Save The Bay Report
January 2025

# Local Sea Level Rise & Flood Resilience Policies Report

SAVE THE BAY

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# Introduction

Rising tides and extreme storms threaten to flood hundreds of thousands of Bay Area residents, billions of dollars of economic activity, and large amounts of public infrastructure. Recent atmospheric river storms and accelerating sea level rise (SLR) projections underscore that many shoreline areas lack adequate flood protection, especially in lower income and disadvantaged communities. Inland communities are also vulnerable to flooding from increasingly extreme storms and from shallow groundwater rise.

Sears Point, Marin Independent Journal

Market and 5th Street, Oakland

In April 2023, Save The Bay released our Sea Level Rise and Flood Resilience Strategy which describes our vision for achieving a flood resilient Bay Area through federal, state, regional, and local action. One of our recommendations was: "Municipal plans should include vulnerability assessments and mitigation strategies for risks associated with sea level rise…including groundwater rise, the risk of toxic pollution migration, and upstream flooding associated with storm impacts." In this Local Sea Level Rise and Flood Resilience Policies report, we expand on the specific policies that municipalities should adopt to prepare for flooding.

Through effective planning, city and county governments play a large role in protecting residents from sea level rise and flooding. In their high-level planning and visioning documents, such as General Plans and Local Hazard Mitigation Plans, they should set strong flood resilience goals. They should then implement these policies through zoning, ordinances, capital planning, shoreline resilience plans, and other policy-making processes.

In this report, we present a list of best-practice local policies that Bay Area cities and counties should adopt to prepare for the risks posed by sea level rise, shallow groundwater rise, and stormwater flooding. The policies have been compiled from regional guidance reports and existing city policies with the input of issue experts.

### The report contains:

1. A policy checklist of key sea level rise and flood resilience planning policies that cities should adopt.
2. Examples of how some of the policies have been implemented in existing city policy.
3. A summary of key local planning documents and how they relate to sea level rise and flood resilience.
4. Examples of model flood resilience policy language drawn from existing planning documents adopted by Bay Area cities.

## Principles

The policies in this report are formed around the following key principles:

Revegetated horizontal levee

Green stormwater infrastructure

**Utilize nature wherever possible.** The Adaptation Atlas, produced by the San Francisco Estuary Institute, identifies scientifically sound management approaches to improve climate resilience of the Bay. This blueprint shows how Bay Area subregions can maximize the use of restored tidal marshes, horizontal levees, and other nature-based infrastructure to buffer developed areas from the Bay's rising tides. These strategies can absorb tidal action and migrate upland with rising tides while supporting habitat and open space that reconnects people to the Bay. Studies also show how urban greening with natural stormwater infrastructure can reduce stormwater flooding in our cities and provide multiple climate adaptation benefits for public health and wildlife.

**Center the voices of frontline communities.** Flooding and other climate impacts pose greater risks to lower income and disadvantaged communities that have suffered from disinvestment and may lack resources to plan for resilience. These communities must be centered in the process of creating truly equitable resilience. Improving flood protection should also minimize displacement of residents in these areas.

**Build for flood resilience.** Focus new development and redevelopment in less vulnerable areas near transit and jobs to increase climate resilience and reduce climate emissions. In developed areas where sea level rise and extreme storms will bring intermittent flooding, apply resilient building standards consistently to minimize social and economic disruption from flooding.

## Alignment with Regional Shoreline Adaptation Plans

Cities are required to create Regional Shoreline Adaptation Plans (RSAP) by 2035 following the Bay Conservation and Development Commission's RSAP guidelines. The recommendations in this report are best practices for meeting or exceeding the RSAP requirements and creating strong shoreline resilience plans.

## Referenced Documents

The policies in this report are a compilation of existing policies that we feel best ensure cities are addressing risks posed by sea level rise, shallow groundwater, and stormwater flooding across all aspects of city planning. The policies are drawn from the following sources, as well as other sources which are cited in the policy checklist:

- Existing general plans, zoning policies, LHMPs, and climate adaptation plans of Bay Area cities.
- **Save The Bay's Sea Level Rise and Flood Resilience Strategy:** Our position paper on how local, regional, and state governments must prepare for sea level rise and flooding.
- **OneShoreline Planning Policy Guidance:** Provides guidance and model language for Safety Elements and Zoning Ordinances for shoreline resilience planning in San Mateo County
- **Greenbelt Alliance's Resilience Playbook:** Describes policies that strengthen the infrastructure of natural and working lands, uplifting nature-based solutions that absorb floodwaters, sequester carbon, protect our water supply, and provide buffers from wildfires. The Policy Matrix includes model policies from cities' existing planning documents.
- **BCDC's Regional Shoreline Adaptation Plan (RSAP) Guidelines:** Establishes guidelines for cities to follow when creating their Regional Shoreline Adaptatation Plans, which they are mandated to complete by 2034.
- **SFEI's Adaptation Atlas:** Establishes the Operational Landscape Unit framework for shoreline resilience planning and describes adaptation measures to address sea level rise.
- **SFEI's "Shallow Groundwater Response to Sea Level Rise" Report:** Describes the risks associated with shallow groundwater rise and offers planning guidance.

