Transportation Authority of Marin

HIGHWAY 101 INTERCHANGE & APPROACHING ROADWAY STUDY

Tamalpais Drive/Paradise Drive

EXISTING CONDITIONS, CONSTRAINTS, & OPPORTUNITIES REPORT

HNTB

Parisi
TRANSPORTATION CONSULTING

JULY 2022

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INTRODUCTION

This report on the Tamalpais Drive/Paradise Drive Interchange forms one of a series of reports being prepared under the Transportation Authority of Marin's (TAM) Highway 101 Interchange and Approaching Roadway Study that examines the existing conditions, deficiencies, and constraints of 12 selected interchanges on Highway 101 in Marin County. The reports also identify opportunities for improvement under a program of near- and long-term projects that aim to improve operations and safety for all users.

The planning study is funded through Measure AA – the reauthorized ½-cent transportation sales tax that was approved by Marin voters in 2018. The overarching goal of the Transportation Sales Tax Renewal Expenditure Plan is to "reduce congestion and reduce greenhouse gas emissions, maintain and improve local transportation infrastructure, and provide high quality transportation options for people of all ages who live, work, and travel in Marin County."

Each interchange was evaluated to determine the existing conditions of the roadway, such as nonstandard features or outmoded design and flooding, traffic conditions, pedestrian/bicyclist circulation and intermodal connectivity, and environmental conditions, including vulnerability to sea level rise (SLR). The study looked at previous planning studies for these interchanges as well as any recent or proposed nearby development, including the new Sonoma–Marin Area Rail Transit (SMART) passenger rail line which aligns closely with Highway 101.

EXISTING CONDITIONS

There are a number of existing physical and operational deficiencies associated with the Tamalpais Drive / Paradise Drive interchange including short acceleration and merge lengths for vehicles to merge onto the Highway 101 mainline from the northbound (NB) and the southbound (SB) on-ramps, less than standard ramp separation between Madera Blvd and SB off-ramp, less than standard shoulder and lane widths on ramps, and less than successive on-ramp separation between the NB ramps. Pavement within the Tamalpais Drive / Paradise Drive Interchange is rated fair/good.

In the five-year period from 2014-2018, the interchange reported a total of 24 collisions, 15 of which resulted in minor injuries. About one-third of all collisions were caused by rear ends. An additional 25% were caused by broadsides, and 21% caused by drivers hitting a fixed object.

The level of service in the AM peak hours are rated C at the Tamalpais Drive/Madera Blvd/Sanford St intersection. All other intersections within the project study limit has an AM peak level of service of B or better.

The level of service in the PM peak hours are rated C at the intersection of Tamalpais Drive/Madera Blvd/Sanford St and Tamalpais Drive/San Clemente Drive. All other intersections within the project study limit have a PM peak level of service of B or better.

Executive Summary

IMPROVEMENT CONCEPTS

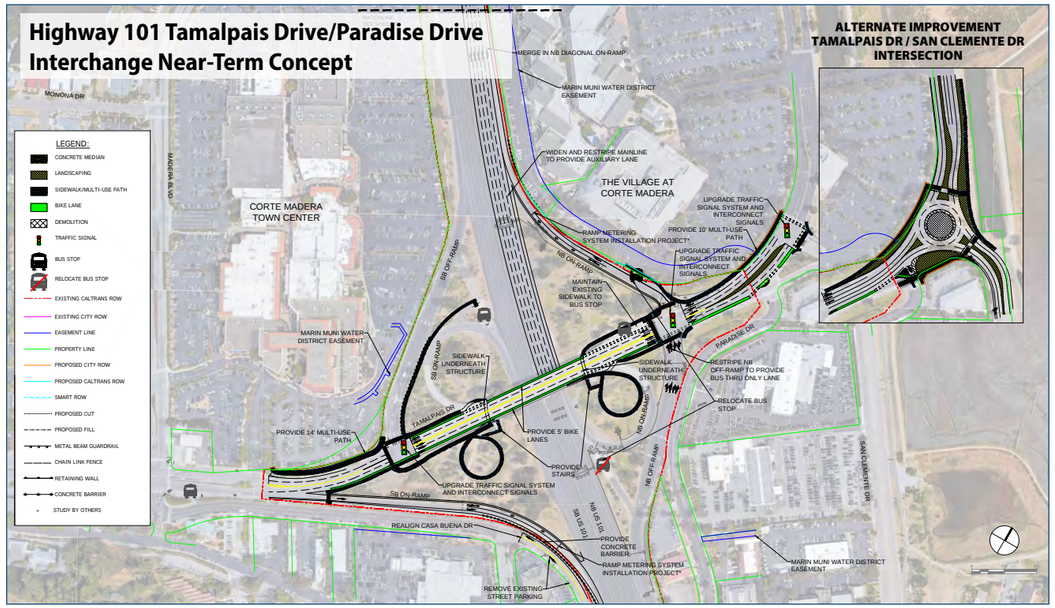
Proposed improvements seek to address deficiencies and to upgrade the conditions for vehicular traffic, transit users, pedestrians, and bicyclists. The improvements vary from readily implementable solutions, such as new crosswalks, curb ramp replacements, restriping, new bike facilities, upgrading sidewalk and existing transit stops, improved multimodal connectivity, and widened bridges. Many of the improvements recommended by this study will strengthen the interchange's relationship with the surrounding area and new developments, and they will improve the operation and safety of these interchanges for all users, allowing smoother travel to, from, and across Highway 101 and local roads.

Concepts are presented as near- and long-term improvements based on the ease of implementation.

The near-term concept proposes the Caltrans Tamalpais Drive Overcrossing (EA 04-4J860) Project Approval/Environmental Document (PA&ED) with additional design features proposed by this study. This project proposes to widen NB U.S. 101 to provide for an auxiliary lane extending from the NB on-ramp from Tamalpais Drive to the conform at the Wornum Drive overcrossing. The existing signal at the intersection will also be upgraded.

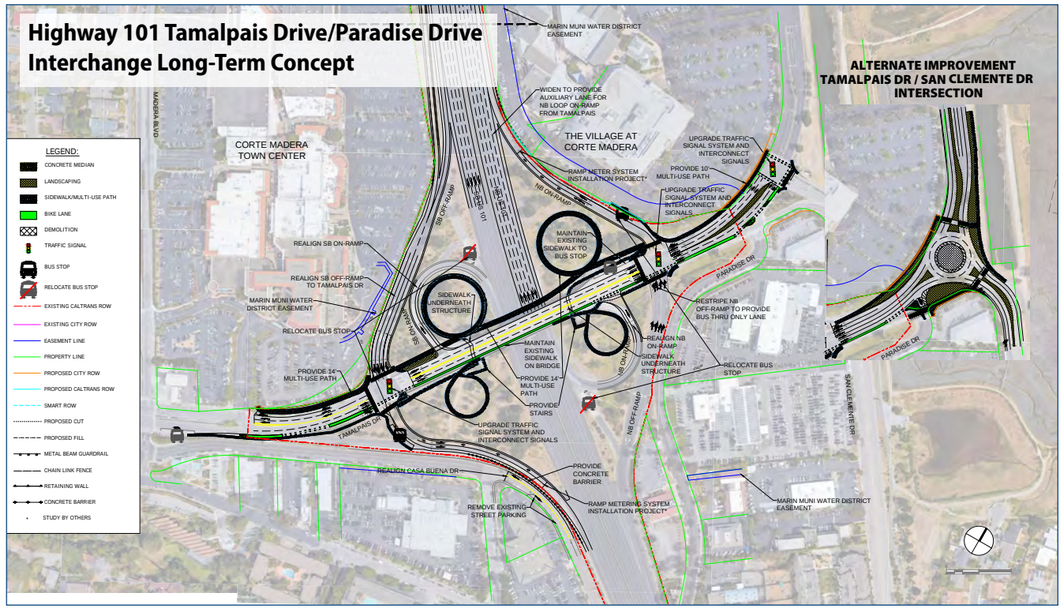
The long-term concept includes the near-term concept with additional design features proposed by this study. The U.S. 101 SB on-ramp from Madera Blvd is removed and realigned to conform to the U.S. 101 SB off-ramp to Tamalpais. Drivers from Madera Blvd wishing to connect to SB U.S. 101 can cross the intersection at Tamalpais and connect to U.S. 101 via a realigned SB on-ramp. A new bicycle/pedestrian structure is proposed in the northeast and northwest quadrants of the interchange, connecting users in the east and west direction along Tamalpais. The SB bus stop is relocated onto the realigned SB on-ramp from Tamalpais with a new bus pull-out.

The near- and long-term concepts for Tamalpais Drive/Paradise Drive conform to the near- and long-term concepts for the Sir Francis Drake Boulevard/Fifer Avenue/Industrial Way.



The improvement concepts have been shared with the local jurisdictions and transit agency representatives, who have had an opportunity to review and comment on the concepts presented.

Refer to Attachment I for the exhibit associated with the near- and long-term concepts.



Executive Summary

IMPLEMENTATION

As part of this study, each of the 12 interchanges will undergo evaluation and prioritization with the goal of identifying the most appropriate projects to move forward into project development.

It is anticipated that the improvements proposed under both the near- and long-term concepts would follow the typical three-phase California Department of Transportation (Caltrans) project development process for approval of work within the state's right of way.

- Project Initiation Document (PID) (Project Study Report-Project Development Support)
- PA&ED
- Plans Specifications and Estimates (PS&E)

Elements of the project could be implemented in a phased manner by either TAM or the City of San Rafael to meet funding opportunities.

Additionally, elements of the project could be incorporated into projects sponsored by Caltrans, such as a long-range ramp-squaring project identified by the System Planning Group.

NEXT STEPS

1. TAM Board to select projects(s) to move forward into project development in consultation with agency stakeholders.
2. TAM and the local jurisdiction will coordinate with the Metropolitan Transportation Commission (MTC) to have the project included in the current Regional Transportation Plan (RTP).
3. TAM and the local jurisdiction will secure funding for the PID and enter into a cooperative agreement with Caltrans for project development.
4. TAM will work with the local jurisdiction and a Project Development Team to prepare the PID for Caltrans approval to proceed to the PA&ED Phase for a locally funded project. Alternatively, the local jurisdiction can identify elements that can be implemented via a Caltrans encroachment permit process or on the approaching roadway outside Caltrans right of way.
5. TAM and the local jurisdiction will seek funding for subsequent phases of the project. If there is insufficient funding available, it may be possible to phase the improvements.

Introduction

This report on the Tamalpais Drive/Paradise Drive Interchange forms one of a series of reports being prepared under TAM's Highway 101 Interchange and Approaching Roadway Study that examines the existing conditions, deficiencies, and constraints of 12 selected interchanges on Highway 101 in Marin County. The reports also identify opportunities for improvement under a program of near- and long-term projects that aim to improve operations and safety for all users.

The reports provide the basis for establishing performance measures against which improvement concepts can be evaluated and prioritized in a subsequent phase of the study.

The planning study is funded through Measure AA – the reauthorized ½-cent transportation sales tax that was approved by Marin voters in 2018. The overarching goal of the Transportation Sales Tax Renewal Expenditure Plan is to "reduce congestion and reduce greenhouse gas emissions, maintain and improve local transportation infrastructure, and provide high quality transportation options for people of all ages who live, work, and travel in Marin County." The Plan allocates 3% of the revenue for a 30-year program of improvements to interchanges and freeway access routes on Highway 101 to reduce congestion, improve local traffic flow, and address flooding impacts within the county. These funds will serve to leverage larger regional, state, and federal funds.

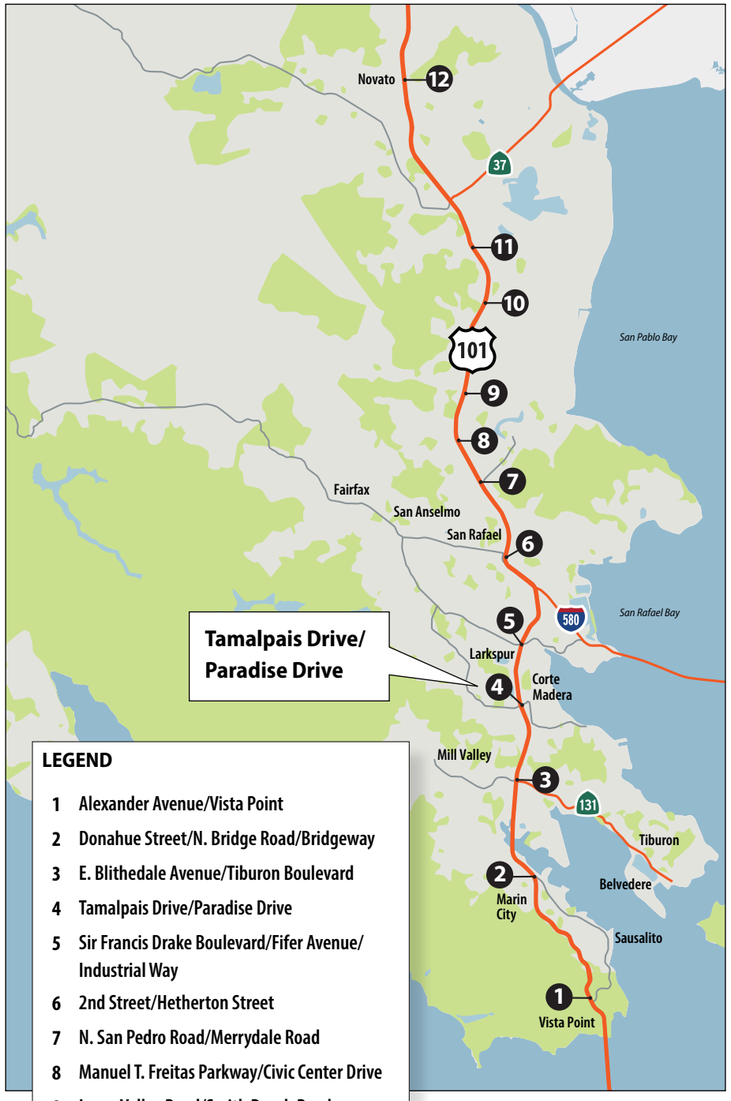
Throughout Marin County, Highway 101 serves as the primary north-south roadway and is a key link between communities. Accessing Highway 101 in Marin is a major source of congestion on local roads, which reduces the connectivity of communities across Marin. Interchanges vary in age and in needs for improvements. As communities around Marin have grown over the last 30-40 years, interchanges built in the 1950s and 1960s have not been altered to meet demands of vehicles, transit, bicyclists, and pedestrians. Many do not meet current design or operational standards.

In addition to the vehicular traffic these interchanges serve, many also provide bus stops for Marin Transit and Golden Gate Transit, which offer local and regional bus services but have poor connectivity with local land uses or for transfer between transit providers. Provisions for bike and pedestrian access are also typically poor, with missing, discontinuous, or generally unsafe paths of travel and a general lack of connectivity with the local pedestrian and bike networks.

The 12 interchanges identified for improvement within this study span the cities of Sausalito, Larkspur, San Rafael, and Novato; town of Corte Madera; and unincorporated areas of Marin County. The southernmost interchange is located just north of the Golden Gate Bridge at Alexander Avenue, and the northernmost interchange is located in Novato at Atherton Avenue.

Each interchange was evaluated to determine the existing conditions of the roadway, such as nonstandard features or outmoded design and flooding, traffic conditions, pedestrian/bicyclist circulation and intermodal connectivity, and environmental conditions, including vulnerability to SLR. The study looked at previous planning studies for these interchanges as well as any recent or proposed nearby development, including the new SMART passenger rail line which aligns closely with Highway 101.

This study addresses alleviating these nonstandard features and upgrading the conditions for vehicular traffic, transit users, pedestrians, and bicyclists. Proposed improvements vary from readily implementable solutions, such as new crosswalks, curb ramp replacements and restriping to new bike facilities, improved multimodal connectivity, and widened bridges. Many of the improvements recommended by this study will strengthen the interchange's relationship with the surrounding area and new developments, and they will improve the operation and safety of these interchanges for all users, allowing smoother travel to, from, and across Highway 101 and local roads.



Project Location and Background

The interchange at Tamalpais Drive/Paradise Drive is located at U.S. 101 postmile (PM) 7.37 in the unincorporated town of Corte Madera in Marin County. It is situated in an urban environment characterized by commercial buildings with outdoor malls in the northern corners of the interchange and car dealerships in the southern corners. Residential areas are located further to the west and the Corte Madera Marsh State Marine Park to the east of U.S. 101 .

The northbound off-ramp is a diagonal ramp which intersects with Tamalpais Drive at a signalized intersection that allows motorists to reach both directions. Motorists accessing southbound U.S. 101 via westbound Tamalpais Drive will use the southbound diagonal ramp. Motorists accessing southbound U.S. 101 via eastbound Tamalpais Drive will use a southbound loop ramp. The southbound off-ramp is a diagonal ramp that intersects with Tamalpais Drive at a signalized intersection that allows motorists to reach both directions. Motorists accessing northbound U.S. 101 via westbound Tamalpais Drive will use northbound loop on-ramp. Motorists accessing northbound U.S. 101 via eastbound Tamalpais Drive will use the northbound diagonal on-ramp.

The overcrossing at Tamalpais Drive/Paradise Drive, officially called the Tamalpais Drive Overcrossing (Bridge No. 27-002), was constructed in 1957. The bridge was retrofitted in 1985 and 1994.

Bus stops serving Golden Gate Transit and Marin Transit are located within the loop ramps and within the vicinity of the interchange on Tamalpais Drive/Paradise Drive. The bus stops within the loop ramps are sheltered bus stops on short travel lanes that connect the diagonal off-ramps and loop on-ramps allowing buses to stop for riders and traverse back onto the highway. The pedestrian paths are poorly lit and connect to Tamalpais Drive requiring transit riders to traverse across the high-speed highway ramps. Spiral ramps connect the pedestrian paths from the bus stops up to the minimal sidewalk on Tamalpais Drive. There are no bicycle accommodations on the overcrossing.

The Corte Madera Marsh State Marine Park located to the east has a Class I dedicated bicycle trail running to the north and south.

Previous Studies

This interchange was previously studied in the Central and Southern Marin Transit Study (2009).

The *Caltrans US 101 North Comprehensive Multimodal Corridor Plan* (2020) observed a northbound PM peak bottleneck between the Tamalpais Drive on-ramp north to the Sir Francis Drake off-ramp. The corridor plan proposed a range of improvements for the Highway 101 corridor.

- A short-term project that is currently under development by MTC/Caltrans is installing ramp metering for all remaining locations on Highway 101 in Marin County. This project has been environmentally cleared.

Potential solutions for the interchange were identified in TAM's Highway 101 Interchange Fact Sheet (2017) including:

- Adding a northbound Highway 101 auxiliary lane to Sir Francis Drake Boulevard
- Widening the overcrossing to provide more traffic and/or turning lanes
- Reconstructing the overcrossing with a different profile to improve motorist sight lines
- Providing a wide sidewalk on both sides of the overcrossing or multi-use pathway along one side
- Squaring up the on-ramp connection from the overcrossing to improve safety
- Widening the on-ramps to provided added traffic capacity
- Relocating and/or improving bus stops and bus stop access
- Installing on-ramp meters to improve overall operational efficiency of Highway 101
- Improving intersection signal coordination

The Marin County Travel Safety Plan (2018) recommended the following improvements:

- Signal improvements, including additional phases and signal coordination at multiple locations, signal head upgrades to 12" LEDs with backplates, and additional advanced dilemma detection zones
- Pedestrian crossing improvements, including new stop bars, bulb outs, directional curb ramps, reduced curb radii, and Americans with Disabilities Act (ADA)/Accessible Pedestrian Signal (APS) pedestrian push button
- Bicycle facility improvements, including the installation of bike lanes on Tamalpais Drive and additional dedicated bicycle facilities

Future Development

There are no known developments within the Tamalpais Drive/Paradise Drive interchange.

Existing Conditions and Constraints

OVERVIEW

The following pages present an overview of the interchange study area's existing infrastructure, transportation, and environmental conditions and constraints. Data are from field observations as well as a number of national, state, and local sources, and they provide an important understanding of the interchange area.

Photo Exhibit

Photographs were taken during visits to the interchange area in early 2021. These capture existing conditions at various locations throughout the interchange area.

Infrastructure

A review of current infrastructure was undertaken to describe structures, utilities, drainage, right of way, and pavement conditions. Data considered for this section came from Caltrans, MarinMap, and MTC.

Nonstandard Design Features

Existing features within the interchange area were evaluated against the current Caltrans Highway Design Manual as well as local and ADA standards. Four types of nonstandard features were highlighted: nonstandard features on the highway, nonstandard features on the local roadway, ADA compliance, and nonstandard bike/pedestrian features.

Multimodal Infrastructure

Multimodal infrastructure was assessed through in-field reviews of facilities throughout the interchange area. The review noted the interchange configuration and the number of roadway lanes, and it included the location and condition of bike and pedestrian facilities, including sidewalks, Class I shared-use paths, Class II bike lanes, and any informal paths (e.g., dirt walking routes). The location of public transit stops and any connectivity gaps for people traveling to or from the stops were also noted for the purpose of the assessment.

Transit Routes

Marin Transit and Golden Gate Transit routes serving the interchange area as of early 2019 (pre-COVID) were identified. Distinction was made between local and freeway-only service routes. This section includes a brief discussion of transit stop amenities and accessibility issues.

Transit Ridership

Onboardings and alightings for each public transit stop within the interchange area were analyzed using Marin Transit (2017) and Golden Gate Transit (2020) ridership data provided by the respective transit agencies. For Golden Gate Transit routes, a growth factor was used to estimate pre-COVID ridership numbers based on the data provided. The resulting map shows onboardings, alightings, and total estimated daily passengers for each transit stop.

Weekday Peak Hour Traffic Volumes

Weekday AM and PM peak hour traffic volume turning movements are displayed for each intersection within the intersection area. These data are mostly from pre-COVID conditions (2017 to early 2019), but some counts were taken in Fall 2019 and adjusted to reflect a pre-COVID scenario.

Weekday AM & PM Peak Period Congestion

Year 2019 congestion data from INRIX was displayed for hourly periods during the AM and PM weekday peak periods. These data were assessed to determine which parts of the interchange area typically experience notably high or low vehicle congestion.

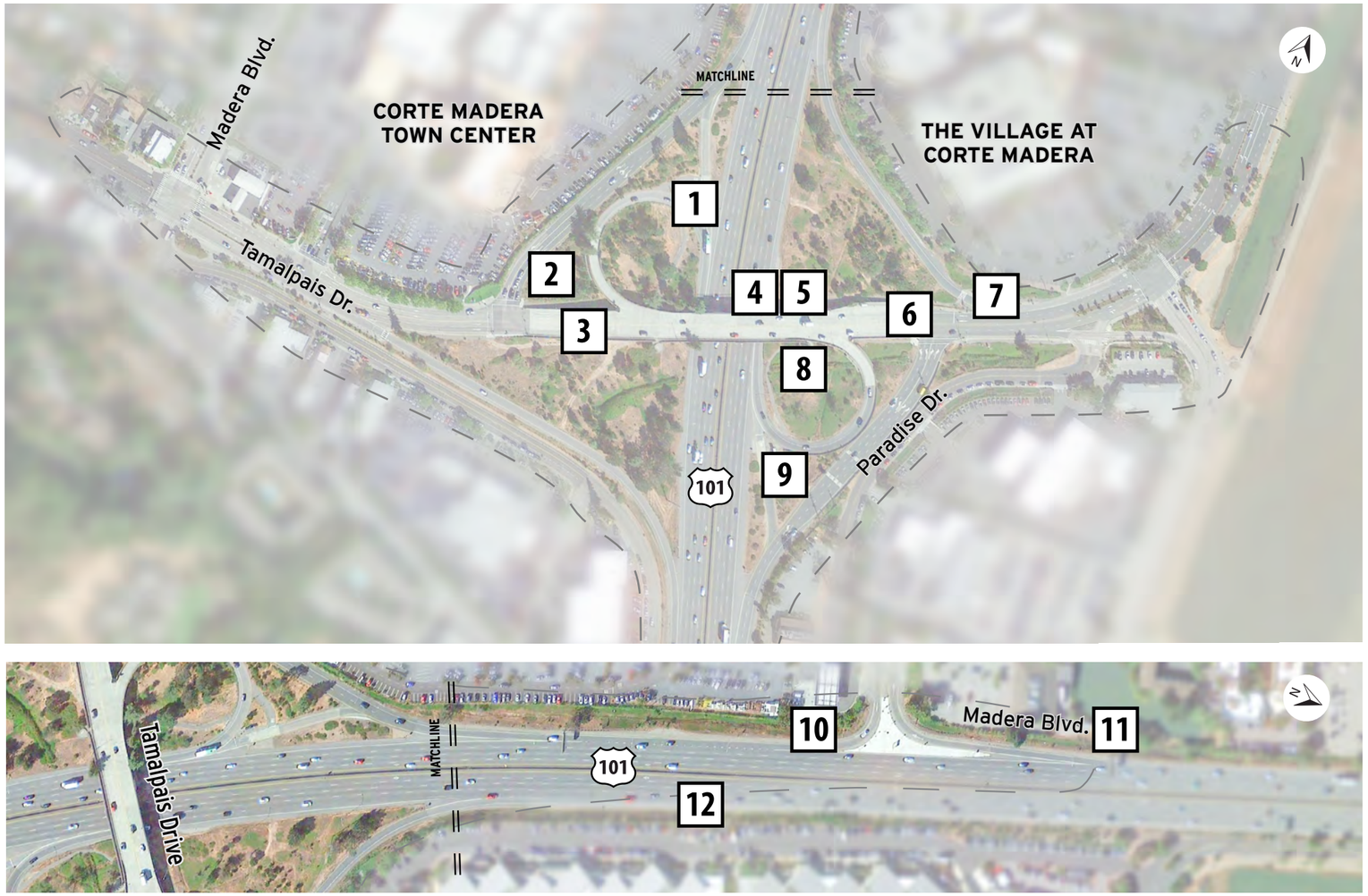
Crash Type & Severity

Five years of crash data (2014-2018) from SWITRS were analyzed within the project study area local roads and ramps. Particular note was taken of crashes involving pedestrians or bicyclists. The Crash Type exhibit notes the locations of crashes by type (i.e., head-on, sideswipe, etc.). The Crash Severity map displays the location of fatal crashes, crashes resulting in severe injury, and crashes resulting in minor injury. The exhibits include a brief discussion of primary collision factor trends.

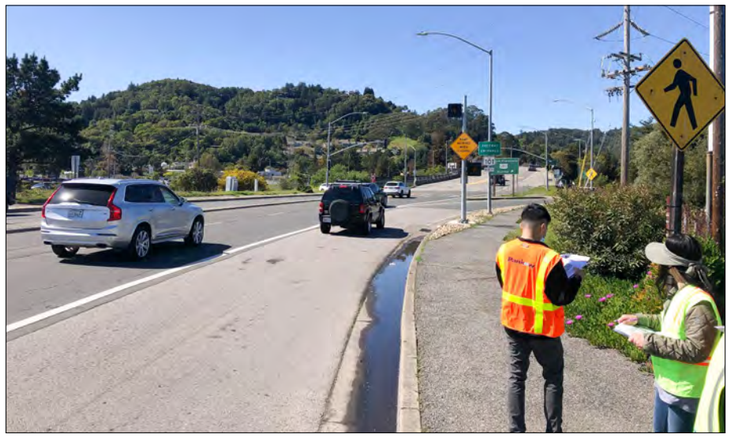
Environmental Constraints

A desktop review considered environmental conditions and constraints within the interchange area. This review noted cultural resources, hazardous waste/materials, biological resources including water quality, susceptibility to sea-level rise, and land use/growth. The data reviewed was from a number of sources, including the Golden Gate National Parks Conservancy, MarinMap, and GeoTracker. The environmental disciplines also reviewed the following databases: Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS), National Wetlands Inventory (NWI), California Natural Diversity Database (CNDDB), and the San Francisco Bay Area Conservation and Development Commission (BCDC) mapping tool Adapting to Rising Tides (ART) Bay Shoreline Flood Explorer.

PHOTO EXHIBIT



Source: Parisi Transportation Consulting 2020



Looking west toward Highway 101 northbound on-ramp from north side of Tamalpais Drive; photo taken during field review.

Gap in fence used by pedestrians accessing sidewalk on north side of Tamalpais Drive east of the Highway 101 northbound on-ramp; photo taken during field review.

LEGEND

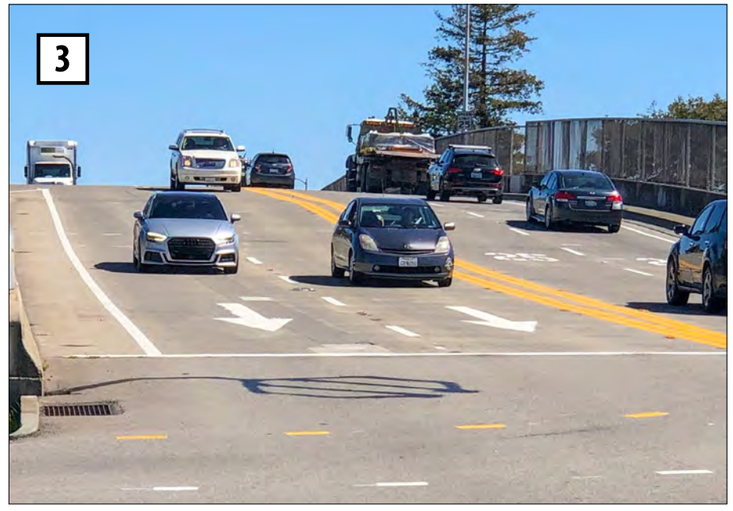
Study Boundary

\# Photo Number; see next two pages

PHOTO EXHIBIT

Golden Gate Transit bus approaching the bus stop between the Highway 101 southbound off- and on-ramps.

View of pedestrian walkway south of the Tamalpais Drive overcrossing; note lack of lighting along pathway and under the loop on-ramp to southbound Highway 101.



Looking east at westbound Tamalpais Drive traffic approaching the signalized Highway 101 northbound off-ramp intersection.

Spiral pedestrian ramp on the east side of Highway 101 connecting to the south side of Tamalpais Drive overcrossing; ramp grade exceeds ADA standards.

Pedestrian pathway under the east side of Tamalpais Drive overcrossing; note spiral ramp in background.

View of pavement settling next to bridge approach across from the Highway 101 northbound off-ramp.

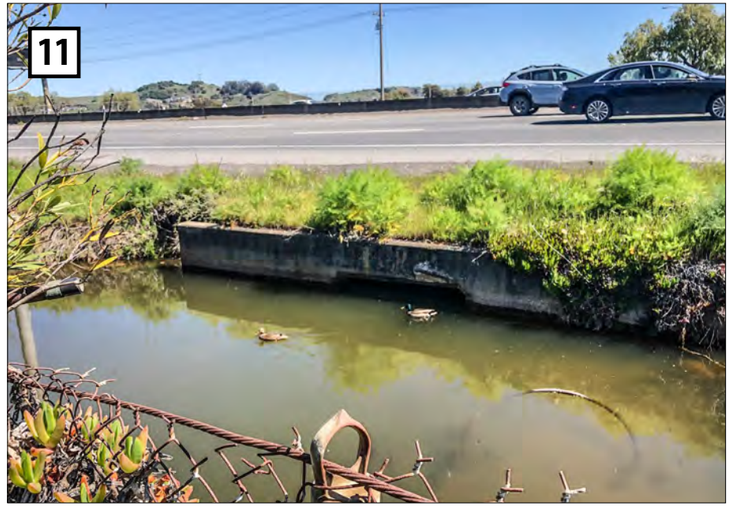
PHOTO EXHIBIT

Uncontrolled pedestrian crosswalk across the diagonal on-ramp to northbound Highway 101.

Sidewalk, shoulder, and eastbound vehicular travel lanes on Tamalpais Drive overcrossing; note the structure's vertical crest curve.

Bus stop on the east side of Highway 101 that is located between northbound off- and on-ramps; pedestrians must cross on-ramp.

Weaving segment and auxiliary lane along southbound Highway 101 between the on-ramp from Madera Boulevard and the off-ramp to Tamalpais Drive.



Waterway on the west side of Highway 101 south of Madera Boulevard.

Looking at shoulder along northbound Highway 101 north of the Tamalpais Drive diagonal on-ramp; note fence and utilities.

INFRASTRUCTURE

Geometric Conditions and Nonstandard Features

The existing geometric conditions and features were evaluated for the Tamalpais Drive/Paradise Drive Interchange. The project objective was to assess the existing condition for the ramps and the local roadways leading to and from the ramps within the study area. The Highway 101 mainline was not evaluated as part of this study. The existing conditions were evaluated against the current Caltrans Highway Design Manual, Marin County, ADA criteria, and Marin Transit standards.

The Town of Corte Madera noted concerns with the design speed for the overcrossing per the sight distance provided. This study could not investigate this concern without performing a topographical survey of the existing conditions. This is recommended to be assessed in future phases of design.

There currently does not exist a defined pathway for bicyclists to utilize across the overcrossing. There is a designated Class I bike path on San Clemente Drive. Bicyclists that desire to cross the bridge to connect to the west side of U.S. 101 will need to travel on the existing travel lane/shoulder or utilize the sidewalk to connect.

Within the interchange, there exist bus stops servicing Golden Gate Transit and Marin Transit that require transit riders to cross the ramps. NB transit riders currently cross at an undefined crossing on the NB loop on-ramp just before vehicles enter the freeway. SB transit riders currently cross at an undefined crossing on the SB loop on-ramp just before vehicles enter on the freeway.

Refer to the Nonstandard Design Features exhibit for the detailed locations where these less than standard roadway features exist.

Structures Conditions

The existing Tamalpais Drive overcrossing (Bridge No. 27-0072) was constructed in 1957. It was retrofitted in 1985 and 1994. The bridge superstructure consists of steel girders. The bridge has a sufficiency rating of 55.6. The Tamalpais Drive overcrossing has a vertical clearance of 17.75 feet, meeting current Caltrans Highway Design Manual standards of 15 feet over a local roadway.

A bridge requiring replacement is not judged solely on the age of the bridge and it's sufficiency rating. There are other factors to consider, such as the bridge's ability to meet standards with further improvement, (e.g., bridge widening or the benefit to cost of repairing the bridge versus a full bridge replacement). Consideration for bridge replacement will need to be reviewed on a bridge-by-bridge basis.

It was observed in the field that there was settlement occurring around the bridge approaches. Asphalt overlay has been installed on the roadway to mitigate the difference in the roadway elevations. In future phases of work, a geotechnical evaluation is recommended to review the existing soils data for further recommendation on appropriate repair options to address the settlement here.

Identified Maintenance Needs

The project team completed a review of the current Caltrans Bridge Inspection Report and recommends the following work:

- Replace some of the restrainer cables
- To resolve settlement, a temporarily solution is to provide an asphalt overlay to resolve the grade differential

It is also noted that the existing bridge steel girder paint may contain lead.

Refer to the Nonstandard Design Features exhibit for the detailed locations where these less than standard roadway features exist.

Pavement Condition Index

The Tamalpais Drive/Paradise Drive interchange pavement condition were collected via the MTC Vital Signs website for street pavement conditions. MTC provides a pavement condition index (PCI) for local streets within the Bay Area, dated 2018.

Looking north across the Tamalpais Drive loop on-ramp to northbound Highway 101, as well as the Tamalpais Drive overcrossing. View from on-freeway bus stop.

The existing pavement conditions were given a PCI range as categorized:

- Failed/Poor (0-49)
- At Risk (50-59)
- Fair/Good (60-79)
- Very Good/Excellent (80-100)

For locations where information was not provided, a visual check was performed on Google Earth and validated in the field. This was also completed to corroborate data against more current conditions. The PCIs for the interchange study area are rated as follows:

- Tamalpais Drive/Paradise Drive – fair/good (60-79).

MTC Vital Signs, "Street Pavement Conditions" did not provide any data for this interchange.

Pavement conditions rated fair/good and above do not require improvements at this time. Pavement condition rated "at risk" can be considered for rehabilitation under future improvement projects to return existing roadways to good condition. Existing pavement conditions rated "failed/poor" can be considered for reconstruction under future improvement projects to restore structural integrity to the roadway.

Utilities

The project completed a research of existing utilities and identified all known utilities within the project study area. Utility data was gathered from local utility owners, Caltrans and MarinMap.

The project collected data on major utilities that are defined by Caltrans as high priority. These major utilities also included electric or gas transmission lines, sanitary sewer lines larger than 24" diameter and water lines greater than 12" diameter.

Within the interchange, there were major utilities identified. There is an existing 16" HP PG&E pipeline along the freeway on the southbound side, embedded approximately 100' away from the edge of southbound U.S. 101 shoulder. Refer to mapping for location and type.

Refer to the Project Base Map (Attachment A) for the Existing Utility Mapping.

Drainage

The existing drainage conditions were assessed for the Tamalpais Drive/ Paradise Drive interchange. Watersheds are located within the city of Corte Madera. On-site drainage areas consist of highway, surface streets, commercial areas with parking lots, and unpaved roadside areas. Unpaved loop areas have relatively flat relief with slopes ranging from approximately 0 – 10%.

Within Caltrans' right of way, runoff is conveyed to the unpaved areas within the interchange ramp loops via sheet flow or cross culvert. Runoff that accumulates in unpaved loop areas on the west side of the interchange is conveyed across U.S. 101 to the east side loop areas via a 6-feet x 5-feet box culvert. A system of ditches conveys runoff in the unpaved loop areas to drainage along Tamalpais Drive to the east.

The study area falls within Federal Emergency Management Agency (FEMA) designated Flood Zones AE and Zone X (shaded) (see **Attachment L**). FEMA defines Zone AE as "the base floodplain where base flood elevations are provided" (FEMA, n.d.). Within the study area, Zone AE denotes areas with a 1% annual chance flood hazard and a base flood elevation (BFE) of 10 feet (NAVD 88). Shaded Zone X is defined as an "area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods" (FEMA, n.d.). Zone X (shaded) is a small portion of the study area consisting of an area within a shopping center in the northeast intersection quadrant.

TAM identified multiple locations within the study area where ponding and flooding have been a recurring issue. Ponding occurs at the U.S. 101 northbound off-ramp and along the northbound U.S. 101 shoulder. Refer to **Attachment F** for locations.

Design of new drainage located within Caltrans' right of way should adhere to the Caltrans Highway Design Manual published in 2020 and the standard drawings of the Caltrans Standard Plans published in 2018. The design of new drainage within local right of way should comply with standard drawings in the Marin County Uniform Construction Standards published 2018.

All proposed stormwater treatment facilities within Caltrans' right of way will adhere to the Caltrans National Pollutant Discharge Elimination System (NPDES) permit. Treatment facilities outside Caltrans' right of way will adhere to the Marin County Phase 1 Municipal Separate Storm Sewer System (MS4) permit for Marin County.

Refer to the Project Base Map (Attachment A) and FEMA Flood mapping (Attachment L) for the existing drainage mapping.

Right of Way

The Tamalpais Drive/Paradise Drive interchange is located within the Caltrans right of way. The Caltrans right of way extends approximately 660 feet to the east and approximately 830 feet to the west from U.S. 101 . Outside of the Caltrans right of way is the Town of Corte Madera right of way.

