WEST CLIFF DRIVE ADAPTATION AND MANAGEMENT PLAN:

PUBLIC WORKS PLAN

APRIL 1, 2021

CITY OF SANTA CRUZ

Caltrans

WEST CLIFF DRIVE ADAPTATION & MANAGEMENT PLAN: A PUBLIC WORKS PLAN
Table of Contents

LIST OF TABLES

LIST OF FIGURES

CITY COUNCIL ADOPTION

RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SANTA CRUZ ADOPTING THE WEST CLIFF DRIVE ADAPTATION AND MANAGEMENT PLAN, A PUBLIC WORKS PLAN

WHEREAS, West Cliff Drive, an essential transportation, recreation, and tourist attraction in Santa Cruz has experienced coastal erosion and increasing vulnerabilities; and

WHEREAS, the City of Santa Cruz developed a West Cliff Drive Adaptation and Management Plan for the City to identify preferred adaptation strategies and to be able to formulate routine monitoring and maintenance programs to reduce the costly need for emergency responses; and

WHEREAS, the California Coastal Act requires all cities, counties, and special districts to adopt a Local Coastal Plan for future development and protection of coastal resources; and

WHEREAS, the City of Santa Cruz seeks to maintain and enhance both a disaster-resistant and resilient city to reduce potential loss of life, property damage, and environmental degradation from sea level rise and other impacts, while serving vulnerable and historically underrepresented communities; and

WHEREAS, the City of Santa Cruz desires to comply with the requirements of the California Coastal Commission and to augment its resilience planning efforts by formally adopting the West Cliff Drive Adaptation and Management Plan;

WHEREAS, the West Cliff Drive Adaptation and Management Plan has been reviewed by all relevant departments, boards and commissions; and

WHEREAS, the draft West Cliff Drive Adaptation and Management Plan was reviewed by the City Council, and the community in or about November, 2020 and was available for public comment and review between that date and on or about February 16, 2021; and

WHEREAS, the West Cliff Drive Adaptation and Management Plan will contribute to building a more resilient Santa Cruz coastline.

NOW, THEREFORE, BE IT RESOLVED that the City of Santa Cruz does hereby adopt the City of Santa Cruz West Cliff Drive Adaptation and Management Plan as an official plan in accordance with the California Coastal Act; and

I HEREBY CERTIFY that the foregoing resolution was introduced, read and adopted at a regular meeting of the City Council on the 27TH day of April 2021 by the following vote

Passed and adopted this __th day of _____, by the following vote:

AYES:

NOES:

ABSENT:

DISQUALIFIED:

APPROVED: _____

Mayor

ATTEST: _____

City Clerk

Acknowledgements

2020-2021 Santa Cruz City Council:
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Haro, Kasunich and Associates, Inc.

Funding:
California Department of Transportation supplemented by California Coastal Commission

A few words from our Project Champions

This West Cliff Drive Adaptation and Management Plan represents over two years of work between staff, the community, consultants and a 17-person technical advisory community (TAC) to establish goals and priorities for resilient coastal management of critical city infrastructure, parks and beaches. With over 1,500 touchpoints with community members over those two years, this process was the first time the City and community worked together to establish an equitable and long term vision for coastal management in the face of climate change. This acknowledgement of necessary adaptation to sea level rise is an important management framework for the City to adopt now and act on urgently.

As TAC members, we know this Plan balances innovation with practicality, defining a 15-year plan for coastal maintenance, transportation corridor enhancements, and the creation of habitat restoration and scenic overlooks for all to enjoy. It also specifies further work required to advance our community's understanding of coastal dynamics and make data-informed decisions on adapting over time.

Future versions of this Plan and associated planning efforts will need to revisit and refine the coastal adaptation approaches possible beyond the 15 year lifespan of this Plan. Through development of a sound funding strategy to implement the Plan, ongoing community engagement especially with those historically under-represented and under-served, attention to scientific and regulatory developments, and proactive monitoring of our coastline to understand when to shift adaptation approaches, the City will be well positioned to bolster coastal resilience for decades to come.

Mayor Donna Meyers
City Council Member & former Mayor Justin Cummings

1. Preface

1.1. Introduction

1.1.1. Purpose of Plan

The purpose of this West Cliff Drive Adaptation and Management Plan (Plan) is to develop a set of scientifically-informed, community-informed coastal management projects to be implemented in the near-term of 10 to 15 year time horizon to address coastal erosion and adopt them in a Public Works Plan format. This set of projects represents a proactive approach to managing all facets of West Cliff Drive under City jurisdiction and sets forth a process for projects to be proposed and completed. The Plan is presented in the context of various coastal resources – recreation, access, transportation, parking habitat, facilities, open space, protection structures, amenities and utilities – and how these projects can be designed to protect, enhance or adapt those resources.

In addition, the Plan specifies routine monitoring and maintenance programs to reduce the costly need for emergency responses. The Plan will assist the City to prioritize public expenditures and seek other funding as well as develop forward thinking land use policies based on scientifically-informed community engagement that consider existing and future coastal hazards and sea level rise.

To address sea level rise and increased storm surges which both accelerate coastal erosion, the secondary purpose of the Plan is to document the feasible adaptation options and current state of community preferences on different coastal adaptation options in the medium to longer term, i.e., next 80 years of adaptation. Both the Plan itself and the community engagement informing coastal management will require periodic revision to consider coastal conditions, regulatory drivers and public opinion. This first Plan lays the groundwork to prepare the City for adapting to the inevitable future of accelerated coastal erosion and vulnerabilities to the Santa Cruz community. Emergency responses can be more costly, unplanned, and over time are more likely to have expanded impacts on coastal resources accompanied by escalating maintenance costs.

The Plan is based on work conducted during 2019 and 2020 by Integral Consulting, LLC as listed below. While excerpts of these documents relevant to the purpose of this Plan are included, hyperlinks are provided in the list below for each full deliverable. All asset numbering in photos and images (e.g., armoring site #X, or stormwater outfall #Y) in this Plan are consistent with those referenced in these documents, which contain more detailed information about each project site's existing condition and vulnerabilities.

Existing Conditions and Future Vulnerability Assessment (November 2019), including

- an inventory of the existing conditions along West Cliff Drive;
- an evaluation of the existing and projected future coastal erosion hazards;
- an assessment of future vulnerability of the transportation corridor, coastal protection structures, water utility-related infrastructure, and coastal resources to sea level rise;

Adaptation Alternatives Analysis (June, 2020), including

- identification of feasible, community-supported adaptation approaches with potential secondary consequences to coastal resources and the fiscal resources of the City;
- discussion of Monitoring and Potential triggers to initiate different phases of an adaptation pathway;
- Transportation Conceptual Alternatives Analysis (July, 2020) evaluating 3 scenarios;
- a cost benefit analysis; and

Public Engagement Synthesis (translated also into Spanish), (November 2020) including

- Description of engagement process to assess community uses and values, preferences on goals and adaptation strategies and pathways;
- Data and graphs to report engagement findings; and
- Project website and document box containing detailed engagement pieces, e.g., virtual reality sea level rise explorer applications, meeting slide decks: www.cityofsantacruz.com/ResilientCoast

As part of the Plan development process, the City invested substantially in outreach and community engagement, supported by a complementary beach-focused project funded by the California Coastal Commission. The goal of the engagement was to build trust, educate, and engage with a wide cross section of the community including many more historically under-served and under-represented people, many who are living on the frontline of sea level rise. Moreover, as primary elements of the Plan were completed, they were reviewed by the Technical Advisory Committee (TAC) and key city staff as well as presented more widely in the community for review and feedback using a wide variety of outreach tools.

1.1.2. Preparation and Use of the Plan

This Plan contains seven significant elements:

1. The context of West Cliff Drive including the existing baseline facilities, circulation and parking, public access and recreation, shoreline conditions and armoring, habitat and utilities.

2. Project Planning considerations and constraints across the range of West Cliff Drive's features and resources including the impacts of sea level rise and climate change to be considered in project development.

3. Resource management goals, objectives, and a program overview that describe the near-term projects that are the focus of this Plan, potential physical triggers to be monitored and developed in future plan alignment and community engagement processes.

4. The Public Works Plan that specifically details the projects that will be phased and implemented upon adoption of the Plan.

5. Potential near term and future illustrative transportation concept designs possible for the corridor.

6. Project Approval Procedures for West Cliff Drive; and

7. A Capital Improvements Program (CIP) project list with estimated costs, phased over 4 three-year CIP cycles, that is integrated into the City's FY22 capital planning;

A set of appendices contain the analyses and supplemental information to support the seven core sections of the report including links to prior documents referenced above. The Plan defines the program – projects, policies and practices – that set the near-term course for adaptive management of West Cliff Drive under climate hazard conditions. The Plan may need to be revisited over time to consider the state of best available science, new policy or regulatory requirements, and to gauge community perspectives on tradeoffs and preferences in coastal management.

Because the West Cliff Drive corridor is nearly three miles in length and its features vary substantially across the corridor, the corridor was separated into 4 zones as noted in Figure 1-0 below.

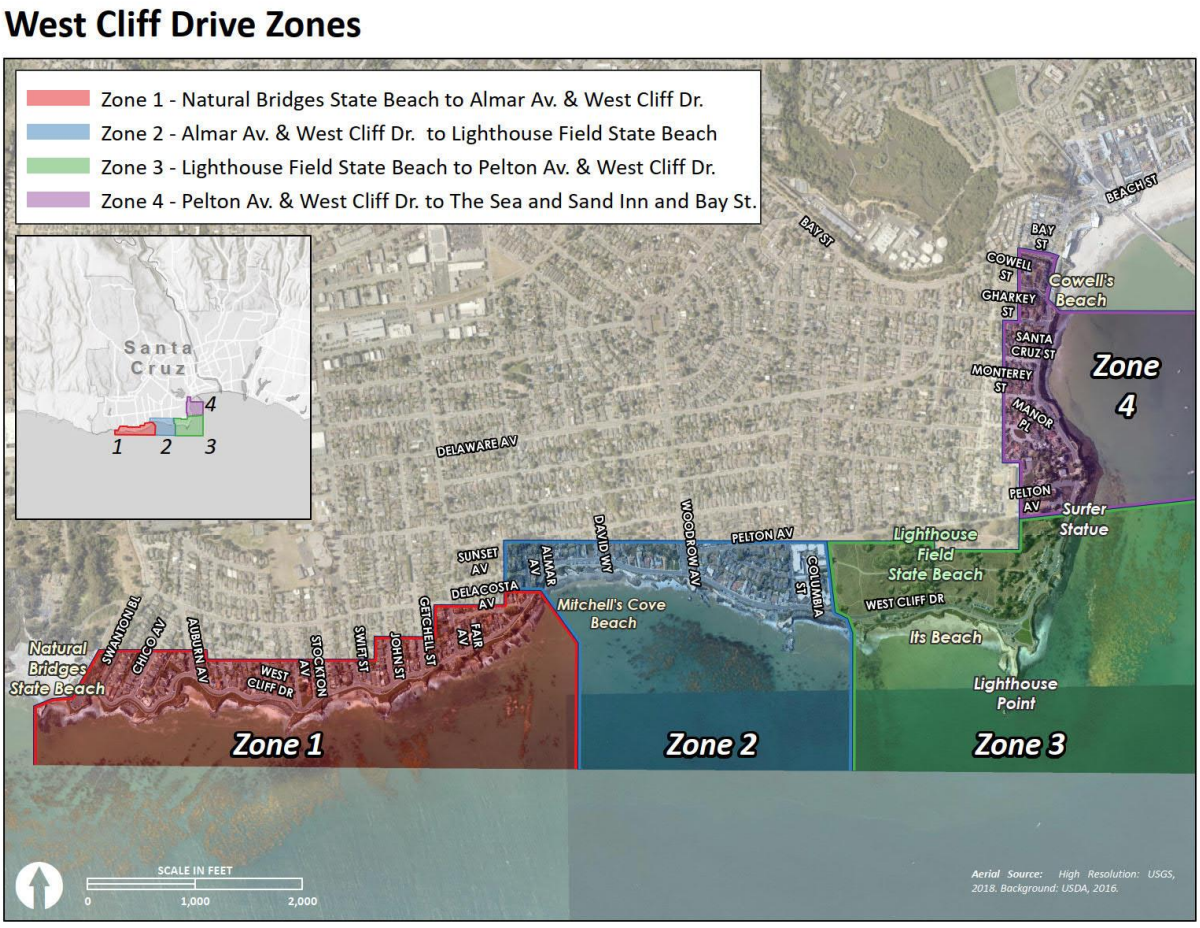


Figure 1-0. The 4 Zones of West Cliff Drive

1.2. Relationship to Other Plans and Permits

The purpose of the West Cliff Drive Plan is to present in one document, the various land use, design, recreation, circulation, environmental quality, and coastal erosion policies that have been designed to protect the coastal resources and public access features along West Cliff Drive.

The goals, policies and programs contained within this plan reflect a conscious effort to balance the many demands upon this area. The plan consolidates and presents the results of previous planning efforts back in the late 1990s and early 2000's, that included citizen input by the West Cliff Drive Task Force, the Parks and Recreation Commission, the Public Works Commission, the City and County Transportation Commissions, the Planning Commission, the City Council, the State Coastal Commission, the California Resources Agency and the Monterey Bay National Marine Sanctuary.

The Plan contains new implementation projects and maintenance concerning habitat landscape and access criteria that affect both public and private development adjacent to West Cliff Drive

The West Cliff Drive Plan follows the organization and parameters set forth in the certified General Plan/Local Coastal Program Policy PR-1.7.6 found on page 345 of the City of Santa Cruz 1990 – 2005 General Plan. Upon adoption by the City and certification by the California Coastal Commission, this Plan will supplement the City of Santa Cruz certified Local Coastal Program (LCP), and implement LCP Parks and Recreation Policy 1.7.6, as well as various CDP conditions requiring the preparation of a West Cliff Drive Management Plan.

1.2.1. City of Santa Cruz General Plan and Local Coastal Program

In 1972, California voters adopted Proposition 20 creating the California Coastal Act and Coastal Commission. The Coastal Commission was given the mandate of implementing Coastal Act policies by preparing a comprehensive plan for the California coastline and reviewing locally-approved projects within a coastal zone of approximately 1,000 yards along the coastline. In 1976, the Coastal Act was revised with specific provisions that coastal permit processing authority be transferred from the Coastal Commission to local government upon the adoption of a Coastal Land Use and Implementation Plan.

The City's Local Coastal Program (LCP) Land Use Plan was certified by the Coastal Commission 1992. The LCP included Policy Parks and Recreation Element Policy 1.7.6 requiring the City to develop and implement an integrated design, land use, recreation, cliff stabilization, and landscaping plan for West Cliff and East Cliff Drives to enhance public access, safety and recreational enjoyment in these areas. Specifically, it provides:

> 1.7.6 Develop and implement an integrated design, land use, recreation, cliff stabilization, and landscaping plan for West Cliff and East Cliff Drives to enhance public access, safety and recreational enjoyment in these areas. (See policy CD 3.4.3, S 1.2.3 and the Seabright Area Plan Summary)
>
> Create a continuous pathway along the coast by enhancing physical linkages between West Cliff and East Cliff Drives and the Beach Promenade.
>
> Lay out criteria for maintaining riprap, protection of paleontological resources and bird nests, and trail maintenance. (See policy S 1.2.3 and policies under CR 1)
>
> Monitor the beach profile and recreational use of beaches to obtain baseline information for analyzing riprap proposals and their recreational impacts and establish criteria for a maximum permitted coverage of sandy beaches by seawalls. (See policy EQ 4.1.3 and S 1.2.3)
>
> Analyze facilities and the need for additional or rehabilitation of existing lighting, restroom, drinking fountains, artistic and landscape enhancements, benches, bike

parking, directional and interpretive signs, accessways, stairways, overlooks, and improved safety proposals.

Develop design criteria for shoreline structures (e.g., minimize amount of material and coverage; emphasize use of non-glare, non-reflective, natural or natural-appearing materials, incorporation of access facilities). (See policy EQ 4.1.3 and S 1.2.3)

Ensure continued monitoring of and possible remedial work for wastewater outfall protective rock (pursuant to Moffatt and Nichol's "Santa Cruz Outfall Monitoring Program").

Develop locational and non-point source pollutant criteria for dealing with drainage discharges.

Examine the feasibility of periodic street closure or limiting vehicular access along the length of West Cliff Drive and consider opening up West Cliff Drive between Washington and Beach Streets to bicycles and pedestrians only. (See policy C 3.1.7)

1.2.2. Coastal Development Permit 3-90-111-A2

CDP 3-90-111-A2, approved by the Coastal Commission in June 1998, allowed construction of two engineered armor stone revetment structures to protect West Cliff Drive and repair of the damaged recreational pathway and two parking areas and was conditioned to require submission of a West Cliff Drive Integrated Development and Management Plan within two years of approval. Specifically, that condition required:

> 5. West Cliff Drive Integrated Development and Management Plan. WITHIN TWO YEARS OF THE APPROVAL OF THIS PERMIT, the permittee shall submit to the Commission for review and approval a West Cliff Drive Integrated Development and Management Plan which will provide for integrated design, land use, recreation, cliff stabilization, and landscaping for the West Cliff Drive corridor consistent with Local Coastal Program Parks and Recreation Element Policy 1.7.6. Provided the City has made regular progress towards completion of the Management Plan, this time period may be extended by the Executive Director for good cause (including funding contingencies). The submittal shall include a schedule of implementation and shall identify potential funding sources. Subsequently, the City shall submit annual implementation status reports to the Executive Director by July 1 of each year.

The City was unable to fulfill this condition in the timeframe noted. However, the Plan satisfies the condition and sets forth a project implementation program process going forward.

1.3. Regulatory Context

1.3.1. California Coastal Act

1.3.2. Other Regulations/State of California Adaptation Guidance

The California Coastal Commission (CCC), Ocean Protection Council (OPC), and Natural Resources Agency (NRA) have released sea level rise and adaptation planning guidance documents that are to be used by local jurisdictions to update land use planning documents.

OPC State of California Sea-Level Rise Guidance (2018)

In March 2018, the California Natural Resources Agency and OPC released an updated *State of California Sea-Level Rise Guidance* including eight preferred sea level rise planning and adaptation approaches:

- Adaptation planning and strategies should prioritize social equity, environmental justice, and the needs of vulnerable communities
- Adaptation strategies should prioritize protection of coastal habitats and public access
- Adaptation strategies should consider the unique characteristics, constraints, and values of existing water-dependent infrastructure, ports, and Public Trust uses
- Consider episodic increases in sea level rise caused by storms and other extreme events
- Coordinate and collaborate with local, state, and federal agencies when selecting sea level rise projections; where feasible, use consistent sea level rise projections across multi-agency planning and regulatory decisions
- Consider local conditions to inform decision making
- Include adaptive capacity in design and planning
- Assessment of risk and adaptation planning should be conducted at community and regional levels, when possible.

CCC Sea Level Rise Policy Guidance (2018)

In November 2018, the CCC adopted the 2018 Sea Level Rise Policy Guidance – Final Science Update (CCC 2018b). The guidance update recommends use of the State of California Sea-Level Rise Guidance: 2018 Update (OPC 2018) for sea level rise scenarios. Both the CCC 2018 and OPC 2018 guidance documents are complementary and utilized across the state for planning and adaptation strategies.

Sea Level Rise Policy Guidance (CCC 2018) outlines 20 guiding principles based on Coastal Act policies that address sea level rise in the coastal zone and fall under four categories:

- Use science to guide decisions (Coastal Act Sections 30006.5; 30335.5);

- Minimize coastal hazards through planning and development standards (Coastal Act Sections 30253, 30235; 30001, 30001.5);
- Maximize protection of public access, recreation, and sensitive coastal resources (Coastal Act Chapter 3 policies); and,
- Maximize agency coordination and public participation (Coastal Act Chapter 5 policies).

Natural Resources Agency Safeguarding California Plan (2018)

The *Safeguarding California Plan: 2018 Update* (NRA 2018) describes the State's climate change adaptation plan and actions state agencies should take to adapt communities, infrastructure, services, and the natural environment to climate change. This Plan outlined programmatic and policy responses as well as seven overarching principles:

- Consider climate change in all functions of government
- Partner with California's most vulnerable populations to increase equity and resilience through investments, planning, research, and education
- Support continued climate research and data tools
- Identify significant and sustainable funding sources to reduce climate risks, harm to people, and disaster spending
- Prioritize natural infrastructure solutions that build climate preparedness, reduce greenhouse gas emissions, and produce other multiple benefits
- Promote collaborative adaptation processes with federal, local, tribal, and regional governments;
- Increase investment in climate change vulnerability assessments of critical built infrastructure.

Transportation/Caltrans Adaptation Guidance

California adopted an Adaptation Planning Guide in 2012 which identified a nine-step process highlighting flexibility while incorporating local and regional characteristics into adaptation projects. This project has followed the guidance and the first six steps (Figure 1-1). The next three steps are identifying adaptation strategies, evaluating and prioritizing them, and eventually developing a phased implementation plan. Caltrans has produced some high-level guidance on adaptation projects; however, it has been focused primarily on Caltrans-operated facilities and not local roadways.

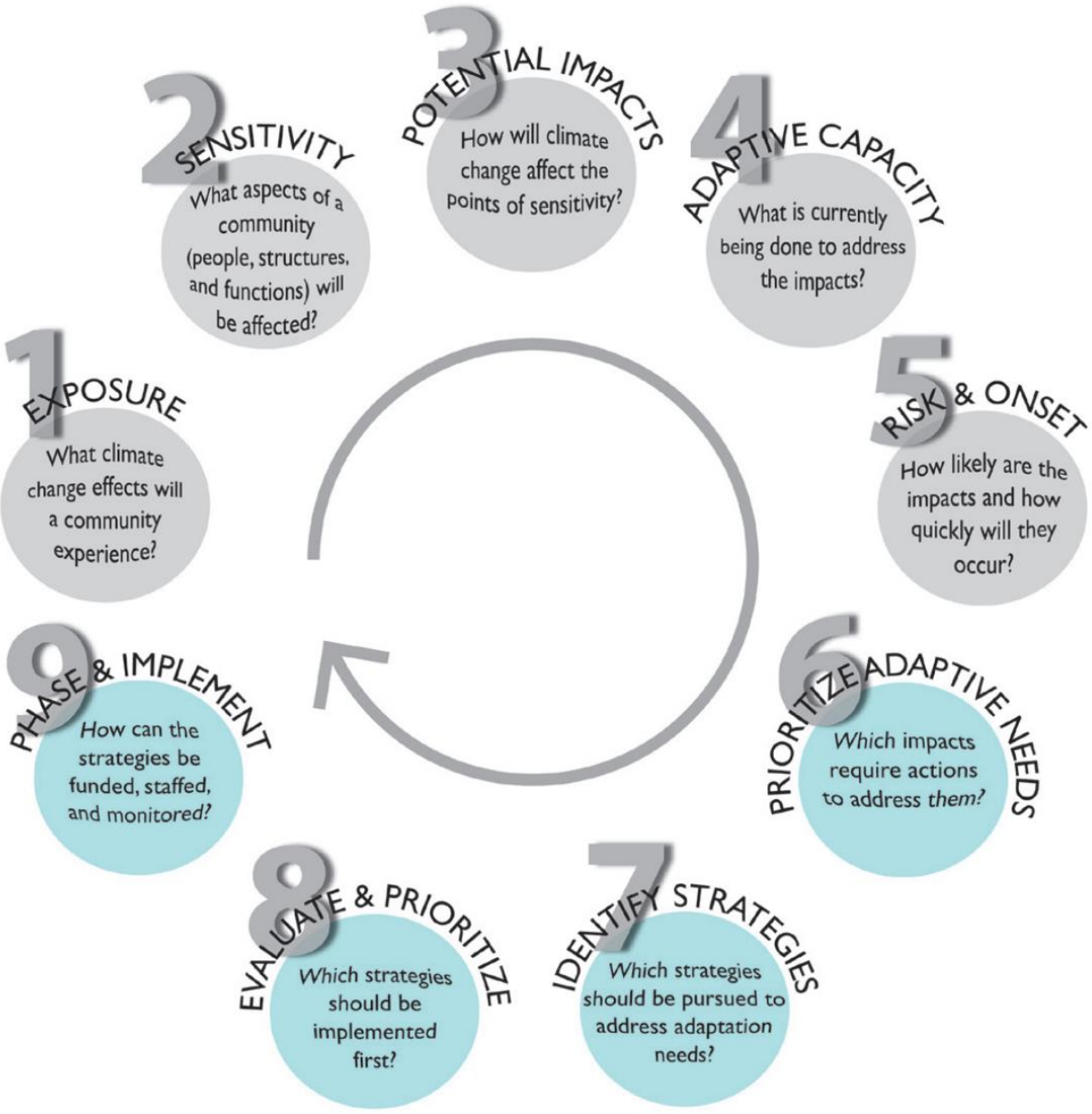


Figure 1-1. The nine steps in adaptation planning development. The gray steps are part of vulnerability assessment (steps 1–5) and blue steps are adaptation planning (steps 6–9). Source: California Adaptation Planning Guide 2012.

Since the funding source of this project is from the Caltrans Adaptation Planning Grant Program, it is relevant to mention Caltrans' ongoing efforts in climate adaptation and resiliency. Caltrans has completed Vulnerability Assessments for each district and is near completion of the Adaptation Priorities Reports for each district. The Caltrans Vulnerability Assessments provided a high-level review of potential climate impacts to each district's portion of the State Highway System. The Adaptation Priorities Report will use the information from the Vulnerability

Assessment Report to prioritize the order in which assets found to be exposed to climate hazards will undergo detailed asset-level climate assessments.

In 2016, the Federal Highway Administration (FHWA) released the Adaptation Decision-Making Assessment Process (ADAP) to assist transportation planners and designers to account for climate change in civil transportation projects. The decision tree (Figure 10-3) assists with all types of adaptation projects, including flooding, erosion, sea level rise and in general evaluating the impacts and secondary consequences from climate change. In addition, FHWA published the Vulnerability Assessment and Adaptation Framework in 2017 citing examples of adaptation work from around the country and citing the use of Multi-Criteria Analyses and Risk Matrices to evaluate adaptation alternatives.

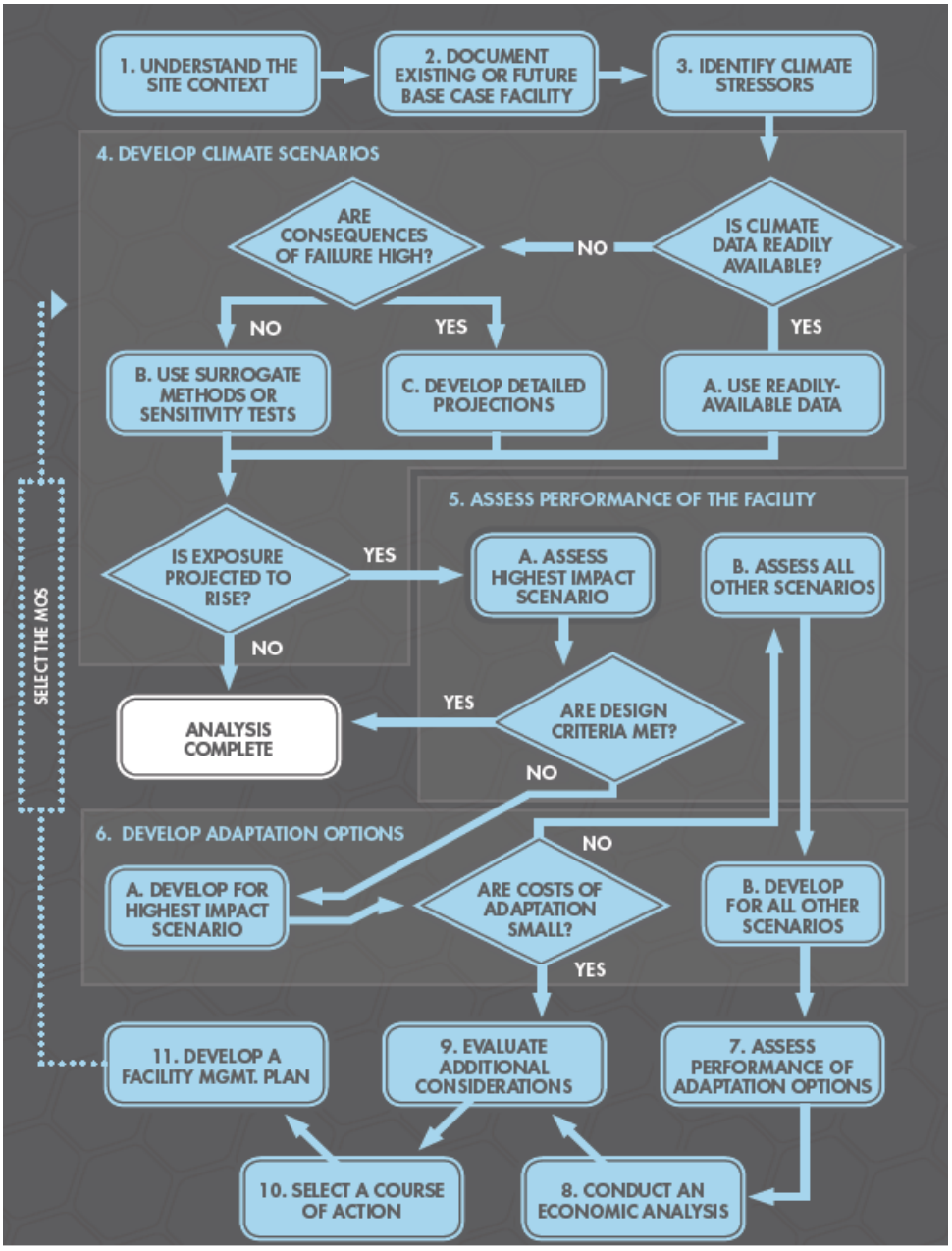


Figure 1-2. FHWA Adaptation Decision-Making Assessment Process

Local Transportation Planning Initiatives

Given the absence of neighborhood scale adaptation guidance, it is important to align transportation adaptation strategies to existing transportation studies and plans that the City of Santa Cruz has previously developed. This consideration of local transportation studies incorporates near term and long-term direction for the future of West Cliff Drive consistent with the City of Santa Cruz General Plan completed in 2012, the City of Santa Cruz Active Transportation Plan (ATP) completed in 2017, and the City of Santa Cruz Climate Action Plan (CAP) completed in 2012 and updated in 2018. Reviewing the existing conditions assessment and

referencing the aforementioned plans helps to guide selection of adaptation alternatives for conceptual design alternative analysis. The ATP serves as a guide for improving active mobility in and around the City of Santa Cruz. The ATP also identified potential future projects, including enhancements of bicycle infrastructure for connecting streets to West Cliff Drive such as Almar Avenue. In addition, a project to stripe additional crosswalks providing formal pedestrian access from West Cliff neighborhoods to the Recreational Trail is identified as well as increasing the number of available bike racks. The ATP also cites the City of Santa Cruz General Plan Policies including:

- M 1.2, Create livable streets. “Livable streets” support the intent of Section 65302(b) of the California Government Code to create “complete streets” planned, designed, operated, and maintained to provide safe mobility for all users, including “bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors.”
- M2.3, Increase the efficiency of the multi-modal transportation system.
- GOAL PR4, An integrated system of citywide and regional trails.
- PR4.1, Provide and maintain an accessible citywide trail system within the city and connect it to regional trails.
- PR4.1.1, Provide trails for a range of uses.
- PR4.1.2, Update and maintain trails in accordance with the City’s Bicycle and Pedestrian Master Plans. Cf. CD5.1, M4.1, M4.2, CC8.4.
- PR4.1.3, Maintain and enhance the recreational value of the San Lorenzo River walkway and East and the West Cliff Drive pathways.
- PR4.1.4, Create a continuous pathway along the coast by enhancing the physical links between West Cliff and East Cliff Drives and the Beach Promenade.
- PR4.1.6, For special events, examine the feasibility of periodically closing the street or limiting vehicular access along West Cliff Drive.
- M4.3.2, Develop bike commute routes along railroad rights-of-way (while ensuring the ability to develop rail transit) and along West Cliff Drive, Broadway, King, and other streets.

Figure 1-3. West Cliff Drive Open Streets, Fall 2019

2. Context

2.1. Regional and Local Setting

2.1.1. Central Coast Region

2.1.2. Project Vicinity

West Cliff Drive represents an ocean front road and recreational transportation corridor that provides visitor and resident access along a 2.7 mile stretch of low cliff backed coast (20 to 45 feet in elevation) from Natural Bridges State Beach in the west to Cowell's Beach in the east. This corridor currently contains two lanes of traffic, one in each direction and the West Cliff Drive Recreational Trail (Recreational Trail), a multi-use biking and walking trail with scenic and coastal accesses. Cliff erosion occurs frequently and there is a long history of coastal erosion along this corridor. Erosion responses have been to either relocate or to armor the eroded areas. Currently, almost 50% of West Cliff is protected by seawalls and rip-rap, of varying age and in varying condition, which currently mitigates some of the existing erosion hazards but may not be sufficient to mitigate future sea level rise hazards.

The coastal armoring along West Cliff Drive is managed and regulated by a number of state and federal regulatory agencies. Private and public property boundary in California is determined by the location of the mean high water (MHW) tide line, a 19-year average of tide elevations. The California Coastal Commission (CCC), the primary coastal management regulatory agency regulates land above MHW within the Coastal Zone and evaluates projects based on their

consistency with 1976 California Coastal Act. The City of Santa Cruz has an LCP, which was certified by the Coastal Commission in 1994 consistent with the 1976 California Coastal Act, and which includes land use policies and an implementation plan granting the City primary permit authority over land use decisions, and an update to the existing LCP is under way. Recent state guidance has encouraged local jurisdictions to update their LCPs to more thoroughly consider the future threats posed by sea level rise and has provided grant funding to facilitate this request. The City is pursuing a complementary project focused on beaches and the land uses adjacent to them with CCC grant funding. Below MHW, subtidal and intertidal lands are also regulated by the California State Lands Commission (CSLC), which manages these areas for public trust uses. In some areas, CSLC grants public trust authority to other entities, such as the City-granted land from the west harbor jetty to Lighthouse Point and the land upon which the City-owned Municipal Wharf sits. In these areas below MHW, the CCC retains coastal development permit authority. As sea levels rise and MHW moves inland, many of the existing coastal armoring structures may come under CSLC jurisdiction.

Federally, the U.S. Army Corps of Engineers (USACE) has the lead federal jurisdiction for biological impacts with its jurisdiction below the ordinary high tide line, which has been legally interpreted to be the highest high tide of the year (aka King Tide). The USACE jurisdiction triggers biological consultations with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service for biological resource concerns. In addition, offshore of West Cliff Drive is the Monterey Bay National Marine Sanctuary, which was established in the 1980s to protect against offshore oil and gas development, but also has responsibility for the protection of marine species and ocean water quality. Depending on where along West Cliff Drive and at what elevation, permits may be required by all aforementioned agencies. As sea level rises, MHW and ordinary high tide and the regulations will shift.

The weather in Santa Cruz is considered Mediterranean with cool, wet winters, and warm, dry summers. Winds generally blow out of the northwest except during storm conditions when winds come from the south. Waves also change seasonally with large west and northwest swells in the fall and winter, wind waves in the spring, and smaller southerly swell waves in the summer. The wave direction largely drives sand transport from the west to the east. Ocean water temperatures are typically cool to cold with the northwest winds driving ocean upwelling and keeping temperatures cold year-round.

West Cliff Drive is oriented primarily east and west so that the dominant wind direction blows offshore from the land to the sea. This creates a unique set of conditions favorable to surfing. Surfing has a long history in Santa Cruz, one of the reasons Santa Cruz proclaims itself Surf City, USA. It was the first location where surfing came from its birthplace in Hawaii to the U.S. Mainland in the late 1800s. The surfer statue of Duke Kahanamoku at West Cliff Drive and Pelton Avenue commemorates this heritage. Santa Cruz is also the location where Jack O'Neill invented the first wetsuit designed to keep surfers warm in cold water. The Lighthouse Surf Museum on West Cliff Drive documents many of the historical changes in surfing and surf culture. As a result of this unique coastal setting, history of surfing, consistent wave exposure

and world class surf spots, Santa Cruz is a mecca for surfers from all over the world and on any given day there can be a thousand surfers in the water off of West Cliff Drive. It is also the reason the surf breaks within Santa Cruz were designated a World Surfing Reserve in 2012.

Aside from surfing, there is a wide variety of land and water based recreational uses along the Recreational Trail and the various coastal accesses to the beaches and water. West Cliff Drive is an iconic coastal roadway with scenic vistas enjoyed by residents and tourists alike. It provides access to enjoy the Pacific Ocean and its many splendors, surfing, swimming, foraging, tide-pooling, and much more. The multi-use Recreational Trail and the roadway provides space to recreate in many forms, walking, bicycling, skating, driving, exercising, and much more. However, there are reports of frequent user conflicts including but not limited to pedestrians and bicyclists, dogs and automobile. Preservation of coastal access both along the corridor and to the water's edge is critically important to the identity of the community. Biking, walking, wildlife viewing, and fishing along with are highly popular for both visitors and residents alike along with a range of other activities. West Cliff Drive is a popular location for races and events, and these official events close West Cliff Drive sporadically throughout the year.

Land use and development along West Cliff are unique. The City owns most of the land along the seaward side of West Cliff Drive except for a few private parcels, including but not limited to a private residence and two hotels. California State Parks owns and operates Lighthouse Field State Beach, on the landward side of West Cliff Drive lies Lighthouse Field, an open space with various habitat and recreational values, as well as portions of West Cliff Drive near the Lighthouse and Natural Bridges State Beach, with both sites having seabird roosting sites as well as monarch butterfly groves. The zoning along the ocean side of West Cliff Drive is Ocean Front Recreation, which limits most development potential.

Along the shoreline are a variety of beaches, rocky intertidal, and cliff roosting habitat for a variety of sensitive bird and intertidal species. Just offshore are kelp beds and offshore rocks, which provide habitat for sea otters and a host of other marine mammals. During fall and spring, it is common to observe migratory whales moving between Alaska and Mexico.

2.2. Existing Facilities

2.2.1. Pedestrian Facilities

Pedestrian facilities along West Cliff Drive include sidewalks, crosswalks, informal trails, curb cuts, truncated domes and provide safe passage along the corridor for a wide variety of users. The primary pedestrian facility is the West Cliff Recreational Trail on the ocean side of the roadway. Additionally, significant portions of West Cliff Drive have a sidewalk accommodated by a non-uniform 5-ft easement on the inland side of the roadway. Pedestrian counts were collected during the traffic counts of vehicles and bicycles and previously listed in Table 2-1, which summarizes the pedestrian volumes observed along the West Cliff Recreational Trail on two summer days. The counts show similar volumes along the West Cliff Recreational Trail, with

slightly higher midweek usage in the more residential portion along Swift Street, and slightly higher usage around Lighthouse Point during the weekend. Pedestrian activity near Bay Street along West Cliff is considerably higher than other areas along the corridor.

Table 2-1. Pedestrian Counts along West Cliff Recreational Trail

Mode	Lighthouse Parking Lot Driveway		Swift Street		Swanton Blvd		Bay St	
	Midweek Daily Total	Weekend Daily Total	Midweek Daily Total	Weekend Daily Total	Midweek Daily Total	Weekend Daily Total	Midweek Daily Total	Weekend Daily Total
Pedestrians	1,600	2,600	1,700	2,500	1,000	1,800	1,800	3,900
Volumes were collected over a 24-hour period at the intersection.								

West Cliff Recreational Trail and Sidewalks

On the ocean side of the West Cliff Drive lies the Recreational Trail, a Class I trail shared collectively by pedestrians, cyclists and all other non-auto users. The trail provides access to stairwells and footpaths to beaches, ocean and intertidal areas. The trail is very well used not only for traveling or accessing the many destinations but also for stopping and gazing at the beautiful vistas off the coast. At times, the Recreational Trail experiences user congestion typically near heavily used beaches and parking areas. Sidewalks exist along West Cliff Drive on the opposite side of the road from the trail, with a few exceptions. These exceptions exist between Stockton Avenue and Merced Avenue, Fair Avenue and De La Costa Avenue, Almar Avenue and Sunset Avenue, portions between Sunset Avenue and David Way, and between Columbia and Pelton alongside Lighthouse Field State Park.

Crosswalks

There are marked crosswalks at very few intersections along the West Cliff Drive corridor, although the majority of three-way stop-controlled intersections do have marked crosswalks, including at Swanton Blvd, Swift St, Woodrow Avenue, and Bay Street. Other marked crosswalks exist at trail access from State Parks Parking Lots B and C adjacent to their driveways. Two painted crosswalks occur midblock, one between parking lot B and the West Cliff Recreational Trail and another joining a State Park trailhead and the West Cliff Recreational Trail between Parking Lots A and B. Crosswalks exist at Manor Avenue and Monterey Street and access to the Manor Avenue parking lot overlooking Cowell's Beach. There are crosswalks on all approaches to the roundabout at the entrance to the wharf. Additionally, marked crosswalks exist between the Dream Inn and their parking lot. Even though marked crosswalks are not present at all intersections, unmarked crosswalks exist at every intersection. Pedestrians have the right of way in all marked crosswalks and unmarked intersections.

State Park Trails and Other Informal Trails
Lighthouse Field State Beach includes a large open space habitat area on top of the cliff between Pelton Avenue and West Cliff Drive. State Parking Lots B, C, and D border the open space. There are many circuitous trails located throughout the open space, which allow pedestrians to walk from inland neighborhoods and the parking lots to West Cliff Drive and the West Cliff Recreational Trail. Additionally, some trails connect Pelton Avenue with West Cliff Drive. Throughout the entire corridor many informal trails exist from the West Cliff Recreational Trail across the bluffs that help provide access to tide pools, beaches and the base of the cliffs.

Accessibility for People with Disabilities
The corridor and West Cliff Recreational Trail are generally accessible to pedestrians with disabilities who require a wheelchair or are visually impaired. Each intersection has curb cuts and a varied level of embedded tactile surfaces within the curb cuts. A few intersections do not provide direct access to the trail, rather a sidewalk to the adjacent local road where trail access exists. Select parking lots do have accessible parking spots available.

2.2.2. Existing Bicycling Conditions

Types of Bicycling Facilities
The core for all cycling along West Cliff Drive is the West Cliff Recreational Trail Class I facility. As mentioned earlier this is a multi-use trail. Cyclists can also use the regular roadway as a Class III facility and often do when the trail is overly congested with other users; however, there is no designated bike lane, cyclists share the lane with vehicles. Cycling along the trail can result in conflicts between some fast-moving cyclists and to other users of the trail Conflicts amongst users were identified frequently in community focus group meetings particularly with regards to the speed of electric assist bikes.

Table 2-1 summarizes the bike counts along the trail. The following side streets to West Cliff Drive have bike lanes: Swanton Boulevard, Swift Street, Woodrow Avenue, and Bay Street. These streets have dedicated bike lanes as Class II facilities between vehicular traffic lanes and on-street parking. These bike lanes provide connection to West Cliff Drive and Recreational Trail, but also connect with other bike lanes and bike routes such as Delaware Avenue. The local street network surrounding and leading into West Cliff Drive are residential with many low volume and low speed roads that work well for many types of bicyclists.

Table 2-1. Bicycling Counts along West Cliff Recreational Trail

Mode	Lighthouse Parking Lot Driveway		Swift Street		Swanton Blvd		Bay St	
	Midweek Daily Total	Weekend Daily Total	Midweek Daily Total	Weekend Daily Total	Midweek Daily Total	Weekend Daily Total	Midweek Daily Total	Weekend Daily Total
Bicycle WB	90	170	90	150	100	150	170	220

Bicycle EB	150	270	190	330	150	280	110	170
Bicycle Subtotal	**240**	**440**	**280**	**480**	**250**	**430**	**280**	**390**
Volumes were collected over a 24-hour period at the intersection.								

Bicycle Access to West Cliff Drive

There are many designated bikeways around Santa Cruz. Specific roadways have designated bike lanes adjacent to either the sidewalk or on-street parking. Swanton Boulevard, Swift Street, Woodrow Avenue, Bay Street and West Cliff Drive from Downtown Santa Cruz. Delaware Avenue, which connects with all the aforementioned bike lanes, has a mixture of bike lanes and shared roadway depending on the right-of-way width.

Bike Racks and Parking

There are only 12 total bike racks along West Cliff Drive, with six located at the Cowell's Beach Main parking lot. The other six are located at the Surfers Memorial Overlook, Lighthouse Point and State Park Parking Lot C. Bikes are frequently locked in great numbers along the fences of West Cliff Drive, especially adjacent to beach access points and stairwells. Figure 3-4 and Figure 3-5 show the locations of all parking lots, bike racks, crosswalks, stairways, and transit.

In 2018, the City of Santa Cruz had partnered with JUMP by Uber to provide a public bike share system. This system provided electric assist bicycles through both the JUMP and the Uber mobile apps to make bikes available on-demand to the public. As part of this system, there were two JUMP Bike share stations in the West Cliff Drive corridor, one at Lighthouse Point parking lot and another on Swanton Boulevard at West Cliff Drive. Bike Share bikes could be locked at their location if a user is continuing to use it or simply parked and locked out of the path of pedestrians and cyclists. Most users would park their bikes with courtesy; however, JUMP Bikes are sometimes parked by the previous user with no discretion or mindfulness of the other users of the corridor. As reported from JUMP, usage along the corridor is consistent through the summer. Peak month trips using JUMP bikes along the corridor in 2019 include: June: 3,400; July: 3,820; August: 3,100, September: 2,950. Figures 2-1 and 2-2 below illustrate the locations of pre-pandemic bicycle infrastructure.

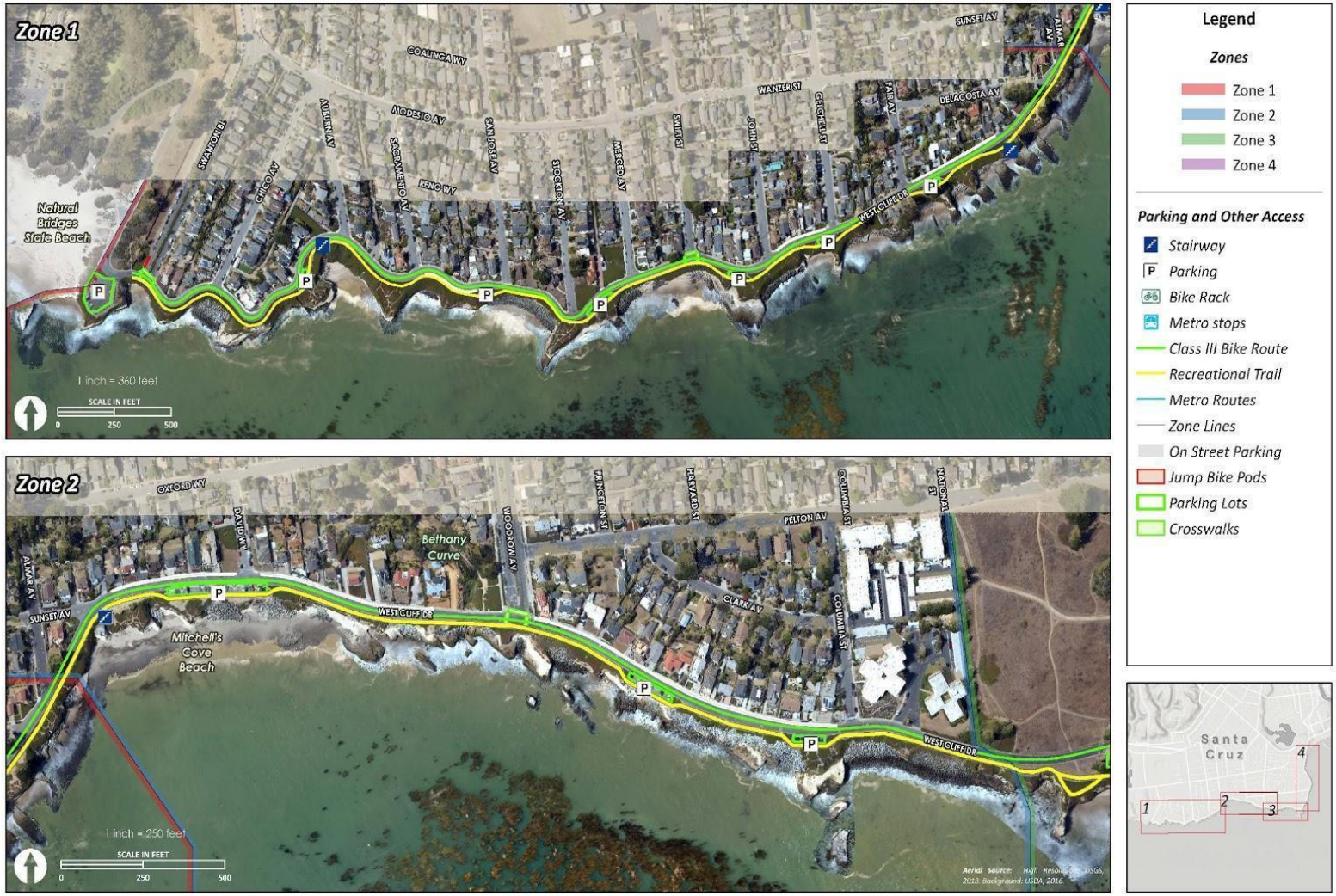


Figure 2-1. Parking, bike parking, stairways, and transit, Zones 1 & 2.

Figure 2-2. Parking, bike parking, stairways, and transit, Zones 3 & 4.

2.2.3. Buildings

There is one building (approx. 6,354 sq ft) on the seaward side of West Cliff Drive.

Table 2-2. Existing buildings on the landward side of West Cliff Drive, and estimated area

Zone	SF + MF Residential Buildings	SF & MF Residential Buildings (sq ft)	Commercial Buildings	Area of Commercial Building (sq ft)	Public Restrooms	Area of Public Restrooms Restroom (sq ft)
Zone 1	59	211,286	0		0	0
Zone 2	37+2 = 39	186,671	0	0	0	0
Zone 3	0	0	1	2,015	2	500
Zone 4	16+2 = 18	737,74	0	0	0	0

2.2.4. State In-Holding

State Lands Commission

In terms of natural resources, aside from the submerged seabed, there are two natural features that are partially included in the State 1969 Submerged Lands Grant Area: beaches and bluff/cliff topography. The State Lands Commission boundary follows the mean tide line along the beach and thus the majority of the unsubmerged Seabright, Main and Cowell Beaches are excluded from the State Grant Area. Similarly, the State Lands Commission boundary extends to and follows a portion of West Cliff Drive's adjacent cliff line, including some seawalls. These features are exposed and vulnerable to the combined impacts of sea level rise, including: rising tide, coastal storm flooding, and erosion.

2.2.5. Outdoor Support Facilities and Amenities

West Cliff Drive includes other support facilities and amenities as noted in figure X including benches, lighting, signage, exercise equipment, restrooms, garbage cans, etc. Figures 2-10 through 2-13 contained in the 2.4 Public Access section of the Context chapter illustrate primary amenities along the corridor.

2.3. Existing Circulation and Parking

2.3.1. Intersections

There are 26 intersections along the West Cliff Drive study corridor (Table 2-3). These intersections are divided into three categories: local road access with side-street stop sign controlled intersections, three-way stop sign controlled intersections, and a single roundabout

near the wharf. The roundabout facilitates access to and from Pacific Avenue and Downtown Santa Cruz, the Santa Cruz Municipal Wharf, Cowell's Beach, Beach Street, Main Beach, and the Santa Cruz Beach Boardwalk and West Cliff Drive. The roundabout was designed for pedestrians with wide crosswalks and curb cuts with tactile warning strips for safer use by the visually impaired. The roundabout accommodates traffic flow to the main tourist attractions in Santa Cruz, The Wharf and Beach Boardwalk.

There are six three-way stop intersections along West Cliff Drive. Those intersections include Swanton Boulevard, Swift Street, Woodrow Avenue, Columbia Street, Pelton Street, and Bay Street. The other 19 local roads with stop-controlled access primarily provide residential access but do provide some limited on-street parking. Table 2-3 provides detail of the assets available at each intersection along the corridor.

Description of Five Cross Sections[1]

Location 1 is the intersection of Swanton Boulevard and West Cliff Drive in Zone 1. It is also the entrance to Natural Bridges State Park and the overlook parking lot. Swanton Blvd is a collector street and has an existing Class II bicycle facility with striped bike lanes. In the future, the City of Santa Cruz plans to enhance the Swanton Boulevard bike lanes to connect the planned Rail Trail to West Cliff Drive. Multimodal traffic counts were collected here and are available in the existing conditions report.

Location 2 is the Pyramid Beach parking lot overlooking Pyramid beach and close to Auburn Avenue in Zone 1. This parking lot currently has 8 parking spots striped perpendicular to the flow of traffic. It is located along a curve and serves as a design example for many of the parking lots along the corridor.

Location 3 is located at Woodrow Avenue. This location is in the middle of the erosion zone that poses a high risk of projected cliff erosion and likelihood of sea cave failure that could affect the West Cliff Drive corridor. Woodrow Avenue is a collector street and has an existing Class II bike lanes. This site has physical constraints due to the current cliff erosion rates, Recreational Trail width, and observation shows frequent movement conflicts between pedestrians and cyclists on the trail. Additionally, the parking lot directly East of Woodrow Avenue along West Cliff Drive where previous coastal armoring failure occurred requiring emergency repairs in 2017 is included to demonstrate design alternatives for similar parking lots.

Location 4 is located at the State Parks Parking Lot A. Just west of the parking lot is a significant erosion risk impacting the Recreational Trail. The ROW transect here is constrained at the point where the recreational trail has a small spur to just west of the parking lot. The lot also has heritage Cypress trees which are considered in the designs. This lot along with the other State Park parking lots has consistently high occupancy percentages. Table 2-6 Parking Lot Names and Lot ID shows capacity and average occupancy.

[1] Also see the figure in Chapter 7 with each cross section mapped.

Location 5 is at Santa Cruz Street. This location is a typical cross section for many residential streets to West Cliff Drive. It also is physically constrained by the amount of space available within the ROW. Design concepts applicable here are applicable at many other locations throughout the corridor such as nearby Gharkey St and residential street to the west such as Merced or Sacramento Avenues.

Table 2-3. Intersections Accessibility and Access to West Cliff Recreational Trail

Cross Street	Curb Cuts	Yellow Tactile	Concrete Tactile	Access to Trail	Painted Crosswalk	Stop Sign
Swanton Blvd	3	3	0	Y	3	3
Chico Ave	2	2	0	N	0	1
Auburn Ave	3	3	0	Y	0	1
Sacramento Ave	3	2	0	Y	0	1
San Jose Ave	3	2	0	Y	0	1
Stockton Ave	2	1	1	Y	0	1
Merced Ave	3	3	0	Y	0	1
Swift St	4	1	3	Y	3	3
John St	3	3	0	Y	0	1
Getchell St	3	1	1	Y	0	1
Fair Ave	3	1	2	Y	0	1
De La Costa	0	0	0	N	0	1
Almar Ave	2	2	0	Y	0	1
Sunset Ave	0	0	0	Y	0	1
David Way	1	1	0	Y	0	1
Woodrow Ave	4	1	1	Y	3	3
Columbia	3	3	0	Y	0	3
Pelton	2	1	0	Y	0	3
Manor Ave	3	1	2	Y	2	1
Monterey St	2	0	2	N	1	1
Santa Cruz St	3	1	2	Y	0	1
Gharkey St	3	1	2	Y	0	1
Cowell St	3	0	2	Y	0	1
Bay St	4	1	0	Y	3	3
Beach St / West Cliff Dr.	4	3	1	Y	2	1
Pacific Avenue	14	14	0	Y	6	Yield

2.3.2. On-Site Circulation / Traffic Counts

To better assess existing conditions, 24-hour multimodal traffic counts were collected for four days ; two days in the middle of summer and two days in the early fall in 2019. Two mid-weekdays and two weekend days were sampled. Standard methodology for traffic data collection is typically one midweek day and one weekend day. The traffic counts were collected at Lighthouse parking lot and Swift Street on Thursday, July 25, and Saturday, July 27, and at Swanton Boulevard and at Bay Street on Saturday, September 29, and Wednesday, October 2. Because the corridor is widely used by pedestrians, recreational users, and cyclists, multimodal traffic counts assist in understanding the uses and patterns of use in the corridor. These traffic counts will be further assessed when evaluating alignment alternatives and conceptual alternatives. The recorded traffic counts are available in the Appendix 4. Turning movement data were used to calculate average daily traffic (ADT). ADT is a measure of traffic volume for a 24-hour period. Table 2,4 includes ADT for both westbound (WB) and eastbound (EB) traffic along West Cliff drive. The traffic count data will be integrated into future transportation modeling phases of the project.

Table 2-4. West Cliff Drive Traffic Counts from Mid-summer and Early Fall

Mode	WCD West of Lighthouse Parking Lot Driveway		WCD East of Swift Street		WCD East of Swanton Blvd		WCD South of Bay St	
	Midweek Daily Total	Weekend Daily Total	Midweek Daily Total	Weekend Daily Total	Midweek Daily Total	Weekend Daily Total	Midweek Daily Total	Weekend Daily Total
Vehicle WB	3,300	2,700	2,200	2,100	1,200	1,600	4,400	5,400
Vehicle EB	3,300	3,400	2,300	2,500	1,300	1,700	4,200	5,100
Vehicle Subtotal	**6,600**	**6,100**	**4,500**	**4,600**	**2,500**	**3,300**	**8,600**	**10,500**
Bicycle WB	90	170	90	150	100	150	170	220
Bicycle EB	150	270	190	330	150	280	110	170
Bicycle Subtotal	**240**	**440**	**280**	**480**	**250**	**430**	**280**	**390**
Pedestrians	1,600	2,600	1,700	2,500	1,000	1,800	1,800	3,900

Volumes were collected over a 24-hour period at the intersection. Calculations were made for through-put at the Lighthouse Parking Lot, East of Swift Street, East of Swanton Blvd and West (South) of Bay St.
WCD = West Cliff Drive

No analysis was conducted to accurately analyze traffic congestion along the corridor. Collected traffic counts reflect a moderate level of daily traffic. Due to the high proportion of recreational users and tourists, slower speeds are often witnessed due to unfamiliarity of the area. These users also can impact the traffic when entering and exiting parking lots, which are often at or near capacity during peak hours, especially sunset and high surf conditions.

No collision analysis was evaluated throughout the corridor. Most often turning movements into and out of parking areas can impact traffic flow and raise the potential for collisions. All three-way stop intersections have painted crosswalks to increase awareness of pedestrians. The West Cliff Recreational Trail experiences a mixture of users at different speeds using a variety of devices, which can create anxiety for several users, especially pedestrians which have been documented by the City during focus group outreach efforts. The width of the Recreational Trail varies throughout the entire length. Some pinch points can cause potential user movement conflicts.

2.3.3. Parking Lots and On Street Parking

The West Cliff Drive corridor has a total of 17 small parking lots adjacent to the West Cliff Recreational Trail. Additionally, there are as many as eight on-street parking areas along West Cliff Drive. The City of Santa Cruz collected parking occupancy data at various times and days during the months of May, July and August 2019 for most parking lots and on-street parking along the corridor. The survey consisted of counting the cars parked in designated lots and on-street parking along West Cliff Drive. All cars parked legally and illegally were counted. Occupancy data were collected for 14 parking lots along West Cliff Drive.

A few parking restrictions exist along the corridor. There is a 20-minute restriction at State Parks Lot A and the Natural Bridges Overlook. Other restrictions along the corridor include, no parking in all City parking lots between midnight and 5:00 a.m. except for Cowell's Beach, which is no parking between 2:00 a.m. to 5:00 a.m[2]. None of the State Parks parking Lots, A, B, C, and D allow parking between sunset and 8:00 a.m. and these lots have a locked gate during non-open hours. The Lighthouse parking lot is closed from 9:00 p.m. to 7:00 a.m. There are additional parking lots at either end of the corridor, one at the Natural Bridges Overlook and one at Cowell's Beach (15 metered spots and 2 accessible spots). No data were collected for those two lots; data were also not collected for the lot across from Fair Avenue. Table 3-5 provides a summary of on-street and off-street capacity. Table 2-5 provides a high-level list of parking lots names, numbers, capacity, average occupancy, average percent full and maximum occupancy. Local focus group feedback includes community concerns about both overnight and extended occupancy of parking spots along West Cliff Drive.

