

FINAL
Marin State Route 1 Repair Guidelines



California Department of Transportation

District 04

July 2015



Note to the Project Development Team

FROM HELENA 'LENKA' CULIK-CARO:

I am pleased to present the Marin State Route 1 Repair Guidelines. Consistent with Caltrans' Strategic Management Plan, these guidelines will help promote stewardship and sustainability of our transportation resources by streamlining projects through a shared vision with our partners. The shared vision promotes sustainability by reducing environmental impacts through design flexibility.

The objective of these repair guidelines is to provide guidance that integrates and balances safety, mobility, and maintenance goals with environmental values. This document provides a framework to enable more timely repairs that are not only functional but are also consistent with the landscape, uses, and regulatory and land management policies associated with Highway 1. This allows the Project Development Team to have a shared understanding of practices and features best suited for the Highway 1 corridor. With a corridor-centric approach, all those who work on repair projects on Highway 1 in Marin County share a common vision rather than approaching each project with separate design considerations. This vision not only bridges Caltrans functional units, it also supports and connects the requirements of the California Coastal Act, Marin County Local Coastal Plan, and National and State Park Services and is supported by Caltrans' policy of Context Sensitive Solutions and the Highway Design Manual flexibility guidance.

These guidelines, as put into practice, will help promote the organizational excellence goals of Caltrans and help the Project Development Team to produce a quality project. Thank you for your hard work, public service and dedication.



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List of Abbreviated Terms

AASHTO	American Association of State Highway and Transportation Officials
AB	Assembly Bill
ADT	average daily traffic
Caltrans	California Department of Transportation
CCC	California Coastal Commission
CCT	California Coastal Trail
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	<i>Code of Federal Regulations</i>
Coastal Act	California Coastal Act
Conservancy	California Coastal Conservancy
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DIB	Design Implementation Bulletin
DOI	Department of the Interior
DOT	Department of Transportation
DOM	<i>State Parks Department Operations Manual</i>
EIR	Environmental Impact Report
EO	emergency opening
FHWA	Federal Highway Administration
FWS	U.S. Fish and Wildlife Service

GGNRA	Golden Gate National Recreation Area
Guidelines	State Route 1 Repair Guidelines
HDM	<i>Highway Design Manual</i>
Highway 1	California State Route 1
KPRA	kingpin-to-rear-axle
LCP	Local Coastal Program
LUP	Land Use Plan
MBGR	metal beam guardrail (includes Midwest Guardrail system or equivalent)
mph	mile (s) per hour
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
OSHA	Occupational Safety and Health Administration
PDT	Project Development Team
PRC	Public Resources Code
SB	Senate Bill
State Parks	California Department of Parks and Recreation
USACE	U.S. Army Corp of Engineers
U.S.C.	United States Code

Glossary

Complete Streets: A transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including pedestrians, bicyclists, motorists, and public transportation users appropriate to the function and context of the facility.

Design Vehicle: The *Highway Design Manual* recommends the California Legal Design Vehicle per Index 404.4(2)(b) be used in the design of Highway 1 in Marin County. Highway 1 in Marin County has been designated a California Legal Kingpin-to-Rear-Axle Distance (KPRA) Advisory Route, with a KPRA of 30 feet (see <http://www.dot.ca.gov/hq/traffops/engineering/trucks/truckmap/truckmap-d04.pdf>).

Fact Sheet for Exceptions to Mandatory Design Standards: A Fact Sheet is required on a project if any element on a project does not meet current standards. Included in the Fact Sheet is justification for why a design exception is required.

Main Street: Term used for sections of Highway 1 through small towns and communities that provide access to businesses and residential roads. They serve pedestrians, bicyclists, businesses, and public transit, with motorized traffic typically traveling at speeds of 20 to 40 miles per hour.

Roadside: A general term denoting the area adjoining the outer edge of the roadbed to the right-of-way line.

Roadway: The portion of Highway 1 included between the outside lines of the sidewalks, curbs and gutters, or side ditches, including the appertaining structures and all slopes, ditches, channels, waterways, and other features necessary for proper drainage and protection.

Scenic Highway: A state or county highway—in total or in part—that is recognized for its scenic value, is protected by a locally adopted corridor protection program, and has been officially designated by Caltrans.

Shoulder: The portion of the roadway contiguous with the traveled way for the accommodation of stopped vehicles, for emergency use, for errant vehicle recovery, and for lateral support of base and surface courses. The shoulder may accommodate bicyclists and pedestrians.

Travel Lane: The portion of the roadway for the movement of vehicles and bicycles, exclusive of shoulders.

Chapter 1 Purpose

The purpose of these California State Route 1 (Highway 1) Repair Guidelines (Guidelines) is to provide California Department of Transportation (Caltrans) staff and stakeholders with a consistent vision and direction when working on or reviewing damage repair projects along the portion of Highway 1 that traverses Marin County within the California Coastal Zone (shown on Figure 1-1). While this damage is predominantly related to storm events, the recommendations apply to any other major event that damages the roadway. The Guidelines allow Caltrans District 4 and its partner agencies to respond with timely and consistent efforts to repair projects in a manner that minimizes alterations, acknowledges the special sensitivity of this segment of Highway 1, supports the existing aesthetics, and protects natural resources while meeting the needs of all user groups.

In 2006, dialogue with Caltrans' partners from the National Park Service (NPS), the California Department of Parks and Recreation (State Parks), Marin County, and the California Coastal Commission (CCC) helped identify the great need for shared damage repair guidance. No Highway 1 corridor-wide recommendations existed that Caltrans staff and partnering agencies could reference when considering potential treatments for damage repair.

To respond to these concerns, Caltrans convened an interdisciplinary working group with these partners to create recommendations that maintain sensitivity to the Highway 1 corridor's social, historic, scenic, and environmental values while also protecting the safety of users. The objective is to provide guidance that Caltrans and its partnering agencies can reference to promote efficient, appropriate repairs to this highly valued highway. These agencies have reviewed and provided feedback on many versions of this report. The final Guidelines reflects compromises made by all partners to find consensus, and to provide more suitable design guidance to Project Development Teams (PDTs) working on repair projects along this corridor.



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Legend

- State Route 1 Marin County
- State Highways
- County Boundary

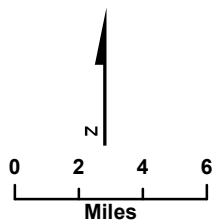


FIGURE 1-1
STATE ROUTE 1 IN MARIN COUNTY
Final Marin State Route 1 Repair Guidelines

Chapter 2 How to Use These Guidelines

These Guidelines have been developed to provide consistency and clarification in design development for Caltrans damage repair projects within Marin County. Damage repair projects are typically spot improvement projects no more than 0.5 mile in length. They may or may not involve structures, such as bridges or retaining walls. Although these Guidelines were created in response to the ongoing need for repair projects, they contain context and stakeholder information that would benefit all projects being considered in the scenic coastal environment.

These Guidelines are intended to instruct users on how to align the design of repair projects with the existing transportation needs of Highway 1 while preserving and enhancing the resources and aesthetics of the project location. Applying these approaches should also streamline the process for meeting the requirements for local, state, and federal approvals of projects in the corridor. This chapter provides a brief description of each remaining chapter in the Guidelines, along with the target audience for each chapter.

Chapter 3 – Environmental and Permitting Conditions

Chapter 3 outlines the issues and key players involved in the project development process for projects in the scenic coastal environment. Staff involved in developing projects along Highway 1 in Marin County should thoroughly understand this section. The District Landscape Architecture Office and Environmental Division will be able to answer any additional questions regarding individual project issues and solutions.

Chapter 4 – Process

Chapter 4 covers the fundamentals of the project development process for damage repair projects. Staff involved in developing projects along Highway 1 in Marin County should thoroughly understand this section. The District Maintenance Office will be able to provide additional details and updates regarding the damage assessment form.

Chapter 5 – Design Guidelines

Chapter 5 contains specific recommendations regarding the design of the permanent restoration portion of a damage repair project and is the essence of this document. Recommendations can be specific or general in nature, and the designer should use judgment when applying these recommendations and keep the context of the Highway 1 facility in mind. All staff involved in the design of a damage repair project

in a scenic coastal environment should review this section in its entirety. Note that the design guidelines in this section do not replace the *Highway Design Manual* (HDM), and any deviations from the standards contained in the HDM still require an approved Design Exception (Fact Sheet). The design guidelines, however, are intended to provide ancillary information for these Fact Sheets. On January 30, 2015, the design exception approval process was delegated to the District for this type of facility. District Design staff can assist in the application of these guidelines and required Fact Sheets upon request.

It is important to understand the project location, natural context, landscape setting, vehicle and bicycle speed, stakeholder needs, and other key site conditions when designing projects in a scenic coastal environment. To support Caltrans' Context-Sensitive Solutions policy as part of these design recommendations, the Working Group has segmented the Highway 1 corridor according to landscape units. Each landscape unit represents an area with similar visual character based on vegetation, topography, and other visual elements. Fifteen designated Highway 1 segments are located in Marin County. Appendix A, Landscape Units and Existing Conditions, provides detailed specifications for each unit. Staff should use these recommendations in tandem with Table 5-1, Design Recommendations, in Chapter 5, which provides recommendations for design elements.

Chapter 3 Environmental and Permitting Considerations

3.1 The Uniqueness of State Route 1

Throughout most of Marin County, Highway 1 is a two-lane rural highway that meanders along the Pacific coastline. Highway 1 traverses large expanses of NPS lands, particularly Golden Gate National Recreation Area (GGNRA) and Point Reyes National Seashore, as well as State Parks, including Mount Tamalpais State Park, Tomales Bay State Park, and Marconi Conference Center State Historic Park. Highway 1 connects, and has become a well-known feature of, the scenic coastline and pastoral inland areas that dominate this region. This scenic quality is protected by the California Coastal Act (Coastal Act), Marin County's Local Coastal Program (LCP), and NPS (GGNRA and Point Reyes National Seashore) and State Parks land management policies. Highway 1 is currently eligible for scenic highway status..

Residents in the area greatly value the unrushed and rural lifestyle of their communities. For many coastal residents along the route, Highway 1 in Marin County is the only transportation connection to the rest of California and constitutes their economic lifeline and access to emergency services. The stunning natural beauty of the landscape has also made this section of Highway 1 a popular destination corridor for outdoor enthusiasts of all types. The Highway 1 corridor serves both as a basic means of transportation and a source of multimodal recreation; therefore, roadway design and management must comprehensively consider and account for a variety of user needs and values.

The geographic context and proximity to the Pacific Ocean means Highway 1 is subject to serious damage from winter storms and earthquakes. Depending on the extent of roadway damage, effects can range from mere traveling inconveniences to full closures to prevent the loss of property or lives. The Loma Prieta earthquake on October 17, 1989, caused significant damage along Highway 1 in Marin County south of Stinson Beach. This portion of Highway 1 was closed for several months following the earthquake due to landslides. Approximately 50 repair projects resulted from the 1998 El Niño events, and nearly a dozen resulted from the 2005 to 2006 rainy season. Despite these repairs, Highway 1 remains constantly vulnerable to natural disasters, climate change, and yearly storm events.

The regional geology of the coastline is controlled by a series of northwest-to-southeast-trending hills and valleys that comprise the Coast Ranges Geomorphic Province. This province extends from the coastline of the Pacific Ocean to the western edge of the Great Valley to the east and is characterized by a series of northwesterly trending ridges, faults, and intermountain valleys formed by compressional tectonic forces.

The geology of the Marin County coastline generally consists of rock of the Franciscan Formation. This formation consists of sedimentary rocks that include greywacke sandstone, shale (siltstone), conglomerate, limestone, and chert, along with volcanic and metamorphic units. Generally, rock of this formation is considered weak and weathers quickly to clayey soil. The Franciscan Formation is known for extensive deep-seated earth flows and landslides and is considered highly susceptible to erosion due to heavy rainfall and wave action generated from winter storms.

Highway 1 is located within the seismically unique and complex active San Andreas strike-slip fault complex. This fault system forms the boundary between the American Plate and the Pacific Plate. Movement along these faults, characterized as strike-slip, causes the plates to grind against each other. The entire length of Highway 1 in Marin County is expected to experience strong ground motion and possible surface rupture at specific locations during a large seismic event on the San Andreas or one of its subsidiaries. Several major earthquakes have occurred in the Bay Area since 1800.

Protecting against impacts to the geographical, geological, biological, visual, cultural, and archeological resources along Highway 1 can constrain and often delay its maintenance and repair. Historically, repair and maintenance projects have been challenging and usually take longer than similar projects in inland portions of the Caltrans system.

In addition to its unique natural features, Highway 1 is distinguished by its political boundaries. Most of Highway 1 falls within the California Coastal Zone, where specific policies govern development in an effort to protect the access, qualities, and resources of the California coast.

3.2 Guiding Authorities

3.2.1 National Park Service and State Parks Policies

NPS and State Parks have extensive policies that direct management and use of their lands. These policies span natural resource protection, transportation, recreational

uses, and protection of their viewsheds. They affect activities in and adjacent to NPS and State Parks lands. Highway 1 traverses numerous parks in the southern and central portion of Marin County, particularly in Segments 2-12, as indicated in the Landscape Units Location Map and Existing Conditions table in Appendix A. A selection of State Parks policies is presented in the following subsections and should be considered when projects occur adjacent to or may affect these lands.

3.2.1.1 STATE PARKS POLICY

State Parks policies relating to Highway 1 include the following:

- **Department Operations Manual (DOM), State Parks (0304:2.3).** The purpose of State Parks shall be to preserve outstanding natural, scenic, and cultural values; indigenous aquatic and terrestrial fauna and flora; and the most significant and representative examples of ecological regions.
- **DOM, Scenic Values and Viewshed (0312.2).** The principal objective in the management of scenic areas is preservation of the quality of the visual environment. More specific objectives in scenic resource management should include the following:
 - Identify and protect scenic resources and qualities
 - Avoid or minimize modifications to scenic resources
 - Remove intrusive human-made elements that are not significant cultural resources, including intrusive light and noise
 - Where modifications of scenic resources are necessary, design attractive structures, subordinate to the character of their surroundings and that appear to belong to their setting, in sympathy with the sense of place
 - Locate structures in the background as much as possible, isolated from primary views
 - Use visually harmonious materials, colors, textures, and scale that blend into and are subordinate to their landscapes background
 - Unify structures on the site with a consistent style of architecture and materials

Protection of scenic resources goes beyond State Parks boundaries. Development outside of the park boundary that is out of scale with its surroundings, with contrasting colors or reflective surfaces, or poorly sited, can impact views from within the park.

3.2.1.2 NATIONAL PARK SERVICE POLICY

NPS policies relating to Highway 1 include the following:

National Park Service Director's Order 87D (2004, Section 3)

Congress has emphasized the importance of constructing and reconstructing the federal aid highway system to bring the system's roads up to standards and to increase the safety of the system and has authorized the Secretary of Transportation to appropriate federal lands for highway purposes. Congress has also established, in Section 4(f) of the Department of Transportation (DOT) Act of 1969 (23 United States Code [U.S.C.] 138), a national policy that "special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

In support of this policy, Section 4(f) prohibits the Secretary of Transportation from approving "any program or project which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance..., or any land from an historic site of national, State, or local significance...unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use."

NPS Management Policies 2006 and Director's Order 87D were written to be consistent with the language included in DOT Act regulations under Section 4(f). NPS will work closely with federal and state DOTs when new highways, roads, or expansions of existing road corridors that may affect NPS lands are proposed. In accordance with 23 U.S.C. 138 and the Organic Act, the NPS will object to any proposal to route a state or local road through national parklands or to increase the size of a right-of-way for an existing road unless the NPS first determines (or concurs with a DOT determination of) and that the action is not contrary to the public interest or inconsistent with the purposes for which the park was established and will not cause health and safety risks to visitors or park staff.

Section 4(f) applies to projects that require the use of NPS and State Parks lands for transportation purposes and an approval from the Federal Highway Administration (FHWA) (Caltrans) is required to proceed. FHWA administers provisions of Section 4(f) on projects or programs related to roadways under this provision of law for the Secretary of Transportation.

When DOTs at the federal, state, and local levels study the need for new roads or the improvement of existing roads, they occasionally identify an alternative route that would use NPS lands. When this happens, it becomes necessary for the U.S. Department of the Interior (DOI), usually through NPS, to concur with the DOT's findings pursuant to Section 4(f) of the DOT Act that (a) there is no feasible and prudent alternative and (b) all possible planning to minimize harm to the park has taken place. In most cases, DOI relies on the NPS to draft its response to DOT's Section 4(f) findings. However, it should be understood that DOI retains actual concurrence authority.

***National Park Service Management Policies 2006, Section 9.2 –
Transportation Systems and Alternative Transportation***

NPS will work closely with the federal and state DOTs when new highways, roads, or expansions of existing road corridors that may impact NPS lands are proposed. In accordance with 23 U.S.C. 138 and the Organic Act, NPS will object to any proposal to route a state or local road through NPS lands, or to increase the size of a right-of-way for an existing road, unless NPS first determines (or concurs with a DOT determination) the following:

- No feasible and prudent alternative exists.
- All possible planning to minimize and mitigate harm to the park has taken place.
- It will not be contrary to the public interest or inconsistent with the purposes for which the park was established.
- It will not cause health and safety risks to visitors or park staff.
- It will conform to NPS standards and practices for road design, engineering, and construction.
- In making these determinations, NPS will take into account the factors listed in Section 9.2 (listed below).

- Responsibility for future maintenance—meeting NPS standards—must be identified before NPS approval of a proposal (see Section 9.2.1.2.2, Construction and Expansion Proposals, of the National Park Service Management Policies).

NPS will also advocate corridor crossings for terrestrial and aquatic wildlife and other accommodations to promote biodiversity and avoid or mitigate (1) harm to individual animals, (2) the fragmentation of plant and animal habitats, and (3) the disruption of natural systems.

