Transportation Concept Report

State Route 1 North

District 4

September 2021

California Department of Transportation

"A brighter future for all through a world-class transportation network"

Approvals:

Ephrem Meharena	09/27/2021	L Tawansy	9/29/2021
JEAN C.R. FINNEY	Date	DINA EL-TAWANSY	Date
Deputy District Director		District Director	
Transportation Planning and Local Assistance			

Stakeholder Acknowledgement:

District 4 is pleased to acknowledge the time and contributions of stakeholders and partner agencies to this TCR. Development of System Planning documents is dependent upon the participation and collaboration of key stakeholders. This TCR represents a cooperative Planning effort for State Route 1 North. Representatives from the National Park Service, Marin and Sonoma Counties, Transportation Authority of Marin, Sonoma County Transportation Authority, Kashia Band of Pomo Indians, communities, and other local jurisdictions provided essential information, advice and feedback for the preparation of this document.

Document Preparation

This State Route 1 North Transportation Concept Report was prepared by:

MIKE JONES
Associate Transportation Planner
Office of System and Regional Planning
System Planning North Bay and Peninsula Branch

KELSEY PETTIS
Associate Transportation Planner
Office of System and Regional Planning
System Planning North Bay and Peninsula Branch

JOSEPHINE HSAI
Senior Transportation Planner
Office of System and Regional Planning
System Planning North Bay and Peninsula Branch

STEPHEN H. YOKOI, AICP
District Office Chief
Office of System and Regional Planning

TABLE OF CONTENTS

List of Figures

List of Tables

CALTRANS MISSION & GOALS

MISSION	Provide a safe and reliable transportation network that serves all people and respects the environment				
CORE VALUES	ENGAGEMENT	EQUITY	INNOVATION	INTEGRITY	PRIDE
	We inspire and motivate one another through effective communication, collaboration, teamwork, and partnership.	We strive to eliminate disparities while improving outcomes for all.	We are empowered to seek creative solutions and take informed risks.	We promote trust and accountability through our consistent and ethical actions.	As one Caltrans family, we are proud of our work and strive for excellence in public service.
STRATEGIC IMPERATIVES	STRATEGIC IMPERATIVE 1	STRATEGIC IMPERATIVE 2	STRATEGIC IMPERATIVE 3		
	Improve and expand community partnerships, especially in underserved communities.	To the maximum extent feasible, align financial investments to deliver on State goals and Caltrans' strategic outcomes while maintaining a fix-it-first approach and staying within existing funding frameworks.	Commit to equity-focused actions that make advancements in the areas of People, Programs and Projects, Partnerships, and Planet, as referenced in Caltrans' Equity Statement.		
GOALS	Safety first	Cultivate excellence	Enhance and connect the multimodal transportation network		
	Strengthen stewardship and drive efficiency	Lead climate action	Advance equity and livability in all communities		

ABOUT THE TRANSPORTATION CONCEPT REPORT (TCR)

System Planning is the long-range Transportation Planning process for the California Department of Transportation (Caltrans). The System Planning process fulfills Caltrans statutory responsibility as owner/operator of the State Highway System (SHS) (Gov. Code §65086) by identifying deficiencies and proposing improvements to the SHS. Through System Planning, Caltrans focuses on developing an integrated multimodal transportation system that meets Caltrans goals: safety first, strengthen stewardship and drive efficiency, cultivate excellence, lead climate action, enhance and connect the multimodal transportation network, and advance equity and livability in all communities.

The System Planning process is primarily composed of: The District System Management Plan (DSMP), the Transportation Concept Reports or Corridor Plans, Comprehensive Multimodal Corridor Plans (CMCP), and the Multi-Modal Operations, Non-SHOPP, Transportation Equity Report (MONSTER) Project List. The DSMP is a long-range strategic policy and planning document that focuses on maintaining, operating, managing, and developing the transportation system. The TCR is a multi-jurisdictional planning document that identifies the existing and future route conditions as well as future needs for each route on the SHS and informs the MONSTER Project List. The CMCP is a more complex document that identifies future needs within corridors experiencing or expected to experience high levels of congestion. The MONSTER Project List is a list of long-range conceptual, planned, and partially programmed SHS transportation projects used to recommend projects for funding. These System Planning products are also intended as resources for stakeholders including the public and partner regional and local agencies.

The TCR includes detailed review of all transportation modes in the corridor and if applicable, their current and projected levels of operation. Land use, community characteristics, and environmental assessments are described to show a corridor's context and where applicable, are called out as Key Corridor Issues. The TCR also includes Caltrans suggestions for optimizing transportation modes in relation to system preservation, efficiency, and expansion. The Corridor Concept, with consideration for various transportation issues, factors, and needs, presents the long-term vision for a route during a 25-year planning horizon. Planned and programmed projects from State and local plans and programs are included in this document as well as project proposals to help inform the Caltrans Project Initiation Document (PID) and project development process.

Other policy documents that guided the development of this TCR include:

- *The Caltrans Strategic Plan 2020-2024*
- *The California Transportation Plan 2050* (CTP 2050)
- *Climate Action Plan for Transportation Infrastructure* (CAPTI)
- Deputy Directive (DD) 64-R2 - Complete Streets
- *Caltrans Smart Mobility Framework* (SMF)
- *The Statewide Transit Strategic Plan* (STSP)
- *California Active Transportation* (CAT) *Plans*
- *California State Rail Plan* (CSRP)
- *California Freight Mobility Plan* (CFMP)
- *California Sustainable Freight Action Plan*
- *Caltrans Interregional Transportation Strategic Plan* (ITSP)
- *California Aviation Plan*
- Assembly Bill (AB)-32
- Senate Bill (SB)-375

- SB-391
- SB-743
- SB-486
- SB-32
- Other related legislation

Figure 1. How TCR fits into the State Planning Process

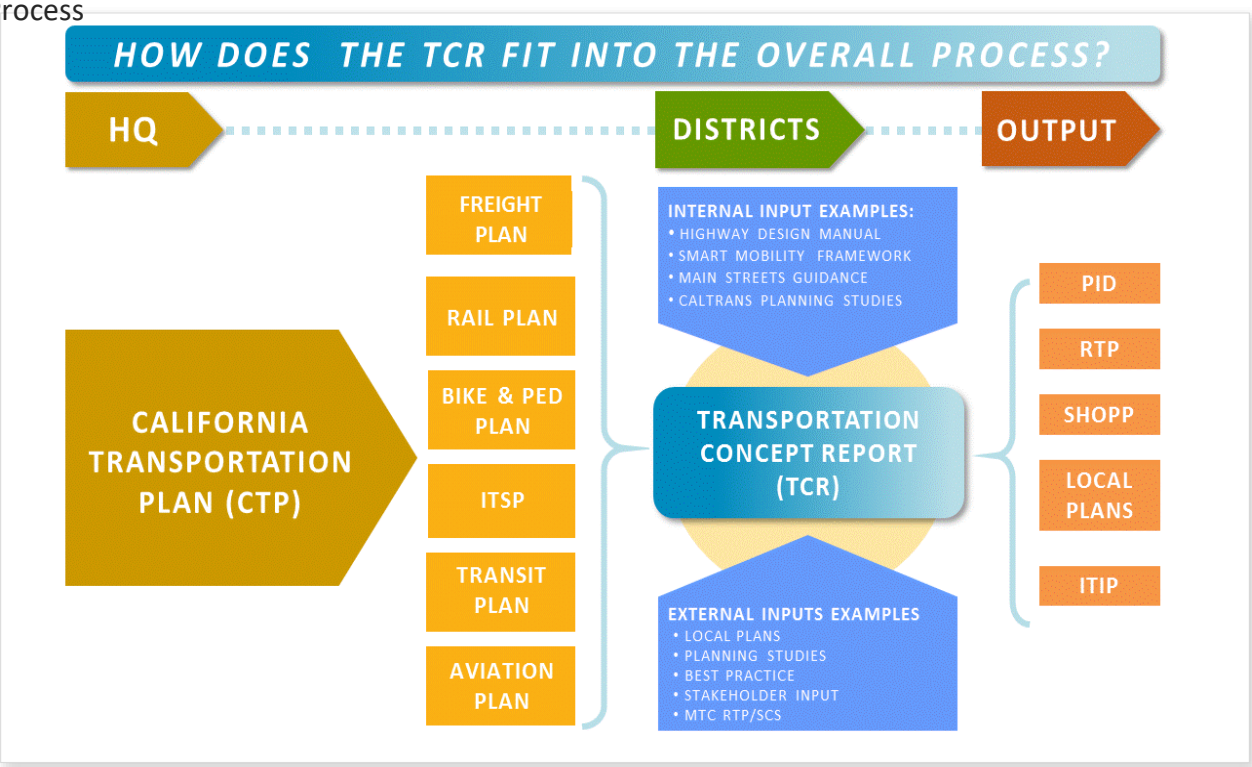


Figure 1 outlines how the TCR fits in to the State Planning process. TCRs are guided by the California Transportation Plan, which includes six modal plans, and receive inputs from internal functional units and external partners. TCRs help identify what projects might be needed along highway corridors. Potential projects derived from TCRs and other planning documents may be selected for further study and be programmed, subject to various considerations, including regional agency priorities and the availability of funding. As shown in **Figure 1**, project concepts can advance to local and regional transportation plans and various funding programs.

STAKEHOLDER PARTICIPATION

In 2021, Caltrans revised its Mission and Goals to emphasize greater collaboration to improve mobility for all modes. Caltrans Goals emphasize safety first, strengthen stewardship and drive efficiency, cultivate excellence, lead climate action, enhance and connect the multimodal transportation network, and advance equity and livability in all communities. Caltrans District 4 Planning hosted a facilitated stakeholder workshop on May 6, 2016 to collect early input to inform the TCR development process. This interactive, hands-on public workshop was designed to identify ideas from partners on key needs and priorities for the State Route 1 North TCR in Marin and Sonoma Counties. The workshop convened at the Red Barn Classroom at Point Reyes Station. This provided a unique opportunity for partners to collaboratively identify assets, issues and opportunities for SR 1 North. See **Appendix J** for the workshop summary. Additionally, a presentation of the draft TCR was held in March 2019 at the Sonoma Coast Municipal Advisory Council in Bodega Bay during an extended public review period. Over 230 comments were gathered during the public review period, providing invaluable input from communities, local and county agencies, advocacy groups, and more.

EXECUTIVE SUMMARY

Concept Summary

The State Route (SR) 1 North Corridor (Corridor) covers 110 miles of SR 1 in Marin and Sonoma Counties. It is one of the most dramatic and beautiful sections of this world-famous picturesque highway that runs along the Pacific coastline of California. The Corridor serves as a critical connection for many small and relatively isolated communities but is best known for its coastal views, rural setting, and access to several federal, State, and County open space, park and recreation areas, and beaches.

This Transportation Concept Report (TCR) has been developed to meet the latest State goals, policies, and strategic objectives for transportation from the California Transportation Plan (CTP) 2050, Climate Action Plan for Transportation Infrastructure (CAPTI), and Caltrans Smart Mobility Framework Guide (2020). The TCR also incorporates ideas and concerns of public agencies and advocacy groups who were invited in May 2016 to a special public outreach workshop at the Point Reyes Visitor Center in Marin County. In addition, a TCR presentation was held in March 2019 at the Sonoma Coast Municipal Advisory Council in Bodega Bay during an extended public review draft period. The SR 1 North TCR public review draft became available for public comment in November 2018 and was then extended to March 2019, gathering over 230 comments. **Table E-1** summarizes strategies by segment to achieve the 25-year concept for this Corridor.

Table E- 1 Strategies to Achieve Concept Summary

Segment	25 Year Strategies to Achieve Concept
A **US 101-Erica Road** **(MRN 0-2.8)**	• Study limiting or consolidating commercial driveway access to SR 1 to minimize conflicts and increase bike/ped facilities • Provide Class II or III bike lanes from US 101 to Sir Francis Drake. Prioritize Class II for uphill locations • Provide Class I facility for less confident riders between Maple Street and Almonte Boulevard • Consider intersection improvements at Erica Road and Panoramic Highway by “squaring up” and improve sight lines and bike/ped access to the nearby trail. • Develop shuttles to beaches and parks with one-stop parking to reduce the impact of visitor traffic • Address flooding at Manzanita P&R. Consider relocation to develop a “Marin South” Multimodal Transportation Center. • Re-design the Mill-Valley Sausalito Multi-Use Pathway as part of an elevated levee structure • Improve the US 101 and Shoreline Highway ramp with reconfigurations or signalization • Create an earthen embankment in relatively low-lying areas • Explore adaptation strategies at Tam Junction, Marin City, and the Manzanita Area
B **Erica Road - Bolinas Rd.** **(MRN 2.8-17.2)**	• Engage in regular collaboration with the Bolinas Lagoon residents and local agencies and strategize a long-term highway development plan to address flooding from sea level rise (SLR) on SR 1 near Bolinas Lagoon. • Implement solutions that works with the natural processes of the sedimentation to address SLR. • Offer combined Muir Woods and Ferry and transit tickets to/from San Francisco • Extend shuttle hours and services with one-stop parking • Identify water-level thresholds for maximum flood depth or frequency to determine which roads will need to be elevated, relocated, seasonally closed, or abandoned • Add crossings with traffic calming improvements on SR 1 for bicyclists and pedestrians to access beach and park entrances (e.g Miwok Trail)

Segment	25 Year Strategies to Achieve Concept
	• Improve intersections on SR 1 at Panoramic Highway, Franks Valley Rd and Pacific Way for bike/ped access • Provide Class II or III improvements. Prioritize Class II for uphill locations. Consider Class I throughout the Corridor in the long term.
C Bolinas Road -Valley Ford Road (MRN 17.2-50.5)	• Provide a combination of Class I path and Class II bike improvements on Hwy 1 from Bear Valley Rd to Point Reyes-Petaluma Rd and Class II or III improvements throughout. Consider Class I throughout the Corridor in the long term. • Add crossings with traffic calming improvements on SR 1 for bicyclists and pedestrians to access beach and park entrances • Manage for flash flood and high flow events that might adversely affect existing and new vegetation by increasing absorption and decreasing runoff • Convert vulnerable routes to levees to address temporary flooding, inundation, erosion, wave surge, and high wind • Continually improve and promote the existing West Marin Stagecoach Line • Replace culverts with bridges, if feasible, where they are detrimentally affecting the natural drainage • Identify water-level thresholds for maximum flood depth or frequency to determine which roads will need to be elevated, relocated, seasonally closed, or abandoned (e.g. Sir Francis Drake) • Support completion of the California Coastal Trail
D Valley Ford Road-SR 116 (SON 0-20.1)	• Survey and determine feasibility for retaining existing shoreline protection (Westshore Rd., SR 1, and Bayflat Rd.) and investigate options for living shorelines. Evaluate locations for hard protection (ex. sea walls and tide gates) use only if allowable and no feasible less damaging alternative exists. • Ensure that transportation networks are designed to function even if the highest projected SLR occurs. Efforts to realign, retrofit, and/or protect infrastructure should be coordinated with Caltrans District 4, local public works, transportation agencies, and coastal planning efforts (including SR 116) • Develop understanding of sediment needs for healthy dune habitat • Identify water-level triggers for maximum flood depth or frequency to determine which roads will need to be elevated, relocated, seasonally closed, or abandoned • Develop a monitoring plan to address SLR (e.g. coastal erosion monitoring) • Support completion of the Bodega Bay Trail from Salmon Creek to Doran Regional Park in Bodega Bay • Provide Class II bike lanes between Valley Ford Road and SR 116. Consider Class I throughout the Corridor in the long term • Support one stop parking with future enhanced transit options to Bodega Bay, Jenner, and northeast to the Russian River Valley • Add crossings with traffic calming improvements on SR 1 for bicyclists and pedestrians to access beach and park entrances • Replace culverts with bridges as appropriate • Support completion of the Coastal Trail between W King Trail in Bodega Bay to the Mendocino County border
E SR 116-Mendocino County (SON 20.1-58.6)	• Conduct adaptation studies and reports with local partners • Identify water-level triggers for maximum flood depth or frequency to determine which roads will need to be elevated, relocated, seasonally closed, or abandoned • Support completion of the Coastal Trail to the Mendocino County line. Add sidewalks or walkways from Gualala Regional Park to Gualala. • Add crossings with traffic calming improvements on SR 1 for bicyclists and pedestrians to access beach and park entrances (e.g. Shell Beach) • Replace culverts with bridges, if feasible, where they are detrimentally affecting the natural drainage • Provide Class II or III improvements. Prioritize Class II for uphill locations. Consider Class I throughout the Corridor in the long term.

Aligned with the California Transportation Plan (CTP) 2050 goals are strategies applicable to the entire Corridor:

Safety

Provide a safe and secure transportation system

- Work with partner agencies on alternative evacuation routes to plan for emergencies for all communities along the Corridor
- Consider bus length limitations on SR 1 for travelers to safely navigate through the Corridor.
- Continual maintenance of culverts during rainy season to decrease flooding in the Corridor, removal of flammable debris during wildfire season, and clearing of any overgrowth to increase sight lines along narrow or curved roadways.
- Improve intersections and include crossings for bicyclists and pedestrians to access beaches and parks across SR 1.
- Introduce traffic calming or speed reduction measures to prevent bicyclist, pedestrian, and vehicle conflicts.

Climate

Achieve statewide GHG emissions reduction targets and increase resilience to climate change

- Display real-time SR 1 congestion information on Changeable Message Signs on US 101 or other appropriate locations, websites, or telecommunication methods to notify SR 1 travelers to reduce visitor impact.
- Coordinate with transit and park agencies on park-and-ride lots along US 101 for shuttle services to SR 1 destinations as a measure to reduce visitor congestion.
- Increase transit, bicycle, and pedestrian facilities to reduce vehicle pollution
- Pursue a phased approach to addressing sea level rise (SLR) in coordination with communities and local partner agencies by linking each phase to a particular impact of SLR on shared assets over time.

Equity

Eliminate transportation burdens for low-income communities, communities of color, people with disabilities, and other disadvantaged groups

- Continue engaging in public outreach with local communities, Native American Tribes, local planning, and management agencies at all stages of planning and project development.

Accessibility

Improve multimodal mobility and access to destinations for all users

- Increase transit options throughout the Corridor with a mix of fixed transit and on-demand transit services
- Any projects, especially repaving and bridge replacement should consider bicycle and pedestrian improvements.
- Support completion of the California Coastal Trail with Class I bike/ped improvements parallel to SR 1 where feasible.

- Monitor and ensure safe public beach access to beaches along the Corridor

Quality of Life & Public Health

Enable vibrant, healthy communities

- Protect the rural character of coastal communities by balancing local and visitor needs.
- Support additional public transportation choices and services for increased mobility
- Coordinate a feasibility study for developing pull outs in appropriate locations to determine their use, such as emergency or slow vehicle turn outs, electric vehicle (EV) charging stations, bicycle and pedestrian rest stops in areas of incline or adjacent to the California Coastal Trail, and as rest stops with amenities, parking, and restrooms.
- Promote the Pacific Coast Bike Route or USBR 95, the California Coastal Trail, and associated trails to increase walking and biking
- Support "one-stop parking" which enables visitors to reserve and pay for a parking space in advance at destinations to prevent parking overflow. Encourage one-stop parking locations to include EV charging stations as well.

Economy

Support a vibrant resilient economy

- Planning ahead for Climate Change impacts for coastal communities is crucial in supporting a resilient economy and community
- Promoting and enhancing SR 1 as a vacation destination resulting in fewer trips to distant places

Environment

Enhance environmental health and reduce negative transportation impacts

- Encourage increased use of transit, bicycling, and walking within the Corridor
- Support natural hydrologic, sediment patterns, and ecologic processes, including fish passage migration and safe wildlife passage, in the design of future waterway crossings.
- Reuse sediment (e.g. trapped in culverts) for restoration purposes to support the coastal habitat to the greatest extent feasible

Support Infrastructure

Maintain a high-quality resilient transportation system

- Bundle projects to look at all the potential impacts in a segment, not just on a project-by-project approach.
- Address impacts of climate change and SLR on culvert maintenance and replacement.
- Utilize the District 4 Adaptation Priorities Report, to address needed adaptation of Caltrans assets
- Plan a transportation system that is designed to function at the highest level of SLR projections
- Support Local Coastal Program policies with infrastructure, construction, maintenance in partnership with local agencies of Marin and Sonoma Counties.

Concept Rationale

With sea level rise (SLR) and climate change leading to more extreme weather conditions, it is becoming more difficult and expensive to keep SR 1 (and other local highways) open. However, this TCR assumes that both the State and region will continue to invest in SR 1 to address its issues, in accordance to the Local Coastal Programs and the Coastal Act Section 30254 for the Corridor to remain a scenic two-lane conventional highway. The TCR presents SR 1 North Corridor in relation to three main themes: access, enhancement, and demand. Multimodal transportation options are integrated in each of these themes. Access increases mobility choices while reducing vehicle miles travelled and seasonal congestion impacts to visitors and coastal communities. Enhancement of a journey to and from a destination creates a dignified environment for all of its local residents and visitors while also integrating climate change resiliency and environmental stewardship. Demand on SR 1 needs to be met with effective communication, especially with respect to accessibility. The demand on SR 1 needs to be met with effective communication, especially with respect to accessibility.

The TCR proposes significant investment for areas on SR 1 that are vulnerable to climate change, particularly the US 101/SR 1 interchange, Stinson Beach, Bolinas Lagoon, and Bodega Bay. These areas are all increasingly subject to SLR, storm damage, and coastal erosion, yet are also some of the most scenic and accessible sections of the California coast. The TCR suggests adopting similar SLR adaptation approaches that are being applied at Gleason Beach (e.g. roadway realignment and construction of new bridges) as well as implementation of adaptation strategies from various vulnerability assessments, studies, and adaptation reports throughout the Corridor. These strategies would enhance the resilience of SR 1 while at the same time possibly reducing the environmental impacts such as cutting into slopes and interfering with the natural drainage caused by the highway. Although expensive, these improvements can bring many benefits, not only environmental but quality of living and public health. The change is brought on by necessity, as the current strategy of focusing on maintenance and emergency repair may not meet the long-term needs of the Corridor. Any projects from realignment of SR 1 to pavement rehabilitation, will be opportunities to bundle multimodal improvements and environmental restoration within the Corridor. Various improvements such as pullouts, increased transit service, park and ride lots, Coastal Trail, pedestrian and bicycle facilities, and one-stop parking can be introduced in consultation with communities and partner agencies.

The TCR also examines possible ways to address visitor impact and recreational needs of the Corridor with strategies to reduce influxes of visitor congestion. Greenhouse gas (GHG) reduction is a key State and Department goal and this TCR identifies the recreational potential of the Corridor through multimodal means to support the Metropolitan Transportation Commission's Regional Transportation Plan and Sustainable Communities Strategy in response to SB 375, which is essential to reducing the region's GHG emissions. This TCR seeks to reduce reliance on the private vehicle and encourages bicycle and pedestrian facilities and transit alternatives such as shuttles for both visitors and locals. During the SR 1 North outreach, participants emphasized the need to balance visitor impacts with the needs of local residents and businesses.

Some of the strategies in the TCR could result in a significant change to parts of the Corridor within the 25 Year Planning horizon. However, many of these strategies are not yet clearly defined and will need further study and discussion with external partners prior to implementation.

PLANNING CONTEXT

Corridor Planning is intended to be consistent with existing legislation such as AB 32, SB 375, and SB 743. Consistent with the Caltrans Mission, Vision, and Goals, this TCR is also informed by Plan Bay Area (PBA), Caltrans Smart Mobility Framework (SMF), Climate Action Plan for Transportation Infrastructure (CAPTI), California Transportation Plan (CTP) 2050, the California Coastal Commission, Caltrans District 4 State Route (SR) 1 Repair Guidelines, and input from a special stakeholder workshop and public review draft period. The Planning Context section will provide further background in these areas.

Climate Action Plan for Transportation Infrastructure

The *Climate Action Plan for Transportation Infrastructure* (CAPTI)[1] is an overarching framework and statement of intent for aligning State transportation infrastructure investments with California's Climate, Health, and Social Equity goals with priority given to "fix-it-first" projects as stated in Senate Bill 1 (SB 1).

The CAPTI serves as statewide policy to meet the Governor's Climate goals and directs the California State Transportation Agency (CalSTA), Caltrans, and the California Transportation Commission (CTC) to address climate change as described in Executive Orders **N-79-20** and **N-19-19**.

The CAPTI investment framework consists of:

- Investing in networks of safe and accessible bicycle and pedestrian infrastructure
- Addressing social and racial equity by reducing public health and economic harms and maximizing community benefits
- Building toward an integrated, statewide rail and transit network
- Investments in light, medium, and heavy-duty zero-emission vehicle (ZEV) infrastructure
- Making safety improvements to reduce fatalities and severe injuries of all users towards zero
- Promoting projects that do not significantly increase passenger vehicle travel
- Promoting compact infill development while protecting residents and businesses from displacement
- Protecting natural and working lands
- Assessing physical climate risk

CAPTI strategies include cultivating and accelerating sustainable transportation by leading with State investments and advancing State transportation leadership on climate and equity through improved planning and project partnerships. CAPTI efforts will support the CTP 2050 goals to meet State climate change targets, mandates, and policies. CAPTI is also closely aligned with the Caltrans 2020-2024 Strategic Plan which showcases a fundamental shift for Caltrans to lead climate action as a top priority. The Plan will also be a living document that will evolve over time. After a public review period, CalSTA adopted the Final CAPTI on July 15, 2021.

[1] https://calsta.ca.gov/-/media/calsta-media/documents/capti-2021-calsta.pdfation Infrastructure

The concept strategies discussed below for SR 1 North are consistent with the CAPTI's investment framework and CAPTI's strategies to cultivate a sustainable transportation system while leading climate action through planning and partnerships.

California Transportation Plan 2050

California Transportation Plan (CTP) 2050, adopted in 2021, presents a vision for California's future transportation system and articulates strategic goals, policies, and recommendations to improve multimodal mobility and accessibility while reducing greenhouse gas emissions. The Plan is committed to addressing the immediate threats of COVID-19, and long-standing systemic injustice, as well as California's firm commitment to combatting climate change and the many risks it poses to our infrastructure and communities. Senate Bill 391 (SB 391) requires the CTP to address how the state will achieve maximum feasible emissions reductions in order to attain a statewide reduction of greenhouse gas emissions to 1990 levels by 2020 and eighty percent below 1990 levels by 2050. The Plan demonstrates how advancements in clean fuel technologies, continued shift toward active travel, transit, and shared mobility, more efficient land use and development practices, and continued shifts to telework can collectively reduce transportation emissions to support these goals. The CTP 2050 also reinforces long-held values such as improving system safety, improving mobility and accessibility, advancing environmental health and justice, and enhancing quality of life. In long-range planning, it is crucial that the strategies, goals, and projects identified for the Corridor furthers the overall goals of CTP 2050. This will ultimately result in reducing greenhouse gas emissions while improving transportation for all users.

Below is a summary of overarching strategies for the SR 1 North Corridor that are aligned to the CTP 2050 Goals. The TCR is a long-range policy and strategy document, and not an implementation plan. These recommendations and strategies are qualitative and have yet to be linked to performance measures and targets. Specific strategies for each segment are described in the Concept Strategies by Segment section (pages 60-74).

Climate

Achieve statewide GHG emissions reduction targets and increase resilience to climate change

- Display real-time SR 1 congestion information on Changeable Message Signs on US 101 or other appropriate locations, websites, or telecommunication methods to notify SR 1 travelers to reduce visitor impact.
- Coordinate with transit and park agencies on park-and-ride lots along US 101 for shuttle services to SR 1 destinations as a measure to reduce visitor congestion.
- Increase transit, bicycle, and pedestrian facilities to reduce vehicle pollution
- Pursue a phased approach to addressing sea level rise (SLR) in coordination with communities and local partner agencies by linking each phase to a particular impact of SLR on shared assets over time.

Safety

Provide a safe and secure transportation system

- Work with partner agencies on alternative evacuation routes to plan for emergencies for all communities along the Corridor

- Consider bus length limitations on SR 1 for travelers to safely navigate through the Corridor.
- Continual maintenance of culverts during rainy season to decrease flooding in the Corridor, removal of flammable debris during wildfire season, and clearing of any overgrowth to increase sight lines along narrow or curved roadways.
- Improve intersections and include crossings for bicyclists and pedestrians to access beaches and parks across SR 1.
- Introduce traffic calming or speed reduction measures to prevent bicyclist, pedestrian, and vehicle conflicts.

Equity

Eliminate transportation burdens for low-income communities, communities of color, people with disabilities, and other disadvantaged groups

- Continue engaging in public outreach with local communities, Native American Tribes, local planning, and management agencies at all stages of planning and project development.

Accessibility

Improve multimodal mobility and access to destinations for all users

- Increase transit options throughout the Corridor with a mix of fixed transit and on-demand transit services
- Any projects, especially repaving and bridge replacement should consider bicycle and pedestrian improvements.
- Support completion of the California Coastal Trail with Class I bike/ped improvements parallel to SR 1 where feasible.
- Monitor and ensure safe public beach access to beaches along the Corridor

Quality of Life & Public Health

Enable vibrant, healthy communities

- Protect the rural character of coastal communities by balancing local and visitor needs.
- Support additional public transportation choices and services for increased mobility
- Coordinate a feasibility study for developing pull outs in appropriate locations to determine their use, such as emergency or slow vehicle turn outs, electric vehicle (EV) charging stations, bicycle and pedestrian rest stops in areas of incline or adjacent to the California Coastal Trail, and as rest stops with amenities, parking, and restrooms.
- Promote the Pacific Coast Bike Route or USBR 95, the California Coastal Trail, and associated trails to increase walking and biking
- Support “one-stop parking” which enables visitors to reserve and pay for a parking space in advance at destinations to prevent parking overflow. Encourage one-stop parking locations to include EV charging stations as well.