Table 2-5. Parking Capacity by Type Associated Parking Space Approximation
(* represents approximate capacity)

Parking	Number of Areas Collected	Total Parking Capacity by spaces
Lots	19	311
All On-street	30	535

[2] A residents' safety group installed a Verizon Camera in collaboration with the City at the parking lot in Zone 4 on West Cliff Drive that may provide after hours parking occupancy data in the future for the City to reference in both design and any proposed fee structure.

West Cliff On-Street only Counted	3	35
West Cliff On-Street only identified*	9	134

Table 2-6. Parking Lot Names and Lot ID
(* signifies occupancy data not collected, # signifies parking limited to 20 minutes)

Lot Number	Name	Capacity	Average	Avg % Full	Max
	Natural Bridges Vista Point*#	25			
	Cowell's Beach*	17			
	Fair Ave*	6			
1	Chico Ave	8	5	63%	8
2	San Jose Ave	4	3	77%	11
3	Stockton Ave	14	9	61%	14
4	Swift St	8	5	68%	8
5	Getchell St	8	6	78%	15
6	Mitchell's Cove	33	19	59%	33
7	Lot 7	16	10	61%	16
8	Columbia	11	2	16%	11
9	State Parks Lot A#	19	13	68%	19
10	State Parks Lot B	20	17	85%	23
11	Lighthouse	32	25	77%	32
12	State Parks Lot C	33	27	81%	34
13	State Parks Lot D	35	25	71%	36
14	Steamers Lane	16	14	86%	17
15	Cypress	13	12	90%	14
16	Manor Ave	17	16	93%	18

2.3.4. Transit Access

Santa Cruz Metro provides transit access along Bay Street and Beach Street. Bus routes 19 and 20 pass along Bay Street and Beach Street, and Route 20 through Delaware Ave. These routes provide service between downtown Santa Cruz and the University of Santa Cruz via Bay Street. No transit exists along the West Cliff Drive corridor itself; however, some lines do have stops that are walking distance from West Cliff Drive. Additionally, during the summer a trolley provides service between downtown Santa Cruz and Monterey Bay National Marine Sanctuary

Exploration Center with access to the Municipal Wharf, Cowell's Beach, and the Beach Boardwalk. Transit trip planning is available through Transit App, Google Maps, Apple Maps, and Cruz 511 (cruz511.org) due to the creation and maintenance of the General Transit Feed Specification transit schedule by Santa Cruz Metro.

2.4. Existing Public Access and Recreation

2.4.1. General Public Coastal Access and Recreation

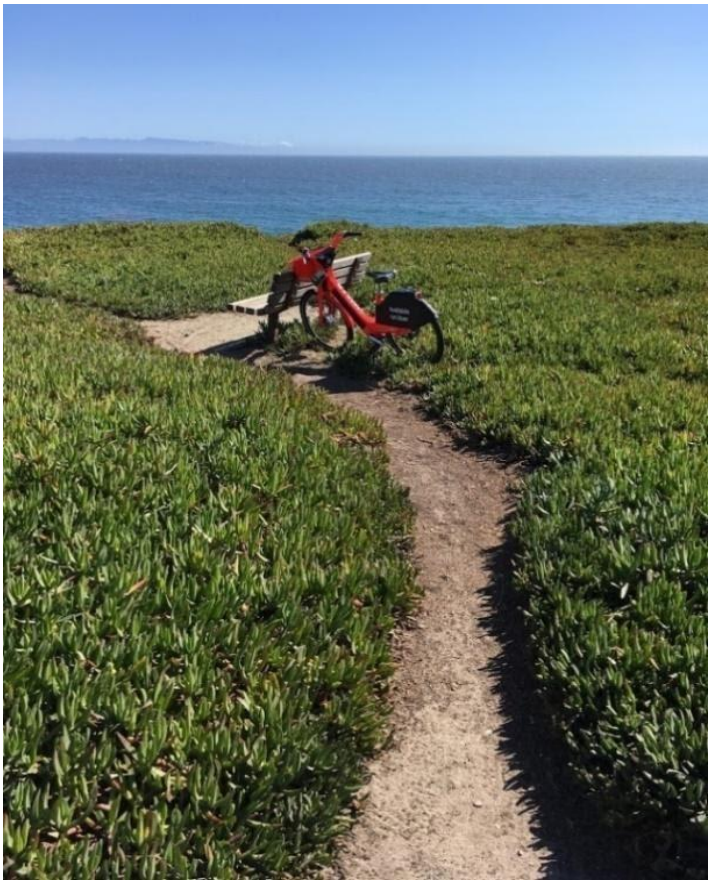
Twenty-seven formal access areas were documented during the survey, and the primary access way type was noted. Access types include overlooks (overlook parks, overlook bike trails), informal trails, and stairways. The term trail in this refers to a paved formal trail, often the Recreational Trail. The term informal trail refers to a dirt or rock trail that can be within either a formal or informal designated access area. Some formal access areas support secondary informal access. Photos of various formal access types are shown below in Figure 2-3.

Overlook, Access: 3-7

Overlook Trail, Access: 3-1

Bike Trail Overlook, Access: 3-2

Overlook Trail, Access: 4-10



Trail (Formal), Access: 2-9

Stairway, Access: 4-9

Figure 2-3. Different types of formal coastal access defined along West Cliff Drive.

Each of the 27 formal access areas are described below in Table 2-7. Photos of each site are also available in previous deliverables for this project.

Table 2-7. Inventory of Formal Coastal Access Areas

Access No.	Length (ft) of Access Ways Associated with Area	Primary Access Area Type (s)	Primary Access Area Material	Access to	Ease of Access	Secondary Informal Access Present	Amenities
1-1	Natural Bridges Entrance	Informal Trail, Trail, and Overlook	Paved and Dirt	Beach	ADA and Walk	Secondary access to terrace and beach via informal trail (scramble)	Overlook Parking, Visitors Center, Bathrooms, Trash/Recycling, Picnic Areas
1-4	Path: 51 ft Trail: 605 ft	Trail	Dirt	Blufftop	Walk	Secondary access to terrace via informal trail (scramble)	2 benches, 1 pyramid art, 1 trash/recycling, 1 life ring, 8 parking spaces
1-6	Trail: 605 ft	Trail	Dirt	Blufftop	Walk	Secondary access to terrace via informal trail (scramble)	1 bench, overlook
1-10	Path: 37 ft Trail: 336 ft	Trail	Dirt	Blufftop	Walk	Secondary access to terrace via informal trail (scramble) fishing access	3 benches, 12 parking spots, 1 trash/recycling, life ring, overlook
1-14	Path: 53 ft Trail: 684 ft	Trail	Dirt	Blufftop	Walk	Secondary access to terrace and beach via informal trail and rip rap (scramble) tidepool, surf, and fishing access	4 benches, 1 trash/recycling, 8 parking spots, overlook
1-16	Path: 23 ft Trail: 189 ft	Trail	Dirt	Blufftop	Walk	Secondary access to terrace via informal trail (scramble) surf, and fishing access	1 bench, 1 trash/recycling
1-19	Path: 46 ft Trail: 293 ft	Overlook	Dirt	Blufftop	Walk	Secondary access to terrace via informal trail (walk)	1 bench, 1 trash/recycling
1-20	Trail: 284 ft	Trail	Dirt	Blufftop	Walk	Secondary access to rip-rap via informal trail (scramble)	1 bench
1-21	Stair: 25 ft	Overlook & Stairway	Dirt and Concrete	Blufftop and Beach	Walk	N/A	1 bench, tidepool access stair
1-22	Trail: 393 ft	Trail	Dirt	Blufftop	Walk	Secondary access to rip-rap and water via informal trail (scramble) and rip rap (climb)	2 benches
2-1	Stair: 125 ft	Stairway	Concrete	Beach	Walk	N/A	Mitchell's Cove Staircase, life ring, beach surf, tidepool

Access No.	Length (ft) of Access Ways Associated with Area	Primary Access Area Type (s)	Primary Access Area Material	Access to	Ease of Access	Secondary Informal Access Present	Amenities
2-2	Trail: 328 ft	Trail	Dirt	Blufftop	Walk	N/A	1 bench, 2 work out equipment, 1 trash/recycle, overlook
2-3	Informal Trail: 33 ft Trail: 309 ft	Overlook	Dirt	Blufftop	Walk	Secondary access to beach via informal concrete trail (walk) and rip rap (climb)	3 trash/recycle, 2 benches, 31 parking spaces, +1 handicap, no railing
2-9	Trail: 448 ft	Trail	Dirt	Blufftop	Walk	Secondary access to terrace and beach/water via informal trail (scramble)	4 benches, 1 trash/recycle
3-1	Informal Trail: 165 ft Trail: 170 ft	Overlook Trail	Paved	Informal Trail on Blufftop	ADA	N/A	2 benches (multiple access)
3-2	Trail: 260 ft	Overlook, Bike Trail	Paved	Path	ADA	Secondary access to terrace, rip-rap and water/beach via informal trails (scramble) and rip rap (climb)	4 benches, 1 trash/recycle, 16 parking spaces (+2 handicap)
3-3	Informal Trail: 104ft	Overlook Trail	Decomposed Granite	Blufftop	ADA	N/A	2 benches
3-4	Stair: 69 ft Trail:220 ft	Stairway	Concrete	Beach	Walk	N/A	life ring, dog beach access, trash can (4)
3-6	Informal Trail: 1,433 ft Trail: 1188 ft	Overlook Park	Paved	Blufftop	ADA	Secondary access to terrace behind fence (walk) and water (jump) via informal trails – surf access	1 handicap space, 28 parking spaces, interpretive signs, life ring
3-7	Informal Trail: 105 ft Trail: 72 ft Stair: 78ft	Overlook and stairway	Decomposed Granite and Concrete	Blufftop and Beach	ADA and Walk	Secondary access to blufftop (scramble) via informal trail	2 benches, bike locking station, 1 trash/recycle, railing
3-8	Trail: 52 ft	Overlook Bike Trail	Paved	Trail	ADA	Secondary access to blufftop, terrace and water via informal trails and formal stairway	bench, 16 parking spaces, 2 trash/recycling, sign: photo of surfers' location, , surf access
4-1	Informal Trail: 119 ft Trail: 27 ft	Overlook Park	Decomposed Granite	Blufftop	ADA	N/A	Surfers Statue, 2 benches, trash/recycle, railing
4-2	Stair: 88ft	Stairway	Concrete	Beach/Water	Walk	N/A	life ring, trash + recycling, surf

Access No.	Length (ft) of Access Ways Associated with Area	Primary Access Area Type (s)	Primary Access Area Material	Access to	Ease of Access	Secondary Informal Access Present	Amenities
							access, upper portion of stair has railing
4-5	Informal Trail: 129 ft Trail: 110ft	Overlook Park	Decomposed Granite	Blufftop	ADA	Secondary access behind to blufftop, via informal trails	Overlook park, 3 benches, railing
4-8	Trail: 150 ft	Overlook	Dirt	Blufftop	Walk	N/A	Bruce Sharpe Overlook, no railing, grass + dirt, 2 benches, 18 parking spots
4-9	Stair: 96ft	Stairway	Concrete	Beach/Water	Walk	N/A	surf access
4-10	Informal Trail: 172 ft	Overlook Park	Decomposed Granite	Blufftop	ADA	N/A	2 benches, water fountain, garbage can, railing, interpretive sign

Table 2-8 summarizes the types of formal coastal access along West Cliff Drive by zone.

Table 2-8. Summary of Formal Access Areas by Primary Access Type and Zone

Primary Type of Access	Zone 1	Zone 2	Zone 3	Zone 4	Total
Overlook, Overlook Trail, Overlook Park	2	1	4	4	**11**
Paved Trail	8	2	0	0	**10**
Stairway	1	1	2	2	**6**
Total	**11**	**4**	**6**	**6**	**27**

Formal access types within Zone 1 consist primarily of trails and informal trails. Zone 2 has the fewest formal access areas. Formal access types within Zones 3 and 4 consist of overlooks and stairways.

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Figure 2-4 Popular pocket beaches along West Cliff Drive.

2.4.2. Beaches

Santa Cruz's west side coastline is studded with a number of small to mid-size beaches distributed along the 2.7 miles of coastline. As depicted in Figure 2-4, West Cliff Drive beaches of note include (from large to small), Its (Lighthouse) Beach (within Zone 3), Mitchell's Cove (within Zone 2), and Pyramid Beach (within Zone 1). Several smaller beaches are found between Fair and Swift streets within Zone 1.

West Cliff Drive's coastline consists primarily of 25 to 40-foot high bluffs that front an uplifted marine terrace. The bluff backed coastline is broken up by small pocket beaches, with Its Beach and Mitchell's Cove being the largest. Many of the smaller pocket beaches are backed by riprap so that as sea level continues to rise, it is likely that these narrow beaches will gradually be lost (Griggs and Haddad, 2011) (Figure 2-5).

Figure 2-5. Rip rap backs many of the West Cliff pocket beaches.

Its Beach is a south-facing beach below the bluff on the west side of Lighthouse Field. The City Parks and State Parks share management of the beach. The City manages Lighthouse point and State Parks manages the adjacent open space park across West Cliff Drive from the beach. There is a stairway providing access to the beach, which is frequented by dog owners and boogie boarders.

Mitchell's Cove is located below the bluff between Woodrow Avenue and Almar Avenue. There is a parking lot right above the beach and a stairway that provides access down to the beach. During high tides and during the winter stormy months there is not much dry sand exposed in Mitchell's Cove. Rip rap has been piled up in the pockets of the bluff to minimize erosion from winter storms.

Pyramid Beach (also known as 222 Beach or Nude Beach) is located at Auburn Avenue. This beach has steep walls and is susceptible to erosion. The back of the beach has been filled with rip rap that currently has displaced some of the beach area. In the winter the sand is eroded away. In the summer, once the sand has built back up, a small secluded beach can be found. There is no stairway down to Pyramid Beach, so it is accessed using informal trails.

Restoration opportunities within the pocket beaches along West Cliff are somewhat limited due to intense winter swell. However, small restoration projects have been implemented along the first terrace of the bluff and along the coast recreation trail at several locations along West Cliff.

Beach Recreation

Its Beach is the most intensively used beach along West Cliff during the summer months. During the winter, storm waves lower the beach sand level and attack the bluffs at high tides. Monitoring of Its Beach during the 1997-98 El Niño documented that the 150-foot wide beach present in October was completely eroded by February and the sand had dropped about eight feet in elevation (Griggs and Haddad, 2011), demonstrating the dynamic fluctuations in beach width and elevation. There is limited armor backing the beach so as sea level has risen historically, the bluffs have gradually retreated, maintaining a narrow and heavily used beach. Overall, the low bluffs have changed very little over the past century. Riprap on the west side of Its Beach has reduced recreational use of this portion of the beach and limited lateral access west of the armoring to low tides. Rising seas will progressively narrow the summer beach and lead to more frequent and severe winter wave impacts, which even now overtops the bluff (Griggs and Haddad, 2011).

2.4.3. Recreational Use of Coastal Areas

Coastal recreational activities that can be accessed along West Cliff Drive include surfing, biking, skating, walking, tidepools, beach-going, fishing, sponge and skim boarding, dogs playing on beach, and wildlife viewing (sea otters, seals, whales, dolphins, pelicans, cormorants, and other sea and shorebirds). Primary types of recreational use and access locations, based on observational surveys conducted by the City of Santa Cruz in 2019 and local knowledge of the project team, are described below in Table 2-6.

Table 2-9. Primary Types of Use and Access Locations

Recreation Type	Primary Access Locations (Zone and #)
Surfing	John Street (1-14), Getchell Street (1-16), Lighthouse Point terrace (3-6), Steamer Lane stairway (3-7), Surfer Statue stairway (4-1), Cowell Beach stairway (4-9)
Boogie boarding and skim boarding	Its Beach stairway (3-4), Mitchell Cove stairway (2-1)
Beach-going (sun-bathing, swimming, walking, picnic)	Pyramid Beach (1-5), Mitchell Cove stairway (2-1), Its Beach stairway (3-4), Cowell Beach stairway (4-10)
Fishing	Pyramid overlook trail (1-4), Stockton Ave (1-10), John Street (1-14), Getchell Street (1-16), Overlook across from St. Joseph's (4-4)
Dog Walking	Recreational Trail: Continuous
Off Leash dog	Mitchell's Cove stairway (restricted by time, before 10am and after 4pm) (2-1), Its Beach stairway (unsanctioned) (3-4)
Coastal Viewing	Designated overlooks, Lighthouse Point Park (3-6), Continuous
Biking	Recreational Trail: Continuous
Walking or Running	Recreational Trail: Continuous
Creating Art (painting, photography, writing, etc.)	Stockton Ave (1-10), Swift Ave (1-14), Getchell Street (1-16), Fair Ave (1-19), Lighthouse Point Park (3-6), above Cowell (4-10), and other Overlooks
Tidepooling	John Street (1-14,), Near De La Costa (1-21), Mitchell's Cove (2-1)
Clubs and Meet ups (e.g. Stroller Strides, drum circle)	Lighthouse Point Park (3-6), Recreational Trail: Continuous

Amenities and Use

The lists of amenities and uses below are compiled from the City of Santa Cruz website, observational surveys conducted by the City of Santa Cruz, and local knowledge of the project team. Maps of amenity locations are shown in Figure 2-6 through Figure 2-9.

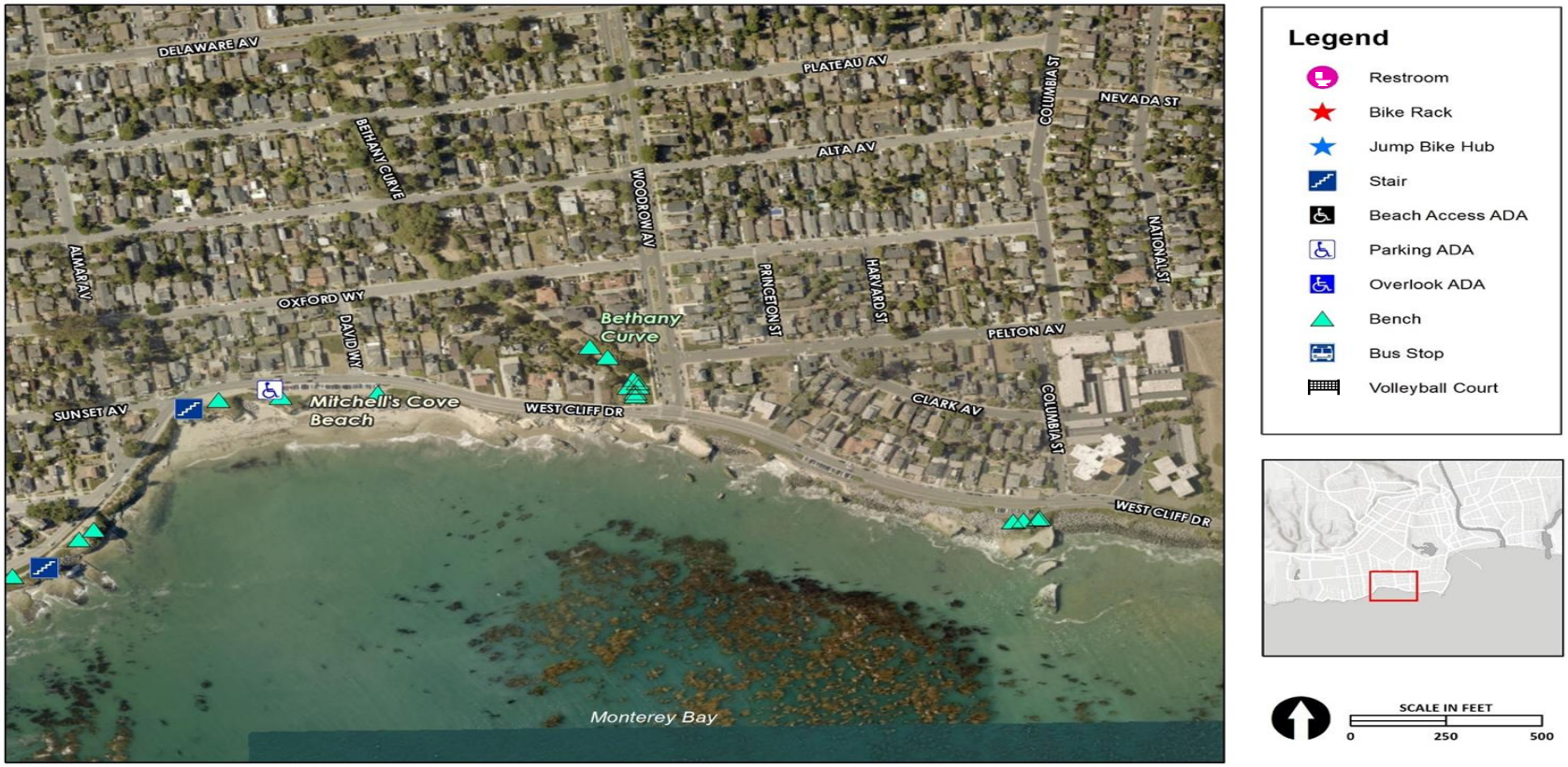


Figure 2-6. Map of West Cliff Drive Zone 2 coastal amenities.

Figure 2-7. Map of West Cliff Drive Zone 1 (Pyramid Beach and adjacent clifftop access) coastal access amenities.

Figure 2-8. Map of West Cliff Drive Zone 3 coastal access amenities.

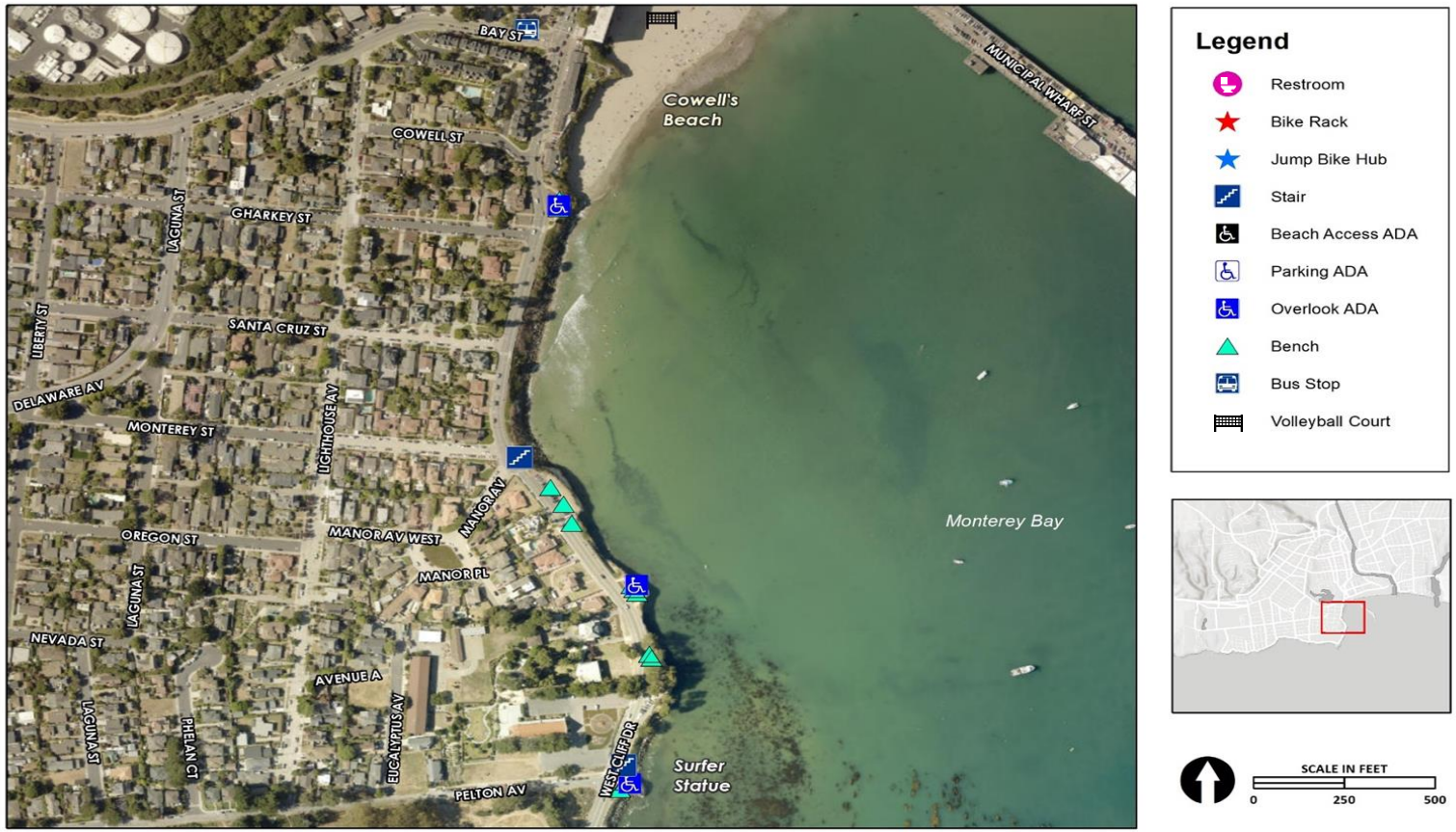


Figure 2-9. Map of West Cliff Drive Zone 4 coastal access amenities.

Existing Level of Service to Under-represented User Groups

Lighthouse Point is managed by the City, provides views of the Monterey Bay to many locals and visitors. Stairs at Its Beach and Mitchell's Cove provide easy (non-ADA) access to the beach and are frequented by boogie boarders and dog owners among others recreating and exercising.

The coastline extending along West Cliff Drive is bisected by small pocket beaches. Many of the smaller pocket beaches are backed by riprap that limits access to many user groups and restrict use of the beach during high tides. Access to the numerous beaches is provided by a variety of sanctioned infrastructure including stairs (Its and Mitchell's) and overlooks, and informal dirt pathways and trails that the public uses to scramble down the cliff to gain access to the open terrace areas (fishing, picnicking and ocean watching) and to the beach and ocean (sand and surf access).

Figure 2-10. West Cliff Drive offers many cliff top viewing amenities.

There are no wheelchair accessible pathways to the beach or ocean along West Cliff Drive. However, Cowell Beach, at the foot of West Cliff Drive, has a wheelchair accessible pathway and beach . Access to many small beaches and water entry locations otherwise requires a scramble down the cliff and over rock revetment that is unsafe for many user groups, restricting general access to these areas. Such informal and unsanctioned access by the public may lead to further erosion of terrace and bluff deposits. Some pocket beaches are only usable at low tide and are flooded during high tide periods. Public restrooms along West Cliff are only available at Lighthouse Field.

The greatest level of access and service for underrepresented groups is provided near Lighthouse Point and Its Beach. Other zones of West Cliff drive provide much fewer sanctioned and planned access to the beach. For most under-represented groups, the greatest access and recreational opportunities provided by West Cliff Drive are the bike and pedestrian pathway and other cliff top viewing amenities (Figures 2-7 through 2-10). Steep natural cliffs and substantial riprap reduce water and beach access along Zones 1 and 2 to most of the surveyed groups. Existing level of service for each zone is shown in Table 2 -7 through Table 10.

. West Cliff Drive Zone 1 (Pyramid Beach and adjacent cliff top access): Priority amenities and level of access for under-represented user groups. West Cliff Zone 1 offers the lowest level of access and service for these user groups.

Interviewed Under-Represented Groups	Beach and Coastal Access Ways			Cliff Top Access and Coastal Viewing				Transportation			Recreation			Coastal Habitats		Overall Level of Service
	Safe/ADA Beach Access	*Beach Wheelchair Available*	*Fire Pits*	*ADA Overlooks*	*ADA Coastal Trail*	*Available Bathrooms*	*Benches*	*Bus Stop Proximity*	*ADA Parking*	*Jump Bikes*	*Camps & Special Events on West Cliff*	*Water Access*	*Businesses/ Jobs*	*Stormwater Protection*	*Natural Habitat Areas*	
Elderly	X			X	X	X	X		X							
Youth	X						X			X	X	X	X		X	
People with Disabilities	X	X		X	X	X			X							
Low Income Residents													X	X		
Tribal	X														X	
Homeless			X			X									X	
LGBTQ+						X										
Fishers	X						X					X		X	X	

Level of Service Provided to Group

High Moderate Low **X** Identified during interview as being a coastal resource used by group

West Cliff Drive Zone 2 (Mitchell's Cove): Priority amenities and level of access for under-represented user groups.

Interviewed Under-Represented Groups	Beach and Coastal Access Ways			Cliff Top Access and Coastal Viewing				Transportation			Recreation			Coastal Habitats		Overall Level of Service
	Safe/ADA Beach Access	*Beach Wheelchair Available*	*Fire Pits*	*ADA Overlooks*	*ADA Coastal Trail*	*Available Bathrooms*	*Benches*	*Bus Stop Proximity*	*ADA Parking*	*Jump Bikes*	*Camps & Special Events on West Cliff*	*Water Access*	*Businesses/ Jobs*	*Stormwater Protection*	*Natural Habitat Areas*	
Elderly	X			X	X	X	X		X							
Youth	X						X			X	X	X	X		X	
People with Disabilities	X	X		X	X	X			X							
Low Income Residents													X	X		
Tribal	X														X	
Homeless			X			X									X	
LGBTQ+						X										
Fishers	X						X					X		X	X	

Level of Service Provided to Group

High Moderate Low **X** Identified during interview as being a coastal resource used by group

West Cliff Drive Zone 3 (Lighthouse Point and Its Beach): Priority amenities and level of access for under-represented user groups. West Cliff Zone 3 offers the highest level of access and service for these user groups.

Interviewed Under-Represented Groups	Beach and Coastal Access Ways			Cliff Top Access and Coastal Viewing				Transportation			Recreation				Coastal Habitats		Overall Level of Service
	Safe/ADA Beach Access	*Beach Wheelchair Available*	*Fire Pits*	*ADA Overlooks*	*ADA Coastal Trail*	*Available Bathrooms*	*Benches*	*Bus Stop Proximity*	*ADA Parking*	*Jump Bikes*	*Camps & Special Events on West Cliff*	*Water Access*	*Businesses/ Jobs*		*Stormwater Protection*	*Natural Habitat Areas*	
Elderly	X			X	X	X	X		X								
Youth	X						X			X	X	X	X			X	
People with Disabilities	X	X		X	X	X			X								
Low Income Residents													X		X		
Tribal	X															X	
Homeless			X			X										X	
LGBTQ+						X											
Fishers	X						X					X			X	X	

Level of Service Provided to Group

High Moderate Low X Identified during interview as being a coastal resource used by group

West Cliff Zone 4 (Bay Street to Pelton Ave): Priority amenities and level of access for under-represented user groups

Interviewed Under-Represented Groups	Beach and Coastal Access Ways			Cliff Top Access and Coastal Viewing				Transportation			Recreation			Coastal Habitats		Overall Level of Service
	Safe/ADA Beach Access	*Beach Wheelchair Available*	*Fire Pits*	*ADA Overlooks*	*ADA Coastal Trail*	*Available Bathrooms*	*Benches*	*Bus Stop Proximity*	*ADA Parking*	*Jump Bikes*	*Camps & Special Events on West Cliff*	*Water Access*	*Businesses / Jobs*	*Stormwater Protection*	*Natural Habitat Areas*	
Elderly	X			X	X	X	X		X							
Youth	X						X			X	X	X	X		X	
People with Disabilities	X	X		X	X	X			X							
Low Income Residents													X	X		
Tribal	X														X	
Homeless			X			X									X	
LGBTQ+						X										
Fishers	X						X					X		X	X	

Level of Service Provided to Group

High Moderate Low X Identified during interview as being a coastal resource used by group

2.5. Existing Shoreline Armoring Inventory and Conditions

A summary of the existing condition of shoreline armoring are characterized the Existing Conditions and Future Vulnerability Assessment developed for the project contains photos and detailed descriptions of the condition and character of each of the 53 armoring sites along the corridor including:

- the type of armor (rip-rap revetment or a concrete retaining wall in most cases);
- the linear and alongshore length of the armor;
- the date or approximate date of construction;
- the effect of the armor on coastal access;
- management recommendations for the structure (e.g., restack rocks, remove fugitive rocks from shoreline, etc.); and
- engineering observations of each structure from the coastal engineers at Haro Kasunich and Associates

Figures 2-11 and 2-12 contains all armoring sites along West Cliff Drive.

Figure 2-11. All armor sites along West Cliff Drive (Zone 1 & 2).

Figure 2-12. All armor sites along West Cliff Drive (Zone 3 & 4).

The history of Coastal Armoring on West Cliff Drive includes details on date, type, location and cost. Table 2-7 below contains the basic properties of all armoring currently in place.

Table 2-10. Basic Properties of Existing Armor along West Cliff Drive

Number	Type		Length (ft.)		Original Emplacement date	Is there a beach (Y/N)*	Is Beach accessible (Y/N)*
	Rip-rap	Wall	Linear	Coastline			
1.	*	-	30	35	1957-1961	Y	N
2.	-	*	135	135	1998	Y	N
3.	*	-	164	260	After 1960 and before 1975	N	-
4.	*		61	61	After 1982 and before 1987	N	-
5.	-	*	64	64	After 1972 and before 1979	N	-
6.	*	-	87	132	1956-1961	Y	Y
7.	*	-	37	40	Before 1990	N	-
8.	*	-	77	91	Before 1990	N	-
9.	-	*	60	60	before 1972	Y	Y
10.	*	-	332	386	After 1965 but before 1975	Y	Y
11.	*	-	136	170	After 1965 but before 1975	N	-
12.	*	-	60	73	After 1965 but before 1975	N	-
13.	*	-	124	150	Some rock present in 1965	Y	N

Number	Type		Length (ft.)		Original Emplacement date	Is there a beach (Y/N)*	Is Beach accessible (Y/N)*
	Rip-rap	Wall	Linear	Coastline			
14.	*	-	230	260	Rock present in 1975	Y	N
15.	*	-	82	100	After 1975 but before 1990	Y	N
16.	*	-	140	155	In both 1983 & 1994	Y	Y
17.	*	-	85	125	Some rock present in 1975	Y	Y
18.	*	-	80	87	Some rock present in 1975	Y	Y
19.	*	-	82	125	1990	Y	Y
20.	*	-	62	72	Some rock present in 1975	Y	Y
21.	*	-	42	42	Some rock present in 1975	Y	Y
22.	*	-	52	52	Some rock present in 1975	Y	Y
23.	*	-	35	97	1990	Y	Y
24.	*	-	100	110	1990	Y	Y
25.	*	-	121	165	1990	Y	Y
26.	*	-	54	54	1990	Y	Y
27.	-	*	156	156	1990	Y	N
28.	*	-	28	28	1990	Y	N
29.	*	-	88	160	1995 and 1998	Y	Y
30.	*	-	38	38	1995 and 1998	Y	Y
31.	*	-	68	68	1995 and 1998	Y	Y
32.	*	-	62	62	1995 and 1998	Y	Y
33.	*	-	14+16	14+16	1990	Y	N
34.	*	-	30	103	1990	Y	N
35.	*		130	184	1990	Y	N
36.	*	-	142	168	Before 1990; not present in 1975	Y	N
37.	-	*	185	185	2000	Y	N
38.	*	-	466	510	Some rock at east end in 1975	Y	N
39.	*	-	517	642	Some rip-rap present in 1972	Y	N
40.	-	*	50	50	After 1987 and before 2002	Y	N
41.	*	-	100	105	After 1979 and before 1987	Y	Y
42.	-	*	10	10	After 1987 and before 2002	Y	N
43.	*		72	74	After 1979 and before 1987	Y	N
44.	-	*	26	26	After 1979 and before 1987	Y	N
45.	-	*	388	388	1984	Y	Y
46.	*	-	63	63	After 1979 but before 1990	Y	N
47.	*	-	160	165	After 1963 and before 1965	Y	Y
48.	*	-	100	162	After 1963 and before 1965	N	-
49.	*	-	395	430	After 1963 and before 1965	Y	N

Number	Type		Length (ft.)		Original Emplacement date	Is there a beach (Y/N)*	Is Beach accessible (Y/N)*
	Rip-rap	Wall	Linear	Coastline			
50.	*	-	237	254	After 1965 and before 1972	Y	Y
51.	-	*	150	150	Present in 1972	Y	N
52.	*	-	850	875	Between 1963 and 1965	Y	Y
53.	-	*	396	396	After 2005 and before 2008	Y	Y

2.6. Existing Utilities

2.6.1. Water Related Systems

Wastewater

The City of Santa Cruz public wastewater system is an underground system of 160 miles of pipe that transport wastewater from pipelines under neighborhood streets to the City of Santa Cruz Wastewater Treatment Facility located near Neary Lagoon (Figure 2-13). In total, approximately 1,590 feet (0.3 mile) of wastewater pipe, 25 manholes, and other wastewater structures (including the pump station at Mitchells' Cove) are located along West Cliff Drive. In addition, the main ocean outfall infrastructure runs across Mitchell's Cove and roughly a mile offshore before taking a westerly bend and discharging offshore of Natural Bridges, right side under concrete vault).

Figure 2-13. The wastewater outfall pipeline leaves Mitchell's Cove from the cement structure on the west side (right) of the beach.

Stormwater

The City storm drain system collects stormwater runoff from City streets along gutters and through underground pipes to discharge into local waterways and the Monterey Bay. The system is designed for the control of flooding and does not provide any treatment to the stormwater runoff. However, catch basins are labeled to remind residents that any discharge routes to the ocean. There are 4,498 feet (0.85 mile) of storm drain pipe and 128 storm drain structures (including manholes, drop basins, outfalls, etc.) located along West Cliff Drive. Forty-two of these structures are outfalls located along the cliff of West Cliff Drive (Figure 2-14 and Figure 2-15).

An on-the-ground inventory and condition evaluation of storm drain outfalls was conducted in September of 2019. The evaluation noted material of structure, condition of the structure, and whether the structure is contributing to any cliff erosion. Some of the outfall locations could not be found due to being buried by rip-rap or iceplant or because accessing the location was impractical. Outfall locations were also overlaid with the designated erosion hazard zone as noted in Table 2-11.

Surveyed outfalls from the City are shown as a blue icon on the map (Figure 2-14 and Figure 2-15). In some cases, the outfall found was in a slightly different place than the location provided via the city GIS layer, presumably due to mapping resolution and methods. However, it may also be because the found and surveyed outfall is a defunct structure and the new outfall location has been moved to a different location that we were unable to locate, or vice versa. Results of the inventory are shown in Table 2-11.

Figure 2-14. Locations of water infrastructure along West Cliff Drive, Zones 1 & 2.

Figure 2-15. Locations of water infrastructure along West Cliff Drive, Zones 3 & 4.

Table 2-11. Inventory and Evaluation of Storm Drain Outfalls along West Cliff Drive Cliff

Outfall #	City ID	Material	Contributing to Erosion?	Erosion Area of Concern	Notes
1-1	L2-DO304	Metal and Plastic	No	No	Metal 12", and 2 small plastic pipes, weeps for upper cliff terrace wall?
1-2	L2-DO301	Unknown	Unknown	No	Located beneath rip rap
1-3	L2-DO305	Metal	Yes	No	Erosion area and lots of seep
1-4	L2-DO303	Metal	No	Medium (bluff face erosion)	
1-5	L2-DO306	Metal	Yes	Medium/High (bluff face/cave)	
1-6	L2-DO302	Unknown	Unknown	No	Willows dense in area, could not find outfall

Outfall #	City ID	Material	Contributing to Erosion?	Erosion Area of Concern	Notes
1-7	L2-DO407	Concrete	No	No	Restoration opportunity, hanging stream
1-8	L2-DO405	Metal	No	High (undercut)	
1-9	L2-DO404	Plastic and CMP	Yes	No	Water seeping from cliff
1-10	L2-DO401	Plastic	No	No	
1-11	L2-DO402	Unknown	Unknown	No	Located beneath rip rap and iceplant
1-12	L2-DO406	Metal	No	No	
1-13	M2-DO303	Unknown	Unknown	No	end of John Street
1-14	M2-DO301	Unknown	Unknown	Medium (undercut)	end of Getchell St.
1-15	M2-DO302	Metal	No	High (cave)	
1-16	M2-DO102	Unknown	Unknown	No	Small black plastic pipe near location? Is this an outfall?
1-17	M2-DO103	Metal	No	High (cave)	
1-18	M2-DO101	Metal	No	No	Further inspection required
1-19	M2-DO202	Unknown	Yes	No	
1-20	M2-DO201	Concrete	No	No	Large outlet
2-1	M3-DO513	Metal	Yes	No	coming out of seawall
2-2	M3-DO201	Concrete	No	No	Located at Bethany Curve, below bridge
2-3	N2-DO104	Unknown	Unknown	No	Located beneath rip rap and iceplant
2-4	N2-DO205	Unknown	Unknown	No	Located beneath rip rap
2-5	N2-DO105	Metal	Unknown	No	Rusted, lots of rip rap

Outfall #	City ID	Material	Contributing to Erosion?	Erosion Area of Concern	Notes
2-6	N2-DO102	Unknown	Unknown	No	Located beneath rip rap
2-7	N2-DO103	Unknown	Unknown	No	Located beneath rip rap and iceplant
2-8	N2-DO106	Concrete	Yes	High (bluff face erosion)	bluff erosion
3-1	N2-DO210	Metal	Yes	High (bluff face erosion)	
3-2	N2-DO206	Metal	Yes	No	Sakrete wall above
3-3	N2-DO208	Unknown	Yes	No	Located behind Sakrete wall: water seeping
3-4	N2-DO207	Plastic	Yes	No	
3-5	N2-DO201	Metal	No	No	
3-6	N2-DO209	Metal	No	No	Coming out of seawall
3-7	O2-DO101	Unknown	Unknown	No	Located along cliff, No Access
3-8	O2-DO102	Metal	Yes	No	some erosion around culvert
3-9	O3-DO501	Unknown	Yes	Medium (undercut)	under parking lot
3-10	O3-DO502	Plastic	No	No	located above rip rap
4-1	O3-DO301	Unknown	Unknown	Low (undercut)	Located along cliff, No Access
4-2	O3-DO104	Metal	No	No	Located adjacent to Cowell Beach Access stairway (Access# 4-2)
4-3	O4-DO501	Metal	Yes	No	eroding underneath
4-4	O4-DO502	Unknown	Unknown	No	Located along cliff, No Access

West Cliff Stormwater Outfalls Maintenance and Erosion Concerns

Stormwater drains can cause significant erosion of the cliff face, specifically the upper terrace deposits, compounding coastal erosion hazards and leading to potential loss of additional West

Cliff infrastructure. Replacement and redesign of aged stormwater pipes can help to reduce erosion of highly erosive soils as well as help to reduce costly repairs and loss of access.

A number of storm drains have been replaced. In other locations old pipes have been abandoned and new ones were installed that were not visible during field visits (likely covered with vegetation or rip-rap). Table 2-9 above notes storm drains that were identified during field surveys as likely contributing to coastal erosion. Storm drains contributing to erosion that are also located within areas noted by field investigations as showing signs of active erosion (i.e., Outfall #s 1-5, 2-8, 3-1) should be evaluated for replacement or upgrades (Figure 2-16).

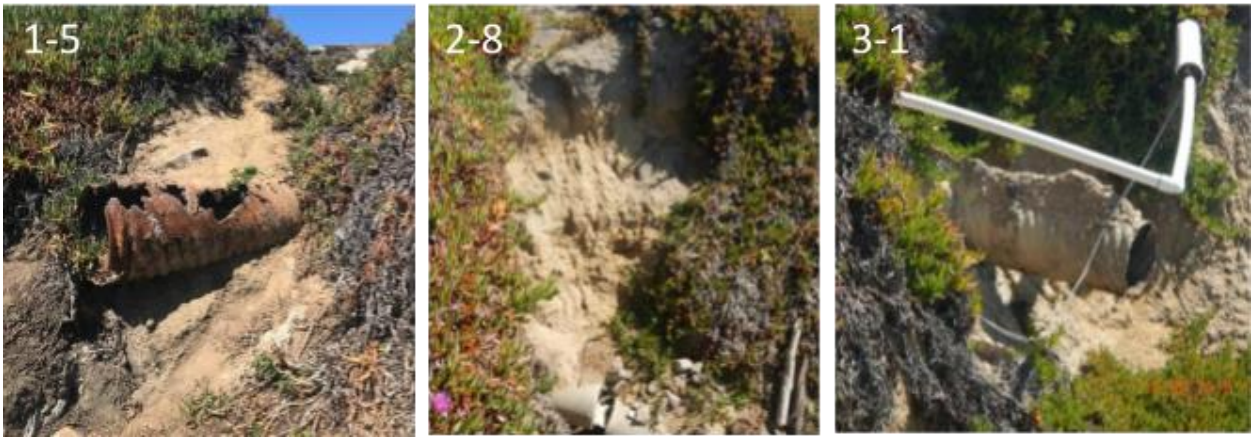


Figure 2-16. Examples of stormwater outfalls and proximity to erosion or seepage.

2.6.2. Electrical, Gas and Communications Systems

The electrical, gas and communications system infrastructure along West Cliff Drive are owned by others and the City does not have any records with their locations. The Plan will be provided to the utility providers. Any planning and implementation of any near-term Plan projects will include outreach to these utilities in advance.

3. Project Planning Considerations and Constraints

3.1. Land Resources

This section focusses on the planning considerations and constraints for each zone from a land resource perspective. Mapped areas and descriptions characterized as “high hazard” include areas of erosion concern where (1) undercuts of caves are > than 6-ft in depth or (2) the distance between the eroding cliff or terrace deposits and the cliff edge or Recreational Trail or cliff top is between 0 and 10 feet. There are 48 areas of areas of erosion concern but most are not identified as high hazards. A geologic hazard is a naturally occurring phenomenon capable of causing damage and includes both sudden and slow moving phenomena. Areas with faster coastal erosion or more rapid landward erosion of the cliff edge are considered to have greater hazards. A risk is the potential that exposure to the hazard will lead to a vulnerability and generally refers to the product of the magnitude of the potential failure or event and the probability of it occurring. Figures 3-1 through 3-4 depict the areas of high hazard and high risk, coastal armoring, and projected extent of 2100 erosion with no adaptation intervention for each zone.

Zone 1—Natural Bridges Overlook to Almar Avenue
This westernmost Zone of West Cliff Drive has 21 different coastal armoring structures and 23 areas of erosion concern. Two areas of erosion concern were identified as high risk in the short term with erosion likely to impact the Recreational Trail and/or West Cliff Drive. These areas are associated with the existing failure affecting the Recreational Trail near Auburn Avenue and erosion at the end of Merced Avenue (Figure 3-1). In addition, there are three locations along West Cliff Drive where the curb-to-curb distance is less than 25 feet and traffic safety are already impaired (Figure 3-1). Within the short term of the next 10 years, 8 of these coastal armoring structures are projected to fail and require attention, while 12 of the areas of erosion concern are deemed potentially high hazard and likely to erode. The coastal armoring structures that need short term attention include two shotcrete sandbag walls and the failed revetment on Pyramid Beach which currently presents hazardous conditions with rusted rebar and impaired access.

The eroded Recreational Trail near Auburn has already been identified by the City for repair using an elevated approach for a 70 foot length of trail. In addition to the short-term risk and hazards, there are several locations where management changes could improve upon existing conditions, by removing some of the extensive revetments covering small pocket beaches, improving lateral access along the wave cut platforms, restoring habitats including bluff top and the perched wetland on Auburn Creek, and reducing disturbance to sensitive species by improving management of recreational uses.

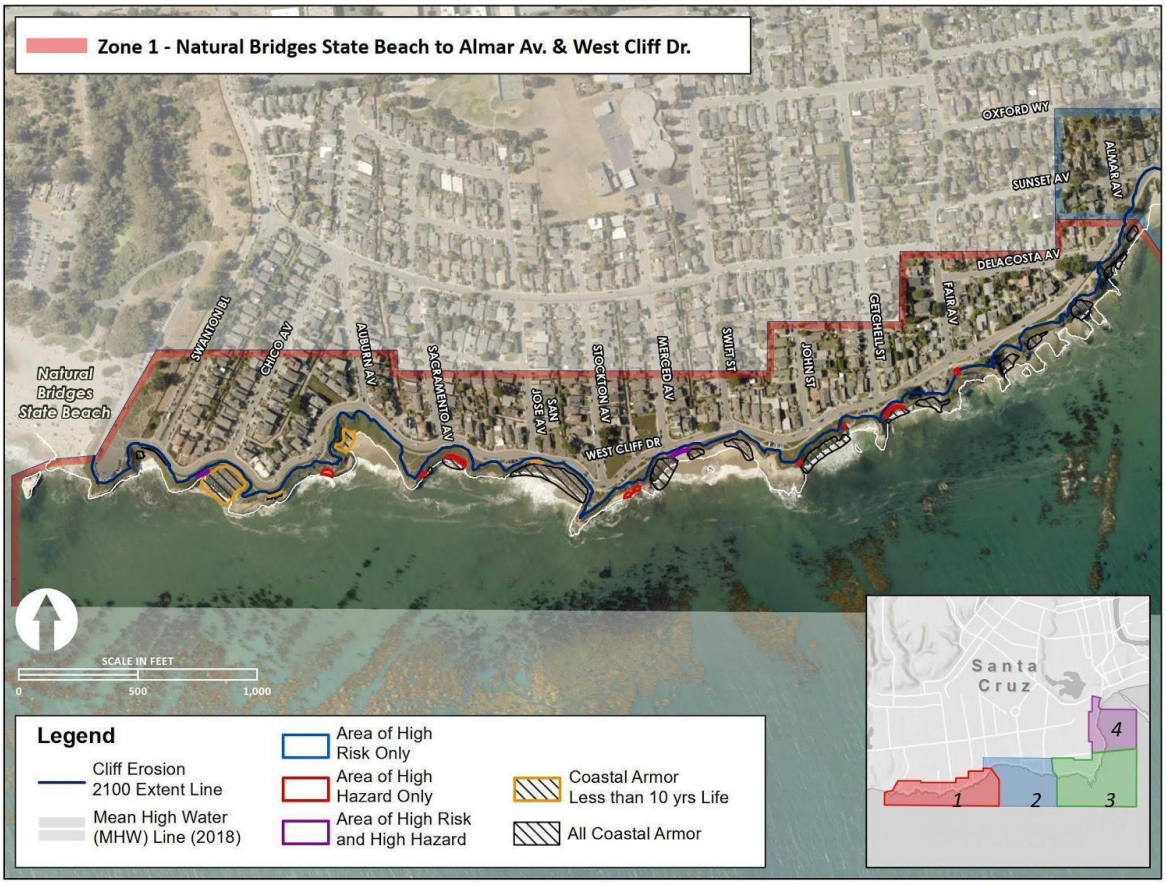


Figure 3-1. Priority areas for adaptation and management in Zone 1.

Zone 2—Almar Avenue to Lighthouse Field State Beach

Zone 2 of West Cliff Drive contains 27 different coastal armoring structures and 8 areas of erosion concern. Eight of these short-term high hazard areas of erosion concern were also identified as high risk in the short term with erosion likely to impact the Recreational Trail and/or West Cliff Drive. The most severe is the sea cave near David Way which undermines the Recreational Trail and both lanes of traffic on West Cliff Drive. The remainder of these high risk areas are largely associated with failures in the soft bluff top sediments where the cliff edge is in close proximity to the Recreational Trail. There are two locations along this zone of West Cliff Drive where the curb-to-curb distance is less than 25 feet and traffic safety are already impaired (Figure 3-2). This zone is also the only one where West Cliff Drive residences can access their properties directly from West Cliff Drive.

Within the short term of the next 10 years, 11 of these coastal armoring structures are projected to fail and require attention, while 10 of the areas of erosion concern mapped are deemed high hazard and likely to erode. Many of these structures are revetments built on the beach and the top of the cliff that show signs of deterioration with many fugitive rocks

contributing to the burial of the beach and reduction of coastal recreational and habitat resources. The heavily used beach at Mitchell's Cove provides an important beach access used for surfing, beach recreation, and marine safety.

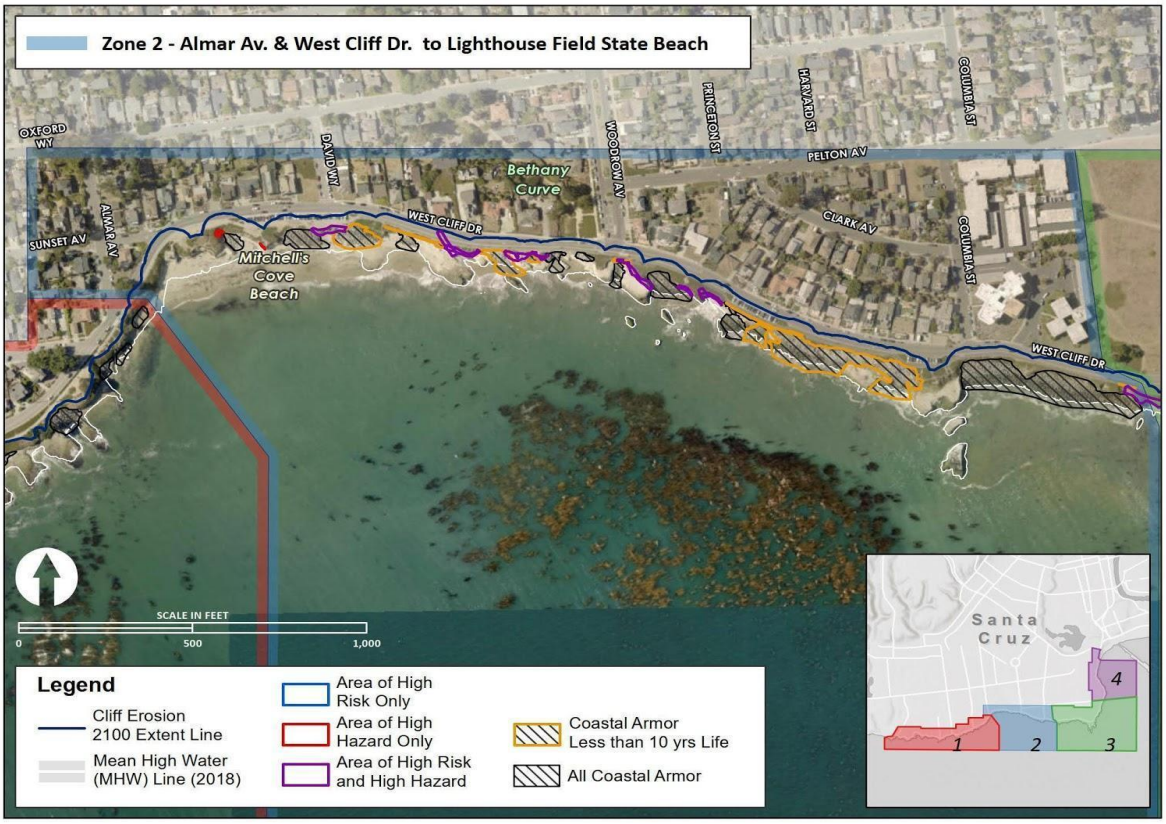


Figure 3-2. Priority areas for adaptation and management in Zone 2.

Zone 3—Lighthouse State Beach to Pelton Avenue at the Surfer Statue

Zone 3 of West Cliff Drive contains 7 different coastal armoring structures and 10 areas of erosion concern. Within the short term of the next 10 years, three areas of erosion concern were identified as high risk erosion likely to impact the Recreational Trail and/or West Cliff Drive. These include a substantial sea cave at Lighthouse Point that could affect the Lighthouse and surf museum in the future. In addition, several undercuts could likely undermine portions of the Recreational Trail. In Zone 3, none of the coastal armoring structures are projected to fail. Four of the areas of erosion concern are deemed high hazard, and if they erode, would likely affect the Recreational Trail, parking, and potentially West Cliff Drive (Figure 3-3).

Figure 3-3. Priority areas for adaptation and management in Zone 3.

Zone 4—Pelton Avenue and the Surfer Statue to Bay Avenue

Zone 4 of West Cliff Drive contains three different coastal armoring structures and four areas of erosion concern. Within the short term of the next 10 years, three areas of erosion concern were identified as high risk so when erosion does occur, it will likely impact the Recreational Trail, parking and/or West Cliff Drive. These locations are all associated with sea caves, with only one of them identified as a high hazard likely to fail in the short term. Presently, none of these coastal armoring structures are projected to fail nor require attention (Figure 3-4). This area however does have the highest traffic and Recreational Trail usage of the West Cliff Drive Corridor.

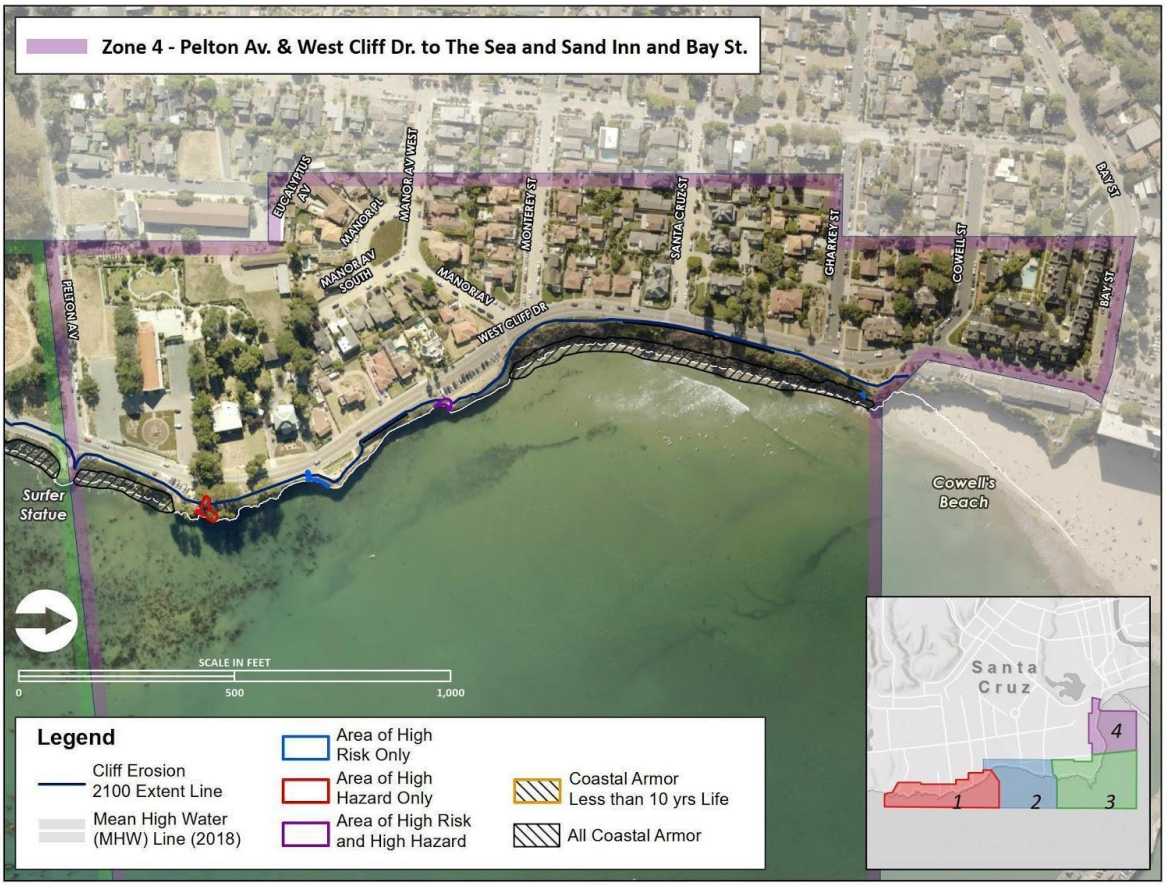


Figure 3-4. Priority areas for adaptation and management in Zone 4.

3.2. Climate

West Cliff Drive represents an ocean front road and recreational transportation corridor that provides visitor and resident access along a 2.7 mile stretch of low cliff backed coast (20 to 45 feet in elevation) from Natural Bridges State Beach in the west to Cowell's Beach in the east. This corridor currently contains two lanes of traffic, one in each direction and the West Cliff Drive Recreational Trail (Recreational Trail), a multi-use biking and walking trail with scenic and coastal accesses. Cliff erosion is common and there is a long history of coastal erosion along this corridor. Erosion responses have been to either relocate or to armor the eroded areas. Currently, almost 50% of West Cliff is protected by seawalls and rip-rap, of varying age and in varying condition, which currently mitigates some of the existing erosion hazards but may not be sufficient to mitigate future sea level rise hazards.