Refer to the Project Base Map (Attachment A) for the existing right of way mapping.

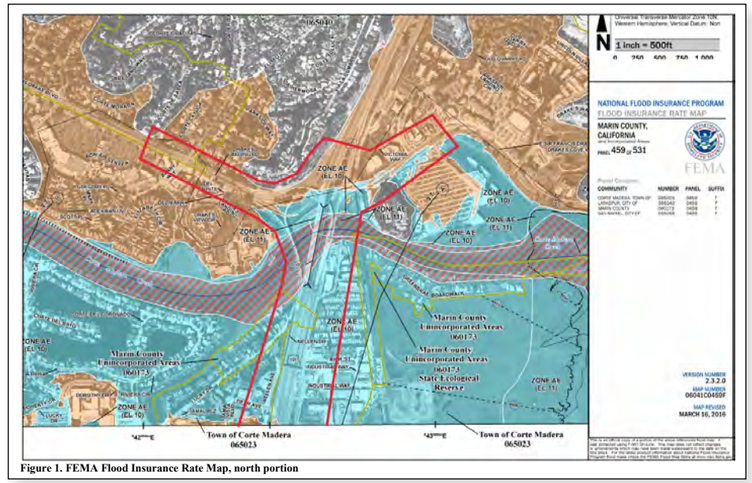
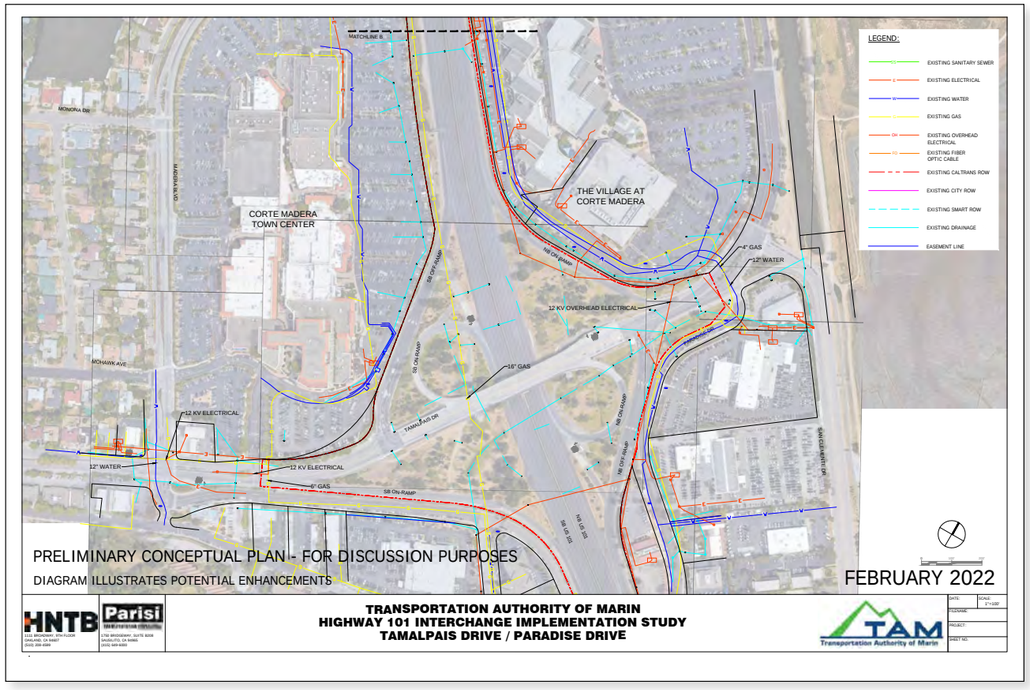
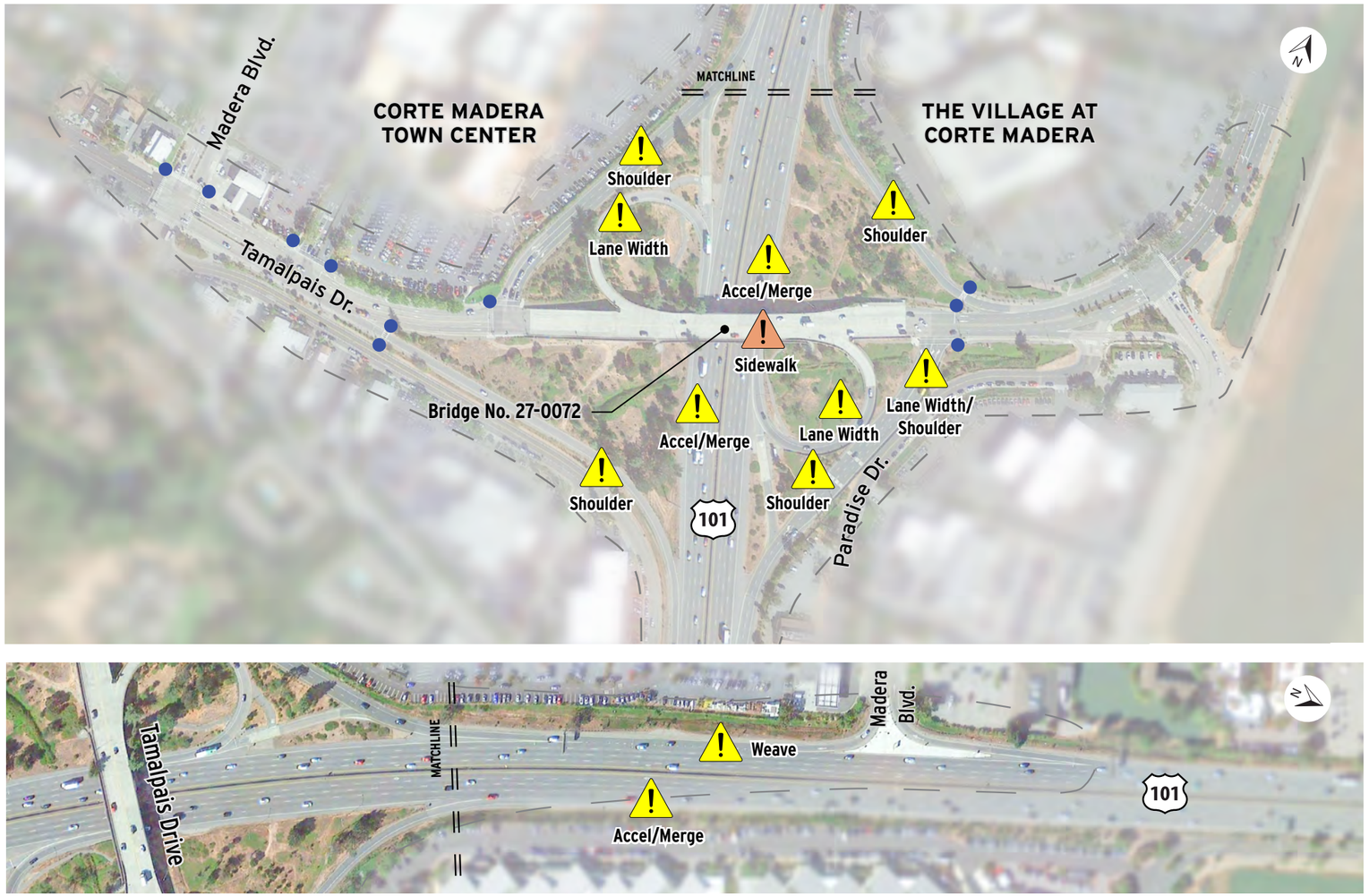


Figure 1. FEMA Flood Insurance Rate Map, north portion



NONSTANDARD DESIGN FEATURES



Source: HNTB 2022

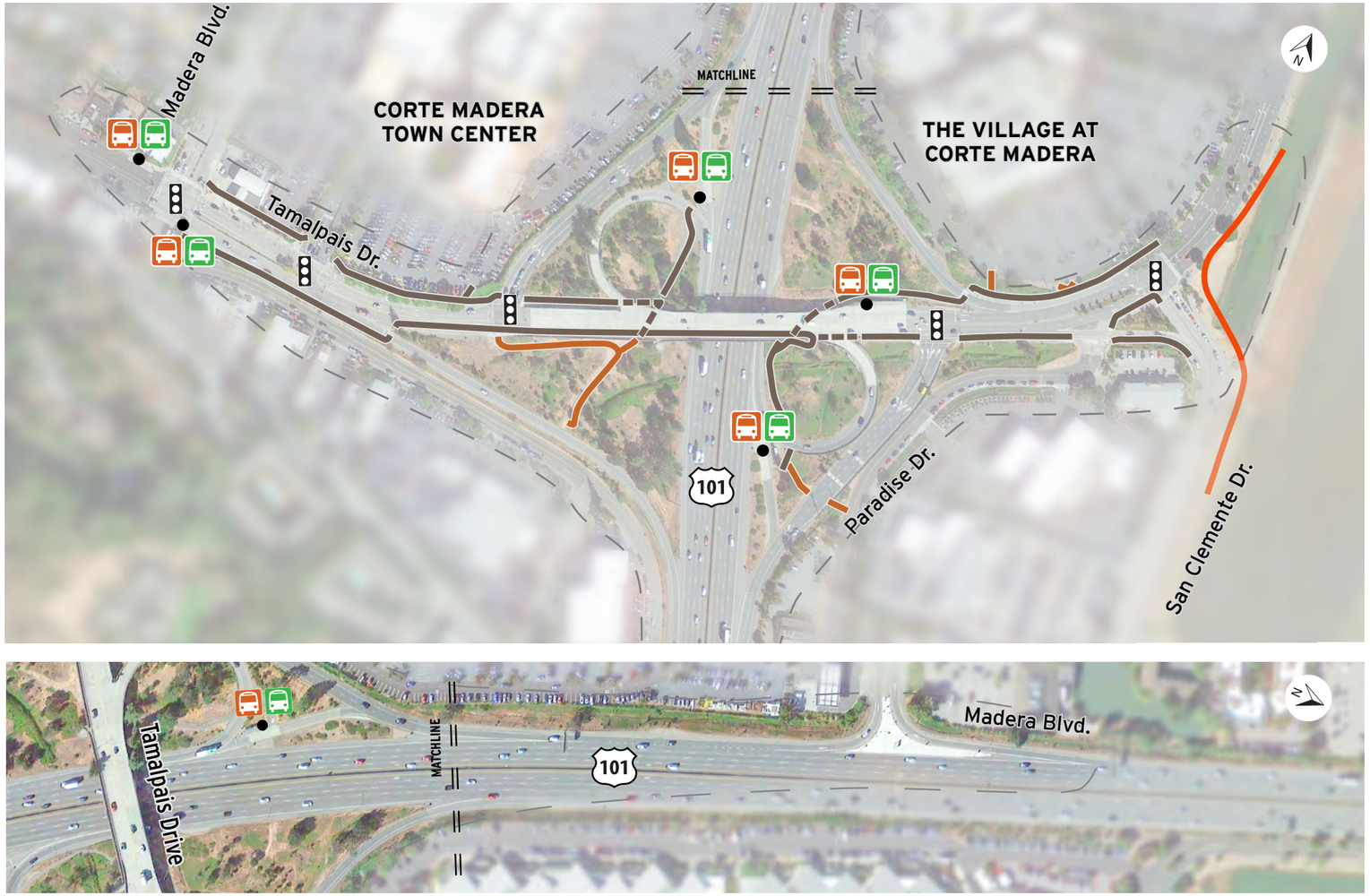
- The inside lane width on the southbound and northbound loop on-ramps do not meet truck lane width requirements.
- The Madera Boulevard southbound on- and off-ramps to Tamalpais Drive have less than standard ramp separation, providing less than standard weaving distance between the two ramps.
- The northbound and southbound on-ramps have less than standard separation for successive on-ramps, providing less than standard acceleration and merge lengths for vehicles merging onto the Highway 101 mainline.
- The northbound off-ramp, northbound loop on-ramp, and southbound loop on-ramp have less than standard lane widths.
- The northbound and southbound on- and off-ramps at Tamalpais Drive have less than standard shoulder widths.
- The existing sidewalk on eastbound Tamalpais Drive overcrossing is less than standard width.
- The existing curb ramps identified do not meet current ADA standards at the intersections identified within the project study area.

Refer to the Deficiency Matrix (Attachment J) for more information.

LEGEND

- Study Boundary
- Nonstandard Features on Highway
- Nonstandard Features on Local Roadway
- ADA Non-Compliance

MULTIMODAL INFRASTRUCTURE



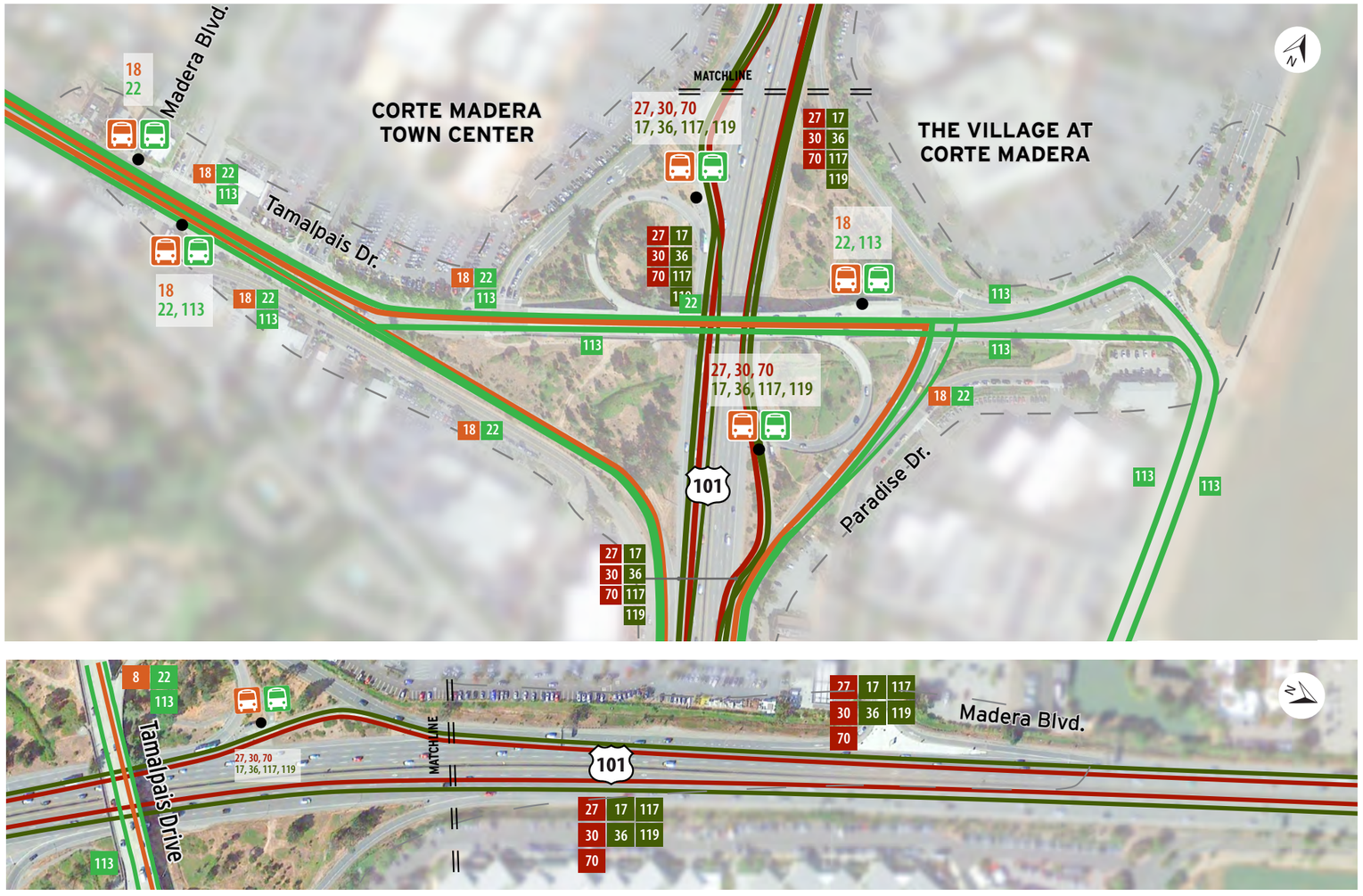
Source: Parisi Transportation Consulting 2021

LEGEND

- Study Boundary
- Traffic Signal
- Golden Gate Transit Bus Stop
- Marin Transit Bus Stop
- Class I Path
- Sidewalk
- Sidewalk Under Freeway

- The interchange provides access for much of Corte Madera in addition to the two major regional shopping centers located on either side of Highway 101. For bicyclists and pedestrians, it provides access to the North-South Greenway which provides vital north/south connectivity in Marin County.
- The interchange is a Partial Cloverleaf Type A with two loop on-ramps and four diagonal ramps.
- The Tamalpais Drive overcrossing was constructed in 1957 with retrofit projects in 1985 and 1994.
- Tamalpais Drive carries two lanes of traffic in each direction with additional turn lanes provided at most intersections and at the Highway 101 on-ramps. Narrow shoulders approximately 4 feet wide are provided on both sides of the overcrossing.
- On-ramps to both northbound and southbound Highway 101 are free-flow, allowing drivers the ability to access Highway 101 without slowing. Off-ramps from Highway 101 are signalized and include three to four lanes of traffic. The approximately 700-foot distance between the southbound on-ramp from Madera Boulevard and the Tamalpais Drive exit can result in a challenging weave between vehicles entering and exiting Highway 101 at this location.
- A 5-foot-wide sidewalk is present on the south side of Tamalpais Drive; it requires pedestrians to cross Highway 101 on-ramps at uncontrolled crossings. Sidewalks on the north side of Tamalpais Drive are incomplete with no sidewalks on the overcrossing. Pathways along the sloped areas between the overcrossing and the freeway are provided to the Highway 101 bus pads and between the south side of Tamalpais Drive and the southbound on-ramp to Highway 101.
- There are no dedicated bicycle facilities on Tamalpais Drive and on the overcrossing. A Class I shared-use pathway representing the North-South Greenway is accessible at the eastern end of Tamalpais Drive, at San Clemente Drive. In addition, wide shoulder lanes are present on San Clemente Drive and Casa Buena Drive that bicyclists can use outside of the travel lanes.
- There are a total of five bus stops in the interchange study area, including three located on Tamalpais Drive and two on the northbound and southbound Highway 101 bus pads.

TRANSIT ROUTES



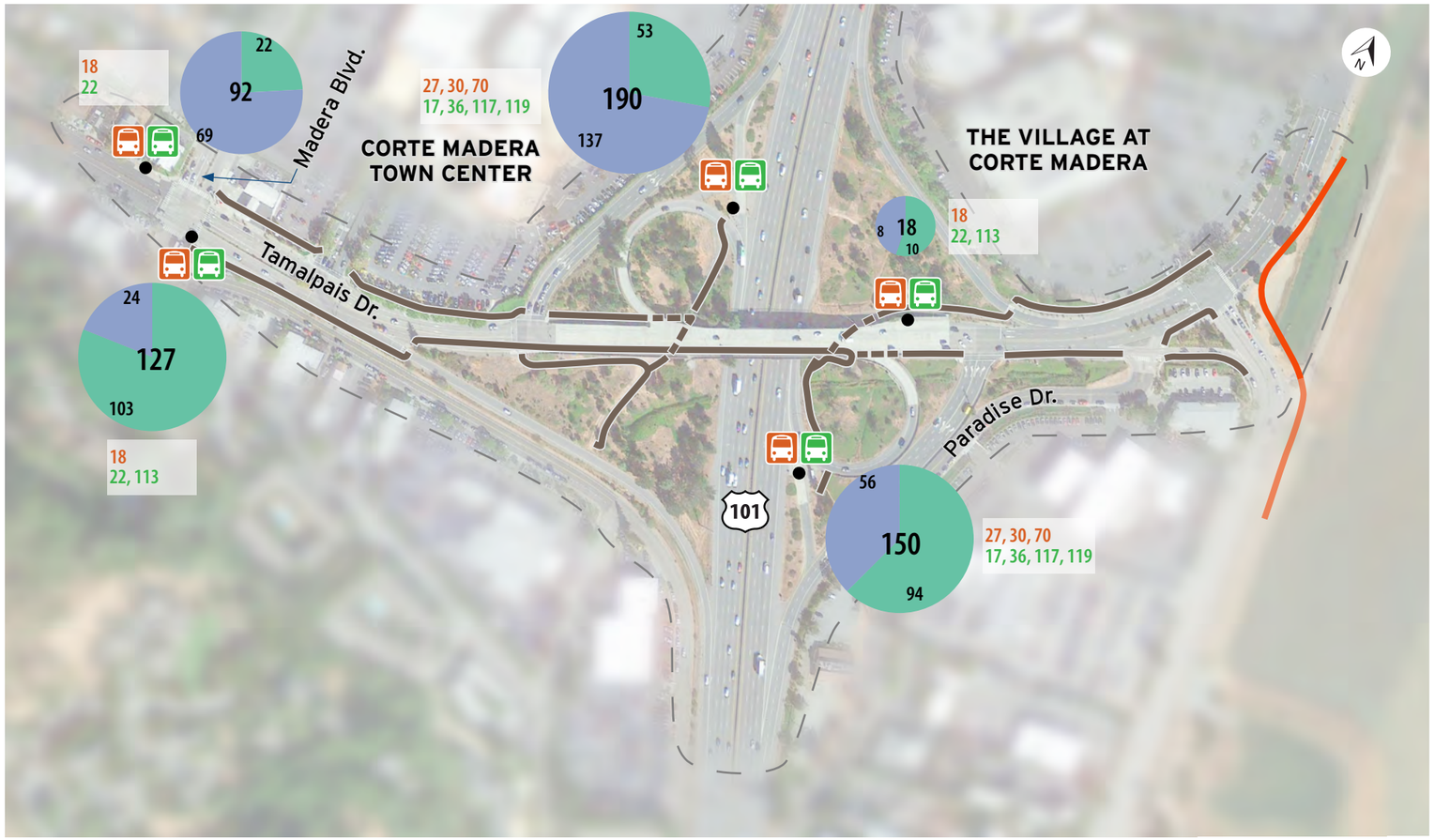
Source: Marin Transit 2020 & Golden Gate Transit 2020

- A total of 11 Golden Gate Transit and Marin Transit routes serve the Tamalpais Drive interchange area. Three of the routes stop along Tamalpais Drive and seven routes provide service via the Highway 101 bus pads.
- Access to many of the bus stops in the study area are challenging to access and transfer between. An incomplete sidewalk network on the north side of the overcrossing and the location of the Highway 101 bus pads adjacent to on-ramps require pedestrians to use circuitous pathways and uncontrolled crossings for access to these stops. Wayfinding to and between the bus stops does not exist, which presents greater challenges for passengers.
- Tamalpais Drive represents a major transit hub for the two transit providers. Service along the Highway 101 corridor has 5- to 10-minute service frequencies, and the local service has a one-hour service interval. Golden Gate Transit and Marin Transit would like to be able to bring regional and local transit connections closer and more convenient for passengers.

LEGEND

- Study Boundary
- Golden Gate Transit Bus Stop
- Marin Transit Bus Stop
- Golden Gate Transit Route
- Marin Transit Route
- Golden Gate Transit Route (101 Only)
- Marin Transit Route (101 Only)

TRANSIT RIDERSHIP



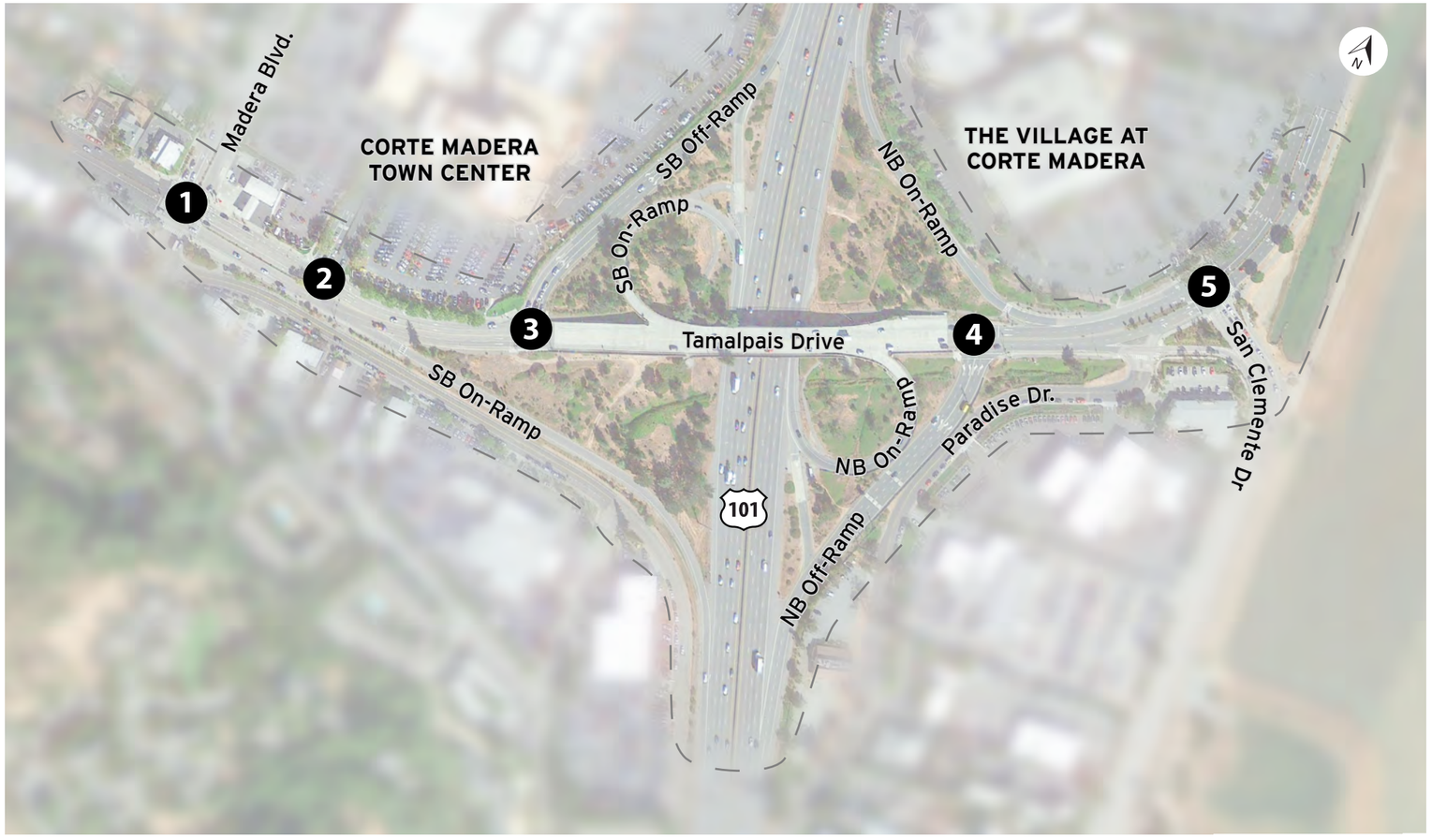
- There are a total of five bus stops in the interchange study area, including three located on Tamalpais Drive and two on the northbound and southbound Highway 101 bus pads.
- A total of nearly 600 passengers on- and off-board buses in the interchange study area per day. The two Highway 101 bus pad stops serve a total of about 340 passengers per day, providing access between San Francisco and points north of Corte Madera. The bus stop adjacent to the Madera Drive intersection with Tamalpais Drive serves approximately 125 daily passengers.

Source: Marin Transit 2020 & Golden Gate Transit 2020

LEGEND

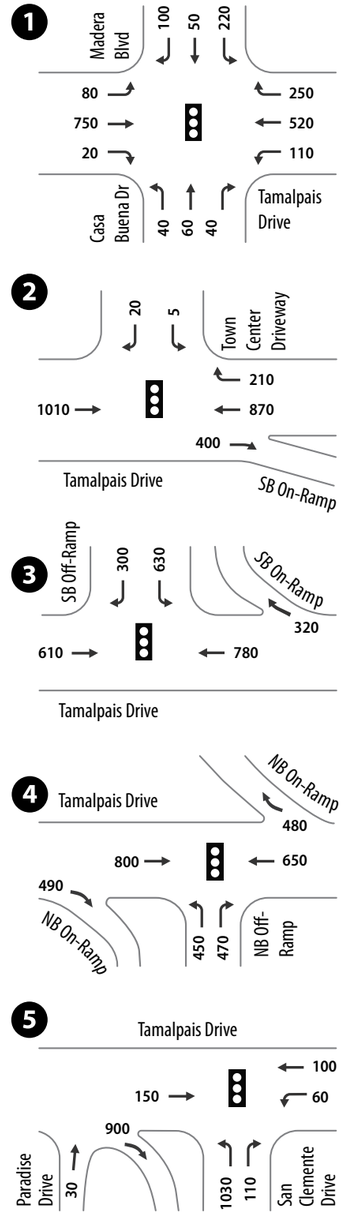
Study Boundary
Traffic Signal
Golden Gate Transit Bus Stop
Marin Transit Bus Stop
Class I Path
Sidewalk
Sidewalk Under Freeway
Onboardings
Offboardings

WEEKDAY PEAK HOUR TRAFFIC VOLUMES

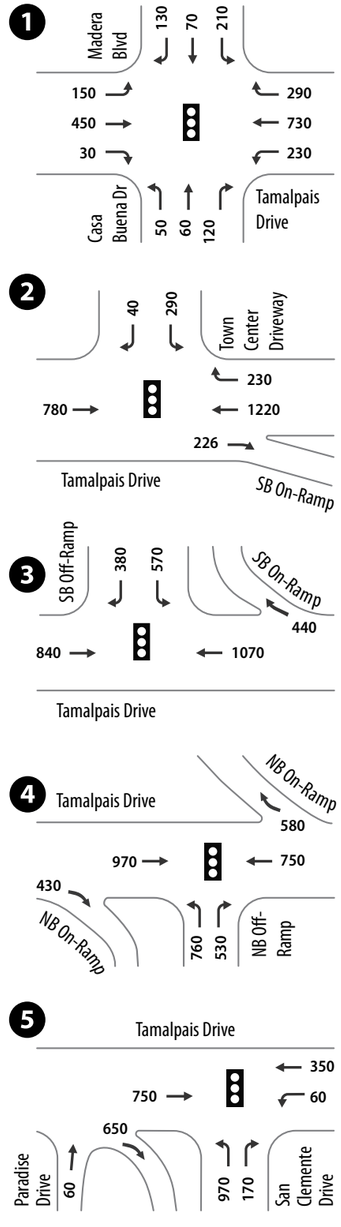


Source: Parisi Transportation Consulting 2021

AM Peak Hour



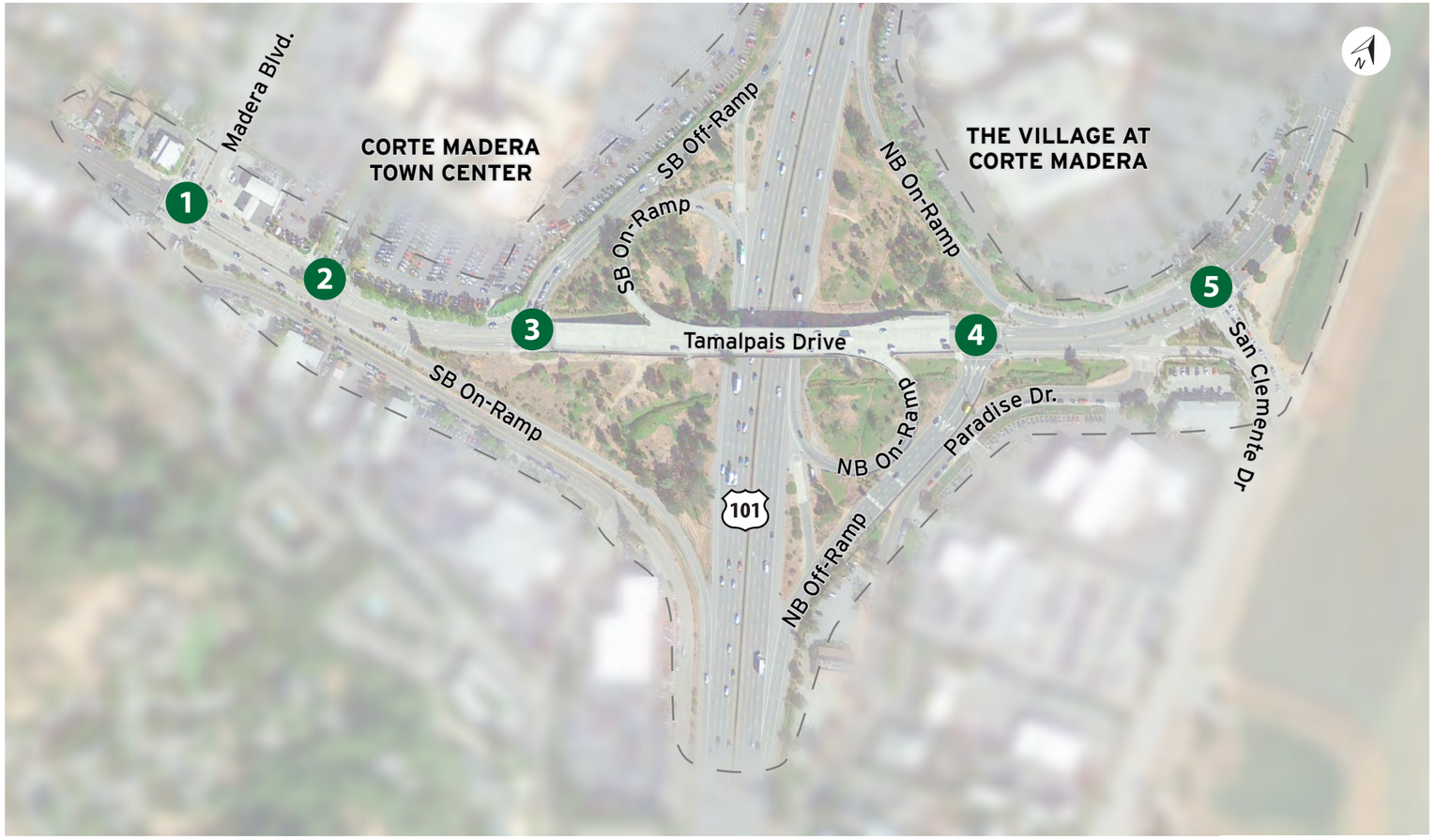
PM Peak Hour



LEGEND

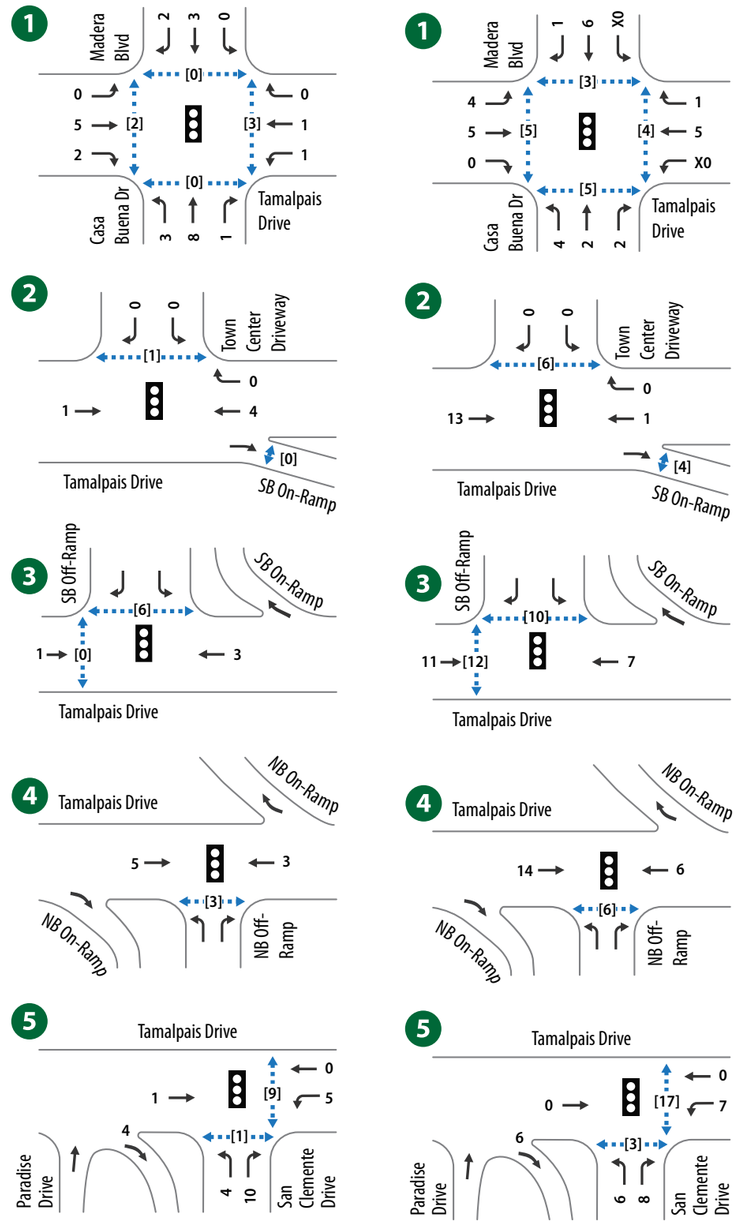
Study Boundary

WEEKDAY PEAK HOUR PEDESTRIAN & BICYCLE TRAFFIC VOLUMES

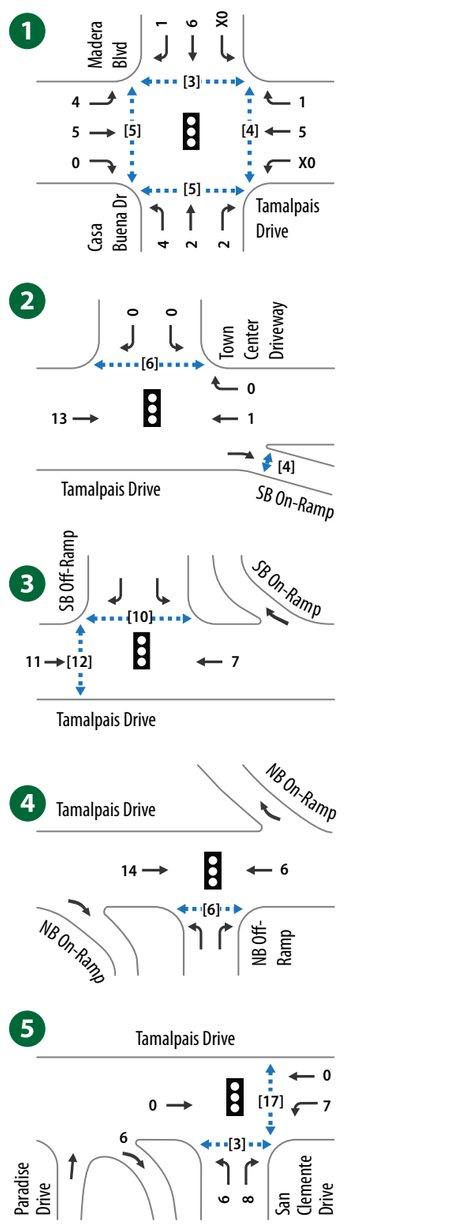


Source: Parisi Transportation Consulting 2021

AM Peak Hour



PM Peak Hour

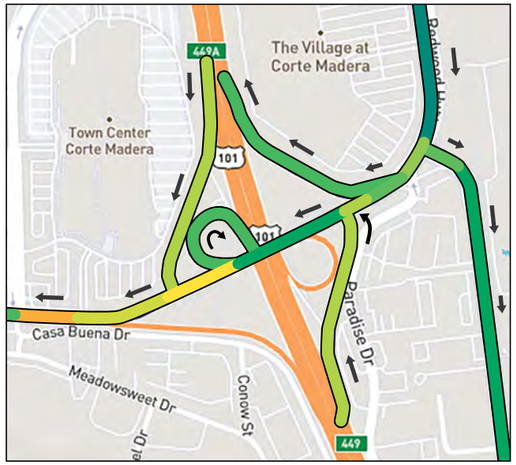


LEGEND

Study Boundary [xx] – Pedestrian xx - Bike [xx] – Pedestrian PM xx - Bike PM

WEEKDAY AM PEAK PERIOD CONGESTION

7–8 AM - Westbound & Southbound



8–9 AM - Westbound & Southbound

7–8 AM - Eastbound & Northbound

8–9 AM - Eastbound & Northbound

Source: INRIX 2019

LEGEND

Study Boundary Most congested Least congested

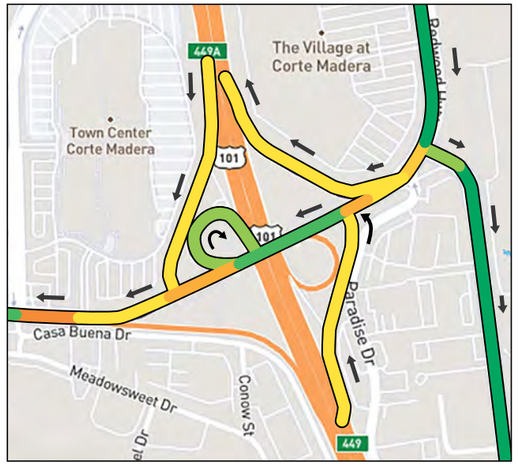
- Tamalpais Drive at Highway 101 serves approximately 25,000 vehicles per day.
- In the morning peak period, traffic congestion is fairly uniform in both directions and is most pronounced along Tamalpais Drive west of Highway 101 and on the off-ramps.