Before a decision is made to design, construct, expand, or upgrade access to or within a park, non-construction alternatives—such as distributing visitors to alternative locations—must be fully explored. If non-construction alternatives will not achieve satisfactory results, then a development solution should consider whether the project:

- Is appropriate and necessary to meet park management needs or to provide for visitor use and enjoyment
- Is designed with extreme care and sensitivity to the landscape through which it passes
- Will not cause unacceptable impacts on natural and cultural resources and will minimize or mitigate those impacts that cannot be avoided
- Will reduce traffic congestion, noise, air pollution, and adverse effects on park resources and values
- Will not cause use in the areas it serves to exceed the areas' visitor carrying capacities
- Will incorporate the principles of energy conservation and sustainability
- Is able to demonstrate financial and operational sustainability
- Will incorporate universal design principles to provide for accessibility for all people, including those with disabilities
- Will take maximum advantage of interpretive opportunities and scenic values
- Will not violate federal, state, or local air pollution control plans or regulations

- Is based on a comprehensive and multidisciplinary approach that is fully consistent with the park’s general management plan and asset management plan
- Will enhance the visitor experience by offering new or improved interpretive or recreational opportunities, by simplifying travel within the park, or by making it easier or safer to see park features

National Park Service Organic Act of 1916

The NPS Organic Act of 1916 states that “[NPS] shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified...by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (16 U.S.C. 1).

For additional information on the Organic Act, see the *Golden Gate National Recreation Area/Muir Woods National Monument General Management Plan/Final Environmental Impact Statement* (NPS 2014).

3.2.2 Coastal Zone Management Act

The U.S. Congress passed the Coastal Zone Management Act (CZMA) of 1972 to preserve, protect, develop, and (where possible) restore or enhance the resources of the nation’s coastal zone. Additionally, Congress intended to encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and esthetic values, as well as the needs for compatible economic development.

For all of the California Coast, except the San Francisco Bay, the CCC is responsible for implementing the CZMA. The CCC is responsible for reviewing proposed federal and federally authorized activities to assess their consistency with the approved state coastal management program.

The CCC’s federal consistency authority applies to activities that are undertaken, funded, or permitted by federal agencies or if they occur on federal lands. Such activities, whether or not they occur inside or outside of the coastal zone, are subject to the federal consistency CZMA provisions if they have the potential to affect

resources in the coastal zone. During such reviews, the CCC determines whether the proposed activities are consistent with the policies of the Coastal Act and may refer to certified Local Coastal Program policies as guidance for determining such consistency.

3.2.3 California Coastal Act

The resource protection policies and planning processes underpinning the Coastal Act were established by voter initiative in 1972 (Proposition 20) and later adopted by the California Legislature through the Coastal Act of 1976. The law is administered by the CCC and is the backbone of the State's federally approved coastal management program. The CCC issues coastal development permits; reviews federal activities affecting the Coastal Zone; reviews local coastal programs; educates the public; and works with local governments and other agencies to protect a number of coastal resources, including public beach access, wetlands, sensitive habitats, agricultural lands, water quality, scenic vistas, and coastal tourism. The CCC's jurisdiction extends to all areas within the Coastal Zone, which includes approximately 1.5 million acres of coastal land extending from Oregon to Mexico. The Coastal Zone's western boundary begins 3 miles at sea and extends inland to varying degrees that range from a few blocks to several miles. Much of Highway 1 falls within the Coastal Zone. Projects within the Coastal Zone that include activities not specifically excluded by the Coastal Act are subject to regulatory review by the CCC or, where the CCC has certified a Local Coastal Program, by the local government implementing that program. A large proportion of Caltrans' projects that are subject to local government review for necessary Coastal Development Permits are also appealable to the CCC.

Several Coastal Act policies apply specifically to Highway 1, including, but not limited to the following:

- **Public Resources Code (PRC) Section 30251:** "The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas."
- **PRC Section 30254:** "it is the intent of the (California) Legislature that State Highway 1 in rural areas of the Coastal Zone remain a scenic two-lane highway."

- **PRC Section 30240:** “Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.”
- **PRC Section 30610:** “no coastal development permit shall be required pursuant to this chapter for... (d) Repair or maintenance activities that do not result in an addition to, or enlargement or expansion of, the object of those repair or maintenance activities; provided, however, that if the commission determines that certain extraordinary methods of repair and maintenance involve a risk of substantial adverse environmental impact, it shall, by regulation, require that a permit be obtained pursuant to this chapter.”

The permit exclusion described above (PRC 30610) applies to a number of activities covered in the CCC’s regulations. Local governments can also request that these exclusions be included in their LCPs, as certified by the CCC.

So long as there is no risk of causing substantial adverse impacts on public access, environmentally sensitive habitat areas, wetlands, or public views to the ocean and there is no expansion of the roadway facility, no permit is required for repair and maintenance of existing public roads, including landscaping; signalization; lighting; signing; resurfacing; installing or expanding retaining walls, safety barriers, and railings; and other comparable development within the existing right-of-way, as specified in Section 13252 of the regulations (14 California Code of Regulations 13252[a][3][B]). Designers are encouraged to contact the District’s Coastal Liaison to determine the applicability of the exclusion.

Maintenance activities are generally those necessary to preserve the highway facility as it was constructed, including constructing temporary detours; removing slides and slip outs; restoring and repairing drainage appurtenances; installing slope protection devices; installing minor drainage facilities for preservation of the roadway or adjacent properties; restoring, repairing, and modifying bridges and other highway structures for public safety; and restoring pavement and base to original condition by replacement, resurfacing, or pavement grooving. A permit is required for excavation or disposal of fill outside of the roadway prism.

The following Caltrans maintenance and alteration programs (or their equivalent conducted by local road departments) *that do not result in an addition to or enlargement or expansion of the existing public road facility itself* (emphasis added) do not require a permit except as noted:

- Flexible Roadbed Program
- Rigid Roadbed Program
- Roadside Maintenance Program
- Roadway Litter and Debris Program
- Vegetation Control Program
- Pavement Delineation Program
- Sign Program
- Electrical Program
- Traffic Safety Devices Program
- Public Service Facility Program (except that a permit is required for construction of new facilities)
- Landscape Program
- Bridge and Pump Maintenance Program
- Tubes, Tunnel, and Ferry Maintenance Program
- Bridge Painting Program
- Miscellaneous safety projects, provided there is not expansion in the roadway or number of traffic lanes
- Major damage maintenance, repair, and restoration
- Comparable minor alterations

Appendix B, Coastal Act Repair Maintenance Exclusions, provides a full description of the activities listed previously.

3.2.4 Local Coastal Programs

LCPs are the local governments' planning guidelines for coastal development and, once approved by the CCC, provide cities and counties with the authority to issue Coastal Development Permits, with defined appeal authority resting with the CCC. The CCC retains the primary permit jurisdiction for tidelands, submerged lands, and public trust lands. An LCP must be consistent with Coastal Act policies and allows local governments to specify further actions and policies for their own regional setting. Marin County's LCP includes a Land Use Plan (LUP)—which prescribes land use classifications, types, and densities of allowable development, goals, and policies surrounding development—and an Implementation Plan, primarily zoning ordinances, that provides for the LUP's implementation. Marin County reviews projects and issues Coastal Development Permits, based on its LCP, in areas within the Coastal Zone occurring outside of the CCC's primary jurisdiction.

Marin County adopted its LCP in two segments in 1981 and 1982. Major revisions have not occurred until recently. Marin County recently conducted a comprehensive review of its LUP and, after a series of public meetings and outreach efforts, the Marin County Board of Supervisors adopted the Draft LUP and Development Code Amendments in July 2013; these were certified by the CCC in May 2014. Some of the policies in the LUP affect work on Highway 1 and inform the efforts of the Guidelines Working Group. At the time of the publishing of these Guidelines, the County continues to consider a companion Implementation Plan that, upon certification, will also apply to projects requiring coastal permits. It should be noted that Marin County policy for highways in rural areas, such as West Marin, is to include Caltrans Class II shoulder standards, which is a minimum of 4-foot-wide shoulders; however a policy prescribing 4-foot-wide shoulders is not part of the certified LCP and is not the standard of review for projects in the Coastal Zone. The following are Marin County LCP policies particularly relevant to Highway 1:

- **C-TR-1, Roads in the Coastal Zone:** “Limit roads in the Coastal Zone to two lanes. Work with State and federal agencies and local communities to enhance road safety, improve pedestrian, bicycle, and transit access, and stabilize or reduce congestion through means such as limiting local parking, creating a multipurpose path from West Marin to the City-Centered Corridor, and providing shuttle service to popular destinations. Shoulder widening for bicycles, turn lanes

at intersections, turnouts for slow-moving traffic or at scenic vistas, traffic calming measures, and similar improvements are permitted provided that such improvements are consistent with the coastal resource protection policies of the LCP. However, projects will not be undertaken to increase the motorized vehicular capacity of these roads” (Marin County Community Development Agency 2014).

- **C-TR-2, Scenic Quality of Highway 1:** “Ensure that Highway 1 shall remain a scenic two-lane roadway throughout Marin’s Coastal Zone. Maintain the existing narrow, twisty two-lane roadway that successfully complements the rugged, open character unique to the coastal area from the southern boundary of Marin’s Coastal Zone northward to the Bolinas Lagoon. Ensure that improvements shall not, either individually or cumulatively, detract from the rural scenic characteristics of the highway throughout the Coastal Zone, shall minimize encroachment into parklands to the maximum extent feasible, and shall be limited to improvements necessary for the continued use of the highway: slope stabilization, drainage control, and minor safety improvements such as guardrail placement, signing, etc.; expansion of shoulder paving to accommodate bicycle or pedestrian traffic; creation of slow traffic and vista turnouts, as a safety and convenience improvement; and other minor improvements necessary to adequately accommodate public transit. Avoid incursions and other adverse impacts in ESHAs [Environmentally Sensitive Habitat Areas] and their buffers. These improvements shall limit the site alterations to the minimum amount necessary to carry out the project and minimize environmental impacts and incorporate related compensatory visual or landform restorations where feasible.” (Marin County Community Development Agency 2014).
- **C-TR-3 Impacts to Highway One from Sea Level Rise.** “Consult with Caltrans to protect access to the coast and to minimize impacts of sea level rise on Highway 1. Identify areas that will regularly be inundated by the ocean or are at risk of periodic inundation from storm surge and sea level rise. 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 (see also Environmental Hazards Program CEH-22.a: Research and Respond to the Impacts of Sea Level Rise on Marin County's Coastal Zone).”

- **C-DES-2, Design Protection of Visual Resources:** “Ensure Appropriate Siting and Design of structures to protect significant views, including views both to and along the coast as seen from public viewing areas and waters used for recreational purposes. The intent of this policy is the protection of significant public views rather than coastal views from private residential areas by requiring development to be screened with appropriate landscaping provided that, when mature, the landscaping will not interfere with public views to and along the coast. The use of drought-tolerant, native coastal plant species is encouraged. Road and driveway construction, grading, and utility extensions will be kept to a minimum, except that longer road and driveway extensions may be necessary in highly visible areas to avoid or minimize other impacts.” (Marin County Community Development Agency 2014).

3.2.5 California Coastal Trail

The California Coastal Trail (CCT) is a product of multiple regulations and state and federal policies, including the following:

- The Coastal Act, which calls for protecting and providing maximum public access to the shoreline, including such measures as a statewide coastal trail system (PRC Section 30220-30224).
- Section 31408 of the State Coastal Conservancy Act of 1976 (PRC Section 31000 et al.), which calls for the California Coastal Conservancy (Conservancy) to have a principal role in the implementation of a coastal trail.
- State and federal designation of the CCT as California’s Millennium Legacy Trail in 1999.
- Senate Bill (SB) 908, passed into law in 2001, which requires the completion of the CCT.
- Assembly Bill (AB) 1396, passed into law in 2007, directing the Conservancy to coordinate development of the CCT with Caltrans, State Parks, and the CCC. Under this bill, Caltrans is responsible for notifying the Conservancy quarterly, as well as other specified agencies, regarding excess property suitable for the CCT. In addition, the law requires that provisions for the CCT be included in regional transportation plans and that, to the extent feasible, state agencies with property interests or regulatory authority along the coast cooperate in planning and making

lands available for the completion of the trail, including constructing trail links, placing signs, and management.

The CCT is envisioned to be a continuous, interconnected, braided public trail system along the California coastline. The CCT may take the form of an informal footpath, paved sidewalk, separated bicycle path, or, where no other alternative exists, may connect along the shoulder of the roadway, on either an interim or a permanent basis.

While primarily for pedestrians, the CCT is intended to accommodate a variety of users, including bicyclists, wheelchair users, equestrians, and other complementary forms of non-motorized transportation.

3.2.6 Additional Permitting, Concurrences, and Authorizations

In addition to the policies and restrictions unique to the Coastal Zone, Highway 1 repairs in Marin County are subject to regulations that apply to all project activities in California in general. Depending on the scope of the damage, the location, and the necessary response, Caltrans may be required to obtain permits, concurrences, or authorizations from the following: California Department of Fish and Wildlife (CDFW), the California Regional Water Quality Control Board, State Parks, the U.S. Army Corps of Engineers (USACE), the U.S. Fish and Wildlife Service (FWS), NPS (GGNRA and Point Reyes National Seashore), the State Lands Commission, the Gulf of Farallones National Marine Sanctuary, or the National Oceanic and Atmospheric Administration. Each of these agencies examines Caltrans' efforts through a different lens and policy, adding another layer of complexity to the regulatory matrix that applies to any Highway 1 repair project.

For damage repair projects adjacent to NPS or State Parks lands, or other areas of exceptional scenic quality, including the Coastal Zone, Caltrans should consult with the affected land manager as early in the planning process as possible, before preliminary design/at project scoping and at approximately the 30, 60, and 90 percent design review process to ensure that all feasible measures to avoid and minimize harm are incorporated, that public lands resources are considered in the project development process, and that resources are adequately protected. In addition, designers are encouraged to seek engagement with agencies throughout the project development process. This collaboration and early coordination will need to be managed to keep the project on schedule.

Numerous federal and state permitting and environmental planning requirements may pertain to projects along Highway 1 in Marin County. For a comprehensive list

and description of these requirements, please refer to the state environmental reference site assessable online at <http://www.dot.ca.gov/ser/voll/voll.htm>. An overview of those requirements that are frequently triggered in repair projects along this corridor follows.

3.2.6.1 MOVING AHEAD FOR PROGRESS IN THE 21ST CENTURY ACT (2012)

The Moving Ahead for Progress in the 21st Century Act (P.L. 112-141) funded surface transportation programs and directs the policy and programmatic framework for investments to guide the growth and development of the national transportation system. As the overarching transportation act in place at this time, it informs all processes of agencies under the federal DOT, including environmental compliance.

3.2.6.2 NATIONAL ENVIRONMENTAL POLICY ACT (1969)

Projects are subject to the National Environmental Policy Act (NEPA) when the action includes projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies. When Caltrans road projects are federally funded, Caltrans, under authority delegated to it by FHWA, must complete a NEPA evaluation of the effects of the project on the human environment (comprising economic, social, and environmental impacts). As part of NEPA compliance, the federal agency must comply also with all federal laws under the NEPA “umbrella,” including the National Historic Preservation Act, the federal Endangered Species Act, and Section 4(f).

As a federal agency, NPS also completes NEPA for actions within its purview. The Council on Environmental Quality recommends that federal agencies work cooperatively to complete NEPA evaluations. Although decisions need to be rendered separately by the agencies, consistency and efficiency can be gained by combining the NEPA evaluation.

NEPA implementation regulations differ by federal agency. FHWA follows Title 23 *Code of Federal Regulations* (CFR) Part 771 (Environmental Impact and Related Procedures), and NPS follows Directors Order 12. Three classes of actions prescribe the level of documentation required in the NEPA process, which are Categorical Exclusions, Environmental Assessments, and Environmental Impact Statements.

3.2.6.3 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The purpose of the California Environmental Quality Act (CEQA) is to maintain a quality environment for the people of California by giving the people responsibility for engaging in the environmental review process. CEQA applies to governmental

action, which may involve (1) activities directly undertaken by a governmental agency, (2) activities financed in whole or in part by a governmental agency, or (3) private activities that require approval from a governmental agency. Any California agency with discretionary approval (the “lead agency”) over such an action that has the potential to affect the physical environment (a “project”) must complete a CEQA determination that is subject to public scrutiny before granting approval.

The agency or project proponent must prepare an environmental document that describes the project and assesses its projected impacts. An agency will normally take up to three separate steps in deciding which document to prepare for a project subject to CEQA. First, the lead agency examines the project to determine whether the project is subject to CEQA at all. For example, certain classes of project enumerated in the CEQA guidelines are categorically exempt. If the project is exempt, the process does not need to proceed any further.

If the project is not exempt, the lead agency takes the second step and conducts an Initial Study, a systematic examination of various environmental resources in the project area, to determine whether the project may have a significant effect on the environment. If the Initial Study shows no substantial evidence that the project may cause a substantial adverse change in the environment (a “significant effect”), the lead agency prepares a Negative Declaration or Mitigated Negative Declaration, as applicable.

If the Initial Study shows that the project may have a significant effect, the lead agency takes the third step and prepares an Environmental Impact Report (EIR). An EIR is prepared when the public agency finds substantial evidence that the project may have a significant effect on the environment. An EIR may also be prepared without an Initial Study if the existence of substantial evidence is not in question.

The environmental document is circulated to responsible agencies and the public. The agency or project proponent must provide reasoned, good-faith responses to these comments, and, if necessary, amend the document or scope of the project based on these responses. For any impact found to be significant, an EIR must propose mitigation. If the agency decides to approve a project with significant impacts for which mitigation is found to be infeasible, it must publish its findings and a Statement of Overriding Considerations. It is worth noting that much of the information developed in NEPA/CEQA evaluations is relied upon for meeting necessary filing requirements for Coastal Development Permits or CCC Federal Consistency actions;

therefore, it is a good practice to include Coastal Act and LCP Policy requirements in the scoping of any environmental document.