We are grateful to the following individuals* who helped shape this document and the policy checklist with their input and feedback:

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*These acknowledgements do not necesssarily indicate an endorsement by these individuals

# Flood Resilience Policy Checklist

This policy checklist lists policies and the corresponding planning documents that those policies should be included in. It also lists the source of the policy idea and/or existing planning documents that include that policy.

## Compounding Flood Resilience

| # | Policy | Planning Document(s) | Source(s) & Example(s) |
|---|---|---|---|
| 1 | Addresses flooding from all major sources, including storms, sea level rise, and shallow groundwater rise | Safety Element<br>LHMP<br>CAP<br>Shoreline Resilience Plan | Save The Bay's Sea Level Rise & Flood Resilience Strategy |
| 2 | Models the compounded flood risk resulting from the interaction between sea level rise, groundwater rise, and stormwater | Safety Element<br>LHMP<br>CAP<br>Shoreline Resilience Plan | |
| 3 | Commits to implementing the city's Climate Action Plan (if applicable) and LHMP in the Safety Element, and uses consistent hazard data across all plans | Safety Element | SB 379<br>Adaptation Planning Guide |
| 4 | Coordinates shoreline resilience planning with adjacent cities and counties | Safety Element<br>LHMP<br>CAP<br>Shoreline Resilience Plan | BayAdapt Joint Platform<br>SB 272 |
| 5 | Has taken steps towards creating a shoreline resilience plan[1] that meets or exceeds BCDC's Regional Shoreline Adaptation Plan guidelines<br>See "Shoreline Resilience Plan" Case Study for more info → | Safety Element<br>LHMP<br>CAP<br>Shoreline Resilience Plan | BayAdapt Joint Platform<br>SB 272 |
| 6 | Involves non-English speaking, environmental justice, and Indigenous communities in resilience planning and increases awareness of climate change and flood risk among these communities | Safety Element<br>EJ Element<br>LHMP<br>CAP<br>Shoreline Resilience Plan | Greenbelt Alliance Resilience Playbook |
| 7 | Has design guidelines for capital infrastructure projects that take flood risk into account, including:<br>• Have a minimum lowest floor elevation of 4 feet above the current base flood elevation and elevate critical equipment<br>• Maximize the use of natural infrastructure for flood resilience (i.e. wetland restoration, green stormwater infrastructure, flood plain restoration, and open space protection) before considering hardened structures<br>• Plan for future flood conditions for the life of the project | Green Stormwater Infrastructure Plan<br>Capital Improvement Plan | Greenbelt Alliance Resilience Playbook<br>One San Francisco SLR Checklist |

1 Steps could include creating a shoreline resilience plan budget item or funding strategy, hiring a shoreline resilience staff person, putting out an RFP for a consultant, etc.

| # | Policy | Planning Document(s) | Source(s) & Example(s) |
|---|---|---|---|
| | • Assess how risks of liquefaction, slope instability, erosion, sea level rise, and groundwater rise may compound each other and design accordingly or avoid development in areas where risk is too great<br>• If located on a contaminated site, account for impacts of rising shallow groundwater on contaminant mobilization in project design and all steps of the site remediation process, in coordination with the relevant agencies responsible for the remediation plan for the site. Create a vulnerability assessment, adaptation plan, and groundwater monitoring plan<br>See "Integrating Flood Resilience Into Capital Improvement Planning" Case Study for more info → | | |
| 8 | Has a plan for existing critical facilities and public infrastructure that:<br>• Identifies critical facilities and public infrastructure, including underground utilities, vulnerable to flooding over the life of the project<br>• Plans upgrades or protections to these facilities with consideration for future increases in flooding, sea level rise, and shallow groundwater rise. Prioritizes protections based on the asset's vulnerability to inundation, sensitivity to inundation, and utility to disadvantaged communities<br>• Creates adaptation plans for these facilities with clear triggers or time horizons detailing steps for maintenance, retrofitting, and/or relocation<br>• Ensures that the city's existing and planned Bay Trail segments are resilient to sea level rise<br>• Prioritizes repair of sewer pipes that are at risk of exposure to VOCs | Safety Element<br>LHMP<br>CAP<br>Capital Improvement Plan<br>Shoreline Resilience Plan | SFEI "Shallow Groundwater Response to Sea Level Rise" Report<br>San Rafael General Plan<br>San Francisco Sea Level Rise Guidance for Capital Planning |
| 9 | Implements or considers a policy of managed retreat in areas at-risk for repeated damage, including identifying areas to accommodate versus protect against sea level rise and other compounding hazards like landslide and liquefaction[2] | Safety Element<br>Housing Element<br>LHMP<br>CAP<br>Zoning Code<br>Ordinance<br>Shoreline Resilience Plan | Greenbelt Alliance Resilience Playbook<br>Santa Cruz Climate Adaptation Plan |

2 The managed retreat strategy can be enacted through a variety of policies, including transfers of development rights, tax credits, land buyouts, incentivized retreat, relocation of roads and other public infrastructure, setting relocation trigger thresholds, and restricting the rebuilding of buildings destroyed in floods.