Highway 101 Tamalpais Drive/Paradise Drive Interchange – AM Level of Service (LOS) Summary

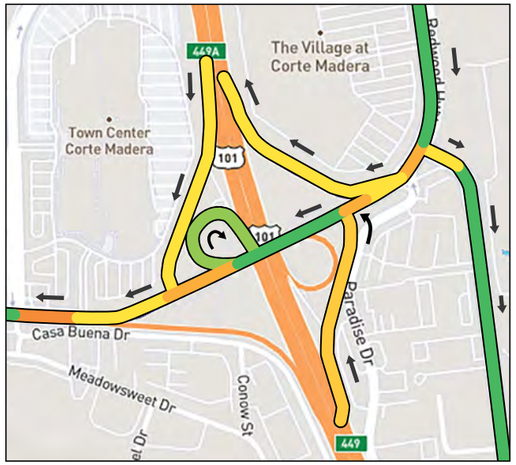
No.	Intersection	LOS	Delay (s)
1	Tamalpais Dr./Madera Blvd./Sanford St.	C	26.8
2	Tamalpais Dr./Town Center Driveway	A	1.2
3	Tamalpais Dr./Hwy. 101 Southbound Off-Ramp	B	12.1
4	Tamalpais Dr./Hwy. 101 Northbound Off-Ramp	B	11.5
5	Tamalpais Dr./San Clemente Dr.	B	14.3

WEEKDAY PM PEAK PERIOD CONGESTION

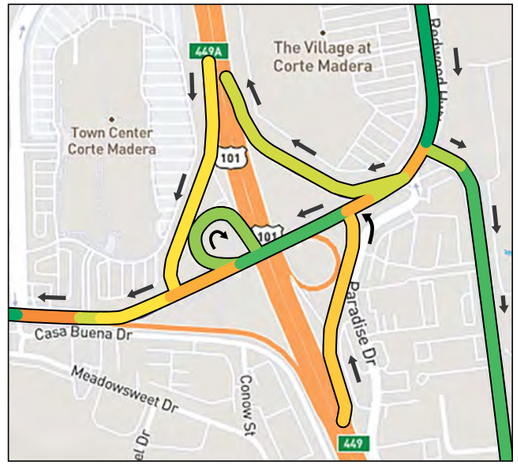
4–5 PM - Westbound & Southbound



5–6 PM - Westbound & Southbound



6–7 PM - Westbound & Southbound



4–5 PM - Eastbound & Northbound

5–6 PM - Eastbound & Northbound

6–7 PM - Eastbound & Northbound

Source: INRIX 2019

LEGEND

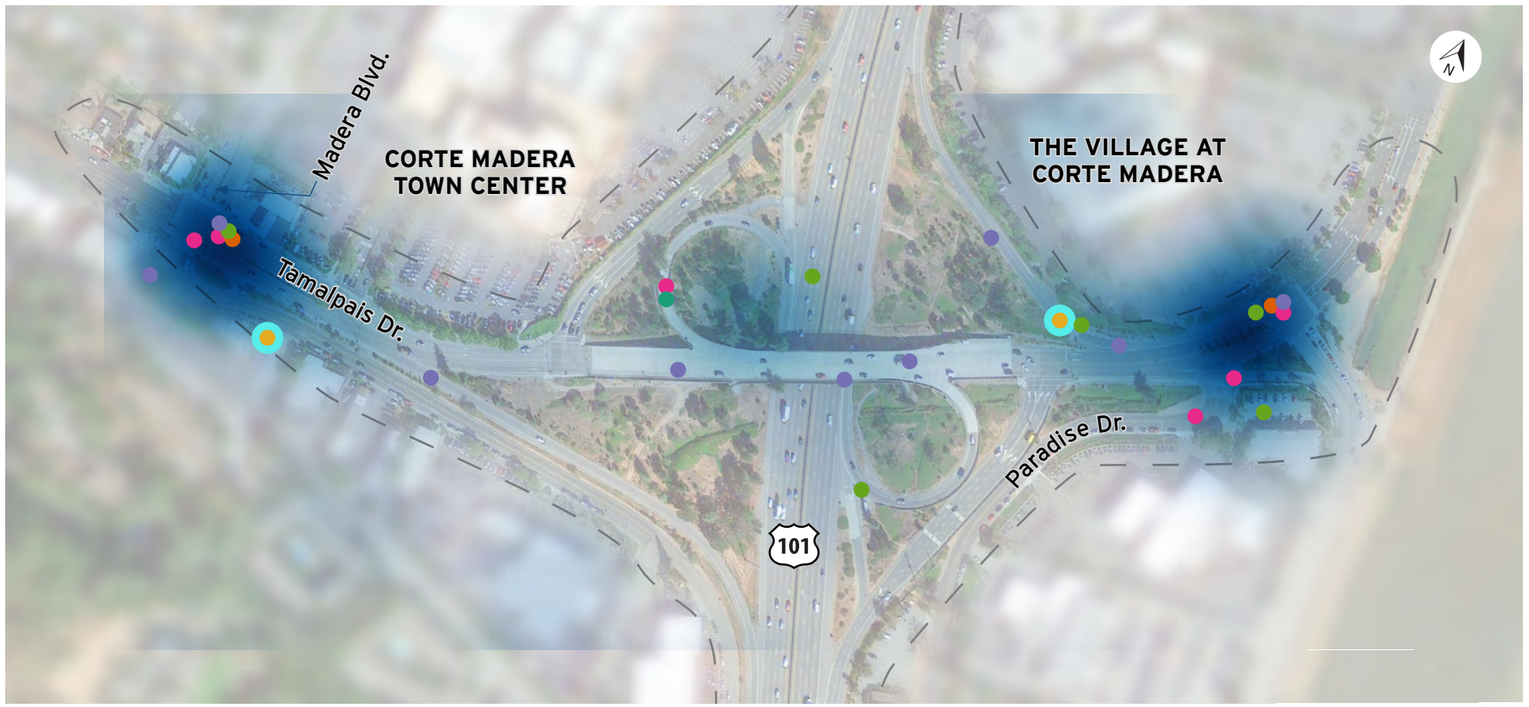
Study Boundary Most congested Least congested

- In the afternoon peak period, congestion in both directions is present between Madera Boulevard and Highway 101, and on the off-ramps and northbound on-ramp.
- In general, traffic congestion correlates with the collision pattern at the Tamalpais Drive/Madera Boulevard intersection. Lighter congestion is shown in the AM and heavier congestion picks up in the PM. Congestion also tends to correlate to the collision pattern at the Tamalpais Drive/San Clemente Drive intersection.

Highway 101 Tamalpais Drive/Paradise Drive Interchange – PM LOS Summary

No.	Intersection	LOS	Delay (s)
1	Tamalpais Dr./Madera Blvd./Sanford St.	C	34.9
2	Tamalpais Dr./Town Center Driveway	A	6.9
3	Tamalpais Dr./Hwy. 101 Southbound Off-Ramp	B	16.5
4	Tamalpais Dr./Hwy. 101 Northbound Off-Ramp	B	15
5	Tamalpais Dr./San Clemente Dr.	C	25.8

CRASH TYPE



Source: SWITRS 2014-2018

- In the five-year period from 2014 - 2018, the interchange experienced a total of 24 reported collisions. Clusters of collisions took place at or near the intersection of Tamalpais Drive/Paradise Drive, and at Tamalpais Drive intersection with the Corte Madera Town Center access road, just west of the southbound Highway 101 on-ramp.
- Of the 24 total reported collisions, 15, or 63%, resulted in injuries. All of the injuries were considered to be minor.
- About one-third of all collisions were caused by rear ends. An additional 25% were caused by broadsides, and 21% were caused by drivers hitting a fixed object.
- One-third of all collisions were the result of unsafe speeds. Another 25% were the result of drivers violating traffic signals, and 13% were caused by improper turning.
- Two pedestrians were involved in collisions. Both of these collisions were minor. One of these collisions was due to improper turning, and the other was due to violation of the pedestrian right of way.
- One of the pedestrian collisions took place near the Casa Buena Drive intersection with Sanford Street and the other near the northbound on-ramp from Tamalpais Drive.

LEGEND

Study Boundary

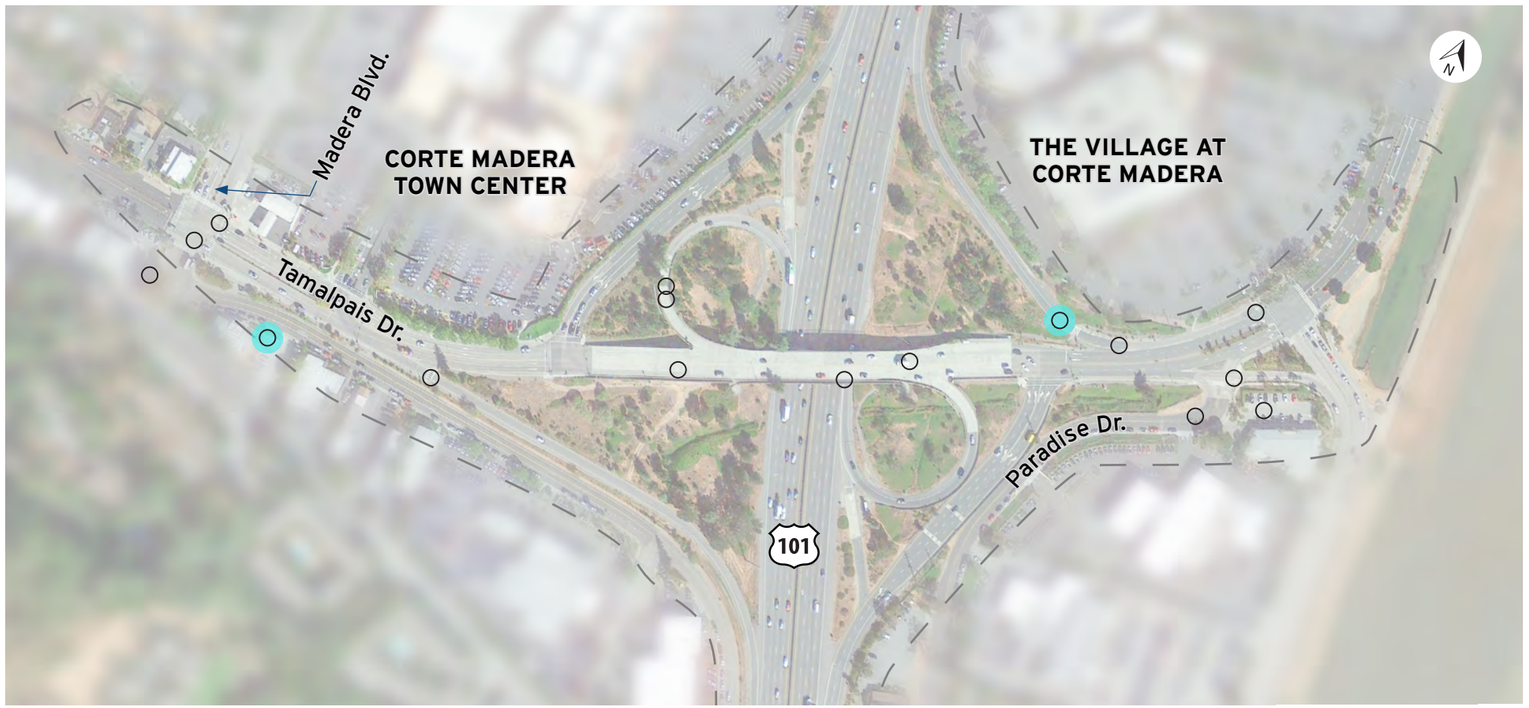
TYPE OF CRASH

- Head-On
- Rear End
- Hit Object
- Side Swipe
- Broadside
- Other

PEDESTRIAN & BICYCLE INVOLVEMENT

- Involving Pedestrian

CRASH SEVERITY



Source: SWITRS 2014-2018

- Of the 24 total reported collisions in the study area, 15, or 63%, resulted in injuries. All of the injuries were considered minor.
- Two of the collisions involved pedestrians that resulted in minor injury.
- The collisions involving injuries were distributed fairly evenly throughout the interchange study area, with small clusters mirroring the general collision locations. The two pedestrian collisions took place near the Casa Buena/Sanford Street intersection, and one at the crosswalk at the northbound Highway 101 on-ramp from Tamalpais Drive.
- Of the collisions resulting in injury, approximately one-third were caused by unsafe speeds with another 33% the result of traffic signal violations.

LEGEND

	TYPE OF CRASH	PEDESTRIAN & BICYCLE INVOLVEMENT
Study Boundary	Minor Injury	Involving Pedestrian

ENVIRONMENTAL CONSTRAINTS

Cultural Resources

Soil types within the interchange and its surroundings are highly sensitive for buried cultural resources, which is supported by documented resources within a quarter-mile radius of the study area. Ground disturbing activities could adversely impact previously documented and/or undiscovered prehistoric and historic period archaeological resources.

One documented built environment resource was noted in the study area. Changes to visual elements in the interchange could affect documented and undocumented built resources.

Technical studies will be required to comply with the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA). Native American consultation is also recommended early in project planning to gather further information on the nature and location of tribal cultural resources.

Hazardous Waste/Materials

Based on historical releases, there is a moderate-high risk for encountering hazardous waste (perchloroethylene, volatile organic compounds, diesel, and oil) within the interchange. In addition, aerially deposited lead originating from past vehicle emissions could be a source of contamination within the interchange. Parcels targeted for right of way acquisition should be evaluated for potential contamination. Proper disposal of any contaminated soil and/or groundwater could add to the overall project cost and potentially delay construction.

An initial site assessment is recommended to further evaluate potential sources of hazardous contamination.

Biological Resources/Water Quality

Habitat for special-status animal species potentially occurs within and near the interchange. Field surveys would be needed to confirm the presence of any special-status species. If present, agency coordination would be required to identify any impacts and permitting may be required.

Streams and their associated riparian habitat are present within (and near) the interchange. Wetlands are also mapped within the study area. A field survey will be needed to confirm the extent of Waters of the US and Waters of the State. Impacts to any surface waters or wetlands would require permitting and potentially mitigation.

Sea Level Rise Susceptibility

The interchange is on a low-lying section of U.S. 101 that is currently threatened with flooding during king tides. Without storm surge, the interchange would be threatened by SLR before 2030 (1 in 200 high emissions scenario equating to one foot of SLR). SLR adaptation measures would need to be evaluated and potentially incorporated into any proposed interchange improvements.

Land Use/Growth

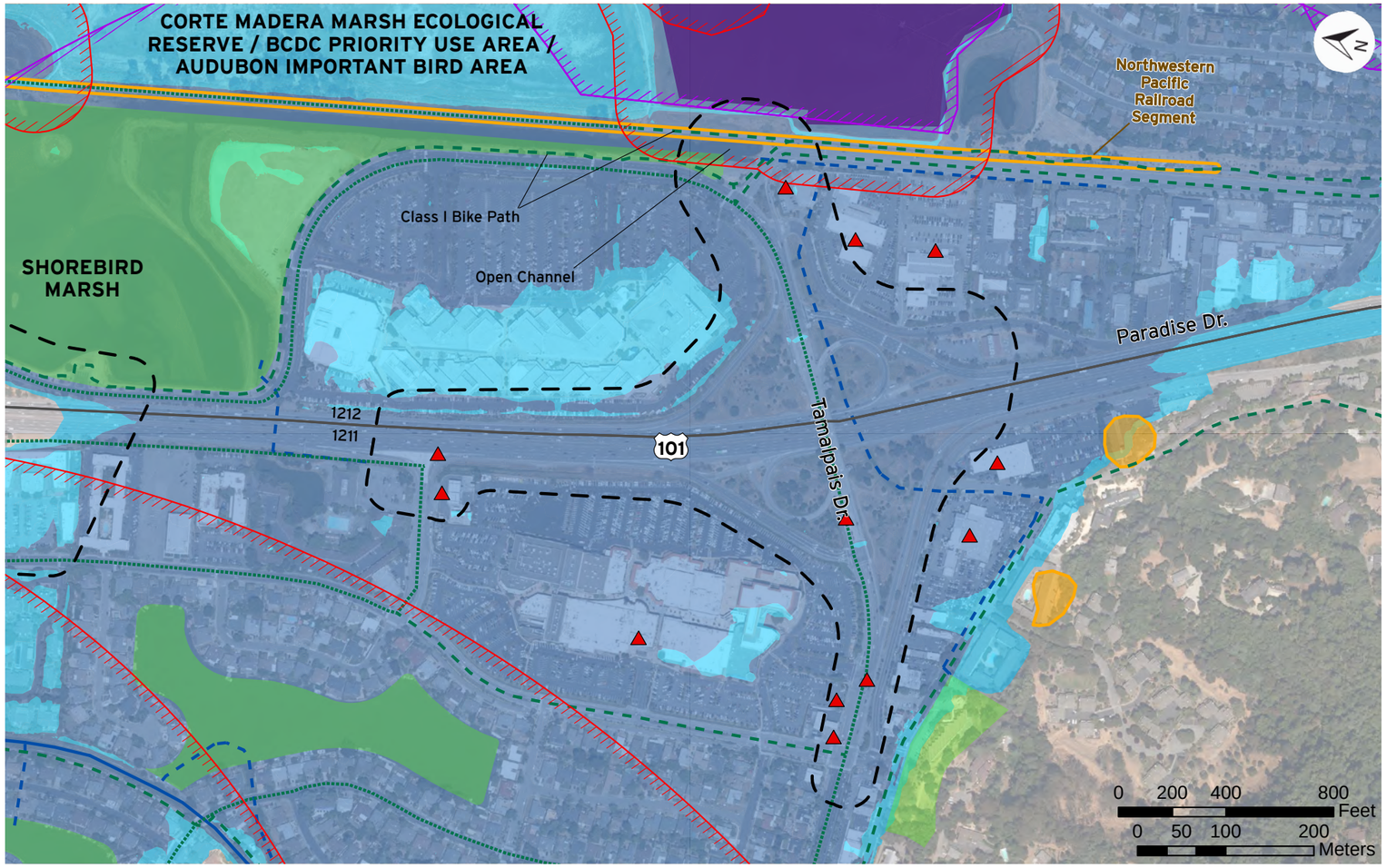
Minority and low-income Environmental Justice communities are likely present in Census Tracts 1211 and 1212. Potential project impacts to these communities would need to be evaluated to determine if disproportionally high and adverse impacts would occur.

Class I bike paths are present along Redwood Highway and San Clemente Drive. These paths are protected Section 4(f) resources. Permanent and/or temporary impacts would need to be fully evaluated under NEPA.

A BCDC permit would be required for interchange improvements within that agency's jurisdiction.

Based on the review of applicable city general plans, there is a low likelihood that interchange improvements would induce growth.

ENVIRONMENTAL CONSTRAINTS



Sources: Golden Gate National Parks Conservancy, MarinMap, CNDDB, ART, NRHP, NHD, GeoTracker, DTSC.

- Environmental Justice communities are in Census Tracts 1211 and 1212.
- There is high sensitivity for buried cultural resources.
- There is moderate to high risk of encountering hazardous waste contamination.
- There is potential for special-status animal species.
- The interchange is currently impacted by king tide flooding and seal level rise would flood by 2030 without storm surge.
- Streams and wetlands are present.

LEGEND

- Study Boundary
- Trail
- Park
- Hazardous Waste
- Existing Bike Facility
- Proposed Bike Facility
- Built Historical Resources
- Census Tract
- Environmentally Sensitive Area
- Fish Barrier
- Special-Status Plant
- Special-Status Animal
- Perennial Stream
- Intermittent Stream/Culvert
- Critical Habitat
- 36" Sea Level Rise (2052 H++)
- 108" Sea Level Rise (2092 H++)

STAKEHOLDER AGENCY AND PUBLIC OUTREACH

Stakeholder Outreach

At the onset of the project, TAM contacted representatives from the Public Works and Planning departments of the jurisdictions along the project corridor; Marin Transit; Golden Gate Bridge, Highway, and Transportation District; and Caltrans to advise them of the project and solicit a point of contact from each agency. Follow-up meetings were scheduled to seek input on issues of concern, to inform the team of planned projects within the vicinity, and to obtain project information relevant to the study. Jurisdictional stakeholders were also apprised of the evaluation process to select a 12th interchange for study and to gain their concurrence.

TAM Executive Committee and Board Briefings

Briefings were also made to the TAM Administration, Projects & Planning Executive Committee, and the TAM Board for selection of the 12th interchange and to establish the project goals and objectives for evaluation purposes.

Online Survey

An online survey was conducted between March 17 and April 16, 2021, to solicit input from Marin County residents and travelers on the project study interchange locations.

The survey was launched to support the development and refinement of the program's goals and objectives and to gather thoughts and priorities on transportation modes and deficiencies related to interchange improvements and access.

The online survey was distributed widely throughout Marin County through the following mechanisms:

- TAM social media feeds via Facebook and Twitter
- TAM project website
- TAM Traveler Newsletter
- TAM electronic mailer/e-blast
- Partner Agencies and Jurisdictions electronic mailer/e-blast – Organizations/Jurisdictions included in the distribution of the survey included California Walk & Bicycle Technical Advisory Committee, (Caltrans), Marin Transit, Golden Gate Transit, SMART Transit, and cities and towns in Marin County
- Community Groups electronic mailer/e-blast – Organizations included in the distribution of the survey were Marin Bicycle Coalition, San Rafael Canal Alliance, and others
- Paid Facebook advertisement targeting Spanish-speaking audiences
- TAM press release

A total of 2,758 participants were engaged with the survey, which was conducted in Spanish and English.

The online survey asked a series of questions mostly in multiple choice format with the last question allowing participants to provide additional input. These questions were:

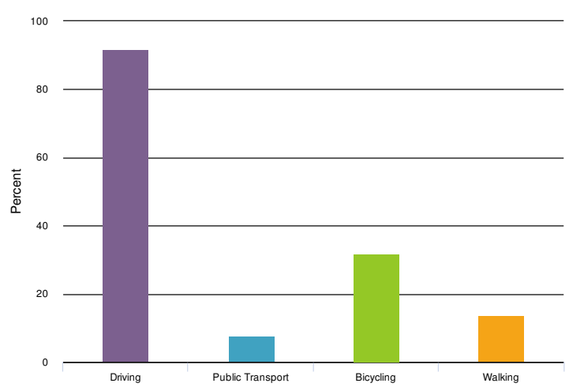
1. How do you normally travel through this interchange? Select up to 2.
   a. Driving
   b. Public Transport
   c. Bicycling
   d. Walking
2. What are the main purposes you use this interchange for? Select up to 2.
   a. Commuting to/from work
   b. School
   c. Shopping
   d. Recreation
   e. Other (please specify)
3. Please rank the following priorities (listed below) for this interchange based on their importance to you. (Priorities were ranked not important, lower importance, no opinion, somewhat important, most important.)
   a. Reduce traffic congestion
   b. Make it easier to drive to and ride from this interchange
   c. Improve the quality and access to bus stops near this interchange
   d. Increase Park and ride capacity
   e. Make it safer to walk around this interchange
   f. Make it safer to bike around this interchange
   g. Improve lighting and security
   h. Improve environmental sustainability (e.g., protection from flooding and sea level rise)
4. Is there anything else you'd like to let us know about traveling on or around this interchange?

Refer to the Online Survey Comments (Attachment K) for a summary of the comments received for the Tamalpais Drive/Paradise Drive Interchange.

	Not Important	Lower Importance	No Opinion	Somewhat Important	Most Important
Reduce traffic congestion	7.5%	12.3%	5.5%	29.6%	45.1%
Make it easier to drive to and from this interchange	13.0%	7.5%	12.6%	35.0%	31.9%
Improve the quality and access to bus stops near this interchange	20.7%	12.4%	29.9%	21.9%	15.1%
Increase Park and Ride capacity	27.0%	15.5%	38.1%	13.5%	6.0%
Make it safer to walk around this interchange	8.7%	9.1%	15.4%	29.6%	37.2%
Make it safer to bike around this interchange	10.7%	8.7%	11.5%	23.4%	45.6%
Improve lighting and security	13.1%	12.7%	27.0%	31.3%	15.9%
Improve environmental sustainability and resiliency (e.g., protection from flooding and sea level rise)	13.0%	11.5%	21.3%	32.8%	21.3%

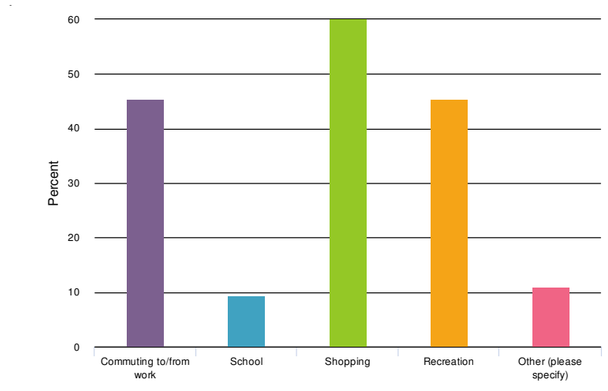
TAMALPAIS DRIVE/PARADISE DRIVE

How do you normally travel through this interchange? Select up to two



Value	Percent	Responses
Driving	91.9%	237
Public Transport	7.8%	20
Bicycling	31.8%	82
Walking	13.6%	35

What are the main purposes you use this interchange for? Select up to two



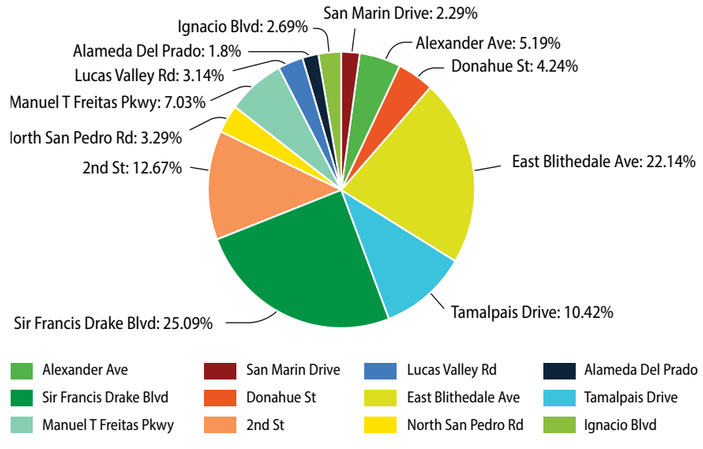
Value	Percent	Responses
Commuting to/from work	45.5%	116
School	9.4%	24
Shopping	60.0%	153
Recreation	45.5%	116
Other (please specify)	11.0%	28

A total of 166 participants provided additional input for the Tamalpais Drive/Paradise Drive interchange. Responses from those surveyed are summarized below:

- Traffic operations (i.e., add auxiliary lane to improve congestion, improve signage, ramp entrance/exit safety, ramp proximity, merging safety, and traffic signal operations)
- Provide safe bicycle and pedestrian facilities
- Improve safety for pedestrian crossing, including a potential pedestrian overpass connecting the two malls
- Increase park and ride capacity
- Improve access to bus stop
- Address flooding
- Address roadway settlement creating grade difference from overpass
- Improve ADA compliance
- Provide auxiliary lane to Sir Francis Drake Blvd from Tamalpais Drive
- Traffic congestion
- Provide separate pedestrian overcrossing (referenced plans developed by Skidmore Owings and Merril)
- Mainline operations (i.e., short weave between Madera Blvd ramps and Tamalpais Drive SB off-ramp)

Corridor Summary

The chart below describes the breakdown by interchange for the 2,758 surveyed. The interchange receiving the most input was Sir Francis Drake Blvd with 25.09%, followed by East Blithedale Ave with 22.14%. The third and fourth ranked interchanges in terms of input received were Second Street with 12.67% and Tamalpais Drive with 10.42%. The remaining interchanges received less than 10% of the total input received.



meta-chart.com

Opportunities and Concept Development

PRELIMINARY INTERCHANGE AREA CONCEPTS

This section describes the improvement opportunities identified for the Tamalpais Drive/Paradise Drive interchange to address operational deficiencies and safety for all users of the interchange and approaching roadways. These improvements will alleviate existing nonstandard conditions by upgrading existing facilities for vehicular traffic, transit users, pedestrians, and bicyclists.

Concepts aim to address safety for all modes and will provide the following upgrades within the project study area:

- Curb ramps upgraded to meet current ADA requirements.
- Existing traffic signals upgraded and interconnected, where beneficial.
- High visibility crosswalks installed at pedestrian crossings.
- Class II and IV bike lanes painted green.
- Existing sidewalks widened to a 6-foot-wide minimum.
- Minimum 11-foot-wide travel lanes provided.

These features may not necessarily be identified on the concept plans, but they have been accounted for in the project's conceptual cost. The concepts developed take into consideration the deficiencies noted in the preceding sections, data collected from field observations, and an understanding of the interchange from discussions with the local jurisdictions and transit agency representatives.

In addition, the concepts take into consideration planned developments and project improvements in the vicinity of the interchange and projected traffic conditions to the year 2040.

For this interchange the study has assessed the following projects that have been studied or are currently under consideration:

- A short-term project currently under development by MTC/Caltrans is to install ramp metering for all remaining locations on Highway 101 in Marin County. This project has been environmentally cleared.
- Caltrans Tamalpais Drive Overcrossing (EA 04-4J860) PA&ED

Concepts have been developed as near- and long-term concepts, which are based primarily on ease of implementation using the following guidelines:

- Near-term projects generally include improvements that may not necessarily be complicated in design, are lower cost, and require a less rigorous project approval process. For example, these improvements can be squaring off curb returns or lane reassignment within the current right of way to provide for a Class II bike lane and sidewalk widening.
- Long-term projects generally include improvements that are more complicated in design, entail significant capital investment, have right of way requirements, and require a more involved project development and approval process. For example, long-term improvements could be a proposal for a bridge widening/replacement or modification to freeway entry and exit points that will require Caltrans and Federal Highway Administration (FHWA) review and approval.

Note that the near-term design features are generally included in the long-term project, allowing for phased implementation to meet funding availability.

The improvement concepts have been shared with the local jurisdictions and transit agency representatives, who have had an opportunity to review and comment on the concepts presented.

Each concept has been assessed for utility impacts, right of way requirements, and potential for environmental impacts. Conceptual cost estimates have been prepared for the near- and long-term concepts.

Examples of Potential Near-Term and Long-Term Improvements

Near-Term	Long-Term
Lane reconfiguration and reassignments	Separated bike/pedestrian paths
Resolve discontinuities in bike lanes	Separate bike/pedestrian overcrossings
Resolve paths of travel and ADA	Structure widening
Signalization and crossing protections	Roundabouts
Tighten curb returns/shorten sidewalks	New interchange configuration
Ramp metering	Significant right of way acquisitions
Access to transit and interconnectivity	Significant environmental impacts

Near-Term Concept

The near-term concept for the Tamalpais Drive / Paradise Drive interchange will propose the current Caltrans Project Study Report (PSR) Tamalpais Drive Overcrossing programmed Alternative 2B forward. Caltrans is currently working on completing the draft environmental document for the Caltrans Tamalpais Overcrossing project (EA 04-4J860) due to release in 2022 for public review and comment.

The Caltrans project description for Alternative 2B is described in the Project Initiation Report dated June 2019.

Alternative 2B proposes to remove the two existing pedestrian spiral walkway ramps and to construct two new pedestrian loop ramps with stairways. This option also proposes to construct a new pedestrian sidewalk along the SB U.S. 101 off-ramp from the intersection at the Tamalpais Drive overcrossing to the existing bus station at the bus bypass. The existing NB U.S. 101 diagonal on-ramp will be realigned to be controlled at a new signalized intersection at Tamalpais Drive overcrossing. The realigned NB on-ramp will include a new bus stop and bus pullout. The existing bus bypass at the NB U.S. 101 off-ramp will be removed.

In addition, the concept also proposes the following improvements:

- Provide Class II bike lanes in the eastbound and westbound direction on Tamalpais Drive / Paradise Drive.
- Restripe the outside left turn lane from the NB diagonal off-ramp to provide a thru movement for bus use only.

This study proposed additional improvements to supplement the Caltrans PSR Alternative 2B option. They are as follows:

- Upgrading existing signal system and interconnecting signals at the intersection of Tamalpais Drive and San Clemente Drive. Alternatively, this study proposes to provide a roundabout option at the intersection of Tamalpais Drive and San Clemente Drive. The roundabout option should be further analyzed and should consider public outreach in future phases to determine feasibility.
- Implement ramp metering improvements as proposed by the Caltrans' Ramp Metering System Installation Project.
- The NB U.S. 101 mainline is proposed to be restriped to provide for four thru lanes and an auxiliary lane for drivers entering the mainline from the NB loop on-ramp. The auxiliary lane will merge drivers with drivers entering from the NB diagonal on-ramp to continue north towards Sir Francis Drake Boulevard. The four thru lanes and auxiliary lane will continue towards Sir Francis Drake Boulevard and conform to existing just before the Wornum Drive Undercrossing.

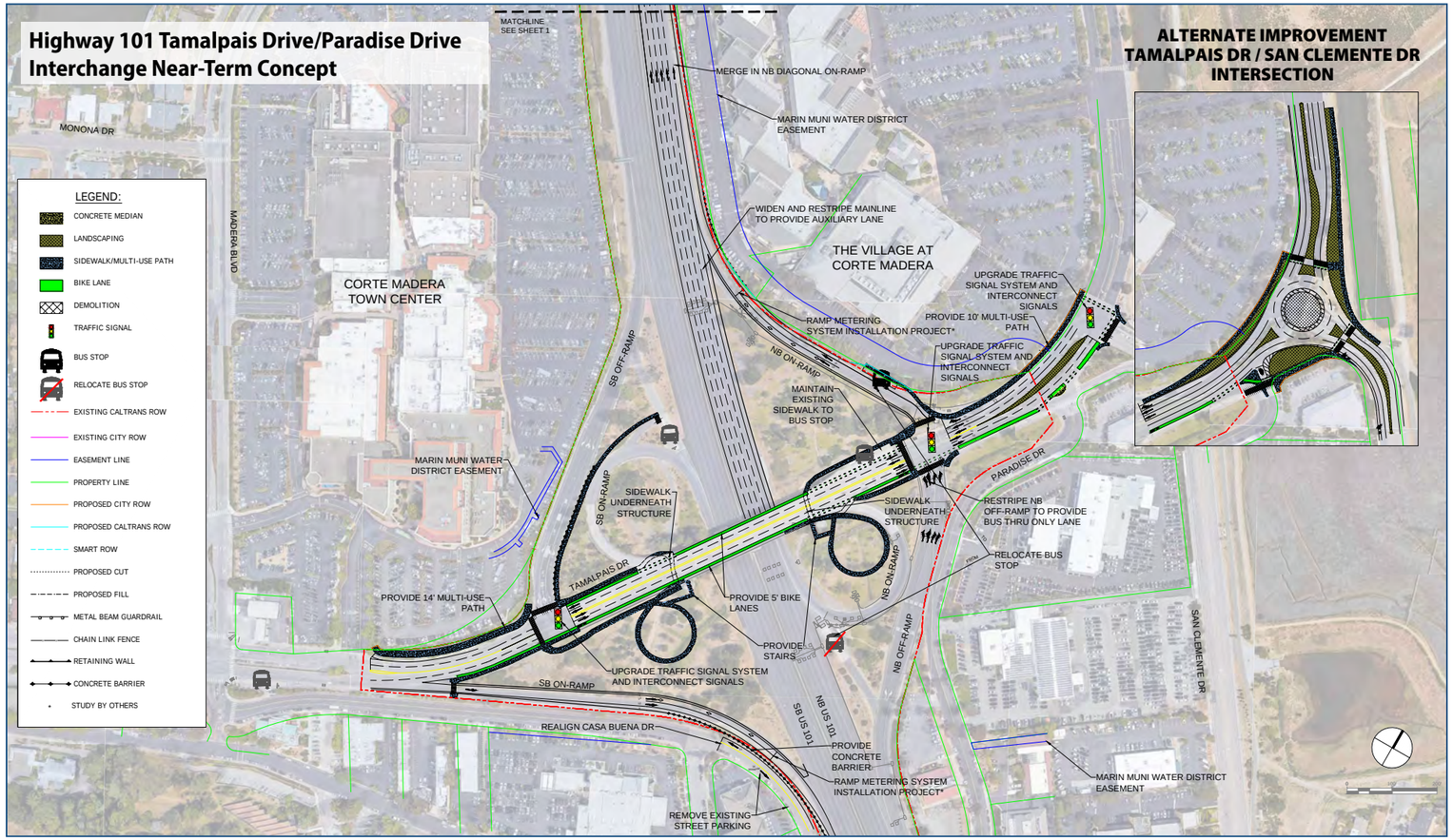


Figure is 1 of 2 exhibits for the near-term concept. Refer to Attachment I for complete exhibits.

