR-20 Bet. Harbor Dr & US Post office

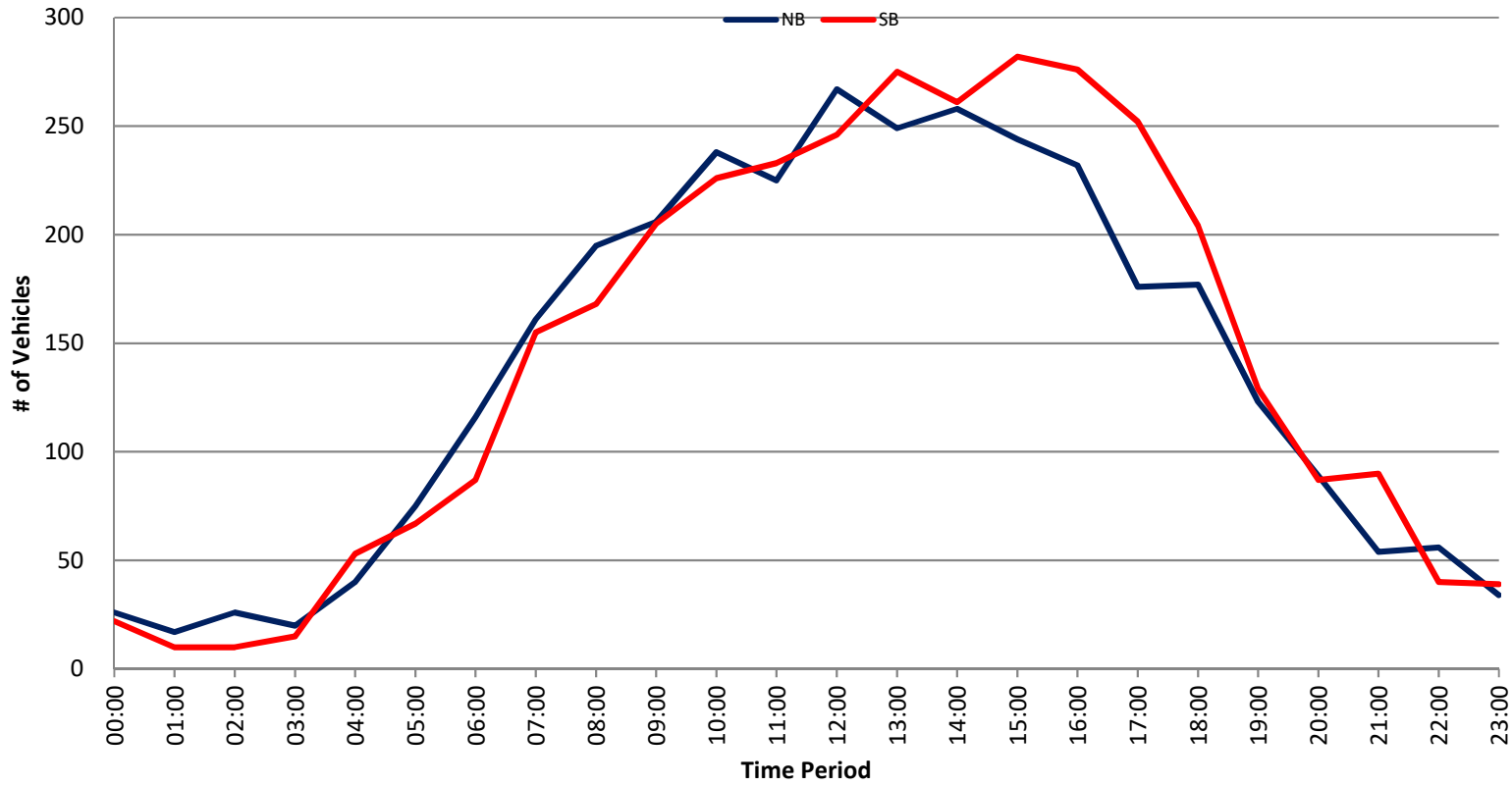
Day: Tuesday
Date: 4/2/2019

City: Glenhaven
Project #: CA19_8172_003

DAILY TOTALS					NB	SB	EB	WB	Total		
					3,304	3,432	0	0	6,736		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	10	3			13	12:00	76	74			150
00:15	3	12			15	12:15	47	58			105
00:30	3	4			7	12:30	59	53			112
00:45	10	26	3	22	13 48	12:45	85	267	61	246	146 513
01:00	2	2			4	13:00	59	69			128
01:15	1	5			6	13:15	45	89			134
01:30	9	1			10	13:30	87	53			140
01:45	5	17	2	10	7 27	13:45	58	249	64	275	122 524
02:00	4	3			7	14:00	61	66			127
02:15	9	1			10	14:15	76	67			143
02:30	2	1			3	14:30	63	58			121
02:45	11	26	5	10	16 36	14:45	58	258	70	261	128 519
03:00	4	5			9	15:00	46	74			120
03:15	9	4			13	15:15	66	51			117
03:30	3	4			7	15:30	59	84			143
03:45	4	20	2	15	6 35	15:45	73	244	73	282	146 526
04:00	6	9			15	16:00	57	74			131
04:15	6	24			30	16:15	58	71			129
04:30	13	11			24	16:30	52	54			106
04:45	15	40	9	53	24 93	16:45	65	232	77	276	142 508
05:00	14	16			30	17:00	36	51			87
05:15	20	19			39	17:15	51	84			135
05:30	22	10			32	17:30	39	59			98
05:45	19	75	22	67	41 142	17:45	50	176	58	252	108 428
06:00	22	19			41	18:00	45	55			100
06:15	40	27			67	18:15	40	46			86
06:30	24	23			47	18:30	40	62			102
06:45	30	116	18	87	48 203	18:45	52	177	41	204	93 381
07:00	29	29			58	19:00	31	43			74
07:15	38	36			74	19:15	40	26			66
07:30	42	47			89	19:30	27	31			58
07:45	52	161	43	155	95 316	19:45	25	123	29	129	54 252
08:00	43	34			77	20:00	28	30			58
08:15	47	49			96	20:15	15	20			35
08:30	54	41			95	20:30	20	19			39
08:45	51	195	44	168	95 363	20:45	26	89	18	87	44 176
09:00	36	49			85	21:00	18	21			39
09:15	56	53			109	21:15	17	19			36
09:30	62	41			103	21:30	10	21			31
09:45	52	206	62	205	114 411	21:45	9	54	29	90	38 144
10:00	56	63			119	22:00	13	7			20
10:15	66	53			119	22:15	21	7			28
10:30	50	52			102	22:30	9	13			22
10:45	66	238	58	226	124 464	22:45	13	56	13	40	26 96
11:00	50	50			100	23:00	8	15			23
11:15	52	66			118	23:15	10	7			17
11:30	59	49			108	23:30	10	8			18
11:45	64	225	68	233	132 458	23:45	6	34	9	39	15 73
TOTALS	1345	1251			2596	TOTALS	1959	2181			4140
SPLIT %	51.8%	48.2%			38.5%	SPLIT %	47.3%	52.7%			61.5%

DAILY TOTALS					NB	SB	EB	WB	Total
					3,304	3,432	0	0	6,736

AM Peak Hour	11:15	11:15			11:15	PM Peak Hour	13:30	15:30			15:30
AM Pk Volume	251	257			508	PM Pk Volume	282	302			549
Pk Hr Factor	0.826	0.868			0.847	Pk Hr Factor	0.810	0.899			0.940
7 - 9 Volume	356	323	0	0	679	4 - 6 Volume	408	528	0	0	936
7 - 9 Peak Hour	07:45	07:30			07:45	4 - 6 Peak Hour	16:00	16:00			16:00
7 - 9 Pk Volume	196	173	0	0	363	4 - 6 Pk Volume	232	276	0	0	508
Pk Hr Factor	0.907	0.883	0.000	0.000	0.945	Pk Hr Factor	0.892	0.896	0.000	0.000	0.894



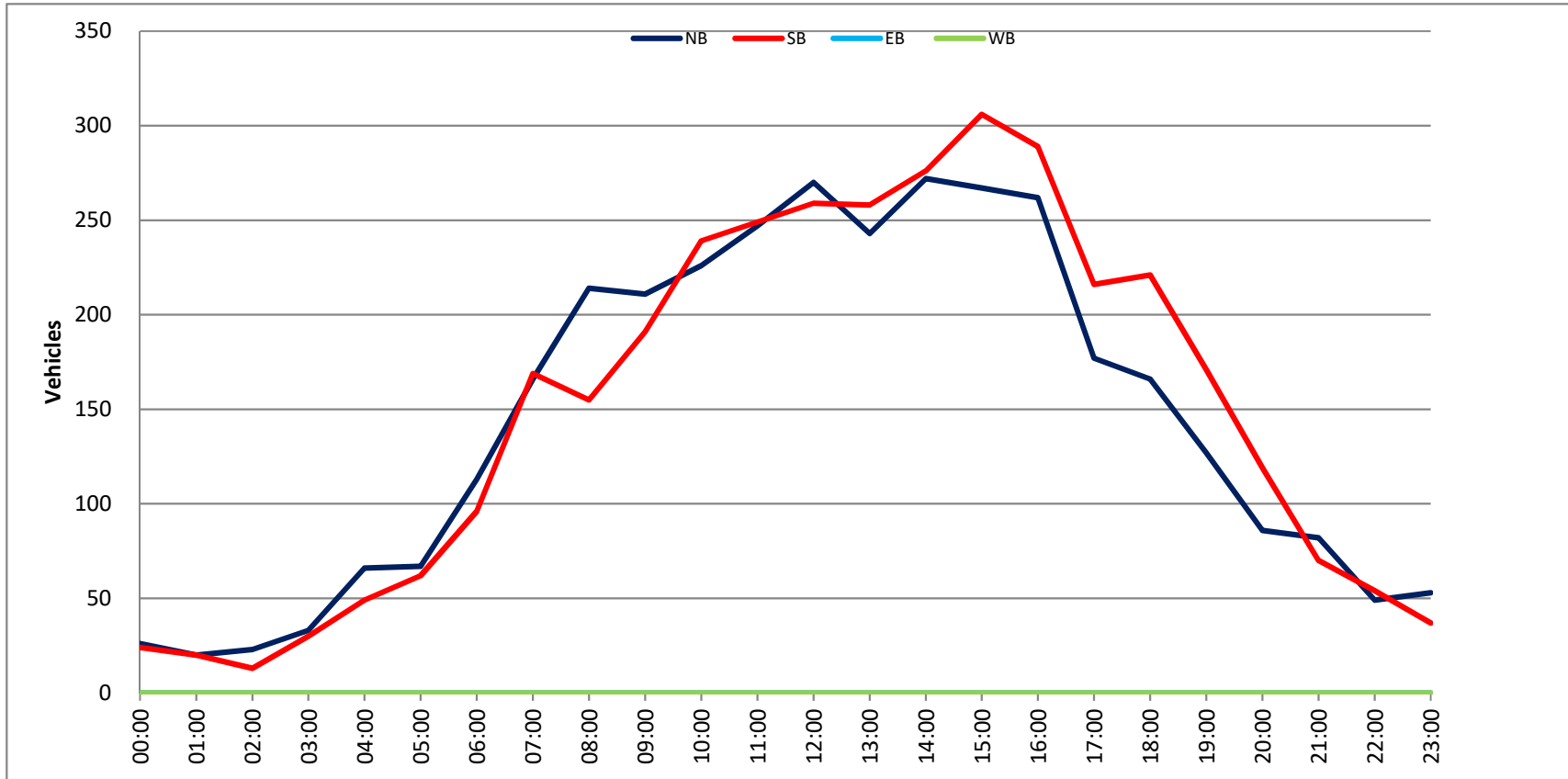
VOLUME

SR-20 Bet. Harbor Dr & US Post office

Day: Wednesday
Date: 4/3/2019City: Glenhaven
Project #: CA19_8172_003

DAILY TOTALS					NB	SB	EB	WB	Total		
					3,466	3,573	0	0	7,039		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	6	4			10	12:00	70	72			142
00:15	7	4			11	12:15	75	67			142
00:30	3	8			11	12:30	55	47			102
00:45	10	26	8	24	18	12:45	70	270	73	259	143
01:00	8	7			15	13:00	58	70			128
01:15	7	6			13	13:15	62	66			128
01:30	2	2			4	13:30	49	60			109
01:45	3	20	5	20	8	13:45	74	243	62	258	136
02:00	3	7			10	14:00	67	71			138
02:15	12	1			13	14:15	61	61			122
02:30	4	2			6	14:30	78	81			159
02:45	4	23	3	13	7	14:45	66	272	63	276	129
03:00	4	6			10	15:00	63	71			134
03:15	6	3			9	15:15	61	73			134
03:30	9	4			13	15:30	62	90			152
03:45	14	33	17	30	31	15:45	81	267	72	306	153
04:00	16	16			32	16:00	65	71			136
04:15	14	9			23	16:15	67	75			142
04:30	16	14			30	16:30	67	83			150
04:45	20	66	10	49	30	16:45	63	262	60	289	123
05:00	18	13			31	17:00	51	52			103
05:15	20	10			30	17:15	43	43			86
05:30	11	14			25	17:30	46	59			105
05:45	18	67	25	62	43	17:45	37	177	62	216	99
06:00	28	20			48	18:00	40	63			103
06:15	30	20			50	18:15	46	56			102
06:30	27	19			46	18:30	44	58			102
06:45	28	113	37	96	65	18:45	36	166	44	221	80
07:00	30	31			61	19:00	33	43			76
07:15	48	50			98	19:15	34	44			78
07:30	49	55			104	19:30	38	32			70
07:45	39	166	33	169	72	19:45	22	127	52	171	74
08:00	48	42			90	20:00	25	43			68
08:15	63	40			103	20:15	19	32			51
08:30	62	45			107	20:30	22	20			42
08:45	41	214	28	155	69	20:45	20	86	24	119	44
09:00	50	48			98	21:00	20	23			43
09:15	45	46			91	21:15	14	24			38
09:30	54	37			91	21:30	20	12			32
09:45	62	211	60	191	122	21:45	28	82	11	70	39
10:00	57	43			100	22:00	14	18			32
10:15	51	77			128	22:15	13	17			30
10:30	61	60			121	22:30	8	10			18
10:45	57	226	59	239	116	22:45	14	49	9	54	23
11:00	43	57			100	23:00	13	13			26
11:15	66	68			134	23:15	12	7			19
11:30	60	64			124	23:30	19	8			27
11:45	78	247	60	249	138	23:45	9	53	9	37	18
TOTALS	1412	1297			2709	TOTALS	2054	2276			4330
SPLIT %	52.1%	47.9%			38.5%	SPLIT %	47.4%	52.6%			61.5%

DAILY TOTALS					NB	SB	EB	WB	Total		
					3,466	3,573	0	0	7,039		
AM Peak Hour	11:30	11:15			11:30	PM Peak Hour	13:45	15:30	15:30		
AM Pk Volume	283	264			546	PM Pk Volume	280	308	583		
Pk Hr Factor	0.907	0.917			0.961	Pk Hr Factor	0.897	0.856	0.953		
7 - 9 Volume	380	324	0	0	704	4 - 6 Volume	439	505	0	0	944
7 - 9 Peak Hour	08:00	07:15			07:45	4 - 6 Peak Hour	16:00	16:00			16:00
7 - 9 Pk Volume	214	180	0	0	372	4 - 6 Pk Volume	262	289	0	0	551
Pk Hr Factor	0.849	0.818	0.000	0.000	0.869	Pk Hr Factor	0.978	0.870	0.000	0.000	0.918



VOLUME

SR-20 Bet. Short St & Pine St

Day: Tuesday
Date: 4/2/2019City: Clearlake Oaks
Project #: CA19_8172_004

DAILY TOTALS					NB	SB	EB	WB	Total		
					4,096	4,254	0	0	8,350		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	7	6			13	12:00	87	77			164
00:15	3	7			10	12:15	74	106			180
00:30	5	9			14	12:30	89	83			172
00:45	12	27	3	25	52	12:45	78	328	68	334	662
01:00	3	6			9	13:00	64	94			158
01:15	4	3			7	13:15	96	99			195
01:30	7	3			10	13:30	79	81			160
01:45	6	20	2	14	34	13:45	71	310	75	349	659
02:00	5	3			8	14:00	76	87			163
02:15	8	1			9	14:15	89	92			181
02:30	3	4			7	14:30	71	118			189
02:45	10	26	1	9	35	14:45	65	301	71	368	669
03:00	3	7			10	15:00	80	89			169
03:15	7	5			12	15:15	89	83			172
03:30	5	9			14	15:30	80	78			158
03:45	4	19	3	24	43	15:45	84	333	101	351	684
04:00	10	3			13	16:00	77	72			149
04:15	10	19			29	16:15	59	90			149
04:30	8	21			29	16:30	72	77			149
04:45	13	41	10	53	94	16:45	76	284	75	314	598
05:00	15	14			29	17:00	65	62			127
05:15	22	17			39	17:15	59	76			135
05:30	31	16			47	17:30	43	72			115
05:45	30	98	25	72	170	17:45	66	233	72	282	515
06:00	24	28			52	18:00	44	59			103
06:15	32	27			59	18:15	54	50			104
06:30	30	36			66	18:30	70	69			139
06:45	35	121	28	119	240	18:45	38	206	54	232	438
07:00	31	33			64	19:00	40	48			88
07:15	44	39			83	19:15	48	35			83
07:30	59	59			118	19:30	28	43			71
07:45	53	187	48	179	366	19:45	41	157	31	157	314
08:00	43	51			94	20:00	33	31			64
08:15	62	63			125	20:15	27	34			61
08:30	69	65			134	20:30	29	19			48
08:45	57	231	42	221	452	20:45	30	119	24	108	227
09:00	60	44			104	21:00	30	21			51
09:15	68	70			138	21:15	19	27			46
09:30	73	80			153	21:30	18	23			41
09:45	76	277	67	261	538	21:45	19	86	34	105	191
10:00	62	70			132	22:00	19	22			41
10:15	71	71			142	22:15	21	7			28
10:30	81	72			153	22:30	11	11			22
10:45	83	297	68	281	578	22:45	11	62	17	57	119
11:00	67	70			137	23:00	11	15			26
11:15	64	69			133	23:15	11	10			21
11:30	80	70			150	23:30	12	12			24
11:45	78	289	82	291	580	23:45	10	44	11	48	92
TOTALS	1633	1549			3182	TOTALS	2463	2705			5168
SPLIT %	51.3%	48.7%			38.1%	SPLIT %	47.7%	52.3%			61.9%

DAILY TOTALS					NB	SB	EB	WB	Total
					4,096	4,254	0	0	8,350
AM Peak Hour	11:45	11:45			11:45	PM Peak Hour	15:00	13:45	15:00
AM Pk Volume	328	348			676	PM Pk Volume	333	372	684
Pk Hr Factor	0.921	0.821			0.939	Pk Hr Factor	0.935	0.788	0.924
7 - 9 Volume	418	400	0	0	818	4 - 6 Volume	517	596	1113
7 - 9 Peak Hour	08:00	07:45			07:45	4 - 6 Peak Hour	16:00	16:00	16:00
7 - 9 Pk Volume	231	227	0	0	454	4 - 6 Pk Volume	284	314	598
Pk Hr Factor	0.837	0.873	0.000	0.000	0.847	Pk Hr Factor	0.922	0.872	0.990

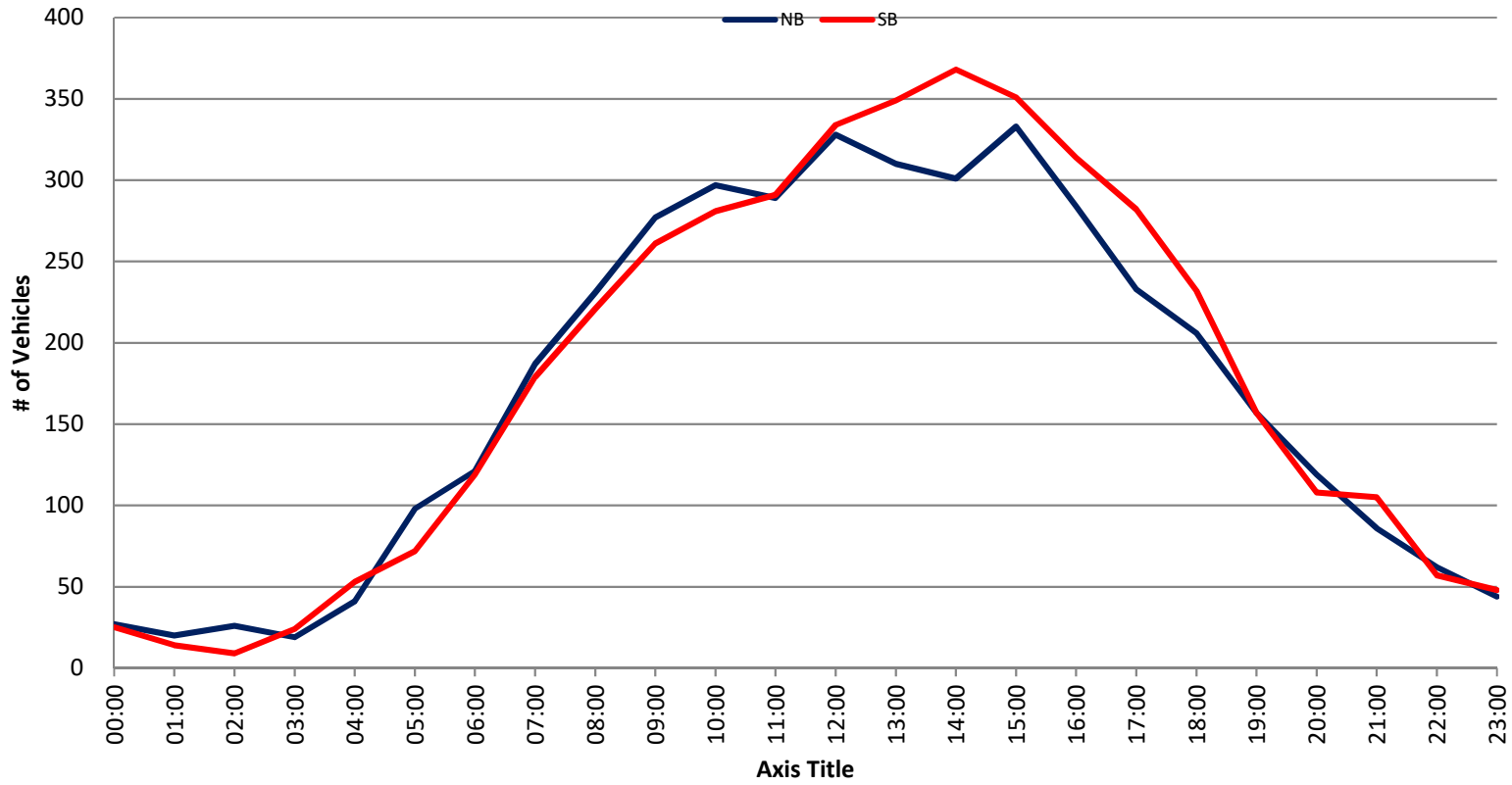
Prepared by NDS/ATD

Project #: CA19_8172_004

City: Clearlake Oaks

Location: SR-20 Bet. Short St & Pine St

Date: 4/2/2019



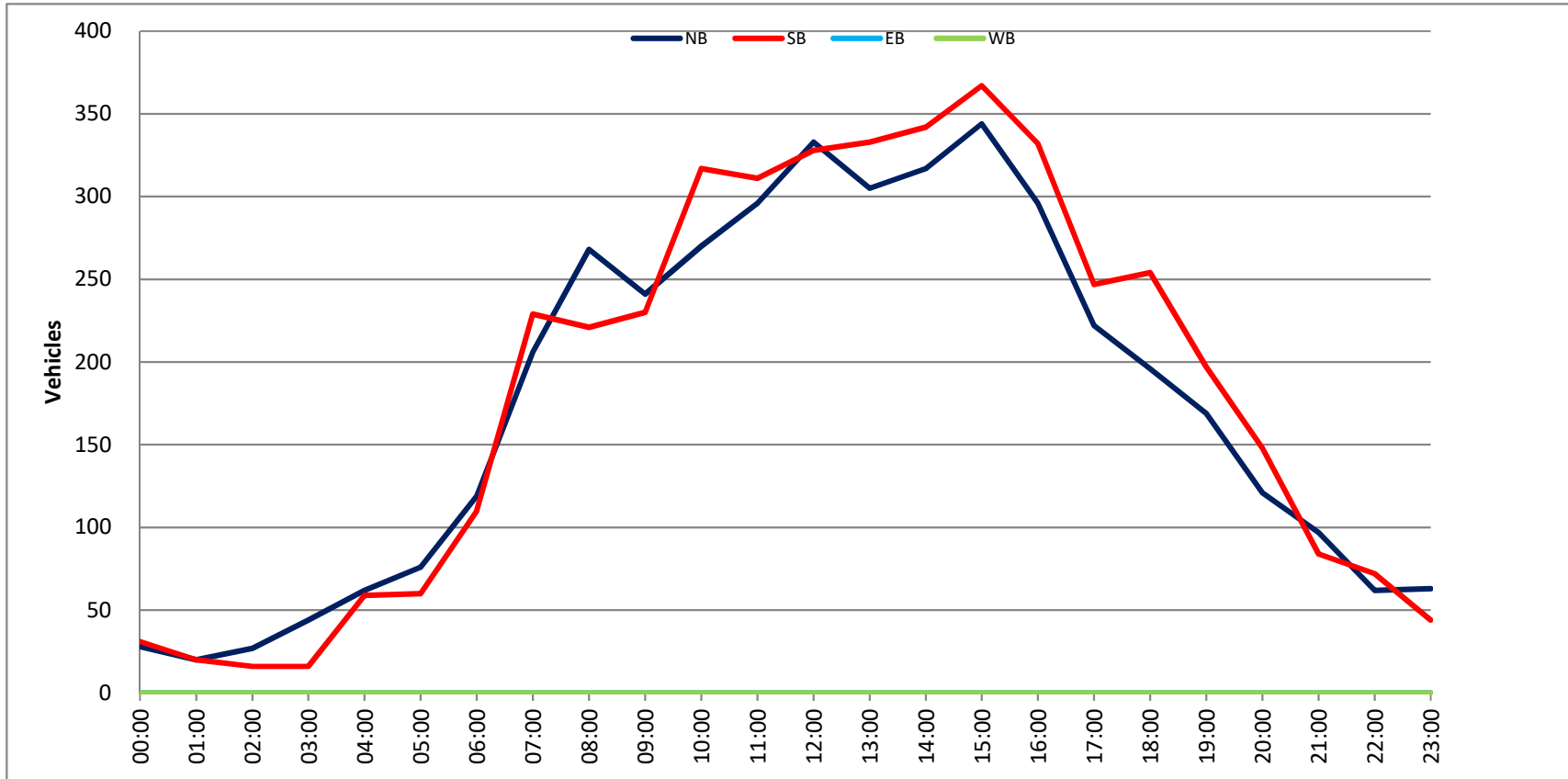
VOLUME

SR-20 Bet. Short St & Pine St

Day: Wednesday
Date: 4/3/2019City: Clearlake Oaks
Project #: CA19_8172_004

DAILY TOTALS					NB	SB	EB	WB	Total		
					4,182	4,368	0	0	8,550		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	7	7			14	12:00	80	88			168
00:15	7	3			10	12:15	91	87			178
00:30	7	8			15	12:30	85	71			156
00:45	7	28	13	31	20	12:45	77	333	82	328	661
01:00	6	4			10	13:00	66	83			149
01:15	7	9			16	13:15	72	83			155
01:30	3	4			7	13:30	75	101			176
01:45	4	20	3	20	7	13:45	92	305	66	333	638
02:00	6	5			11	14:00	75	81			156
02:15	12	4			16	14:15	76	73			149
02:30	5	2			7	14:30	85	109			194
02:45	4	27	5	16	9	14:45	81	317	79	342	659
03:00	4	1			5	15:00	81	75			156
03:15	15	1			16	15:15	89	96			185
03:30	9	4			13	15:30	82	116			198
03:45	16	44	10	16	26	15:45	92	344	80	367	711
04:00	10	15			25	16:00	75	75			150
04:15	15	13			28	16:15	79	89			168
04:30	21	18			39	16:30	77	94			171
04:45	16	62	13	59	29	16:45	65	296	74	332	628
05:00	21	14			35	17:00	68	64			132
05:15	15	12			27	17:15	51	62			113
05:30	12	13			25	17:30	54	62			116
05:45	28	76	21	60	49	17:45	49	222	59	247	469
06:00	20	32			52	18:00	51	77			128
06:15	39	23			62	18:15	54	69			123
06:30	34	25			59	18:30	52	51			103
06:45	26	119	30	110	56	18:45	39	196	57	254	450
07:00	40	58			98	19:00	40	48			88
07:15	59	50			109	19:15	43	56			99
07:30	48	69			117	19:30	52	37			89
07:45	59	206	52	229	111	19:45	34	169	56	197	366
08:00	54	45			99	20:00	34	55			89
08:15	75	62			137	20:15	33	34			67
08:30	68	52			120	20:30	28	32			60
08:45	71	268	62	221	133	20:45	26	121	27	148	269
09:00	57	59			116	21:00	27	23			50
09:15	60	48			108	21:15	17	24			41
09:30	55	53			108	21:30	23	23			46
09:45	69	241	70	230	139	21:45	30	97	14	84	181
10:00	56	69			125	22:00	16	27			43
10:15	71	74			145	22:15	14	15			29
10:30	74	78			152	22:30	14	19			33
10:45	69	270	96	317	165	22:45	18	62	11	72	134
11:00	65	74			139	23:00	15	14			29
11:15	75	71			146	23:15	30	15			45
11:30	79	79			158	23:30	10	7			17
11:45	77	296	87	311	164	23:45	8	63	8	44	107
TOTALS	1657	1620			3277	TOTALS	2525	2748			5273
SPLIT %	50.6%	49.4%			38.3%	SPLIT %	47.9%	52.1%			61.7%

DAILY TOTALS					NB	SB	EB	WB	Total
					4,182	4,368	0	0	8,550
AM Peak Hour	11:45	11:30			11:30	PM Peak Hour	15:00	15:00	15:00
AM Pk Volume	333	341			668	PM Pk Volume	344	367	711
Pk Hr Factor	0.915	0.969			0.938	Pk Hr Factor	0.935	0.791	0.898
7 - 9 Volume	474	450	0	0	924	4 - 6 Volume	518	579	1097
7 - 9 Peak Hour	08:00	07:00			08:00	4 - 6 Peak Hour	16:00	16:00	16:00
7 - 9 Pk Volume	268	229	0	0	497	4 - 6 Pk Volume	296	332	628
Pk Hr Factor	0.893	0.830	0.000	0.000	0.892	Pk Hr Factor	0.937	0.883	0.918



Appendix D

Speed Survey





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Speed Surveys Note

Two sets of speed surveys were collected. Both are presented in this Appendix.

Set A

- Collected by W-Trans staff on 4/16/19
- 85th percentile speeds for Nice, Lucerne, Glenhaven and Clearlake Oaks are 51, 35, 49 and 38
- These are the speeds referenced in the report.