The weather in Santa Cruz is considered Mediterranean with cool, wet winters, and warm, dry summers. Winds generally blow out of the northwest except during storm conditions when winds come from the south. Waves also change seasonally with large west and northwest swells in the fall and winter, wind waves in the spring, and smaller southerly swell waves in the summer. The wave direction largely drives sand transport from the west to the east. Ocean water temperatures are typically cool to cold with the northwest winds driving ocean upwelling and keeping temperatures cold year-round.

Future climate conditions will drive the timing and intensity of impacts such as sea level rise, coastal storm flooding and erosion. This Plan includes projects for erosion through the end of the century under various assumptions as summarized in Appendix A1. The City's Climate Adaptation Plan Update (2018) provides projections for these impacts, and others, throughout the City and will be updated with best available science in 2023.

3.3. Topography

The coastline from Natural Bridges State Beach to Cowell's Beach consists of a low cliff (20 to 45 feet in height). The lower bedrock portion of the cliff consists of Santa Cruz Mudstone from Natural Bridges to Almar Avenue, where the mudstone then dips below sea level. The overlying and younger Purisima Formation first appears in the cliff at Swift Street and by Almar Avenue makes up the entire lower bedrock portion of the cliff. Much younger sandy to cobble terrace deposits cap the bedrock along the entire length of West Cliff Drive. Small beaches are found in the various embayments along the coast with the two largest beaches at Mitchell's Cove and Its Beach created by downcoast promontories trapping sand as it moves along the coast. Along the shoreline are a variety of beaches, rocky intertidal, and cliff roosting habitat for a variety of sensitive bird and intertidal species. Just offshore are kelp beds and offshore rocks, which provide habitat for sea otters and a host of other marine mammals. During fall and spring, it is common to observe migratory whales moving between Alaska and Mexico.

3.4. Geology and Coastal Erosion Geologic & Geomorphic

The coastline from Natural Bridges State Beach to Cowell's Beach consists of a low cliff (20 to 45 feet in height), which forms the outer edge of the lowest marine terrace along the Santa Cruz City coastline. The lower bedrock portion of the cliff consists of Santa Cruz Mudstone from Natural Bridges to Almar Avenue, where the mudstone then dips below sea level. The overlying and younger Purisima Formation that first appears in the cliff at Swift Street and by Almar Avenue makes up the entire lower bedrock portion of the cliff. Much younger sandy to cobble bluff terrace deposits cap the bedrock along West Cliff Drive and are typically about 10 to 15 feet in thickness (Figure 3-5).

The Santa Cruz Mudstone is relatively hard and resistant to erosion compared to the mudstones, siltstones, and sandstones of the Purisima Formation, but there are also significant variations in erosional resistance controlled by jointing, fracturing, and also differences in lithology and cementation. These differences in erodibility have led to an irregular coastline along West Cliff Drive consisting of embayments with narrow pocket beaches interspersed with more resistant bedrock protrusions or points (Figure 3-5). Many of the embayments within the Mudstone and the Purisima Formation follow joint patterns, and therefore have nearly the same orientations (approximately northwest–southeast). Variations in erosion between layers of bedrock have also led to the frequent occurrence of natural arches or bridges, which will form and then collapse over time (Figure 3-6). The collapse of these arches produces high short-term erosion rates, generally followed by long periods when the cliffs are stable and relatively unchanged. In some locations, a weak stratigraphic layer or bed along the base of the cliff has led to an undercut, which eventually leads to collapse of the overlying bedrock.

Figure 3-5. Oriented embayments eroded along parallel joints in the Santa Cruz Mudstone; note the locations of small low tide pocket beaches where no coastal armoring exists.

Figure 3-6. Formation of arches due to undercutting along joint patterns is common.

The overlying unconsolidated terrace deposits vary from sands to gravels and cobbles (Figure 3-7) and are easily eroded when exposed to direct wave attack during periods of high tides and large waves. This process of wave overtopping that strips off the terrace deposits results in the common presence of a bedrock platform along the lower cliff in many locations along West Cliff Drive (Figure 3-7 and Figure 3-8). The exposed or stripped platform ranges from a few feet to about 100 feet in width, with the latter exposed at the end of Swift Street. There is a limit, however, to how far the terrace deposits can be eroded back from the outer edge of the platform due to limitations on how far significant wave energy overtopping the bedrock platform can extend landward.

Nonetheless, the erosion of the terrace deposits has produced the greatest threat to the Recreational Trail along most of West Cliff and ultimately to the roadway itself. The second greatest threat is the landward erosion of caves along joint sets in the Purisima that have extended a considerable distance landward from the cliff edge or beach. The roofs of several of these caves have collapsed or partially collapsed over the years leaving coves or embayments into the cliff or sinkholes, the most recent one occurred in 2017 under a parking lot between Woodrow and Columbia (Figure 3-9) that required a large volume of concrete to fill and stabilize (Figure 3-10).

There is a long history of local sightseeing along West Cliff extending back well over a century, long before it was paved and a part of it became a formal street (“*the road of a thousand*

wonders" appeared on some early colored postcards). In the early days, there were horse and buggy rides out along the cliffs on a dirt road. In 1897–98, however, Santa Cruz suffered a major drought such that the dirt road along the cliff and typical afternoon winds produced dust that made the ride unpleasant, which deterred tourists from visiting. The city subsequently hired the Armstrong brothers (who were inventors) to solve this concern and bring back the visitors.

Figure 3-7. Section of bluff top terrace deposits at the end of Swift Street consisting of sand below and mudstone gravel and cobbles above

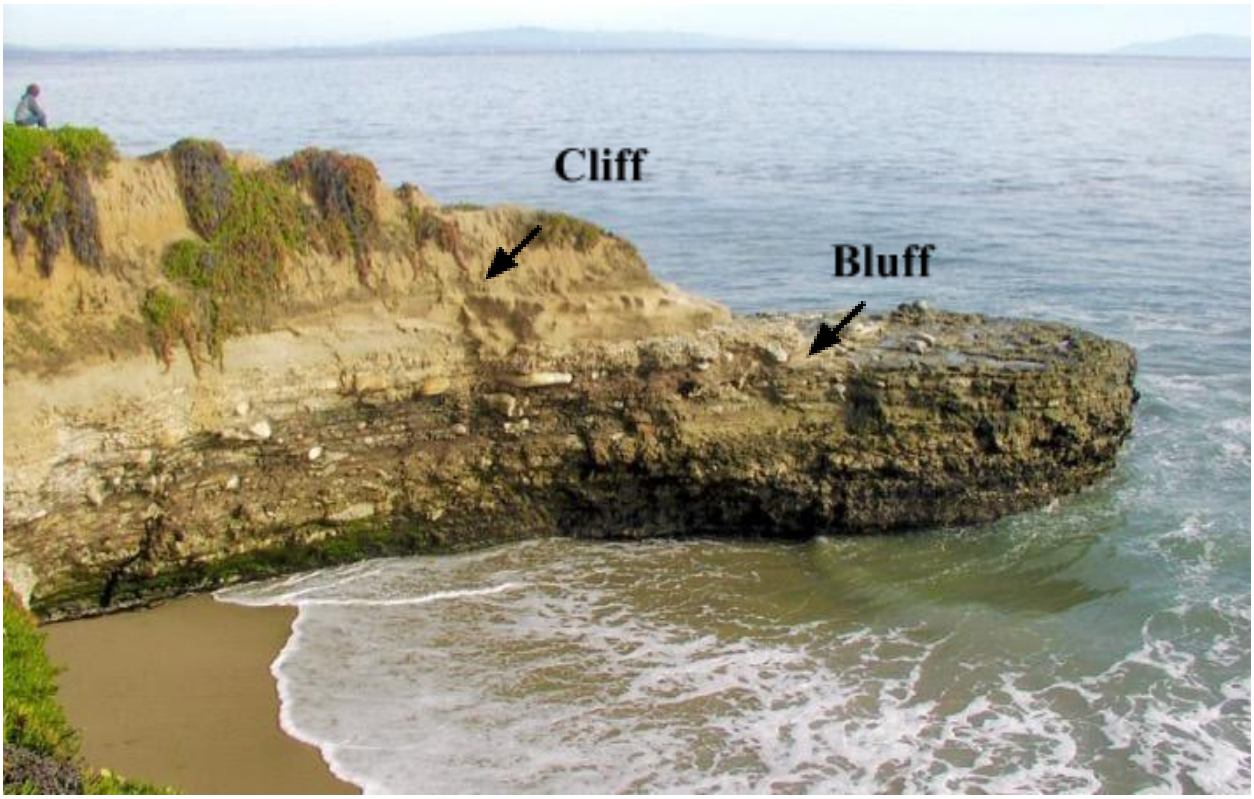


Figure 3-8. Wave overtopping of the more resistant cliffs made of the Santa Cruz Mudstone has eroded back the overlying Purisima Formation and bluff top terrace deposits (Zone 1)

Figure 3-9. Collapse of one of the parking areas along West Cliff due to wave undermining of a seawall just west of Columbia Street followed by collapse of overlying fill material (Zone 2).

Figure 3-10. Repair of 2016 sinkhole in Zone 2 between Woodrow Avenue and Columbia Avenue.

The Armstrong brothers engineered a solution by using what was likely a cave and natural blowhole just east of the end of today's Chico Avenue. They bored two approximately 6-foot diameter shafts through the bedrock terrace into a sea cave, and then placed large pipes with pistons into the shafts. Large waves surging in at high tides pushed the pistons up. As they descended under gravity, the pistons forced seawater up through pipes into a storage tank mounted on a derrick above the clifftop (Figure 3-11). Seawater then flowed by gravity into a horse drawn water tank, which was used to water down the dirt road to keep the dust under control.

The history of erosion at that location provides an important perspective on the long-term erodibility of the Santa Cruz Mudstone along West Cliff (Figure 3-11 and Figure 3-12). Now, more than 125 years later, the outer shaft has eroded, but the inner shaft still exists and is now plugged with a concrete cap perforated with PVC pipe to allow the wave surge at high tide to be dissipated as an artificial blowhole (Figure 3-13). This suggests that certain portions of West Cliff Drive, particularly in the Santa Cruz Mudstone Formation in Zone 1 are not very erodible.

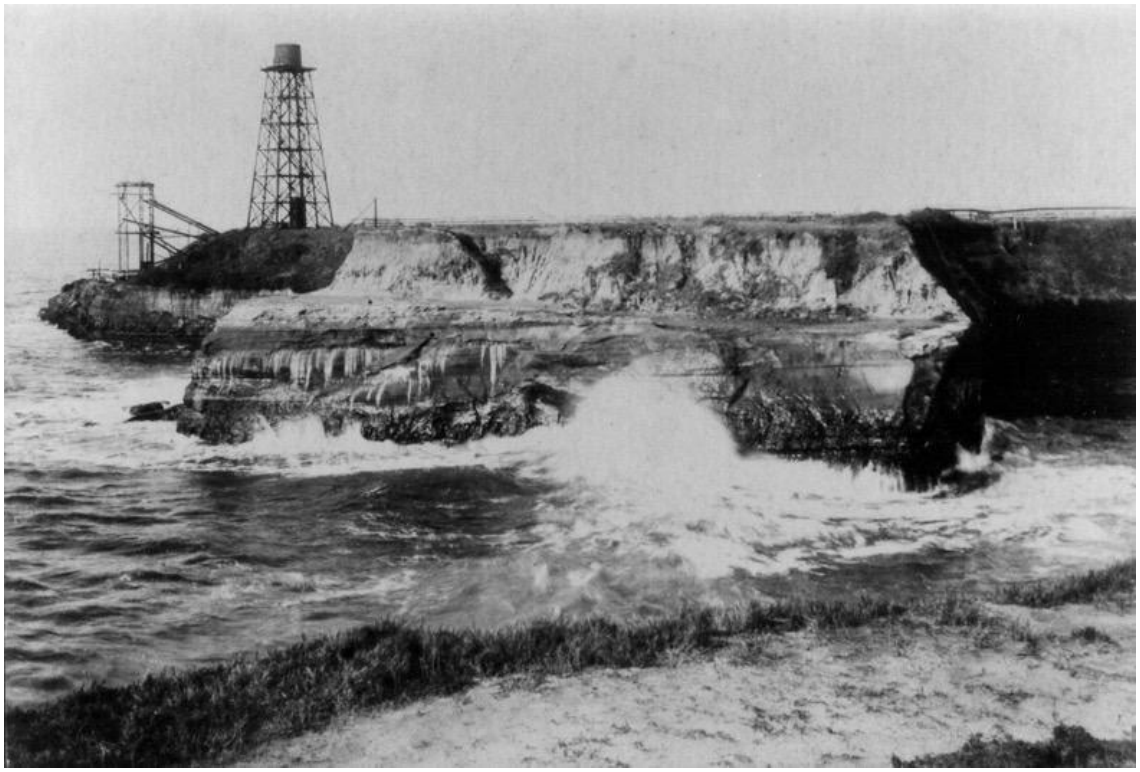


Figure 3-11. Wave motor near the end of Chico Avenue (1898).

Figure 3-12. Wave motor near the end of Chico Avenue (2006) (same view as Figure 3-15).

Figure 3-13. Concrete cork-like cap over former wave motor shaft was fitted with three PVC pipes to relieve pressure from wave surge and now serves as a natural blowhole.

Processes of Cliff (bedrock) and Bluff (terrace deposits) Erosion

There are many different types of coastal and terrestrial processes that contribute to erosion along West Cliff Drive. These processes include:

- Wave erosion of the marine terrace deposits
- Wave erosion and undercutting of the bedrock at the base of the cliff
- Sea cave development and failure
- Sea arch formation and collapse
- Sink holes in compacted fill
- Stormwater scour
- Trampling of erodible bluff top terrace deposits
- Wind driven wave splash erosion
- Biological disturbance from burrowing animals and vegetative weighting

Photographs can sometimes provide useful evidence of cliff erosion. The earliest dated photographs we have discovered of this coast were taken 143 years ago (1876). Certain areas such as the picturesque arches, sea stacks and distinct rock formations, for example, were photographed frequently and memorialized in hand-colored postcards and family albums. Over the subsequent years, as winter storms have periodically battered the bluffs and cliffs, and sea level has gradually risen, the coastline has slowly retreated. Some areas have changed dramatically (Figure 3-14 vs. Figure 3-15; and Figure 3-16 and Figure 3-17 vs. Figure 3-18) and others have changed surprisingly little. The natural bridges, arches, and sea stacks that owe their origins to wave attack of the weaker sandstones, siltstones, and mudstones have been destroyed by the same forces that created them, with many fascinating and revealing photographs taken of these natural and unnatural features along the way *(*Figure 3-19).

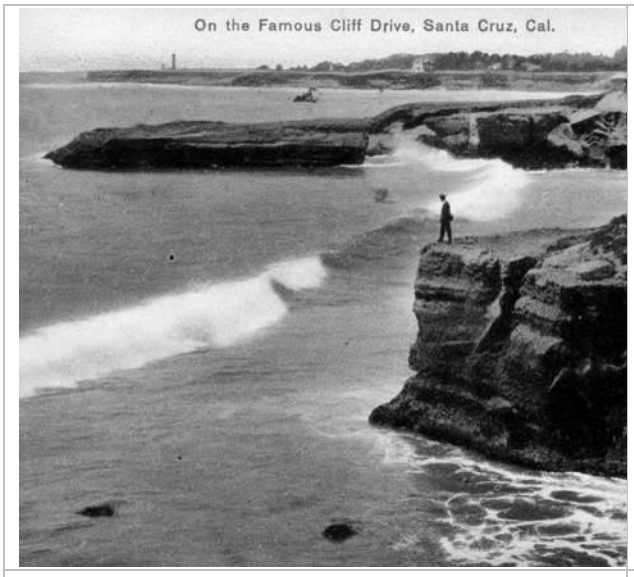


Figure 3-14. Bird Rock and vicinity west of Lighthouse Point in 1909.

Figure 3-15. Bird Rock and vicinity west of Lighthouse Point in 2006.

Figure 3-16. Arch east of Lighthouse Point at Steamer Lane in ~1890.

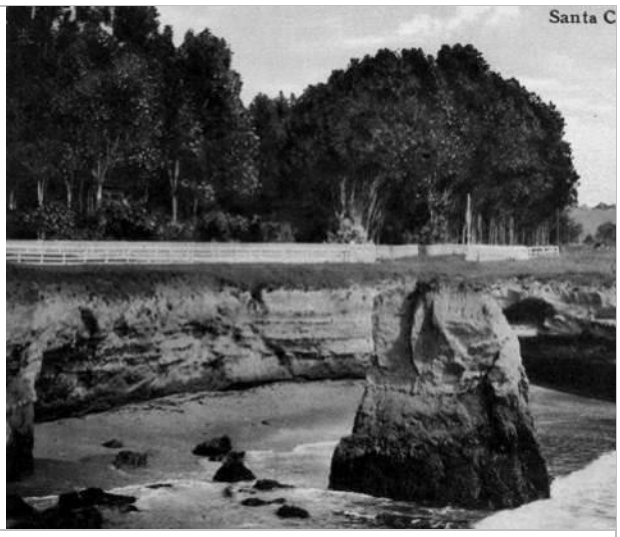


Figure 3-17. Collapsed arch at Steamer Lane in ~1920.

Figure 3-18. Base of arch at Steamer Lane almost completely eroded in 2006

Figure 3-19. Over the course of about 25 years, an arch had collapsed near the end of Almar Avenue at Mitchell's Cove Beach and then broken up further (photo dates from left: 1990, 2011, and 2016).

While it is difficult to get any quantitative measurements of cliff or bluff retreat from old ground photographs, they do provide a clear qualitative record of the extents of change or erosion that has taken place since the time of the original photographs. In many cases and for most people, a *then* and *now* set of photographs can provide a more understandable record of coastal change that is readily understood by a wide community cross section than a numeric rate of retreat given in inches/year or centimeters/year. However, in order to project future cliff erosion hazards, it is important to get accurate historical erosion rates.

3.5. Biotic Resources

Coastal Habitats: Nearshore (rocky intertidal, beaches, kelp)

West Cliff has a mix of rocky intertidal and beach habitats that support a diverse assemblage of species and provide for recreational and educational opportunities. Figure 3-20 and Figure 3-21 show the location of intertidal areas, and Table 3-1 shows the acreage of these habitats in each zone. We calculated the intertidal zone from the differences between MHW and MLLW. We interpreted the resulting data based on observations of the intertidal landscape and sand levels from recent years, including the 2018/19 winter. The intertidal points of interest locations reflect human use of intertidal area along West Cliff and were digitized based on the City Recreational Use Surveys and more than 25 years of professional observation.

Table 3-1. Area (acres) by Zone of Nearshore Marine Habitats above Low Water along West Cliff Drive

Zone	Beaches	Intertidal Areas	Intertidal Points of Interest
1	4.64	1.28	1.12
2	2.64	0.40	0.23
3	2.84	4.26	1.55
4	3.86	3.30	6.33
Total	13.97	9.23	9.23

The West Cliff intertidal habitats are comprised of a mix of substrates including sand, native rock, rip-rap (granite, limestone, sandstone, concrete and other), and seawall. Dynamic by nature, the abundance and distribution of sand varies at annual, interannual, and greater (decadal/episodic) time scales. Rocky intertidal communities are resilient to burial and can emerge intact following long periods of being inundated by sand. The area of intertidal habitat is greatest in Zones 3 and 4, related to patterns in the seaward extension of the rocky shelf and sand accumulation. Intertidal Points of Interest are greatest in Zone 4 where Lighthouse Point and fringing kelp beds afford substantial protection from direct swell and northwest winds. Much of the Zone 4 intertidal habitat is only accessible during extreme low tides.

The fingered rock outcroppings west of Mitchell's Cove in Zone 1 are notable intertidal features that align with the jointing in the Santa Cruz Mudstone Formation. The combination of pocket beaches and rock structural complexity make for a diverse and accessible intertidal zone. The rock shelf outcropping at the base of John Street has exceptional tidepools, similar to those

found at the Natural Bridges State Beach Tidepools (Figure 3-22). In addition to being popular locations for recreation, these intertidal habitats are inhabited and utilized by many species. Shorebirds and seabirds frequent the rocky intertidal between Zones 1 and 3 where they are commonly observed during the migration season (September through April). Rip-rap forms a substrate for many intertidal organisms along West Cliff and this habitat is frequented by foraging seabirds, shorebirds, and waders. These species are most commonly found in the more inaccessible portions of West Cliff and during times of low human visitation.

Beaches are found throughout the study area with the largest total beach area occurring in Zones 1 and 4. Notable features include Its Beach, west of Lighthouse Point, Cowell's Beach at the base of the Cowell's Stairs, Mitchell's Cove, the pocket beaches to the west of Mitchell's Cove, and the beach at the base of Auburn Avenue. Of these, only Its Beach and Mitchells Cove regularly remain accessible during high tide, in many instances due to shoreline armoring that covers the beach. These beaches provide foraging habitat for shorebirds and seabirds. Pacific sand crabs (*Emerita analoga*) inhabit these sites and are important prey for nearshore fishes and shorebirds. All beaches in the study area are frequently occupied by people when exposed during daylight hours with good weather, meaning species must either forage elsewhere or at night.

Figure 3-20. Nearshore habitats in Zones 1 & 2.

Figure 3-21. Nearshore habitats in Zones 3 & 4.

Figure 3-22. Tidepools at the base of John Street

Large beds of giant kelp (*Macrocystis pyrifera*) occur along West Cliff Drive. These features are sparser in sand-bottomed areas near Natural Bridges, Mitchell's Cove, Its Beach and near Cowell's Beach. This foundational species supports a diverse assembly of organisms, harboring important prey and habitat for many species from invertebrates, fish, and seals to the California sea otter (*Enhydra lutris*). Wading shorebirds such as great and snowy egrets (*Ardea alba* and *Egretta thula)* often use kelp beds as floating perches to hunt the abundance of kelp associates. Kelp beds also calm wave chop and can significantly improve near shore water surface conditions for beachgoers and surfers. The extent of kelp varies over time depending on the season, upwelling, water clarity and solar radiation. Kelp and other algae are dislodged by seasonal swells. Sometimes considered a nuisance, the resulting drift algae is an important subsidy to the coastline and marine environment. Algae wrack forms food and habitat for detritovores such as kelp flies (*Coelopa frigida*) that feed a host of higher trophic species including shore and landbirds. The kelp wrack most commonly deposits in Zone 2 at Mitchell's Cove beach (Figure 3-23). The kelp holdfasts when torn from the reef also provide a transportation pathway for cobbles to reach the shoreline.

Figure 3-23. Drift algae at Steamer Lane.

Documented observations of sensitive species that utilize the nearshore habitats along West Cliff Drive are presented in Figure 5-1 and Figure 5-2 and Table 3-2. Unless otherwise specified, observations were collected in part for the Final Environmental Impact Report (EIR) for the 2030 Santa Cruz General Plan (2012) and during 25 years of working and recreating along West Cliff Drive. Sensitive species of West Cliff seek privacy where they can breed or roost unmolested by people, pets or predatory animals (e.g., black rat, *Rattus rattus*). These sites include offshore rocks, cliff ledges, and cliff cavities. Over time, coastal management practices such as armoring have reduced these features by stopping erosional processes. Increased coastal access and recreational use has compounded the problem. The Santa Cruz General Plan/Local Coastal Program, 1990-2005 (1994) defers to language in the General Plan for Lighthouse Field State Beach (1984) for mitigation of these impacts and calls out specific species including the black swift (*Cypseloides niger*) and pigeon guillemot (*Cepphus columba*). The black swift is a Priority 3 Species of Special Concern with known historical nesting sites southwest of Mitchell's Cove and at Lighthouse Point (link to photo). The more abundant pigeon guillemot nest at various sites along West Cliff with the most important being a colony of approximately 5–10 pairs located in crevice features on the cliffs at the base of Stockton Avenue.

Table 3-2. Sensitive Animal Species Documented as Utilizing Habitat in Each Zone along West Cliff Drive

Zone	Pt #	Class	Species	Type	Location
1	1	Seabirds	Brown Pelican, Seabird spp., Shorebird spp.	Roosting Rock	Natural Bridge
1	2	Seabirds	Brandt's Cormorant, Western Gull	Nesting Rock	Natural Bridge
1	3	Seabirds	Western Gull	Nesting Ledge	Natural Bridges Head
1	4	Seabirds	Black Oystercatcher	Nesting Ledge	Natural Bridges Head
1	5	Seabirds	Brandt's Cormorant	Nesting Ledge	Natural Bridges Head
1	6	Seabirds	Snowy Egret, Shorebird	Roosting Ledge	Natural Bridges Head
1	7	Seabirds	Pelagic Cormorant	Nesting Ledge	Cliff between Swanton and Chico
1	8	Seabirds	Cormorant spp.	Roosting Ledge	Cliff between Swanton and Chico
1	9	Seabirds	Pigeon Guillemot	Nesting Cavities	Stockton Cove
2	1	Seabirds	Seabird spp., Shorebird spp.	Roosting Ledge	SE of Woodrow
2	2	Seabirds	Seabird spp., Shorebird spp.	Roosting Ledge	SE of Woodrow
2	3	Seabirds	Seabird spp., Shorebird spp.	Roosting Rock	SE of Woodrow
2	4	Seabirds	Seabird spp., Shorebird spp.	Roosting Rock	SE of Woodrow
2	5	Seabirds	Seabird spp., Shorebird spp.	Roosting Rock	SE of Woodrow
2	6	Seabirds	Seabird spp., Shorebird spp.	Roosting Rock	N of Bird Rock
2	7	Seabirds	Cormorant spp., Shorebird spp., Brown Pelican	Roosting Rock	Bird Rock Off Columbia
3	1	Seabirds	Pigeon Guillemot	Nesting Cavities	Off West End Lighthouse Field
3	2	Seabirds	Shorebird spp., Seabird spp.	Roosting Ledge	Off West End Lighthouse Field
3	3	Seabirds	Seabird spp., Shorebird spp.	Roosting Ledge	Lighthouse Point
3	4	Seabirds	Seabird spp., Shorebird spp.	Roosting Ledge	Lighthouse Point
3	5	Landbirds	Black Swift	Historical Nesting 1994	Sea Cave East Side of Its
3	6	Seabirds	Seabird spp., Shorebird spp.	Roosting Ledge	Lighthouse Point
3	7	Marine Mammals	California Sea Lion	Haulout Ledge	Lighthouse Point
3	8	Seabirds	Shorebird spp.	Roosting Ledge	Lighthouse Point
3	9	Seabirds	Cormorant spp., Shorebird spp., Brown Pelican	Roosting Rock	Seal Rock
3	10	Marine Mammals	California Sea Lion	Haulout Rock	Seal Rock
3	11	Seabirds	Pigeon Guillemot	Nesting Cavity	Lighthouse Point Above the Slot
3	12	Landbirds	Black Swift	Historical Nesting	Lighthouse Point
3	13	Seabirds	Pigeon Guillemot	Nesting Cavity	Due East of Lighthouse

3	14	Seabirds	Pigeon Guillemot	Nesting Cavity	East of Parking Lot on Ocean Side by Bathrooms
3	15	Insects	Monarch Butterfly	Overwintering Site	NE Side Lighthouse Field
4	1	Seabirds	Pelagic Cormorant	Roosting Ledge	East of St Joseph's
4	2	Seabirds	Pelagic Cormorant	Roosting Ledge	East of St Joseph's
4	3	Seabirds	Pelagic Cormorant	Roosting Ledge	East of St Joseph's
4	4	Seabirds	Pelagic Cormorant	Roosting Ledge	Below Small Park by Old Bathrooms SE of Manor

The largest seabird colony on West Cliff is the colony of Brandt's cormorants (*Phalacrocorax penicillatus*) at the Natural Bridge (Figure 3-24). The colony moved from Natural Bridges to breed on a relatively isolated mainland ledge on the eastern side of Natural Bridges head. The move from the Natural Bridges to the mainland coincided with large influxes of migrating California brown pelicans (*Pelicanus occidentalis*) whose roosting activities on the bridge may have displaced the cormorants. By 2018, the mainland cormorant colony had grown to 36 nests and 84 fledglings. This expansion occurred despite disturbance by coastal visitors. California State Parks and Groundswell Coastal Ecology erected interpretive signage to minimize seabird disturbance at Natural Bridges. The cormorants resumed nesting on the Natural Bridges in 2019, a year when fewer pelicans migrated to Santa Cruz. As Natural Bridge and other rocks disappear, seabirds, shorebirds and other species will face diminishing offshore roosting and nest resources. The Brandt's cormorant story is a good example of how marine species can be limited by undisturbed breeding sites along West Cliff and potential solutions (i.e., safe mainland nesting habitat).

Figure 3-24. Brandt's cormorant nesting colony on the leeward side of Natural Bridges head.

Table 3-2 and Table 3-3 contain information on species that rely on nearshore and land habitats along West Cliff Drive. Marine mammals such as harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus califonianus*) require isolated locations for resting and breeding. California sea lions haul out on Seal Rock and have been observed using Lighthouse Point during the night. Sea otters may occasionally seek refuge on land during birth or become stranded during extreme weather events. Table 5-4 highlights the multitude of migratory and resident seabird species that utilize rocks and ledges along West Cliff for roosting and breeding.

Table 3-3. Breeding Status of Mammal Species Documented along West Cliff Drive (Final EIR for the 2030 Santa Cruz General Plan [2012] and personal observation)

Common Name	Scientific Name	Marine (M)/ Terrestrial (T)	Breeding Status (B – Breeding, M – Migratory)	Invasive
California Sea Lion	*Zalophus californianus*	M	M	
California Sea Otter	*Enhydra lutris*	M	B	
Common Bottlenose Dolphin	*Tursiops truncatus*	M	B	
Northern Elephant Seal	*Mirounga angustirostris*	M	M	
Grey Whale	*Eschrichtius robustus*	M	M	
Harbor Porpoise	*Phocoena phocoena*	M	B	
Harbor Seal	*Phoca vitulina*	M	B	
Humpback Whale	*Megaptera novaeangliae*	M	M	
Black Rat	*Rattus rattus*	T	B	I
Black-tailed Deer	*Odocoileus hemionus columbianus*	T	B	
Bobcat	*Lynx rufus*	T	B	
Brush Rabbit	*Sylvilagus bachmani*	T	B	
Coyote	*Canis lantrans*	T	B	
Feral Cat	*Felis cattus*	T	B	
Long-tailed Weasel	*Mustela frenata*	T	B	
Opossum	*Didelphis virginiana*	T	B	I
Pocket Gopher	*Thomomys bottae*	T	B	
Raccoon	*Procyon loter*	T	B	I
Striped Skunk	*Mephitis mephitis*	T	B	

Table 3-4. Breeding Status and Habitat Requirements of Bird Species along West Cliff Drive

Key: Seabird/Landbird = S/L, Breeding Status: B – breeding, B? – likely breeding, M – migration, R – resident.

Common Name	Scientific Name	Landbird or Seabird/ Shorebird	Breeding Status	Cliff/ Ledge Nester	Protected Roosts	Rocky Intertidal	Beach
Allen's Hummingbird	*Selasphorus sasin*	L	B				
American Crow	*Corvus brachyrhynchos*	L	B				
American Robin	*Turdus migratorius*	L	B?/M				
Anna's Hummingbird	*Calypte anna*	L	B				
Barn Owl	*Tyto albus*	L	B?/R	1	1		
Barn Swallow	*Hirundo rustica*	L	B	1			
Bewick's Wren	*Thryomanes bewickii*	L	B				
Black Oystercatcher	*Haematopus bachmani*	S	B	1	1		
Black Phoebe	*Sayornis nigricans*	L	B	1			
Black Swift	*Cypseloides niger*	L	B (Hist)	1	1		
Black Turnstone	*Arenaria melanocephala*	S	M		1	1	
Black-crowned Night-Heron	*Nycticorax nycticorax*	S	B?/R		1		
Black-headed Grosbeak	*Pheucticus melanocephalus*	L	B?/M				
Brandt's Cormorant	*Phalacrocorax penicillatus*	S	B	1	1		
Brewer's Blackbird	*Euphagus cyanocephalus*	L	B				
Brown Creeper	*Certhia americana*	L	B				
Brown Pelican	*Pelecanus occidentalis*	S	M		1		
Bushtit	*Psaltriparus minimus*	L	B				
California Gull	*Larus californicus*	S	M				
California Quail	*Callipepla californica*	L	B?/R				
California Scrub-Jay	*Aphelocoma californica*	L	B				
California Thrasher	*Toxostoma redivivum*	L	B?/R				
California Towhee	*Melozone crissalis*	L	B				
Chestnut-backed Chickadee	*Poecile rufescens*	L	B				

Common Name	Scientific Name	Landbird or Seabird/ Shorebird	Breeding Status	Cliff/ Ledge Nester	Protected Roosts	Rocky Intertidal	Beach
Clark's Grebe	*Aechmophorus clarkii*	S	M				
Cliff Swallow	*Petrochelidon pyrrhonota*	L	B	1	1		
Common Loon	*Gavia immer*	S	M				
Common murre	*Uria aalge*	S	M				
Common Raven	*Corvus corax*	L	B?				
Common Yellowthroat	*Geothlypis trichas*	L	B?/R				
Cooper's Hawk	*Accipiter cooperii*	L	M				
Dark-eyed Junco	*Junco hyemalis*	L	B				
Double-crested Cormorant	*Phalacrocorax auritus*	S	R		1		
Downy Woodpecker	*Dryobates pubescens*	L	B?/R				
European Starling	*Sturnus vulgaris*	L	B				
Fox Sparrow	*Passerella iliaca*	L	M				
Glaucous-winged Gull	*Larus glaucescens*	S	M				
Golden-crowned Sparrow	*Zonotrichia atricapilla*	L	M				
Great Blue Heron	*Ardea herodias*	S	B?/R				
Great Egret	*Ardea alba*	S	B?/R				
Great Horned Owl	*Bubo virginianus*	L	B?/R				
Green Heron	*Butorides virescens*	S	B?/R		1		
Hairy Woodpecker	*Dryobates villosus*	L	B?/R				
Heermann's Gull	*Larus heermanni*	S	M				
Hermit Thrush	*Catharus guttatus*	L	M				
House Finch	*Haemorhous mexicanus*	L	B				
House Wren	*Troglodytes aedon*	L	R				
Hutton's Vireo	*Vireo huttoni*	L	B?/M				
Killdeer	*Charadrius vociferus*	S	B				
Lesser Goldfinch	*Spinus psaltria*	L	B				

Common Name	Scientific Name	Landbird or Seabird/ Shorebird	Breeding Status	Cliff/ Ledge Nester	Protected Roosts	Rocky Intertidal	Beach
Long-billed Curlew	*Numenius americanus*	S	M				1
Mallard	*Anas platyrhynchos*	S	R				
Marbled Godwit	*Limosa fedoa*	S	M		1		1
Mew Gull	*Larus canus*	S	M				
Mourning Dove	*Zenaida macroura*	L	B				
Northern Harrier	*Circus hudsonius*	L	R				
Northern Mockingbird	*Mimus polyglottos*	L	B				
Orange-crowned Warbler	*Oreothlypis celata*	L	M				
Osprey	*Pandion haliaetus*	L	B?/M		1		
Pacific Loon	*Gavia pacifica*	S	M				
Pacific-slope Flycatcher	*Empidonax difficilis*	L	B?/M				
Pelagic Cormorant	*Phalacrocorax pelagicus*	S	B	1	1		
Peregrine Falcon	*Falco peregrinus*	L	R/M		1		
Pied-billed Grebe	*Podilymbus podiceps*	S	R				
Pigeon Guillemot	*Cepphus columba*	S	B	1	1	1	
Pygmy Nuthatch	*Sitta pygmaea*	L	B				
Red-breasted Sapsucker	*Sphyrapicus ruber*	L	B?/R				
Red-necked Loon	*Gavia stellata*	S	M				
Red-necked Phalarope	*Phalaropus lobatus*	S	M				
Red-shouldered Hawk	*Buteo lineatus*	L	B				
Red-tailed Hawk	*Buteo jamaicensis*	L	B				
Red-winged Blackbird	*Agelaius phoeniceus*	L	B				
Ring-billed Gull	*Larus delawarensis*	S	M				
Rock Pigeon	*Columba livia*	L	B	1			

Common Name	Scientific Name	Landbird or Seabird/ Shorebird	Breeding Status	Cliff/ Ledge Nester	Protected Roosts	Rocky Intertidal	Beach
Ruby-crowned Kinglet	*Regulus calendula*	L	B?/M				
Sanderling	*Calidris alba*	S	M		1		1
Say's Phoebe	*Sayornis saya*	L	M				
Sharp-shinned Hawk	*Accipiter striatus*	L	M				
Short-billed Dowitcher	*Limnodromus griseus*	S	M		1		1
Snowy Egret	*Egretta thula*	S	B?/R				
Song Sparrow	*Melospiza melodia*	L	B				
Spotted Towhee	*Pipilo maculatus*	L	B?/R				
Steller's Jay	*Cyanocitta stelleri*	L	R				
Surf Scoter	*Melanitta perspicillata*	S	M				1
Surfbird	*Calidris virgata*	S	M		1	1	
Townsend's Warbler	*Setophaga townsendi*	L	M				
Tree Swallow	*Tachycineta bicolor*	L	B				
Violet Green Swallow	*Tachycineta thalassina*	L	B?/M				
Warbling Vireo	*Vireo gilvus*	L	B?/M				
Western Grebe	*Aechmophorus occidentalis*	S	M				
Western Gull	*Larus occidentalis*	S	B	1	1		
Western Tanager	*Piranga ludoviciana*	L	B?/M				
Western Wood-Pewee	*Contopus sordidulus*	L	M				
Whimbrel	*Numenius phaeopus*	S	M				1
White-crowned Sparrow	*Zonotrichia leucophrys*	L	B?/R/M				
White-tailed Kite	*Elanus leucurus*	L	R				
Wilson's Warbler	*Cardellina pusilla*	L	M				
Wrentit	*Chamaea fasciata*	L	B?/R				
Yellow-rumped Warbler	*Setophaga coronata*	L	M				

Coastal Habitat: Upland

Upland habitat along West Cliff Drive is dominated by invasive species with elements of historical native communities. Habitats seaward of West Cliff Drive along with recent restoration sites can be seen in Figure 3-25 and Figure 3-26. Table 3-5 summarizes acreage for the dominant habitats: iceplant, restored, and tree canopy. Specific habitat types along with species assemblages are listed in Table 3-6 and Table 3-7. Remnant native species occur primarily at stream outfalls, Lighthouse Field State Beach, and isolated cliff faces such as those above Cowell's Beach. Most of the native species listed in these tables have been reintroduced along West Cliff by coastal restoration efforts that began with support from the City in 2012.

Lighthouse Field State Beach has significant canopy cover from Monterey cypress (*Cupresses macrocarpa*), blue gum (*Eucalyptus globulus*), arroyo willow (*Salix lasiolepus*), and Monterey pine (*Pinus radiata*). These trees comprise the important Lighthouse Field monarch butterfly overwintering site in Zone 3 (Figure 3-27). This monarch site ranked second highest in numbers among western overwintering sites during the recent 2018/19 season (Xerces 2019) and is managed under the Monarch Butterfly Overwintering Site Management Plan for Lighthouse Field State Beach in 2017 (Pelton 2017). The plan supports strategic tree plantings to maintain structure of the overwintering grove for monarchs. Tree plantings were initiated in the late 2000s and have resumed during the past two winters. The iconic Monterey cypress is the dominant cliff top tree species along West Cliff. Valued for aesthetic, shade, structural habitat and salt tolerance, this species can accelerate coastal erosion through hydraulic root pressure as their roots wedge into seams in the rock substrate in search of water. There are relevant examples of this process at Seabright Beach. Cypress are prone to toppling when planted in shallow soils of the first coastal terrace. Evidence of this can be seen at Lighthouse Field State Beach following periods of heavy rainfall and wind.

Other forest types are described in Table 3-6. Development of the coastal terrace and riparian zones has left only small traces of these communities along West Cliff. Remnants can be found in Lighthouse Field, a few seeps west of Mitchell's Cove and along Bethany Creek.

The majority of vegetation on the seaward side of West Cliff consists of invasive nonnative highway iceplant. (*Carpobrotus edulis*) and a hybrid between this and sea fig (*Carpobrotus chilensis*), herein collectively referred to as iceplant. Originally from South Africa, iceplant was introduced around 1900 and was planted extensively along railroad grades and highways to stabilize sand (Weber and D'Antonio, 1990). Iceplant has also been used extensively as an ornamental. Iceplant outcompetes other plants species by suppressing the growth of seedlings and mature plants (Zedler and Scheid, 1988; D'Antonio, 1990; D'Antonio and Mahall, 1991; D'Antonio et al., 1993). The California Invasive Plant Council lists iceplant as Category A-1 plant, highly invasive. Iceplant has severely impacted native Northern Coastal Bluff Scrub and Coastal Dune habitats and now covers thousands of acres in coastal California (CalIPC). The highest acreage of iceplant occurs in Zone 1. Iceplant forms monotypic stands with extremely low diversity, offering little in structure or forage for wildlife. Iceplant also alters soil chemistry by increasing salt load, reducing pH, and adding organic matter that is slow to breakdown. Dense

fibrous roots interfere with water uptake by more deeply rooted native plants (D'Antonio and Mahall 1991). A study on native bee response to removal of iceplant and restoration of native Coastal Bluff Habitat found a tenfold increase in bee abundance and threefold increase in diversity at the genus level.

Iceplant is almost always observed in association with large erosion events of marine terrace deposits along West Cliff. Iceplant becomes engorged and heavy following rainfall during the wet season. The shallow-rooted iceplant mats then fail in large slips (Figure 3-25). This observation may be in part due to the ability of iceplant to hold materials beyond the angle of repose. These failures lead to relaxation of the bluff edge towards a more stable angle.

Figure 3-25. Iceplant slippage near Natural Bridges (left) and west of Its Beach (right).

Other common West Cliff invasive plants are listed in Table 3-7. Of these species, the City has undertaken efforts to eradicate most of the jubata grass (*Cortdateria jubata*) from West Cliff with small patches remaining near the base of De la Costa Avenue. This included removing a large stand on the cliffs east of the Cowell's Stairs in about 2016 following a fire associated with a homeless encampment. The grasses on this list can make the initial phases of coastal restoration difficult but can be brought under control over time. Fortunately, the patches of Kikuyu and Bermuda grass on West Cliff are relatively small and restricted to highly trafficked areas such as by the public bathrooms at Lighthouse Field State Beach.

Invasive mammals are known to negatively impact native communities. Of these, black rats are commonly found in the rip-rap and iceplant habitat. Black rats are voracious predators of seabird eggs and prey on intertidal communities. The author led an egg predation study in 2002, which found that eggs in artificial nests in areas with rip-rap along West Cliff were more likely to be subject to predation than those in areas without rip-rap. Black rats could very like be limiting some seabirds and landbirds from nesting along West Cliff. Rat trails can be seen in the soft soils along West Cliff (Figure 3-26). Feral cats are another species with top down effects that are commonly fed at several locations on West Cliff. Rock doves (pigeons) are a third ruderal invasive species that competes with pigeon guillemots for nesting sites. People feed pigeons at several locations along West Cliff including at the Natural Bridges Overlook. Pigeons were linked to a reduction in water quality at Cowell's Beach where the City spent significant funds to exclude this species from under the wharf. All these invasive species likely play a significant role in limiting wildlife populations in the study area.

Figure 3-26. Black rat tracks above rip-rap west of Its Beach.

Fossorial mammals along West Cliff Drive include pocket gophers (*Thomomys bottae*). Pocket gophers are ecosystem engineers and their tunneling activities are important to mixing the soil and creating subterranean habitat for other species. Gophers are linked to erosion and can cause water piping that can exacerbate erosional processes. Appropriately selected native plants are resistant to gophers; however, nonnative plant communities often have difficulties becoming established in the presence of gophers. They are important prey items for many species and both raptors and waders can be observed taking gophers along West Cliff.

Coastal restoration has considerably increased native vegetation communities along West Cliff Drive. Restoration sites are located on California State Parks, City of Santa Cruz properties, as shown in Figure 3-27 and Figure 3-28. The area of restored habitat is summarized in Table 3-5. Restoration efforts along West Cliff began in 2011 by Groundswell Coastal Ecology and are ongoing (link to photo). This work involves local schools and community members. Restoration target communities draw on the following vegetation alliances: Yellow Bush Lupine Scrub, California Sagebrush Shrub, Dune Mat, Arroyo Willow Thickets, Poison Oak Scrub, Coyote Brush Scrub, Sea Lyme Grass Patches, Ashy Ryegrass–Creeping Ryegrass Turfs, Silver Dune Lupine–Mock Heather Scrub, Slough Sedge Swards, and Sand Dune Sedge Swaths (California Native

Plant Society's Manual of California Vegetation Online). All restoration materials are from locally collected stock and raised in the Groundswell greenhouse at Branciforte Small Schools (link to photo). Some materials are propagated at satellite greenhouses located at local schools.

Newly restored communities have become well established within 1 to 3 years after planting. Maintenance is required to prevent iceplant from reinvading along the plot edges (link to photo). Native resident and migrant animal species have recruited to the restored habitat. Local students and community participated in all restoration efforts. This work has also integrated science curricula into the restoration process (link to photo). These efforts provide a working model for future restoration along West Cliff Drive. This work has received support from the City, State, and federal agencies (including the Coastal Commission), and local donors.

Table 3-5. Area (acres) by Zone of Coastal Habitats along West Cliff Drive

Zone	Restoration (Coastside)	Restoration (Inland)	Iceplant	Canopy (Coastside)
1	0.57	0.17	5.56	0.39
2	0	0.02	1.52	0.00
3	3.27	0.22	1.60	0.11
4	0.02	0	0.73	0.43
All	3.86	0.41	9.42	**0.94**

Figure 3-27. Upland habitats and sensitive animal species in Zones 1 & 2.

Figure 3-28. Upland habitats and sensitive animal species in Zone 3 & 4.

Table 3-6. Native Tree and Plant Species and Associated Plant Alliances (CNPS Manual of California Vegetation online) Found in Forested Habitats of West Cliff Drive (personal observation)

Common Name	Scientific Name	Non-native Trees	Coast Live Oak Woodland	Central Coast Arroyo Willow Thickets	Red Alder Forest
California buckeye	*Aesculus californica*		1		
red alder	*Alnus rubra*				1
California mugwort	*Artemisia douglasiana*		1	1	1
salt marsh baccharis	*Baccharis glutinosa*			1	1
valley sedge	*Carex barbarae*			1	1
ceonothus	*Ceanothus thyrsiflorus*		1		
soap plant	*Chlorogalum pomeridianum var. divaricatum*		1		
yerba buena	*Clinopodium douglasii*		1		
Red osier dogwood	*Cornus sericea ssp sericea*			1	1
beaked hazelnut	*Corylus cornuta var califnornica*		1	1	1

Monterey cypress	*Cupressus macrocarpa*	1			
blue gum	*Eucalyptus globulus*	1			
California fescue	*Festuca californica*		1		
wood strawberry	*Fragaria californica*		1		
common cowparsnip	*Heracleum maximum*			1	1
ocean spray	*Holodiscus discolor*		1		
horkelia	*Horkelia californica*		1	1	
Mexican Rush	*Juncus mexicanus*			1	1
Western rush	*Juncus occidentalis*			1	1
common rush	*Juncus patens*			1	1
bicolored lupine	*Lupinus bicolor*		1		
California wax myrtle	*Morella californica*			1	
Monterey pine	*Pinus radiata*	1			
self heal	*Prunella vulgaris var. lanceolata*		1		
coast live oak	*Quercus agrifolia*		1		
California buttercup	*Ranunculus californicus*		1		
canyon gooseberry	*Ribes menziesii var menziesii*		1		
flowering currant	*Ribes sanguineum*		1		
fuchsia flowered gooseberry	*Ribes speciosum*		1		
California rose	*Rosa californica*		1		
thimbleberry	*Rubus parviflorus*			1	1
California blackberry	*Rubus ursinus*		1	1	1
arroyo willow	*Salix lasiolepis*			1	
red elderberry	*Sambucus racemosa*			1	1
bee plant	*Scrophularia californica*			1	
California hedge nettle	*Stacchys bullata*		1	1	
poison oak	*Toxicodendron diversilobum*		1		

Table 3-7. Common Invasive Plant Species Found along West Cliff Drive (personal observation)

Common Name	Scientific Name
sea fig	*Carpobrotus edulis*
iceplant	*Carpobrotus chilensis*
jubata grass	*Cortdateria jubata*
Bermuda grass	*Cynodon dactylon*

Canarian Sea Lavender	*Limonium perezii*
Kikuyu grass	*Pennisetum clandestinum*
ripgut brome	*Bromus diandrus*

Three coastal creeks terminate at the ocean on West Cliff (Table 3-8). The first, Arroyo Seco, is almost entirely underground in Zone 1, daylighting for some 20 feet before spilling out over the cliff near the base of Auburn Avenue (Figure 3-29). The creek terminus may have been rerouted from a previous path that perhaps went down Auburn Avenue and helped create the small cove that still exists today. There is also a small patch of arroyo willow where the logical creek path appears to lay. Bethany Creek has good water flow, elements of native vegetation and a maturing grove of sycamore trees (*Platanus* spp.). Recent restoration efforts here follow a red alder and arroyo willow riparian habitat model and making headway against the many invasive species in this watershed (link to photo). Lighthouse Creek is a promising seasonal watershed with low gradient lines that shoot out over the coastal cliff and onto Its Beach. The creek holds a seasonal population of Pacific chorus frogs (*Hyla regilla*) and drains the flat annual grass lands of Lighthouse Field. Connectivity of the creek to surface runoff along Pelton Avenue is poor offering an enhancement opportunity to reduce seasonal street flooding and help rewater the Lighthouse Field shallow water aquifer. Biological diversity along the creek is low and could benefit from the addition of flowering moist native perennial grassland plants, which would help benefit the overwintering monarch population and other pollinator species.

Table 3-8. Names and Lengths of Streams Falling within the West Cliff Drive Project Area

Creek Name	Length (ft)
Arroyo Seco	434
Bethany	447
Lighthouse Field	701

Figure 3-29. Arroyo Seco Creek outlet near Auburn Avenue in Zone

4. Goals, Objectives, Program Overview Plan Projects

4.1. Resource and Management Goals and Objectives

Goals and objectives were refined through early TAC and community engagement. The overarching goal for resource and coastal management as outlined in this Plan is to recognize the need to prioritize coastal-dependent resources and equitably balance competing resource needs over changing long-term conditions.

4.1.1. Coastal Resource Goals

1. Maintain/protect beach width where feasible. [Environmental Quality]
2. Ensure beaches along the length of the city coastline remain accessible and preserve public and private visitor serving facilities and minimize increases in visitor densities on specific beaches in collaboration with other agencies holding jurisdiction (e.g., State Parks). [Parks and Recreation]
3. Maintain a distribution of beach access points by encouraging a variety of transportation options along the entire city coastline. [Parks and Recreation]
4. Minimize coastal habitat loss and maintain ecological connectivity. [Environmental Quality]
5. Address needs of underserved people of the community, both local residents and visitors, little to no cost access and recreation, day use parking, transportation, cultural and spiritual uses, and jobs. [Community Design; Housing, Cultural]
6. Maintain public safety on beaches and when accessing beaches; work with marine safety staff to upgrade priority marine rescue egress locations (i.e. Zone 2). [Safety]
7. Accommodate a diversity of recreational activities for a range of users. [Parks and Recreation]
8. Maintain and enhance water quality to the extent feasible. [Environmental Quality]
9. Encourage, enhance and maintain regional sediment supply to the coast including sand management programs that enhance beach and coastal recreation while partially mitigating some impacts from coastal armoring. [Safety, Environmental Quality, and Parks and Recreation]

4.1.2. Coastal Management Goals

1. Minimize coastal armoring. [Safety, Park and Rec, Environmental Quality, Econ Development]

2. Reduce beach area loss from placement footprint of shoreline protection structures. [Safety, Parks and Recreation]
3. Prioritize living shoreline adaptations. [Safety, Park and Rec, Environmental Quality]
4. Monitor coastal access infrastructure and beach width long-term and in response to extreme storm events; monitor how coastal change is impacting coastal use. [Safety]

Overarching goal: Recognize the need to prioritize coastal-dependent resources and equitably balance competing resource needs over changing long-term conditions.

4.1.3. Objectives for Sense of Place and Cultural Identity

- Continue to honor and uphold the unique places along West Cliff Drive where people may live, play, worship, and work
- Retain (in place or relocate), or enhance key local features that contribute to the historical and contemporary cultural identity of West Cliff Drive (surfing, coastal resources, Lighthouse and museum, sculptures, memorial benches, and scenic views)
- Increase education and awareness of coastal change (sea level rise and erosion) and its potential community impacts to local ecosystems, recreation, transportation and infrastructure

4.1.4. Objectives for Recreation and Access

- Maintain or enhance public access so as to distribute access to ocean, beaches, and along cliff top to promote use across the entire West Cliff Drive corridor
- Maintain or enhance public access so as to distribute access to ocean, beaches and along cliff top to promote visitation across the entire West Cliff Drive corridor
- Prioritize lateral access along West Cliff Drive cliff tops and in the Main Beach area so that all groups of people have access to recreation opportunities
- Maximize access, especially for most vulnerable populations
- Mitigate the need for emergency repairs by adopting a plan allowing necessary maintenance and upkeep of City facilities
- Maintain and enhance emergency access for marine rescue operations
- Monitor coastal access infrastructure and beach width long term and in response to extreme storm events; monitor how coastal change is impacting coastal use
- Maintain/protect pocket beach width where feasible
- Maximize beaches for as long possible

4.1.5. Objectives for Transportation

- Improve transportation safety, aiming to resolve multi-modal transportation conflicts, especially for underrepresented populations within the community (e.g., elderly, disabled, linguistically isolated)
- Prioritize lateral access along West Cliff Drive cliff tops and in the Main Beach area so that all groups of people have access to recreation opportunities
- Maximize access, especially for most vulnerable populations
- Mitigate the need for emergency repairs by adopting a plan allowing necessary maintenance and upkeep of City facilities
- Maintain and enhance emergency access for marine rescue operations
- Monitor coastal access infrastructure and beach width long term and in response to extreme storm events; monitor how coastal change is impacting coastal use
- Maintain first responder access to coastline, beaches, and residences
- Maintain and improve the corridor for active transportation modes (e.g. walking, cycling)
- Manage limited parking resources to promote maximum public access

4.1.6 Objectives for Ecosystems and Habitats

- Maintain and enhance biological and species diversity, water quality, minimize coastal habitat loss and maintain ecosystem connectivity
- Reduce erosion by managing sediments, recreational uses, amenities, and stormwater systems
- Maintain and enhance biological and species diversity, water quality, minimize coastal habitat loss and maintain ecosystem connectivity
- Minimize coastal armoring, prioritize living shoreline adaptations, and reduce beach area loss from placement footprint of shoreline protection structures.

4.2. Public Works Project Concepts Overview

Future actions for West Cliff Drive can be considered along various time frames. For the purposes of this project, the City is using a Public Works Plan to define priority projects for near term implementation (next 10-15 years), which is summarized in this section. The Plan also identifies projects that initiate further studies, and planning and design for the medium-term (10 to 30 years). **The summary of the priority project concepts is followed by specific public works projects by zone and by habitat and landscaping projects and maintenance for West Cliff Drive corridor-wide.** A Capital Improvements Program table summarizing all projects across all zones is located in Chapter 9.

Adaptation to coastal erosion and sea level rise along each zone of West Cliff Drive will likely require multiple approaches over time. Uncertainties in timing of large storm waves at high tides, elevation of sea level rise in the future, and projected extents of future coastal erosion, require consideration of feasible adaptation strategies over both short- and long-term time scales with an adaptation pathways approach. Short-term projects authorized through this Plan as well as medium to longer term adaptations were determined through a systematic process during 2019-2020.

4.2.1. Revetment and Armoring

A priority of the Plan is to identify the components of an armoring maintenance program, specifically (1) new and replacement armoring projects zone by zone, (2) anticipated design and implementation phases and (3) criteria for maintenance repairs corridor-wide. This program is aimed at enhancing recreational uses and maintaining the existing path while repurposing existing riprap if reasonably possible and minimizing the addition of new riprap. In addition to the in-depth evaluation of armoring conducted as part of the preparation of the Plan, the Public Works department conducts an annual inspection and assessment of all armoring movement. The near term projects and anticipated maintenance proposed in the Plan will include the retrieval of fugitive rocks where feasible (i.e., rip rap that has moved out of place but could be restacked), the restacking or repair of existing structures (which could include new rock) to minimize toe scour, stabilization of caves, maintenance of the revetment design profiles (when feasible) to reduce the footprint on the beach, replacement and design of seawalls and general maintenance to avoid of emergency repairs. The Existing Conditions inventory and engineering assessment determined that all existing riprap and armoring could be reached by crane from the cliff top, although some may require partial temporary closure of West Cliff Drive. The Public Works Department, with adequate funding, will phase the short-term projects proposed by Zone in addition to other typical maintenance that may be required as revealed through annual inspection. Aside from the near-term projects proposed, the trigger for maintenance repairs will be exceedance of the minimum revetment elevation target (e.g., 80% of revetment design height).

Design activities related to armoring should be coordinated with other priorities of the Plan, e.g., transportation, habitat restoration, overlook improvements, etc. Construction activities related to armoring should attempt to minimize impacts to coastal access and the neighborhoods during operations. Maintenance operations could be summarized annually in a monitoring and maintenance report.

4.2.2. Transportation Facilities

Multi-modal traffic count data collected along the corridor show a well-used Recreational Trail by cyclists, pedestrians and other non-auto users. Observations and public feedback noted that user conflicts and congestion are common along the trail, especially at several narrow pinch

points along the Trail. Recent widening efforts have been effective in minimizing overcrowding along limited sections of the Recreational Trail.

Several alternative transportation designs to West Cliff Drive and the Recreational Trail were identified to support walking and bicycling priorities. In community outreach for this project, the Recreational Trail was the highest priority transportation facility to maintain in the corridor. In general, the transportation adaptation alternatives maximize the use of available space and are intended to respond to actual erosion events and narrowing of the West Cliff Drive corridor over time. The Short-Term Alternative 1 identifies the following transportation improvements for implementation:

- Improved signage along the corridor indicating it is a shared Class III bicycle facility on the roadway
- Improved visibility and addition of marked crosswalks, including signage and painted crosswalk improvements,
- Inventory and identification of all curb cuts and tactile warning boards, and improvements to those that are substandard
- Consideration of additional curb cuts to facilitate access to and from the recreational trail from the roadway and side streets
- Continued multi-modal traffic count monitoring along the corridor
- Continued parking lot occupancy counts and consideration of additional parking management strategies including, but not limited to enforcement, user fees, expanded time based limits, residential permits, and other demand side tools to support adaptation.

The medium term Alternative 2 considers a conversion to a vehicular one-way east to west roadway pending future coastal erosion. There has been substantial input from the community on Alternative 2, with no consensus from community feedback received during the outreach events in support of or against the one-way option. Public Works Department will continue the use of multi-modal traffic counts, conducting regular counts and further community engagement as needed for assessing the potential impacts and the future design of this alternative. The transportation alternative concepts are more fully discussed with Figures in plan and section view in Chapter 7 of this Plan.

4.2.3. Public Access, Recreation, and Education

The Existing Conditions Inventory identified a comprehensive list of needs to improve, repair, and enhance the existing designated accesses and provide new overlook opportunities. New structures or maintenance work should include consideration of access improvements. Specific locations of access projects (e.g., stairwells) are discussed in the Zone by Zone project section.

Many West Cliff users visit the unique overlook terraces along the coastline that provide a close-up and off-road experience and provide unique ocean and sunset views, fishing opportunities and beach or ocean access. Some of this coastal terrace has been covered with rock as part of historical armoring efforts. This rock covers areas of this unique coastal environment and restricts lateral access among areas of the coast. A further analysis of current terrace use and potential use will be completed to identify areas where vertical sea wall upgrades to failing rock revetment can provide added terrace access, overlooks and use. Specific locations of revetment upgrades projects are discussed in the Zone by Zone project section. Such an increase in resource area and access can help to address loss of vertical access and over time beach use along other areas of West Cliff.