Economy

Support a vibrant resilient economy

- Planning ahead for Climate Change impacts for coastal communities is crucial in supporting a resilient economy and community
- Promoting and enhancing SR 1 as a vacation destination resulting in fewer trips to distant places

Environment

Enhance environmental health and reduce negative transportation impacts

- Encourage increased use of transit, bicycling, and walking within the Corridor
- Support natural hydrologic, sediment patterns, and ecologic processes, including fish passage migration and safe wildlife passage, in the design of future waterway crossings.
- Reuse sediment (e.g. trapped in culverts) for restoration purposes to support the coastal habitat to the greatest extent feasible

Infrastructure

Maintain a high-quality resilient transportation system

- Bundle projects to look at all the potential impacts in a segment, not just on a project-by-project approach.
- Address impacts of climate change and SLR on culvert maintenance and replacement.
- Utilize the District 4 Adaptation Priorities Report, to address needed adaptation of Caltrans assets
- Plan a transportation system that is designed to function at the highest level of SLR projections
- Support Local Coastal Program policies with infrastructure, construction, maintenance in partnership with local agencies of Marin and Sonoma Counties.

Plan Bay Area

Plan Bay Area 2050, an update to Plan Bay Area 2040, is the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) for the nine-county San Francisco Bay Area. It is a long-range plan used to chart the course for future growth of the region. Plan Bay Area 2050 focuses on four key issues—the economy, the environment, housing, and transportation. The Metropolitan Transportation Commission and the Association of Bay Area Governments, working with local partners and the public, are expected to adopt the Final Plan Bay Area 2050 in the Fall of 2021.

Plan Bay Area 2050 is financially-constrained and serves as a “roadmap” for the region’s future, by articulating policies and investments necessary to advance the goal of a more affordable, connected, diverse, healthy, and vibrant Bay Area. The plan identifies a path for future investment – including infrastructure to improve our transportation system and to protect communities from Climate Change, including rising sea levels – as well as addressing Equity in realizing future growth for housing and jobs. Plan Bay Area 2050 must be in conformity with regional and national air quality standards. The plan reflects a shared vision to be implemented

through partnership with State, local, and federal governments, as well as businesses and non-profit organizations. All projects funded in the region need to be consistent with Plan Bay Area 2050.

PBA 2040 has no designated PDAs in the SR 1 North Corridor. The Corridor is surrounded by county, State, and national parks as well as two PCAs: the Marin County Agricultural Lands PCA and the Coastal Access and Resource Protection PCA in Sonoma County.[2] Priority Conservation Areas (PCAs) are regionally significant open spaces which have a broad agreement for long-term protection. These areas are designated locations that will be preserved for future generations and not cave into urban development.

Caltrans District 4 SR 1 Repair Guidelines

The main purpose of the District 4 SR 1 Repair Guidelines for Marin[3] and Sonoma[4] Counties is to provide Caltrans, the California Coastal Commission, and local stakeholders with a consistent vision and direction for storm damage repair projects on Highway 1 within the Coastal Zone (shown on **Appendix A**). While potential damage is predominantly related to storm events, the recommendations apply to any other major event that damages the roadway. The Guidelines allow Caltrans and its partner agencies to respond with timely and consistent efforts to repair projects in a manner that minimizes impacts, acknowledging the special sensitivity of Highway 1, while supporting existing aesthetics, and protecting natural resources while meeting the needs of all user groups. The repair guidelines also provide specific information on exclusions in the coastal development permitting process.

California Coastal Commission

The California Coastal Commission was established by voter initiative in 1972 (Proposition 20) and later made permanent by the State Legislature through adoption of the California Coastal Act of 1976.

In partnership with coastal cities and counties, the Coastal Commission regulates the use of land and water in the coastal zone. The Coastal Commission establishes specific policies that address issues such as shoreline public access and recreation, lower cost visitor accommodations, terrestrial and marine habitat protection, visual resources, landform alteration, agricultural lands, commercial fisheries, industrial uses, water quality, offshore oil and gas development, transportation, development design, power plants, ports, and public works projects. Development activities are defined as construction of buildings, divisions of land, and activities that change the intensity of land use or public access to coastal waters including new construction and expansion of existing uses, require a coastal development permit (CDP) from either the Coastal Commission or local government.

The protection of coastal resources is primarily implemented through the Local Coastal Programs (LCP) in Marin and Sonoma counties. LCPs are local government's guide to development in the coastal zone, in partnership with the Coastal Commission. LCPs contain the ground rules for future development and protection of coastal resources in the 76 coastal cities

[2] Priority Conservation Area Maps for each county: https://abag.ca.gov/priority/conservation/maps.html
[3] https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/ccc-mrn-1-repair-design-guidelines-a11y.pdf
[4] https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/ccc-sonoma-state-rte-1-repair-guidelines-a11y.pdf

and counties in California. Each LCP includes a land use plan and measures to implement the plan (such as zoning ordinances). Prepared by local governments, the LCPs guide short- and long-term conservation and use of coastal resources. While each LCP reflects unique characteristics of individual local coastal communities, regional and statewide interests and concerns must also be addressed consistent with Coastal Act goals and policies. Following adoption by a city council or county board of supervisors, an LCP is submitted to the Coastal Commission for review for consistency with State Coastal Act requirements. In many cases of projects in the coastal zone, the commission retains an appeal authority over the LCP CDP decision making.

In 2017, Caltrans entered into a Partnership Agreement with the California Coastal Commission. Both statewide agencies agree to promote the integration of transportation, coastal and environmental planning through participation in related activities including future Transportation Concept Report and Project Initiation Report (PIR) development. Recommendations to improve coordination and communication between the two agencies are documented in "Plan for Improved Agency Partnering" (December, 2016) by the Integrated Planning Team (IPT), with a focus in two areas: sea level rise (SLR) and the California Coastal Trail. Caltrans District 4 Climate Change Vulnerability Assessment identifies the potential effects of Climate Change on the State Highway System. Caltrans supports the California Coastal Trail concept as delineated in the Plan for Improved Agency Partnerings to incorporate existing oceanfront trails and paths and support facilities of public shoreline parks and beaches into the California Coastal Trail network.[5]

State Route 1 provides an important and limited access route to the coastal zone. As required by the Coastal Act, State Route 1 in rural areas of the coastal zone shall remain a scenic two-lane roadway.[6] Improvements cannot individually or cumulatively detract from the rural scenic characteristics of the highway. Beyond repair and maintenance, improvements are limited to minor projects, provided that no filling of streams or wetlands occurs. These projects include slope stabilization, drainage control, and safety improvements such as guardrail placement and signing; expansion of shoulder paving to accommodate bicycle or pedestrian traffic; traffic calming and vista turn-outs for safety and convenience; and other minor improvements necessary to adequately accommodate public transit.

The LCPs for Marin and Sonoma Counties discourage use of private automobiles and strongly supports development of expanded transit and other alternative methods of transportation in the coastal zone, such as bicycles. Bicycle and pedestrian paths, separated from roads where possible, are especially encouraged. The development of new transit service routes and associated loading and turning areas is also encouraged, consistent with the goal of utilizing public transit to meet current and increased use of coastal access and recreational areas.

SR 1 North Workshop – May 2016

This workshop purpose was two-fold. First, to supplement the relative paucity of tools for planning rural areas with regard to transportation. Second, to coordinate the large number of important agencies and stakeholder groups in the Corridor. Representatives of government agencies attended at the federal (National Park Service and Golden Gate National Recreation Area), State (State Parks and California Coastal Commission) and counties (Sonoma and Marin),

[5] https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/ser/iaccc-improved-agency-partnering-agreement-a11y.pdf

[6] California Coastal Act Section 30254

as well as non-profit, special interest and volunteer organizations. Led by a facilitator, participants expressed their views on transportation issues and opportunities in the Corridor. These results are summarized in the **Appendix J** and were important in shaping the scope of this TCR.

SR 1 North TCR Presentation – March 2019

A presentation was given in March 2019 at the Sonoma Coast Municipal Advisory Council in Bodega Bay during the extended public review draft period. The SR 1 North TCR public review draft was available for public comment in November 2018, but was extended to March 2019, resulting in over 230 comments received and addressed. The following are major topics expressed:

- Add and improve pullouts with pervious paving for emergency turnouts, rest areas, transit stops, bicyclists rest areas, parking, and electric vehicle charging stations
- Improve pedestrian and bicyclist access to beaches, parks, and trails
- Protect the rural community character. Complete Streets and Main Street improvements should not impede the rural character of the community.
- Address adaptation to SLR, storm surges, and coastal erosion in various locations
- Increase maintenance on SR 1 as an emergency evacuation route by improving sight distance and removing debris for wildfire prevention
- Improve the planning process and public outreach
- Include additional information on environmental, cultural, tribal, and historical resource
- Remove language on promoting tourism
- Address visitor congestion with increased transit, one-stop parking, and electronic message signs and park-and-ride lots from US 101
- Restrict bus length to 30 feet or less along the Corridor
- Encourage bus stop locations that do not impact the community

Smart Mobility Framework

The Smart Mobility Framework (SMF) guides implementation of multimodal transportation strategies in support of compact and sustainable communities through a broad range of transportation and housing choices. *Smart Mobility 2010: A Call to Action for the New Decade,* developed in partnership with the US Environmental Protection Agency, the Governor's Office of Planning and Research, and the California Department of Housing and Community Development, provided concepts and tools to incorporate smart mobility principles into all phases of transportation decision-making.

In December 2020, *The Caltrans Smart Mobility Framework Guide 2020* introduced strategies, performance measures, and analysis methods for implementing smart mobility, organized around five themes: network management, multimodal choices, speed suitability, accessibility and connectivity, and equity. The guide also describes the application of five "place types" to identify transportation planning and project development priorities across the State. These place types describe existing geographic areas based on location, land use, density, and other characteristics:

- Central Cities
- Urban Communities
- Suburban Communities
- Rural Areas
- Protected Lands and Special Use Areas

Each of the place types correspond to transportation planning priorities and serves as a guide, not a rule for development of recommendations. Planners consider the specific characteristics of a given planning area in addition to local, regional, and State plans and collaboration when recommending strategic transportation system investments.

The SMF Guide incorporates the intent of SB 743 as well as social equity and environmental justice considerations, which are integral to all planning decisions. The SMF guides Caltrans and stakeholder agencies in assessing how well plans, programs, and projects support Smart Mobility. The following transportation planning priorities from the SMF Guide 2020 were identified to meet the needs of each census-designated place, town, or community as shown in **Table 1**.

Table 1. Smart Mobility Framework Place Types and Priorities

Segment	Census-Designated Places	SMF 2020 Place Type	Transportation Priorities
A	Sausalito, Strawberry, Mill Valley City, Marin City, Tamalpais-Homestead Valley	Suburban	• Improvements to network connectivity to reduce route/trip lengths and opportunities to encourage non-SOV trips • Complete streets facility treatments near schools and areas with an opportunity to transition to urban community place types • Transit, on-demand transit, and rideshare implementation to employment centers where appropriate • Access management and speed management on arterial streets
B-E	Muir Beach, Stinson Beach, Bolinas, Woodacre, San Geronimo, Lagunitas-Forest Knolls, Nicasio, Point Reyes Station, Inverness, Tomales, Dillon Beach, Bloomfield, Valley Ford, Occidental, Bodega, Bodega Bay, Salmon Creek, Carmet, Sereno Del Mar, Guerneville, Monte Rio, Jenner, Cazadero, Timber Cove, Sea Ranch	Rural	• Bicycle and pedestrian facilities in rural centers/main streets • Traffic calming in rural centers/main streets • Trails where public access and recreational use is permitted • Targeted transit or transit on-demand to accommodate transit-dependent populations/employees/visitors
A-E	N/A	Protected Lands/Special Use Areas	• For any lands not fully protected, projects and programs should assure permanent retention in open space/resource conservation status. Green prints that identify important

Segment	Census-Designated Places	SMF 2020 Place Type	Transportation Priorities
			natural resource lands and working landscapes can provide opportunities to align open space protection efforts with regional blueprints. For SR 1, this place type includes areas with environmental considerations, wildlife habitat connectivity, federal lands, county and state parks and trails, watershed lands, and priority conservation areas. • For special use areas, projects are determined by the purpose and context of the special use area.

CORRIDOR VISION

This chapter summarizes transportation strategies for the SR 1 North Corridor in relation to three main themes: access, enhancement, and demand. Multimodal transportation options are integrated into each of these themes. Access increases mobility choices while reducing vehicle miles travelled and seasonal congestion impacts to visitors and coastal communities. Enhancement of a journey to and from a destination creates a dignified environment for all of its local residents and visitors while also integrating climate change resiliency and environmental stewardship. Demand on SR 1 needs to be met with effective communication, especially with respect to accessibility. These themes are further described below.

Access

SR 1 for many is a destination. Therefore, getting to SR 1 is as important as traveling on it. The following are a few hotpot locations where access to SR 1 are critical due to seasonal congestion:

- SR 1 from the southern end of the Corridor to Stinson Beach
- Sir Francis Drake Boulevard to Point Reyes National Seashore
- Bodega Bay Head to Jenner and Fort Ross Historic Park

These roadway segments have heavy seasonal traffic which detracts from the scenic and aesthetic qualities that help to identify the Corridor as a scenic highway. To manage congestion, the number of vehicles entering the Corridor at peak periods needs to be reduced, while maintaining access. This can be done by making public transportation a more viable option. The National Park Service (NPS) with Marin Transit runs a seasonal visitor bus shuttle to Muir Woods and there is a need to find better ways of accommodating existing and future demand to places like Stinson Beach and Bodega Bay. There is also a need to expand transit trips to the lesser known parks and coastal areas in the Corridor through either increased fixed transit along the Corridor or on-demand transit services. Access to the California Coastal Trail with future bicycle and pedestrian improvements on or parallel to SR 1 would allow people to access more remote sections of the coast. However, north of Jenner, the winding and tenuous nature of the highway does not lend itself readily to significant increases in visitors, even though Fort Ross State Historic Park, Salt Point State Park and other locations further north are unique destinations.

Increased transit services utilizing park-and-ride facilities along US 101 to SR 1 can reduce visitor congestion in the Corridor as well. Due to some narrow and curvy roadways on SR 1, smaller length transit vehicles should be considered.

Visitor traffic from US 101 could be rerouted to gateway routes (See pages 20-21) through electronic messaging signs on US 101 to reduce congestion. Travelers would be encouraged to use alternate routes other than Sir Francis Drake Boulevard or SR 116 through Sebastopol, for example. However, with many drivers using electronic mapping applications such as Google maps, it could be difficult to divert traffic to a suggested route and may impact local community roadways**.** A better option is to communicate congestion levels to SR 1 visitors using the electronic messaging signs from US 101 that are near these gateway routes or through other telecommunication methods such as the Caltrans QuickMap.[7] This can inform visitors of congestion before committing to SR 1.

[7] http://quickmap.dot.ca.gov/

Enhancement

"Highway 1" is world-renowned for its scenic qualities. However, there are surprisingly few amenities in the SR 1 North Corridor. The roadway itself has narrow lanes and limited shoulders. Many creek crossings are culverts rather than bridges, and pullouts are often unpaved lacking amenities. The TCR suggests improving pullouts where feasible and aesthetically appropriate with basic amenities such as benches, picnic tables, information panels and restrooms consistent with Local Coastal Programs and community support. The ideal concept would be to construct pullouts that encourage visitors to get out of their vehicles and enjoy the view, separated from traffic and for pedestrians and bicyclists to rest after a hiking or biking a steep incline.

DEVELOPING PULLOUTS

Many of the pullouts on SR 1 are unpaved, small in size, and have no amenities. Pullouts that have turnout signs have been used by slower moving vehicles to let faster traffic pass. At the SR 1 North TCR Outreach workshop held on May 6, 2016, a number of participants asked for more and better designed pullouts. In some scenic areas, drivers may almost slow to a crawl and want to be assured that there will be somewhere they can safely pull off the road to stop and admire the view. In other cases, drivers may want to pull over for emergencies. Some were mainly interested in speeding up their journey even though SR 1 is a winding road in most locations and unsuited to high speeds. Proper signage and traffic calming measures should be incorporated into developing these pullouts as fast driving on a road that bicyclists, pedestrians and equestrians share is not appropriate.

This TCR proposes a feasibility study in consultation with community, county, and State agencies to determine where quality paved pullouts, turnouts, or rest stops should be strategically located, replacing many of the existing ad-hoc pull outs. These developed pullouts can as a turnout for slower moving vehicles or emergency stops; as potential bus stops accommodated for smaller transit vehicles with room to board and alight passengers; and as rest stops to include amenities such as parking, electric vehicle charging, benches, picnic tables, and restrooms. Bicycle/pedestrian rest stops can be located after steep inclines or near the California Coastal Trail. Pervious paving for these developed pullouts may also be examined. These features would let drivers, bicyclists, and pedestrians stop safely to enjoy the view and surroundings. While rest stop locations at scenic locations should be considered, they should not be provided at the expense of vehicular turnouts.

With climate change, it is probable that some sections of SR 1 will ultimately need to be realigned inland to meet changing conditions. When and if this occurs, opportunities should be taken (where appropriate) to enhance the existing infrastructure with multimodal improvements and environmental restoration, while at the same time balancing the needs of local communities. Other projects such as pavement rehabilitation and bridge replacements can consider the addition of improvements for location-based needs identified through the D4 Bike and Pedestrian Plans (pages 23-32). Caltrans examines pavement conditions (**Appendix E**) and bridge health (**Appendix F**) to inform the State Highway Operation Protection Program (SHOPP)[8](**Appendix H**). Additionally, fish passage remediation locations are also assessed to be included in any culvert or bridge project (**Appendix G**).

Currently, most of the existing creek crossings are culverts, with the road cutting into the hillside. With rising sea levels and increasing precipitation, many culverts will become functionally obsolete and the roadway harder to maintain. There could be aesthetic and environmental benefits to replace them with more resilient and architecturally designed structures. In some cases, this would mean replacing a culvert with a bridge, but in other places it might involve relocating the highway across the front of ravines or moving inland. Structures would be designed to be more resilient to climate change and in many cases, reduce maintenance costs and the need for highway closures. If designed appropriately, replacing culverts with bridges not only improves transportation service but also creates opportunities for landward expansion of wetlands, offsetting those lost to SLR, and additional funding opportunities from restoration, habitat and fish and wildlife sources. There are two segments of SR 1 in Marin and Sonoma Counties that would particularly benefit from such a strategy, due to both their scenic locations and susceptibility to be affected by climate change.

- Segment B- Panoramic Highway to Stinson Beach, Bolinas Lagoon
- Segment D- Bodega Bay to the Russian River/Jenner[9]

Figure 2 shows an example of a culvert, which can cause erosion both up and down stream by limiting the natural drainage of the creek. Replacing culverts with bridges can help mitigate these effects and improve aesthetics.

Figure 2. Culverted Creek at Millerton

[8] The SHOPP is developed to preserve and protect the state highway system. This program, adopted on even years, primarily includes projects intended to rehabilitate the roadway or roadside and to improve traffic safety or operations.

[9] Center for Ocean Solutions, Focused Vulnerability Assessment: Sonoma County, July 2016

Both of these segments are already being affected by rising sea levels and climate change. They will most likely require rebuilding/realignment of sections of the highway. They also contain the visitor "hotspots" of Stinson Beach and Bodega Bay; together with some of the most dramatic and accessible sections of the coast. Infrastructure improvements in these two segments will require detailed engineering studies to analyze resilience, cost effectiveness, aesthetics and environmental consequences, to name a few. This analysis will need to be undertaken prior to any long-term project-specific investment, as it could result in significant relocation of the existing alignment. An example of this would be the Gleason Beach Realignment Project. To the greatest extent feasible, such projects should improve natural drainage and sediment patterns, restore coastal habitats, and beneficially reuse sediment (e.g. trapped in culverts) for restoration purposes. In some cases, the old roadway might be used for rest stops or sections of the California Coastal Trail. In most cases, however, the old alignment would need to be restored to its natural condition.

GLEASON BEACH

SR 1 at Gleason Beach is a popular tourist destination and vital connector for local residents, visitors, and businesses to several coastal communities in the surrounding area. SR 1 also allows emergency services to access these areas. The biggest challenge is on-going and potential repair increases in erosion, resulting in more frequent and longer road closures and this emergency roadway work on SR 1. Costly maintenance and repairs to existing SR 1 will only increase as the roadway continues to endure increasing levels of erosion and coastal-related impacts. Although the SR 1 Gleason Beach realignment project has been a controversial project, Caltrans has received overall support from communities, external agencies, stakeholders, as well as final approval of the project by the California Coastal Commission in December 2020.

Failure to retain SR 1 as a connector would adversely affect multimodal travel by increasing travel times due to long detours. Loss of connectivity and accessibility would affect access to schools, places of employment and impact community cohesion in the Gleason Beach coastal village by disrupting connections to Jenner, Bodega Bay, and destinations further out. Emergency services such as fire protection and emergency medical and rescue service providers located several miles from Gleason Beach also need SR 1 to reach those in need. Therefore, keeping SR 1 open is critically important to the safety and success of communities, agriculture, and the economy of the area.

Demand

Recreation is an important part of the socioeconomic mix to enhance quality of life and public health. The SR 1 North Corridor is uniquely situated in the Bay Area and provides a "lower carbon" vacation destination for residents of the Bay Area. However, the visitor experience of the Corridor is complicated by the multitude of open spaces and respective organizations responsible for preserving and managing recreational opportunities. Park and local agencies can collaboratively work together to provide a unified visitor approach for the Corridor. Local Coastal Programs for both Marin and Sonoma Counties require SR 1 to be kept at two lanes with policies to improve shuttle service and limit parking for congestion relief. This TCR encourages one-stop parking to manage demand in the Corridor which allows visitors to reserve and pay for parking in advance of their visit. These one-stop parking locations may be

existing parking lots inside or outside of the Corridor that can be converted and further developed to include electric vehicle (EV) charging stations and shuttle service.

Coordination with local, State, and regional agencies is needed to provide one-stop parking with EV charging stations, increased shuttle service, and transit/ferry combo tickets to reach these high demand areas (even seasonally). A unified approach such as a website can provide information on shuttle schedules, park-and-ride lot or one-stop parking locations, and bicycle and pedestrian trails to encourage visitors to travel by active transportation modes. An example of collaboration is where the Golden Gate National Recreational Area (GGNRA) together with Caltrans have installed an electronic message board on US 101 directing drivers to the Muir Woods Shuttle.

CORRIDOR OVERVIEW AND ANALYSIS

State Route 1 North in Marin and Sonoma Counties (SR 1 North) is a 110-mile segment of the world-famous north-south highway that runs along the Pacific coast of California. The SR 1 North Corridor serves as a critical connection for the small and relatively isolated communities along its route. Like the rest of this coastal highway, SR 1 North is known for its scenic views and natural features. In Marin and Sonoma Counties, SR 1 passes many federal, State, and existing and planned county parks, beaches and other recreation areas frequented by tourists from around the world.

WHAT'S IN A NAME?

Officially it is **California State Route 1**, but this world-famous highway goes by a number of other names for long stretches. To many, it is generally known as **Highway 1**. SR 1 picks up numerous local names as it passes through local communities, large and small, but there are four main names it goes by-

Shoreline Highway (in Mendocino and Marin Counties)

Coast Highway (in Sonoma County)

Cabrillo Highway (Daly City in San Mateo County to US 101 and South of Lompoc in Santa Barbara County)

Pacific Coast Highway (South of Carpinteria in Santa Barbara County to Dana Point in Orange County)

For its entire length, SR 1 is a two-lane conventional highway, often winding and usually with only minimal shoulders. The following sections will describe the route segmentation, traffic counts, gateway routes to SR 1, freight, transit, bicycle and pedestrian facilities, and broadband opportunities along SR 1.

Route Segmentation

Segmentation allows easier assessment of the Corridor needs for SR 1. The Corridor has been segmented largely based upon motor vehicle Average Annual Daily Traffic (AADT), county boundaries, intersections, and route designations.

Table 2. Route Segmentation

Segment	Location	County	Begin Post Mile	End Post Mile
A	US 101 to Erica Road (2.8 miles)	MRN	0	2.8
B	Erica Road to Bolinas Road (14 miles)	MRN	2.8	17.2
C	Bolinas Road to Valley Ford Road (33 miles)	MRN	17.2	50.5
D	Valley Ford Road to SR 116 (20 miles)	SON	0	20.1
E	SR 116 to Mendocino County (38 miles)	SON	20.1	58.6

Segment Summary

Segment A: This part of SR 1 serves the unincorporated community of Tamalpais/Homestead Valley in Marin County. Residential traffic predominates, but this is also the main access to the southern Marin coast for tourists and residents alike.

Segment B: SR 1 leads directly to the coastal communities of Muir Beach, Stinson Beach and Bolinas; this segment is slow and winding; congested in peak season and on weekends. Panoramic Highway provides an alternative route to Stinson Beach as well as Muir Woods National Monument and Mount Tamalpais State Park.

Segment C: North of Bolinas, SR 1 runs inland following the San Andreas Fault. SR 1 has low traffic volumes for this whole segment, but Sir Francis Drake Boulevard and the Point Reyes-Petaluma Road carry traffic to Point Reyes National Seashore and Point Reyes Station.

Segment D: This relatively busy segment of SR 1 serves Bodega Bay from Petaluma, but north of Bodega Bay, traffic decreases significantly.

Segment E: North of Jenner, SR 1 is remote, steep, and winding. Traffic is light with an AADT less than 3,000. This segment is the main access to many local communities and popular sites such as the Jenner Headlands Open Space, Fort Ross State Historic Park, Timber Cove, Salt Point State Park, Stewarts Point, Stewarts Point Rancheria, Sea Ranch, and Gualala (at Mendocino Countyline) as well as local inland residences

Figure 3. SR 1 North Segment Map

Segment	Northern Limit (length)	CNTY	PM	Description
A	US 101 – Eric Rd (3 miles)	MRN	2.8	Mainly residential traffic (except weekends)
B	Bolinas Road (14 miles)	MRN	17.2	Marin Headlands and Stinson Beach/Bolinas
C	Valley Ford Road (33 miles)	MRN	50.5	Rural section with little through traffic
D	SR 116 (20 miles)	SON	20.1	Section of Coast Highway including Bodega Bay and Jenner
E	Mendocino County (38 miles)	SON	58.6	Remote section of coast including Gualala and Sea Ranch

Table 3.Corridor Description by Segment

Segment	A	B	C	D	E
California Freeway & Expressway System	No	No	No	No	No
National Highway System	MAP 21 Principal Arterial	No	No	No	No
Scenic Highway	Eligible	Eligible	Eligible	Eligible	Eligible
Caltrans IRSS	Yes	Yes	Yes	Yes	Yes
Federal Functional Classification	Conventional Highway	Conventional Highway	Conventional Highway	Conventional Highway	Conventional Highway
Goods Movement Route	No	No	No	No	No
Truck Designation	CA Legal Kingpin-to-Rear-Axle (KPRA) Advisory Route < 30'	CA Legal KPRA Advisory Route < 30'	CA Legal KPRA Advisory Route 40'on SR 1 between SON/MRN County line to Smith Brothers Lane.	CA Legal KPRA Advisory Route < 30'	CA Legal KPRA Advisory Route < 30'
Rural/Urban/Urbanized	Urban	Rural	Rural	Rural	Rural
Metropolitan Planning Organization	MTC	MTC	MTC	MTC	MTC
Congestion Management Agency (CMA) & County Transportation Commission	Transportation Authority of Marin (TAM)	TAM	TAM	Sonoma County Transportation Authority (SCTA)	SCTA
Air District	Bay Area Air Quality Management District (BAAQMD)	BAAQMD	BAAQMD	BAAQMD (up to SR 1 and Valley Ford-Freestone Rd Junction) /Northern Sonoma County Air Pollution Control District (NSCAPCD)	NSCAPCD
Regulatory Agency and Park Management	Not Applicable	Golden Gate National Recreational Area (GGNRA), Mt Tamalpais State Park, Martin Griffin Preserve	GGNRA, Point Reyes National Seashore, Tomales Bay State Park, Tomales Bay Ecological Reserve, Marconi Conference Center State Historic Park	Sonoma Coast State Park	Sonoma Coast State Park, Salt Point State Park, Jenner Headlands Preserve, Fort Ross State Historic Park, Stillwater Cover Regional Park, Kruse Rhododendron State Natural Reserve, Stewarts Point Ranch, Gualala Point Regional Park
Terrain	Rolling and Flat	Rolling and Flat	Rolling	Rolling	Rolling

SR 1 North Motor Vehicle Traffic Levels

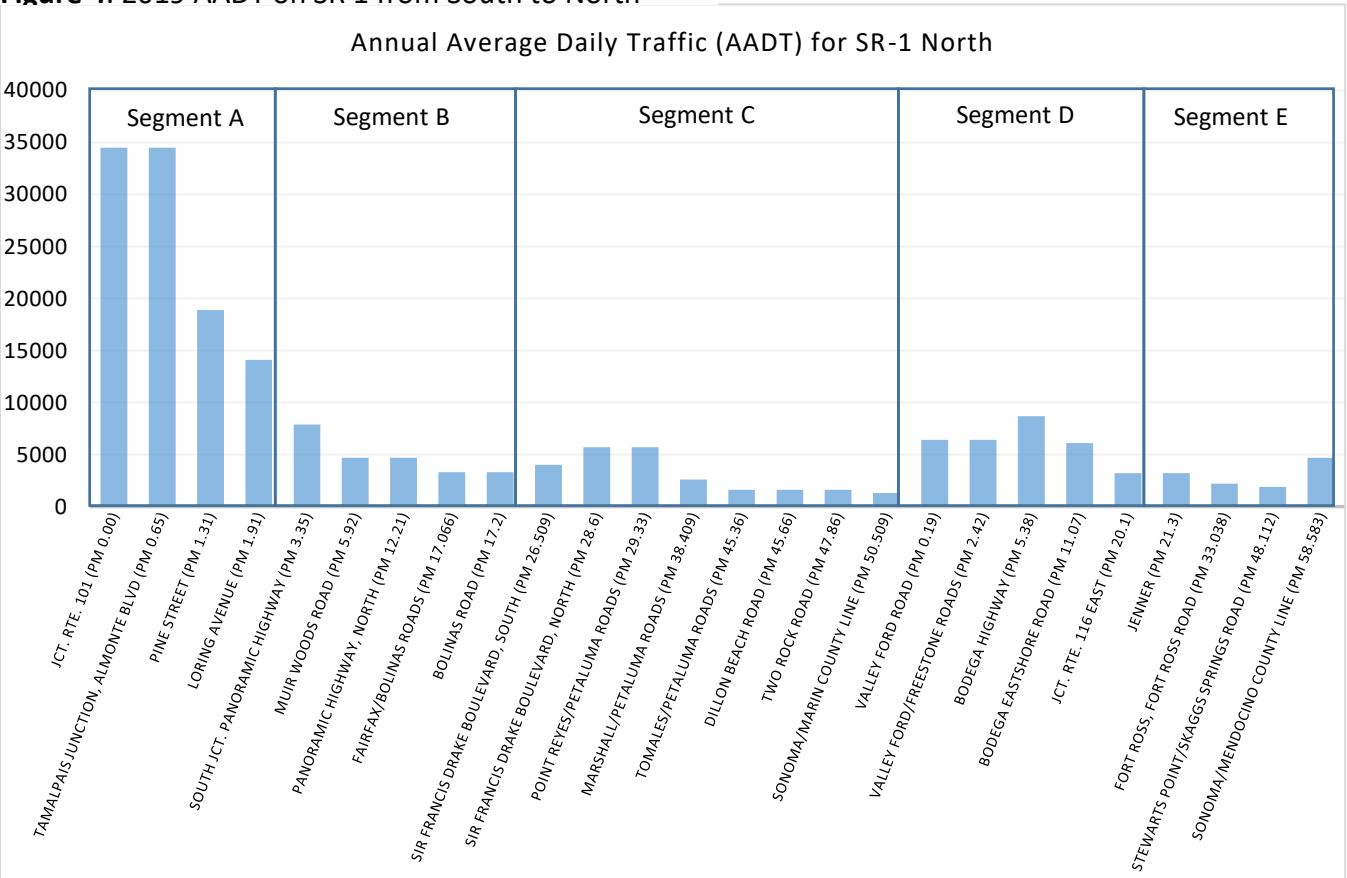
Figure 4 shows the 2019 Annual Average Daily Traffic (AADT) along the Corridor with the highest AADT in Segment A (over 30,000 at Tamalpais Junction) and Segment B, along the Panoramic Highway to Muir Woods. Segment A serves as the primary access to Mill Valley, via Almonte Boulevard and is affected by congestion between Tam Junction and US 101. According to the 2019 American Community Survey estimates for commuting to work, Segment A serves the largest amount of workforce with the highest number of commuters using alternative modes of transportation besides driving alone in comparison to the rest of the Corridor. AADT is generally lower than 8,000 throughout the Corridor but there is significant variation along SR 1 with peaks at Point Reyes (5,700) and Bodega (8,700). On summer weekends the traffic is much heavier with significant congestion at several areas (e.g. Stinson Beach) on roads (e.g. Sir Francis Drake Boulevard) leading to SR 1.