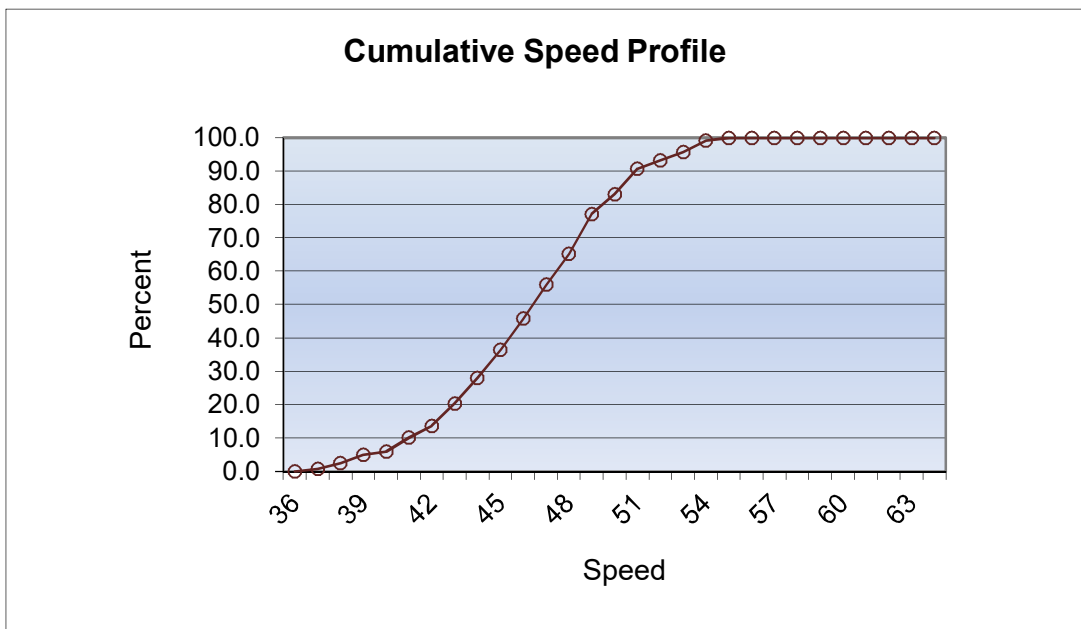
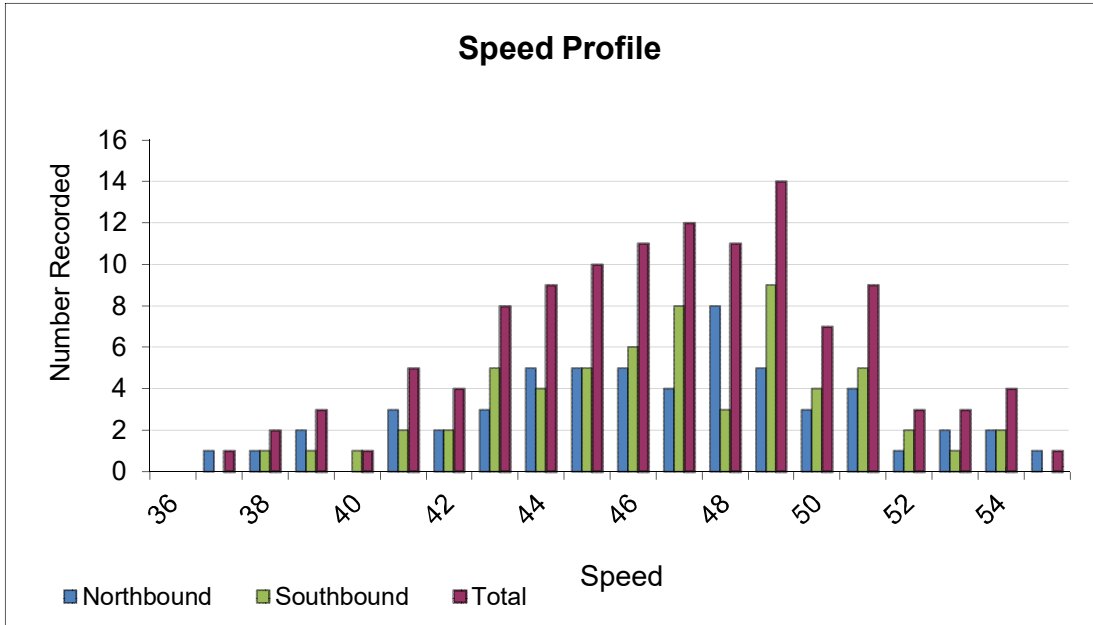
Set A

- Collected by NDS count services on 4/2/19
- 85th percentile speeds for Nice, Lucerne, Glenhaven and Clearlake Oaks are 46, 39, 49 and 42

Street: Highway 20 (Nice)

From: Keeling Avenue

To: Levy Avenue



Date Data Collected: April 16, 2019

Start Time: 12:45 PM

Weather: Sunny

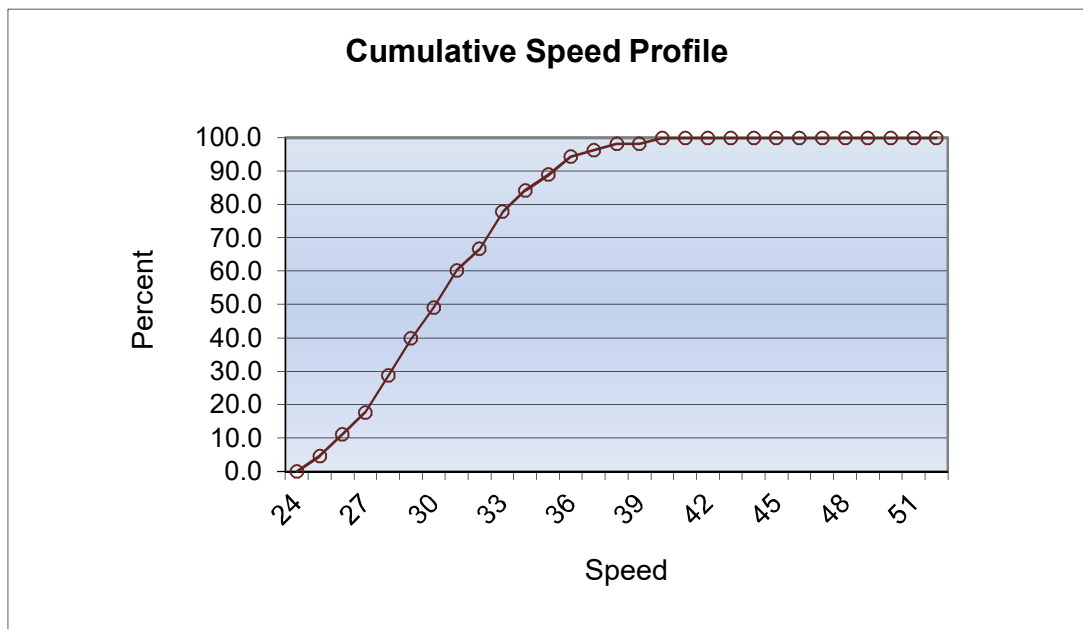
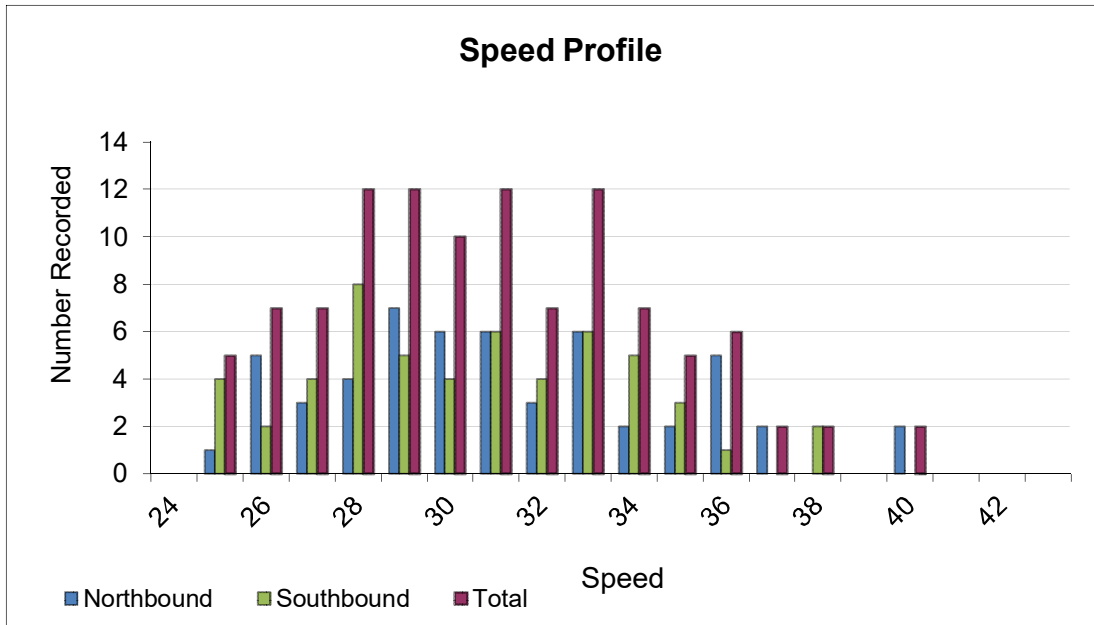
Speed	Northbound	Southbound	Total	Percent of Total	Cumulative Percent
36			0	0.00	0.0
37	1		1	0.85	0.8
38	1	1	2	1.69	2.5
39	2	1	3	2.54	5.1
40		1	1	0.85	5.9
41	3	2	5	4.24	10.2
42	2	2	4	3.39	13.6
43	3	5	8	6.78	20.3
44	5	4	9	7.63	28.0
45	5	5	10	8.47	36.4
46	5	6	11	9.32	45.8
47	4	8	12	10.17	55.9
48	8	3	11	9.32	65.3
49	5	9	14	11.86	77.1
50	3	4	7	5.93	83.1
51	4	5	9	7.63	90.7
52	1	2	3	2.54	93.2
53	2	1	3	2.54	95.8
54	2	2	4	3.39	99.2
55	1		1	0.85	100.0
56			0	0.00	100.0
57			0	0.00	100.0
58			0	0.00	100.0
59			0	0.00	100.0
60			0	0.00	100.0
61			0	0.00	100.0
62			0	0.00	100.0
63			0	0.00	100.0
64			0	0.00	100.0
65			0	0.00	100.0
66			0	0.00	100.0
67			0	0.00	100.0
68			0	0.00	100.0
69			0	0.00	100.0
70			0	0.00	100.0
71			0	0.00	100.0
72			0	0.00	100.0
73			0	0.00	100.0

57 61 118

Street: Highway 20 (Lucerne)

From: 4th Avenue

To: 3rd Avenue



Date Data Collected: April 16, 2019

Start Time: 11:20 AM

Weather: Sunny

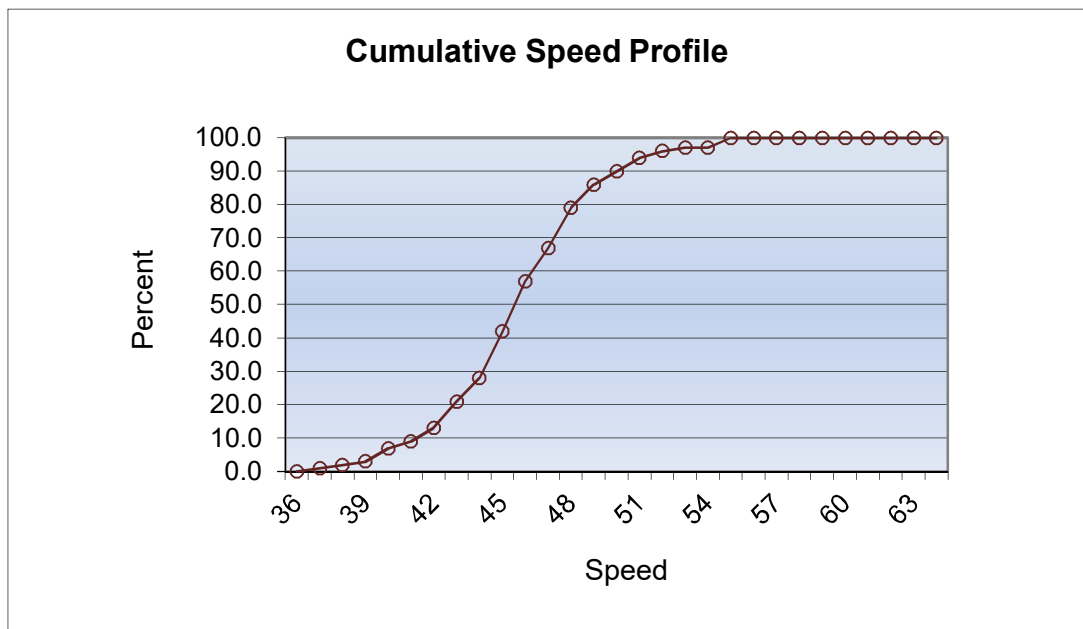
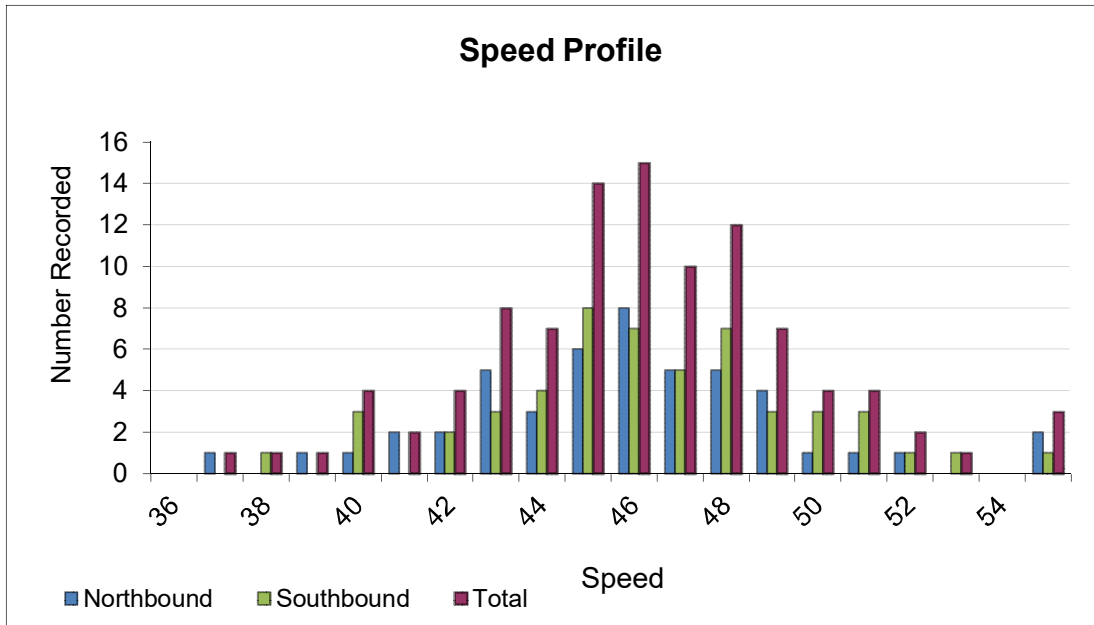
Speed	Northbound	Southbound	Total	Percent of Total	Cumulative Percent
24			0	0.00	0.0
25	1	4	5	4.63	4.6
26	5	2	7	6.48	11.1
27	3	4	7	6.48	17.6
28	4	8	12	11.11	28.7
29	7	5	12	11.11	39.8
30	6	4	10	9.26	49.1
31	6	6	12	11.11	60.2
32	3	4	7	6.48	66.7
33	6	6	12	11.11	77.8
34	2	5	7	6.48	84.3
35	2	3	5	4.63	88.9
36	5	1	6	5.56	94.4
37	2		2	1.85	96.3
38		2	2	1.85	98.1
39			0	0.00	98.1
40	2		2	1.85	100.0
41			0	0.00	100.0
42			0	0.00	100.0
43			0	0.00	100.0
44			0	0.00	100.0
45			0	0.00	100.0
46			0	0.00	100.0
47			0	0.00	100.0
48			0	0.00	100.0
49			0	0.00	100.0
50			0	0.00	100.0
51			0	0.00	100.0
52			0	0.00	100.0
53			0	0.00	100.0
54			0	0.00	100.0
55			0	0.00	100.0
56			0	0.00	100.0
57			0	0.00	100.0
58			0	0.00	100.0
59			0	0.00	100.0
60			0	0.00	100.0
61			0	0.00	100.0

54 54 108

Street: Highway 20 (Glenhaven)

From: near Post Office

To:



Date Data Collected: April 16, 2019

Start Time: 10:35 AM

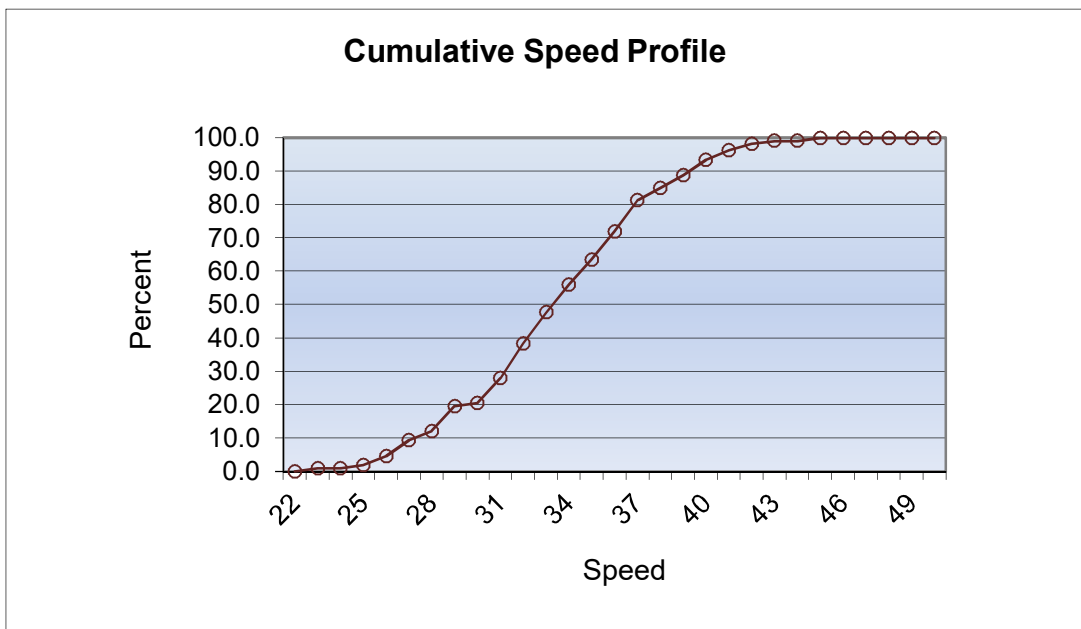
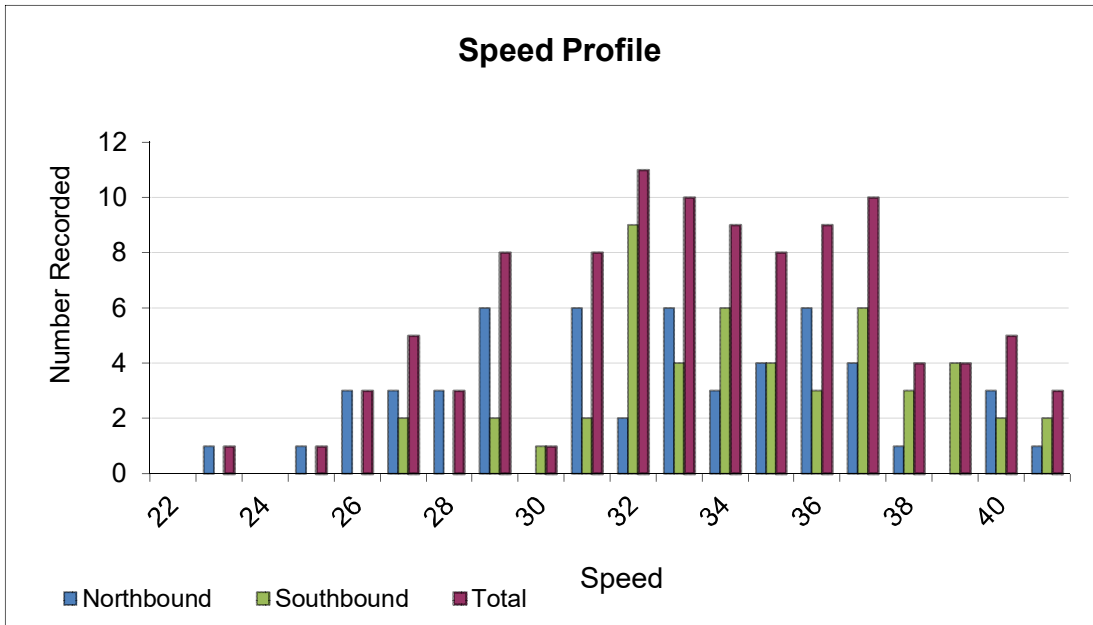
Weather: Sunny

Speed	Northbound	Southbound	Total	Percent of Total	Cumulative Percent
36			0	0.00	0.0
37	1		1	1.00	1.0
38		1	1	1.00	2.0
39	1		1	1.00	3.0
40	1	3	4	4.00	7.0
41	2		2	2.00	9.0
42	2	2	4	4.00	13.0
43	5	3	8	8.00	21.0
44	3	4	7	7.00	28.0
45	6	8	14	14.00	42.0
46	8	7	15	15.00	57.0
47	5	5	10	10.00	67.0
48	5	7	12	12.00	79.0
49	4	3	7	7.00	86.0
50	1	3	4	4.00	90.0
51	1	3	4	4.00	94.0
52	1	1	2	2.00	96.0
53		1	1	1.00	97.0
54			0	0.00	97.0
55	2	1	3	3.00	100.0
56			0	0.00	100.0
57			0	0.00	100.0
58			0	0.00	100.0
59			0	0.00	100.0
60			0	0.00	100.0
61			0	0.00	100.0
62			0	0.00	100.0
63			0	0.00	100.0
64			0	0.00	100.0
65			0	0.00	100.0
66			0	0.00	100.0
67			0	0.00	100.0
68			0	0.00	100.0
69			0	0.00	100.0
70			0	0.00	100.0
71			0	0.00	100.0
72			0	0.00	100.0
73			0	0.00	100.0
	48	52	100		

Street: Highway 20 (Clearlake Oaks)

From: Hoover Street

To: Butler Street



Date Data Collected: April 16, 2019

Start Time: 10:00 AM

Weather: Overcast

Speed	Northbound	Southbound	Total	Percent of Total	Cumulative Percent
22			0	0.00	0.0
23	1		1	0.93	0.9
24			0	0.00	0.9
25	1		1	0.93	1.9
26	3		3	2.80	4.7
27	3	2	5	4.67	9.3
28	3		3	2.80	12.1
29	6	2	8	7.48	19.6
30		1	1	0.93	20.6
31	6	2	8	7.48	28.0
32	2	9	11	10.28	38.3
33	6	4	10	9.35	47.7
34	3	6	9	8.41	56.1
35	4	4	8	7.48	63.6
36	6	3	9	8.41	72.0
37	4	6	10	9.35	81.3
38	1	3	4	3.74	85.0
39		4	4	3.74	88.8
40	3	2	5	4.67	93.5
41	1	2	3	2.80	96.3
42	1	1	2	1.87	98.1
43		1	1	0.93	99.1
44			0	0.00	99.1
45		1	1	0.93	100.0
46			0	0.00	100.0
47			0	0.00	100.0
48			0	0.00	100.0
49			0	0.00	100.0
50			0	0.00	100.0
51			0	0.00	100.0
52			0	0.00	100.0
53			0	0.00	100.0
54			0	0.00	100.0
55			0	0.00	100.0
56			0	0.00	100.0
57			0	0.00	100.0
58			0	0.00	100.0
59			0	0.00	100.0

54 53 107

Spot Speed Study

Prepared by: National Data & Surveying Services

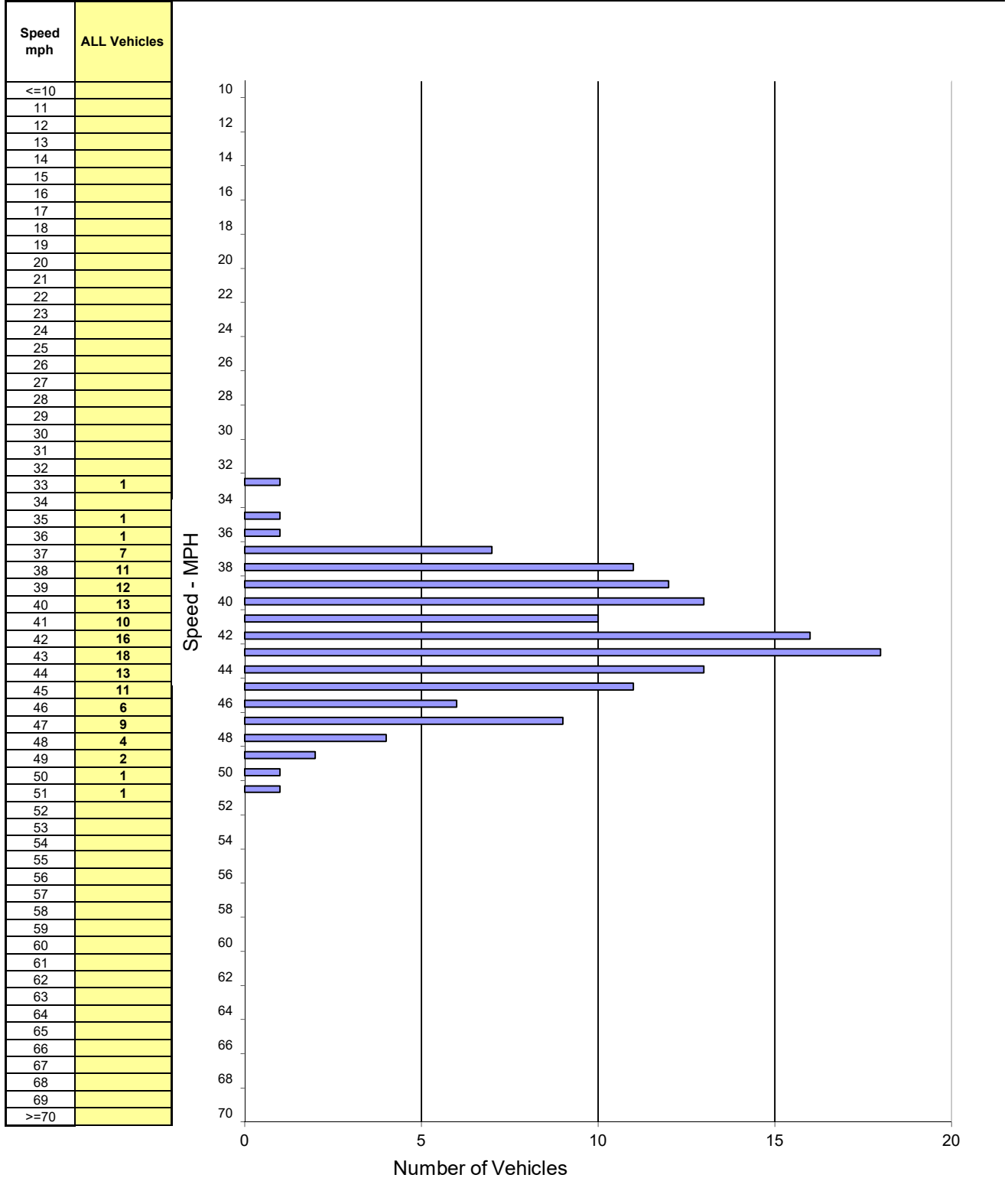
City of Lake County

DATE: 4/2/2019
TIME: 14:10-15:10

Location: SR-20 150' N/O Keeling Ave
Posted Speed: 40 MPH Clear/Dry

Project #: 19-8173-001

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	137	33 - 51	42 mph	46 mph	38 - 47	119	87%	7% / 10	6% / 8

Spot Speed Study

Prepared by: National Data & Surveying Services

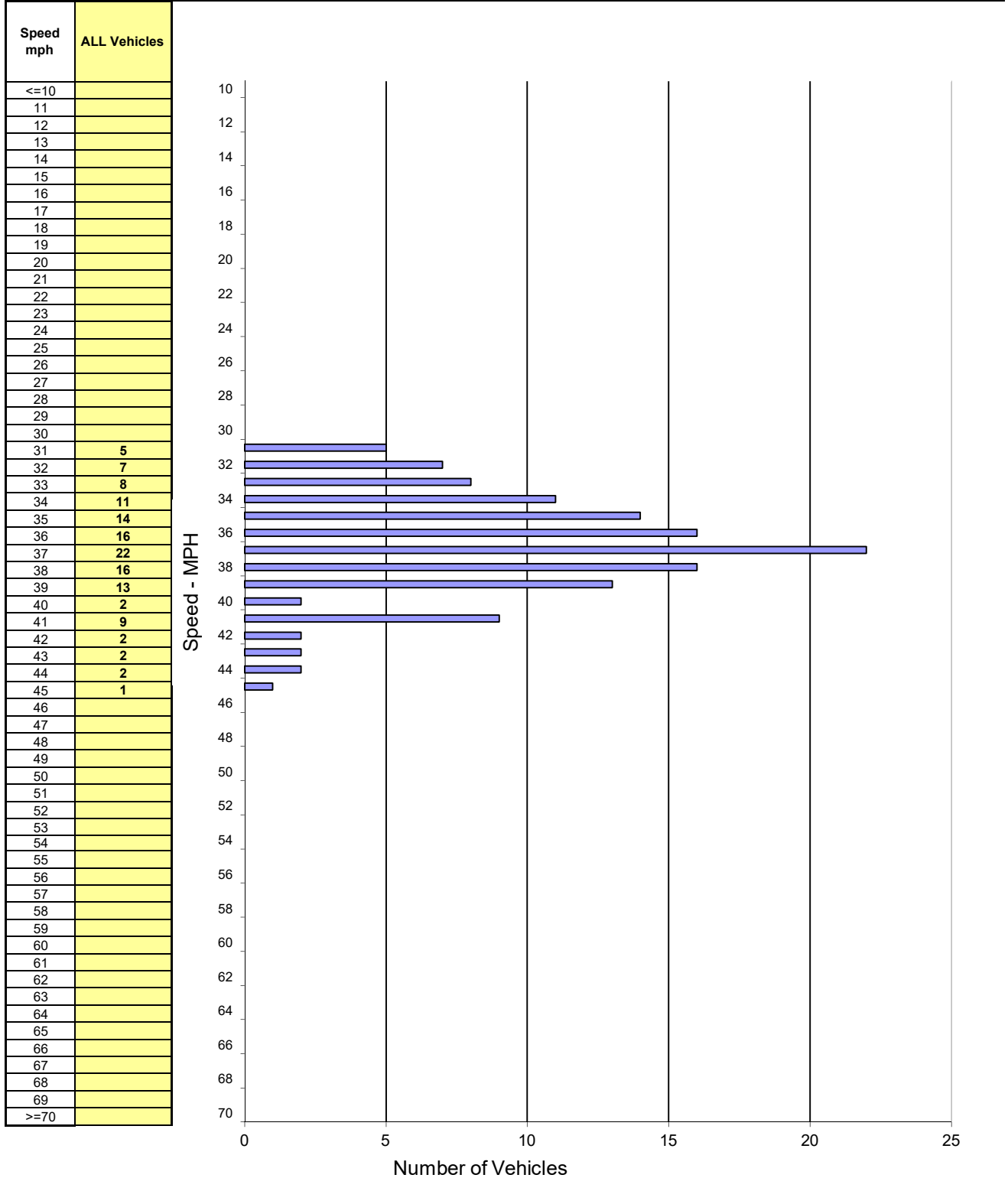
City of Lake County

DATE: 4/2/2019
TIME: 12:30-13:40

Location: SR-20 100' N/O 8th St
Posted Speed: 35 MPH Clear/Dry

Project #: 19-8173-002

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	130	31 - 45	37 mph	39 mph	32 - 41	118	91%	3% / 5	6% / 7

Spot Speed Study

Prepared by: National Data & Surveying Services

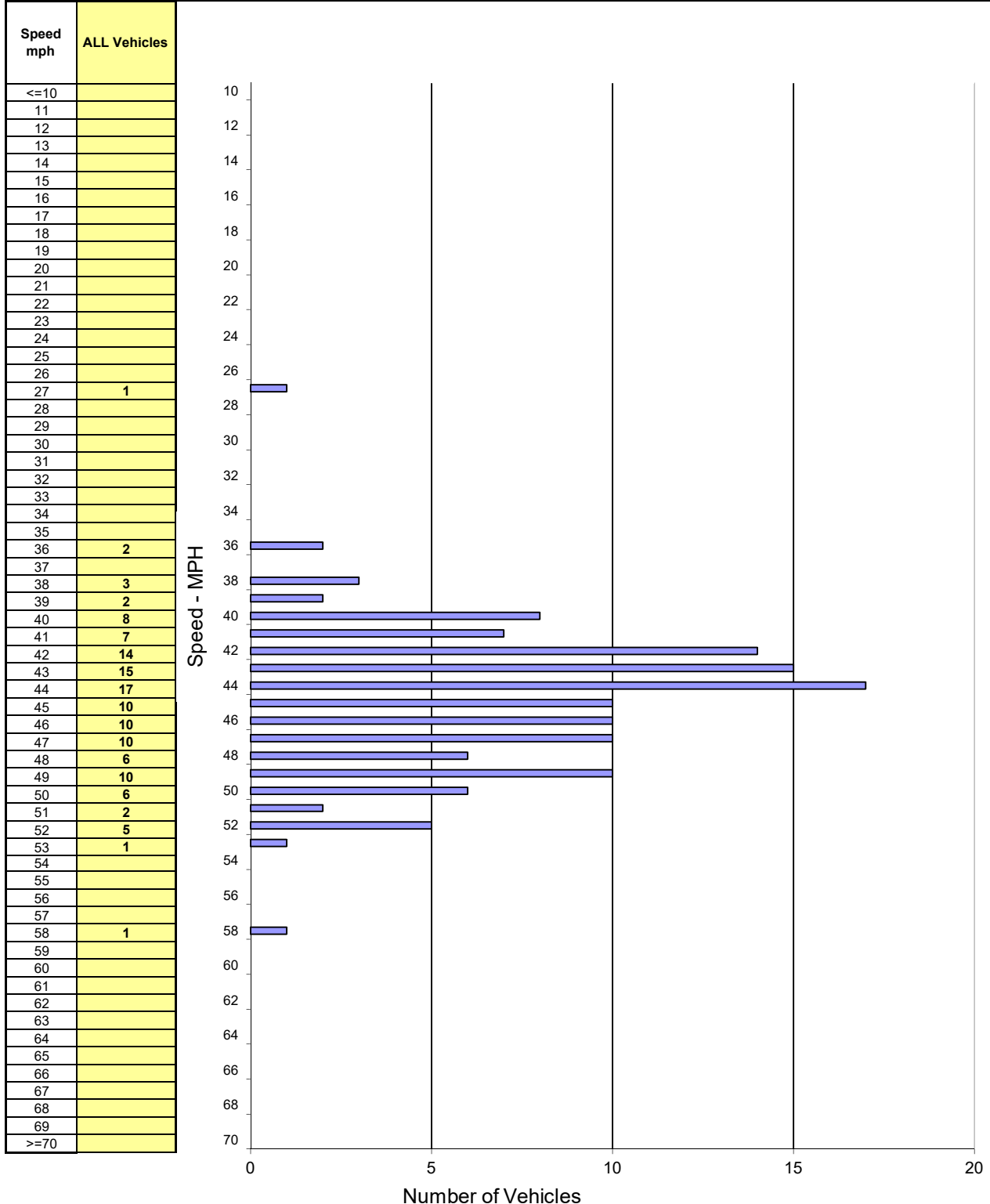
City of Lake County

DATE: 4/2/2019
TIME: 11:15-12:15

Location: SR-20 50' S/O Harbor Dr
Posted Speed: 45 MPH Clear/Dry

Project #: 19-8173-003

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	130	27 - 58	44 mph	49 mph	40 - 49	107	82%	6% / 8	12% / 15