3.2.6.4 CLEAN WATER ACT OF 1977 AND 1987

The purpose of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of waters through prevention and elimination of pollution. It applies to any discharge of a pollutant into waters of the U.S.

Section 401: Section 401 of the CWA requires a water quality certification from the State Board or Regional Board when a project (1) requires a federal license or permit (a Section 404 permit is the most common federal permit for Caltrans projects) and (2) will result in a discharge to waters of the U.S. Such certification may be conditioned. Project activities that typically result in a discharge subject to Section 401 water quality certification are the construction and subsequent operation of a facility.

The State Water Resources Control Board revised State regulations (23 California Code of Regulations § 3830-3869) for the 401 Water Quality Certification Program before it went into effect on June 24, 2000. The likelihood of a passive waiver has been reduced by the revised regulations

Section 402: This section of the CWA establishes a permitting system for the discharge of any pollutant (except dredge or fill material) into waters of the U.S. A National Pollutant Discharge Elimination System (NPDES) permit is required for all point discharges of pollutants to surface waters. A point source is a discernible, confined, and discrete conveyance, such as a pipe, ditch, or channel. Permits (NPDES permit) for all other discharges are obtained from U.S. Environmental Protection Agency or appropriate State agency, which in most cases is the appropriate Regional Water Quality Control Board (Section 402).

Section 404: Section 404 of the CWA establishes a permit program administered by USACE, regulating the discharge of dredged or fill material into waters of the U.S. (including wetlands). The Section 404(b)(1) guidelines allow the discharge of dredged or fill material into the aquatic system only if there is no practicable alternative that would have less adverse impacts. This coordination is conducted through consultation with USACE.

3.2.6.5 ENDANGERED SPECIES ACT OF 1973 (16 U.S.C. 1531-1543)

This act and subsequent amendments provides guidance for the conservation of endangered and threatened species and the ecosystems upon which they depend.

Section 7: This section requires federal agencies, in consultation with, and with the assistance of, the Secretary of the Interior or the Secretary of Commerce, as appropriate, to ensure that the actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. FWS and National Marine Fisheries Service (NMFS) share responsibilities for administering the Act. Regulations governing interagency cooperation under Section 7 are found at 50 CFR Part 402. The opinion issued at the conclusion of consultation will include a statement that authorizes take that may occur incidental to an otherwise legal activity. Section 7 allows for incidental take of a listed species for activities funded or carried out by federal agencies if the take is incidental to, and not the purpose of, an otherwise lawful activity (economic development, land, or water use activities).

Section 9: This section lists those actions that are prohibited under the Endangered Species Act. Take of a listed species in accordance with the Act is prohibited. Two processes (Section 7 and Section 10) allow take when it is incidental to an otherwise legal activity.

Section 10: Section 10 provides a means whereby a non-federal action with a potential to result in the take of a listed species could be allowed under an incidental take permit. Application procedures are found at 50 CFR Parts 13 and 17 for species under the jurisdiction of FWS and 50 CFR Parts 217, 220, and 222 for species under the jurisdiction of NMFS. Specifically, Section 10(a)(1)(B) permits the incidental take of a federally listed species by private interests and non-federal government agencies if the take is incidental to, and not the purpose of, an otherwise lawful activity and is accompanied by a Habitat Conservation Plan. Also, Section 10(a)(1)(A) allows take for scientific research purposes or to enhance the propagation and survival of the species.

3.2.6.6 CALIFORNIA ENDANGERED SPECIES ACT (FISH AND GAME CODE § 2050 ET SEQ.)

The California Endangered Species Act (CESA) establishes the policy of the state to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that state agencies should not approve projects that would

jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy.

No state agency consultation procedures are provided under CESA; however, projects that might result in a “take” of a state-listed species require a permit from CDFW. For projects that affect both a state- and federal-listed species, compliance with the federal Endangered Species Act may satisfy CESA if CDFW determines that the federal incidental take authorization is “consistent” with CESA under Fish and Game Code § 2080.1. For projects that will result in a “take” of a state-only listed species, Caltrans must apply for an incidental take permit under Fish and Game Code § 2081(b).

3.2.6.7 FISH PASSAGE AND WILDLIFE ACCOMMODATIONS

With the passage of California SB 857 in 2005, Article 3.5 of Chapter 1 of Division 1 of the Streets and Highways Code was amended to indicate that Caltrans must provide for the unimpeded passage for anadromous fish. Damage repair projects that include existing stream or river crossings must incorporate into the design the remediation of existing conditions that impede fish passage. Designers and PDTs should work with the Caltrans District Fish Passage Coordinator to review fish barrier locations. Resource information is available online at <http://www.calfish.org/>. In addition, any new facilities must facilitate the movement of anadromous fish. Design guidance can be found in the Caltrans (2007b) publication *Fish Passage Design for Road Crossings* at <http://www.dot.ca.gov/hq/oppd/fishPassage/index.htm>.

Repair projects will include, where appropriate, safe crossings for terrestrial and aquatic wildlife and other accommodations to promote biodiversity and avoid or mitigate harm to individual animals, the fragmentation of plant and animal habitats, and the disruption of natural systems.

3.2.6.8 CALIFORNIA STATE CONCURRENT RESOLUTION 17 – RELATIVE TO OAK WOODLANDS (1989)

This resolution requires that state agencies undertake in the performance of their duties to preserve and protect native oak trees to the greatest degree feasible or provide for replacement plantings where Blue, Engleman, Valley, or Coast live oak trees are removed. Oak woodlands, for this purpose, are defined as a 5-acre circular area containing five or more oak trees per acre.

3.2.7 Caltrans Standards and Directives

Additionally, many internal Caltrans standards and guidance will apply to these projects. An overview of these follows.

3.2.7.1 DESIGN STANDARDS

Caltrans designs roadways in accordance with the HDM. For example, the HDM calls for new construction to have a 40-foot-wide roadway section (width), consisting of two 12-foot-wide lanes (one in each direction) with 8-foot-wide paved shoulders on conventional highways. A design exception is required for any project intending to install a section that is less than 40 feet wide. However, there are many good reasons to seek out a narrower roadway section. These include unacceptable impacts to archaeological resources, sensitive or listed biological resources, and visual resources, as well as topographical and right-of-way constraints, excessive costs, context sensitivity, and regulatory policy. In addition to the standards noted previously, many more have been developed to provide mobility and safety for all users. For additional current standards, see Caltrans Design Information Bulletin (DIB) #79-03 at <http://www.dot.ca.gov/hq/oppd/dib/dib79-03.pdf> (Caltrans 2007a). This bulletin, currently in its third edition, contains the standards for most damage repair projects. These standards need to be read in combination with a variety of other guidance, policies, Deputy Directives, etc., such as those discussed further as follows.

3.2.8 Context-Sensitive Solutions

In November 2001, Caltrans adopted a policy, Director's Policy 22, stating that all approaches toward planning, designing, constructing, maintaining, and operating the Caltrans system should look for "Context-Sensitive Solutions." This means that transportation decision making should be inclusive, considering and integrating aesthetic, historic, and environmental values into the process of project delivery. The policy recognizes that highways are more than just the paved roadway—they are corridors that support communities' economic, aesthetic, cultural, and social needs. The Context-Sensitive Solutions policy asks staff to reach resolutions through a collaborative interdisciplinary approach involving all stakeholders. Staff should coordinate within NPS and State Parks staff for projects bordering these park lands. See the map and Existing Conditions table in Appendix A for federal and state parks adjacent to Highway 1 in Marin County. The County of Marin and the CCC should be included for projects in, or affecting the resources of, the Coastal Zone.

3.2.9 Complete Streets Policy

In October 2008, Caltrans strengthened Deputy Directive 64 (DD-64-R1), which requires Caltrans to consider and account for multimodal travel. This “Complete Streets” policy requires that all manuals, guidance, and training be updated to ensure that all facets of Caltrans activity include the consideration of bicycle, pedestrian, and transit modes. The Caltrans HDM has recently been revised to address and fully incorporate the Complete Streets policy.

3.2.10 Main Street: Flexibility in Design and Operations

The *Main Street, California A Guide for Improving Community and Transportation Vitality* booklet (Caltrans 2013) is a compilation of suggestions that can enhance established traffic engineering and design practices in the implementation of DD-64-R1. Although the ideas and practices in this report do not supersede existing Caltrans’ manuals, the suggestions support existing multimodal policies and standards, offering stakeholder engagement and traffic-calming practices for projects focused on main streets in communities. The booklet is available for download at http://www.dot.ca.gov/hq/LandArch/mainstreet/main_street_3rd_edition.pdf.

3.2.11 Climate Change Policy

On June 22, 2012, Caltrans issued Director’s Policy 30 (DP-30) on Climate Change. DP-30 directs the coordination of climate change mitigation and adaptation across all Caltrans programs, to include design and construction of transportation infrastructure, support of climate change-related research, ensuring that adequate resources are allocated toward project-level climate change-related studies, and further development, coordination, and implementation of Caltrans Climate Change policy.

Chapter 4 Process

4.1 Process for Major Damage Repairs

Caltrans District 4 Maintenance is responsible for providing documentation to secure funding for major damage repairs. This documentation requires input from a wide range of functional units, including, but not limited to, the following:

- Geotechnical Design
- Civil “Roadway”
- Landscape Architecture
- Environmental
- Structures
- Materials
- Hydraulics
- Right-of-Way
- Traffic
- Construction

A Caltrans Director’s Order is necessary for capital projects to perform emergency damage repairs. A Director’s Order is a formal document, signed by the Director’s Office or delegated to a Deputy Director, that grants authority to a district to accelerate a project award and sets aside the standard project advertising, bidding, and award processes. Director’s Orders are critical to Caltrans’ ability to respond effectively and quickly to emergencies on the state highway system.

The typical approach for most major damage sites is a standard two-step process consisting of two projects. The first project is an emergency opening (EO) project, such as debris removal, asphalt concrete pavement leveling, or setting up traffic control to restore essential transportation functions. The second project is a permanent restoration project for the full repairs.

EOs are repairs made during and immediately following a major damage event to restore essential traffic, minimize the extent of damage, and/or protect the remaining facilities. Typically, permanent restorations are repairs performed after emergency repairs have been completed to restore the highway to its pre-disaster operating condition.

There are instances when EO and permanent restoration projects are performed concurrently. If this is the case, the Guidelines herein would also apply to the project. The EO response is immediate and design investigations begin immediately as well, leading up to an accelerated design effort. These guidelines apply to these projects where the permanent restoration is done concurrently with the emergency opening. EO-only efforts are directed by the Division of Maintenance and should use these guidelines as a reference for best practices.

4.1.1 Project Development for Storm Damage Projects

Most permanent restoration projects and replacement projects use the normal design-bid-build process, following the guidelines in the *Project Development Procedures Manual* for a normal bid with plans, specifications, and an engineer's estimate. A Damage Assessment Form serves as the Project Approval document for some straightforward projects. For more complex projects, a Project Report is required. The District Maintenance Engineer will coordinate with Design and Headquarters programming to make this determination.

All projects must comply with state and federal regulations intended to protect the public and environment from damage or impacts. Response to events that have been declared a disaster by the state or federal government, or in which a state of emergency has been declared, may have some or all of these regulations suspended for a short period of time. It is during this time that EO projects typically are executed.

The following is an overview of the permanent restoration project development process:

- 1) Performing a field assessment.
- 2) Conducting a preliminary consultation with staff of agencies with permitting authority over the project. As part of this consultation, participants will determine what additional review may be desirable before and during Caltrans' 30, 60, and 90 percent design review processes.
- 3) Ensuring that preliminary design is based on the HDM, the parameters of this document, and other constraints identified by field assessment team, including the following:

- a. Forming a PDT—The project will be refined based on functional group guidance, and the design exceptions will be considered based on project context and impacts through preparation of a Design Exception Fact Sheet. Fulfilling the policy objectives listed in Chapter 3, and their underlying mandates, should be a high priority in guiding the design process.
 - b. Maintaining current roadway geometry, where feasible, while providing for safe multimodal travel should guide design rather than achieving a greater design speed, as discussed in the Design Speed subsection of Section 5.2.1, Roadway.
 - c. Considering how the various design parameters of Chapter 5 can be synthesized to best fulfill policy objectives and inform the overall design.¹
- 4) Ensuring environmental compliance, including the development and preparation of the NEPA and CEQA document as needed, incorporating alternative design analysis and other information needed for any required coastal development permits, 4(f) coordination, or other agency approvals. This task requires continued coordination with relevant permitting agencies. Additional or revised design exceptions may need to be prepared as part of this planning process. Depending on the level of environmental document, it may require public involvement activities.
 - 5) See also Section 5.2 for additional considerations when projects are in or adjacent to NPS or State Parks lands, or within the Coastal Zone.
 - 6) Securing environmental permits.² Permitting may involve appearance before an approval authority and a public involvement process.

¹ For example, relative to the roadway geometrics and lane/shoulder widths, while 12-foot lanes might provide safe truck turning, one or both shoulders could be designed to be more narrow where appropriate to minimize the overall roadway/structure width, or vice versa (designing a more narrow travel lane and increasing the width of the shoulder[s]). Where there are overall roadway width constraints and the topography (hills) heighten safety concerns for uphill cyclists, consideration should be given to designing 4-foot shoulders for a cyclist-climbing lane, with a more narrow shoulder in the opposite downhill direction.

² A coastal permit may be required, as discussed in Chapter 3. Depending on the scope/location of the damage and the necessary repair response, Caltrans may also be required to obtain permits, concurrences, or authorizations from the following: CDFW, the California Regional Water Quality Control Board, State Parks, USACE, FWS, GGNRA, State Lands Commission, the Gulf of Farallones National Marine Sanctuary, or the National Oceanic and Atmospheric Administration. Each of these agencies examines Caltrans' efforts through a different lens of policy requirements, adding another layer of complexity to the regulatory matrix that applies to any Highway 1 repair project.

- 7) Finalizing project design, satisfying permit conditions, and obtaining right-of-way clearances.
- 8) Sending project construction plans out to bid.
- 9) Performing post-construction activities, such as revegetation monitoring and reporting and implementing mitigation commitments.

For additional information on Major Damage or Director's Order Projects refer to the Division of Maintenance Website (<http://onramp.dot.ca.gov/hq/maint/orway/ha23>).

4.1.2 Federal Funding

EO and permanent restoration projects are eligible for federal funding reimbursement when there is a declared disaster. Projects are eligible for reimbursement for two federal fiscal years after the storm event. The funding source is first-come/first-served. Projects developed quickly are more likely to receive federal transportation dollars. Projects that are not able to meet the time constraints of the federal program are likely to be funded from the State Highway Operations and Protection Program account under the Major Damage Restoration category. The greater percentage of federal dollars captured to fund the Major Damage Restoration category frees up the State Highway Operations and Protection Program state-only funding for lower-priority programming categories, such as the Stormwater Mitigation Program or the Roadside Protection and Restoration Program.

Chapter 5 Design Guidelines

The design guidelines herein apply to the Highway 1 coastal corridor in Marin County. These Guidelines are intended to improve consistency in design and aesthetic considerations along Highway 1 in Marin County. Projects should minimize change in order to protect the rural character of Highway 1, stay within the existing right-of-way, be visually compatible with the surrounding environment, and maintain safety and functionality of all design elements. Chapter 80 of the HDM calls for a balanced solution to transportation problems. The HDM Topic 109, Scenic Values in Planning and Design (see Appendix C), states that the location of the highway, its alignment and profile, the roadway cross section, and other features should all be in harmony with the setting. These guidelines provide additional factors to be considered in achieving that goal. In particular, they provide greater specificity to assist in achieving successful context sensitive designs through appropriate HDM exceptions. All staff involved in the design of a damage repair project in a coastal environment should review Chapter 5 in its entirety.

Consultation with Marin County and the CCC is encouraged for projects requiring coastal development permits, as is early notification to other applicable permitting agencies. Projects within, adjacent to, or visible from NPS or State Parks lands, especially public viewing areas, should include early coordination with NPS or State Parks to obtain their input and recommendations. This consultation should include all design elements. The project development team should meet early with the Environmental generalist for coordination with partners.

5.1 Overview of Recommendations

Per DIB 79-03, major repair projects can restore the highway to the condition that existed prior to the damage; however, consideration of appropriate highway improvements is part of the project development process. Restoration projects that necessitate physical changes to the roadside environment involving a structure—such as retaining walls, bridges, or viaducts—shall, in accordance with the HDM and exception process, strive to maintain the existing character of roadway and minimize the roadway geometric features to achieve appropriate, context-sensitive design standards consistent with resource preservation. These design features include width, horizontal and vertical alignment, superelevation, and stopping sight distance. The exact features that constitute final design should be based on a sound engineering analysis that considers the context of the specific project location and the avoidance

of adverse impacts. Projects that are considered replacement facilities are expected to bring the roadway geometric features to minimum design standards. However, as indicated in Topics 81 and 109 of the HDM (Appendix C), designers are required to consider potential impacts on sensitive resources and scenic values. Projects with the potential to result in unacceptable adverse impacts to coastal resources should be reevaluated to consider nonstandard design options to avoid or reduce such impacts. Note that there is value in staying within the existing right-of-way and road bench width, retaining existing curvature of Highway 1 that has a more natural fit to the landscape, and in limiting driving speeds, as they are important to the user's experience and part of the character of the roadway.