Long-Term Concept

The long-term concept for Tamalpais Drive proposes improvements extending and connecting to long-term improvements proposed for the Sir Francis Drake Boulevard interchange.

The Madera Boulevard SB on-ramp is reconfigured to redirect drivers onto a frontage road paralleling SB U.S. 101 and connecting drivers to the SB off-ramp to Tamalpais Drive. Drivers from Madera Boulevard wanting to connect to SB U.S. 101 will connect through at the signalized intersection at Tamalpais Drive to the realigned SB on-ramp. The SB mainline will be restriped to carry four thru lanes plus an auxiliary lane from the preceding interchange. These SB mainline improvements supplement the long-term improvements proposed for the Sir Francis Drake Boulevard interchange. Refer to the Sir Francis Drake Boulevard long-term improvements for continuation.

Eastbound drivers on Tamalpais Drive will be able to access SB U.S. 101 via the realigned SB on-ramp at a signalized intersection making a right-only turn onto the ramp. Westbound drivers will be able to make a left at the signalized intersection to enter the realigned SB on-ramp to access SB U.S. 101 .

A new multi-use structure is proposed on the north side of Tamalpais Drive connecting users in the east and west direction to an at-grade multi-use path extending between Madera Boulevard and San Clement Drive. The multi-use structure will go over the mainline providing standard 18.5' vertical clearance and touching down on either side of the freeway to conform to existing ground. The multi-use structure will comply with current ADA requirements. With the addition of this structure, the westbound Class II bike lane is not considered for the long-term concept.

The SB bus stop will be relocated as part of the long-term concept. The SB bus stop is proposed to be relocated to the realigned SB off-ramp and within walking distance to Tamalpais Drive. The NB bus stop is relocated and will be similar to the near-term concept. All other bus stop locations within the interchange's study area remain in their current locations.

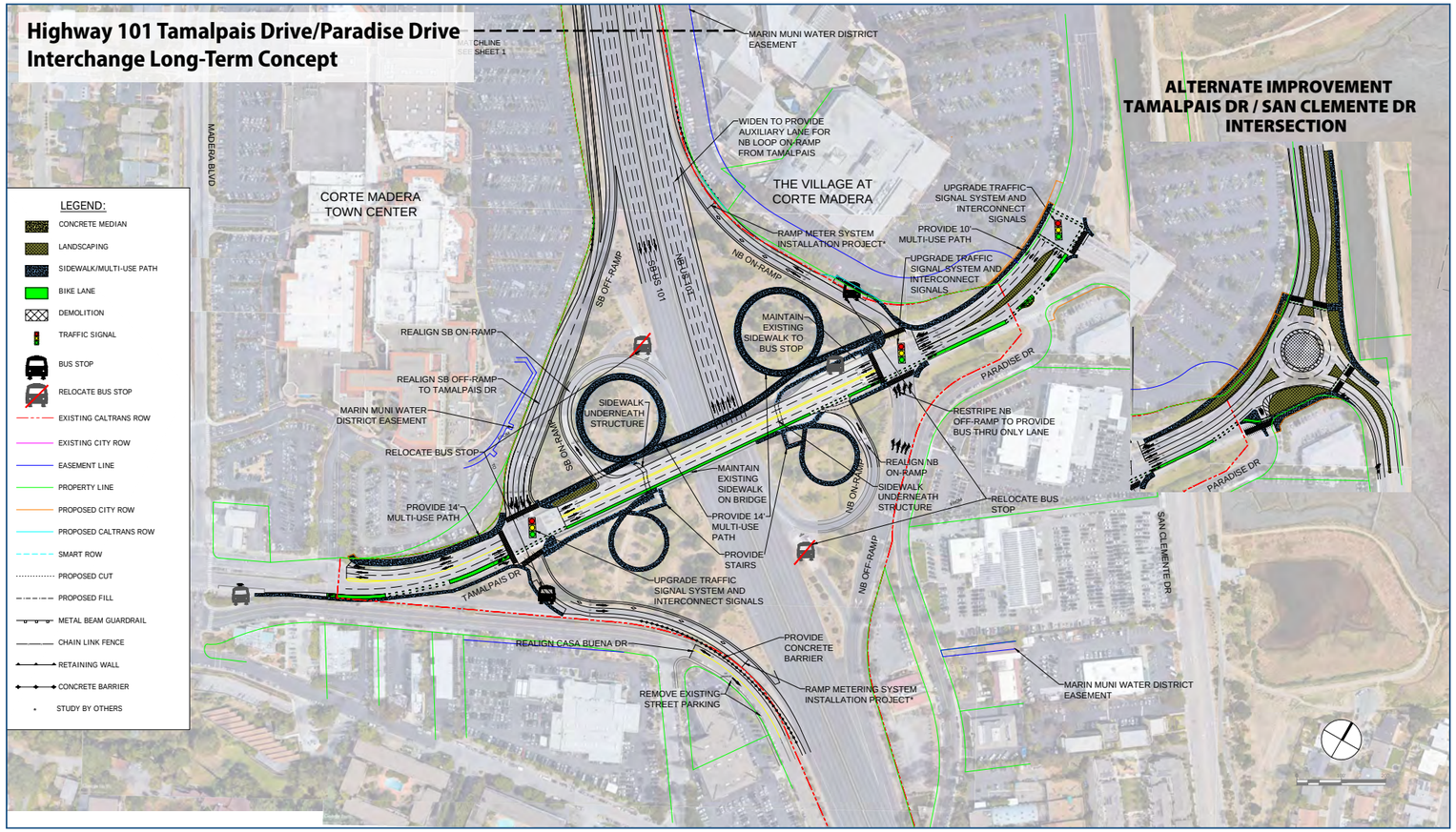


Figure is 1 of 2 exhibits for the near-term concept. Refer to Attachment I for complete exhibits.

Utility Requirements

Attachment C provides the utility conflict matrix summarizing the impacts for the near-term and long-term concepts. A recommended disposition is provided for each utility for this phase of work. It is recommended that these utilities be further evaluated in subsequent design phases as the design is further refined.

A summary of the major utilities identified and affected by the concepts are noted below.

Utility impacts common to the near- and long-term concepts are:

- Within the vicinity of Paradise Drive, a 4" gas, 12" water are identified to be protected in place.
- Located near the west side conform on Tamalpais drive, a 6" gas line and 12 kilovolt (kV) electrical line are identified to be protected in place.
- Near the SB ramps, a 16" gas line is identified to be protected in place.

Utility impacts identified for only the long-term concepts are:

- Near San Clemente Drive, a 12 kV electrical line is identified to be protected in place.
- Near the Madera Blvd ramp, a 16" gas line is identified to be protected in place.

Right of Way Requirements

The project collected GIS right of way information from MarinMap, Caltrans and right of way record maps and assessor's map to assess the right of way requirements for the alternatives developed. The findings are summarized in Attachment D listing the right of way requirements for the near-and long-term concepts. The right of way requirements will be further refined in subsequent design phases as the design is further refined.

The near- and long-term concepts will require similar additional right of way requirements to construct the proposed elements. Along the north side of Tamalpais Drive, additional right of way is needed on the on the far west side of the project study area and near the intersection of San Clemente Drive and Tamalpais Drive. Along the northbound diagonal on-ramp, additional right of way is needed on the east side to widen the ramp.

Environmental Considerations

Benefit to Environmental Justice Communities

Based on Census data, both minority and low-income Environmental Justice communities are present within the study area. Both the near- and long-term improvements include multimodal components that would offer alternative modes of transportation and improve connectivity across U.S. 101, decreasing its barrier effect. In addition, improved connections to study area bus stops would improve access to transit services.

Ability to Gain Project Approvals

Substantial soil disturbance is proposed under both the near- and long-term improvements. Because the project study area is highly sensitive for buried cultural resources, disturbances could impact unknown prehistoric or historic archaeological resources. In addition, one built environmental cultural resource (Northwestern Pacific Roadway Segment) is documented near Redwood Highway and could be directly (or indirectly) impacted by both sets of improvements. Cultural resource regulatory approvals may be required.

Excavation within the interchange and along Redwood Highway could encounter groundwater, which has an elevated risk of containing hazardous waste contamination. Any encountered contamination which would need to be properly treated and disposed of.

Habitat for special-status plant and animal species and waterways would likely be impacted under both the near- and long-term improvements. If impacted, regulatory agency coordination, permitting, and potentially mitigation would be required.

The project study area is currently threatened by SLR. Both near- and long-term improvements would need to evaluate SLR adaptation measures to protect the proposed improvements. Adaptation measures could increase cost and have secondary environmental resource impacts. In addition, a BCDC permit would be required under both sets of improvements. This permit has a long-lead time and would likely require evaluation of SLR adaptation measures.

Both the near- and long-term improvements would modify an existing Class 1 bike path. Permanent and temporary modifications of this Section 4(f) resource, including closures during construction, would need to be coordinated through the official(s) with jurisdiction.

Cost Estimate

The project cost for the near- and long-term improvements are summarized below:

		Escalated Total Project Cost
1	Tamalpais near-term	$29,500,000
2	Tamalpais near-term (w/ Roundabout Option)	$44,500,000
3	Tamalpais long-term	$81,000,000
4	Tamalpais long-term (w/ Roundabout Option)	$85,050,000

The cost of the near-term Tamalpais Drive concept deviates from Caltrans' PSR (2019) based on this study's findings and assumptions for the project:

- This study estimated cost of the new pedestrian structure to be $500/square feet.
- The near-term concept deviates from Caltrans PSR's Alternative 2B option with additional design features. These design deviations are additional costs to the project.
- This study also takes into consideration SLR adaptation measures.
- This study assumes a higher cost for hazardous waste.

The cost for the roundabout option for the near-term Tamalpais Drive alternative will impact cost as it will require additional right of way take and have greater environmental impacts compared to a signalized intersection.

The escalated project cost assumes the project, for near-and long-term improvements, will start construction in 5 years with the estimated start to be April 2026 at an annual escalation rate of 3.5%.

The project cost is conceptual and will be further refined in subsequent phases.

Refer to Attachment B for backup support for the conceptual cost.

Funding

The Highway 101 Interchange and Approaching Roadway Study is funded through Measure AA – the reauthorized ½-cent transportation sales tax that was approved by Marin voters in 2018. The funding will be used to leverage regional, state, and federal funds for a program of improvements that will be determined through the TAM Board in coordination with Caltrans and the local jurisdictional stakeholders.

Regional and state transportation funding opportunities increased with passage of the Bay Area's Regional Measure 3 in June 2018 and California's Senate Bill 1 (SB1) in 2017. Federal funding is anticipated to play a larger role with recent passage of the Infrastructure Investment and Jobs Act (IIJA) in 2021. In addition, the Highway 101 interchange improvement projects are anticipated to be competitive to a number of grant programs that promote regional and state goals for sustainability and equity, access and mobility, congestion management, clean air, and climate action, such as the Active Transportation Program (ATP), the Transportation Fund for Clean Air (TFCA), and the Climate Action Plan for Transportation Infrastructure (CAPTI).

This interchange may also be eligible for funds through local traffic mitigation impact fees that are levied on adjacent planned land use developments.

PROJECT IMPLEMENTATION

As part of this study, each of the 12 interchanges will undergo evaluation and prioritization with the goal of identifying the most appropriate projects to move forward into project development.

It is anticipated that the improvements proposed under both the near- and long-term concepts would follow the typical three-phase Caltrans project development process for approval of work within the state's right of way.

- PID (Project Study Report-Project Development Support)
- PA&ED
- PS&E

Project Initiation

The first step in the process is for funding to be obtained for preparation of the PID for the selected project(s). This would likely be sponsored by TAM under Measure AA – the reauthorized ½-cent transportation sales tax that was approved by Marin voters in 2018 – or with assistance from other local and regional funding sources.

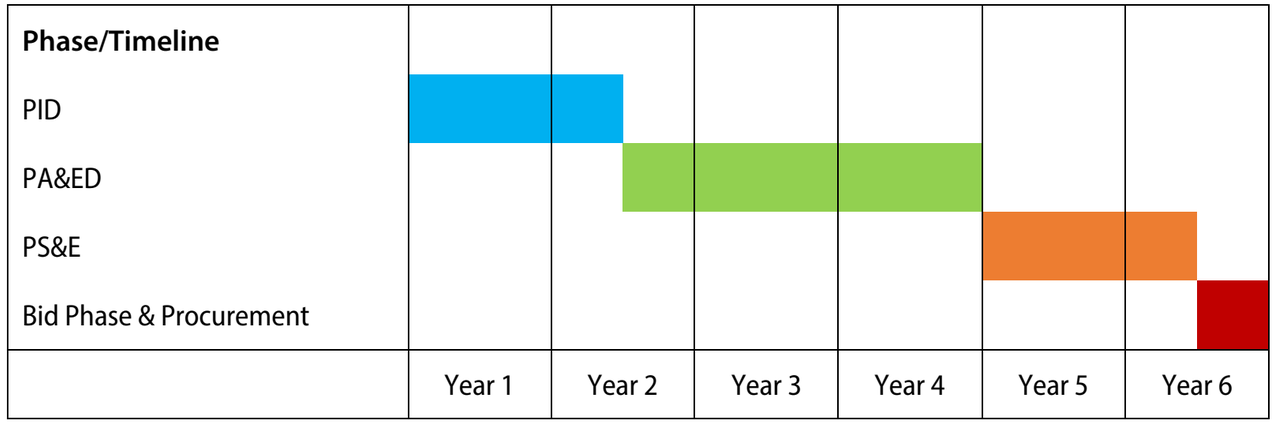
The document would refine and scope the project, or project alternatives, and define the level of effort needed for the environmental phase, including the level of environmental document anticipated and what supporting technical studies would be required. Coordination is required with MTC to ensure the project is entered into the current RTP (Plan Bay Area 2050) and with Caltrans to ensure they have appropriate resources scheduled to support the project.

Phased Implementation

Elements of the project could be implemented in a phased manner by either TAM, the City of Larkspur, or the Town of Corte Madera to meet funding opportunities. For example, improvements outside of Caltrans right of way could be implemented without entailing Caltrans project development process; or smaller scale improvements could progress through the Caltrans encroachment permit process, once environmental clearance was obtained. Additionally, elements of the project could be incorporated into projects sponsored by Caltrans, such as the long-range ramp-squaring project identified by the System Planning Group.

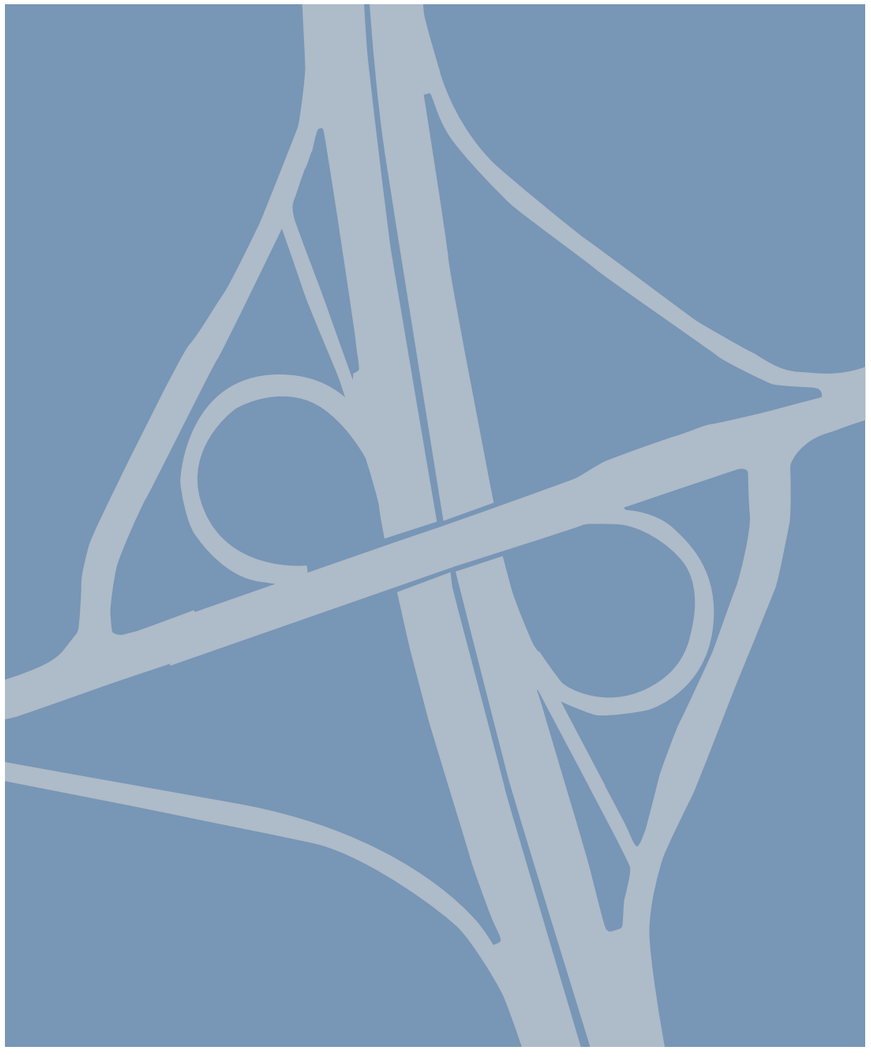
Timeline

The following chart provides a representative timeline for project development.



Next Steps

1. TAM Board to select a projects(s) to move forward into project development in consultation with agency stakeholders.
2. TAM and the local jurisdiction will coordinate with MTC to have the project included in the current RTP.
3. TAM and the local jurisdiction will secure funding for the PID and will enter into a cooperative agreement with Caltrans for project development.
4. TAM will work with the local jurisdiction and a Project Development Team to prepare the PID for Caltrans approval to proceed to the PA&ED Phase for a locally funded project. Alternatively, TAM can work with the local jurisdiction and a Project Development Team to identify design features that can be implemented through the Caltrans encroachment permit process or on the approaching roadways outside of Caltrans' right of way.
5. TAM and the local jurisdiction will seek funding for subsequent phases of the project. If there is insufficient funding available, it may be possible to phase the improvements.



TAMALPAIS DRIVE

ATTACHMENTS

A. Project Base Map

B. Cost Estimates (Near-Term and Long-Term)

C. Utility Impact Matrix

D. Right of Way Requirement Matrix

E. Existing and 2040 Traffic Volumes

F. Collision Data

G. Transit Ridership Data

H. Synchro Output

I. Preliminary Conceptual Plans

J. Deficiency Matrix

K. Online Survey Comments

L. Existing FEMA Map

A. Project Base Map

LEGEND:

- SS — EXISTING SANITARY SEWER
- E — EXISTING ELECTRICAL
- W — EXISTING WATER
- G — EXISTING GAS
- OH — EXISTING OVERHEAD ELECTRICAL
- FO — EXISTING FIBER OPTIC CABLE
- EXISTING CALTRANS ROW
- EXISTING CITY ROW
- EXISTING SMART ROW
- EXISTING DRAINAGE
- EASEMENT LINE

Project Base Map

FEBRUARY 2022

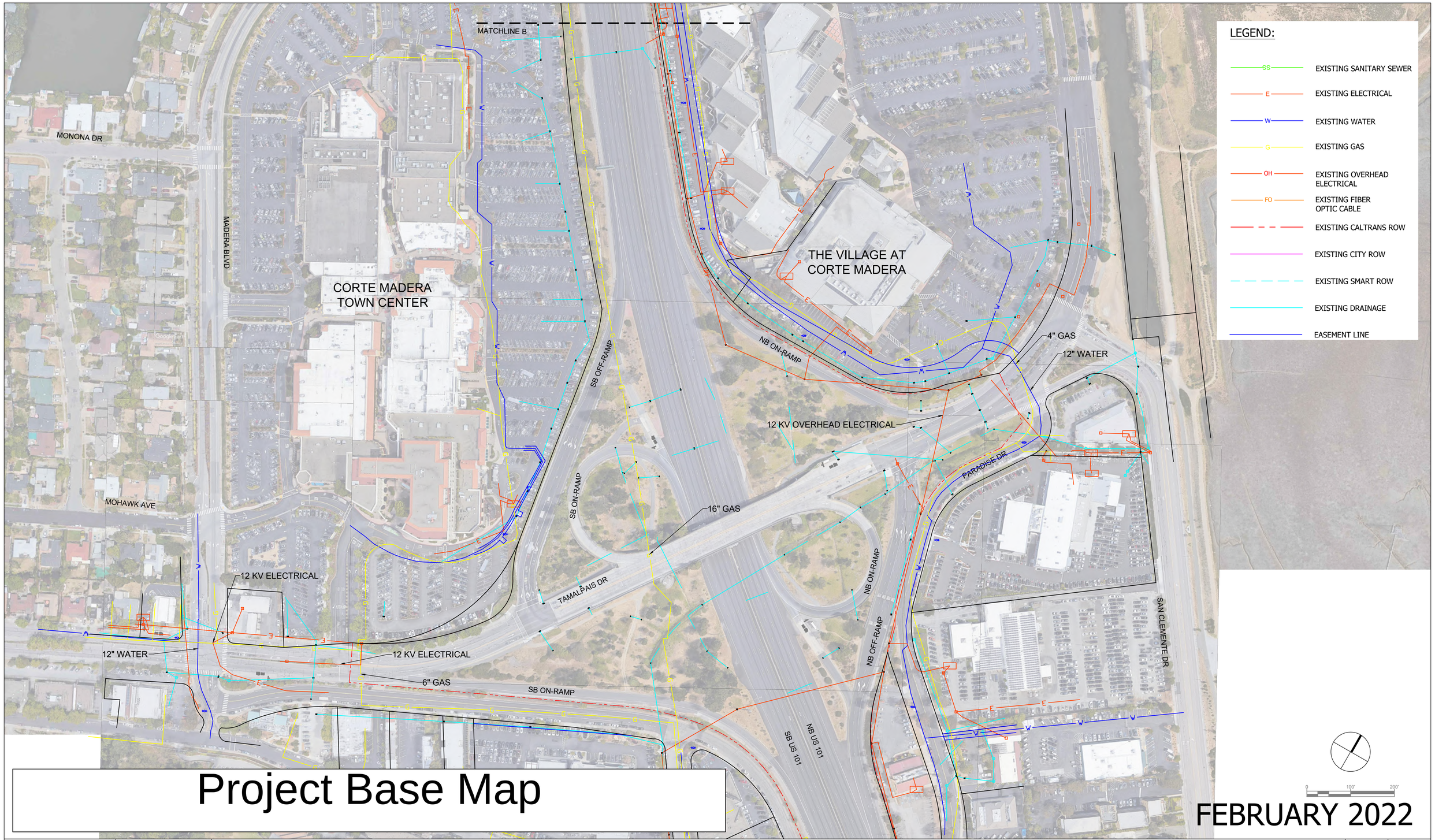
HNTB
1111 BROADWAY, 9TH FLOOR
OAKLAND, CA 94607
(510) 208-4599

Parisi TRANSPORTATION CONSULTING
1750 BRIDGEWAY, SUITE B208
SAUSILITO, CA 94965
(415) 649-6000

TRANSPORTATION AUTHORITY OF MARIN
HIGHWAY 101 INTERCHANGE IMPLEMENTATION STUDY
TAMALPAIS DRIVE / PARADISE DRIVE

TAM Transportation Authority of Marin

DATE:	SCALE: 1"=100'
FILENAME:	
PROJECT:	
SHEET NO.	



Project Base Map

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HIGHWAY 101 INTERCHANGE IMPLEMENTATION STUDY
TAMALPAIS DRIVE / PARADISE DRIVE

TAM Transportation Authority of Marin

DATE:	SCALE: 1"=100'
FILENAME:	
PROJECT:	
SHEET NO.	

B. Cost Estimates (Near-Term and Long-Term)

Project Cost Estimate

Project Owner:	Transportation Authority of Marin
Project Description:	Hwy 101 Interchange and Approach Roadway Improvement Program
Location:	Tamalpais Drive / Paradise Drive - Near Term Improvements
Type of Estimate:	Conceptual Level Cost Estimate
Prepared by:	HNTB

SUMMARY OF PROJECT OUTLAY COSTS

		Current Year Cost	Escalated Cost
I	ROADWAY	$ 11,187,577	$ 13,060,735
II	STRUCTURES	$ 7,150,000	$ 8,347,138
III	RIGHT OF WAY	$ 997,589	$ 1,164,617
	TOTAL CAPITAL OUTLAY COST	**$ 19,335,165**	**$ 22,572,490**
IV	PRELIMINARY ENGINEERING/ENVIRONMENTAL	$ 1,467,006	$ 1,571,494
V	DESIGN ENGINEERING	$ 1,833,758	$ 1,897,939
VI	DESIGN SERVICES DURING CONSTRUCTION	$ 550,127	$ 550,127
VII	CONSTRUCTION MANAGEMENT	$ 2,750,637	$ 2,946,551
	TOTAL SUPPORT COST	**$ 6,601,528**	**$ 6,966,111**
	DIRECT PROJECT COST	**$ 25,936,693**	**$ 29,538,601**
VIII	AGENCY MANAGEMENT	$ 2,750,637	$ 3,622,063
	TOTAL PROJECT COST	**$ 28,687,330**	**$ 33,160,664**

Project Cost Estimate

Project Owner: Transporation Authority of Marin
Project Description: Hwy 101 Interchange and Approach Roadway Improvement Program
Location: Tamalpais Drive / Paradise Drive - Near Term Improvements

Item code	Description	Unit	Quantity	Unit Price ($)	Cost	
I. Roadway						
01 Earthwork						
1.1	Clearing & Grubbing	LS	1	50,000.00	$ 50,000	
1.2	Roadway Excavation	CY	0	65.00	$ -	
				Subtotal for Item 01 Earthwork	**$ 50,000**	
02 Pavement Structural Section						
2.1	Remove Curb and Gutter	LF	1,400	25.00	$ 35,000	
2.2	Remove Concrete Sidewalk	SF	22,000	5.00	$ 110,000	
2.3	Remove Asphalt Concrete Pavement	SF	0	5.00	$ -	
2.4	Remove Concrete Island	SF	0	10.00	$ -	
2.5	Remove Concrete Slope Paving	SF	0	50.00	$ -	
2.6	Pavement Section	SF	33,700	11.00	$ 370,700	
2.7	Microsurfacing	SF	280,000	1.00	$ 280,000	
2.8	Curb and Gutter	LF	2,000	65.00	$ 130,000	
2.9	Sidewalk / Multi-Use Path	SF	29,000	5.00	$ 145,000	
2.10	Concrete Island/Median	SF	200	25.00	$ 5,000	
				Subtotal for Item 02 Pavement Structural Section	**$ 1,075,700**	
03 Drainage						
3.1	Drainage (assume % of Roadway Cost Items 1 through 2)	1%			$ 11,257.00	
				Subtotal of Item 03 Drainage	**$ 11,257**	
04 Specialty Items						
4.1	Metal Beam Guard Railing	LF	0	65.00	$ -	
4.2	ADA Curb Ramps	EA	16	4,700.00	$ 75,200	
4.3	Concrete Barrier	LF	900	300.00	$ 270,000	
4.4	Retaining Wall (Caltrans Type 1) (H=4'-10')	SQFT	0	160.00	$ -	
4.5	Retaining Wall (Caltrans Type 1) (H=10'-20')	SQFT	0	190.00	$ -	
4.6	Remove Metal Beam Guard Railing	LF	0	20.00	$ -	
4.7	Remove Concrete Barrier	LF	0	50.00	$ -	
				Subtotal for Items 04 Specialty Items	**$ 345,200**	
05 Environmental						
5.1	Landscape and Irrigation	SF	3,000	35.00	$ 105,000	
5.2	Additional Environmental Needs	LS	1	1,950,000.00	$ 1,950,000	
5.3	Environmental Mitigation (assume % of Total Cost of Items 1 through 5.2)	20%			$ 707,431	
				Subtotal for Item 05 Environmental	**$ 2,762,431**	
06 Traffic						
06a Traffic Items						
6a.1	Traffic Signal Upgrade	EA	3	350,000.00	$ 1,050,000	
6a.2	Pedestrian Hybrid Beacon (PHB)	EA	1	175,000.00	$ 175,000	
6a.3	Rapid Reflective Flashing Beacons (one pair)	EA	0	25,000.00	$ -	
6a.4	Traffic Signal Priority	EA	1	150,000.00	$ 150,000	
6a.5	Traffic Operations Systems (Ramp Metering)	EA	0	350,000.00	$ -	
6a.6	Traffic Signal (New)	EA	0	500,000.00	$ -	
				Subtotal for Item 06a Traffic Items	**$ 1,375,000**	
					Subtotal Sections 1 through 6a	**$ 5,619,588**
06b Additional Traffic Items						
6b.1	High Visibility Crosswalk (cost by width of roadway)	LF	410	36.00	$ 14,760	
6b.2	Highway Signage Structure	EA	0	1,000,000.00	$ -	
6b.3	Signing and Striping	LS	1	200,000.00	$ 200,000	
6b.4	Remove Signing and Striping	1%			$ 56,196	
6b.5	Roadway Lighting	5%			$ 280,979	
6b.6	Stage Construction and Traffic Handling	LS	1	1,000,000.00	$ 1,000,000	
				Subtotal for Item 06b Traffic Items	**$ 1,551,935**	
					Subtotal Sections 1 through 6	**$ 7,171,524**
07 Minor Items						
7.1	American with Disabilities Act Items	1%			$ 71,715.24	
7.2	Bike Path Items	1%			$ 71,715	
7.3	Other Minor Items	8%			$ 573,722	
				Subtotal of Item 07 Minor Items	**$ 717,152**	
08 Roadway Mobilization						
8.1	Roadway Mobilization	10%			$ 717,152	
				Subtotal for Item 08 Roadway Mobilization	**$ 717,152**	
09 Roadway Contingency						
9.1	Roadway Contingency (assume % of total cost of Section Items 01-08)	30%			$ 2,581,749	
				Subtotal for Item 09 Roadway Contingency	**$ 2,581,749**	
					Subtotal for Items 1-9 (Roadway)	**$ 11,187,577**

Project Cost Estimate

Project Owner: Transporation Authority of Marin
Project Description: Hwy 101 Interchange and Approach Roadway Improvement Program
Location: Tamalpais Drive / Paradise Drive - Near Term Improvements

Item code	Description	Unit	Quantity	Unit Price ($)	Cost	
II. Structures						
10 Structures						
10.1	Bridge Demolition	SF	0	60.00	$ -	
10.2	New Structure (bike/ped)	SF	11,000	500.00	$ 5,500,000	
10.3	Bridge Widening	SF	0	600.00	$ -	
10.4	Pedstrian Overcrossing (including ramp)	SF	0	550.00	$ -	
10.5	Pedestrian Undercrossing (including ramp)	SF	0	600.00	$ -	
10.6	Tunnel	SF	0	1,200.00	$ -	
10.7	Structure modification	SF	0	700.00	$ -	
			Subtotal for Item 10 Structures		**$ 5,500,000**	
10.8	Structure Contingency	30%			$ 1,650,000.00	
					Subtotal for Structures	**$ 7,150,000**
	TOTAL CONSTRUCTION COST (TCC) - SUM OF ITEMS 1-10 (ROADWAY AND STRUCTURES)					**$ 18,337,577**
III. Right of Way						
III.1	Right of Way Acquisition	SF	4,600	65.00	$ 299,000	
III.2	TCE	SF	19,000	15.00	$ 285,000	
III.3	Utility Relocation (assume % of total cost of Section 01-10)	1%			$ 183,376	
			Subtotal for Item 11 Right of Way		**$ 767,376**	
III.4	Right of Way Contingency	30%			$ 230,212.73	
					Subtotal for Right of Way	**$ 997,589**
Engineering and Management Costs						
			TCC	**Duration (Year)**	**Unescalatd Risk Loaded**	**Escalated (per year of TCC)**
						(escalation rate = 3.5%)
IV	**Preliminary Engineering/Environmental**	8%	***$ 18,337,577***	*2*	$ 1,467,006.16	$ 1,571,493.67
V	**Design Engineering**	10%	***$ 18,337,577***	*1*	$ 1,833,757.70	$ 1,897,939.22
VI	**Design Services During Construction**	3%	***$ 18,337,577***	*2*	$ 550,127.31	$ 550,127.31
VII	**Construction Management**	15%	***$ 18,337,577***	*2*	$ 2,750,636.55	$ 2,946,550.63
VIII	**Agency Management**	15%	***$ 18,337,577***	*8*	$ 2,750,636.55	$ 3,622,063.06
Escalation						
		Value				
	Date of Estimate (Month/Year)	11/4/2021				
	Anticipated Project Inititation Document Start (1-year dura	April 2022				
	Anticipated year to begin construction (Month Year)	April 2026				
	Estimated construction duration (in years)	2				
	Years of Escalation (to start of construction)	4.5				
	Annual Escalation Rate, percentage	3.5%				
	Total Escalation	117%				
					Current Year Cost	**Escalated**
			Escalated Roadway Cost		**$ 11,187,577**	**$ 13,060,735**
			Escalated Structure Cost		**$ 7,150,000**	**$ 8,347,138**
			Escalated Right of Way Cost		**$ 997,589**	**$ 1,164,617**

Project Cost Estimate

Project Owner: Transportation Authority of Marin
Project Description: Hwy 101 Interchange and Approach Roadway Improvement Program
Location: Tamalpais Drive / Paradise Drive - Near -Term Improvements (Roundabout Option)
Type of Estimate: Conceptual Level Cost Estimate
Prepared by: HNTB

SUMMARY OF PROJECT OUTLAY COSTS

		Current Year Cost	Escalated Cost
I	ROADWAY	$ 24,184,374	$ 28,233,610
II	STRUCTURES	$ 7,150,000	$ 8,347,138
III	RIGHT OF WAY	$ 1,474,972	$ 1,721,929
	TOTAL CAPITAL OUTLAY COST	**$ 32,809,345**	**$ 38,302,678**
IV	PRELIMINARY ENGINEERING/ENVIRONMENTAL	$ 2,506,750	$ 2,685,293
V	DESIGN ENGINEERING	$ 3,133,437	$ 3,243,108
VI	DESIGN SERVICES DURING CONSTRUCTION	$ 940,031	$ 940,031
VII	CONSTRUCTION MANAGEMENT	$ 4,700,156	$ 5,034,925
	TOTAL SUPPORT COST	**$ 11,280,374**	**$ 11,903,357**
	DIRECT PROJECT COST	**$ 44,089,720**	**$ 50,206,035**
VIII	AGENCY MANAGEMENT	$ 4,700,156	$ 6,189,208
	TOTAL PROJECT COST	**$ 48,789,876**	**$ 56,395,243**

Project Cost Estimate

Project Owner: Transporation Authority of Marin
Project Description: Hwy 101 Interchange and Approach Roadway Improvement Program
Location: Tamalpais Drive / Paradise Drive - Near Term Improvements (Roundabout Option)

Item code	Description	Unit	Quantity	Unit Price ($)	Cost	
I. Roadway						
01 Earthwork						
1.1	Clearing & Grubbing	LS	1	50,000.00	$ 50,000	
1.2	Roadway Excavation	CY	0	65.00	$ -	
				Subtotal for Item 01 Earthwork	**$ 50,000**	
02 Pavement Structural Section						
2.1	Remove Curb and Gutter	LF	1,900	25.00	$ 47,500	
2.2	Remove Concrete Sidewalk	SF	27,430	5.00	$ 137,150	
2.3	Remove Asphalt Concrete Pavement	SF	24,000	5.00	$ 120,000	
2.4	Remove Concrete Island	SF	0	10.00	$ -	
2.5	Remove Concrete Slope Paving	SF	0	50.00	$ -	
2.6	Pavement Section	SF	52,550	11.00	$ 578,050	
2.7	Microsurfacing	SF	260,000	1.00	$ 260,000	
2.8	Curb and Gutter	LF	3,500	65.00	$ 227,500	
2.9	Sidewalk / Multi-Use Path	SF	35,900	5.00	$ 179,500	
2.10	Concrete Island/Median	SF	700	25.00	$ 17,500	
				Subtotal for Item 02 Pavement Structural Section	**$ 1,567,200**	
03 Drainage						
3.1	Drainage (assume % of Roadway Cost Items 1 through 2)		1%		$ 16,172.00	
				Subtotal of Item 03 Drainage	**$ 16,172**	
04 Specialty Items						
4.1	Metal Beam Guard Railing	LF	0	65.00	$ -	
4.2	ADA Curb Ramps	EA	16	4,700.00	$ 75,200	
4.3	Concrete Barrier	LF	900	300.00	$ 270,000	
4.4	Retaining Wall (Caltrans Type 1) (H=4'-10')	SQFT	0	160.00	$ -	
4.5	Retaining Wall (Caltrans Type 1) (H=10'-20')	SQFT	0	190.00	$ -	
4.6	Remove Metal Beam Guard Railing	LF	0	20.00	$ -	
4.7	Remove Concrete Barrier	LF	0	50.00	$ -	
				Subtotal for Items 04 Specialty Items	**$ 345,200**	
05 Environmental						
5.1	Landscape and Irrigation	SF	30,000	35.00	$ 1,050,000	
5.2	Additional Environmental Needs	LS	1	6,550,000.00	$ 6,550,000	
5.3	Public Art (at roundabout)	LS	1	800,000.00	$ 800,000	
5.4	Environmental Mitigation (assume % of Total Cost of Items 1 through 5.2)		20%		$ 2,075,714	
				Subtotal for Item 05 Environmental	**$ 10,475,714**	
06 Traffic						
06a Traffic Items						
6a.1	Traffic Signal Upgrade	EA	2	350,000.00	$ 700,000	
6a.2	Pedestrian Hybrid Beacon (PHB)	EA	1	175,000.00	$ 175,000	
6a.3	Rapid Reflective Flashing Beacons (one pair)	EA	0	25,000.00	$ -	
6a.4	Traffic Signal Priority	EA	1	150,000.00	$ 150,000	
6a.5	Traffic Operations Systems (Ramp Metering)	EA	0	350,000.00	$ -	
6a.6	Traffic Signal (New)	EA	0	500,000.00	$ -	
				Subtotal for Item 06a Traffic Items	**$ 1,025,000**	
					Subtotal Sections 1 through 6a	**$ 13,479,286**
06b Additional Traffic Items						
6b.1	High Visibility Crosswalk (cost by width of roadway)	LF	410	36.00	$ 14,760	
6b.2	Highway Signage Structure	EA	0	1,000,000.00	$ -	
6b.3	Signing and Striping	LS	1	200,000.00	$ 200,000	
6b.4	Remove Signing and Striping		1%		$ 134,793	
6b.5	Roadway Lighting		5%		$ 673,964	
6b.6	Stage Construction and Traffic Handling	LS	1	1,000,000.00	$ 1,000,000	
				Subtotal for Item 06b Traffic Items	**$ 2,023,517**	
					Subtotal Sections 1 through 6	**$ 15,502,804**
07 Minor Items						
7.1	American with Disabilities Act Items		1%		$ 155,028.04	
7.2	Bike Path Items		1%		$ 155,028	
7.3	Other Minor Items		8%		$ 1,240,224	
				Subtotal of Item 07 Minor Items	**$ 1,550,280**	
08 Roadway Mobilization						
8.1	Roadway Mobilization		10%		$ 1,550,280	
				Subtotal for Item 08 Roadway Mobilization	**$ 1,550,280**	
09 Roadway Contingency						
9.1	Roadway Contingency (assume % of total cost of Section Items 01-08)		30%		$ 5,581,009	
				Subtotal for Item 09 Roadway Contingency	**$ 5,581,009**	
					Subtotal for Items 1-9 (Roadway)	**$ 24,184,374**