Spot Speed Study

Prepared by: National Data & Surveying Services

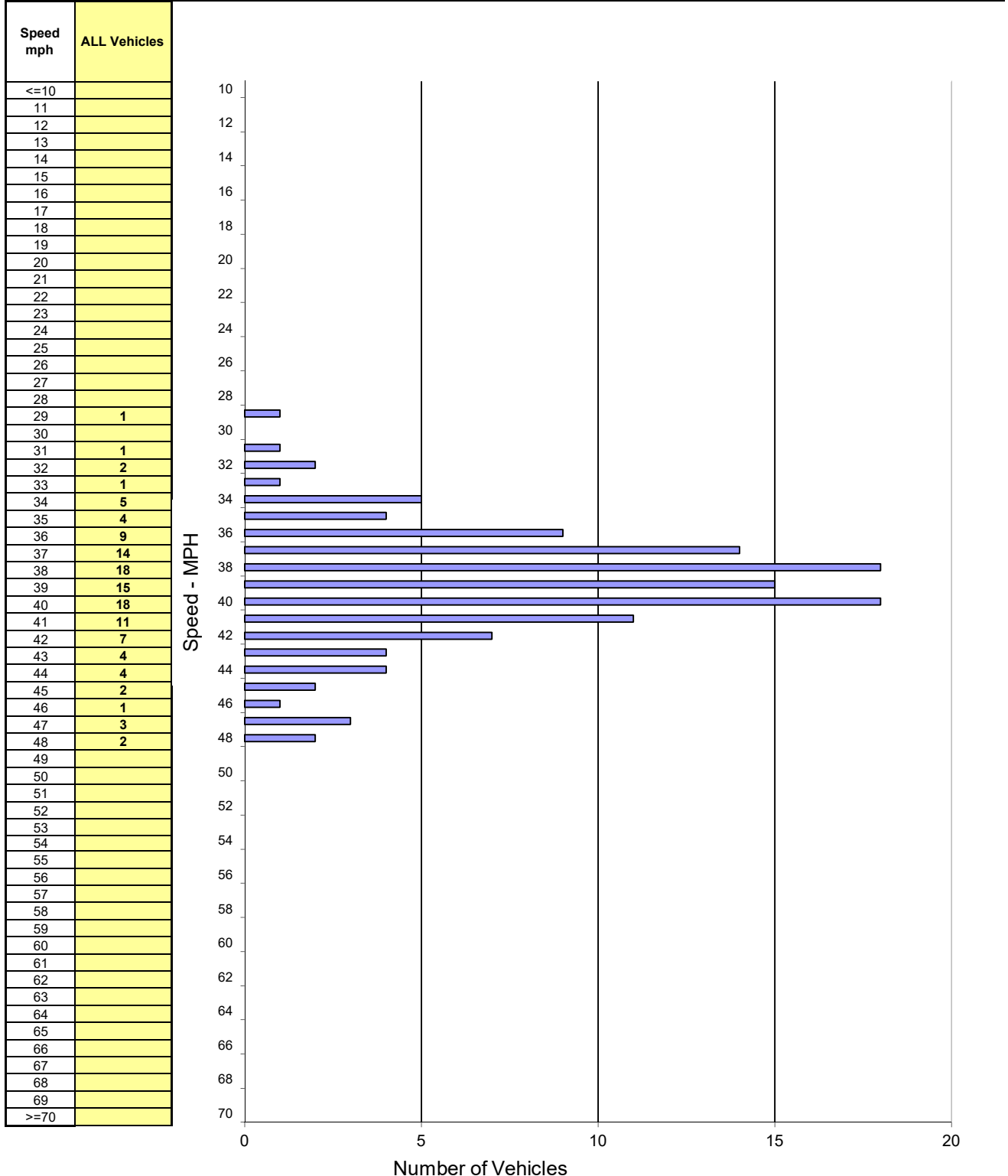
City of Lake County

DATE: 4/2/2019
TIME: 10:00-11:00

Location: SR-20 100' N/O Pine St
Posted Speed: 35 MPH Clear/Dry

Project #: 19-8173-004

Northbound & Southbound Spot Speeds



SPEED PARAMETERS									
Class	Count	Range	50th Percentile	85th Percentile	10 MPH Pace	# in Pace	Percent in Pace	% / # Below Pace	% / # Above Pace
ALL	122	29 - 48	39 mph	42 mph	34 - 43	105	86%	4% / 5	10% / 12



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Appendix E

Collision Rate Calculations and Diagrams





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SEGMENT COLLISION RATE CALCULATIONS

078LXX Hwy 20 Traffic Calming

Location: Nice

Date of Count: Tuesday, April 02, 2019
ADT: 11,600

Number of Collisions: 21
Number of Injuries: 0
Number of Fatalities: 0
Start Date: March 1, 2013
End Date: February 28, 2018
Number of Years: 5

Highway Type: Conventional 3 lanes
Area: Suburban

Segment Length: 1.0 miles
Direction: East/West

$$\frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Segment Length} \times \text{Number of Years}}$$

$$\frac{21 \times 1,000,000}{11,600 \times 365 \times 1 \times 5}$$

	<u>Collision Rate</u>	<u>Fatality Rate</u>	<u>Injury Rate</u>
Study Segment	0.99 c/mvm	0.0%	0.0%
Statewide Average*	1.16 c/mvm	2.4%	39.5%

ADT = average daily traffic volume
 c/mvm = collisions per million vehicle miles
 * 2013 Collision Data on California State Highways, Caltrans

Location: Lucerne

Date of Count: Tuesday, April 02, 2019
ADT: 9,200

Number of Collisions: 30
Number of Injuries: 0
Number of Fatalities: 0
Start Date: March 1, 2013
End Date: February 28, 2018
Number of Years: 5

Highway Type: Conventional 3 lanes
Area: Suburban

Segment Length: 1.0 miles
Direction: East/West

$$\frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Segment Length} \times \text{Number of Years}}$$

$$\frac{30 \times 1,000,000}{9,200 \times 365 \times 1 \times 5}$$

	<u>Collision Rate</u>	<u>Fatality Rate</u>	<u>Injury Rate</u>
Study Segment	1.79 c/mvm	0.0%	0.0%
Statewide Average*	1.16 c/mvm	2.4%	39.5%

ADT = average daily traffic volume
 c/mvm = collisions per million vehicle miles
 * 2013 Collision Data on California State Highways, Caltrans

SEGMENT COLLISION RATE CALCULATIONS

078LXX Hwy 20 Traffic Calming

Location: Glenhaven

Date of Count: Tuesday, April 02, 2019
ADT: 6,700

Number of Collisions: 0
Number of Injuries: 0
Number of Fatalities: 0
Start Date: March 1, 2013
End Date: February 28, 2018
Number of Years: 5

Highway Type: Conventional 2 lanes or less
Area: Suburban
Design Speed: 45-55

Segment Length: 1.0 miles
Direction: East/West

$$\frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Segment Length} \times \text{Number of Years}}$$

$$\frac{0 \times 1,000,000}{6,700 \times 365 \times 1 \times 5}$$

	<u>Collision Rate</u>	<u>Fatality Rate</u>	<u>Injury Rate</u>
Study Segment	0.00 c/mvm	0.0%	0.0%
Statewide Average*	1.32 c/mvm	1.2%	41.1%

ADT = average daily traffic volume
 c/mvm = collisions per million vehicle miles
 * 2013 Collision Data on California State Highways, Caltrans

Location: Clearlake Oaks

Date of Count: Tuesday, April 02, 2019
ADT: 8,400

Number of Collisions: 30
Number of Injuries: 0
Number of Fatalities: 0
Start Date: March 1, 2013
End Date: February 28, 2018
Number of Years: 5

Highway Type: Conventional 3 lanes
Area: Suburban

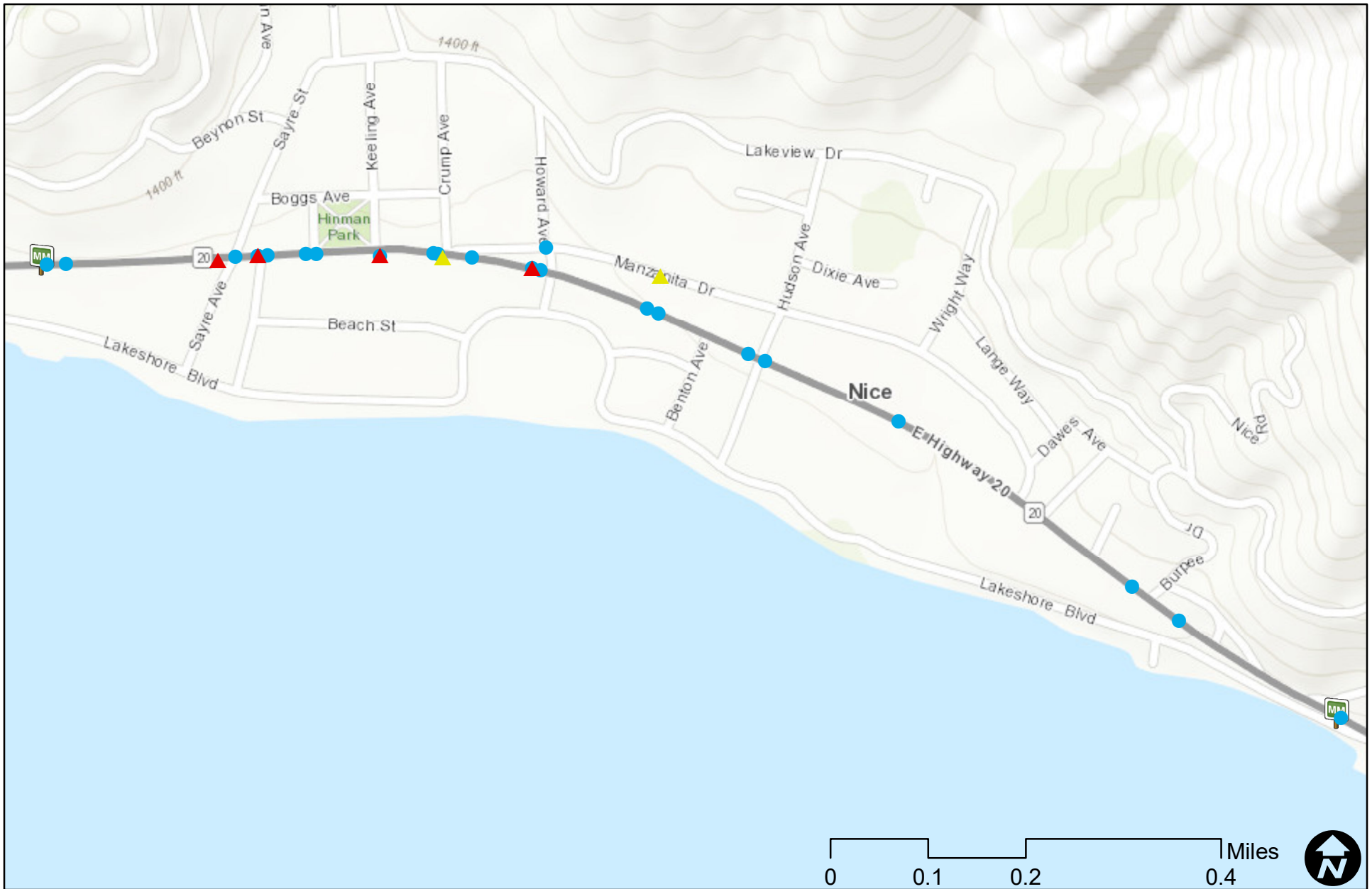
Segment Length: 1.0 miles
Direction: East/West

$$\frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Segment Length} \times \text{Number of Years}}$$

$$\frac{30 \times 1,000,000}{8,400 \times 365 \times 1 \times 5}$$

	<u>Collision Rate</u>	<u>Fatality Rate</u>	<u>Injury Rate</u>
Study Segment	1.96 c/mvm	0.0%	0.0%
Statewide Average*	1.16 c/mvm	2.4%	39.5%

ADT = average daily traffic volume
 c/mvm = collisions per million vehicle miles
 * 2013 Collision Data on California State Highways, Caltrans



Hwy 20 Traffic Calming Project

Collisions between Post Mile Markers 13.5 and 14.5

Collisions are sourced from the Transportation Injury Mapping System (TIMS).



Post Mile Marker



Collision Involving Pedestrian within Recent 10 Year Period

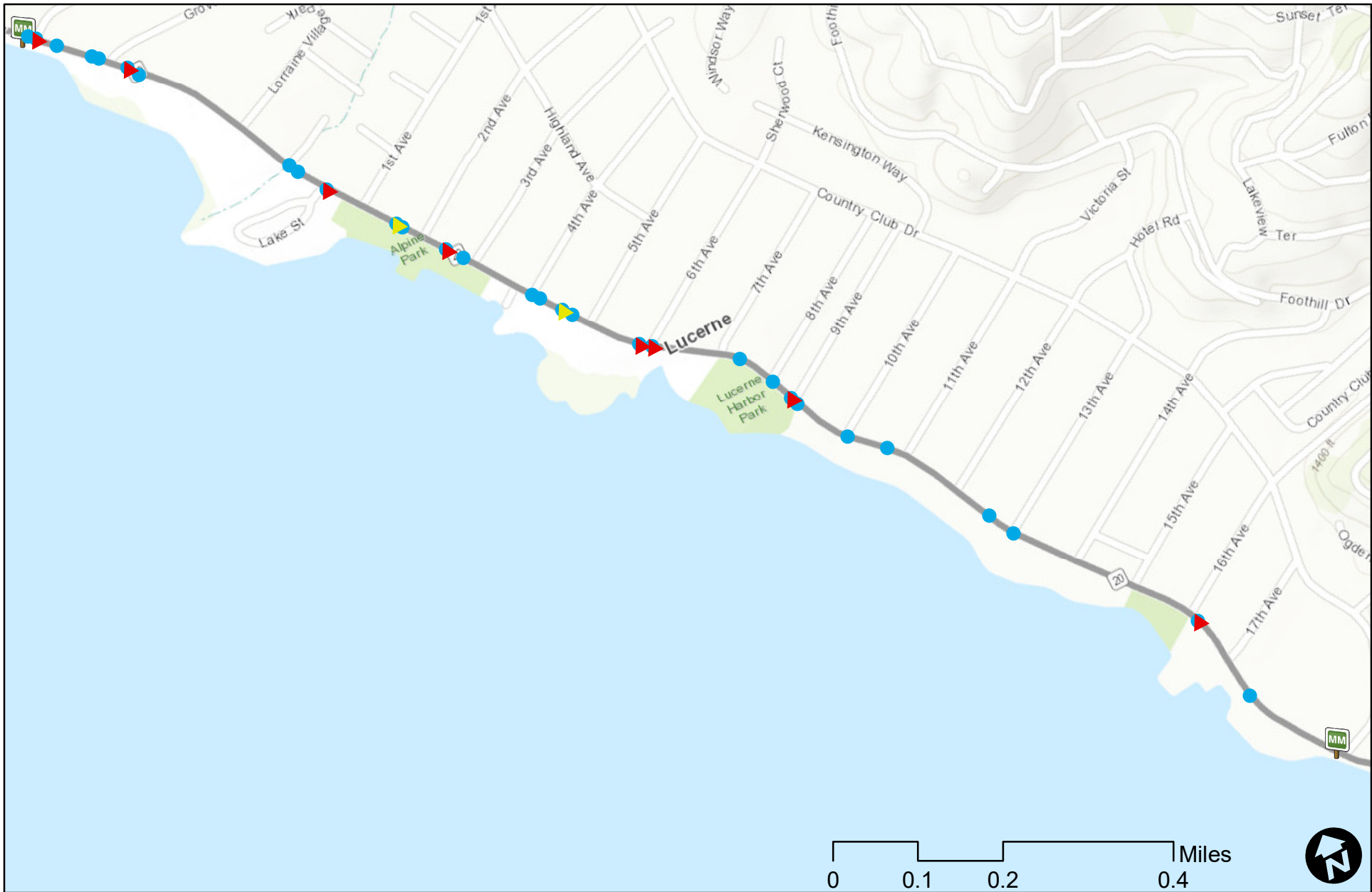


Collision Involving Bicyclist within Recent 10 Year Period



All Collisions within Recent 5 Year Period





Hwy 20 Traffic Calming Project

Collisions between Post Mile Markers 16.57 and 17.92

Collisions are sourced from the Transportation Injury Mapping System (TIMS).



Post Mile Marker



Collision Involving Pedestrian within Recent 10 Year Period

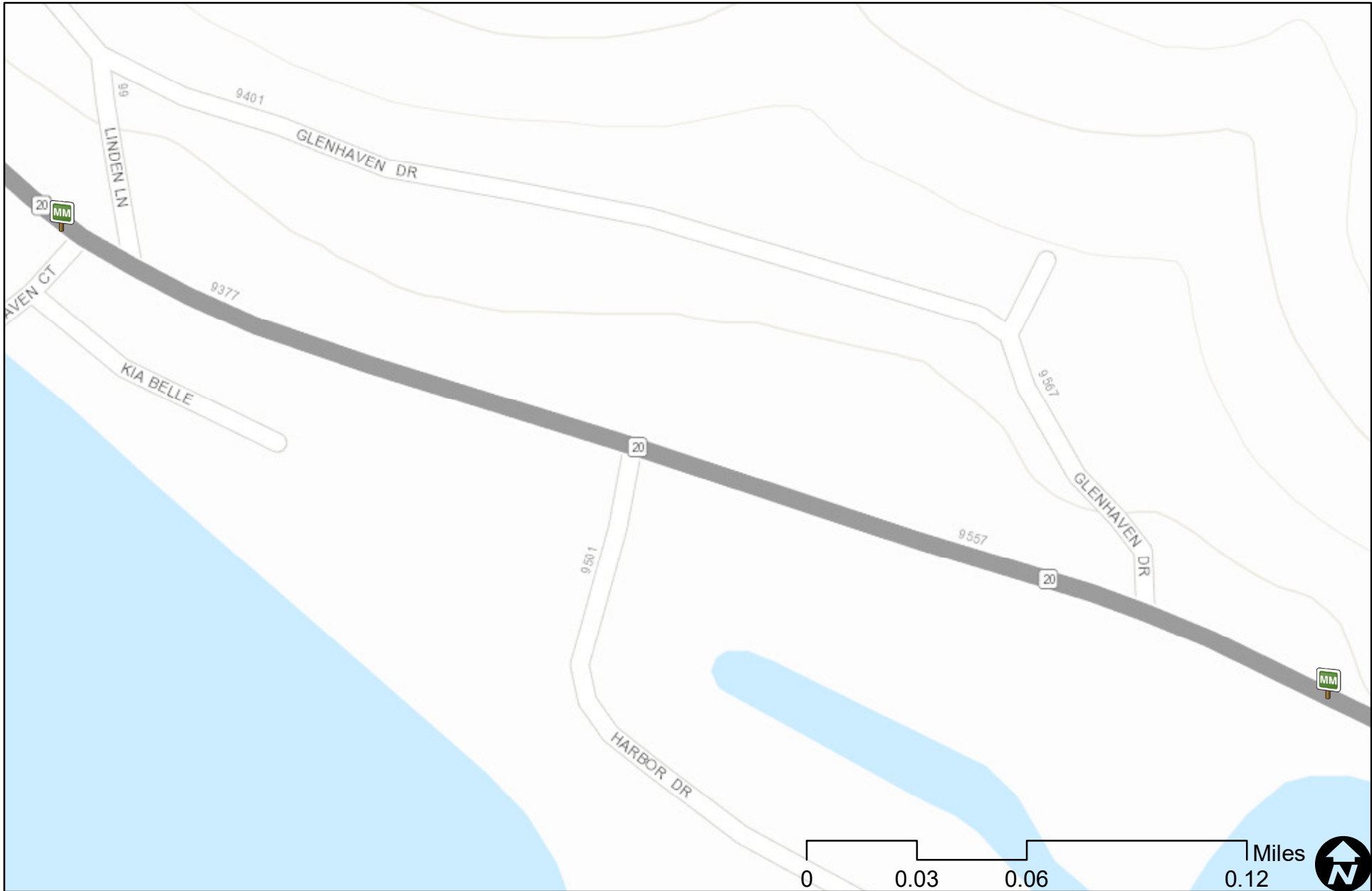


Collision Involving Bicyclist within Recent 10 Year Period



All Collisions within Recent 5 Year Period





Hwy 20 Traffic Calming Project

Collisions between Post Mile Markers 24.20 and 24.48

Collisions are sourced from the Transportation Injury Mapping System (TIMS).



Post Mile Marker



Collision Involving Pedestrian within Recent 10 Year Period

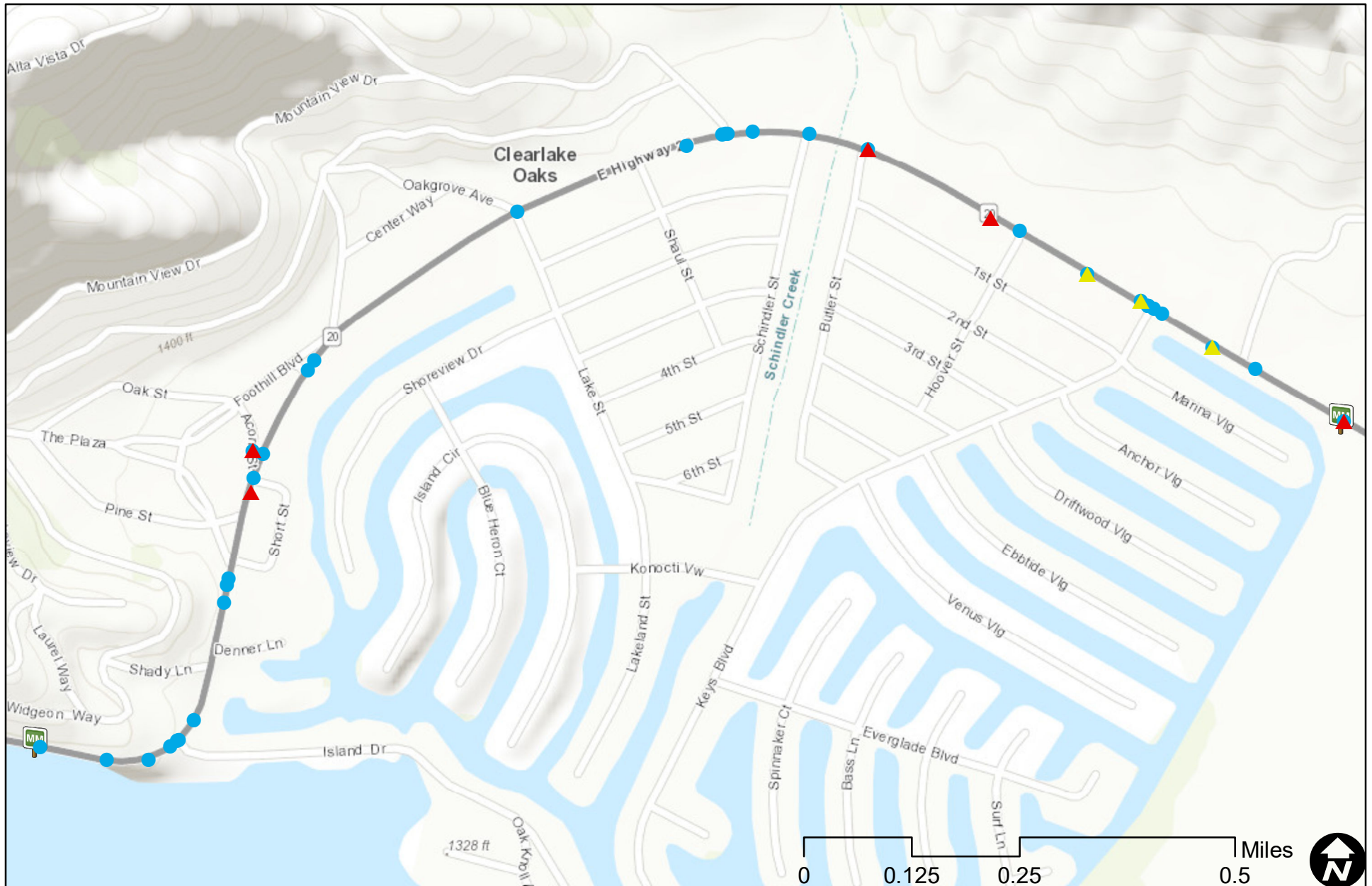


Collision Involving Bicyclist within Recent 10 Year Period



All Collisions within Recent 5 Year Period





Hwy 20 Traffic Calming Project

Collisions between Post Mile Markers 27.53 and 29.06

Collisions are sourced from the Transportation Injury Mapping System (TIMS).



Post Mile Marker



Collision Involving Pedestrian within Recent 10 Year Period



Collision Involving Bicyclist within Recent 10 Year Period



All Collisions within Recent 5 Year Period



Appendix F

Pedestrian Crossing Warrants



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Pedestrian Hybrid Beacon (HAWK) Signal Warrant

High-Speed Roadway

Project Name: Hwy 20 Traffic Calming

Scenario: PM Existing

Location: Sayre Ave

Date of Count: Tuesday, April 2, 2019

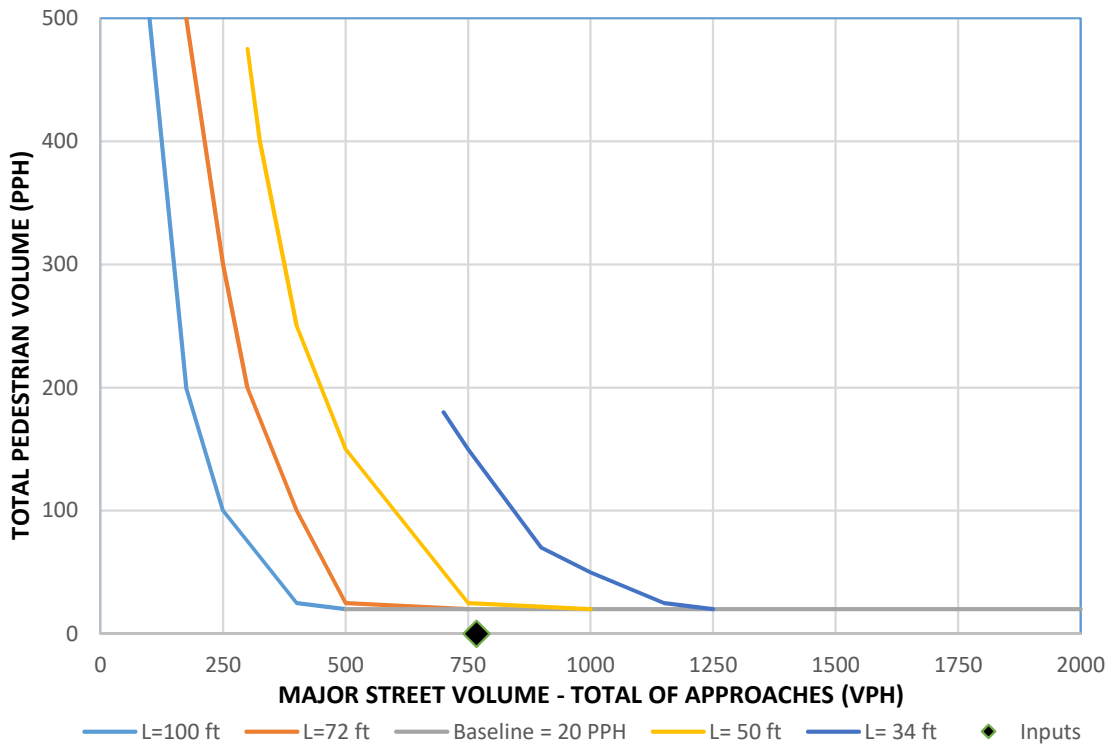
Speed Limit: 51 mph

Crosswalk Length: 71 feet

Major Street Approach Volume: 767 VPH

Pedestrians Crossing: 0 PPH

WARRANT MET? NO



Note: Installation of a HAWK Signal is warranted when the plotted point (see graph above) falls above the curve representing the corresponding crosswalk length (L).

If the length (L) of the crosswalk does not match one displayed on the graph, interpolate between existing curves to find the position of the curve representing the crosswalk length being analyzed.

Reference: California Manual on Uniform Traffic Control Devices (MUTCD) 2014 Edition

Pedestrian Hybrid Beacon (HAWK) Signal Warrant

High-Speed Roadway

Project Name: Hwy 20 Traffic Calming

Scenario: PM Existing

Location: Manzanita Dr

Date of Count: Tuesday, April 2, 2019

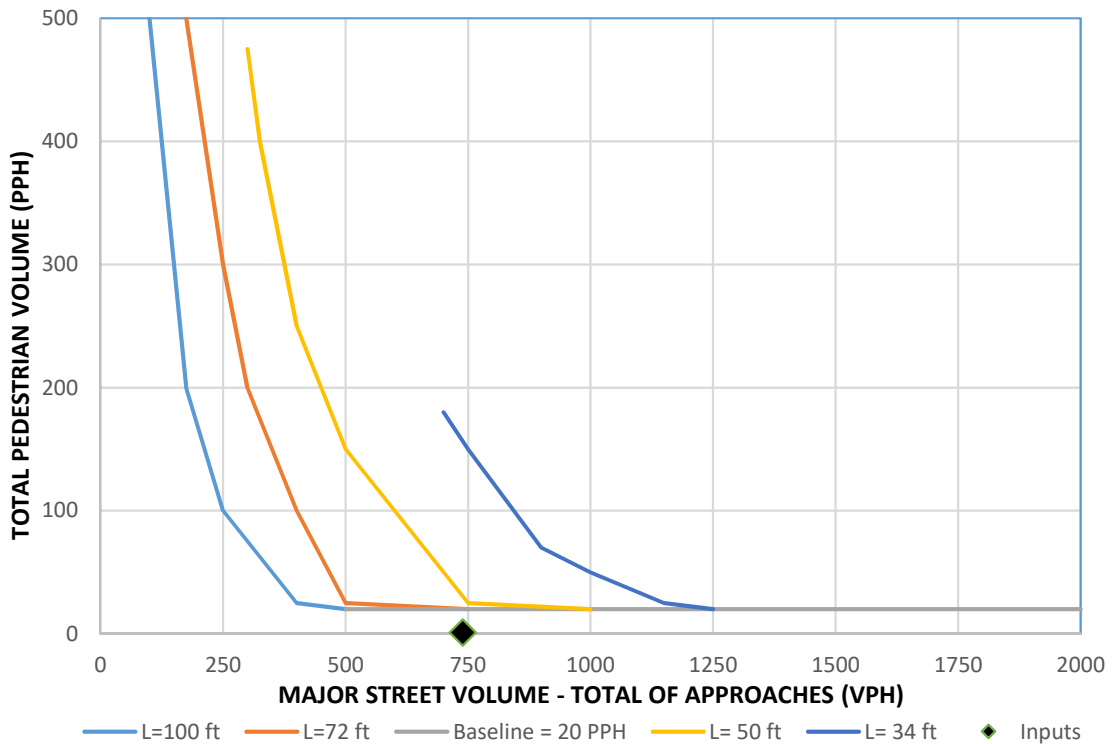
Speed Limit: 51 mph

Crosswalk Length: 52 feet

Major Street Approach Volume: 739 VPH

Pedestrians Crossing: 1 PPH

WARRANT MET? NO



Note: Installation of a HAWK Signal is warranted when the plotted point (see graph above) falls above the curve representing the corresponding crosswalk length (L).

If the length (L) of the crosswalk does not match one displayed on the graph, interpolate between existing curves to find the position of the curve representing the crosswalk length being analyzed.

Reference: California Manual on Uniform Traffic Control Devices (MUTCD) 2014 Edition

Pedestrian Hybrid Beacon (HAWK) Signal Warrant

Low-Speed Roadway

Project Name: Hwy 20 Traffic Calming

Scenario: PM Existing

Location: 5th

Date of Count: Tuesday, April 2, 2019

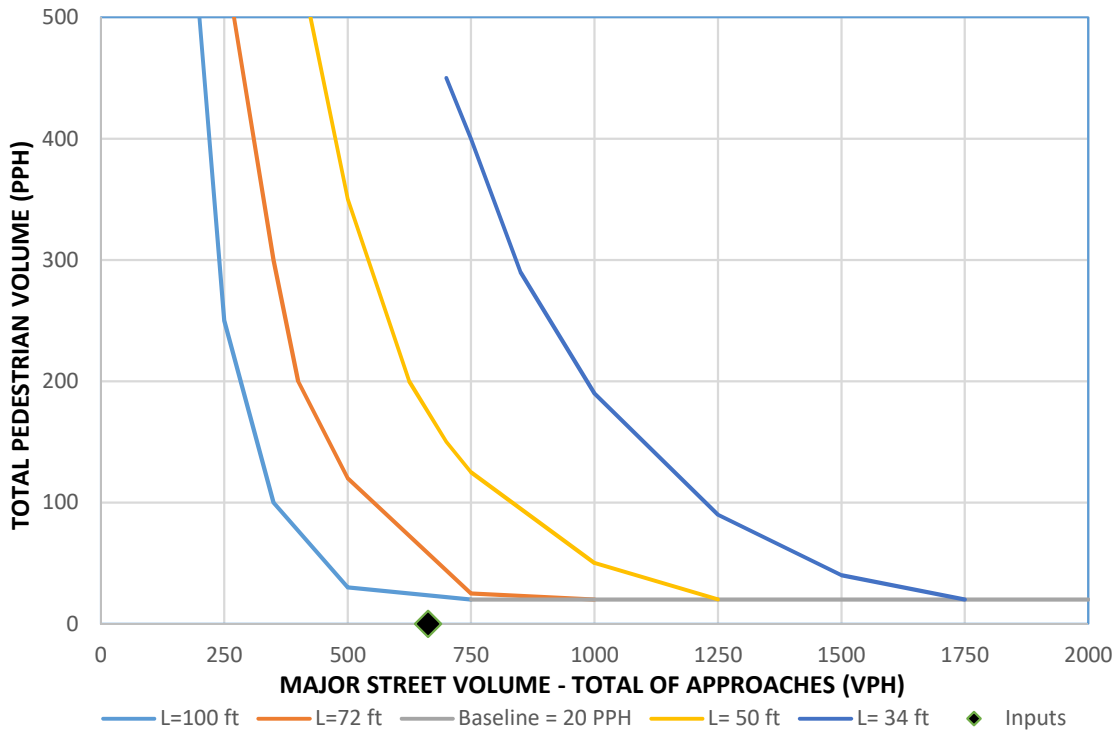
Speed Limit: 35 mph

Crosswalk Length: 45 feet

Major Street Approach Volume: 663 VPH

Pedestrians Crossing: 0 PPH

WARRANT MET? NO



Note: Installation of a HAWK Signal is warranted when the plotted point (see graph above) falls above the curve representing the corresponding crosswalk length (L).

If the length (L) of the crosswalk does not match one displayed on the graph, interpolate between existing curves to find the position of the curve representing the crosswalk length being analyzed.