| # | Policy | Planning Document(s) | Source(s) & Example(s) |
|---|---|---|---|
| 10 | Requires new private developments and/or substantial reconstruction, in the Sea Level Rise or Shallow Groundwater Overlay Zones to:<br>• Have a minimum lowest floor elevation of 4 feet above the current base flood elevation and elevate critical equipment<br>• Maximize the use of natural infrastructure for flood resilience (i.e. wetland restoration, green stormwater infrastructure, flood plain restoration, and open space protection) before considering hardened structures<br>• Plan for future flood conditions for the life of the project<br>• Limit the building of emergency centers/ shelters, fire stations, hospitals and health care facilities, schools, major electrical and natural gas distribution facilities, and subsurface parking in the overlay zone<br>• Contribute to regional shoreline infrastructure funds (unless existing infrastructure already protects against projected flooding)<br>• Assess how risks of liquefaction, slope instability, erosion, sea level rise, and groundwater rise may compound each other and design accordingly or avoid development in areas where risk is too great<br>• If located on a contaminated site, account for impacts of rising shallow groundwater on contaminant mobilization in project design and all steps of the site remediation process, in coordination with the relevant agencies responsible for the remediation plan for the site. Create a vulnerability assessment, adaptation plan, and groundwater monitoring plan<br>See “Overlay Zones” Case Study for more info → | Safety Element<br>Housing Element<br>LHMP<br>CAP<br>Zoning Ordinance<br>Building Code<br>Shoreline Resilience Plan | OneShoreline Planning Policy Guidance<br>Save The Bay’s Sea Level Rise & Flood Resilience Strategy<br>Oakland Safety Element<br>SFEI “Shallow Groundwater Response to Sea Level Rise” Report<br>U.S. Geological Survey’s Bay Area Liquefaction Susceptibility Map<br>San Francisco Building Codes Administrative Bulletin AB-111 |
| 11 | Requires new development and/or substantial reconstruction adjacent to the Bay Trail to maintain trail access under current and future flood conditions | Safety Element<br>LHMP<br>CAP<br>Zoning Code<br>Ordinance<br>Shoreline Resilience Plan | OneShoreline Planning Policy Guidance |
| 12 | Identifies funding opportunities and a funding plan to finance flood resilience projects. May consider tax or bond measures, assessment districts, geologic hazard abatement districts, and regional, state, and federal funding | LHMP<br>CAP<br>Shoreline Resilience Plan | San Rafael Safety Element Policy S-3.9 |

| # | Policy | Planning Document(s) | Source(s) & Example(s) |
|---|---|---|---|
| 13 | Requires disclosure of sea level rise and other climate-related flood hazards on sale of real estate[3] | Safety Element<br>Housing Element<br>Ordinance | South San Francisco General Plan CR-1.3.3<br>San Rafael Safety Element Program S-3.3A<br>New York Legislation (A.1967/S.5400) |
| 14 | Participates in and maximizes benefits of FEMA's National Flood Insurance Program (NFIP) Community Rating System to reduce flood insurance premiums | LHMP<br>Safety Element<br>Housing Element<br>CAP | OneShoreline Planning Policy Guidance |
| 15 | Includes policies that prioritize development of affordable and higher density housing near jobs and transit and away from flood risk zones[4] | Safety Element, Housing Element<br>LHMP<br>CAP<br>Shoreline Resilience Plan | Greenbelt Alliance Resilience Playbook<br>Los Gatos Housing Element |
| 16 | Has an inventory of toxic sites and pollutant sources at risk of contaminant mobilization due to sea level rise or shallow groundwater. Include contaminated sites identified by communities, even if they are not included in state or federal databases | Safety Element<br>Housing Element<br>EJ Element<br>LHMP<br>CAP<br>Ordinance<br>Shoreline Resilience Plan | San Rafael Safety Element Program S-5.4B<br>Richmond Action to Develop a Shoreline Resiliency Plan with Inclusion of an Inventory of Toxic Sites on the Richmond Shoreline |
| 17 | Works with frontline communities and CBOs to advocate for comprehensive cleanup of contaminated sites, prioritizing sites posing the highest and most immediate risk to communities | Safety Element<br>EJ Element<br>Housing Element<br>LHMP | San Francisco Bay Shoreline Contamination Cleanup Coalition Shoreline Cleanup Position Statement |
| 18 | **For Counties:** Funds and supports regular, community-led health studies of residents and workers who utilize homes, schools, recreation, and work places near toxic sites near the shoreline to determine if they are accumulating and/or being harmed by contaminants | Safety Element<br>EJ Element<br>LHMP<br>CAP<br>Ordinance | San Francisco Bay Shoreline Contamination Cleanup Coalition Shoreline Cleanup Position Statement |

## Groundwater Rise Resilience

| | | | |
|---|---|---|---|
| 19 | Has watershed-level groundwater rise modeling to understand where groundwater rise will pose risk of buoyancy, seepage, infiltration, liquefaction, corrosion, and contaminant mobilization hazards | Safety Element<br>LHMP<br>CAP<br>Shoreline Resilience Plan | OneShoreline Planning Policy Guidance<br>SFEI "Shallow Groundwater Response to Sea Level Rise" Report |
| 20 | Establishes a Shallow Groundwater Rise Overlay Zone over the area that may experience shallow (water table between 1-2m depth) to emergent (water table at surface) groundwater with 6.6 feet of sea level rise, assuming a moderate groundwater flow factor, and update the data at least every 5 years<br>See "Overlay Zone" Case Study for more info → | Zoning Code<br>Ordinance<br>Shoreline Resilience Plan | OneShoreline Planning Policy Guidance |

3 Cities can do this by revising their Residential Building Resale report requirements (as San Rafael committed to in its Safety Element) or by enacting an ordinance (as South San Francisco committed to). According to the Coastal Commission's Residential Adaptation Policy Guidance, this kind of disclosure requirement can be detailed in an Implementation Plan or other ordinance.