West Cliff Drive is an important part of the Santa Cruz community. It is a great location to educate residents and visitors alike about the coastal processes, history, recreational uses, and climate change. It is also an opportunity to expand and invite different populations of the community that are often underrepresented to learn and enjoy this community facility. The City anticipates evaluating and implementing signage about the coastal processes, history, climate change, recreation, and ecology along with transportation signage, as appropriate. It is important the signage does not overwhelm, clutter and ultimately degrade the natural scenic beauty along West Cliff. Design considerations and placement will help maintain continuity and a sense of place along West Cliff Drive. Signs could be designed in Spanish and English.

Figure 4-1. Example of habitat signage along Natural Bridges State Park

4.2.4. Sand Management Program

As identified in the Adaptation Alternatives analysis completed for the project with a high benefit cost ratio, the proposed sand management concept would place approximately sand from a source such as the Harbor, San Lorenzo River or other, raising sand levels. A Sand Management Study proposed in the short-term will evaluate sources, feasibility, downstream impacts and costs for a periodic sand placement program. For example, one scenario to model and evaluate could involve recycling about 10% of the annual sand volume dredged at the harbor to augment natural sand supply and widen City Beaches while assessing any alternations to natural sand supply to beaches downcoast of the Harbor. If Santa Cruz Harbor is a viable source, sand might be transported by barge to the beach and pumped onshore. Whereas if the San Lorenzo River is a viable source, sand might be trucked and placed on beach. The sand placement may help mitigate the loss of beaches from coastal armoring and enhance the quality of some of the surf breaks, also a feature to be analyzed. Close and early engagement with downcoast stakeholders will also be key to the Sand Management Study's scope of work. This feasibility study would include consultation with the necessary regulatory and funding agencies to inform the permitting and environmental review, and establish possible funding mechanisms. The economic analysis indicates that benefits can be maximized if this project is completed within this decade. Dependent on the outcome of this analysis the City may initiate planning if feasibility study identifies an alternative with a high likelihood of success and support from community engagement.

4.2.5. Habitat and Landscaping

Key opportunities for enhancing nearshore marine resources include maintaining sandy beach habitat, tidepools, offshore rock outcroppings, and isolated seabird roosting and nesting habitat. Elements such as tidepools, cracks, and substrate texture that facilitate colonization by marine species and be integrated into existing, purpose built, and multi-functional coastal armoring structures. Structures should include engineering elements to promote sand retention. Seabird roosting and nesting habitat should be created at key locations by restoring existing ledges currently covered by invasive plants, engineering new ledges and crevices on native bluffs as well as existing, and new built armoring structures. Structures built to stem the formation of sea caves could have opportunity to include habitat elements suitable for rare black swifts. Design standards and a prioritization framework must be developed not only for these opportunities, but for restoration and landscaping in general

Potential Overarching Design Principles

Design principles for landscaping and habitat enhancements or living shorelines adaptation strategies should provide desired ecosystem services, match landscape level patterns in coastal ecology, emphasize function habitat over landscaping, promote habitat connectivity, and balance attention on terrestrial and marine habitats. In addition to reducing erosion, enhancing coastal resiliency, and increasing biodiversity, healthy living shorelines provide ecosystem services including water filtration, nutrient uptake, carbon sequestration, pollination services, reduce invasive pests, help curb pollution, and more. One way of viewing living shorelines is as multipurpose landscaping that focuses on making coastlines more resilient and building habitat.

The design process should work to maximize the benefits of these and other services. Visitor access, human interaction, and aesthetic are important components of living shorelines from both the perspective of managing human impact on the environment and recognizing economic returns on coastal investments. Living shorelines solutions in high energy systems must either integrate with resilient geologic or built hard features or have space to accommodate dynamic shorelines and adaptive retreat. Living shorelines can be implemented through restoration of existing degraded habitat and accompany installation of coastal armoring. The most elegant implementations in developed systems seamlessly bridge elements of the built environment by weaving threads of functional habitat into engineered structures. To maximize project lifespans, design considerations should provide functionality at a wide range of tidal stages and future sea level rise horizons.

Prioritization Framework

A prioritization framework based on factors including priority areas of erosion concern, potential to reduce erosion, project complexity, cost, project life span, access, and ecological benefit should be developed to facilitate living shorelines implementation. To identify projects with discrete boundaries, West Cliff Zones could be divided into subunits of manageable size that encompass priority areas of erosion concern, visitor access pathways, microwatershed boundaries, consider equipment access, and implementation considerations on adjacent subunits.

Physical Processes

A primary goal of living shoreline adaptation strategies is to focus on physical processes such as reducing erosion, slope stabilization, increased sand retention, and runoff filtration. Individual projects may address erosion associated with existing armor, slope failures, and access ways. Implementation may require erosion control plans that specify use of materials such as jute and waddles. Since access pathways have significantly increased erosion and channelized stormwater runoff, this process may involve redesign of access pathways on the oceanside of the bike path. Many of these scenarios may require bioswales, curb-cutouts, and other permeable materials to reduce concentration of runoff, increase water retention, and percolation.

Ecological

A second element of living shoreline adaptation strategies seeks to support healthy ecosystems including functional habitat. Primary ecological goals include matching landscape level patterns in biodiversity and abundance of species, include a diversity of habitats and promotion of habitat connectivity. Living shorelines can include both living (vegetation) and abiotic structural components and should occur in both the terrestrial and marine ecosystems. Vegetation can provide food such as seeds and nectar and structure for reproduction and shelter for native fauna. Abiotic components should prioritize local nature-based materials such as elements of local wood and rock. It is important to note that vertical habitat is often overlooked and under-utilized and offers a significant opportunity for additional habitat in space constrained systems.

Terrestrial

Terrestrial living shorelines may focus on vegetated habitats where much of the work involves removal of invasive iceplant and subsequent revegetation along erosive trails and post construction restoration. This process should be multiphase, starting off with foundational species and then adding species that are less commonly encountered in coastal vegetation communities. Plant selection should focus on perennials and include both shrubs and rhizomatous species that develop fibrous underground root systems that are effective at stabilizing soils. Species palettes should be tailored to abiotic factors such as seasonal inundation, salt loading, soil type, and foot traffic. Species selection should also consider gopher pressure which can be intense at some sites, the life span of species, use of weedy native species which can dominate some systems, and patch size of individual species or species groupings. Restoration or post construction erosion control using reseeding can be effective in some scenarios. This practice should rely on locally collected native seed and avoid boiler plate seed mixes such the Santa Cruz Erosion Control Mix. In some instances, sterile nurse crops seeding in conjunction with natives may be useful in establishing vegetative cover on bare soils. Non-sterile nurse species should be avoided. Follow up planting and maintenance may be required as there may be some trial and error in determining where species may best grow. Many sites have low weed seedbanks due to almost complete monoculture of iceplant along West Cliff, however planting may require follow up maintenance to ensure natives become established and are able to outcompete invasive weeds. Community and school groups have shown to be a good venue for maintenance and monitoring of restoration sites.

Habitat for flora and fauna can also be designed into coastal armor structures to promote habitat connectivity across the landscape. Structures can incorporate elements such weep holes that can water vegetated ledges and shelves as well as shallow dishes that collect water for animals to drink. The curtailing of erosional processes along West Cliff has resulted in a loss of bird habitat. One opportunity to mitigate this is to build isolated ledges and crevices into natural cliffs and built structures to support breeding and roosting of seabirds and landbirds. This can be accomplished by clearing invasive vegetation, cutting, drilling, bolting on features, or designing habitat into native rock as well as existing and newly built structures. The extensive subsurface cavities associated with rip rap promote black rat habitat and should be avoided in future armor structures.

Marine

There is opportunity to enhance the marine environment on existing and future structures. Engineering intertidal and subsurface features that increase sand retention could help support sandy beach habitat. Texture, rugosity and tidepools could be added to structures to provide habitat intertidal marine fauna. These features could be added to existing structures including rip rap and provide holes for fish and refugia crevices for limpets and abalone. There may also be opportunity to include small offshore rock outcroppings that service as roosting location for seabirds.

Restoration

The greatest enhancement opportunities for the terrestrial portion of West Cliff are restoring native habitat by removing invasive iceplant followed by replanting with a diverse palette of locally sourced native plant species. Restored habitat may support an increased biodiversity of resident and migratory fauna in less than one year. The long-term goal should be to remove iceplant throughout West Cliff. To reduce effort and edge effects, the workplan should include a prioritization framework with planned units that minimize the perimeter of unrestored habitat and disturbance to adjacent lands. Removal should occur in late summer, so soils are not bare during the long dry season. Depending on site characteristics, iceplant removal may require multiple techniques. Hand work and heavy equipment such as excavators are feasible in flat areas and on slopes with less erosive soils.

Iceplant has formed dense mats over 2 feet think in some locations. Here and in some other sites have a thick organic duff layer that is hydrophobic and a poor substrate for planting native plants. This layer must be removed to support successful native plantings. Heavy equipment is the tool of choice for this task. Physical removal techniques may cause excessive erosion on steep slopes with friable soils. Where ice plant mats tend to be less dense, treatment with herbicide is the most effective tool for removing iceplant. The remaining dead iceplant can serve as an erosion control mat which can be planted directly into. For this reason, the City may consider granting a policy exemption for the use of herbicides in removal of iceplant from priority areas that have erosive conditions which preclude hand or mechanized removal within the West Cliff living shoreline enhancement footprint. Solarization during the summer and fall months may be a viable alternative. However, using large tarps on steep slopes may be expensive and present risks including erosions and potential introduction of large amounts of plastic into the nearshore marine environmental. Pilot trials should be carried out prior to exercising this option. For flat surfaces, it is most efficient to plant once the winter rains have saturated the soils. If watering is an option, planting can occur in the early fall before the winter rains to give plants a head start on establishment. This can be advantageous for steep surfaces. Opportunistic native plant restoration can also take advantage of the frequent natural slippage events that occur on iceplant slopes during the winter.

Aesthetic is an important consideration. Future built infrastructure should color and texture match the native geology better than previous attempts such as the Pleasure Point Seawall Project. This element is crucial to connecting coastal users, visitors and residents, with a sense of place, that they are here on the Central Coast of California. Achieving both color and texture to match that of the native Santa Cruz mudstone and Purisima formations is well within the capacities of cement contractors. This element should include testing that evaluates application techniques used in the field as colorants can stratify during application. Testing should also incorporate a waiting period for materials to cure, be exposed to saltwater, and material performance over extended time periods.

Landscaping and Overlooks

A number of areas to improve landscaping, amenities and overlooks have been identified by zone in 4.3. The Parks and Recreation Department intends to lead a West Cliff Drive standards

project to specify design standards for overlooks, railings, park signs, interpretive signs, minor retaining walls, in FY 23. Incorporation of habitat and landscaping improvements into other larger Public Works projects will be evaluated.

4.2.6. Stormwater Drainage

Stormwater drains can cause significant erosion of the cliff face, specifically the upper soft bluff terrace deposits, compounding coastal erosion hazards and leading to potential loss of the Recreational Trail and West Cliff infrastructure. Replacement and redesign of aged stormwater pipes can help to reduce erosion of highly erosive soils as well as help to reduce costly repairs and loss of access. While a number of storm drains have been replaced, in other locations old pipes have been abandoned and new ones installed that were not visible during field visits (likely covered with vegetation or rip-rap). In Chapter 5, the Plan specifies evaluating all stormwater outfalls and pipe infrastructure along West Cliff Drive in the near term and replacement of those in poor condition.

Failing CMP will be replaced with plastic pipe and realigned to minimize erosion. Design considerations for replacing stormwater infrastructure will focus on reducing seepage and erosion, dissipating flow velocities and discharging flow below the upper more erosive geologic layers. One drainage outfall in particular is deserving of additional design consideration. The drainage outfall at Pyramid Beach offers a unique opportunity to mirror a natural waterfall on the beach. Specific locations of these stormwater projects are identified in the Zone by Zone project section. Examples of stormwater infrastructure in need of upgrading are shown in Figure 4-2.

Figure 4-2. Examples of failing stormwater infrastructure

4.3. Zone by Zone Public Works Projects

Referencing the Existing Conditions inventory evaluated throughout the course of the Plan development process, short-term projects, the focus of this Plan, are proposed to be high priorities with planning, permitting, financing and implementation within the next 10-15 years. Projects are identified based on the projected life expectancy of Existing Conditions, projected impacts of sea level rise, and anticipated preferences of the City and community. While the focus is the short-term (<15 years), medium (15 to 30 years) and long-term (30+ years) adaptations are briefly mentioned in this section as well but are further detailed in the adaptation alternatives analysis. The City's proposed short-term projects also include planning, design, and consideration of permitting and financing requirements for more medium term projects. The City also anticipates it will develop and refine its triggers and monitoring program to identify when planning and implementation should commence based on observable changes to the West Cliff Drive corridor

The City will complete these projects according to the considerations and constraints, policies, best management practices, and illustrative transportation concepts described in Chapters 3, 5, 6 and 7, respectively. The City will consider combining projects, when feasible for cost effectiveness, achieving economies of scale by integrating into the major projects specified for design and/or implementation. For example, Parks and Recreation is interested in coupling a West Cliff Drive Recreational Path signage evaluation project with the evaluation of signage for the corridor-wide transportation signage project specified for all zones. Similarly, transportation, habitat restoration and overlook enhancement projects can be coupled with the design for large seawall projects. General cost estimates for each are included in the Capital Improvements Program Chapter 9 of the Plan.

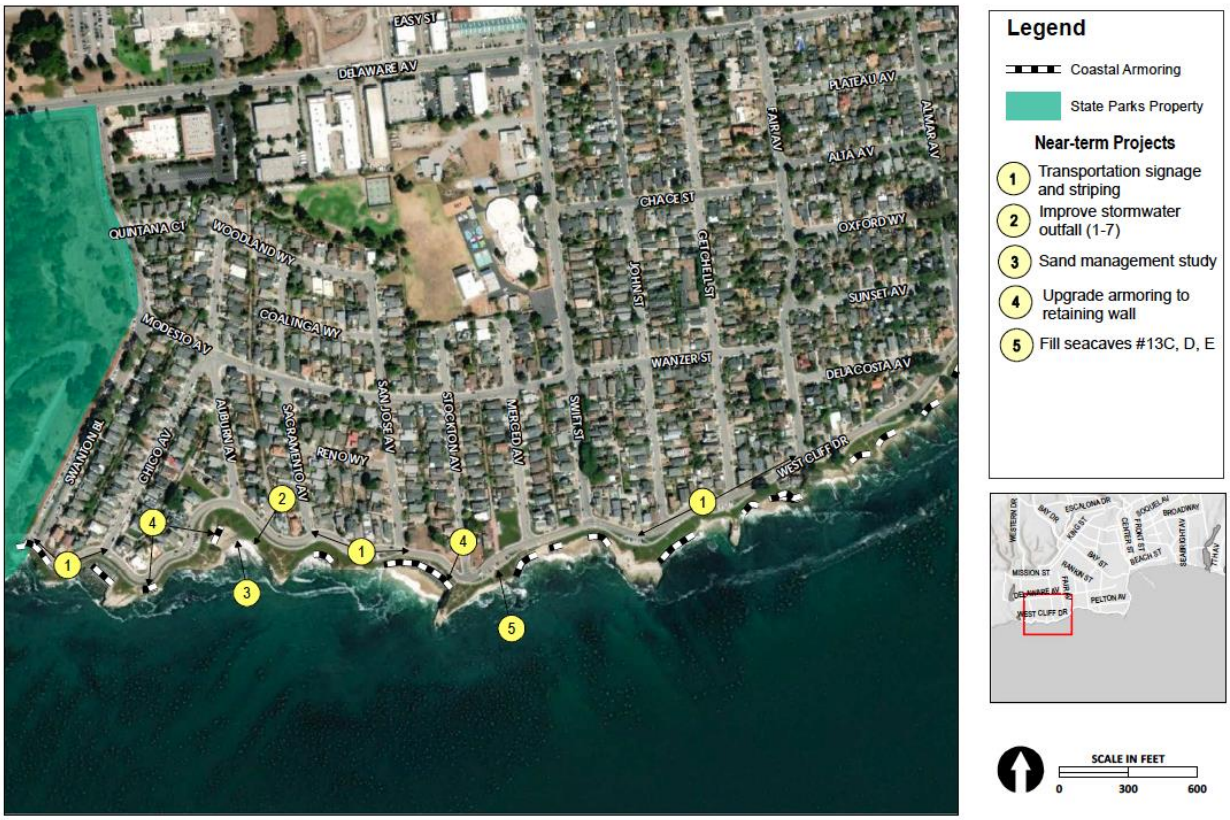
All projects described by zone fall into one of four categories of projects with different levels of project authorizations required for each category of project as defined in Chapter 6: maintenance, minor projects, major projects, and other studies. In addition to the zone by zone projects, the City will complete a Corridor-wide Master Signage Plan and Design Standards.

Zone 1 – Natural Bridges to Almar Avenue Project Descriptions
Additional figures are included from the existing conditions inventory are included to provide further information for each of the short-term projects proposed as part of this Plan. At the end of the Zone 1 Project Descriptions, reference the Zone 1 and 2 Existing Conditions Maps for:

Map 1: Armoring Sites
Map 2: Areas of Erosion Concern
Map 3: Access
Map 4: Utility Infrastructure[3]

[3] Utility Infrastructure depicted in Map 4 (for Zone 1 and all Zones) includes water, wastewater and stormwater infrastructure owned and operated by the City. Gas, electricity and communications infrastructure was not available to locate in mapping. However, the City will conduct outreach to those utility providers prior to Plan project implementation.

Figure 4-3. Specific priority projects identified in Zone 1 to be completed in the short-term



1. Maintenance: Improve transportation signage and striping aligned as indicated in Transportation Concept Alternative 1 to further communicate West Cliff Drive as a Class III bikeway as further described in Chapter 7. The City can begin consideration of a one-way vehicular alternative to maintain and enhance the Recreational Trail should a failure occur that inhibits status quo transportation patterns (AEC #6 and #14).

2. Maintenance: Improve the exterior of the stormwater outfall at Pyramid Beach between Auburn Avenue and Sacramento Avenue to look like a natural waterfall to enhance the viewshed.

3. Other Study: Conduct a sand management study to determine feasibility of the sand management program concept through additional engineering and scientific investigations including sand compatibility, sediment transport modeling, source analysis, transportation alternatives analysis, permitting, cost estimating and financing to determine the engineering feasibility and potential lifecycle for each placement. Includes engagement with regulators, downcoast stakeholders and the community.

4. Maintenance: Upgrade any failed non-engineered structures at armoring site #6 and 4, 5, 9 to retaining walls.

5. Major Project: Fill seacaves #13C, D and E. Based on the characterization provided in the existing conditions, the City will design and implement a cave fill project to bolster resilience of the coastline between Stockton Avenue and Merced Avenue.

6. (Zone-wide; not shown on map) Minor Project: Parking management strategies to encourage maximum public access and reflect frequent overflow parking from Natural Bridges State Park and Beach. These tools include times limits, hours of operation, residential parking permit zones, and user fees.

7. (Zone-wide; not shown on map) Maintenance: Addition of formal bike parking throughout Zone 1, including Natural Bridges, Parking areas, and Pyramid Beach.

8. (Zone-wide; not shown on map) Maintenance: Conduct stormwater outfall and pipe televising and repair/replace any failed pipe;

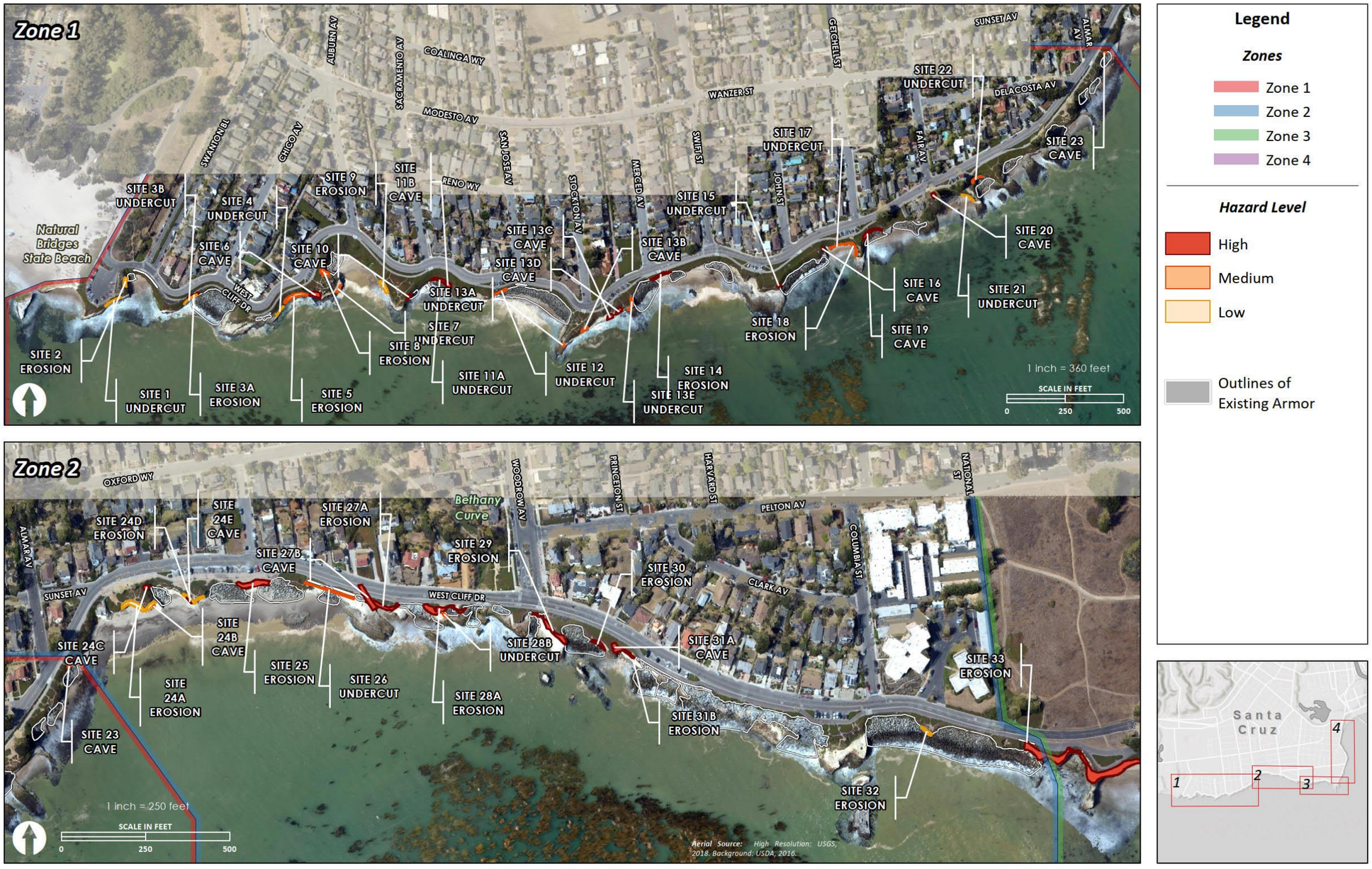
Specific projects that are likely to require additional study in the short term for implementation in the medium term will be identified based on continued monitoring of the extent of undercutting and the distance of the bluff edge to the Recreational Trail.

Medium-Term: Following significant wave or erosion events, the City will consider accommodating erosion and public access by relocating the Recreational Trail inland even if it requires the loss of parking or transitions the roadway from two-way vehicular traffic to one-way vehicular traffic from east to west for a portion or all of West Cliff Drive. Any road and or Recreational Trail realignment should seek to maximize width and maintain of the Recreational Trail based on the Conceptual transportation design concepts for Alternative 2 pursuant to standards in place at the time. If feasible medium term transportation improvements will be coordinated with other major projects identified for the medium term, e.g., new or improved armoring and/or sand management. Continued parking management tools are to be implemented to manage an increase in demand and a decrease in supply as the result of coastal erosion.

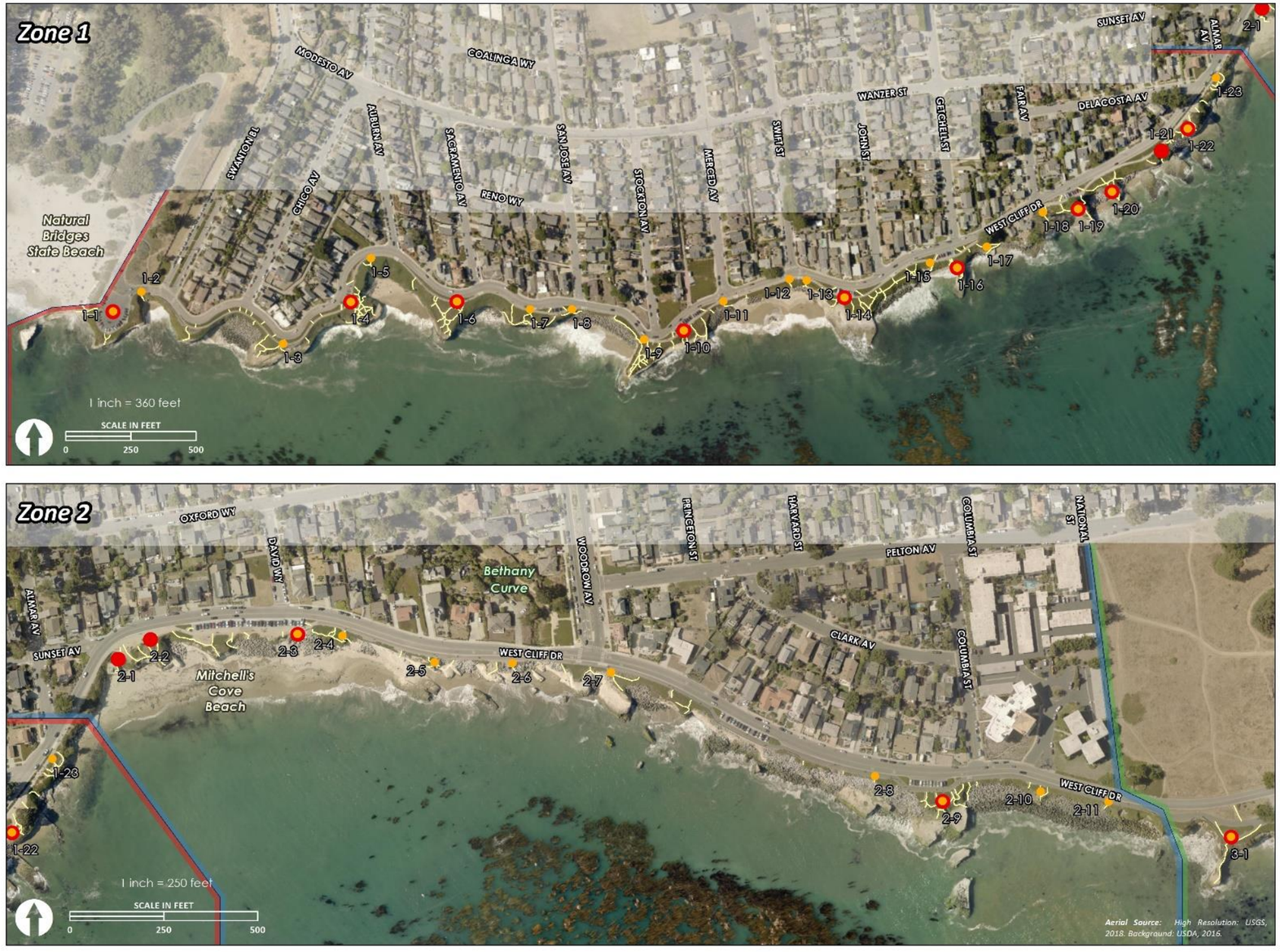
Long-Term: The City will further investigate and potentially implement a long-term investment in the sand management program based studies conducted in the short-term. As erosion events or maintenance costs exceed an identified trigger, then the City will consider prioritizing using the available public West Cliff Drive right of way space to realign and maintain the Recreational Trail by reducing street parking and vehicular traffic to a one way and eventually closure except for emergency services. It is anticipated that future updates to the West Cliff Drive Plan and Climate Adaptation Plan will continue to engage with residents and evaluate appropriate timing for planning and implementation of long-term adaptation strategies.

Map 1. Figure 4-4. All armor sites along West Cliff Drive (Zones 1 & 2).

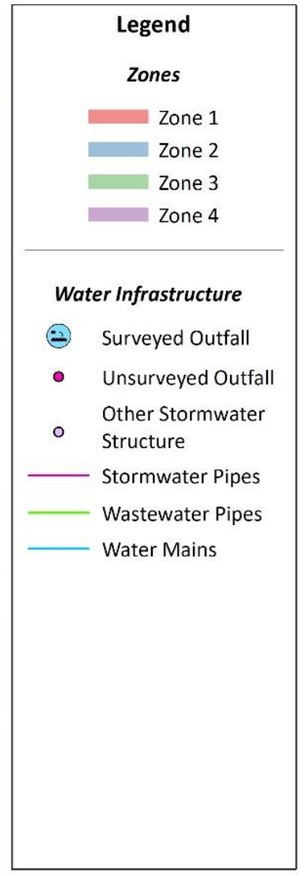
Map 2. Figure 4-5. Priority Areas of Erosion Concern for Zones 1 & 2.

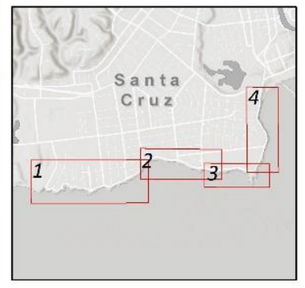


Map 3. Figure 4-6. Locations of formal and informal access areas along West Cliff Drive, Zones 1 & 2.



Map 4. Figure 4-7. Locations of Utility Infrastructure along West Cliff Drive, Zones 1 & 2.





Zone 2 – Mitchell's Cove – Almar to Arch Rock Project Descriptions

This zone is complex with the highest amount of current erosion risks, including high risk of sea cave failures. The estimated life span of many of the existing armoring structures is less than 10 years. The areas of erosion concern include several existing bluff top failures and sea caves where collapse would affect both the Recreational Trail and, likely, vehicular traffic along West Cliff Drive (AEC #27). Most of the existing armoring structures have substantial amounts of fugitive rocks that are affecting priority beach recreation areas. As a result, a zone wide approach is the priority for Zone 2. This zonal approach is similar to the County Redevelopment Agency funded project along East Cliff Drive at Pleasure Point, Santa Cruz. There, the County removed existing riprap and engineered a vertical soil nail seawall while improving the Recreational Trail along the clifftop and vertical access improvements. This Zone 2 Zonal approach includes replacing failing revetments, aging seawalls and removing fugitive rocks to improve beach recreational opportunities and where appropriate restore and enhance the blufftop terrace access, transportation corridor, habitats and recreational opportunities, as well as performing standard maintenance activities to extend the useful life of existing structures.

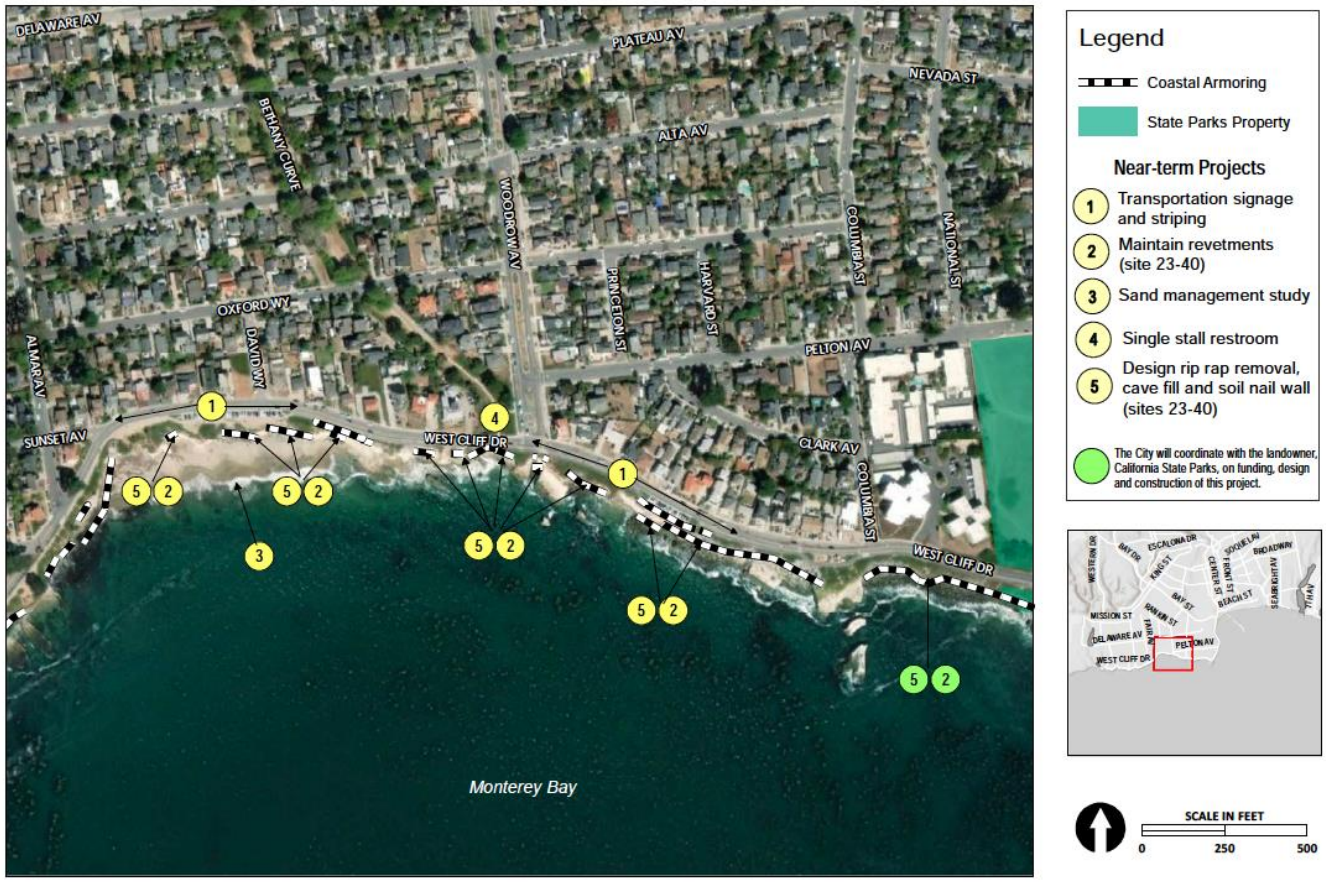
This zone has several constraints. For example, there are homes that are only accessible through West Cliff Drive. This area is a place of low bluff top elevation, high wave energy and poor vertical access. Marine safety staff routinely have to make rescues in this area.

The specific projects identified in Zone 2 focus on a very short-term maintenance of the existing revetments to prevent emergency failures and the design of a zonal approach. While funding is being assembled to implement the zonal approach design, maintaining the existing revetments will continue to be a priority to preserve the recreational trail and vehicular access. It is recommended that this Zone 2-wide project be identified in the Local Hazard Mitigation Plan (LHMP) to be eligible for federal FEMA funding.

For reference, before the Zone 2 Project Descriptions, please see the Zone 2 Existing Conditions Maps for by zone before the start of Zone 2:

Map 1: Armoring Sites
Map 2: Areas of Erosion Concern
Map 3: Access
Map 4: Utility Infrastructure

Figure 4-6. Specific priority projects identified in Zone 2 to be completed in the short-term



1. Maintenance: A priority is to improve transportation signage aligned with concept designs (Alternative 1 as depicted in Chapter 7) and to further communicate West Cliff Drive as a Class III bikeway as further described in chapter 7.

2. Minor Project: Maintain Revetments #23 - 40: Fugitive rocks will be restacked to reduce the potential of failure of short life span structures. Cap the entrance to the cave at David Way with rip rap.

3. Other Study: Conduct a sand management study to determine feasibility of the sand management concept.

4. Minor Project: Construct a gender neutral public restroom inland of Bethany Curve bridge near Woodrow.

5. Major Project: Design a zone-wide engineering and funding approach to remove or reduce the existing rip-rap (sites 23 to 40) and replace with soil nail walls or vertical recurved seawalls, with special consideration of integrating living shoreline approaches and habitat restoration. Some of the

revetment will be repurposed as fill if possible, sea caves will be reinforced and/or capped as feasible. If feasible armoring and revetment design will include design of transportation improvements, habitat restoration projects

6. (Zone-wide; not shown on map) Maintenance: Conduct stormwater outfall and pipe televising and replace failed pipe;

7. (Zone-wide; not shown on map) Minor Project: Parking management strategies to encourage maximum public access. These tools include times limits, hours of operation, residential parking permit zones, and user fees.

8. (Zone-wide; not shown on map) Maintenance: Addition of formal bike parking throughout Zone 2, including Mitchell's, Parking areas, Bethany Curve, and overlook areas.

Medium-Long Term: Based on results of the benefit cost analysis the City will evaluate construction of a groin or wave dissipation structure near Bethany Curve to reduce wave energy and erosion by impounding sand on the beach at Mitchells Cove. Such a structure could potentially enhance surf conditions and beach recreation.

The City may begin consideration of a one-way vehicular alternative to maintain and enhance the Recreational Trail should a failure occur that inhibits status quo transportation patterns , particularly as erosion continues to narrow the Recreational Trail (AEC #27 and #28). See Chapter 7 for more on this concept.

Zone 3 – Its Beach, Point Santa Cruz, and Steamer Lane

Zone 3 contains a high concentration of beach and surfing resources highly valued by the community as determined during the outreach and engagement process. This Zone contains the Santa Cruz Lighthouse and is backed by Lighthouse Field which is managed by California State Parks. Given the different orientations of the coastline around Point Santa Cruz and slightly different community priorities and management challenges, this zone is broken into two subsections, the western side at Its Beach, and the eastern side along the iconic Steamer Lane surf break. Given the high recreational and visitor usage of this zone, currently with the only public restroom on West Cliff Drive, it is an important Zone to improve signage and expand education to a wider variety of user groups. Improved signage is discussed in the corridor wide priorities, but specifically, multilingual signage, gender neutral bathrooms, and signs depicting the outlines of existing sea cave extents would improve education.

Map 1: Armoring Sites
Map 2: Areas of Erosion Concern
Map 3: Access
Map 4: Utility Infrastructure

Figure 4-7. Specific priority projects identified in Zone 3 to be completed in the short term

Short-Term: The specific priority projects identified in Zone 3 to be completed in the near term include as noted on Figure 4-7. Additional figures are included from the existing conditions to provide further information for each of the near term projects proposed as part of this Plan. The City will consider combining projects, when feasible for cost effectiveness, to integrate access and habitat and landscaping improvements into the major projects specified for design and/or implementation. One constraint in this zone is that a portion is owned by the City and a portion by State Parks, making jurisdictional coordination in this zone particularly important. State Parks has reviewed this Plan is interested in carrying out projects identified on State Parks property if funding might be collaboratively obtained for those and other projects in Zone 3.

1. Maintenance: A priority is to improve transportation signage aligned with concept designs (Alternative 1) and to further communicate West Cliff Drive as a Class III bikeway.

2. Other Study: Conduct a sand management study to determine feasibility of the sand management concept.

3. Other Study: Conduct a geotechnical study of sea cave on west side of Lighthouse Point (AEC #37). Previous studies were conducted in 2006 and 2016 with little change in sea cave. Next scheduled study is in 2026. Although not anticipated, should the study reveal an imminent risk, the City will prioritize evaluation and design of an alternative or the feasibility of relocating the Lighthouse (retreat) in the medium to longer term.

4. Minor Project: Maintain revetment at armoring sites 47 and 48 to the east of Lighthouse Point including restacking fugitive rocks and removal of other deteriorated infrastructure no longer in use at armoring site 48. Maintenance at armoring site 47 includes the repair of vertical access as described in #6 below.

5. Maintenance: Design a sea wall replacement at armoring site 44 to be implemented in the medium term.

6. Maintenance: Improve vertical access by refurbishing existing stairwells (Access #4 and 7)

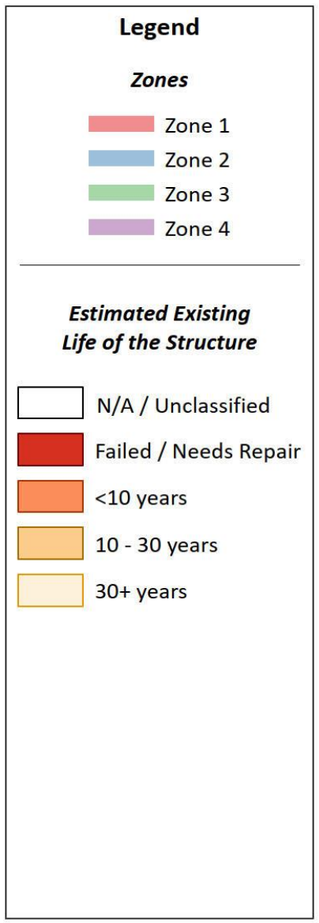
7. (Zone-wide; not shown): Parking management strategies to encourage maximum public access and promote parking turnover. These tools include times limits, hours of operation, residential parking permit zones, and user fees.

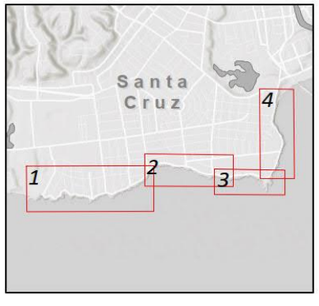
8. (Zone-wide; not shown): Addition of formal bike parking throughout Zone 1, including Its Beach, additional bike parking at the lighthouse, in lighthouse field parking areas, and at the surfer statue.

Medium-Term: The City will begin consideration of a one-way vehicular alternative to maintain and enhance the Recreational Trail should a failure occur that inhibits status quo transportation patterns. As erosion compromises the Recreational Trail, the City will prioritize an inland migration of the Recreational Trail and begin implementing a one way vehicular alternative based on the Conceptual Design (Alternative 2). The City will conduct community outreach and evaluate the one-way vehicular alternative to maintain and enhance the Recreational Trail should a failure occur that inhibits status quo transportation patterns. It is possible to relocate parking lots accordingly as conceptualized in the Alternative 2 analysis. Each location will need further design and accurate ROW measurements to understand how much parking can be maintained or suggest full parking lot relocation. The City will consider design or implement any designs for hardening or retreating the Lighthouse and associated amenities on the coastline.

Long-Term: The City will consider relocation of the Lighthouse inland based upon the Lighthouse Point Alternatives Analysis and Geotechnical Study contained in the Chapter 9 CIP program, to be performed around 2026, as well as any triggers established. As erosion occurs and the City plans for catastrophic failure, this alternative allows managed retreat and realignment the Recreational Trail. This longer-term option may consider either a one way West Cliff Drive vehicular traffic alternative or a rerouting option.

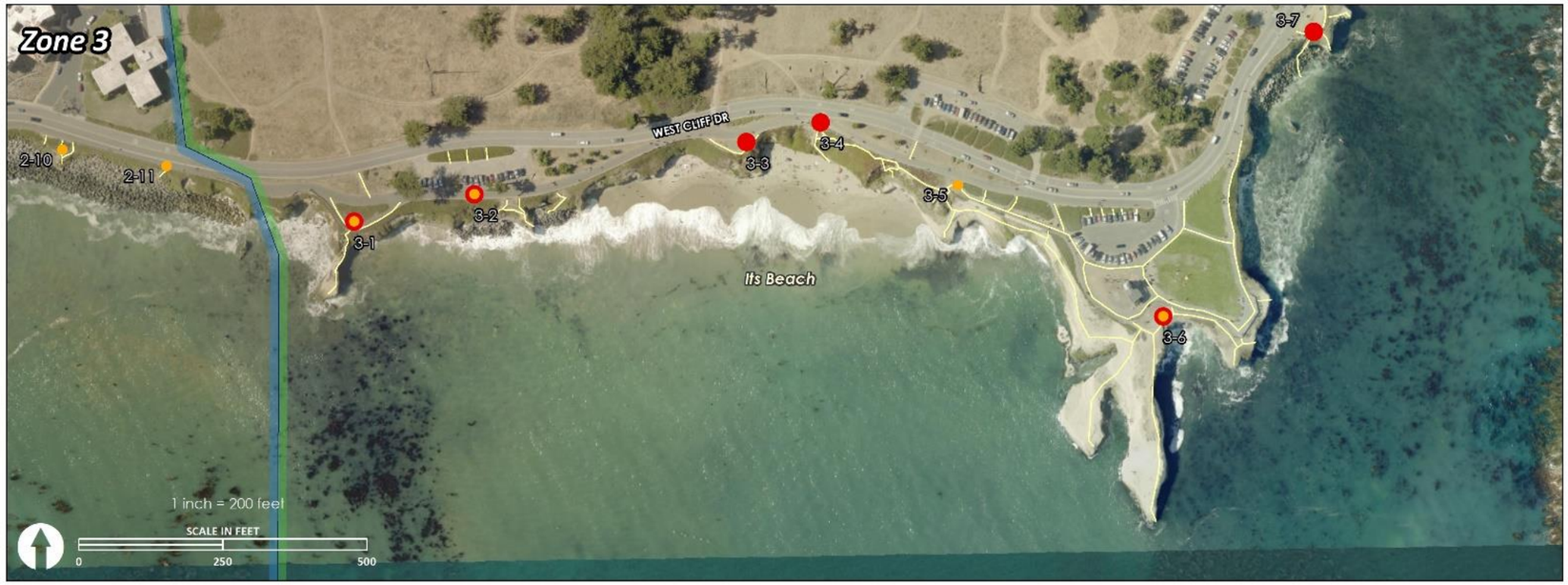
Map 5. Figure 4-8. All armor sites along West Cliff Drive (Zones 3 & 4)

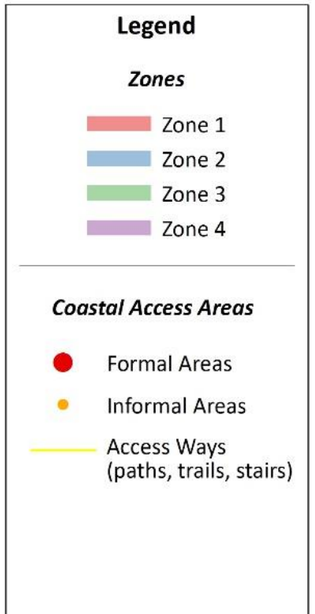


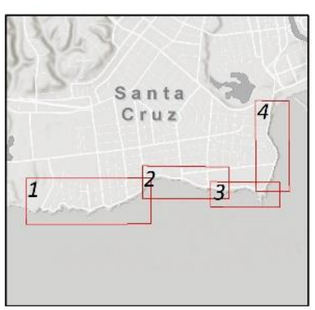


Map 6. Figure 4-9. Priority Areas of Erosion Concern for Zones 3 & 4.

Map 7. Figure 4-10. Locations of formal and informal access areas along West Cliff Drive, Zones 3 & 4.







Map 8. Figure 4-11. Locations of utility infrastructure along West Cliff Drive, Zones 3 & 4.

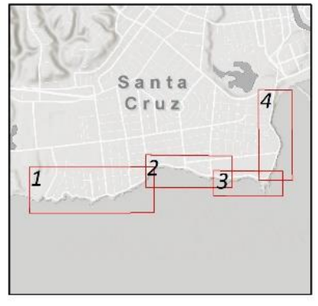
Legend

Zones

- Zone 1
- Zone 2
- Zone 3
- Zone 4

Water Infrastructure

- Surveyed Outfall
- Unsurveyed Outfall
- Other Stormwater Structure
- Stormwater Pipes
- Wastewater Pipes
- Water Mains

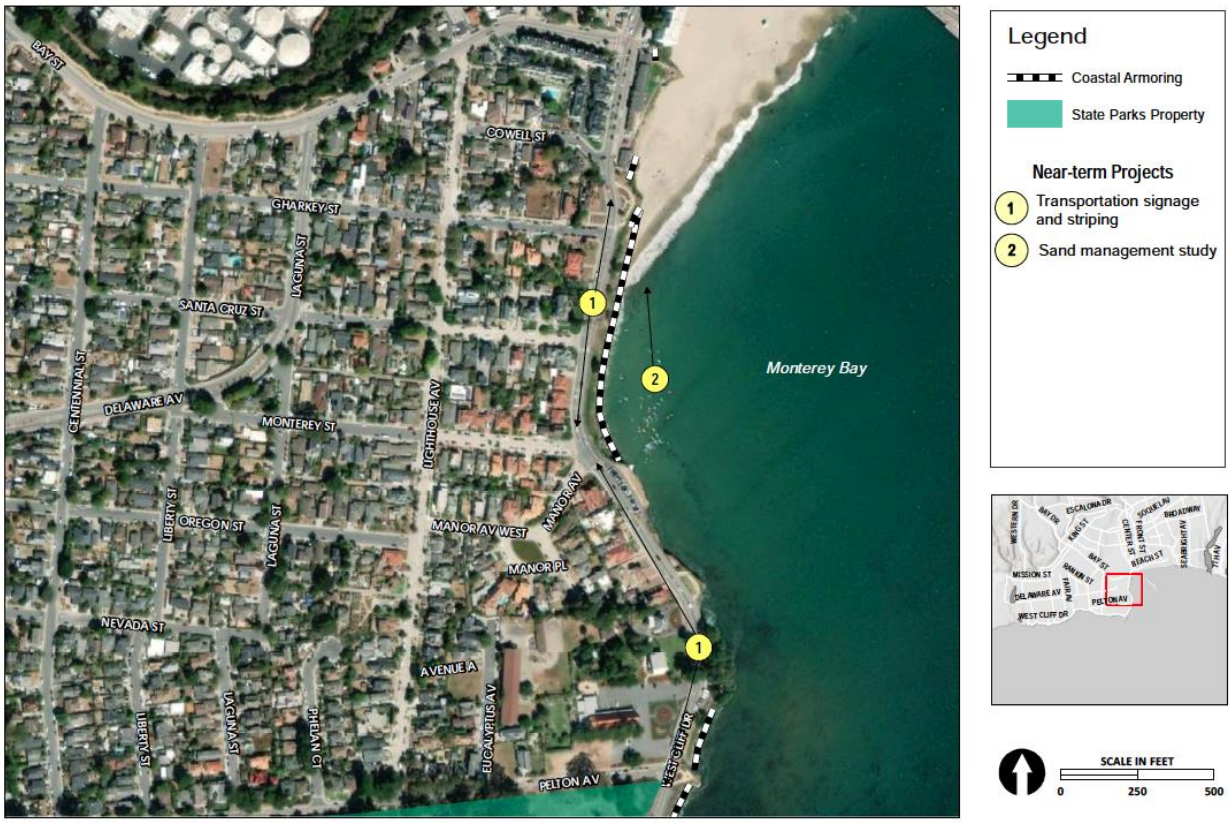


Zone 4 Pelton Avenue to Bay Street Project Descriptions
For reference, before the Zone 4 Project Descriptions, please see the Zone 4 Existing Conditions Maps for by zone:

Map 1: Armoring Sites
Map 2: Areas of Erosion Concern
Map 3: Access
Map 4: Utility Infrastructure

This zone has extremely high use of the Recreational Trail and beach access to the Cowells surf break. There are several sea caves (AEC #45 - #48) that will be monitored. Figure 4-12 below indicates the location of near-term projects recommended as part of the Plan.

Figure 4-12. Specific priority projects identified in Zone 4 to be completed in the short term



In the short-term, the City's priorities in Zone 4 are to improve transportation signage aligned with Concept designs (Alternative 1) to further communicate West Cliff Drive as a Class III bikeway, consider vertical access improvements to existing staircases and the sand management study.

1. Maintenance: A priority is to improve transportation signage aligned with concept designs (Alternative 1) and to further communicate West Cliff Drive as a Class III bikeway.

2. Other Study: Conduct a sand management study to determine feasibility of the sand management concept.

3. (Zone-wide; not shown): Minor Project: Parking management strategies to encourage maximum public access and promote turnover, especially near beach access points. These tools include times limits, hours of operation, residential parking permit zones, and user fees.

4. (Zone-wide; not shown): Maintenance: Addition of formal bike parking throughout Zone 4, including Parking areas, and additional bike parking at Cowell Beach.

Medium-Term: The City will begin consideration of a one-way vehicular alternative to maintain and enhance the Recreational Trail should a failure occur that inhibits status quo transportation patterns. As erosion and expansion of the sea caves continue (AEC #45 – 48), the City will consider some riprap placement in the cave (AEC#45) to reduce erosion rates and look to fill or grout sea caves (AEC #46 - #48). As bluff top erosion continues, and affects the Recreational Trail, the City will consider toward a one-way vehicle alternative (Alternative 2) to enhance Recreational Trail usage. Chapter 7 contains more details on this concept

Long-Term: Over the long term, the City, based triggers will further investigate and potentially implement a long-term investment in the sand management program. As erosion events or maintenance costs exceed an identified trigger, then the City will prioritize using the available public West Cliff Drive right of way space to realign and maintain the Recreational Trail by reducing street parking and vehicular traffic to a one way and eventually closure except for emergency services. It is anticipated that future updates to the West Cliff Drive Public Works Plan and City Adaptation Plan will continue to educate and evaluate appropriate timing of planning and implementation of long-term adaptation strategies.

4.4. Corridor-Wide Habitat and Landscaping Maintenance Projects

This section specifies opportunities for habitat restoration and landscaping maintenance projects and under the responsibility of the Parks and Recreation Department. Project locations have been identified and will be coupled with Public Works projects identified in Section 4.3 and on an individual basis as funding allows. State Parks is interested in collaborating on the projects on their property with sufficient funding. In addition to ongoing maintenance, the City will also prepare Corridor-wide Master Landscaping Plan and Design Standards.

On-Going Maintenance: Routine repair and maintenance activities for maintaining landscaping, and existing structures will occur within fifty feet of the Coastal Bluff, involve the temporary use of mechanized equipment or placement of construction materials, may include a negligible

addition of new solid materials, and sometimes necessitate a minor expansion or enlargement of the structure being replaced or maintained. Examples include painting and replacing railing, tractor use on paved areas for vegetation management, powerwashing stairs, painting the Lighthouse and Surf Museum. Maps 4-19 through 4-13 depict locations for on-going repair and maintenance activities by zone. Habitat and Landscaping maintenance project types as noted on the Maps include:

Site Furnishings: Benches, bike racks, trash receptacles, interpretive signage and other support furnishings may be placed at intervals along the multi-use trail.

Natural Restoration Plantings: Iceplant may be removed and replaced with native plantings at key locations. Future studies, coordinated with other design and feasibility work could inform restoration project location, plant type, and size. Plant heights should not exceed approximately three feet in height.

Scenic Overlooks: Small, ADA accessible, scenic overlooks are recommended along the multi-use trail. The overlooks will provide visitors opportunities to stop along the trail at numerous points of interest. The design of the overlooks will blend-in with the natural setting through the use of natural or natural-looking materials and native plantings and will incorporate site furnishings when possible.

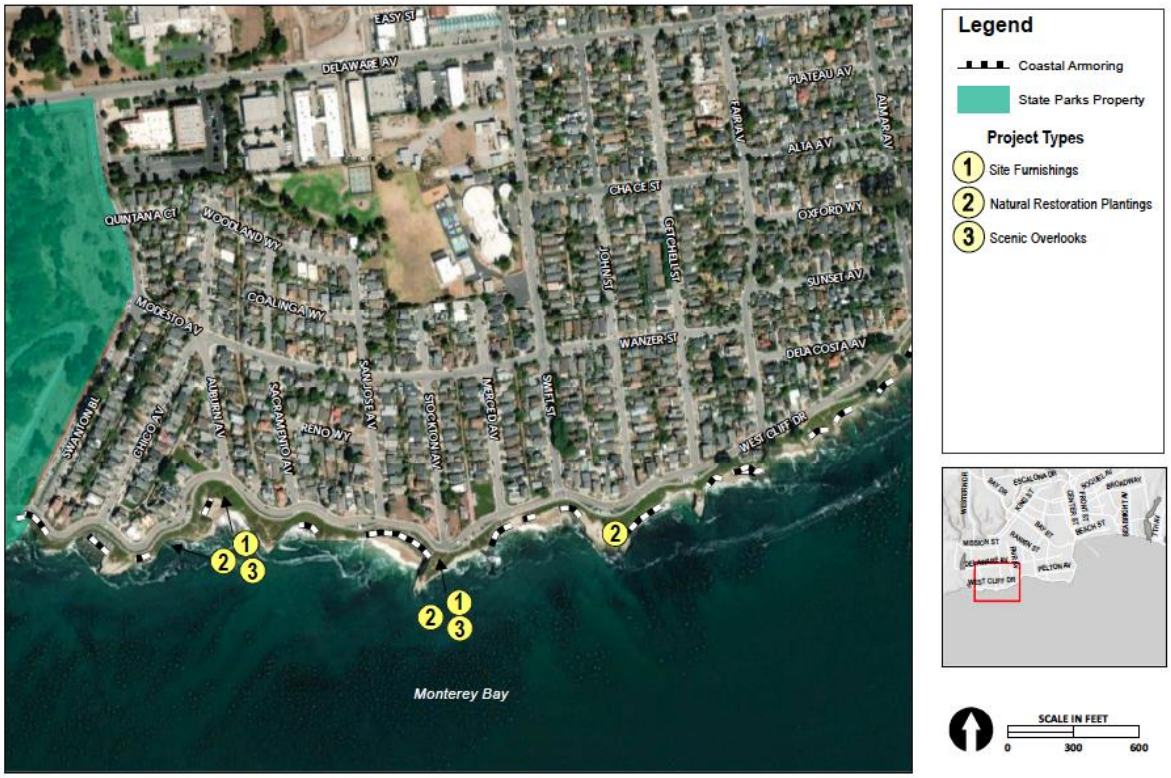


Figure 4-9. Specific priority habitat and landscaping maintenance projects identified in Zone 1 to be completed in the short term

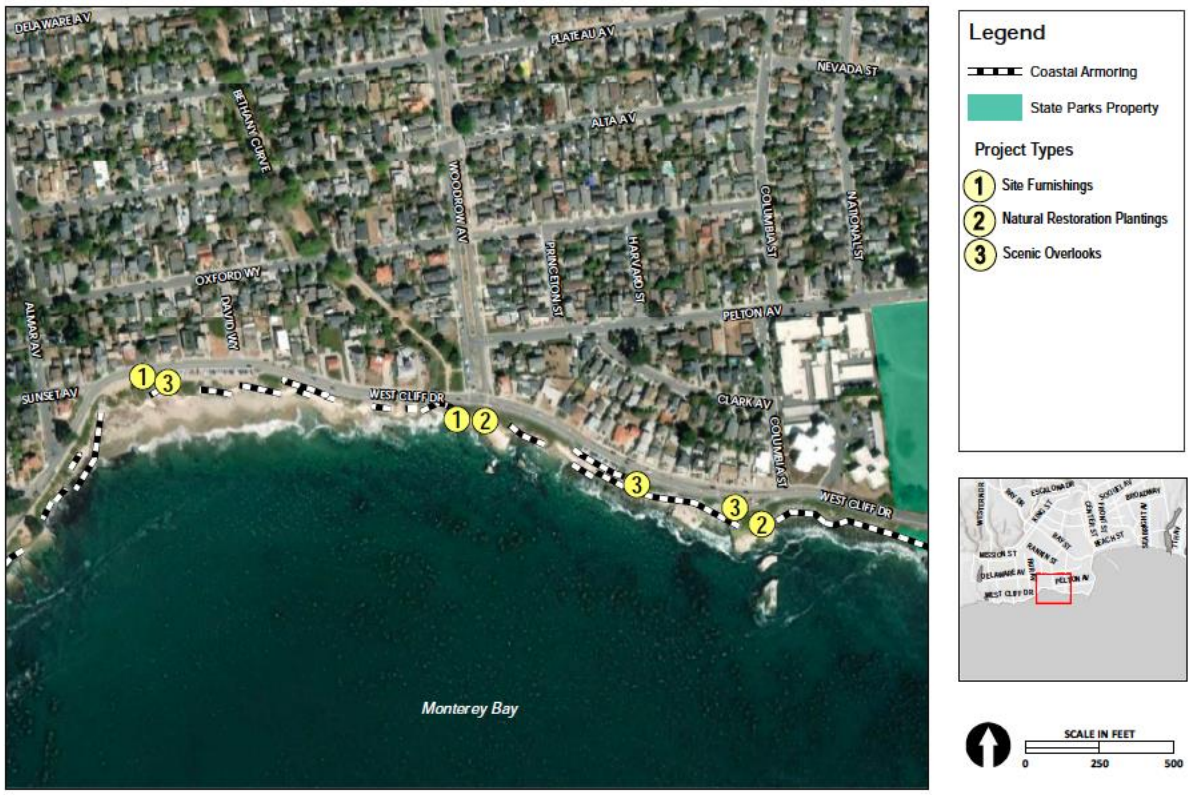


Figure 4-10. Specific priority habitat and landscaping maintenance projects identified in Zone2 to be completed in the short term

Figure 4-11. Specific priority habitat and landscaping maintenance projects identified in Zone 3 to be completed in the short term

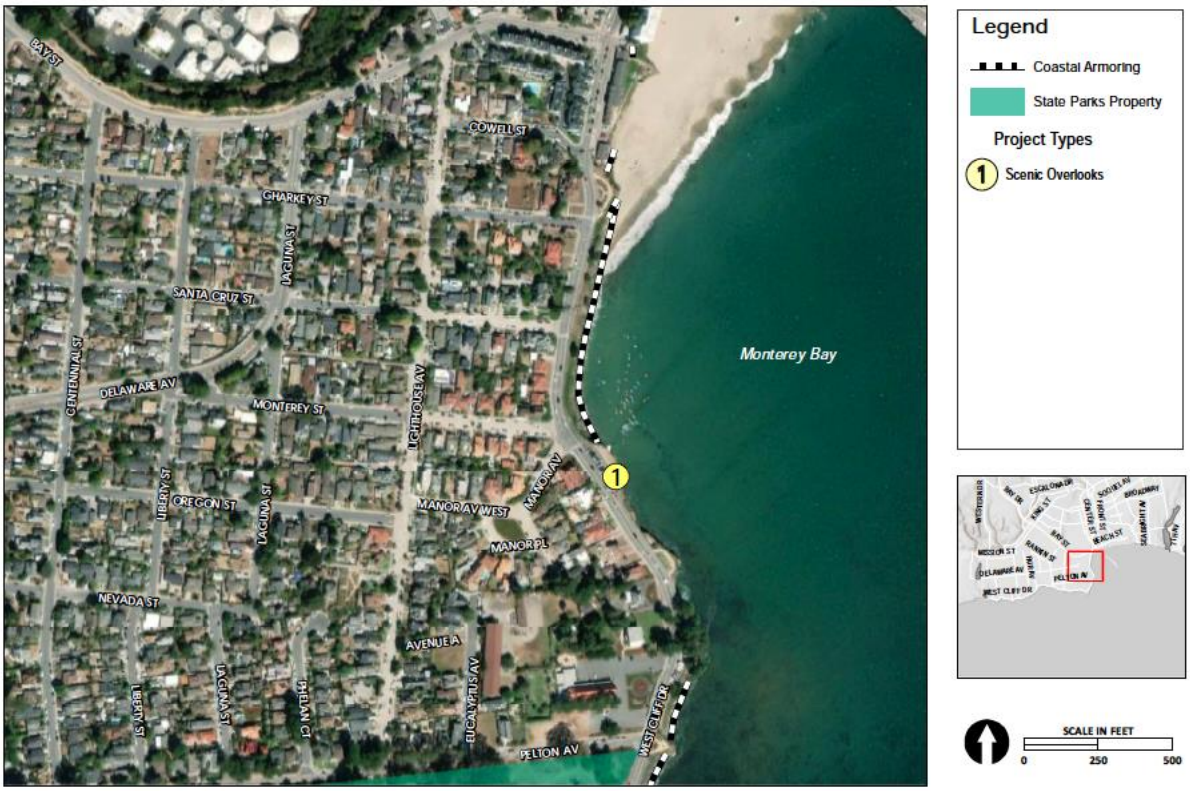


Figure 4-12. Specific priority habitat and landscaping maintenance projects identified in Zone 4 to be completed in the short term

4.5. Monitoring and Triggers

Triggers represent a point in time when action must be taken to address coastal hazard-related vulnerabilities before impacts reach a point of emergency. Triggers are measurable indicators that must be monitored to initiate planning, permitting, and/or the implementation process for adaptive measures. An appropriate trigger provides enough notice and lead time to plan for and implement an adaptation strategy before vulnerabilities become severe.