Table 4. Commute Choice by Mode

COMMUTE MODE	Marin County	Sonoma County
Drive alone	62%	72%
Carpool	6%	8%
Transit	10%	4%
Walk	3%	3%
Other	3%	1%
Worked from home	15%	12%
Mean travel time to work (minutes)	35.37	35.85

Source: 2019 American Community Survey Data Profile for census designated places along SR 1 North

Figure 4. 2019 AADT on SR 1 from South to North



Gateway Corridors

SR 1 North is a critical connection to the various farms and communities in the surrounding area. However, it cannot be seen just as a transportation Corridor where people travel from end to end. The counts show that some sections of SR 1 in Marin and Sonoma Counties have surprisingly low levels of traffic (AADT less than 3,000) despite SR 1 being known as visitor-serving. SR 1 is a destination for most, either to homes, businesses, or recreation.

Figure 5 shows the most effective routes to access SR 1, from either San Francisco or via the Richmond—San Rafael Bridge (main access from the East Bay and Sacramento regions). These routes represent the majority of regional and inter-regional traffic to SR 1 from outside the Corridor. Those traveling from points north on US 101 or Santa Rosa would have different route choices.

For trips that would access the Corridor via the Golden Gate or Richmond—San Rafael Bridges, the following "gateway" routes have been identified connecting from US 101 to coastal SR 1:

1. River Road/SR 116 (Segment E)
2. Bodega Avenue/Valley Ford (Segment D)
3. Bodega Avenue/Tomales (Segment C)
4. Novato Boulevard (Segment C)
5. Sir Francis Drake Boulevard (Segment C)
6. US 101 at Manzanita (Segments A & B)

Most of these "gateway" routes are not part of the State Highway System and provide various opportunities in reaching SR 1. Potential strategies are detailed in the Concept Strategies by Segment section (pages 60-74).

Figure 5. Gateway Routes to coastal SR 1 based upon trips originating from US 101

Freight Transportation

SR 1 is mostly a California Legal Kingpin to Rear Axle (KPRA) less than 30 feet advisory route (posted as 30 feet) except for the portion between the Marin and Sonoma County line to Smith Brothers Lane which is a California Legal KPRA 40 feet advisory route. However, like other traffic to destinations on SR 1, freight largely uses other highways to access SR 1. For even small trucks, the roads available are limited, and many of the narrower roads between US 101 and the coast are largely unsuitable to through truck traffic. While truck traffic is essential on SR 1, the truck AADT is very low, with US 101/SR 1 Junction, Tamalpais Junction, and the more agricultural areas near Valley Ford on Bodega Highway having the largest truck AADT in 2019 (approximately 10 percent or less of the total vehicle AADT).[10]

Transit Services

There is no direct transit service along the Corridor from the Golden Gate Bridge to Mendocino County (Gualala). Despite the rural nature of SR 1 North, there is good transit service in some parts of the Corridor. On the weekends, up to twelve buses go daily to Stinson Beach from Marin City, and eight daily from San Rafael to Point Reyes Station/Inverness. Transit services on SR 1 are divided between two County transit agencies, and trips to and from the Corridor can involve transfers between additional transit agencies. However, recent frequency of the Muir Woods Shuttle has increased the need for connections to local transit and ferry services (e.g. Sausalito) on weekdays. Bus lengths over 40 feet are prohibited on SR 1 except for the portion between Marin and Sonoma County line and Smith Brothers Lane, which allows up to 45 feet.[11] In 2018, Marin County adopted an ordinance to limit bus lengths to 30 feet on County roads, specifically Muir Woods Road and Frank Valley Road between Panoramic Highway and the Muir Woods entrance, with advised access to Muir Woods via Shoreline Highway through Muir Beach. Due to the various curves along SR 1 for Segments A, B, and D, limiting bus lengths to around 30 feet or less or reducing the speed limit should be examined in coordination with stakeholders and agencies for travelers to safely navigate through the Corridor.[12] However, this in turn reduces capacity and would require more transit trips. To encourage more transit service for the Corridor, additional bus routes and stop locations should also be carefully determined.

Transit Agencies serving US 1 North:

- **Marin Transit:** The West Marin Stage Coach serves segments A, B, and C which includes Marin City, Stinson Beach, Bolinas, Point Reyes Station, Inverness, Muir Woods National Monument (seasonal/weekends) from Sausalito and San Rafael (connection to Sonoma-Marin Area Rail Transit (SMART))[13]
- **Sonoma Transit** (on SR 116 and River Road, to Guerneville and Occidental in West Sonoma County)[14]directly serves SR 1 in Sonoma County with its seasonal route 29, which operates on weekend days during the months of June, July, and August. Route 29 provides service along SR 1 between Bodega Bay, Jenner, and inland connections to the

[10] https://dot.ca.gov/programs/traffic-operations/legal-truck-access/truck-network-map
[11] https://dot.ca.gov/-/media/dot-media/programs/traffic-operations/documents/trucks/busmap-d04-a11y.pdf
[12] https://www.ptreyeslight.com/article/county-restricts-bus-length-muir-woods-road-ahead-future-improvements
[13] https://marintransit.org/routes
[14] https://sctransit.com/all-routes/

Lower Russian River communities, the towns of Bodega and Freestone, and the cities of Sebastopol and Santa Rosa

- **Mendocino Transit:** Serves segments C, D, and E which includes Valley Ford, Bodega, Sea Ranch and Gualala (one bus a day) from Santa Rosa[15]

Other transit agencies that operate or connect to the Corridor:

- Golden Gate Transit: Ferries and buses from San Francisco to Marin and Sonoma Counties along US 101[16]
- SMART Rail: Passenger rail service parallel to US 101 between Larkspur and Sonoma County Airport
- Amtrak Thruway Buses: Three per day at Petaluma and Santa Rosa from Martinez Amtrak station.[17]

Figure 6. - Bus at Point Reyes Station

Bicycling in the SR 1 North Corridor

The "Pacific Coast Bikeway" is a world-renowned bike route from Canada to Mexico, part of which is designated as the United States Bicycle Route (USBR) 95.[18] [19]The SR 1 North Corridor is a core section of this route with relatively little traffic and many scenic vistas. Due to the prevailing winds from the northwest, and the preference to be closer to the ocean, most long-distance bicycling in the Corridor occurs from north to south. However, despite the high profile of the Pacific Coast Bikeway, recreation/fitness cycling in the Corridor is more local.

[15] https://mendocinotransit.org/routes/route-95/
[16] https://www.goldengate.org/bus/system-maps/
[17] https://www.amtrak.com/routes.html
[18] https://www.adventurecycling.org/routes-and-maps/us-bicycle-route-system/maps-and-route-resources/
[19]https://www.adventurecycling.org/about-us/media/press-releases/u-s-bicycle-route-system-adds-2-903-miles-of-new-routes-in-5-states/

PACIFIC COAST BIKEWAY

The Pacific Coast Bike Route (PCBR), as officially known, is a designated cycling route that runs along the California coast from the border with Canada to the border with Mexico. The route was legislatively designated by the State of California in 1976 to commemorate the nation's 200th birthday. The route follows State highways, freeways, and city or county roads throughout its length.

District 1 (Eureka) and District 5 (San Luis Obispo) have done much mapping and signing of the PCBR. District 1 developed a signing system, which is more than just route-finding, showing facilities and accommodations on or near the route. In August 2021, the Adventure Cycling Association officially designated a part of the PCBR from Oregon border to San Francisco as the United States Bicycle Route (USBR) 95 and mapped the route on their website. Beginning at the southern end of San Francisco before crossing into Sausalito on the Golden Gate Bridge, the route follows various city and county roads and trails before continuing north along SR 1 at Point Reyes Station and beyond the Bay Area.

Especially in the southern parts of the Corridor, SR 1 is used to make short trips from the inland towns or staging areas in parks. Roads, like Sir Francis Drake Boulevard, have large numbers of recreational cyclists during the summer and on weekends. However, due to the topography and lack of dedicated bicycle facilities, non-recreational biking is not common and is within local communities even though the Corridor permits bicycle use. Bicyclists are permitted along the Corridor and while a large number of users support four-foot shoulders, geographical and geological constraints can be a limiting factor for the construction of shoulders.

Caltrans District 4 Bike Plan

Caltrans addresses bicycles in projects throughout the project development process. The 2018 Caltrans District 4 Bike Plan (D4BP) identifies infrastructure improvements that enhance bicycle safety and mobility and recommends removal of barriers to bicycling in the region. The Plan was developed in cooperation with local and regional partners and the public to ensure that the recommended bicycle improvements on the State Highway System complement proposals for local and regional networks. The Plan considers all types of bicycle trips, but prioritizes utilitarian bicycle travel, such as to work, school, shopping, or to connect to transit. State highways that serve as recreational or touring routes for bicyclists are also considered. The Plan helps inform future investments on the State transportation network. Many funding programs also require consideration of complete streets improvements as part of a project, such as sidewalks, bike lanes, and crossing improvements. Caltrans is eligible to compete for State and regional Active Transportation Program (ATP) funds for improvements that have the potential to increase biking trips or to enhance safety.

The Caltrans District 4 Bike Plan Web Map covers the State highway system within the nine Bay Area counties, showing which State highways are open to bicyclists, where bicyclists are prohibited, and alternate routes where bicycling is prohibited. In addition, the D4BP provided a needs analysis and identified priority improvements.[20] **Table 5** shows the recommended

[20] The needs analysis is based on multiple data sources to rank highway segments on Level of Traffic Stress (LTS), low stress connectivity (permeability), collision history, and potential bicycling demand. Improvements are classified by prioritization categories of top, mid, and low tiers.

projects from the D4BP. Regardless of its assigned tier, the proposed improvements can be incorporated into projects.

Table 5. Proposed District Bike Plan Projects

Segment	County	Post mile	Location	Improvement Type	Description	Cost	Tier
A	Marin	0.0	US 101 and Shoreline Highway	Minor Interchange (signage and striping)- Class IIB	TAM BPAC proposes some minor US 101 ramp reconfiguration and signalization.	$	MID
A	Marin	0.61	Tamalpais-Homestead Valley from Maple St - Almonte Blvd	Corridor Improvement-Class I	Proposed Class II bike lanes from Marin County Draft Bicycle and Pedestrian Master Plan. Marin County Bicycle Coalition confirms demand for Class II bike lanes for strong riders, and a separate facility would be recommended for less confident users, including children.	$$	TOP
A	Marin	0 - 3.21	Almonte, Tamalpais Valley Hwy 1 - Panoramic Way	Corridor Improvement-Shoulder improvements	Provide a combination of Class II bike lanes and Class III bike route on Highway 1 as proposed in the Draft Marin County Bicycle and Pedestrian Plan (2017). Prioritize Class II for uphill segments and "widen where feasible" to create additional shoulder area where feasible during road repaving projects.	$	LOW
B-C	Marin	3.21 - 25.84	Unincorporated Marin County from US 101 - Sir Francis Drake Blvd	Corridor Improvement-Class I	Provide a combination of Class II bike lanes and Class III bike route on Highway 1 as proposed in the Draft Marin County Bicycle and Pedestrian Plan (2017). Prioritize Class II for uphill segments and "widen where feasible" to create additional shoulder area where feasible during road repaving projects.	$$$$	MID
B	Marin	3.33	Tamalpais-Homestead Valley at Erica Rd	Intersection Improvement at uncontrolled intersection	Consider "squaring up" the intersection with Panoramic Highway to improve sight lines and access for bicyclists	$	LOW
B	Marin	3.59	Tamalpais-Homestead Valley at Erica Rd	Intersection Improvement at uncontrolled intersection	Recommended by Bay Area Ridge Trail. Connect the Miwok hiking path.	$	MID
B	Marin	5.46	Muir Beach at Pacific Way	Intersection Improvement at uncontrolled intersection	Pacific Way leads to beach access, which may generate demand. Sight lines and left turns to access Pacific Way are challenging. Signage may help, and additional measures (beacons or other controls) should be evaluated.	$	LOW

Segment	County	Post mile	Location	Improvement Type	Description	Cost	Tier
B	Marin	5.68	Muir Beach at Franks Valley Rd	Intersection Improvement at uncontrolled intersection	Intersection has challenging sight lines for bicyclists exiting Franks Valley Road. Some kind of roundabout here may improve safety/comfort, but speeds and user volumes may be an issue.	$$	LOW
C	Marin	25.84 - 28.77	Point Reyes Station from Sir Francis Drake Blvd - Point Reyes Petaluma Rd	Corridor Improvement-Class I	Provide a combination of Class I path and Class II bike lanes on Hwy 1 from Bear Valley Rd to Point Reyes-Petaluma Rd.	$$$	LOW
C	Marin	28.86	Point Reyes Station from Dillon Beach Rd - Point Reyes Petaluma Rd	Corridor Improvement-Class I	Proposed bicycle facilities on Highway 1 either Class III or Class II as proposed in the Draft Marin County Bicycle and Pedestrian Plan (2017). Use the "widen where feasible approach" that provide additional shoulder area along where feasible as part of road repaving projects.	$$$$	MID
D	Marin, Sonoma	0.21	Valley Ford Rd - Dillon Beach Rd	Corridor Improvement-Class I	Proposed bicycle facilities on Highway 1 either Class III or Class II as proposed in the Draft Marin County Bicycle and Pedestrian Plan (2017). Use the "widen where feasible approach" that provide additional shoulder area along where feasible as part of road repaving projects.	$$$	LOW
D	Sonoma	9.6	Bodega Bay from W King Trail - Mendocino County border	Corridor Improvement-Class I	The Sonoma County Local Coastal Plan and County Bicycle and Pedestrian Plan[21] identifies the Coastal Trail and the Bodega Bay Trail that follows the California coastline. The California Coastal Trail starts at the Mexico/California border and ends at the Oregon/California border.	$$$$	MID
D-E	Sonoma	0.21 - 20.26	Jenner from Willow Creek Rd - Valley Ford Rd	Corridor Improvement-Class II	Class II bike lanes as proposed in Sonoma County Bicycle and Pedestrian Plan	$$$	LOW

*Note: $=Under $250,000, $$=$250,000 - $1,500,000, $$$=$1,500,000 - $7,000,000, $$$$=Over $7,000,00

[21] https://sonomacounty.ca.gov/PRMD/Long-Range-Plans/Bicycle-and-Pedestrian-Plan/

Walking in the Corridor

As designated, the California Coastal Trail (CCT) runs from the Oregon border to Mexico. In 2001, SB 908 mandated the completion of the CCT. The trail is approximately 70 percent complete but very disconnected.[22] The large number of trails in the federal, State and local parks nearby make the SR 1 North Corridor one of the most completed sections of the trail. SR 1 has very limited dedicated pedestrian facilities and many sections of the CCT involve walking on SR 1. The TCR supports developing improved pedestrian facilities as identified in the District 4 Pedestrian Plan, LCPs, and local and countywide bicycle and pedestrian plans in accordance to Caltrans Complete Street policies[23] to provide context sensitive solutions to protect the rural character of the coastal communities.

Any future bridge replacements affected by SLR, such as the Salmon Creek Bridge, Russian River Bridge, Russian Gulch Bridge, and Gualala River Bridge can be made to include pedestrian pathways to improve access to USBR 95 and the CCT. In the first SR 1 North TCR Workshop, some participants suggested that a local shuttle service be provided so that walkers can hike the CCT and ride to return to their starting point. Sonoma Transit and Marin Transit currently operates a seasonal/weekend bus service along SR 1, but should consider additional stops where appropriate to meet the recreational needs of pedestrians. **Figures 7-8** show the various parks and trails along the Corridor, including the CCT.

[22] https://the-california-coastal-trail-1-coastalcomm.hub.arcgis.com/

[23] https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/dd-64-r2-a11y.pdf

Figure 7. SR 1 North Sonoma County Parks and Trails

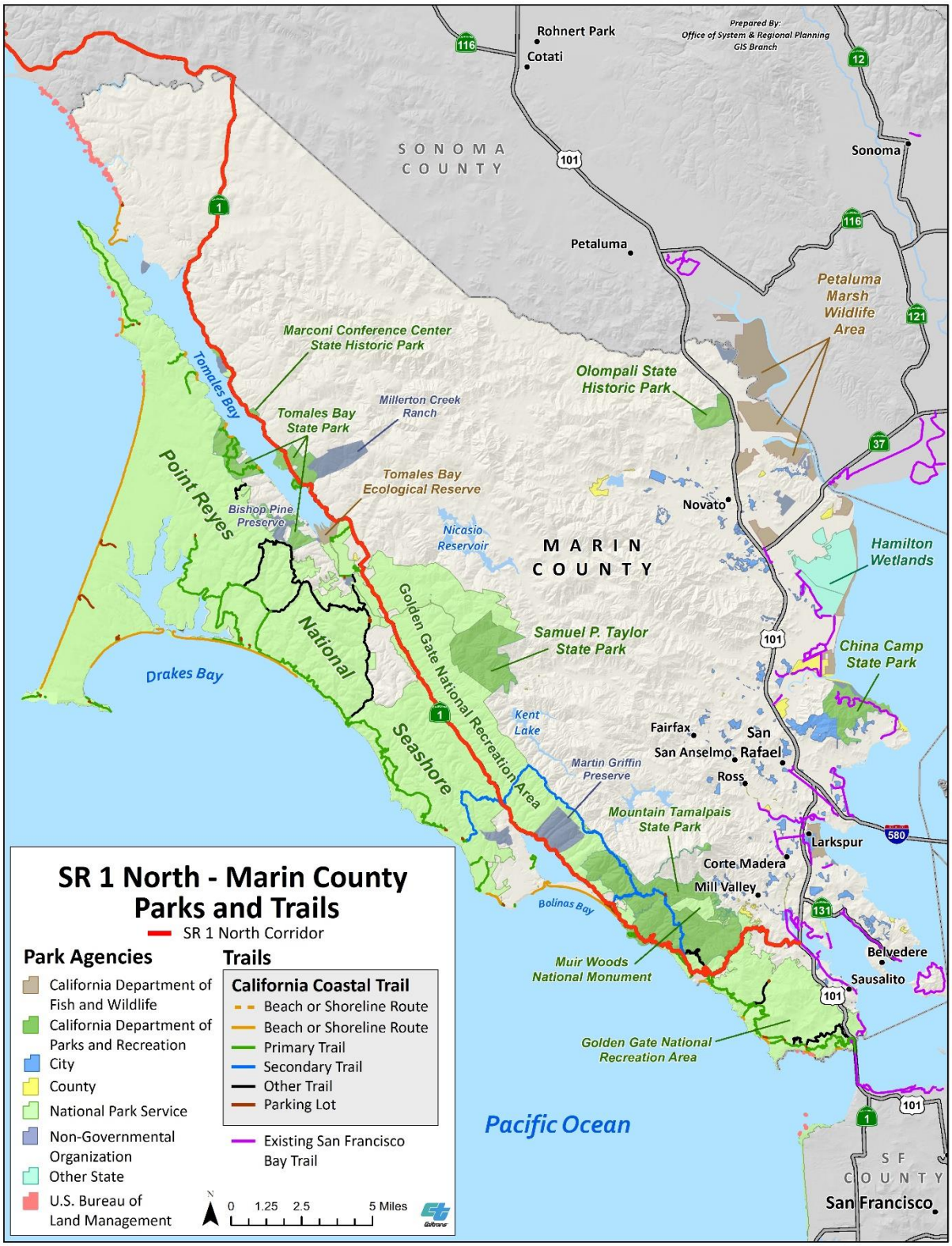


Figure 8. SR 1 North Marin County Parks and Trails

The Caltrans District 4 Pedestrian Plan

The Caltrans District 4 Pedestrian Plan, completed in April 2021, supplements the 2018 Caltrans District 4 Bicycle Plan. These combined plans are part of a comprehensive planning process to implement the statewide bicycle and pedestrian plan, California Active Transportation (CAT) Plan, *Toward an Active California.* The CAT plan identifies State highway system (SHS) locations with bicycle and pedestrian needs across all Districts which were then evaluated and prioritized according mobility, safety, equity, and preservation goals.

The District 4 Pedestrian Plan includes two elements: a summary report providing an overview of the conditions and areas of significant needs for pedestrians; and a story map, an interactive map that identifies and prioritizes location-based pedestrian needs to improve access along, across, and parallel to the State Highway System as well as disadvantaged communities, density of pedestrian collisions, pedestrian facility conditions, and highways where pedestrians are permitted. These priority needs are based on an analysis of existing gaps and barriers in the network, as well as latent pedestrian demand, indicated by public input and a variety of data sets.

Planned improvements to bicycle and pedestrian facilities are from a variety of sources, including:

- Projects identified in county and city bicycle and pedestrian plans
- An updated project list from each County Transportation Agency
- Input received from the Caltrans District 4 Bicycle Plan and Pedestrian Plan public outreach efforts, and
- Bicycle and pedestrian needs along a Corridor identified by Caltrans

The Plan identified locations as either a crossing or a corridor. Crossing needs are one or more of the following: 1) stressful pedestrian crossing, 2) infrequent crossings, 3) freeway interchange needs, and 4) other needs identified through local input or partner agencies. An example is a crossing needed for pedestrians to access the beach across the highway from a parking lot. Corridor needs are one or more of the following: 1) street sidewalk gaps, 2) sidewalks in fair or poor condition, 3) sidewalks along higher-speeds highways, and 4) other corridor needs identified through local input or by partner agencies.

Locations were scored by first breaking down the SHS into smaller segments that Caltrans might use to develop its improvement projects. Second, each segment was assigned a score based on its context, using measures like those in the District 4 Today section of the Summary Report. Measures were grouped according to the goals of Toward an Active California and weighted to reflect local active transportation vision and input. Freeway crossings, which aren't included in those segments, are also scored. The scored segments (and freeway crossings) were then ranked and sorted into tiers with Tier 1 representing the highest intensity of need. Although SR 1 is identified as Tier 3, many of the location-based needs (shown in **Figures 9 and 10**) will inform the current and future projects along the SR 1 North Corridor.

Figure 9. District 4 Pedestrian Plan Location-Based Needs Map – Marin County

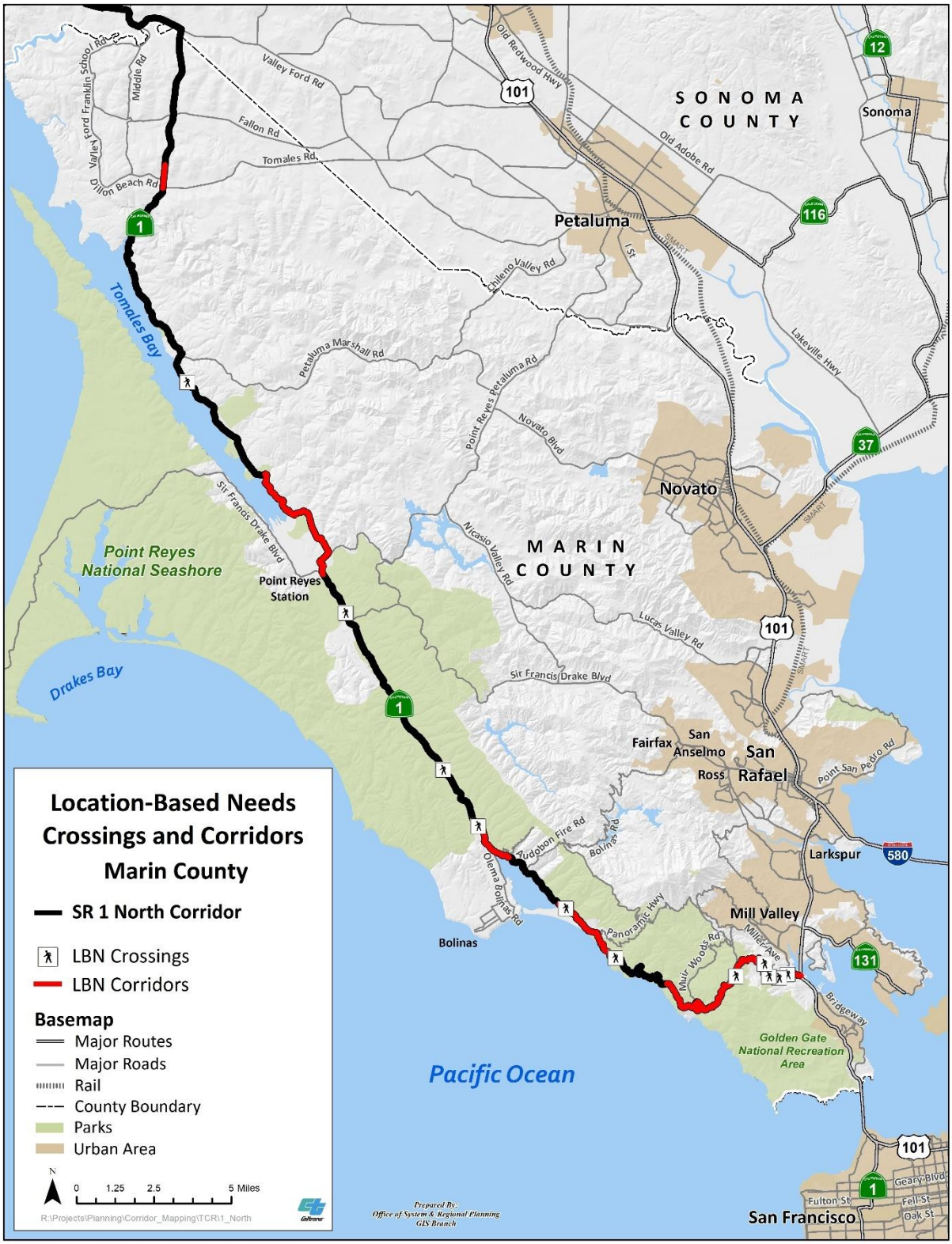


Figure 10. District 4 Pedestrian Plan Location-Based Needs Map -Sonoma County

Broadband

Broadband service has become an essential element of communication, an engine of economic activity, educational opportunity, civic engagement, access to health care, teleworking and much more. Income, education, disability status, age, race and ethnicity all correlate with broadband availability and use. Residents in less populated areas generally have less access to broadband services. State right-of-way can be a source of expanding the broadband network which could provide increased accessibility to rural and other underserved communities, including Tribal lands.

California Governor's Executive Order S-23-06, Twenty-First Century Government, directed establishment of the California Broadband Task Force to bring together Caltrans, public, and private stakeholders to identify opportunities to facilitate broadband installation across the State. Assembly Bill (AB) 1549 of 2016 requires Caltrans to notify broadband deployment organizations on construction methods suitable for broadband installation through the Department website. This would bring together private and public partnership for opportunities to increase advanced communication technologies. In 2018, Caltrans developed the "Incorporating Wired Broadband Facility on State Highway Right-of-Way User Guide," providing guidelines on Caltrans processes for wired broadband providers to incorporate wired broadband facilities in State highway right of way.