Project Cost Estimate

Project Owner: Transporation Authority of Marin
Project Description: Hwy 101 Interchange and Approach Roadway Improvement Program
Location: Tamalpais Drive / Paradise Drive - Near Term Improvements (Roundabout Option)

Item code	Description	Unit	Quantity	Unit Price ($)	Cost	
II. Structures						
10 Structures						
10.1	Bridge Demolition	SF	0	60.00	$ -	
10.2	New Bridge Structure	SF	11,000	500.00	$ 5,500,000	
10.3	Bridge Widening	SF	0	600.00	$ -	
10.4	Pedstrian Overcrossing (including ramp)	SF	0	550.00	$ -	
10.5	Pedestrian Undercrossing (including ramp)	SF	0	600.00	$ -	
10.6	Tunnel	SF	0	1,200.00	$ -	
10.7	Structure modification	SF	0	700.00	$ -	
			Subtotal for Item 10 Structures		**$ 5,500,000**	
10.8	Structure Contingency		30%		$ 1,650,000.00	
					Subtotal for Structures	**$ 7,150,000**
	TOTAL CONSTRUCTION COST (TCC) - SUM OF ITEMS 1-10 (ROADWAY AND STRUCTURES)					**$ 31,334,374**
III. Right of Way						
III.1	Right of Way Acquisition	SF	8,250	65.00	$ 536,250	
III.2	TCE	SF	19,000	15.00	$ 285,000	
III.3	Utility Relocation (assume % of total cost of Section 01-10)		1%		$ 313,344	
			Subtotal for Item 11 Right of Way		**$ 1,134,594**	
III.4	Right of Way Contingency		30%		$ 340,378.12	
					Subtotal for Right of Way	**$ 1,474,972**
Engineering and Management Costs						
			TCC	**Duration (Year)**	**Unescalatd Risk Loaded**	**Escalated (per year of TCC)**
						(escalation rate = 3.5%)
IV	**Preliminary Engineering/Environmental**	8%	***$ 31,334,374***	*2*	$ 2,506,749.89	$ 2,685,293.15
V	**Design Engineering**	10%	***$ 31,334,374***	*1*	$ 3,133,437.36	$ 3,243,107.67
VI	**Design Services During Construction**	3%	***$ 31,334,374***	*2*	$ 940,031.21	$ 940,031.21
VII	**Construction Management**	15%	***$ 31,334,374***	*2*	$ 4,700,156.04	$ 5,034,924.65
VIII	**Agency Management**	15%	***$ 31,334,374***	*8*	$ 4,700,156.04	$ 6,189,207.95
Escalation						
		Value				
	Date of Estimate (Month/Year)	11/4/2021				
	Anticipated Project Inititation Document Start (1-year dur	April 2022				
	Anticipated year to begin construction (Month Year)	April 2026				
	Estimated construction duration (in years)	2				
	Years of Escalation (to start of construction)	4.5				
	Annual Escalation Rate, percentage	3.5%				
	Total Escalation	117%			**Current Year Cost**	**Escalated**
			Escalated Roadway Cost		**$ 24,184,374**	**$ 28,233,610**
			Escalated Structure Cost		**$ 7,150,000**	**$ 8,347,138**
			Escalated Right of Way Cost		**$ 1,474,972**	**$ 1,721,929**

Project Cost Estimate

Project Owner:	Transportation Authority of Marin
Project Description:	Hwy 101 Interchange and Approach Roadway Improvement Program
Location:	Tamalpais Drive / Paradise Drive - Long Term Improvements
Type of Estimate:	Conceptual Level Cost Estimate
Prepared by:	HNTB

SUMMARY OF PROJECT OUTLAY COSTS

		Current Year Cost	Escalated Cost
I	ROADWAY	$ 18,324,696	$ 21,392,836
II	STRUCTURES	$ 26,442,000	$ 30,869,236
III	RIGHT OF WAY	$ 2,548,434	$ 2,975,123
	TOTAL CAPITAL OUTLAY COST	**$ 47,315,131**	**$ 55,237,195**
IV	PRELIMINARY ENGINEERING/ENVIRONMENTAL	$ 3,581,336	$ 3,836,416
V	DESIGN ENGINEERING	$ 4,476,670	$ 4,633,353
VI	DESIGN SERVICES DURING CONSTRUCTION	$ 1,343,001	$ 1,343,001
VII	CONSTRUCTION MANAGEMENT	$ 6,715,004	$ 7,193,281
	TOTAL SUPPORT COST	**$ 16,116,011**	**$ 17,006,051**
	DIRECT PROJECT COST	**$ 63,431,141**	**$ 72,243,246**
VIII	AGENCY MANAGEMENT	$ 6,715,004	$ 8,842,379
	TOTAL PROJECT COST	**$ 70,146,146**	**$ 81,085,625**

Project Cost Estimate

Project Owner: Transporation Authority of Marin
Project Description: Hwy 101 Interchange and Approach Roadway Improvement Program
Location: Tamalpais Drive / Paradise Drive - Long Term Improvements

Item code	Description	Unit	Quantity	Unit Price ($)	Cost	
I. Roadway						
01 Earthwork						
1.1	Clearing & Grubbing	LS	1	50,000.00	$ 50,000	
1.2	Roadway Excavation	CY	0	65.00	$ -	
				Subtotal for Item 01 Earthwork	**$ 50,000**	
02 Pavement Structural Section						
2.1	Remove Curb and Gutter	LF	6,000	25.00	$ 150,000	
2.2	Remove Concrete Sidewalk	SF	21,400	5.00	$ 107,000	
2.3	Remove Asphalt Concrete Pavement	SF	10,000	5.00	$ 50,000	
2.4	Remove Concrete Island	SF	0	10.00	$ -	
2.5	Remove Concrete Slope Paving	SF	0	50.00	$ -	
2.6	Pavement Section	SF	127,100	11.00	$ 1,398,100	
2.7	Microsurfacing	SF	380,000	1.00	$ 380,000	
2.8	Curb and Gutter	LF	2,500	65.00	$ 162,500	
2.9	Sidewalk / Multi-Use Path	SF	30,000	5.00	$ 150,000	
2.10	Concrete Island/Median	SF	200	25.00	$ 5,000	
				Subtotal for Item 02 Pavement Structural Section	**$ 2,402,600**	
03 Drainage						
3.1	Drainage (assume % of Roadway Cost Items 1 through 2)		1%		$ 24,526.00	
				Subtotal of Item 03 Drainage	**$ 24,526**	
04 Specialty Items						
4.1	Metal Beam Guard Railing	LF	0	65.00	$ -	
4.2	ADA Curb Ramps	EA	15	4,700.00	$ 70,500	
4.3	Concrete Barrier	LF	800	300.00	$ 240,000	
4.4	Retaining Wall (Caltrans Type 1) (H=4'-10')	SQFT	0	160.00	$ -	
4.5	Retaining Wall (Caltrans Type 1) (H=10'-20')	SQFT	0	190.00	$ -	
4.6	Remove Metal Beam Guard Railing	LF	0	20.00	$ -	
4.7	Remove Concrete Barrier	LF	0	50.00	$ -	
				Subtotal for Items 04 Specialty Items	**$ 310,500**	
05 Environmental						
5.1	Landscape and Irrigation	SF	4,500	35.00	$ 157,500	
5.2	Additional Environmental Needs	LS	1	1,950,000.00	$ 1,950,000	
5.3	Environmental Mitigation (assume % of Total Cost of Items 1 through 5.1)		20%		$ 979,025	
				Subtotal for Item 05 Environmental	**$ 3,086,525**	
06 Traffic						
06a Traffic Items						
6a.1	Traffic Signal Upgrade	EA	3	400,000.00	$ 1,200,000	
6a.2	Pedestrian Hybrid Beacon (PHB)	EA	0	80,000.00	$ -	
6a.3	Rapid Reflective Flashing Beacons (one pair)	EA	0	15,000.00	$ -	
6a.4	Traffic Signal Priority	EA	0	400,000.00	$ -	
6a.5	Traffic Operations Systems (Ramp Metering)	EA	0	350,000.00	$ -	
				Subtotal for Item 06a Traffic Items	**$ 1,200,000**	
					Subtotal Sections 1 through 6a	**$ 7,074,151**
06b Additional Traffic Items						
6b.1	High Visibility Crosswalk (cost by width of roadway)	LF	500	36.00	$ 18,000	
6b.2	Highway Signage Structure	EA	3	1,000,000.00	$ 3,000,000	
6b.3	Signing and Striping	LS	1	230,000.00	$ 230,000	
6b.4	Remove Signing and Striping		1%		$ 70,742	
6b.5	Roadway Lighting		5%		$ 353,708	
6b.6	Stage Construction and Traffic Handling	LS	1	1,000,000.00	$ 1,000,000	
				Subtotal for Item 06b Traffic Items	**$ 4,672,449**	
					Subtotal Sections 1 through 6	**$ 11,746,600**
07 Minor Items						
7.1	American with Disabilities Act Items		1%		$ 117,466.00	
7.2	Bike Path Items		1%		$ 117,466	
7.3	Other Minor Items		8%		$ 939,728	
				Subtotal of Item 07 Minor Items	**$ 1,174,660**	
08 Roadway Mobilization						
8.1	Roadway Mobilization		10%		$ 1,174,660	
				Subtotal for Item 08 Roadway Mobilization	**$ 1,174,660**	
09 Roadway Contingency						
9.1	Roadway Contingency (assume % of total cost of Section Items 01-08)		30%		$ 4,228,776	
				Subtotal for Item 09 Roadway Contingency	**$ 4,228,776**	
					Subtotal for Items 1-9 (Roadway)	**$ 18,324,696**

Project Cost Estimate

Project Owner: Transporation Authority of Marin
Project Description: Hwy 101 Interchange and Approach Roadway Improvement Program
Location: Tamalpais Drive / Paradise Drive - Long Term Improvements

Item code	Description	Unit	Quantity	Unit Price ($)	Cost	
II. Structures						
10 Structures						
10.1	Bridge Demolition	SF	0	60.00	$ -	
10.2	New Bridge Structure	SF	32,000	500.00	$ 16,000,000	
10.3	Bridge Widening	SF	0	600.00	$ -	
10.4	Pedstrian Overcrossing (including ramp)	SF	0	550.00	$ -	
10.5	Pedestrian Undercrossing (including ramp)	SF	0	600.00	$ -	
10.6	Tunnel	SF	0	1,200.00	$ -	
10.7	Structure modification	SF	6,200	700.00	$ 4,340,000	
			Subtotal for Item 10 Structures		**$ 20,340,000**	
10.8	Structure Contingency	30%			$ 6,102,000.00	
					Subtotal for Structures	**$ 26,442,000**
	TOTAL CONSTRUCTION COST (TCC) - SUM OF ITEMS 1-10 (ROADWAY AND STRUCTURES)					**$ 44,766,696**
III. Right of Way						
III.1	Right of Way Acquisition	SF	12,000	65.00	$ 780,000	
III.2	TCE	SF	19,000	15.00	$ 285,000	
III.3	Utility Relocation (assume % of total cost of Section 01-10)	2%			$ 895,334	
			Subtotal for Item 11 Right of Way		**$ 1,960,334**	
III.4	Right of Way Contingency	30%			$ 588,100.18	
					Subtotal for Right of Way	**$ 2,548,434**
Engineering and Management Costs						
			TCC	**Duration (Year)**	**Unescalatd Risk Loaded**	**Escalated (per year of TCC)**
						(escalation rate = 3.5%)
IV	**Preliminary Engineering/Environmental**	8%	***$ 44,766,696***	*2*	$ 3,581,335.71	$ 3,836,416.35
V	**Design Engineering**	10%	***$ 44,766,696***	*1*	$ 4,476,669.64	$ 4,633,353.08
VI	**Design Services During Construction**	3%	***$ 44,766,696***	*2*	$ 1,343,000.89	$ 1,343,000.89
VII	**Construction Management**	15%	***$ 44,766,696***	*2*	$ 6,715,004.46	$ 7,193,280.66
VIII	**Agency Management**	15%	***$ 44,766,696***	*8*	$ 6,715,004.46	$ 8,842,378.56
Escalation						
		Value				
	Date of Estimate (Month/Year)	11/4/2021				
	Anticipated Project Initiation Document Start (1-year duration)	April 2022				
	Anticipated year to begin construction (Month Year)	April 2026				
	Estimated construction duration (in years)	2				
	Years of Escalation (to start of construction)	4.5				
	Annual Escalation Rate, percentage	3.5%				
	Total Escalation	117%				
					Current Year Cost	**Escalated**
			Escalated Roadway Cost		**$ 18,324,696**	**$ 21,392,836**
			Escalated Structure Cost		**$ 26,442,000**	**$ 30,869,236**
			Escalated Right of Way Cost		**$ 2,548,434**	**$ 2,975,123**

Project Cost Estimate

Project Owner: Transportation Authority of Marin
Project Description: Hwy 101 Interchange and Approach Roadway Improvement Program
Location: Tamalpais Drive / Paradise Drive - Long Term Improvements (Roundabout Option)
Type of Estimate: Conceptual Level Cost Estimate
Prepared by: HNTB

SUMMARY OF PROJECT OUTLAY COSTS

		Current Year Cost	Escalated Cost
I	ROADWAY	$ 33,353,384	$ 38,937,806
II	STRUCTURES	$ 26,442,000	$ 30,869,236
III	RIGHT OF WAY	$ 2,939,180	$ 3,431,293
	TOTAL CAPITAL OUTLAY COST	**$ 62,734,564**	**$ 73,238,334**
IV	PRELIMINARY ENGINEERING/ENVIRONMENTAL	$ 4,783,631	$ 5,124,345
V	DESIGN ENGINEERING	$ 5,979,538	$ 6,188,822
VI	DESIGN SERVICES DURING CONSTRUCTION	$ 1,793,862	$ 1,793,862
VII	CONSTRUCTION MANAGEMENT	$ 8,969,308	$ 9,608,147
	TOTAL SUPPORT COST	**$ 21,526,338**	**$ 22,715,175**
	DIRECT PROJECT COST	**$ 84,260,902**	**$ 95,953,509**
VIII	AGENCY MANAGEMENT	$ 8,969,308	$ 11,810,865
	TOTAL PROJECT COST	**$ 93,230,210**	**$ 107,764,374**

Project Cost Estimate

Project Owner: Transporation Authority of Marin
Project Description: Hwy 101 Interchange and Approach Roadway Improvement Program
Location: Tamalpais Drive / Paradise Drive - Long Term Improvements (Roundabout Option)

Item code	Description	Unit	Quantity	Unit Price ($)	Cost	
I. Roadway						
01 Earthwork						
1.1	Clearing & Grubbing	LS	1	50,000.00	$ 50,000	
1.2	Roadway Excavation	CY	0	65.00	$ -	
				Subtotal for Item 01 Earthwork	**$ 50,000**	
02 Pavement Structural Section						
2.1	Remove Curb and Gutter	LF	6,500	25.00	$ 162,500	
2.2	Remove Concrete Sidewalk	SF	26,830	5.00	$ 134,150	
2.3	Remove Asphalt Concrete Pavement	SF	34,000	5.00	$ 170,000	
2.4	Remove Concrete Island	SF	0	10.00	$ -	
2.5	Remove Concrete Slope Paving	SF	0	50.00	$ -	
2.6	Pavement Section	SF	149,950	11.00	$ 1,649,450	
2.7	Microsurfacing	SF	480,000	1.00	$ 480,000	
2.8	Curb and Gutter	LF	4,000	65.00	$ 260,000	
2.9	Sidewalk / Multi-use Path	SF	36,900	5.00	$ 184,500	
2.10	Concrete Island/Median	SF	700	25.00	$ 17,500	
				Subtotal for Item 02 Pavement Structural Section	**$ 3,058,100**	
03 Drainage						
3.1	Drainage (assume % of Roadway Cost Items 1 through 2)		1%		$ 31,081.00	
				Subtotal of Item 03 Drainage	**$ 31,081**	
04 Specialty Items						
4.1	Metal Beam Guard Railing	LF	0	65.00	$ -	
4.2	ADA Curb Ramps	EA	15	4,700.00	$ 70,500	
4.3	Concrete Barrier	LF	800	300.00	$ 240,000	
4.4	Retaining Wall (Caltrans Type 1) (H=4'-10')	SQFT	0	160.00	$ -	
4.5	Retaining Wall (Caltrans Type 1) (H=10'-20')	SQFT	0	190.00	$ -	
4.6	Remove Metal Beam Guard Railing	LF	0	20.00	$ -	
4.7	Remove Concrete Barrier	LF	0	50.00	$ -	
				Subtotal for Items 04 Specialty Items	**$ 310,500**	
05 Environmental						
5.1	Landscape and Irrigation	SF	31,500	35.00	$ 1,102,500	
5.2	Additional Environmental Needs	LS	1	7,450,000.00	$ 7,450,000	
5.3	Public Art (at roundabout)	LS	1	800,000.00	$ 800,000	
5.4	Environmental Mitigation (assume % of Total Cost of Items 1 through 5.1)		20%		$ 2,560,436	
				Subtotal for Item 05 Environmental	**$ 11,912,936**	
06 Traffic						
06a Traffic Items						
6a.1	Traffic Signal Upgrade	EA	2	400,000.00	$ 800,000	
6a.2	Pedestrian Hybrid Beacon (PHB)	EA	0	80,000.00	$ -	
6a.3	Rapid Reflective Flashing Beacons (one pair)	EA	0	15,000.00	$ -	
6a.4	Traffic Signal Priority	EA	0	400,000.00	$ -	
6a.5	Traffic Operations Systems (Ramp Metering)	EA	0	350,000.00	$ -	
				Subtotal for Item 06a Traffic Items	**$ 800,000**	
					Subtotal Sections 1 through 6a	**$ 16,162,617**
06b Additional Traffic Items						
6b.1	High Visibility Crosswalk (cost by width of roadway)	LF	500	36.00	$ 18,000	
6b.2	Highway Signage Structure	EA	3	1,000,000.00	$ 3,000,000	
6b.3	Signing and Striping	LS	1	230,000.00	$ 230,000	
6b.4	Remove Signing and Striping		1%		$ 161,626	
6b.5	Roadway Lighting		5%		$ 808,131	
6b.6	Stage Construction and Traffic Handling	LS	1	1,000,000.00	$ 1,000,000	
				Subtotal for Item 06b Traffic Items	**$ 5,217,757**	
					Subtotal Sections 1 through 6	**$ 21,380,374**
07 Minor Items						
7.1	American with Disabilities Act Items		1%		$ 213,803.74	
7.2	Bike Path Items		1%		$ 213,804	
7.3	Other Minor Items		8%		$ 1,710,430	
				Subtotal of Item 07 Minor Items	**$ 2,138,037**	
08 Roadway Mobilization						
8.1	Roadway Mobilization		10%		$ 2,138,037	
				Subtotal for Item 08 Roadway Mobilization	**$ 2,138,037**	
09 Roadway Contingency						
9.1	Roadway Contingency (assume % of total cost of Section Items 01-08)		30%		$ 7,696,935	
				Subtotal for Item 09 Roadway Contingency	**$ 7,696,935**	
					Subtotal for Items 1-9 (Roadway)	**$ 33,353,384**

Project Cost Estimate

Project Owner: Transporation Authority of Marin
Project Description: Hwy 101 Interchange and Approach Roadway Improvement Program
Location: Tamalpais Drive / Paradise Drive - Long Term Improvements (Roundabout Option)

Item code	Description	Unit	Quantity	Unit Price ($)	Cost	
II. Structures						
10 Structures						
10.1	Bridge Demolition	SF	0	60.00	$ -	
10.2	New Bridge Structure	SF	32,000	500.00	$ 16,000,000	
10.3	Bridge Widening	SF	0	600.00	$ -	
10.4	Pedstrian Overcrossing (including ramp)	SF	0	550.00	$ -	
10.5	Pedestrian Undercrossing (including ramp)	SF	0	600.00	$ -	
10.6	Tunnel	SF	0	1,200.00	$ -	
10.7	Structure modification	SF	6,200	700.00	$ 4,340,000	
			Subtotal for Item 10 Structures		**$ 20,340,000**	
10.8	Structure Contingency	30%			$ 6,102,000.00	
					Subtotal for Structures	**$ 26,442,000**
	TOTAL CONSTRUCTION COST (TCC) - SUM OF ITEMS 1-10 (ROADWAY AND STRUCTURES)					**$ 59,795,384**
III. Right of Way						
III.1	Right of Way Acquisition	SF	12,000	65.00	$ 780,000	
III.2	TCE	SF	19,000	15.00	$ 285,000	
III.3	Utility Relocation (assume % of total cost of Section 01-10)	2%			$ 1,195,908	
			Subtotal for Item 11 Right of Way		**$ 2,260,908**	
III.4	Right of Way Contingency	30%			$ 678,272.30	
					Subtotal for Right of Way	**$ 2,939,180**
Engineering and Management Costs						
			TCC	**Duration (Year)**	**Unescalatd Risk Loaded**	**Escalated (per year of TCC)**
						(escalation rate = 3.5%)
IV	**Preliminary Engineering/Environmental**	8%	***$ 59,795,384***	*2*	$ 4,783,630.70	$ 5,124,344.80
V	**Design Engineering**	10%	***$ 59,795,384***	*1*	$ 5,979,538.38	$ 6,188,822.22
VI	**Design Services During Construction**	3%	***$ 59,795,384***	*2*	$ 1,793,861.51	$ 1,793,861.51
VII	**Construction Management**	15%	***$ 59,795,384***	*2*	$ 8,969,307.57	$ 9,608,146.50
VIII	**Agency Management**	15%	***$ 59,795,384***	*8*	$ 8,969,307.57	$ 11,810,865.26
Escalation						
		Value				
	Date of Estimate (Month/Year)	11/4/21				
	Anticipated Project Initiation Document Start (1-year duration)	April 2022				
	Anticipated year to begin construction (Month Year)	April 2026				
	Estimated construction duration (in years)	2				
	Years of Escalation (to start of construction)	4.5				
	Annual Escalation Rate, percentage	3.5%				
	Total Escalation	117%				
					Current Year Cost	**Escalated**
			Escalated Roadway Cost		**$ 33,353,384**	**$ 38,937,806**
			Escalated Structure Cost		**$ 26,442,000**	**$ 30,869,236**
			Escalated Right of Way Cost		**$ 2,939,180**	**$ 3,431,293**

C. Utility Impact Matrix

Utility Conflict Matrix

Project Owner: Transportation Authority of Marin
Project No. : P20062
Project Description: Utility Conflict Assessment
Highway or Route: US 101- Marin County

Utility Conflict Matrix Developed/Revised By: WRECO
Date: 10/27/2021
Reviewed By:
Date:

Note: refer to subsheet for utility conflict cost analysis.

Utility Owner and/or Contact Name	Conflict ID	Location	Utility Type	Size and/or Material	Utility Conflict Description	Recommended Disposition
PG&E	28	Tamalpais Dr LT & NT (5979798.77, 2165601.41) 111 LF	Electric	12kV	End of west side of Tamalpais Dr project area	Confirm depth and adjust electrical box to grade
PG&E	29	Tamalpais Dr LT & NT (5979798.56,2165533.79) 26 LF	Gas	6"	End of west side of Tamalpais Dr project area	Confirm depth. Protect in place
PG&E	31	Tamalpais Dr LT & NT (5981308.00, 2166236.28) 165 LF	Gas	4"	Improvements by Paradrise Dr	Confirm depth. Protect in place
MMWD	32	Tamalpais Dr LT & NT (5981317.03, 2166223.35) 198 LF	Water	12"	Improvements by Paradrise Dr	Confirm depth. Protect in place
PG&E	140	Tamalpais Dr NT (5980408.48, 2166133.06) 41 LF	Gas	16"	concrete work between SB on-ramp and off-ramp	Confirm depth. Protect in place
PG&E	141	Tamalpais Dr NT (5980507.18, 2165719.50) 292 LF	Gas	16"	concrete work on Tamalpais Dr by SB ramps	Relocate gas west from underground ped crossing.

Key:
[List of acronyms used in the utility conflict matrix]

Utility Conflict Matrix

Project Owner: Transportation Authority of Marin
Project No. : P20062
Project Description: Utility Conflict Assessment
Highway or Route: US 101- Marin County

Utility Conflict Matrix Developed/Revised By: WRECO
Date: 10/27/2021
Reviewed By:
Date:

Note: refer to subsheet for utility conflict cost analysis.

Utility Owner and/or Contact Name	Conflict ID	Location	Utility Type	Size and/or Material	Utility Conflict Description	Recommended Disposition
PG&E	26	Tamalpais Dr LT (5980244.51, 2167341.75) 188 LF	Gas	16"	Realign madera ramps by madea blvd	Confirm depth. Protect in place
PG&E	27	Tamalpais Dr LT (5980507,18, 2165719.50) 709 LF	Gas	16"	SB on-ramp by Tamalpais Dr	Relocate SW of proposed underground PED crossing.
PG&E	28	Tamalpais Dr LT & NT (5979798.77, 2165601.41) 111 LF	Electric	12kV	End of west side of Tamalpais Dr project area	Confirm depth and adjust electrical box to grade
PG&E	29	Tamalpais Dr LT & NT (5979798.56,2165533.79) 26 LF	Gas	6"	End of west side of Tamalpais Dr project area	Confirm depth. Protect in place
PG&E	30	Tamalpais Dr LT (5981456.16, 2166517.65) 316 LF	Electric	12kV	Improvements by San Clemente Dr	Confirm depth. Protect in place
PG&E	31	Tamalpais Dr LT & NT (5981308.00, 2166236.28) 165 LF	Gas	4"	Improvements by Paradrise Dr	Confirm depth. Protect in place
MMWD	32	Tamalpais Dr LT & NT (5981317.03, 2166223.35) 198 LF	Water	12"	Improvements by Paradrise Dr	Confirm depth. Protect in place

Key:
[List of acronyms used in the utility conflict matrix]

D. Right of Way Requirement Matrix

Right of Way Requirement Matrix

Project Owner: Transportation Authority of Marin
Project No. : P20062
Project Description: Right of Way Requirement Investigation
Highway or Route: US 101 - Marin County

ROW Requirement Matrix Developed/Revised By: WRECO
Date: 2/8/2022
Reviewed By:
Date:

Note: Refer to attachment for ROW requirement mapping

APN	Address	Location	Owner	Property Type	Partial ROW Acquisition (SF)	Full ROW Acquisition	TCE (SF)
024-032-42	1618 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT	N/A	Commercial	480		
024-163-08	301 Corte Madera Town Center, Corte Madera, CA	4- Tamalpais Dr - LT & NT	N/A	Shopping Center	120		
024-032-22	1400 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT	N/A	Shopping Center	3324		
024-032-22	1400 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT	N/A	Shopping Center	688		
024-032-42	1618 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT Roundabout Option	N/A	Commercial	480		
024-163-08	301 Corte Madera Town Center, Corte Madera, CA	4- Tamalpais Dr - LT & NT Roundabout Option	N/A	Shopping Center	120		
024-032-22	1400 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT Roundabout Option	N/A	Shopping Center	688		
024-032-22	1400 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT Roundabout Option	N/A	Shopping Center	4842		
024-171-22	801 Tamalpais Dr, Corte Madera, CA	4- Tamalpais Dr - LT & NT Roundabout Option	N/A	Commercial	2116		

Key:
[List of acronyms used in the utility conflict matrix]

Right of Way Requirement Matrix

Project Owner: Transportation Authority of Marin
Project No. : P20062
Project Description: Right of Way Requirement Investigation
Highway or Route: US 101 - Marin County

ROW Requirement Matrix Developed/Revised By: WRECO
Date: 2/8/2022
Reviewed By:
Date:

Note: Refer to attachment for ROW requirement mapping

APN	Address	Location	Owner	Property Type	Partial ROW Acquisition (SF)	Full ROW Acquisition	TCE (SF)
024-032-42	1618 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT	N/A	Commercial	480		
024-163-08	301 Corte Madera Town Center, Corte Madera, CA	4- Tamalpais Dr - LT & NT	N/A	Shopping Center	120		
024-032-22	1400 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT	N/A	Shopping Center	3324		
024-032-22	1400 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT	N/A	Shopping Center	688		
024-032-42	1618 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT Roundabout Option	N/A	Commercial	480		
024-163-08	301 Corte Madera Town Center, Corte Madera, CA	4- Tamalpais Dr - LT & NT Roundabout Option	N/A	Shopping Center	120		
024-032-22	1400 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT Roundabout Option	N/A	Shopping Center	688		
024-032-22	1400 Redwood Hwy, Corte Madera, CA	4- Tamalpais Dr - LT & NT Roundabout Option	N/A	Shopping Center	4842		
024-171-22	801 Tamalpais Dr, Corte Madera, CA	4- Tamalpais Dr - LT & NT Roundabout Option	N/A	Commercial	2116		

Key:
[List of acronyms used in the utility conflict matrix]

E. Existing and 2040 Traffic Volumes

Highway 101 - Tamalpais Interchange - Traffic Volumes Summary

4. Hwy 101 Tamalpais Interchange - AM Traffic Volumes Summary - Existing

No.	Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Tamalpais Dr./Madera Blvd./Sanford St.	40	60	40	220	50	100	80	750	20	110	520	250
2	Tamalpais Dr./Town Center Driveway	-	-	-	5	-	20	-	1010	400	-	870	210
3	Tamalpais Dr./ Hwy. 101 Southbound Off-Ramp	-	-	-	630	-	300	-	610	-	-	780	320
4	Tamalpais Dr./ Hwy. 101 Northbound Off-Ramp	450	-	470	-	-	-	-	800	490	-	650	480
5	Tamalpais Dr./ San Clemente Dr.	1030	-	110	-	-	-	-	150	900	60	100	-

4. Hwy 101 Tamalpais Interchange - PM Traffic Volumes Summary - Existing

No.	Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Tamalpais Dr./Madera Blvd./Sanford St.	50	60	120	210	70	130	150	450	30	230	730	290
2	Tamalpais Dr./Town Center Driveway	-	-	-	290	-	40	-	780	226	-	1220	230
3	Tamalpais Dr./ Hwy. 101 Southbound Off-Ramp	-	-	-	570	-	380	-	840	-	-	1070	440
4	Tamalpais Dr./ Hwy. 101 Northbound Off-Ramp	760	-	530	-	-	-	-	940	430	-	750	580
5	Tamalpais Dr./ San Clemente Dr.	970	-	170	-	-	-	-	750	650	60	350	-

4. Hwy 101 Tamalpais Interchange - AM Traffic Volumes Summary - 2040

No.	Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Tamalpais Dr./Madera Blvd./Sanford St.	44	66	44	242	55	110	88	825	22	121	572	275
2	Tamalpais Dr./Town Center Driveway	-	-	-	6	-	22	-	1111	440	-	957	231
3	Tamalpais Dr./ Hwy. 101 Southbound Off-Ramp	-	-	-	693	-	330	-	671	-	-	858	352
4	Tamalpais Dr./ Hwy. 101 Northbound Off-Ramp	495	-	517	-	-	-	-	880	539	-	715	528
5	Tamalpais Dr./ San Clemente Dr.	1133	-	121	-	-	-	-	165	990	66	110	-

4. Hwy 101 Tamalpais Interchange - PM Traffic Volumes Summary - 2040

No.	Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	Tamalpais Dr./Madera Blvd./Sanford St.	53	63	126	221	74	137	158	473	32	242	767	305
2	Tamalpais Dr./Town Center Driveway	-	-	-	305	-	42	-	819	237	-	1281	242
3	Tamalpais Dr./ Hwy. 101 Southbound Off-Ramp	-	-	-	599	-	399	-	882	-	-	1124	462
4	Tamalpais Dr./ Hwy. 101 Northbound Off-Ramp	798	-	557	-	-	-	-	987	452	-	788	609
5	Tamalpais Dr./ San Clemente Dr.	1019	-	179	-	-	-	-	788	683	63	368	-

F. Collision Data

SWITRS Collision Raw Data Export Layout

ITEM NAME	DESCRIPTION	POSSIBLE VALUES
CASE_ID	The unique identifier of the collision report (barcode beginning 2002; 19 digit code prior to 2002)	
ACCIDENT_YEAR	The year when the collision occurred	
COLLISION_DATE	The date when the collision occurred (YYYYMMDD)	
COLLISION_TIME	The time when the collision occurred (24 hour time)	
PRIMARY_RD		
SECONDARY_RD		
DISTANCE		Distance converted to feet
DIRECTION		N - North E - East S - South W - West Blank - Not Stated, In Intersection
INTERSECTION		Y - Intersection N - Not Intersection Blank - Not Stated
COLLISION_SEVERITY	The injury level severity of the collision (highest level of injury in collision)	1 - Fatal 2 - Injury (Severe) 3 - Injury (Other Visible) 4 - Injury (Complaint of Pain) 0 - PDO
NUMBER_KILLED	Counts victims in the collision with collision severity of 1	0 to N for each collision
NUMBER_INJURED	Counts victims in the collision with collision severity of 2, 3, or 4	0 to N for each collision

SWITRS Collision Raw Data Export Layout

ITEM NAME	DESCRIPTION	POSSIBLE VALUES
PCF_VIOL_CATEGORY		01 - Driving or Bicycling Under the Influence 02 - Impeding Traffic 03 - Unsafe Speed 04 - Following Too Closely 05 - Wrong Side of Road 06 - Improper Passing 07 - Unsafe Lane Change 08 - Improper Turning 09 - Automobile Right of Way 10 - Pedestrian Right of Way 11 - Pedestrian Violation 12 - Traffic Signals and Signs 13 - Hazardous Parking 14 - Lights 15 - Brakes 16 - Other Equipment 17 - Other Hazardous Violation 18 - Other Than Driver (or Pedestrian 19 - 20 - 21 - Unsafe Starting or Backing 22 - Other Improper Driving 23 - Pedestrian or "Other" Under the Influence of Alcohol or Drug 24 - Fell Asleep 00 - Unknown Blank - Not Stated

SWITRS Collision Raw Data Export Layout

ITEM NAME	DESCRIPTION	POSSIBLE VALUES
TYPE_OF_COLLISION		A - Head-On B - Sideswipe C - Rear End D - Broadside E - Hit Object F - Overturned G - Vehicle/Pedestrian H - Other Blank - Not Stated
MVIW		A - Non-Collision B - Pedestrian C - Other Motor Vehicle D - Motor Vehicle on Other Roadway E - Parked Motor Vehicle F - Train G - Bicycle H - Animal I - Fixed Object J - Other Object Blank - Not Stated
PED_ACTION		A - No Pedestrian Involved B - Crossing in Crosswalk at Intersection C - Crossing in Crosswalk Not at Intersection D - Crossing Not in Crosswalk E - In Road, Including Shoulder F - Not in Road G - Approaching/Leaving School Bus Blank - Not Stated
PEDESTRIAN_ACCIDENT	Indicates whether the collision involved a pedestrian	Y or blank

SWITRS Collision Raw Data Export Layout

ITEM NAME	DESCRIPTION	POSSIBLE VALUES
BICYCLE_ACCIDENT	Indicates whether the collision involved a bicycle	Y or blank
COUNT_PED_KILLED	Counts the victims in the collision with Party Type 2 and Collision Severity 1	0 to N for each collision
COUNT_PED_INJURED	Counts the victims in the collision with Party Type 2 and Collision Severity 2. 3. or 4	0 to N for each collision
COUNT_BICYCLIST_KILLED	Counts the victims in the collision with Party Type 4 and Collision Severity 1	0 to N for each collision
COUNT_BICYCLIST_INJURED	Counts the victims in the collision with Party Type 4 and Collision Severity 2. 3. or 4	0 to N for each collision
LATITUDE		
LONGITUDE		

SWITRS Collision Raw Data Export

CASE_ID	ACCIDENT_YEAR	COLLISION_DATE	COLLISION_TIME	PRIMARY_RD	SECONDARY_RD	DISTANCE
8659822	2018	20180615	1020	SAN CLEMENTE DR	REDWOOD HWY	312
8543399	2017	20171025	1514	MEADOWSWEET DR	LAUREL DR	104
8562948	2018	20180130	1341	TAMALPAIS DR	SANFORD	20
8393407	2017	20170531	830	SANFORD ST	TAMALPAIS DR	0
8302703	2017	20170131	1350	TAMALPAIS DR	RT 101	21
8758910	2018	20181122	2217	TAMALPAIS AV	RT 101	0
8758686	2018	20180926	2038	TAMALPAIS DR	RT 101	51
8098770	2016	20160701	1936	MADERA BL	TAMALPAIS DR	132
90495472	2017	20170701	437	TAMALPAIS DRIVE W/B TO US-101 N/B	SAN CLEMENTE DRIVE	323
7109414	2015	20150919	2027	SAN CLEMENTE DR	PG%E POLE #636	120
6569680	2014	20140710	853	TAMALPAIS DR	RT 101	25
90371983	2017	20170117	812	TAMALPAIS DR. E/B TO US-101 S/B	SANFORD ST.	1200
8473235	2017	20170824	1717	TAMALPAIS DR	RT 101	219
90677227	2018	20180212	1840	TAMALPAIS DRIVE	THE NORTHBOUND US-101 OFF RAMP	175
8660282	2018	20180608	722	TAMALPAIS DR	PARADISE DR	56
90030872	2015	20151009	1600	TAMALPAIS DR W/B	US-101 N/B	550
8444961	2017	20170618	1514	TAMALPAIS DR	RT 101	0
8607896	2018	20180303	1639	TAMALPAIS DR	RT 101	6
8013103	2016	20160210	1323	TAMALPAIS DR	RT 101	0
7000334	2015	20150530	1310	TAMALPAIS DR	SANFORD DR	0
6847530	2015	20150308	1813	TAMALPAIS DR	RT 101	0
8540096	2017	20170928	1108	TAMALPAIS DR	RT 101	0
8066941	2016	20160509	1739	TAMALPAIS DR	SANFORD ST	20
90835172	2018	20181005	1715	NB US-101 FROM TAMALPAIS DRIVE	SAN CLEMENTE DR	356