Triggers are an important component of the implementation of climate adaptation plans and pathways. Adaptation plans which utilize triggers supports a planning process which incorporates the inherent uncertainty (risk) surrounding the effects of climate change on coastal areas. These risks are often preceded by the crossing of tipping points or thresholds. The use of triggers can help to identify when planning and permitting processes should be initiated and when adaptation action should be implemented.

Triggers must be monitored to inform adaptation decisions, and triggers should be reevaluated and updated as needed in the future to capture advances in sea level rise science and changing conditions. A monitoring program plays an important role in the implementation of adaptation pathways, in order to limit risks. This report recommends planning-level adaptation thresholds that can be drafted in to a monitoring program and codified within the city LCP update. The City

will need to monitor and evaluate progress towards these thresholds to determine whether and when these thresholds are met and thus initiate action and expenditure of funds. One trigger is established by this Plan and as noted repeatedly, the monitoring program will be further developed after adoption of the Plan: Aside from the near-term projects proposed, the trigger for maintenance repairs will be exceedance of the minimum revetment elevation target (e.g., 80% of revetment design height).

The City makes an annual inspection of the coastline that will inform annual budgeting. The City is also developing partnerships to leverage resources and existing technologies to establish a resilient and efficient manner with which to monitor coastal conditions and triggers. Strategies may then be implemented before a trigger threshold is met.

The City may consider the following potential triggers for the adaptation of the cliffs, bluffs and transportation features.

- Distance between cliff edge and Recreational Trail
- Documentation of Recreational Trail impacts from cliff erosion (location, scale, repair costs)
- Survey of right of way easements along inland side of West Cliff Drive
- Wave overtopping and cleanup frequency near Bethany Curve
- Sea cave overburden (ceiling thickness and depth)
- Fugitive rocks and placement loss of beach area
- Recreational use of surf, beach/shoreline, and Recreational Trail (consider automated camera, laser counters, video extraction)
- Vehicular use (parking, types of vehicles, direction, and volume) on West Cliff Drive as well as residential roads and arterials
- Multi-modal traffic counts on West Cliff Drive and surrounding roadways
- Beach width during winter King tide series and late summer conditions
- Visual inspection following any wave event greater than a 10 year recurrence

5. Public Works Plan

The primary purpose of this chapter is to set forth a Public Works Plan for West Cliff Drive whereby the recommended policies in this chapter are an expression of the relevant provisions of Chapter 3 of the Coastal Act. This Public Works Plan reflects the planning objectives, program overview, design principles, and projects discussed in Chapters 4 and should be considered and interpreted in light of the narrative and diagrams of that chapter.

5.1. Application of the Public Works Plan

This section sets forth the manner in which the Plan shall be applied in order to ensure conformity with applicable laws, including the California Coastal Act.

5.1.1. Policies Governing Interpretation and Use of the Public Works Plan

Projects defined in this Plan shall only commence only if City commitments identified in this Plan, comply with applicable rules and regulations and unless circumstances prevent such implementation.

5.2. Land Use

This Section sets forth potential policies for land use on West Cliff Drive relative to implementation of the Plan. These policies will be further developed and adopted in a subsequent LCP update. The Plan consists of the following program elements with potential policies pertaining to each included.

- Shoreline Protection Devices.
- Public Access and Recreation Facilities
- Traffic Circulation and Parking
- Water related Utilities
- Habitat and Landscaping
- Other Studies

The existing General Plan policy most directly applicable to potential LCP updates is PR 3.3 and its subparts:

> ***PR3.3*** Protect, maintain, and enhance publicly accessible coastal and open space areas. . . .
>
> PR3.3.1 Protect coastal bluffs and beaches from intrusion by non-recreational structures and incompatible uses.
>
> PR3.3.2 Ensure that development does not interfere with the public's right to access the ocean (where acquired through use or other legislative authorization).

PR3.3.3 Require new development and public works projects to provide public access from the nearest public roadway to the shoreline and along the coast, except where it is inconsistent with public safety or protection of fragile coastal resources, or where adequate access exists nearby.

PR3.3.4 Maximize public access and enjoyment of recreation areas along the coastline.

PR policy 3.3.3. concerning public works in particular highlights the need to update the General Plan consistent with policy and specific adaptation pathway projects that may be adopted in the LCP.

The City will work with the Coastal Commission to identify when and where certain public access amenities (i.e. parking, access) may need to be surrendered as part of an adaptation strategy for the retention of other coastal resources and amenities. For instance, it may be determined that PR policy 3.3 take precedence over similar policies to preserve coastal parking when coastal adaptation needs put these two policies at odds.

5.2.1 Recommendations for new general policies for all West Cliff projects

The Planning Department staff are considering the following recommendations for new policies to be integrated into the LCP amendment:

Best Available Science: Project reviews shall use, as applicable, the best available science about projected sea level rise and other climate-change related environmental changes when addressing coastal erosion, bluff failure, flooding and other coastal hazards.

Adaptation Funding: The City will pursue feasible grant funding sources or new funding mechanisms, such as the formation of special districts including Geologic Hazard Abatement Districts (GHADs), or securing FEMA and other federal or state adaptation and hazard mitigation funds, to finance adaptation strategies for public infrastructure.

Plan Implementation: The City will implement a West Cliff Drive Public Works Plan focused on short term maintenance, planning and engineering studies, and upgrades to West cliff Drive infrastructure. Projects included within the Plan may include: revetment repairs and upgrades, repairs, upgrades and rerouting of transportation infrastructure, relocation of parking out of hazard areas, emergency repairs to failing armoring and caves, sand management program feasibility studies, landscaping and maintenance, etc.

Capital Improvements Policy: Incorporate resiliency measures and adaptation strategies into capital improvement planning and other investment decisions. Resiliency measures can include but are not limited to: raising of infrastructure and structures, establishment of permanent or

temporary alternative routes for transportation infrastructure, green infrastructure that reduces flooding, and upgrades to stormwater and wastewater systems.

Policy considerations to address needs of underrepresented groups

- Signage improvements – multilingual and gender neutral
- Upgraded seawalls should integrate user groups who value access to the water (fishing from beach and bedrock platforms), and ADA cliff top infrastructure that does not impair views. Ensure that new armoring does not impact those who prefer to fish from mid-level terraces along cliffs by including design elements that enhance public use of roadway, public bike and pedestrian pathways, and access points to the beach and terrace. Implementation of beach nourishment programs in conjunction with construction of hard armoring can help to mitigate the loss of beach area below these structures.
- The potential loss of services (roadway and parking) due to adopting a managed retreat strategy may impact user groups who rely on ADA amenities, and cliff top infrastructure. The City shall prioritize the retention of public recreational infrastructure (walkways and bike paths), minimize the loss of public vertical access over 2 lane vehicular access, recreational trail, and parking.
- Measures to support community equity and access opportunities for all while adapting to sea level rise include: Install/maintain/ upgrade stairs, include cliff top fishing spots, remove rock impeding water access, upgrade stormwater and surface drainage infrastructure, replace lookouts as they fail, maintain coast trail, replace benches, gender neutral bathroom, riprap and enhance stairs, and enhance overlooks.

5.2.2. Recommendations for new policies for Shoreline Protection Devices

Policy (New Shoreline Structures): Unless a waiver of rights to shoreline protection applies, shoreline protection structures, including revetments, breakwaters, groins, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted consistent with the LCP's policies when (1) required to serve coastal-dependent recreation uses, or protect existing principal development structures or public beaches in danger from erosion; (2) when designed to eliminate or mitigate adverse impacts on local shoreline sand supply, minimize the footprint of the structure on the beach and when there is no less environmentally damaging feasible alternative such as beach nourishment, non-structural drainage and native landscape improvements, or (3) other similar non-structural options. New structures shall be required to pay in lieu fees into a fund to support coastal adaptation in the City. For purposes of this policy "existing principal structures" means shoreline structures that were legally authorized prior to January 1, 1977.

Partial Armoring: Policy: Evaluate the potential of partially armoring or filling the Lighthouse Point sea cave to protect coastal resources, surf breaks and access opportunities.

Existing Revetment Policy: Existing revetments shall be monitored frequently (as outlined in the West Cliff Public Works Plan) and necessary repairs and upgrades will be reported to City Council and the Coastal Commission.

Maintenance of Existing Revetment Policy: Maintenance of existing revetments shall prioritize recreational benefits by removing fugitive rocks, enhancing vertical access opportunities and removing or repurposing unnecessary rip rap for use elsewhere along the West Cliff Drive corridor.

New Revetment Policy: To minimize the loss of other beach resources, prohibit revetments or other structures with large base footprints. Preferred armoring to be small-footprint recurved sea walls where feasible.

5.2.3. Recommendations for Public Access and Recreation Policies

Public Access Policy (CA Policies 30210-30222)

Maximum public access to the coastal resources of West Cliff Drive and the adjacent shoreline and coastal area shall be provided consistent with public safety, coastal resource protection, and implementation of the transportation and functional needs of the roadway.

5.2.4. Recommendations for policies for Bike and Auto Traffic Circulation and Parking

Automobile Parking: in order to expand coastal access, parking management techniques may be employed along the entirety of publicly managed parking resources within the study area. These parking management techniques could include, but not be limited to hours of operation, time-limited parking, zone based parking pricing, residential permit zones, and others.

Bicycle Parking: bicycle parking shall be a principally permitted use. Bicycle parking may be installed in locations consistent with standard city guidelines in order to expand non-automobile access to the coast and formalize bicycle parking areas. Parking shall minimize impacts to views and protect visual resources.

Multiuse Path: the existing multiuse pathway provides opportunities for coastal recreation, access to the beach and ocean, and opportunities for observation and quiet contemplation. Maintenance activities needed to maintain the pathway shall be permitted. Additionally, existing landscaped areas located between the pathway and edge of the roadway may be converted to expand the existing pathway and offer opportunities to create more spaces for the path or coastal overlooks.

5.2.5. Recommendations for policies for Water Related Utilities

Storm Water Policy: The City shall prioritize (I.e. include within related cliff top repair projects) the maintenance and improvement of West Cliff storm drain discharge infrastructure to ensure

its function as a critical flood prevention device to limit discharge impacts (erosion) to coastal resources, coastal access, public infrastructure and facilities, and existing development.

5.2.6. Recommendations for policies for Habitat and Landscaping

The City shall seek to restore native landscaping and habitat, enhance the unique nature of the surroundings and educate the public. (Coastal Act Section 30230-30231)

5.2.7. Recommendations for policies for Sediment Management

Sand management and placement may help to mitigate secondary impacts to recreational resources from existing revetments including surf breaks, beach width and continued loss of narrow pocket beach access for all West Cliff beaches.

Policy: The placement of sediments at appropriate points along the shoreline may be permitted for the purpose of beach nourishment, if the source material proposed for deposition contains the physical (e.g., grain size and type), chemical, color, particle shape, debris, and compatibility characteristics appropriate for beach replenishment and does not cause significant down coast sand limitations.

5.3. Recommended Monitoring and Trigger Policies

Policy (Monitoring Shoreline Change)
The City shall implement a monitoring program for sea-level rise, beach width, bluff offset, flooding and storm damage, traffic patterns, recreational uses, and other potential measures or triggers for guiding implementation of the LCP's sea-level rise adaptation policies. The monitoring program shall include post storm and yearly (minimum) shoreline and bluff edge observational surveys, document annual maintenance costs and also establish thresholds. Annual monitoring results will be reported to City Council for review.

Monitoring Program Policy: The City shall implement a monitoring program for sea level rise, beach width, bluff offset, flooding and storm damage, and other potential measures or triggers for guiding implementation of the Coastal Resilience policies. The monitoring program shall include yearly shoreline and bluff edge surveys and also establish thresholds for reassessing the City's Adaptation Plan.

Monitoring Program Policy: Monitor the beach profile and recreational use of beaches to obtain baseline information for analyzing riprap proposals and their recreational impacts and establish criteria for a maximum permitted coverage of sandy beaches by seawalls.

6. Best Management Practices

These **sample conditions** can be used to inform Coastal Development Permit applications. Not every condition will be appropriate for each project proposed as part of the Plan but the list can be used to determine what will generally be required by the Coastal Commission during project review.

6.1. Routine Maintenance

Routine maintenance does not require additional documentation or Executive Director approval and involves the replacement, minor expansion, and/or repair of existing infrastructure or facilities. Maintenance will involve the temporary use of mechanized equipment and placement of construction materials within 50-ft of the bluff edge, including but not limited to roadway, recreational path, sidewalk, utilities, parking, landscaping, fencing, and others.

6.2. Water Quality

6.2.1. Principles

Protect and Restore Water Quality
Protect and, where feasible, restore the quality of coastal waters to implement Coastal Act policies (in particular Sections 30230 and 30231). Coastal waters include the ocean, rivers, streams, wetlands, estuaries, lakes, and groundwater.

> § 30230. Marine resources shall be maintained, enhanced, and, where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.
>
> § 30231. The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Minimize Pollutants in Runoff from the Project
Plan, site, and design project to minimize the transport of pollutants in runoff from the project site into coastal waters.

Minimize Changes in the Site's Runoff Flow Regime
Plan, site, and design project to minimize post-project changes in the site's runoff flow regime (i.e., volume, flow rate, timing, and duration), to preserve the pre-project hydrologic balance and prevent adverse changes in the hydrology of coastal waters (i.e., hydromodification).

Give Precedence to Low Impact Development Approach to Stormwater Management
Give precedence to a Low Impact Development (LID) approach to stormwater management in all development. LID integrates preventive project Site Design strategies with small-scale, distributed BMPs to replicate the site's pre-project hydrologic balance through infiltration, evapotranspiration, harvesting, detention, or retention of stormwater close to the source.

Protect and Restore Hydrologic Features
Plan, site, and design project to protect and, where feasible, restore hydrologic features such as stream corridors, drainage swales, topographical depressions, groundwater recharge areas, floodplains, and wetlands.

Preserve or Enhance Vegetation
Plan, site, and design project to preserve or enhance non-invasive vegetation to achieve water quality benefits such as transpiration, interception of rainfall, pollutant uptake, shading of waterways to maintain water temperature, and erosion control.

Maintain or Enhance On-Site Infiltration
Plan, site, and design project to maintain or enhance on-site infiltration of runoff, where appropriate and feasible, to reduce runoff and recharge groundwater.

Minimize Impervious Surfaces
Minimize the installation of impervious surfaces, especially directly-connected impervious areas, and, where feasible, increase the area of pervious surfaces, to reduce runoff.

Use Pollutant Source Control BMPs
Use pollutant Source Control Best Management Practices (BMPs), which can be structural features or operational actions, in projects to minimize the transport of pollutants in runoff from the project site.

Prevent Adverse Impacts to Environmentally Sensitive Habitat Areas from Runoff
In areas adjacent to an Environmentally Sensitive Habitat Area (ESHA), plan, site, and design project to protect the ESHA from any significant disruption of habitat values resulting from the discharge of stormwater or dry weather runoff flows.

Minimize Adverse Impacts from Stormwater Outfall Discharges
Avoid construction of new stormwater outfalls and direct stormwater to existing facilities with appropriate treatment and filtration, where feasible. Where new outfalls cannot be avoided,

plan, site, and design outfalls to minimize adverse impacts to coastal resources from outfall discharges, including consolidation of existing and new outfalls where appropriate.

Manage BMPs for the Life of the Project
Implement appropriate protocols to manage BMPs (including ongoing operation, maintenance, inspection, and training) in all projects, to protect coastal water resources for the life of the project.

Minimize Water Quality Impacts During Construction
Minimize water quality impacts during construction by minimizing the project footprint, phasing grading activities, implementing soil stabilization and pollution prevention measures, and preventing unnecessary soil compaction.

6.2.1. Storm Water Pollution Prevention Plan

Prior to commencement of construction, the Permittee shall submit two sets of a final Storm Water Pollution Prevention Plan (SWPPP) to the Executive Director for review and approval. Minor adjustments to the following requirements may be allowed by the Executive Director or their designee if the adjustments: (1) are deemed reasonable and necessary; and (2) do not adversely impact coastal resources. The final SWPPP shall include provisions for all of the following:

Sedimentation Controlled
Runoff from the project site shall not increase sedimentation in coastal waters post-construction. During construction, runoff from the project site shall not increase sedimentation in coastal waters beyond what is allowable under the final Water Quality Certification approved for the project by the Regional Water Quality Control Board.

Pollutants Controlled
Runoff from the project site shall not result in pollutants entering coastal waters during construction or post-construction.

BMPs
Best Management Practices (BMPs) shall be used to prevent the entry of polluted stormwater runoff into coastal waters during construction and post-construction, including use of relevant BMPs as detailed in the current California Storm Water Quality Best Management Handbooks (http://www.cabmphandbooks.com).

Spill Measures
An on-site spill prevention and control response program, consisting of BMPs for the storage of clean-up materials, training, designation of responsible individuals, and reporting protocols to the appropriate public and emergency services agencies in the event of a spill, shall be implemented at the project to capture and clean-up any accidental or other releases of oil,

grease, fuels, lubricants, or other hazardous materials, including to avoid them entering coastal waters or wetlands.

BMP Schedule
A schedule for installation and maintenance of appropriate construction source-control BMPs to prevent entry of stormwater runoff into the construction site and prevent excavated materials from entering runoff leaving the construction site.

All requirements above and all requirements of the approved SWPPP shall be enforceable components of this CDP. The Permittee shall undertake development in accordance with this condition and the approved SWPPP.

6.2.2. Water Quality Management Plan

Prior to commencement of construction, the Permittee shall submit two sets of a Water Quality Management Plan (WQMP) for the post-construction project site to the Executive Director for review and approval. The WQMP shall be prepared by a licensed water quality professional, and shall include plans, descriptions, and supporting calculations. Minor adjustments to the following requirements may be allowed by the Executive Director or their designee if such adjustments: (1) are deemed reasonable and necessary; and (2) do not adversely impact coastal resources. In addition to the specifications above, the plan shall be in substantial conformance with the following requirements:

BMPs
The WQMP shall incorporate appropriate structural and non-structural Best Management Practices (BMPs) (site design, source control and treatment control) into the development, designed to reduce, to the maximum extent practicable, the volume, velocity and pollutant load of stormwater and dry weather flows leaving the project area;

Irrigation/Fertilizers
Irrigation and the use of fertilizers and other landscaping chemicals shall be minimized through the use of low-maintenance landscaping and efficient irrigation technology or systems;

Post-Construction Criteria
Post-construction structural BMPs (or suites of BMPs) used for water quality treatment shall be designed to treat, infiltrate or filter the amount of stormwater runoff produced by all storms up to the 95% percentile, 24-hour storm event for volume-based BMPs, and shall not create conditions that exceed pre-project peak flows for the 2-10 year storm events.

Maintenance Required
All BMPs shall be designed, installed, and maintained for the life of the project in accordance with well-recognized and accepted design principles and guidelines, such as those contained in the California Stormwater Quality Association Best Management Practice Manuals.

Minimum Maintenance Schedule
At a minimum, all BMP traps/separators and/or filters shall be inspected and cleaned/repaired or otherwise maintained in accordance with the following schedule: (1) prior to the start of the winter storm season, no later than October 15th each year, (2) monthly thereafter for the duration of the rainy season (October 15th -April 30), and cleaned/maintained as necessary based on inspection and, (3) as needed throughout the dry season.

Proper Disposal
Debris and other water pollutants removed from structural BMP(s) during clean out shall be contained and disposed of in a proper manner.

Manufacturer's Specifications
It is the permittee's responsibility to maintain the drainage system and the associated structures and BMPs according to manufacturer's specifications.

All requirements above and all requirements of the approved WQMP shall be enforceable components of this CDP. The Permittee shall undertake development in accordance with this condition and the approved WQMP.

6.3. Construction Plan and Monitoring

6.3.1. Construction Plan

Prior to Commencement of Construction of a Major Project identified in the Plan that requires a CDP, the Permittee (the City) shall submit two sets of Construction Plans to the Executive Director for review and approval. The Construction Plans shall, at a minimum, include the following:

Construction Areas
The Construction Plan shall identify the specific location of all construction areas, all staging areas, all storage areas, all construction access corridors (to the construction site and staging areas), and all public pedestrian access corridors. Construction activities will be managed to have the least impact on public access and coastal resources.

Construction Methods and Timing
The Construction Plan shall specify the construction methods to be used, including all methods to be used to keep the construction areas separated from public recreational use areas (including using the space available on the blufftop portions of the project area for staging, storage, and construction activities) to the maximum extent feasible provided it does not significantly adversely affect public access, and including using unobtrusive fencing (or equivalent measures) to delineate construction areas), and including all methods to be used to protect Monterey Bay. All erosion control/water quality best management practices to be implemented during construction and their location shall be noted.

Construction Requirements

The Construction Plan shall include the following construction requirements specified by written notes on the Construction Plan. Minor adjustments to the following construction requirements may be allowed by the Executive Director or designee if such adjustments: (1) are deemed reasonable and necessary; and (2) do not adversely impact coastal resources.

- Unless infeasible.
- All work shall take place during daylight hours, and lighting of the beach and ocean area is prohibited unless work is deemed emergency (e.g., in the case of infrastructure or catastrophic cliff failure.
- Grading of intertidal areas is prohibited, except removal of existing debris, concrete, rubble, etc., is allowed in these areas.
- Only rubber-tired construction vehicles are allowed on the beach, with the exception that track vehicles may be used if the Executive Director or their designee determines that they are required to safely carry out construction. When transiting on the beach, all such vehicles shall remain as close to the bluff edge as possible and avoid contact with ocean waters where feasible.
- All construction materials and equipment placed seaward of the bluffs during daylight construction hours shall be stored beyond the reach of tidal waters. All construction materials and equipment shall be removed in their entirety from these areas by sunset each day that work occurs, except for erosion and sediment controls and/or construction area boundary fencing where such controls and/or fencing are placed as close to the toe of the coastal protection/bluff as possible, and are minimized in their extent.
- Construction (including but not limited to construction activities, and materials and/or equipment storage) is prohibited outside of the defined construction, staging, and storage areas.
- Equipment washing, servicing, and refueling shall not take place on the beach, and shall only be allowed at a designated inland location as noted on the Plan. Appropriate best management practices shall be used to ensure that no spills of petroleum products or other chemicals take place during these activities.
- The construction site shall maintain good construction site housekeeping controls and procedures (e.g., clean up all leaks, drips, and other spills immediately; keep materials covered and out of the rain, including covering exposed piles of soil and wastes; dispose of all wastes properly, place trash receptacles on site for that purpose, and cover open trash receptacles during wet weather; remove all construction debris from the beach; etc.).
- All erosion and sediment controls shall be in place prior to the commencement of construction as well as at the end of each workday. At a minimum, silt fences, or equivalent apparatus, shall be installed at the perimeter of the construction site to prevent construction-related runoff and/or sediment from entering into Monterey Bay.
- All public recreational use areas and all beach access points impacted by

construction activities shall be restored to their pre-construction condition or better as soon as possible. Any native materials impacted shall be filtered as necessary to remove all construction debris.

All requirements above and all requirements of the approved Construction Plan shall comply with the CDP, if applicable. The City shall undertake projects in accordance with the applicable conditions and an approved Construction Plan. Adjustments to these requirements may be allowed by the Director or their designee if such adjustments: (1) are deemed reasonable and necessary; and (2) do not adversely impact coastal resources.

6.3.2. Construction Site Documents & Construction Coordinator

Construction Site Documents
Copies of the signed CDP, if applicable, or equivalent document and the approved Construction Plan shall be maintained in a conspicuous location at the construction job site at all times, and such copies shall be available for public review on request. All persons involved with the construction shall be briefed on the content and meaning of the CDP (if applicable) and the approved Construction Plan, and the public review requirements applicable to them, prior to commencement of construction.

Construction Coordinator
A construction coordinator may be designated to be contacted during construction should questions arise regarding the construction (in case of both regular inquiries and emergencies), and the coordinator's contact information (i.e., address, email, phone numbers, etc.) including, at a minimum, a telephone number and email address that will be made available 24 hours a day for the duration of construction, shall be conspicuously posted at the job site where such contact information is readily visible from public viewing areas, along with an indication that the construction coordinator should be contacted in the case of questions regarding the construction (in case of both regular inquiries and emergencies). The construction coordinator shall record the contact information (e.g., name, address, email, phone number, etc.) and nature of all complaints received regarding the construction, and shall investigate complaints and take remedial action, if necessary, within one business day of receipt of the complaint or inquiry.

6.4. Shoreline Armoring

6.4.1. Concrete Surfacing

Surfaces shall be of similar visual quality to the best examples of concrete surfacing in the project area. The color, texture, and undulations of the coastal protection surface shall be maintained throughout the life of the structure.

Drainage
All drainage and related elements within the sculpted concrete shall be camouflaged (e.g., randomly spaced, hidden with overhanging or otherwise protruding sculpted concrete, etc.) so as to be hidden from view and/or inconspicuous as seen from the top of the bluffs and the beach.

Structural Concrete Foundation Reduction
Any structural concrete foundation landward of the wall shall be lowered to the maximum extent feasible in order to facilitate lowering the height of associated railing. The reduction in foundation height shall be consistent with ensuring the structural stability of any armoring sidewalls.

Transition from project seawall to revetment
The transition from the seawall to the revetment shall minimize the amount of rip-rap used to the maximum degree feasible while still maintaining the effectiveness of permitted armoring. All rip-rap shall be removed unless it is proven necessary for transition, and all other rip-rap shall be limited as much as possible with the goal being to remove as much rip-rap from the project area as possible.

Maintaining existing revetment
Until such time a future project occurs, existing rip-rap shall be maintained to the maximum extent feasible.

All other rip-rap
Other than the rip-rap allowed at the transition (see above), all other rock, rip-rap, concrete rubble, or equivalent in the project area shall be removed.

Concrete surfacing
All seawall (including footing and scour apron) and stairway surfaces (other than stair treads) shall be faced with a sculpted concrete surface that mimics natural undulating bluff landforms in the vicinity in terms of integral mottled color, texture, and undulation. Any protruding concrete elements (e.g., corners, edges, etc.), including all stairways, shall be contoured in a non-linear manner designed to evoke natural bluff undulations. Surfaces shall be of similar or better visual quality in this respect to the best examples provided by the emergency walls in the project area.

Existing seawall
Existing seawalls shall be modified to include additional surfacing and articulation, to more effectively camouflage these sections of the seawall.

Drainage
All drainage and related elements within the sculpted concrete and any related energy dissipation measures shall be camouflaged (e.g., randomly spaced, hidden with overhanging or otherwise protruding sculpted concrete, etc.) so as to be hidden from view and/or inconspicuous as seen from the on top of the bluffs and the beach.

6.5. Public Pathways

6.5.1. Goat trails/high relief areas

All seawalls shall incorporate areas of high relief/informal goat trails at appropriate locations for emergency egress for surfers. A goat trail is common language for an informal access point.

6.5.2 Inland side of West Cliff Drive right-of-way

All public right-of-way along the inland side of West Cliff Drive may be appropriate to be used for public improvements. In locations where the road cannot be moved inland to the full right-of-way extent for good cause (like a required turning radius, existing pedestrian facilities, etc.), then the right-of-way shall still be put to public use (e.g., additional pedestrian facilities, coordinated landscaping along the inland road edge, parking, etc.). A curb or equivalent shall be included on the inland side of the West Cliff Drive travel lane and/or parking.

Striping plan
Project area striping shall be limited to the degree feasible while still providing clear direction and accounting for public safety. The transition from project area paths at both ends shall be clearly demarcated on the pavement in some way (different pavement markings, striping, coloring, etc.) and shall run more or less in the same general direction as the paths as much as possible (i.e., angled to the road as opposed to a perpendicular crossing).

Sign plan
Signs shall be limited to the degree feasible, including through consolidation of signs, while still providing clear direction and accounting for public safety. All sign siting, design, and text shall be provided. All signs shall be designed to blend into the parkway viewshed as much as possible.

Drainage
All project area drainage shall be filtered and treated prior to discharge from project area outfalls. All outfalls not located within the seawalls shall be completely screened from public view by vegetation.

All requirements above shall be enforceable components of this coastal development permit. Any proposed changes to the approved Revised Plans shall be reported to the Executive Director or their designee. No changes to the approved Revised Plans shall occur without a Commission amendment to this coastal development permit unless the Executive Director or their designee determines that no amendment is necessary.

6.6. Drainage and Landscaping (Bluff Top)

6.6.1. Drainage Plan

The drainage shall be designed such that water will not flow over the coastal blufftop edge to the

beach below or over the arroyo blufftop edge to the arroyo below. The drainage system shall not contribute to coastal bluff or arroyo bluff erosion. The drainage system shall be visually unobtrusive, including through use of plantings so as to protect views of the site from any public viewpoint.

6.6.2. Landscaping Plan

The landscaping plan shall provide for the following:

1. Maintenance of the existing natural vegetated state, except that California coastal strand native plant species that do not exceed four feet in height (so that at maturity the plants do not block the view toward the ocean from any public viewpoint) may be planted if desired to enhance habitat. If the plan includes the planting of native plant species, the plan shall include drip or other low-water use irrigation details (if feasible) that may be used until the plants are established.

2. Removal of any invasive non-native plant species (as defined in the *California Invasive Plant Council's List*) that are present on the site.

7. Illustrative Future Transportation Concept Designs

7.1. West Cliff Drive Improvements Site Plan & Concept Designs

The current configuration of West Cliff Drive is a bidirectional two-lane roadway. The roadway is a Class III bicycle facility, meaning it is a designated bike route but without striped bicycle lanes. The current speed limit is 25 mph, and there are six three-way stop-controlled intersections along the corridor. In total, there are 17 intersecting residential feeder roads to West Cliff Drive. The corridor has a mix of on-street parking and 19 off-street parking areas throughout the corridor, including Natural Bridges State Beach overlook and Cowells Beach parking area (just outside the area of interest).

There are several ways to enhance the current transportation corridor configuration in order to help improve multimodal access and safety. Alternative 1 is a short-term management strategy to improve the safety and reduce conflicts along the corridor, including among users of the Recreational Trail, as well as to expand coastal access for multimodal users. Potential enhancements include improved signage, measures to reduce vehicle speeds, and additional pedestrian improvements such as marked crosswalks to improve accessibility between feeder roads and the Recreational Trail. Bicycle and pedestrian access would also be enhanced by completing the Recreational Trail widening projects in Zone 1.

While many transportation options are possible for West Cliff Drive, this Plan considers a phased approach based upon triggers. Alternative 1 is an improved “status quo,” which is recommended to be implemented in the near term. Alternative 2 would transition West Cliff Drive to one-way for a portion or the entirety of the corridor based upon erosion and sea level rise triggers that would prohibit the status quo from continuing. Erosion triggers will be developed in subsequent work.

Roadway cross sections are useful to help illustrate how the conceptual designs of alternatives function. Cross sections are presented for Alternatives 1 and 2 in five locations. In order to be consistent with City of Santa Cruz Fire Department requirements for emergency vehicle access, the conceptual alternatives were designed with a minimum clear width of 20 feet and a preferred width of 26 feet. These considerations are particularly relevant for Alternative 2.

The following five roadway cross section locations were selected to illustrate the alternative concepts based on an approximate public right of way (ROW) width analysis, including the sidewalk, roadway, Recreational Trail, and a space to the cliff edge. Further design work will require surveyed ROW widths to measure available public space. The resulting transects provided a broad list of candidate locations. The selected locations are representative of the corridor from the perspectives of a width constrained intersection, width and curve based parking lot, mid-corridor intersection, and general parking configurations.

1. Swanton Boulevard (Zone 1)
2. Pyramid Beach parking lot (Zone 1)
3. Woodrow Avenue (Zone 2)
4. State Parks Lot A (Zone 3?)
5. Santa Cruz Street (Zone 4)

These locations and conceptual designs provide both a plan view from above and a cross sectional view of the desired street dimensions for the proposed alternatives

Figure 7-1. Roadway cross section locations included for Proposed Alternative Concepts

A Traffic Operations Analysis for Alternatives 1 and 2 is also included in the Transportation Conceptual Alternatives Analysis deliverable from the 2019-2020 work.

7.1. Current Configuration with Enhancements (Alternative 1)

The proposed short-term enhancements for the current configuration (alternative 1) require minimum physical interventions. The goal is to reduce user conflicts and improve the safety of bicyclists along the corridor by enhancing the pavement markings and signing. The table containing Intersections Accessibility and Access to West Cliff Recreational Trail in the Existing Conditions reports indicates whether the intersections have curb cuts, tactile warning surfaces access to the Recreational Trail painted crosswalks and stop signs and should be referenced when the City proceeds with design of enhancements. Design will address how many new curb cuts will be required, where tactile warning surface updates are needed and where painted

crosswalks should be added. Per the proposed design concept, the West Cliff Drive corridor would remain a Class III Shared Roadway with added Shared Lane Markings (SLMs) or "sharrows" as in Figure 7-1. Conceptual designs in plan and section view are provided at the five roadway crossing locations for Alternative 1 enhancements in Figures 7-3 through 7-10. Any triggers development and/or initiating of this alternative must be coordinated with the joint land owner of many areas along West Cliff Drive, California Department of State Parks. State Parks has indicated interest in coordinating funding and implementation of this alternative in the near term.

Figure 7-2. Green Backed Sharrow

Source - http://beagreencommuter.com/new-bike-lanes-on-campus-improve-safety-for-everyone/

Sharrows are road markings used to indicate a shared lane environment for bicycles and vehicles. Shared lane markings reinforce the legitimacy of bicycle traffic on the street and recommend proper bicyclist positioning. Shared Lane Markings is not a facility type and should not be considered a substitute for bike lanes, cycle tracks, or other separation treatments. The Manual on Uniform Traffic Control Devices (MUTCD) outlines guidance for shared lane markings in section 9C.07. Shared Lane Markings can be used with 'Bicycle May Use Full Lane' R4-11 sign to inform road users that bicyclists might occupy the full travel lane.

Furthermore, it is recommended to provide wayfinding signage along the corridor to guide bicyclists to their destinations along preferred bicycle routes. These signs are typically placed at the intersections or other key locations. This proposed wayfinding should be integrated with the existing Countywide Bicycle Wayfinding signage, existing city wayfinding signage and other existing or new West Cliff Drive signage for consistency.

7.1.1 Location 1: Swanton Boulevard and West Cliff Drive

Figure 7-3 Plan view of Proposed Alternative 1 Enhancements at Swanton Blvd at West Cliff Drive

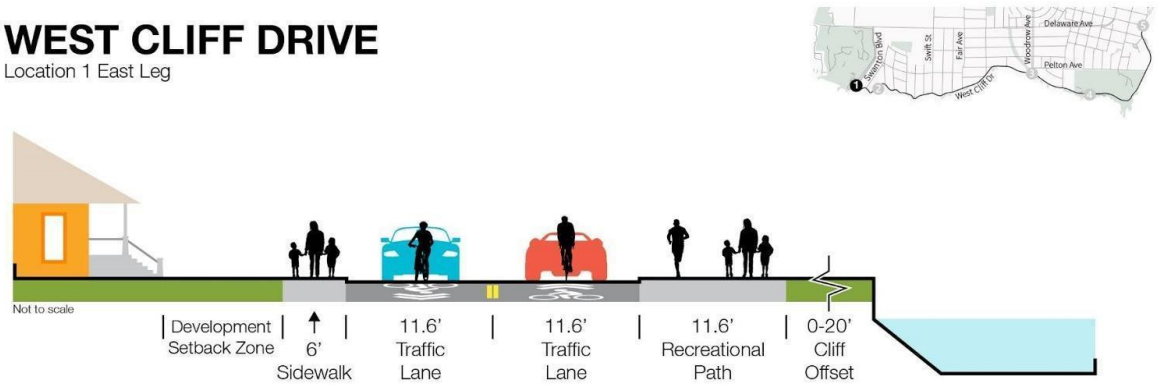


Figure 7-4 Cross Section of West Cliff Drive Proposed Alternative 1 Enhancements at Swanton Blvd

7.1.2. Location 2 Pyramid Beach parking lot between Auburn Ave and Chico St

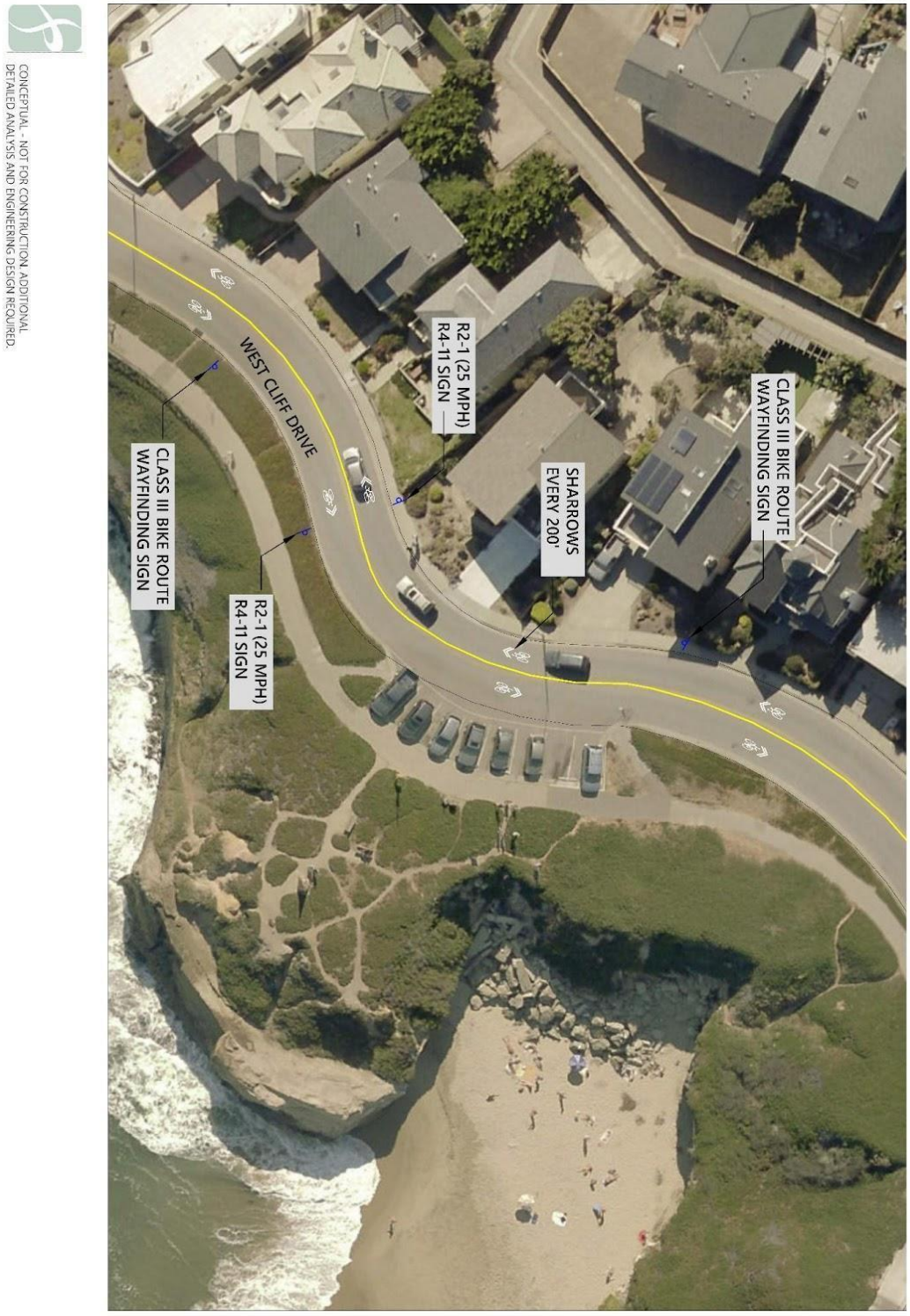


Figure 7-5 Plan view of Proposed Alternative 1 Enhancements Plan view at Pyramid Beach parking lot

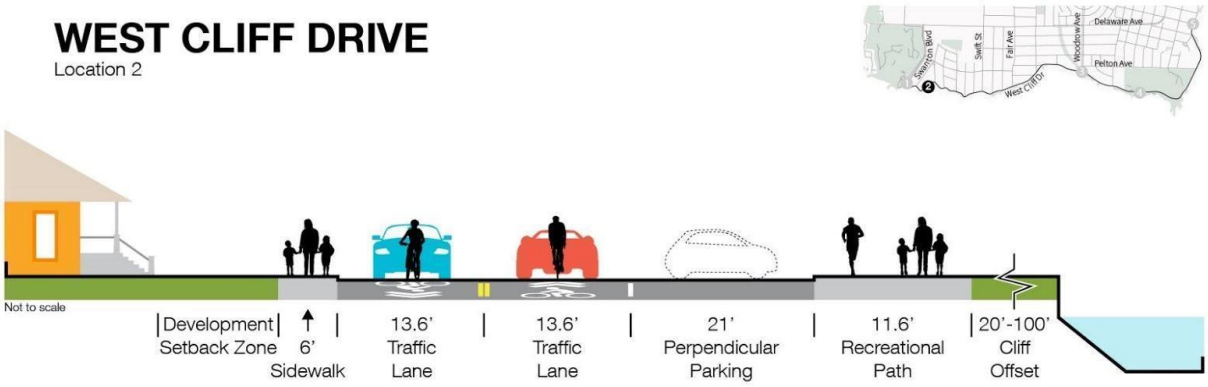


Figure 7-6. Cross Section of West Cliff Drive Alternative 1 Enhancements at Pyramid Beach parking lot

7.1.3. Location 3 Woodrow Avenue at West Cliff Drive

Figure 7-7 Plan view of Proposed West Cliff Drive Alternative 1 Enhancements at Woodrow Avenue

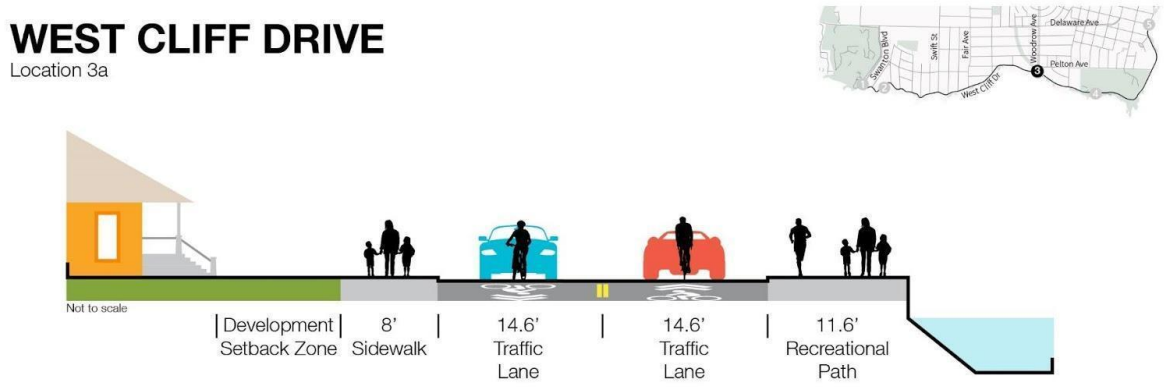


Figure 7-8 Cross Section of West Cliff Drive Alternative 1 Enhancements Just west of Woodrow Ave.

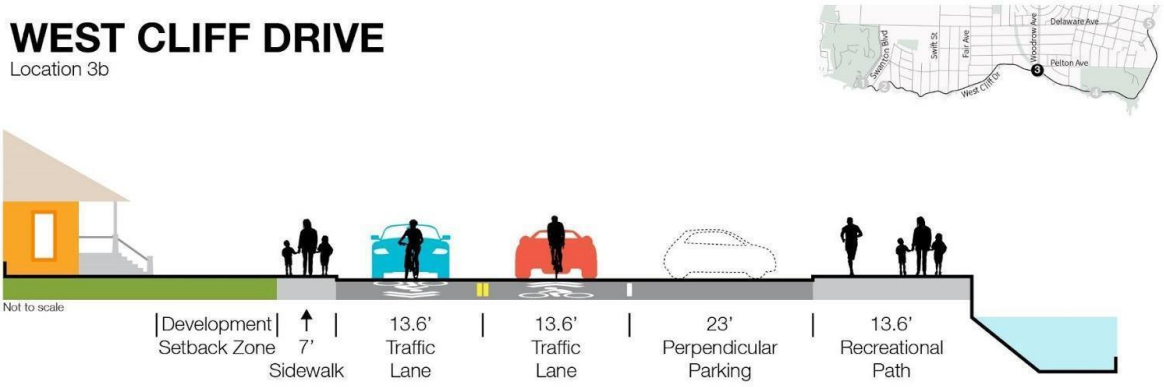


Figure 7-9 Cross Section of West Cliff Drive Alternative 1 east of Woodrow Avenue

7.1.4. Location 4 State Parks Parking Lot A

Figure 7-10 Plan view of West Cliff Drive Alternative 1 Enhancements at State Parks Parking Lot A

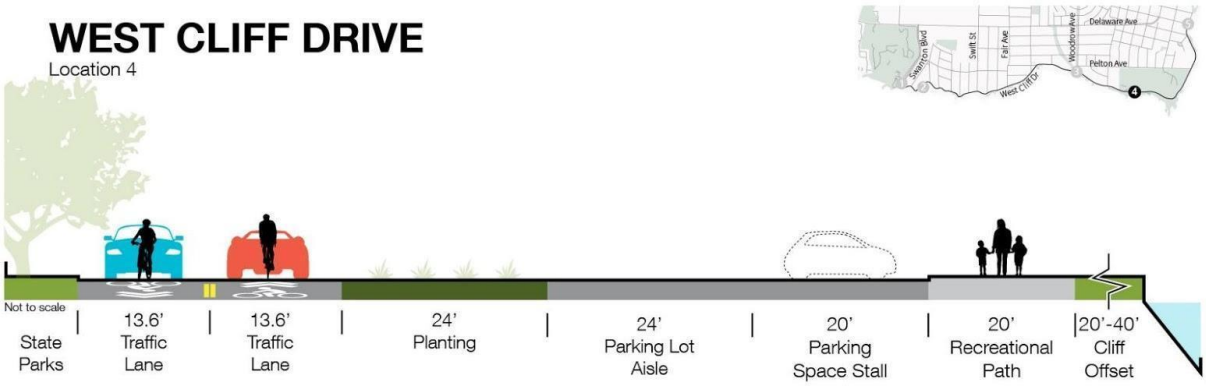


Figure 7-11 West Cliff Drive Alternative 1 Enhancements at Cross Section of State Parks Parking Lot A

7.1.5. Location 5 Santa Cruz Street at West Cliff Drive

Figure 7-12 Plan view of Alternative 1 Enhancements at Santa Cruz St and West Cliff Drive

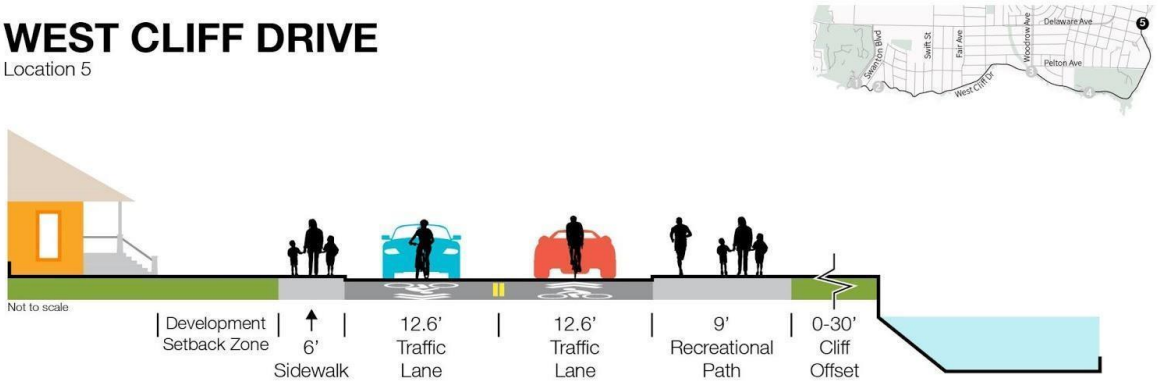


Figure 7-13 Alternative 1 Enhancements at Cross Section of Santa Cruz St and West Cliff Drive

7.2 One-way Traffic with Enhanced Bicycling Facility (Alternative 2)

While the near term alternative, e.g., Alternative 1, is the focus of projects advanced as part of the Plan, Alternative 2 is included in this report as a potential next step adaptation action for the City and Community to consider in the medium term. The City will evaluate under what conditions Alternative 1 is no longer viable and what triggers would initiate further exploration of Alternative 2 in future work.

This alternative would convert one automobile traffic lane to an additional bicycling facility, or cycle track. A two-way cycle track that is separated from automobile traffic would also allow the existing Recreational Trail to be primarily used as a walking path. This alternative would maintain westbound automobile access throughout the corridor for residential and recreational purposes. It would also be designed to maintain parking along the corridor. A two-way cycle track would help reduce user conflicts between bicyclists and other users along the Recreational Trail. This alternative is considered a medium-term adaptation approach, and could be initiated at some point in the future when cliff erosion trigger thresholds are exceeded (to be determined). Upon closure of the Recreational Trail the cycle track could be repurposed to serve as the relocated Recreational Trail. Any triggers development and/or initiating of this alternative must be coordinated with the joint land owner of many areas along West Cliff Drive, California Department of State Parks. . Conceptual designs in plan and section view are provided at the five roadway crossing locations for Alternative 2 concepts in Figures 7-15 through 7-26.

One-way with Enhanced Bicycling Facility
This alternative includes one-way westbound vehicle traffic with a two-way cycle track on the ocean side of the corridor. The following describes the concept design elements proposed in alternative 2:

Two-way cycle tracks are physically separated cycle tracks that allow bicycle movement in both directions on one side of the road using a single vehicular traffic lane. Some are separated by a buffer from adjacent pedestrian facilities or by a raised sidewalk if the cycle track is at roadway grade. In addition, two-way cycle tracks on one-way streets reduce out of direction travel by providing contra-flow movements. It should be noted that these facilities are more attractive to a wider range of bicyclists at all levels and ages than less separated facilities. Per Caltrans Design Information Bulletin 89-01, for separated bikeways at the same level as adjacent travel lane, there must be a minimum of 2 feet buffer with flexible posts. Figure 7-14 Shows a two-way cycle track with adjacent traffic and sidewalk along Beach Street in Santa Cruz.

Figure 7-14. Two-way cycle track with adjacent traffic and sidewalk.
Source: Fehr & Peers.

Drivable grass structure: In some locations with wider ROW, it is recommended to consider use of drivable grass or other vegetation structure to provide a more appealing landscape. Drivable grass structure enables the permeable grass area to be used by emergency vehicles while preventing other vehicles from driving or parking over them.