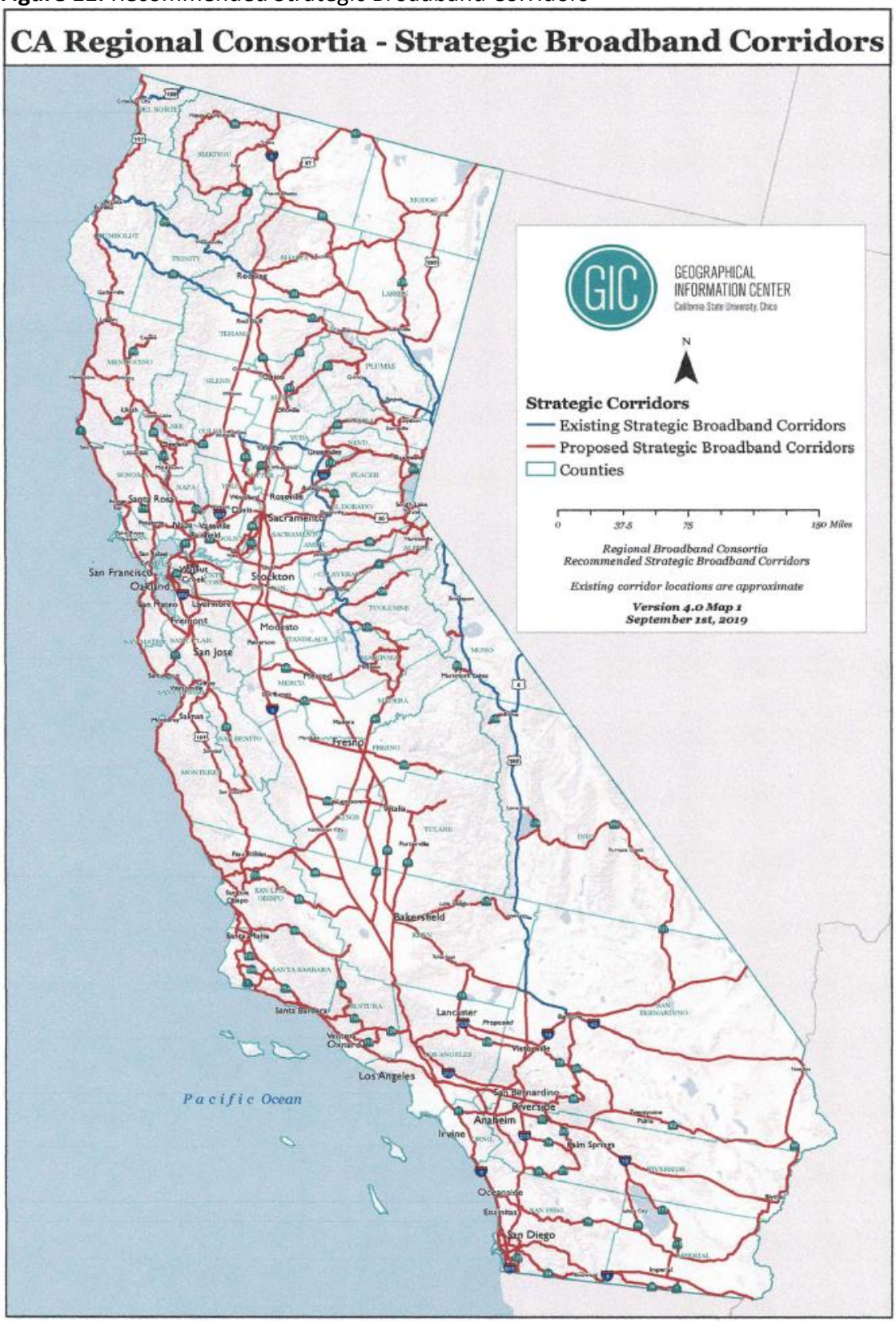
The California Advanced Services Fund (CASF) provided $645 million for the California Public Utility Commission to provide broadband access to no less than 98% of California households in each region.[24] It has funded 17 regional broadband consortia across the State that have identified "Strategic Broadband Corridors" which are now used as part of Caltrans planning efforts to provide broadband services to areas currently without broadband access and build out facilities in underserved areas. Caltrans encourages developing partnerships with stakeholders and the regional broadband consortium during planning, environmental scoping, and project development to integrate broadband for these Strategic Broadband Corridors. With Governor Newsom's approval of SB 156 Communications: Broadband in July 2021, a $6 billion multiyear investment was established to expand, enhance, operate, and maintain high-speed broadband internet infrastructure to unserved and underserved communities. Caltrans will work closely with the newly established Office of Broadband and Digital Literacy to construct a statewide open-access middle-mile broadband network.[25]

The regional broadband consortia for Marin, Mendocino, Napa, and Sonoma Counties is the North Bay/North Coast Broadband Consortium (NBNCBC). NBNCBC identified rural West Marin and the unincorporated areas within the County as high priority. These communities are low-density, coastal, and inland clusters, lacking broadband access and are a part of the digital divide. Sonoma County's coastal region was also identified as a priority area due to concerns for safety, education, business, agricultural, healthcare, and tourism industries. The NBNCNC identified Sonoma county's lack of connectivity as an issue that spans across both the private and public sector. The lack of connectivity hurts students, first responders, farmers, public agencies, and the county's ability to become a main tourist attraction of the North Bay. These issue areas all rely on efficient and fast broadband services to promote the welfare of residents in both Marin and Sonoma Counties. See **Figure 11** for a map of recommended strategic broadband corridors which includes SR 1 North in Marin and Sonoma Counties.

[24] https://www.cpuc.ca.gov/casf/

[25] https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB156

Figure 11. Recommended Strategic Broadband Corridors



ENVIRONMENTAL AND CULTURAL CONSIDERATIONS

The purpose of the environmental scan is to conduct a high-level identification of potential environmental factors that may require future analysis in the project development process. This information may not represent all environmental considerations that exist within the Corridor vicinity. The factors are categorized based on a scale of Low-Medium-High probability of an environmental issue and determination was conducted by District 4 Transportation Planning. Caltrans supports reducing environmental impacts from the transportation system as an overall strategic objective. **Table 6** below lists environmental factors present in SR 1 North and shows their impact probability. **Figures 12-14** further shows critical habitats identified by the Fish and Wildlife Service (USFWS) for threatened and endangered species, fish passage barrier statuses, regional Priority Conservation Areas (PCAs), wetlands, and potential section 4(f) lands[26].

Table 6. Environmental Considerations

Segment	A	B	C	D	E
Section 4(f) Land	*Low*	*High*	*High*	*High*	*High*
Coastal Zone	*N/A*	*High*	*High*	*High*	*High*
Farm/Timberland	*N/A*	*Low*	*High*	*N/A*	*N/A*
Environmental Justice	*High*	*Low*	*Low*	*Low*	*Low*
Cultural Resources	*Low*	*Med*	*High*	*High*	*Med*
Visual Esthetics	*Med*	*High*	*High*	*High*	*High*
Geology/Soils/Seismic	*Low*	*High*	*High*	*High*	*High*
Climate Change/Sea Level Rise	*High*	*High*	*High*	*High*	*High*
Hazardous Materials	*Low*	*Low*	*Low*	*Low*	*Low*
Naturally Occurring Asbestos	*Low*	*Med*	*High*	*High*	*Low*
Ozone*	*Non-Attainment*	*Non-Attainment*	*Non-Attainment*	*Attainment*	*Attainment*
Particulate Matter (PM) 2.5*	*Non-Attainment*	*Non-Attainment*	*Non-Attainment*	*Attainment*	*Attainment*
PM 10*	*Non-Attainment*	*Non-Attainment*	*Non-Attainment*	*Attainment*	*Attainment*
Carbon Monoxide*	*Attainment*	*Attainment*	*Attainment*	*Unclassified*	*Unclassified*
Noise	*Low*	*Low*	*Low*	*Low*	*Low*
Waters and Wetlands	*High*	*High*	*High*	*High*	*High*
Special Status Species	*High*	*High*	*High*	*High*	*High*
Fish Passage	*High*	*High*	*High*	*High*	*High*
Wildlife Connectivity	*Med*	*High*	*High*	*High*	*High*

*Air quality criteria pollutants are based on State area designations[27]

[26] Section 4(f) refers to the original section within the U.S. Department of Transportation Act of 1966 which provided for consideration of park and recreation lands, wildlife and waterfowl refuges, and historic sites during transportation project development.

[27] https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations

Figure 12. Environmental Factors Map - Marin County

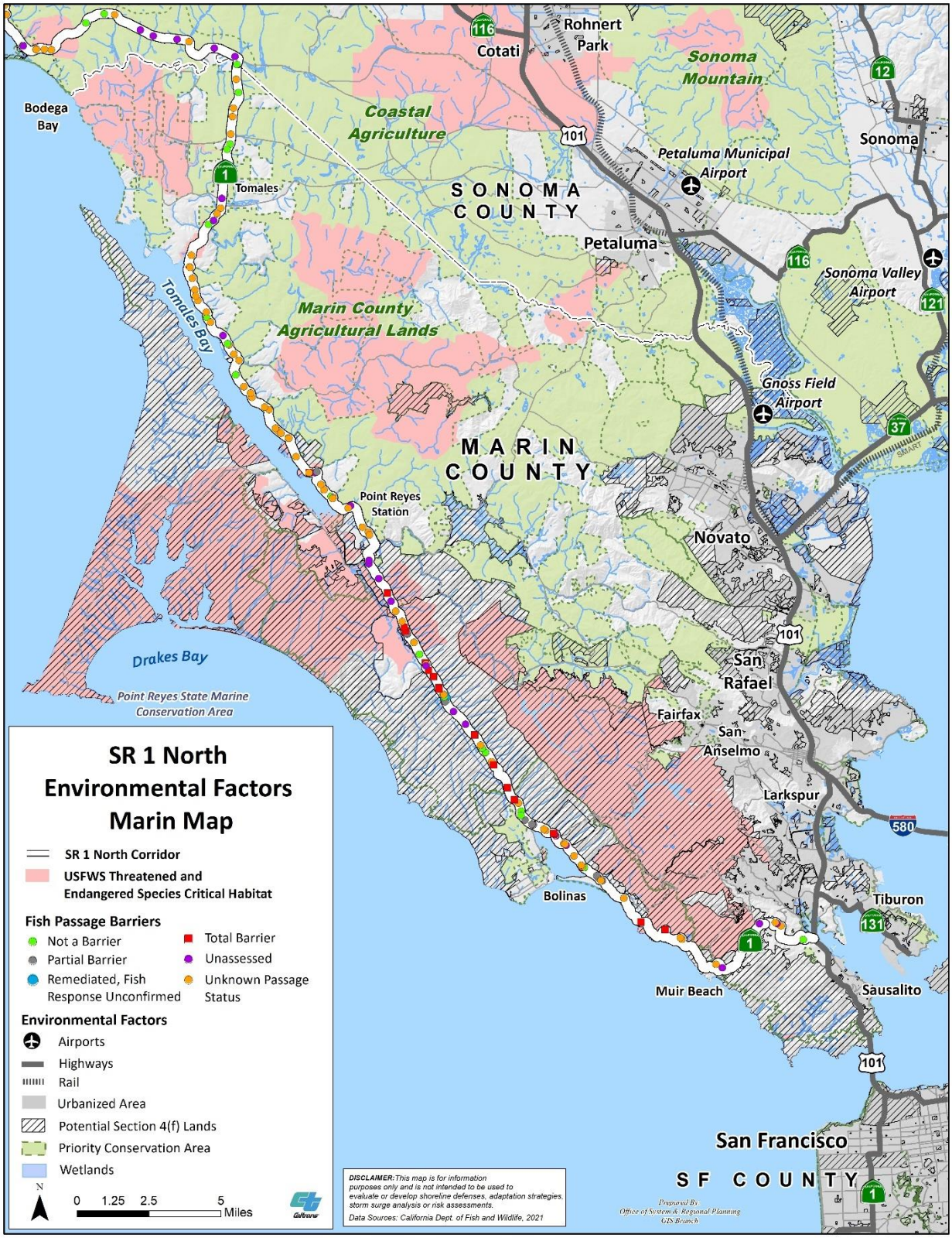
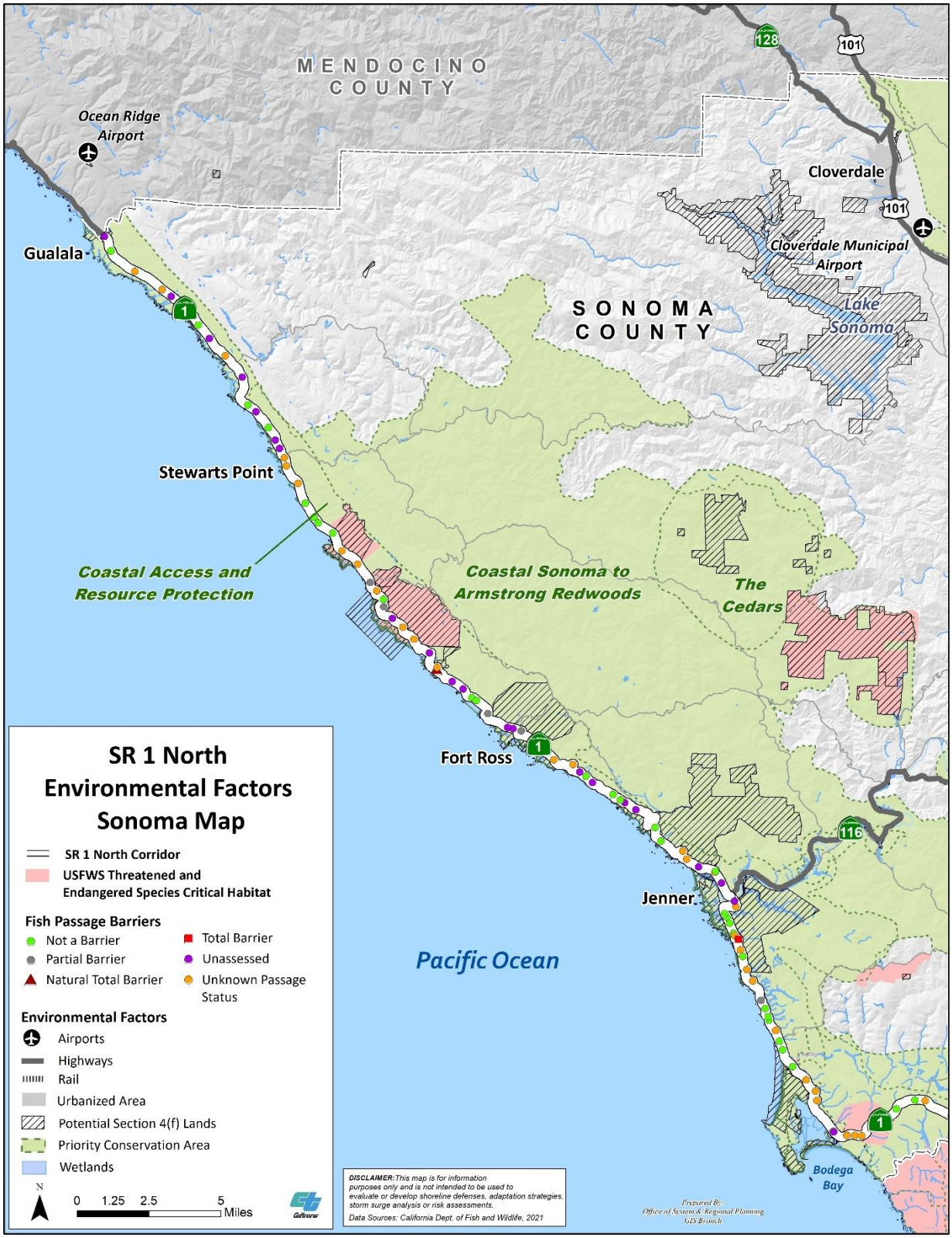


Figure 13. Environmental Factors Map - Sonoma County



Natural Preservation Lands and Waters

About two-thirds of SR 1 in Marin and Sonoma Counties traverses national, State and county parks, designated mainly to retain the land in its natural state, and to provide recreational and educational opportunities to all. The expansion of existing transportation facilities (e.g. road widening) or the construction of new ones is generally not acceptable due the California Coastal Act; the steepness of the terrain; and impacts to the environment. Any project should consider the context to protect scenic views, the rural character of the coast, critical habitats to threatened and endangered species, wildlife crossings, cultural resources, and public access; all of which, should be weighed against the ecological impacts of construction or other impacts to coastal resources. Projects should reduce visual impacts, plant native vegetation, improve fish passage, be designed to accommodate increased hydraulic capacity due to anticipated hydrologic changes due to climate change and avoid the placement of new concrete or other impervious surfaces that alter streambeds and waterflow.

The Greater Farallones National Marine Sanctuary (GFNMS) manages the waters and submerged lands off the coast of Marin and Sonoma Counties, including Estero de San Antonio and Estero Americano. The upstream boundary of Estero de San Antonio ends at the tide gate at Valley Ford-Franklin School Road and the upstream boundary of Estero Americano ends at the bridge at Valley Ford Estero Road. Any site-specific projects should be designed and implemented to prevent negative impacts to the waters and habitats of the sanctuary in compliance to the National Marine Sanctuaries Act.[28]

Fish Passage

The California Legislature passed Senate Bill 857 in 2006, which directs Caltrans to address fish passage. Caltrans is tasked with assessing stream crossings within the State Highway System for fish passage and to determine if highway stream crossings constitute a barrier to the migration of anadromous fish species, including federal- and state-listed salmonids. Caltrans Biologists and Engineers must assess these stream crossings and categorize barriers as either temporal, partial, or total barriers at highway stream crossings, and Caltrans Headquarters' Division of Environmental Analysis is required to submit an annual report on the Caltrans Fish Passage Program to the Legislature, due October 1st each year. Caltrans is tasked with remediating all barriers when there is an active project that affects a stream crossing location with a known barrier and working cooperatively with the National Marine Fisheries Service and California Department of Fish and Wildlife (CDFW).

SR 1 traverses numerous stream crossings on the North Coast that support federally listed steelhead and federal and state-listed Coho salmonid, along with myriad other species. There are several unassessed and assessed stream crossings along SR 1 in Marin and Sonoma counties, and of the assessed locations, some stream crossings do not block the migration of anadromous fish while others constitute barriers (see **Figures 12 and 13**). Once projects are programmed at a stream crossing location, project teams must conduct early coordination to determine how the barrier will be remediated, and all projects must be analyzed to determine if a project will promulgate a new barrier in the long term. **Appendix G** provides further information of priority fish passage locations for funding and active fish passage locations. Caltrans and its partners should seek opportunities to include fish passage design elements in

[28] GFNMS regulations and permit procedures can be found here: https://farallones.noaa.gov/manage/regulations.html.

project scopes but also program standalone fish passage barrier remediation projects, including through grant funding when there may be no transportation nexus.

Wildlife Crossings

In addition to abundant stream crossings, the North Coast provides habitat for an array of wildlife species, including common and rare and protected species. During project review and approval, Caltrans – as Lead Agency under CEQA – must determine how programmed projects will affect wildlife migration and connectivity as specified in the biological resources section of Appendix G of the CEQA Guidelines. Regulatory agencies may also provide permit conditions that ensure future projects will not further contribute to the barrier effect of roadways, which even on low volume roads like SR 1 can constitute complete and total barriers to the movement and gene flow of certain species.

Caltrans should consider the integration of design features and elements that enhance wildlife passage as part of project scopes. These features may include directional fencing, enlarged culverts or bridges, species-specific culverts or "low bridges" for federal- and state-protected amphibians and reptiles, but can also include standalone wildlife overpasses. The larger overpasses can be very costly and are normally a result of partnership efforts with stakeholders including local governments, not-for-profit conservation organizations, city and county governments, state and federal agencies. Enhancing wildlife passage is critical for decreasing the incidence of wildlife-vehicle collisions and improving driver safety and also facilitating the recovery of listed species, which on the North Coast primarily include small-bodied amphibians and reptiles (like the California red-legged frog).

Figure 14 highlights the wildlife connectivity opportunities along the SR 1 North Corridor. The connectivity opportunity (in red) on the map shows the parts of highways that overlap with Natural Landscape Blocks as identified in the California Essential Habitat Connectivity Project and movement corridors as identified in the Bay Area Critical Linkages Project. Projects within these connectivity opportunity areas should be "flagged" during pre-project scoping to identify solutions to address wildlife passage issues, should they be present. Project proponents must ensure that Caltrans Biologists are included in early scoping meetings. Early project scoping should focus, in part, on promoting linkage opportunities for rare and protected species found in natural and undeveloped landscapes, including agricultural areas, in narrow riparian corridors running through urban areas, and in some highway underpasses.[29] Additionally, regardless of a project's location on the North Coast – and because the area is largely rural and undeveloped – Environmental Planners and Project Development Teams should consult CDFW's Areas of Conservation Emphasis (ACE) to determine the wildlife connectivity potential of a specific area as ACE is a model that provides a finer scale view of an area's relative importance and likelihood of supporting wildlife movement. For instance, ACE allows users to assess an area's potential to withstand climatic extremes (climate resilience) in the long-term and support species movement as animals adapt and change their behavior in response to a changing climate. These areas include riparian corridors, and fish passage remediation projects should include terrestrial passage enhancements to synergize project costs and efficiencies.

[29] Bay Area Open Space Council, CLN 1.0 Progress Report 2017, http://www.bayarealands.org//wp-content/uploads/2017/07/CLN-1.0-Progress-Report.pdf

Figure 14. SR 1 North Wildlife Connectivity Opportunities

Cultural Resources

The Corridor has a long and varied history with remnants of the past scattered throughout, including Native American cultural resources that have not been identified. In August 2018, the California Coastal Commission adopted a Tribal Consultation Policy to protect tribal resources and improve government-to-government dialogue.[30] The federal government and the State have several programs to recognize and protect important cultural resources, including the National Register of Historic Places, California Register of Historical Resources, California Historical Landmarks, and California Points of Historical Interest. These programs include the placement of plaques or markers identifying a registered historic resource. Landmarks and Points of Historical Interest are eligible for directional signage located along State Highways.[31] Several cultural resources along SR 1 have been identified for their historic importance including potential section 4(f) lands as shown in **Figures 12-13**.The following are a few examples of Historic Sites in the Corridor (see **Appendix C** for a more comprehensive list):

- Grandi Building/Western Hotel, Point Reyes Station
- Marconi Conference Center, Tomales Bay
- Tomales Village Historic District
- Bodega Village Historic District (where Ansel Adams, an environmental activist and photographer, took the "Church & Road" photograph)
- Bodega Bay/Village locations of Alfred Hitchcock's 1963 movie "The Birds"
- Fort Ross State Historic Park
- Sea Ranch Development

Climate Change

The National Oceanic and Atmospheric Administration (NOAA) modeling of a seven-foot increase in sea level due to climate change shows that high tides and storm surges will dramatically affect numerous locations along the SR 1 Corridor[32].

Coastal communities in California are experiencing the impacts of rising sea levels with increased erosion, extensive flooding during storms, and periodic tidal flooding. The most current sea level rise (SLR) guidelines by the California Ocean Protection Council (OPC) and the California Natural Resources Agency were adopted in 2018. The California Coastal Commission (CCC), recommends local governments use the projections provided in the 2018 OPC SLR Guidance to determine the effects of SLR on planned projects, including low-lying areas. The Guidelines provide SLR projections for the Year 2030 through 2150. The planning horizon was expanded to support precautionary planning and decision-making for projects with longer life spans.[33] These projections indicate that areas along San Francisco Bay will experience rising sea levels of two feet by mid-century (2050) and seven feet by the end of the century (2100) under

---

[30] https://documents.coastal.ca.gov/assets/env-justice/tribal-consultation/CCC Tribal Consultation Policy Adopted 8.8.2018.pdf

[31] California Manual on Uniform Traffic Control Devices 2014 Revision 3, page 626

[32] Sonoma County Local Coastal Plan Update, Sea Level Rise – Flooding, 2013

[33] State of California Sea-Level Ride Guidance 2018 Update, http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A_OPC_SLR_Guidance-rd3.pdf

the 1-in-200 chance (0.5 percent probability) high-emissions scenario.[34] The updated 2018 OPC SLR Guidance is the best available science for SLR analysis for critical infrastructure projects. Transportation projects should be assessed using the medium-high and extreme (H++) risk aversion scenarios for the anticipated life of the project in conjunction with the combined effects of the coastal hazards that have the potential to affect a given location (e.g., wave run-up, flooding, erosion) and 100-year storm activity.

The following **Table 7** shows how many highway centerline miles of SR 1 North will be exposed to SLR based on the NOAA modeling and the latest SLR projections from the OPC Guidance:

Table 7. SR 1 North Highway Centerline Miles Vulnerable to SLR

SLR Scenario	County	Total Length of SHS Exposed (Miles)
2-Feet	Marin	1.69
	Sonoma	0.26
	Total:	**1.95**
7-Feet	Marin	13.93
	Sonoma	0.35
	Total:	**14.28**
Low-lying Areas 2-Feet	Marin	0.02
	Sonoma	0.12
	Total:	**0.14**
Low-lying Areas 7-Feet	Marin	0.00
	Sonoma	0.08
	Total:	**0.08**

Figures 15 and 16 show the locations of the SR 1 centerline miles that will be exposed to SLR as shown on **Table 7**. Low lying areas that are hydraulically disconnected areas at two feet or seven feet of SLR are not vulnerable because they are protected by either a levee or other construction even though they are below the water elevation being mapped.

[34] *Guidance on Incorporating Sea Level Rise*, Caltrans Climate Change Workgroup, per California Ocean Protection Council Resolution of March 2011.

Figure 15. SR 1 Areas Potentially Exposed to 2 Feet of SLR

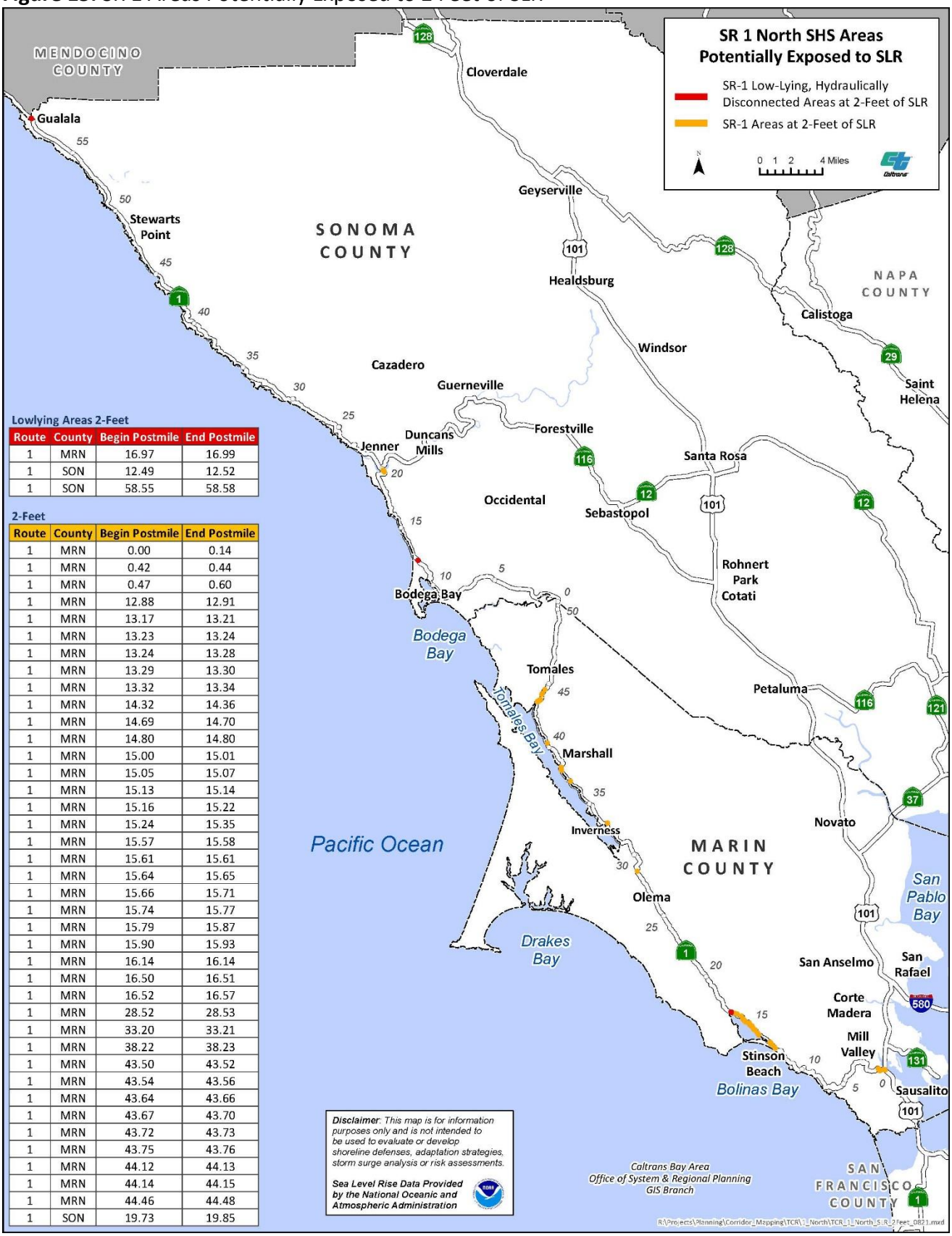
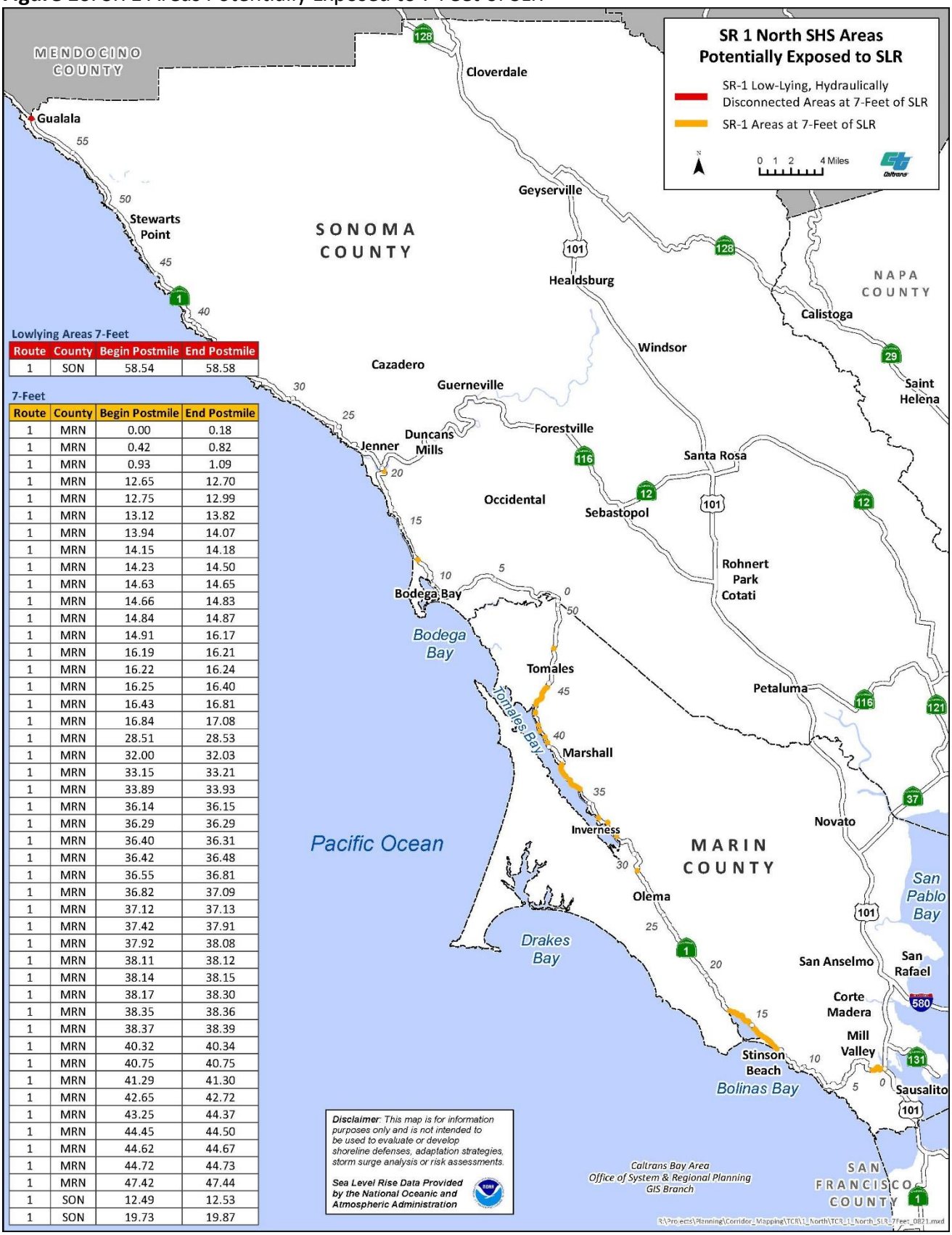


Figure 16. SR 1 Areas Potentially Exposed to 7 Feet of SLR



Lowlying Areas 7-Feet

Route	County	Begin Postmile	End Postmile
1	SON	58.54	58.58

7-Feet

Route	County	Begin Postmile	End Postmile
1	MRN	0.00	0.18
1	MRN	0.42	0.82
1	MRN	0.93	1.09
1	MRN	12.65	12.70
1	MRN	12.75	12.99
1	MRN	13.12	13.82
1	MRN	13.94	14.07
1	MRN	14.15	14.18
1	MRN	14.23	14.50
1	MRN	14.63	14.65
1	MRN	14.66	14.83
1	MRN	14.84	14.87
1	MRN	14.91	16.17
1	MRN	16.19	16.21
1	MRN	16.22	16.24
1	MRN	16.25	16.40
1	MRN	16.43	16.81
1	MRN	16.84	17.08
1	MRN	28.51	28.53
1	MRN	32.00	32.03
1	MRN	33.15	33.21
1	MRN	33.89	33.93
1	MRN	36.14	36.15
1	MRN	36.29	36.29
1	MRN	36.40	36.31
1	MRN	36.42	36.48
1	MRN	36.55	36.81
1	MRN	36.82	37.09
1	MRN	37.12	37.13
1	MRN	37.42	37.91
1	MRN	37.92	38.08
1	MRN	38.11	38.12
1	MRN	38.14	38.15
1	MRN	38.17	38.30
1	MRN	38.35	38.36
1	MRN	38.37	38.39
1	MRN	40.32	40.34
1	MRN	40.75	40.75
1	MRN	41.29	41.30
1	MRN	42.65	42.72
1	MRN	43.25	44.37
1	MRN	44.45	44.50
1	MRN	44.62	44.67
1	MRN	44.72	44.73
1	MRN	47.42	47.44
1	SON	12.49	12.53
1	SON	19.73	19.87

SLR and storm surge will not only result in regular inundation of segments of SR 1, but flooding adjacent to State highways, such as along SR 116, where there is a variety of residential and commercial properties and farmland. SLR will also affect access to SR 1, and its coastal communities and recreational attractions including beaches, parking lots, and recreational multi-use trails at numerous scenic locations. SLR will also have a profound effect on coastal drainage, causing possible indirect flooding from backups to creeks and drainage systems during storms. In some areas close to the ocean, SLR may also elevate water tables which could result in groundwater flooding and/or exposure of buried infrastructure.