To achieve these objectives, designers might have to deviate from design standards. For example, it may not be possible to accommodate very large trucks or higher design speeds. Highway 1 in Marin County has been designated a California Legal Kingpin-to-Rear-Axle (KPR) Advisory Route with a KPR of 30 feet. Repair projects are not intended to increase this KPR number. Maintaining the current roadway curvature and using lower design speeds (see the Design Speeds subsection in Section 5.2.1) should accommodate the California KPR Advisory Vehicle while minimizing impacts to adjacent resources. Note that there will be situations where accommodating the Advisory Vehicle will have a greater adverse impact than benefits. These situations need to be evaluated carefully. If it is not reasonable to meet the design standards, exceptions need to be documented according to procedures in the *Project Development Procedures Manual*.

Projects that would typically be required to bring the Highway 1 facility up to current design standards shall have an approved Design Exception Fact Sheet where they need to deviate from HDM standards. This Highway 1 Repair Guidelines document can be cited as ancillary documentation in these Fact Sheets; however, the approval for these Fact Sheets is reliant on impacts to specific resources on a project-by-project basis. Careful attention should be given to designing projects to be consistent with Marin County LCP and Coastal Act policies for all projects along Highway 1 within the Coastal Zone. Similarly, projects in or adjacent to National and State Park lands, or that may affect the scenic qualities of NPS or State Parks lands, should be consistent with park plans and management policies.

A summary of recommended design features where different from the HDM/DIB 79-03 standards (a Fact Sheet is still required as cited previously unless otherwise noted) includes the following:

- **Travelled-Way Width:** As a starting place in the design process, 12 feet is the preferred travelled-way width, with 11 feet (or less) acceptable in developed areas and under other circumstances (consistent with NPS Management Policy 9.2.1.2.2, 11-foot lanes, or replacement of existing lesser-width lanes, should also be considered in the highly scenic and resource-constrained areas of the Coastal Zone when the project is in or adjacent to, or may affect scenic qualities of, NPS or State Parks lands and/or other areas of exceptional scenic quality, where truck templates or other tools indicate that the design vehicle can stay within its lane per Index 404.2(1)(b) of the HDM).
- **Shoulder Width:** A 4-foot-wide shoulder is the recommended shoulder width in rural areas. See Travel Lanes and Shoulders subsection in Section 5.2.1 Roadway, for discussion of factors to consider when determining appropriate deviations from this recommendation that would result in wider or narrower shoulders. Narrower shoulders help in preserving the rural character of the roadway. Consideration of wider shoulders may be appropriate where vertical elements such as metal beam guardrail (MBGR) or bridge rail are present or are proposed for extended lengths. These elements limit the ability for bicyclists to use the full width of the shoulder. In addition, narrower shoulders may be appropriate in some downhill sections where bicycle traffic has the opportunity to use the full lane width or where wider shoulders would individually or cumulatively adversely affect sensitive or scenic coastal resources and to avoid development outside of the right-of-way.
- **Roadway Alignment:** Realignment of curves is not normally warranted and should be minimized. In general, realignment of curves should only be considered when there is a demonstrated crash history. When needed, they should be consistent with Marin County Local Coastal Plan policies, particularly C-TR-1 and C-TR-2 (see Section 3.2.4 of these guidelines), and the Coastal Act as well as NPS and State Parks management policies.
- **Superelevation:** Use of the American Association of State Highway and Transportation Officials (AASHTO) standards as guidance is acceptable.

For repair projects, the PDT should be aware that there are usually many interested stakeholders who need to be involved in the project development process, consistent with the Context-Sensitive Solutions policy.

The PDT also should note that there are many good reasons to seek out a narrower roadway section. These include potential significant impacts to archaeological resources, sensitive or listed biological resources, and visual resources, as well as topographical and right-of-way constraints, excessive costs, context sensitivity, and regulatory policy.

In general, the consistent use of MBGR is expected to be employed when such a vehicular barrier is necessary; additional potential barrier types that may need to be considered for certain circumstances are discussed in Appendix D, Barrier Selection.

See Table 5-1 for summary of all Highway 1 design recommendations.

Table 5-1 Design Recommendations



Design Element	Recommendation	Comments
<p>Roadway Geometrics</p> 	<p>The character of the existing horizontal and vertical alignment should be generally maintained. Design speed should be commensurate: 25 to 40 miles per hour (mph) or less is acceptable in rural mountainous, rolling, or flat areas and 25 mph or less is acceptable in developed areas.</p>	<p>Where alterations may be warranted, primarily because of a demonstrated crash history, any necessary new alignment should avoid and mitigate resource impacts and be carefully fitted and blended in with the existing topography. Repair projects should consider alternatives that provide for staying within the existing roadway bench and right-of-way. Encroachments into NPS or State Parks lands should be avoided.</p>
<p>Lane Width</p> 	<p>Preserving the existing, scenic two-lane character of Highway 1 is the primary goal; less than 12-foot lane widths may be considered.</p>	<p>HDM Index 301.1 calls for a 12-foot-wide lane. Lane width in villages can be 11 feet. However, narrower than 12-foot lanes should be considered if negative project impacts can be reduced, the design vehicle can be accommodated, the character of the roadway can be preserved, and sight distance is adequate. See Section 5.2.1 of these Guidelines.</p>

Table 5-1 Design Recommendations




Design Element	Recommendation	Comments
<p>Shoulder Width – Rural Locations</p> 	<p>4-foot (or less) paved shoulder width. Considerations include avoiding negative project impacts that would be significant under applicable resource protection policies and accommodating cyclists according to project-specific topography and context.</p>	<p>HDM Table 307.2 calls for an 8-foot shoulder width for new two-lane, two-way roadways where the average daily traffic (ADT) is greater than 400. However, a 4-foot (or less) shoulder width can be used to promote the rural character of the roadway, provide space for multimodal users, and reduce visual impacts caused by the full geometric cross section and should be considered in sensitive areas. See Section 5.2.1 for more information.</p>
<p>Paved Shoulder Width within Villages</p> 	<p>5-foot shoulder width where no parking exists; 13-foot shoulder width where parking exists.</p>	<p>The 5- or 13-foot shoulder width can be provided in villages to accommodate bicyclists. Pedestrians should be accommodated on sidewalks or paths. Seek out stakeholder involvement when working in villages to ensure consistency with Marin County Local Coastal Program and village plans.</p>
<p>Parking, Pullouts, Unpaved Shoulders, and Turnouts</p> 	<p>No net loss of parking, pullouts, or turnouts. Paving beyond the 4-foot-wide shoulder should be limited. Non-pavement treatments should be used where feasible. Other roadway use or development of the area beyond the shoulder should be minimized and fit in with the natural environment.</p>	<p>Any pullouts removed should be replaced so as to provide equivalent or better service. Any opportunities to add parking, pullouts, or turnouts should be considered, especially where there is an identified need and where consistent with the Marin County LCP.</p>

Table 5-1 Design Recommendations




Design Element	Recommendation	Comments
<p>Bridge Barriers and Railing</p> 	<p>Bridge railings should be see-through type, to allow maximum views and consider all multimodal users. Designers should ensure that the railing height and rail opening widths meet current minimum design standards for both bicyclists and pedestrians where appropriate. Need to consider wider shoulders next to bridge rail and extended runs of guardrail.</p>	<p>See-through types of railings are used to allow viewers visual access to the unique scenic qualities of the crossing. Bicycle and pedestrian railings added to a bridge rail can be highly visible and special attention should be given to the aesthetics of these railings.</p>
<p>Railing</p> 	<p>MBGR is the preferred railing type where railing is required. Wood posts and matte finish on railing should be used where feasible.</p>	<p>MBGR is a consistent and familiar feature along the Highway 1 corridor. It provides transparency, context sensitivity, and is cost effective. See Appendix D of these Guidelines for other railing types that may be considered in certain circumstances. Continuity in railing type is important to avoid visual intrusion caused by dissimilar roadside features.</p>
<p>End Treatments</p> 	<p>Where practical, see-through concrete barriers and railings should be terminated with a buried end-section. If not feasible, an in-line end-section should be used.</p>	<p>Buried end-sections and in-line end-sections minimize visual impacts. Design solutions that avoid the need for crash cushions that would cause visual intrusion are encouraged.</p>

Table 5-1 Design Recommendations




Design Element	Recommendation	Comments
<p>Non-safety Fencing</p> 	<p>Where fencing is required along Highway 1, it generally should be wire or timber with timber posts, however, other fence types should be installed where they are more typical and appropriate for the adjacent land use.</p>	<p>Wire and timber are common features along Highway 1 and in rural and agricultural settings. Chain-link fence should be avoided. Before replacing a stand-alone fence, consider its purpose/need and alternatives. In general, do not add non-safety fencing unless it serves to promote, and is consistent with policies of, the Marin County LCP.</p>
<p>Slope Stabilization</p> 	<p>Nonstructural options should be considered first, then, where not feasible, other options which can be revegetated with native plants are preferred.</p>	<p>Nonstructural options are less visually disruptive than retaining walls. Solutions that can be vegetated with locally appropriate native palette of plants to blend in with the surrounding environment are preferred. Revegetated areas should be maintained to be free of priority weed species. See Section 5.2.4, vegetation in NPS/State Parks areas.</p>
<p>Retaining Wall – Timber Lagging Walls</p> 	<p>Timber lagging, with earth tone staining on concrete and metal features, is typically used for retaining walls required below the roadway. The wall should be installed below grade to the maximum extent feasible. Burying the retaining wall should be considered when feasible to minimize visual impacts. If guardrail is not likely to be required, consider reducing the unpaved area between pavement edge and front of wall to 3 feet. Communicate with Traffic Safety for these issues.</p>	<p>Timber lagging is visually appropriate for both rural and marine settings. Coat the concrete and metal features to blend into the setting and reduce glare. Dark-brown paint (Federal Standard 595 Color #30051) should be used. Stain should also be dark brown. Wall aesthetic uniformity is important to minimize cumulative visual impacts caused by inconsistency.</p>

Table 5-1 Design Recommendations





Design Element	Recommendation	Comments
<p>Buried Walls</p> 	<p>Retaining walls should be buried, if feasible, and should be revegetated with appropriate native plants.</p>	<p>Resulting slope should be evaluated to determine whether guardrail is required per Chapter 7 of the Traffic Manual. If guardrail is not required or anticipated, consider reducing the unpaved area between the edge of pavement and the front of any necessary retaining wall to a 3-foot width. Communicate with Traffic Safety for these issues</p> <p>Any choice between uphill or downhill retaining wall structures should favor that with the least environmental and scenic damage.</p>
<p>Retaining Wall – Carved and Stained Rock Walls</p> 	<p>Soil nail walls with shotcrete are typically used for walls above the roadway. Stain and carve shotcrete to mimic local natural rock outcroppings. Eliminate paved ditch and maintenance railing where feasible. Stain all appurtenances to match the wall, including concrete barriers, concrete ditches, cable railing, and drainage pipes. The wall should be installed below grade to the maximum extent feasible.</p>	<p>Carved rock walls blend into the natural environment. Staining of the concrete and metal features blend into the setting and reduce glare. Wall aesthetic uniformity is important to minimize cumulative visual impacts caused by inconsistency. Attention to aesthetic detail on these walls goes beyond color and texture. Vertical alignment should be adjusted to resemble natural rock formations. The wall face should have a batter to mimic a natural slope aspect. See Section 5.2.4.</p>
<p>Retaining Wall – Uphill walls in GGNRA boundary</p> 	<p>Uphill walls should be avoided whenever feasible. Generally, walls within the GGNRA boundary should be as simple as possible with a smooth concrete surface. Soil nail walls will need forms to achieve a smooth surface. This should be considered early in the project scope and when determining the wall layout. The wall should be installed below grade to the maximum extent feasible. Alternative fall protection above the wall with tie off cables anchored at grade should be considered.</p>	<p>Wall aesthetic uniformity is important to minimize cumulative visual impacts caused by inconsistency.</p> <p>Contact the District Landscape Architect for all aesthetic recommendations.</p>

Table 5-1 Design Recommendations

Design Element	Recommendation	Comments
<p>Drainage Features</p> 	<p>Drainage pipes should be hidden from view where feasible. Pipes that cannot be hidden should be colored with earth-tone coating to conceal them. Concrete drainage features should be colored to match adjacent earth tones. Drainage rock used as dissipators should be colored earth tone to reduce visual impacts. Inlets should be sited outside of where bicyclists are most likely to ride, if feasible, and shall use bicycle-proof grates.</p>	<p>Drainage features should be camouflaged to the extent feasible. Drainage features can be highly reflective and visually intrusive if left uncovered, uncolored or unmaintained.</p> <p>Drainage features will be designed to ensure that they do not contribute to erosion and sedimentation where they discharge.</p>

5.2 Design Considerations

When repair projects are in, or immediately adjacent to NPS or State Parks lands, or within the Coastal Zone, designers will engage these stakeholders early in the project development process. The following are design considerations when projects lie within these areas. Additionally, potential effects to the public views from parklands or to the habitat corridors connected to the parklands caused by repair projects outside or not directly adjacent to NPS or State Parks lands also should receive careful consideration, with an eye toward avoiding and mitigating any negative impacts, including change to the existing rural roadway road character. Severely constrained cases include those where Highway 1 roadwork would encroach onto NPS or State Parks lands, or where changes to the roadway geometry would individually or cumulatively detract from the rural scenic characteristics of Highway 1 and would cause negative impacts to sensitive coastal resources within the Coastal Zone. These considerations will also be weighed in combination with the need to provide safe and appropriate public access for all modes of travel. Consultation with NPS, State Parks, Marin County, and CCC staff and following these Guidelines can assist Caltrans in

identifying project alternatives and design features to minimize impacts. In addition to the considerations presented as follows, Park Road Standards (NPS 1984) is also a valuable resource. Note that guidance in this document does not replace the guidance in the HDM but offers additional perspective on designing Highway 1 through NPS and State Parks lands and other areas of exceptional scenic quality. Highway 1 through, and adjacent to, NPS and State Parks land in Marin County serves both as the major transportation in the area, as well as a park road. A park road should be fundamentally designed to maintain an overall continuing sense of intimacy with the countryside or area through which it passes (NPS 1984). These considerations have been developed with the purpose of balancing these needs and are intended to provide flexibility to create a balanced transportation system.

Consistent with the context-sensitive flexibility allowed in the HDM, the following considerations apply when projects would encroach onto or are adjacent to NPS or State Parks lands, or where changes to the roadway geometry would individually or cumulatively impact park resources or detract from the rural scenic characteristics of Highway 1 or would cause negative impacts to sensitive coastal resources within the Coastal Zone. The same measures should also be considered as potential strategies for achieving consistency with Coastal Act and Marin Local Coastal Program policies and goals (as generally noted in Chapter 3 of these guidelines) for projects within the Coastal Zone.³

- 1) The roadway cross section, alignment, and all appurtenant features should generally stay within the state right-of-way and specifically not encroach into NPS or State Parks lands.
- 2) Realignment of curves is not normally warranted should be minimized. When needed, curve realignments should be consistent with Marin County Local Coastal Plan policies, particularly C-TR-1 and C-TR-2. See Section 3.2.4 of these guidelines and the Coastal Act as well as NPS and State Parks management

³ Note that the Legislature declared in the passage of the Coastal Act at Section 30001 (a) “that the California coastal zone is a distinct and valuable natural resource of vital and enduring interest to all the people and exists as a delicately balanced ecosystem” and (b) “that the permanent protection of the state’s natural and scenic resources is a paramount concern to present and future residents of the state and nation.” Also, refer to other related policies of the Coastal Act in Chapter 3 of these guidelines.

- policies when the project is adjacent to those park lands. In general, realignment of curves should only be considered when there is a demonstrated crash history.⁴
- 3) The width of the roadway may be less than the HDM recommended width. If so, the following considerations are applicable:
 - a. Lane widths should accommodate the design vehicle, and sight distance should be adequate. This feature needs a careful evaluation to balance resource protection and maintaining the rural character of the roadway with accommodating all users. Other related issues will be grade, shoulder transitions, and context of the highway.
 - b. Shoulders should accommodate non-motorized traffic; however, in highly scenic and severely constrained conditions where the recommended shoulders are not attainable without negatively affecting natural and cultural resources, shoulders less than 4 feet wide can be considered, and the shoulder widths on each side of the highway may be different. Determinations regarding shoulder widths for accommodating cyclists in specific projects shall consider strategic needs within the corridor. For example, the distribution of available shoulder width should consider grade and the presence of vertical elements in the direction of bicycle traffic, as well as sight distance and the Clear Recovery Zone. In general, if shoulders cannot be provided along both edges of Highway 1 without resource impacts, consider placing more shoulder width along the uphill edge to accommodate slower bicycle traffic and less along the downhill edge. Turnouts (as recommended per Index 204.5[4] of the HDM and in desirable locations for all modes of users) are another option that should be considered as part of the design process.
 - 4) Retaining walls should be buried, if feasible, to maintain the rural character of the highway; they also should be revegetated with appropriate native plants⁵ to remove this manmade structural component of Highway 1 from the viewshed.
 - a. The resulting slope should be evaluated to determine whether guardrail is required per Chapter 7 of the Traffic Manual.

⁴ This consideration should include an evaluation of whether there is any indication that the existing roadway geometry, unsafe driving practices, or other exigencies actually factored into the cause of the crash(es). The results of this evaluation must factor into any decision about whether the roadway alignment or curvature actually need to be changed.

⁵See Section 5.2.5.