7.2.1 Location 1: Swanton Boulevard and West Cliff Drive

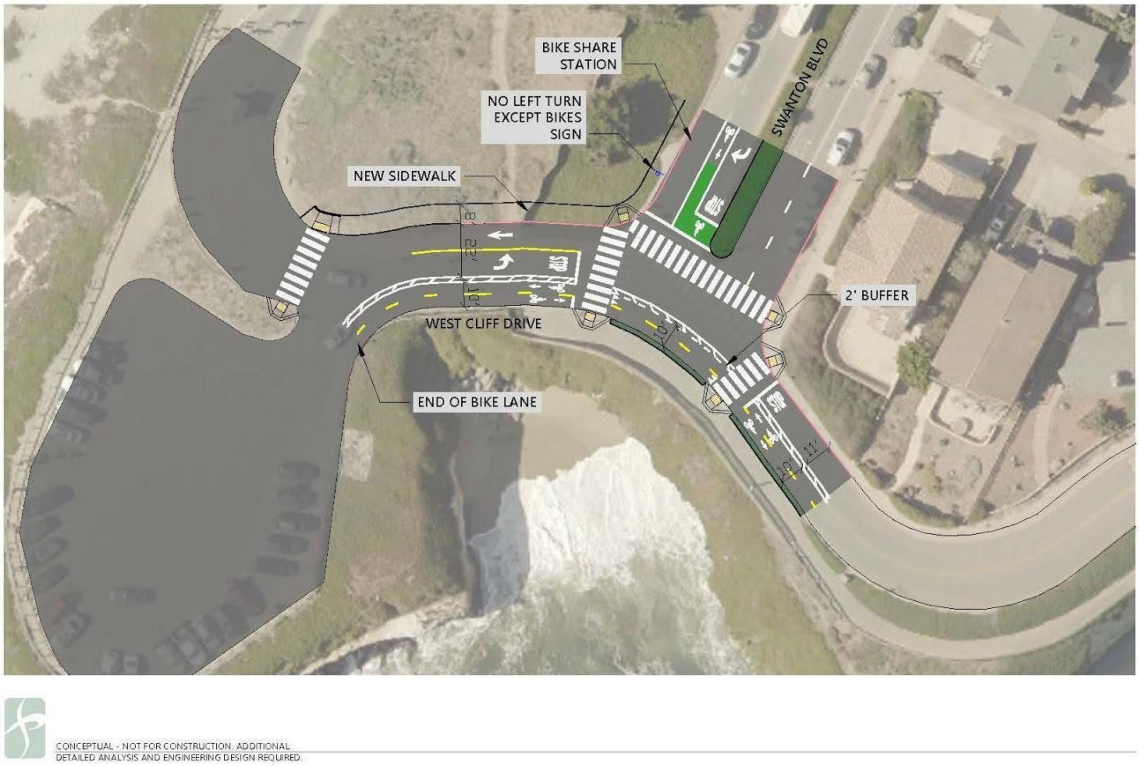


Figure 7-15. Alternative 2 Concept- Plan view of Swanton Blvd at West Cliff Drive

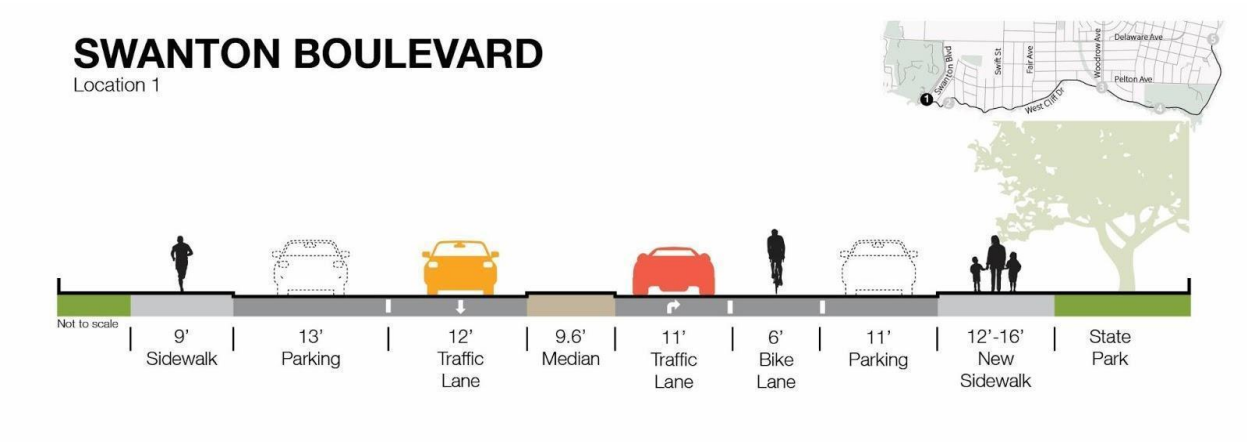


Figure 7-16. Alternative 2 Concept- Cross Section of Swanton Blvd at West Cliff Drive

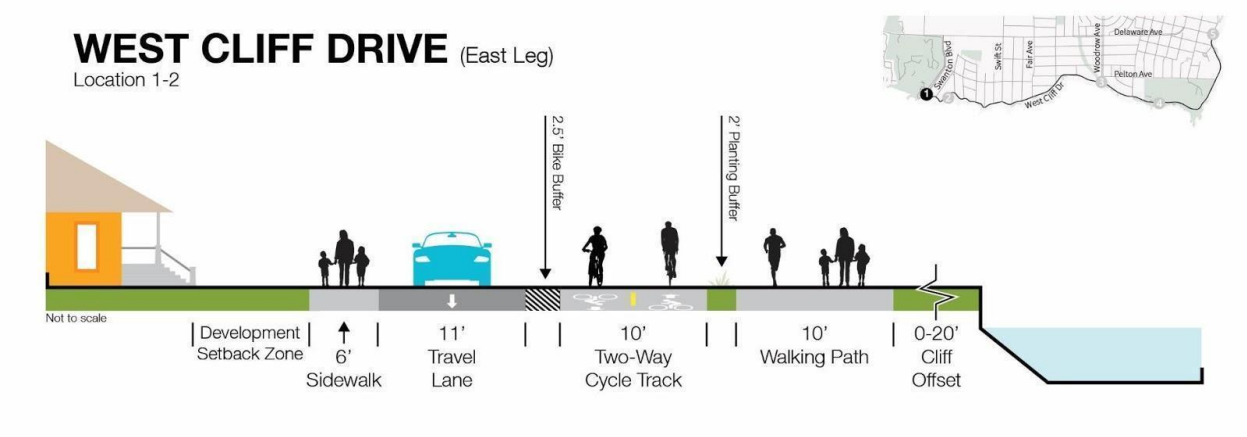


Figure 7-17. Alternative 2 Concept- Cross Section of West Cliff Drive east of Swanton Blvd

7.2.2. Location 2 Pyramid Beach parking lot

Figure 7-18. Alternative 2 Concept- Plan view of Pyramid Beach parking lot

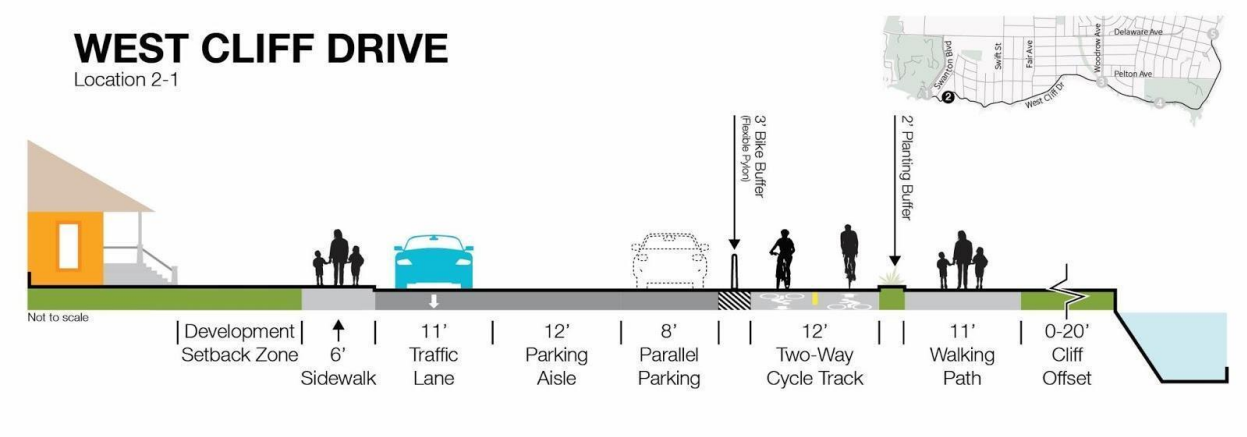


Figure 7-19. Alternative 2 Concept- Cross Section of Pyramid Beach parking lot

7.2.3. Location 3 Woodrow Avenue at West Cliff Drive

Figure 7-20. Alternative 2 Concept- Plan view of Woodrow Avenue at West Cliff Drive

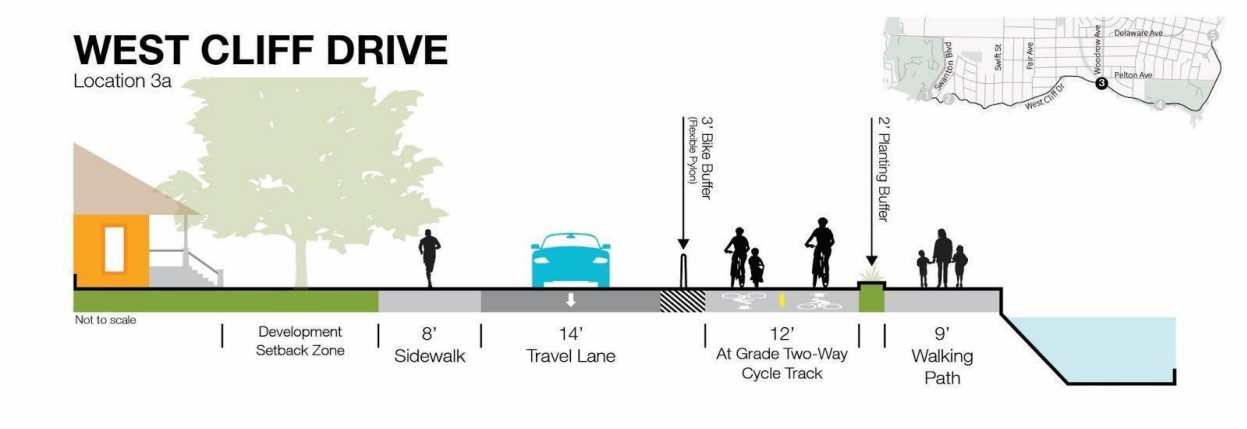


Figure 7-21. Alternative 2 Concept- Cross Section of Just west of Woodrow Avenue at West Cliff Drive

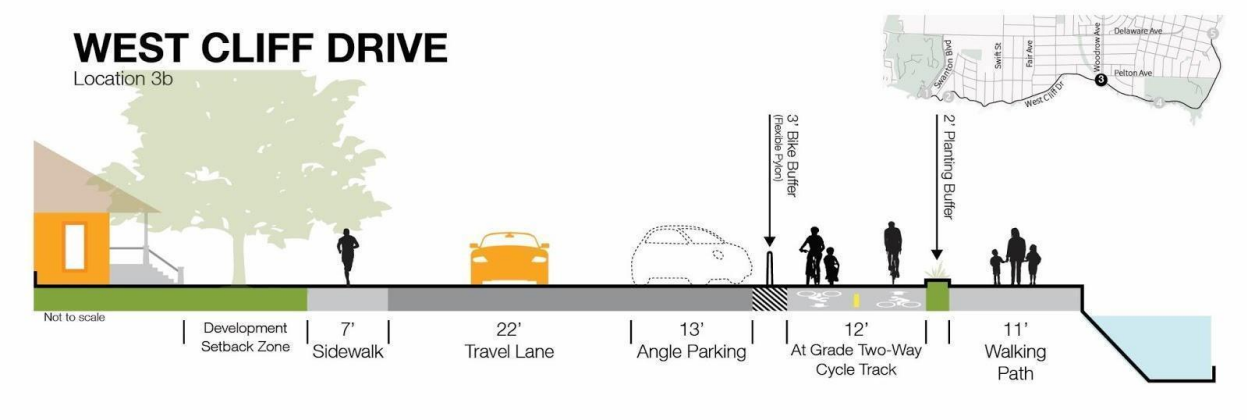


Figure 7-22. Alternative 2 Concept- Cross Section of parking lot on West Cliff Drive, east of Woodrow Avenue

7.2.4. Location 4 State Parks Parking Lot A

Figure 7-23. Alternative 2 Concept- Plan view of State Parks Parking Lot A

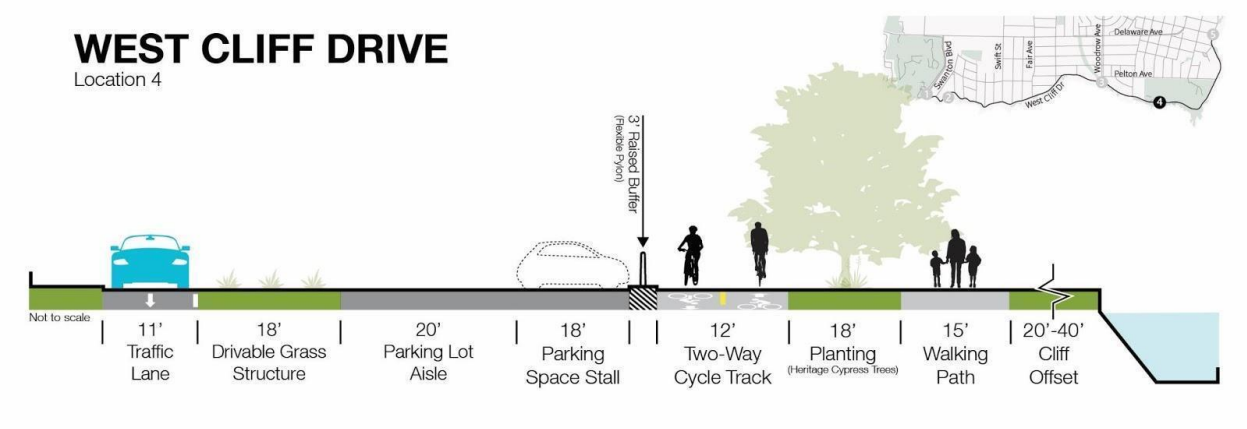


Figure 7-24. Alternative 2 Concept- Cross Section of State Parks Parking Lot A

7.2.5. Location 5 Santa Cruz Street at West Cliff Drive

Figure 7-25. Alternative 2 Concept- Plan view of Santa Cruz St at West Cliff Drive

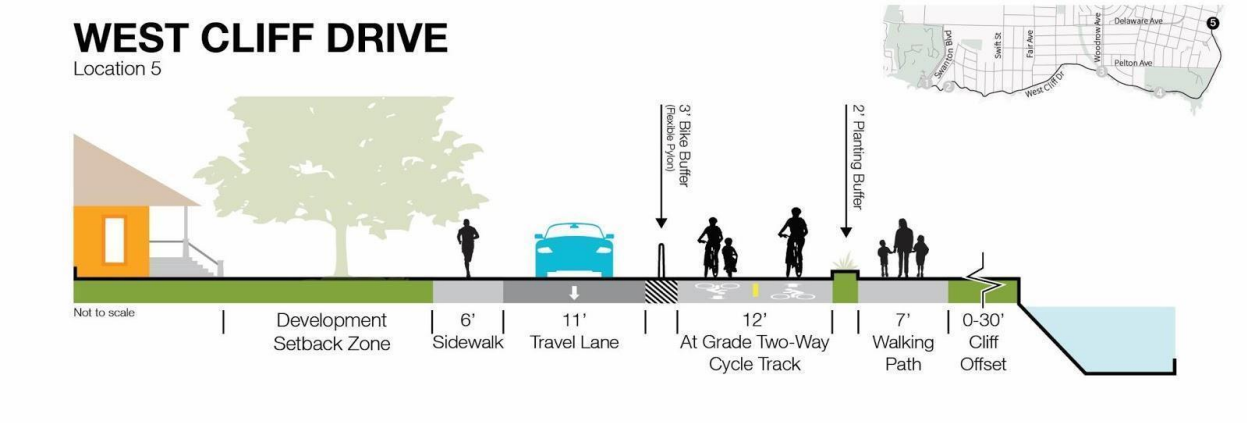


Figure 7-26. Alternative 2 Concept- Cross Section of Santa Cruz St at West Cliff Drive

7.2.6. Alternative 2 Parking Spaces

The parking spaces described under Alternative 2 allow for angled or parallel parking options. Given the limited available ROW width for emergency vehicle access, the optimum use of the

available on-street parking spaces was considered for each parking lot locations. Table 7-1 outlines different on-street parking design configuration at each parking lot location.

Table 7-1 Available parking spaces with different design configurations

Location	Existing Available Spaces	Parallel Available Spaces	90 Degree Angle Available Spaces	60 Degree Angle Available Spaces	45 Degree Angle Available Spaces
Lot 1 Chico Ave / Auburn Ave	8	8	N/A*	N/A*	N/A*
Woodrow Parking Lot (Lot 7)	16	6 (10)	N/A*	7(9)**	10(6)***
State Parks Lot A	19	21 on-street & 18(1) parking lot	On-street N/A*	On-street N/A*	On-street N/A*

*Less than 20 feet width of ROW is remained for emergency vehicle access
**26 feet width of ROW is remained for emergency vehicle access
***22 feet width of ROW is remained for emergency vehicle access
(x) is the number of parking spaces lost due to configuration design

8. Project Review & Authorization Procedures

The purpose of this chapter is to set forth procedures for reviewing and authorizing project implementation on West Cliff Drive as well as delineating routine maintenance and pre-approved projects that do not require additional authorization. The Coastal Permit section of the City's Zoning Ordinance (Part 3 of Chapter 24.08 of the Santa Cruz Municipal Code) is part of the Implementation Program of the City's certified Local Coastal Program (LCP). It delineates the process for coastal permits and includes a list of project types that are excluded from the Coastal Development Permit process, as authorized by and in accordance with the procedures certified by the Coastal Commission. Part 3 also lists project types that are exempt from the Coastal Development Permit process in accordance with the California Coastal Act of 1976 and the California Code of Regulations. In addition to these lists of excluded and exempt project types, Part 3 includes noticing requirements and required findings for Coastal Development Permit determination.

This chapter describes three additional levels of project types that are specific to the West Cliff Drive Adaptation and Management Public Works Plan and the review and approval process for such projects. These project levels include basic maintenance, which is exempt from review based on this Public Works Plan; minor projects, which are contained in this Public Works Plan by description and are approved through the approval of this Plan; and major projects, which are not defined in this plan and would require approval of a Coastal Development Permit. Typically exemptions do not apply to a beach, wetland or sand dune or within a specified distance from the coastal bluff. However, projects contained in this Plan that are specified to take place within Coastal commission jurisdiction are allowable so long as the habitat and environmental protection measures outlined in Chapter 4 are followed and best management practices are utilized.

8.1. Review and Authorization of Proposed Projects by the City

8.1.1. Definitions

"The Plan" or "Plan" means West Cliff Drive Adaptation and Management Public Works Plan.

"California Coastal Commission," "Coastal Commission," and "Commission" mean the California Coastal Commission.

"Contained in" means that a proposed development is of a kind contemplated by the Plan and is within the parameters of the Plan, including but not limited to the size, location, and type of the proposed project.

"Project" means a project developed for the purposes of this Plan.

“Person” means any individual, organization, partnership, limited liability company, or other business association or corporation, including any utility, and any federal, state, local government, or special district or an agency thereof**.**

“Public works” means (a) all production, storage, transmission, and recovery facilities for water, sewerage, telephone, and other similar utilities owned or operated by any public agency or by any utility subject to the jurisdiction of the Public Utilities Commission, except for energy facilities; (b) all public transportation facilities, including streets, roads, highways, public parking lots and structures, ports, harbors, airports, railroads, and mass transit facilities and stations, bridges, trolley wires, and other related facilities and (c) all publicly financed recreational facilities, all projects of the State Coastal Conservancy, and any development by a special district.

“The Public Works Director” and “the Director” mean the Public Works Director for the City of Santa Cruz

“The Executive Director of the California Coastal Commission” and “the Executive Director” mean the Executive Director of the California Coastal Commission or his/her designee. All required coordination/consultation with the Executive Director shall be initiated through and facilitated by Planning staff of the Coastal Commission's Central Coast District office. Note that all materials required to be sent to the Executive Director shall be sent to the Coastal Commission’s Central Coast District Office.

“The City,” refers to the City of Santa Cruz.

8.1.2. Exclusions

The following categories of development are excluded from the requirement for a coastal development permit per the certified Local Coastal Program:

1. Signs. All signs are excluded except freestanding signs over eight feet in height and those signs governing shoreline access.

2. Bikeways. Construction of new bikeways (within existing rights-of-way), except if new construction reduces parking in the Beach Recreation or Seabright Beach Areas.

3. Exclusion of Temporary Events. Special events shall be evaluated for exclusion status by the city pursuant to Coastal Commission Guidelines for Exclusion of Temporary Events from Coastal Commission Permit Requirements (adopted May 12, 1994) in consultation with the Executive Director. The Executive Director shall retain exclusion review authority if it is determined that there are significant adverse impacts on coastal resources.

4. Temporary Structures. All temporary (six months or less; nonrenewable) structures and uses consistent with the conservation and cultural resource regulations and that do not conflict with public access and access policies.

In addition, the Zoning Administrator may, at the time the application for development within the Coastal Zone is submitted, make a determination that the development is categorically excluded from the requirement for a Coastal Development Permit. This determination shall be made with reference to the certified Local Coastal Program, including any maps, categorical exclusions, land use designations and zoning ordinances which are adopted as part of the Local Coastal Program. Only developments which fully comply with the policies and ordinances of the certified Local Coastal Program may be excluded under this categorical exclusion.

8.1.3 Notice of Exclusion.

Notices of exclusion shall be issued on forms prepared for that purpose by the department of planning and community development and shall indicate the developer's name, street address, if any, and assessor's parcel number(s) of the project site, a brief description of the development, and the date(s) of application for any other permit(s). A copy of the notice of exclusion shall be provided to the Coastal Commission and to any person who has requested such notice within five working days of issuance. The notice of exclusion may be issued at the time of project application but shall not become effective until all other approvals and permits required for the project are obtained. A copy of all terms and conditions imposed by the city shall be provided to the Coastal Commission.

8.1.4 Exemptions

Minor projects lacking coastal significance are exempted from the requirements of coastal development permit processing in accordance with the California Coastal Act of 1976, the California Code of Regulations, and Local Coastal Program. Other projects are not subject to local coastal development permit jurisdiction. Within this Plan there may be further exemptions that override the exceptions in the exemptions listed here.

No local coastal permit is required for the following activities:

1. Projects described in Repair, Maintenance and Utility Hook-Up Exclusions from Permit Requirements adopted by the California Coastal Commission on September 5, 1978, which is incorporated as Appendix II of the Local Coastal Program document and found at the end of this Chapter.

2. Projects undertaken by federal agencies.

3. Projects with Coastal Permit. Development authorized by a coastal permit (still valid) issued by the Coastal Commission or in areas where the Coastal Commission retains original permit jurisdiction.

4. Replacement After Natural Disaster. The replacement of any structure, other than a public works facility, destroyed by a natural disaster is exempt; provided, that the replacement structure:

a. Will be for the same use as the destroyed structure; and

b. Will not exceed the floor area, height, or bulk of the destroyed structure by more than ten percent; and

c. Will be sited in the same location on the affected property as the destroyed structure.

5. Improvements to Existing Single-Family Residences, Including Mobilehomes.

a. Exempt improvements to single-family residences include the following:

(1) Additions and other improvements in the CZ-O Coastal Zone Overlay District but outside the SP-O Shoreline Protection Overlay District to an existing single-family residence, including improvements to any fixtures or other structures directly attached to the residence or to structures on the property normally associated with a single-family residence, such as garages, swimming pools, fences, storage sheds, decks, gazebos, patios, greenhouses, driveway paving, and other similar non-habitable improvements;

(2) On property located within the SP-O Shoreline Protection Overlay District, improvements that would not result in an increase in height of ten percent or more or an increase of ten percent or more of internal floor area of an existing structure, or an additional improvement of ten percent or less where an improvement to the structure had previously been undertaken pursuant to this section, and not including any non-attached structure such as garages, fences, shoreline protective works or docks;

(3) Landscaping on the lot.

b. This exemption for improvements to single-family residences, including mobilehomes, does not include the following:

(1) Additions to single-family residences where the development permit issued for the original structure by the city or Coastal Commission indicated that any future additions would require a coastal permit;

(2) Where the structure is located on a beach, wetland, or seaward of the mean high-tide line; where the residence or proposed improvement would encroach within fifty feet of the edge of a coastal bluff;

(3) Where the improvement would involve any significant alteration of land forms on a beach, wetland, or sand dune, or is within one hundred feet of a coastal bluff or within any natural resource or natural hazard area as indicated in the Local Coastal Program;

(4) In areas having a critically short water supply as declared by resolution of the Coastal Commission, construction of major water-using development not essential to residential use such as swimming pools or extension of landscape irrigation systems;

(5) Expansion or construction of water wells or septic systems.

6. Improvements to Existing Duplexes and Multifamily Residences.

a. Exempt improvements to duplexes and multifamily residences include the following:

(1) Additions and other improvements in the CZ-O Coastal Zone Overlay District but outside the SP-O Shoreline Protection Overlay District to an existing duplex or multifamily residence, including improvements to any fixtures or other structures directly attached to the residence or to structures on the property normally associated with a duplex or multifamily residence, such as garages, swimming pools, fences, storage sheds, decks, gazebos, patios, greenhouses, driveway paving, and other similar non-habitable improvements;

(2) On property located within the SP-O Shoreline Protection Overlay District, improvements that would not result in an increase in height of ten percent or more or an increase of ten percent or more of internal floor area of an existing structure, or an additional improvement of ten percent or less where an improvement to the structure had previously been undertaken pursuant to this section, and not including any non-attached structure such as garages, fences, shoreline protective works or docks;

(3) Landscaping on the lot.

b. This exemption for improvements to duplexes and multifamily residences, including mobilehomes, does not include the following:

(1) Additions to duplexes or multifamily residences where the development permit issued for the original structure by the city or Coastal Commission indicated that any future additions would require a coastal permit;

(2) Where the structure is located on a beach, wetland, stream or lake; seaward of the mean high-tide line; where the structure or proposed improvement would encroach within fifty feet of the edge of a coastal bluff;

(3) Where the improvement would involve any significant alteration of land forms on a beach, wetland, or sand dune, or is within one hundred feet of a coastal bluff or within any natural resource or natural hazard area as indicated in the Local Coastal Program;

(4) Improvement which would change the type or intensity of use of the structure;

(5) In areas having a critically short water supply as declared by resolution of the Coastal Commission, construction of major water-using development not essential to residential use such as swimming pools or extension of landscape irrigation systems;

(6) Expansion or construction of water wells or septic systems.

7. Interior Remodeling. Interior remodeling, residential and non-residential, is exempt except where the use is being converted into a more intensive use or results in a loss of visitor-serving or public-access facilities.

8. Any activity that involves the conversion of any existing multiple-unit residential structure to a time-share project, estate or use, as defined in Section 11003.5 of the Business and Professions Code, is exempt except that the division of a multiple-unit residential structure into condominiums shall not be considered a time-share project, estate, or use.

9. Maintenance Dredging. Maintenance dredging of existing navigation channels or moving dredge material from such channels to a disposal area outside the Coastal Zone, pursuant to a permit from the United States Army Corps of Engineers.

10. Repair and Maintenance Activity. 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; however, the following extraordinary methods of repair and maintenance shall require a coastal development permit because they involve a risk of substantial adverse environmental impact:

a. Any method of repair or maintenance of a seawall revetment, bluff retaining wall, breakwater, groin, culvert, outfall, or similar shoreline work that involves:

(1) Repair or maintenance involving substantial alteration of the foundation of the protective work including pilings and other surface or subsurface structures;

(2) The placement, whether temporary or permanent, of rip-rap, artificial berms of sand or other beach materials, or any other forms of solid materials, on a beach or in coastal waters, streams, wetlands, estuaries and lakes or on a shoreline protective work, except for agricultural dikes within enclosed bays or estuaries;

(3) The replacement of twenty percent or more of the materials of an existing structure with materials of a different kind; or

(4) The presence, whether temporary or permanent, of mechanized construction equipment or construction materials on any sand area or bluff or within twenty feet of coastal waters or streams.

b. Any method of routine maintenance dredging that involves:

(1) The dredging of one hundred thousand cubic yards or more within a twelve-month period;

(2) The placement of dredged spoils of any quantity within an environmentally sensitive habitat area, or any sand area, within fifty feet of the edge of a coastal bluff or environmentally sensitive habitat area, or within twenty feet of coastal waters or streams; or

(3) The removal, sale, or disposal of dredged spoils of any quantity that would be suitable for beach nourishment in an area the Commission has declared by resolution to have a critically short sand supply that must be maintained for protection of structures, coastal access or public recreational use.

c. Any repair or maintenance to facilities or structures or work located in an environmentally sensitive habitat area, any sand area, within fifty feet of the edge of a coastal bluff or environmentally sensitive habitat area, or within twenty feet of coastal waters or streams that include:

(1) The placement or removal, whether temporary or permanent, of rip-rap, rocks, sand or other beach materials or any other forms of solid materials;

(2) The presence, whether temporary or permanent, of mechanized equipment or construction materials.

11. Land Division. Land division brought about in connection with the acquisition of such land by a public agency for recreational purposes.

12. Non-Major Vegetation Removal.

a. Trees, fourteen inches and less in diameter, and shrub removal and trimming not subject to the heritage tree provisions (Chapter 9.56 of the Municipal Code) and not located in a Vegetation Community (Map EQ-8) or otherwise identified by the Local Coastal Program, including area and specific plans as within an area of potentially significant natural resources or in an erosion hazard area, are exempted except when located seaward of the first public road paralleling the sea.

b. Weed abatement not located in a Vegetation Community (Map EQ-8) or otherwise identified by the Local Coastal Program, including area and specific plans as within an area of potentially significant natural resources or in an erosion hazard area is exempted except when located seaward of the first public road paralleling the sea.

13. Portions of Projects. Portions of projects on portions of parcels outside the CZ-O are exempt.

8.1.5 Additional Maintenance Projects

In addition to the exempted maintenance projects described above, the maintenance projects of the following types and those contained in Chapter 4 of the Plan are approved by this Plan and shall not require a separate Coastal Development Permit. Projects that are exempt per the California Coastal Commission's *Repair, Maintenance and Utility Hook-Ups Exclusions from Permit Requirements* (see exhibit at end of Chapter) are noted with "RMU." Where the RMU refers to "highway" or "State Highway," it is recognized per Section II.A. of the RMU that this reference also applies to local roads and rights-of-way. For exemptions listed in 8.1.4 above

that restrict the application of the exemption to areas outside of a beach, wetland or sand dune or within a specified distance from the coastal bluff, that restriction of the exemption shall not apply so long as the habitat and environmental protection measures outlined in Chapter 4 are followed and best management practices are utilized, if applicable.

1. Signs governing coastal access that are contained in this Plan that replace existing signs with similar signs as part of an overall signage program, including new signs made necessary by safety concerns. (RMU II.A, Appendix I, 7.)
2. Repair, replacement, and addition of fencing and guard rail safety barriers. (RMU 17.c)
3. Repair and maintenance of existing roads and path, including pothole filling, repaving with associated striping, curb ramp replacement, concrete repair, and streetlight repair and replacement. (RMU II.A)
4. Repair and replacement of stormwater outlets. (RMU II.B.4)
5. Repair and maintenance of existing structures or facilities with no increase in the size of the structure or level or type of use. (RMU II.B.5.E)
6. Trimming and removal of overgrown vegetation by hand or mechanical means. (RMU Appendix I, 5.)
7. Maintenance of existing public service facilities. (RMU Appendix I, 10.)
8. The treatment, maintenance, and replacement of vegetative material within the right-of-way, including hand and mechanical means. (RMU Appendix I, 11)
9. Undergrounding of existing utilities. (RMU II.B.2.b)

Specific Maintenance Projects Contained in Plan:

1. Zone 1: Improve exterior of Pyramid Beach stormwater outfall. (RMU II.4)
2. Zone 1-4: Conduct stormwater outfall and pipe televising and replace failed pipe to achieve design performance. (RMU II.4)
3. All Zones: Sinkhole repair as needed. (RMU Appendix 1, 15)
4. Zone 3: Improve vertical access at existing stairwells (#4 and 7). (RMU Appendix 1, 17)
5. Addition of formal (marked) bike parking at the following locations:
    a. Zone 1: Natural Bridges, other parking areas, and Pyramid Beach
    b. Zone 2: Mitchell's Cove, parking areas, Bethany Curve, and overlook areas
    c. Zone 3: Lighthouse, Lighthouse Field parking areas, Surfer statue.
    d. Zone 4: Parking areas and Cowell Beach

8.1.6 Minor Projects

Minor projects are those that do not qualify as repair and maintenance but that are contained in the Plan. Such projects will generally include little to no expansion of existing facilities (no more than a 20% increase in size), no new uses that are not contained in the Plan, and

negligible to no environmental impacts. Where the project would affect a beach, wetland or sand dune or would be within a specified distance from the coastal bluff, the habitat and environmental protection measures outlined in Chapter 4 shall be followed and best management practices shall be utilized, if applicable.

For minor projects, no new CDPs will be required. These projects will be included in the annual report of projects completed that the City submits to the Commission. Examples of projects in this category include:

1. Zone 2: Install a gender-neutral public restroom on the inland side of Bethany Curve bridge near Woodrow Avenue.
2. Zone 2: Maintain revetments #23-40 by restacking rock to original design grade and slope and capping entrance to David Way cave with placement of suitably sized rock to prevent access.
3. Zone 3: Maintain revetments #47 and 48 east of Lighthouse Point, retaining structure placement and repair as contained in the Plan.
4. Zone 1-4: Implement parking management strategies, including but not limited to time limited parking, additional ADA access parking, and metered parking at strategic locations. The intent of these parking management strategies is to provide more equitable parking solutions to ensure short duration visitor parking becomes available at prime locations throughout the day.

8.1.7 Major Projects

Major projects are those that are not contained in the Plan or, if described herein, still need full design and/or engineering studies that have not yet been performed before the project can be implemented. These major projects are subject to the City's normal Coastal Development Permit approval process. Projects in this category include the design upgrade and installation of retaining walls to replace failed, non-engineered structures at armoring sites #4, 5, 6, and 9 in Zone 1, the design of the seawall at Mitchell's Cove in Zone 2, and the filling of sea caves #13 C, D, and E in Zone 1.

8.1.8 Permit Procedures

An application for a coastal permit shall be reviewed in conjunction with whatever other permits are required for the project in the underlying zone. Uses requiring only a coastal development permit shall be acted upon by the zoning administrator. Where a coastal development permit is combined with another permit, the approving body for the coastal development permit shall be the same as that for the permit required for the underlying zoning district. A public hearing shall be held in all cases, except for accessory dwelling units and any other permits subject to staff level ministerial approval under State law.

8.1.9 Challenges to Determination of Coastal Permit Requirement, Exclusion, or Applicable Process

In the case of disputes over the City of Santa Cruz's determination of coastal development permit requirement, exclusion, or applicable hearing and appeals procedures, the planning director shall request an opinion of the Executive Director of the Coastal Commission. Local acceptance for filing and/or processing of the permit application shall cease until the Department of Planning and Community Development receives the determination of appropriate process from the Executive Director of the Coastal Commission.

8.1.10 Exception

Nothing in this part shall prevent demolition or the strengthening or restoring to a safe condition of any building or structure declared unsafe by the City Building Official or Fire Marshal.

8.1.11 Coastal Access

Access easements may be required to create and/or maintain existing public access to the coastline or in accordance with Local Coastal Plan policy.

8.1.12 Findings Required

The hearing body must find that the development is consistent with the General Plan, the Local Coastal Land Use Plan and the Local Coastal Implementation Program and will:

1. Maintain views between the sea and the first public roadway parallel to the sea;

2. Protect vegetation, natural habitats and natural resources consistent with the Local Coastal Land Use Plan;

3. Be consistent with any applicable design plans and/or area plans incorporated into the Local Coastal Land Use Plan;

4. Maintain public access to the coast along any coastline as set forth in the Local Coastal Land Use Plan;

5. Be consistent with the Local Coastal Land Use Plan goal of providing visitor-serving needs as appropriate;

6. Be consistent with the Local Coastal Land Use Plan goal of encouraging coastal development uses as appropriate.

8.1.13 Notice of Final Action

Within seven calendar days of the final local action on a coastal permit, the City shall provide notice of its action by first class mail to the Coastal Commission and to any persons who

specifically requested notice of such final action by submitting a self-addressed, stamped envelope to the department of planning and community development. Such notice shall include conditions of approval and written findings and the procedures for appeal of the local decision to the Coastal Commission. Appealable coastal development permits shall not be deemed complete and a final action taken until all local rights of appeal have been exhausted.

8.2. Coastal Commission Review of Projects

The Coastal Commission shall review coastal development permit applications for projects contained in the West Cliff Drive Adaptation and Management Public Works Plan (Plan) that have been authorized by the City for consistency with the Plan in accordance with the procedures of this section.

8.2.1. Submittal of Project Application

Within ten days of receipt of the project application, City determination, and all applicable supporting information for a proposed project, the Executive Director of the Coastal Commission shall review the submittal and shall determine whether additional information is necessary to determine if the proposed project is consistent with the Plan, and if additional information is deemed necessary, shall request such information from the Public Works Director, the Planning Director, or the director of the department submitting the application. The project submittal shall be deemed filed as follows:

1. If the Executive Director does not respond to the project submittal or any subsequent information submittal within ten days following its receipt, the application shall be deemed filed on the tenth day following the Executive Director's receipt of the application or the subsequent information submittal, or

2. The application shall be deemed filed when all necessary information requested has been received by the Executive Director.

   In the event of disagreement concerning the need for additional information or the adequacy of the subsequent information submitted to enable the Commission to determine consistency with the Plan, the Executive Director or Public Works Director may submit the disagreement to the Commission for resolution. The Executive Director shall schedule the matter for hearing and resolution at the next Commission meeting or as soon thereafter as practicable, but in no event later than sixty (60) calendar days after the Executive Director's receipt of written notice by the Public Works Director that the City disagrees that the Executive Director's request for information is necessary to determine if the proposed development is consistent with the Plan (the "Hearing Deadline").

The matter shall be scheduled and heard by the Commission in accordance, to the extent practicable, with the procedures set forth in 14 California Code of Regulations Section 13056(d).

8.2.2. Coastal Commission Hearing Deadline

If the Commission fails to act upon the project submittal on or before the Hearing Deadline, the noticed project shall be deemed consistent with the certified Plan. The Hearing Deadline may be extended if, on or before the Hearing Deadline, the Public Works Director waives the City's right to a hearing within thirty working days, and agrees to an extension to a date certain, no more than three months from the Hearing Deadline, to allow for Commission review of the proposed project at a later hearing.

8.2.3. Coastal Commission Review and Determination of Consistency with Plan

The Executive Director shall report in writing to the Commission the pendency of the proposed project for which a submittal has been deemed filed. The Coastal Commission shall review the proposed project at a scheduled public hearing prior to the Hearing Deadline.

If the Executive Director determines that one or more proposed project(s) is de minimis with respect to the purposes and provisions of the Plan, they may be scheduled for Commission review at one public hearing during which all such items may be taken up as a single matter pursuant to procedures comparable to the Commission's consent calendar procedures (California Code of Regulations, Title 14, Sections 13101 through 13103).

For all other proposed project(s), the Executive Director's report to the Commission shall include a description sufficient to allow the Commission to understand the location, nature, and extent of the proposed project(s), and a discussion and recommendation regarding the consistency of the proposed project with the Plan. On or before the Hearing Deadline the Commission, by a majority of its membership present, may take one of the following actions on a proposed project:

1. Determine that the proposed project is consistent with the Plan, or

2. Determine that conditions are required to render the proposed project consistent with the certified Plan and vote to impose any condition necessary to render the proposed project consistent with the Plan.

Following Commission action, the Executive Director shall inform the Public Works Director of the Commission's action and shall forward any conditions associated with it. If the Commission has voted to impose any condition necessary to render the project consistent with the Plan,

project shall not be undertaken until the conditions have been incorporated into the project.

Coastal Commission review of a proposed project shall be deemed complete on either:

1. The date of a Commission action determining that the proposed project is consistent with the Plan (with or without conditions to render it consistent); or

2. If the Commission has failed to act on the proposed project by the Hearing Deadline, the date of the Hearing Deadline.

3. Upon completion of Commission review, the City may undertake the project provided that any conditions imposed by the Commission to render the development consistent with the Plan have been incorporated into the project.

8.3. Amendment of Project Authorizations

Authorization for projects that have been deemed consistent with the Plan by the City and/or the Coastal Commission may be amended in the same manner specified by this Plan for the initial review of proposed project. A project that requires amendment of a pre-plan certification Commission action and that is not subject to the Coastal Commission's retained permit jurisdiction and/or other retained review authority (see Section 8.5) shall be pursued through the Coastal Commission directly, unless the Executive Director, in consultation with the Public Works Director, or the Commission determines that de novo review under Plan procedures is more appropriate. The determination shall be made on the basis of the extent to which the proposed change significantly alters the effect of terms and/or conditions of the original approval. In either case, the standard of review is the Plan.

8.4. Effective Date and Expiration Date of Project Authorizations; Extension of Authorizations

8.4.1. Effective Date of Project Authorizations

Unless expressly stated otherwise in the approval documents, the effective date of a Project authorization shall be the date the Coastal Commission's review of the proposed project is deemed complete pursuant to Section 8.2.3.

8.4.2. Expiration Date of Project Authorizations

Unless explicitly stated otherwise in the approval documents, the expiration date of a project authorization pursuant to this Plan shall be three years following its effective date. Thereafter, development of the project may not commence unless the authorization has been extended as provided herein pursuant to Section 8.4.3, or a new authorization and review by the

Commission has been completed in accordance with Plan provisions for initial review of proposed development.

8.4.3. Extension of Project Authorizations

The expiration date of a project authorization may be extended for a period not to exceed one year if the Public Works Director determines that there are no changed circumstances that may affect the project's consistency with the Plan. In such a case, before the expiration of the authorization, the Public Works Director shall submit to the Executive Director notice of intent to extend authorization of the project together with supporting information sufficient for the Executive Director to determine whether there are changed circumstances that may affect the development's consistency with the Plan, including any modified and/or new materials making up the supporting information. The submittal shall stay the expiration of the authorization and the start of construction.

If the Executive Director determines that the extension is consistent with the Plan, the City shall post notice of the determination consistent with the City's posting requirements and the Executive Director shall mail the notice to all persons and agencies on the original mailing list for the project and to all persons and agencies known by the Executive Director to be interested in the proposed extension. The notice shall include a summary of the extension approval process and information on contacting the City and the Coastal Commission concerning the proposed extension. If no written objection is received at the Commission office within 10 working days of posting and mailing notice, the determination of consistency shall be conclusive.

If the Executive Director determines that due to changed circumstances the project may not be consistent with the Plan, the proposed extension shall be reported to the Commission at a noticed public hearing. The report shall include any pertinent changes in circumstances relating to the proposed extension. If three or more commissioners object to the extension on grounds the project may not be consistent with the Plan, the matter shall be set for hearing as though it were a new application submittal, including that the City shall post notice and shall provide the Executive Director with supporting information in the manner prescribed for new proposed projects.

Successive extensions of an authorization may not exceed one year each.

8.5. Coastal Commission's Permit Jurisdiction

After certification of the Plan, the Coastal Commission retains permit jurisdiction over projects on tidelands, submerged lands, and public trust lands, whether filled or unfilled, on and adjacent to West Cliff Drive (see "Coastal Commission Retained Jurisdiction Area" in Figure 8-1). Under the Federal Coastal Zone Management Act, the Commission also retains federal consistency review authority over federal activities and federal permitted activities on or

adjacent to West Cliff Drive. The Plan shall provide non-binding guidance for such permit and federal consistency review by the Commission.

The Commission also retains permit jurisdiction outside of the retained jurisdiction area over projects that were approved by Commission action before the date of Plan certification. Any proposal to expand such existing project shall be subject to the project review procedures of the Plan. For any proposal to modify such existing project, the determination of whether to treat the proposal as an amendment to the Commission authorization or as a new project subject to Plan review shall be made on a case-by-case basis as provided in Section 8.3 (Amendment of Project Authorizations).

8.6. Monitoring of Projects

The City shall be responsible for ensuring that all terms, conditions, and mitigations associated with authorized projects, including but not limited to mitigation measures and CEQA/NEPA requirements, are fulfilled. Project managers and other City personnel assigned responsibility to implement and/or monitor authorized projects shall contact the Public Works Director annually by the end of each calendar year to provide information regarding compliance with the terms and conditions of each Plan authorization that year and continuing obligations from authorizations in previous years.

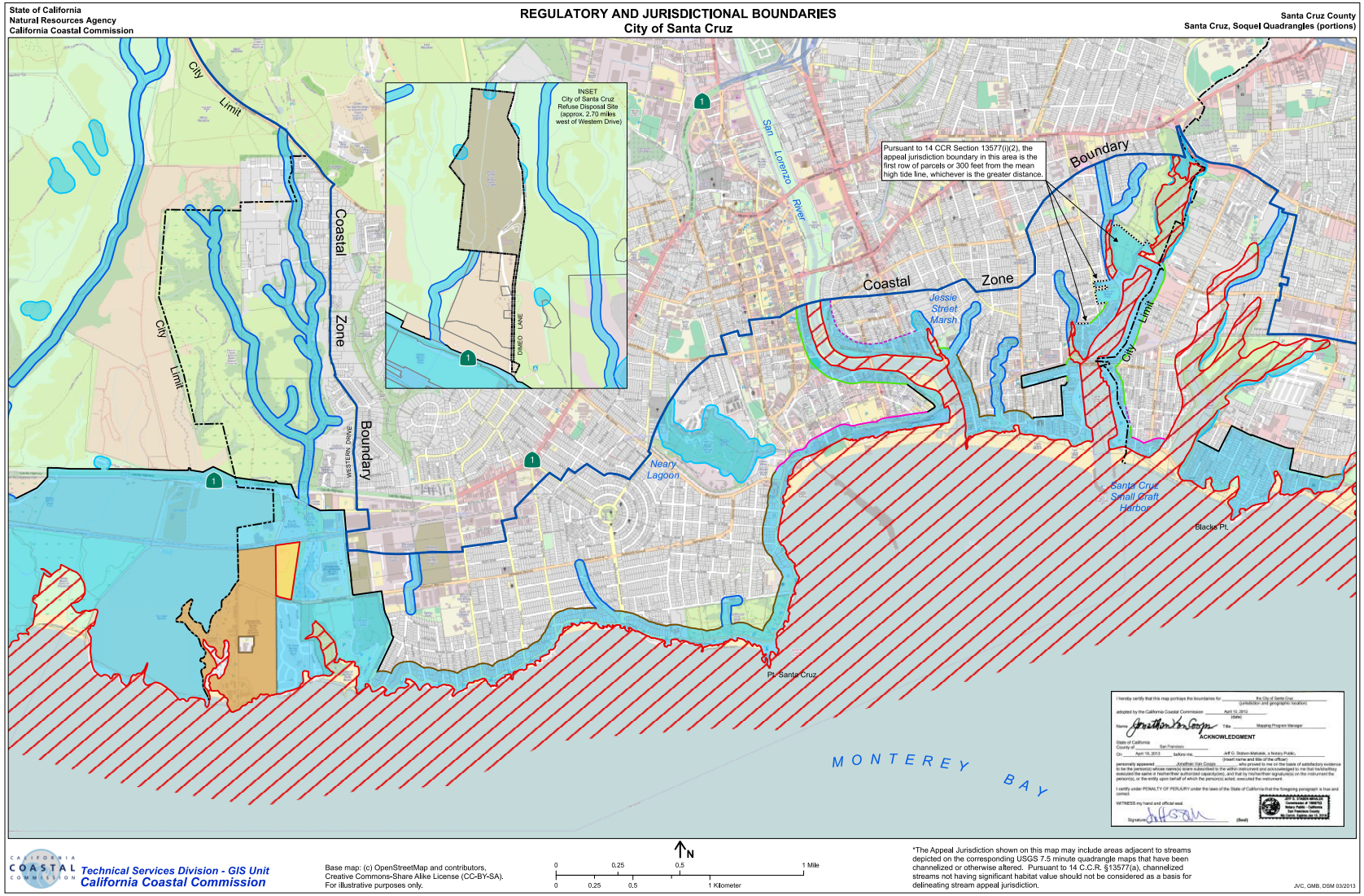


Figure 8-1. Coastal Commission Retained Jurisdiction Area

The Public Works Director shall verify that all terms and conditions have been timely fulfilled and shall update each project's list of conditions and mitigations with compliance information on a yearly basis.

The Director shall include within on-going project monitoring programs of the City an annual written Plan monitoring report that includes a cumulative and calendar year summary of: Plan-authorized project compliance; projects excluded or exempt from coastal development permits by virtue of Sections 8.1.2, 8.1.4 and 8.1.5; emergency authorizations pursuant to Section 8.8; enforcement undertaken pursuant to Section 8.7; Plan-required biannual monitoring reports (e.g., triggers); status of Plan-required improvements and other city commitments; and any comments received on Plan implementation. The Director shall maintain a record of these annual summary reports in the Director's office, and they shall be available for public review. The Director shall submit a copy of each annual report to the Executive Director within ten days of its completion. Completion of projects and the set of annual summary reports shall constitute an Implementation Program, which shall be revisited at the next iteration of Plan preparation.

8.7. Enforcement

In addition to all other available remedies, the provisions of the Plan and the Coastal Act shall be enforceable pursuant to Chapter 9 of California Public Resources Code Division 20. Any person who performs or undertakes projects on West Cliff Drive that are (a) in violation of the Plan, (b) inconsistent with any pre-Plan Coastal Commission authorization (including coastal development permit approval), and/or (c) inconsistent with any Plan project authorization may, in addition to any other penalties or remedies, be civilly liable in accordance with the provisions of Public Resources Code Sections 30820, 30821.6 and 30822.

The City shall ensure that projects implemented on West Cliff Drive are consistent with the Plan and the terms and conditions of project authorizations pursuant to the Plan. The Public Works Director shall investigate in a reasonable timeframe any allegations regarding projects being undertaken inconsistent with the provisions of the Plan and/or project authorizations, and shall attempt to resolve any such inconsistencies. The Executive Director and/or Coastal Commission may also enforce the terms of the Plan and the Coastal Act.

8.8. Emergency Authorizations

8.8.1. Definition of Emergency

For the purpose of this Section the term "emergency" means: a sudden unexpected occurrence demanding immediate action to prevent or mitigate loss or damage to life, health, property, or essential public services.

8.8.2. Emergency Project in Areas Outside of the Coastal Commission's Retained Jurisdiction

A. City Manager's Authority

Where immediate action by the City is required to protect life and property of the City from imminent danger, or to restore, repair, or maintain City property, utilities, or services destroyed, damaged, or interrupted by natural disaster, serious accident, or in other cases of an emergency, the City Manager may authorize an emergency project on West Cliff Drive outside of the Coastal Commission's retained jurisdiction area (see Figure 8-1) in compliance with this Section. Emergency work within areas subject to the Coastal Commission's permit jurisdiction is addressed in Subsection 8.8.3 below.

B. Extreme Emergency Requiring Immediate Action

If an emergency is so extreme that it does not allow time for the written requests, authorizations, and coordination described in this section, the City and persons undertaking any emergency project shall adhere as closely as reasonably possible to the written request, authorization, and coordination portions of these procedures. If an emergency is so extreme that it does not allow time for the written requests (Section 8.8.2.C), authorizations (Sections 8.8.2.D, 8.8.2.E, 8.8.2.F, and 8.8.3), and coordination (Sections 8.8.2.D and 8.8.2.E) described in this section, the City and persons undertaking any emergency project shall adhere as closely as reasonably possible to the written request, authorization, and coordination portions of these procedures. In all cases, compliance with Section 8.8.2.E is required.

C. Request for Emergency Project Authorization

A request for an emergency project authorization shall be filed with the City Manager in writing if time allows, or in person, by email, or by telephone if time does not allow. In such a case, the written request and authorization shall be provided as described in subsection 8.8.2.B, above. The request shall include, at a minimum:

1. The nature and location of the emergency;
2. The cause of the emergency, insofar as this can be established;
3. The remedial, protective, and/or preventative development proposed to address the emergency, including an evaluation of potential alternatives if time allows; and
4. The circumstances associated with the emergency that justify the emergency project proposed, including the probable consequences of failing to act.

D. City Manager's Responsibilities

Prior to authorizing an emergency project, and to the extent time allows, the City Manager or his/her designee shall:

1. Verify the facts associated with an emergency authorization request, including the existence and nature of the emergency;
2. Coordinate with Planning staff in the Central Coast District office of the California Coastal Commission as to the nature of the emergency and the scope of the emergency project proposed; and
3. Provide public notice of the emergency project, with the extent and type of notice determined on the basis of the nature of emergency.

E. Findings Required for Authorization of Emergency Project

The City Manager may authorize an emergency project on West Cliff Drive if he/she first finds that:

1. Immediate action by the City is required to protect life and property of the City from imminent danger, or to restore, repair, or maintain City property, utilities, or services destroyed, damaged, or interrupted by natural disaster, serious accident, or in other cases of emergency;
2. The emergency requires action more quickly than could occur through the Plan's normal project review procedures, and the emergency project can and will be completed within 30 days unless otherwise specified in the emergency authorization;
3. Public comment on the proposed emergency project has been reviewed, if time allows;
4. The City Manager has coordinated with Planning staff in the Central Coast District office of the California Coastal Commission and/or the Executive Director pursuant to Plan Subsection 8.8.2.D;
5. The emergency project proposed is the minimum necessary to address the emergency and, is the least environmentally damaging temporary alternative for addressing the emergency; and;
6. The emergency project proposed would be consistent with the Plan and/or would not impede attainment of Plan requirements following completion of the emergency project.

F. Form of Emergency Project Authorization

The emergency project authorization shall be a written document and, at a minimum, shall include:

1. The date of issuance;
2. The scope of project to be performed;
3. The timeframe for completion of the emergency project (not to exceed 30 days);
4. Terms and conditions of the authorization;
5. A provision stating that any projects or structures constructed pursuant to an emergency authorization shall be considered temporary until authorized by the regular Plan development authorization processes, and that issuance of an emergency authorization shall not constitute an entitlement to the erection of permanent projects or structures; and

6. A provision stating that the project authorized through the emergency process must be removed and the affected area restored if a Project authorization has not been received within six months of authorization of the emergency project (or within one year if a Plan amendment is also required). If it is not so authorized, the emergency project authorized, or the unauthorized portion of the project, shall be removed and the affected area restored.

G. Notice of Emergency Project Authorization

No later than three days after the occurrence of the disaster or the discovery of the danger, the City Manager shall provide the Executive Director of the Coastal Commission with at least telephonic or email notice of the type and location of the emergency action taken. As soon as possible and no later than 7 days after the emergency, the City Manager shall submit a written Notice of Emergency Project Authorization to the Executive Director. The Notice shall include information documenting compliance with this section, including the written emergency authorization. The notice is informational only.

8.8.3. Emergency Project in Areas within the Coastal Commission's Retained Jurisdiction

In the event of an emergency necessitating an emergency project on land on which the Coastal Commission retains jurisdiction (see Plan Section 8.7 and Figure 8-1) the procedures of this subsection shall apply.

The Public Works Director shall apply for an emergency permit to the Executive Director, by letter if time allows, and by telephone, email, or in person if time does not allow. All processing of the proposed emergency permit shall be in accordance with 14 Cal. Code of Regulations Sections 13136-13143.

Where immediate action by the City is required to protect life and public property from imminent danger or to restore, repair, or maintain public works, utilities, or services damaged or interrupted by natural disaster or other emergency, the requirement for obtaining an emergency permit may be waived, in accordance with Section 30611 of the Coastal Act; provided that the City shall comply with the requirements of Section 30611. The City shall notify the Executive Director of the type and location of the emergency work within three days of the disaster or discovery of the danger, whichever comes first. This subsection does not authorize erection of any permanent structure valued at more than $25,000. Within seven days of acting, the City shall notify the Executive Director in writing of the reasons why the action was taken and provide verification of compliance with the expenditure limits. The City's submittal to the Executive Director shall be reported to the Commission and otherwise processed in accordance with 14 Cal. Code of Regulations Section 13144.

Section 30610(c)(e) has since been modified and should *now* read 30610(c)**(f)**.

See Procedural memo #37 (dated 8/15/97) regarding emergency exemption projects (Firestone bill).

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

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, backfill 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 mantain, 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 T.V. 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.

9. Capital Improvement Program

The City's Public Works Department will combine and sequence the implementation short term projects described in Chapters 4 and 5 as noted in the table below through FY 2033. The zone by zone and corridor wide projects were grouped together by type (e.g., revetment stabilization, armoring, cave stabilization, etc.). Together these projects are estimated to exceed $18.8 million. Select projects will be integrated into the City's next Capital Improvements Program (CIP) budget (FY22 – FY 24), as primarily unfunded projects. Key projects will be integrated into the Local Hazard Mitigation Plan's next revision in 2023 to make them eligible for Federal funding. Budget estimates and project funding estimates will be refined in planning and/or design for each project. The City's Parks and Recreation Department's maintenance and minor projects, e.g., habitat restoration and overlook enhancements, can be carried out under project authorizations specified in this Plan Chapter 8. However, such enhancements can also be coupled with minor or major Public Works CIP projects, and a notation of such is indicated in the PW CIP Table below.

The City annually assesses which CIP projects budgeted support the implementation of the Climate Adaptation Plan (2018) and will specifically note those that implement this Plan. This information becomes part of each year's draft budget introduction. The City is developing the funding strategy to implement the Plan's CIP, which will consist of grants, revenue measures and philanthropy, as part of the Interim Recovery Plan (adopted in November, 2020) implementation. A summary of funding sources identified by the consultant team to be evaluated in this context is contained in Appendix A4.

Parks and Recreation CIP Project

FY 23 West Cliff Drive Restoration and Landscaping Design Standards Development ($60,000)

Other Plans and Programs

1. Upon adoption of this Plan, the City will develop a funding strategy for the CIP projects identified through FY33. Led by the City Manager's Office, this funding strategy will include grants, revenue and philanthropy and has been adopted as part of the City's Interim Recovery Plan implementation (February 23, 2020).

2. The City will refine and develop a Monitoring Triggers Program in the first CIP cycle, led by the City Manager's Office. Funding is currently pending to assist with that effort.

3. The City will annually inspect the coastline, reviewing areas of erosion and hot spot concern, and the conditions of facilities. The City will report to the Coastal Commission biannually on the status of Plan implementation and any changes to conditions.

4. The City will amend its LCP to reflect sea level rise policies and other policies as recommended by the Plan. This work is underway by the City's Planning Department and anticipated to be adopted by end of calendar year 2021.

5. The City will complete a Corridor-wide Master Signage Plan and Design Standards.

Table 9-1 Public Works CIP Project Descriptions, Cost Estimates and Sequencing

Public Works Project	PW CIP Section	Description / Funding Sources	Total Project Budget Estimate	FY22 – FY24 Estimate	FY25 - FY27 Estimate	FY28- FY30 Estimate	FY 31 – FY 33 Estimate
West Cliff Drive Revetment Stabilization	general/ unfunded	Adopted in the West Cliff Drive Public Works Plan, this project includes the design and construction of repairs to coastal revetment (riprap) infrastructure at various locations along West Cliff Drive identified as approaching its useful life and has been prioritized for repair (e.g., design and construction of riprap east of Lighthouse Point and between Almar and Columbia Avenue) as well a blocking the sea cave with riprap at David Way. The project will likely be funded through a combination of grant funding to be pursued, e.g., State grants, FEMA BRIC, State Shoreline Erosion Control Grant Program for Funding in Fiscal Year 2022-23, and pre/post mitigation funding (currently unfunded).	**$7,000,000**	$2,500,000	$1,500,000	$1,500,000	$1,500,000
West Cliff Drive Armoring	General/ unfunded	Adopted in the West Cliff Drive Public Works Plan, this project includes the design and construction of a seawall to replace revetment (Zone 2), a replacement seawall at West Its Beach and Upgrade Armoring at Chico/Auburn and Stockton. The project will likely be funded through a combination of grant funding to be pursued, e.g., State grants, FEMA BRIC, State Shoreline Erosion Control Grant Program for Funding in Fiscal Year 2022-23, and pre/post mitigation funding (currently unfunded). A portion of work at Chico/Auburn is already funded	**$3,950,000**	$450,000	$400,000	$2,700,000	$400,000
West Cliff Drive Sea Cave Stabilization	General/ unfunded	Adopted in the West Cliff Drive Public Works Plan, this project includes the design and fill a sea cave at Stockton Ave. The project will likely be funded through a combination of grant funding to be pursued, e.g., State grants, FEMA BRIC, State Shoreline Erosion Control Grant Program for Funding in Fiscal Year 2022-23, and pre/post mitigation funding (currently unfunded).	**$1,500,000**	$0	$350,000	$1,150,000	$0

Public Works Project	PW CIP Section	Description / Funding Sources	Total Project Budget Estimate	FY22 – FY24 Estimate	FY25 - FY27 Estimate	FY28- FY30 Estimate	FY 31 – FY 33 Estimate
Pyramid Beach Stormwater Outfall Upgrade	General/ unfunded	Adopted in the West Cliff Drive Public Works Plan, this project includes the design and construction of repairs and aesthetic enhancements to the stormwater outfall above Pyramid Beach to improve the views from adjacent scenic overlooks. The project will likely be funded through a combination of general fund, private funding and grants funding to be pursued (currently unfunded). This project can also be combined with other larger CIP projects along West Cliff Drive.	**$350,000**	$0	$350,000	$0	$0
West Cliff Drive Transportation and Signage Improvements (unfunded)	General/ possible gas tax	Adopted in the West Cliff Drive Public Works Plan, this project includes the design and construction of corridor-wide transportation striping, signage (including trail signage) and other ancillary improvements . The project will likely be funded through a combination of gas tax funds and federal and state grants to be pursued. This project can also be combined with other CIP projects along West Cliff Drive.	**$3,750,000**	$0	$750,000		$3,000,000
West Cliff Drive Stair Access Improvements (access #2, 4 and 7)	General/ partially funded	Adopted in the West Cliff Drive Public Works Plan, this project includes the design and construction replacing three coastal access stairwells (referenced in the Plan and associated studies as access points 2, 4 and 7). The project will likely be funded through General Funds.	**$450,000**	$150,000	$150,000	$150,000	
West Cliff Drive Stormwater Outfall Pipe Televising & Repair	gas tax/ partially funded	Adopted through the West Cliff Drive Public Works Plan, this project involves televising all West Cliff Drive Stormwater Outfalls and pipes, prioritizing those requiring replacement and replace primarily Corrugated Metal Pipe (CMP) storm drain pipe, which has a useful life of approximately 50 years. There are several of these storm drains corridor-wide where the pipe has corroded and collapsed, necessitating replacement with plastic pipe which has a longer useful life. Engineering and Operations staff identify the highest priority locations using the Plan as a guide. Project funding will come from PW stormwater maintenance and a combination of gas tax funds and federal and state grants to be pursued.	**$1,200,000**	$300,000	$300,000	$300,000	$300,000

Public Works Project	PW CIP Section	Description / Funding Sources	Total Project Budget Estimate	FY22 – FY24 Estimate	FY25 - FY27 Estimate	FY28- FY30 Estimate	FY 31 – FY 33 Estimate
Bethany Curve Restroom (general fund)	General /unfunded	Adopted in the West Cliff Drive Public Works Plan, this project involves the installation of a portable restroom with enclosure designed to blend into the surroundings at a site within the inland side of West Cliff Drive in the Bethany Curve open space. Funded through General Fund (currently unfunded).	**$100,000**	$15,000	$85,000	$0	$0
Coastal Sand Management Study	General/ unfunded	Adopted in the West Cliff Drive Public Works Plan, this project involves completing a study to evaluate the potential for using sand management techniques to replenish sand in downcoast beaches and identify next steps and funding streams for feasible options. This project is currently unfunded but it is anticipated that Prop 1 funding via OPC, Coastal Conservancy or another state agency will be pursued.	**$500,000**	$0	$500,000	$0	$0
			$18,800,000	**$3,415,000**	**$4,385,000**	**$5,800,000**	**$5,200,000**
			Total WCD PWP Budget Estimate	**FY22 – FY24 Estimate**	**FY25 - FY27 Estimate**	**FY28- FY30 Estimate**	**FY 31 – FY 33 Estimate**

APPENDICES

Appendix A1. Existing Conditions

Chapter 3 summarizes the key findings of the Existing Conditions and Future Vulnerability Assessment completed in November 2019 and references the following technical appendices included in the full document:

Appendix 1. Existing Coastal Armoring Inventory
Appendix 2. Coastal Armoring Engineering Findings
Appendix 3. History of Coastal Armoring (including permit information)
Appendix 4. Areas of Erosion Concern Inventory
Appendix 5. Transportation Counts
Appendix 6. Future Cliff Erosion Model Comparison
Appendix 7. Historical Erosion Rates Calculated from Aerial Photography

Appendix A2. Projections & Analysis of Future Conditions

There are two primary analytic sources for determining project climate change hazards along West Cliff Drive. The primary analytical source for projected bluff and cliff erosion on West Cliff Drive is the Existing Conditions and Future Vulnerability Assessment completed by Integral Consulting as part of the West Cliff Drive Adaptation and Management Plan project. Integral Consulting also prepared a Future Cliff Erosion Model Comparison Memo that compares available tools (including the ESA coastal climate hazard layers, USGS CosMos and localized estimation techniques).