The effects of climate change are not limited to SLR but also include higher temperatures and an increased risk of wildfires that are more severe than in decades past; increased precipitation and intensity; and additional coastal erosion. Some of the ways the Corridor might be affected (especially in remote and largely rural areas) are the following:

- **Higher Temperatures –** There is an increase in fire risk, especially inland more so than coastal areas where marine conditions dominate. Nevertheless, wildfires may affect access to and from the Corridor, and there could be impacts to agriculture[35]. Keeping SR 1 free of road closures, accessible, and well maintained is especially important for communities at high risk. Coastal communities in Marin and Sonoma Counties depend on SR 1 to serve as an emergency escape route.
- **Increased Precipitation and Intensity –** In Marin and Sonoma Counties, storm damage incidents frequently result in roadway closures and necessitates extensive and expensive repairs. Climate change could increase total rainfall and the intensity of storms, resulting in more frequent closures and repairs. The geologic conditions in the Corridor are susceptible to deep-seated landslides which could affect access roads as well as SR 1 itself. There is also anticipated to be an increased occurrence of flooding from higher river levels during storms (e.g. Russian River, Miller Creek and Gualala River).
- **Additional Coastal Erosion from SLR –** SLR effectively accelerates coastal erosion from wave action. For example, at the current rate of coastal retreat, it is expected that the 87-foot section of roadway at Gleason Beach in Sonoma County abutting the coastal bluffs will be undermined within five years. [36] Currently, there is an approved project to realign SR 1 at this location where cliff erosion has already occurred.
- **Storm Surge –** Storm surge is defined as a rising of the sea as a result of atmospheric pressure changes and wind associated with a storm. Rising seas translate into more water that can be in motion during storm surge events, which increases the frequency of flooding events and the long-term risks to infrastructure. Storm surge in combination with SLR would result in increased flooding potential.

This TCR recommends that beyond emergency repairs, long-term solutions to address climate change impacts, including alternatives that evaluate replacement and realignment options, be evaluated for each highway segment. A phased approach should be considered in coordination with communities and local partner agencies and regulatory agencies, especially the California Coastal Commission, to address SLR impacts to shared assets by linking each phase to a particular amount of SLR or a particular physical impact of SLR over time. Caltrans has identified vulnerabilities statewide and assessed the impacts of climate change on the State Highway

[35] Protecting Marin County Farmland, MALT Map & List of Protected Properties, https://www.malt.org/MALT-map Ag + Open Space Sonoma County, Protected lands Map, http://www.sonomaopenspace.org/lands/

[36] https://dot.ca.gov/caltrans-near-me/district-4/d4-projects/d4-1-gleason-beach-roadway-realignment-project

System. With increasing SLR and coastal storms by mid-century, localities may begin to consider retreat strategies, which may require the expansion of inland communities. Strategies such as beach renourishment, tidal marsh restoration, and coastal armoring may not be effective enough over the long term. Nature-based solutions can deliver substantial environmental and recreational values while also providing protection from increasing sea levels. One study developed technical guidance on design and implementation of natural infrastructure for adaptation to sea-level rise[37].

The *Caltrans District 4 Climate Change Vulnerability Assessment* was completed in 2018. Based on climate data, California will experience more severe droughts, rising sea levels, more severe storm impacts and coastal erosion, increased temperatures and longer heat waves, and longer and more severe wildfire seasons. The Assessment had three objectives: 1) to understand the types of weather-related and longer-term climate change events that will likely occur with greater frequency and intensity in future years; 2) to conduct a Vulnerability Assessment to determine those Caltrans assets vulnerable to various climate-influenced natural hazards; and 3) to develop a method to prioritize candidate projects for actions that are responsive to climate change. The Assessment outlined potential vulnerabilities to the State Highway System (SHS) to showcase the types of climate stressors that will affect future planning, maintenance, and operations of the District's assets. The climate stressors that would impact the District include temperature, precipitation, wildfire, SLR, and storm surge. Data for the Years 2025, 2055, and 2085 were analyzed. An interactive **web-based map** was developed to show which routes within the District are exposed to various climate stressors under different scenarios. As Caltrans takes the lead on climate action, it is crucial that climate change is addressed in long-range plans to ensure that the transportation system remains resilient and secure for all users.

The *Caltrans District 4 Adaptation Priorities Report* completed in 2020 was the next phase in addressing climate change after the Vulnerability Assessment was completed. The purpose of the Report is to prioritize District 4 assets that will be exposed to climate hazards through a detailed asset-level climate assessment. The prioritization considers the timing of climate change, the severity, extensiveness, and the condition of the asset that is at risk. This report is mainly focused on bridges, large culverts, small culverts, and roadways. The climate hazards used in the prioritization methodology are temperature, riverine flooding, wildfire, SLR, storm surge, and cliff retreat. Various asset-hazard combinations were studied, some of the combinations include pavement binder grade exposure to temperature changes; small and large culverts exposed to riverine flooding; bridge exposure to coastal cliff retreat; and at-grade roadway exposure to SLR. The average cross-hazard prioritization score provides a holistic view of various threats an asset be exposed to. The scores are on a zero to 100 scale, the higher the score, the greater adaptation priority of the asset. There are five priority levels for District 4 assets.

The next step is for the District to develop and evaluate adaptation options for each asset category to ensure the ability to withstand future climate changes. The detailed adaptation assessments will include coordination with key stakeholder groups. The Report can be used in long-range planning to prioritize segments of the roadway and other assets that will be affected by climate change.[38]

[37] https://scc.ca.gov/climate-change/climate-ready-program/natural-infrastructure/

[38] https://dot.ca.gov/programs/transportation-planning/2020-adapation-priorities-reports

Table 8 showcases the priority assets that were identified as Priority 1 assets along SR 1 in Marin and Sonoma Counties. See **Appendix B** for other assets that were identified in the Report as Priorities 2 and 3.

Table 8. District 4 Adaptation Priorities

Segment	County	Postmile	Feature Crossed or Carriageway*	Asset Type	Average Cross Hazard Prioritization Score
A	Marin	0/0.759	P	Roadway	55.32
A	Marin	0.42	Coyote Creek	Bridge No. 27 0018	74.97
B	Marin	12.591/17.06	P	Roadway	55.32
B	Marin	13.49	N/A	Small Culvert No. 270014001349	71.31
B	Marin	13.69	N/A	Small Culvert No. 270014001369	69.90
B	Marin	14.31	N/A	Small Culvert No. 270014001431	69.94
B	Marin	14.86	N/A	Small Culvert No. 270014001486	73.54
B	Marin	15.36	N/A	Small Culvert No. 270010001536	85.58
B	Marin	16.06	N/A	Small Culvert No. 270010001606	87.36
B	Marin	16.47	N/A	Small Culvert No. 270014001647	71.18
B	Marin	16.95	N/A	Small Culvert No. 270010001695	55.81
C	Marin	27.16	N/A	Small Culvert No. 270010002716	44.52
C	Marin	27.92	N/A	Small Culvert No. 270010002792	46.61
C	Marin	28.51	Lagunitas Creek	Bridge No. 27 0023	66.23
C	Marin	32.2	N/A	Small Culvert No. 270010003220	59.10
C	Marin	33.4	Millerton Gulch	Large Culvert No. 27 0114	78.49
C	Marin	36.487/38.408	P	Roadway	55.32
C	Marin	40.75	N/A	Small Culvert No. 270010004075	41.42
C	Marin	41.71	N/A	Small Culvert No. 270010004171	53.15
C	Marin	42.68	N/A	Small Culvert No. 270010004268	53.28
C	Marin	44.45	Walker Creek	Bridge No. 27 0026	64.07
C	Marin	45.13	N/A	Small Culvert No. 270010004513	51.97
D	Sonoma	12.41	N/A	Small Culvert No. 200014001241	67.88

Segment	County	Postmile	Feature Crossed	Asset Type	Average Cross Hazard
D	Sonoma	12.49	Salmon Creek	Bridge No. 20 0191	63.89
D	Sonoma	13.21	N/A	Small Culvert No. 200010001321	73.57
D	Sonoma	13.46	N/A	Small Culvert No.200010001345	89.52
D	Sonoma	14.57	N/A	Small Culvert No. 200010001457	50.59
D	Sonoma	14.979/16.348	P	Roadway	55.32
D	Sonoma	15.3	Scotty Creek	Large Culvert No. 20 0198	76.31
D	Sonoma	15.65	N/A	Small Culvert No. 200010001565	100.00
D	Sonoma	19.72	Russian River	Bridge No. 20 0195	71.62
E	Sonoma	20.71	N/A	Small Culvert No. 200010002071	80.89
E	Sonoma	21.139/21.226	P	Roadway	55.32
E	Sonoma	21.26	N/A	Small Culvert No. 200010002126	68.46
E	Sonoma	24.5	Russian Gulch	Bridge No. 20 0070	70.76
E	Sonoma	34.61	N/A	Small Culvert No. 200014003461	40.28
E	Sonoma	35.34	N/A	Small Culvert No. 200010003534	61.66
E	Sonoma	35.44	N/A	Small Culvert No. 20010003544	54.43
E	Sonoma	37.24	N/A	Small Culvert No. 200010003724	47.19
E	Sonoma	38.19	N/A	Small Culvert No. 200010003819	76.23
E	Sonoma	38.24	N/A	Small Culvert No. 200010003824	76.23
E	Sonoma	45.41	N/A	Small Culvert No. 20001004541	94.33

* Caltrans' alignment codes designate the carriageway on divided roadways: "P" always represents northbound or eastbound carriageways whereas "S" always represents southbound or westbound carriageways. Undivided roadways are always indicated with a "P".

Local Efforts to Address SLR

The following are local efforts to address SLR along SR 1 North. **Table 9** lists the adaptation strategies from studies described below that are applicable to this Corridor.

Greater Farallones National Marine Sanctuary (GFNMS)

Most of the land and water along the coast of Marin and Sonoma Counties are protected by the Greater Farallones National Marine Sanctuary.[39] The National Marine Sanctuaries Act seeks to protect significant water and secure habitat for wildlife, cultural resources, research, fishing, and recreation.[40] Since 2008, GFNMS has led the Ocean Climate Program to address climate change impacts along the coast and build ecosystem resilience and sustainability by promoting action and collaboration among multiple agencies.[41] GFNMS' *Climate Action Plan* (2016) lays the foundation and provides general adaptation strategies such as living shorelines, promoting education, protecting and restoring habitat, limiting human disturbance, addressing invasive species, and investing in science needs.[42] With vulnerabilities outlined in GFNMS's *2015 Climate Change Vulnerability Assessment for the North-central California Coast and Ocean*[43], the *2016 Climate-Smart Adaptation for North-central California Coastal Habitats* [44] expands on the Climate Action Plan strategies for more specific actions to enhance the region's natural resource resilience to climate change impacts.

The *Sonoma-Marin Coastal Regional Sediment Management Report* (CRSMR) (2018) is a guidance and policy document with recommendations to restore the regional sediment along the coastline. Fourteen locations were identified with issues, goals, a time frame, management strategies, feasibility, and agencies to develop policy oversight and consultation. Nine of these locations are along SR 1: Driftwood Beach-north side of Russian River Mouth, Russian River (mouth, jetty and estuary), Jenner, Gleason Beach, Bodega Head, Bodega Harbor, Doran Park, Estero Americano, Inverness, and Bolinas lagoon.[45] The *Coastal Resilience Sediment Plan (November 2019)* [46] builds on the CRSMR by assessing those recommendations for consistency with sanctuary policies and identifying actions that are fit for GFNMS and partner agencies to achieve.

BayWAVE Vulnerability Assessment

Marin Bay Waterfront Adaptation and Vulnerability Evaluation (BayWAVE)[47] is Marin County's coordinated planning effort for SLR along the bay shoreline. Adaptation planning efforts includes hazard mitigation planning, updating the Countywide General Plan, and adaptation projects throughout the County. The Marin Shoreline SLR Vulnerability Assessment was

[39] https://farallones.noaa.gov/gallery/maps.html
[40] https://farallones.noaa.gov/manage/regulations.html.
[41] https://farallones.noaa.gov/manage/climate/
[42] https://nmsfarallones.blob.core.windows.net/farallones-prod/media/docs/2016-climate-adaptation-plan.pdf
[43] https://sanctuaries.noaa.gov/science/conservation/vulnerability-assessment-gfnms.html
[44] https://nmsfarallones.blob.core.windows.net/farallones-prod/media/archive/manage/climate/pdf/Climate-SmartAdaptationReport.pdf
[45]http://farallones.org/wp-content/uploads/2018/12/CRSMR_GFNMS_finalreport_revised_v2_new-graphics-compressed.pdf
[46] https://nmsfarallones.blob.core.windows.net/farallones-prod/media/docs/20191101-coastal-resilience-and-sediment-plan.pdf
[47] Marin BayWAVE Project - Community Development Agency – County of Marin (marincounty.org)

completed in April of 2017[48]. Manzanita Park and Ride, Tam Junction, and Tamalpais Valley (Segment A) are analyzed and discussed in the Assessment. For further information on the BayWAVE Vulnerability Assessment, see **Table 9**.

Sea-level Marin Adaptation Response Team: C-SMART

C-SMART is an effort to understand the impacts of SLR in West Marin and work with communities to prepare for a resilient future. *The C-SMART Vulnerability Assessment*[49] , completed in 2016, identifies assets in West Marin that could be impacted under five different SLR scenarios ranging from near to long term. The Assessment covers assets such as parcels, buildings, transportation, utilities, natural resources, recreation, and emergency services. The areas of Muir Beach, Stinson Beach, Bolinas (Segment B), Inverness, Point Reyes Station, Dillion Beach (Segment C) are highlighted in the Assessment.

The C-SMART Adaptation Report[50] , finalized in 2018, discusses potential actions and strategies to protect against SLR and coastal hazards. Adaptation strategies are sectioned by the asset type and communities profile categories in the Vulnerability Assessment. For an explanation of strategies for assets and communities along SR 1, see **Table 9**.

The Stinson Beach Dune Feasibility Study[51] is a part of the larger Marin County effort, C-SMART. The Feasibility Study is to determine whether or not a dune system at Stinson Beach is achievable. The study will examine:

- Different alternatives for constructing dunes
- How much protection from flooding and erosion the dunes would provide
- Costs of the various alternatives
- Sources of sand
- Regulatory of pathways for approval
- Amount of public support

The Tomales Bay Feasibility Study[52] assesses where living shorelines in Tomales Bay can provide flood and erosion protection from the impacts of incremental rises in sea level, support vibrant recreational opportunities, and help restore a healthy ecological system in the bay. The study will develop preliminary designs for two to five pilot projects and provide direction for next steps. In June 2020, six to eight initial opportunity sites for living shoreline projects will be identified. Using evaluation criteria and stakeholder input, two to five sites will be selected to move into the conceptual design phase of the project. The project designs and recommendations for next steps will be completed in August 2021.

[48] https://www.marinwatersheds.org/sites/default/files/2019-04/BAYWAVE final.pdf
[49] https://www.marincounty.org/depts/cd/divisions/planning/csmart-sea-level-rise/csmart-publications-csmart-infospot
[50] https://www.marincounty.org/-/media/files/departments/cd/planning/slr/c-smart/2019/181211_csmart_adaptation_report_final_small.pdf?la=en
[51] https://www.marincounty.org/depts/cd/divisions/planning/csmart-sea-level-rise/adaptation-planning/stinson-beach-nature-based-adaptation-feasibility-study
[52] https://www.marincounty.org/depts/cd/divisions/planning/csmart-sea-level-rise/adaptation-planning/tomales-bay-nature-based-adaptation-feasibility-study

Stinson Beach Adaptation and Resilience Collaboration

The Marin County Community Development Agency (CDA) was awarded a $396,000 Coastal Resilience Grant from the California Ocean Protection Council[53]. The grant will fund a new adaptation and resilience collaboration for Stinson Beach. Project participants will identify adaptation measures and place them in strategic adaptation pathways that identify sequencing, triggers and decision points for the long-term, with greater detail on near- and medium-term adaptation solutions. A suite of potential adaptation measures for specific sites and timing will be analyzed and nature-based options will be evaluated along with additional alternatives. Marin County plans to work with stakeholders to develop and apply evaluation criteria, including economic benefit-cost analysis to both individual adaptation measures and adaptation pathways to assess feasibility, efficacy, environmental impact, equity, and economic factors. The project began in May 2021 and will be completed in June 2024.

Tomales Bay Bulkhead Vulnerability Assessment

The Marin County Community Development Agency received a FEMA Hazard and Mitigation grant to complete a vulnerability assessment of the bulkheads along the East Shore of Tomales Bay (Segment C). The eastern shore of Tomales Bay and the town of Marshall are vulnerable to SLR and storm surges. These bulkheads are also regarded as stabilizing the bed of Highway 1 which fronts the homes and open shoreline. Shoreline erosion from the loss or compromise of shoreline bulkheads would not only undermine homes, but would also put the highway, water and utility lines and sewage collection facilities at risk. The scope of the assessment includes community outreach and engagement, a bulkhead existing conditions survey, evaluation of three sites by a structural engineer, identification of next steps and alternatives. The Assessment should be completed by February 2022.

Highway 1 Corridor in Tam Valley Transportation Resilience Planning Report

Marin County Department of Public Works was awarded a Caltrans Adaptation Planning Grant in 2018 to address climate change, adaptation, and current flooding at State Route 1 in southern Marin. The final report was completed in April 2021. The scope of work was developed to coordinate several efforts within the project reach to understand the issues and options for adaptation for the entire area. Miller Avenue, Bothin Marsh, Manzanita, and Marin City are areas that the Report identified as priorities for adaptation along SR 1. Each area has four to five adaptation strategies that ranged from nature-based solutions to hard solutions. Examples of adaptation strategies included elevated levees, ecotone slope, coarse beach, tide gates, and sea walls. Next steps are for Marin County to continue to support and coordinate with SLR planning work in the area with local expertise, stakeholder support, and regional planning.

Marin Richardson Bay Resilience

Marin County developed a StoryMap for Richardson Bay to showcase how SLR will impact many in the surrounding area. The StoryMap includes videos, maps, and pictures of current flooding. The map also discusses various adaptation tools and offers a brief description on how they may combat SLR.

[53] https://www.marincounty.org/main/county-press-releases/press-releases/2021/cda-stinsonslr-030121

2021 Manzanita Area Flood Reduction Study

The flood reduction study completed by Marin County alongside Caltrans in January 2021 identifies and evaluates potential measures that can be implemented in the near-term to reduce the impact of flooding in the SR 1/US 101 vicinity, the Manzanita Park-and-Ride, the Mill Valley-Sausalito Multi-Use Path (Bay Trail), and adjacent public facilities and commercial properties along the shoreline of Richardson Bay from Gate 6 ½ Road in Sausalito north to Coyote Creek. The study focuses primarily on reducing the impacts of flooding that occurs during King Tide events under sunny day conditions. Larger scale solutions, such as major upgrades to SR 1, resolution of settlement issues, major upgrades to the Park-and-Ride, relocation of the Bay Trail, or other large infrastructure improvements, may be needed to provide a comprehensive long-term solution for both tidal flooding and storm-induced flooding, but the focus of this study is relatively small-scale or lower cost solutions that can be implemented in the near term (5 to 10 years) to help reduce the impact of flooding during King Tide events.

Local Coastal Programs

The Local Coastal Program/Plan (LCP) is a planning document developed by local governments to guide and inform development in the coastal zone, in partnership with the California Coastal Commission. Vulnerability and Adaptation Assessments and Reports help inform the LCPs by identifying and analyzing assets and communities that are at risk to SLR and inundation. The following describes the LCPs along SR 1:

Sonoma County

The Draft LCP[54] for Sonoma County highlights areas and communities along SR 1 that are at risk to coastal erosion and SLR. Gleason Beach, along SR 1 is at great risk of coastal erosion. Previous attempts to stabilize SR 1 were unsuccessful; the current strategy is to realign this portion of SR 1. In, addition to the risk to existing homes, public safety for people accessing the beach is of concern with coastal bluff erosion. If official or prescriptive paths or trails to the beach are lost, visitors may use unofficial or non-prescriptive routes over unstable bluffs to reach the beach.

Most of the communities along the coast are above the level of the ocean. Low-lying areas in Sonoma County from Jenner to Bodega Bay (Segment D) are at significant risk of exposure due to the low-lying areas which include public beaches, residential and commercial development. Appendix G in the Draft Sonoma County LCP is a focused vulnerability assessment and adaptation strategies for the area around Bodega Bay. Assets in the Bodega Harbor Area vulnerable to SLR and storm events include roads, public and private marinas, residential development, coastal freshwater marsh, and tidal mudflats. SLR will impact these valuable assets with potential impacts to access recreation and tourism, and commercial fishing.

The Final LCP will possibly be approved in Fall 2021 by the California Coastal Commission. For further explanation of strategies for Corridor segments in Sonoma County, please see the Concept of Strategies by Segment section.

[54] https://sonomacounty.ca.gov/PRMD/Long-Range-Plans/Local-Coastal-Program/Public-Review-Draft/#compiledPlan

Marin County

The LCP includes a land use plan for the Marin County coast to guide development and to ensure that coastal resources are properly utilized and protected. Cliff retreat is one of the environmental concerns identified in the LCP. Areas of Bolinas and Muir Beach (Segment A) are experiencing especially high rates of shoreline erosion.

The Plan emphasizes that Marin County should consult with Caltrans District 4 to protect access to the coast, minimize impacts of SLR on State Route 1, and identify areas that will regularly be inundated by the ocean or are at risk of periodic inundation from storm surge and SLR. A combination of structural and non-structural measures should be considered with a preference towards non-structural solutions, including relocating the Highway, unless the structural solutions are less environmentally damaging.[55]

Countywide Adaptation Strategies

These strategies are based on those identified from the above local efforts to address SLR and may be applicable to various areas in both counties. Caltrans District 4 supports these countywide strategies.

Marin and Sonoma Counties

- Consider a monitoring program to detect impacts of climate change and management actions on natural resources
- Increase awareness of seasonal flooding on public lands and trails through signage and social media
- Consider SLR resiliency in the next Marin Countywide Plan update as a basis for developing countywide policies and program
- Stabilize cliffs through revegetation (with native, climate appropriate species) and natural netting (e.g. jute, not chain-link fence). Design any hardening methods to consider ecosystem needs (e.g. seabird nesting)
- Remove non-native invasive plants (e.g. jubata grass) that undermine cliff integrity, and where appropriate, replant with natives or drought-/heat- tolerant species that support cliff structure
- For roads that cannot be raised/moved, or in conjunction with raising/moving roads, look for opportunities to create functional habitat (e.g., replace hard/grey infrastructure such as rip-rap with living shorelines and migration space)
- Consider the removal of seawalls (including rip rap) and make associated modifications to support retreat
- Install beach sediment traps (add good jetties, giant fine mesh nets, sand flume cells) to accumulate sediment where needed
- Identify opportunities for Regional Sediment Management. Any proposed SLR project should be designed in a manner that enhances resiliency of SR 1 while improving drainage and sediment patterns to also restore coastal habitats and reuse sediment (such as sediment trapped in culverts or other bypass) for restoration purposes to the greatest extent feasible.

[55] https://www.marincounty.org/depts/cd/divisions/planning/local-coastal-program

- Conduct SLR adaptation analysis for areas with high priority assets identified in the District 4 Adaptation Priorities Report with county partners
- Plans for Adaptation Coastal Hazards (PATCH) – Community-scale plans for each of the seven communities in West Marin to adapt infrastructure of community wide important to coastal hazards (requires partnership with Caltrans)

Summary of Adaptation Strategies for SR 1 North

Table 9, Adaptation Strategies for SR 1 North is a compilation of the adaptation strategies discussed the various adaptation reports, vulnerability assessments, and studies conducted in Marin and Sonoma counties along the Corridor. These strategies are broken down by short-term, mid-term, and long-term strategies. The placement of strategies in these timeframes are based on the latest SLR projections during development of each study and adjusted to fit the 2018 OPC SLR Guidance for the medium-high scenario (0.8 feet by 2030, 2 feet by 2050 and 7 feet by 2100). Short-term or near-term strategies are those that can be implemented by 2030, mid-term strategies are those that can be implemented by 2050, and long-term strategies are those that can be implemented by 2100. It is crucial to evaluate and implement these strategies in a timely manner. The timeframes for implementing these adaptation solutions are subject to change as resources and future funding are made available.