- b. If guardrail is not required or anticipated, consider reducing the unpaved area between the edge of pavement and the front of any necessary retaining wall to a 3-foot width. Communicate with Traffic Safety for these issues. Note that per Revised Standard Plan A77N3, a Midwest guardrail system typically requires a 4-foot width. See Chapter 7 of the Traffic Manual for additional safety system design guidance and alternatives. The slope of unpaved area should be 10:1 or flatter.
- 5) A cable railing per Index 210.6 of the HDM may be required. Note that this railing is an Occupational Safety and Health Administration (OSHA) requirement; however, such a railing can raise scenic resource protection concerns. Alternative systems that would not rely on a permanent cable railing should be carefully considered on a case-by-case basis. Maintenance should concur to an alternate system that meets the OSHA requirement.
- 6) Any paving beyond a 4-foot-wide (or less) shoulder should be for parking, pullouts, turnouts, drainage, or other facilities only and shall be limited, consistent with the resource protection goals to protect the rural character of the highway, natural landforms and sensitive resources. Alternatives to paving roadside drainage ditches (and gutters) should be evaluated. District Hydraulics can assist with this evaluation.
- 7) Non-pavement treatments should be used, particularly where this may assist treatment and infiltration of stormwater runoff. Other roadway use or development of the area beyond the paved shoulder (e.g., for a pathway, shoulder backing, drainage ditch) shall be minimized and should fit in with the natural environment.
- 8) Roadside gutters should remain unpaved wherever feasible and should be designed to avoid erosion and sedimentation and sensitive resources. Alternative surface treatments of paved gutters should be considered to reduce visual impacts. In all cases, gutter treatment should consider maintenance needs and the potential for non-motorized use.
- 9) Culverts and other infrastructure should be designed to avoid erosion and sedimentation and designed and maintained to minimize visual impacts. Culvert outfalls should be carefully designed to prevent erosion and sedimentation. Existing drainage facilities should be evaluated and projects designed to address any deficiencies as feasible within the new project. Downstream impacts will be

avoided and minimized; consider mitigation for unavoidable impacts resulting from the concentration of water.

- 10) See the Drainage subsection in Section 5.2.5 for further discussion of these considerations.

Detailed description of design considerations for Highway 1 in Marin County follow.

5.2.1 Roadway

DESIGN SPEEDS

The HDM defines design speed as “a speed selected to establish specific minimum geometric design elements for a particular section of highway.” These design elements include vertical and horizontal alignment and sight distance. Although Table 101.2 in the HDM defines the standard design speed for conventional highways in rural, flat terrain as 55 to 70 mph, in rolling terrain as 50 to 60 mph, and in mountainous terrain as 40 to 50 mph, several additional factors must be considered in the final selection of an appropriate design speed.

Many factors influence the choice of design speed, including the terrain, environmental impacts, type and anticipated volume of traffic, functional classification of the highway, and whether the area is rural or urban. Scenic values are also a consideration in the selection of a design speed.

In addition, the selected design speed should be consistent with the speeds that are likely to be expected on a given highway facility. Drivers adjust their speed based on their perception of the physical limitations of the highway and its traffic. Where a reason for limiting speed is obvious to approaching drivers, they are more apt to accept a lower design speed than where there is no apparent reason for it.

As outlined in Topic 81 of the HDM, it is not always feasible or appropriate—either from a physical or an environmental standpoint—to bring the roadway up to minimum standards defined in the HDM; therefore, technical reductions in design speeds are required. For Highway 1 in Marin County, the design speeds listed in Table 101.2 are often significantly above the posted speed limits or above what a driver will achieve or expect to achieve and therefore need to be lowered. Designers should aim to retain the natural curvature of Highway 1 as this will protect the character of the highway, calm traffic, enhance the recreational experience, and minimize impacts to adjacent coastal resources. Design improvements along Highway

1 that will protect the existing character and sensitive resources should be considered through all practical means, including lower design speeds.

As noted, HDM design speeds can be adjusted to be lower, especially where there are tight curves. A design speed of 25 to 40 mph (or less) may be acceptable in rural mountainous, rolling, or flat areas, and 25 mph (or less) is generally acceptable in developed village areas. The chosen design speeds for a project should generally reflect current safe and appropriate speeds for the existing highway geometry.

POSTED SPEEDS

Posted speed limits, or speed zones, are set based on the 85th percentile speed of free-flowing traffic. This posted speed may be reduced by 5 mph where engineering study indicates the need for a reduction in speed based on collision records, roadside development, and other conditions not readily apparent to the driver. The District Traffic Safety Engineer should be consulted for assistance with this procedure.

Advisory speeds are used to advise motorists of changes in conditions, including roadway horizontal alignment and sight distance. These are determined based on site conditions and are below the posted speed limit.

Appendix A shows speed zones along Highway 1 but does not differentiate between posted speeds and advisory speeds. There are several different speed zones, dependent on the roadway conditions and location. While the predominant posted speed may be 55 mph, the advisory speed or speed zone is lower where the sight distance is restricted by steep grades or tight horizontal curves. In these areas, design exceptions are often required due to the limited right-of-way and restrictive existing conditions. Some segments may not have been subject to a speed study and are therefore shown as being the default 55 mph. As part of a repair project, especially on a curved section of Highway 1, performing a speed study and posting or adjusting an advisory speed sign, should be considered.

Marin County can be categorized into several segments based on similar landscape unit types, which are listed below. Appendix A, Landscape Units and Existing Conditions, describes the landscape units in greater detail, as well as the existing posted and advisory speeds for each segment. This appendix also highlights the areas adjacent to NPS and State Parks lands.

Towns: Several sections of Highway 1 in Marin County pass through small rural towns with driveways that serve commercial and residential areas along Highway 1.

These sections have a higher percentage of bicycle and pedestrian traffic. These sections typically have posted speeds of 25 to 35 mph and relatively level grades (less than 4 percent).

In these sections, lower design speeds may be deemed appropriate to provide for the needs of both non-motorized and motorized modes of transportation. Wider pavement sections with appropriate striping should be considered to accommodate bicyclists and pedestrians, with a minimum of 5-foot-wide shoulders where parking is not present and 13-foot-wide shoulders where parking is allowed.

Coastal Bluff, Marine Terrace, Coastal Canyon, Estuary, and Bay Front: These landscape units typically are characterized by winding roadways with steep hillsides along Highway 1. Speed zones and advisory speeds in these sections vary, with some areas 35 mph or less, because the roadway geometrics require motorists to travel more slowly to navigate the existing curves and grades. Right-of-way typically is limited in these sections.

Forested: There are sections along Highway 1 with eucalyptus, cypress, oak, and pine groves. The roadway in these sections is typically winding with rolling grades up to 7 percent or more. Speed zones are typically 35 to 55 mph, with existing advisory speed locations due to the existing horizontal and vertical curve alignment. Travel lane and shoulder-width requirements may change or reduce in size while still accommodating the needs of the traveling public in these sections. Right-of-way may be limited in these areas.

Agricultural/Pasture: Typically, the agricultural sections have level grades, with grasslands and open farmlands along Highway 1. Speed zones for these sections are typically 30 to 55 mph, with some advisory speed locations at horizontal curves with limited sight distance. These sections require special consideration when choosing an appropriate travel lane and shoulder width, barrier type, and when evaluating existing horizontal and vertical curves. Marin County LCP policies regarding agricultural lands should be taken into account when designing highway projects. A narrower cross section may or may not be appropriate in these areas, but all potential resource impacts should be evaluated to assist in that determination.

HORIZONTAL AND VERTICAL ALIGNMENT

The existing horizontal and vertical alignment of Highway 1 is a key factor that defines its distinctive character, along with user expectations. This character is defined in the context of Highway 1 segments noted previously. For example,

Highway 1 in the coastal bluff and coastal canyon sections is characterized by having rolling grades and a winding roadway, while Highway 1 along a marine terrace has a straighter, more level alignment. Meeting the users' expectations is a basic design concept that should be strived for in all cases; therefore, comprehensive improvements that significantly alter the character of Highway 1 and thus change the users' expectations and recreational experience are not normally justified, warranted, or desirable. Minor adjustments to the roadway alignment, which could, for example, remove a broken back curve or provide the necessary superelevation transitions between reversing curves, can often be included on a case-by-case basis. In general, however, realignment of curves should only be considered when there is a demonstrated crash history. Impacts to coastal resources should also be a part of this consideration. The decision to include or not include any roadway improvement needs to factor in the existing alignment and other basic geometric features such as width, sight distance, or the presence/absence of a turn lane; the context of the Highway 1 facility; the crash history of the area; the possible need for traffic calming features; and the crash potential, both before and after the proposed improvements. In cases where overriding issues call for a realignment of Highway 1, the alignment should be carefully fitted and blended in with the topography in such a manner as to address any safety concerns, as well as fit the character of Highway 1 in light of the surrounding landscape and sensitive resources.

SIGHT DISTANCE, SUPERELEVATION, AND HORIZONTAL AND VERTICAL CURVES

Commensurate with the chosen design speed, the alignment should provide stopping sight distance. This is a basic design standard that should be strived for in all circumstances.

An alignment that provides a high degree of drivability is attained when the horizontal alignment and superelevation are consistent with the design speed, and there is sufficient tangent length to attain the superelevation runoff shown in Topic 202 of the HDM. For low-speed facilities, the superelevation rates shown in Table 202.2 could be reduced without sacrificing safety or drivability. The AASHTO publication *A Policy of Geometric Design of Highways and Streets* (AASHTO 2011) provides guidance on superelevation and speed and may provide additional insights for achieving acceptable project design. Note that a Fact Sheet will be required for nonstandard design.

The guidelines for vertical curves in Index 204.4 of the HDM provide for highway geometry commensurate with the design speed. In addition, vertical curves that

restrict sight distance below standard should be considered for upgrading. Nonstandard stopping sight distance will require a Fact Sheet.

Consideration of whether to modify curvature based on a demonstrated crash history should also include an evaluation of whether there is any indication that the existing roadway geometry or other factors actually contributed to the cause of the crash(es). The results of this evaluation must factor into any decision about whether the roadway alignment actually needs to be changed. Lower design speeds should be evaluated as a means to calm traffic and as an alternate to changing a current alignment. Beyond this, any further consideration of any roadway adjustment should only be made to the extent that it is necessary for the design vehicle to stay within the lane, and keeping in balance the potential benefits with the potential adverse impacts given the context of the facility.

TRAVEL LANES AND SHOULDERS

The HDM establishes a standard roadway section for a new two-lane undivided roadway to be two 12-foot-wide lanes and two 8-foot-wide shoulders. However, for resurfacing, restoration, and rehabilitation projects (also known as 3R), geometric standards for paved shoulder widths may vary depending on traffic volumes and the width of existing shoulders. The ADT for Highway 1 varies from 1,250 to 17,400 vehicles. Per DIB 79-03, all segments of Highway 1 in Marin County require at least 4-foot-wide (ADT of 1,001 to 3,000) or 8-foot-wide (ADT more than 3,001) shoulders based on the ADT for Highway 1. However, site-specific conditions may also call for further modification of these widths through design exceptions, and additional considerations as noted herein, for projects within the Coastal Zone or within or adjacent to National and State Park lands.

Due to the highly scenic and sensitive environment of Highway 1 through Marin County, as well as the existing narrow (often 22-foot-wide) roadbed, with a few exceptions, a 40-foot roadway may not be considered to be appropriate. In some areas, the travel lane width should be 12 feet unless the Highway 1 facility can be considered a “Main Street” facility with a speed of 40 mph or less, in which case 11 feet would be appropriate. In addition, consider whether the roadwork would encroach onto or impact sensitive resources within or adjacent to NPS or State Parks lands, or whether the project is within the Coastal Zone. Under these conditions, and in consultation with affected land manager, consider whether the travel lane width can be reduced to 11 feet (or less), while also factoring in design vehicle considerations and other non-motorized users as noted herein. Additional adjustments

to lane widths may be needed in tight curves, to address site distance constraints, or to avoid significant impacts.

Per DIB 79-03, EO and permanent restoration projects not involving a structure can be constructed to preexisting conditions. However, consideration of providing alternative lane width as discussed previously and increasing shoulder width to provide additional clear recovery room and room for bicyclists, pedestrians, and equestrians is generally encouraged if there are no substantial individual or cumulative coastal resource impacts. Generally, a minimum 4-foot-wide paved shoulder for projects along Highway 1 in Marin County is recommended. However, in highly scenic and severely constrained conditions where the recommended shoulders are not appropriate, shoulders less than 4 feet wide can be considered, and the shoulder widths on each side of the highway may be different. Other deviations include segments of Highway 1 with a high traffic volume and/or segments with a high prevailing speed, along with segments within commercial or town sections, or where a pullout is being repaired or replaced.

Highway 1 serves as the “Main Street” for many small villages in Marin County. Often, a wider roadway section, which includes parallel parking for businesses and residences, bike lanes, and sidewalks, may be the most appropriate and user-friendly solution. Village sections have a higher percentage of bicycle and pedestrian traffic than the more rural sections of Highway 1 and should be given special consideration. In these sections, the recommended 4-foot-wide shoulder without parking and 5-foot-wide paved shoulder plus additional shoulder width for parking to accommodate bicycles is recommended. In general, a separate pedestrian way should be provided next to the paved shoulder, which would be for bicyclists. Where parking is present, a shoulder width of 12 to 13 feet is appropriate. However, perpendicular and diagonal parking are not recommended, and the use of Highway 1 for this purpose is discouraged. Given the various conditions currently existing in villages (e.g., locations vary as to having curbs, parallel parking, no parking, informal off-road parking, sidewalks, etc.), a site-specific solution should be derived based on coordination with local officials and in conformance with the Marin County LCP and applicable village plan(s). See DIB 82-05 for Americans with Disabilities Act requirements and accommodations.

PDTs should consider narrower lanes and shoulder widths when their projects would cause negative impacts, either individually or cumulatively, to sensitive resources within the Coastal Zone.

The location of shoulder-width reductions or tapers back to the existing shoulder width should consider the visibility of bicyclists to motorized traffic. Shoulders on flat or ascending grades should have width reductions where sight distance is not significantly restricted by crest vertical or horizontal curves. This allows bicyclists to transition from the shoulder to the lane in full view of motorized traffic. This provision is less of a concern in downgrades where bicyclists are expected to use the full lane width.

Any new project on Highway 1 in Marin County should carefully consider the most appropriate roadway for the specific project site. Additional planning factors are discussed as follows.

BICYCLE AND PEDESTRIAN FACILITIES

Bicyclists and pedestrians are frequent users of Highway 1, but off-road separated facilities or standard bicycle lanes are not feasible for most of Highway 1 in Marin County within the existing right-of-way. All options for accommodating cyclists and pedestrians in a context-sensitive manner should be considered, with an eye toward including cycling improvements where the needs and opportunities are the greatest, while at the same time not detracting from the rural scenic characteristics of Highway 1 or causing other negative impacts to sensitive resources within the National/State Park Lands or the Coastal Zone. Bicyclist-appropriate railings, at the minimum allowable height, should be considered on barriers, walls, and bridges.

In some locations, it may be appropriate to increase the paved shoulder width, such as where with poor line of sight, vertical elements such as MBGR or bridge rail are present or proposed for extended lengths because these elements limit the ability of bicyclists to use the full width of the shoulder. Shoulders wider or narrower than 4 feet in a rural environment should also be based on sensitivity of adjacent land, severely constrained conditions where narrower or wider shoulders would be appropriate given the actual or expected volume of bicycle and pedestrian traffic using the shoulder for mobility, taking into account site-specific topography and particular user needs from a corridor perspective.

PEDESTRIAN AND BICYCLE CROSSINGS

Repair projects should consider the need for safe crossings of Highway 1, such as where a trail crosses Highway 1 at or near a repair location. Elements such as signage, crosswalks, or other safety improvements should be incorporated into repair design as appropriate.

CALIFORNIA COASTAL TRAIL

Caltrans is supportive of the CCT, and designers should consider the alignment of the CCT when designing damage repair solutions. Repair projects should be designed such that they address any trail considerations that may fall within a project limit and do not preclude future development of the trail. Information on the alignment of the CCT is available on CCC's Web site at: <http://www.coastal.ca.gov/access/ctrail-access.html> and, more specifically, on Map 25 of the Marin County LCP.

Contributing to links in the CCT within a project's limits is a potential strategy for mitigating unavoidable project impacts to public coastal access and should be considered for feasibility.

Pedestrians and bicyclists should be accommodated in all projects in some manner unless comparable and adequate accommodations already exist. Specific pedestrian facilities should be incorporated into projects on a case-by-case basis.

PARKING, PULLOUTS, AND TURNOUTS

Vehicles frequently park or pull over on the shoulders and off of the travel lanes along Highway 1 to observe the scenic vistas. It is important to consider surface treatment, safety, and potential blockage of bicycle access when considering accommodating parking or pullouts on the shoulder. Sight distance and other safety issues should be considered when creating new parking and pullout locations. Any new pullouts or parking areas should be consistent with the Marin County LCP. Consultation with NPS or State Parks is necessary regarding the addition, retention, or removal of any parking, pullout, or turnouts when within those jurisdictions.

Existing paved and unpaved pullouts have been inventoried and are characterized in Appendix E, Pullout Log. Existing pullouts should be preserved when feasible. If projects warrant the removal of an existing pullout, it should be replaced in an appropriate location so there is no net reduction in the number of pullouts.

5.2.2 Bridges

Bridge width, the design of the bridge, and selection of the barrier and railing type for the structure should be such that they complement the existing surroundings. Stakeholder involvement should be part of any bridge replacement project.

BRIDGE BARRIERS AND RAILING

Each bridge is unique and, as such, the bridge barrier/railing should be determined on a case-by-case basis. The selected railing type should consider the safety of motorists, bicyclists, and pedestrians, while also being visually compatible with the surrounding

landscape. Guidance is provided in *Bridge Rails and Barriers: A Reference Guide for Transportation Projects in the Coastal Zone*. Caltrans is committed to using railing on the coast that minimizes visual impacts. Following is a list of barrier/railing options, along with some benefits and disadvantages to consider when selecting a railing for use along Highway 1. Designers should ensure that the railing height and rail opening widths meet current design standards for both bicyclists and pedestrians where appropriate.

5.2.3 Guardrail, Railing, End Treatment, and Fences

Roadside safety devices, such as guardrail and metal or concrete railing, are common features along the Highway 1 corridor. Following is a brief description of railing types to be considered along the Highway 1 corridor.