Reference: California Manual on Uniform Traffic Control Devices (MUTCD) 2014 Edition

Pedestrian Hybrid Beacon (HAWK) Signal Warrant

Low-Speed Roadway

Project Name: Hwy 20 Traffic Calming

Scenario: PM (Existing)

Location: 13th

Date of Count: Tuesday, April 2, 2019

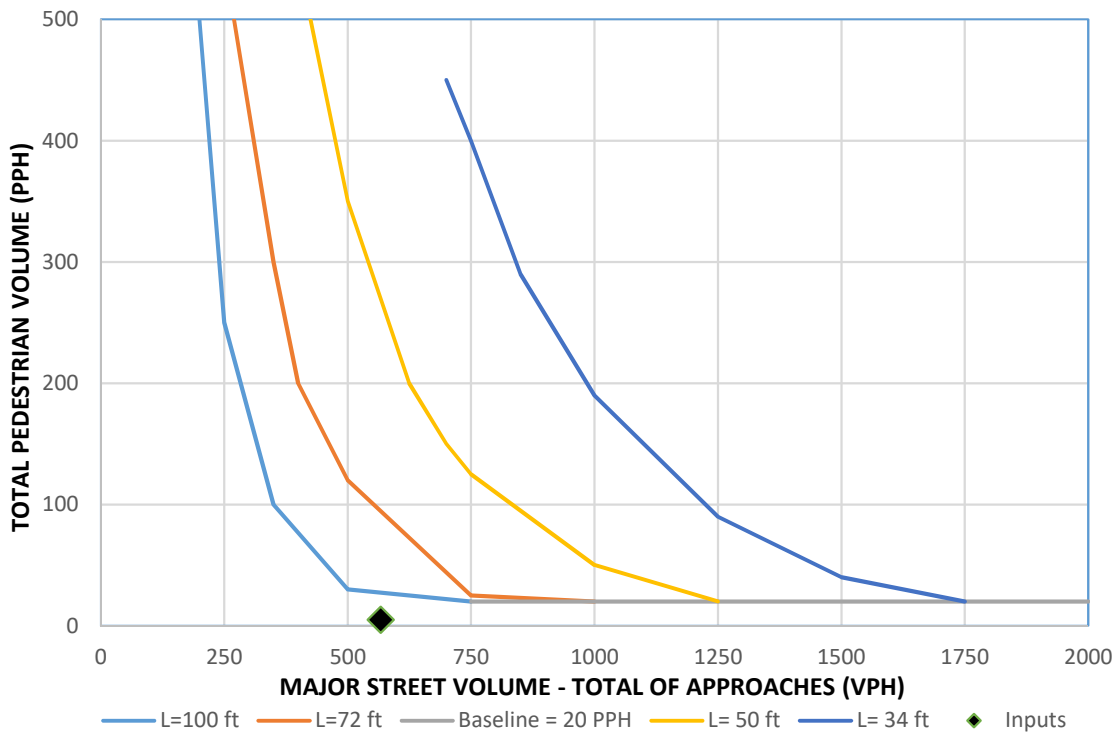
Speed Limit: 35 mph

Crosswalk Length: 51 feet

Major Street Approach Volume: 567 VPH

Pedestrians Crossing: 5 PPH

WARRANT MET? NO



Note: Installation of a HAWK Signal is warranted when the plotted point (see graph above) falls above the curve representing the corresponding crosswalk length (L).

If the length (L) of the crosswalk does not match one displayed on the graph, interpolate between existing curves to find the position of the curve representing the crosswalk length being analyzed.

Reference: California Manual on Uniform Traffic Control Devices (MUTCD) 2014 Edition

Pedestrian Hybrid Beacon (HAWK) Signal Warrant

High-Speed Roadway

Project Name: Hwy 20 Traffic Calming

Scenario: PM Existing

Location: Glenhaven Midblock

Date of Count: Tuesday, April 2, 2019

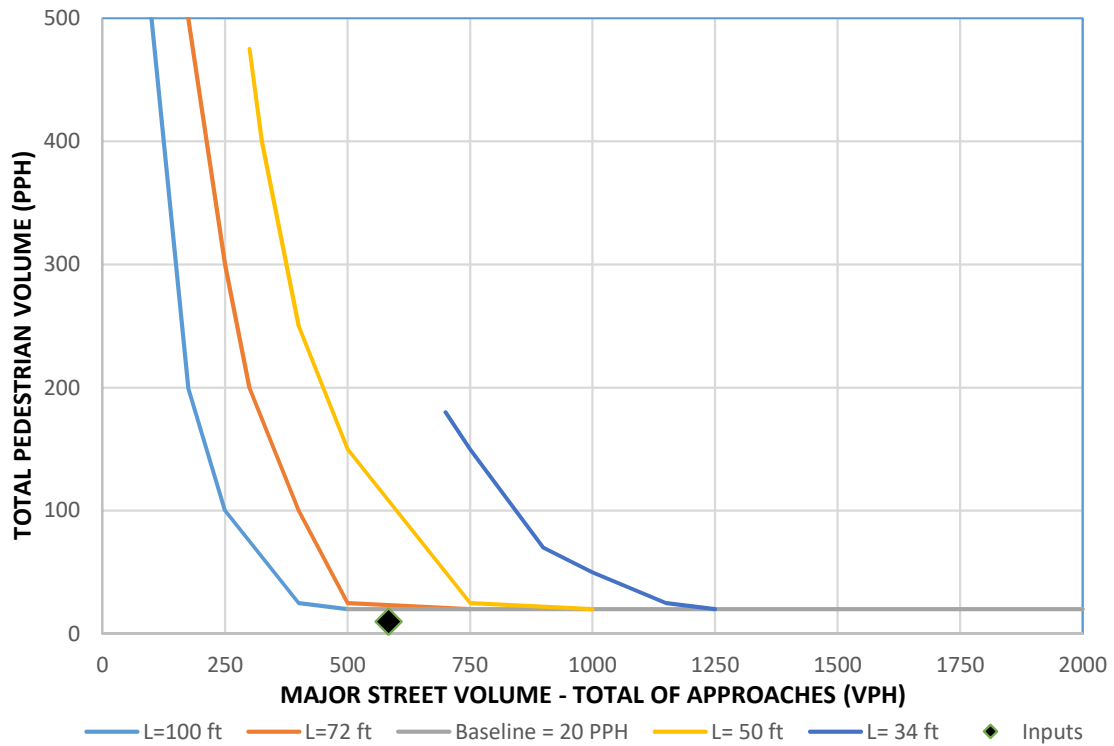
Speed Limit: 49 mph

Crosswalk Length: 66 feet

Major Street Approach Volume: 584 VPH

Pedestrians Crossing: 10 PPH

WARRANT MET? NO



Note: Installation of a HAWK Signal is warranted when the plotted point (see graph above) falls above the curve representing the corresponding crosswalk length (L).

If the length (L) of the crosswalk does not match one displayed on the graph, interpolate between existing curves to find the position of the curve representing the crosswalk length being analyzed.

Reference: California Manual on Uniform Traffic Control Devices (MUTCD) 2014 Edition

Pedestrian Hybrid Beacon (HAWK) Signal Warrant

High-Speed Roadway

Project Name: Hwy 20 Traffic Calming

Scenario: PM Existing

Location: Acorn St

Date of Count: Tuesday, April 2, 2019

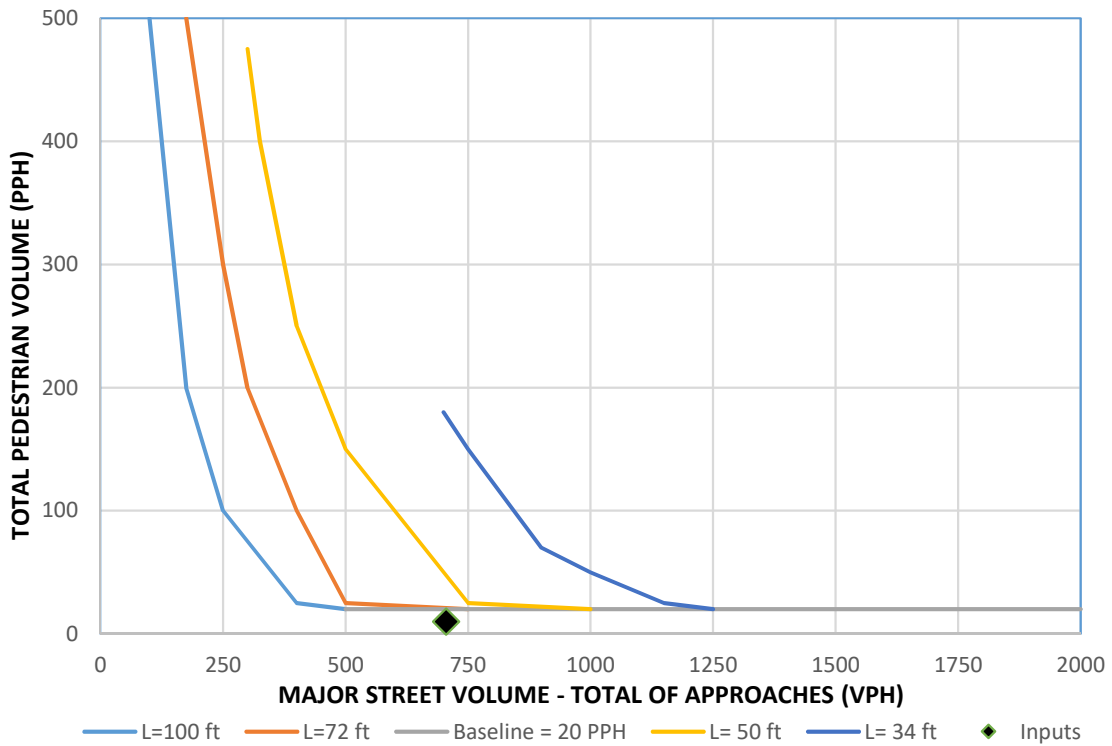
Speed Limit: 38 mph

Crosswalk Length: 100 feet

Major Street Approach Volume: 705 VPH

Pedestrians Crossing: 10 PPH

WARRANT MET? NO



Note: Installation of a HAWK Signal is warranted when the plotted point (see graph above) falls above the curve representing the corresponding crosswalk length (L).

If the length (L) of the crosswalk does not match one displayed on the graph, interpolate between existing curves to find the position of the curve representing the crosswalk length being analyzed.

Reference: California Manual on Uniform Traffic Control Devices (MUTCD) 2014 Edition

Pedestrian Hybrid Beacon (HAWK) Signal Warrant

High-Speed Roadway

Project Name: Hwy 20 Traffic Calming

Scenario: PM Existing

Location: High Valley Rd

Date of Count: Tuesday, April 2, 2019

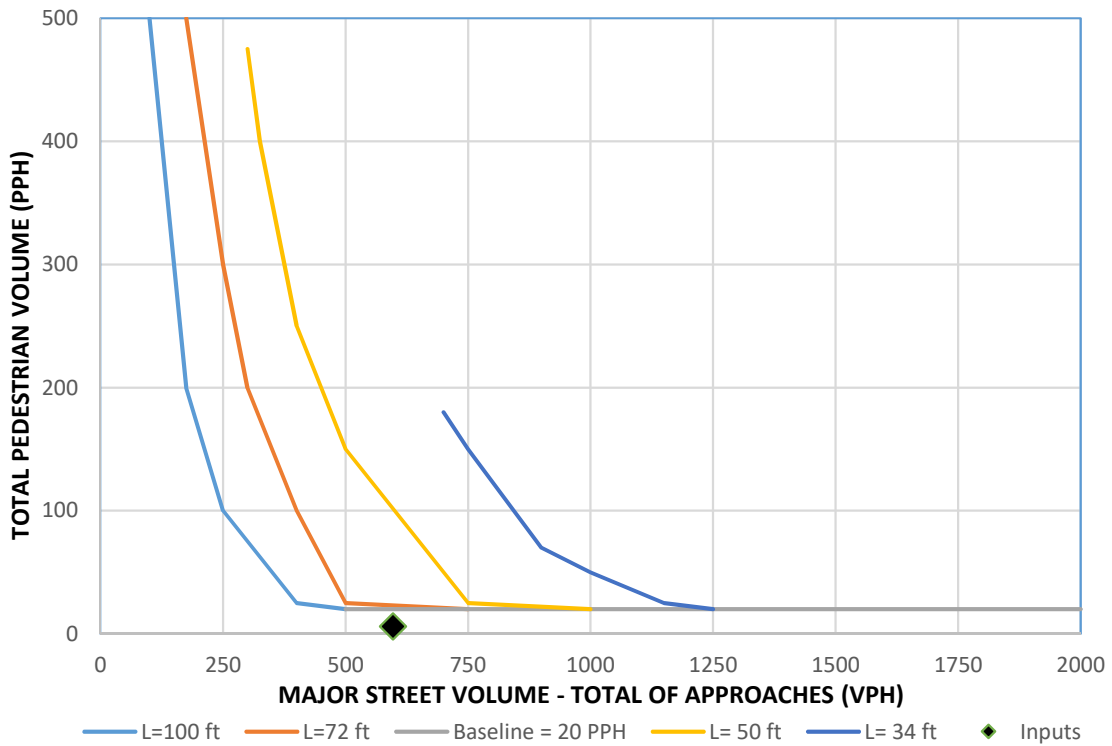
Speed Limit: 38 mph

Crosswalk Length: 56 feet

Major Street Approach Volume: 597 VPH

Pedestrians Crossing: 6 PPH

WARRANT MET? NO



Note: Installation of a HAWK Signal is warranted when the plotted point (see graph above) falls above the curve representing the corresponding crosswalk length (L).

If the length (L) of the crosswalk does not match one displayed on the graph, interpolate between existing curves to find the position of the curve representing the crosswalk length being analyzed.

Reference: California Manual on Uniform Traffic Control Devices (MUTCD) 2014 Edition

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet

Worksheet 2: Peak-Hour, EXCEEDS 35 MPH

Analyst and Site Information

Analyst: Steve Weinberger S Major Street: Hwy 20
 Analysis Date: 23-Apr-19 Minor Street or Location: Sayre
 Data Collection Date: 4/2/2019 Peak Hour: PM Peak (Existing)

Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):

- a) Worksheet 1 - 35 mph or less
- b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists

Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?

2a Peak-hour pedestrian volume (ped/h), vp **2a** 0
 o If 2a ≥ 14 ped/h, then go to Step 3.
 o If 2a < 14 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible. **Consider TCD Treatment**

Step 3: Does the crossing meet the pedestrian volume warrant for a traffic signal?

3a Major road volume, total of both approaches during peak hour (veh/h), V maj-s **3a** 757
3b Minimum signal warrant volume for peak hour (use 3a for Vmaj-s)
 • SC = 0.00035 Vmaj-s² - 0.80083 Vmaj-s + 529.197 / 0.75, OR
 • [(0.00035 3a² - 0.80083 3a + 529.197)/0.75]
3b 164.7144533
3c o If 3b < 93, then enter 93. If 3b ≥ 93, then enter 3b. **3c** 164.7144533
3d o If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c. **3d** 164.7144533
 o If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.

Step 4: Estimate pedestrian delay.

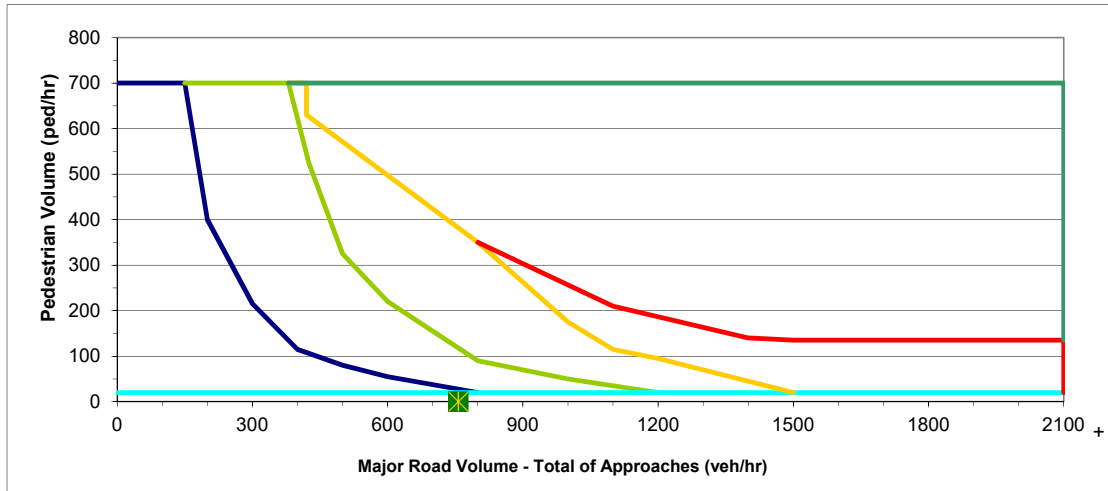
4a Pedestrian crossing distance, curb to curb (ft), L **4a** 71
4b Pedestrian walking speed (ft/s), Sp **4b** 3.5
4c Pedestrian start-up time and end clearance time (s), ts **4c** 4
4d o Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c] **4d** 24.28571429
4e Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh.h), Vmaj-d **4e** 757
4f o Major road flow rate (veh/s), v = (Vmaj-d / 0.7) / 3600 OR [(4e / 0.7) / 3600] **4f** 0.300396825
4g o Average pedestrian delay (s/person), dp = (e^{v^{tc}} - v^{tc} - 1) / v OR [(e^{4d x 4d} - 4d - 1) / 4f] **4g** 4877.346258
4h o Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] **4h** 0
 (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.

Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.

Expected motorist compliance at pedestrian crossings in region, Comp = high or low **5a** LOW

Total Pedestrian Delay Dp (4h) and Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED
Dp < 5.3h and Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = high	USE ACTIVE OR ENHANCED

Roadway Configuration: 56' Wide, <35 mph, Vped = 3.5 ft/s



LEGEND
X Study Intersection
Signal
Enhanced-High Visibility/Active when Present
Red
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)
Striped Crosswalk
No Treatment

DESCRIPTIONS OF TREATMENT TYPES		
RED	ENHANCED-HIGH VISIBILITY/ACTIVE WHEN PRESENT	
	Active When Present	Enhanced/High Visibility
<ul style="list-style-type: none"> • Midblock Signal • Half Signal • HAWK 	<ul style="list-style-type: none"> • In Roadway Warning Lights • Passive/Pushbutton Flashing Beacons • Pedestrian Crossing Flags • Rapid Rectangular Flashing Beacons 	<ul style="list-style-type: none"> • In-Street Crossing Signs • High Visibility Signs/Markings • Pedestrian Refuge Islands • Raised Crosswalks • Curb Extensions • Advanced Signage • Advanced Stop/Yield Lines • Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet

Worksheet 2: Peak-Hour, EXCEEDS 35 MPH

Analyst and Site Information

Analyst: Steve Weinberger
 Analysis Date: 23-Apr-19
 Data Collection Date: 4/2/2019

Major Street: Hwy 20
 Minor Street or Location: Manzanita
 Peak Hour: PM Peak (Existing)

Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):

- a) Worksheet 1 - 35 mph or less
- b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists

Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?

2a Peak-hour pedestrian volume (ped/h), vp 1
 o If 2a ≥ 14 ped/h, then go to Step 3.
 o If 2a < 14 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible. Consider TCD Treatment

Step 3: Does the crossing meet the pedestrian volume warrant for a traffic signal?

3a Major road volume, total of both approaches during peak hour (veh/h), V maj-s 738
3b Minimum signal warrant volume for peak hour (use 3a for Vmaj-s) 171.74648
 • SC = 0.00035 Vmaj-s² - 0.80083 Vmaj-s + 529.197 / 0.75, OR
 • [(0.00035 3a² - 0.80083 3a + 529.197)/0.75]
3c o If 3b < 93, then enter 93. If 3b ≥ 93, then enter 3b. 171.74648
3d o If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c. 171.74648
 o If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.

Step 4: Estimate pedestrian delay.

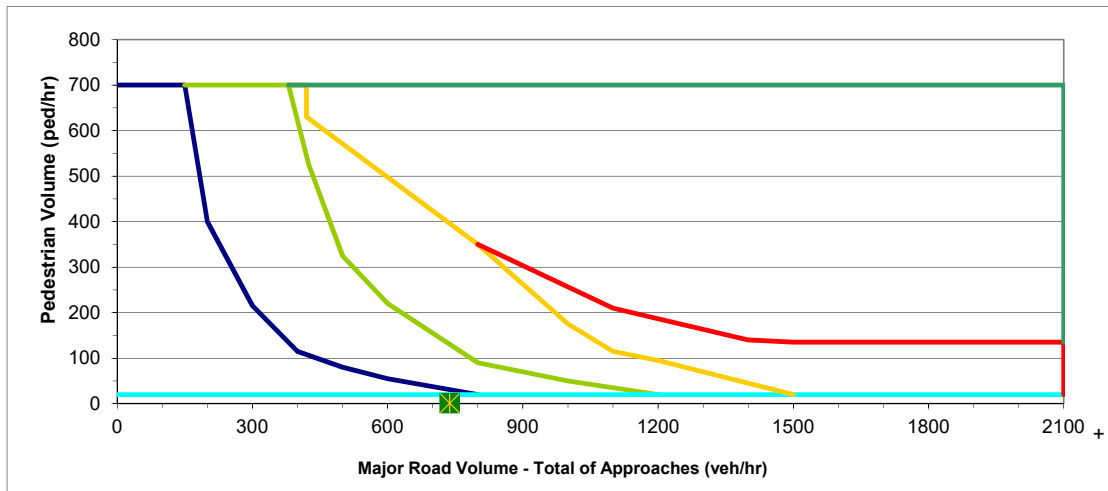
4a Pedestrian crossing distance, curb to curb (ft), L 52
4b Pedestrian walking speed (ft/s), Sp 3.5
4c Pedestrian start-up time and end clearance time (s), ts 4
4d o Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c] 18.85714286
4e Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh.h), Vmaj-d 738
4f o Major road flow rate (veh/s), v = (Vmaj-d / 0.7) / 3600 OR [(4e / 0.7) / 3600] 0.292857143
4g o Average pedestrian delay (s/person), dp = (e^{v tc} - v tc - 1) / v OR [(e^{4f x 4d} - 4f x 4d - 1) / 4f] 832.2306437
4h o Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] 0.231175179
 (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.

Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.

Expected motorist compliance at pedestrian crossings in region, Comp = high or low 5a LOW

Total Pedestrian Delay Dp (4h) and Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED
Dp < 5.3h and Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = high	USE ACTIVE OR ENHANCED

Roadway Configuration: 56' Wide, <35 mph, Vped = 3.5 ft/s



LEGEND
X Study Intersection
Signal
Enhanced-High Visibility/Active when Present
Red
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)
Striped Crosswalk
No Treatment

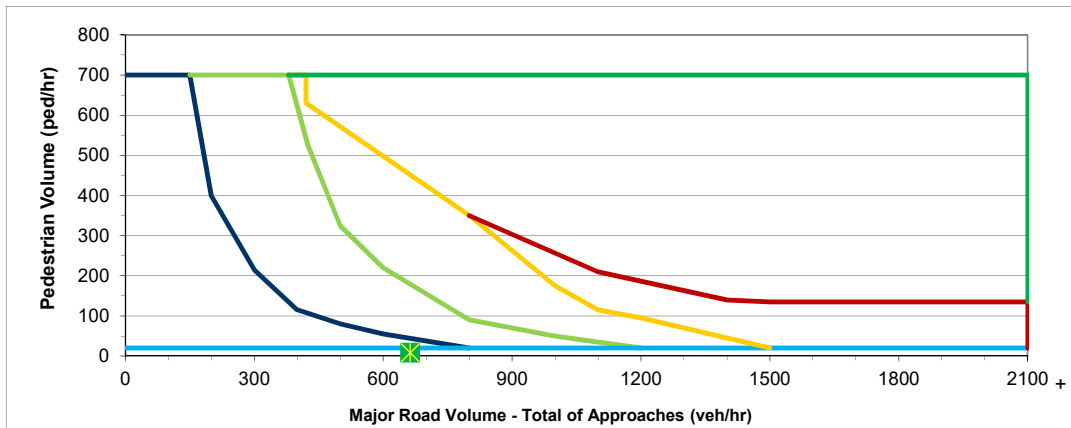
DESCRIPTIONS OF TREATMENT TYPES		
RED	ENHANCED-HIGH VISIBILITY/ACTIVE WHEN PRESENT	
	Active When Present	Enhanced/High Visibility
<ul style="list-style-type: none"> • Midblock Signal • Half Signal • HAWK 	<ul style="list-style-type: none"> • In Roadway Warning Lights • Passive/Pushbutton Flashing Beacons • Pedestrian Crossing Flags • Rapid Rectangular Flashing Beacons 	<ul style="list-style-type: none"> • In-Street Crossing Signs • High Visibility Signs/Markings • Pedestrian Refuge Islands • Raised Crosswalks • Curb Extensions • Advanced Signage • Advanced Stop/Yield Lines • Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet

Worksheet 1: Peak-Hour, 35 MPH or Less

Analyst and Site Information		
Analyst:	Steve Weinberger	Major Street:
Analysis Date:	4/23/2019	Minor Street or Location:
Data Collection Date:	4/2/2019	Peak Hour:
Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):		
a) Worksheet 1 - 35 mph or less		
b) Worksheet 2 - exceeds 35 mph, communities with less than 10,000, or where major transit stop exists		
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?		
Peak-hour pedestrian volume (ped/h), vp	2a	8
If 2a ≥ 20 ped/h, then go to Step 3.		
If 2a < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.		
0		
Major road volume, total of both approaches during peak hour (veh/h), V maj-s	3a	663
Minimum signal warrant volume for peak hour (use 3a for Vmaj-s), SC SC = 0.00021 Vmaj-s ² - 0.74072 Vmaj-s + 734.125/0.75 OR [(0.00021 3a ² - 0.74072 3a + 734.125)/0.75]	3b	447.1161733
If 3b < 133, then enter 133. If 3b ≥ 133, then enter 3b.	3c	447.1161733
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c.	3d	447.1161733
If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.		
Step 4: Estimate pedestrian delay.		
Pedestrian crossing distance, curb to curb (ft), L	4a	45
Pedestrian walking speed (ft.s), Sp	4b	3.5
Pedestrian start-up time and end clearance time (s), ts	4c	4
Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c]	4d	16.85714286
Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh/h), Vmaj-d	4e	444
Major road flow rate (veh/s), v = Vmaj-d/3600 OR [4e/3600]	4f	0.123333333
Average pedestrian delay (s/person), dp = (e ^{-v tc} - v tc - 1) / v OR [(e ^{-4f x 4d} - 4f x 4d - 1) / 4f]	4g	39.87406719
Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.	4h	0.088609038
Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.		
Expected motorist compliance at pedestrian crossings in region, Comp = high or low	5a	LOW
Total Pedestrian Delay, Dp (from 4h) and Motorist Compliance, Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)	
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED	
1.3h ≤ Dp < 21.3h and Comp = high or low) OR 5.3 ≤ Dp < 21.3 h and Comp = high	DO NOT USE ACTIVE OR ENHANCED	
Dp < 1.3 h (Comp = high or low)	USE CROSSWALK	

Roadway Configuration: _____ 56' Wide, <35 mph, Vped = 3.5 ft/s _____

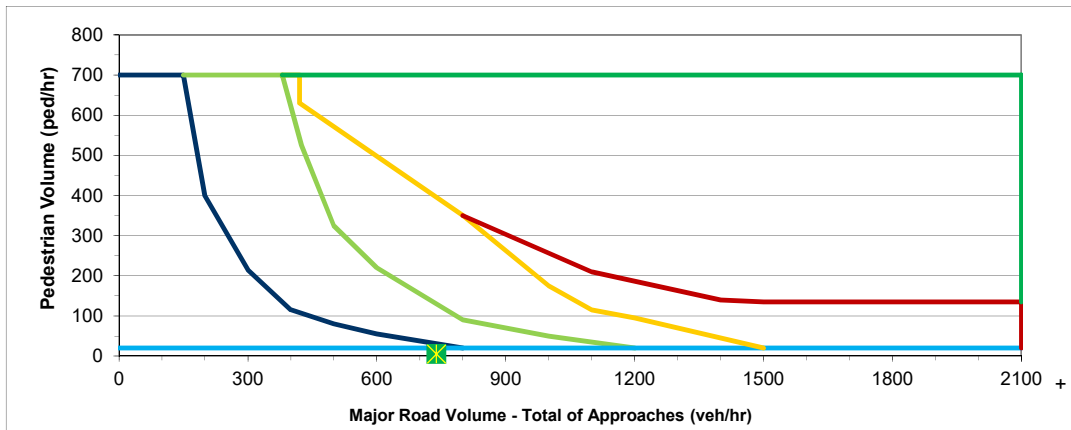


Legend:	Description of Treatment Types:	
X	Study Intersection	
▬	Striped Crosswalk	
▬	Enhanced-High Visibility/Active when Present	
▬	Red	
▬	Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)	
▬	Signal	
▬	No Treatment	
▬	Red:	Enhanced-High Visibility/Active when Present
	Midblock Signal	Active When Present In Roadway Warning Lights
	Half Signal	Enhanced/High Visibility In-Street Crossing Signs
	HAWK	High Visibility Signs/Markings Pedestrian Refuge Islands
		Passive/Pushbutton Flashing Beacons
		Raised Crosswalks Curb Extensions
		Pedestrian Crossing Flags Advanced Signage
		Rapid Rectangular Flashing Beacons
		Advanced Stop/Yield Lines Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet
Worksheet 1: Peak-Hour, 35 MPH or Less

Analyst and Site Information			
Analyst:	Steve Weinberger	Major Street:	Hwy 20
Analysis Date:	4/23/2019	Minor Street or Location:	13th Ave
Data Collection Date:	4/2/2019	Peak Hour:	PM Peak (Existing)
Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):			
a) Worksheet 1 - 35 mph or less			
b) Worksheet 2 - exceeds 35 mph, communities with less than 10,000, or where major transit stop exists			
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?			
Peak-hour pedestrian volume (ped/h), vp	2a		5
If 2a ≥ 20 ped/h, then go to Step 3.			
If 2a < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.			
0			
Major road volume, total of both approaches during peak hour (veh/h), V maj-s	3a		739
Minimum signal warrant volume for peak hour (use 3a for Vmaj-s), SC $SC = 0.00021 V_{maj-s}^2 - 0.74072 V_{maj-s} + 734.125/0.75$ OR $[(0.00021 3a^2 - 0.74072 3a + 734.125)/0.75]$	3b		401.8911067
If 3b < 133, then enter 133. If 3b ≥ 133, then enter 3b.	3c		401.8911067
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c.	3d		401.8911067
If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L	4a		51
Pedestrian walking speed (ft.s), Sp	4b		3.5
Pedestrian start-up time and end clearance time (s), ts	4c		4
Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c]	4d		18.57142857
Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh/h), Vmaj-d	4e		739
Major road flow rate (veh/s), v = Vmaj-d/3600 OR [4e/3600]	4f		0.205277778
Average pedestrian delay (s/person), dp = $(e^{v \cdot tc} - v \cdot tc - 1) / v$ OR $[(e^{4f \times 4d} - 4f \times 4d - 1) / 4f]$	4g		197.0119468
Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.	4h		0.273627704
Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region, Comp = high or low	5a		LOW
Total Pedestrian Delay, Dp (from 4h) and Motorist Compliance, Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)		
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED		
1.3h ≤ Dp < 21.3h and Comp = high or low) OR 5.3 ≤ Dp < 21.3 h and Comp = high	DO NOT USE ACTIVE OR ENHANCED		
Dp < 1.3 h (Comp = high or low)	USE CROSSWALK		

Roadway Configuration: _____ 56' Wide, <35 mph, Vped = 3.5 ft/s _____



Legend:	Description of Treatment Types:	
X Study Intersection	Red:	Enhanced-High Visibility/Active when Present
Striped Crosswalk	Midblock Signal	Active When Present In Roadway Warning Lights
Enhanced-High Visibility/Active when Present	Half Signal	Enhanced/High Visibility In-Street Crossing Signs
Red	HAWK	High Visibility Signs/Markings Pedestrian Refuge Islands
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)		Passive/Pushbutton Flashing Beacons
Signal		Raised Crosswalks Curb Extensions
No Treatment		Pedestrian Crossing Flags Advanced Signage
		Rapid Rectangular Flashing Beacons
		Advanced Stop/Yield Lines Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet

Worksheet 2: Peak-Hour, EXCEEDS 35 MPH

Analyst and Site Information

Analyst: Steve Weinberger	Major Street: Hwy 20
Analysis Date: 23-Apr-19	Minor Street or Location: Midblock
Data Collection Date: 4/2/2019	Peak Hour: PM Peak (Existing)

Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):

- a) Worksheet 1 - 35 mph or less
- b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists

Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?

2a Peak-hour pedestrian volume (ped/h), vp 10

o If 2a ≥ 14 ped/h, then go to Step 3.

o If 2a < 14 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible. Consider TCD Treatment

Step 3: Does the crossing meet the pedestrian volume warrant for a traffic signal?

3a Major road volume, total of both approaches during peak hour (veh/h), V maj-s 551

3b Minimum signal warrant volume for peak hour (use 3a for Vmaj-s)

• SC = 0.00035 Vmaj-s² - 0.80083 Vmaj-s + 529.197 / 0.75, OR

• [(0.00035 3a² - 0.80083 3a + 529.197)/0.75]

3c o If 3b < 93, then enter 93. If 3b ≥ 93, then enter 3b. 258.93336

3d o If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c. 258.93336

o If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.

Step 4: Estimate pedestrian delay.

4a Pedestrian crossing distance, curb to curb (ft), L 66

4b Pedestrian walking speed (ft.s), Sp 3.5

4c Pedestrian start-up time and end clearance time (s), ts 4

4d o Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c] 22.85714286

4e Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh.h), Vmaj-d 551

4f o Major road flow rate (veh/s), v = (Vmaj-d / 0.7) / 3600 OR [(4e / 0.7) / 3600] 0.218650794

4g o Average pedestrian delay (s/person), dp = (e^{v tc} - v tc - 1) / v OR [(e^{4f x 4d} - 4f x 4d - 1) / 4f] 649.7999289

4h o Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] 1.804999803

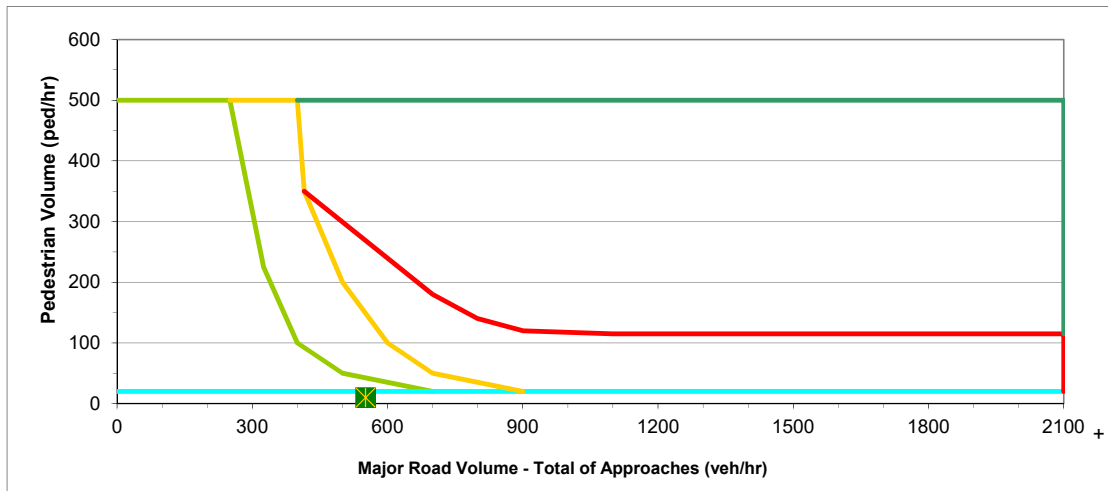
(this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.

Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.

Expected motorist compliance at pedestrian crossings in region, Comp = high or low 5a

Total Pedestrian Delay Dp (4h) and Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED
Dp < 5.3h and Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = high	USE ACTIVE OR ENHANCED

Roadway Configuration: 66' Wide, >35 mph, Vped = 3.5 ft/s



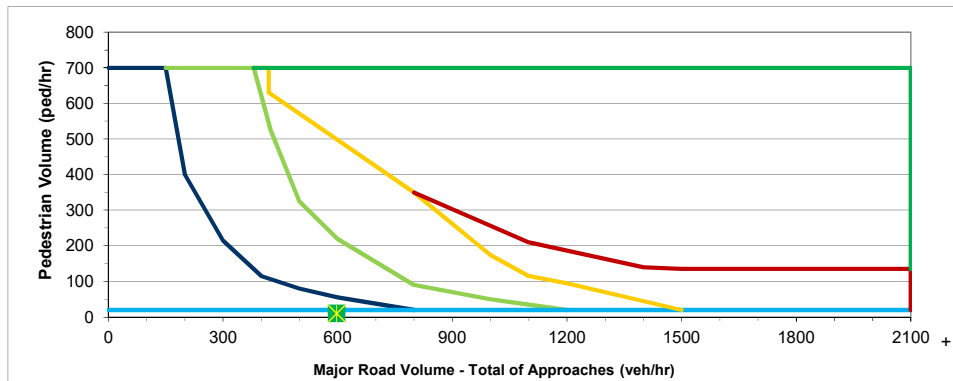
LEGEND
X Study Intersection
Signal
Enhanced-High Visibility/Active when Present
Red
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)
Striped Crosswalk
No Treatment

DESCRIPTIONS OF TREATMENT TYPES		
RED	ENHANCED-HIGH VISIBILITY/ACTIVE WHEN PRESENT	
	Active When Present	Enhanced/High Visibility
<ul style="list-style-type: none"> • Midblock Signal • Half Signal • HAWK 	<ul style="list-style-type: none"> • In Roadway Warning Lights • Passive/Pushbutton Flashing Beacons • Pedestrian Crossing Flags • Rapid Rectangular Flashing Beacons 	<ul style="list-style-type: none"> • In-Street Crossing Signs • High Visibility Signs/Markings • Pedestrian Refuge Islands • Raised Crosswalks • Curb Extensions • Advanced Signage • Advanced Stop/Yield Lines • Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet
Worksheet 1: Peak-Hour, 35 MPH or Less

Analyst and Site Information			
Analyst:	Steve Weinberger	Major Street:	Hwy 20
Analysis Date:	4/23/2019	Minor Street or Location:	Acorn
Data Collection Date:	4/2/2019	Peak Hour:	PM Peak (Existing)
Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):			
a) Worksheet 1 - 35 mph or less			
b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists			
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?			
Peak-hour pedestrian volume (ped/h), vp	2a		10
If 2a ≥ 20 ped/h, then go to Step 3.			
If 2a < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.			
0			
Major road volume, total of both approaches during peak hour (veh/h), V maj-s	3a		598
Minimum signal warrant volume for peak hour (use 3a for Vmaj-s), SC $SC = 0.00021 V_{maj-s}^2 - 0.74072 V_{maj-s} + 734.125/0.75$ OR $[(0.00021 3a^2 - 0.74072 3a + 734.125)/0.75]$	3b		488.3617067
If 3b < 133, then enter 133. If 3b ≥ 133, then enter 3b.	3c		488.3617067
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c.	3d		488.3617067
If 2a ≥ 20, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L	4a		100
Pedestrian walking speed (ft/s), Sp	4b		3.5
Pedestrian start-up time and end clearance time (s), ts	4c		4
Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c]	4d		32.57142857
Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh/h), Vmaj-d	4e		598
Major road flow rate (veh/s), v = Vmaj-d/3600 OR [4e/3600]	4f		0.166111111
Average pedestrian delay (s/person), dp = $(e^{v \cdot tc} - v \cdot tc - 1) / v$ OR $[(e^{4f \cdot 4d} - 4f \cdot 4d - 1) / 4f]$	4g		1308.326858
Total pedestrian delay (h), Dp = (dp x vp) / 3600 OR [(4g x 2a) / 3600] <small>(this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.</small>	4h		3.634241272
Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region, Comp = high or low	5a		LOW
Total Pedestrian Delay, Dp (from 4h) and Motorist Compliance, Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)		
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED		
1.3h ≤ Dp < 21.3h and Comp = high or low OR 5.3 ≤ Dp < 21.3 h and Comp = high	USE ACTIVE OR ENHANCED		
Dp < 1.3 h (Comp = high or low)	DO NOT USE CROSSWALK		

Roadway Configuration: _____ 56' Wide, <35 mph, Vped = 3.5 ft/s _____



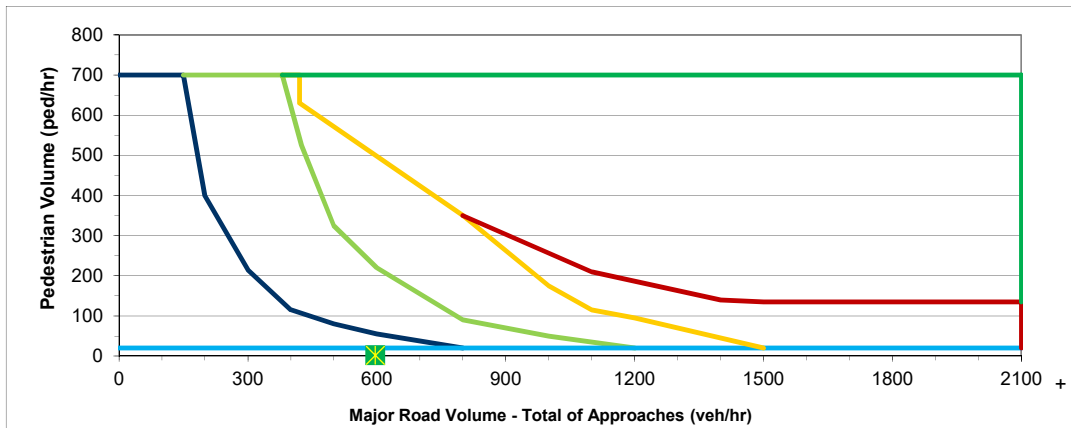
Legend:	Description of Treatment Types:	
X Study Intersection	Red:	Enhanced-High Visibility/Active when Present
 Striped Crosswalk	Midblock Signal	Active When Present Enhanced/High Visibility
Enhanced-High Visibility/Active when Present	In Roadway Warning Lights	In-Street Crossing Signs High Visibility Signs/Markings
Red	Half Signal	Pedestrian Refuge Islands
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)	HAWK	Raised Crosswalks
Signal		Pedestrian Crossing Curb Extensions
No Treatment		Flags Advanced Signage
		Rapid Rectangular Advanced Stop/Yield Lines
		Flashing Beacons Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet

Worksheet 1: Peak-Hour, 35 MPH or Less

Analyst and Site Information			
Analyst:	Steve Weinberger	Major Street:	Hwy 20
Analysis Date:	4/23/2019	Minor Street or Location:	High Valley
Data Collection Date:	4/2/2019	Peak Hour:	PM Peak (Existing)
Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):			
a) Worksheet 1 - 35 mph or less			
b) Worksheet 2 - exceeds 35 mph, communities with less than 10,000, or where major transit stop exists			
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?			
Peak-hour pedestrian volume (ped/h), vp	2a		2
If 2a ≥ 20 ped/h, then go to Step 3.			
If 2a < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.			
0			
Major road volume, total of both approaches during peak hour (veh/h), V maj-s	3a		597
Minimum signal warrant volume for peak hour (use 3a for Vmaj-s), SC SC = 0.00021 Vmaj-s ² - 0.74072 Vmaj-s + 734.125/0.75 OR [(0.00021 3a ² - 0.74072 3a + 734.125)/0.75]	3b		489.0147333
If 3b < 133, then enter 133. If 3b ≥ 133, then enter 3b.	3c		489.0147333
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c.	3d		489.0147333
If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L	4a		56
Pedestrian walking speed (ft.s), Sp	4b		3.5
Pedestrian start-up time and end clearance time (s), ts	4c		4
Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c]	4d		20
Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh/h), Vmaj-d	4e		597
Major road flow rate (veh/s), v = Vmaj-d/3600 OR [4e/3600]	4f		0.165833333
Average pedestrian delay (s/person), dp = (e ^{-v tc} - v tc - 1) / v OR [(e ^{-4f x 4d} - 4f x 4d - 1) / 4f]	4g		140.2108717
Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.	4h		0.077894929
Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region, Comp = high or low	5a		LOW
Total Pedestrian Delay, Dp (from 4h) and Motorist Compliance, Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)		
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED		
1.3h ≤ Dp < 21.3h and Comp = high or low) OR 5.3 ≤ Dp < 21.3 h and Comp = high	DO NOT USE ACTIVE OR ENHANCED		
Dp < 1.3 h (Comp = high or low)	USE CROSSWALK		

Roadway Configuration: _____ 56' Wide, <35 mph, Vped = 3.5 ft/s _____



Legend:	Description of Treatment Types:	
X Study Intersection	Red:	Enhanced-High Visibility/Active when Present
Striped Crosswalk	Midblock Signal	Active When Present Enhanced/High Visibility
Enhanced-High Visibility/Active when Present	Half Signal	In Roadway Warning In-Street Crossing Signs
Red	HAWK	Lights High Visibility Signs/Markings
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)		Passive/Pushbutton Pedestrian Refuge Islands
Signal		Flashing Beacons Raised Crosswalks
No Treatment		Pedestrian Crossing Flags Curb Extensions
		Rapid Rectangular Advanced Signage
		Flashing Beacons Advanced Stop/Yield Lines
		Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet

Worksheet 2: Peak-Hour, EXCEEDS 35 MPH

Analyst and Site Information

Analyst: Steve Weinberger
 Analysis Date: 4/23/2019
 Data Collection Date: 4/2/2019

Major Street: Hwy 20
 Minor Street or Location: Sayre
 Peak Hour: PM Peak (Threshold)

Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):

- a) Worksheet 1 - 35 mph or less
- b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists

Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?

2a Peak-hour pedestrian volume (ped/h), vp 4
 o If 2a ≥ 14 ped/h, then go to Step 3.
 o If 2a < 14 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible. Consider TCD Treatment

Step 3: Does the crossing meet the pedestrian volume warrant for a traffic signal?

3a Major road volume, total of both approaches during peak hour (veh/h), V maj-s 757
3b Minimum signal warrant volume for peak hour (use 3a for Vmaj-s)
 • SC = 0.00035 Vmaj-s² - 0.80083 Vmaj-s + 529.197 / 0.75, OR
 • [(0.00035 3a² - 0.80083 3a + 529.197)/0.75]
164.7144533
3c o If 3b < 93, then enter 93. If 3b ≥ 93, then enter 3b. 164.7144533
3d o If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c. 164.7144533
 o If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.

Step 4: Estimate pedestrian delay.

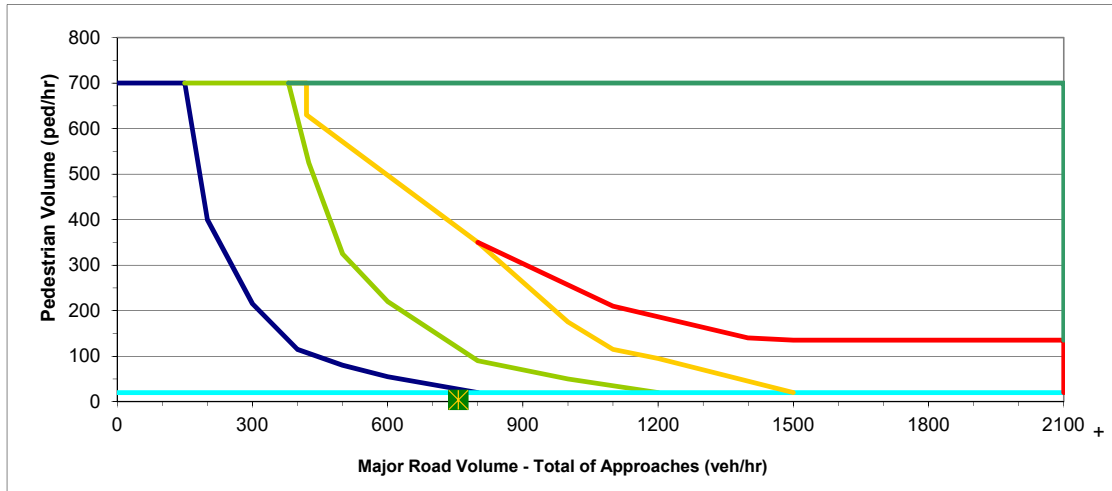
4a Pedestrian crossing distance, curb to curb (ft), L 71
4b Pedestrian walking speed (ft/s), Sp 3.5
4c Pedestrian start-up time and end clearance time (s), ts 4
4d o Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c] 24.28571429
4e Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh.h), Vmaj-d 757
4f o Major road flow rate (veh/s), v = (Vmaj-d / 0.7) / 3600 OR [(4e / 0.7) / 3600] 0.300396825
4g o Average pedestrian delay (s/person), dp = (e^{v tc} - v tc - 1) / v OR [(e^{4f x 4d} - 4f x 4d - 1) / 4f] 4877.346258
4h o Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] 5.41927362
 (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.

Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.

Expected motorist compliance at pedestrian crossings in region, Comp = high or low 5a LOW

Total Pedestrian Delay Dp (4h) and Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	USE RED
Dp < 5.3h and Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = high	DO NOT USE ACTIVE OR ENHANCED

Roadway Configuration: 56' Wide, <35 mph, Vped = 3.5 ft/s



LEGEND
X Study Intersection
Signal
Enhanced-High Visibility/Active when Present
Red
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)
Striped Crosswalk
No Treatment

DESCRIPTIONS OF TREATMENT TYPES		
RED	ENHANCED-HIGH VISIBILITY/ACTIVE WHEN PRESENT	
	Active When Present	Enhanced/High Visibility
<ul style="list-style-type: none"> • Midblock Signal • Half Signal • HAWK 	<ul style="list-style-type: none"> • In Roadway Warning Lights • Passive/Pushbutton Flashing Beacons • Pedestrian Crossing Flags • Rapid Rectangular Flashing Beacons 	<ul style="list-style-type: none"> • In-Street Crossing Signs • High Visibility Signs/Markings • Pedestrian Refuge Islands • Raised Crosswalks • Curb Extensions • Advanced Signage • Advanced Stop/Yield Lines • Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet

Worksheet 2: Peak-Hour, EXCEEDS 35 MPH

Analyst and Site Information

Analyst: Steve Weinberger
 Analysis Date: 4/23/2019
 Data Collection Date: 4/2/2019

Major Street: Hwy 20
 Minor Street or Location: Manzanita
 Peak Hour: PM Peak (Threshold)

Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):

- a) Worksheet 1 - 35 mph or less
- b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists

Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?

2a Peak-hour pedestrian volume (ped/h), vp 14

o If 2a ≥ 14 ped/h, then go to Step 3.
 o If 2a < 14 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.

Step 3: Does the crossing meet the pedestrian volume warrant for a traffic signal?

3a Major road volume, total of both approaches during peak hour (veh/h), V maj-s 738

3b Minimum signal warrant volume for peak hour (use 3a for Vmaj-s)
 • SC = 0.00035 Vmaj-s² - 0.80083 Vmaj-s + 529.197 / 0.75, OR
 • [(0.00035 3a² - 0.80083 3a + 529.197)/0.75]

3c o If 3b < 93, then enter 93. If 3b ≥ 93, then enter 3b. 171.74648

3d o If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c. 171.74648

o If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.

Step 4: Estimate pedestrian delay.

4a Pedestrian crossing distance, curb to curb (ft), L 52

4b Pedestrian walking speed (ft/s), Sp 3.5

4c Pedestrian start-up time and end clearance time (s), ts 4

4d o Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c] 18.85714286

4e Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh.h), Vmaj-d 738

4f o Major road flow rate (veh/s), v = (Vmaj-d / 0.7) / 3600 OR [(4e / 0.7) / 3600] 0.292857143

4g o Average pedestrian delay (s/person), dp = (e^{v tc} - v tc - 1) / v OR [(e^{4f x 4d} - 4f x 4d - 1) / 4f] 832.2306437

4h o Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] 3.236452503

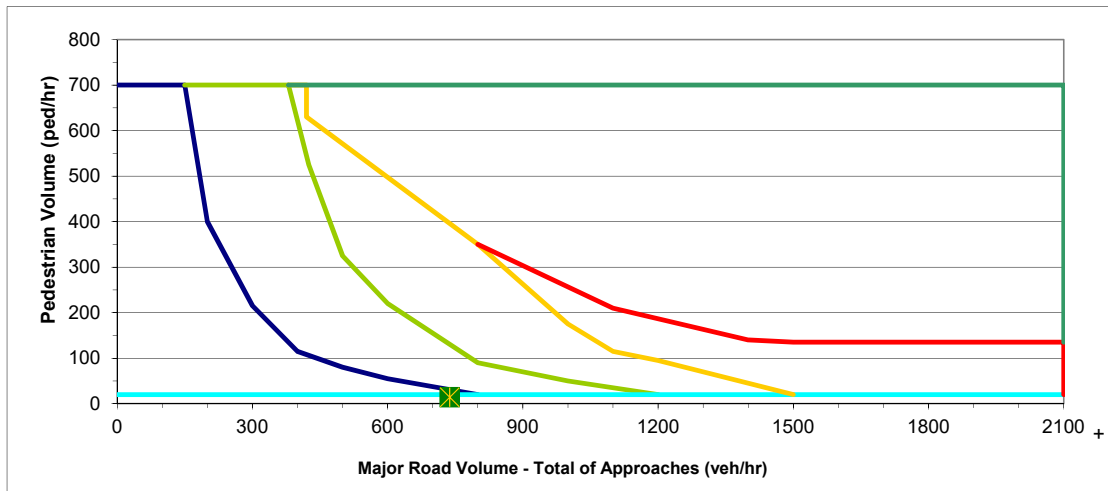
(this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.

Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.

Expected motorist compliance at pedestrian crossings in region, Comp = high or low 5a LOW

Total Pedestrian Delay Dp (4h) and Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED
Dp < 5.3h and Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = high	USE ACTIVE OR ENHANCED

Roadway Configuration: 56' Wide, <35 mph, Vped = 3.5 ft/s



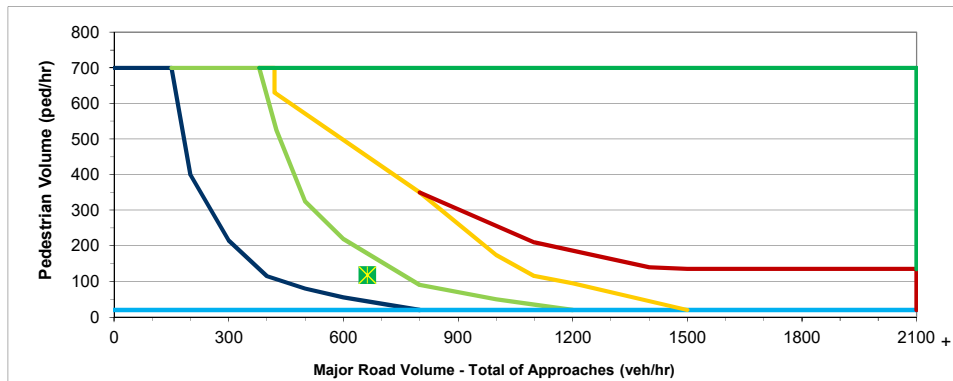
LEGEND
X Study Intersection
Signal
Enhanced-High Visibility/Active when Present
Red
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)
Striped Crosswalk
No Treatment

DESCRIPTIONS OF TREATMENT TYPES		
RED	ENHANCED-HIGH VISIBILITY/ACTIVE WHEN PRESENT	
	Active When Present	Enhanced/High Visibility
<ul style="list-style-type: none"> • Midblock Signal • Half Signal • HAWK 	<ul style="list-style-type: none"> • In Roadway Warning Lights • Passive/Pushbutton Flashing Beacons • Pedestrian Crossing Flags • Rapid Rectangular Flashing Beacons 	<ul style="list-style-type: none"> • In-Street Crossing Signs • High Visibility Signs/Markings • Pedestrian Refuge Islands • Raised Crosswalks • Curb Extensions • Advanced Signage • Advanced Stop/Yield Lines • Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet
Worksheet 1: Peak-Hour, 35 MPH or Less

Analyst and Site Information			
Analyst:	Steve Weinberger	Major Street:	Hwy 20
Analysis Date:	4/23/2019	Minor Street or Location:	5th Ave
Data Collection Date:	4/2/2019	Peak Hour:	PM Peak (Threshold)
Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):			
a) Worksheet 1 - 35 mph or less			
b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists			
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?			
Peak-hour pedestrian volume (ped/h), vp	2a		118
If 2a ≥ 20 ped/h, then go to Step 3.			
If 2a < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.			
0			
Major road volume, total of both approaches during peak hour (veh/h), V maj-s	3a		663
Minimum signal warrant volume for peak hour (use 3a for Vmaj-s), SC			
SC = 0.00021 Vmaj-s ² - 0.74072 Vmaj-s + 734.125/0.75			
OR [(0.00021 3a ² - 0.74072 3a + 734.125)/0.75]	3b		447.1161733
If 3b < 133, then enter 133. If 3b ≥ 133, then enter 3b.	3c		447.1161733
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c.	3d		447.1161733
If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L	4a		45
Pedestrian walking speed (ft.s), Sp	4b		3.5
Pedestrian start-up time and end clearance time (s), ts	4c		4
Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c]	4d		16.85714286
Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh.h), Vmaj-d	4e		444
Major road flow rate (veh/s), v = Vmaj-d/3600 OR [4e/3600]	4f		0.123333333
Average pedestrian delay (s/person), dp = (e ^{-v*tc} - v*tc - 1) / v OR [(e ^{-4f*4d} - 4f * 4d - 1) / 4f]	4g		39.87406719
Total pedestrian delay (h), Dp=(dp x vp) / 3600 OR [(4g x 2a) / 3600]	4h		1.306983314
Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region, Comp = high or low	5a		LOW
Total Pedestrian Delay, Dp (from 4h) and Motorist Compliance, Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)		
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED		
1.3h ≤ Dp < 21.3h and Comp = high or low) OR 5.3 ≤ Dp < 21.3 h and Comp = high	USE ACTIVE OR ENHANCED		
Dp < 1.3 h (Comp = high or low)	DO NOT USE CROSSWALK		

Roadway Configuration: _____ 56' Wide, <35 mph, Vped = 3.5 ft/s _____



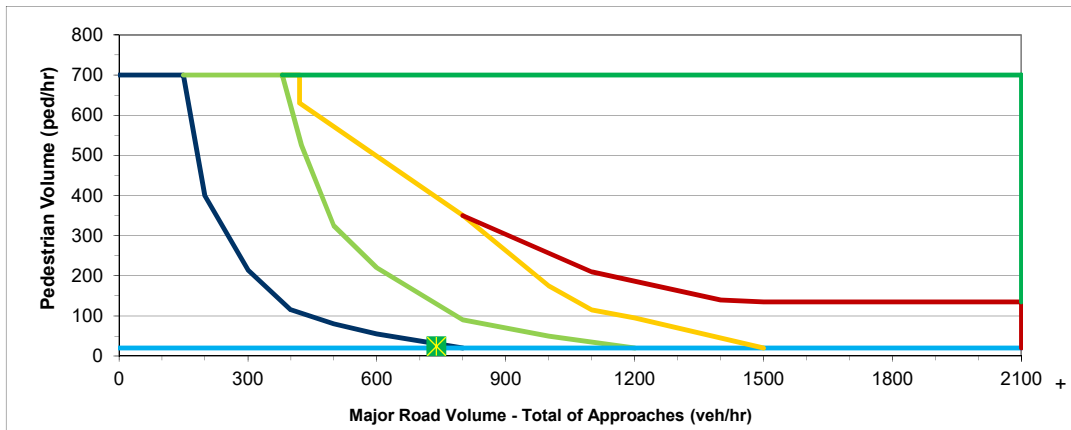
Legend:	Description of Treatment Types:	
X Study Intersection	Red:	Enhanced-High Visibility/Active when Present
 Striped Crosswalk	Midblock Signal	Active When Present
Enhanced-High Visibility/Active when Present	Half Signal	In Roadway Warning Lights
Red	HAWK	Passive/Pushbutton Flashing Beacons
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)		Pedestrian Crossing Flags
Signal		Rapid Rectangular Flashing Beacons
No Treatment		
		Enhanced/High Visibility
		In-Street Crossing Signs
		High Visibility Signs/Markings
		Pedestrian Refuge Islands
		Raised Crosswalks
		Curb Extensions
		Advanced Signage
		Advanced Stop/Yield Lines
		Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet

Worksheet 1: Peak-Hour, 35 MPH or Less

Analyst and Site Information			
Analyst:	Steve Weinberger	Major Street:	Hwy 20
Analysis Date:	4/23/2019	Minor Street or Location:	13th Ave
Data Collection Date:	4/2/2019	Peak Hour:	PM Peak (Threshold)
Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):			
a) Worksheet 1 - 35 mph or less			
b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists			
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?			
Peak-hour pedestrian volume (ped/h), vp	2a		24
If 2a ≥ 20 ped/h, then go to Step 3.			
If 2a < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.			
0			
Major road volume, total of both approaches during peak hour (veh/h), V maj-s	3a		739
Minimum signal warrant volume for peak hour (use 3a for Vmaj-s), SC SC = 0.00021 Vmaj-s ² - 0.74072 Vmaj-s + 734.125/0.75 OR [(0.00021 3a ² - 0.74072 3a + 734.125)/0.75]	3b		401.8911067
If 3b < 133, then enter 133. If 3b ≥ 133, then enter 3b.	3c		401.8911067
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c.	3d		401.8911067
If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L	4a		51
Pedestrian walking speed (ft.s), Sp	4b		3.5
Pedestrian start-up time and end clearance time (s), ts	4c		4
Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c]	4d		18.57142857
Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh/h), Vmaj-d	4e		739
Major road flow rate (veh/s), v = Vmaj-d/3600 OR [4e/3600]	4f		0.205277778
Average pedestrian delay (s/person), dp = (e ^{-v tc} - v tc - 1) / v OR [(e ^{-4f x 4d} - 4f x 4d - 1) / 4f]	4g		197.0119468
Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.	4h		1.313412979
Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region, Comp = high or low	5a		LOW
Total Pedestrian Delay, Dp (from 4h) and Motorist Compliance, Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)		
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED		
1.3h ≤ Dp < 21.3h and Comp = high or low) OR 5.3 ≤ Dp < 21.3 h and Comp = high	USE ACTIVE OR ENHANCED		
Dp < 1.3 h (Comp = high or low)	DO NOT USE CROSSWALK		

Roadway Configuration: _____ 56' Wide, <35 mph, Vped = 3.5 ft/s _____



Legend:	Description of Treatment Types:	
X Study Intersection	Red:	Enhanced-High Visibility/Active when Present
Striped Crosswalk	Midblock Signal	Active When Present Enhanced/High Visibility
Enhanced-High Visibility/Active when Present	Half Signal	In Roadway Warning In-Street Crossing Signs
Red	HAWK	Lights High Visibility Signs/Markings
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)		Passive/Pushbutton Pedestrian Refuge Islands
Signal		Flashing Beacons Raised Crosswalks
No Treatment		Pedestrian Crossing Flags Curb Extensions
		Rapid Rectangular Advanced Signage
		Flashing Beacons Advanced Stop/Yield Lines
		Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet

Worksheet 2: Peak-Hour, EXCEEDS 35 MPH

Analyst and Site Information

Analyst: Steve Weinberger
 Analysis Date: 4/23/2019
 Data Collection Date: 4/2/2019

Major Street: Hwy 20
 Minor Street or Location: Glenhaven Midblock
 Peak Hour: PM Peak (Threshold)

Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):

- a) Worksheet 1 - 35 mph or less
- b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists

Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?

2a Peak-hour pedestrian volume (ped/h), vp 2a 14

- o If 2a ≥ 14 ped/h, then go to Step 3.
- o If 2a < 14 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.

Step 3: Does the crossing meet the pedestrian volume warrant for a traffic signal?

3a Major road volume, total of both approaches during peak hour (veh/h), V maj-s 3a 551

3b Minimum signal warrant volume for peak hour (use 3a for Vmaj-s) 3b 258.93336

- $SC = 0.00035 V_{maj-s}^2 - 0.80083 V_{maj-s} + 529.197$ / 0.75, **OR**
- $[(0.00035 3a^2 - 0.80083 3a + 529.197) / 0.75]$

3c o If 3b < 93, then enter 93. If 3b ≥ 93, then enter 3b. 3c 258.93336

3d o If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c. 3d 258.93336

- o If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.

Step 4: Estimate pedestrian delay.

4a Pedestrian crossing distance, curb to curb (ft), L 4a 66

4b Pedestrian walking speed (ft/s), Sp 4b 3.5

4c Pedestrian start-up time and end clearance time (s), ts 4c 4

4d o Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c] 4d 22.85714286

4e Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh.h), Vmaj-d 4e 551

4f o Major road flow rate (veh/s), v = (Vmaj-d / 0.7) / 3600 OR [(4e / 0.7) / 3600] 4f 0.218650794

4g o Average pedestrian delay (s/person), dp = (e^{v_{lc}} - v_{lc} - 1) / v OR [(e^{4d x 4d} - 4d - 1) / 4f] 4g 649.7999289

4h o Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] 4h 2.526999724

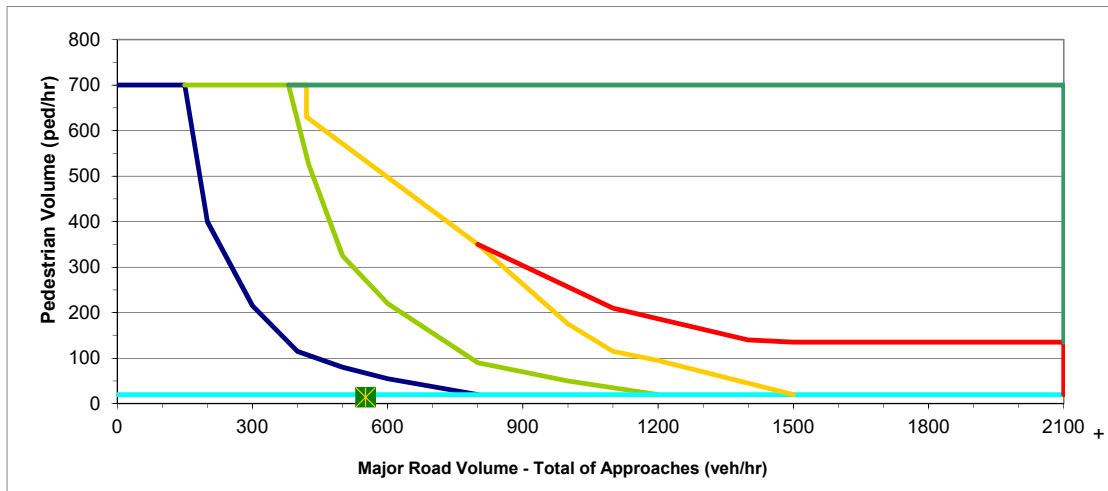
(this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.

Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.