Table 9. Adaptation Strategies for SR 1 North

Segment	Vicinity	Studies	Short-Term Strategies	Mid-Term Strategies	Long-Term Strategies
A	Sausalito, Strawberry, Mill Valley City	• BayWAVE	• Work closely with BayWAVE effort to identify adaptation strategies	• Re-design the Mill-Valley Sausalito Multi-Use Pathway as part of an elevated levee structure	
A	Marin City	• BayWAVE • Highway 1 Corridor in Tam Valley Transportation Resilience Plan	• Develop detention ponds to accommodate local storm flooding as SLR • Construct tide gates in multiple locations where stormwater gates meet the Bay. As sea levels rise there may be a need to augment the tide gates to include pumps	• Construct sea walls in collaboration with elevated levees • Construct a series of sea walls in the Manzanita Area along with pumps to protect the area • Construct floating structures along the Bay near the Manzanita Area to combat high tides	• Explore the possibility of retreat for the Manzanita Area if other options such as sea walls and floating structures are not adequate or feasible
A	Tamalpais-Homestead Valley	• BayWAVE • Highway 1 Corridor in Tam Valley Transportation Resilience Plan • Manzanita Flood Reduction Study Report	• Implement Alternatives 1-3 from the Manzanita Flood Study Report. Alt 1) Reduce flooding on SR 1 and the Caltrans Maintenance Yard by installing Tideflex valve, tide gates, and barriers. Alt 2) Prevent overtopping of the Bay	• At Tam Junction, construct a Complete Green Street approach along Shoreline Highway • At Tam Junction, construct an ecotone slope • At Tam Junction, construct a super levee approach for	

Segment	Vicinity	Studies	Short-Term Strategies	Mid-Term Strategies	Long-Term Strategies
			Trail, improve ecologic functions of the Bothin Marsh, improve public use of trail facilities, and additional flood reduction to adjacent commercial properties. Alt 3) Further storm drain system improvements. Study runoff floods in the full range of tide conditions.	property owners along the Shoreline Highway and Coyote Creek	
B	Muir Beach	• C-SMART • Climate-Smart Adaptation for North-central California Coastal Habitats	• Manage for flash flood and high flow events that might adversely affect existing and new vegetation by increasing absorption and decreasing runoff	• Explore feasibility of realigning vulnerable roads landward	
B	Stinson Beach	• C-SMART • Climate-Smart Adaptation for North-central California Coastal Habitats • Coastal Resilience Sediment Plan	• Manage for flash flood and high flow events that might adversely affect existing and new vegetation by increasing absorption and decreasing runoff • Identify triggers for maximum flood depth or frequency thresholds to determine what roads will need to be elevated, relocated, seasonally closed, or abandoned • Evaluate extending dune system. Protect/enhance existing dunes. Encourage planting of native vegetation.	• Build redundancy into the system by providing alternate evacuation routes where feasible • Explore the feasibility of experimental and innovative coastal-protection options (ex. constructed wetlands, horizontal levees, dune restoration, and beach nourishment) • Stabilize cliffs through revegetation and natural netting • Explore feasibility of realigning vulnerable roads landward • Retrofit or relocate recreation and visitor-serving facilities like trails and access points • Increase overflow capacity of Easkoot Creek for flood control and to create habitat. Protect/acquire open areas where dunes can migrate.	• Shoreline Highway elevation

Segment	Vicinity	Studies	Short-Term Strategies	Mid-Term Strategies	Long-Term Strategies
B	Bolinas	• C-SMART • Climate-Smart Adaptation for North-central California Coastal Habitats	• Identify triggers for maximum flood depth or frequency thresholds to determine what roads will need to be elevated, relocated, seasonally closed, or abandoned • Develop Rapid Climate-Ready Response plans: develop plans that will allow for road removal/redesign in case of a disaster	• Convert vulnerable roads to levees to address temporary flooding, inundation, erosion, wave surge, and high wind • Explore feasibility of experimental and innovative coastal-protection options • Stabilize cliffs through revegetation and natural netting • Explore feasibility of realigning vulnerable roads landward • Build redundancy into the system by providing alternate evacuation routes where feasible • Retrofit or relocate recreation and visitor-serving facilities like trails and access points	• Realign or relocate roads • Identify areas that are critical for estuary expansion and that have roads that impede estuary migration, and have roads vulnerable to, other climate impacts
B	Bolinas Lagoon	• C-SMART • Climate-Smart Adaptation for North-central California Coastal Habitats • Coastal Resilience Sediment Plan	• Support Bolinas Lagoon restoration efforts	• Consider alternatives to protect the roadway, including living shorelines, horizontal levee, or elevating SR 1 (bypass). Understand changes in depths of water level, road, and habitat impacts	• Remove or modify structures that disrupt the delivery of sediment via long-shore, and coastal and near-shore structures that contribute to erosion. If the structure cannot be removed, then enable for managed retreat (for bluffs to feed the beach as SLRs) and support beach nourishment to allow for beach expansion
C	Olema	• C-SMART	• Identify triggers for maximum flood depth or frequency to determine what roads will need to be elevated, relocated, seasonally closed, or abandoned	• Convert vulnerable roads to levees to address temporary flooding, inundation, erosion, wave surge, and high wind	

Segment	Vicinity	Studies	Short-Term Strategies	Mid-Term Strategies	Long-Term Strategies
C	Lagunitas Creek	• Climate-Smart Adaptation for North-central California Coastal Habitats	• Manage for flash flood and high flow events that might adversely affect existing and new vegetation by increasing absorption and decreasing runoff. Strategies may include improve culverts, pumps, tide gates, bridges, stream management, increased use of permeable pavement and increased absorption opportunity, all communities require rain barrels.		
C	Point Reyes Station	• C-SMART	• Identify water-level triggers for management actions and coordinate with DPW and Caltrans • Support post-disaster repairs as an opportunity to plan for higher water levels	• Build redundancy into the system by providing alternate evacuation routes where feasible	• Elevate affected segments of Shoreline Highway • Realignment of affected segments of Shoreline Highway, implemented by Caltrans • Retrofit or relocate recreation and visitor-serving facilities like trails and access points
C	Inverness	• C-SMART	• Support post-disaster repairs as an opportunity to plan for higher water levels • Identify triggers for maximum flood depth or frequency to determine what roads will need to be elevated, relocated, seasonally closed, or abandoned	• Convert vulnerable roads to levees to address temporary flooding, inundation, erosion, wave surge, and high wind • Build redundancy into the system by providing alternate evacuation routes where feasible	• Invest in larger culverts or raise the roadway on piles to allow conveyance of storm runoff (roadway elevation is preferred for wetland migration)
C	Tomales Bay	• C-SMART • Climate-Smart Adaptation for North-central California Coastal Habitats	• Further investigate Shoreline Highway vulnerability along Tomales Bay in the East Shore area • Identify triggers for maximum flood depth or frequency to	• Retrofit or relocate recreation and visitor-serving facilities like trails and access points • Explore the feasibility of realigning	

Segment	Vicinity	Studies	Short-Term Strategies	Mid-Term Strategies	Long-Term Strategies
			determine what roads will need to be elevated, relocated, seasonally closed, or abandoned • Support post-disaster repairs as an opportunity to plan for higher water levels • Develop Rapid Climate-Ready Response plans: develop plans that will allow for road removal/redesign in case of a disaster. • Identify areas that are critical for estuary expansion and that have roads that impede estuary migration, and have roads vulnerable to, other climate impacts	vulnerable roads landward	
D	Bodega Bay	• Bodega Bay Focused Vulnerability Assessment • Coastal Resilience Sediment Plan	• Survey and determine feasibility of retaining existing shoreline protection (Westshore Rd., SR 1, and Bayflat Rd.) • Evaluate locations for hard protection use only if allowable and if no feasible less damaging alternative exists • Develop a plan to remove or relocate existing structures that become threatened • Investigate option for living shorelines • Upgrade roads near Estero Americano to improve drainage	• Consider avoiding new development in hazardous areas • Determine the feasibility of establishing conservation easements or other development restrictions to protect habitat	• Ensure that transportation networks are designed to function even if the highest projected SLR occurs. Efforts to realign, retrofit, and/or protect infrastructure should be coordinated with Caltrans, local public works/transportation agencies, and coastal planning efforts. Individual transportation projects would be implemented through Coastal Development Permits • Elevate roadway; build causeway; limit vehicle access. Elevate/retreat active harbor easements. Move roadway where

Segment	Vicinity	Studies	Short-Term Strategies	Mid-Term Strategies	Long-Term Strategies
					needed. Monitor, maintain, adapt previous actions
D	Salmon Creek Beach	• Coastal Resilience Sediment Plan		• Develop understanding of sediment needs for healthy dune habitat. Determine projected lifespan of Highway 1.	

CONCEPT STRATEGIES BY SEGMENT

This chapter summarizes concepts for each segment based on the Corridor vision and the various studies, plans, and policies mentioned throughout the TCR. Strategies that apply to the entire Corridor, not just the segment, were previously mentioned in the CTP 2050 goals (Pages 2-4). Most of these proposals would need to be further developed in conjunction with Caltrans partners in the Corridor and will have a direct effect upon the future function, operation and maintenance of SR 1. These strategies by segment are aligned with the goals of the CTP 2050 to achieve a common vision for the future of our transportation network.

Segment A - US 101 to Erica Road (PM 0-2.8)

Overall, most traffic in this segment is local, but on weekends congestion is greatly increased by visitor traffic to beaches and parks along SR 1. This part of SR 1 serves the unincorporated community of Tamalpais/Homestead Valley in Marin County and connects to one of two arterial roadways into and out of the City of Mill Valley. Residential and commuter traffic predominates, but this is also the main access to the coastal communities of Muir Beach, Stinson Beach, and Bolinas as well as Muir Woods National Monument and Mount Tamalpais State Park. This will not change. However, strategies proposed at the SR 1 North workshop on May 6, 2016 recommended more shuttles and remote parking areas as a partial solution to congestion in this segment (see Segment B.).

At the Manzanita Park-and-Ride (P&R) lot, which is used by commuters and Marin Airporter passengers, there is persistent tidal flooding (which increases with SLR and storm surge) especially during high tides. BayWAVE, The Manzanita Flood Reduction Study Report, and The Highway 1 Corridor in Tam Valley Transportation Resilience Plan explain the importance of the Park-and-Ride lot and how this segment is crucial for commuters. Ensuring this segment and US 101 remains resilient against SLR and storm surge is vital. The plans and reports included various adaptation strategies to address flooding that is happening now. All strategies related to climate change would require collaboration with local and county partners. Caltrans District 4 is preparing a Project Initiation Document to study alternatives to address the flooding issues at this P&R lot and the surrounding vicinity that will be completed in June 2023. The Manzanita P&R could be expanded if relocated and developed into a "Marin South Travel Center" serving cars, transit, taxis and shuttles.

Caltrans and Marin County are making improvements at Tamalpais Valley Junction (aka Tam Junction) (PM: MRN/1/0.65) for bikes and pedestrians, but there are limitations due to the need to move vehicular traffic though this vital intersection. The number of driveways, turning movements, and pedestrians often cause backups through Tam junction and towards Tamalpais High School in Mill Valley. In addition, there are few sidewalks in this area.

A community along Segment A is identified as a California Climate Investment Priority Population.[56] Certain populations, such as disadvantaged and low-income communities are exceptionally vulnerable to the impacts of climate change. The strategies listed below will advance the Equity goal of the CTP 2050 by reducing transportation burdens and emphasizing implementation of adaptation planning.

[56] https://webmaps.arb.ca.gov/PriorityPopulations/

Table 10. Segment A strategies

Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
Study limiting or consolidating commercial driveway access to SR 1 to minimize conflicts and increase bike/ped facilities	X	X	X	X	X		X
Widen shoulders where feasible during road repaving projects to Provide Class II or III bike lanes from US 101 to Sir Francis Drake. Prioritize Class II for uphill locations.	X	X	X	X			X
Provide Class I facility for less confident riders between Maple Street and Almonte Boulevard	X	X	X	X			X
Consider intersection improvements at Erica Road and Panoramic Highway by "squaring up" to improve sight lines and bike/ped access to the nearby trail.	X	X	X	X		X	X
Develop shuttles to beaches and parks with one-stop parking to reduce the impact of visitor traffic		X	X	X	X		
Address flooding and SLR issues at Manzanita P&R to and improve access or consider relocation to develop a "Marin South" Multimodal Transportation Center in the vicinity.	X	X	X	X	X		X
Re-design the Mill-Valley Sausalito Multi-Use Pathway as part of an elevated levee structure	X	X	X	X	X		X
Explore adaptation strategies for the Manzanita Area:	X	X		X	X		X

Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
-Construct floating structures along the Bay to combat high tides **-Construct a series of sea walls along with pumps to protect the area** **-Explore retreat if other options are not feasible or adequate**							
Explore adaptation strategies in the Marin City: **-Construct sea walls in collaboration with elevated levees** **- Construct tide gates in multiple locations where stormwater gates meet the Bay. As sea levels rise, there may be a need to augment the tide gates to include pumps** **-Construct floating structures** **-Develop detention ponds to accommodate local storm flooding as SLR**	X	X		X	X		X
Explore adaptation strategies at Tam Junction **-Construct a Complete Green Street approach along Shoreline Highway** **-Develop a coarse beach to reduce shoreline erosion and lessen the impact of storm surges** **-Construct an ecotone slope**	X	X	X	X	X	X	X

Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
-Construct a super levee approach for property owners along the Shoreline Highway and Coyote Creek							
Create an earthen embankment in relatively low lying areas that currently provide a path for the tide to enter and flood upland areas		X					X
US 101 and Shoreline Highway ramp reconfigurations or signalization improvements	X	X	X	X	X		X

*All strategies would require collaboration with local partners

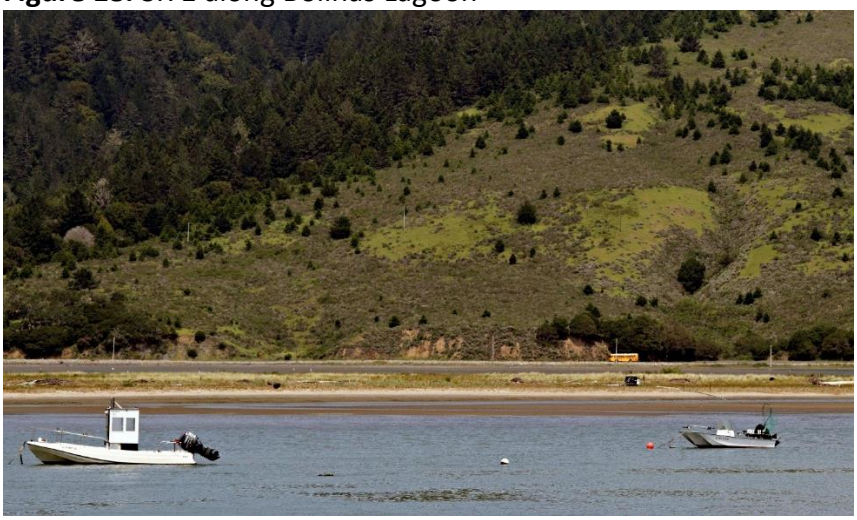
Segment B – Erica Road to Bolinas Road (PM 2.8-17.2)

This segment, just over twenty miles north of San Francisco, is a popular recreational destination for Bay Area residents and tourists. Workshop participants suggested remote parking to alleviate congestion in Stinson Beach, but with heavy local traffic on SR 1 from US 101, and environmental constraints, any remote parking would need to be along the US 101 Corridor (see Segment A). Currently, the National Park Service is supporting the Muir Woods shuttle, and Marin Transit provides the Route 61 (Stagecoach) bus to Stinson Beach/Bolinas (both connect with the Sausalito Ferry on weekends). As of 2018, a reservation system for public parking at Muir Woods has been introduced together with a fee. However, while a bus to Stinson Beach would cost $4.00 round trip per adult, parking at Stinson Beach is free.

Figure 17. Muir Beach GGNRA

This segment of SR 1 is prone to extensive storm damage, and extended closures of the highway can greatly inconvenience users of SR 1. The current alignment of SR 1 follows the hillside, cutting into the slope and crossing creeks in culverts. If this alignment is maintained, climate change is only going to further exacerbate environmental impacts with storms impacting the roadway and natural drainage. Several drainage systems on SR 1 near Bolinas Lagoon from north of Stinson Beach to Fairfax-Bolinas Road have become clogged with sediment that is transported from properties outside State right of way (R/W), obstructing and burying culverts and roadside ditches that result in flooding and closure of highway, primarily during winter. SR 1 is located at the toe of the alluvial fans of creeks that are located on highly erosive soils in steep watersheds. The sedimentation that is occurring is part of a natural process that is beneficial to Bolinas Lagoon's evolution.

Figure 18. SR 1 along Bolinas Lagoon



Alternatively, to increase the resilience, and to reduce the environmental impact of this section of SR 1, structures (e.g. bridges, viaducts) could be added to cross several creeks and ravines along this coastal segment of SR 1. This would be expensive but is comparable to the approach taken for the "Big Sur" stretch of SR 1 in Monterey County, where many more creeks and gullies are crossed by bridges. A similar strategy would be needed at Bolinas Lagoon where rising sea levels will require some relocation of the highway, though here at this location, the entire roadway would need to be raised above the level of projected SLR. Currently, Caltrans is working with Marin County to develop options to both protect the highway and help restore the natural habitat at the northern end of the Bolinas Lagoon.[57] However, this Bolinas Lagoon North End Restoration Project only covers a small section of SR 1, and engineering solutions to address climate change in this segment will need to be much more extensive.

The objectives of the project are to alleviate chronic flooding of county and State roadways and improve traffic safety, the function of Lewis and Wilkins Creek, enhance riparian and wetland habitats, and allow for future expansion of Bolinas Lagoon as sea levels rise. The current conceptual designs for the project include only a portion of SR 1; yet, this project provides the foundation for which Caltrans can build upon and continue collaboration with Marin County, the National Park Service, and Audubon Canyon Ranch on current and future studies.

[57] https://farallones.noaa.gov/eco/bolinas/northend.html

Two communities along Segment B have been identified as a California Climate Investment Priority Population. Certain populations, such as disadvantaged and low-income communities are especially vulnerable to the impacts of climate change. The strategies listed below will advance the Equity goal of the CTP 2050 by reducing transportation burdens and emphasizing implementation of adaptation planning.

Table 11. Segment B Strategies

Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
Engage in regular collaboration with the Bolinas Lagoon residents, land use planning and management agencies and strategize a long-term highway development plan in response to the impacts of climate change that reduces the current environmental impacts, provides a permanent, resilient transportation solution, and adds to the aesthetics of the highway	X	X	X	X	X	X	X
Implement solutions that works with the natural processes of the sedimentation to address SLR.		X				X	
Improve and develop existing "stagecoach" transit services along with one-stop parking to accommodate local residents as well as visitors		X	X	X	X		
Manage traffic in Muir Woods **-Offer combined Muir Woods and Ferry and transit tickets to/from San Francisco** **-Extend Muir Woods Shuttle hours to accommodate employees and public**		X	X	X	X	x	
Identify water-level thresholds for maximum	X	X	X				X

Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
flood depth or frequency to determine which roads will need to be elevated, relocated, seasonally closed, or abandoned							
Add crossings with traffic calming improvements on SR 1 for bicyclists and pedestrians to access beach and park entrances (e.g Miwok Trail)	X	X	X	X			X
Consider "squaring up" the intersection with Panoramic Highway to improve sight lines and access for bicyclists	X	X	X	X			X
Improve intersection at SR 1/ Franks Valley Rd to improve sight lines for bicyclists.	X	X	X	X			
Improve intersection at SR 1/Pacific Way with signage and additional measures such as beacons.	X	X	X	X			X
Widen shoulders where feasible during road repaving projects to provide Class II or III improvements. Prioritize Class II for uphill locations. Consider Class I throughout the Corridor in the long term.	X	X	X	X			X

*All strategies would require collaboration with local partners

Segment C - Bolinas Road to Valley Ford Road (PM 17.2-50.5)

SR 1 in this segment has relatively low AADT. This is especially true north of Petaluma Road with an AADT of less than 1700. Twelve of 33 miles are adjacent to Tomales Bay. The segment includes Point Reyes National Seashore and its Visitor Center, the San Andreas Fault, Olema, and Point Reyes Station as well as a number of other settlements. However, most visitors arrive at this segment via Sir Francis Drake Boulevard or Point Reyes-Petaluma Road (from Lucas Valley Road or Novato Boulevard).

SIR FRANCIS DRAKE BOULEVARD

Sir Francis Drake Boulevard runs from the Richmond-San Rafael Bridge to the tip of Point Reyes and was once planned to be the alignment of a new State Highway, SR 251, as a freeway. Today, between US 101 and SR 1, the road performs a number of different functions and varies considerably in classification, as a suburban arterial, an expressway, an urban street, a Main Street, a rural road, and a park road. Its federal functional classification is an *Other Principal Arterial* in the urban area from Fairfax through the communities of Ross, San Anselmo, Kentfield, Greenbrae, and San Quentin. It is a *Major Collector* from Fairfax to SR 1. Marin County is making the boulevard more amenable to bikes and pedestrians in its eastern section, nearer US 101. Between San Anselmo and Fairfax, Sir Francis Drake Boulevard is a two-lane urban street, then a rural road (in Woodacre and Forest Knolls). While in Samuel P Taylor Park, the road winds between Lagunitas Creek and the redwoods. Cyclists and pedestrians are common, as this is the only access to most of the park. Sir Francis Drake Boulevard west of SR 1 at the Point Reyes National Seashore is lower than other areas and will likely see inundation and affect the ability of SR 1.

Of these routes, the Novato Boulevard route is best suited for through traffic to SR 1, without conflicts with other users. Both Lucas Valley Road and Sir Francis Drake Boulevard are winding and narrow, attracting numerous bicyclists when the weather is good. While Sir Francis Drake Boulevard is the most direct route to reach Point Reyes, there are numerous issues associated with it as a through route. This TCR suggests solutions to reduce through traffic to SR 1 on Sir Francis Drake, for the benefit of the communities near US 101 (Fairfax, San Anselmo, Ross, etc.). They are adversely impacted by heavy seasonal traffic to the coast. One stop parking with increased transit options are suggested as well as the long-proposed extension of the Cross Marin Trail. Cross Marin Trail is a multi-use pathway from Shafter Bridge to its terminus at Platform Bridge along the former North West Pacific Railroad grade. A feasibility study will determine the trail extension to Point Reyes Station.[58]

C-SMART and The Climate-Smart Adaptation for North-Central California Coastal Habitats identified a handful of adaptation strategies that Caltrans can assist in implementing to increase the segment's resiliency to SLR. Segment C is adjacent to Tomales Bay, and SLR continues to pose increasing challenges to keeping SR 1 open due to flooding and increased shoreline erosion. There is also a high probability of landslides due to increased heavy storms and precipitation. Culverts are a common method for creek crossings below SR 1 North, but culverts limit natural drainage and potentially causes creeks to back up with sediment. Millerton Gulch, just north of Point Reyes Station is an example of where a culvert is causing excessive erosion. A long-term strategy, would be to replace the culverts with bridges, restoring the natural channel below and creating opportunities for landward expansion of wetlands, offsetting those lost to

[58] https://www.ptreyeslight.com/article/county-will-look-how-bring-cross-marin-trail-point-reyes-station

SLR. This segment will require increasing monitoring, maintenance, and collaboration between agencies to keep it operating.

Table 12. Segment C Strategies

Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
Provide a combination of Class I path and Class II bike improvements on Hwy 1 from Bear Valley Rd to Point Reyes-Petaluma Rd.	X	X	X	X			X
Widen shoulders where feasible during road repaving projects to provide Class II or III improvements. Prioritize Class II for uphill locations. Consider Class I throughout the Corridor in the long term.	X	X	X	X			X
Add crossings with traffic calming improvements on SR 1 for bicyclists and pedestrians to access beach and park entrances	X	X	X	X			X
Manage for flash flood and high flow events that might adversely affect existing and new vegetation by increasing absorption and decreasing runoff	X	X				X	
Convert vulnerable routes to levees to address temporary flooding, inundation, erosion, wave surge, and high wind	X	X				X	X
Continually improve and promote the existing West Marin Stagecoach Line that serves Point Reyes from San Rafael. Support direct connections to San Francisco and SMART, along with one-stop parking to		X	X	X	X		X

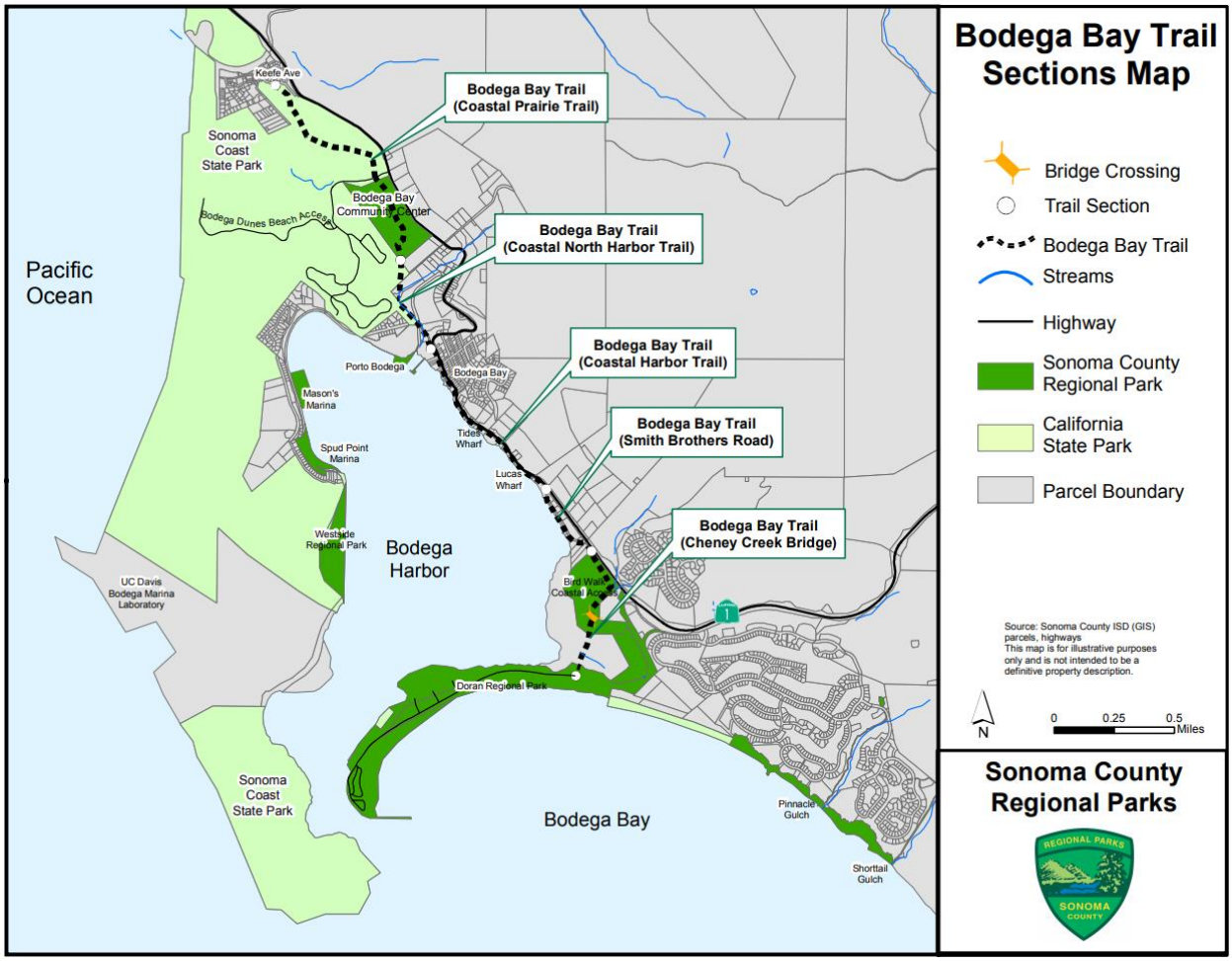
Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
accommodate local residents as well as visitors							
Retrofit or relocate recreation and visitor-serving facilities like trails and access points	X	X	X	X			X
Replace culverts with bridges, if feasible, where they are detrimentally affecting the natural drainage		X	X	X		X	X
Identify water-level thresholds for management actions and coordinate between County Department of Public Works and Caltrans District 4 (e.g. Sir Francis Drake)	X	X					
Support completion of the California Coastal Trail		X	X	X			X

Figure 19. Tomales, a small rural Marin community

Segment D - Valley Ford Road to SR 116 (Russian River) (PM 0-20.1)

Bodega Bay is an appealing, albeit dispersed coastal destination, easily reached from US 101 at Petaluma or Stony Point via Valley Ford Road. Sonoma County Regional Parks are completing a bike and pedestrian trail (see **Figure 20**) to implement their 2005 Bicycle and Pedestrian Trails Study that will link the disparate parts of this community along the shoreline. The 1.1 mile Coastal Prairie Trail was recently completed in August 2016. Next in line for construction is the 0.60 mile Coastal North Harbor Trail, the 0.37 mile trail segment paralleling Smith Brothers Road, and the 1 mile Coastal Harbor Trail when funding is available. The study also recommended for Caltrans to add shoulder widening along SR 1 between Salmon Creek and Harbor Way South for Class II bicycle lanes.[59] Sonoma County supports Class II lanes for bicyclists for the entire length of Segment D. This would benefit bicyclists but would require further evaluation on whether aesthetics of the highway would be impacted and landscaping where vegetation on property lines might need to be cut back.[60]

Figure 20. Bodega Bay Trail Sections Map



There is currently only one northbound and one southbound lifeline bus trip per day as well as seasonal weekend bus service during the summer months, but a better level of transit service is

[59] https://sonomacounty.ca.gov/Parks/Planning/Bodega-Bay-Bike-and-Pedestrian-Trail/
[60] https://scta.ca.gov/planning/countywide-bike-and-pedestrain-plan/ - 1599601826084-7f4008c1-f2de

needed to accommodate surges in visitors. While well provided with accommodations and restaurants, Bodega Bay is light on cultural activities, similar to Point Reyes Visitor Center just 35 miles south. The SR 116 TCR recommends a shuttle service for the Russian River Valley, which might extend as far east to the coast providing transit service to Sonoma Coast State Park. Beaches in Jenner are becoming a popular destination. Consideration should be given to provide one-stop parking locations to lessen visitor impacts in the area and provide crossings on SR 1 for beach and park access.

There are a number of locations in this segment where increased coastal erosion may require realignment of SR 1. Five miles north of Bodega Bay, coastal erosion is partially closing down the highway at Gleason Beach. Anticipating continued coastal erosion due to SLR and climate change, Caltrans is currently preparing realignment of the highway east by 90 feet of the existing State right-of-way, a 900-foot bridge, and restoration of the natural flow of Scotty Creek.[61]

The Bodega Bay Focused Vulnerability Assessment and The Coastal Resilience Sediment Plan identified crucial adaptation strategies for Segment D. The adaptation strategies call for further investigation and additional plans for specific locations (including SR 116) for nature based and hard protection. These plans should be conducted by county and local partners, Caltrans would be involved as a key stakeholder. A community along Segment D is identified as a California Climate Investment Priority Population. Certain populations, such as disadvantaged and low-income communities are exceptionally vulnerable to the impacts of climate change. The strategies listed below will advance the Equity goal of the CTP 2050 by reducing transportation burdens and emphasizing implementation of adaptation planning.