4 This can include re-zoning to allow higher density in neighborhoods near transit and jobs or identifying priority development areas that are outside of flood zones, among other policies.

| # | Policy | Planning Document(s) | Source(s) & Example(s) |
|---|---|---|---|
| 21 | Within the Shallow Groundwater Rise Overlay Zone, establishes policies to limit risks associated with groundwater rise such as groundwater-resilient and corrosion-inhibiting building materials, sump pump restrictions, regular foundation inspections, and permitting limits in areas at risk of toxic contaminant mobilization | Safety Element<br>Housing Element<br>LHMP<br>CAP<br>Zoning Code<br>Ordinance<br>Building Standards<br>Shoreline Resilience Plan | OneShoreline Planning Policy Guidance |

## Sea Level Rise Resilience

| | | | |
|---|---|---|---|
| 22 | Sea level rise projections remain consistent with the Ocean Protection Council's Sea-Level Rise Guidance extreme risk projections and/or consistent with BCDC Shoreline Resilience Plan Guidelines. The areas affected by the associated sea level and groundwater rise are mapped, with data updated at least every 5 years | Safety Element<br>LHMP<br>CAP<br>Shoreline Resilience Plan | OPC Sea-level Rise Guidance |
| 23 | Establishes a Sea Level Rise Overlay Zone over the area affected by a 100-year flood plus 6.6 feet of sea level rise, and update data at least every 5 years<br>See "Overlay Zone" Case Study for more info → | Zoning Code<br>Ordinance<br>Shoreline Resilience Plan | OneShoreline Planning Policy Guidance |
| 24 | Establishes buffer zones at least 100 ft from the Bay shoreline[5] and at least 35 ft from the top of creek banks where development is limited except for flood protection, habitat restoration, public access, and recreation projects | Safety Element<br>LHMP<br>CAP<br>Zoning Code<br>Ordinance<br>Shoreline Resilience Plan | OneShoreline Planning Policy Guidance |
| 25 | Preserves and restores existing wetlands and space for upland migration for flood protection, habitat restoration, public access, and recreation | Safety Element<br>LHMP<br>CAP<br>Zoning Code<br>Ordinance<br>Shoreline Resilience Plan | |

## Green Infrastructure and Storm Flooding Resilience

| | | | |
|---|---|---|---|
| 26 | Identifies areas at risk of flooding due to current and future storms. Has a Storm Drain Master Plan that ensures the storm drain system has the capacity to function under future conditions. Includes prioritization of projects based on future flood risk, water quality, and disadvantaged community status<br>See "Storm Drain Master Plan" Case Study for more info → | LHMP<br>Safety Element<br>CAP<br>Storm Drain Master Plan | Oakland Storm Drain Master Plan Project<br>San Mateo Countywide Sustainable Streets Master Plan |
| 27 | Has a dedicated leadership role focused on GSI implementation across municipality and across departments | | |

5 As defined by the McAteer-Petris Act, BCDC's originating law.

| # | Policy | Planning Document(s) | Source(s) & Example(s) |
|---|---|---|---|
| 28 | Only approves new development or redevelopment projects if they fulfill the requirements of the Municipal Regional Stormwater Permit, including using low-impact development to manage all onsite stormwater | Housing Element<br>Ordinance | Sustainable Streets Master Plan Appendix F.4 Sample Resolution for Establishing Green Infrastructure Development Standards |
| 29 | The Conditions of Approval for major development/ redevelopment require building and maintaining green stormwater infrastructure in the frontage area to treat runoff from the adjacent right of way where feasible | EJ Element<br>Safety Element<br>Ordinance | Sustainable Streets Master Plan Appendix F.5<br>Redwood City Resolution No. 15796 |
| 30 | Coordinates across departments to plan and fund “complete green street” and “complete green neighborhood” projects | EJ Element<br>Safety Element<br>LHMP<br>CAP | Oakland EJ Element EJ-7.1 |
| 31 | Aligns urban greening plans, green/complete streets plans, pedestrian and bicycle plans, climate resilience plans, storm drain plan, and tree canopy plans to ensure new projects are planning for climate resilience, and GSI is incorporated into the public right of way when street projects are implemented | EJ Element<br>Safety Element<br>LHMP<br>CAP | Sustainable Streets Master Plan Appendix F.3 Sample Sustainable Streets Policy |
| 32 | Involves and invests in workforce development programs for maintenance of urban greening features | EJ Element<br>Safety Element<br>LHMP<br>CAP | San Jose Conservation Corps |
| 33 | Commits to engaging the community in urban greening projects and prioritizing community knowledge when designing and planning projects | EJ Element<br>Safety Element<br>LHMP<br>CAP | Greenbelt Alliance Resilience Playbook |
| 34 | Identifies communities experiencing heightened flood risk, urban heat, air pollution, and lack of green space to ensure equitable distribution of multi-benefit urban greening strategies | EJ Element<br>Safety Element<br>LHMP<br>CAP | Greenbelt Alliance Resilience Playbook |