Fencing is also a common feature within the Highway 1 corridor along many of the agricultural and recreational areas. Depending on the location, fencing may be privately or publicly installed and maintained.

RAILING

Caltrans is committed to using railings that minimize visual impacts along the coast. There are several types of Caltrans standard railings that can be considered for use along Highway 1 depending on the location and design speed of the roadway. This subsection provides a description of these standard railings. Additional railing types should also be considered, such as those described in *Bridge Rails and Barriers: A Reference Guide for Transportation Projects in the Coastal Zone*.

Designers should carefully consider the safety of all users and the compatibility with the surrounding environment when selecting a railing type. Designers should ensure that the railing height and rail opening widths meet current standards for both bicyclists and pedestrians where appropriate.

Metal Beam Guard Rail: MBGR (Midwest Guardrail Systems or equivalent) with wooden posts is the predominant railing type currently seen along Highway 1 in Marin County. It is relatively transparent, very familiar, and is considered the best railing option for several reasons, including compatibility with existing roadway features, good transparency, context sensitivity, cost effectiveness, its current inclusion in the Standard Plans, and the fact that Maintenance has the materials for repair readily available. Where site conditions allow, wood posts should be used. MBGR should have a matte finish applied to the final coating to reduce glare, and space to allow for deflection of the MBGR should be included as necessary. Other

approved guardrails may be considered for aesthetic reasons or unavoidable project limitations. Consult the District Landscape Architect to ensure visual compatibility with the corridor.

ST-10: Depending on the location and view, this 32-inch-high metal railing is considered aesthetically more desirable than the Type 80 railing listed below and therefore ranks higher than the Type 80 on the list of choices. The benefits of this railing include more transparency than the Type 80, less required maintenance than MBGR, and it is currently included in the Standard Plans. Disadvantages include the potential requirement of additional bicycle/pedestrian railing that may not be aesthetically desirable, a higher construction cost than other railing types, the potential to have issues fitting along a curved alignment, and introduction of an unfamiliar element on the coast.

ST-10 Modified I: This railing is the ST-10 railing listed previously with the addition of a bicycle/pedestrian railing attached to the backside. The benefit of this railing, as compared to the standard ST-10, is that it meets bicycle railing height requirements. The disadvantages of this type of rail include less visual continuity than the standard ST-10 railing and, depending on the design of the bicycle railing, that it may be more or less transparent and aesthetically desirable than other railing types.

ST-20: The benefits of this railing type are that it meets the bicycle/pedestrian height requirements, it requires less maintenance than MBGR, it is currently included in the Standard Plans, and it requires no additional right-of-way for an offset second railing. The disadvantages of this type of railing include a large and grate-like appearance, a higher construction cost than other railing types, the potential to have issues fitting along a curved alignment, and the introduction of an unfamiliar element on the coast.

Type 80: This concrete railing has not yet been used on Highway 1 in Marin County and would be an unfamiliar addition to the landscape. The benefits of this railing type are that it allows for some transparency, requires minimal maintenance, and is currently included in the Standard Plans. The disadvantages of this railing type are that it is heavy and bulky, it is not typically seen on the coast, it may require an additional bicycle/pedestrian railing that may be aesthetically undesirable, and it has a higher construction cost than other railing types.

Solid Barriers: Solid barriers could be used in special circumstances but should be carefully considered and chosen only as a last resort.

If a concrete option is selected, contact the Office of Landscape Architecture to determine whether the barrier needs to be colored to match the surroundings.

END TREATMENTS

End treatments for railing and concrete barriers are also important elements. The designer should select the appropriate end treatments for the railing and concrete barriers based on several factors, including the design speed and geometrics of the roadway, maintenance considerations, availability of replacement parts, safety for all users, and consistency along the Highway 1 corridor. Where feasible, railings and barriers should be terminated with buried end sections, such as in an adjacent slope or an earthen berm. The height of berms used for buried end sections must be sufficient for standard installations. If buried end sections are not feasible, inline end treatments should be considered. Alternative end treatments such as barrels or crash cushions should be avoided, as they are likely to cause visual impacts. The designer should strive to design a solution that does not require the use of these types of end treatments.

FENCING

Right-of-way fencing is an uncommon feature on Highway 1, but may be found along many of the agricultural and recreational areas. The vast majority of fencing along the highway is privately owned. Caltrans will construct private fencing only as a right-of-way consideration to mitigate damages (i.e., to replace existing fencing damaged or altered by a Caltrans construction project).

Fencing may be state owned. In that case, before constructing or replacing a stand-alone fence, consider its purpose with regard to whether it needs to be constructed and whether there are alternative means for meeting that purpose. In general, do not add non-safety fencing unless it serves to promote, and is consistent with policies of, the Marin County LCP. The fencing type should be consistent throughout the Highway 1 corridor and should be functional. Generally, chain-link fencing should be avoided, unless required for specific security purposes and only if more compatible options are not available. Depending on location and context, desirable fence types include the following:

- Wire (barbed or smooth) on timber or steel posts
- Stretched cable on timber posts
- Timber post and rail (single or multiple rails)

- Timber post and split rail (applicable to forested settings)
- Timber post and pickets
- Hybrid designs combining a variety of the above elements other types of fences typical to the specific location (e.g., picket fences in villages or corral fencing in ranch areas) that are consistent with Marin County LCP provisions or village plans (note, for example, County Code Section 22.20.050, Fencing and Screening Standards, and *Tomales Community Plan* Appendix D, Design Guidelines [Marin County Community Development Agency 1997]).

Newly installed steel fencing should be colored to better blend in with the surrounding environmental setting and rural character of Highway 1.

Fencing should not create a visual barrier to the scenic landscape nor should it create a barrier to wildlife. Consult with the adjacent public land manager to determine appropriate treatment.

The previously listed points are applicable whether the fence is private or a Caltrans fence. See Topic 701 of the HDM for an in-depth discussion of the various types of fences Caltrans constructs.

5.2.4 Slope Stabilization

Due to the extreme terrain and frequent landslides along the Highway 1 corridor, structural and nonstructural slope stabilization systems are often necessary. Nonstructural options should be used over structural systems where feasible.

NONSTRUCTURAL SLOPE STABILITY RECOMMENDATIONS

Nonstructural slope stability solutions are generally more cost effective and less visually disruptive than structural solutions. Nonstructural systems that can be revegetated are encouraged because these systems have the potential to blend more fully into the surrounding landscape when mature. The most appropriate nonstructural solution for a specific site should be determined by the geotechnical engineer and geologist. Refer to Section 5.2.5 for a discussion on landscape/erosion control. Some examples of nonstructural solutions include, but are not limited to, the following:

- Slope reconstruction
- Rock slope protection
- Geosynthetic stabilized embankments gabions

- Embankment confinement systems
- Rock drapery or anchored mesh
- Rock bolting

RETAINING WALLS

A wide variety of retaining wall options are available to engineers in the event that a structural wall is the most appropriate alternative to stabilizing a slope. In general, retaining walls can be categorized into two broad categories—cut-slope walls (which are typically found in the upslope section of the roadway) and fill walls (which are typically found in the downslope section of the roadway). The Geotechnical Engineer, the Structural Engineer, and the Geologist will determine the most appropriate retaining wall type, height, and length for a specific site. Retaining walls are considered structures; therefore, the design standards for pavement width cross section apply. Safe maintenance access must be considered in the design and layout of retaining walls.

From a visual standpoint, the final appearance of the wall surface, wall height, length, and top elevation have a visual impact and should be consistent with these considerations. The District Landscape Architect should be consulted.

TIMBER LAGGING WALLS

The primary preference for the appearance of retaining walls consists of a timber lagging aesthetic treatment.

The H-piles should be painted a dark brown with a matte finish. Glossy paint finishes should be avoided. The walers (if necessary for tieback anchors) should be stained a dark brown to match the H-piles and the timber lagging. Federal Standard 595 Color #30051 is the preferred color choice to be used for this wall type.

Burying the walls is recommended and should be considered to minimize visual impacts.

Where concrete barriers are incorporated into the retaining walls and the wall is exposed, the barrier should be stained to match the color of the wall.

In some locations, another treatment may be preferred. Consult with the District Landscape Architecture for all walls to determine appropriate treatment.

CARVED AND STAINED ROCK WALLS

The secondary aesthetic preference consists of a carved rock aesthetic treatment that is stained to match the surrounding rock formations. This treatment is similar to the finish found on most soil nail walls along the coast, although this appearance can be achieved on other wall types as well. In some locations, stained concrete may be preferred to carved and stained rock walls.

Where concrete barriers are incorporated into the retaining walls, the barrier should be stained to match the color of the wall.

Walls should be discussed with the District Landscape Architect to ensure that the aesthetic treatment selected is acceptable from a visual standpoint.

FALL PROTECTION

Fall protection is required at the top of all retaining walls greater than 30 inches in height.

If maintenance requires access to the top of an uphill wall, fall protection should be Caltrans standard cable railing. The fence should be colored to blend in with the environment. If maintenance does not require access to the top of the wall, a safety cable may be installed in lieu of the cable railing. Alternative systems that would not rely on a permanent cable railing should be carefully considered on a case-by-case basis.

Chain-link railing should be avoided as fall protection in favor of one of the previously listed solutions.

For cases where new safety cable or railing that would be visible from the roadway and would negatively affect the scenic character of Highway 1 must be installed, existing safety cables, railings or roadside appurtenances within the project limits should be evaluated for removal to keep visual clutter to a minimum.

SLEEPER SLABS

Sleeper slabs, if used for the installation of barrier railings at retaining walls, should be treated to match the remainder of the roadway. The sleeper slabs may be lowered and overlaid with a thin layer of asphalt concrete pavement or may be colored to blend in with the surrounding roadway surface.

DRAINAGE DITCHES BEHIND WALLS

Concrete drainage ditches that are located behind retaining walls should be stained or treated to blend into the surrounding landscape.

5.2.5 Roadside Features**DRAINAGE**

The safety, functionality, and aesthetics of drainage systems should be carefully reviewed and considered. This section discusses the aesthetic treatments that should be considered when installing drainage systems. Slope protection or concrete should be treated to blend with the surrounding landscape. Drainage will be designed to avoid erosion and sedimentation, or contributing to destabilization of slopes. Existing drainage features will be evaluated at storm damage repair sites. Where feasible, improvements will be incorporated into the new roadway facility to avoid further erosion and sedimentation

Headwalls and Wingwalls

Typically, aesthetic treatments are not required on concrete headwalls and wingwalls, but due to the highly scenic nature of Highway 1, aesthetic treatments should be considered to ensure that headwalls and wingwalls blend into the existing landscape. Such treatments may include stained or integrally colored concrete to match the surrounding landscape.

Pipes and Inlets

Exposed pipes and end sections extending from walls or hillsides, including galvanized pipes, should be treated to blend in to the adjacent landscape. The preferred color is brown with a matte finish to reduce glare.

Drainage inlets should be sited outside of where bicyclists are most likely to ride, if feasible; inlets placed within the roadway must use bicycle-proof grates.

Outfalls

New pipes and culverts should discharge at established drainage outfalls. The development of new drainage outfalls should be avoided. Where possible, culverts and pipes should be designed in such a manner as to minimize outfall velocities while still conforming to the velocity recommendations in Section 838.4 of the HDM.

Drainage outfalls that can be revegetated are preferred and should be used when site conditions allow. Revegetation considerations are discussed in the Landscaping and Revegetation section below.

Ditches

The size and location of drainage features should be designed to blend into the surrounding landscape. Concrete and metal facilities should be treated to match the surrounding terrain. Where appropriate, drainage ditches should be designed in conjunction with the shoulder to reduce the amount of pavement and widening needed, following the guidelines in Chapter 830 of the HDM.

LANDSCAPING AND REVEGETATION

Revegetation and Erosion Control

Native plant communities contribute to the scenic nature of Highway 1. The objective for revegetation for all areas disturbed by roadside repairs, including construction access and staging areas, is to reestablish native vegetation that integrates and matches adjacent intact native plant communities without introducing non-native species into weed-free native communities. Designers should specify seed and plant material from local sources whenever feasible. Consult with the Project Biologist and Erosion Control Specialist for recommendations on appropriate plant material. Designers should look for opportunities to cover features such as rock slope protection and drainage pipes with weed-free soil and locally appropriate plant material to achieve revegetation objectives. Because inadvertent application of soil that contains high-priority weed species propagules can create a large maintenance issue, it is essential that all soil sources be examined by an individual familiar with high-priority weed species prior to application to avoid accidental introduction.

Designers should consult with the Project Biologist and Erosion Control Specialist. Where the project is adjacent to or on NPS or State Parks lands, Caltrans will enter into a planting agreement with the NPS and State Parks. Contact the District Landscape Architect to initiate the process early in project development. The agreement shall cover work on areas disturbed within the State right-of-way and on State Parks or National Park Service lands. The scope of work for revegetation, weed management, and erosion control plans will generally include (1) collection of local seed and propagation of local plant material, (2) planting installation and plant establishment on State right-of-ways and National and State Parks land for up to 5 years, and (3) exotic weed management. Consult Caltrans Erosion Control Unit for project-specific best management practices and erosion control plans and special provisions.

For projects located in areas outside of GGNRA and State Parks, the PDT team is encouraged to look for additional partnership opportunities for plant establishment and longer term weed abatement.

Invasive and Exotic Vegetation Control

The first line of defense—and the most cost-effective long-term strategy against invasive weeds—is preventing them from becoming established. Prevention and exclusion of noxious weed species are the most practical and economical means of weed management. This is accomplished by ensuring that seed or reproductive plant parts of new weed species are prevented from being intentionally or unintentionally introduced to an area. Best management practices for invasive exotic weed prevention are already incorporated into standard special provisions and include preventative measures, such as equipment washing and seed testing.

Outbreaks of invasive weeds should be controlled during the plant establishment period if applicable. Nonstandard special provisions requiring the contractor to perform more aggressive management practices may be needed to control invasive weeds during plant establishment.

When working within or adjacent to NPS or State Parks lands, the PDT should make early contact with the respective agency to develop vegetation control plans that are in concert with their resource management programs that may involve a multi-year process of seed gathering and propagation. It is also recommended to consider partnerships with these agencies to perform plant establishment and/or long-term maintenance activities. Control of exotic vegetation should be covered in the revegetation planting agreement discussed in Revegetation and Erosion Control above.

SIGNAGE

Signage guidelines should follow the fundamental principle that “less is more” with regard to signage along Highway 1. Only signs that are necessary for the safety of the traveling public and that convey essential information to the traveler, including wayfinding/directional signs, should be installed. The design and placement of signage should be in accordance with the latest edition of the *California Manual of Uniform Traffic Control Devices*, which sets uniform standards and specifications for official traffic signs to be used on streets and highways in California. Signs should be combined onto existing posts where feasible. Signs for the Pacific Coast Bike Route should be provided where applicable.

5.2.6 Miscellaneous

FISH PASSAGE AND WILDLIFE ACCOMMODATIONS

Repair projects will include, where appropriate, safe crossings for terrestrial and aquatic wildlife and other accommodations to promote biodiversity and avoid or mitigate harm to individual animals, the fragmentation of plant and animal habitats, and the disruption of natural systems. For more details on fish passage, see Section 3.2.6.7.

CONSTRUCTION/MAINTENANCE ACCESS ROADS

Construction access roads shall generally be chosen to disturb the least amount of area and be as unobtrusive as possible. However, consideration should be given to whether a construction access road could subsequently serve as a pedestrian access trail and, if so, should be restored for that purpose after project completion.

Construction access roads or benches that are built to facilitate construction activities should be re-graded using slope rounding techniques and revegetated to match the existing terrain once construction is complete (see also Section 5.2.5). If the access roads are needed for future maintenance access, they should be minimized in width and length and seeded with erosion control.

SCENIC HIGHWAY STATUS

The HDM defines a scenic highway as a “state or county highway, in total or in part, that is recognized for its scenic value, protected by a locally adopted corridor protection program, and has been officially designated by Caltrans.” Highway 1 is currently eligible for scenic highway status and, if status is awarded, specific requirements will be triggered, including special signage along Highway 1.

Repair projects will minimize impacts, individually and cumulatively, to the characteristics that make these segments eligible for Scenic Highway status.