CASE_ID	DIRECTION	INTERSECTION	COLLISION_ SEVERITY	NUMBER_ KILLED	NUMBER_ INJURED	PCF_VIOL_ CATEGORY	TYPE_OF_ COLLISION	MVIW	PED_ACTION	PEDESTRIAN_ ACCIDENT
8659822	S	N	0	0	0	7	B	C	A	
8543399	W	N	0	0	0	8	B	E	A	
8562948	E	N	0	0	0	8	B	C	A	
8393407		Y	0	0	0	3	C	C	A	
8302703	N	N	0	0	0	3	C	C	A	
8758910		Y	0	0	0	12	D	C	A	
8758686	W	N	0	0	0	3	E	I	A	
8098770	N	N	0	0	0	17	E	I	A	
90495472	W	N	0	0	0	22	E	I	A	
7109414	N	N	3	0	1	1	E	I	A	
6569680	E	N	4	0	1	3	C	C	A	
90371983	E	N	4	0	2	3	C	C	A	
8473235	W	N	4	0	1	3	C	C	A	
90677227	W	N	4	0	1	3	C	C	A	
8660282	W	N	4	0	1	3	E	I	A	
90030872	E	N	4	0	1	4	C	C	A	
8444961		Y	3	0	1	9	D	C	A	
8607896	W	N	3	0	1	12	A	C	A	
8013103		Y	3	0	2	12	D	C	A	
7000334		Y	4	0	1	12	D	C	A	
6847530		Y	4	0	2	12	D	C	A	
8540096		Y	4	0	1	12	D	C	A	
8066941	E	N	3	0	1	8	G	B	B	Y
90835172	W	N	3	0	1	10	G	B	C	Y

CASE_ID	BICYCLE_ ACCIDENT	COUNT_PED_ KILLED	COUNT_PED_ INJURED	COUNT_BICYCLIST_ KILLED	COUNT_BICYCLIST_ INJURED	LATITUDE	LONGITUDE
8659822		0	0	0	0	37.92733	-122.51198
8543399		0	0	0	0	37.924	-122.51702
8562948		0	0	0	0	37.92513	-122.51867
8393407		0	0	0	0	37.92513	-122.51867
8302703		0	0	0	0	37.92733	-122.51198
8758910		0	0	0	0	37.92733	-122.51198
8758686		0	0	0	0	37.92422	-122.51552
8098770		0	0	0	0	37.92513	-122.51867
90495472		0	0	0	0	37.92676	-122.51304
7109414		0	0	0	0	37.9273	-122.51207
6569680		0	0	0	0	37.92564	-122.51519
90371983		0	0	0	0	37.925	-122.51696
8473235		0	0	0	0	37.92591	-122.51435
90677227		0	0	0	0	37.92616	-122.514
8660282		0	0	0	0	37.92665	-122.51158
90030872		0	0	0	0	37.92683	-122.51273
8444961		0	0	0	0	37.92605	-122.51533
8607896		0	0	0	0	37.92605	-122.51533
8013103		0	0	0	0	37.92686	-122.51215
7000334		0	0	0	0	37.925	-122.51884
6847530		0	0	0	0	37.92672	-122.51219
8540096		0	0	0	0	37.92513	-122.51867
8066941		0	1	0	0	37.9247	-122.51808
90835172		0	1	0	0	37.92673	-122.51319

G. Transit Ridership Data

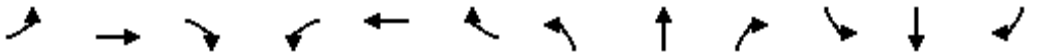
Highway 101 Tamalpais Dr Interchange - Transit Ridership

	Marin Transit Routes			Golden Gate Transit Routes			Total	
Stop ID	Route Numbers	Board	Exit	Route Numbers	Board*	Exit*	Board	Exit
42010	22, 113, 117	9	4	18	1	4	10	8
40280	22, 117	19	6	18	3	63	22	69
40281	22, 117, 113	7	24	18	96	0	103	24
40282	113	1					1	0
40295	17, 36, 119	25	79	27, 30, 70	28	58	53	137
40296	17, 36, 119	49	26	27, 30, 70	45	30	94	56

Data Sources: Marin Transit 2017, Golden Gate Transit 2020

*2020 Golden Gate Transit data were multiplied by a factor of 1.04 per transit agency recommendation to adjust for pandemic ridership

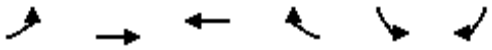
H. Synchro Output



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	753	18	112	523	250	39	59	39	215	48	102
Future Volume (vph)	80	753	18	112	523	250	39	59	39	215	48	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	2.0		4.0	2.0	2.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1770	3524		1770	3539	1532		1827	1554	1681	1714	1534
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	0.97	1.00
Satd. Flow (perm)	1770	3524		1770	3539	1532		1827	1554	1681	1714	1534
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	818	20	122	568	272	42	64	42	234	52	111
RTOR Reduction (vph)	0	1	0	0	0	117	0	0	38	0	0	97
Lane Group Flow (vph)	87	837	0	122	568	155	0	106	4	138	148	14
Confl. Peds. (#/hr)	4		4	4		4	4		4	4		4
Confl. Bikes (#/hr)												7
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	10.3	63.1		12.6	65.4	65.4		12.5	12.5	14.8	14.8	14.8
Effective Green, g (s)	10.3	66.1		12.6	68.4	68.4		12.5	12.5	14.8	14.8	14.8
Actuated g/C Ratio	0.09	0.55		0.10	0.57	0.57		0.10	0.10	0.12	0.12	0.12
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0		4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0		2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	151	1941		185	2017	873		190	161	207	211	189
v/s Ratio Prot	0.05	c0.24		c0.07	0.16			c0.06		0.08	c0.09	
v/s Ratio Perm						0.10			0.00			0.01
v/c Ratio	0.58	0.43		0.66	0.28	0.18		0.56	0.03	0.67	0.70	0.07
Uniform Delay, d1	52.8	15.9		51.6	13.2	12.3		51.1	48.3	50.2	50.5	46.5
Progression Factor	1.00	1.00		0.92	0.81	1.27		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	0.7		6.2	0.3	0.4		2.0	0.0	6.1	8.3	0.1
Delay (s)	56.0	16.6		53.8	11.0	16.1		53.1	48.3	56.4	58.8	46.6
Level of Service	E	B		D	B	B		D	D	E	E	D
Approach Delay (s)		20.3			17.9			51.8			54.5	
Approach LOS		C			B			D			D	

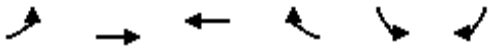
Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱	↰↰	↱
Traffic Volume (vph)	0	1007	869	213	5	16
Future Volume (vph)	0	1007	869	213	5	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0	2.0	2.0	4.0	4.0
Lane Util. Factor		0.95	0.95	1.00	0.97	1.00
Frpb, ped/bikes		1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	0.85
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3539	3539	1543	3433	1583
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3539	3539	1543	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1095	945	232	5	17
RTOR Reduction (vph)	0	0	0	33	0	16
Lane Group Flow (vph)	0	1095	945	199	5	1
Confl. Bikes (#/hr)				13		10
Turn Type		NA	NA	Perm	Prot	Prot
Protected Phases		2	6		4	4
Permitted Phases				6		
Actuated Green, G (s)		48.4	48.4	48.4	2.6	2.6
Effective Green, g (s)		51.4	51.4	51.4	2.6	2.6
Actuated g/C Ratio		0.86	0.86	0.86	0.04	0.04
Clearance Time (s)		5.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		3031	3031	1321	148	68
v/s Ratio Prot		c0.31	0.27		c0.00	0.00
v/s Ratio Perm				0.13		
v/c Ratio		0.36	0.31	0.15	0.03	0.01
Uniform Delay, d1		0.9	0.8	0.7	27.5	27.5
Progression Factor		0.98	0.68	0.33	1.00	1.00
Incremental Delay, d2		0.3	0.2	0.2	0.1	0.1
Delay (s)		1.2	0.8	0.5	27.6	27.5
Level of Service		A	A	A	C	C
Approach Delay (s)		1.2	0.7		27.5	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	1.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	614	783	0	680	299
Future Volume (vph)	0	614	783	0	680	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0	2.0		4.7	4.7
Lane Util. Factor		0.95	0.95		0.97	0.91
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	1.00		0.98	0.85
Flt Protected		1.00	1.00		0.96	1.00
Satd. Flow (prot)		3539	3539		3390	1441
Flt Permitted		1.00	1.00		0.96	1.00
Satd. Flow (perm)		3539	3539		3390	1441
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	667	851	0	739	325
RTOR Reduction (vph)	0	0	0	0	17	63
Lane Group Flow (vph)	0	667	851	0	807	177
Confl. Peds. (#/hr)						10
Confl. Bikes (#/hr)						10
Turn Type		NA	NA		Prot	Prot
Protected Phases		2	6		4	4
Permitted Phases						
Actuated Green, G (s)		29.2	29.2		21.1	21.1
Effective Green, g (s)		32.2	32.2		21.1	21.1
Actuated g/C Ratio		0.54	0.54		0.35	0.35
Clearance Time (s)		5.0	5.0		4.7	4.7
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1899	1899		1192	506
v/s Ratio Prot		0.19	c0.24		c0.24	0.12
v/s Ratio Perm						
v/c Ratio		0.35	0.45		0.68	0.35
Uniform Delay, d1		7.9	8.5		16.6	14.4
Progression Factor		0.86	1.00		1.00	1.00
Incremental Delay, d2		0.5	0.8		1.5	0.4
Delay (s)		7.3	9.2		18.1	14.8
Level of Service		A	A		B	B
Approach Delay (s)		7.3	9.2		17.4	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.7
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	803	0	0	652	449	466
Future Volume (vph)	803	0	0	652	449	466
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0			2.0	4.7	4.7
Lane Util. Factor	0.95			0.95	0.97	0.88
Frpb, ped/bikes	1.00			1.00	1.00	0.94
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	3433	2633
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	3433	2633
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	873	0	0	709	488	507
RTOR Reduction (vph)	0	0	0	0	0	226
Lane Group Flow (vph)	873	0	0	709	488	281
Confl. Peds. (#/hr)						5
Confl. Bikes (#/hr)						16
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	37.6			37.6	14.7	14.7
Effective Green, g (s)	40.6			40.6	14.7	14.7
Actuated g/C Ratio	0.65			0.65	0.24	0.24
Clearance Time (s)	5.0			5.0	4.7	4.7
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2317			2317	813	624
v/s Ratio Prot	c0.25			0.20	c0.14	
v/s Ratio Perm						0.11
v/c Ratio	0.38			0.31	0.60	0.45
Uniform Delay, d1	4.9			4.6	21.0	20.2
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.5			0.3	1.3	0.5
Delay (s)	5.4			5.0	22.3	20.7
Level of Service	A			A	C	C
Approach Delay (s)	5.4			5.0	21.5	
Approach LOS	A			A	C	

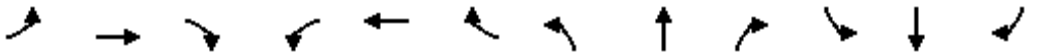
Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	6.7
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	142	0	64	101	1027	112
Future Volume (vph)	142	0	64	101	1027	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.91	0.97	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.99	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3539		1770	5085	3394	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3539		1770	5085	3394	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	154	0	70	110	1116	122
RTOR Reduction (vph)	0	0	0	0	6	0
Lane Group Flow (vph)	154	0	70	110	1232	0
Confl. Peds. (#/hr)						7
Confl. Bikes (#/hr)						7
Turn Type	NA		Prot	NA	Prot	
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	11.9		5.7	21.6	60.4	
Effective Green, g (s)	11.9		5.7	21.6	60.4	
Actuated g/C Ratio	0.13		0.06	0.24	0.67	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	4.0		0.2	4.0	4.0	
Lane Grp Cap (vph)	467		112	1220	2277	
v/s Ratio Prot	c0.04		c0.04	0.02	c0.36	
v/s Ratio Perm						
v/c Ratio	0.33		0.62	0.09	0.54	
Uniform Delay, d1	35.4		41.1	26.6	7.6	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.6		7.6	0.0	0.9	
Delay (s)	36.0		48.7	26.6	8.6	
Level of Service	D		D	C	A	
Approach Delay (s)	36.0			35.2	8.6	
Approach LOS	D			D	A	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

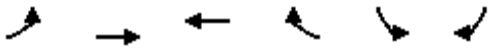
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	445	31	230	732	294	46	63	121	210	68	133
Future Volume (vph)	152	445	31	230	732	294	46	63	121	210	68	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	3.0		4.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1770	3497		1770	3539	1532		1824	1554	1681	1722	1535
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	0.97	1.00
Satd. Flow (perm)	1770	3497		1770	3539	1532		1824	1554	1681	1722	1535
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	165	484	34	250	796	320	50	68	132	228	74	145
RTOR Reduction (vph)	0	4	0	0	0	158	0	0	118	0	0	126
Lane Group Flow (vph)	165	514	0	250	796	162	0	118	14	135	167	19
Confl. Peds. (#/hr)	4		4	4		4	4		4	4		4
Confl. Bikes (#/hr)												7
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	15.6	52.9		21.3	58.6	58.6		13.1	13.1	15.7	15.7	15.7
Effective Green, g (s)	15.6	54.9		21.3	60.6	60.6		13.1	13.1	15.7	15.7	15.7
Actuated g/C Ratio	0.13	0.46		0.18	0.51	0.51		0.11	0.11	0.13	0.13	0.13
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0		4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0		2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	230	1599		314	1787	773		199	169	219	225	200
v/s Ratio Prot	0.09	0.15		c0.14	c0.22			c0.06		0.08	c0.10	
v/s Ratio Perm						0.11			0.01			0.01
v/c Ratio	0.72	0.32		0.80	0.45	0.21		0.59	0.09	0.62	0.74	0.09
Uniform Delay, d1	50.1	20.7		47.3	19.0	16.4		50.9	48.1	49.3	50.2	45.9
Progression Factor	1.00	1.00		0.96	0.85	2.07		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.6	0.5		10.8	0.7	0.5		3.1	0.1	3.6	10.9	0.1
Delay (s)	58.6	21.2		56.0	16.8	34.6		54.0	48.1	52.9	61.1	46.0
Level of Service	E	C		E	B	C		D	D	D	E	D
Approach Delay (s)		30.3			28.1			50.9			53.7	
Approach LOS		C			C			D			D	

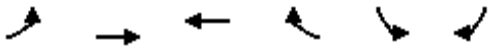
Intersection Summary			
HCM 2000 Control Delay	34.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	776	1217	226	291	39
Future Volume (vph)	0	776	1217	226	291	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0	3.0	4.0	4.0
Lane Util. Factor		0.95	0.95	1.00	0.97	1.00
Frpb, ped/bikes		1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		1.00	1.00	0.85	1.00	0.85
Flt Protected		1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)		3539	3539	1541	3433	1583
Flt Permitted		1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)		3539	3539	1541	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	843	1323	246	316	42
RTOR Reduction (vph)	0	0	0	73	0	34
Lane Group Flow (vph)	0	843	1323	173	316	8
Confl. Bikes (#/hr)				13		10
Turn Type		NA	NA	Perm	Prot	Prot
Protected Phases		2	6		4	4
Permitted Phases				6		
Actuated Green, G (s)		40.2	40.2	40.2	10.8	10.8
Effective Green, g (s)		42.2	42.2	42.2	10.8	10.8
Actuated g/C Ratio		0.70	0.70	0.70	0.18	0.18
Clearance Time (s)		5.0	5.0	5.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		2489	2489	1083	617	284
v/s Ratio Prot		0.24	c0.37		c0.09	0.00
v/s Ratio Perm				0.11		
v/c Ratio		0.34	0.53	0.16	0.51	0.03
Uniform Delay, d1		3.5	4.2	3.0	22.2	20.3
Progression Factor		1.08	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.3	0.8	0.3	0.7	0.0
Delay (s)		4.1	5.0	3.3	22.9	20.3
Level of Service		A	A	A	C	C
Approach Delay (s)		4.1	4.8		22.6	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	841	1066	0	567	377
Future Volume (vph)	0	841	1066	0	567	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0		5.4	5.4
Lane Util. Factor		0.95	0.95		0.97	0.91
Frpb, ped/bikes		1.00	1.00		0.99	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		1.00	1.00		0.98	0.85
Flt Protected		1.00	1.00		0.96	1.00
Satd. Flow (prot)		3539	3539		3385	1441
Flt Permitted		1.00	1.00		0.96	1.00
Satd. Flow (perm)		3539	3539		3385	1441
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	914	1159	0	616	410
RTOR Reduction (vph)	0	0	0	0	13	35
Lane Group Flow (vph)	0	914	1159	0	677	301
Confl. Peds. (#/hr)						10
Confl. Bikes (#/hr)						10
Turn Type		NA	NA		Prot	Prot
Protected Phases		2	6		4	4
Permitted Phases						
Actuated Green, G (s)		48.8	48.8		25.5	25.5
Effective Green, g (s)		50.8	50.8		24.8	24.8
Actuated g/C Ratio		0.60	0.60		0.30	0.30
Clearance Time (s)		5.0	5.0		4.7	4.7
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2140	2140		999	425
v/s Ratio Prot		0.26	c0.33		0.20	c0.21
v/s Ratio Perm						
v/c Ratio		0.43	0.54		0.68	0.71
Uniform Delay, d1		8.8	9.8		26.1	26.4
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.6	1.0		1.8	5.4
Delay (s)		9.5	10.7		27.9	31.7
Level of Service		A	B		C	C
Approach Delay (s)		9.5	10.7		29.2	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	8.4
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	974	0	0	745	758	533
Future Volume (vph)	974	0	0	745	758	533
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			3.0	5.4	5.4
Lane Util. Factor	0.95			0.95	0.97	0.88
Frpb, ped/bikes	1.00			1.00	1.00	0.95
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3539			3539	3433	2651
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3539			3539	3433	2651
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1059	0	0	810	824	579
RTOR Reduction (vph)	0	0	0	0	0	113
Lane Group Flow (vph)	1059	0	0	810	824	466
Confl. Peds. (#/hr)						5
Confl. Bikes (#/hr)						16
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	33.5			33.5	18.8	18.8
Effective Green, g (s)	35.5			35.5	18.1	18.1
Actuated g/C Ratio	0.57			0.57	0.29	0.29
Clearance Time (s)	5.0			5.0	4.7	4.7
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2026			2026	1002	773
v/s Ratio Prot	c0.30			0.23	c0.24	
v/s Ratio Perm						0.18
v/c Ratio	0.52			0.40	0.82	0.60
Uniform Delay, d1	8.1			7.3	20.5	18.9
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.0			0.6	5.5	1.3
Delay (s)	9.1			7.9	26.0	20.2
Level of Service	A			A	C	C
Approach Delay (s)	9.1			7.9	23.6	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	8.4
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

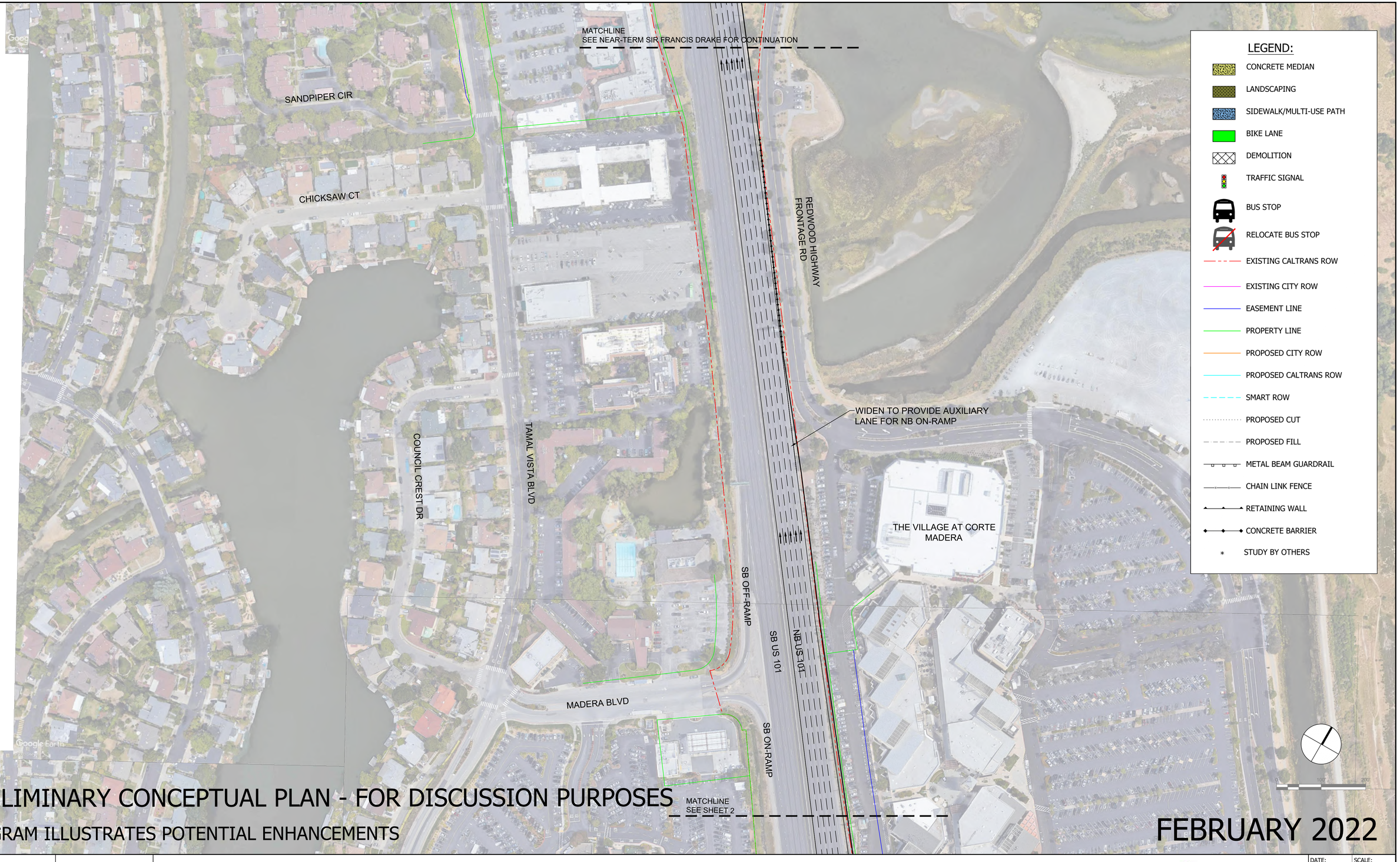
c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	752	0	64	348	974	168
Future Volume (vph)	752	0	64	348	974	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.91	0.97	
Frpb, ped/bikes	1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	1.00		1.00	1.00	0.98	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3539		1770	5085	3371	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3539		1770	5085	3371	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	817	0	70	378	1059	183
RTOR Reduction (vph)	0	0	0	0	14	0
Lane Group Flow (vph)	817	0	70	378	1228	0
Confl. Peds. (#/hr)						7
Confl. Bikes (#/hr)						7
Turn Type	NA		Prot	NA	Prot	
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	24.3		5.7	34.0	48.0	
Effective Green, g (s)	24.3		5.7	34.0	48.0	
Actuated g/C Ratio	0.27		0.06	0.38	0.53	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	4.0		0.2	4.0	4.0	
Lane Grp Cap (vph)	955		112	1921	1797	
v/s Ratio Prot	c0.23		c0.04	0.07	c0.36	
v/s Ratio Perm						
v/c Ratio	0.86		0.62	0.20	0.68	
Uniform Delay, d1	31.2		41.1	18.8	15.4	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	7.9		7.6	0.1	2.1	
Delay (s)	39.0		48.7	18.9	17.6	
Level of Service	D		D	B	B	
Approach Delay (s)	39.0			23.5	17.6	
Approach LOS	D			C	B	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

I. Preliminary Conceptual Plans



PRELIMINARY CONCEPTUAL PLAN - FOR DISCUSSION PURPOSES

DIAGRAM ILLUSTRATES POTENTIAL ENHANCEMENTS

FEBRUARY 2022

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Parisi TRANSPORTATION CONSULTING
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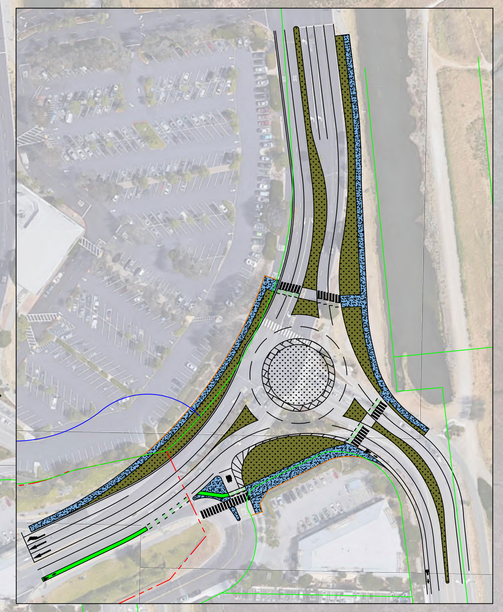
HIGHWAY 101 INTERCHANGE AND APPROACH ROADWAY IMPROVEMENT PROGRAM
TAMALPAIS DRIVE / PARADISE DRIVE
NEAR-TERM IMPROVEMENTS

TAM Transportation Authority of Marin

DATE:	SCALE: 1"=100'
FILENAME:	
PROJECT:	
SHEET NO.	

ALTERNATE IMPROVEMENT
TAMALPAIS DR / SAN CLEMENTE DR INTERSECTION



MATCHLINE
SEE SHEET 1

MONONA DR

MADERA BLVD

CORTE MADERA
TOWN CENTER

MERGE IN NB DIAGONAL ON-RAMP

MARIN MUNI WATER DISTRICT
EASEMENT

WIDEN AND RESTRIPE MAINLINE
TO PROVIDE AUXILIARY LANE

THE VILLAGE AT
CORTE MADERA

UPGRADE TRAFFIC
SIGNAL SYSTEM AND
INTERCONNECT
SIGNALS

PROVIDE 10' MULTI-USE
PATH

RAMP METERING
SYSTEM INSTALLATION PROJECT*

UPGRADE TRAFFIC
SIGNAL SYSTEM AND
INTERCONNECT
SIGNALS

NB ON-RAMP

SB OFF-RAMP

MAINTAIN
EXISTING
SIDEWALK TO
BUS STOP

PARADISE DR

MARIN MUNI WATER
DISTRICT EASEMENT

SB ON-RAMP

SIDEWALK
UNDERNEATH
STRUCTURE

SIDEWALK
UNDERNEATH
STRUCTURE

RESTRIPE NB
OFF-RAMP TO PROVIDE
BUS THRU ONLY LANE

TO

FROM

RELOCATE BUS
STOP

NB ON-RAMP

TAMALPAIS DR

PROVIDE 14' MULTI-USE
PATH

PROVIDE 5' BIKE
LANES

PROVIDE
STAIRS

NB OFF-RAMP

SAN CLEMENTE DR

UPGRADE TRAFFIC SIGNAL SYSTEM
AND INTERCONNECT SIGNALS

SB ON-RAMP

NB US 101

SB US 101

REALIGN CASA BUENA DR

PROVIDE
CONCRETE
BARRIER

RAMP METERING SYSTEM
INSTALLATION PROJECT*

MARIN MUNI WATER DISTRICT
EASEMENT

REMOVE EXISTING
STREET PARKING

0 100' 200'

LEGEND:

- CONCRETE MEDIAN
- LANDSCAPING
- SIDEWALK/MULTI-USE PATH
- BIKE LANE
- DEMOLITION
- TRAFFIC SIGNAL
- BUS STOP
- RELOCATE BUS STOP
- EXISTING CALTRANS ROW
- EXISTING CITY ROW
- EASEMENT LINE
- PROPERTY LINE
- PROPOSED CITY ROW
- PROPOSED CALTRANS ROW
- SMART ROW
- PROPOSED CUT
- PROPOSED FILL
- METAL BEAM GUARDRAIL
- CHAIN LINK FENCE
- RETAINING WALL
- CONCRETE BARRIER
- * STUDY BY OTHERS

PRELIMINARY CONCEPTUAL PLAN - FOR DISCUSSION PURPOSES

DIAGRAM ILLUSTRATES POTENTIAL ENHANCEMENTS

FEBRUARY 2022

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HIGHWAY 101 INTERCHANGE AND APPROACH ROADWAY IMPROVEMENT PROGRAM
TAMALPAIS DRIVE / PARADISE DRIVE
NEAR-TERM IMPROVEMENTS

TAM Transportation Authority of Marin

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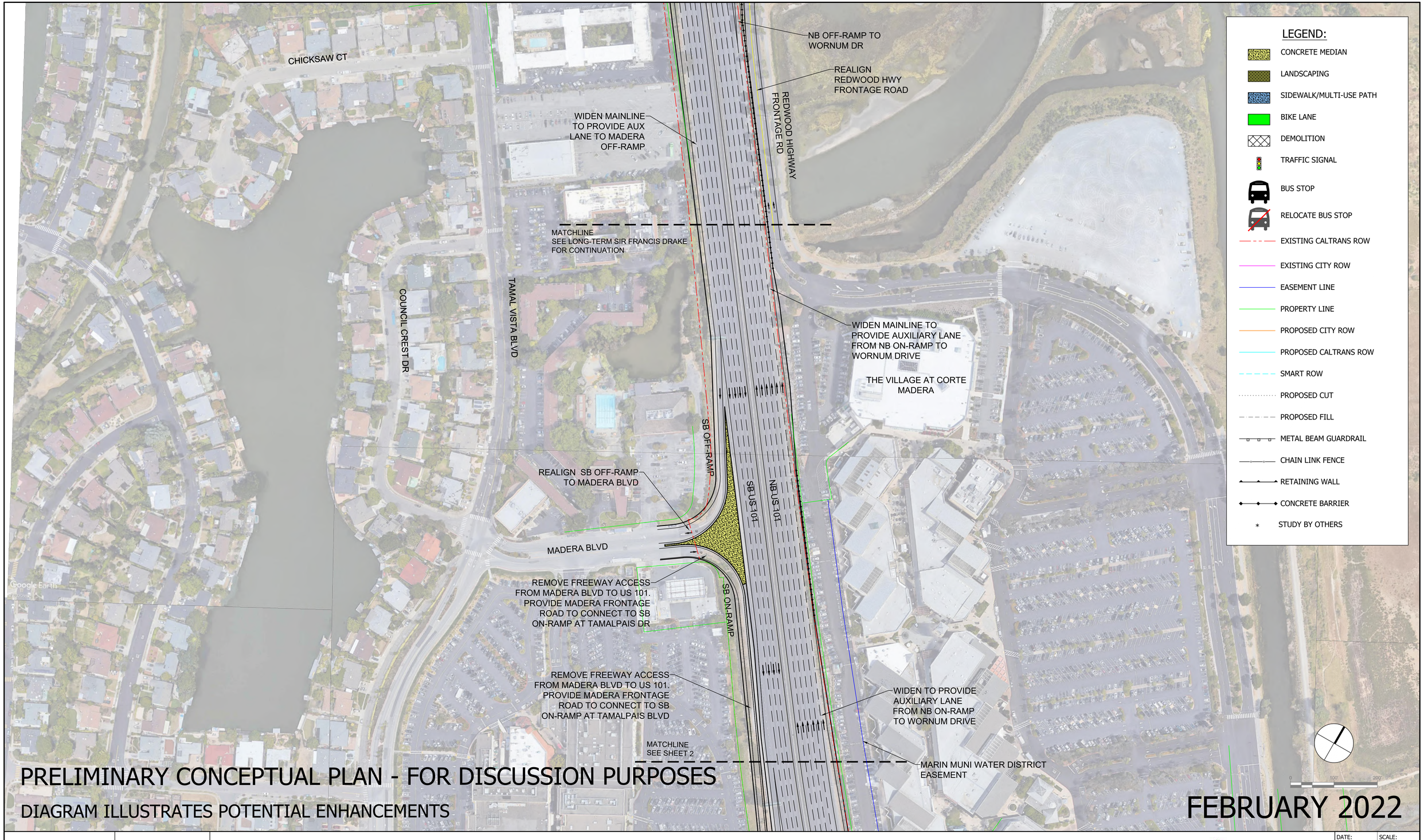

PRELIMINARY CONCEPTUAL PLAN - FOR DISCUSSION PURPOSES

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TRANSPORTATION AUTHORITY OF MARIN
HIGHWAY 101 INTERCHANGE IMPLEMENTATION STUDY
TAMALPAIS DRIVE / PARADISE DRIVE LONG-TERM IMPROVEMENTS

TAM Transportation Authority of Marin

DATE:	SCALE: 1"=100'
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SHEET NO.	

ALTERNATE IMPROVEMENT
TAMALPAIS DR / SAN CLEMENTE DR INTERSECTION

LEGEND:

- CONCRETE MEDIAN
- LANDSCAPING
- SIDEWALK/MULTI-USE PATH
- BIKE LANE
- DEMOLITION
- TRAFFIC SIGNAL
- BUS STOP
- RELOCATE BUS STOP
- EXISTING CALTRANS ROW
- EXISTING CITY ROW
- EASEMENT LINE
- PROPERTY LINE
- PROPOSED CITY ROW
- PROPOSED CALTRANS ROW
- SMART ROW
- PROPOSED CUT
- PROPOSED FILL
- METAL BEAM GUARDRAIL
- CHAIN LINK FENCE
- RETAINING WALL
- CONCRETE BARRIER
- STUDY BY OTHERS

MATCHLINE SEE SHEET 1

MARIN MUNI WATER DISTRICT EASEMENT

MADERA BLVD

CORTE MADERA TOWN CENTER

WIDEN TO PROVIDE AUXILIARY LANE FOR NB LOOP ON-RAMP FROM TAMALPAIS

THE VILLAGE AT CORTE MADERA

UPGRADE TRAFFIC SIGNAL SYSTEM AND INTERCONNECT SIGNALS

PROVIDE 10' MULTI-USE PATH

RAMP METER SYSTEM INSTALLATION PROJECT*

NB ON-RAMP

SB OFF-RAMP

SB US 101

NB US 101

UPGRADE TRAFFIC SIGNAL SYSTEM AND INTERCONNECT SIGNALS

MAINTAIN EXISTING SIDEWALK TO BUS STOP

REALIGN SB ON-RAMP

REALIGN SB OFF-RAMP TO TAMALPAIS DR

MARIN MUNI WATER DISTRICT EASEMENT

SIDEWALK UNDERNEATH STRUCTURE

PARADISE DR

RESTRIPE NB OFF-RAMP TO PROVIDE BUS THRU ONLY LANE

RELOCATE BUS STOP

SB ON-RAMP

MAINTAIN EXISTING SIDEWALK ON BRIDGE

PROVIDE 14' MULTI-USE PATH

PROVIDE STAIRS

REALIGN NB ON-RAMP

SIDEWALK UNDERNEATH STRUCTURE

NB ON-RAMP

RELOCATE BUS STOP

PROVIDE 14' MULTI-USE PATH

TAMALPAIS DR

UPGRADE TRAFFIC SIGNAL SYSTEM AND INTERCONNECT SIGNALS

NB OFF-RAMP

SAN CLEMENTE DR

REALIGN CASA BUENA DR

PROVIDE CONCRETE BARRIER

REMOVE EXISTING STREET PARKING

RAMP METERING SYSTEM INSTALLATION PROJECT*

MARIN MUNI WATER DISTRICT EASEMENT

0 100' 200

PRELIMINARY CONCEPTUAL PLAN - FOR DISCUSSION PURPOSES

DIAGRAM ILLUSTRATES POTENTIAL ENHANCEMENTS

FEBRUARY 2022

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HIGHWAY 101 INTERCHANGE AND APPROACH ROADWAY IMPROVEMENT PROGRAM
TAMALPAIS DRIVE / PARADISE DRIVE
LONG-TERM IMPROVEMENTS

TAM Transportation Authority of Marin

DATE:	SCALE: 1"=100'
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SHEET NO.	

J. Deficiency Matrix

Hwy 101 Interchange Implementation Study - Deficiency Matrix (Caltrans HDM)

Note: Existing conditions evaluated against Caltrans HDM(July 2020).

No.	HDM Section	HDM Boldface/Underline Criteria	Standard Applied	Tamalpais Dr / Paradise Dr
1	101.1(2)(c)(2) Local Streets or Roads	**Where the local facility connects to a freeway or expressway (such as ramp terminal intersections), the design speed of the local facility shall be a minimum of 35 miles per hour.** However, the design speed should be 45 miles per hour when feasible.	45 mph standard / 35 mph minimum	•Speed Limit:25mph
2	Sidewalk	The minimum width of a sidewalk should be 8 feet between a curb and a building when in urban and rural main street place types. For all other locations the minimum width of sidewalk should be 6 feet when contiguous to a curb or 5 feet when separated by a planting strip.	8 feet for urban/rural main street to face of building 6 feet contiguous sidewalk 5 feet with separated planting	•6' sidewalk on south side of overcrossing
3	201.6 Stopping Sight Distance on Horizontal Curve	Figure 201.6		•SB ON-ramp SSD = 113' (DS=15 mph) •NB ON-ramp SSD = 227' (DS=30 mph)
4	206.3 Pavement Reductions	Through Lane Drops. When a lane is to be dropped, it should be done by tapering over a distance equal to WV, where W=Width of lane to be dropped and V=Design Speed.		•See 504.3(5)
5	208.4 Bridge Sidewalks	**The minimum width of a bridge sidewalk shall be 6 feet.**	6 feet	•6' sidewalk on south side of overcrossing
6	208.6 Bicycle and Pedestrian Overcrossing and Undercrossings	The minimum width of walkway for pedestrian overcrossing should be 8 feet. The minimum vertical clearance of the pedestrian undercrossing should be 10 feet.	8 feet	•N/A
7	208.6 Bicycle and Pedestrian Overcrossing and Undercrossing	Class I bikeways are designed for the exclusive use of bicyclists and pedestrians; equestrian access is prohibited.		Noted - N/A
8	208.10(2) Bridge Barriers and Railings Policies	To reduce the risk of objects being dropped or thrown upon vehicles, protective screening in the form of fence-type railings should be installed along new overcrossing structure sidewalks in urban areas (Sec 92.6 California Streets and Highway Code).		•Chain-link railing on the side with sidewalk •Tubular on the side without sidewalk
9	208.10(2) Bridge Barriers and Railings Policies	**Any use of railings and barriers with sidewalks on structures with posted speeds greater than 45 miles per hour shall have a barrier separation between the roadway and the sidewalk.**		•N/A - Speed Limit:25mph

Hwy 101 Interchange Implementation Study - Deficiency Matrix (Caltrans HDM)

Note: Existing conditions evaluated against Caltrans HDM(July 2020).