## Policy Implementation & Accountability Recommendations

| | | | |
|---|---|---|---|
| 35 | Assigns priorities to adaptation strategies based on an established set of criteria, including time sensitivity and equity. Has an equity analysis framework that identifies high-need communities and their priorities | EJ Element, Safety Element, LHMP, CAP | US EPA Regional Resilience Toolkit<br>Oakland’s Equity Indicators Report |
| 36 | Assigns a lead department/agency and a lead staff person to each adaptation strategy | EJ Element<br>Safety Element<br>LHMP<br>CAP | US EPA Regional Resilience Toolkit |

| # | Policy | Planning Document(s) | Source(s) & Example(s) |
|---|---|---|---|
| 37 | Assigns cost estimates and a planned funding source to adaptation strategies. Embeds resilience planning into the jurisdiction's fiscal planning | EJ Element<br>Safety Element<br>LHMP<br>CAP | US EPA Regional Resilience Toolkit |
| 38 | Staff reports includle a section that reviews impact on sustainability, resilience, and equity, as well as fiscal impact | | Greenbelt Alliance Resilience Playbook |
| 39 | Sets clear, measurable goals with dates. Example: Plant X number of street trees (~25% increase) in the sidewalk tree wells to complete the street tree network by 2040 | LHMP<br>CAP<br>Shoreline Resilience Plan | Greenbelt Alliance Resilience Playbook |
| 40 | Mandates annual reporting on General Plan progress be posted on the city website with a clear dashboard that indicates progress on implementation plans. Add clear visuals of how the city is meeting its goals and associated metrics that are transparent, engage the community, and demonstrate measurable equitable outcomes | | Greenbelt Alliance Resilience Playbook |

# Planning & Policy Implementation Case Studies

## Overlay Zones

Sea level rise and groundwater rise overlay zones map out which geographical areas will be affected by flooding under future climate conditions and apply specific development requirements or restrictions on those areas. Overlay zones can be created through a zoning code update and are a key step in ensuring that flood-resilient development conditions are implemented and enforced. OneShoreline's Planning Policy Guidance provides template language for creating Sea Level Rise and Groundwater Rise Overlay Zones.

### Examples

**Burlingame:** In 2021, Burlingame updated its zoning ordinance to include regulations for the Bayfront Commercial District, including guidelines for new development to be resilient to sea level rise. Section 25.12.050 outlines public access, flood, and sea level rise performance guidelines for new developments. It adopts Burlingame's Map of Future Conditions, including a Sea Level Rise Overlay District, which is based on the Our Coast Our Future hazard map.

**South San Francisco** (SSF): In 2022 SSF updated its zoning code to include a Flood Plain/Sea Level Rise overlay district. The overlay district includes areas that will flood under a 36-inch sea level rise scenario and a 100-year storm. It imposes new construction requirements including base flood elevations sufficient to protect against the FEMA 100-year event with 3 feet of sea level rise, nature-based stormwater infrastructure designed to function under future conditions, and a bay access buffer within 100 ft from the shoreline.

## Shoreline Resilience Plan

With the passage of SB 272 (Laird, 2024), Bay Area cities are required to create Shoreline Resilience Adaptation Plans (RSAPs) and have those plans approved by the Bay Conservation and Development Commission (BCDC) by 2034. BCDC has released RSAP guidelines which cities must follow when creating their shoreline plans. Jurisdictions should adopt RSAPs as soon as possible in order to access funding for plan implementation and begin protecting their communities from flooding.

### Example

**Hayward:** The Hayward Regional Shoreline Adaptation Master Plan (HRSAP) was created in 2021 to establish a vision and adaptation strategies for protecting natural and built shoreline assets from sea level rise. It recommends shoreline resilience projects such as horizontal levees, gently sloping vegetated buffers that provide sea level rise protection and water quality benefits. The HRSAP was created by a joint powers authority consisting of the City, the Hayward Area Park and Recreation District (HARD), and the East Bay Regional Park District.

## Integrating Flood Resilience Into Capital Improvement Planning

Local jurisdictions must ensure that public infrastructure (such as parks, streets, sewers, stormwater infrastructure, and shoreline infrastructure) are designed for flood resilience and incorporate nature-based solutions wherever possible. They can do this by creating capital improvement planning processes and guidelines to ensure all proposed projects are evaluated for flood resilience and green infrastructure potential.

**Examples**

**Burlingame:** Burlingame has a green infrastructure checklist used to evaluate opportunities to include green stormwater infrastructure (GSI) features in capital projects. This approach ensures that no opportunities for GSI are missed. It can be found in Appendix B of the city's Green Infrastructure Plan.

**San Francisco**: San Francisco has a "Guidance for Incorporating Sea Level Rise into Capital Planning in San Francisco Sea Level Rise Checklist". Using this checklist ensures that all capital projects planned in the sea level rise vulnerability zone are resilient to sea level rise.

## Storm Drain Master Plan

Cities should create storm drain master plans that identify areas at risk of flooding due to current and future storms and identify projects to ensure the storm drain system has the capacity to function under future conditions. Identified projects should be prioritized based on future flood risk, water quality, and benefits to disadvantaged communities. As much as possible, the city should identify green stormwater infrastructure solutions to drainage issues; this could take the form of a green streets master plan.