Chapter 6 References

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Appendix A Landscape Units and Existing Conditions

Existing Conditions: Roadway - Marin County

Community	Segment	Landscape Character and Road Use	Landscape Unit Description	Segment Location (PM)	Adjacent Federal/State Parks	Surrounding Topography			2010 Traffic Volumes (AADT)	Existing		RRR Standard (DIB 79-03 Table 2)		Speed Zone (Posted)
						Steep	Rolling	Gentle		Lane Width	Shldr Width	Lane Width	Shldr width	
City of Mill Valley	1	T	This landscape unit begins at the underpass of Route 101 in Mill Valley and proceeds through a mostly commercial area for the first mile before it begins a stretch of sporadic residential development for the next mile with some forestation. The roadway in this area is level with parallel parking and sidewalks on the southbound side, and utility poles on northbound side north of Coyote Creek. To the north end of this segment, the route leaves the residential area and begins to wind uphill. Local stakeholders include the City of Mill Valley, Marin County, and Marin County Open Space District.	0.0-0.5, 0.8	NO				32500,					
		T		1.9		2	1	3	13700	11	0-4	12	8	35
	2	F	This landscape unit begins at the western edge of Mill Valley and winds upwards through a eucalyptus grove to the top of a crest where it descends toward the ocean. The roadway has mountainous and rolling terrain with steep slopes, sharp curves, limited sight distance, and several retaining walls (steel piles with timber lagging). Local stakeholders include California State Parks, the Golden Gate National Recreation Area (GGNRA), and Marin County.	1.90-4.00	GGNRA/Mt. Tamalpais State Park	1	3		6900	10-11	0-1	12	8	35
	3	CC	This landscape unit winds through steep grassy hillsides on both sides, passing by the small community of Muir Beach. The roadway has mountainous and rolling terrain with steep slopes, sharp curves, and limited sight distance. Local stakeholders include California State Parks, GGNRA, and Marin County.	4.00-7.20	GGNRA/Mt. Tamalpais State Park	1	3		3900	10	0-2	12	8	35
	4	CB	This landscape unit winds through eucalyptus and cypress groves with steep grassy hillsides on both sides before it continues to wind toward the ocean to the town of Stinson Beach. The roadway has rolling terrain with sharp curves, limited sight distance, and several retaining walls (steel piles with timber lagging) with 12-foot lanes and 4-foot shoulders on the southbound side. Local stakeholders include California State Parks, GGNRA, and Marin County.	7.20-12.10	GGNRA/Mt. Tamalpais State Park	1	3		3900	11	0-1	12	8	55 **
Stinson Beach	5	T	This landscape unit is comprised of the village of Stinson Beach where the route is slow and passes by numerous driveways and residential landscapes. The roadway is level within Stinson Beach. There are no sidewalks and parking is angled or parallel in both directions. Local stakeholders include the California Department of Fish and Game (CDFG), GGNRA, and Marin County.	12.10-12.85	GGNRA/-			1	3850	12	2-8	12	8	25

Existing Conditions: Roadway - Marin County

Community	Segment	Landscape Character and Road Use	Landscape Unit Description	Segment Location (PM)	Adjacent Federal/State Parks	Surrounding Topography			2010 Traffic Volumes (AADT)	Existing		RRR Standard (DIB 79-03 Table 2)		Speed Zone (Posted)
						Steep	Rolling	Gentle		Lane Width	Shldr Width	Lane Width	Shldr width	
Bolinas Lagoon	6	BF/E	This landscape unit leaves Stinson Beach and begins a winding ascent through a growth of cypress and pine until it reaches an open area of mostly grassy hillsides. The route from this point on hugs the hillside closely above the coastline with steep grassy slopes on both sides. The uphill or east side sometimes has steep cuts and the western side is mostly protected by guardrail. The route continues to wind with sporadic clusters of cypress and eucalyptus until it winds closer to Bolinas Bay. Starting at the southern end of Bolinas Bay, the road closely follows the winding edge of the water with the Bay on the west and steep grassy and mature growth covered hillsides to the east. In this section, the roadway is level with a few sharp curves. Local stakeholders include California State Parks, Marin County Open Space District, GGNRA, and Marin County. This segment also passes Audubon Canyon Ranch.	12.85-16.90	GGNRA/-	2		2	2700	10	0-1	12	4	35
	7	AP/F	This landscape unit continues into GGNRA, which is mostly a winding route with mature groves of cypress, pines, and eucalyptus on both sides. There are sporadic openings of grassy pastures and the occasional farmhouse. There roadway is mostly level with rolling terrain. Local stakeholders include Marin County Open Space District, GGNRA, and Marin County.	16.90-26.40	GGNRA/-	3	2	2	2500	11-12	0-1	12	4	30, 40
Olema	8	T	This landscape unit passes through the small community of Olema, which has a commercial area with restaurants and residences. The route then continues through a varied landscape of forestation and open farmlands. The roadway is predominantly level with moderate curves. This segment is adjacent to the GGNRA. Local stakeholders include GGNRA and Marin County.	26.40-27.00	GGNRA, Point Reyes National Seashore/-		3	1	3000	12	2-3	12	4	30, 40
	9	AP/F	This landscape unit consists of the route leaving the community of Olema and turning northeast where it passes by some minor stands of cypress and eucalyptus before it enters into the valley of a steep but shallow winding canyon. Both sides of the canyon are marked with steeply cut sides with grassland cover or trees. The views are more open to the west. The roadway is predominantly level. This segment is adjacent to GGNRA. Local stakeholders include GGNRA and Marin County.	27.00-28.20	GGNRA, Point Reyes National Seashore/-		2	2	3000	12	2-2.8	12	4	35
Pt. Reyes Station	10	T	This landscape unit passes through the small unincorporated community of Point Reyes Station with a variety of small stores, restaurants, and residences. The roadway is level through the main street area and crosses city streets and driveways. There are sidewalks and parallel parking on both sides. Local stakeholders include CDFG, GGNRA, and Marin County.	28.20-29.30	GGNRA/-			1	4400	12	7.5	12	8	30

Existing Conditions: Roadway - Marin County

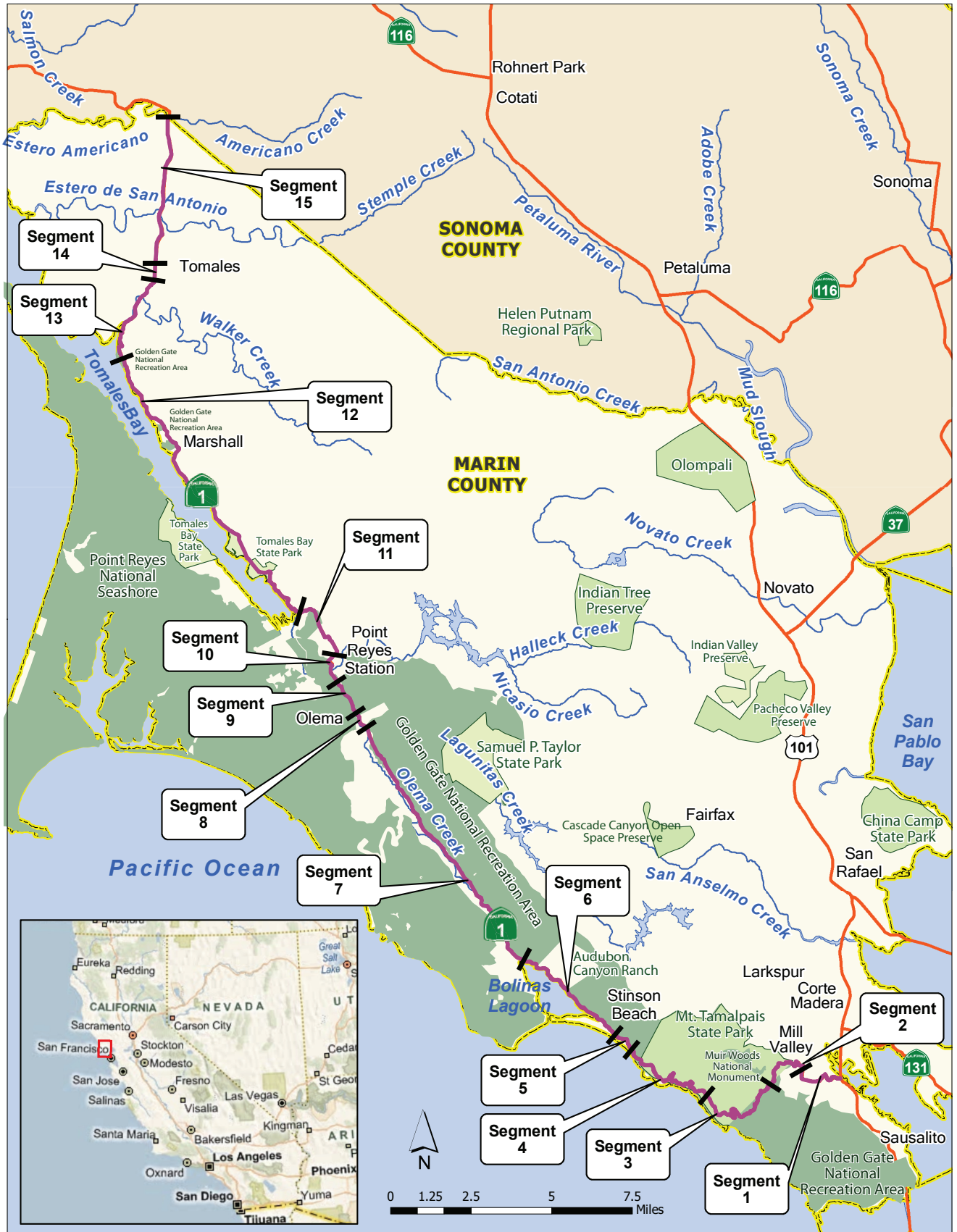
Community	Segment	Landscape Character and Road Use	Landscape Unit Description	Segment Location (PM)	Adjacent Federal/State Parks	Surrounding Topography			2010 Traffic Volumes (AADT)	Existing		RRR Standard (DIB 79-03 Table 2)		Speed Zone (Posted)
						Steep	Rolling	Gentle		Lane Width	Shldr Width	Lane Width	Shldr width	
	11	AP/F	This landscape unit leaves Point Reyes Station and is characterized by random clusters of cypress, oaks, and eucalyptus mixed with openings of grassy fields and sporadic farmlands. The roadway is mostly level with some rolling terrain. Local stakeholders include CDFG, GGNRA, and Marin County.	29.30-31.45	GGNRA/-		1		4400	11	0-1	12	8	35, 55
Tomales Bay/Marshall	12	BF/AP/F/T	This landscape unit is characterized by random clusters of cypress and oaks mixed with open views of grassy fields, rolling terrain, and sporadic farmlands as it passes Tomales Bay. There are a few small stores, restaurants, and residences scattered along the road and between the road and the bay. Local stakeholders include CDFG, California State Parks, Marin Agricultural Land Trust, Marin County Parks Department, GGNRA, and Marin County. This segment also passes Audubon Canyon Ranch.	31.45-42.20	GGNRA/-		2	1	2150	11	0-1	12	4	35
	13	AP/F	This landscape unit is characterized by random clusters of cypress and oaks mixed with open views of grassy fields, level and rolling terrain, and sporadic farmlands. The road turns away from the bay and into a coastal canyon, running along a river. Local stakeholders include CDFG, Marin Agricultural Land Trust, and Marin County.	42.20-45.36	GGNRA/-	1	3	2	1350	11	1-2	12	4	55 **
Tomales	14	T	This landscape unit consists of traveling through the small community of Tomales Bay, comprising a mix of farmlands, driveways, and sporadic clumps of oaks, eucalyptus, and cypress. The roadway is predominantly level. This segment is adjacent to the Marin Agricultural Land Trust. Local stakeholders include Marin County.	45.36-45.95	No		3	1	1250	12	12-15	12	4	30
	15	AP/F	This landscape unit leaves the small community of Tomales Bay and enters into a mostly vast and flat landscape composed of grassy farmlands and occasional clumps of vegetation until it reaches Petaluma/Valley Ford Road. The roadway is predominantly level with some rolling hills. Local stakeholders include Marin County. This segment is adjacent to the Marin Agricultural Land Trust.	45.95-50.51	No	3	1	3	1250	12	3-5	12	4	55 **

CB = Coastal Bluff
 MT = Marine Terrace
 CC = Coastal Canyon
 T = Town
 AP = Agricultural/Pasture
 F = Forested
 BF = Bay Front
 E = Estuary

1 = Prevalent
 2 = Somewhat Prevalent
 3 = Minor Condition

* Recommended width is greater than standard width

** Default Speed Limit without signage on conventional hwy



Source: Caltrans

LEGEND

- Federal Parks
- State Parks
- Highway 1 Landscape Units

**LOCATION MAP
MARIN COUNTY LANDSCAPE UNITS**

Appendix B Coastal Act Repair Maintenance Exclusions

REPAIR, MAINTENANCE AND UTILITY HOOK-UP EXCLUSIONS FROM PERMIT REQUIREMENTS

(Adopted by the California Coastal Commission on September 5, 1978)

NOTE: This guideline applies only to exclusions established in subsections (d) and (f) of section [30610](#). For other exceptions to the permit requirements, see [Section 13250](#) of the Commission Regulations (additions to existing single-family houses), Sections [13200 through 13210](#) (vested rights), Sections [13211-13213](#) (permits granted under the 1972 Coastal Act), Sections [13215-13235](#) (urban land), Sections [13240-13249](#) (categories of development), Sections [13136-13144](#) (emergency permits) and Sections [13145-13154.5](#) (administrative permits).

I. General Provisions.

Section 30610 of the Coastal Act states in part:

...no coastal development permit shall be required pursuant to this chapter for...

(d) Repair or maintenance activities that do not result in an addition to, or enlargement or expansion of, the object of those repair or maintenance activities; provided, however, that if the commission determines that certain extraordinary methods of repair and maintenance involve a risk of substantial adverse environmental impact, it shall, by regulation, require that a permit be obtained pursuant to this chapter.

...

(f) The installation, testing, and placement in service or the replacement of any necessary utility connection between an existing service facility and any development approved pursuant to this division; provided, however, that the commission may, where necessary, require reasonable conditions to mitigate any adverse impacts on coastal resources, including scenic resources.**

This guideline is intended to detail the types of development activities the Commission considers repair, maintenance or utility hook-ups related to the on-going work of various types of public and private agencies. Such lists obviously cannot be exhaustive and the exclusions also apply to activities comparable to those listed. Where a proposed activity is not included in this guideline, the Regional Commission Executive Director, after consultation with the State Commission Executive Director, if necessary, will determine whether a permit is required.

The standards for these exclusions are stated in [Section 30610](#) of the Coastal Act: they do not relate to the environmental impact of the proposed activity. The repair and maintenance exclusion is intended to allow continuation of existing developments and activities which began before the effective date of the Coastal Act. The utility hook-up exclusion exempts utilities from obtaining permits for work to serve developments because Commission review of such work is included in the review of the development itself.

** Minor changes have been made to the legal citations to the Coastal Act contained in this document to correspond to the current version of the cited Section.

II. Description of Activities Excluded.

The following construction activities comparable to those listed do not require a coastal development permit except as specified below:

A. Roads. No permit is required for repair and maintenance of existing public roads including landscaping, signalization, lighting, signing, resurfacing, installation or expansion of retaining walls, safety barriers and railings and other comparable development within the existing right-of-way as specified below. Maintenance activities are generally those necessary to preserve the highway facility as it was constructed, including: construction of temporary detours, removal of slides and slip cuts, restoration and repair of drainage appurtenances, slope protection devices, installation of minor drainage facilities for preservation of the roadway or adjacent properties, restoration, repair and modifying for public safety bridges and other highway structures, restoring pavement and base to original condition by replacement, resurfacing, or pavement grooving. A permit is required for excavation or disposal of fill outside of the roadway prism. The following maintenance and alteration programs of the State Department of Transportation, or their equivalent conducted by local road departments, which do not result in an addition to or enlargement or expansion of the existing public road facility itself, do not require a permit except as noted: (1) [Flexible Roadbed Program](#); (2) [Rigid Roadbed Program](#); (3) [Roadside Maintenance Program](#); (4) [Roadway Litter and Debris Program](#); (5) [Vegetation Control Program](#); (6) [Pavement Delineation Program](#); (7) [Sign Program](#); (8) [Electrical Program](#); (9) [Traffic Safety Devices Program](#); (10) [Public Service Facility Program](#) except that a permit is required for construction of new facilities; (11) [Landscape Program](#); (12) [Bridge and Pump Maintenance Program](#); (13) [Tubes, Tunnel and Ferry Maintenance Program](#); (14) [Bridge Painting Program](#); (15) [Miscellaneous safety projects](#), provided there is not expansion in the roadway or number of traffic lanes; (16) [Major damage maintenance, repair and restoration](#); (17) [Comparable Minor Alterations](#).

(NOTE: See [Appendix I](#) for more detailed description of activities included in these programs.)

B. Public Utilities.

1. Natural Gas, Chilled Water and Steam Facilities.

a. Service Connections. Install, test and place in service the necessary piping and related components to provide natural gas, chilled water and/or steam service to development either exempted or approved under the Coastal Act, including:

(1) Extend underground gas, chilled water and/or steam mains, except in marshes, streams or rivers, from terminus of existing main piping to proper location in front of customer's property. Break and remove pavement as necessary, open trench or bore, for installation of main piping, install mains and appurtenances, pressure test for leakage, back-fill open cuts, purge air from piping and introduce gas, chilled water and/or steam into newly installed piping. Restore pavement as necessary. Provide for cathodic protection as necessary.

(2) Extend underground gas, chilled water and/or steam service piping from the main locations, except, in marshes, streams or rivers, to the meter location on the customer's property. Construction activities are similar to those in Item (1) above.

(3) Construct and install the meter set assembly, generally above ground, on the customer's property, including installation of associated valves, pressure regulator, meter and necessary piping to connect the gas, chilled water and/or steam service to the customer's piping system.

(4) When necessary, install gas, chilled water and/or steam pressure regulation equipment and related components, to control pressure where the source of the supply is at a higher pressure than the pressure in the district distribution main system. Construction includes necessary excavation, installation of piping, valves, regulators, below ground vaults and related components.

(5) Install necessary cathodic protection facilities for main and service extensions to new and existing customers.

b. Distribution and Transmission Facilities.

(1) Operate, inspect and maintain distribution and transmission mains, services, meter set assemblies and district regulator stations. Conduct leakage surveys, repair leaks, handle emergency or hazardous incidents, maintain supply pressure, inspect and adjust pressure regulators, operate valves, locate and mark facilities to help prevent damage to them and to provide for public safety.