A secondary analytic source for assessing coastal flooding impacts to Natural Bridges State Beach intersecting the west end of the corridor. Central Coast Wetlands Group (CCWG) conducted the complementary study to the West Cliff Drive Adaptation and Management Plan project evaluating sea level rise policies appropriate to support beach access and protection. CCWG referenced the 2017 coastal climate change vulnerability analysis conducted by CCWG for the City of Santa Cruz for the 2018 Climate Adaptation Plan Update. This analysis used the Coastal Resilience hazard model developed by Environmental Science Associates (ESA) and funded by the State Coastal Conservancy[4] to project the separate and combined spatial and temporal extent for rising tide, erosion and coastal storm flooding. An important limitation of the original ESA hazard layers is that they do not account for coastal armoring. To address this, CCWG modified the hazard layers to account for reductions in potential hazards provided by current coastal protection infrastructure. This refinement of this coastal hazard analysis helped to better understand the future risks Santa Cruz may face from each individual coastal hazard process.

West Cliff Projected Cliff Erosion Hazards

Accelerating Historical Erosion Rates Using Future Increases in King Tide Elevations.

Integral developed a tidal response model for the purposes of projecting future cliff erosion hazard areas along West Cliff Drive. The tidal response model, like CoSMoS and Coastal Resilience, is based on the theory that with future sea level rise, there will be greater duration of water levels impacting the coastal cliffs in the future than presently exists, thus future cliff erosion will be proportional to the amount of increase in the duration of water levels.

The model concept is that while future wave runup is uncertain, erosion typically is associated with higher tide water levels. The highest water levels of the year known as king tides or perigean tides, which occur when the moon and sun are in alignment and the earth's orbit and tilt are closest to the sun (typically in the late fall and winter). This causes the highest tides of the year in the winter when wave energy tends to be highest. The relative changes in the duration of high tide levels above a Year 2000 MLLW were used to accelerate the detailed historical erosion rates. MLLW was chosen as the tide range based on the geomorphic observation related to the formation of undercuts, sea caves and cavities that naturally form in the bedrock at the base of the bluff from abrasion by turbulent beach sediments and wave impact forces.

[4] The Coastal Resilience model developed by ESA in 2014 mapped hazard zones at various sea level rise scenarios for each of the individual coastal hazards (rising tides, coastal storm flooding, and coastal erosion). The Coastal Resilience hazard layers are available for viewing through the online mapping viewer at www.coastalresilience.org.

The tidal model identified the existing king tide elevation in feet MLLW from current tide data at the Monterey tide gauge and compared it to current common extreme beach scour levels along West Cliff Drive observed to be at an elevation of approximately 0 feet MLLW using the current 2018 MLLW tidal datum. Using the future sea level rise projections from OPC (2018), predictions of future king tides elevations, were added to the current 2018 MLLW tidal datum, and made for each decade between now and 2100. For each decade between now and 2100 the tidal response model uses the proportion of the vertical distance between:

1. Current extreme beach scour levels along West Cliff Drive (0.0 MLLW) and the current king tide level (+7.2 feet MLLW) using the 2018 MLLW datum
2. Current extreme beach scour levels along West Cliff Drive (0.0 MLLW) and the future king tide level for each decade until 2100 (sea level rise +6.9 feet) using the 2018 MLLW datum to be proportional to:
3. The historical coastal cliff erosion rate as measured in the time period between 1956 and 2018
4. Accelerated the future coastal cliff erosion rate for each decade until 2100

Finally, using the future coastal cliff erosion rate for each decade until 2100, each decade's accelerated erosion rate was multiplied by 10 years to yield a erosion cliff distance (top edge of 2018 cliff landward retreat distance) for each decade. Summing the distances for each decade allows the position of the edge of the cliff to be projected and mapped at the end of any decade between now and 2100. For the future vulnerability assessment, the City requested the use of 2030, 2060, and 2100 as the dates of future projected cliff erosion hazards. The results of this analysis are summarized in **Error! Reference s ource not found.**, and are depicted on the maps of West Cliff Drive shown as **Error! Reference source not found.** to **Error! Reference source not found.**.

Scenarios for Future Vulnerability Assessment

Sea Level Rise Scenarios are discussed in the Existing Conditions and Future Vulnerability assessment. The future vulnerability is reported for results for each time horizon and sea level rise projection. For comparison, linear projection of the existing coastal erosion rates is included along with the projections of the median and medium-high risk sea level rise scenarios. The discussion of the future vulnerability and maps of vulnerability focused on the medium-high risk aversion scenario in accordance with State guidance. These scenarios should provide the City with more confidence in the short and medium near-term adaptation approaches and necessary planning steps to implement this Plan.

Projected Cliff Erosion Hazard Distances from a 2018 Cliff Edge for Each of the Scenarios

Observed erosion distances from 1956 to 2018 used to develop the historical erosion rates shown for comparison.

Historical Erosion Rate 1956-2018 (inches/year)[5]	Zone 1	Zone 2	Zone 3	Zone 4
	1.1	3.8	2.7	0.7

Linear Extrapolation — Cliff erosion distances (feet)

Date	# of years	SLR (feet)	Zone 1	Zone 2	Zone 3	Zone 4
1956-2018	62	0.3	5.7	19.6	14.0	3.6
2018-2030	12	0.1	1.1	3.8	2.7	0.7
2030-2060	42	0.2	3.9	13.3	9.5	2.5
2060-2100	82	0.4	7.5	26.0	18.5	4.8

Median (50%) — Cliff erosion distances (feet)

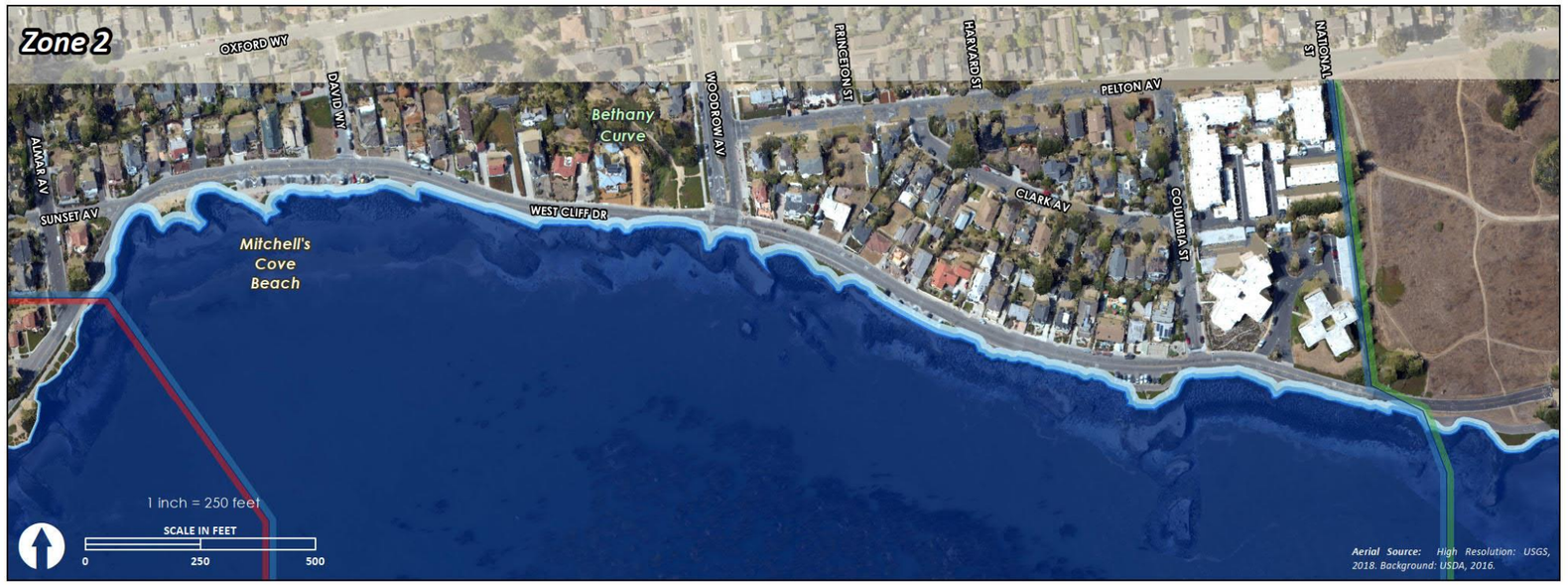
Date	# of years	SLR (feet)	Zone 1	Zone 2	Zone 3	Zone 4
1956-2018	62	0.3	5.7	19.6	14.0	3.6
2018-2030	12	0.4	1.2	4.0	2.9	0.7
2030-2060	42	1.0	4.2	14.6	10.4	2.7
2060-2100	82	2.3	8.8	30.4	21.6	5.6

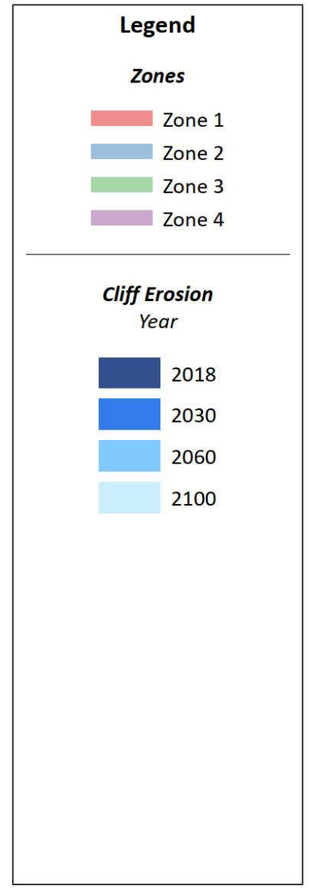
Medium High (0.5%) — Cliff erosion distances (feet)

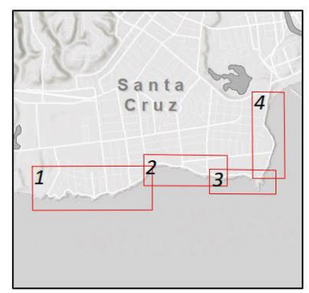
Date	# of years	SLR (feet)	Zone 1	Zone 2	Zone 3	Zone 4
1956-2018	62	0.3	5.7	19.6	14.0	3.6
2018-2030	12	0.8	1.2	4.2	3.0	0.8
2030-2060	42	2.6	4.7	16.2	11.5	3.0
2060-2100	82	6.9	10.9	37.8	26.8	7.0

Given the uncertainty, monitoring of the bluff edge position along West Cliff Drive for a minimum of the next 30 years, will enable validation the sea level rise projections and the coastal erosion projections of this or any other model. Aerial drone survey techniques with overlaid geo-rectified aerial photography may be useful in this regard. The City is working with USGS, NOAA, the County of Santa Cruz, and the Santa Cruz Harbor District to evaluate installing and maintain a tide gauge that digitally records sea level. This tide gauge can be used to verify actual measured future sea level rise amounts in relation to the continental mass that includes West Cliff Drive to determine the local relative sea level rise rates compared to elsewhere in California as well as global sea level rise.

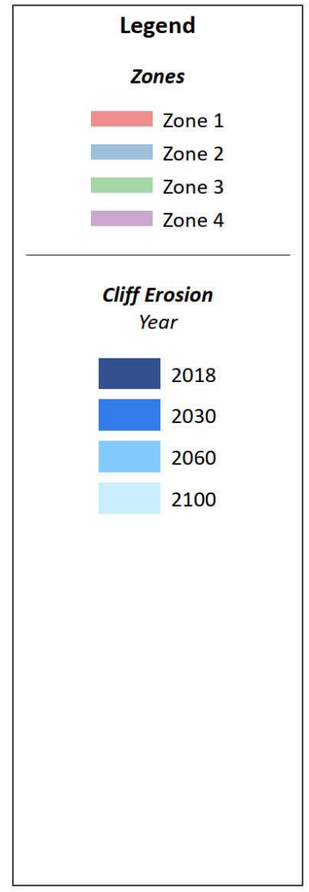
[5] Historical erosion rates reported in Table above in inches/year.

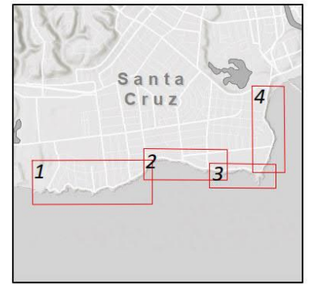




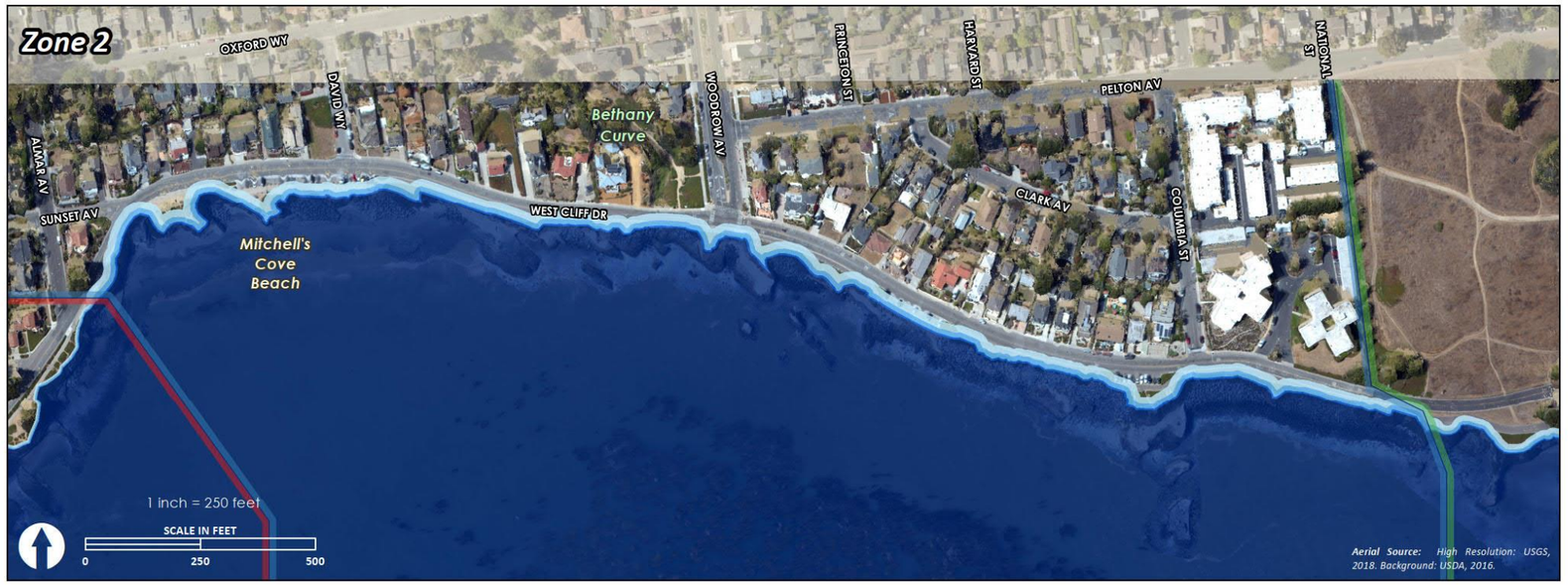


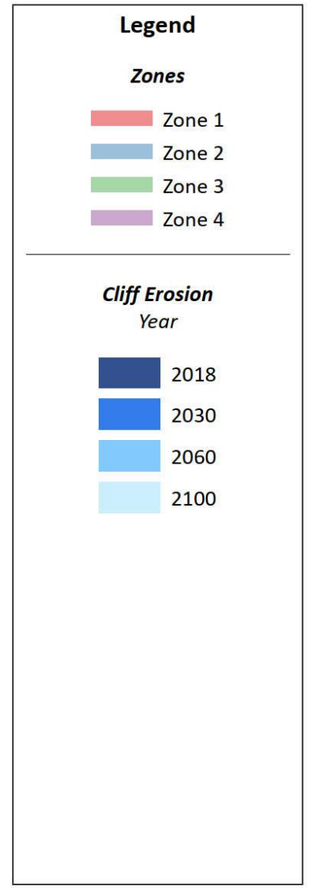
Projected linear cliff erosion hazards for Zones 1 & 2. Cliff erosion hazards, based on a year 2000 baseline, project that sea levels will rise by 0.1 feet in 2030, 0.2 feet in 2060, and 0.4 feet in 2100

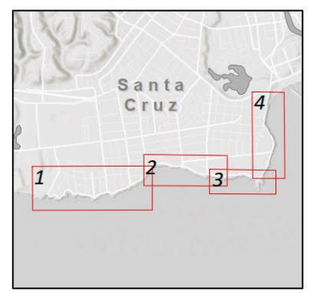




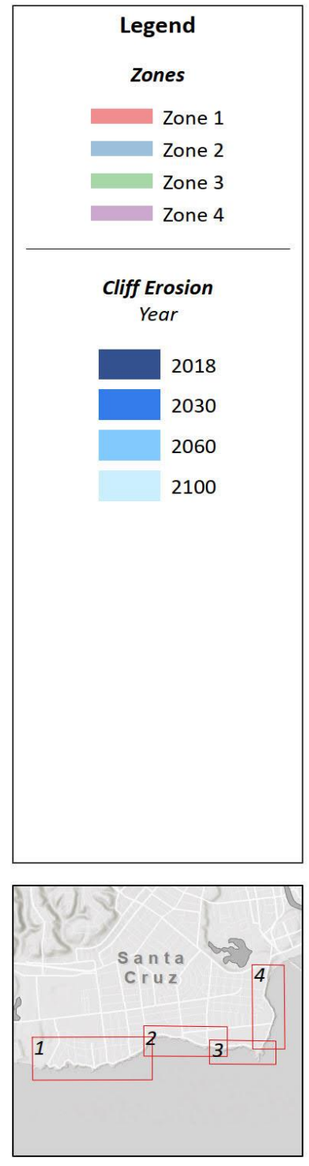
Projected linear cliff erosion hazards for Zones 3 & 4. Cliff erosion hazards, based on a year 2000 baseline, project that sea levels will rise by 0.1 feet in 2030, 0.2 feet in 2060, and 0.4 feet in 2100



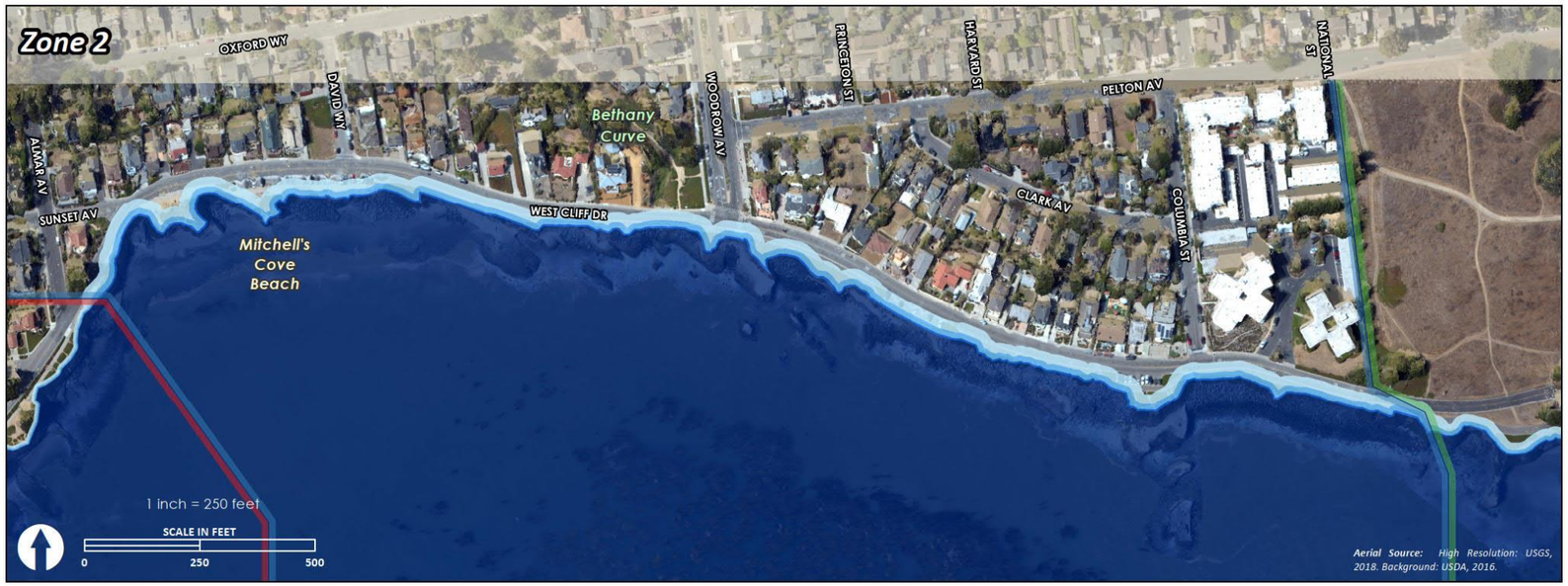


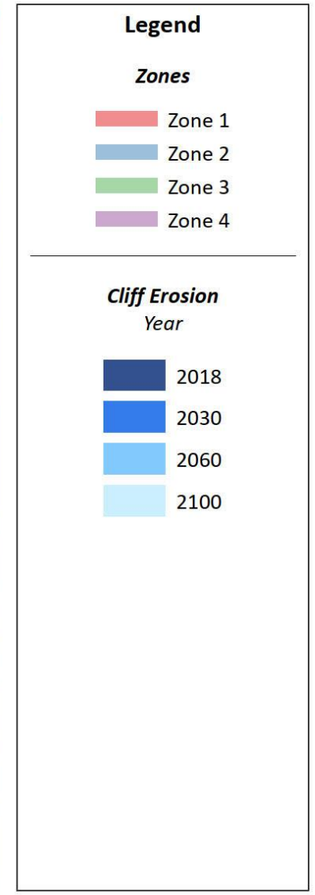


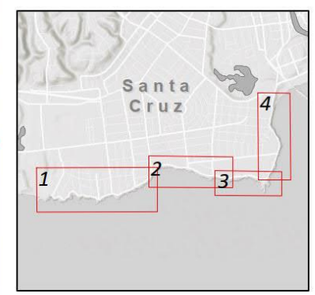
Projected median risk sea level rise (50% probability) cliff erosion hazards for Zones 1 & 2. Cliff erosion hazards, based on a year 2000 baseline, project that sea levels will rise by 0.4 feet in 2030, 1.0 feet in 2060, and 2.3 feet in 2100



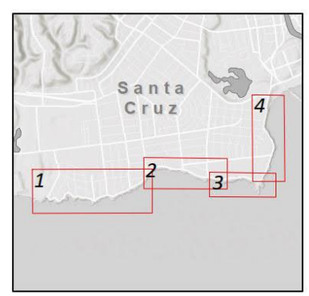
Projected median risk sea level rise (50% probability) cliff erosion hazards for Zones 3 & 4. Cliff erosion hazards, based on a year 2000 baseline, project that sea levels will rise by 0.4 feet in 2030, 1.0 feet in 2060, and 2.3 feet in 2100







Projected medium-high risk sea level rise (0.5% probability) cliff erosion hazards for Zones 1 & 2. Cliff erosion hazards, based on a year 2000 baseline, project that sea levels will rise by 0.8 feet in 2030, 2.6 feet in 2060, and 6.9 feet in 2100



Projected medium-high risk sea level rise (0.5% probability) cliff erosion hazards for Zones 3 & 4. Cliff erosion hazards, based on a year 2000 baseline, project that sea levels will rise by0.8 feet in 2030, 2.6 feet in 2060, and 6.9 feet in 2100

Coastal Climate Change Hazards and Projected Impacts at Beaches

The 2018 Climate Adaptation Plan Update's sea level rise vulnerability analysis evaluates the impacts of each individual coastal climate change hazard process (rising tides, coastal storm flooding, and erosion) for time horizons 2010 (existing), 2030 (.3ft SLR), 2060 (2.4 ft SLR), and 2100 (5.2 ft SLR) on beach resources, specifically Natural Bridges. Definitions of each of these hazards are discussed below. More information about the method used and the 2017 SLR assessment can be found in the City of Santa Cruz 2018 Climate Adaptation Plan Update.

Rising Tides

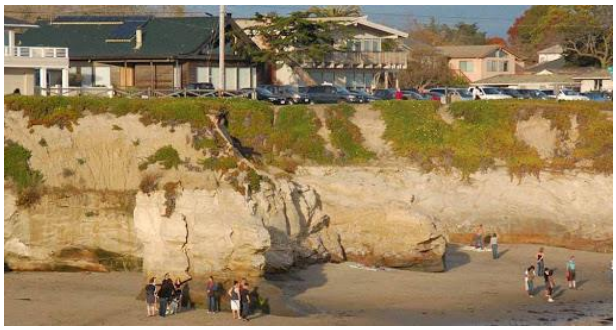
These hazard zones show the area and depth of inundation caused simply by rising tides and ground water levels (not considering storms, erosion, or river discharge). The water level mapped in these inundation areas is the Extreme Monthly High Water (EMHW) level, which is the high water level reached approximately once a month.

Coastal Storm Flooding

The coastal storm flooding hazard zones depict the projected flooding caused by future coastal storms. The processes that drive these hazards include (1) storm surge (a rise in the ocean water level caused by waves and pressure changes during a storm), (2) wave overtopping (waves running up over the beach and flowing into low-lying areas, calculated using the maximum historical wave conditions), and (3) additional flooding caused when rising sea level exacerbate storm surge and wave overtopping. These hazard zones also take into account areas that are projected to erode, sometimes leading to additional flooding through new hydraulic connections between the ocean and low-lying areas.

Coastal Erosion

The coastal erosion hazard layers represent future cliff and dune (sandy beach) erosion hazard zones, incorporating site-specific historic trends in erosion, additional erosion caused by accelerating sea level rise and (in the case of the storm erosion hazard zones) the potential erosion impact of a large storm wave event. The inland extent of the



hazard zones represents projections of the future crest of the dunes, or future potential cliff edge, for a given sea level rise scenario and planning horizon. The extents of these hazard zones were modified by CCWG to take into account existing coastal armoring through the year 2030.

Natural Bridges State Beach Projected Coastal Hazards

The projected coastal hazard zones for Natural Bridges Beach for rising tides, coastal storm flooding, and bluff erosion can be found in ,
, and **Error! Reference source not found.** below. Natural Bridges State Beach is owned and operated by California Department of State Parks, a key stakeholder in the project. Any projects involving the intersection of West Cliff Drive with the Park will require close coordination with State Parks.

- Coastal Flooding (CF): By 2030 all of the beach is projected to be inundated during large storm events
- Rising Tides (RT): By 2030 beach width may be reduced by 10%, by 2100 the beach width may be reduced by 30-50%.
- Bluff Erosion (ER): Erosion is projected to impact coastal access ways and habitat areas as early as 2030.

A summary of assets that are projected to be impacted by future coastal hazards is shown in **Error! Reference source not found.**.

Natural Bridges State Beach is a large beach area at the west end of the City that provides beach access to many residents and visitors. The eastern bluff and adjacent parking and access road are vulnerable to coastal erosion and sea level rise is projected to flood large portions of the beach. Back bluff erosion may lead to loss of parking and picnic areas and may impact coastal habitat areas including Moore Creek lagoon.

Assets projected to be impacted by coastal hazards at Natural Bridges Beach.

Severity characterized as Low-short term impacts with minimal rebuild required, Moderate-some infrastructure replacement required, High- significant impact to infrastructure requiring significant replacement.

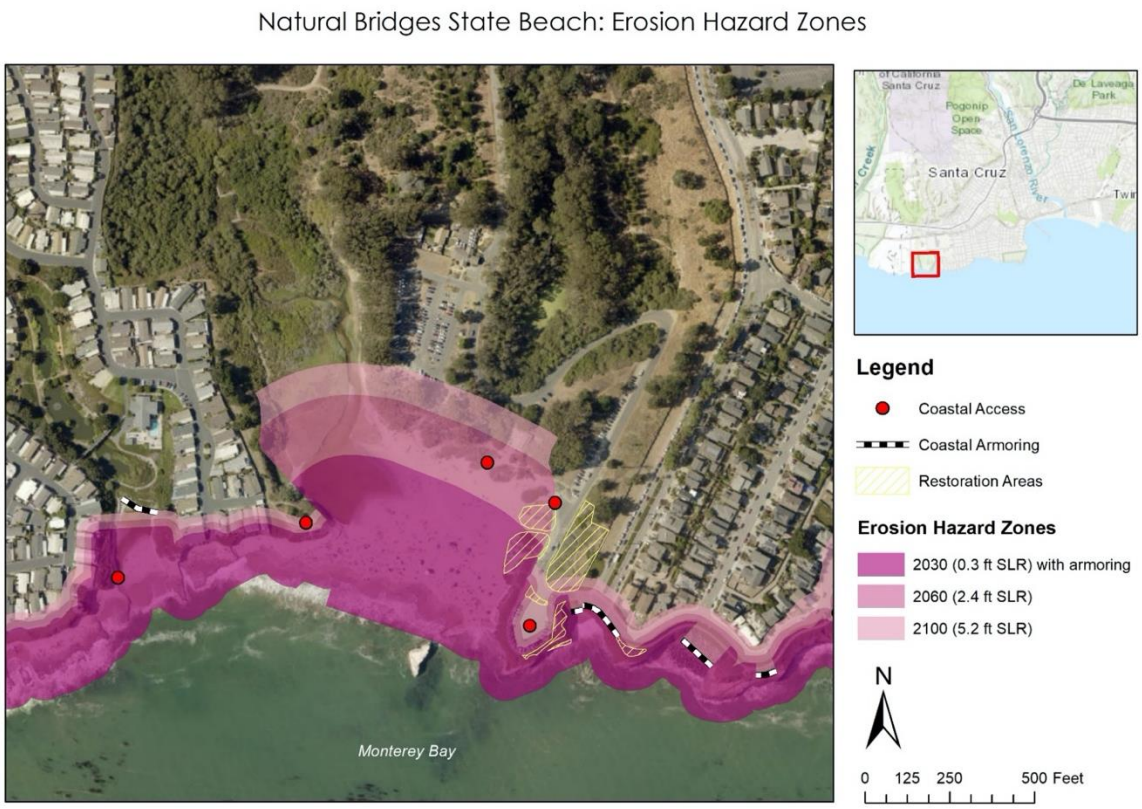
Asset	Hazard	Time horizon	Severity
Access Driveway	CF ER	2030 2060	Moderate Severe
Habitat: Intertidal	CF ER	2030 2030	Moderate Moderate
Habitat: Lagoon	CF ER RT	2030 2060 2060	Low Moderate Severe
Habitat: Nesting bird	ER	2030	Moderate

Natural Bridges State Beach: Rising Tides Hazard Zones

Rising tides hazard zones at Natural Bridges Beach for time horizons 2030 (.3 ft SLR), 2060 (2.4 ft SLR), and 2100 (5.2 ft SLR).

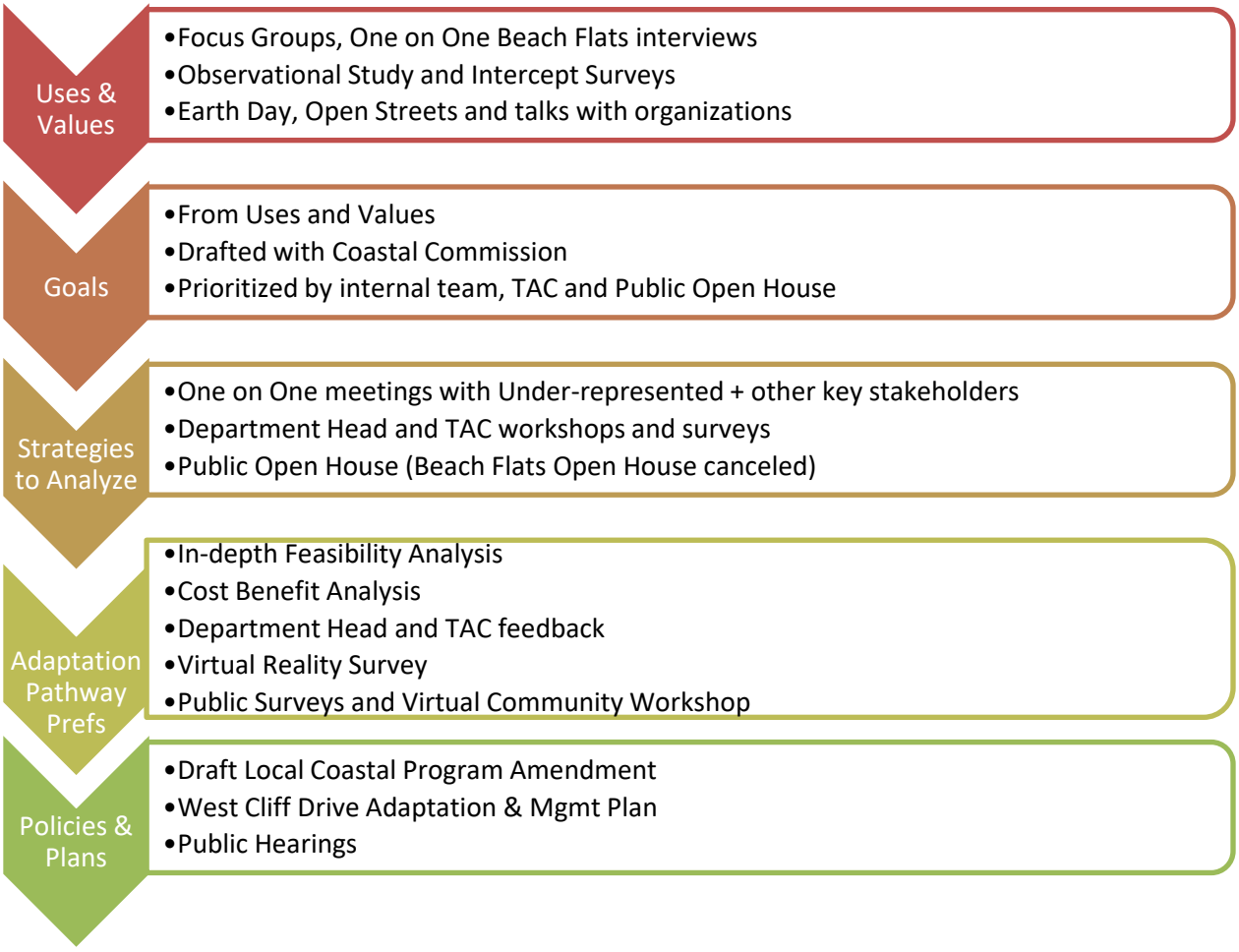
Natural Bridges State Beach: Coastal Storm Flooding Hazard Zones

Coastal storm flooding hazard zones at Natural Bridges Beach for time horizons 2030 (.3 ft SLR), 2060 (2.4 ft SLR), and 2100 (5.2 ft SLR).



Coastal erosion hazard zones at Natural Bridges Beach for time horizons 2030 (.3 ft SLR), 2060 (2.4 ft SLR), and 2100 (5.2 ft SLR). Existing armoring is accounted for (restricting erosion) through 2030 but assumed to fail to restrict erosion past that time horizon.

Appendix A3. Coastal Adaptation Pathways Determination Process



The full Adaptation Alternatives Analysis process and findings developed for the West Cliff Drive Adaptation and Management Plan project is available at the project website. The full Synthesis Summary of Outreach and Engagement for the project and the complementary LCP Amendment project are available at the project website. This appendix excerpts sections from both documents.

A3.1. Determining Adaptations to Analyze and Cost Benefit Analysis

Over the short term, priorities were determined based on the existing conditions report, which included mapped areas of erosion concern, coastal structures with less than a 10-year lifespan based on engineering evaluation, and areas identified as High Risk (short term erosion likely to impact West Cliff Drive or the Recreational Trail). To reduce uncertainties and evaluate adaptation strategies in enough detail to support the development of a West Cliff Drive Adaptation and Management Plan, a prioritized subset of feasible adaptation strategies over time for each of the West Cliff Drive zones was required.

Longer term, adaptation priorities for further analysis based on projections of future coastal erosion, community priorities and regulatory requirements to maintain coastal recreation and resources along the West Cliff Drive corridor were also required.

An extensive outreach and engagement effort was conducted in late 2019 and early 2020, targeting various focus groups, TAC, City leadership, historically underrepresented groups, and the community at large. This process prioritized key objectives, evaluation criteria and ultimately provided a community focused list of up to three short and long term coastal and transportation adaptation alternatives for each West Cliff Drive zone. Both short term (<10 years) and longer term preferred adaption strategies were identified that will be considered in future conceptual design and cost–benefit analysis tasks. Results from these future tasks will support the completion of the West Cliff Drive Adaptation and Management Plan and identify monitoring triggers to support development of adaptation pathways.

A social vulnerability assessment completed as part of related ongoing coastal management and climate change studies, has identified specific shortcomings in existing facilities and amenities used by historically underrepresented groups for each of the zones found along West Cliff Drive (Table 3-7). Zone 3 provides the best suite of amenities to all historically underrepresented groups. Shortcomings in existing amenities should be considered in development of preferred adaptation strategies for all zones, but particularly those that don't currently provide a good level of access to all groups.

Overall level of service and access to underrepresented community populations by Zone (adapted from City of Santa Cruz Social Vulnerability Assessment 2020).

Underrepresented Group	Zone 1	Zone 2	Zone 3	Zone 4
Elderly				
Youth				
People with Disabilities				
Low Income residents				
Tribal				
Homeless				
LGBTQ+				
Fishers				

Level of Service Provided to Group

High | Moderate | Low

The following sections identify prioritized coastal and transportation adaptation alternatives for the short and long term in each zone along West Cliff Drive for future analysis as indicated by various stakeholder groups. A fuller summary of the stakeholder engagement process and

outcomes are summarized at the Engagement Synthesis document completed for the complementary beaches focused project.

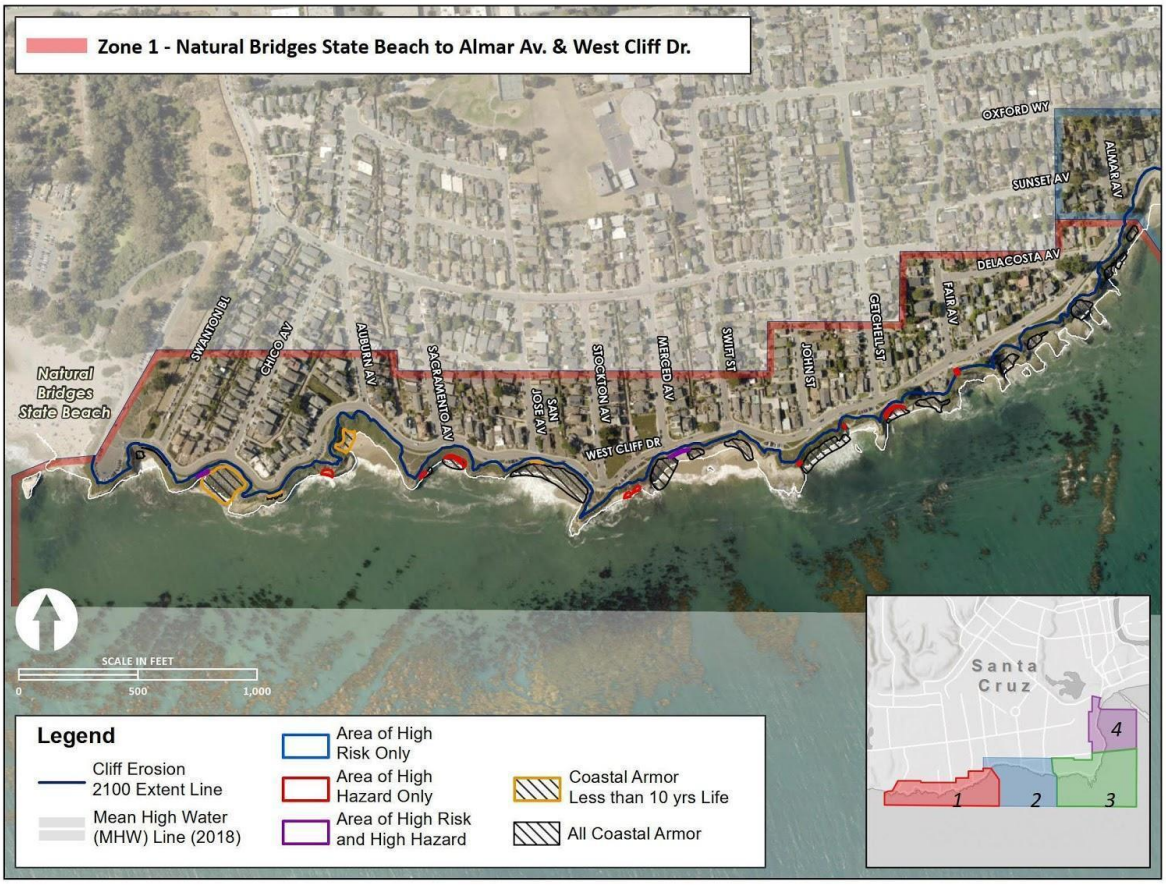
Zone 1—Natural Bridges Overlook to Almar Avenue

Through the TAC and City department head process priorities were determined for short term coastal and transportation preferences and long term coastal adaptation and transportation preferences . The preferences in the short term included restoration of the perched wetland near Auburn Avenue; repair, replacement, and addition of revetments; and sand placement on pyramid beach. The preferences for long term coastal adaptation included managed retreat, construction of soil nail walls, and restoration of the perched wetland at Auburn Avenue.

These various strategies were presented at a community open house along with supporting materials such as maps and diagrams, and community members were encouraged to engage in dialogue with members of the team, city department heads, and other members of the public, many of whom reside along or within a few blocks of West Cliff Drive. Following these interactions, members of the public were asked to prioritize their preferred adaptation alternatives for both the short term and long term.

Based on those survey responses, the most highly prioritized short term coastal adaptation strategy was to maintain revetments, with more than 60 percent of respondents choosing this option, and the most highly prioritized long term coastal adaptation strategy was managed retreat, with close to 50 percent choosing this option. The most highly prioritized short and long term transportation adaptation priority was identified as converting West Cliff Drive to one-way traffic while maintaining the recreation trail, with close to 50 percent choosing this option over both the short and long terms. Over the long term, the community placed a high priority on maintaining the Recreation Trail for this section, with one-third of respondents identifying relocating traffic in order to keep the Recreation Trail as a priority. This left

approximately 18 percent of respondents prioritizing vehicular traffic over the trail.



Priority areas for adaptation and management in Zone 1.

Longer term, projections of future coastal erosion, as well as already mapped areas of erosion concern are likely to cause additional disruption to the West Cliff Drive corridor. In addition, impacts associated with previously made adaptation decisions about protecting with revetments will degrade coastal access, beach recreation, and surf recreation. Based on community input, TAC guidance, and City leadership priorities, short to long term adaptation for the coast and transportation corridor are identified in the table below.

Prioritized short term and long term adaptation approaches for detailed conceptual design and cost benefit analysis in Zone 1

Zone 1	Cost		Effectiveness Certainty	Secondary Impacts			Lifespan
	Upfront	*Maintenance*		*Beach, Coastal*	*Rec Trail*	*Road*	
Short term adaptation							
Maintain or upgrade revetments	$$	$	High	-	=	=	Medium
Sand placement program Pyramid Beach	$	$	Low	+	?	?	Short
Seawalls on cliffs providing lateral access	$$$	$	High	-	-	=	Medium
Short term transportation							
Maintain two-way with Rec Trail - Elevate	$$$	$	Low	-	-	=	Short
One-way with Rec Trail	$$	$	High	+	+	-	Medium
Relocate traffic keep Rec Trail	$$$	$	High	+	+	-	Long
Long term adaptation							
Soil nail wall	$$$		High	-	=	=	Medium
Managed Retreat	$	$	High	+	=	-	Long
Sand placement on Pyramid Beach	$	$	Low	+	?	?	Short
Long term transportation							
Maintain two-way	$$$	$$$	Low	-	-	=	Short
One-way with Rec Trail	$	$	High	+	+	-	Medium
Relocate traffic keep Rec Trail	$	$	High	+	+	-	Long

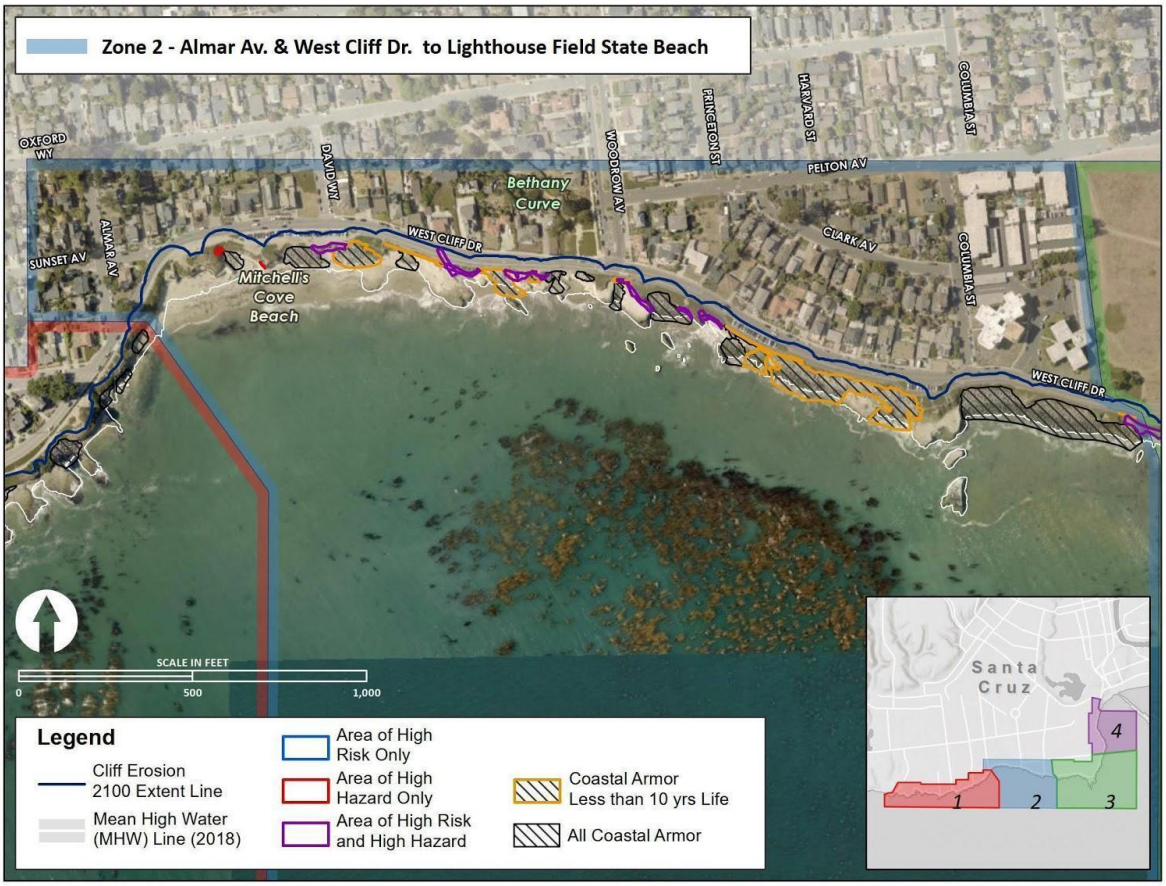
Upfront Cost: relative construction cost ($$$ = High, $$ = Medium, $=Low)
Maintenance Cost: relative cost associated with the lifespan of the project ($$$ = High, $$ = Medium, $=Low)
Certainty of Success: certainty that measure will function as intended for its projected lifespan (High, Medium, Low)
Secondary Impacts: consequences associated with the adaptation that could affect the beach or coastal resources, coastal access, or parking and roads. Plus (+) refers to an improvement from existing conditions, Minus (-) refers to a deterioration from existing conditions, Equal (=) refers to a similar to existing condition
Lifespan: relative length of time the adaptation strategy functions (Short is <10 years, Medium is up to 30 years, and Long is 30+ years)

Zone 2—Almar Avenue to Lighthouse Field State Beach

Through the TAC and City department head process priorities were determined for short term coastal and transportation preferences, and long term coastal adaptation and transportation

preferences. The preferences in the short term included cave fills, sand nourishment, groin construction, and habitat restoration. The preferences for long term coastal adaptation included retreating West Cliff Drive to one way or partial one way, elevating the bridge over Bethany Curve, construction of soil nail walls, and habitat restoration. These various strategies were presented at a community open house, and members of the public were asked to prioritize their preferred adaptation alternatives for both the short term and long term .

Community workshop priority adaptation responses for Zone 2 resembled those of Zone 1, with the highest priority short term coastal adaptation strategy placed on maintaining revetments, with 40 percent choosing this option, and in the long term, managed retreat, with close to 60 percent choosing this option The most highly prioritized short and long term transportation priority was identified as converting West Cliff Drive to one-way traffic while maintaining the recreation trail, with 55 percent choosing this option in the short term, and 45 percent choosing this for the long term. Similar to other zones, over the long term the community placed an extremely high priority on maintaining the recreation trail for this section, with 40 percent of respondents identifying relocating traffic in order to keep the recreation trail as a priority. This left approximately 15 percent of respondents prioritizing vehicular traffic over the trail.



Priority areas for adaptation and management in Zone 2.

Longer term, projections of future coastal erosion, as well as existing mapped areas of erosion concern are likely to cause multiple disruptions to the West Cliff Drive corridor. In addition, erosion impacts could affect a critical wastewater pump station, as well as a low lying bridge near Woodrow Avenue at the mouth of the Bethany Curve Creek, which follows the alignment of the Ben Lomond Fault. This area already experiences substantial wave overtopping during high wave/high tide events, not currently documented by the City.

Continuing impacts associated with prior management decisions to protect with revetments will degrade coastal access, beach recreation, and surf recreation. Based on community input, TAC guidance, and City leadership priorities and all the other technical work, short and long term adaptation for the coast and transportation corridor are identified in the table below.

Prioritized short term and long term adaptation approaches for detailed conceptual design and cost benefit analysis in Zone 2

Zone 2	Cost		Certainty	Secondary Impacts			Lifespan
	Upfront	*Maintenance*		*Beach, Coastal*	*Rec Trail*	*Road*	
Short term adaptation							
Cave fill + Soil Nail Wall	$$$+	?	High	-	=	=	Medium
Sand management	$	$	Low	+	?	?	Short
Maintain revetments	$$	$	Medium	-	=	=	Medium
Short term transportation							
Maintain two-way	$	$$$	Low	-	-	=	Short
One way with Rec Trail	$$	$	High	+	+	-	Medium
Relocate traffic keep Rec Trail	$$$	$	High	+	+	-	Long
Long term adaptation							
Sand management	$	$	Low	+	?	=	Short
Groin	$$$	$	Medium	+	?	-	Medium
Managed Retreat	$	$	High	+	-	-	Long
Long term transportation							
Maintain two-way	$$$	$$$	Low	-	-	=	Short
One-way with Rec Trail	$	$	Medium	+	+	-	Medium
Relocate traffic keep Rec Trail	$	$	High	+	+	-	Long

Upfront Cost: relative construction cost ($$$ = High, $$ = Medium, $=Low)
Maintenance Cost: relative cost associated with the lifespan of the project ($$$ = High, $$ = Medium, $=Low)
Certainty of Success: certainty that measure will function as intended for its projected lifespan (High, Medium, Low)
Secondary Impacts: consequences associated with the adaptation that could affect the beach or coastal resources, coastal access, or parking and roads. Plus (+) refers to an improvement from existing conditions, Minus (-) refers to a deterioration from existing conditions, Equal (=) refers to a similar to existing condition
Lifespan: relative length of time the adaptation strategy functions (Short is <10 years, Medium is up to 30 years, and Long is 30+ years)

Zone 3—Lighthouse State Beach to Pelton Avenue at the Surfer Statue

Through the TAC and City department head process, priorities were determined for short term coastal and transportation preferences and long term coastal adaptation and transportation preferences. The preferences in the short term included a one-way road restriction along West Cliff Drive and to retreat the lighthouse inland or to the historical location at Lighthouse Field. The preferences for long term coastal adaptation included to retreat West Cliff Drive into Lighthouse Field or merge into Pelton Avenue and maintain bike and pedestrian access along

coast, move parking from the ocean side of West Cliff Drive at lighthouse point to the other side of road, and retreat the lighthouse further inland.

These various strategies were presented at a community open house, and members of the public were asked to prioritize their preferred adaptation alternatives for both the short term and long term. This non-residential zone varied from the other three zones as a short term preference was placed on managed retreat rather than maintaining revetments. The most highly prioritized short and long term coastal adaptation strategy was managed retreat, with more than 45 percent prioritizing this option in the short term, and more than 80 percent prioritizing this in the long term. This represents a 20–30 percent higher favorability towards managed retreat in the long term over other zones .The most highly prioritized short and long term transportation priority was identified as converting West Cliff Drive to one-way traffic while maintaining the recreation trail, with close to 60 percent choosing this option in the short term, and more than 50 percent choosing this for the long term. Similar to other zones, over the long term, the community placed an extremely high priority on maintaining the recreation trail for this section, with 35 percent of respondents identifying relocating traffic in order to keep the Recreation Trail as a priority. This left approximately 12 percent of respondents prioritizing vehicular traffic over the trail. This zone represents the area with the highest community priority placed on managed retreat strategies and maintaining the recreation trail over vehicular traffic.

Priority areas for adaptation and management in Zone 3.

Longer term, projections of future coastal erosion as well as already mapped areas of erosion concern are likely to cause multiple disruptions to the West Cliff Drive corridor including loss of public parking. In addition, erosion impacts could affect a cultural landmark in the Mark Abbott Memorial Lighthouse.

Continuing impacts associated with protecting with revetments are likely to impact and potentially destroy the world famous surf spot known as Steamer Lane. Based on community input, TAC guidance, and City leadership priorities, and the technical work, short and long term adaptation for the coast and transportation corridor are identified in the table below.

Prioritized short term and long term adaptation approaches for detailed conceptual design and cost benefit analysis in Zone 3

Zone 3	Cost		Certainty	Secondary Impacts			Lifespan
	Upfront	*Maintenance*		*Beach, Coastal*	*Rec Trail*	*Road*	
Short term adaptation							
Cave fill	$$$+	?	High	-	=	=	Medium
Maintain revetments	$$	$	Medium	-	=	=	Medium
Managed Retreat	$	$	High	+	+	-	Long
Short term transportation							
Maintain two-way	$	$$$	Low	-	-	=	Short
One way with Rec Trail	$$	$	High	+	+	-	Medium
Relocate traffic keep Rec Trail	$$$	$	High	+	+	-	Long
Long term adaptation							
Managed Retreat	$	$	High	+	+	-	Long
Long term transportation							
Maintain two-way	$$$	$$$	Low	-	-	=	Short
One way with Rec Trail	$$	$	Medium	+	+	-	Medium
Relocate traffic keep Rec Trail	$$	$	High	+	+	-	Long

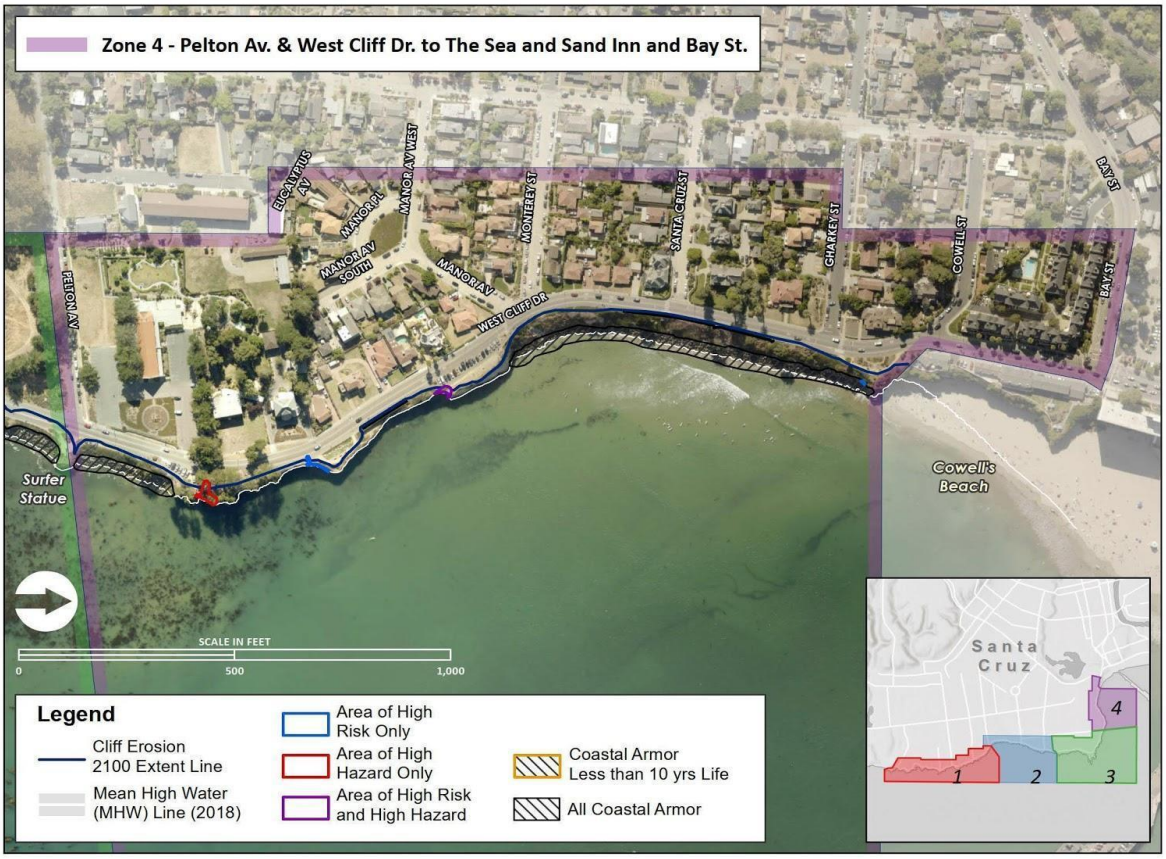
Upfront Cost: relative construction cost ($$$ = High, $$ = Medium, $=Low)
Maintenance Cost: relative cost associated with the lifespan of the project ($$$ = High, $$ = Medium, $=Low)
Certainty of Success: certainty that measure will function as intended for its projected lifespan (High, Medium, Low)
Secondary Impacts: consequences associated with the adaptation that could affect the beach or coastal resources, coastal access, or parking and roads. Plus (+) refers to an improvement from existing conditions, Minus (-) refers to a deterioration from existing conditions, Equal (=) refers to a similar to existing condition
Lifespan: relative length of time the adaptation strategy functions (Short is <10 years, Medium is up to 30 years, and Long is 30+ years)

Zone 4—Pelton Avenue and the Surfer Statue to Bay Avenue

Zone 4 of West Cliff Drive contains three different coastal armoring structures and four areas of erosion concern. Within the short term of the next 10 years, three areas of erosion concern were identified as high risk so when erosion does occur, it will likely impact the Recreational Trail, parking and/or West Cliff Drive. These locations are all associated with sea caves, with only one of them identified as a high hazard likely to fail in the short term. Presently, none of these coastal armoring structures are projected to fail nor require attention. This area however does have the highest traffic and Recreational Trail usage of the West Cliff Drive Corridor.

Through the TAC and City department head process priorities were determined for short term coastal and transportation preferences and long term coastal adaptation and transportation preferences. The preferences in the short term included cave fills and to repair, replace, and add revetments. The preferences for long term coastal adaptation included to retreat West Cliff Drive and convert to one-way to prioritize the bike and pedestrian travel, and sea wall armoring strategies such as soil nail walls.

These various strategies were presented at a community open house, and members of the public were asked to prioritize their preferred adaptation alternatives for both the short term and long term. The most highly prioritized short term coastal adaptation strategy was to maintain revetments, with close to 50 percent choosing this option, and the most highly prioritized long term coastal adaptation strategy was managed retreat, with 55 percent choosing this option Construction of soil nail walls was also a high priority in the long term, with the remaining 45% of respondents choosing this option The most highly prioritized short and long term transportation adaptation priority was identified as converting West Cliff Drive to one-way traffic while maintaining the recreation trail, with 55 percent choosing this option in the short term, and 40 percent choosing this in the long term Similar to all other zones, over the long term the community placed an extremely high priority on maintaining the recreation trail for this section, with 40 percent of respondents identifying relocating traffic in order to keep the recreation trail as a priority. This left approximately 15 percent of respondents prioritizing vehicular traffic over the trail.



Priority areas for adaptation and management in Zone 4.

Longer term, projections of future coastal erosion, as well as already mapped areas of erosion concern are likely to cause multiple disruptions to the West Cliff Drive corridor including loss of public parking.