**Examples**

**Pacifica:** Pacifica's Storm Drain Master Plan identifies capacity deficiencies in the storm drainage system, develops feasible alternatives to correct these deficiencies, and plans the infrastructure that will serve future development. It includes an analysis of future precipitation impacts on the storm drain system.

**San Mateo County:** The San Mateo Countywide Green Streets Master Plan identifies "how and where to build sustainable streets in San Mateo County that integrate stormwater management with local priorities, like bike and pedestrian mobility, transit improvements, climate change adaptation, and more." It includes an analysis of stormwater runoff under future climate scenarios, which determined that the planned green street projects could offset the projected roadway runoff due to climate change for a 2-year storm. Additionally, the green streets projects were prioritized based on water quality, flood risk, water supply, climate change impacts, groundwater constraints, utility constraints, vulnerable community indicators, vehicle ownership statistics, urban canopy, and urban heat island effect.

# Planning Documents Summary

Each policy in the policy checklist above may belong in one or more planning or implementation documents. This section describes the purpose and scope of various planning and policy documents and how they relate to flood resilience policy.

- **General Plan:** A general plan is a local government's blueprint for meeting the community's long-term vision for the future on topics such as land use, housing, climate, emergency preparedness, open space, and more. They're usually updated every 10 to 20 years and involve community outreach and engagement, so they're a key opportunity to influence a city's future planning. Cities and counties are required to have a general plan that includes the following elements:
  - **Safety Element:** Assesses natural and human-made threats (such as fire, hazardous materials, and flooding) and outlines priorities for mitigating these threats. This is a key section to include flood resilience policies.
  - **Environmental Justice (EJ) Element:** Outlines priorities for achieving equity and addressing the burden of pollution and climate risk to Environmental Justice communities.
  - **Housing Element:** A blueprint for housing the City's residents, including low-income housing. This is a key element for ensuring that infill housing is prioritized in areas outside of flood zones.
- **Local Hazard Mitigation Plan (LHMP):** An LHMP identifies potential risks that may arise from local natural hazards and vulnerabilities, and long-term strategies for protecting people, property, and the environment. LHMPs are required to qualify for certain Federal Emergency Management Agency (FEMA) opportunities.
- **Climate Adaptation Plan (CAP):** A CAP Identifies climate impacts and evaluates and prioritizes actions or strategies to prepare for and respond to climate change. CAPs are optional.
- **Zoning Code:** The zoning code maps out what types of development and land uses are and are not allowed in each part of the city/county. Zoning codes directly impact development standards, so they're a key place to implement land use policies that limit building in flood zones or impose protective development standards in flood zones.
- **Capital Improvement Plan (CIP):** A CIP guides the City's long-term funding, construction, repair and replacement of public facilities and infrastructure (such as libraries, sewers, parks, streets, and other assets). The CIP informs how funds are allocated in the city's budget. It's a key document to ensure that city projects are designed for flood resilience and maximize nature-based features.

# Attachments

## Attachment A: Model Language for Planning Documents

The following tables provide examples of flood resilience policy language drawn from existing planning documents adopted by Bay Area cities.

### General Flood Resilience Policies

| City | Planning Document | Model Language |
|---|---|---|
| San Rafael | Safety Element | **Policy S-3.9: Flood Control Improvements Funding**<br>Pursue financing and funding opportunities to fund short-term and long-term flood control and adaptation projects. Funding tools and opportunities would include, among others tax or bond measures, assessment districts, geologic hazard abatement districts and grants. The City will also support legislation that provides regional, state, and federal funding for these projects, and will pursue such funding as it becomes available. |
| South San Francisco | General Plan | **Action CR-1.3.3: Require multi-hazard real estate disclosure.**<br>Enact an ordinance to require real estate disclosures of all hazards identified in the Hazard Mitigation Plan, including hazards associated with anticipatory sea level rise and flooding, geologic hazards, groundwater inundation, or wildfire for commercial and residential properties, including ownership and rental. |
| City of Fremont | City of Fremont Climate Action Plan | **LU-C-8.3** Coordinate with private landowners and property managers to support the upgrade of facilities vulnerable to the impacts of climate change, and consider managed retreat as a long term strategy to reduce flood risk associated with sea level rise. |

### Sea Level Rise and Groundwater Rise Policies

| | | |
|---|---|---|
| City of Menlo Park | 2021 Multi Jurisdictional Local Hazard Mitigation Plan | **MP-20: Develop and implement a Green Infrastructure Plan to improve storm water quality and flood protection.**<br>The City Council adopted the Green Stormwater Infrastructure Plan in 2019. The City has also hired a consultant to develop a storm water master plan.<br>**Action MPK-28** — Support green infrastructure projects that enhance resiliency to natural disasters and incorporate green design elements into hazard mitigation projects where feasible. |
| San Rafael | Safety Element | **Program S-3.3A.** Residential Building Resale (RBR) Reports. Revise the RBR Report template to include a disclosure of potential property risk due to increased tidal flooding and sea level rise. Utilize the Sea Level Rise Prediction Map for confirming property vulnerability. Work with realtors and property owners to implement this requirement. |