Table 13. Segment D Strategies

Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
Survey and determine feasibility for retaining existing shoreline protection (Westshore Rd., SR 1, and Bayflat Rd.) and investigate options for living shorelines. Evaluate locations for hard protection (ex. sea walls and tide gates) use only if allowable and no feasible less damaging alternative exists.	X	X				X	X
Ensure that transportation networks are designed to function even if the highest projected SLR	X	X					X

[61] Caltrans, State Route 1 Gleason Beach Roadway Realignment Project Final Environmental Impact Report, 2016

Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
occurs. Efforts to realign, retrofit, and/or protect infrastructure should be coordinated with Caltrans District 4, local public works, transportation agencies, and coastal planning efforts (including SR 116)							
Develop understanding of sediment needs for healthy dune habitat		X				X	X
Identify water-level triggers for maximum flood depth or frequency to determine which roads will need to be elevated, relocated, seasonally closed, or abandoned	X	X					
Develop a monitoring plan to address SLR (e.g. coastal erosion monitoring)		X					
Support completion of the Bodega Bay Trail from Salmon Creek to Doran Regional Park in Bodega Bay[62]		X	X	X			X
Widen shoulders for Class II bike lanes where feasible during repaving projects and connect to the planned lower Russian River Trail. Consider Class I throughout the Corridor in the long term	X	X	X	X			X
Support one stop parking with future enhanced transit options to Bodega Bay, Jenner, and		X	X	X		X	

[62] Coastal Prairie Trail, https://parks.sonomacounty.ca.gov/Visit/Coastal-Prairie-Trail/

Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
northeast to the Russian River Valley							
Add crossings with traffic calming improvements on SR 1 for bicyclists and pedestrians to access beach and park entrances	X	X	X	X			X
Replace culverts with bridges as appropriate where the natural drainage is adversely affected		X	X	X		X	X
Support completion of the Coastal Trail between W King Trail in Bodega Bay to the Mendocino County border		X	X	X			X

*All strategies would need collaboration with local partners

Segment E - SR 116 to Mendocino County (Gualala) (PM 20.1-58.6)

This long segment has some of remotest coastline in the Bay Area and includes the communities of Jenner, Stewarts Point, Sea Ranch and Gualala (Mendocino County). Low traffic volumes may not justify higher cost improvements such as bridges and tunnels for this section of SR 1. However, in the short to medium term, the TCR recommends continuing the existing policy of remedial maintenance in response to storm damage and normal wear and tear. No adaptation or vulnerability assessments have been conducted that include this segment. However, this segment is vulnerable to SLR and prone to inundation. A crucial strategy is to conduct vulnerability and adaptation reports for this segment along with regional, county, and local partners to identify solutions for at-risk assets.

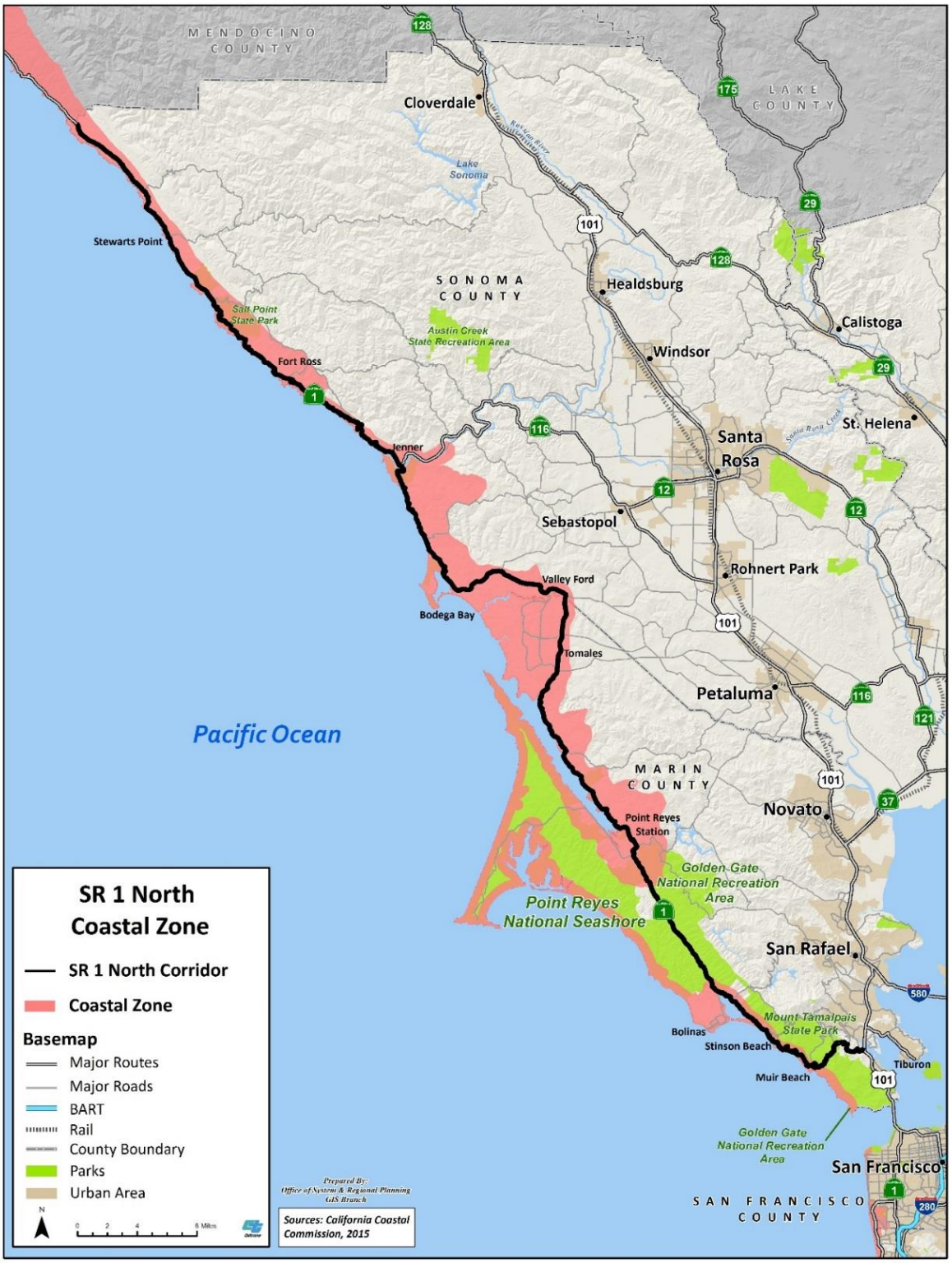
Table 14. Segment E Strategies

Strategy*	Safety	Climate	Accessibility	Quality of Life and Public Health	Economy	Environment	Infrastructure
Conduct adaptation studies and reports along with regional, county, and local partners to identify solutions for at-risk assets	X	X					
Identify water-level triggers for maximum flood depth or frequency to determine which roads will need to be elevated, relocated, seasonally closed, or abandoned	X	X					
Support completion of the California Coastal Trail to the Mendocino County line. Add sidewalks or walkways from Gualala Regional Park to Gualala.		X	X	X			X
Add crossings with traffic calming improvements on SR 1 for bicyclists and pedestrians to access beach and park entrances (e.g. Shell Beach)	X	X	X	X			X
Replace culverts with bridges, if feasible, where they are detrimentally affecting the natural drainage		X	X	X		X	X
Widen shoulders where feasible during road repaving projects to provide Class II or III improvements. Prioritize Class II for uphill locations. Consider Class I throughout the Corridor in the long term.	X	X	X	X			X

*All strategies would need collaboration with local partners

APPENDICES

Appendix A: Coastal Zone in Marin and Sonoma Counties



Appendix B: Additional District 4 Adaptation Priority Assets

Priority	County	Route and Postmile	Feature Crossed or Carriageway*	Asset Type	Average Cross Hazard Prioritization Score
2	SON	SR 1 9.16	Cheney Gulch	Bridge No. 20 0189	26.22
3	SON	SR 1 0.33	Pocolimi Creek	Bridge No. 27 0056	24.54
3	MRN	SR 1 29.85	Tomasini Canyon	Bridge No. 27 0056	24.09
3	MRN	SR 1 17.53	N/A	Small Culvert No. 270015201753	24.47
3	SON	SR 1 11.67	N/A	Small Culvert No. 200010001167	22.43
3	SON	SR 1 53.24	N/A	Small Culvert No. 200010005324	20.89
3	SON	SR 1 53.96	N/A	Small Culvert No. 200010005396	20.82
3	MRN	SR 1 18.17	N/A	Small Culvert No. 270010001817	20.37
3	SON	SR1 31.37	N/A	Small Culvert No. 200010003137	20.26
3	SON	SR 1 51.52	N/A	Small Culvert No. 200010005152	20.18
3	MRN	SR 1 20.53	N/A	Small Culvert No. 270010002053	19.93
3	MRN	SR 1 20.66	N/A	Small Culvert No. 270010002066	19.93
2	MRN	SR 1 40.407/44.422	P	Roadway	23.88
3	MRN	SR 1 0.759/0.869	P	Roadway	13.20
3	MRN	SR 1 11.133/12.209	P	Roadway	13.20
3	MRN	SR 1 17.06/17.2	P	Roadway	13.20
3	MRN	SR 1 31.017/33.211	P	Roadway	13.20
3	MRN	SR 1 34.786/36.487	P	Roadway	13.20
3	MRN	SR 1 7.937/10.651	P	Roadway	13.20
3	SON	SR 1 12.413/14.979	P	Roadway	13.20
3	SON	SR 1 20.101/21.139	P	Roadway	13.20
3	SON	SR 1 36.185/36.727	P	Roadway	13.20
3	SON	SR 1 45.549/48.111	P	Roadway	13.20

Appendix C: Cultural Sites in the SR 1 North Corridor

Segment	County	PM	Resource Name	Address	Landmark / Point of Interest	California Register	National Register
B	MRN	15.7	Muir Beach Mailbox Row and Golden Gate Dairy*	1760 Shoreline Highway	Y		
B	MRN	16.1	Walker House (Audubon Canyon Ranch)	4900 Shoreline Hwy, Stinson Beach, CA			
B/C	MRN	16-29	Olema Valley Dairy Ranches Historic District/Lagunitas Loop Ranches	SR 1 (between Bolinas and Point Reyes Station)		Y	Y
C	MRN	22.1	Olema Lime Kilns	SR 1 (between Bolinas and Olema)	Y	Y	Y
C	MRN		Olema Cemetery*	Olema			
C	MRN		Town of Olema*	Olema			
C	MRN	28.8	Point Reyes Emporium, Cheda's Garage and smaller storefronts, old bank, Stellina, Creamery Building*	Point Reyes Station			
C	MRN	28.7	Grandi Company Building/Western Hotel/Post Office*	Point Reyes Station			
C	MRN	36.8	Marconi Conference Center	18500 Shoreline Highway (near Marshall)			
C	MRN	38.1	Marshall Tavern	20102 Shoreline Highway (Marshall)			
C	MRN	38.5	Brother Store	20125 Shoreline Highway (Marshall)			
C	MRN	38.4	Lacy House and Blacksmith Shop	20230 Shoreline Highway (Marshall)			
C	MRN	41.3	Straus Home Ranch	22888 Shoreline Highway (Blakes Landing Farming)			
C	MRN		Blakes Landing Farms*				

Segment	County	PM	Resource Name	Address	Landmark / Point of Interest	California Register	National Register
C	MRN		Miwok Cemetery*	Marshall			
C	MRN		Old Huff home (now Zimmerman)*	Hamlet			
C	MRN	45.3/ 46.1	Tomales Village Historic District	Tomales		Y	Y
C	MRN	45.7	Diekmann's General Store and Post Office**	27005 CA-1			
D	SON	1.9	Valley Ford Historic District	Valley Ford		Y	
D	SON	1.9	Valley Ford Hotel	14415 Valley Ford Road, Valley Ford, CA			
D	SON	3.9	Duncan Mills Historic District	2 mile east of SR1 on SR116		Y	
D	SON	3.9	Duncan Mills Depot	23600 Moscow Road, Duncans Mills, CA (off SR 116)		Y	
D	SON	NA	Bodega Historic District (Town of Bodega)	Bodega Highway (1/2 mile north of SR1)			Y
D	SON	NA	Saint Teresa of Avila Church	17242 Bodega Highway (1/2 mile north of SR1)	Y		
D	SON	NA	Watson School	15000 Bodega Highway (2 miles east of Bodega)	Y		
D	SON	NA	Freestone Historic District (Town of Freestone)	Intersection of Bohemian Highway and Bodega Highway		Y	
D	SON	NA	Hinds Hotel	306 Bohemian Hwy; Freestone, CA			Y
D	SON	10	Bodega Bay and Harbor	Bodega Bay	Y		
D	SON	13.5	Carrington Ranch Rural Historic Landscape District	Colman Valley Road		Y	

Segment	County	PM	Resource Name	Address	Landmark / Point of Interest	California Register	National Register
E	SON	33	Fort Ross	19005 Coast Hwy. Fort Ross, CA	Y		
E	SON	NA	Stillwater Cove Ranch*	22555 Hwy 1			
E	SON	50.6	The Sea Ranch Condominium 1	110-128 Sea Walk Drive, The Sea Ranch, CA			Y

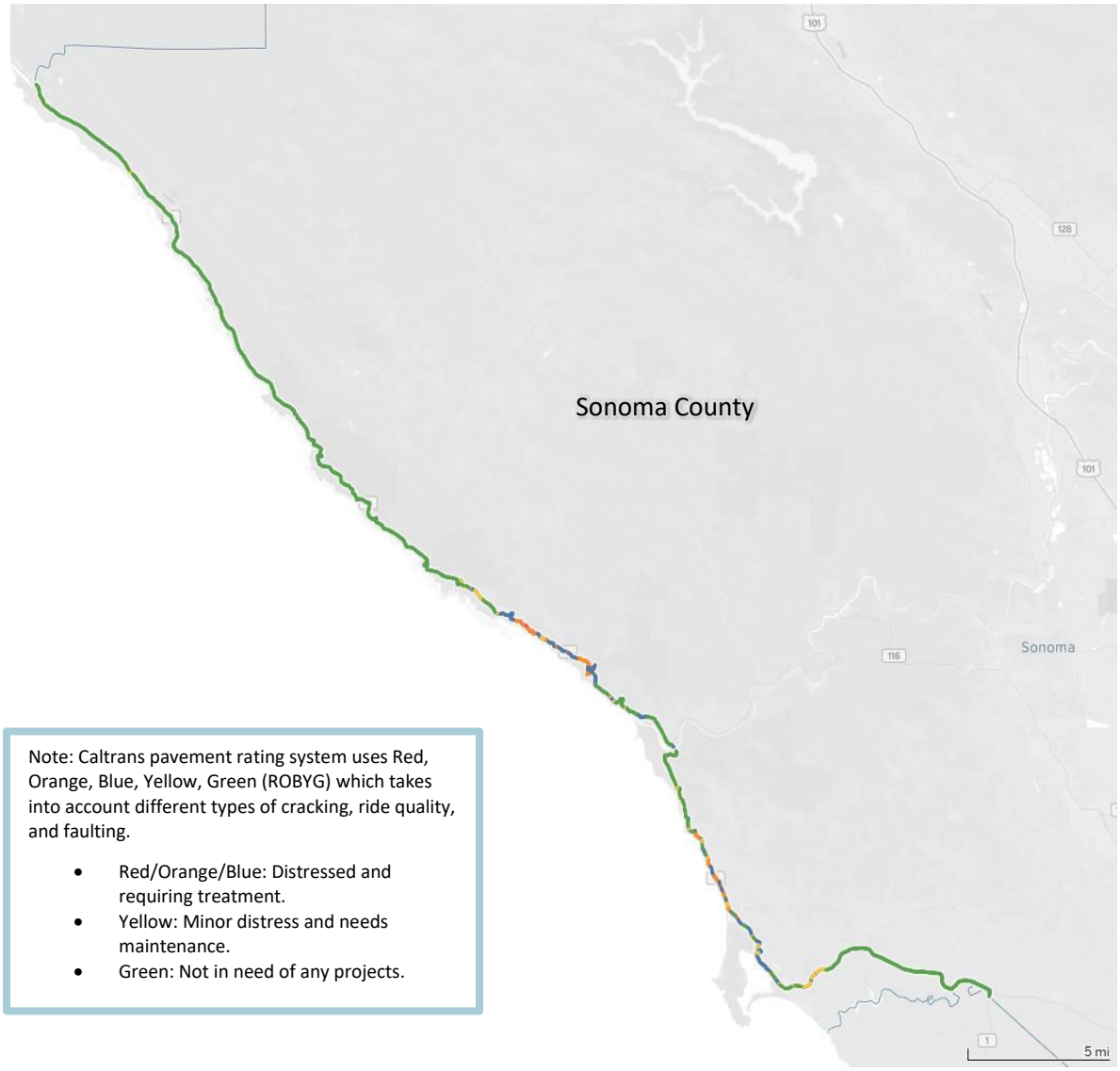
Note: The cultural sites in this table is not a comprehensive list. Although Native American cultural resources are not identified at this time, there are existing resources along the SR 1 Corridor.

*Identified as Community Historical Assets through public outreach

Appendix D: 2019 AADT for SR 1

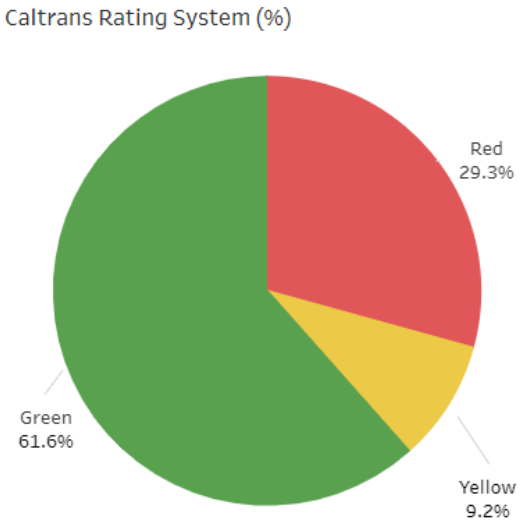
CNTY.	P.M.	LOCATION	AADT.
MRN	0.65	TAMALPAIS JUNCTION, ALMONTE BOULEVARD	34500
MRN	1.31	PINE STREET	34500
MRN	1.91	LORING AVENUE	18900
MRN	3.35	SOUTH JCT. PANORAMIC HIGHWAY	14100
MRN	5.92	MUIR WOODS ROAD	7900
MRN	12.21	PANORAMIC HIGHWAY, NORTH	4700
MRN	17.066	FAIRFAX/BOLINAS ROADS	4700
MRN	17.2	BOLINAS ROAD	3300
MRN	26.509	SIR FRANCIS DRAKE BOULEVARD, SOUTH	3300
MRN	28.6	SIR FRANCIS DRAKE BOULEVARD, NORTH	4000
MRN	29.33	POINT REYES/PETALUMA ROADS	5700
MRN	38.409	MARSHALL/PETALUMA ROADS	5700
MRN	45.36	TOMALES/PETALUMA ROADS	2600
MRN	45.66	DILLON BEACH ROAD	1600
MRN	47.86	TWO ROCK ROAD	1600
MRN	50.509	SONOMA/MARIN COUNTY LINE	1600
SON	0.19	VALLEY FORD ROAD	1300
SON	2.42	VALLEY FORD/FREESTONE ROADS	6400
SON	5.38	BODEGA HIGHWAY	6400
SON	11.07	BODEGA EASTSHORE ROAD	8700
SON	20.1	JCT. RTE. 116 EAST	6100
SON	21.3	JENNER	3200
SON	33.038	FORT ROSS, FORT ROSS ROAD	3200
SON	48.112	STEWARTS POINT/SKAGGS SPRINGS ROAD	2200
SON	58.583	SONOMA/MENDOCINO COUNTY LINE	1900

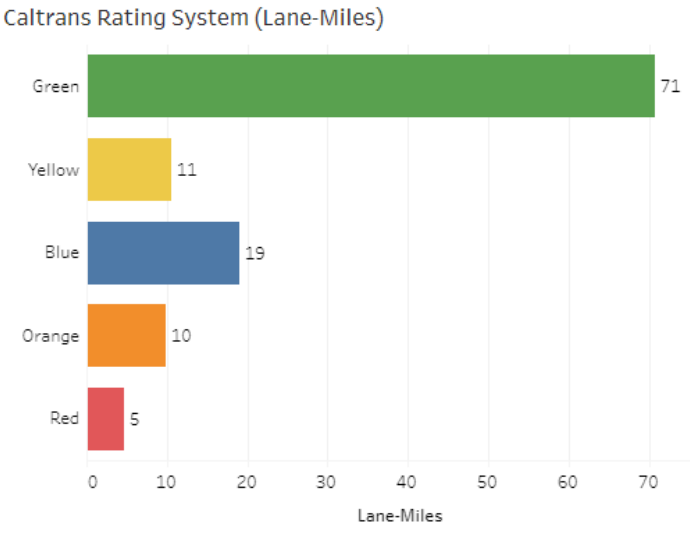
Appendix E: SR 1 Pavement Condition

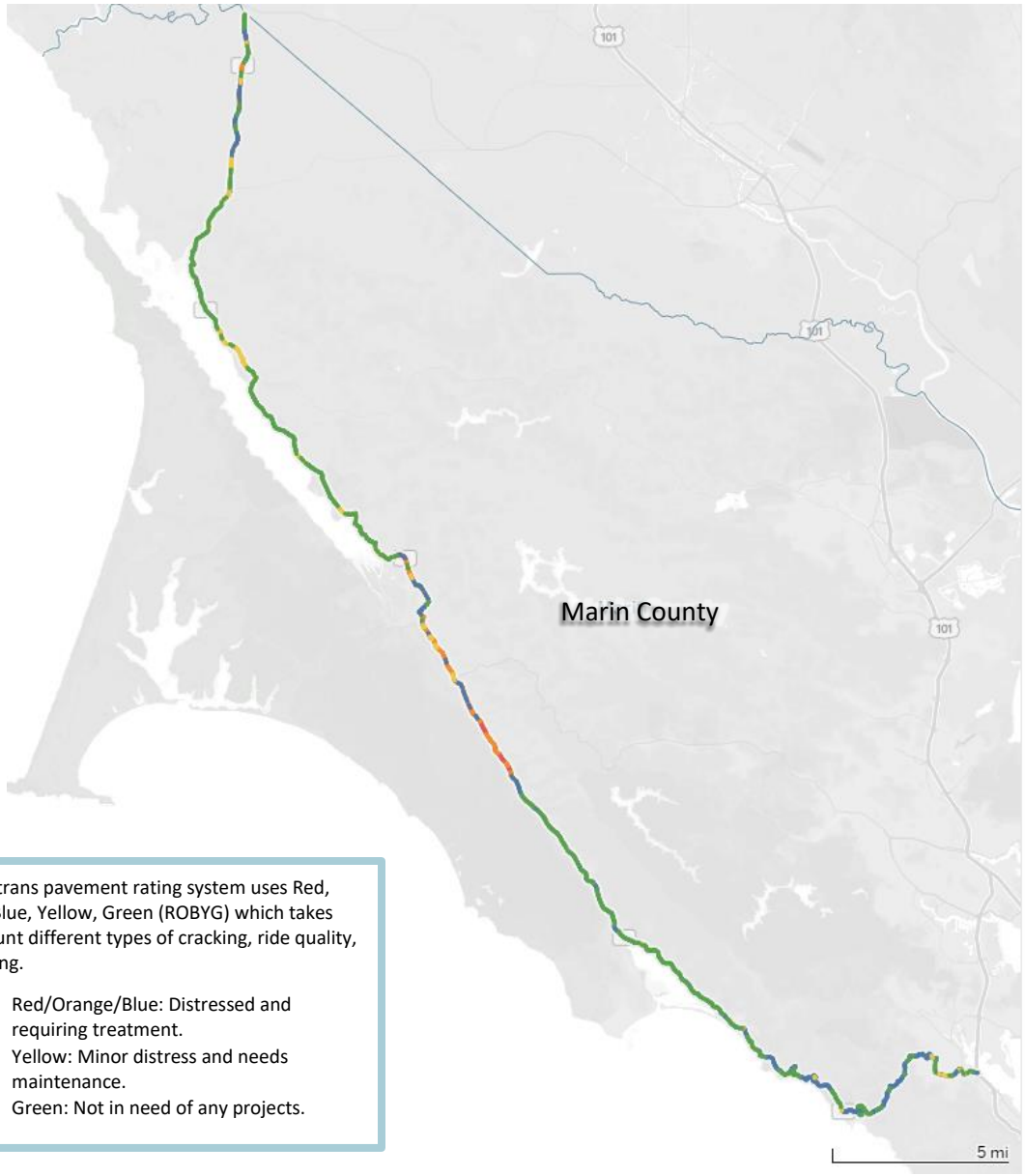


Note: Caltrans pavement rating system uses Red, Orange, Blue, Yellow, Green (ROBYG) which takes into account different types of cracking, ride quality, and faulting.

- Red/Orange/Blue: Distressed and requiring treatment.
- Yellow: Minor distress and needs maintenance.
- Green: Not in need of any projects.

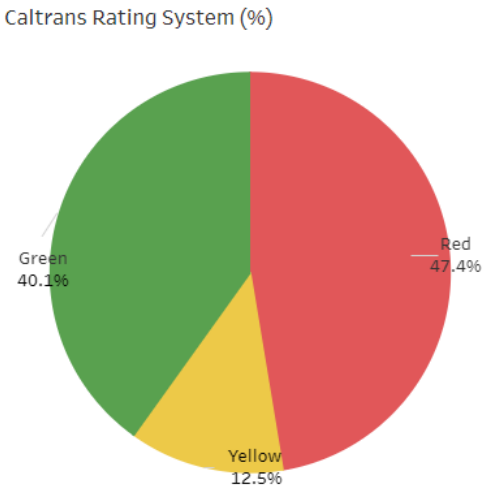


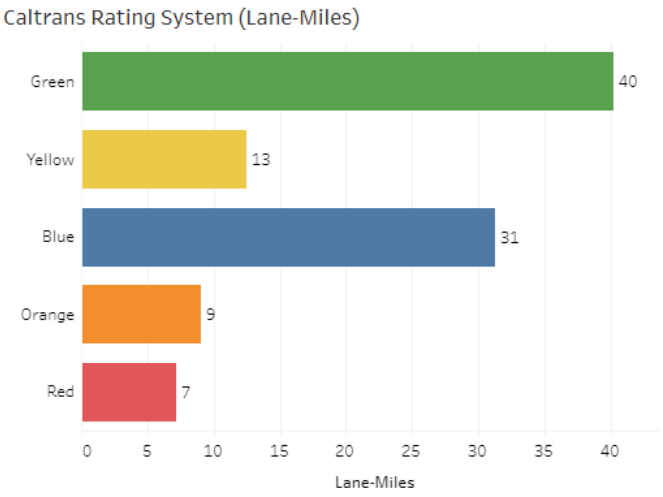




Note: Caltrans pavement rating system uses Red, Orange, Blue, Yellow, Green (ROBYG) which takes into account different types of cracking, ride quality, and faulting.

- Red/Orange/Blue: Distressed and requiring treatment.
- Yellow: Minor distress and needs maintenance.
- Green: Not in need of any projects.





Appendix F: SR 1 Bridge Health

Bridge #	Bridge Name	CO	PM	Health	Scour	Seismic	Goods Movement	Bridge Rail
27 0018	COYOTE CREEK	MRN	0.42	Fair	Fair	Good	Good	Good
27 0019	REDWOOD CREEK	MRN	6.02	Poor	Good	Good	Good	Good
27 0105	SIDEHILL VIADUCT NO. 1	MRN	11.62	Good	N/A	Good	Good	Good
27 0106	SIDEHILL VIADUCT NO. 2	MRN	11.63	Good	N/A	Good	Good	Good
27 0077	ESKOOT CREEK	MRN	12.37	Fair	Good	Good	Good	Poor
27 0122	GIACOMINI GULCH	MRN	22.78	Good	Good	Good	Good	Good
27 0020	OLEMA CREEK	MRN	22.81	Fair	Good	Good	Good	Poor
27 0021	OLEMA CREEK	MRN	22.96	Fair	Good	Good	Good	Poor
27 0120	OLEMA CREEK TRIBUTARY	MRN	24.67	Good	Fair	Good	Good	Good
27 0022	LAGUNITAS CREEK OVERFLOW	MRN	28.39	Fair	Good	Good	Good	Poor
27 0023	LAGUNITAS CREEK	MRN	28.51	Poor	TBD	Poor	Fair	Poor
27 0024	LAGUNITAS CREEK OVERFLOW	MRN	28.56	Fair	Good	Good	Good	Poor
27 0056	TOMASINI CANYON	MRN	29.85	Fair	Good	Good	Good	Good
27 0114	MILLERTON GULCH	MRN	33.40	Good	Good	Good	Good	Good
27 0025	ELLIS CREEK	MRN	34.97	Fair	Good	Good	Good	N/A
27 0026	WALKER CREEK	MRN	44.45	Good	Good	Good	Good	Good
27 0027	STEMPLE CREEK	MRN	47.41	Good	Good	Good	Good	Good
27 0054	FALLON CREEK	MRN	47.60	Good	Good	Good	Good	Good
27 0121	AMERICANO CREEK	MRN	50.44	Good	Good	Good	Good	Good
20 0186	POCOLIMI CREEK	SON	0.33	Good	Good	Good	Good	N/A
20 0189	CHENEY GULCH	SON	9.16	Fair	Good	Good	Good	N/A
20 0191	SALMON CREEK	SON	12.49	Good	Fair	Good	Good	Good
20 0198	SCOTTY CREEK	SON	15.30	Fair	Good	Good	Good	N/A
20 0195	RUSSIAN RIVER	SON	19.72	Fair	Fair	Good	Good	Good
20 0070	RUSSIAN GULCH	SON	24.50	Fair	Good	Good	Good	Poor

Note: Consider bicycle and pedestrian improvements for any future bridge replacement projects due to SLR, particularly Salmon Creek Bridge, Russian River Bridge, Russian River Gulch Bridge, and Gualala River Bridge to improve access to the USBR 95 and the California Coastal Trail

Appendix G: Fish Passage Locations

The tables below show the priority fish passage locations for future funding and current active fish remediation locations from the 2019 Fish Passage Annual Legislative Report that are specific to the SR 1 Corridor.[63]

Priority Fish Passage Locations for Funding

County – Route – Post Mile	PAD ID #	Stream Name	Tributary to	Description
Marin -1 – PM 18.69	706078	McCurdy Creek	Pine Gulch Creek (Bolinas Lagoon)	Central California Coast Steelhead (Threatened), Central California Coast Coho (Endangered). There is an estimated **0.75 miles** of salmon and Steelhead habitat above this barrier.
Marin – 1 – PM 18.69	706079	North Fork McCurdy Creek	McCurdy Creek/ Pine Gulch Creek	Central California Coast Steelhead (Threatened), Central California Coast Coho (Endangered). There is an estimated **0.75 miles** of salmon and Steelhead habitat above this barrier.
Marin – 1 – PM 22.67	706059	John West Fork	Olema Creek	Central California Coast Steelhead (Threatened), Central California Coast Coho (Endangered). There is an estimated **2.85 miles** of salmon and Steelhead habitat above this barrier.
Marin – 1 – PM 25.63	706054	Quarry Gulch	Olema Creek	Central California Coast Steelhead (Threatened), Central California Coast Coho (Endangered). There is an estimated **0.87 miles** of salmon and Steelhead habitat above this barrier.
Marin – 1 – PM 25.67	759028	Quarry Gulch	Olema Creek	Central California Coast Steelhead (Threatened), Central California Coast Coho (Endangered). There is an estimated **0.86 miles** of salmon and Steelhead habitat above this barrier

Active Fish Passage Remediation Locations

County – Route – Post Mile	EA	Project Name	Program	PAD ID #	Estimated Year of Construction	Estimated Year Construction Completed	Total Programmed Fish Passage Project Funding
Sonoma – 1 – PM 15.1	0A020	Gleason Beach Highway Realignment	SHOPP	733223	2021/22	2023/24	**$22.5M**

[63] https://dot.ca.gov/-/media/dot-media/programs/legislative-affairs/documents/fish-passage-annual-report-caltrans-2019-a11y.pdf

Appendix H: SHOPP Projects

The list below are current and planned SHOPP projects along SR 1, including projects identified in the SHOPP Ten Year Project Book.