No.	HDM Section	HDM Boldface/Underline Criteria	Standard Applied	Tamalpais Dr / Paradise Dr
10	208.10(6) Bicycle Railing	As a general policy, bicycle railings should be installed at the following locations: (a) On a Class I bikeway, except that a lower rail may be used if a curbed sidewalk, not signed for bicycle use, separates the bikeway from the rail or a shoulder at least 8 feet wide exists on the other side of the rail. (b) On the outside of a Class II or III bikeway, unless a curbed sidewalk, not signed for bicycle use, separates the bikeways from the rail.		▪N/A
11	208.10(7) Bridge Approach Railings	**Approach railings shall be installed at the ends of bridge railings exposed to approach traffic.**		▪Yes
12	301.1 Width	**Table 302.1**	Single-lane ramps shoulder width: 4' LT, 8' RT Multilane ramps shoulder width: 4' LT, 8' RT	▪NB single lane on-ramp: 1' (LT), 8' (RT) ▪NB single lane on-ramp(Loop): 2'(LT), 8' (RT) ▪SB single lane on-ramp: 2'(LT), 8' (RT) ▪SB single lane on-ramp(Loop): 2'(LT), 8' (RT) ▪NB multi lane off-ramp: 4'(LT), 4' (RT) ▪SB multi lane off-ramp: 4'(LT), 5' (RT)
13	301.1 Lane Width (travel lane width on overpass/underpass)	**The minimum lane width on two-lane and multilane highways, ramps, collector-distributor roads, and other appurtenant roadways shall be 12 feet, except as follows:** **▪ For conventional State highways and posted speeds less than or equal to 40 miles per hour and AADTT (truck volume) less than 250 per lane that are in urban, city or town centers (rural main streets), the minimum lane width shall be 11 feet.** **▪Where a 2-lane conventional State highway connects to a freeway within an interchange, the lane width shall be 12 feet.** **▪Where a multilane State highway connects to a freeway within an interchange, the outer most lane of the highway in each direction of travel shall be 12 feet.**	12 feet	Overcrossing lane widths ▪Approx. 12' - striping missing
14	301.1 Lane Width	**The minimum lane width on two-lane and multilane highways, ramps, collector-distributor roads, and other appurtenant roadways shall be 12 feet, except as follows:** **▪For conventional State highways and posted speeds less than or equal to 40 miles per hour and AADTT (truck volume) less than 250 per lane that are in urban, city or town centers (rural main streets), the minimum lane width shall be 11 feet.** **▪Where a 2-lane conventional State highway connects to a freeway within an interchange, the lane width shall be 12 feet.** **▪Where a multilane State highway connects to a freeway within an interchange, the outer most lane of the highway in each direction of travel shall be 12 feet.**	12 feet *(unless otherwise noted for truck lane width)*	▪NB diagonal off-ramp: two lanes transitioning into 4-11' lanes ▪NB diagonal on-ramp (r=133'): single 12' lane ▪NB loop on-ramp: 14' single lane (20' standard for truck lane width) ▪SB diagonal on-ramp (r-136'):16' single lane ▪SB loop on-ramp:14' single lane (20' standard for truck lane width) ▪SB diagonal off-ramp: 3-12' lanes

Hwy 101 Interchange Implementation Study - Deficiency Matrix (Caltrans HDM)

Note: Existing conditions evaluated against Caltrans HDM(July 2020).

No.	HDM Section	HDM Boldface/Underline Criteria	Standard Applied	Tamalpais Dr / Paradise Dr
15	301.2(1) Class II Bikeway (Bike Lane) Lane Width	**Class II bikeways (bike lanes), for the preferential use of bicycles, may be established within the roadbed and shall be located immediately adjacent to a traffic lane as allowed in this manual.**		•N/A
16	308.1 City Streets and County Roads	**Where local facility, not on the NHS, within the State right of way crosses over or under a freeway or expressway but has no connection to the State facility, the minium design standards for the cross section of the local facility within the State's right of way shall be the local agency adopted standards.**		•Noted
17	308.1 City Streets and County Roads	**Where a local facility crosses over or under a freeway or expressway and connects to the State facility (such as ramp terminal intersections), the minimum design standards for the cross section of the local facility shall be at least equal to those for a conventional highway with the exception that the outside shoulder width shall match the approach roadway, but not less than 4 feet, and as shown below.**		•Noted
18	308.1 City Streets and County Roads	**Where a 2-lane facility connects to a freeway within an interchange, the lane width of the local facility shall be 12 feet.**	12 feet	•Noted - N/A (within Caltrans ROW)
19	308.1 City Streets and County Roads	**Where a multilane local facility connects to a freeway within an interchange, the outer most lane in each direction of the local facility shall be 12 feet.**	Outer lane width = 12'	•Noted - N/A (within Caltrans ROW)
20	308.1 City Streets and County Roads	**Shoulder width shall not be less than 5 feet when railings or other lateral obstructions are adjacent to the right edge of shoulder.**	5' shoulder from lateral obstruction	•Noted - N/A (within Caltrans ROW)
21	308.1 City Streets and County Roads	**If gutter pans are used, then the minimum shoulder width shall be 3 feet wider than the width of the gutter pan being used.**	3' wide shoulder plus gutter pan width	•Noted - N/A (within Caltrans ROW)

Hwy 101 Interchange Implementation Study - Deficiency Matrix (Caltrans HDM)

Note: Existing conditions evaluated against Caltrans HDM(July 2020).

No.	HDM Section	HDM Boldface/Underline Criteria	Standard Applied	Tamalpais Dr / Paradise Dr
22	308.1 City Streets and County Roads	**The minimum width for two-lane overcrossing structures at interchanges shall be 40 feet curb-to-curb.**	40 feet curb to curb	•57'
23	301.2(1) Class II Bikeway (Bike Lane) Lane Width	**The minimum Class II bike lane width shall be 4 feet, except where:** -Adjacent to on-street parking, the minimum bike lane should be 5 feet -Posted speeds are greater than 40 miles per hour, the minimum bike lane should be 6 feet	Min Class II bike lane width = 4' Class II adjacent to street parking = 5' >40 mph, Class II bike lane width = 6'	•N/A
24	309.1 (3) Horizontal Clearances for Highways - Minimum Clearances	**The following minimum horizontal clearances shall apply to all objects that are closer to the edge of traveled way than the clear recovery zone distances listed below:** **(a) The minimum horizontal clearance to all objects, such as bridge rails and safety-shaped concrete barriers, as well as sand-filled barrels, guardrail, etc., on all freeway and expressway facilities, including auxiliary lanes, ramps and collector-distributor roads, shall be equal to the standard shoulder width of the highway facility as stated in Table 302.1. A minimum clearance of 4 feet shall be provided where the standard shoulder width is less than 4 feet. Approach rail connections to bridge rail may require special treatment to maintain the standard shoulder width.**	Standard shoulder width from Table 302.1. 4' minimum for shoulder width < 4'.	•Sidewalk on EB and WB has no striping to define shoulder
25	309.1 (3) Horizontal Clearances for Highways - Minimum Clearances	**The following minimum horizontal clearances shall apply to all objects that are closer to the edge of traveled way than the clear recovery zone distances listed below:** **(b) The minimum horizontal clearance to walls, such as abutment walls, retaining walls in cut locations, and noise barriers on all facilities, including auxiliary lanes, ramps and collector-distributor roads, shall not be less than 10 feet per Table 302.1.**	10 feet to abutment walls, retaining wall in cut locations, and noise barriers	•N/A
26	309.1 (3) Horizontal Clearances for Highways - Minimum Clearances	**The following minimum horizontal clearances shall apply to all objects that are closer to the edge of traveled way than the clear recovery zone distances listed below:** **(c) On conventional highways, frontage roads, city streets and county roads within the State right of way (all without curbs), the minimum horizontal clearance shall be the standard shoulder width as listed in Table 302.1 and 307.2, except that a minimum clearance of 4 feet shall be provided where the standard shoulder width is less than 4 feet.**	Conventional highway, frontage roads, city streets within State ROW, minimum horizontal clearance is standard shoulder width and/or 4 feet	
27	309.1 (3) Horizontal Clearances for Highways - Minimum Clearances	In areas without curbs, the face of Type 60 concrete barrier should be constructed integrally at the base of any retaining, pier, or abutment wall which faces traffic and is 15 feet or less from the edge of traveled way (right or left of traffic and measures from the face of wall).		•N/A

Hwy 101 Interchange Implementation Study - Deficiency Matrix (Caltrans HDM)

Note: Existing conditions evaluated against Caltrans HDM(July 2020).

No.	HDM Section	HDM Boldface/Underline Criteria	Standard Applied	Tamalpais Dr / Paradise Dr
28	309.2(1)(a) Vertical Clearances - Major Structures - Freeways and Expressways	**16 feet 6 inches shall be the minimum vertical clearance over the roadbed of the State facility (e.g. main lanes, shoulders, ramps, collector-distributor roads, speed change lanes, etc.)**	16.5'	•17.8'
29	309.2(1)(c) Vertical Clearances - Major Structures - Conventional Highways, Parkways, and Local Facilities, All Projects	**15 feet shall be the minimum vertical clearance over the traveled way and 14 feet 6 inches shall be the minimum vertical clearance over the shoulders of all portions of the roadbed.**	15' traveled way 14' 6" shoulders	•N/A
30	309.2(2)Vertical Clearances - Minor Structures	**Pedestrian over-crossings shall have a minimum vertical clearance 2 feet greater than the standard for major structures for the State facility in question. Sign structures shall have a vertical clearance of 18 feet over roadbed of the State facility.**	18.5' over freeways	•N/A
31	403.6(1) Turning Traffic: Treatment of Intersections with Right-Turn Only Lanes	Optional right-turn lanes should not be used in combination with right-turn-only lanes on roads where bicycle travel is permitted.		•N/A
32	403.6(1) Turning Traffic: Treatment of Intersections with Right-Turn Only Lanes	Locations of right-turn-only lanes should provide a minimum of 4-foot width for bicycle use between the right-turn and through lane when bikes are permitted, except where posted speed is greater than 40 miles per hour, the minimum width should be 6 feet.		•N/A
33	405.1(2)(b) Public Road Intersection	The minimum value for corner sight distance at signalized intersections should be equal to the stopping sight distance as given in Table 201.1 measured as previously described.		•No Obstructions
34	405.1(3) Decision Sight Distance	At intersections where the State route turns or crosses another State route, the decision sight distance values given in Table 201.7 should be used.		•N/A
35	405.2(2)(a) Left-turn Channelization: Lane Widths	**The lane width for both single and double left-turn lanes on State highways shall be 12 feet.**	12 feet	•N/A
36	405.2(4) Two-way Left-turn Lane (TWLTL)	**The minimum width for a TWLTL (Two-way Left-turn Lane) shall be 12 feet (see Index 301.1)**	12 feet	•N/A

Hwy 101 Interchange Implementation Study - Deficiency Matrix (Caltrans HDM)

Note: Existing conditions evaluated against Caltrans HDM(July 2020).

No.	HDM Section	HDM Boldface/Underline Criteria	Standard Applied	Tamalpais Dr / Paradise Dr
37	405.3(2)(a) Right-Turn Channelization: Lane and Shoulder Width	**Index 301.1 shall be used for right-turn lane width requirements. Shoulder width shall be a minimum of 4 feet. Lane width is 12'.**	12 feet	•N/A
38	405.3(2)(b) Right-Turn Channelization: Curve Radius	Where pedestrians are allowed to cross a free right-turning roadway, the curve radius should be such that the operating speed of vehicular traffic is no more than 20 miles per hour at the pedestrian crossing. See Index 504.3(3) for additional information.		•Noted - N/A
39	501.3 Spacing	**The minimum interchange spacing shall be one mile in urban areas, two miles outside of urban areas, and two miles between freeway-to-freeway interchanges and other interchanges. The minimum interchange spacing on interchanges outside of urban areas shall be three miles.**	1 mile (urban)	Existing Condition - •SFD - 1.22 miles •E. Blithedale/JCT RTE 131 - 1.67 mi
40	504.2(2) Freeway Entrances and Exits	Design of freeway entrances and exits should conform to the standard designs illustrated in Figure 504.2A-B (single lane), and Figure 504.3K (two-lane entrances and exits) and/or Figure 504.4 (diverging brand connections), as appropriate. *Deceleration Length: See HDM 504.2B* *Acceleration Length: See HDM 504.2A*	Single lane on-ramp entrance Acceleration Length = 467.11' (measure from curve to gore point) Merge length = 600' (measure from gore point to 12' lane drop)	•NB diagonal on-ramp Accel:100'<467.11' Merge:511'<600' •NB loop on-ramp Accel:381'<467.11' Merge: does not meet successive on-ramps separation, short merge. •SB diagonal on-ramp Accel: Auxiliary lane provided Merge: Auxiliary lane provided •SB loop on-ramp Accel: 407'<467.11' Merge: does not meet successive on-ramps separation, short merge.
41	504.2(2) Freeway Entrances and Exits	**The minimum deceleration length shown on Figure 504.2B shall be provided prior to the first curve beyond the exit nose to assure adequate distance for vehicles to decelerate before entering the curve.**	R<300', DL=570' R=300'-499', DL=470' R=500'-999', DL =420' R=1,000 or greater, DL=270'	•Noted
42	504.3(1)(a) Ramps: Design Speed	When ramps terminate at an intersection at which all traffic is expected to make a turning movement, the minimum design speed along the ramp should be 25 miles per hour. When a "through" movement is provided at the ramp terminus, the minimum ramp design speed should meet or exceed the design speed of the highway facility for which the through movement is provided.		•Noted
43	504.3(1)(b) Ramps: Lane Width (Trucks)	**Ramp Lanes shall be a minimum of 12 feet in width. Where ramps have curve radii of 350 feet or less, measured along the outside edge of traveled way for single lane ramps or along the outside lane line for multilane ramps, with a central angle greater than 60 degrees, the single ramp, or the lane furthest to the right if the ramp is multilane, shall be widened in accordance with Table 504.3 in order to accommodate large truck wheel paths.**	(Inside lane for multilane ramps) R<150', Lane width = 20' R=150-179', Lane width = 17' R=180-209', Lane width = 16' R=210-249', Lane width = 15' R=250-299', Lane width = 14' R=300-350', Lane width = 13' R>35', Lane width = 12'	•NB off-ramp: two lanes transitioning into 4-11' lanes •NB on-ramp (r=133'): single 12' lane •NB loop on-ramp: 14' single lane subject to more widening? •SB loop on-ramp (r-136'):16' single lane (20' standard) •SB on-ramp:15' single lane •SB off-ramp: Three 12' lanes

Hwy 101 Interchange Implementation Study - Deficiency Matrix (Caltrans HDM)

Note: Existing conditions evaluated against Caltrans HDM(July 2020).

No.	HDM Section	HDM Boldface/Underline Criteria	Standard Applied	Tamalpais Dr / Paradise Dr
44	504.3(1)(c) shoulder width	**Shoulder widths for ramps shall be as indicated in Table 302.1**		•Shoulder widths indicated above in Section 301.1
45	504.3(3) Location and Design of Ramp Intersections on the Crossroads	**For left-turn maneuvers from an off-ramp at an unsignalized intersection, the length of crossroads open to view should be according to the corner sight distance criteria in Index 405.1**		•N/A - signalized
46	504.3(3) Location and Design of Ramp Intersections on the Crossroads	**The minimum distance (curb return to curb return) between ramp intersections and local road intersections shall be 400 feet.** The preferred minimum distance should be 500 feet.		•Noted but did not evaluate- Does not appear to be an issue here.
47	504.3(5) Single-lane Ramps	When additional lanes are provided near an entrance ramp intersection, the lane drop should be accomplished over a distance equal to WV. The lane to be dropped should be on the right so the traffic merges left.	WV for ramp entering or exiting the freeway	Noted - N/A
48	504.3(5) Single-lane Ramps	If the length of the single lane ramp exceeds 1,000 feet, an additional lane should be provided on the ramp to permit passing maneuvers.	exit ramps with lengths greater than 1000' require additional lane	Noted
49	504.3(9) Distance Between Successive On-ramps	This distance should be about 1,000 feet unless the upstream ramp adds an auxiliary lane in which case the downstream ramp should merge with the auxiliary lane in a standard 50:1 (longitudinal to lateral) convergence.	1000' feet	•Less than standard separation between successive SB on-ramps but auxiliary lane provided at downstream ramp - meets standard •Less than standard separation between successive NB on-ramps, 705' <1000'
50	504.3(10) Distance Between Successive Exits	The minimum distance between successive exit ramps for guide signs should be 1,000 feet on the freeway and 600 feet on collector-distributor roads.	1000' feet	•Meets standard
51	504.7 Weaving Sections	**Between interchanges, the minimum entrance ramp-to-exit ramp spacing, measured as shown on Figure 504.2A and 504.2B shall be 2,000 feet in urban areas, 5,000 feet outside urban areas, and 5,000 feet between freeway-to-freeway interchanges and other interchanges.**	2000 feet for urban (entrance ramp-to-exist ramp spacing)	SB on-ramp from Madera Blvd to SB off-ramp to Tamalpais: Distance = 467' < 2000'
52	1003.1(1)(a) Class I Bikeways (Bike Paths): Traveled Way	**The minimum paved width of a traveled way for a two-way bike path shall be 8 feet, 10 feet preferred. The minimum paved width for a one-way bike path shall be 5 feet.**	Two-way Class I =8' (10' preferred) (5' minimum)	•N/A

Hwy 101 Interchange Implementation Study - Deficiency Matrix (Caltrans HDM)

Note: Existing conditions evaluated against Caltrans HDM(July 2020).

No.	HDM Section	HDM Boldface/Underline Criteria	Standard Applied	Tamalpais Dr / Paradise Dr
53	1003.1(1)(b) Class I Bikeways (Bike Paths): Shoulder	**A minimum 2-foot wide shoulder, composed of the same pavement materials as the bike path or all weather surface material that is free of vegetation, shall be provided adjacent to the traveled way of the bike path when not on a structure.**	2' clear	•N/A
54	1003.1(3) Class I Bikeways (Bike Paths): Clearance to Obstructions	**A minimum 2-foot horizontal clearance from the paved edge of a bike path to obstruction shall be provided.**	2' clear to obstruction	•N/A
55	1003.1(3) Class I Bikeways (Bike Paths): Clearance to Obstructions	**The clear width of a bicycle path on structures between railings shall be not less than 10 feet.**	10' clear from structures	•N/A
56	1003.1(3) Class I Bikeways (Bike Paths): Clearance to Obstructions	**The vertical clearance to obstruction across the width of a bike path shall be a minimum of 8 feet and 7 feet over shoulder.**	Class I vertical clearance = 8' over roadway and 7' over shoulder	•N/A
57	1003.1(7) Class I Bikeways (Bike Paths): Clearance to Obstructions	**The minimum separation between the edge of traveled way of a one-way or two-way bicycle path and edge of traveled way of a parallel road or street shall be 5 feet plus the standard shoulder width. Bike paths within the clear recovery zone of freeways shall include a physical barrier separation.**	Class I - 5' clear + shoulder width to one-way or two-way bicycle path. Can be less with barrier.	•N/A

Hwy 101 Interchange Implementation Study - Deficiency Matrix (Local Standards)

Note: Existing conditions evaluated against the Marin County Uniform Construction Standards(July 2008), the City of Novato's Uniform Standards(May 2013), and Marin Transit(August 2013).

No.	Jurisdiction	Criteria	Standard	Tamalpais Dr / Paradise Dr
1	Uniform Construction Standards for Marin County dated July 2018		•Arterial road means road specified in the countywide plan or the Marin county annual road list, and other major roads with an actual or projected ADT over two thousand •Industrial commercial road means providing access to, or through, an industrial or commercial zone or an area of high truck and/or other large vehicle traffic •Collector road means a road with an actual or projected ADT from one though to two thousand •Residential road means a road providing access to a generally residential area and which serves or may serve twenty or more dwelling units, and a maximum potential ADT of one thousand •Minor residential road means a road providing access to a generally residential area and which serve seven to nineteen dwelling units, and a maximum potential ADT of five hundred •Limited residential road means a road which serves two to six dwelling units, and a maximum potential ADT of one hundred fifty	•Arterial/Collector
2	Uniform Construction Standards for Marin County dated July 2019	Design Speed	All roads except residential roads will have a minimum design speed of 25 mph	•Speed Limit:25mph
3	Uniform Construction Standards for Marin County dated July 2020	Centerline Radii	Follow Caltrans Highway Design Manual	•Noted
4	Uniform Construction Standards for Marin County dated July 2021	Intersections	Roads shall intersect each other as near to a right angle as is practical. Where several streets converge at one point, special approach treatment shall be provided to optimize driver sight distance and pedestrian safety. Provisions may include, but are not limited to, setback lines, special rounding, slope grading and/or vegetation removal. Block corners shall be rounded at the property line by a radius of not less than twenty feet and curb or pavement returns shall have a minimum radius of twenty-five feet.	•Noted
5	Uniform Construction Standards for Marin County dated July 2022	Roadway Width - lane widths	The following table sets forth the minimum widths for the improved section measured from face of curb to face of curb. Where no curb or berm is proposed the paved width shall be one foot greater than that listed to allow for edge striping and pavement edge raveling. •limited residential road: 20' with shoulders and 24' with curbs •minor residential road: 28' •residential road: 36' •collector road: 40' •arterial and industrial/commercial: as required	Tamalpais Dr and Madera Blvd (West of overpass) •Tamalpais Dr:75' •Madera Blve:67 •Casa Buena Dr:37' (Standard:40') Tamalpais Dr and San Clemente Dr(east of overpass) •Tamalpais:85' •San Clemente:51'
6	Uniform Construction Standards for Marin County dated July 2023	Roadway With - shoulder width	Shoulders shall be provided on each side of all roads. Shoulders shall normally be four feet although wider shoulders may be required as deemed appropriate by the agency.	•No shoulders
7	Uniform Construction Standards for Marin County dated July 2024	Curbs	Curbs and gutters or berms shall be required adjacent to all parking lanes and where physical separation, delineation, or stormwater control is necessary. PCC curbs and gutters shall normally be required in order to minimize long-term maintenance. AC berms may be allowed where appropriate at the discretion of the agency.	•Curb and Gutter exist within the first intersections •Parking lane on Casa Buena Dr (west of overpass)

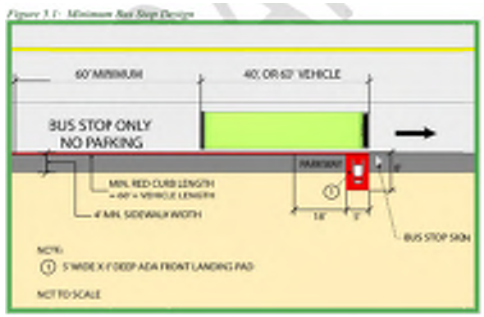
Hwy 101 Interchange Implementation Study - Deficiency Matrix (Local Standards)

Note: Existing conditions evaluated against the Marin County Uniform Construction Standards(July 2008), the City of Novato's Uniform Standards(May 2013), and Marin Transit(August 2013).

No.	Jurisdiction	Criteria	Standard	Tamalpais Dr / Paradise Dr
8	Uniform Construction Standards for Marin County dated July 2025	Sidewalks required	Sidewalks shall be provided in conformance with any applicable general, specific, or community plan which has been adopted by the county. In addition, the following general standards shall apply: (a) Sidewalks shall be required on both side of all roads within residential areas where densities will be equal to or ultimately exceed four units per acre (b) Sidewalks shall be required on only one side of each road within a residential area where densities will be less than four units per acre (c) Pedestrian paths of an acceptable width may also be required through the center of long blocks; to provide access to schools, parks, playgrounds, open space, and other public areas; to river, lake, bay and ocean frontage; to connect cul -de-sac streets and where otherwise necessary as determined by the agency and/or the community development agency. If location outside of the right of way of a county maintained road, provisions must be made for their maintenance. (d) Sidewalks may be eliminated on one or both sides of streets where it is found that topography, density or other circumstances make them impractical as determined by the agency (e) Sidewalks shall be required on both sides of all roads in industrial, commercial and business districts (f) Safe and reasonable direct pedestrian access shall be provided between residential subdivisions and transit stops where feasible	
9	Uniform Construction Standards for Marin County dated July 2026	Sidewalks within city-centered corridor	4' in width adjacent to a curb or 4.5' when separated by a curb. Additional width may be required for potential high pedestrian volumes such as near schools, places of public assembly, commercial areas and in vicinity of senior citizen housing or convalescent hospital.	•Sidewalk east of overpass:7' and 8' •Sidewalk west of overpass 8'
10	Uniform Construction Standards for Marin County dated July 2027	Sidewalk obstructions	(a) No poles, grates, covers, fire hydrants or other obstructions are allowed within a sidewalk. Utility boxes and other flush facility may be allowed within a sidewalk if their location and nature are deemed safe by the agency. (b) If the postal service requires that mailboxes be located adjacent to the curb then the sidewalk shall be either separated from the curb or wide enough to provide a four-foot obstructed width	Pole within a sidewalk: •EB sidewalk before SB on ramp (west of overpass) •WB sidewalk Tamalpais Dr and San Clemente Dr intersection (east of overpass)
11	Uniform Construction Standards for Marin County dated July 2028	Transit facilities - passenger shelters	Bus passenger shelters shall be designed to shelter at least eight persons, shall not obstruct a sidewalk and shall be subject to approval of the Marin County Transit District and the agency.	•Bus Shelter outside of sidewalk
12	Uniform Standards (City of Novato) dated May 2013	Bus Turnout	Refer to drawing no. 195N	
13	Marin Transit (Golden Gate Transit) dated August 2013		The bus stop has ADA landing pads, 4 - feet accessible sidewalk, a clear wheelchair's space inside the shelter, and barrier and obstacle-free zone.	•East of overcross (Stop id 40296): landing pad<8' deep not enough room for wheel chair
14	Marin Transit (Golden Gate Transit) dated August 2014		No parking in front of bus stop	•Yes
15	Marin Transit (Golden Gate Transit) dated August 2015		60' clear from parking to bus stop (near side stops)	•N/A
16	Marin Transit (Golden Gate Transit) dated August 2016		50' clear from parking to bus stop (far side stops)	•N/A
17	Marin Transit (Golden Gate Transit) dated August 2017		60' clear from back and 60' clear from front of bus (mid block stops)	•Yes

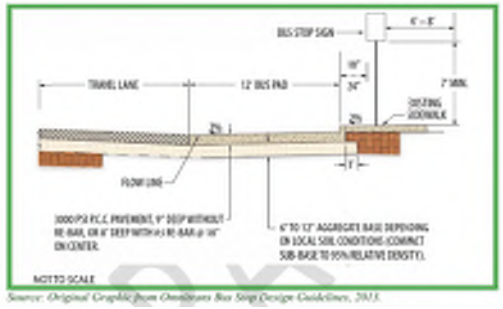
Hwy 101 Interchange Implementation Study - Deficiency Matrix (Local Standards)

Note: Existing conditions evaluated against the Marin County Uniform Construction Standards(July 2008), the City of Novato's Uniform Standards(May 2013), and Marin Transit(August 2013).

No.	Jurisdiction	Criteria	Standard	Tamalpais Dr / Paradise Dr
18	Marin Transit (Golden Gate Transit) dated August 2018		Bus turn-out should be consider: •Traffic in the curb lane exceeds 250 vehicles during the peak hour •Traffic speed is greater than 40 mph •Bus volumes are 10 or more per peak hour on the roadway •Passenger volumes exceed 20 boardings per hour •Average peak-period dwell time exceed 30 second per bus •History of repeated traffic and/or pedestrian accidents at stop location •A right turn lane is used by buses as a queue jumper lane, •Improvements, such as widening, are planned for major roadway. This provides the opportunity to include the bus bay as part of the reconstruction, resulting in better-designed and less-costly bus turnout.	
19	Marin Transit (Golden Gate Transit) dated August 2019		When traffic volumes exceed 1000 veh/hr per lane, placement of a bus turnout on a high-volume road is guided by the following: •Far side intersection placement is desirable. Bus bays should be placed at signal-controlled intersection so that the signal can create gaps in traffic. •Near side bays should be avoided because of conflicts with right-turning vehicles, delays to transit service as buses attempt to re-enter the travel lane, and obstruction of traffic control devices and pedestrian activity unless associated with key sites or key pedestrian access to major transit-oriented activities centers. •Midblock bus bays locations are not desirable unless associated with key pedestrian access to major transit-oriented activities centers.	
20	Marin Transit (Golden Gate Transit) dated August 2020		Bus pad : 8" thick reinforced concrete pad with #3 rebar at 18" OC. Width of pad =11' and varies in length (40'-60') (depends on bus length)+3' buffer at beg/end	•Adjacent to SB 101 (Stop ID 40295): Standard bus pad, Improve sidewalk here? •Adjacent to NB 101 (Stop ID 40296): Standard bus pad, Improve sidewalk here? •East of overcross (Stop id 40296): Concrete bus pad • West of overcross (40281 and 40280): Standard bus pad
21	Marin Transit (Golden Gate Transit) dated August 2021		ADA Landing Pad : front landing pad are 5 feet parallel to street and 8 feet deep and rear landing pad are 5 feet parallel to street and 8 feet deep (ADAAG 10.2.1)	•East of overcross (Stop id 40296): landing pad<8' not enough room for wheel chair
22	Marin Transit (Golden Gate Transit) dated August 2022		Minimum Bus Stop Design 	

Hwy 101 Interchange Implementation Study - Deficiency Matrix (Local Standards)

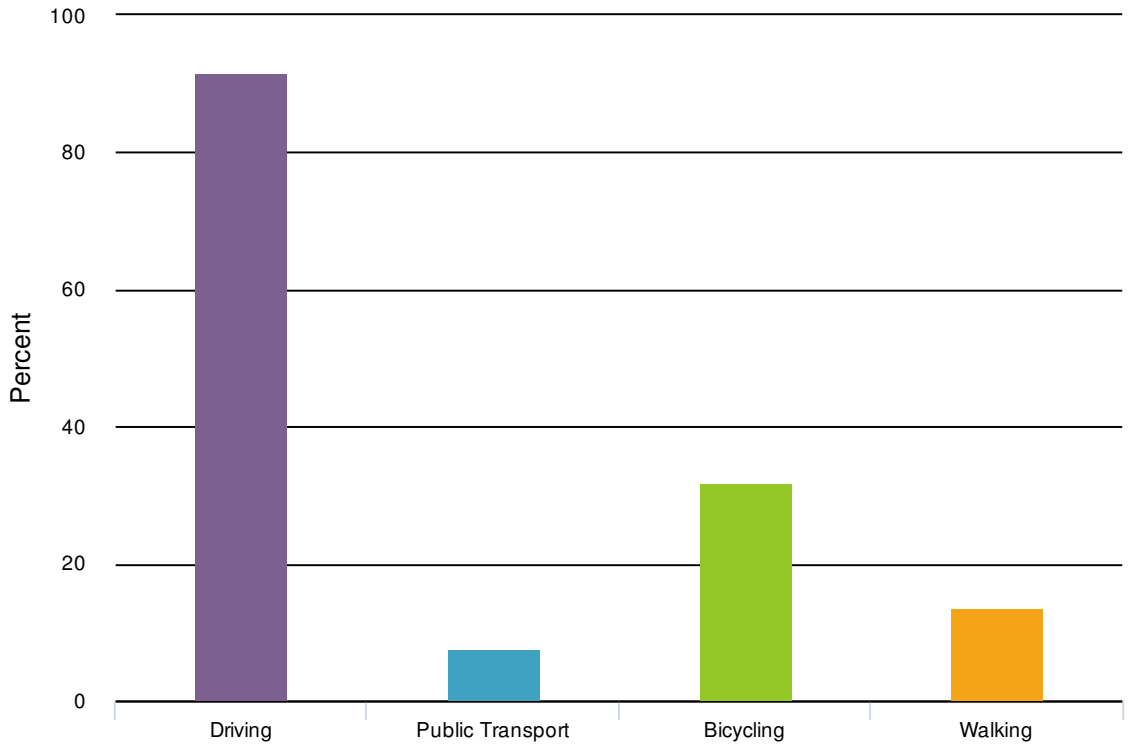
Note: Existing conditions evaluated against the Marin County Uniform Construction Standards(July 2008), the City of Novato's Uniform Standards(May 2013), and Marin Transit(August 2013).

No.	Jurisdiction	Criteria	Standard	Tamalpais Dr / Paradise Dr
23	Marin Transit (Golden Gate Transit) dated August 2023		Bus Pad Design - Cross Section  *Source: Original Graphic from Omnitrans Bus Stop Design Guidelines, 2015.*	

K. Online Survey Comments

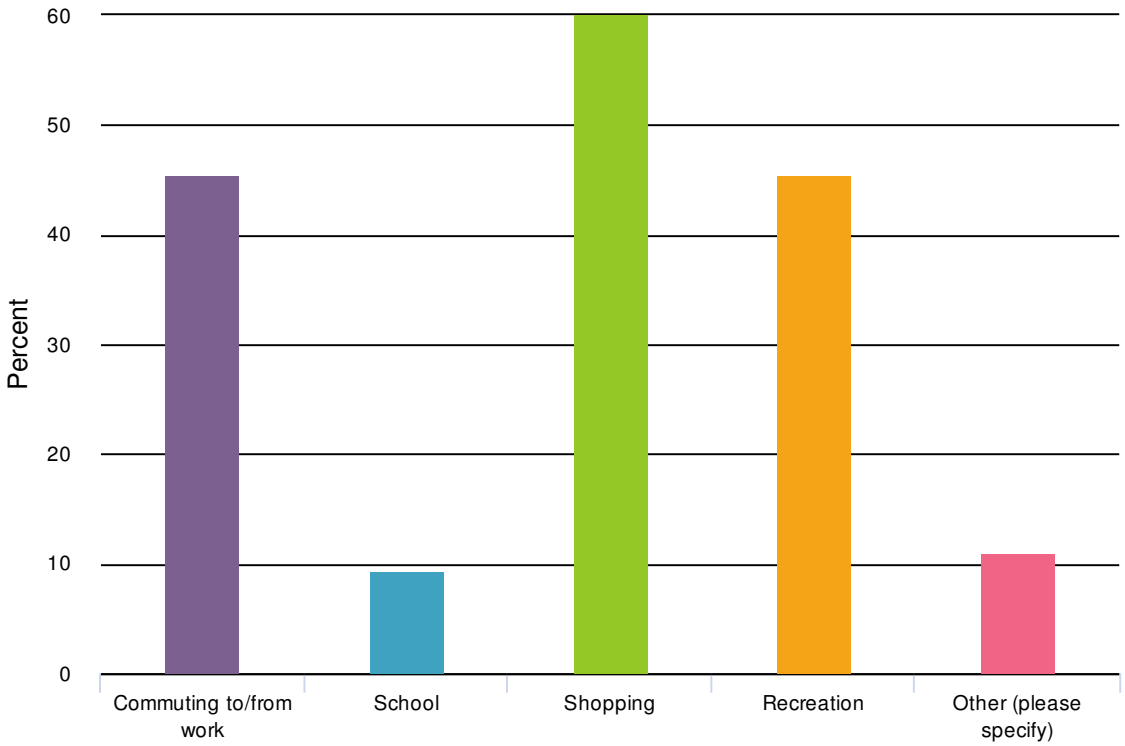
Tamalpais Drive / Paradise Drive

13. How do you normally travel through this interchange? Select up to 2



Value	Percent	Responses
Driving	91.9%	237
Public Transport	7.8%	20
Bicycling	31.8%	82
Walking	13.6%	35

14. What are the main purposes you use this interchange for? Select up to 2



Value	Percent	Responses
Commuting to/from work	45.5%	116
School	9.4%	24
Shopping	60.0%	153
Recreation	45.5%	116
Other (please specify)	11.0%	28

Other (please specify)	Count
Access north/south 101	1
Access to medical care and social connections	1
Business	1
Dr appointment	1
Everything??	1
Totals	27

Other (please specify)	Count
Family duties	1
Food, dentist, town hall visit	1
For everything, as this is our primary interchange	1
Getting between east and west parts of Corte Madera for everything	1
Getting to the other side of town for walks or meeting friends	1
Going to meetings, medical, volunteer work, etc.	1
Heading home	1
Musical appointments, health appointments	1
Resident	1
This is my closest entrance to 101. I use it for everything.	1
Visit Friends in the area	1
Visiting family	1
Visiting friends and famliy	1
Volunteer work	1
doctor	1
everything	1
everything else	1
first three reasons	1
medical	1
medical appointments	1
to the library and post office	1
travel north on 101	1
Totals	27

15. Please rank the following priorities for this interchange based on their importance to you:

	Not Important	Lower Importance	No Opinion	Somewhat Important	Most Important	Responses
Reduce traffic congestion Count Row %	19 7.5%	31 12.3%	14 5.5%	75 29.6%	114 45.1%	253
Make it easier to drive to and from this interchange Count Row %	33 13.0%	19 7.5%	32 12.6%	89 35.0%	81 31.9%	254
Improve the quality and access to bus stops near this interchange Count Row %	52 20.7%	31 12.4%	75 29.9%	55 21.9%	38 15.1%	251
Increase Park and Ride capacity Count Row %	68 27.0%	39 15.5%	96 38.1%	34 13.5%	15 6.0%	252
Make it safer to walk around this interchange Count Row %	22 8.7%	23 9.1%	39 15.4%	75 29.6%	94 37.2%	253
Make it safer to bike around this interchange Count Row %	27 10.7%	22 8.7%	29 11.5%	59 23.4%	115 45.6%	252

	Not Important	Lower Importance	No Opinion	Somewhat Important	Most Important	Responses
Improve lighting and security Count Row %	33 13.1%	32 12.7%	68 27.0%	79 31.3%	40 15.9%	252
Improve environmental sustainability and resiliency (e.g. protection from flooding and sea level rise) Count Row %	33 13.0%	29 11.5%	54 21.3%	83 32.8%	54 21.3%	253
Totals Total Responses						254

16. Is there anything else you'd like to let us know about traveling on or around this interchange? Please be as specific as possible.

ResponseID	Response
92	No, just testing the form.
269	Biking through this interchange is very uncomfortable, as you have to interact with speeding cars merging onto the free on-ramps. There is no physical separation between riders and automobiles. While I will ride this when forced to, I would never take a less experienced rider across the interchange, making it a massive barrier to commute and recreational travel.
330	Many of us in the community were very excited about the prospect of the wide multi-use path being attached to this overpass. It is extremely disappointing that this does not appear feasible.
334	Current bus stop arrangement is dangerous. Bus stops should be located so we don't have to walk across freeway ramps to get to them.
360	Between Sir Francis Drake exit and Tamalpis Drive on 101, there is a lane that ends without any warning . I believe it is after Lucky Drive. Must be a lot of accidents because it is without warning
369	Crossing the freeway on/off ramps on Tamalpais Drive on a bike feels really dangerous. Cars want to pass you and quickly make a right turn into the onramp, cutting you off. There should be dedicated bike lanes that don't just disappear, but are painted green and dotted, so motorists are reminded that they are sharing the road with cyclists.

ResponseID	Response
370	Add green lanes for cyclists. Make sure to have the green lanes continue in the line of bike travel when crossing merge lanes. Encouraging cyclists to deviate right, then left confuses drivers.
378	This interchange is also sinking. When entering the freeway from the west and heading north on 101 there is a huge dip down between the interchange and the road pavement where it is sinking. This has been getting much worse in the past five years.
390	--Add bicycle green lanes to the overpass. Be sure these lanes cross motor vehicle 101 ramp lanes in a straight alignment in the direction of intended travel. A zig-zag route confuses motorists.
396	Crossing the freeway on/off ramps on Tamalpais Drive on a bike feels really dangerous. Cars want to pass you and quickly make a right turn into the onramp, cutting you off. There should be dedicated bike lanes that don't just disappear, but are painted green and dotted, so motorists are reminded that they are sharing the road with cyclists.
417	This interchange is a MAJOR barrier between the bayside and mountain sides of Corte Madera. It separates students from their schools and from the public library in CM.
424	Though Manzanita is the worst for flooding I see this as an area where it will be a problem elsewhere
425	Given the number of traffic lights nearby, there needs to be better synchronization to accommodate the predominate traffic flows at different times of day. Access to the on- and off-ramps for 101 NB is often hampered by Sir Francis Drake/Richmond Bridge traffic, with drivers constantly using the exit-only lane to jump in front of other cars, preventing drivers intending to get off the highway from doing so without significant delay.
430	Paradise/Tamalpais is a tortured old interchange with a messy interaction with Paradise Dr. and San Clemente Dr. And, and as you know, the pedestrian/cycling experience crossing it is pretty bad.
435	I think car traffic flows somewhat well in the area. It's not super safe for walkers and bikers. The pedestrian walkways across the bridge and down to 101 is dark, small, and riddled with trash. There are usually some folks wandering about and spending time under the bridge with bags of something, not sure what, but not well kept.