| City | Planning Document | Model Language |
|---|---|---|
| San Rafael | Safety Element | **Program S-3.6A:** Sea Level Rise Adaptation Plan.<br>Prepare and adopt an adaptation plan addressing increased flooding and sea level rise. The adaptation plan shall include the following components:<br>a. Sea Level Rise Projection Map, to be used as the basis for adaptation planning.<br>b. Coordination with local, county, state, regional and federal agencies with bay and shoreline oversight, major property owners, and owners of critical infrastructure and facilities in the preparation of the adaptation plan.<br>c. An outreach plan to major stakeholders and all property owners within the vulnerable areas.<br>d. An inventory of potential areas and sites suitable for mid- to large-scale adaptation projects (see Appendices D and E for more information)<br>e. A menu of adaptation measures and approaches that could include but not be limited to:<br>• Managed retreat, especially on low-lying, undeveloped and underdeveloped sites; in areas that are permanent open space; and in areas that are environmentally constrained. Transfer of development rights from such areas should be encouraged.<br>• Innovative green shoreline protection and nature-based adaptation measures such as wetlands and habitat restoration, and horizontal levees where most practical and feasible.<br>• Hard line armoring measures (sea walls, levees, breakwater, locks, etc.) in densely developed areas to minimize the potential for displacement of permanent residents and businesses.<br>• Elevating areas, structures, and infrastructure to reduce risks.<br>f. The appropriate timing and "phasing" of adaptation planning and implementation.<br>g. Potential financing tools and opportunities.<br>h. Coordination or incorporation into the San Rafael Local Hazard Mitigation Plan. |
| San Rafael | Safety Element | **Program S-5.4A:** Use of Environmental Databases in Development Review. When development is proposed, use environmental and hazardous materials data bases (such as the State GeoTracker data base) to determine whether the site is contaminated as a result of past activity. As appropriate, require studies and measures to identify and mitigate identified hazards. |

| City | Planning Document | Model Language |
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| San Francisco | Building Code Administrative Bulletin AB-111 | **10.4 Sea Level Rise.** Effects considered should include, but are not limited to, the potential for increased flooding and the effect of rising groundwater on increasing hydrostatic pressure, increasing liquefaction potential, saltwater intrusion, and decreasing bearing capacity. |

## Toxic Site Policies

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| San Rafael | Safety Element | **Program S-5.4B:** Hazardous Soils Clean-Up. Work with appropriate agencies to require remediation and clean-up prior to development of sites where hazardous materials have impacted soil or groundwater. The required level of remediation and clean-up shall be determined by the Certified Unified Program Agency (see Program S-3.2A) based on the intended use of the site and health risk to the public. |
| San Rafael | Safety Element | **Program S-5.4C:** Environmental Site Management Plan (ESMP). Require the preparation of an ESMP in consultation with the San Francisco Bay Regional Water Quality Control Board and/or the Department of Toxic Substance Control (DTSC), for proposed development on sites with known contamination of hazardous materials pursuant to Government Code Section 65962.5. This includes, but is not limited to, sites in the on-line DTSC EnviroStor Data Base and the State GeoTracker Data base. |
| San Rafael | Safety Element | **Program S-5.4D:** Soil Vapor Intrusion Assessment. For sites with potential residual soil or groundwater contamination that are planned for redevelopment with an overlying occupied building, a soil vapor intrusion assessment shall be performed by a licensed environmental professional. If the results indicate the potential for significant vapor intrusion into the building, project design shall include vapor controls or source removal as appropriate in accordance with regulatory agency requirements. |
| City of San Francisco | City of San Francisco Climate Action Plan | **City Department Coordination (Land Contamination in the Southeast p.130**) — Identify funding that supports the Sea Level Rise Working Group in researching how current and former industrial uses of waterfront areas can lead to issues around soil contamination and hazardous materials that may be exacerbated by sea level rise. |
| City of Richmond | City Council Action | DIRECT staff to circulate an RFP to contract with a shoreline consultant for the creation of a Shoreline Resiliency Plan with inclusion of an inventory of toxic sites along our shoreline and come back to the Council by end of year with a recommended consultant to create this plan over the course of 12 months. |

| City | Planning Document | Model Language |
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| City of Richmond | Housing Element | **Program H-2.6.1: Site Remediation**<br>Require property owners to comply with state and federal requirements for site remediation as a condition for approving redevelopment on contaminated sites. In collaboration with other government agencies, utilize the Department of Toxic Substance Control (DTSC) Cortese List to prioritize the remediation of city and non-city-owned property to protect human and environmental health. Seek state and federal funds to implement the necessary level of clean-up |
| City of Hayward | Environmental Justice Element Draft | **Policy EJ-1.7 Targeted Health Monitoring**<br>Coordinate with the Alameda County Public Health Department to actively monitor and actively support the health of residents living in-proximity to hazardous waste facilities and cleanup sites.<br>• Program EJ-1.6: Develop a community protection program that offers health resources, monitoring, and additional supports to residents living within a one half-mile radius of a hazardous waste facility or cleanup site. |