EA/SHOPP ID	County	Postmile	Project	Description	Program Year	Current Phase
0A020	SON	15.1 / 15.7	Gleason Realignment	In Sonoma County near Bodega Bay, from 0.2 miles south to 0.4 miles north of Scotty Creek Culvert. Realign roadway. Near Carmet, from 0.1 mile to 0.7 mile north of Calle Del Sol. Realign roadway near Gleason Beach. Active Fish Passage Remediation.	2021	1_POSTRTL
4G780	SON	0 / 58.36	SON 1 CL rumble strip	Construct Rumble strips at centerline and shoulder widening at various locations	2024	0_PAED
0G642	MRN	28.5 / 28.51	Lagunitas Creek Bridge	Near Point Reyes Station, at Lagunitas Creek Bridge No. 27-0023, replace bridge	2022	1_PSE
0J300	SON	26.7 / 27	Soldier Pile Wall	Near Jenner, from 0.3 to 0.4 mile north of Myers Grade Road. Permanent restoration of roadway slipouts.	2021	1_PSE
1J960	MRN	22.8 / 33	MRN 1 CAPM	Pavement Rehabilitation.Near Point Reyes Station and Olema, from Olema Creek Bridge to north of Cypress Road (PM 22.8/31); also near Tomales, from south of Tomales-Petaluma Road to south of Valley Ford Road (PM 45.0/50.5). Pavement rehabilitation, improve drainage, and upgrade Americans with Disabilities Act (ADA) facilities.	2022	1_PSE
2J510	MRN	40.3	Rehabilitate Culvert	In Marin County near Marshall at 0.10 mile south of Clark Road/ Remove and replace 66-inch culvert.	2024	0_PAED
1K720	SON	1 / 28.7	Rehabilitate Culvert	Rehabilitate culvert. Near Bodega Bay, Carmet, and Jenner, from 0.7 mile south of Middle Road to 2.3 miles north of Meyers Grade Road at various locations. Rehabilitate drainage systems.	2024	0_PAED
1K730	SON	30.8 / 40.6	Son 1 Culverts Rehab	Drainage system restoration - rehabilitate culverts. Near Jenner, from south of Fort Ross Road to north of Moon Rock	2022	1_PSE

EA/SHOPP ID	County	Postmile	Project	Description	Program Year	Current Phase
				Campground at various locations. Rehabilitate drainage culverts.		
1K740	SON	32.4 / 32.5	Nickname Required	Drainage system upgrade at 0.5 miles south of Fort Ross Rd, in Sonoma County.	2026	K_PHASE
1K750	SON	41.2 / 54.6	Son 1 Culverts Rehab	Near Gualala, from north of Moon Rock Campground to 0.1 mile north of Vantage Road. Rehabilitate drainage culverts.	2022	1_PSE
1K760	SON	45.4	Son 1 Culverts Rehab	Near Sea Ranch, at 2.7 miles south of Skaggs Springs Road. Rehabilitate damaged culvert.	2024	0_PAED
3A250	MRN	13.1 / 45.1	Rehabilitate Culverts	Near Stinson Beach, Point Reyes, and Tomales, from north of Calle Del Arroyo to south of Tomales Petaluma Road at various locations. Rehabilitate drainage systems.	2024	0_PAED
4K820	MRN	6.6		In Marin County, at Muir Beach, 0.3 miles north of seascape, construct soldier pile wall.		Unknown
0P960	MRN	0.4 / 23	Marin 1 Bridge Rail replacements	Near Mill Valley, Stinson Beach, and Olema, at Coyote Creek Bridge No. 27-0018 (PM 0.42), Eskoot Creek Bridge No. 27-0077 (PM 12.37), Olema Creek Bridge No. 27-0020 (PM 22.81) and Olema Creek Bridge No. 27-0021 (PM 22.96). Upgrade bridge rails.	2024	0_PAED
0Q700	SON	23.4	STORM DAMAGE PERMANENT RESTORATION	Near Jenner, at 3.0 miles south of Meyers Grade Road, replace culvert with concrete box culvert due to sinkhole	2021	Unknown
4S78A	MRN	24.7	Olema Creek Meadow Restoration	Near Olema, at 1.8 miles south of Sir Francis Drake Blvd, meadow restoration.		K_PHASE
1Q250	SON	24.5 / 24.6	PID Phase RUSSIAN GULCH BRIDGE RAILING	Near Jenner at Russian Gulch, bridge rail replace and upgrade for Russian Gulch Br#20-0070 Br Rail	2026; Target RTL 29/30	0_PAED
1Q340	SON	19.2 / 21.8	Jenner Replace Culvert	Near Jenner, from south of Willow Creek Road to Burke Avenue. Rehabilitate drainage systems at two locations.	2024	0_PAED
2Q530	MRN	13.1 / 44.9	Drainage System Restoration	Near Stinson Beach, Point Reyes, and Tomales, from north of Calle Del Arroyo to south of Tomales Petaluma Road at various locations. Rehabilitate drainage systems.	2024	0_PAED

EA/SHOPP ID	County	Postmile	Project	Description	Program Year	Current Phase
3Q420	SON	9.1 / 16.1	HM122	In Sonoma County at and near Bodega Bay from Doran Park Road to 0.8 miles north of Scotty Creek Bridge, RHMA overlay	2021	Unknown
3Q680	SON	5.38	Nickname Required	In Sonoma County, T-intersection of SR 1 and Bodega Bay Highway, safety lightening installation	2020	Unknown
0AA44	MRN	22.78	Follow-up mitigation to 2017 storm director's order project EA04-4K850	Near Five Brooks, at Giacomini Creek Bridge No. 27-0122. Four-year mitigation plant establishment for emergency project EA 4K850.	2021	1_PSE
0AA48	MRN	10.7 / 11	Mrn 1 10.7-11 Plant Establishment	Near Stinson Beach, from 1.5 miles south to 1.2 miles south of Panoramic Highway North. Four-year mitigation plant establishment and monitoring for emergency projects EA 4K240 and EA 4S220.	2021	1_PSE
4Q800	SON	24.2 / 30.5	SON-1 CAPM	Near Jenner from 0.3 miles south of Russian Gulch Bridge to 2.54 miles south of Fort Ross Road, CAPM Pavement preservation		K_PHASE
3AA30	SON	49.83 / 50.02	MINOR B	Near Yardarm Drive, replace culverts	2021	Unknown
3AA50	MRN	5.3		Near Muir Beach at Green Gulch, repair roadway cracks and surface distress using sheetpile and anchors		K_PHASE
0W130	MRN	11.5		Near Stinson Beach, at 0.6 miles south of Panoramic Highway north junction, major damage permanent restoration; follow-up mitigation to storm damage project EA 04-0P130	2020	1_PSE
0W550	MRN	40.1	Minor B	In Marin County, near the town of Marshall on Route 1, replace failed 24-inch CPM culvert with 24 inch plasti	2021	Unknown
0W660	MRN	0.04		In the city of Mill Valley in Marin County, at Route 1, PM 0.040 at the entrance to the Manzanita, replace culvert and repair AC Pavement	2021	Unknown
0W740	SON	51.1 / 55	Mrn 1 Drainage system restoration	In Sonoma County, from Moonraker Road to Gualala River, replace/install culverts		K_PHASE
1W000	MRN	1.01	MINOR B	In Marin County, on Route 1 at intersection with Tennessee	2021	Unknown

EA/SHOPP ID	County	Postmile	Project	Description	Program Year	Current Phase
				Avenue. Install Rectangular Rapid Flashing Beacon (RRFB) and widen shoulder.		
1W320	MRN	17.05 / 17.2	Bolinas Lagoon Wye PEER Project	In Marin County, SR 1, near Olema Bolinas Rd and Fairfax/Bolinas Hwy 1 intersection, extensive habitat restoration including traffic safety improvement and addressing future SLR issue	2021	Unknown
4Q790	SON	0.8 / 22.0	Drainage	In Sonoma County, from Valley Ford Road to Route 116, and from Salt Point State Park to Gualala Point	Projected SHOPP cycle 2026	TYP, RTL 2029/30; projected SHOPP cycle 2026
4AC40	SON	0.0 / 58.583	Safety - Collision Reduction	Upgrade curve warning signs, various locations of SON County	Projected SHOPP Cycle 2022	TYP, RTL 2024/35; Projected SHOPP Cycle 2022
4Q810	SON	23.0 / 39.5	Drainage	In Sonoma County, from La Porte Drive to Salt Point State Park	Projected SHOPP Cycle 2022; Long Lead	TYP; RTL 2029/30; Projected SHOPP Cycle 2022; Long Lead
4S930	SON	21.2 / 21.5	Major Damage - Protective Betterments	In Sonoma County, at Jenner, construct subsurface drainage behind crib wall	Projected SHOPP Cycle 2022	TYP; RTL 2031/32; Projected SHOPP Cycle 2022
SHOPP ID: 20330	SON	50.6 / 58.58	Pavement	Sea Walk Drive to Mendocino County Line. HMA Thick Overlay (PM 50.6/55)	Projected SHOPP Cycle 2024	TYP; RTL 2027/28; Projected SHOPP Cycle 2024; 2024 PID candidate
SHOPP ID: 20331	SON	30.5 / R45.0	Pavement	HMA Thick Overlay	Plan Year 2028	
SHOPP ID: 20332	SON	0.0 / 9.1	Pavement	Marin County Line to Doran Park Road. HMA Thick Overlay	Projected SHOPP Cycle 2024	TYP; RTL 2031/32; Projected SHOPP Cycle 2024
SHOPP ID: 18738	SON	16.1 / 30.5	Pavement	HMA Thick Overlay	Plan Year 2026	
SHOPP ID: 14149	MRN	0.42 / 28.56	Bridge			TYP; RTL 2023/24; not found in

EA/SHOPP ID	County	Postmile	Project	Description	Program Year	Current Phase
						asset management plan tool
SHOPP ID: 16738	MRN	4.1	Mobility - Operational Improvements		Projected SHOPP Cycle 2022	TYP; RTL 2031/32; Projected SHOPP Cycle 2022
0AA45	MRN	0.0 / 17.0	Pavement	From Manzanita to Bolinas Road, CAPM; AC Resurfacing, Curb Ramps	Projected SHOPP Cycle 2024	TYP; RTL 2026/27; Projected SHOPP Cycle 2024; 2024 PID Candidate (nonreservation)
4G930	MRN	30.9 / 31.4	Major Damage - Protective Betterments	In Marin County, near Point Reyes Station, from 0.7 mile to 1.2 miles north of Cypress Road, realign roadway due to flooding	Projected SHOPP Cycle 2022	TYP; RTL 2030/31; Projected SHOPP Cycle 2022 (shelved?)
SHOPP ID: 20281	MRN	0.1 /0.11	Facilities	Relocate and reconstruct MS / Manzanita MS (5713)	Projected SHOPP Cycle 2024	TYP; RTL 2031/32; Long Lead SHOPP; Projected SHOPP Cycle 2024
SHOPP ID: 21697	MRN	44.5 / 45.26	Sustainability/Climate Change	On Route 1 in the county of Marin near the town of Tomales to address recurring flooding. Long Lead PIR to address recurring flooding outside the Town of Tomales.	Projected SHOPP cycle 2024	Long Lead SHOPP; Target RTL 2026/27; Long Lead RTL 2031/32; Projected SHOPP cycle 2024; 2024 PID candidate
SHOPP ID: 22014	SON	3.0 / 27.1	Drainage	In Sonoma County, from Freestone-Valley Ford Road to Meyer Gulch, rehabilitate culverts	Projected SHOPP cycle 2024	Target RTL 2027/28; 2024 PID candidate; Projected SHOPP Cycle 2024

EA/SHOPP ID	County	Postmile	Project	Description	Program Year	Current Phase
SHOPP ID: 22015	SON	27.3 / 32.5	Drainage	In Sonoma County, from Meyer Gulch to Fort Ross Road, rehabilitate culverts	Projected SHOPP cycle 2024	Target RTL 2027/28; 2024 PID candidate; Projected SHOPP Cycle 2024
SHOPP ID: 22016	SON	41.4 / 51.0	Drainage	In Sonoma County, from Fort Ross Road to Miller Creek, rehabilitate culverts	Projected SHOPP cycle 2024	Target RTL 2027/28; 2024 PID candidate; Projected SHOPP Cycle 2024
SHOPP ID: 22017	SON	41.4 / 51.0	Drainage	In Sonoma County, from Miller Creek to Moonraker Road, rehabilitate culverts	Projected SHOPP cycle 2024	Target RTL 2026/27; 2024 PID candidate; Projected SHOPP Cycle 2024
SHOPP ID: 17840	MRN	0/17	Pavement	Rehab HMA Thick Overlay	Plan Year 2026	Plan Year 2026
SHOPP ID: 20337	MRN	17/22.8	Pavement	Rehab HMA Thick Overlay	Plan Year 2025	Plan Year 2025
SHOPP ID: 18737	MRN	31.2/45	Pavement	Rehab HMA Thick Overlay	Plan Year 2028	Plan Year 2028

Appendix I: Governmental Plans, Programs, and Deputy Directives

FEDERAL

Fixing America's Surface Transportation Act (FAST Act) December 2015

FAST Act will provide $305 Billion in funding for surface transportation programs and was signed into law in December 2015. The federal spending bill replaces MAP-21, Moving Ahead for Progress in the 21st Century signed into law in 2012. FAST Act provides funding for highway, transit, and railroad networks, most of which will be distributed to state departments of transportation and local transit agencies.

Federal Transportation Improvement Program (FTIP)

All federally funded projects, and regionally significant projects (regardless of funding), must be listed in the FTIP per federal law. A project is not eligible to be programmed in the FTIP until it is programmed in the *State Transportation Improvement Program* (STIP) or in the *State Highway Operations and Protection Program* (SHOPP). Other types of funding (Federal Demonstration, Congestion Mitigation and Air Quality (CMAQ), Transportation Enhancement Activities (TEA), and Surface Transportation Program (STP) must be officially approved before the projects can be included in the FTIP.

STATE

California Transportation Plan (CTP) 2050

The CTP is a long-range policy framework to meet California's future multi-modal mobility needs and reduce greenhouse gas and particulate matter (PM) emissions. The CTP defines goals, performance-based policies, and strategies to achieve a collective vision for California's future Statewide, integrated, multimodal transportation system. A new updated plan was recently finalized in June 2016. It focuses on meeting new trends and challenges, such as economic and job growth, climate change, freight movement, and public health. In addition, performance measures and targets were developed to assess performance of the transportation system to meet the requirements of MAP-21. Caltrans has initiated CTP 2050, a strategic update to CTP 2040.

California Interregional Blueprint (CIB)

Responding to Senate Bill 391 of 2009, CIB informs and enhances the State's transportation planning process. Similar to requirements for regional transportation plans under Senate Bill 375, SB 391 requires the State's long-range transportation plan to meet California's climate change goals under Assembly Bill 32. In response to these statutes, Caltrans is preparing a state-level transportation blueprint to inform CTP 2040 and articulate the State's vision for an integrated, multi-modal interregional transportation system that integrates the Regional Blueprint Program (see the Regional appendix section) and complements regional transportation plans. The CIB will integrate the State's long-range multi-modal plans and Caltrans-sponsored programs with the latest technology and tools to enhance our ability to plan for and manage a transportation system that will expand mode choices and meet future increases in transportation needs and still meet the GHG-reduction targets or SB 375.

State Transportation Improvement Program (STIP)

The STIP is a multi-year capital improvement program of transportation projects on and off the State Highway System, funded with revenues from the Transportation Investment Fund and other funding sources. Caltrans and the regional planning agencies prepare transportation improvement plans for submittal. Local agencies work through their Regional Transportation

Planning Agency (RTPA), County Transportation Commission, or Metropolitan Planning Organization (MPO), as appropriate, to nominate projects for inclusion in the STIP.

Interregional Transportation Improvement Program (ITIP)

The Interregional Transportation Improvement Program (ITIP) is a state-funding program for the Interregional Improvement Program (IIP) and is a sub-element of the State Transportation Improvement Program. The IIP is a state funding category created in SB 45 for intercity rail, interregional road or rail expansion projects outside urban areas, or projects of statewide significance, which include projects to improve State highways, the intercity passenger rail system, and the interregional movement of people, vehicles, and goods. Caltrans nominates and the California Transportation Commission approves a listing of interregional highway and rail projects for 25% of the funds to be programmed in the STIP (the other 75% are Regional Improvement Program funds). Only projects planned on State highways are to be included in this program.

Interregional Transportation Strategic Plan (ITSP) 2015

The ITSP is a California Department of Transportation (Caltrans) document that provides guidance for the identification and prioritization of interregional State highway projects. The ITSP promotes the State of California's role of improving mobility while providing opportunity for efficient goods movement. It also provides summary information regarding other interregional transportation modes—in particular, intercity passenger rail. The ITSP highlights critical planning considerations such as system planning, complete streets, and climate change.

District System Management Plan (DSMP)

The DSMP provides a vehicle for the development of multi-modal and multi-jurisdictional transportation strategies. These strategies must be based on an analysis that is developed in partnership with regional and local agencies. The DSMP is the State's counterpart to the Regional Transportation Plan (RTP) for the region. The former Transportation System Development Program (TSDP) is now incorporated within this management plan as a Project List.

State Highway Operation and Protection Program (SHOPP)

Caltrans prepares the SHOPP for the expenditure of transportation funds for major capital improvements necessary to preserve and protect the State Highway System. The SHOPP is a four-year funding program updated every two years, focusing available resources on the most critical categories of projects: safety mandates, bridge, and pavement preservation. The *Ten-Year SHOPP* anticipates long-term projected expansion and maintenance needs.

Ten-Year SHOPP

The Ten-Year SHOPP is a State plan for the rehabilitation and reconstruction of State highways and bridges. The purpose of the plan is to identify needs for the upcoming ten years. The plan is updated every two years. It includes specific milestones, quantifiable accomplishments and strategies to control cost and improve the efficiency of the program. The Ten-Year SHOPP differs from programmed two-year SHOPP, as it has no funding constraints assigned, just Program targets.

California Strategic Growth Plan

The Governor and Legislature have initiated the first phase of a comprehensive Strategic Growth Plan to address California's critical infrastructure needs over the next twenty years. California faces over $500 billion in infrastructure needs to meet the demands of a population

expected to increase by 23 percent over the next two decades. In November 2006, the voters approved the first installment of that twenty-year vision to rebuild California by authorizing a series of General Obligation bonds totaling $42.7 billion.

Smart Mobility Framework

Caltrans released *Smart Mobility 2010: A Call to Action for the New Decade* in February 2010. SMF was prepared in partnership with US Environmental Protection Agency, the Governor's Office of Planning and Research, and the California Department of Housing and Community Development to address both long-range challenges and short-term pragmatic actions to implement multi-modal and sustainable transportation strategies in California.

Smart Mobility 2010 provides new tools and techniques to improve planning. It links land use "place types," considers growth scenarios and how growth will best gain the benefits of smart mobility. The SMF emphasizes travel choices, healthy, livable communities, reliable travel times for people and freight, and safety for all users. This vision supports the goals of social equity, climate change intervention, and energy security as well as a robust and sustainable economy.

Caltrans Deputy Directive DD-64-R2 *Complete Streets - Integrating the Transportation System, 2008 & 2014*

DD-64-R2 expresses Caltrans commitment to providing for the needs of all travelers including motorists, pedestrians, bicyclists and persons with disabilities in all programming, planning, maintenance, construction, operations, and project development activities and products.

State Assembly Bill 32 (AB 32) *Global Warming Solutions Act, September 2006*

This bill requires the State's greenhouse gas emissions to be reduced to 1990 levels by the Year 2020. Caltrans strategy to reduce global warming emissions has two elements. The first is to make transportation systems more efficient through operational improvements. The second is to integrate emission reduction measures into the planning, development, operations and maintenance of transportation elements.

Senate Bill 1 (SB 1) *Road and Repair Accountability Act, 2017*

SB 1 provides the first significant, stable, and on-going increase in State-directed transportation funding in more than two decades. This legislative package invests $54 billion over the next decade to fix roads, freeways and bridges in communities across California and puts more dollars toward transit and safety. These funds will be split equally between state and local investments. SB 1 presents a balance of new resources and reasonable reforms to ensure efficiency, accountability, and performance from each dollar invested to improve California's transportation system.

Senate Bill 45 (SB 45), *1997*

SB 45 establishes guidelines for the California Transportation Commission to administer the allocation of funds appropriated from the Public Transportation Account for capital transportation projects designed to improve transportation facilities.

Senate Bill 375 (SB 375) *Addressing Greenhouse Gas Emissions from the Transportation Sector, 2008*

SB 375 provides a means for achieving AB 32 goals from cars and light trucks. The transportation sector contributes over forty percent of the GHGs throughout the State. Automobiles and light trucks alone contribute almost thirty percent. SB-375requires the California Air Resources Board (ARB) to develop regional greenhouse gas (GHG) emission reduction targets for cars and light trucks for each of the 18 Metropolitan Planning Organizations (MPOs). Through their

planning processes, each of the MPOs is required to develop plans to meet their regional GHG reduction target. This would be accomplished through either the financially constrained "sustainable communities strategy" as part of their regional transportation plan (RTP) or an unconstrained alternative planning strategy. SB-375 also provides streamlining of California Environmental Quality Act (CEQA) requirements for specific residential and mixed-use developments.

Senate Bill 391 (SB 391) *California Transportation Plan updates, 2009*

This bill requires the department to update the California Transportation Plan by December 31, 2015, and every 5 years thereafter. The bill requires the plan to address how the state will achieve maximum feasible emissions reductions in order to attain a statewide reduction of greenhouse gas emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050. The bill requires the plan to identify the statewide integrated multimodal transportation system needed to achieve these results.

Senate Bill 743 (SB 743) *California Environmental Quality Act (CEQA) updates, 2013*

This bill requires the Office of Planning and Research to update guidelines for analyzing transportation project impacts as they relate to CEQA legislation. Currently, guidelines are considered interim as the SB 743 court ruling is not final as of May 2018. Vehicle Miles Traveled (VMT) now provides an alternative to LOS for evaluating transportation impacts. Particularly within areas served by transit, those alternative criteria must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses."

Caltrans - Climate Action Plan

Greenhouse gas (GHG) emissions and the related subject of global climate change are emerging as critical issues for the transportation community. Caltrans recognizes the significance of cleaner, more energy efficient transportation. On June 1, 2005 the State established climate change emissions reduction targets for California that lead to development of the Climate Action Program. This program highlights reducing congestion and improving efficiency of transportation systems through smart land use, operational improvements, and Intelligent Transportation Systems (objectives of the State's Strategic Growth Plan). The Climate Action Plan approach also includes institutionalizing energy efficiency and GHG emission reduction measures and technology into planning, project development, operations, and maintenance of transportation facilities, fleets, buildings, and equipment. The Draft report is expected by the end of June 2018.

Comprehensive Multimodal Corridor Plans (CMCP)

SB 1 established multiple funding programs, including the Solutions for Congested Corridors Program (SCCP). This program provides $250 million annually on a competitive basis to Caltrans and regional agencies for projects designed to achieve a balanced set of transportation, environmental, and community access improvements within highly-congested travel corridors throughout the State. The legislation stipulates projects eligible for SCCP funding must be included in a Comprehensive Multimodal Corridor Plan designed to reduce congestion in highly-traveled corridors by providing more transportation choices for residents, commuters and visitors to the area while preserving the character of the local community and creating opportunities for neighborhood enhancements. CTC developed CMCP guidelines in 2018.

Corridor System Management Plans (CSMP)

In 2007, the California Transportation Commission adopted a resolution stating "…the Commission expects Caltrans and regional agencies to preserve the mobility gains of urban corridor capacity improvements over time that will be described in Corridor System Management Plans (CSMPs)." A CSMP is a transportation planning document that will study the facility based on comprehensive performance assessments and evaluations. The strategies are phased, and include both operational and more traditional long-range capital expansion strategies. They take into account transit usage, projections, and interactions with arterial network, and connection to State Highways. Each CSMP presents an analysis of existing and future traffic conditions and proposes traffic management strategies and capital improvements to maintain and enhance mobility within each corridor.

California Freight Mobility Plan, 2020

In collaboration with various State, regional and local partners, public and private sectors, and the members of the California Freight Advisory Committee (CFAC), Caltrans developed the California Freight Mobility Plan 2020 to provide a long-term vision for California's freight future. The CFMP is a comprehensive plan that governs the immediate and long-range planning activities and capital investments by the state with respect to freight movement. This multimodal freight transportation system facilitates the reliable and efficient movement of goods while ensuring a prosperous economy, social equity, and human and environmental health. The CFMP also complies with California State Government Code Section 13978.8(b)(1) (Assembly Bill 14, Lowenthal) and the freight provisions of the federal Fixing America's Surface Transportation Act (FAST Act) which requires each state that receives funding under the National Highway Freight Program to develop a State Freight Plan.

California State Rail Plan (CSRP), 2018

The Rail Plan establishes a long-term vision for prioritizing state investment in an efficient, effective passenger and freight rail system, which supports the goals and policies of the California Transportation Plan 2040. The Rail Plan identifies service goals, capital costs, and a phased strategy for achieving the Vision. This ambitious plan identifies a coordinated, statewide passenger rail network that will get Californians where they want to go, when they want to go, and enhance the movement of goods by rail to support California's industries and the economy. The California State Rail Plan was approved on September 2018.

REGIONAL

Regional Transportation Plan (RTP) and Plan Bay Area

The Metropolitan Transportation Commission (MTC) functions as both the State-designated Regional Transportation Planning Agency (RTPA) and federally-designated Metropolitan Planning Organization (MPO). MTC is responsible for the development and update of the RTP, a financially constrained long range transportation plan for the region. Pursuant to SB 375, along with an updated RTP, each region in California must develop a Sustainable Communities Strategy (SCS) that promotes walk and bike-friendly mixed-use commercial and residential development close to mass transit, jobs, schools, shopping, parks, recreation, and other amenities. MTC's Plan Bay Area (PBA), first adopted in July 2013 and then updated in July 2017 as *PBA 2040*, serves as the San Francisco Bay Area's RTP and SCS. Plan Bay Area discusses how the Bay Area will grow over the next two decades and identifies transportation and land use strategies to enable a more sustainable, equitable and economically vibrant future. MTC is currently working on an update to PBA 2040, known as Plan Bay Area 2050, to be adopted in 2021.

Regional Transportation Improvement Program (RTIP)

The Regional Transportation Improvement Program is a sub-element of the State Transportation Improvement Program (STIP). The Metropolitan Transportation Commission is responsible for developing regional project priorities for the RTIP for the nine counties of the Bay Area. The biennial RTIP is then submitted to the California Transportation Commission for inclusion in the STIP.

Regional Blueprint Planning Program

The Regional Blueprint Planning Program supports the smart growth element of the Strategic Growth Plan by promoting smart land use choices at the regional and local levels. The Regional Blueprint Planning Program was a grant program that supported Metropolitan Planning Organizations (MPOs) and Regional Transportation Planning Agencies (RTPAs) to conduct comprehensive scenario planning. Using consensus-building and a broad-based visioning approach it's goal was to envision future land use patterns and their potential impacts on a region's transportation system, housing supply, jobs/housing balance, resource management and other protections. The Blueprint planning effort in the San Francisco Bay Area is the Focus our Vision (FOCUS) program, which is led by the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) with support from the Bay Area Air Quality Management District (BAAQMD) the Bay Conservation and Development Commission (BCDC), and Caltrans. These agencies and local governments participated in the Regional Blueprint Planning Program since the program's inception in 2005, receiving grants for all four years, and now carry on regional blueprint goals through *the FOCUS program.*

Freeway Performance Initiative (FPI)

This is the Metropolitan Transportation Commission's ongoing effort to improve the operations, safety, and management of the Bay Area's freeway network by deploying system management strategies, completing the HOV lane system, addressing regional freight issues, and closing key freeway infrastructure gaps.

Appendix J: SR 1 North Pre-TCR Partner Workshop Summary - May 2016

Caltrans District 4 Planning hosted a facilitated stakeholder workshop on May 6, 2016, to collect early input to inform the TCR development process. The workshop was designed to be interactive and hands-on to best identify ideas from stakeholders and partners on key priorities for State Route 1 North in Marin and Sonoma counties. The workshop provided a unique opportunity for partners to collaboratively identify assets, issues, and opportunities for the Corridor. Typical engagement for Corridor Plans such as TCRs consists of an email to stakeholders such as cities and counties notifying them of the Plan, the timeline, review, and comment periods. Notifying and involving stakeholders in a collaborative manner should be the minimum in-house public that Caltrans D4 Planning conducts.