(2) Install, replace, alter, relocate or remove piping and cathodic protection facilities as necessary due to corrosion, interference with other underground or surface construction, franchise requirements, mechanical damage, reinforcement to existing distribution systems to provide for increased usage (provided such usage is to provide service to development either exempted or approved under the Coastal Act). Isolation of piping segments or systems to provide emergency control and the restoration of service to a customer.

c. Production and Storage Facilities. Perform necessary maintenance, replacement, repair, relocation, abandonment and removal work to gas storage facilities, chilled water and/or steam plant facilities, mechanical equipment including prime movers and pumping equipment, chilled water and/or steam production facilities, gas and oil processing facilities, pollution control facilities, cooling towers, electric equipment, controls, gas injection and withdrawal wells, and other miscellaneous plant and pipeline structures. Installation of any required new safety devices and pollution control facilities within existing structures or equipment or where land coverage, height, or bulk of existing structures will not be increased.

d. Miscellaneous. Perform necessary maintenance, repair, replacement, relocation, abandonment and removal work to pipeline roads, rights-of-way, fences and gates, sprinkler systems, landscaping, odorizing stations, telemetry equipment, lighting facilities, mechanical and electrical equipment, cathodic protection facilities and environmental control equipment.

e. Grading and Clearing. Maintenance activities shall not extend to the construction of any new roads to the site of the work. A permit is required for grading an undisturbed area of greater than 500 sq. ft., removal of trees exceeding 12 inches dbh or clearing more than 500

sq. ft. of brush or other vegetation unless the Executive Director of the Regional Commission determines the activity does not involve the removal of major vegetation.

2. **Electric Utilities.**

a. Generation Stations, Substations, Fuel Handling, Transportation and Storage Facilities and Equivalent Facilities. A coastal permit is not required for repairs, maintenance, and minor alterations which do not increase the capacity of the facility or work required to supply increased demand of existing customer's facilities in order to maintain the existing standard of service. A coastal permit is not required for installation of any required new safety devices and pollution control facilities within existing structures of equipment or where land coverage, height or bulk of existing structures will not be increased.

b. Transmission and Distribution and Communication Facilities. A coastal permit is not required to maintain, replace, or modify existing overhead facilities, including the addition of equipment and wires to existing poles or other structures, right-of-way maintenance, and minor pole and equipment relocations. A coastal permit is not required to install, test and place in service power line extension facilities and supply points specifically required to provide service to development permitted or exempted under the Coastal Act, or work required to supply increased demand of existing customers' facilities in order to maintain the existing standard of service.

A coastal permit is not required to install, test, place in service, maintain, replace, modify or relocate underground facilities or to convert existing overhead facilities to underground facilities provided that work is limited to public road or railroad rights-of-way or public utility easements (P.U.E.).

c. Services. Electrical service and metering facilities may be installed and placed in service to any development permitted or exempted under the Coastal Act. A coastal permit is not required to maintain, replace, or relocate service or metering facilities for developments permitted or exempted under the Coastal Act.

d. Grading, Clearing and Removal of Vegetation. Excluded activities shall not extend to the construction of any new road to the site of the work. In cases involving removal of trees exceeding 12 inches dbh, grading of any undisturbed area of greater than 500 sq. ft. or clearing of more than 500 sq. ft. of brush or other vegetation, the utility shall consult with the Executive Director of the Regional Commission to determine whether the project involves removal of major vegetation such that a permit is required. A coastal permit is not required for removal of minor vegetation for maintenance purposes (tree trimming, etc.) for safety clearances.

e. Definitions.

(1) Line Extension. All facilities for permanent service excluding transformers, services and meters, required to extend electric service from the utility's existing permanent facilities to one or more supply points.

(2) **Service.** A single set of conductors and related facilities required to deliver electric energy from a supply point to the customer's facilities.

(3) **Supply Point.** Any transformer, pole, manhole, pull box or other such facilities at which the utility connects one or more sets of service conductors to the utility's permanent electric facilities.

3. **Telephone.** No permit or conditions are required for the activities of a telephone company that come within the following areas:

a. Repair and maintenance of existing damaged or faulty poles, wires, cables, terminals, load cases, guys and conduits, including the necessary related facilities, to restore service or prevent service outages.

b. Placement of existing telephone facilities underground, provided such undergrounding shall be limited to public road or railroad rights-of-way or public utility easements (P.U.E.) and provided there is no removal of major vegetation and the site is restored as close as reasonably possible to its original condition.

c. Placement of additional aerial facilities on existing poles.

d. Removal of existing poles and facilities thereon, where new, replacing facilities have been placed underground.

e. Performance of work in connection with or placement of facilities to expand service to existing customers or to serve new customers, including placement of underground service connections or aerial service connections from existing poles with any necessary clearance poles.

f. Removal of minor vegetation for maintenance purposes (tree trimming, etc.).

g. Maintenance activities shall not extend to the construction of any new roads to the site of the work. A permit is required for grading an undisturbed area of greater than 500 sq. ft., removal of trees exceeding 12 inches dbh or clearing more than 500 sq. ft. of brush or other vegetation unless the Executive Director of the Regional Commission determines the activity does not involve the removal of major vegetation.

4. **Others, including Water, Sewer, Flood Control, City and County Public Works, Cable TV.** No permit is required for repair or maintenance of existing facilities that do not alter the service capacity, installation of new or increased service to development permitted or exempted under the Coastal Act, placement of additional facilities on existing poles, or placement of existing facilities underground, provided such undergrounding shall be limited to public road or railroad rights-of-way or public utility easements (P.U.E.) and provided there is no removal of major vegetation and the site is restored as close as reasonably possible to its original condition. A permit is required for installation of service to vacant parcels or installation of capacity beyond that needed to serve developments permitted or exempted under the Coastal Act.

Maintenance activities shall not extend to the construction of any new roads to the site of the work. A permit is required for grading an undisturbed area of greater than 500 sq. ft., removal

of trees exceeding 12 inches dbh or clearing more than 500 sq. ft. of brush or other vegetation unless the Executive Director of the Regional Commission determines the activity does not involve the removal of major vegetation. No permit is required for removal of minor vegetation (e.g., tree trimming) where it interferes with service pipes or lines.

C. Parks. No permit is required for routine maintenance of existing public parks including repair or modification of existing public facilities where the level or type of public use or the size of structures will not be altered.

D. Industrial Facilities. No permit is required for routine repair, maintenance and minor alterations to existing facilities, necessary for on-going production that do not expand the area or operation of the existing plant. No permit is required for minor modifications of existing structures required by governmental safety and environmental regulations, where necessary to maintain existing production capacity, where located within existing structures, and where height or bulk of existing structures will not be altered.

E. Other Structures. For routine repair and maintenance of existing structures or facilities not specifically enumerated above, no permit is required provided that the level or type of use or size of the structure is not altered. (NOTE: See Section [13250](#) of the Commission Regulations for exclusions or additions to existing single-family houses.)

F. Dredging and Beach Alteration. (NOTE: Maintenance dredging of navigation channels is exempted by Section 30610 (b). Other dredging and sand movement projects, where part of an established program may be exempt from the permit requirements of the Coastal Act by reason of vested rights, where such rights have been reviewed and acknowledged by the Regional Commission. Contact the Regional Commission office for information and application forms.)

APPENDIX I

Detailed description of activities included in road maintenance programs for which no coastal development permit is required.

1. **Flexible Roadbed Program.** This program covers the restoration and repair of both surface and base within the previously paved portion of the roadway. This includes previously paved asphalt concrete shoulders two feet or greater in width where the shoulder is designated by traffic marking, pavement delineation or traffic use. Paved shoulders less than two feet in width will be considered as included in the traveled way lanes.
2. **Roadbed, Rigid.** The Rigid Roadbed Program covers the restoration and repair of both surface and base within that paved portion of the roadway used for the movement of vehicles. This includes asphaltic concrete or oiled shoulders two feet or greater in width. Paved shoulders less than two feet in width will be considered as included in the traveled way lanes. This program does not include roadbed widening projects.
3. **Roadside Maintenance Program.** This program includes the repair, replacement, and cleaning of ditches, culverts, underdrains, horizontal drains and miscellaneous headwalls and debris racks. Also included are fence repairs, roadside section restoration (e.g., drift removal, bench cleaning, slide removal, and fill slope replacement). In addition, repairs or replacement of retaining walls, installation of slope protection devices, minor drainage facilities, sidewalks and curbs, bins, cattle guards and other such structures where there is no increase in size (or adding to what exists) is included in this program. This program shall not include seawalls or other shoreline protective works, activities subject to review under Section 1601 of the Fish and Game Code, or excavation or disposal of fill outside of the roadway prism.
4. **Roadway Litter and Debris Program.** This program includes all work concerning roadbed and roadside cleanup operations to insure that the highway presents a neat, clean and attractive appearance.
5. **Vegetation Control Program.** Vegetation control refers to the maintenance treatment of all vegetative material growing native within the highway rights-of-way. Included is cutting and trimming by hand and mechanical means.
6. **Pavement Delineation Program.** The pavement delineation program involves all work necessary to place and maintain distinctive roadway markings on the traveled way. This includes layout, removal of old stripe, painting of new or existing stripe including striping for bike lanes, installation and/or removal of raised pavement markers including cleaning of such markers and the use of thermoplastic, tape or raised bars for pavement markings. Changing of striping for more lanes is not included in this program.
7. **Sign Program.** The sign program includes all work performed on existing signs for the purpose of warning, regulating or guiding traffic including bicycle traffic using bike lanes. The work consists of manufacture, assembly and installation of new signs to replace existing signs and the repair, cleaning and painting of signs.

8. **Electrical Program.** This program includes all work performed on in-place highway electrical facilities used to control traffic with signal systems, provide safety and sign lighting, illuminate maintenance building and grounds, generate standby power, operate bridges, pumps and automatic watering systems. Certain navigational lighting installed on bridges and bridge fenders or piling are included in this program.
9. **Traffic Safety Devices Program.** Work performed under this program includes replacement of guide posts, markers, skid resistant grooves, and also replacement, cleaning and/or painting of guard rails. The repair of median barrier cable chain link fence and portland cement concrete walls; the repair and maintenance of energy dissipators such as water type bumpers, sand traps or other devices installed for the purpose of absorbing vehicle energy are included in this program.
10. **Public Service Facility Program.** Public Service Facilities consist of roadside rests, vista points, map stops, historical monuments, roadside fountain areas and vehicle inspection stops. Work to be performed under this program consists of a wide variety of custodial maintenance in connection with existing restrooms, fountains and picnic areas.
11. **Landscape Program.** This program refers to the treatment, maintenance and replacement of all vegetative material planted within the State Highway right-of-way. Work includes watering, fertilizing, plant replacement, weed control by hand and mechanical means and tree trimming.
12. **Bridge and Pump Maintenance Program.** The Bridge and Pump Maintenance Program includes work performed on all structures which provide for passage of highway traffic over, through or under obstacles and/or qualify for bridge numbers as assigned by the Division of Structures.
13. **Tubes, Tunnel and Ferry Maintenance Program.** The Tubes, Tunnel and Ferry Maintenance Program includes maintenance and repair of tunnels, tubes, ferries and docks or slips. Tunnel or tube maintenance includes washing, cleaning, tile repair and the maintenance of electro-mechanical equipment. Tunnel structural repairs will be performed under this program when covered by approved Division of Structures reports of work needed.
14. **Bridge Painting Program.** This program involves bridge maintenance painting performed in conformance with the requirements of air pollution control and water quality control agencies having jurisdiction.
15. **Miscellaneous Safety Projects.** Elimination of hazards within the operating areas or the operating right-of-way or projects modifying existing features such as curbs, dikes, headwalls, slopes, ditches, drop inlets, signals and lighting, etc., within the right-of-way to improve roadside safety.
16. **Major Damage Maintenance, Repair and Restoration.** Provides temporary road openings and related maintenance and returns highway facilities to serviceable states as rapidly as possible following major damage from storms; earthquakes; tidal waves; ship, train or vehicle collisions; gasoline truck fires; aircraft crashes, and all other kinds of physical violence. (NOTE: These items may be developments rather than repair or maintenance activities, but would be subject to the emergency permit provisions of the Coastal Act. Inquiries should be

directed to the Regional Commission staff if at all possible prior to commencement of construction.)

17. **Miscellaneous Alterations.**

- a. Installation, modification or removal of regulatory, warning or informational signs, according to the standards of the State Department of Transportation Uniform Sign Chart.
- b. Traffic channelization - improvements to local service and safety by delineation of traffic routes through the use of curbs, dikes, striping, etc., including turn pockets, where construction is performed by State Department of Transportation Maintenance Department or equivalent activities by local road departments.
- c. Maintenance of existing bicycle facilities.
- d. Modification of traffic control systems and devices including addition of new elements such as signs, signals, controllers, and lighting.
- e. Devices such as glare screen, median barrier, fencing, guard-rail safety barriers, energy attenuators, guide posts, markers, safety cable, ladders, lighting, hoists, paving grooving.
- f. Alteration or widening of existing grade separation structure where the primary function and utility remains unaltered.
- g. Minor operational improvements such as median and side ditch drainage facilities, where not subject to review under Section 1601 of the Fish and Game Code or involving excavation or disposal of fill outside of the roadway prism.
- h. Modification, upgrading, alteration, relocation, or removal of railroad grade crossings, railroad grade crossing protection, and the construction of bus and truck stop lanes at railroad grade crossings.

Appendix C Highway Design Manual Topics

Appendix C Highway Design Manual Topics

Topic 81 – Project Development Overview

Index 81.1 – Philosophy

The project development process seeks to provide a degree of mobility to users of the transportation system that is in balance with other values. In the development of transportation projects, social, economic, and environmental effects must be considered fully along with technical issues so that final decisions are made in the best overall public interest. Attention should be given to such considerations as the following:

- (a) Need for safe and efficient transportation
- (b) Attainment of community goals and objectives
- (c) Needs of low mobility and disadvantaged groups
- (d) Costs of eliminating or minimizing adverse effects on natural resources, environmental values, public services, aesthetic values, and community and individual integrity
- (e) Planning based on realistic financial estimates
- (f) The cost, ease, and safety of maintaining whatever is built

Proper consideration of these items requires that a facility be viewed from the perspectives of the user, the nearby community, and larger statewide interests. For the user, efficient travel and safety are paramount concerns. At the same time, the community often is more concerned about local aesthetic, social, and economic impacts. The general population, however, tends to be interested in how successfully a project functions as part of the overall transportation system and how large a share of available capital resources it consumes. Therefore, individual projects must be selected for construction based on overall system benefits as well as community goals, plans, and values.

Decisions must also emphasize different transportation modes working together effectively.

The goal is to provide a safe, sustainable, integrated and efficient transportation system in a manner that is compatible with, or which enhances, adjacent community values and plans. For more information on flexibility in Design and developing projects which enhance livability, see <http://www.dot.ca.gov/hq/oppd/design/2014-4-2-Flexibility-in-Design.pdf> and http://www.dot.ca.gov/hq/projdev/pdq/2015_PDQ_Winter.pdf.

Topic 109 – Scenic Values in Planning and Design

109.1 Basic Precepts

For any highway, having a pleasing appearance is an important consideration. Scenic values must be considered along with safety, utility, economy, and all the other factors considered in planning and design. This is particularly true of the many portions of the State Highway System situated in areas of natural beauty. The location of the highway, its alignment and profile, the cross section design, and other features should be in harmony with the setting.

109.2 Design Speed

The design speed should be carefully chosen, as it is the key element that establishes standards for the horizontal alignment and profile of the highway. These requirements in turn directly influence how well the highway blends into the landscape. Scenic values, particularly in areas of natural scenic beauty must play a part along with the other factors set forth under Index 101.1 in selecting a design speed.

109.3 Aesthetic Factors

Throughout planning and design, consider the following:

- (a) The location of the highway should be such that the new construction will preserve the natural environment and will lead to and unfold scenic positions. In some cases, additional minor grading not required for roadbed alignment may expose an attractive view or hide an unsightly one.
- (b) The general alignment and profile of the highway should fit the character of the area traversed so that unsightly scars of excavation and embankment will be held to a minimum. Curvilinear horizontal alignment should be coordinated with vertical curvature to achieve a pleasing appearance.
- (c) Existing vegetation (e.g., trees, specimen plants and diminishing native species) should be preserved and protected to the maximum extent feasible during the

planning, design, and construction of transportation projects. Whenever specimen or mature trees are present, especially in forested areas, a tree survey should be made to provide accurate data on the variety, condition, location, size, and ground elevations of trees affected.

- (d) Appropriate replacement planting should be provided when existing planting is removed. When native or specimen trees are removed, replacement planting should reflect the visual importance of the plantings lost. Where the visual impact of tree removal is substantial, replacement with large transplants or specimen size trees may be appropriate. If not, an appropriate quantity of smaller replacements may be required to ensure eventual survival of an adequate number of plants.

Provisions for watering and establishment of replacement planting should also be considered. The District Landscape Architect should be consulted early in the planning and design process so that appropriate conservation and revegetation measures are incorporated.

- (e) Existing vegetation such as trees or large brush may be selectively thinned or removed to open up scenic vistas or provide a natural looking boundary between forest and cleared areas. Vegetation removal for aesthetic purposes should be undertaken only with the concurrence of the District Landscape Architect.
- (f) Vista points should be provided when views and scenery of outstanding merit occur and feasible sites can be found (see Topic 904 for site selection criteria).
- (g) Whenever feasible, wide medians and independent roadways should be provided on multilane facilities as these features add scenic interest and relieve the monotony of parallel roadways.
- (h) Bridges, tunnels, and walls merit consideration in lieu of prominent excavation and embankment slopes when costs of such alternates are not excessive.
- (i) Slopes should be flattened and rounded whenever practical and vegetation provided so that lines of construction are softened.
- (j) Structures should be located and designed to give the most pleasing appearance.
- (k) Scars from material sites should be avoided. Planting compatible with the surroundings should be undertaken to revegetate such scars when they are unavoidable.

- (l) Drainage appurtenances should be so located that erosion, sumps, and debris collection areas are hidden from view or eliminated when site conditions permit.
- (m) Interchange areas should be graded as flat as reasonable with slope rounding and contouring to provide graceful, natural looking appearance. The appearance can be further enhanced by planting a vegetative cover appropriate to the locality, being careful to maintain driver visibility.
- (n) In locations where graffiti has been excessive, concepts such as limiting accessibility, planting, and surface treatments should be considered to deter graffiti.
- (o) Roadsides should be designed to deter weed growth along the traveled way, and to provide for mechanical litter collection.