Expected motorist compliance at pedestrian crossings in region, Comp = high or low 5a LOW

Total Pedestrian Delay Dp (4h) and Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	DO NOT USE RED
Dp < 5.3h and Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = high	USE ACTIVE OR ENHANCED

Roadway Configuration: 56' Wide, <35 mph, Vped = 3.5 ft/s



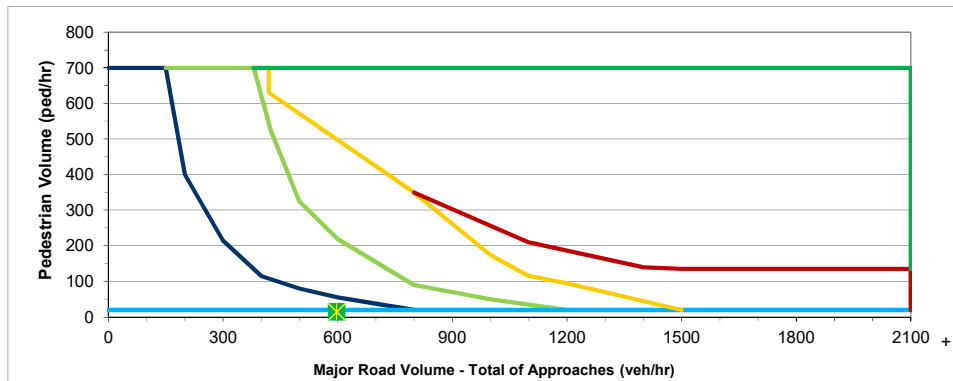
LEGEND
X Study Intersection
Signal
Enhanced-High Visibility/Active when Present
Red
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)
Striped Crosswalk
No Treatment

DESCRIPTIONS OF TREATMENT TYPES		
RED	ENHANCED-HIGH VISIBILITY/ACTIVE WHEN PRESENT	
	Active When Present	Enhanced/High Visibility
<ul style="list-style-type: none"> • Midblock Signal • Half Signal • HAWK 	<ul style="list-style-type: none"> • In Roadway Warning Lights • Passive/Pushbutton Flashing Beacons • Pedestrian Crossing Flags • Rapid Rectangular Flashing Beacons 	<ul style="list-style-type: none"> • In-Street Crossing Signs • High Visibility Signs/Markings • Pedestrian Refuge Islands • Raised Crosswalks • Curb Extensions • Advanced Signage • Advanced Stop/Yield Lines • Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet
Worksheet 1: Peak-Hour, 35 MPH or Less

Analyst and Site Information			
Analyst:	Steve Weinberger	Major Street:	Hwy 20
Analysis Date:	4/23/2019	Minor Street or Location:	Acorn
Data Collection Date:	4/2/2019	Peak Hour:	PM Peak (Threshold)
Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):			
a) Worksheet 1 - 35 mph or less			
b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists			
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?			
Peak-hour pedestrian volume (ped/h), vp	2a		15
If 2a ≥ 20 ped/h, then go to Step 3.			
If 2a < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.			
0			
Major road volume, total of both approaches during peak hour (veh/h), V maj-s	3a		598
Minimum signal warrant volume for peak hour (use 3a for Vmaj-s), SC $SC = 0.00021 V_{maj-s}^2 - 0.74072 V_{maj-s} + 734.125/0.75$ OR $[(0.00021 3a^2 - 0.74072 3a + 734.125)/0.75]$	3b		488.3617067
If 3b < 133, then enter 133. If 3b ≥ 133, then enter 3b.	3c		488.3617067
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c.	3d		488.3617067
If 2a ≥ 20, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L	4a		100
Pedestrian walking speed (ft/s), Sp	4b		3.5
Pedestrian start-up time and end clearance time (s), ts	4c		4
Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c]	4d		32.57142857
Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh/h), Vmaj-d	4e		598
Major road flow rate (veh/s), v = Vmaj-d/3600 OR [4e/3600]	4f		0.1661111111
Average pedestrian delay (s/person), dp = $(e^{v \cdot tc} - v \cdot tc - 1) / v$ OR $[(e^{4f \cdot 4d} - 4f \cdot 4d - 1) / 4f]$	4g		1308.326858
Total pedestrian delay (h), Dp = (dp x vp) / 3600 OR [(4g x 2a) / 3600] (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.	4h		5.451361908
Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region, Comp = high or low	5a		LOW
Total Pedestrian Delay, Dp (from 4h) and Motorist Compliance, Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)		
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	USE RED		
1.3h ≤ Dp < 21.3h and Comp = high or low) OR 5.3 ≤ Dp < 21.3 h and Comp = high	USE ACTIVE OR ENHANCED		
Dp < 1.3 h (Comp = high or low)	DO NOT USE CROSSWALK		

Roadway Configuration: 56' Wide, <35 mph, Vped = 3.5 ft/s

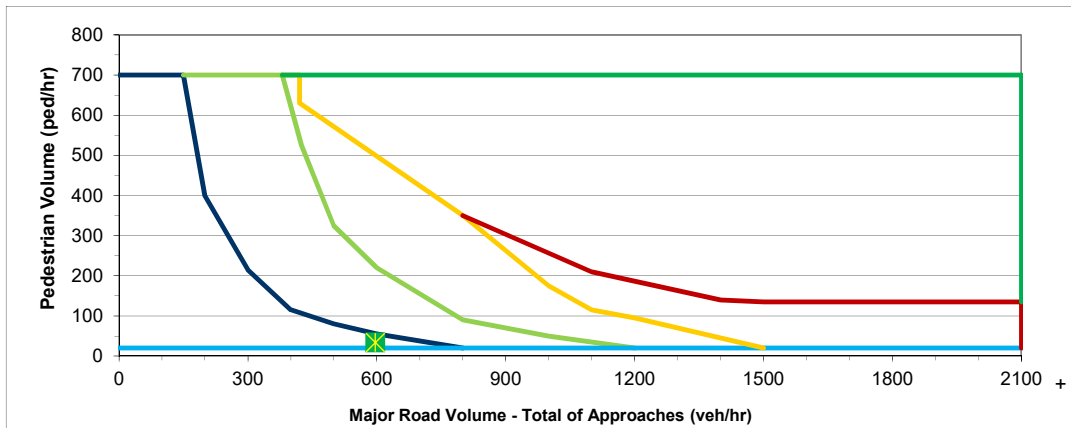


Legend:	Description of Treatment Types:	
Study Intersection	Red:	Enhanced-High Visibility/Active when Present
Striped Crosswalk	Midblock Signal	Active When Present
Enhanced-High Visibility/Active when Present	Half Signal	In Roadway Warning
Red	HAWK	Lights
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)		Passive/Pushbutton
Signal		Flashing Beacons
No Treatment		Pedestrian Crossing
		Flags
		Rapid Rectangular
		Flashing Beacons
		Constant Flashing Yellow Beacons

TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet
Worksheet 1: Peak-Hour, 35 MPH or Less

Analyst and Site Information			
Analyst:	Steve Weinberger	Major Street:	Hwy 20
Analysis Date:	4/23/2019	Minor Street or Location:	High Valley
Data Collection Date:	4/2/2019	Peak Hour:	PM Peak (Threshold)
Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):			
a) Worksheet 1 - 35 mph or less			
b) Worksheet 2 - exceeds 35 mph, communities with less than 10,000, or where major transit stop exists			
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?			
Peak-hour pedestrian volume (ped/h), vp	2a		34
If 2a < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.			
0			
Major road volume, total of both approaches during peak hour (veh/h), V maj-s	3a		597
Minimum signal warrant volume for peak hour (use 3a for Vmaj-s), SC $SC = 0.00021 V_{maj-s}^2 - 0.74072 V_{maj-s} + 734.125/0.75$ OR $[(0.00021 3a^2 - 0.74072 3a + 734.125)/0.75]$	3b		489.0147333
If $3b < 133$, then enter 133. If $3b \geq 133$, then enter 3b.	3c		489.0147333
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c.	3d		489.0147333
If $2a \geq 3d$, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L	4a		56
Pedestrian walking speed (ft.s), Sp	4b		3.5
Pedestrian start-up time and end clearance time (s), ts	4c		4
Critical gap required for crossing pedestrian (s), tc = $(L/Sp) + ts$ OR $[(4a/4b) + 4c]$	4d		20
Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh/h), Vmaj-d	4e		597
Major road flow rate (veh/s), v = $V_{maj-d}/3600$ OR $[4e/3600]$	4f		0.165833333
Average pedestrian delay (s/person), dp = $(e^{v \cdot tc} - v \cdot tc - 1) / v$ OR $[(e^{4f \times 4d} - 4f \times 4d - 1) / 4f]$	4g		140.2108717
Total pedestrian delay (h), Dp = $(dp \times Vp) / 3600$ OR $[(4g \times 2a) / 3600]$ (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.	4h		1.324213788
Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region, Comp = high or low	5a		LOW
Total Pedestrian Delay, Dp (from 4h) and Motorist Compliance, Comp (from 5a)	Treatment Category (see Descriptions of Sample Treatments for examples)		
$Dp \geq 21.3h$ (Comp = high or low) OR $5.3h \leq Dp < 21.3h$ and Comp = low	DO NOT USE RED		
$1.3h \leq Dp < 21.3h$ and Comp = high or low) OR $5.3 \leq Dp < 21.3h$ and Comp = high	USE ACTIVE OR ENHANCED		
$Dp < 1.3h$ (Comp = high or low)	DO NOT USE CROSSWALK		

Roadway Configuration: _____ 56' Wide, <35 mph, Vped = 3.5 ft/s _____



Legend:	Description of Treatment Types:	
X Study Intersection	Red:	Enhanced-High Visibility/Active when Present
Striped Crosswalk	Midblock Signal	Active When Present Enhanced/High Visibility
Enhanced-High Visibility/Active when Present	In Roadway Warning Lights	In-Street Crossing Signs
Red	Half Signal	High Visibility Signs/Markings
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)	HAWK	Passive/Pushbutton Pedestrian Refuge Islands
Signal		Flashing Beacons
No Treatment		Raised Crosswalks
		Pedestrian Crossing Flags
		Curb Extensions
		Advanced Signage
		Rapid Rectangular
		Advanced Stop/Yield Lines
		Flashing Beacons
		Constant Flashing Yellow Beacons



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Appendix G

Intersection Level of Service Calculations





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HCM 6th TWSC
1: Sayre Ave & SR 20

04/25/2019

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Vol, veh/h	1	192	4	4	344	0	13	0	10	4	0	18
Future Vol, veh/h	1	192	4	4	344	0	13	0	10	4	0	18
Conflicting Peds, #/hr	1	0	1	1	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	200	4	4	358	0	14	0	10	4	0	19

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	359	0	205	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.12	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.218	-	2.218	-
Pot Cap-1 Maneuver	1200	-	1366	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1199	-	1365	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	12.2	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	527	1199	-	-	1365	-	-	613
HCM Lane V/C Ratio	0.045	0.001	-	-	0.003	-	-	0.037
HCM Control Delay (s)	12.2	8	0	-	7.6	0	-	11.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

HCM 6th TWSC
1: Sayre Ave & SR 20

04/25/2019

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Vol, veh/h	25	429	10	4	293	6	7	1	3	6	2	12
Future Vol, veh/h	25	429	10	4	293	6	7	1	3	6	2	12
Conflicting Peds, #/hr	3	0	2	2	0	3	2	0	2	3	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	452	11	4	308	6	7	1	3	6	2	13

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	317	0	465	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.12	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.218	-	2.218	-
Pot Cap-1 Maneuver	1243	-	1096	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1239	-	1094	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.1	16.7	13.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	320	1239	-	-	1094	-	-	441
HCM Lane V/C Ratio	0.036	0.021	-	-	0.004	-	-	0.048
HCM Control Delay (s)	16.7	8	0	-	8.3	0	-	13.6
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	7	197	318	0	0	10
Future Vol, veh/h	7	197	318	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	219	353	0	0	11

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	353	0	0	588	353
Stage 1	-	-	-	353	-
Stage 2	-	-	-	235	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2,218	-	-	3,518	3,318
Pot Cap-1 Maneuver	1206	-	-	471	691
Stage 1	-	-	-	711	-
Stage 2	-	-	-	804	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1206	-	-	467	691
Mov Cap-2 Maneuver	-	-	-	554	-
Stage 1	-	-	-	705	-
Stage 2	-	-	-	804	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1206	-	-	-	691
HCM Lane V/C Ratio	0.006	-	-	-	0.016
HCM Control Delay (s)	8	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	24	415	299	1	0	14
Future Vol, veh/h	24	415	299	1	0	14
Conflicting Peds, #/hr	6	0	0	5	5	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	494	356	1	0	17

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	363	0	0	920	369
Stage 1	-	-	-	363	-
Stage 2	-	-	-	557	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2,218	-	-	3,518	3,318
Pot Cap-1 Maneuver	1196	-	-	301	677
Stage 1	-	-	-	704	-
Stage 2	-	-	-	574	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1189	-	-	287	669
Mov Cap-2 Maneuver	-	-	-	412	-
Stage 1	-	-	-	676	-
Stage 2	-	-	-	571	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1189	-	-	-	669
HCM Lane V/C Ratio	0.024	-	-	-	0.025
HCM Control Delay (s)	8.1	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

HCM 6th TWSC
3: SR 20 & 5th Ave

04/25/2019

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T			T
Traffic Vol, veh/h	6	5	264	1	3	176
Future Vol, veh/h	6	5	264	1	3	176
Conflicting Peds, #/hr	8	9	0	8	9	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	6	322	1	4	215

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	563	341	0
Stage 1	332	-	-
Stage 2	231	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	487	701	-
Stage 1	727	-	-
Stage 2	807	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	477	689	-
Mov Cap-2 Maneuver	561	-	-
Stage 1	720	-	-
Stage 2	797	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	613	1216
HCM Lane V/C Ratio	-	-	0.022	0.003
HCM Control Delay (s)	-	-	11	8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 6th TWSC
3: SR 20 & 5th Ave

04/25/2019

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T			T
Traffic Vol, veh/h	4	10	297	0	3	363
Future Vol, veh/h	4	10	297	0	3	363
Conflicting Peds, #/hr	6	6	0	6	6	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	11	326	0	3	399

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	743	338	0
Stage 1	332	-	-
Stage 2	411	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	383	704	-
Stage 1	727	-	-
Stage 2	669	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	377	696	-
Mov Cap-2 Maneuver	487	-	-
Stage 1	723	-	-
Stage 2	663	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	620	1220
HCM Lane V/C Ratio	-	-	0.025	0.003
HCM Control Delay (s)	-	-	11	8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔			↔
Traffic Vol, veh/h	6	17	238	6	17	156
Future Vol, veh/h	6	17	238	6	17	156
Conflicting Peds, #/hr	4	2	0	4	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	25	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	20	283	7	20	186

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	521	293	0
Stage 1	291	-	-
Stage 2	230	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	516	746	-
Stage 1	759	-	-
Stage 2	808	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	503	742	-
Mov Cap-2 Maneuver	582	-	-
Stage 1	756	-	-
Stage 2	790	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	582	742	1263	-
HCM Lane V/C Ratio	-	-	0.012	0.027	0.016	-
HCM Control Delay (s)	-	-	11.3	10	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0.1	0	-

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔			↔
Traffic Vol, veh/h	7	18	248	4	19	299
Future Vol, veh/h	7	18	248	4	19	299
Conflicting Peds, #/hr	14	17	0	14	17	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	25	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	19	267	4	20	322

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	662	303	0
Stage 1	286	-	-
Stage 2	376	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	427	737	-
Stage 1	763	-	-
Stage 2	694	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	407	713	-
Mov Cap-2 Maneuver	508	-	-
Stage 1	751	-	-
Stage 2	672	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	508	713	1253	-
HCM Lane V/C Ratio	-	-	0.015	0.027	0.016	-
HCM Control Delay (s)	-	-	12.2	10.2	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

HCM 6th TWSC
5: SR 20 & High Valley Road

04/25/2019

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	5	210	209	9	2	3
Future Vol, veh/h	5	210	209	9	2	3
Conflicting Peds, #/hr	1	0	0	3	3	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	231	230	10	2	3

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	243	0	0	482	239
Stage 1	-	-	-	238	-
Stage 2	-	-	-	244	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1323	-	-	543	800
Stage 1	-	-	-	802	-
Stage 2	-	-	-	797	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1319	-	-	538	797
Mov Cap-2 Maneuver	-	-	-	609	-
Stage 1	-	-	-	796	-
Stage 2	-	-	-	795	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1319	-	-	-	709
HCM Lane V/C Ratio	0.004	-	-	-	0.008
HCM Control Delay (s)	7.7	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC
5: SR 20 & High Valley Road

04/25/2019

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	2	298	286	13	28	7
Future Vol, veh/h	2	298	286	13	28	7
Conflicting Peds, #/hr	6	0	0	6	6	6
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	339	325	15	32	8

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	346	0	0	688	345
Stage 1	-	-	-	339	-
Stage 2	-	-	-	349	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1213	-	-	412	698
Stage 1	-	-	-	722	-
Stage 2	-	-	-	714	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1206	-	-	406	690
Mov Cap-2 Maneuver	-	-	-	511	-
Stage 1	-	-	-	716	-
Stage 2	-	-	-	710	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1206	-	-	-	539
HCM Lane V/C Ratio	0.002	-	-	-	0.074
HCM Control Delay (s)	8	0	-	-	12.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

HCM 6th TWSC
6: Keys Blvd/Chevron Driveway & SR 20

04/25/2019

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Vol, veh/h	13	203	13	13	199	12	15	4	31	6	1	3
Future Vol, veh/h	13	203	13	13	199	12	15	4	31	6	1	3
Conflicting Peds, #/hr	1	0	2	2	0	1	2	0	2	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	211	14	14	207	13	16	4	32	6	1	3

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	221	0	0	227
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.12	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.218	-	2.218	-
Pot Cap-1 Maneuver	1348	-	1341	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1347	-	1338	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	11.1	12.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	638	1347	-	-	1338	-	-	517
HCM Lane V/C Ratio	0.082	0.01	-	-	0.01	-	-	0.02
HCM Control Delay (s)	11.1	7.7	0	-	7.7	0	-	12.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

HCM 6th TWSC
6: Keys Blvd/Chevron Driveway & SR 20

04/25/2019

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Vol, veh/h	7	313	20	41	289	13	17	3	21	10	2	2
Future Vol, veh/h	7	313	20	41	289	13	17	3	21	10	2	2
Conflicting Peds, #/hr	0	0	6	6	0	0	6	0	6	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	333	21	44	307	14	18	3	22	11	2	2

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	321	0	0	360
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.12	-	4.12	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.218	-	2.218	-
Pot Cap-1 Maneuver	1239	-	1199	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1239	-	1192	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	14.6	16.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	420	1239	-	-	1192	-	-	318
HCM Lane V/C Ratio	0.104	0.006	-	-	0.037	-	-	0.047
HCM Control Delay (s)	14.6	7.9	0	-	8.1	0	-	16.9
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.1

Appendix H

Publicity Materials





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Community Workshops Outreach and Results

Help create a safe and welcoming environment
for the northshore's residents and visitors.

Hwy 20 Northshore Communities Traffic Calming Plan

Community Workshop

Thursday, May 16
6 – 7 pm

Lucerne Alpine Senior Center
3985 County Club Drive
Lucerne, CA 95458

(10th Ave. and Country Club Dr.)

We want to hear your needs and suggestions for safety improvements for walking, bicycling, and transit use along Highway 20 in the communities of **Nice, Lucerne, Glenhaven** and **Clearlake Oaks!**

6 – 7 pm: Discuss your needs and suggestions for improvements with the project team.

7 pm: Lucerne Area Town Hall Meeting begins. A presentation about the project will be given during the town hall meeting.

For more information:

Cayla McDonell
cmcdonell@lgc.org
(916) 448-1198 x324

Snacks and refreshments
will be provided.

Families and children welcome!

Funding for the Highway 20 Northshore Communities Traffic Calming Plan & Engineered Feasibility Study is paid for by a grant from the California Department of Transportation.



*Ayude a crear un ambiente seguro y acogedor
para los residentes y visitantes a
la costa norte.*

Plan para Apaciguar el Trafico en la Carretera 20 en las Comunidades de la Costa Norte

Taller de la Comunidad

Jueves, 16 de mayo
6 a 7 pm

Centro para Gente Mayor de Lucerne
Calle Country Club Drive 3985
Lucerne, CA 95458

(Avenida 10th y Country Club Drive)

Queremos oír sus sugerencias para mejorar la seguridad para caminar, andar en bicicleta y tomar transporte público a lo largo de la Carretera 20 en las comunidades de **Nice, Lucerne, Glenhaven y Clearlake Oaks.**

6 a 7 pm: Denos sus necesidades y sugerencias para mejoras con el equipo técnico.

7 pm: Empieza la junta de ayuntamiento de Lucerne. Durante la junta se dará una presentación sobre el proyecto.

Para más información:

Cayla McDonell
cmcdonell@lgc.org
(916) 448-1198 x324

Habrán botanas y refrigerio.

Familias y niños bienvenidos.

El Plan y Estudio de Factibilidad para Apaciguar el Trafico en la Carretera 20 en las Comunidades de la Costa Norte está siendo financiado a través de una subvención del Departamento de Transporte de California.



Hwy 20 Northshore Communities Traffic Calming Plan

We Want To Hear From You!

Where would you like to walk and bike along Highway 20 in the communities of **Nice, Lucerne, Glenhaven** and **Clearlake Oaks**? While walking and bicycling, do you experience unsafe conditions or challenges getting to where you want to go?

Please provide your feedback at the following link:

wikimapping.com/Highway20.html

Want to review and provide input on preliminary designs for safety improvements?

Come to the next **Community Workshop!**

Thursday September 19, 6:00 pm - 7:00 pm

Lucerne Alpine Senior Center

3985 County Club Drive Lucerne, CA 95458



For more information:

Cayla McDonell
cmcdonell@lgc.org
(916) 448-1198 x324

Hwy 20 Northshore Communities Traffic Calming Plan

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Thursday September 19, 6:00 pm - 7:00 pm

Lucerne Alpine Senior Center

3985 County Club Drive Lucerne, CA 95458



For more information:

Cayla McDonell
cmcdonell@lgc.org
(916) 448-1198 x324

NEWS > LOCAL NEWS

Highway 20 Northshore traffic calming plan presented



(Mary Phillips for the Record-Bee) Citizens work together to discuss the proposed Northshore traffic calming plan at the Lucerne Alpine Senior Center on Thursday.

By **MARY PHILLIPS** |

September 21, 2018 at 4:10 pm

LUCERNE— Approximately 30 people attended the second workshop for the Highway 20 Northshore traffic study took place Thursday evening at the Lucerne Alpine Senior Center. The enhancement of pedestrian crossing safety, improvements to pedestrian sidewalk and walkway facilities, improvements aimed at providing bicycle lanes/facilities, lighting issues, passing in the center turn lane and slowing down vehicle traffic were all cited as priorities.

Maps of Nice, Lucerne, Glenhaven and Clearlake Oaks depicting proposed traffic calming measures lined the left side of the room and round tables were set up to better facilitate conversation among participants. Attendance consisted of concerned citizens, Caltrans and consultants.

Both Pamela Kicenski, from Clearlake Oaks and on the Board of the East Region Town Hall Council, and Mike Herman, President of Clear Lake Keys Property Owners Association (POA) stated they were hoping for an update and to see if any items discussed in previous workshops had been incorporated. Greg Stanley, resident of Lucerne said he was hoping to see traffic slowed down stating that current conditions were dangerous.

Steve Weinberger, Senior Principal from W-Trans, began the presentation by stating that there will be one more workshop to be held in December and that the final plan will be presented in early 2020. Signage and flashing lights were also suggested for gateways or entry points in order to inform drivers that they were entering a town and to decrease their speed. Weinberger cautioned that changes could require trade-offs. For example, adding bike lanes could impact parking, pedestrian enhancements could impact vehicle access and slowing traffic could impact the ease of vehicle movements. Weinberger gave the example that adding bicycle lanes would impact parking in Lucerne between 1st and 17th streets.

Weinberger said certain limitations that hamper full deployment of the plan, among them: funding, maintenance needs, Caltrans design guidelines, Caltrans policies, emergency and large vehicle access.

Funding for the study was provided through a \$120,000 dollar Caltrans Sustainable Transportation Planning Grant, according to John Speka, Lake Area Planning Council and senior transportation planner. Speka said that the next step would be to find funding to implement the proposed changes. He suggested that Caltrans or the Active Transportation Program (ATP) would be a good place to start.

Cayla McDonnell, who works with the Local Government Commission and is in charge of the outreach component of the project, said that she had been conducting



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COMMUNITY
first
 CREDIT UNION

Community workshop on Highway 20 traffic calming project planned for Sept. 19

LUCERNE, Calif. – A workshop to update the community on the Highway 20 Northshore Communities Traffic Calming Plan & Engineered Feasibility Study will be held on Thursday, Sept. 19, in Lucerne.



The workshop will take place from 6 to 7 p.m., ahead of the Lucerne Area Town Hall meeting, at the Lucerne Alpine Senior Center, 3985 Country Club, at the corner of 10th Avenue and Country Club Drive.

Lake County/City Area Planning Council is conducting the Highway 20 Northshore Communities Traffic Calming Plan & Engineered Feasibility Study.

The Sept. 19 workshop is planned to give the public opportunity to help improve access and safety for walking, bicycling, and transit use along Highway 20 in the communities of Nice, Lucerne, Glenhaven and Clearlake Oaks.

Families and children are welcome.

From 6 to 6:30 p.m., there will be a preview of draft design concepts and the opportunity to provide input.

From 6:30 to 7 p.m., the project team will conduct a presentation about the project and the draft designs.

At 7 p.m., the Lucerne Area Town Hall meeting begins.

Snacks and refreshments will be provided.

Funding for the Highway 20 Northshore Communities Traffic Calming Plans & Engineered Feasibility Study is paid for by a grant from the California Department of Transportation received by the Lake Area Planning Council.

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NEWS > GOVERNMENT

Traffic safety improvements on Highway 20 and Lakeport's 11th Street to be discussed

By [AIDAN FREEMAN](#) | afreeman@record-bee.com | Record-Bee

May 13, 2019 at 3:23 pm

LAKE COUNTY — Residents will have the opportunity to discuss several planned roadway improvement studies at multiple public meetings in Lake County this week.

Representatives from the Santa Rosa-based traffic engineering firm W-Trans will attend a meeting at Lakeport City Hall on Tuesday from 6 p.m. to 8 p.m. to seek input from the public on the Lake Area Planning Council and City of Lakeport-backed 11th Street Corridor Multi-Modal Engineered Feasibility Study.

On Wednesday, Western Region Town Hall member Margaret Sanders will provide an update on her recent meeting with Caltrans District 1 Chief Traffic Safety Officer David Morgan, who attended the town hall's March meeting to discuss residents' ongoing concerns about pedestrian safety and traffic speeds along the Northshore section of Highway 20. WRTH Chair Gene Paleno said Monday that Sanders had met with Morgan last week, and that she will be summarizing that meeting on Wednesday

On Thursday, the W-Trans firm will seek input from Northshore residents on the Highway 20 Traffic Calming Plan & Feasibility Study at a meeting at the Lucerne Alpine Senior Center from 6 p.m to 7 p.m.

Immediately following that meeting, the firm will make a presentation during the Lucerne Area Town Hall meeting concerning the Highway 20 traffic calming plan.

Both the 11th Street corridor and Highway 20 design studies have been funded by grants awarded last year to the Lake APC. Each grant—both Caltrans Sustainable Transportation Planning Sustainable Communities Grants—totals roughly \$148,000.

W-Trans planner Barry Bergman said Monday that the meetings in Lucerne and Lakeport are part of the first stage of the firm's data-collection efforts which will guide what is to be designed to improve the 11th Street corridor and Highway 20 for bicycle and pedestrian use.

Bergman said the firm will be trying to “get a sense of what issues people feel are important” in order to find what things can be done to best improve bicycle and pedestrian access at both locations.

Bergman noted that the Caltrans grant awarded to Lake APC for W-Trans' work pursuant to the Highway 20 traffic calming plan does not pertain to all of the Northshore stretch of Highway 20, rather to four specific sections of it, namely Nice, Lucerne, Glenhaven and Clearlake Oaks. The Upper Lake section of the highway, he

Bergman noted that more funding would be needed to complete any designs and recommendations that W-Trans makes to Caltrans and the County of Lake regarding 11th Street and Highway 20.

“Ultimately we would come up with some recommendations for the project,” he said. Then it’s a question of how the county and Caltrans would proceed.

The Lake APC meeting regarding the 11th Street corridor will be held Tuesday from 6 p.m. to 8 p.m. at Lakeport City Hall, 225 Park Street.

The Western Region Town Hall meeting will be held Wednesday at 5 p.m. at the Habematolel Tribal Room, 9470 Main Street in Upper Lake.


The Lake APC meeting regarding the Highway 20 traffic calming plan will be held Thursday from 6 p.m. to 7 p.m. at the Lucerne Alpine Senior Center, 3985 Country Club Drive.

The Lucerne Area Town Hall meeting will succeed Thursday’s Lake APC meeting at 7 p.m. in the same location.

Tags: [Caltrans](#), [City of Lakeport](#), [Highway 20](#), [Lucerne Area Town Hall](#), [Newsletter](#), [West Region Town Hall](#)

Aidan Freeman

Aidan Freeman is an assistant editor covering local government, wildfire resiliency, cannabis and just about anything else for the Lake County Record-Bee. Before the Bee, Aidan covered local events for the Topanga-based Messenger Mountain News. When he's not writing, he's reading. Contact Aidan at (707) 900-2025.

 Follow Aidan Freeman [@aidanfreeman](#)

Ayude a crear un ambiente seguro y acogedor
para los residentes y visitantes a
la costa norte.

Plan para Apaciguar el Trafico en la Carretera 20 en las Comunidades de la Costa Norte

Taller de la Comunidad

Jueves, 19 de septiembre
6 a 7 pm

Centro para Gente Mayor de Lucerne
Calle Country Club Drive 3985
Lucerne, CA 95458

(Avenida 10th y Country Club Drive)

¡Comparta sus comentarios sobre los diseños preliminares para mejorar la seguridad para peatones, ciclistas y usuarios de transporte público a lo largo de la Carretera 20 en las comunidades de **Nice, Lucerne, Glenhaven** y **Clearlake Oaks!**

6 a 6:30 pm: Vista previa y oportunidad para comentarios sobre los conceptos preliminares.

6:30 a 7 pm: El equino técnico dará una presentación sobre el proyecto y los conceptos preliminares.

7 pm: Empieza la junta de ayuntamiento de Lucerne.

Para más información:

Cayla McDonell
cmcdonell@lgc.org
(916) 448-1198 x324

Habrán botanas y refrigerio.

Familias y niños bienvenidos.

El Plan y Estudio de Factibilidad para Apaciguar el Trafico en la Carretera 20 en las Comunidades de la Costa Norte está siendo financiado a través de una subvención del Departamento de Transporte de California.



Help create a safe and welcoming environment
for the northshore's residents and visitors.

Hwy 20 Northshore Communities Traffic Calming Plan

Community Workshop

Thursday, September 19
6 – 7 pm

Lucerne Alpine Senior Center
3985 County Club Drive
Lucerne, CA 95458

(10th Ave. and Country Club Dr.)

We want to hear your feedback on draft designs for safety improvements for walking, bicycling, and transit use along Highway 20 in the communities of **Nice, Lucerne, Glenhaven** and **Clearlake Oaks!**

6 – 6:30 pm: Preview and provide input on draft design concepts.

6:30 – 7 pm: The project team will conduct a presentation about the the project and the draft designs.

7 pm: The Lucerne Area Town Hall Meeting begins.

For more information:

Cayla McDonell
cmcdonell@lgc.org
(916) 448-1198 x324

Snacks and refreshments
will be provided.

Families and children welcome!

Funding for the Highway 20 Northshore Communities Traffic Calming Plan & Engineered Feasibility Study is paid for by a grant from the California Department of Transportation.



Name	email & phone	Organization & Town
Bill Becker	274-8592	AT LARGE/LUCERNE
Mike Herman	michael-l-herman @aol.com	Clear Lake/KEYS port President
Pamela Kicinski	pkicinski@aol.com 925-584-0780	East Region Town Hall Council
Mary Phillips	maryephillips@yahoo.com	Record Bee
Chris Bledsoe	Chris.Bledsoe@DOT.CA.gov	
Brad Mettam	Brad.mettam@dot.ca.gov	Caltrans
Rex Jackson	rex.jackson@dot.gov	Caltrans
Brett Gronemeyer	brett.gronemeyer@dot.ca.gov	Caltrans, Eureka
Sallyann Melluish	melluish2004@yahoo.com	Lucerne
Emil Roessingh	erssingh@hotmail.com	Lucerne
Dani Primas	cricketfeet@yahoo.com	Lucerne
Kevin Wayall	8849 Rose Mount DR Lucerne	LUCERNE
ES Cranley	eddie.e.cranley@labounty.ca.gov	Lucerne
Greg Stanley	gstanley9@icloud.com	Lucerne
Marsha Williams	mwallwright@gmail.com	Lucerne
Jon Williams	jonfwilliams@gmail.com	Lucerne
Kurt Mickelvey	Kurt.Mickelvey@gmail.com 207-245-3873	Lucerne Area Town Hall - vice chair
John Jensen	wensens@bikecorenews.com	Lucerne Town Hall
DAN DE BONIS	dmldebonis@yahoo.com	LUCERNE
Greg Restani		
USA Fabel	lmfabel@aol.com 367-9977	Lucerne
Shannon Skilwell	SkilwellSK@gmail.com	UPPER Lake
Charles Behne	ckbehne@gmail.com 274-8508	Lucerne

Hwy 20 Call Today at 1:30p: Key Feedback Based on Community Input To-Date

1 message

Cayla McDonell <cmcdonell@lgc.org>

Wed, Sep 11, 2019 at 1:24 PM

To: Barry Bergman <bbergman@w-trans.com>, Steve Weinberger <sweinberger@w-trans.com>, John Speka <spekaj@dow-associates.com>

Cc: Josh Meyer <jmeyer@lgc.org>

Hi Everyone,

For our call today - below includes the results of outreach to-date. These key priorities from community members are based on input from National Night Out, the Lake County Fair, and the online wikimaps survey. This is the information that I will present next week at the Community Workshop in Lucerne. I will also mention specific locations where these issues are prevalent during my presentation, but I have not yet finished assessing that information to include it below.

Nice - 75 Comments

- #1: Unsafe for Pedestrians to Cross Hwy 20. High speeds, few crosswalks.
- #2: Desire improved lighting & way to signal to vehicles that pedestrians crossing at crosswalks. Improve lighting at key locations along hwy 20 to improve visibility for pedestrians and bicyclists at key locations (parks, stores, other key destinations).
- #3: Repair and add new sidewalk facilities.

Lucerne - 122 Comments

- #1: Unsafe for Pedestrians to Cross Hwy 20. High speeds and visual obstructions (vehicles parked, trees, etc) make it difficult for vehicles to see that pedestrians are attempting to cross at a crosswalk.
- #2: Improve bicycle facilities. Bicycle lanes are narrow. Pinch points exacerbate the narrow widths and push bicycles closer to cars (narrow bridge near 1st avenue and parked cars along the state route).
- #3: Repair and add new sidewalk facilities.

Glenhaven - 12 Comments

- #1: Westbound vehicle traffic travels at high speeds and does not slow down near the blind corner east of Post Office and Linden Lane where pedestrians frequently cross Hwy 20.
- #2: Repair and add new sidewalk facilities.
- #3: Improve bicycle facilities.

Clearlake Oaks - 36 Comments

- #1: Unsafe for Pedestrians to Cross Hwy 20. High speeds, infrequent/long crosswalks and visual obstructions (vehicles parked, trees, etc) make it difficult for vehicles to see pedestrians in crosswalks.
- #2: Vehicles use median turn lane as a passing lane.
- #3: Roadway too narrow for bicycles where vehicles park along Hwy 20 and where there are narrow lane widths.

Cayla McDonell

Community Design Project Manager

*Help create a safe and welcoming environment
for the northshore's residents and visitors.*

Hwy 20 Northshore Communities Traffic Calming Plan

Come to a Community Workshop Near You!