ResponseID	Response
442	Address settlement on the east and west ends of the bridge (overpass) structure. Smoother transitional interface from structure to roadway surface. It's too bad that those working for the State seem to be totally ignorant about settlement issues and attribute all problems to climate change and sea level rise. Look at the NOAA data for 2 water level measurement stations one in Richmond and one in San Francisco. At those two stations, the water level (tides, etc.) trend has actually gone down slightly over the past 5 years.
447	I want a dedicated and protected highway on-ramp lane configured to funnel traffic off of east bound Tamalpais ave onto the south bound 101 freeway on-ramp. East bound Tamalpais ave has significant extra width approaching the onramp. Unfortunately there is a stoplight before the ramp, which allows cars exiting the Town Place Mall to access 101 south. In the last 7 years this intersection very congested during peak periods. Creating a protected third lane that does not have to stop at the light (with a merge on the onramp for cars coming from the mall) would reduce traffic congestion.
452	There is a plan developed by Skidmore Owings an Merril for a cantilevered walkway that would attach to the overcrossing. I understand it's in a bucket somewhere at Caltrans. Would very much like to see this idea pursued.
460	It is settlement that is a big problem with this interchange in that the overpass was built on pilings to bedrock and it doesn't settle like the roadway does. Hence the ski jump from the overpass to the street area. The traffic gets heavy around the holidays and at times of the day when schools down Paradise Drive start and end and the parents are driving their children. There is congestion and the signals at the junction of San Clemente and Tamal Vista meet are not timed correctly and there is a lot of waiting time.
464	The pedestrian crossing at the west exit onto 101 N should be moved.The location is dangerous. It is too much in the curve and drivers don't realized there is a crosswalk there. It is the only way to access the bus pad on that side of the overpass. There is too much curve at the top of the overpass. Is there a way to level it in the center so cars don't rear end each other? It's a dirty and ugly overpass. A crosswalk on each side would be great as well.
471	Worst thing: Getting onto 101N from the west is always a nightmare because of the northbound backup for the SFDB exit. Additionally, traffic light timing disadvantages residents on the west side of 101. After waiting at the 101N exit stoplight, we turn left and are *always* forced to then wait at the 101S exit stoplight, with two additional stoplights immediately thereafter. Driving Tamalpais eastbound *to* the interchange, I'm often forced to stop at *4* stoplights consecutively before getting onto 101N. The south Town Center exit and 101S exit stoplights s/b better coordinated to effectively reduce our stoplights by one. Thanks!

ResponseID	Response
472	I walk with my 3 year old through this intersection frequently. My top priority is to make it safer to for pedestrians and bikers to get across the freeway. Would it be possible to make a path specific for foot and traffic?
474	There is no bike path or walking path to safely cross the freeway.
475	The traffic southbound 101 going in and out off Mill Valley could be improved. Congestion is a constant issue even during covid and reduced traffic numbers. MAny have expressed interest in completing this important nexus for the north south greenway biking paths and connectors.
487	The pedestrian and bible routes through here are dangerous for my children. Need to get rid of the homeless under the freeway, or make it safe to walk or cycle over the top
493	Eliminate the entrance/exit from Town Center and the associated stop light. Bad timing of lights often backs up cars to the 4stop intersection and the bus pad becomes somewhat dangerous. There just isn't enough space between lights, and the flow of traffic to the southbound on ramp could be much smoother as a result. If you can't eliminate the exit, fix the timing so one or two cars exiting the mall don't trigger the light and create backups.
496	This interchange is frequently backed up with traffic which appears to be stemming from the 580 exit up the highway - many people travel in the exit lane and get back onto the highway at the last minute which also backs up the exit traffic. Traveling in the bike lane east is horrendously unsafe with the highway onramp in the current configuration without any bike lane mapping on the road way and lack of signage.
499	Extend the northbound exit-only lane another 100 yards and make it "impossible" for lane runners to slam on their brakes in order to force their way into through traffic. Very dangerous on two counts.
527	To much congestion between this interchange, Fifer, and 580. Causes backups every evening during commute hours. Backups extend to Mill valley
535	The Paradise Drive/Tam Drive intersection is responsible for miles of slow northbound traffic every commute afternoon. It impacts all the way back to Sausalito and is one of the only remaining traffic choke points on 101 in Southern Marin. It clears up just north of it. There has got to be a solution. It has been happening for years with no fix. It is so bad that I plan my day/evening/kids school events around knowing I will crawl from the SausalitoMarin exit to Greenbrae every afternoon if I don't leave before 3:30. Please clear the Paradise interchange log jam!! Thanks

ResponseID	Response
569	There's always congestion on the freeway created by having two onramps going north onto 101. Cars have to merge with those two lanes and then merge again with the freeway lanes. Maybe there should be two onramp lanes going north on both sides to allow better merging before getting onto the freeway. These onramps are too close to the Lucky Drive offramp which causes congestion due to cars changing lanes to get on and off the freeway.
574	Riding a bike over the freeway is always an adventure and can be quite scary. Cars trying trying to turn right onto the freeway as I am trying to go straight over the freeway is difficult with large potential for conflict between the cars and bicycles.
579	Smooth flow on to Hwy 101 in the event of need to evacuate is very important.
583	Cycling and walking across the overpass is unsafe and scary. (all ramps and directions) Pedestrians are shunted to spirals, stairs, and underpasses. Narrow traffic lanes, add raised bicycle paths on both sides with raised crossings of on-ramps to force cars to drive at safe speeds. Reconfigure S/B on-ramp to 101 from Tab Drive for cyclists and pedestrians.
592	just provide a wider shoulder or protected bike lanes,
594	Pedestrian and bike access to cross 101 is really difficult here. Bikes have to share a narrow bike lane with traffic and the pedestrian section of the bridge is very narrow and only on the south side. There is a lot of room for improvement here.
595	Traffic flow east bound is poor. Too many people trying to change lanes in short distance to go to shopping center, take 101N onramp, or get in lane for Paradise Dr when on-ramp traffic is backed up.
601	entering 101 traveling north from the east side of Corte Madera has a very short merge lane. I am not sure if this is why the fence is always torn up but I am aware of how quickly you need to decide to merge or wait for an opening. The merge should be of a greater length for safety reasons and there should be a guard rail between the merge lane and the fence.
615	Many cars get off 101 south in the evenings only to get back immediately going north to try and beat 580 traffic. It causes terrible congestion. Please fix this.
638	It is prone to flooding, and an eyesore, often full of litter
644	not sure it needs expensive modification at this time. age is not a factor. my car is old as well, still works fine this intersection seems to work fine as well.

ResponseID	Response
654	It's really unpleasant for pedestrians and bicyclists and sometimes feels unsafe, since you have to travel under the overpass to access the stairs. Doesn't feel good at night when walking alone. A separate, landscaped pedestrian/bike overpass would be so much better. We'd love to be a pilot for this type of project!
668	This is a clusterfork of congestion and Caltrans knows it. Fix it.
678	This interchange is the cause of a frequent backup of northbound 101, mostly in the afternoon. The problem is the volume of traffic entering the freeway in combination with the volume of traffic moving into the rightmost lanes to exit at the next interchange towards the Richmond Bridge. The solution is obvious: BUILD AN AUXILIARY LANE ON NORTHBOUND 101 BETWEEN PARADISE AND SIR FRANCIS DRAKE EXITS!! The stretch between these two interchanges also needs to be raised because of sea level rise.
683	Fix the bump on the northbound ramp
730	This exit is one of 3 exits that are too close together to make it safe. Perhaps removing Madera (southbound) would help between Lucky Drive & Tamalpais/Paradise Drive.
769	To move on foot between the shopping malls east and west of the 101 freeway is almost impossible. Please consider ways to connect the two malls (and their attendant bus stops) with a more pedestrian friendly and faster route/system that does not involve walking dangerously close to the freeway. Some trees or bushes separating cars from walkers, or an alternative bridge would be ideal.
777	this is one of 3 key chokepoints in southern Marin; the others being Sir Francis Drake eastbound and I-580 eastbound, both just to the north of this one. more comments to follow on the Drake east bound link.
778	N and S exits blind and dangerous
819	We need more park-and-ride options for public transit! It's crazy how few parking spaces we have at bus stops. And the bus stops that are right off the highway Are so dangerous, how are people supposed to get to them without walking through an exit?
870	I ended up at the bus stop on the northbound side of 101 once. It was very difficult to figure out where to walk safely to get up to Paradise Drive. There were really no signs at all, and you have to walk across the exit or on ramp, and I don't believe there was even a painted crosswalk or any signs to let drivers know that there could be pedestrians crossing the ramp. Very dangerous!

ResponseID	Response
945	Southbound exit dangerous with the short merging between madera Blvd
967	Short merge onto 101 north and south needs to be addressed
974	Going northbound this interchange works well. Going southbound it is too close to the Madera Blvd. entrance.
1020	Terribly hazardous interchange, with high auto speeds and multiple on and off freeway makes for a frightening experience for anything but a SUV/Truck! This critical interchange could create a beneficial connection between two shopping malls by design safe passage for bicyclists and pedestrians!
1028	This can be a dangerous intersection where the traffic merges.
1078	101 N, just north of Tamalpais Drive, the freeway bottlenecks from 5 lanes to 4, creating a backup. It is 4 lanes for a about a 1/4 mile before it opens up to 5 lanes again and traffic is relieved. I hope the county is considering widening this short stretch of 4 lanes.
1080	Hard to find the bus stop. Bus stops should be a comfortable and safe place to wait for the bus.
1085	It's a crazy intersection.
1108	The fact that there are 2 entries northbound to 101 causes incredible back ups on the 101 all the way to Strawberry. This interchange needs to be reconstructed in conjunction with SFD to streamline North and East bound (Richmond Bridge) traffic.
1136	Please improve pedestrian access and safety at this location, particularly for bus riders accessing both the north-and the southbound bus pads. Such access should be on the shortest and most direct route from the nearby roadways as possible. Furthermore, there should be crosswalks installed, with appropriate signage and possibly also traffic safety devices such as HAWK or other types of traffic signals, to help protect pedestrians and ensure their safety when crossing streets and on ramps.
1157	Leaving tam rd going North into the freeway is crazy. Cars are merging, exiting while you are trying to enter and no space to safely merge.

ResponseID	Response
1179	The accessibility to all persons using all modes, including persons with disabilities must be improved greatly at this interchange. The existing pedestrian over crossing spiral ramps are far too steep and the sidewalks are too narrow, too steep, and have too many wide joints/cracks and vertical offsets due to settling, etc. The northbound afternoon/evening backup of traffic from Sir Francis Drake off ramp area is a HUGE problem for many many people on a daily basis. Traffic backs up all the way to the Marin City area regularly and sometimes up the grade to the Robin Williams Tunnel.
1225	Driving east on Tamalpais and then heading north requires two quick merges on 101 North -- with vehicles already on the highway and with vehicles coming from the Village. It can be quite nerve-wracking.
1265	Traveling north 101 traffic seems to consistently slow at this exit. There seems to be too many on-ramp options and the metering lights are not active. Seems to force traffic into outer lanes and when HOV lane is active there are only two lanes for traffic flow.
1273	The double lane 101S entrance needs safety improvements to remind drivers to yield to cyclists continuing along Tamalpais to Paradise.
1276	There needs to be better directional signs for biking over this intersection in both directions. Its a very popular bike route.
1277	Getting on north 101 from Paradise Drive: It is difficult to merge safely here. I look and look. I match my speed to merge. I have a clear lane and then suddenly someone has decided to change lanes at the foot of the on ramp because they want to get into the far right exit only lane to SFDB. You can't see them. And they don't slow down, because they have the right of way. However I don't believe they should change lanes at the foot of an on ramp.
1292	That's all the questions? There needs to be a light here so that traffic coming out of the Cost Plus/Trader Joe's center can reach some level of sanity.
1326	Safety while driving - traffic congestion and the safety of driving through this interchange should be together.
1330	We need wider lanes especially when cars are merging towards Lucky Drive Bus pad. Buses can't get through because of cars merging On a one lane and causes major delay .
1343	In its current configuration, it is near impossible to ride your bike with a child across from one side of 101 to the other. It is hands down one of the worst places to ride a bicycle in this part of Marin at the moment. Even as a very confident, tall and very visible bike rider, I still feel very exposed when crossing over 101 at this intersection.

ResponseID	Response
1347	Afternoon north bound 101 traffic slows to a crawl. These drivers are crossing to the East Bay. There is insufficient road capacity for the need to cross to the East Bay.
1351	Super duper dangerous access to bus stop that picks up on 101. It's insane. People walk across the on ramp. It feels like this design was conceived in the early 50's when people ate heavy metals, drank rubbing alcohol, and inhaled tobacco more than oxygen.
1381	No.
1397	ZERO VISIBILITY: When exiting from the south and turning left (west) towards Corte Madera and Larkspur, you can't see over the concrete wall. Lots of red light runners coming from the overpass. Dangerous combination. Also obviously dangerous for people who must take the bus.
1430	1. This interchange is the first cause of heavy backup on northbound 101 to the Richmond Bridge. 2. Separate merges onto north 101 from both west and eastbound Tamalpais Dr. cause increased congestion. 3. The "exit only" lane from northbound 101 to Tamalpais causes late-merging backup as people merge left to stay on 101 North. 4. Instead of "exit only" northbound to Tamalpais, let that right lane to continue all the way to SFD exit. Combine this with merging east/west Tamalpais onramps together before they merge onto 101 north via the additional lane carrying over from previous "exit only" lane.
1465	please eliminate right-on-red please add bike lane
1476	This interchange slows traffic significantly from those entering Northbound 101. Carpool is crossing over toward the bridge exit and those coming on are crossing the opposite way to get on 101.
1490	The speed limit is too low. If you took a speed survey it would be 30-40mph average across the overpass
1517	There are two major issues around this intersection: 1) Northbound 101 has a single lane that starts in Mill Valley and ends in Corte Madera. As traffic increases cars spill into the right lane only to have to merge a half-mile later -- the merge leads to a lot of braking and congestion. I suspect that if you could prevent traffic from using this lane as a short cut it would reduce traffic. 2) Please include/require integration with city of Corte Madera traffic planners. The malls sitting on either side of the freeway are a major contributor to traffic.
1523	Expand 101 for more lanes

ResponseID	Response
1534	I know of cyclists who have been hit as cars turn right on red without stopping. The bike lanes should be clear and marked along this intersection - an easy fix!!
1547	Difficult to avoid southbound 101 exiting vehicles while trying to merge onto southbound 101 from the southpound onramp at north end of Corte Madera Town Center because this traffic must cross each other.
1591	While heading north, I don't find this exit to be used super heavily in comparison to the Sir Francis Drake Blvd exit. Therefore, the fifth lane (exiting lane with dashed lines) beginning at East Blithedale Avenue / Tiburon Boulevard if cut short too soon. The fifth lane exits at this exit, causing a break in the fifth lane, and then picks up again with the northern onramp of this exit. This break in the fifth lane diminishes the value of having the 5th lane because it ends too soon.
1599	Making the crossing over the freeway to the other side for recreation walking or on a bike is confusing, anxiety producing, and dangerous.
1600	It would be AMAZING if there was a way to walk between the two malls using the North side of the bridge. The current pedestrian path on the South side of the bridge is not very friendly (lots of up/downs, limited visibility around corners to see others coming).
1672	Trying to get on NB 101 then, immediately having to exit to sit in traffic then get back on the freeway is ridiculous. So many people just cut over, dangerous!
1677	This interchange is absolutely one of the main causes for the awful daily commute traffic that happens. This area gets so congested, because there are TWO merging areas in a matter of 500ft. There is no on-ramp signal or anything to help space out drivers. I'd say this interchange and the one near Strawberry/Tiburon are absolutely the worst in terms of creating traffic congestion.
1705	As a bicyclist, the bridge over 101 (and the four merge-lane crossings) is the single hairiest place to ride of any bike 'route' in Marin. Walking or biking under the freeway isn't much better, with scattered homeless zombies, garbage, and poor lighting; it'd likely be voted The Most Likely Place to be Murdered in Southern Marin.
1711	Walking across the interchange is tricky due to the bus stops being located on the opposite side of the walk path that crosses the bridge. Walking to the East freeway bus pad is also tricky as it involves walking across active traffic entering the freeway. Walking to the West freeway bus pad is tricky and even dangerous at night. The official path requires you to go under the overpass, where often homeless people are sheltering from rain/weather, in addition to there being no dedicated lights for that path.

ResponseID	Response
1736	Very dangerous trying to ride bike or walk over this pass.
1738	Sooooo dangerous for cyclists and miserable for pedestrians as well.
1757	The Town of Corte Madera is bisected by 101. Improving the function of this Intersection, especially from the perspective of those walking and on bicycles, would help knit together the two halves of the Town. It could also help transit, and even shopping on both sides of 101. Introducing a wide cantilevered walkway on the North side of the bridge would help a great deal.
1772	change flow on 101 north and Tamalpais Drive; too many entrances in short area.
1781	This overpass dissects Corte Madera and it is unsafe to walk or bike over it as it is. I think it should be upgraded for safe walking and biking.
1796	The signage WB is inaccurate and requires last-minute lane changes to enter 101 in the correct direction.
1823	this onramp and interchange results in the major bottleneck that pushes traffic back to Sausalito regularly. the removal of lane for exit only and the subsequent mutlitple onramp points cause significant slowing. It is long overdue for a full revamp including consistent lanes through to SFD and north
1829	As a driver I feel for walkers and bikers because the car rules! Need bike lanes on overpass and better access for walkers.
1836	A pedestrian & bicycle overpass in this area would be so wise for a CM million reasons. You know what they are.
1852	Casa Buena Drive, the 101 service road is HORRIBLY neglected, ignored, poor lighting, poor surface quality crowding by trucks dropping off cars and Marin Joes blocking the road with valet and drunk patrons entering or exiting the restaurant. EXTREMELY dangerous and neglected road with NO lighting, NO appropriate pedestrian sidewalks south of Marin Joes, poor bike / road sharing. It has been on the planning for upgrade for years and NEVER happens. People will be killed before you pay attention and FIX IT.
1860	The pedestrian paths are currently narrow and roundabout. Make them better.
1865	I like to see a clean and safe walkway connecting east side of Paradise to the west side of Tamalpais. Having a open air clean, safe walkway will allow for walking, not having to use a car to get from one side to the other side, running for exercise.

ResponseID	Response
1866	This intersection exits onto 101 North in two places and adds two lanes of traffic onto 101 North without an added lane on 101 North to handle the entering cars. Therefore, 101 North becomes overloaded and traffic on 101 North stalls here everyday during evening rush hour. This could be easily relieved by adding one more traffic lane on 101 North between this intersection/on ramp and the off ramp/intersection for Sir Francis Drake Blvd and the RSR bridge. This is "a quick and easy fix" that would make a world of difference to 101 Northbound every single day of commuting.
1867	This is one area in Marin that calls to pedestrians -- because of stores, open spaces, library, etc. -- yet asks us to take our life in our hands if we want to walk here. This whole area should be redesigned for pedestrians.
1905	If there are pedestrians in the crosswalk near Macy's (San Clemente, then right on Redwood Highway), and a car waiting to turn right onto Redwood highway, the traffic will be backed up on San Clemente - since most drivers are turning left to get the north or south bound freeway ramps or Tamalpais drive.
1906	This interchange frequently floods.
1952	Proposal to change Eastbound Tamalpais on-ramp to Northbound Hwy 101 configuration. Tighten the radius of the curve to allow traffic to pass between the East/Westbound overpass support structure and the pedestrian spiral walkway. Extend the length of the onramp, parallel to Northbound 101, to allow merging with traffic from Westbound Tamalpais on-ramp to Northbound 101. Both on-ramps would require traffic metering to allow efficient merging to Northbound 101. This proposal may require 100 shoulder widening to extend the Highway 101 merge lane. Proposal could be a short term fix to current traffic congestion on 101 before having to perform reconstruction.
1963	Dangerous merge
1965	The North bound onramp to 101 N at this interchange is the cause of everyday backups on 101N that extend South into Mill Valley during afternoon commuter hours. Once cars pass this interchange on 101N the traffic drops substantially. This is based on observations commuting over 20 years.
1990	I would suggest that the two lanes be marked so drivers know before hand which lane to get into if you are going north on 101 or simply going straight thru to Paradise drive . The town of corte madera has a long history of vehicles abruptly changing lanes and having accidents on the overpass . My car was totaled while stopped on the interchange several years ago while drivers were changing lanes at the last minute . Also we need to fix the back up on 101 north from Sir Francis Drake to Tamalpais. 100 word limit not helpful.

ResponseID	Response
1998	I heard of a plan to connect 101 directly to Richmond bridge. That is 100% most important. This interchange is a mess. I won't list the issues here - you know them.
2004	This interchange across the highway is a nearly complete barrier to bike and pedestrian use, effectively dividing the two halves of Corte Madera as well as the shopping center into separated entities only accessible safely by car. I can't think of a higher priority to get started on, with more potential to improve biking and walking alternatives to driving, than at this location.
2025	The right turn lane onto San Clemente Dr should be removed. It is setup to encourage drivers who just got off the freeway to continue at the same speeds, endangering pedestrians and cyclists. It should be an ordinary right turn at the light.
2057	There are no lights on this freeway. Look at other cities and states where roads are well lit.
2058	The overpass bridge is extremely dangerous. I have been crashed into and seen accidents; primarily Eastbound towards Paradise Drive. One help: install sign "NO RIGHT TURN ON RED" off 101 southbound to Paradise Drive. cars do NOT EVEN STOP! forcing others to hit brakes. As a car approaches San Clemente/Paradise interchange from the overpass there are three choices; hard to distinguish if one is unfamiliar. Also two pedestrian crosswalks. Once cars decide they can turn on red off 101, without even stopping, they clog traffic. Stop making right on red an ENTITLEMENT! At Vintage Oaks it is not allowed.
2103	The Madera Blvd. exit /entrance Southbound relieve congestion at the Paradise Dr/Tamalpais Drive Southbound exit/entrance ramps. It functions well at all times of the day/night under normal traffic flow conditions. I think the work that Corte Madera is doing to mitigate flooding effects from climate change will help a lot as will the mitigation work that CalTrans has recently completed on our Bayside.
2106	Consider what is a "want" as compared to a "need". For example, do we really need improvements anywhere at this time ?
2111	It would be great if we can put up sound barriers on the side of the highway leading up to this interchange, coming from Sausalito on the eastern side of 101. There are a lot of homes that are right next to the highway in the Madera del Presidio neighborhood, and the sound barriers would greatly reduce the noise pollution that arises from the highway and the neighborhood being right next to each other.
2120	From the Lucky drive exit to the madera exit and then to the tamalpais exit is an exceedingly dangerous route because in order to exit one has to enter the same lane as the cars entering that lane and the distance to do this safely is not adequate.

ResponseID	Response
2126	Lots of traffic back-up to get onto northbound 101 causes people to purposely drive in the left lane and then cut in front of people at the last minute to get into the right lane and onto the onramp. This has been an increasing issue as cities and towns create traffic calming measures and try to change the flow of traffic.
2137	Seems very dangerous now to bike or walk through this interchange. The bike danger is obvious, but the danger to pedestrians trying to get across the 101N off-ramp is also high. Drivers are looking to the left in order to turn right on red, and pedestrians are trying to cross from the right, and may not be seen by drivers trying to make a quick right turn.
2168	safety for vehicles as well as pedestrians.
2170	As both a driver and cyclist, we REALLY need improved bike lane space on the overpass and clear road painting and signage to protect cyclists from motorists using the circular 101 on ramps
2181	Going east typically gets backed up, especially during the holidays and school hours. Because of the traffic, cars will jump into the right lane after passing the light and often stop waiting to enter the lane so they can enter the 101N. Additionally, the crosswalk on the right hand side is quite dangerous as many cars don't stop for pedestrians who are crossing the street where the on ramp is.
2188	Given that RoundAbouts are known to 1. cost less overall and overtime, 2. improve traffic flow, 3. reduce fatal pedestrian accidents, 4. reduce carbon emissions from idling cars that sit uselessly at lights, 5. save the public money because they aren't wasting gas sitting idly at traffic lights and in traffic... WHY! isn't Marin County beginning the transition to RoundAbouts for all these areas you have listed in your survey. WHY! are we spending a ridiculous amount of money on traffic lights? https://freakonomics.com/podcast/roundabouts/
2209	primary site of congestion caused by old egress points for 1960's level traffic. make this major interchange since it serves 3 nearby shopping centers and 2 cities. coordination with Drake Blvd and Larkspur interchange must be done together and in conjunction with new I-580 interchange.
2252	Please make a dedicated on/off ramp on the northbound lane from the 101 entrance at paradise drive to the next exit.
2270	The biggest problem is the on-ramp from this interchange going north on 101. Cars are entering the highway here while other cars are merging right in anticipation of the next exit toward the Richmond Bridge. This has a huge slowdown effect on all traffic heading north.

ResponseID	Response
2274	This is a second suggestion for SFD exit, not enough words available. I feel I go in circles trying to cross 101 at SFD. Coming from SFD heading eastbound, for example, to Trader Joe's, I have to get on 101S, get off at Lucky Drive, then circle around to Redwood Highway. Many people do this and it creates a lot of traffic. Having an overpass connecting SFD with Redwood Highway would work, or, having a way when you are on SFD and crossing 101 before Marin Mart, to be able to loop to the right to access Redwood Highway.
2319	Very concerned about traffic congestion and speed limit enforcement between this intersection and downtown Larkspur. With sea level rise this will likely become primary north south route if 101 floods. Recommend developing the old train track lines and tunnel as supplemental car/bike lanes to provide north south expressway access from Mill Valley without bottlenecks through Larkspur and Corte Madera
2325	Heading eastbound on a bicycle, drivers do not respect cyclists who are attempting to stay straight on Tamalpais Boulevard and use the overpass. Instead, drivers aggressively cut off cyclists while accelerating onto southbound 101. This overcrossing needs a green-painted bike lane, including through intersections, from the last stoplight on the east side all the way to the auto dealerships on the west side.
2364	Northbound direction from Tamalpais, the onramp merges with the freeway, causing a backup. The onramp should merge with the dedicated lane from the Paradise onramp, not the freeway. Also, the dedicated lane expands to two lanes before Lucky Drive. The double lane should be extended all the way back to the Paradise onramp. That way, it would be easier to merge the two onramps headed onto northbound 101.
2386	Biking across this interchange is a nightmare.
2392	Eliminate "exit only" lanes of 101 on/off ramps. When the on-ramp enters into an "exit only" lane, it creates so much urgent lane-changing, which causes traffic on 101 to bottleneck around these interchanges.
2478	A large amount of traffic is generated by vehicles trying to reach shopping centers or cross from east to west to access schools and surrounding businesses.
2481	It is very scary to bike over the freeway crossing and the tight spiral pedestrian passage does not work well for bicycles. Also, the sidewalks along the freeway bridge are very narrow and do not easily accommodate both pedestrian and bicycle. I especially worry when I am in the traffic lane and must cross the freeway on-ramp.
2503	Nothing will be solved unless one of the two northbound onramps is eliminated. This traffic is solveable.

ResponseID	Response
2548	Improve exit systems to show which lanes for each direction. Signage unclear
2554	20% of car trips are of < 1 mile, 48% are < 3 miles, 95% are < 30 miles,the average 5.95 miles.Allow only 66% of any vehicle roadway to be allotted to cars,34% to bicycles.Imagine how many fewer cars there would be on the roadways if 48% of drivers could bike to their destination!Even if only 20% biked instead of drove, the improvement in congestion would be huge.Goal of infrastructure design should be to encourage as many people as possible to cycle by improving cyclists' sense of security.Review "Focus on Cycling - Copenhagen Guidelines for the Design of Road Projects".
2578	This could be a safe way for my kids to get to school, the library, sports and the mall by bike. It is just too weird and dangerous. Adding a separate bike/pedestrian overpass would dramatically change life!
2581	Riding across the bridge in either direction is dangerous
2595	ALWAYS a DANGER to cyclists riding over this overpass. ☹
2598	The northbound on ramps from Tamalpais are a train wreck and need to be timed.
2606	Combine the two northbound 101 on ramps into one plus an auxiliary lane to stop the backups to Sausalito. Make an all ages and abilities biking and walking class 1 path connecting east and west Corte Madera and also to the north and south 101 bus pads. Keep the bus pads on the freeway to prevent additional bus delay.
2681	This intersection is one I regularly use. Above photos mention "Mirando al Oeste" which is incorrect; I've never heard of this street and can't find it on Google Maps in Corte Madera. Drivers are spectacularly badly behaved and ignorant about which lane to use coming from San Clemente Drive North through stop light and west to Tamalpais Drive. They frequently use left lane so they can gain a few car lengths and then dangerously cut in front of other traffic to either go north on US101 or to take south bound US101 on ramp on west side of overpass.
2684	works pretty well for driving, very dangerous on a bike.
2697	Too dangerous for anyone but experienced bikers to use this intersection. Dangerous for pedestrians also as they have to cross over highway entrances near two big malls. The malls attract traffic that is not local and may not be looking for pedestrians. Entering the highway going north is problematic as the entry is right around where people already in the highway start to move over to the right hand exit for the upcoming exits a bit north of Paradise.

ResponseID	Response
2702	Bike lanes too narrow when going eastbound over freeway. Both east and westbound have risks of bicyclists getting hit by motor vehicles entering 101 on-ramp.
2757	The sidewalk is very tight. People walking on the north side of the structure is very dangerous
2759	This interchange could benefit from stream lining the consecutive on-ramps in the NB directions to alleviate PM back-ups all the way to Mill Valley. Creating a more walkable and bike friendly crossing at US 101 to connect the two shopping center could help reduce congestion.
2801	Traffic backs up trying to get to east Corte Madera
2820	I'd love to walk with my toddler in a stroller here, but it's not safe.
2830	This is the main traffic bottleneck on 101. You can see the northbound traffic in the afternoon ending here. All the merging that goes on into an existing lane is just terrible. Adding a lane from this to the Richmond bridge exit (the next one) would be huge to making the traffic here way better.
2832	The crosswalk on the on-ramp to US-101 North is atrocious; cars are usually going around 25-30mph (40-49kph) and have little incentive to stop. In addition, there is no lighting which makes pedestrians very invisible at night. Drivers don't expect to stop here, either; once I was waiting at the crosswalk (at night) and a car stopped for me but the car behind them was not expecting them to come to a full stop and did not react in time: they swerved left, honked, and clipped the rear driver-side taillight and fender of the stopped car.
2869	If the interchange was reconstructed to provide a left turn from Tamalpais to the on ramp or alternatively a left turn from the shopping center, one of the on ramps for northbound traffic could be closed and alleviate the backup on 101 by the merging traffic. There are too many cars trying to merge with the two on ramps, and making one ramp with a left turn arrangement might eliminate some of the tie up. Traffic tends to flow somewhat after until Lucky Dr.

L. Existing FEMA Map

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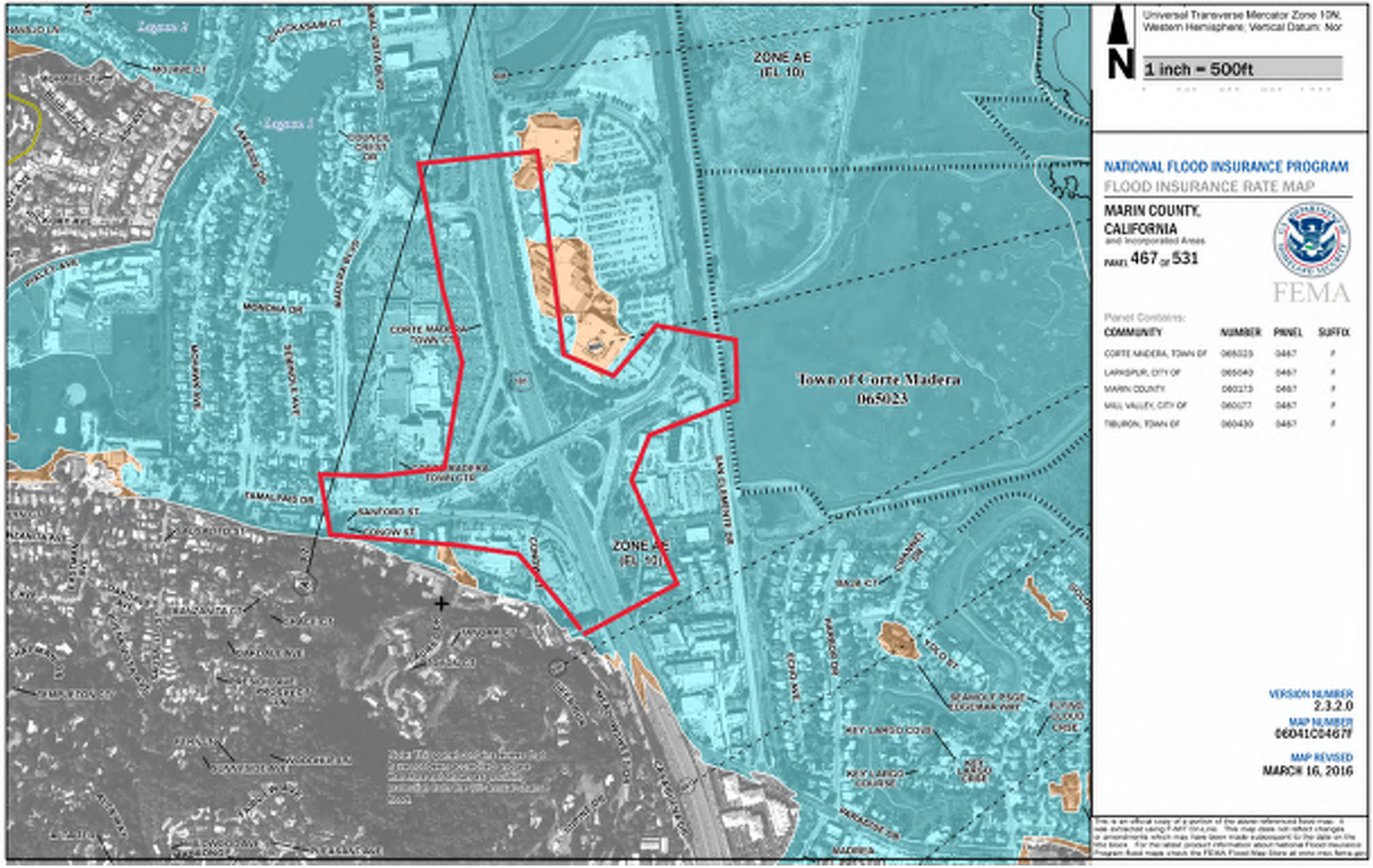

Figure 1. FEMA Flood Insurance Rate Map

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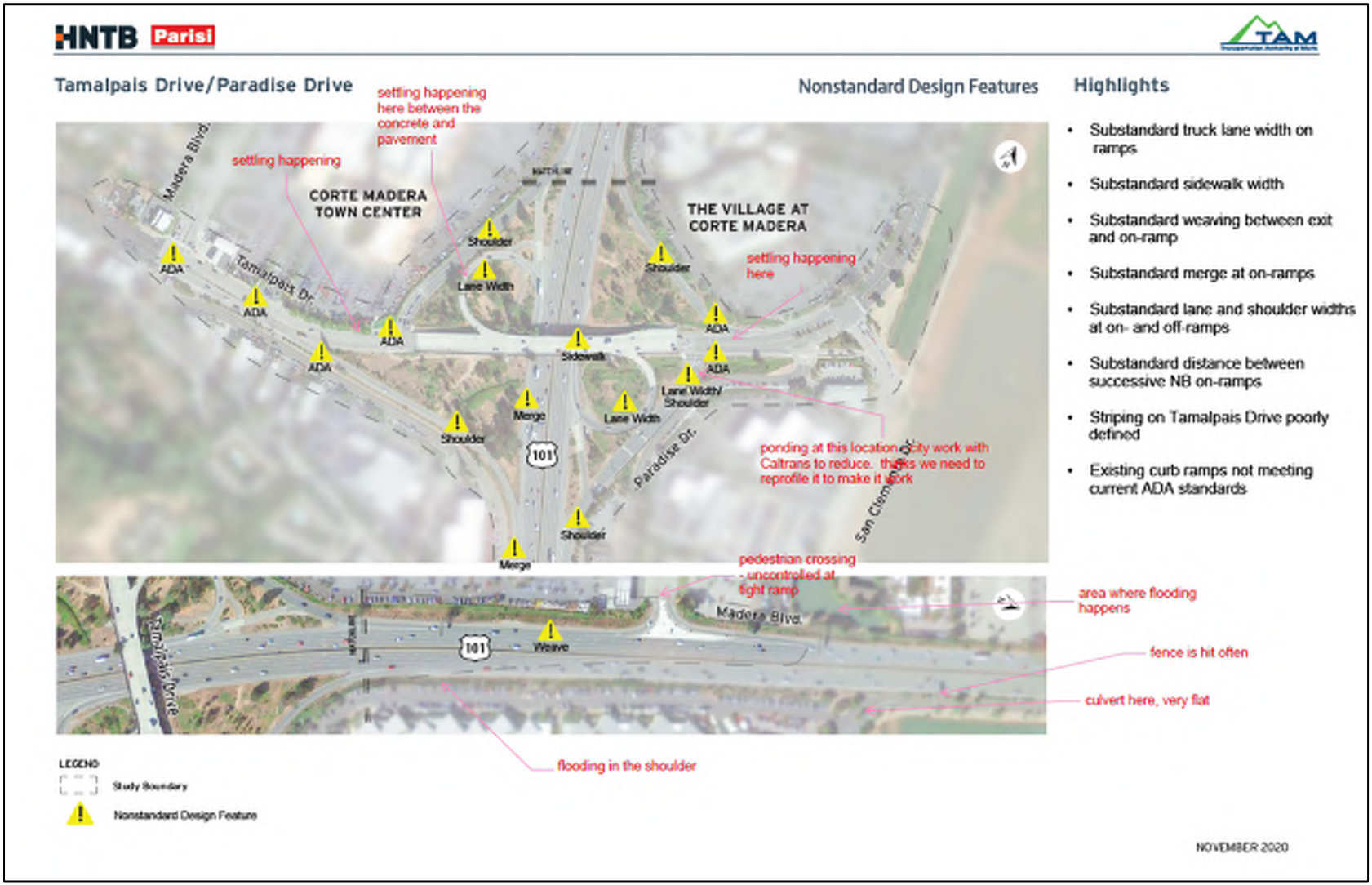

Figure 2. Tamalpais Drive/Paradise Drive Nonstandard Design Features