## Green Infrastructure and Storm Flooding Policies

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| Oakland | EJ Element | **Urban Greening.** Develop equitable partner agreements with community-based organizations and collaboratively work to identify, fund, develop, and maintain specific green infrastructure projects in EJ Communities. Align urban greening efforts with flood and pollution prevention, prioritizing green stormwater infrastructure, especially in areas at risk of flooding |
| San Francisco | Building Code Administrative Bulletin AB-111 | **10.4 Sea Level Rise.** Effects considered should include, but are not limited to, the potential for increased flooding and the effect of rising groundwater on increasing hydrostatic pressure, increasing liquefaction potential, saltwater intrusion, and decreasing bearing capacity. |
| Oakland | EJ Element | **Complete Neighborhoods.** Promote "complete neighborhoods"— where residents have safe and convenient access to goods and services on a daily or regular basis—that address unique neighborhood needs, and support physical activity, including walking, bicycling, active transportation, recreation, and active play. |
| East Palo Alto | 2021 Multi Jurisdictional Local Hazard Mitigation Plan | **Action EPA-14** — Improve stormwater drainage to alleviate repeated localized flooding, especially storm drain systems connected to San Mateo County Flood and Sea Level Rise Resiliency District (FSLRRD) Flood Zone channels and infrastructure. |

| City | Planning Document | Model Language |
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| San Francisco | City of San Francisco Climate Action Plan | **HE.2-1 (Nature-Based Solutions & Indigenous Involvement)** The City will engage American Indian tribes, cultural bearers, neighborhood organizations, local businesses, the San Francisco Unified School District, and non-profit organizations during the planning and implementation of greening projects, including for the purpose of local hiring and workforce development. |
| Redwood City | Redwood City Resolution No. 15796 (Pg. 4) | **Green Infrastructure in the Public Right of Way**<br>All Large Developments shall provide a preliminary utility study including GI improvements in the right-of-way to capture and treat the runoff tributary to the project frontage. The City Engineer will review said study and determine whether the improvements are feasible and conform to other improvements located in the right-of way. All GI improvements deemed feasible by the City Engineer shall be designed and constructed by the developer, and the developer and/or property owner shall enter into an agreement for the maintenance of those improvements in accordance with the same requirements for PSPPM. |

## Attachment B: Additional Resources

1. **Coastal Resilience Compass Plan Alignment Guide:** Describes the purpose & scope of various planning documents including Local Coastal Programs, Housing Elements, Safety Elements, LHMPs, and Climate Adaptation Plans. Includes guidance on how to make sure these plans are all aligned.
2. **Greenbelt Alliance's Resilience Playbook:** Describes policies that strengthen the infrastructure of natural and working lands, uplifting nature-based solutions that absorb floodwaters, sequester carbon, protect our water supply, and provide buffers from wildfires. The Policy Matrix includes model policies from cities' existing planning documents.
3. **OneShoreline Planning Policy Guidance:** Provides guidance and model language for Safety Elements and Zoning Ordinances for shoreline resilience planning in San Mateo County
4. **Coastal Conservancy's Sea Level Rise Guidelines for Critical Infrastructure:** Appendix B includes model policies for Local Coastal Programs. Though intended for coastal cities, they may be helpful references for Bay cities' shoreline resilience plans.
5. **BCDC's BayAdapt Joint Platform:** Describes regional strategies that focus on overcoming barriers and identifying factors for successful adaptation outcomes throughout the region.
6. **San Mateo County Sustainable Streets Master Plan Appendix F:** Provides model language for integrating greening into municipal planning documents as well as a model sustainable streets resolution and a model resolution for green infrastructure development standards.
7. **UC Davis General Plan Search Tool:** This tool allows you to search for key phrases and identifies all the California general plans that include policies related to that phrase. This can be used to find model policies related to topics you're interested in.
8. **SFEI's GreenPlan-IT Tool:** A free online modelling tool to help cities identify optimal sites for GSI and determine the best type of GSI to use to achieve flood and/or pollution reduction goals.
9. **Surging Seas Risk Zone Map:** Shows inundation area for a variety of water level rise (includes sea level rise and storm surge) scenarios as well as the income, population, social vulnerability, and ethnicity of areas affected.
10. **EPA Storm Smart Cities:** Provides guidance on integrating green infrastructure into Local Hazard Mitigation Plans. **SFEI's Adaptation Atlas:** Establishes the Operational Landscape Unit framework for shoreline resilience planning and describes adaptation measures to address sea level rise. The "Financial Measures" section describes shoreline resilience financing mechanisms including conservation easements, buyouts, geologic hazard abatement districts, transfers of development rights, and taxes.
11. **SFEI's "Shallow Groundwater Response to Sea Level Rise" Report:** Describes the risks associated with shallow groundwater rise and offers planning guidance.

### Funding Resources

12. **NBS "Stormwater: A Ten-Step Funding Plan":** Describes 10 funding options available to local governments for raising funds for stormwater infrastructure – water/sewer/trash utilities, development impact fees, regulatory fees, property-related fees, general obligation bonds, community facilities districts, special parcel taxes, assessment districts, grants, and general funds.
13. **BayCAN Funding Tracker:** A database of climate resilience funding grants.
14. **San Francisco Bay Restoration Authority (SFBRA) Grants:** SFBRA funds shoreline projects that restore, enhance, and protect the San Francisco Bay using funds raised by the Measure AA parcel tax. One of the grants offered is a Community Grant awarded to community-based organizations.