Continuing impacts associated with previously made adaptation decisions about protecting with revetments are likely to impact beach recreation and potentially degrade one of the key beginner surf spots, due to increased interaction of waves with the existing revetments at Cowells. Based on community input, TAC guidance, and City leadership priorities, short and long term adaptation for the coast and transportation corridor are identified the table below.

Prioritized short term and long term adaptation approaches for detailed conceptual design and cost benefit analysis in Zone 4

Zone 4	Cost		Certainty	Secondary Impacts			Lifespan
	Upfront	*Maintenance*		*Beach, Coastal*	*Rec Trail*	*Road*	
Short term adaptation							
Cave Fill	$$$+	?	High	-	=	=	Medium
Maintain revetments	$$	$	Medium	-	=	=	Medium
Soil Nail Walls	$$$	?	High	-	=	=	Medium
Short term transportation							
Maintain two-way	$	$$$	Low	-	-	=	Short
One way with Rec Trail	$$	$	High	+	+	-	Medium
Relocate traffic keep Rec Trail	$$$	$	High	+	+	-	Long
Long term adaptation							
Soil Nail Walls	$$$	?	Medium	-	=	=	Medium
Managed Retreat	$	$	High	+	+	-	Long
Long term transportation							
Maintain two-way	$$$	$$$	Low	-	-	=	Short
One-way with Rec Trail	$$	$	Medium	+	+	-	Medium
Relocate traffic keep Rec Trail	$	$	High	+	+	-	Long

Upfront Cost: relative construction cost ($$$ = High, $$ = Medium, $=Low)
Maintenance Cost: relative cost associated with the lifespan of the project ($$$ = High, $$ = Medium, $=Low)
Certainty of Success: certainty that measure will function as intended for its projected lifespan (High, Medium, Low)
Secondary Impacts: consequences associated with the adaptation that could affect the beach or coastal resources, coastal access, or parking and roads. Plus (+) refers to an improvement from existing conditions, Minus (-) refers to a deterioration from existing conditions, Equal (=) refers to a similar to existing condition
Lifespan: relative length of time the adaptation strategy functions (Short is <10 years, Medium is up to 30 years, and Long is 30+ years)

A3.2. West Cliff Drive Benefit Cost Analysis

The purpose of the benefit cost analysis was to compare the economic benefits and costs of choosing to adopt coastal adaptation strategies aimed at managing coastal erosion and sea level rise to the benefits and costs of a future in which the City continues with a business as usual practice of responding to erosion in an emergency response mode. The benefit cost analysis is designed to help decide *whether* to adapt and if so, *the best way* to adapt. Economically worthwhile projects have benefits greater than costs, considering the differences in timing of spending and receipt of benefits and the uncertainties surrounding the extent and rate of sea level rise. The measure used is the *net present value.* Four different adaptation strategies were selected for analysis based on community input and grant funder requirements.

- Business -as-Usual - No actions are taken beyond routine maintenance and irregular emergency repairs. This strategy represents current conditions and practices and its benefits and costs are the base case to which the other adaptation strategies are compared.
- Managed Retreat - Existing armoring structures are removed thus restoring natural erosion and shoreline processes. Recreational Trail and West Cliff Drive realign in response to erosion.
- Recreation Focused Strategy - A combination of sand management, reduction in coastal armoring footprints through upgraded armoring from revetments to vertical seawall/soil nail walls and sand retention structures along with structural adaptation such as bluff top seawalls with terrace access and cave fills in high hazard areas.
- Protection Focused Strategy - Projects that focus on erosion prevention of the cliffs such as expanding existing revetments, construction of new seawalls, filling of sea caves, and construction of artificial bedrock.

Key inputs and assumptions

- Costs were defined as expenditures (construction and maintenance costs). Benefits are defined as gains in the economic value to users of West Cliff Drive for recreation – Recreational Trail, beach and surfing primarily. These values were measured from a willingness to pay survey of over 900 visitors to West Cliff Drive in 2019 and 2020. The analysis used a Monte Carlo technique that calculates both the benefits and costs of adaptation approaches based on triggering actions at specific changes in sea levels as well as the probability of success. Three sea level rise scenarios were examined representing a short, medium, and long term. These sea level rise trigger scenarios are based on current State guidance and analyze the full range of potential sea level rise scenarios to identify future probabilities of adaptation success.
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Key Findings from the Analysis

- The City must decide whether to spend less on adaptation every year (totaling more in the long-term) on a business as usual approach (emergency responses to protect West Cliff Drive) and lose the coastal recreation, or does the City invest more sooner (totaling less over time) to improve recreation and maintain this higher value farther into the future. This crucial community decision will determine how the City approaches creating a funding plan to implement this vision.
- The Recreation Focused Strategy is the economically optimal strategy that combines adaptive actions that provide erosion protection to the shoreline with enhancements to surf and shoreline recreational use. This strategy has the highest net present value and the greatest probability of having positive net benefits across all possible sea levels.
- The business as usual approach is the most expensive adaptation strategy. Investing in any other adaptation strategy saves money and West Cliff Drive resources in the future.

There is almost no chance that the business as usual approach will yield a positive net present value compared with any of the other adaptation options in the future.

- All adaptation strategies have higher positive net present values if investments are made before sea levels have increased by about two feet, most likely to occur around 2050.
- Managed retreat has a positive net present value if undertaken soon but the values diminish to negative if delayed too long.
- The timing of investment decisions to implement adaptation strategies is critical when calculating future net present values because sooner adaptation implementation invests quickly in long-term coastal resiliency and limits costly investments over time in emergency response business as usual actions.

A3.3. Adaptation Pathway Preferences for Policies and Projects

The Team identified adaptation pathway preferences from prior engagement, an in-depth feasibility analysis and, and meetings and workshops with Department Heads, the TAC and key stakeholders. At this stage of the initiative, the community was engaged through Online Storymaps and Community Surveys as well as with a virtual reality application available at the City's library, online and via mobile devices.

In late summer 2020, the City developed a series of eight informational ArcGIS "storymaps" based on four shoreline zones. The storymaps were intended to inform the community on the coastal vulnerabilities and gain further feedback on feasible adaptation pathways and strategies for West Cliff Drive and four adjacent beaches, including Natural Bridges State Beach, Main & Cowell Beaches, and Seabright State Beach. There was an additional storymap on West Cliff Drive Transportation strategies. Each storymap included an integrated survey for community members to express their views on the adaptation pathways and provide additional input. The storymaps and surveys were developed in English and Spanish, and advertised through the City's social media accounts, website, newsletters, and flyers. There were over 1,000 ArcGIS views of the storymaps and approximately 395 survey responses.

Each "storymap" is an overview of the coastal vulnerabilities and feedback mechanism for the feasible adaptation pathways for seven coastal locations in Santa Cruz and one is on the Transportation strategies for West Cliff Drive. Community members were asked to read through each storymap that provided details of the existing conditions, a glossary of terms, an overview of the feasible adaptation pathways. Adaptation pathways are strategies that will help alleviate degradation issues associated with Santa Cruz's coast. Adaptation pathways were developed, for short-term, midterm, and long-term action that, if implemented, will build coastal resilience.

Each storymap included a brief survey to gather community input about the adaptation pathways for each coastal section. The survey asked respondents to identify where they lived in the community, to rank their top considerations for adaptation for each coastal section, and to

indicate their preferred “adaptation pathways” (defined earlier in this document) through star rating on a 5-star scale (a higher number of stars indicated a greater level of agreement) or by picking between options if more than one adaptation option existed. Survey respondents could also share additional comments and feedback at the end of the survey.

Through these visualizations, respondents were able to obtain information about the timeline of the pathway, the triggers to initiate a strategy, the strategy itself, and the cost of the measures. Respondents were able to self-select which locations for which they reviewed storymaps and completed surveys.

Survey Preferences by Coastal Location

The following is a brief summary of the survey results for each storymap. There were different numbers of respondents for each survey, and no responses on the Spanish language surveys despite extended and targeted promotion to Latinx and Beach Flats residents. Overall, community members from the West Side neighborhoods contributed a majority of the survey responses. While the overall number of views of the storymaps were high, the relatively low response rates for each location, and the lack of response from all neighborhoods, and on all questions means that these findings are more anecdotal than absolute. The City has reopened the storymaps and surveys and is putting focused effort on reaching Beach Flats residents into Fall 2020.

West Cliff Zone 1: Pyramid Beach

There were 28 total responses to the West Cliff Zone 1 survey. The top three considerations that were important to the survey respondents were:

1) Maximize habitat improvement
2) High certainty of success in minimizing erosion/flooding
3) Longevity of strategy

The pathway preferred by the community respondents and TAC is Pathway 1. Pathway 1 involves upgrading stormwater infrastructure, repairing existing armoring, and/or implementing a sand management strategy and beach nourishment strategy in the short term. In the medium term, it involved filling caves and upgrading armoring to a soil nail wall. In the long term, it includes removing revetment/armoring and implementing a managed retreat strategy.

West Cliff Zone 2: Mitchell’s Cove

There were 39 total responses for the Mitchell’s Cove survey. The top three considerations that are important to the survey respondents were:

- Maintain access to beach and other amenities
- Maximize habitat improvement
- Maximize space for bike and pedestrian infrastructure

There two suggested pathways that were considered by the community include:

- Pathway 1 Short term: The near-term pathway of implementing a sand management strategy and upgrading stormwater infrastructure was the preferred pathway by the community
- Pathway 1 Mid and Long term: The mid and long-term pathway with the highest rating was to upgrade the revetment to soil nail wall and cave fill, although there was also support for removing the armor and implementing retreat in the community input. The TAC favored this pathway and strongly supported upgrading revetment to soil nail wall and filling the caves.

West Cliff Zone 3: Lighthouse

There were 33 total respondents for the Lighthouse survey. The top three considerations for adaptation include:

- Minimize impacts to surfing quality
- Maintain access to beach and other amenities
- Maximize space for the bike and pedestrian infrastructure

There two suggested pathways that were recommended by the community include:

- Pathway 1, Short Term: Sand Management from Pyramid Beach. This adaptation pathway means implementing a sand management strategy in the short term by allowing sand deposited at Pyramid Beach to migrate down coast and deposit on its beach.
- Pathway 1, Mid to Long Term: Upgrading armoring (soil nail and cave fill) and removing armoring and implementing a managed retreat strategy was the favored pathway of the community respondents.

The TAC consensus opinion favored the option to upgrade the armor in one high hazard area and in another high hazard area in this zone, remove the armor in the mid to long term for managed retreat.

West Cliff Zone 4: Pelton to Bay

There were 33 respondents to the survey. The top three considerations for adaptation include:

- Maximize habitat improvement
- Minimize impacts to surfing quality
- Maintain access to beach and other amenities

The three suggested pathways that were recommended by the community include:

- Pathway 1, Short Term: Sand Management. This pathway means implementing a sand management strategy by allowing sand deposited at Pyramid Beach to migrate down coast and depository on West Cliff beaches.

- Pathway 1, Mid to Long Term: Fill Caves was the favored pathway by both the community and the TAC. This pathway means filling caves once a minimum ceiling thickness is reached.
- Pathway 1, Long Term: Remove Armoring and Implement Retreat.

These pathways provide two possible medium to longer-term adaptation solutions which would involve moving a bike/pedestrian path or going to one lane of traffic, and there was support from respondents and the TAC.

Natural Bridges
There were 72 total respondents for the Natural Bridges survey. The top three community considerations for adaptation include:

- Maximize habitat improvement
- Longevity of strategy
- Maintain access to the beach and other amenities

Only one path was presented for consideration

- Pathway 1, Short to Midterm: Creating a Living Shoreline, which would involve creating vegetated structures.
- Pathway 1, Long Term: Managed Retreat Strategy would implement a managed retreat strategy, which would realign parking access and facilities.

The TAC was in consensus agreement with Pathway 1 as well.

West Cliff Transportation
There were 127 total respondents for the West Cliff Transportation survey. The top three considerations for adaptation include:

- Maintain and improve bike and pedestrian space
- Address stormwater runoff
- Maximize habitat improvement

The three suggested pathways that considered by the community include:

- Short Term Strategy: Current Configuration with Enhancements.
- Mid-Term Strategy: One-way with Enhanced Bicycle Facility.
- Long-term Strategy, Reconfiguration West Cliff Drive in the case of a disaster closing West Cliff Drive: The preferred pathway (37.5% of 127 respondents) was the Reconfiguration of Monterey Street to Liberty Street. However, it was found after the surveys that Monterey Street is not a viable connector due to many transportation corridor issues and should not have been offered as an option. One fifth of the respondents preferred rerouting from Pelton Avenue to Woodrow Avenue to Delaware.

Appendix A4. Funding Options Summary

The adaptation of West Cliff Drive needed to preserve the recreational opportunities and value to the local community will be expensive. This is especially significant given this infrastructure project concerns a specific neighborhood within the city, rather than the city as a whole. Adaptation generally falls into *retreat, accommodate, armoring,* or a mixed strategy of management. It is likely the City of Santa Cruz will need to retreat and alter West Cliff Drive, including significant streetscape modifications to preserve the recreational access and utility of the Recreational Trail, however, some mixed management may also be possible. Regardless of which adaptation strategy the City of Santa Cruz chooses, the capital costs of adaptation on West Cliff Drive will be significant. Some of this cost may be paid for with State funding (discussed below). However, it is likely that the City will need to independently fund a significant portion of these expenditures. This discussion of financing is designed to help the City and other stakeholders pursue financing strategies that are equitable and efficient.

A4.1. Funding Options at the State and Federal Level

Adaptation planning is a challenging undertaking and the City cannot adapt to sea level rise on its own. A successful adaptation plan requires regional dialog and state and federal partnerships to identify, fund, and implement solutions. Challenges include acquiring the necessary funding for adaptation strategies, communicating the need for adaptation to elected officials and staff, and gaining commitment and support from federal and state government agencies to address the realities of local adaptation challenges. Specifically, for West Cliff Drive, outside funding will require a creative approach, leveraging the area's cultural and recreation significance, and the need to maintain coastal infrastructure against increased threats from sea-level rise, coastal erosion, and coastal storms.

The City has, and will continue to partner with local stakeholders and groups such as Groundswell Coastal Ecology as well as partial co-landowner of the corridor, California State Parks, to advance the planning and implementation called out in the Plan. The City has several grant proposals pending to carry out next step work. The projects specified in this Plan will require a combination of grants and outside funding as well as the City's identification of revenue and/or internal funding. An assessment of potential funding opportunities that follows will be refined in a near term next step project to Plan adoption.

Grants and Outside Funds

Hazard Mitigation and Pre-Disaster Assistance (FEMA Programs)

There is overlap between LCP planning and Local Hazard Mitigation Plan (LHMP) as both address a potential range of hazards in a given City. California Governor's Office of Emergency Services' (Cal OES) Hazard Mitigation Planning Division and FEMA's Hazard Mitigation Assistance grant programs provide significant opportunities to adapt by reducing or eliminating potential losses to the City's assets through hazard mitigation planning and project grant funding. Much of the funding of specific projects must be tied to an approved LHMP.

The City has already included sea level rise and climate change related hazards to its LHMP in order to make adaptation projects eligible for federal funding. Currently, Cal OES and FEMA have three grant programs: Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Mitigation Assistance. The total value in each of the grants vary annually based on federal funding authorization, but typically each is in the 10s to 100s of million dollars. This funding may be most appropriate for larger scale projects, e.g., zone 2 sea wall project and/or living shoreline construction.

Cultural, Community and Natural Resources Grant Program – Proposition 68
Following passage of the California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access for All Act of 2018 (Proposition 68), $40 million has been appropriated to the California Natural Resources Agency for competitive grant funds that protect, restore, and enhance California's cultural, community, and natural resources. Funding under this program is available to local agencies and other eligible applicants for projects qualifying under a number of categories including resource protection, enhancement of park, water, and natural resources, and improvement of community and cultural venues or visitor centers. This funding source may be most appropriate for habitat and landscaping projects completed independent or in combination with other larger scale corridor projects.

California Department of Transportation Grant Program
Further grant funding through the Caltrans Sustainable Transportation Grant Program is available, including the "**Sustainable Communities Grants** ($29.5 million awarded in 2020) to encourage local and regional planning that furthers state goals, including, but not limited to, the goals and best practices cited in the Regional Transportation Plan Guidelines adopted by the California Transportation Commission[6]." This source might be tapped for near term improvements for corridor safety.

Opportunities through California State Parks' Office of Grants and Local Services (OGALS) Programs
OGALS administers grants annually for park and recreation needs. Since 2000, OGALS has awarded nearly $3 billion in grants for local park projects. In June 2017, $16 million in grants were awarded through OGALS from the 2002 Resources Bond Act (Proposition 40) for 25 local park projects[7].

California Natural Resources Agency Urban Greening Grants
The California Natural Resources Agency's Urban Greening Program funds green infrastructure projects that improve access to greenspace with climate adaptation co-benefits. These projects

[6] https://dot.ca.gov/programs/transportation-planning/regional-planning/sustainable-transportation-planning-grants
[7] https://resilientca.org/topics/investing-in-adaptation/

can include expansion of neighborhood parks and community space and greening of public lands and structures such as schoolyards. Through California Climate Investments, $26,000,000 is available for Round Two of the program.

California Coastal Conservancy Climate Ready Grant Program

Part of the focus of this program is on coastal resource protection and community preparation for the impacts of climate change. The Coastal Conservancy funds projects covering a wide range of preparedness activities which may be applicable to West Cliff Drive adaption including development, and implementation of adaptation strategies, science-based scenario planning. The focus of the Grants is increasing the "availability of beaches, parks and trails for the public, protect and restore natural lands and wildlife habitat, preserve working lands, and increase community resilience to the impacts of climate change,[8]" and West Cliff Drive could potentially satisfy multiple aims, garnering the project a higher priority.

Pilot Projects

A recent report[9] by the State of California's Legislative Analysts' Office (LAO) indicates that adaptation efforts will need to be financed primarily at the local level, as is the case with most capital improvement projects. However, the report notes that the California Coastal Conservancy and other State Agencies do have funding for pilot demonstration projects related to adaptation. Given the high-profile nature of West Cliff Drive and the world-class surfing, West Cliff Drive may be a perfect setting for an adaptation program focused on recreation and coastal access. Specific access, habitat restoration and landscaping projects may be well suited for these funders.

Fee Options

A usage or user fee on West Cliff Drive, such as a toll or entry ticket, would allow the city to raise funds without imposing a tax on local residents. Yet there are equity concerns with such an option. Given the popularity of the area, there may be several other options for fee generation including (for example): fees on bike shares such as "Jump," increased vendor license fees to sell along West Cliff Drive, and parking fees (discussed in detail below).

However, the use of fees as a revenue source needs to be considered with caution. Although West Cliff Drive is a popular recreation and sightseeing spot, a user fee may result in reduced access and could be regressive. It would also likely reduce access for low-income visitors and disadvantaged local populations and runs counter to the California Coastal Act's mandate of universal access. Depending on the nature of the fee, programs may require approval of the California Coastal Commission.

[8] Ssc.ca.gov/grants/

[9] See Preparing for Rising Seas: How the State Can Help Support Local Coastal Adaptation Efforts, California's Legislative Analysts Office (LAO), December 2019.p. 33.

Impact Mitigation Fees or In Lieu Fees - Sand Mitigation and Public Recreational Impact Fees
Impact mitigation or in lieu fees are another way to generate monies for adaptation measure implementation. Certain structured fees could be established to generate revenues for:
1) covering the necessary planning of, technical studies for, design of, and implementation of adaptation strategies, or 2) developing an emergency cleanup fund to be able to respond quickly and opportunistically following disasters. Disasters, through a different lens, are opportunities to implement changes.

There are currently two structured fees that the CCC uses to address the impacts of shoreline protection – a Sand Mitigation Fee and a Public Recreation fee. The Sand Mitigation Fee is a fee intended to mitigate for the loss of sand supply and loss of recreational beaches in front of structures. The Public Recreation Fee addresses impacts to the loss of public recreation based upon the loss of beach area physically occupied by the coastal structure. An additional fee for ecosystem damages is under consideration by the CCC, which could assess a fee based on the cost of restoration or replacement value of the damaged habitat.

Sand Mitigation Fee: Such a fee would mitigate for actual loss of beach quality sand which would otherwise have been deposited on the beach. For all development involving the construction of a bluff retention device, a Sand Mitigation Fee could be collected by the City to be used for sediment management purposes. The fee could be deposited in an interest- bearing account designated by the City in lieu of providing sand directly to replace the sand that would be lost due to the impacts of any protective structure. Consideration of sand volumes lost over time should factor into whether actual sand placement is preferred or whether the volume/$ should be retained until a substantial volume can be contributed. The methodology used to determine the appropriate mitigation fee has been approved by the CCC in past cases. The funds should solely be used to implement projects which provide sand to the City's beaches, not to fund other public operations, maintenance, or planning studies. However, in the case of implementation of this Plan, the City would be paying into the fund, so there would be no net new revenue achieved.

Public Recreation Fee: Similar to the methodology used by the CCC for the Sand Mitigation Fee, the CCC has used a methodology for calculating a statewide public recreation fee. The City could include such a methodology in the CLUP/General Plan Update and develop administrative processes consistent with CCC guidance, including development of impact mitigation fees for public access and recreation, proposing a public recreation/access project in lieu of payment of Public Recreation Fees to provide a direct recreation and/or access benefit to the general public, and project prioritizations. However, given that most of the West Cliff Drive corridor is publicly owned by the City and California State Parks, the in lieu fee program may not generate significant levels of funding.

Parking Fees and Fines

The City of Santa Cruz's 2030 General plan includes an emphasis on parking, especially for the "Seabright Area." While increasing parking options near West Cliff Drive will improve access and recreation in the area, parking may also offer an alternative revenue source. If the city were to charge for parking, they could raise substantial revenues both in parking fees and parking violation fines. It is common for coastal cities to charge for parking—especially for parking lots. Table A4-1 below shows the parking fees for lots near the beach in a sampling of coastal communities. A parking fee program could also be implemented such as that by the County of Santa Cruz, which requires a resident permit/pass as well as a daily visitor pass. One additional benefit of such a program would be to address one of the conflicts identified along West Cliff --the long-term parking of individuals.

Table A4-1 Coastal parking fees in a sample of California beach towns.

Location	Parking Fee
Laguna Beach	$1.50 to $2.50/hr
Leadbetter Beach (Santa Barbara)	$2/hr
.Huntington Beach	$2/hr, $15/day
Oceanside	$3 to $4/hr
Venice Beach	Depends on time of day, $5 to $15 for 3hr block

Information obtained from the tourism website for each community. Fees for lots tend to be higher.

The City of Santa Cruz conducted a study of the Cowell's Overlook Parking Lot (COPL), an 18 space parking lot overlooking Cowell's Beach. The COPL has a high turnover rate and is in high demand, with over 100,000 "parking events" each year. As expected, demand for this lot peaks in the summer and during the day, there is demand year round. The study included an analysis of potential revenue generation based on a $1/hour fee and projected citations (see A4-1 for citation projected). This study estimated revenues over $1 million annually. Furthermore, as evidenced by Table A4-1 above, a $1/hr fee is low compared to other coastal communities. If the City opted for a higher fee, closer to the rate at Leadbetter or Huntington Beaches, annual revenues could be increased further, providing a substantial contribution to the funds for adapting this popular recreation area to climate change and rising seas.

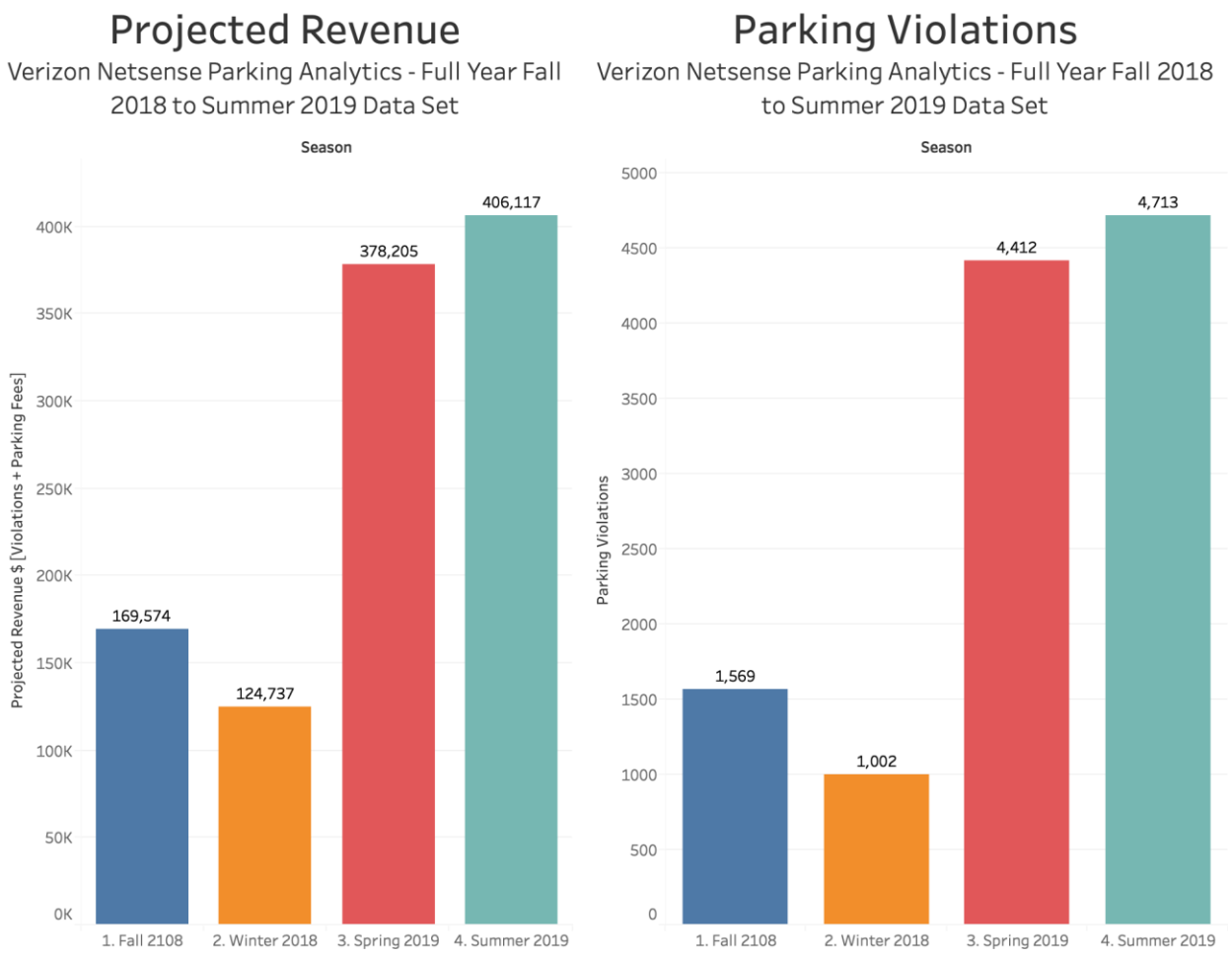

Figure A4-1 Projected Revenue based on $1/hour fee & projected parking citations (2019 COPL study).

While parking fees would generate significant revenues that could aid in funding necessary adaption along West Cliff Drive, there are important considerations. Primarily, parking fees (like other forms of user fees) may result in reduced access for low-income groups who are more sensitive to additional costs. The Coastal Commission could determine that substantial changes to parking supply—including fees—may alter coastal access and violate the Coastal Act. However, given that many other coastal communities charge for parking in beach lots including State Parks, it is likely that a reasonable fee would be allowed, and would not substantially alter coastal access along West Cliff.

The City will conduct further analysis, using $1/hour as an assumed starting point and monitoring use. The City will analyze parking fees on West Cliff Drive for further consideration upon adoption of the Plan.

Non-Local Toll for Driving West Cliff

The City of Santa Cruz could help fund necessary improvements to West Cliff Drive by potentially making the route a "scenic toll road." There are a few scenic toll roads in the United States, including the "17 Mile Drive" in Pebble Beach, CA ($10.50/vehicle)[10] which runs along a pristine coastline, and the Pike's Peak Scenic Road in Colorado ($15/person or $50/vehicle)[11]. The tolls help pay for the cost of maintaining the road and protecting against geological hazards. At West Cliff Drive, the toll could be much lower, perhaps $2-$5/vehicle, as not to discourage visitors entirely. For locals in the neighborhood the city could either issue an annual pass waiving the toll, or include the cost of the pass in annual taxes, allowing for assessment of those most impacted by road improvements, rather than the City's residents overall. Designating West Cliff Drive a toll road may decrease traffic, improving the safety of the road for bikers and trial users. The toll may, however, negatively impact coastal access and like other forms of fees, require the approval and oversight of the California Coastal Commission to ensure its permitted. It is unclear, however how a non-local toll road would be implemented.

Local Taxes and Financing Options

While there are many opportunities for Federal and State funding to support adaption efforts, the City of Santa Cruz will likely be required to independently fund or finance a portion of the project cost. The LAO report indicates that many projects will be financed at the local level, although currently 45% of adaption funding has come from the State, particularly due to local challenges in planning for, prioritizing, and raising funds for adaptation[12]. The report argues that the state does not have the fiscal resources to fund most of the coastal adaptation activities that ultimately will be needed to prepare for SLR, meaning that "local governments have the primary responsibility for planning, authorizing,
maintaining, and operating their local infrastructure, and they—and their residents—correspondingly should pay the cost associated with those activities, including how their infrastructure may need to be modified for SLR." While State dollars can serve as "seed money" and help support initial stages, it will likely be a combination of State and local funds. It is also likely that early adopters could receive State funds for "pilot projects" while late adopters may have to foot a higher portion of the adaptation costs.

Local responsibility for funding and/or financing includes the various fees mentions above. However, it also may include taxes designed to increase revenues for adaption, and various forms of bonds. This section discusses the City's finances in general and the unique circumstances of West Cliff Drive to better illustrate the various tax options. Bonds are included

[10] https://www.pebblebeach.com/17-mile-drive/

[11] https://www.visitcos.com/things-to-do/outdoors/scenic-drives/pikes-peak-highway/

[12] See Preparing for Rising Seas: How the State Can Help Support Local Coastal Adaptation Efforts, California's Legislative Analysts Office (LAO), December 2019.

in this discussion because unlike grants or outside funding, the City will be responsible to eventually fulfill the financial obligation and thus indirectly finance the project.

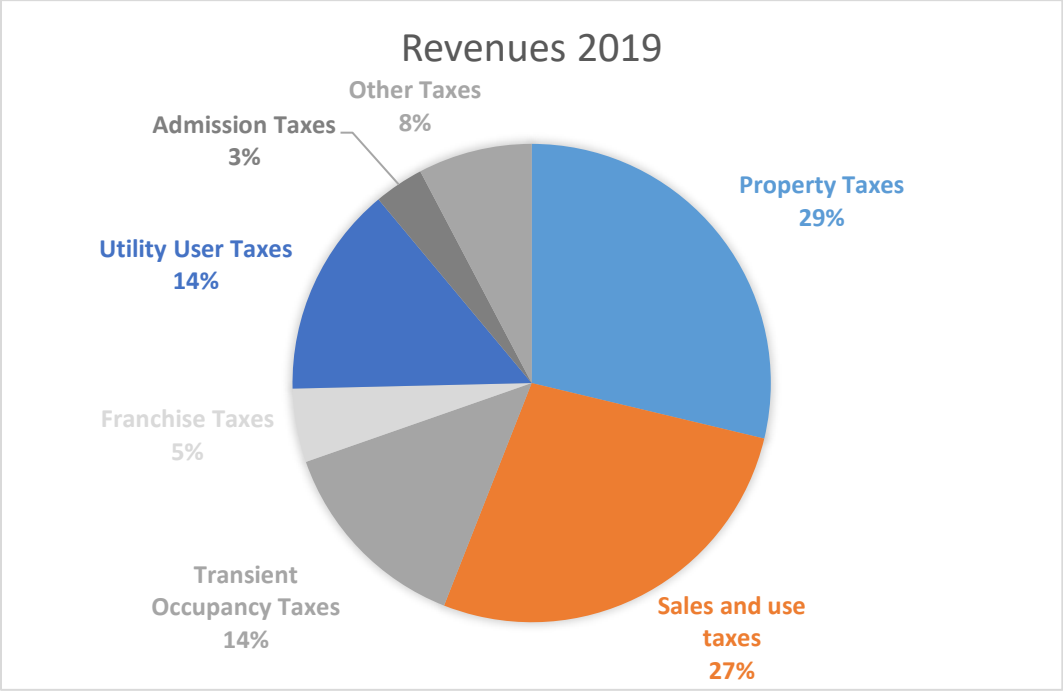

Figure A4-1: Breakdown of Tax Revenues by Type (Source: City of Santa Cruz CAFR, 2019)

Figure A4-1 above breaks down City Tax Revenues for the 2018-2019 Fiscal Year, the latest fully audited data available.[13] As indicated in Figure A3, the City revenues are generated primarily from two sources: property taxes (29%) and sales and use taxes (27%). Two other significant sources of revenue are utility users taxes and transient occupancy taxes.

13 See CAFR https://www.cityofsantacruz.com/home/showdocument?id=78889

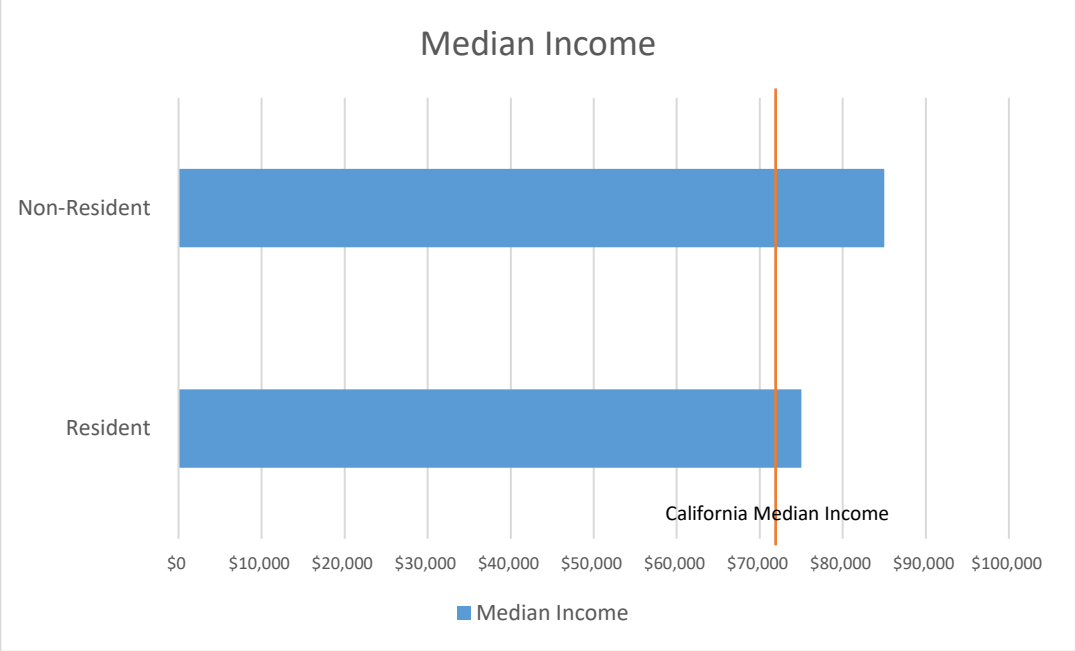

Figure A4-2: Median Income of Survey Respondents on West Cliff Drive compared to California Median Income

To aid our analysis of the options available to increase revenues and fund adaptation project along West Cliff Drive, we examined the incomes of visitors (both local and non-resident). In our surveys of West Cliff Drive, we found visitors to West Cliff Drive, both residents and non-residents of the city of Santa Cruz, have higher median incomes than the median for the state of California. Figure A4-3 compares the reported incomes of respondents to the California median income. In addition, many have much higher incomes than the State median income, as shown by the majority of visitors (43%) earning over $100,000 a year (see Figure A4-4 below).

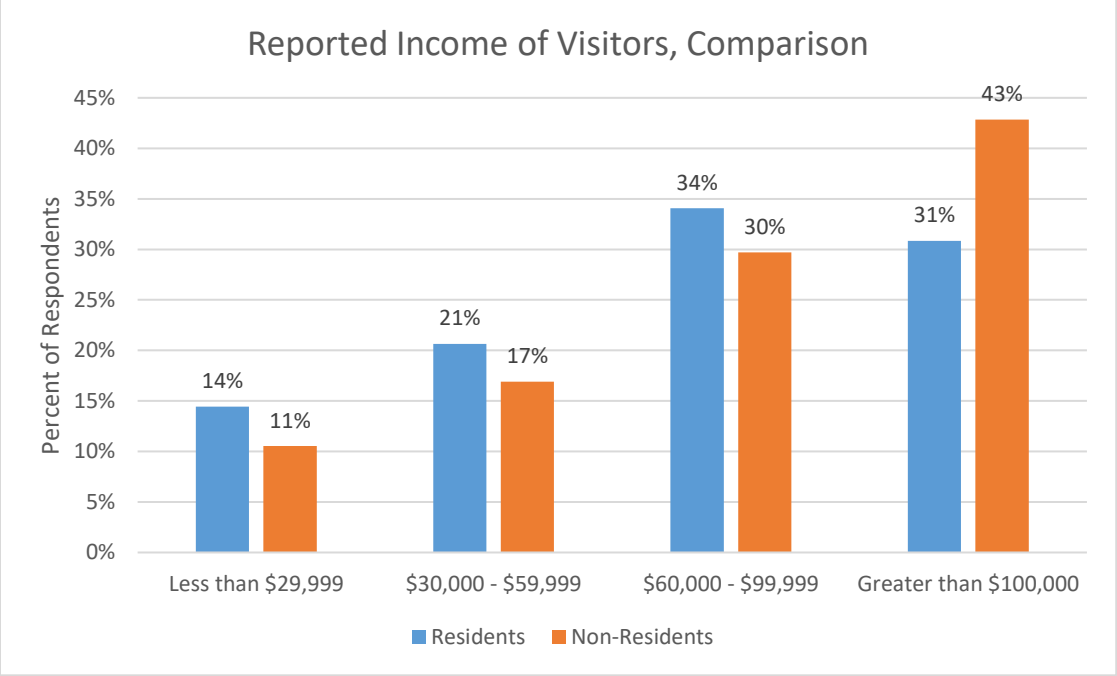

Figure A3-4: Comparing the distribution of reported income between Residents and Non-Residents shows many earn more than $100,000 a year, including the majority of non-residents

Bond Financing

As noted above, any bond financing along West Cliff Drive will likely need to be funded by tax revenues, since access is free and thus non-revenue generating. However, given the large capital expenses required, these tax revenues will likely also require bond financing to pay for the large up-front expenses involved in adaptation.

In the absence of a State grant, Santa Cruz will need to determine the funding and financing of adaptation at West Cliff Drive. Often large capital investment projects, such as the road modification proposed at West Cliff Drive, are funded at least in part via bond financing. However, these bonds will need to be repaid, and for that the city will need to raise revenues on the order of $5 to $20 million. The main challenge with bond financing is ensuring there is robust underlying funding[14]. Funding is subject to voter approval[15]. Different types of bonds require different funding strategies, outlined below.

Municipal GO Bonds (General Obligation)

General Obligation bonds are issued by the local government or the state. Locally issued GO bonds are often applicable to adaptation projects but are subject to 2/3 voter approval because funding is tied to increased property taxes. The ad valorem increase in property taxes can—with supermajority approval—exceed the 1% cap set by Proposition 13. This is often necessary

[14] AECOM, "Paying for Climate Adaptation in California: A Primer for Practitioners." (October 2018). Resources Legacy Fund.
[15] Keenan, Jesse M. *Climate Adaptation Finance and Investment in California*. Taylor & Francis, 2019.

in order to raise the kind of funding needed for resilience and adaptation projects. State issued GO bonds can be funded out of the General Fund and only require 50% voter approval. The general fund is often drawn from sales taxes and fees.

Revenue Bonds
Revenue bonds are generally not subject to voter approval, as they derive their funding from the revenue associated with a project. However, in the case of adaptation to West Cliff Drive, there is no plan for the project itself to generate revenue. Imposing a toll or fee would create revenue, however, it would also reduce access to the coast and therefore violate the California Coastal Act.

California Infrastructure and Economic Development Bank Financing
The California Infrastructure and Economic Development Bank (IBank) was created in 1994 to finance public infrastructure and private development that promote a healthy climate for jobs, contribute to a strong economy, and improve the quality of life in California communities. IBank has broad authority to issue tax-exempt and taxable revenue bonds, provide financing to public agencies, provide credit enhancements, acquire or lease facilities, and leverage state and federal funds. IBank's current programs include the Infrastructure State Revolving Fund Loan Program, California Lending for Energy and Environmental Needs Center, Small Business Finance Center, and the Bond Financing Program.2

Property Taxes
In California, unlike many other states, property taxes, though collected at the county level, are distributed via the State Board of Equalization back to local governments. While property taxes constitute a significant portion of city and county revenues, the ability to increase property taxes is limited. In 1996, California voters approved Proposition 218, "The Right to Vote on Taxes Act," which "substantially expanded restrictions on local government revenue-raising including taxes, assessments and property related fees" (League of California Cities 2019). Furthermore, these property tax increases must go to support "the acquisition or improvement of real property" (California City Finance, 2019). This means that the uses of collected taxes are limited to the state's purchase of property or improvements to structures on government property. Prop 213 requires a two-thirds majority for all property tax supported bond measures, except for school districts, which have a lower threshold of 55%. The two-thirds supermajority requirement put a damper on bond measures, and less than half of bond measures requiring a two-thirds vote have passed since 2001, whereas 84% of measures requiring a 55% measure (for schools) have passed. Since the 55% measures include schools, their high success rate may also be related to continued local support for schools. Overall, the limitations on property taxes have reduced the state's ability to collect them and thereby reduced the budget. However, since most of the West Cliff Drive corridor is publicly owned and heavily used by residents this remains a viable option.

In addition to property tax levies to support school or other bond issues, California law also supports a number of special property tax districts or property tax levies generally on new or substantially improved property. The State of California provides many options, many oriented to improving underfinanced business districts or enabling the development of new properties. Given the residential nature of West Cliff Drive, the City could consider the formation of a Community Facilities District (CFD). In a CFD, a property tax levy is placed upon homeowners in a defined geographic boundary, thus the increase in property tax would not be placed on the entire city, but the homes in proximity to West Cliff Drive. The funds from this tax could be used for infrastructure improvements and public services including the adaptation of the road. However, the special tax is subject to the approval of 2/3 of voters within the CFD. Often, CFDs are placed on new development because of this voting requirement, however, for a project with the necessary political will, a CFD could be used with existing properties.

In the case of West Cliff Drive, the substantial public benefit from the preservation of the existing roadway or public recreation opportunities largely eliminates a Geological Hazard Abatement District, an alternative form of special tax district, from funding consideration. While GHADs have lower approval requirements, they primarily function to preserve private property rather than public areas.[16]

Second Home Taxes

There has been recent pressure in California to pass Assembly Bill 1905[17] which would allow taxation (and reduce the tax breaks) for owners of multiple homes. In Santa Cruz County, there are over 5,000 homes classified by the Census as "occasional use," essentially vacation homes and second homes. These properties make up 43.6% of the total vacancies in the County[18]. Presently, there is not only no additional tax on second homes but rather significant tax breaks in the form of write offs for those able to afford multiple properties.

While the current bill is focused on homelessness, in Santa Cruz and other coastal communities it may be time to look at second homeowners as a source of revenues to preserve the communities they vacation to, and the resources that make those homes valuable. This would promote greater equity, as second homes in California are seen to come with tax *benefits,* rather than additional burdens, in the form of tax deductions[19].

[16] CA Pub Res Code §26566 limits GHADs to "improvements" to private properties within the district boundaries

[17] Brinklow, Adam. "Bay Area mayors want to tax second homes to pay for homeless relief" SF Curbed, March 9 2020.

[18] American Community Survey (ACS) 2018 https://data.census.gov/cedsci/table?q=santa%20cruz%20vacancy&tid=ACSDT1Y2018.B25004&hidePreview=true

[19] Brinklow, Adam. "Bay Area mayors want to tax second homes to pay for homeless relief" SF Curbed, March 9 2020; https://www.mercurynews.com/2017/03/19/california-lawmakers-eye-ending-tax-breaks-for-vacation-homes/

There is not currently an established practice in California for assessing second homeowners additional taxes, however, with the predicted impacts of sea-level rise on coastal resources—where many vacation homes are—there is a growing need to consider this strategy. Furthermore, it may increase coastal access by incentivizing the conversion of these "occasional use" properties from private vacation home to vacation rentals, enabling more people to visit the coast.

Sales taxes

As with property taxes, under California law (Proposition 218), sales taxes are collected by the State. The majority of sales tax revenues go to the State. However, cities and counties are allowed to raise sales taxes (e.g., by 0.25%) and keep those additional proceeds for local spending. If these funds are used for general (funds) purposes, then only a 50% (majority) vote is required. However, if the funds are to be used for a special purpose or a special district is created, then a 2/3 majority is required.

In addition to the political hurdles, the fact that West Cliff Drive is a largely residential area with few sales taxes may make it difficult to justify raising sales taxes. The City may consider raising sales taxes for general funds, which only requires a simple majority (50%) to approve. However, since any increases in funds would go to general revenue, there is no guarantee these funds would be used for West Cliff Drive, or even climate adaptation. As noted above, sales taxes are also regressive—the burden falls harder on lower income households. In addition, sales tax revenues vary with economic activity (sales). Given these constraints, the feasibility of using sales taxes to fund this particular project seems low.

Transient Occupancy Taxes (TOTs)

Transient Occupancy Taxes (TOTs) are another method for the City to raise revenue at the local level. Unlike property tax increases, TOT increases are often a popular ballot measure as they shift the burden of payment from locals (voters) to visitors. They're also progressive, unlike sales taxes. Finally, TOTs can help fund tourism generating projects such as coastal adaptation, as the coast and beaches are the major driver of tourism to Santa Cruz. The city has several options to increase their TOT collection: increase the rate itself, build hotels, or increase the number of Short-Term rentals operating in the City.

The City of Santa Cruz increased their transient occupancy tax (TOT) rate from 10% to 11% in 2012[20]. This measure passed with 82.23% of the vote, demonstrating the relative ease of increasing TOTs in comparison to other taxes. According to the 2019 CAFR for the City of Santa Cruz, the 2012 increase raised revenues by $0.8 million the first year, and since then revenues have risen from $5.6 million in 2013 to almost $11 million in 2019. In 2019, TOTs made up 14% of the City's revenues[21]. Even with this increase, the City's TOT rate is lower than many popular

[20] Santa Cruz CAFR 2019, page iv.
[21] Ibid 15

coastal destinations, for example; Santa Barbara (12%), Los Angeles (14%), San Francisco (14%), Malibu (12%). Santa Cruz could increase their rate to a similar 12% level.

Building more hotels could also increase TOTs. According to the CAFR, the City's plan is to "aggressively pursue the construction of major chain hotels with expectations to increase the hotel tax base[22]." However, relying on hotel construction may be problematic for several reasons. First, the hotel industry was hardest hit by the economic impact of the COVID-19 pandemic—with losses in over 50% of average rates and occupancy levels far below a typical summer season[23]. These losses are likely to reduce the willingness and ability of hotel chains to invest in new development. Secondly, new development is not the most cost effective or efficient way to increase TOTs. Construction takes time and significant investment and may not have community support. Furthermore, development in the coastal zone is subject to the review and approval of the California Coastal Commission. Not only can this create delays, but the Commission and the Coastal Act itself are cautious about new development in the fragile coastal zone and the impacts it may have. Additionally, they may impose mitigation that can increase the costs of building a new hotel.

Given the potential barriers to the construction new hotels, the City may wish to examine a third method of increasing their TOT revenues: increasing the number of Short-Term Rentals in Santa Cruz. While Santa Cruz's regulations on operating Short-Term Rentals (STRs) are straightforward and fair, with basic guidelines on occupancy and guest behavior, their policy strictly limits the number of rentals allowed to operate in the City. Currently, the City of Santa Cruz's permit quota limits the number of Short-Term Rentals to 250[24]. This includes both hosted and non-hosted STRs[25] of all types. 250 STRs represents just over 1% of the total housing units in the City of Santa Cruz[26].

This strict cap may lead to push back from the California Coastal Commission. Oxnard's attempt to impose a 5% density limit on STRs was rejected this year (5% of Oxnard's 54,851 units would be over 2,700 STRs[27]). The Commission proposed a 10% allowance in the beachfront zone[28]. If Santa Cruz wishes to raise TOTs without new development or reliance on major chain hotels, they could similarly increase the number of STRs allowed in the coastal zone, such as along

[22] ibid iv
[23] August data from STR: https://str.com/data-insights-blog/coronavirus-hotel-industry-data-news

[24] https://www.cityofsantacruz.com/government/city-departments/planning-and-community-development/short-term-rentals
[25] The City defines a "hosted" short-term rental as one in which the owner lives in the dwelling at least six months out of the year. In a "non-hosted" rental, owners live elsewhere more than six months out of the year.
[26] City of Santa Cruz "2015-2023 Housing Element" report data from Department of Finance
[27] City of Oxnard "2013-2021 Housing Element" report
[28] https://www.vcstar.com/story/news/local/2020/07/15/oxnard-vacation-airbnb-rental-ordinance-rejected-coastal-commission/5410414002/

West Cliff Drive. This may help avoid push back from not only the Coastal Commission, but also private legal action. In 2019, a similarly strict Short-Term Rental policy in Santa Barbara was rejected in court due to the impact the policy would have on access to the coast, potentially violating the California Coastal Act[29]. Increasing the number of STRs near the coast would help promote access and offer the City a relatively easy method of raising TOT revenues. Many cities have less strict limits in the coastal zone, such as Carlsbad, who allow STRs in commercial zones and throughout the coastal zone, but not in residential areas further inland.

In summary, the City has multiple options for increasing TOT revenues. They can increase their TOT rate through a ballot measure, promote hotel construction, and increase their STR allowance. These options are not mutually exclusive, and the city could choose to enact all of these policies.

User Fees and Utility User taxes

The City of Santa Cruz also receives significant revenues from utility user taxes (UUTs). UUTs are taxes placed on utilities such as electricity, gas, water and sewer as well as some cellular telephone calls. As with sales taxes, Proposition 218 governs UUTs, with special districts requiring a supermajority. According to California City Finance, the majority of measures designed to increase UUTs from 2002-2016 failed; most of the measures that passed kept rates the same, modernized (with respect to cell phone rates) or reduced rates.[30] Given the difficulty in raising UUTs, their regressive nature, and the fact that West Cliff Drive is a residential neighborhood, UUTs are likely not a good option for financing adaptation on West Cliff Drive. Increasing UUTs to pay for damage to existing utility distribution networks (e.g., gas pipelines along an eroded coast) might make sense.

Infrastructure Financing Districts

As of September 2014, California law allows cities and other entities to create enhanced infrastructure financing districts. This allows incremental property tax revenues to be devoted to a specified purpose such as a fund for cleanup, infrastructure, parks and open space, transportation, or other things that could be applied to a variety of adaptation approaches. With the passage of Assembly Bill 313 and Senate Bill 628, the requirements for establishing these districts have been streamlined. The intent of these bills was to fill the local funding void left by the dissolution of the redevelopment agencies. Basically, the City would establish an Economic Infrastructure Financing District, develop a business plan with priority projects (e.g., infrastructure, adaptation, etc.), and then draw funds from changes in local tax revenues occurring as part of a redevelopment or rezone or apply for grant funds.1

[29] *Kracke v. City of Santa Barbara (2019)*

[30] See Utility User Facts, California City Finnace.com. January 2017. http://www.californiacityfinance.com/UUTfacts17.pdf.

Criteria for Selecting a Financing Strategy

When providing a Public Good, any Financing Scheme should consider who uses the good and their ability to pay.

One of the most basic principles of the Public Finance literature is the ability to pay principle—taxes levied on those most likely to use the (public) good and those who can afford it the most.[31] In many sense, these public finance schemes try to mimic private finance schemes. Currently, West Cliff Drive is an open access corridor available to all which has resulted in abuse of parking and recreational amenities by out of town visitors and transient populations. However, improvements and adaptation to West Cliff Drive must be financed somehow. Our survey data indicates that the majority of the users (57%) are residents of the City of Santa Cruz. This result, paired with the data on incomes of residents, suggests that a recreational fee such as a tax on bike or surfboard rentals, a tax on local residents, a parking permit program, and some day use parking might be feasible.

Any financing strategy should be equitable.

One of the most important considerations for any tax scheme is equity. Many public finance economists favor "progressive" taxes, which tax households with higher income or wealth at a higher rate (percentage of wealth or income paid). [32] A progressive income tax, which taxes households with higher incomes at higher rates, is a good example of a tax system that has vertical equity. However, few smaller cities in California use income taxes to collect revenues.

Although many people consider property taxes to be progressive, most empirical studies indicate that property taxes, in general, are regressive—poor households pay a larger share for their income (through rent) on property taxes than wealthy households. However, if one is considering incremental property tax financing, one also needs to consider the demographics of the area. West Cliff Drive is an affluent area with high property values and adding additional property tax levies would tend to fall on more affluent households.

A property tax in this area though could in fact be progressive. The alternative of increasing sales taxes and utility users fees and other taxes on general consumption would be highly regressive since low-income households spend a higher amount of their income on goods (consumption) that are taxed by sales taxes, utility taxes and other users taxes and fees.[33] This type of approach may increase the burden on disadvantaged populations in the community. Although most States, including California, exempt food and rent from sales tax, California sales taxes also excludes services, which increases the taxes regressive nature as the proportion of

[31] Richard A. Musgrave, "Public Finance in a Democratic Society Volume III."
[32] Ibid.
[33] For example see, Chernick, Howard, and Andrew Reschovsky. "Yes! Consumption taxes are regressive." *Challenge* 43, no. 5 (2000): 60-91.

spending on services increases with income. Of the possible options, however, transient occupancy taxes are likely the most progressive since high-income households typically spend a larger portion of their budget on travel.[34]

Any financing strategy should have community support.

"A sustainable community selects mitigation strategies that evolve from full participation among all public and private stakeholders. The participatory process itself may be as important as the outcome."[35]

No one likes taxes, and California has had a mixed history when it comes to taxes and tax reform. Any discussion of the strengths and weaknesses of Proposition 13 or California's tax law in general is beyond the scope of this analysis. However, any financing scheme must be approved by voters. In California, these approvals generally require majority (50%) or supermajority (generally 2/3 of voters) to approve. While many tax increases in California cities have been approved, the types of taxes and situations favorable to approval depend on a number of factors. These will be discussed in more detail below for specific taxes. The approval requirement can often be a barrier to raising funds, however, if the City adopts an adaptation plan with wide public support this should aid in voter approval for local finance schemes.

Any financing strategy should create incentives that are consistent with a community's general adaptation strategy.

One aspect of public finance that often is under appreciated is the *incentives* that these tax schemes create. For example, Wassmer[36] and others have found that cities reliant on sales taxes from retail will often encourage and promote policies, such as big-box stores, that protect their existing tax base. Similarly, cities reliant on property taxes (as most are) will have an incentive to maintain private property and cities reliant on transient occupancy taxes will try to preserve hotel or other TOT revenues that can lead to additional hotel development rather than much needed housing in Santa Cruz.

Any financing strategy should be robust to economic and other shocks.

As with any other entity, cities must rely on tax revenues to sustain their operations. A tax that is stable and predictable is preferable to a tax that varies. The most common source of

[34] For example, see COMBS, J. PAUL, and BARRY W. ELLEDGE. "EFFECTS OF A ROOM TAX ON RESORT HOTEL/MOTELS." *National Tax Journal* 32, no. 2 (1979): 201-07. Accessed August 20, 2020. www.jstor.org/stable/41862222.

[35] Mileti, D. (1999) Disasters by Design: A Reassessment of Natural Hazards in the United States (Washing- ton DC, Joseph Henry Press), p.6.

[36] Wassmer, Robert W. "Fiscalisation of Land Use, Urban Growth Boundaries and Non-central Retail Sprawl in the Western United States." *Urban Stud* 39, no. 8 (July 1, 2002): 1307-1327.

fluctuations in tax revenues is the business cycle—when economic activity is strong, tax revenues are high. On the other hand, when economic activity is weak these tax revenues dwindle. Robustness is particularly important if local bonds finance any project, since creditors require payment in order to avoid default, and therefore prefer stability.

Since property taxes are tied to assessed valuations which in California only changes at the point of real estate transfer, property taxes are the most stable and predictable source of revenue. Sales taxes and utility user taxes vary with consumption so will rise and fall with economic activity. Of the major sources of revenue, transient occupancy taxes (TOTs) are the generally the most subject to the business cycle since during recessions, households often cut back on travel expenses. The current COVID outbreak represents an extreme example, where travel expenditures dropped 50% between March 2020 and July 2020[37].

Table A4-2 summarizes the funding options available to the City for consideration. If the City can find funding for a pilot project from a State Agency such as the California Coastal Conservancy, this might be the best option. However, going forward, the City will likely have to raise its own funding sources to finance some of its climate resilience. While a good deal of discussion of climate resilience financing focus on bonds, it is important to realize that bonds require an underlying revenue scheme, either from an operating business (e.g., a municipal utility) or a tax source.

In the case of West Cliff Drive, which is a largely residential neighborhood, parking fees or bike rentals are possible options. Both of these schemes essentially require users (most likely from out of town) to pay. Our survey indicates that visitors to West Cliff Drive have a higher median income, so these fees should generally be progressive. Passing a tax for this development is a greater hurdle. If the City decides to increase tax revenues, two tax schemes seem the most relevant. First, financing adaption through localized property tax revenues may make economic sense. Property taxes are stable. If one limited the property tax levy to the West Cliff Drive area, which is affluent, the tax would fall mostly on more of these households, who are also most likely visit West Cliff Drive. However, such a tax is unlikely to be politically feasible.

The other potential source of revenues is through transient occupancy taxes (TOTs). The City has seen a significant (almost three-fold) increase in these revenues over the past decade, but it's TOT rate, at 11% is lower than many other coastal cities and significantly lower than Los Angeles or San Francisco (14%). The City has also expressed an interest in attracting large chain hotels/motels, but given the current COVID outbreak and its ramifications, this goal may be difficult to attain. Finally, the City of Santa Cruz has a very tight cap on short-term rentals, allowing 250 in total. This amount to just over 1% of its housing stock, significantly lower than other cities, even those with tight restrictions. The California Coastal Commission has recently rejected the City of Oxnard's 5% cap—much higher than the City of Santa Cruz. The City might

[37] August data from STR: https://str.com/data-insights-blog/coronavirus-hotel-industry-data-news

consider allowing more hosted rentals (where the owner also occupies the dwelling at least six months out of the year), which would increase tax revenues and access. Since STRs may be too expensive for some households, the City may want to consider requiring a certain percentage of STRs (e.g., 20%) go to underserved communities. Unfortunately, TOTs are also highly variable to economic and seasonal fluctuations. Therefore, an optimal scheme may use a mix of different revenue sources.

Table A4-2: Advantages and Disadvantages of Funding Strategies for Plan Implementation

Revenue Source	Equity Considerations	Political Feasibility	Other Factors
Parking Fees	Would generally fall on visitors who have higher incomes	Requires City Approval	Parking places may disappear with retreat
Fees on Bike or Surfboard Rentals	Would generally fall on visitors who have higher incomes	Requires City Approval	May discourage driving.
Property Tax Increase	Regressive, though a special district in WCD would likely be more progressive	Requires 2/3 Supermajority	Stable revenue source, but political feasibility in doubt
Sales Tax Increase	Regressive	Requires simple majority for City, 2/3 for special district	Since there is little or no commerce in WCD, this option may not be feasible
Transient Occupancy Tax (TT) Increase	Progressive	Most TOT measures pass	Financing would be paid by nonresidents even though most WCD visitors are local
Increase Hotels or other Short Term Accommodations	Increases Access, Accommodations may be unaffordable	Residents may wish to restrict visitation or new construction	Santa Cruz's STR restrictions inconsistent with recent Coastal Commission Decisions; Building new hotels in coastal zone may be difficult
UUT Increase	Regressive	Requires simple majority for City, 2/3 for special district	May be feasible for utility upgrade or preservation
State Pilot Project	Current visitors skew towards higher incomes; Pilot project should encourage ACCESS for underserved communities	Requires Grant Funding from State Agency	Likely Best First Option, could be paired with increase in local funding or other matching