Nice

Wednesday December 4th

4:00 – 5:00 pm

North Shore Event Center

2817 East Highway 20

Nice, CA 95464

Clearlake Oaks

Wednesday December 4th

6:30 – 7:30 pm

Northshore Fire Station

12655 State Highway 20

Clearlake Oaks, CA 95423

Provide your input as we begin to prepare final designs for improvements for walking, bicycling, and transit use along Highway 20 in the communities of **Nice, Lucerne, Glenhaven** and **Clearlake Oaks!** *Note that the same information will be presented at both workshops.

For more information:

Cayla McDonell
cmcdonell@lgc.org
(916) 448-1198 x324

Snacks and refreshments
will be provided.

Families and children welcome!

*Funding for the Highway 20 Northshore Communities Traffic Calming
Plan & Engineered Feasibility Study is paid for by a grant from the
California Department of Transportation.*



Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice			
Sayre Ave	Bulbouts <i>*concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians</i>		
Keeling Ave	Pedestrian refuge island (flush, not raised) <i>*located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic</i>		
	Rectangular Rapid Flashing Beacons <i>*button-activated pedestrian crossing signal</i>		
Manzanita Ave	Crosswalk with channelized roadway		
Hudson Ave	Walkway for traffic calming		
Lucerne			
1st Ave	Pedestrian refuge island (flush, not raised)		
3rd Ave	Pedestrian refuge island (flush, not raised)		
	Rectangular Rapid Flashing Beacons		
7th Ave	Crosswalk		
	Pedestrian refuge island (flush, not raised)		
	Pedestrian path to the park		
10th Ave	One bulbout on the south side		
11th Ave	Crosswalk on east side of 11 th Ave		
	Traffic calming median (flush, not raised)		
13th Ave	Crosswalk on east side of 13 th Ave		4
	Pedestrian refuge island (flush, not raised)		5
	Bulbouts		5
16th Ave	One bulbout on south side		
	Traffic calming median (flush, not raised)		

Hwy-20 at Post Office in Glen Haven needs a cross walk for people from the Trailer Park on the south side to get to Post Office

Like the Roundabouts

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Clearlake Oaks			
Pine St	Pedestrian refuge island (flush, not raised)		
Acorn St	Pedestrian refuge island at west side only (flush, not raised)		
	Channelized roadway		
Foothill Blvd	Bulbouts		
Lakeland St	One bulbout on the south side		
High Valley Rd	One bulbout on the south side		
	Rectangular Rapid Flashing Beacons		
	Traffic calming median (flush, not raised)		
Butler St	Consider relocating existing guardrail		
	Relocate crosswalk to west side of street only, if feasible		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
Hoover St	Bulbouts		
	Traffic calming median (flush, not raised)		
West of Keys Blvd	Bulbouts		
	Traffic calming median (flush, not raised)		

Other Ideas & Comment

The crosswalk lights need to have the street lights that are on and then when someone goes under it, it will get brighter. Then it goes ~~of~~ back to the lower light.

all this looks good. hope it all gets done. soon

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Clearlake Oaks			
Pine St	Pedestrian refuge island (flush, not raised)	2	
Acorn St	Pedestrian refuge island at west side only (flush, not raised)	2	
	Channelized roadway	2	
Foothill Blvd	Bulbouts	2	
Lakeland St	One bulbout on the south side	2	
High Valley Rd	One bulbout on the south side	2	
	Rectangular Rapid Flashing Beacons	2	
	Traffic calming median (flush, not raised)	2	
Butler St	Consider relocating existing guardrail	2	
	Relocate crosswalk to west side of street only, if feasible	2	
	Pedestrian refuge island (flush, not raised)	2	
	Bulbouts	2	
Hoover St	Bulbouts	2	
	Traffic calming median (flush, not raised)	2	
West of Keys Blvd	Bulbouts	2	
	Traffic calming median (flush, not raised)	2	

Other Ideas & Comment

In Glenhaven please put a crosswalk and/or a flashing yellow light. Thank you.

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice			
Sayre Ave	Bulbouts <i>*concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians</i>	1	
Keeling Ave	Pedestrian refuge island (flush, not raised) <i>*located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic</i>	1	
	Rectangular Rapid Flashing Beacons <i>*button-activated pedestrian crossing signal</i>	1	
Manzanita Ave	Crosswalk with channelized roadway	1	
Hudson Ave	Walkway for traffic calming	1	
Lucerne			
1 st Ave	Pedestrian refuge island (flush, not raised)	1	
3 rd Ave	Pedestrian refuge island (flush, not raised)	1	
	Rectangular Rapid Flashing Beacons	1	
7 th Ave	Crosswalk	1	
	Pedestrian refuge island (flush, not raised)	1	
	Pedestrian path to the park	1	
10 th Ave	One bulbout on the south side	1	
11 th Ave	Crosswalk on east side of 11 th Ave	1	
	Traffic calming median (flush, not raised)	1	
13 th Ave	Crosswalk on east side of 13 th Ave	1	
	Pedestrian refuge island (flush, not raised)	1	
	Bulbouts	1	
16 th Ave	One bulbout on south side	1	
	Traffic calming median (flush, not raised)	1	

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice			
Sayre Ave	Bulbouts <i>*concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians</i>	2	
Keeling Ave	Pedestrian refuge island (flush, not raised) <i>*located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic</i>	1	
	Rectangular Rapid Flashing Beacons <i>*button-activated pedestrian crossing signal</i>	1	
Manzanita Ave	Crosswalk with channelized roadway	1	
Hudson Ave	Walkway for traffic calming	2	
Lucerne			
1st Ave	Pedestrian refuge island (flush, not raised)	1	
3rd Ave	Pedestrian refuge island (flush, not raised)	1	
	Rectangular Rapid Flashing Beacons	3	
7th Ave	Crosswalk	1 1	
	Pedestrian refuge island (flush, not raised)	1	
	Pedestrian path to the park	1 1	
10th Ave	One bulbout on the south side	1	
11th Ave	Crosswalk on east side of 11 th Ave	1 1	
	Traffic calming median (flush, not raised)	1	
13th Ave	Crosswalk on east side of 13 th Ave	1 1	
	Pedestrian refuge island (flush, not raised)	1	
	Bulbouts	1	
16th Ave	One bulbout on south side	1	
	Traffic calming median (flush, not raised)	1	

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Clearlake Oaks			
Pine St	Pedestrian refuge island (flush, not raised)	1	
Acorn St	Pedestrian refuge island at west side only (flush, not raised)	1	
	Channelized roadway	2	
Foothill Blvd	Bulbouts	1	
Lakeland St	One bulbout on the south side	1	
High Valley Rd	One bulbout on the south side	1	
	Rectangular Rapid Flashing Beacons	1	
	Traffic calming median (flush, not raised)	1	
Butler St	Consider relocating existing guardrail	3	
	Relocate crosswalk to west side of street only, if feasible	5	
	Pedestrian refuge island (flush, not raised)	1	
	Bulbouts	1	
Hoover St	Bulbouts	1	
	Traffic calming median (flush, not raised)	1	
West of Keys Blvd	Bulbouts	1	
	Traffic calming median (flush, not raised)	1	

Other Ideas & Comment

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	Bulbouts		
Hoover St	Bulbouts		
	Traffic calming median (flush, not raised)		
West of Keys Blvd	Bulbouts		
	Traffic calming median (flush, not raised)		

Other Ideas & Comment

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

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Acorn St	Pedestrian refuge island at west side only (flush, not raised)	1	
	Channelized roadway	1	
Foothill Blvd	Bulbouts	1	
Lakeland St	One bulbout on the south side	1	
High Valley Rd	One bulbout on the south side	1	
	Rectangular Rapid Flashing Beacons	1	
	Traffic calming median (flush, not raised)	1	
Butler St	Consider relocating existing guardrail	1	
	Relocate crosswalk to west side of street only, if feasible	1	
	Pedestrian refuge island (flush, not raised)	1	
	Bulbouts	1	
Hoover St	Bulbouts	1	
	Traffic calming median (flush, not raised)	1	
West of Keys Blvd	Bulbouts	1	
	Traffic calming median (flush, not raised)	1	

Other Ideas & Comment

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

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	Bulbouts	1	
Hoover St	Bulbouts	1	
	Traffic calming median (flush, not raised)	1	
West of Keys Blvd	Bulbouts	1	
	Traffic calming median (flush, not raised)	1	

Other Ideas & Comment

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice			
Sayre Ave	Bulbouts <i>*concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians</i>		
Keeling Ave	Pedestrian refuge island (flush, not raised) <i>*located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic</i>		
	Rectangular Rapid Flashing Beacons <i>*button-activated pedestrian crossing signal</i>		
Manzanita Ave	Crosswalk with channelized roadway		
Hudson Ave	Walkway for traffic calming		
Lucerne			
1st Ave	Pedestrian refuge island (flush, not raised)		
3rd Ave	Pedestrian refuge island (flush, not raised)		
	Rectangular Rapid Flashing Beacons		
7th Ave	Crosswalk		
	Pedestrian refuge island (flush, not raised)		
	Pedestrian path to the park		
10th Ave	One bulbout on the south side		
11th Ave	Crosswalk on east side of 11 th Ave		
	Traffic calming median (flush, not raised)		
13th Ave	Crosswalk on east side of 13 th Ave		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
16th Ave	One bulbout on south side		
	Traffic calming median (flush, not raised)		

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Clearlake Oaks			
Pine St	Pedestrian refuge island (flush, not raised)		
Acorn St	Pedestrian refuge island at west side only (flush, not raised)		
	Channelized roadway		
Foothill Blvd	Bulbouts		
Lakeland St	One bulbout on the south side		
High Valley Rd	One bulbout on the south side		
	Rectangular Rapid Flashing Beacons		
	Traffic calming median (flush, not raised)		
Butler St	Consider relocating existing guardrail		
	Relocate crosswalk to west side of street only, if feasible		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
Hoover St	Bulbouts		
	Traffic calming median (flush, not raised)		
West of Keys Blvd	Bulbouts		
	Traffic calming median (flush, not raised)		

Other Ideas & Comment

- Re: intersection of 20 + Island Drive in CLO
- turning on to 20 from Island Drive AND turning left from 20 onto Island Drive is very dangerous because there is a blind curve by the water plant.
 - In the past 6 years, there have been at least 2 deaths at that intersection!
 - An inexpensive solution would be to install round mirrors by the water plant so folks turning can see around the curve to see if cars are coming.
 - Thank you for considering this.

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice			
Sayre Ave	Bulbouts <i>*concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians</i>		
Keeling Ave	Pedestrian refuge island (flush, not raised) <i>*located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic</i>	OVER	
	Rectangular Rapid Flashing Beacons <i>*button-activated pedestrian crossing signal</i>		
Manzanita Ave	Crosswalk with channelized roadway		
Hudson Ave	Walkway for traffic calming		
Lucerne			
1st Ave	Pedestrian refuge island (flush, not raised)		
3rd Ave	Pedestrian refuge island (flush, not raised)		
	Rectangular Rapid Flashing Beacons		
7th Ave	Crosswalk		
	Pedestrian refuge island (flush, not raised)		
	Pedestrian path to the park		
10th Ave	One bulbout on the south side		
11th Ave	Crosswalk on east side of 11 th Ave		
	Traffic calming median (flush, not raised)		
13th Ave	Crosswalk on east side of 13 th Ave		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
16th Ave	One bulbout on south side		
	Traffic calming median (flush, not raised)		

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Clearlake Oaks			
Pine St	Pedestrian refuge island (flush, not raised)		
Acorn St	Pedestrian refuge island at west side only (flush, not raised)		
	Channelized roadway		
Foothill Blvd	Bulbouts		
Lakeland St	One bulbout on the south side		
High Valley Rd	One bulbout on the south side		
	Rectangular Rapid Flashing Beacons		
	Traffic calming median (flush, not raised)		
Butler St	Consider relocating existing guardrail		
	Relocate crosswalk to west side of street only, if feasible		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
Hoover St	Bulbouts		
	Traffic calming median (flush, not raised)		
West of Keys Blvd	Bulbouts		
	Traffic calming median (flush, not raised)		

Other Ideas & Comment

Glenhaven PostOffice needs a crosswalk

Lucerne - Country Club needs flashing lights at the crosswalk.

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice			
Sayre Ave	Bulbouts <i>*concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians</i>		
Keeling Ave	Pedestrian refuge island (flush, not raised) <i>*located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic</i>		
	Rectangular Rapid Flashing Beacons <i>*button-activated pedestrian crossing signal</i>		
Manzanita Ave	Crosswalk with channelized roadway		
Hudson Ave	Walkway for traffic calming		
Lucerne			
1st Ave	Pedestrian refuge island (flush, not raised)		
3rd Ave	Pedestrian refuge island (flush, not raised)		
	Rectangular Rapid Flashing Beacons		
7th Ave	Crosswalk		
	Pedestrian refuge island (flush, not raised)		
	Pedestrian path to the park		
10th Ave	One bulbout on the south side		
11th Ave	Crosswalk on east side of 11 th Ave		
	Traffic calming median (flush, not raised)		
13th Ave	Crosswalk on east side of 13 th Ave		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
16th Ave	One bulbout on south side		
	Traffic calming median (flush, not raised)		

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice			
Sayre Ave	Bulbouts <i>*concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians</i>	1	
Keeling Ave	Pedestrian refuge island (flush, not raised) <i>*located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic</i>	2	
	Rectangular Rapid Flashing Beacons <i>*button-activated pedestrian crossing signal</i>	3	
Manzanita Ave	Crosswalk with channelized roadway	1	
Hudson Ave	Walkway for traffic calming	2	
Lucerne			
1 st Ave	Pedestrian refuge island (flush, not raised)	1	
3 rd Ave	Pedestrian refuge island (flush, not raised)	5	
	Rectangular Rapid Flashing Beacons	3	
7 th Ave	Crosswalk	2	
	Pedestrian refuge island (flush, not raised)	1	
	Pedestrian path to the park	1	
10 th Ave	One bulbout on the south side	1	
11 th Ave	Crosswalk on east side of 11 th Ave	2	
	Traffic calming median (flush, not raised)	4	
13 th Ave	Crosswalk on east side of 13 th Ave	1	
	Pedestrian refuge island (flush, not raised)	1	
	Bulbouts	2	
16 th Ave	One bulbout on south side	1	
	Traffic calming median (flush, not raised)	2	

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Clearlake Oaks			
Pine St	Pedestrian refuge island (flush, not raised)		
Acorn St	Pedestrian refuge island at west side only (flush, not raised)		
	Channelized roadway		
Foothill Blvd	Bulbouts		
Lakeland St	One bulbout on the south side		
High Valley Rd	One bulbout on the south side		
	Rectangular Rapid Flashing Beacons		
	Traffic calming median (flush, not raised)		
Butler St	Consider relocating existing guardrail		
	Relocate crosswalk to west side of street only, if feasible		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
Hoover St	Bulbouts		
	Traffic calming median (flush, not raised)		
West of Keys Blvd	Bulbouts		
	Traffic calming median (flush, not raised)		

Other Ideas & Comment

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice			
Sayre Ave	Bulbouts <i>*concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians</i>	/	
Keeling Ave	Pedestrian refuge island (flush, not raised) <i>*located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic</i>	/	
	Rectangular Rapid Flashing Beacons <i>*button-activated pedestrian crossing signal</i>	/	
Manzanita Ave	Crosswalk with channelized roadway	/	
Hudson Ave	Walkway for traffic calming	/	
Lucerne			
1 st Ave	Pedestrian refuge island (flush, not raised)		
3 rd Ave	Pedestrian refuge island (flush, not raised)		
	Rectangular Rapid Flashing Beacons		
7 th Ave	Crosswalk		
	Pedestrian refuge island (flush, not raised)		
	Pedestrian path to the park		
10 th Ave	One bulbout on the south side		
11 th Ave	Crosswalk on east side of 11 th Ave		
	Traffic calming median (flush, not raised)		
13 th Ave	Crosswalk on east side of 13 th Ave		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
16 th Ave	One bulbout on south side		
	Traffic calming median (flush, not raised)		

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Clearlake Oaks			
Pine St	Pedestrian refuge island (flush, not raised)		
Acorn St	Pedestrian refuge island at west side only (flush, not raised)		
	Channelized roadway		
Foothill Blvd	Bulbouts		
Lakeland St	One bulbout on the south side		
High Valley Rd	One bulbout on the south side		
	Rectangular Rapid Flashing Beacons		
	Traffic calming median (flush, not raised)		
Butler St	Consider relocating existing guardrail		
	Relocate crosswalk to west side of street only, if feasible		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
Hoover St	Bulbouts		
	Traffic calming median (flush, not raised)		
West of Keys Blvd	Bulbouts		
	Traffic calming median (flush, not raised)		

Other Ideas & Comment

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice	<i>See back for comment</i>		
Sayre Ave	Bulbouts <i>*concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians</i>		
Keeling Ave	Pedestrian refuge island (flush , not raised) <i>*located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic</i>		
	Rectangular Rapid Flashing Beacons <i>*button-activated pedestrian crossing signal</i>		
Manzanita Ave	Crosswalk with channelized roadway		
Hudson Ave	Walkway for traffic calming		
Lucerne			
1st Ave	Pedestrian refuge island (flush, not raised)		
3rd Ave	Pedestrian refuge island (flush, not raised)		
	Rectangular Rapid Flashing Beacons		
7th Ave	Crosswalk		
	Pedestrian refuge island (flush, not raised)		
	Pedestrian path to the park		
10th Ave	One bulbout on the south side		
11th Ave	Crosswalk on east side of 11 th Ave		
	Traffic calming median (flush, not raised)		
13th Ave	Crosswalk on east side of 13 th Ave		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
16th Ave	One bulbout on south side		
	Traffic calming median (flush, not raised)		

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Clearlake Oaks			
Pine St	Pedestrian refuge island (flush, not raised)		
Acorn St	Pedestrian refuge island at west side only (flush, not raised)		
	Channelized roadway		
Foothill Blvd	Bulbouts		
Lakeland St	One bulbout on the south side		
High Valley Rd	One bulbout on the south side		
	Rectangular Rapid Flashing Beacons		
	Traffic calming median (flush, not raised)		
Butler St	Consider relocating existing guardrail		
	Relocate crosswalk to west side of street only, if feasible		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
Hoover St	Bulbouts		
	Traffic calming median (flush, not raised)		
West of Keys Blvd	Bulbouts		
	Traffic calming median (flush, not raised)		

Other Ideas & Comment

Nice - we need a crosswalk at Lakeview + Hwy 20
 - bus stops. Lots of pedestrian traffic.
 Very unsafe to cross Hwy 20.

Plan is non-comprehensive does not address

Hwy 20 Northshore Communities Traffic Calming Plan Report Card - Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice			
Sayre Ave	Bulbouts *concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians	#1 issue of	
Keeling Ave	Pedestrian refuge island (flush, not raised) *located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic	big rig using	
	Rectangular Rapid Flashing Beacons *button-activated pedestrian crossing signal 20 for 101	- 5.	
Manzanita Ave	Crosswalk with channelized roadway		
Hudson Ave	Walkway for traffic calming	#2 speed	
Lucerne		waits thru-out.	
1 st Ave	Pedestrian refuge island (flush, not raised)	#35 mph	
3 rd Ave	Pedestrian refuge island (flush, not raised)	NO 55 NO	
	Rectangular Rapid Flashing Beacons		
7 th Ave	Crosswalk	45 mph	
	Pedestrian refuge island (flush, not raised)		
	Pedestrian path to the park		
10 th Ave	One bulbout on the south side	These 2 items	
11 th Ave	Crosswalk on east side of 11 th Ave	would make	
	Traffic calming median (flush, not raised)	the communities	
13 th Ave	Crosswalk on east side of 13 th Ave	safer for all	
	Pedestrian refuge island (flush, not raised)	and cost is	
	Bulbouts	minimal.	
16 th Ave	One bulbout on south side		
	Traffic calming median (flush, not raised)		

Upper Lake
Blue Lakes

(?)

I am opposed to any recommendations, if it does not include UL + BL +

#1 + #2 Above.

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Clearlake Oaks			
Pine St	Pedestrian refuge island (flush, not raised)		
Acorn St	Pedestrian refuge island at west side only (flush, not raised)		
	Channelized roadway		
Foothill Blvd	Bulbouts		
Lakeland St	One bulbout on the south side		
High Valley Rd	One bulbout on the south side		
	Rectangular Rapid Flashing Beacons		
	Traffic calming median (flush, not raised)		
Butler St	Consider relocating existing guardrail		
	Relocate crosswalk to west side of street only, if feasible		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
Hoover St	Bulbouts		
	Traffic calming median (flush, not raised)		
West of Keys Blvd	Bulbouts		
	Traffic calming median (flush, not raised)		

Other Ideas & Comment

See front

Hwy 20 Northshore Communities Traffic Calming Plan Report Card – Dec. 4, 2019

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Nice			
Sayre Ave	Bulbouts <i>*concrete extensions of a sidewalk at a crosswalk, which shorten the crossing distance for pedestrians</i>	1	
Keeling Ave	Pedestrian refuge island (flush, not raised) <i>*located in the middle of a crosswalk, where pedestrians can wait in the middle of the roadway until there is a gap in traffic</i>	1	
	Rectangular Rapid Flashing Beacons <i>*button-activated pedestrian crossing signal</i>	2	
Manzanita Ave	Crosswalk with channelized roadway	1	
Hudson Ave	Walkway for traffic calming	2	
Lucerne			
1 st Ave	Pedestrian refuge island (flush, not raised)		
3 rd Ave	Pedestrian refuge island (flush, not raised)		
	Rectangular Rapid Flashing Beacons		
7 th Ave	Crosswalk		
	Pedestrian refuge island (flush, not raised)		
	Pedestrian path to the park		
10 th Ave	One bulbout on the south side		
11 th Ave	Crosswalk on east side of 11 th Ave		
	Traffic calming median (flush, not raised)		
13 th Ave	Crosswalk on east side of 13 th Ave		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
16 th Ave	One bulbout on south side		
	Traffic calming median (flush, not raised)		

Community Intersecting Street/Feature	Recommended Improvement	Rating (1 through 5) 1 = strong like 5 = strong dislike	No Opinion
Clearlake Oaks			
Pine St	Pedestrian refuge island (flush, not raised)		
Acorn St	Pedestrian refuge island at west side only (flush, not raised)		
	Channelized roadway		
Foothill Blvd	Bulbouts		
Lakeland St	One bulbout on the south side		
High Valley Rd	One bulbout on the south side		
	Rectangular Rapid Flashing Beacons		
	Traffic calming median (flush, not raised)		
Butler St	Consider relocating existing guardrail		
	Relocate crosswalk to west side of street only, if feasible		
	Pedestrian refuge island (flush, not raised)		
	Bulbouts		
Hoover St	Bulbouts		
	Traffic calming median (flush, not raised)		
West of Keys Blvd	Bulbouts		
	Traffic calming median (flush, not raised)		

Other Ideas & Comment

I really like the crosswalk idea for Manzanita by Dollar General!

Online Survey Regarding Plan Recommendations December 2019-January 2020

Summary of Results

In total, 149 survey responses were received. Respondents were asked to rate each recommended improvement on a scale from 1 to 5, 1 being a strong dislike to 5 being a strong like.

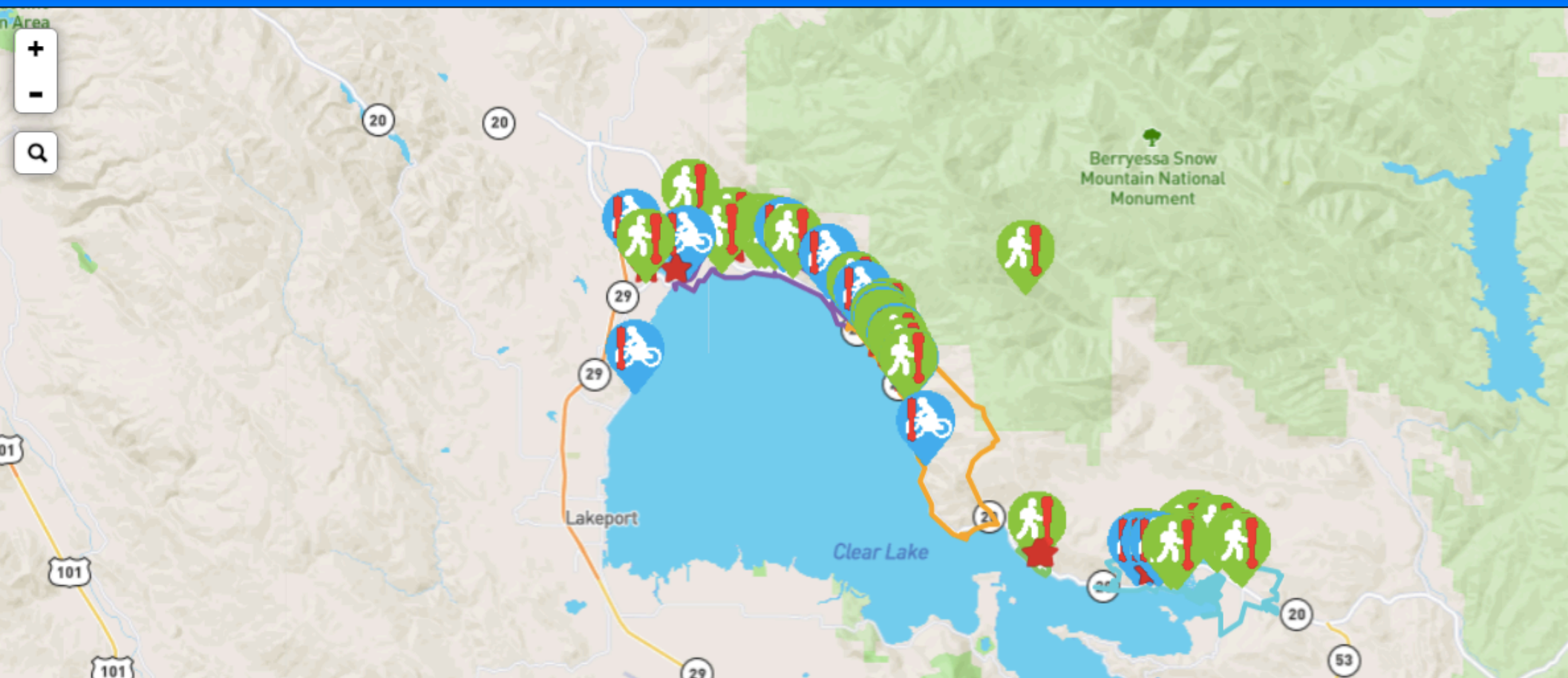
Key feedback received provided below is organized by community and received an average preference score of at least 3.8 and above:

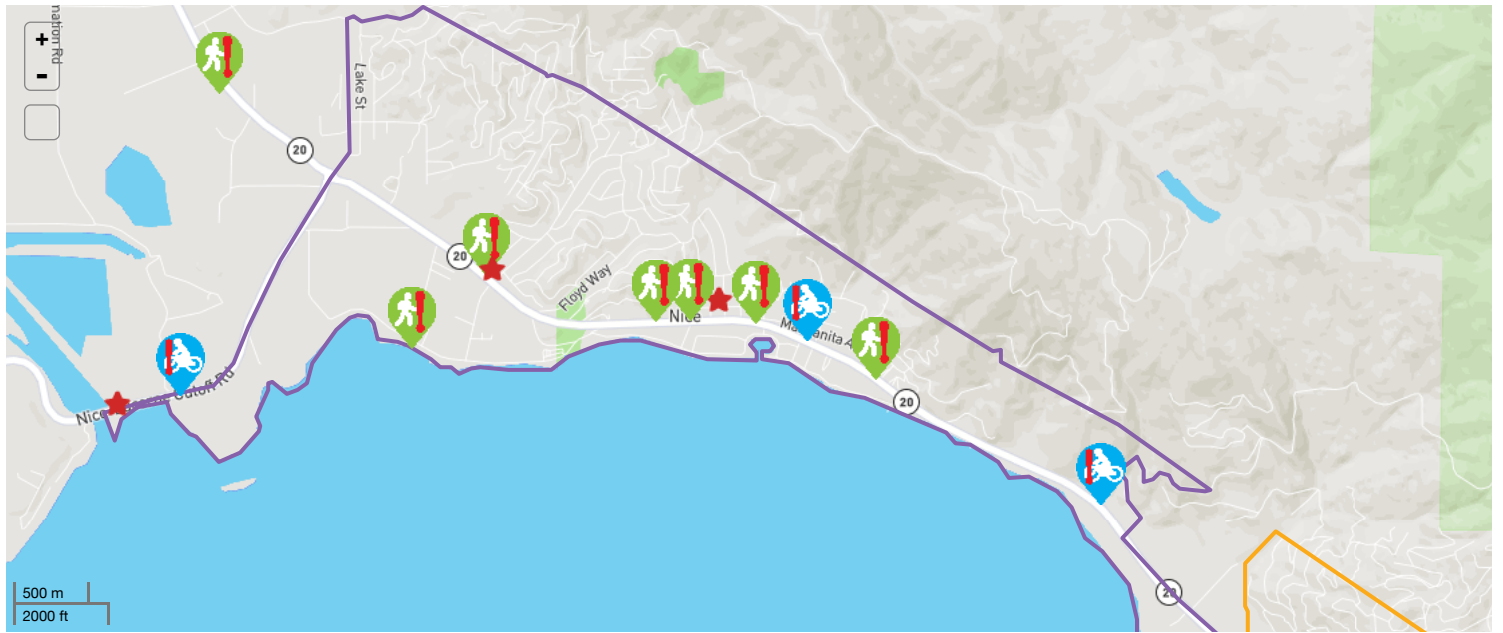
- Nice
 - Rectangular Rapid Flashing Beacons (RRFBs) at Keeling Avenue
 - Crosswalk with Channelization at Manzanita Avenue
 - Traffic Calming Walkway at Hudson Avenue
- Lucerne
 - RRFBs at 3rd Avenue
 - Crosswalk at 7th Avenue
 - Pedestrian Path to Park at 7th Avenue
 - Flush Traffic Calming Median at 11th Avenue
 - Crosswalk on east side of 13th Avenue
 - Flush Traffic Calming Median at 16th Avenue
- Clearlake Oaks
 - RRFBs at High Valley Road
 - Flush Traffic Calming Medians at High Valley Road
 - Flush Traffic Calming Medians west of Keys Boulevard

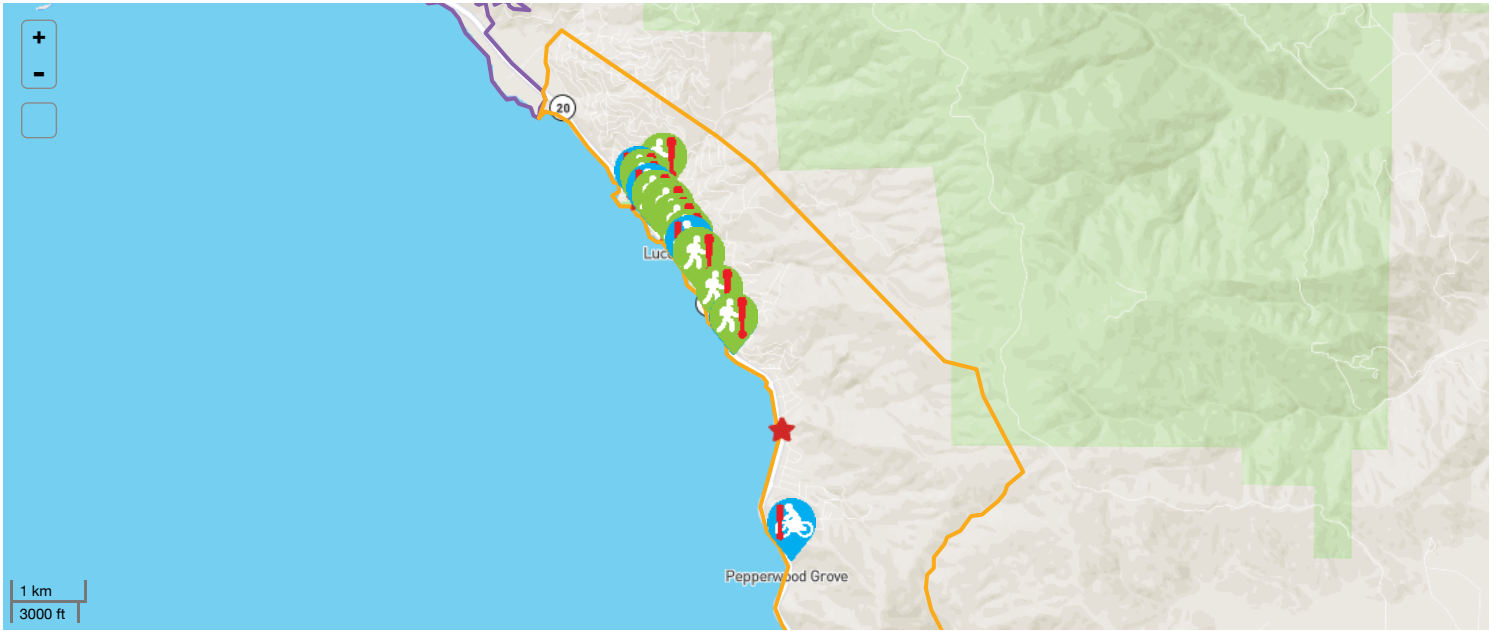


Highway 20 North Shore Communities Traffic Calming Study

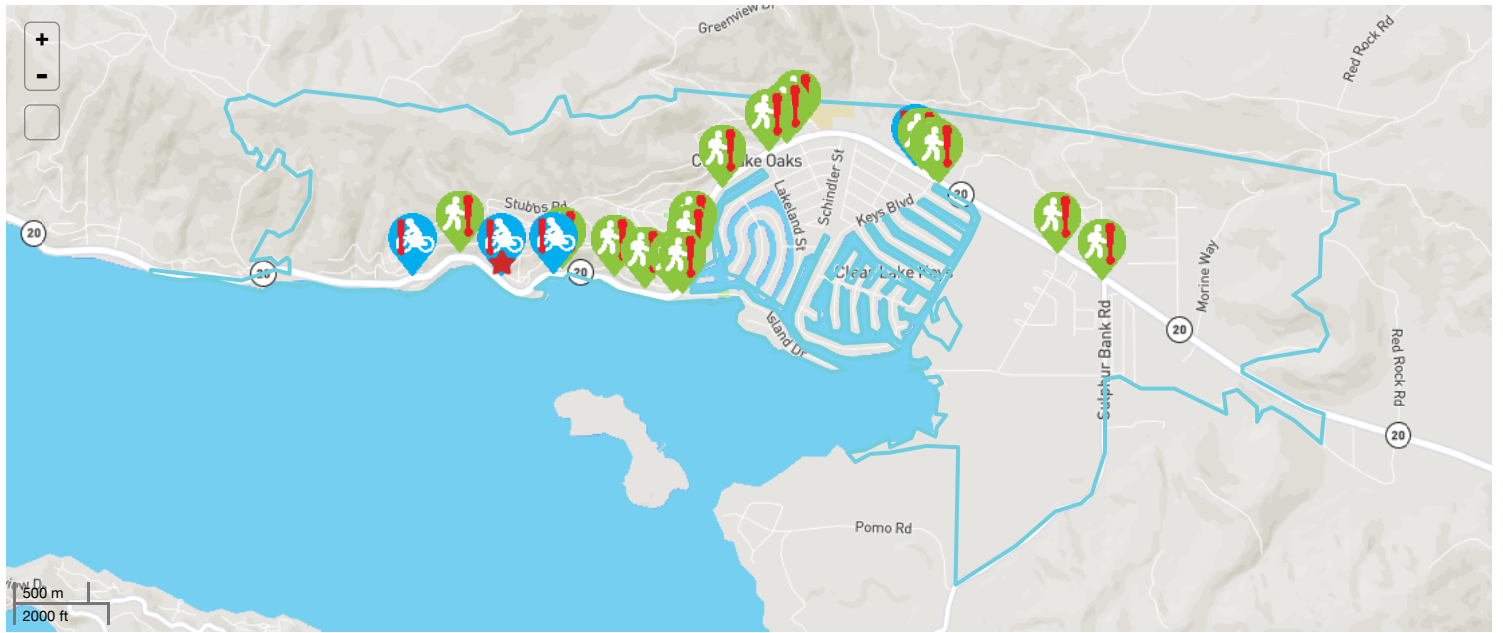
Welcome











Highway 20 Northshore Communities Traffic Calming Plan Draft Design Improvement Input Survey

As we begin to prepare final designs for improvements to be included in the Highway 20 Northshore Communities Traffic Calming Plan, we need to hear from you! The Plan will include improvements for walking, bicycling, and transit use along Highway 20 in the communities of **Nice, Lucerne, Glenhaven** and **Clearlake Oaks**. Your input will help shape the final designs to be incorporated in the Plan.

The Plan is paid for by a grant from the California Department of Transportation (Caltrans), received by the Lake Area Planning Council (APC). The grant from Caltrans funds a plan only and does not include construction.

Thank you for taking our survey!

Which community would you like to provide feedback for? Select all that apply. *

- Nice
- Lucerne
- Clearlake Oaks

Next >>

Nice

NICE

Below includes images meant to provide an example of the types of improvements described in questions 1 - 4, listed further below. These images are meant to be a reference only.



The image above is an example of a RECTANGULAR RAPID FLASHING BEACONS (RRFBs). RRFBs, are button-activated pedestrian crossing signals that alert motor vehicles when a pedestrian intends to cross the roadway.



The image above is an example of a PEDESTRIAN REFUGE ISLAND that is FLUSH with the roadway. Pedestrian refuge islands are located in the middle of a crosswalk, allowing pedestrians to safely wait in the middle of a crosswalk until cars clear the roadway. This also shortens the crossing distance for pedestrians.



The image above is an example of a BULBOUT. Bulbouts are concrete extensions of a sidewalk at a crosswalk, which shorten the distance that pedestrians must cross on a busy roadway.



The images above are examples of TRAFFIC CALMING MEDIANS that are FLUSH with the roadway. By being flush with the roadway, as opposed to raised, this allows emergency vehicles to mount or cross the median as needed.



The image above is an example of a CHANNELIZED ROADWAY with a CROSSWALK. Channelization separates or regulates conflicting traffic movements into more logical paths of travel to facilitate safer movements for all road users.



The image above is an example of a WALKWAY for TRAFFIC CALMING. As opposed to vertical white bars, horizontal bars are more visible to motor vehicles, indicating the potential presence of pedestrians crossing the roadway.

Questions 1 - 4 below are in regard to draft improvements at key roadway intersections in NICE. Please rank each of the improvements from 1 through 5, 1 being strong dislike, 5 being strong like. Refer to the example images above as needed.

Rank the following draft improvement listed below at SAYRE AVE and Highway 20:

BULBOUTS at SAYRE AVE?	☆☆☆☆☆
------------------------	-------

Rank the following draft improvements listed below at KEELING AVE and Highway 20:

FLUSH PEDESTRIAN REFUGE ISLAND at KEELING AVE?	☆☆☆☆☆
RRFBs at KEELING AVE?	☆☆☆☆☆

Rank the following draft improvement listed below at MANZANITA AVE and Highway 20:

CROSSWALK with CHANNELIZED ROADWAY at MANZANITA AVE?	☆☆☆☆☆
--	-------



Rank the following draft improvement listed below at HUDSON and Highway 20:

WALKWAY for TRAFFIC CALMING at HUDSON AVE?	☆☆☆☆☆
--	-------

NICE

	bulbouts at sayre avenue	flush pedestrian refuge island at keeling avenue	RRFBs at keeling avenue	crosswalk and channelization at Manzanita	walkway for traffic calming at hudson avenue	
Total Sum	214.00	204.00	248.00	233.00	245.00	
# of Comments	58.00	59.00	59.00	57.00	58.00	
AVERAGE SCORE (range 1-5)	3.69	3.46	4.20	4.09	4.22	
	2	2	5	3	4	
	4	5	5	5	5	
	3	3	4	3	3	
	3	3	5	3	3	
	1		5	4	5	
	3	5	4	5	4	
	5	4	4	5	4	
	2	4	2	3	3	
	2	2	2	2	2	
	3	3	3	5	3	
	5	5	5	5	5	
	2	3	3	2	3	
	1	1	1	1	1	
	1	1	5	3	3	
	5	5	5	5	5	
	5	5	5	5	5	
	5	5	5	5	3	
	3	5	5	5	5	
	5	5	5	5	5	
	5	3	5	5	5	
	5	1	5	5	5	
	5	4	4	5	5	
	1	5	5	2	5	
	1	5	5	5	5	
	5	5	1	5	5	
	5	2	2	4	3	
	3	2	5		4	
	3	1	5	4	5	

NICE

	bulbouts at sayre avenue	flush pedestrian refuge island at keeling avenue	RRFBs at keeling avenue	crosswalk and channelization at Manzanita	walkway for traffic calming at hudson avenue	
Total Sum	214.00	204.00	248.00	233.00	245.00	
# of Comments	58.00	59.00	59.00	57.00	58.00	
AVERAGE SCORE (range 1-5)	3.69	3.46	4.20	4.09	4.22	
	5	5	5	5	5	
	4	1	5	2	5	
	5	5	5	5	5	
	1	2	5	5	5	
	5	5	5	5	5	
	5	1	5	5	5	
	5	5	5	2	2	
		1	5	5	4	
	5	1	5	5	5	
	5	5	5	5	5	
	5	3	4	2	4	
		4	5		5	
	5	1	5	5	5	
	5	5	5	5	5	
	1	5	1	3	5	
	5	5	5	5	5	
	1	1	1	5	5	
	5	5	5	3	3	
	3	2	2	1	2	
	5	5	5	5	5	
	5	5	5	5	5	
	4	3	5	3	3	
	5	2	5	4	4	
	3	5	2	3	3	
	3	5	5	4		
	4	3	5	5	5	
	1	4	3	5	3	
	5	1	1	5	5	

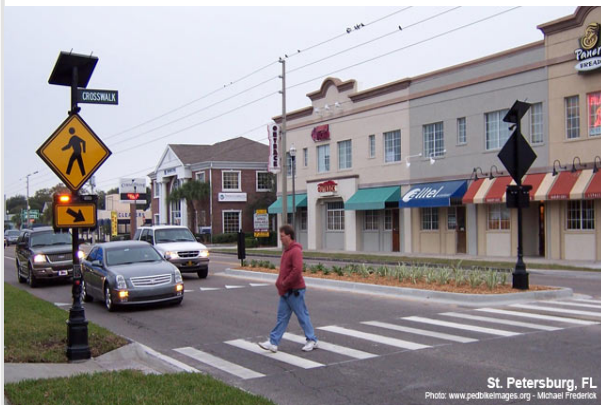
NICE

	bulbouts at sayre avenue	flush pedestrian refuge island at keeling avenue	RRFBs at keeling avenue	crosswalk and channelization at Manzanita	walkway for traffic calming at hudson avenue	
Total Sum	214.00	204.00	248.00	233.00	245.00	
# of Comments	58.00	59.00	59.00	57.00	58.00	
AVERAGE SCORE (range 1-5)	3.69	3.46	4.20	4.09	4.22	
	3	3				
	5	5	5	5	5	
	5	5	5	5	5	
	3	2	4	2	4	

Lucerne

LUCERNE

Below includes images meant to provide an example of the types of improvements described in questions 1 - 7, listed below. These images are meant to be a reference only.



The image above is an example of a RECTANGULAR RAPID FLASHING BEACONS (RRFBs). RRFBs, are button-activated pedestrian crossing signals that alert motor vehicles when a pedestrian intends to cross the roadway.



The image above is an example of a PEDESTRIAN REFUGE ISLAND that is FLUSH with the roadway. Pedestrian refuge islands are located in the middle of a crosswalk, allowing pedestrians to safely wait in the middle of a crosswalk until cars clear the roadway. This also shortens the crossing distance for pedestrians.



The image above is an example of a BULBOUT. Bulbouts are concrete extensions of a sidewalk at a crosswalk, which shorten the distance that pedestrians must cross on a busy roadway.



The images above are examples of TRAFFIC CALMING MEDIANS that are FLUSH with the roadway. By being flush with the roadway, as opposed to raised, this allows emergency vehicles to mount or cross the median as needed.

Questions 1 - 7 below are in regard to draft improvements at key roadway intersections in LUCERNE. Please rank each of the improvements from 1 through 5, 1 being strong dislike, 5 being strong like. Refer to the example images above as needed.

Rank the following draft improvement listed below at 1ST AVE and Highway 20:

FLUSH PEDESTRIAN REFUGE ISLAND at 1ST AVE?	☆☆☆☆☆
--	-------

Rank the following draft improvement listed below at 3RD AVE and Highway 20:

FLUSH PEDESTRIAN REFUGE ISLAND at 3RD AVE?	☆☆☆☆☆
RRFBs at 3RD AVE?	☆☆☆☆☆

Rank the following draft improvement listed below at 7TH AVE and Highway 20:

CROSSWALK at 7TH AVE?	☆☆☆☆☆
FLUSH PEDESTRIAN REFUGE ISLAND at 7TH AVE?	☆☆☆☆☆
	☆☆☆☆☆

PEDESTRIAN PATH to the Park along 7TH AVE?

Rank the following draft improvement listed below at 10TH AVE and Highway 20:

BULBOUT (south side only) at 10TH AVE? ☆☆☆☆☆

Rank the following draft improvement listed below at 11TH AVE and Highway 20:

CROSSWALK (east side only) at 11TH AVE? ☆☆☆☆☆

FLUSH TRAFFIC CALMING MEDIAN at 11TH AVE? ☆☆☆☆☆

Rank the following draft improvement listed below at 13TH AVE and Highway 20:

CROSSWALK (east side only) at 13TH AVE? ☆☆☆☆☆

FLUSH PEDESTRIAN REFUGE ISLAND at 13TH AVE? ☆☆☆☆☆

BULBOUTS at 13TH AVE? ☆☆☆☆☆

Rank the following draft improvement listed below at 16TH AVE and Highway 20:

BULBOUT (south side only) at 16TH AVE? ☆☆☆☆☆

FLUSH TRAFFIC CALMING MEDIAN at 16TH AVE? ☆☆☆☆☆

<< Previous

Next >>

LUCERNE

	flush pedestrian refuge island at 1st avenue	flush pedestrian refuge island at 3rd avenue	RRFBs at 3rd avenue	crosswalk at 7th avenue	flush pedestrian refuge island at 7th avenue	pedestrian park to the park along 7th avenue	bulb out (south side only) at 10th avenue	crosswalk (east side only) at 11th avenue	flush traffic calming median at 11th avenue	crosswalk (east side only) at 13th avenue	flush pedestrian refuge island at 13th avenue	bulb out (south side only) at 16th avenue	flush traffic calming median at 16th avenue	
Total Sum	182.00	175.00	207.00	216.00	183.00	227.00	192.00	201.00	206.00	209.00	186.00	168.00	204.00	
# of Comments	52.00	54.00	52.00	53.00	53.00	53.00	54.00	54.00	54.00	55.00	53.00	53.00	54.00	53.00
AVERAGE SCORE (range 1-5)	3.50	3.24	3.98	4.08	3.45	4.28	3.56	3.72	3.81	3.80	3.51	3.17	3.37	3.85
	1.00	1	5	5		5	5	5	5			5	5	5
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	5	5	5	5	5	5	5	5	5	5	5	5	5	5
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	5	5	5	4	4	5	5	5	5	4	4	5	5	5
	5	5	5	5	5	5	1	2	5	2	5	1	1	5

LUCERNE

	flush pedestrian refuge island at 1st avenue	flush pedestrian refuge island at 3rd avenue	RRFBs at 3rd avenue	crosswalk at 7th avenue	flush pedestrian refuge island at 7th avenue	pedestrian park to the park along 7th avenue	bulb out (south side only) at 10th avenue	crosswalk (east side only) at 11th avenue	flush traffic calming median at 11th avenue	crosswalk (east side only) at 13th avenue	flush pedestrian refuge island at 13th avenue	bulb out (south side only) at 16th avenue	flush traffic calming median at 16th avenue	
Total Sum	182.00	175.00	207.00	216.00	183.00	227.00	192.00	201.00	206.00	209.00	186.00	168.00	204.00	
# of Comments	52.00	54.00	52.00	53.00	53.00	53.00	54.00	54.00	54.00	55.00	53.00	53.00	54.00	53.00
AVERAGE SCORE (range 1-5)	3.50	3.24	3.98	4.08	3.45	4.28	3.56	3.72	3.81	3.80	3.51	3.17	3.37	3.85
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	5	5	5	5	5	5	5	5	5	5		5	5	

Clearlake Oaks

CLEARLAKE OAKS

Below includes images meant to provide an example of the types of improvements described in questions 1 - 8, listed below. These images are meant to be a reference only.



The image above is an example of a RECTANGULAR RAPID FLASHING BEACONS (RRFBs). RRFBs, are button-activated pedestrian crossing signals that alert motor vehicles when a pedestrian intends to cross the roadway.



The image above is an example of a PEDESTRIAN REFUGE ISLAND that is FLUSH with the roadway. Pedestrian refuge islands are located in the middle of a crosswalk, allowing pedestrians to safely wait in the middle of a crosswalk until cars clear the roadway. This also shortens the crossing distance for pedestrians.



The image above is an example of a BULBOUT. Bulbouts are concrete extensions of a sidewalk at a crosswalk, which shorten the distance that pedestrians must cross on a busy roadway.



The images above are examples of TRAFFIC CALMING MEDIANS that are FLUSH with the roadway. By being flush with the roadway, as opposed to raised, this allows emergency vehicles to mount or cross the median as needed.



The image above is an example of a CHANNELIZED ROADWAY with a CROSSWALK. Channelization separates or regulates conflicting traffic movements into more logical paths of travel to facilitate safer movements for all road users.

Questions 1 - 8 below are in regard to draft improvements at key roadway intersections in CLEARLAKE OAKS. Please rank each of the improvements from 1 through 5, 1 being strong dislike, 5 being strong like. Refer to the example images above as needed.

Rank the following draft improvement listed below at PINE ST and Highway 20:

FLUSH PEDESTRIAN REFUGE ISLAND at PINE ST?	☆☆☆☆☆
--	-------

Rank the following draft improvement listed below at ACORN ST and Highway 20:

FLUSH PEDESTRIAN REFUGE ISLAND (west side only) at ACORN ST?	☆☆☆☆☆
CHANNELIZED ROADWAY at ACORN ST?	☆☆☆☆☆



Rank the following draft improvement listed below at Foothill Blvd and Highway 20:

BULBOUTS at FOOTHILL BLVD?	☆☆☆☆☆
----------------------------	-------

Rank the following draft improvement listed below at Lakeland St and Highway 20:

BULBOUT (south side only) at LAKELAND ST?	☆☆☆☆☆
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Rank the following draft improvement listed below at High Valley Rd and Highway 20:

BULBOUT (south side only) at HIGH VALLEY RD?	☆☆☆☆☆
RRFBs at HIGH VALLEY RD?	☆☆☆☆☆
FLUSH TRAFFIC CALMING MEDIAN at HIGH VALLEY RD?	☆☆☆☆☆

Rank the following draft improvement listed below at Butler St and Highway 20:

RELOCATE GUARDRAIL at BUTLER ST?	☆☆☆☆☆
RELOCATE CROSSWALK (to west side only) at BUTLER ST?	☆☆☆☆☆
FLUSH PEDESTRIAN REFUGE ISLAND at BUTLER ST?	☆☆☆☆☆
BULBOUTS at BUTLER ST?	☆☆☆☆☆

Rank the following draft improvement listed below at Hoover St and Highway 20:

BULBOUTS at HOOVER ST?	☆☆☆☆☆
FLUSH TRAFFIC CALMING MEDIAN at HOOVER ST?	☆☆☆☆☆

Rank the following draft improvement listed below at Keys Blvd and Highway 20:

CLEARLAKE OAKS

	flush pedestrian	flush refuge	channel roadways	bulbouts at foothill boulevard	bulbouts (south side only) at lakeland street	bulbouts (south side only) at high valley road	RRFBs at high valley road	flush traffic calming at high valley road	relocate guard rail at butler street	crosswalk (to west side only) at butler street	flush pedestrian refuge island at butler street	bulbouts at butler street	bulbouts at hoover street	flush traffic calming median at hoover street	bulbouts west of keys boulevard	flush traffic calming median west of keys boulevard
Total Sum	271.00	252.00	292.00	244.00	264.00	243.00	318.00	314.00	269.00	246.00	247.00	247.00	228.00	286.00	273.00	319.00
# of	77.00	76.00	78.00	80.00	80.00	77.00	78.00	78.00	77.00	73.00	75.00	78.00	74.00	77.00	82.00	82.00
Comments																
AVERAGE SCORE (range 1-5)	3.52	3.32	3.74	3.05	3.30	3.16	4.08	4.03	3.49	3.37	3.29	3.17	3.08	3.71	3.33	3.89
3	3	4	3	3	3	5	4	4	4	4	4	4	3	4	3	4
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CLEARLAKE OAKS

	flush pedestrian	flush refuge	channel ized roadway at	bulbouts at foothill boulevard	bulbouts (south side only) at lakeland street	bulbouts (south side only) at high valley road	RRFBs at high valley road	flush traffic calming at high valley road	relocate guard rail at butler street	crosswalk (to west side only) at butler street	flush pedestrian refuge island at butler street	bulbouts at butler street	bulbouts at hoover street	flush traffic calming median at hoover street	bulbouts west of keys boulevard	flush traffic calming median west of keys boulevard
Total Sum	271.00	252.00	292.00	244.00	264.00	243.00	318.00	314.00	269.00	246.00	247.00	247.00	228.00	286.00	273.00	319.00
# of Comments	77.00	76.00	78.00	80.00	80.00	77.00	78.00	78.00	77.00	73.00	75.00	78.00	74.00	77.00	82.00	82.00
AVERAGE SCORE (range 1-5)	3.52	3.32	3.74	3.05	3.30	3.16	4.08	4.03	3.49	3.37	3.29	3.17	3.08	3.71	3.33	3.89
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	5	5	3	1	1	1	5	5	1	1	1	1	1	5	1	5

CLEARLAKE OAKS

	flush pedestrian	flush refuge	channel ized roadway at	bulbouts at foothill boulevard	bulbouts (south side only) at lakeland street	bulbouts (south side only) at high valley road	RRFBs at high valley road	flush traffic calming median road	relocate guard rail at butler street	crosswalk (to west side only) at butler street	flush pedestrian refuge island at butler street	bulbouts at butler street	bulbouts at hoover street	flush traffic calming median at hoover street	bulbouts west of keys boulevard	flush traffic calming median west of keys boulevard
Total Sum	271.00	252.00	292.00	244.00	264.00	243.00	318.00	314.00	269.00	246.00	247.00	247.00	228.00	286.00	273.00	319.00
# of Comments	77.00	76.00	78.00	80.00	80.00	77.00	78.00	78.00	77.00	73.00	75.00	78.00	74.00	77.00	82.00	82.00
AVERAGE SCORE (range 1-5)	3.52	3.32	3.74	3.05	3.30	3.16	4.08	4.03	3.49	3.37	3.29	3.17	3.08	3.71	3.33	3.89
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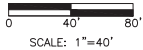
Appendix I

Geometric Concept Plans - Nice





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Date	Revision	By

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DATE	12/2/2019
JOB NO.	LKX078
DRAWING NUMBER	1 of 8

MATCHLINE A SEE ABOVE

MATCHLINE B SEE ABOVE

MATCHLINE A SEE BELOW

MATCHLINE B SEE BELOW

MATCHLINE C SEE PAGE 2

W-Trans
 390 Mendocino Avenue, Suite 201
 Ukiah, CA 95568
 (707) 542-9500 Fax: (707) 542-9590



DRAWN BY
 BKR/ACJ



DESIGNED BY
 W-TRANS
 CHECKED BY
 STEVEN M. FITZSIMONS, R.C.E. NO. 36433

Highway 20 North Shore Communities
 Traffic Calming Plan & Engineered Feasibility Study
 Niles, CA
 30% Concept Geometrics

DATE: 12/2/2019
 JOB NO.: LKX078
 DRAWING NUMBER: 1 of 8

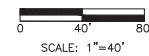
Dec 02, 2019 - 2:48pm

MATCHLINE C SEE PAGE 1



MATCHLINE D SEE BELOW

MATCHLINE D SEE ABOVE



Date	Revision	By

SCALE 1:40
 DATE 12/2/2019
 JOB NO. LKX078
 DRAWING NUMBER 2 of 8

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FOR REDUCED PLANS, THE ORIGINAL SCALE IS IN INCHES

Highway 20 North Shore Communities Traffic Calming Plan & Engineered Feasibility Study
 NICEE, CA

30% Concept Geometrics

DESIGNED BY: W-TRANS
 CHECKED BY: STEVEN M. FITZSIMONS, R.C.E. NO. 36433

DRAWN BY: BKR/ACI
 DATE: _____

W-TRANS
 390 Mendocino Avenue, Suite 201
 Ukiah, CA 95568
 (707) 542-9500 Fax: (707) 542-9590

Appendix J

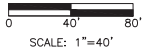
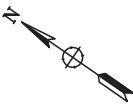
Geometric Concept Plans - Lucerne





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Mar 09, 2020 - 9:25am



Date	Revision	By

DESIGNED BY
W-TRANS

CHECKED BY
STEVEN M. FITZMAURICE, R.C.E. NO. 36433

DRAWN BY
BKR/ACJ

DATE

Highway 20 North Shore Communities
Traffic Calming Plan & Engineered Feasibility Study
LUCERNE, CA

30% Concept Geometrics

SCALE 1:40

DATE 12/2/2019

JOB NO. LKX078

DRAWING NUMBER

3 of 8

Dec 02, 2019 - 2:48pm

MATCHLINE C - SEE PAGE 2

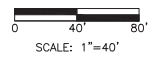
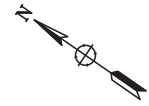


MATCHLINE D - SEE BELOW

MATCHLINE D - SEE ABOVE



MATCHLINE E - SEE PAGE 5



Date	Revision	By

N:\AAA\LKX\LKX\078LKX Hwy 20 Traffic Calming\ACAD\LKX078-D.dwg

FOR REDUCED PLANS, THE ORIGINAL SCALE IS IN INCHES

W-Trans
 390 Mendocino Avenue, Suite 201
 Ukiah, CA 95501
 (707) 542-9500 Fax: (707) 542-9590



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STEVEN M. FITZMAURICE, R.C.E. NO. 36433

DATE

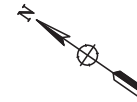
Highway 20 North Shore Communities
 Traffic Calming Plan & Engineered Feasibility Study
 LUCERNE, CA

30% Concept Geometrics

SCALE 1:40
 DATE 12/2/2019
 JOB NO. LKX078
 DRAWING NUMBER
 4 of 8

MATCHLINE E SEE PAGE 4

MATCHLINE F SEE ABOVE



0 40' 80'
SCALE: 1"=40'

Date	Revision	By

SCALE 1:40
DATE 12/2/2019
JOB NO. LKX078
DRAWING NUMBER 5 of 8

MATCHLINE F SEE PAGE 5

Highway 20 North Shore Communities
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LUCERNE, CA

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Professional Engineer Seal: Steven M. Fitzsimons, License No. 604319, State of California, Civil Engineering

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Appendix K

Geometric Concept Plans - Clearlake Oaks



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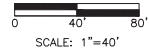


MATCHLINE A SEE BELOW





MATCHLINE A SEE ABOVE

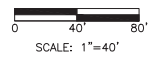
MATCHLINE B SEE PAGE 7



FOR REDUCED PLANS, THE ORIGINAL SCALE IS IN INCHES



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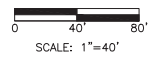
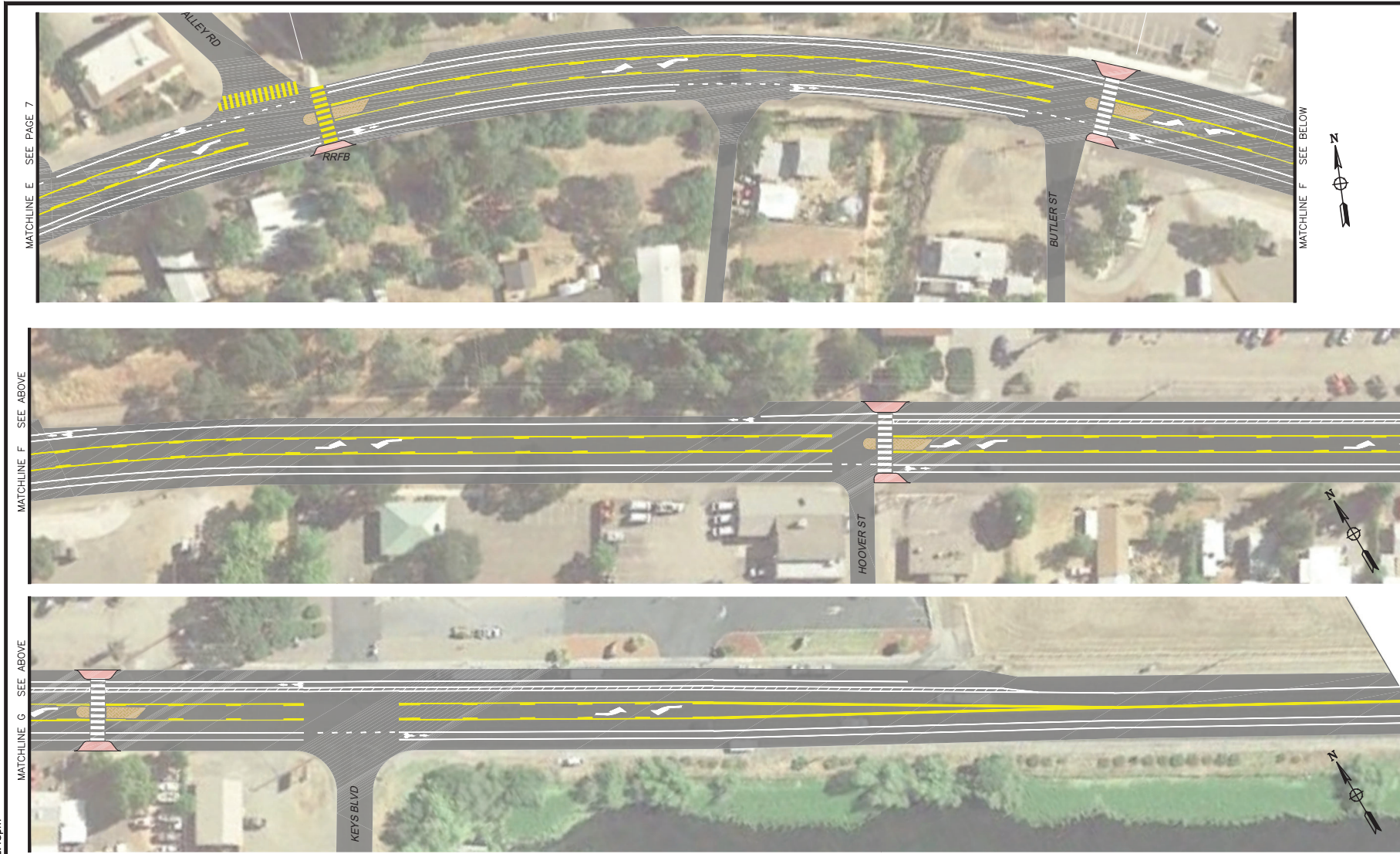
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Appendix L

Cost Estimates





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Highway 20 Traffic Calming Cost Estimate

Date: 3/9/20

By: AKW, SJW

Nice, CA

DETAIL	QUANTITY	COST/UNIT	TOTAL COST
21 (LF)	460	\$1.00	\$ 460
31 (LF)	4670	\$1.00	\$ 4,670
38 (LF)	430	\$1.00	\$ 430
6" WHITE (LF)	24055	\$1.00	\$ 24,055
39A (LF)	1065	\$1.00	\$ 1,065
24" Ladder (SF)	1078	\$5.00	\$ 5,390
CONTINUOUS GBL (SF)	425	\$20.00	\$ 8,500
DASHED GBL (SF)	1775	\$10.00	\$ 17,750
BUFFERED BIKE (SF)	14670	\$2.00	\$ 29,340
III(L/R) (SF)	840	\$5.00	\$ 4,200
STOP (SF)	22	\$250.00	\$ 5,500
NEW CURB (SF)	1615	\$35.00	\$ 56,525
NEW MEDIAN (SF)	467	\$30.00	\$ 14,010
CHANNELIZED AREA (SF)	4820	\$30.00	\$ 144,600
Lighting (LS)	8	\$12,000.00	\$ 96,000
RRFB (LS)	1	\$30,000.00	\$ 30,000
Entry Traffic Calming (LS)	2	\$15,000.00	\$ 30,000
Subtotal			\$ 472,495
Contingency	30 percent		\$ 141,749
Total			\$ 614,244

Highway 20 Traffic Calming Cost Estimate

Date: 3/9/20

By: AKW, SJW

Lucerne, CA

DETAIL	QUANTITY	COST/UNIT	TOTAL COST
21 (LF)	2080	\$1.00	\$ 2,080
31 (LF)	4375	\$1.00	\$ 4,375
6" WHITE (LF)	20683	\$1.00	\$ 20,683
39A (LF)	2295	\$1.00	\$ 2,295
24" Ladder (SF)	2992	\$5.00	\$ 14,960
CONTINUOUS GBL (SF)	3375	\$20.00	\$ 67,500
DASHED GBL (SF)	4122	\$10.00	\$ 41,220
BUFFERED BIKE (SF)	5190	\$2.00	\$ 10,380
III(L/R) (SF)	1890	\$5.00	\$ 9,450
NEW CURB (SF)	1970	\$35.00	\$ 68,950
NEW MEDIAN (SF)	2285	\$30.00	\$ 68,550
BK ARROW (SF)	94.5	\$50.00	\$ 4,725
BK SYMBOL PERSON (SF)	189	\$50.00	\$ 9,450
SHARROW (SF)	23	\$75.00	\$ 1,725
STOP (SF)	22	\$250.00	\$ 5,500
BUS (SF)	20	\$750.00	\$ 15,000
Lighting (LS)	22	\$12,000.00	\$ 264,000
RRFB (LS)	2	\$30,000.00	\$ 60,000
Entry Traffic Calming (LS)	2	\$15,000.00	\$ 30,000
Subtotal			\$ 700,843
Contingency	30 percent		\$ 210,253
Total			\$ 911,096

Highway 20 Traffic Calming Cost Estimate

Date: 3/9/20

By: AKW, SJW

Nice, CA

DETAIL	QUANTITY	COST/UNIT	TOTAL COST
Colored Shoulders (SF)	23648	\$8.00	\$ 189,184
Misc Traffic Calming (LS)	1	\$25,000.00	\$ 25,000
Entry Traffic Calming (LS)	2	\$15,000.00	\$ 30,000
Subtotal			\$ 244,184
Contingency	30 percent		\$ 73,255
Total			\$ 317,439

Highway 20 Traffic Calming Cost Estimate

Date: 3/9/20

By: AKW, SJW

Clearlake Oaks, CA

DETAIL	QUANTITY	COST/UNIT	TOTAL COST
21 (LF)	1310	\$1.00	\$ 1,310
31 (LF)	5755	\$1.00	\$ 5,755
6" WHITE (LF)	28175	\$1.00	\$ 28,175
39A (LF)	858	\$1.00	\$ 858
STOP BAR (LF)	85	\$1.00	\$ 85
24" Ladder WHITE (SF)	1804	\$5.00	\$ 9,020
24" Ladder YELLOW (SF)	484	\$5.00	\$ 2,420
CONTINUOUS GBL (SF)	115	\$20.00	\$ 2,300
BUFFERED BIKE (SF)	11255	\$10.00	\$ 112,550
III(L/R) (SF)	1260	\$5.00	\$ 6,300
NEW CURB (SF)	2275	\$35.00	\$ 79,625
NEW MEDIAN (SF)	6550	\$30.00	\$ 196,500
CHANNELIZED AREA (SF)	8845	\$30.00	\$ 265,350
BK ARROW (SF)	87.5	\$50.00	\$ 4,375
BK SYMBOL PERSON (SF)	175	\$50.00	\$ 8,750
SHARROW (SF)	46	\$75.00	\$ 3,450
STOP (SF)	66	\$5.00	\$ 330
Lighting (LS)	16	\$12,000.00	
RRFB (LS)	1	\$30,000.00	\$ 30,000
Entry Traffic Calming (LS)	2	\$15,000.00	\$ 30,000
Subtotal			\$ 787,153
Contingency	30 percent		\$ 236,146
Total			\$ 1,023,299